CAPE
ENVIRONMENTAL
MANAGEMENT
I N C

TRANSMITTAL LETTER

ENVIRONMENTAL PROTECTION
APR 28 AM 9:18

STID 4655

Tom Peacock
Attn:

Alameda County Env. Health Dept.
Co. name

1131 Harbor Bay Pkwy., #250
Address

Alameda CA

94502-6577

Date April 28 1995

RE: Work Plan Addendum STID 4655

We are transmitting herewith the following:

- ☐ Specifications
- ☐ Original drawings
- ☐ Laboratory reports
- ☐ Prints
- ☐ Shop drawings
- ☐ Electronic media
- ☐ _____

- ☒ For your use
- ☐ Revise and resubmit
- ☐ No exception taken
- ☐ Make corrections needed

COPIES	DESCRIPTION
1	Addendum to Preliminary Site Assessment Work Plan

REMARKS Tom-

In the absence of Juliet, the enclosed addendum has been forwarded to you. Please contact me regarding this project at your earliest convenience. I appreciate your considerations to expedite matters.

20280 South Vermont Ave.
Suite 250
Torrance, CA 90502

Phone 310/532-4500
Fax 310/532-6022

From Larry M. Harlan

Job. # 2403C.16

C A P E
ENVIRONMENTAL
MANAGEMENT
I N C

April 27, 1995

Ms. Juliet Shin
Senior Hazardous Materials Specialist
Alameda County Environmental Health Department (EHD)
Environmental Protection Division
1131 Harbor Bay Parkway, #250
Alameda, California 94502-6577

SUBJECT: Addendum to Preliminary Site Assessment (PSA) Work Plan
Alameda Federal Center
620 Central Avenue, Alameda, California,
STID 4655

Dear Ms. Shin:

CEMI has received EHD review comments of a PSA Work Plan for the above site, dated April 14, 1995. The following work plan addendum addresses EHD comments and additional requirements:

- As mentioned in the T & T Earth Services' Report, free product was observed in MW-3, however measurements of free product thickness were not conducted. As mentioned in the work plan, CEMI will utilize a petroleum-water interface probe to measure free product thickness at MW-3. Following measurement of free product thickness, MW-3 will be purged of three well volumes, using either a dedicated bailer or vacuum truck, allowed to equilibrate, and water samples will then be collected. Purge fluids will be contained in DOT-approved drums pending laboratory analyses and followed with proper transportation, disposal or recycling at a certified facility.

  CEMI is preparing contractor bid specification documents for the removal of Tanks 3 & 4. The document will contain interim remedial measures for the handling of free product. Based on available background information, it is anticipated that dewatering activities will be required during excavation and removal of the tanks, due the occurance of ground water at shallow depth. In the event that free product is observed during tank excavation and removal activities, the contractor shall be required to remove free product from the tank pit using either passive skimming techniques or by pumping. Free product will be collected in approved containers for disposal or recycling at a certified facility.

- Prior to removal of Tanks 3 & 4, CEMI will perform a limited subsurface investigation to assess soil conditions in this area. This investigation will assist in the preparation of contractor specification documents for tank excavation dewatering, shoring, and underpinning requirements and supplement future

2022 [illegible]
Suite 230
[illegible]
510 [illegible]
FAX [illegible]

assessment activities. As part of the soil investigation, CEMI is proposing the installation of three soil borings , to be performed during PSA field activities for tank area 1 & 2, with one of the three borings to be located south of MW-3. Analysis of soil samples will include TPHd, TOG, BTEX, and PNAs as described in the work plan.

A preliminary assessment of the extent and severity of contaminated soil will be conducted during the excavation and removal of Tanks 3 & 4. Based on excavation pit observations and laboratory soil analyses results, additional assessment work not specified in the work plan may be required. This additional work will be conducted specifically for tank area 3 & 4 and shall be designed to meet EHD requirements.

As indicated on page 4 of the existing work plan, additional work has been proposed for Tank 3 & 4 area. Specifically, two test borings, completed as permanent monitoring wells, will be installed and sampled at appropriate locations.

- Analysis of samples collected around Tanks 3 & 4 will include TPHd, TOG, and BTEX as described in the work plan. Test methods will also include analysis for polynuclear aromatic hydrocarbons (PNAs) using EPA Test Method 8270 for the EPA Test Method 8100 suite of analytes (pyrene, fluoranthene, etc.).

- A total of four soil borings will be advanced at Tanks 1 & 2. Two of these borings will be used as temporary wells for ground water sampling and gradient measurements and the remaining two borings will be advanced, within 10-feet and downgradient of the previously existing tanks, for the installation of permanent ground water monitoring wells

- Previous ground water depths have been recorded at approximately 5-feet bgs, however due to seasonally high precipitation it is anticipated that depth to water is now less. To gather additional seasonal ground water depth information, CEMI contacted Mr. Andreas Godfrey of Alameda County Public Works Department for ground water depth information. Mr. Godfrey forwarded well inventory information of wells within a .5 mile radius of the site which indicate ground water depths ranging from 4 to 18 feet bgs. Also, Mr. Wyman Hong of Alameda County Flood Control and Water Conservation District (Zone 7) has been contacted regarding well construction requirements. According to Mr. Hong, in the event that shallow ground water depths are encountered, the well design will require a minimum of 1-foot surface seal with blank well casing and a screened casing interval at or above existing water level (anticipating minimum of 2-feet bgs) to 10-feet below ground water level. A well permit application shall be submitted to Zone 7 for approval.

- CEMI shall field verify the condition of MW-2. If possible, this well will be repaired and used for ground water monitoring. If the well is not reparable then appropriate measures will be employed to destroy the well. Well destruction will include "overdrilling" the well, removing the well casing, and pressure sealing the borehole with an approved sealant or grout placed by tremie method. As a contingency, CEMI will prepare a well destruction permit application to Zone 7 for approval of destruction methods.

- Monthly water level measurements shall be conducted and gradient determinations shall be made for existing and newly installed monitoring wells for the first three months. Recorded water level measurements shall be submitted to the EHD for review. If it is determined that significant ground water gradient fluctuations exist during this three month period, then monthly water level measurements shall be recorded for an additional nine month period.

- Monitoring wells shall be separated by at least twenty feet for adequate gradient flow determinations.

- During drilling activities, soil samples shall be collected at the soil/water interface, at five foot intervals and at any significant change in lithology.

If you have further questions or require additional information, please contact us at (310) 532-4500.

Respectfully submitted,

Larry M. Harlan
Project Geologist

Kenneth W. Pitchford
R.G. # 4135
C.E.G.# 1461
Senior Geologist

cc: Richard Chiu/GSA Region 9
Project File

CAPE
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TRANSMITTAL LETTER

Juliet Shin
Attn:

Alameda County Dept. of Env. Health
Co. name

1131 Harbor Bay Parkway #250
Address

Alameda CA 94502-6577

Date April 5, 1995

RE: PSA Work Plan

We are transmitting herewith the following:

- ☐ Specifications
- ☐ Prints
- ☐ Original drawings
- ☐ Shop drawings
- ☐ Laboratory reports
- ☐ Electronic media
- ☐ _____

- ☒ For your use
- ☐ Revise and resubmit
- ☐ No exception taken
- ☐ Make corrections needed

COPIES	DESCRIPTION
1	Preliminary Site Assessment Work Plan for Alameda Federal Center, 620 Central Ave, Alameda, CA STID 4655

REMARKS

Juliet- Please find the enclosed Work Plan. I have sent (3) copies to Richard Chiu (GSA). If you have any questions please call. Also let me know if I can help expedite these matters.

20280 South Vermont Ave.
Suite 250
Torrance, CA 90502

Phone 310/532-4500
Fax 310/532-6022

From Larry Harlan

CEMI Job. # 2403C.16

C A P E
ENVIRONMENTAL
MANAGEMENT
I N C

April 4, 1995

Ms. Juliet Shin
Senior Hazardous Materials Specialist
Alameda County Department of Environmental Health
Environmental Protection Division
1131 Harbor Bay Parkway, #250
Alameda, California 94502-6577

SUBJECT: Preliminary Site Assessment (PSA) Work Plan
Alameda Federal Center
620 Central Avenue, Alameda, California,

Dear Ms. Shin:

Please find enclosed the PSA Work Plan for the above-referenced project. Cape Environmental Management Inc (CEMI) shall perform the site assessment work to delineate the lateral and vertical extent and severity of observed soil and ground water contamination at the site. Information gathered from the PSA will assist in determining the appropriate course of action to remediate the site, if deemed necessary.

If you have further questions or require additional information, please contact us at (310) 532-4500.

Respectfully Submitted,

Larry M. Harlan
Project Geologist

Kenneth W. Pitchford
R.G. # 4135
C.E.G.# 1461
Senior Geologist (Plan Reviewer)

Attachment

cc: Richard Chiu/GSA Region 9
Project File

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S
Torrance, Ca
310 532
FAX 532

CAPE
ENVIRONMENTAL
MANAGEMENT
I N C

Preliminary Site Assessment Work Plan

Alameda Federal Center
620 Central Avenue
Alameda, California

CEMI Project No. 2403C.16

prepared for:

General Services Administration, Region 9
525 Market Street
San Francisco, California 94105-2799

---

prepared by:

Cape Environmental Management Inc
20280 South Vermont Avenue
Suite 250
Torrance, California 90502

April 1995

TABLE OF CONTENTS

1.0 INTRODUCTION

Cape Environmental Management Inc (CEMI) has contracted services with the General Services Administration (GSA) to perform a Preliminary Site Assessment (PSA) of the Alameda Federal Center, located at 620 Central Avenue, Alameda, California. Figure 1, Site Vicinity Map, indicates the facility location. In addition to the PSA, CEMI will prepare contractor bid specification documents and drawings for the removal of two (2) existing 10,000-gallon underground storage tanks (USTs).

In accordance with required investigation activities, as specified by Alameda County Department of Environmental Health (DEH) letter, dated December 6, 1994, CEMI is proposing the following work plan to investigate the lateral and vertical extent of observed soil and ground water contamination at the site. Guidance documents used in the preparation of this work plan include the Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites , dated August 10, 1990 , the California Water Resources Control Board (CWRCB) Leaking Underground Fuel Tank Field Manual (LUFT), dated October 1989, and the above-referenced DEH correspondence with the GSA.

1.1 Background

It is CEMI's understanding that the DEH is in receipt of and has reviewed previous environmental reports pertaining to UST activities at the site. CEMI has reviewed a report titled Preliminary Report on Tank Removal, Site Investigation, Additional Investigation and Tank Closure Plans , dated May 1994, prepared by TKS Consulting Ltd., from which the following background information has been obtained.

On January 27, 1994 a 1,000-gallon gasoline and diesel fuel UST (Tank 1) and a 5,000- gallon gasoline UST (Tank 2) were removed from the site. There are currently two (2) 10,000-gallon USTs (Tanks 3 and 4) remaining in place. The remaining USTs are full of a material described as an extremely heavy black hydrocarbon with water, grease, and sandy sediment on the bottom. Laboratory analyses of the material contained in Tanks 3 and 4 characterized it as weathered #3 diesel fuel or bunker "C" fuel. These tanks had been decommissioned around 1950 and had been partially filled with sand and covered, leaving the fill ports open. Efforts to pump out the tank contents failed, due to the occurrence of rocks and a hardened clay material which plugged the vacuum hose .

Prior to the removal of Tanks 1 and 2, soil borings were advanced adjacent to both tank areas and soil samples were obtained for laboratory chemical analyses. Analysis of soil samples obtained near Tank 1 identified up to 12 parts per million (ppm) total petroleum hydrocarbons as diesel fuel (TPHd), 100 ppm oil and grease, and traces of heavy metals. Soil samples collected from near Tank 2 identified trace concentrations of TPHd, oil and grease, and trichloroethene (TCE) at 57, 120 and 7 ppm, respectively, and low levels of fluoranthene (12 ppm) and pyrene (26 ppm). Soil samples collected from near Tanks 3 and 4 identified elevated levels of TPHd and oil and grease at 5,100 and 19,000 ppm, respectively.

Three of the soil borings were converted to monitoring wells (MW1, MW2 and MW3). MW1 is located near Tanks 1 and 2; MW2 was apparently damaged during construction and rendered unusable; and MW3 is located near Tanks 3 and 4. MW1 and MW2 were installed to a total depth of 14 feet below ground surface (bgs), with a screened interval from about 3 to 13 feet bgs, and are constructed of 2-inch nominal diameter PVC casing. Water samples collected from MW1 identified benzene, 1,2 dichloroethene (DCE), tetrachloroethene (PCE), and TCE at 0.6, 1.5, 1.0, and 3.0 parts per billion (ppb), respectively. Free product was identified in MW3.

1.2 Site Description

The site is located in the northwest portion of the City of Alameda, approximately 500 feet east of the San Francisco Bay shoreline (refer to Figure 1 - Site Vicinity Map). The site covers an approximate area of 10 acres and maintains several building structures used for administrative office and storage functions. Figure 2 - Site Map, depicts the location and orientation of the subject site.

The site is situated in a relatively flat tidal plain area which slopes gently towards the San Francisco Bay. Boring logs from the site indicate that, generally, site soil consists of clayey gravel from 1 to 3 feet below ground surface (bgs), clean sand from 3 to 11 feet bgs, clay and clayey sands of thicknesses ranging from 1 to 0.5 feet occurring at about 11 feet bgs, and clayey sand, silty sand, clean and heaving sands from 12 to 14 feet bgs. First groundwater was consistently encountered at a depths of 5 to 5.5 feet bgs. Tidal activity is suspected to influence groundwater flow at the site. Groundwater gradient has not been established.

2.0 SUBSURFACE INVESTIGATION PLAN

The following subsurface investigation plan has been designed to delineate the extent of impacted soil and groundwater due to the leaking USTs. In addition, the proposed plan will also initiate implementation of a quarterly groundwater monitoring program. CEMI is preparing construction specification documents and drawings for the GSA to remove the remaining tanks (Tanks 3 and 4).

2.1 Proposed Scope of Work

The following is a description of the proposed scope of work which has been designed to address requirements of the DHS for assessing the site. In general, field work will include the drilling of nine (9) soil borings, converting two (2) soil borings into permanent monitoring wells and converting the remaining seven (7) soil borings into temporary groundwater test wells. Field work will also include collecting soil and groundwater samples and subsequent laboratory analyses as outlined below. Following completion of PSA field work and laboratory analyses a report shall be prepared to describe field methods, techniques, observations, and include soil boring logs, groundwater well construction information, groundwater gradient calculations,

and laboratory analyses. This report will be designed to meet DHS reporting requirements.

Tank Area 1 and 2

Field work at tank area 1 & 2 shall consist of advancing five (5) soil borings. Two (2) soil borings will be advanced adjacent to the tank pits, to a total depth of 15 feet below ground surface (bgs) with soil sample intervals of 5 feet and at any significant change in lithology, to assess soil conditions. These two borings will then be converted to temporary groundwater test wells and "field" surveyed to determine preliminary groundwater elevations. The field surveying will consist of relative elevation reading of the tops of temporary casings by engineer's telescope and rod method. This will aid in siting the remaining three (3) soil borings. Following determination of initial groundwater gradient, one (1) boring will be advanced down-gradient to a depth of 15 feet bgs and converted to a temporary well for water sampling. Following installation and water sampling of the three (3) temporary test wells, the wells will be destroyed by backfilling with Volclay grout or other approved sealant. The remaining two (2) soil borings will be advanced at locations based on initial groundwater gradient information to a total depth of 15 feet bgs with soil sample intervals of 5 feet and at any significant change in lithology. These two (2) borings will be converted to "permanent" monitoring wells for use in a groundwater monitoring program. The permanent wells will be constructed of 4-inch diameter PVC casing and will, in conjunction with the existing 2-inch well, be used to initiate a quarterly groundwater monitoring program. Appendix A is a Typical Monitoring Well Diagram depicting construction design of the permanent wells. Following installation, the permanent wells will be developed, purged, sampled, and surveyed by a licensed land surveyor to an established benchmark. Survey information is necessary to determine ground water gradient to an accuracy of ± 0.01 foot. Figure 3, Tank 1 and 3 Area, indicates the approximate locations of removed USTs and existing monitoring well.

Soil samples will be submitted for laboratory analyses based on organic vapor monitor (OVM) readings and olfactory, visual and tactile field observations. Nine (9) soil and five (5) water samples from tank area 1 & 2 will be submitted for analysis using each of the following methods, EPA Test Method 8020/602 for benzene, toluene, ethylbenzene, and total xylenes (BTEX), EPA Test Method 8015 (DHS Modified Gasoline and Diesel) for total petroleum hydrocarbons, EPA Test Method 8010/601 for chlorinated hydrocarbons, Standard Methods Waste Water (SMWW) Test Method 5520 for oil and grease, and EPA Test Method 8310 for polynuclear aromatic hydrocarbons.

Tank Area 3 & 4

Field work at tank area 3 & 4 shall consist of advancing four (4) soil borings to a total depth of 15 feet below ground surface (bgs). Three of the four soil borings will be advanced adjacent to the existing USTs and sampled at five-foot depth intervals and at any significant change of lithology. These three borings will then be converted

to temporary test wells and "field" surveyed to determine preliminary groundwater elevations. The field surveying information will aid in siting the remaining soil boring, which will also be used to install a temporary test well for water sampling. Following installation and water sampling of the four (4) temporary test wells, the wells will be destroyed by backfilling with Volclay grout or other approved sealant. Figure 4, Tank 3 and 4 Area, indicates the approximate locations of existing USTs and monitoring well.

Soil samples will be submitted for laboratory analyses based on organic vapor monitor (OVM) readings and olfactory, visual and tactile field observations. Nine (9) soil and four (4) water samples from tank area 3 & 4 will be submitted for analyses using each of the following methods, EPA Test Methods 8020/602 for (BTEX), EPA Test Method 8015 (DHS Modified for Diesel), and SMWW Test Method 5520 for oil and grease.

Additional Work at Tank Area 3 and 4

Following the removal of two 10,000-gallon tanks in area 3 & 4 (scheduled for July 1995), CEMI proposes the installation of two (2) 4-inch diameter monitoring wells. The monitoring wells will be installed to a total depth of 15 feet bgs, with soil sampling intervals at five feet and at any significant change in lithology. Following installation, the wells will be developed, purged, sampled and surveyed. These wells will be used in conjunction with the existing monitoring well (MW3) to initiate a quarterly ground water monitoring program.

Four (4) soil, two samples from each boring, and three (3) water samples from tank area 3 & 4 will be submitted for analyses using each of the following methods, EPA Test Method 8020/602 for (BTEX), EPA Test Method 8015 (DHS Modified for Diesel Fuel), and SMWW Test Method 5520 for oil and grease. Following completion of field and laboratory work a report shall be prepared to describe field methods and techniques, observations, boring logs, groundwater gradient, laboratory analyses and address DHS requirements.

2.2 Drilling Methods

2.2.1 Soil Borings

Soil samples will be collected in 2.5 inch-diameter brass sleeves contained in an 18 inch-long California-modified split-spoon drive sampler advanced below the lead auger by repeated blows of a 140 pound drop hammer. Samples will be collected at 5-foot depth intervals or at any significant change in lithology (or at the direction of the field geologist/engineer) for logging and initial screening. Logging will include visual, tactile, and olfactory observations of soil physical characteristics and will be recorded according to the Unified Soil Classification System and other appropriate descriptors.

Appropriate decontamination procedures will be followed for all soil collection and

handling activities to assure sample representativeness and avoid sample contamination and formation cross-contamination. Specifically, all drill augers and drive sampler components will be cleaned by high-pressure steam cleaner prior to contacting the formation. Alternatively, drive samples components may be decontaminated by brushing and agitation in Alconox laboratory detergent solutions and triple rinsed in potable tap water.

2.2.2 Temporary Groundwater Test Wells

As a screening tool, temporary groundwater test wells will be installed at each soil boring location. The drill auger is to be advanced, and soil samples obtained at 5 feet bgs or at any significant change in lithology, to a depth of approximately 8 feet bgs. Screened 2-inch nominal PVC casing will be installed within the hollow-stem auger and clean filter sand will be added to fill the temporary casing/auger annulus. The drill auger will be withdrawn approximately 4 feet to allow casing exposure to the saturated formation. Following equilibration, water level measurements (using an immiscible petroleum-water interface probe with .01 foot graduations) and field surveying, a water sample will be obtained using a dedicated polyethylene bailer.

2.2.3 Permanent Monitoring Wells

Two (2) monitoring wells are proposed for installation at Tank Area 1 and 2. The general method for monitoring well construction will consist of lowering a 10-foot section of well screen through the hollow-stem auger such that several feet of open screen is exposed above static water level, adding filter pack sand to 1-2 feet above the upper screened section, installing a sanitary seal of hydrated bentonite chips approximately 1-2 feet thick above this filter pack, then completing the upper annular seal with Volclay grout of other approved sealant, to ground surface. Each well will be finished with a traffic-rated box and secured with a lockable cap. Appendix A contains a typical monitoring well construction diagram.

2.2.4 Drilling Waste Handling

Soil cuttings, decontamination rinseate water, and purge fluids will be contained (drummed) in DOT approved 55-gallon drums, labeled, and stored in a secure area on-site pending laboratory analysis. Upon completion of chemical analysis the waste will be transported under manifest to a licensed disposal site. Copies of all manifests shall be included in the PSA report.

2.2.5 Groundwater Gradient Determinations

The groundwater monitoring wells will be surveyed by a licensed land surveyor to within .1 lateral foot and .01 vertical foot. Water level measurements shall be taken (using an immiscible petroleum-water interface probe with .01 foot graduations) within .01 foot so that, by solving a three-point problem, ground water gradient may be determined.

2.3 Sampling Methods

All soil samples will be screened by ambient temperature headspace methods for indications of hydrocarbon contamination. Results of the headspace readings will be recorded on the boring logs. This method involves placing approximately 5 cubic inches of soil into a sealed polyethylene bag and allowing the soil temperature to equilibrate for approximately 15 minutes. At that time, the probe of a portable organic vapor meter (OVM) or photo-ionization detector (PID), calibrated with 100 ppm isobutylene, will be inserted into the bag headspace and the reading will be recorded. Samples of soil material that exhibit a significant OVM response will be selected for laboratory analysis.

Selected soil samples will be sealed with Teflon sheets, capped, labeled, and transferred under chain-of-custody to a state-certified laboratory.

Water samples will be transferred directly from the dedicated polyethylene bailers to appropriate laboratory-supplied samples container. A label indicating the date and time of sample collections, sampler's initials, sample designating, and analysis requested, will be affixed to each sample container. All groundwater sample containers will be immediately placed in a pre-cooled ice chest and maintained at a temperature of 4° Celsius for transport to the laboratory under Chain-of-Custody documentation.

2.4 Permitting

Following PSA Work Plan approval by the DHS and prior to initiation of PSA field work, a drilling permit application will be submitted to the Alameda County Flood Control and Water Conservation District (Zone 7 Water Agency).

3.0 HEALTH AND SAFETY PLAN

A site health and safety plan has been prepared detailing potential physical and chemical hazards, emergency response procedures, and other related topics and is included as Appendix B.

4.0 REPORT AND FINDINGS

Following completion of PSA field work and laboratory analyses a written report shall be prepared to describe field methods, techniques, observations, and include soil boring logs, scaled drawings, groundwater well construction information, groundwater gradient calculations, and laboratory analyses. The report shall describe findings of PSA field work and recommendations for further investigations, if deemed necessary. This report will be designed to meet DHS reporting requirements.

FIGURES

C A P E
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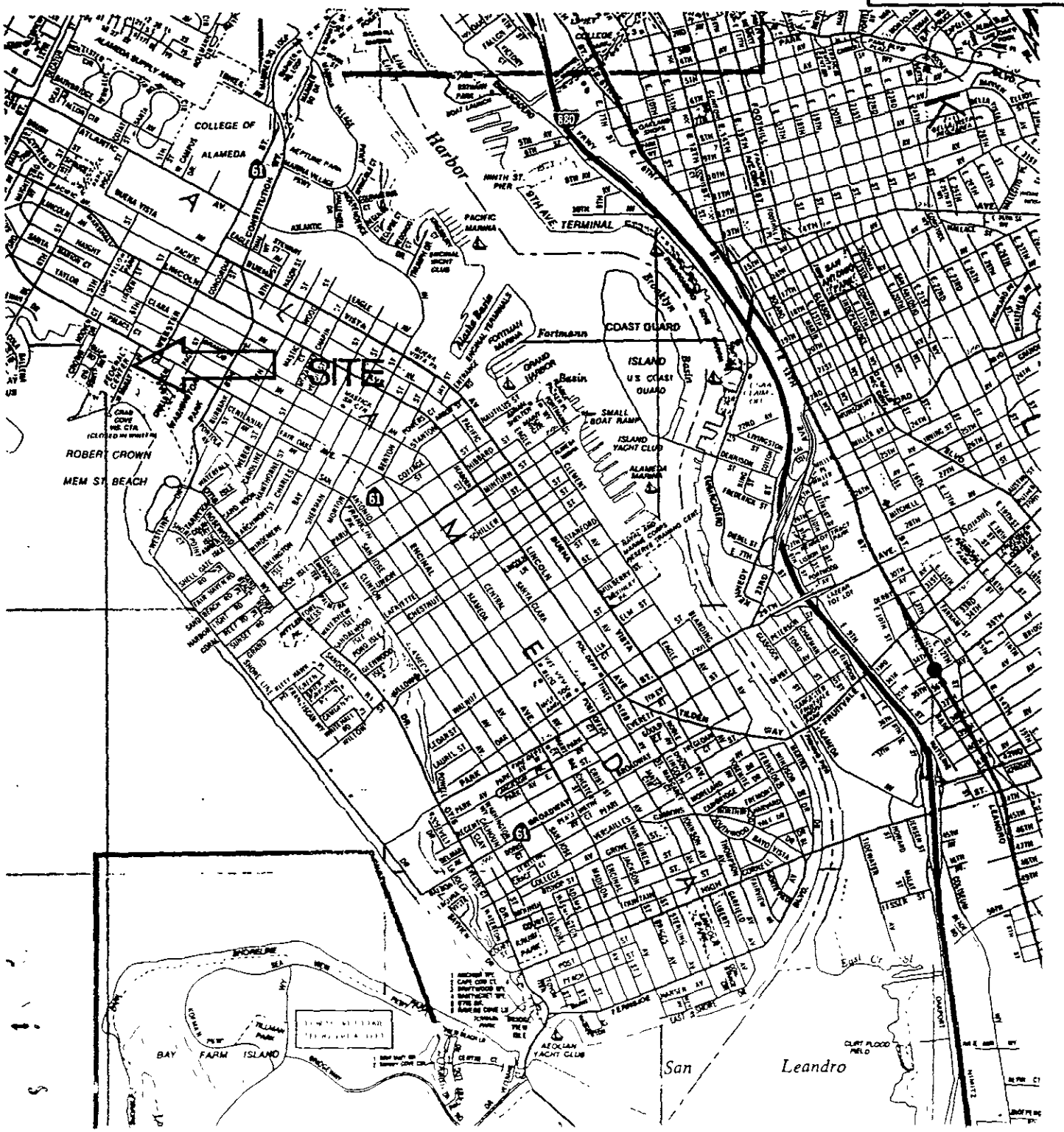
20280 S Vermont Ave.
Suite 250
Torrance, CA 90502
(310) 532-4500



SHEET TITLE FIGURE 1 - SITE VICINITY MAP	CHECKED BY L. HARLAN	PROJECT NUMBER 2403C.16	
PROJECT TITLE ALAMEDA FEDERAL CENTER, ALAMEDA, CA	DRAWN BY J. GONZALES	DATE MAR. 31, '95	SHEET 1 OF 1

C A P E
ENVIRONMENTAL
MANAGEMENT
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20280 S Vermont Ave.
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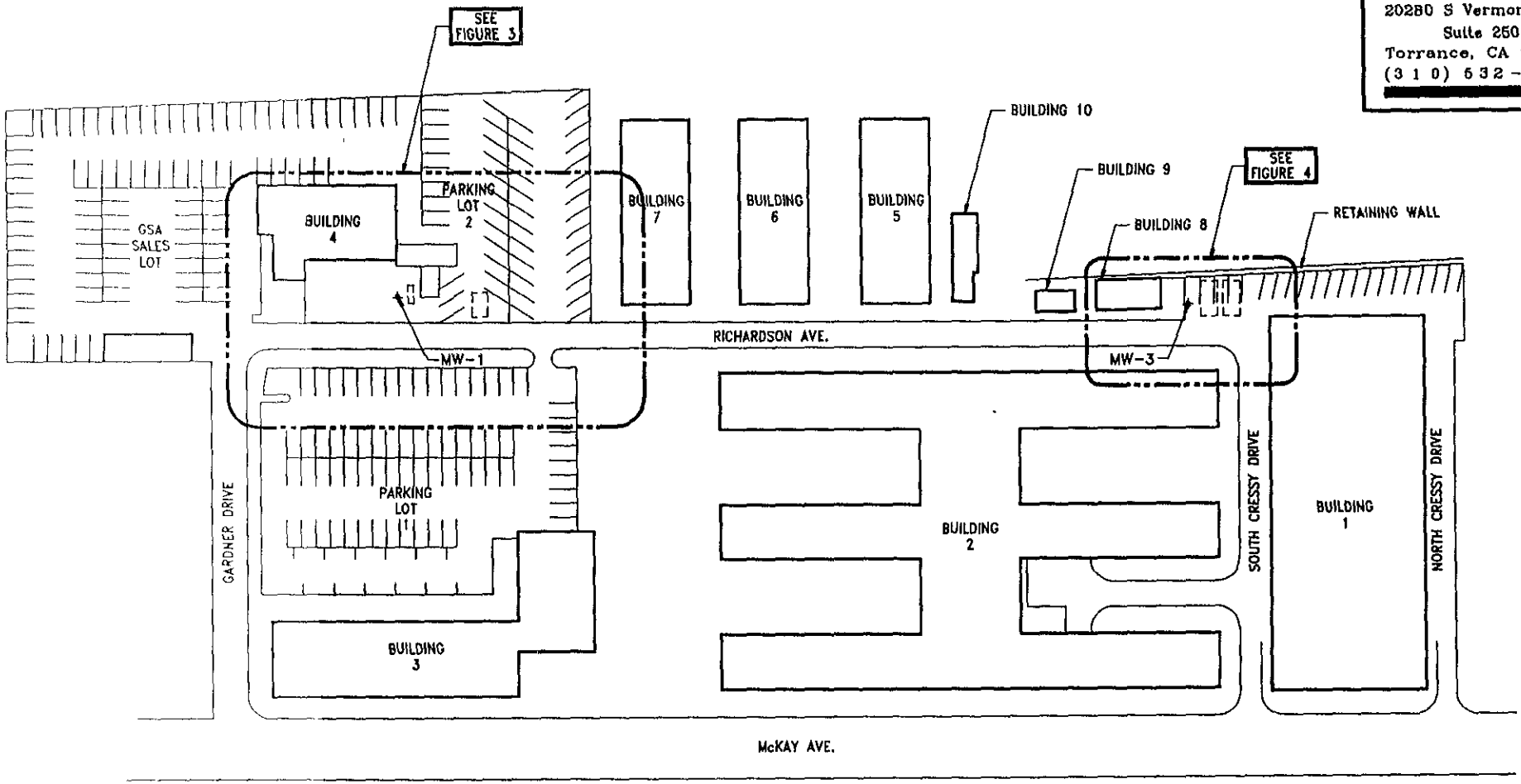
Torrance, CA 90502
(310) 532-4600



LEGEND

MW EXISTING MONITORING WELL

GRAPHIC SCALE

0 10' 50' 100' 150'

PROJECT NORTH

SHEET TITLE: FIGURE 2 - SITE PLAN	CHECKED BY: L. HARLAN	PROJECT NUMBER: 2403C.16	
PROJECT TITLE: ALAMEDA FEDERAL CENTER, ALAMEDA, CA	DRAWN BY: J.GONZALES	DATE: APR. 05, '95	SHEET: 1 OF 1

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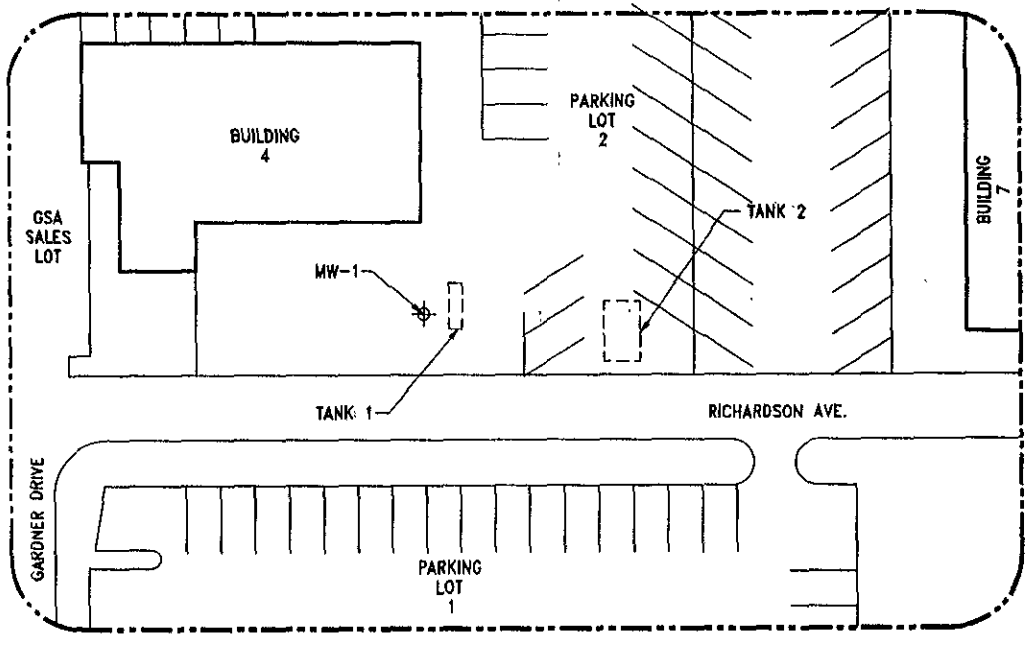
Torrance, CA 90502
(310) 532-4500



LEGEND

MW — EXISTING MONITORING WELL

---- APPROX. LOCATION OF REMOVED UST's

NOT TO SCALE

PROJECT NORTH

SHEET TITLE: FIGURE 3 - TANK 1 & 2 AREA	CHECKED BY: L. HARLAN	PROJECT NUMBER: 2403C.16	
PROJECT TITLE: ALAMEDA FEDERAL CENTER, ALAMEDA, CA	DRAWN BY: J.GONZALES	DATE: APR. 05, '95	SHEET: 1 OF 1

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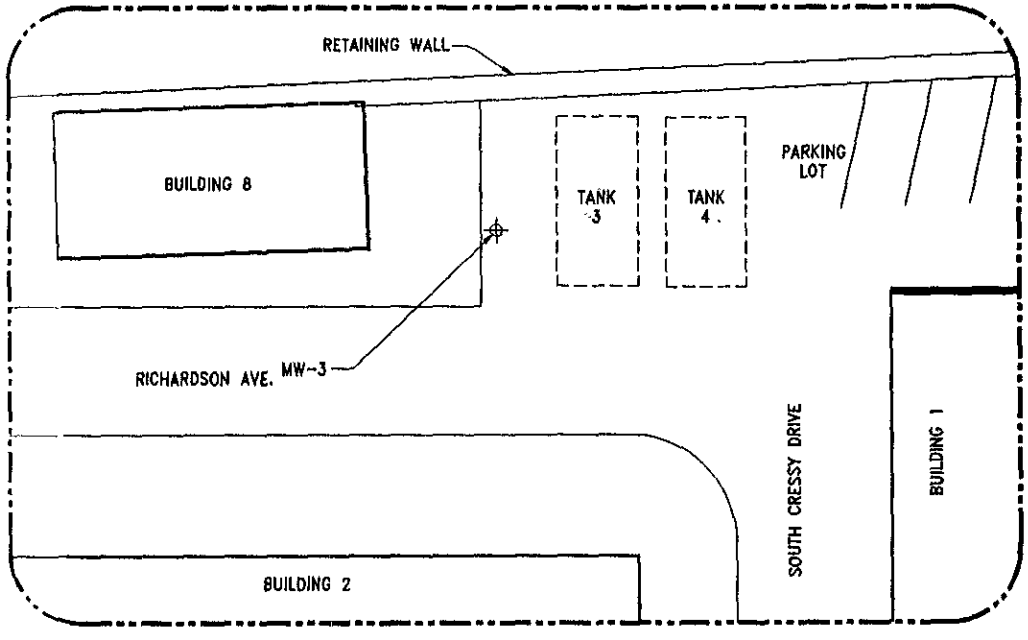


LEGEND

MW — EXISTING MONITORING WELL

---- APPROX. LOCATION OF EXISTING UST's

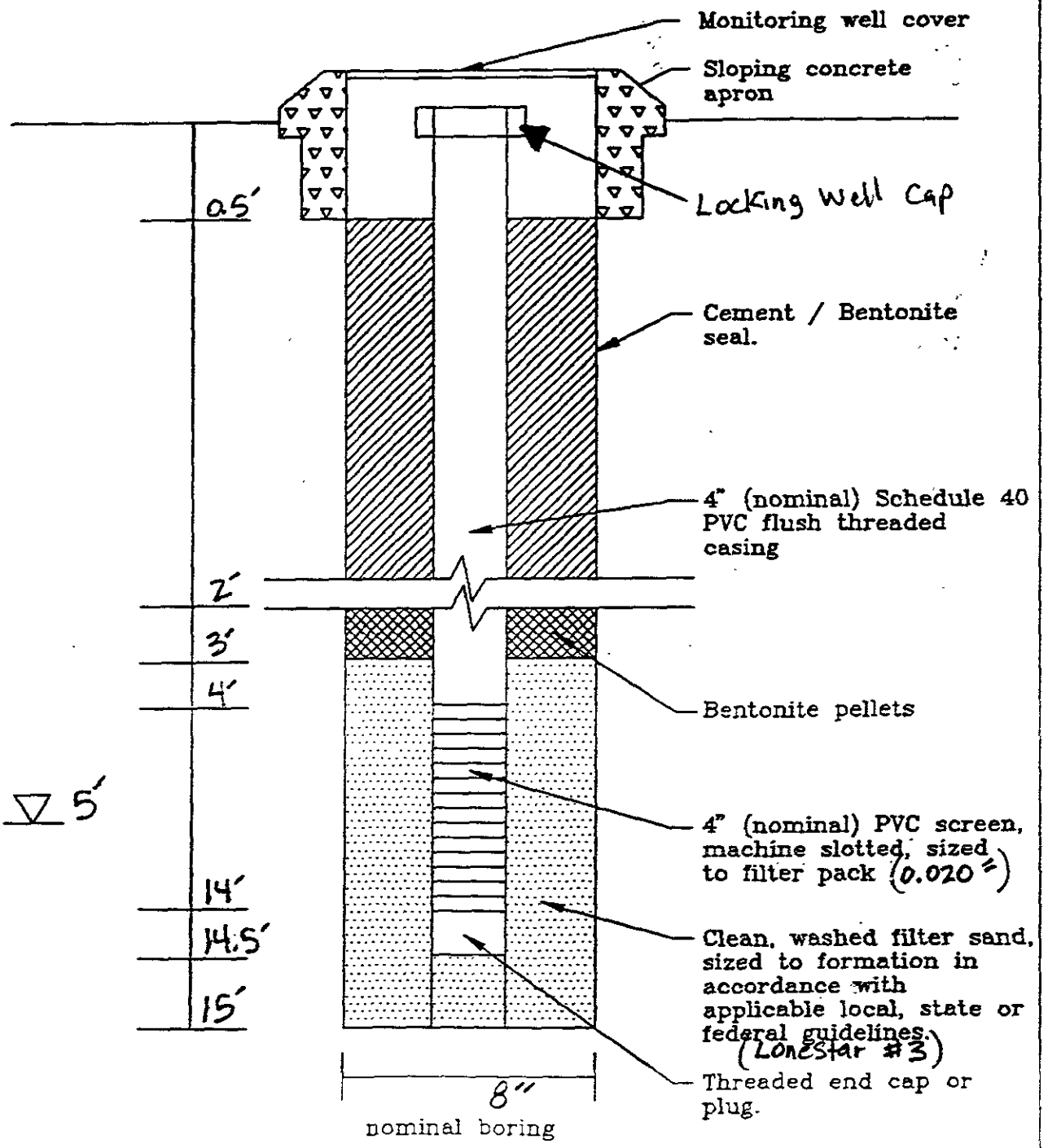
NOT TO SCALE

PROJECT NORTH

SHEET TITLE: FIGURE 4 - TANK 3 & 4 AREA		CHECKED BY: L. HARLAN	PROJECT NUMBER: 2403C.16	
PROJECT TITLE: ALAMEDA FEDERAL CENTER, ALAMEDA, CA	DRAWN BY: J.GONZALES	DATE: APR. 05, '95	SHEET: 1 OF 1	

APPENDIX A

TYPICAL MONITORING WELL DIAGRAM



CAPE ENVIRONMENTAL MANAGEMENT INC	Alameda Federal Center	Typical Monitoring Well
		Project No. / Figure No.

APPENDIX B

HEALTH AND SAFETY PLAN

CAPE
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HEALTH AND SAFETY PLAN

PRELIMINARY SITE ASSESSMENT
ALAMEDA FEDERAL CENTER
620 CENTRAL AVENUE
ALAMEDA, CALIFORNIA

TABLE OF CONTENTS

1.0 INTRODUCTION

The Site Health and Safety Plan (H&SP) outlines the health and safety procedures to be used by Cape Environmental Management, Inc (CEMI). This H&SP applies only to the work described in Section 3.0 and the anticipated hazards identified in Section 4.0. If additional work is to be performed, this plan will be modified by CEMI's Project Manager and Plan Reviewer to incorporate the changes or a new H&SP will be developed. The safety procedures within this H&SP can not be modified or altered by field personnel without clearance from the CEMI Project Manager or Plan Reviewer.

A degree of flexibility has been incorporated into this Plan due to the nature of the field work. Site conditions may change during the course of the work or unforeseen situations may arise that may require deviations from the original plan. Therefore, the provisions are made to allow modification to this plan when determined by the Company. All employees are encouraged to bring to the attention of their supervisor any unsafe or hazardous condition that they observe as they carry out their project responsibilities.

This plan was developed with the best knowledge available at the time. If additional information becomes available or site conditions change, the H&SP will be modified by the Project Manager or the Plan Reviewer prior to the continuation of field work. In the event that a subcontractor's H&SP differs from this plan, the most restrictive H&SP will be used after approval of the Project Manager and/or the Plan Reviewer.

Only CEMI environmental personnel trained in working with hazardous materials will work in contaminated areas of the site. They must have completed the 40 hour hazardous waste training course as required by CEMI policy and OSHA (29CFR 1910.120). They must be currently certified in first aid and CPR, have been fit tested for a respirator, and be approved under a medical monitoring program.

All subcontractors who work in the Exclusion Zone or the Contamination Reduction Zone must also have the appropriate training and medical monitoring as required by OSHA. Written documentation of the OSHA required training and medical surveillance must be presented to the Site Safety Officer prior to the subcontractors' performance of field activities.

The Site Safety Officer will hold a site specific safety meeting prior to start of work.

During the site specific safety meeting the Site Safety Officer will discuss: potential chemical and safety hazards; potential routes of exposure for each chemical hazard; types, limitations, and proper use of Personal Protective Equipment (PPE); and proper decontamination procedures. The Site Safety Officer is also responsible for enforcing this site safety plan.

All CEMI personnel and its subcontractors who will work in the potentially contaminated areas of the site will read and agree to follow this H&SP before performing any field work. This will be documented by having all personnel sign the Plan Acceptance Form in Appendix D.

This H&SP, a first aid kit, eye wash, telephone, and a fire extinguisher must be on site during all field activities described in Section 3.0.. The Emergency Contacts (Section 5), Action Levels (Section 4) , and the Hospital Map (Section 5) must be posted on site. Additional equipment required for this job is listed in Appendix E.

2.0 BACKGROUND

Cape Environmental Management, Inc. (CEMI) has contracted with the General Services Administration (GSA) to conduct a preliminary site assessment at the Alameda Federal Center, located at 620 Central Avenue, Alameda, California. This site assessment is designed to investigate the lateral and vertical extent of observed soil and ground water contamination at the site. Two (2) underground storage tanks USTs have been removed and two (2) USTs remain in place. Also, CEMI will prepare construction specification bid documents and drawings for the removal of the remaining USTs.

On January 27, 1994 a 1,000-gallon gasoline and diesel fuel UST (Tank 1) and a 5,000- gallon gasoline UST (Tank 2) were removed from the site. There are currently two (2) 10,000-gallon USTs (Tanks 3 and 4) remaining in place. The remaining USTs are full of a material described as an extremely heavy black hydrocarbon with water, grease, and sandy sediment on the bottom. Laboratory analyses of the material contained in Tanks 3 and 4 characterized it as weathered #3 diesel fuel or bunker "C" fuel. These tanks had been decommissioned around 1950 and had been partially filled with sand and covered, leaving the fill ports open. Efforts to pump out the tank contents failed, due to the occurrence of rocks and a hardened clay material which plugged the vacuum hose .

Prior to the removal of Tanks 1 and 2, soil borings were advanced adjacent to both tank areas and soil samples were obtained for laboratory chemical analyses.

Analysis of soil samples obtained near Tank 1 identified up to 12 parts per million (ppm) total petroleum hydrocarbons as diesel fuel (TPHd), 100 ppm oil and grease, and traces of heavy metals. Soil samples collected from near Tank 2 identified trace concentrations of TPHd, oil and grease, and trichloroethene (TCE) at 57, 120 and 7 ppm, respectively, and low levels of fluoranthene (12 ppm) and pyrene (26 ppm). Soil samples collected from near Tanks 3 and 4 identified elevated levels of TPHd and oil and grease at 5,100 and 19,000 ppm, respectively.

Three of the soil borings were converted to monitoring wells (MW1, MW2 and MW3). MW1 is located near Tanks 1 and 2; MW2 was apparently damaged during construction and rendered unusable; and MW3 is located near Tanks 3 and 4. MW1 and MW2 were installed to a total depth of 14 feet below ground surface (bgs), with a screened interval from about 3 to 13 feet bgs, and are constructed of 2-inch nominal diameter PVC casing. Water samples collected from MW1 identified benzene, 1,2 dichloroethene (DCE), tetrachloroethene (PCE), and TCE at 0.6, 1.5, 1.0, and 3.0 parts per billion (ppb), respectively. Free product was identified in MW3.

PSA field work will be conducted in accordance with all applicable regulations and following prior approval by Alameda County Department of Environmental Health (DHS)and the Regional Water Quality Control Board (RWQCB). It is presently anticipated that field work may be performed on April 14, 1995, pending approval. Results of this investigation will be used to design future tank closure and/or soil remediation work.

Following work completion, a PSA report shall be prepared and submitted to the appropriate regulatory agencies.

3.0 FIELD ACTIVITIES

The following is a description of the proposed scope of work which has been designed to address requirements of the DHS for assessing the site. In general, field work will include the drilling of nine (9) soil borings, converting two (2) soil borings into permanent monitoring wells and converting the remaining seven (7) soil borings into temporary groundwater test wells. Field work will also include collecting soil and groundwater samples and subsequent laboratory analyses as outlined below.

Tank Area 1 and 2

Field work at tank area 1 & 2 shall consist of advancing five (5) soil borings. Two (2) soil borings will be advanced adjacent to the tank pits, to a total depth of 15 feet below ground surface (bgs) with soil sample intervals of 5 feet and at any significant change in lithology, to assess soil conditions. These two borings will then be converted to temporary groundwater test wells and "field" surveyed to determine preliminary groundwater elevations. The field surveying will consist of relative elevation reading of the tops of temporary casings by engineer's telescope and rod method. This will aid in siting the remaining three (3) soil borings. Following determination of initial groundwater gradient, one (1) boring will be advanced down-gradient to a depth of 15 feet bgs and converted to a temporary well for water sampling. Following installation and water sampling of the three (3) temporary test wells, the wells will be destroyed by backfilling with Volclay grout or other approved sealant. The remaining two (2) soil borings will be advanced at locations based on initial groundwater gradient information to a total depth of 15 feet bgs with soil sample intervals of 5 feet and at any significant change in lithology. These two (2) borings will be converted to "permanent" monitoring wells for use in a groundwater monitoring program. The permanent wells will be constructed of 4-inch diameter PVC casing and will, in conjunction with the existing 2-inch well, be used to initiate a quarterly groundwater monitoring program. Following installation, the permanent wells will be developed, purged, sampled, and surveyed by a licensed land surveyor to an established benchmark. Survey information is necessary to determine ground water gradient to an accuracy of $\pm$0.01 foot.

Soil samples will be submitted for laboratory analyses based on organic vapor monitor (OVM) readings and olfactory, visual and tactile field observations. Nine (9) soil and five (5) water samples from tank area 1 & 2 will be submitted for analysis using each of the following methods, EPA Test Method 8020/602 for benzene, toluene, ethylbenzene, and total xylenes (BTEX), EPA Test Method 8015 (DHS Modified Gasoline and Diesel) for total petroleum hydrocarbons, EPA Test Method 8010/601 for chlorinated hydrocarbons, Standard Methods Waste Water (SMWW) Test Method 5520 for oil and grease, and EPA Test Method 8310 for polynuclear aromatic hydrocarbons.

Tank Area 3 & 4

Field work at tank area 3 & 4 shall consist of advancing four (4) soil borings to a total depth of 15 feet below ground surface (bgs). Three of the four soil borings will be advanced adjacent to the existing USTs and sampled at five-foot depth

intervals and at any significant change of lithology. These three borings will then be converted to temporary test wells and "field" surveyed to determine preliminary groundwater elevations. The field surveying information will aid in siting the remaining soil boring, which will also be used to install a temporary test well for water sampling. Following installation and water sampling of the four (4) temporary test wells, the wells will be destroyed by backfilling with Volclay grout or other approved sealant.

Soil samples will be submitted for laboratory analyses based on organic vapor monitor (OVM) readings and olfactory, visual and tactile field observations. Nine (9) soil and four (4) water samples from tank area 3 & 4 will be submitted for analyses using each of the following methods, EPA Test Methods 8020/602 for (BTEX), EPA Test Method 8015 (DHS Modified for Diesel), and SMWW Test Method 5520 for oil and grease.

4.0 JOB HAZARD ANALYSIS

Based on the previous and current uses of the site the chemicals listed below are potential health hazards. Since a site health and safety plan addresses the "worst case" situation, this plan addresses the health hazards of the compounds listed below with respect to worker safety, should these compounds be encountered.

A. Chemicals - Hydrocarbons

- **Benzene**
- **Diesel**
- **Ethyl Benzene**
- **Exhaust from the equipment**
- **Gasoline**
- **Lead**
- **Toluene**
- **Waste Oil**
- **Xylene**

See Table 1 for breathing zone action levels and Appendix C for detailed information on each chemical.

B. Physical Hazards

- Snapping cables
- Being hit by equipment

- o **Becoming entwined in rotating tools**
- o **Falling objects**
- o **Brush, equipment, or gas-main fires**
- o **Exposure to excessive noise**
- o **Exposure to excessive outside temperatures (heat stress).**

Physical hazards will be controlled by a combination of personal protective equipment (PPE) use and training of employees in safe and proper operation of equipment they will be using at the site. Subcontractors are responsible for the training of their employees in the proper use of their equipment.

C. Communication Procedures

The nearest telephone location will be identified and all field personnel notified of its location in the event that an emergency call must be made.

In the event that respiratory protection is required, the following standard hand signals can be used:

o	**Hand gripping throat**	**- Out of air, can't breathe.**
o	**Grip partner's wrist or put both hands on partner's wrist**	**- Leave area immediately.**
o	**Hands on top of head**	**- Need assistance.**
o	**Thumbs up**	**- Ok; I am alright; I understand.**
o	**Thumbs down**	**- No; negative.**

D. Hazard Control

* **Chemical Hazards**

* Physical Hazards

In addition to the protective equipment needed for protection against the chemical hazards, a hard hat, steel-toed boots, safety glasses, Nomex coveralls, and safety vest will be worn at all times.

Wearing Personal Protective Equipment (PPE) puts a hazardous-waste worker at considerable risk of developing heat stress, and the effects of extreme outside temperatures will be controlled by a combination of work place observations and work/rest cycles. Refer to Table 2 for details on physiological monitoring and Appendix B for signs, symptoms, and first aid of heat stress conditions.

For workers wearing semipermeable or impermeable encapsulation ensembles, the ASGIH standard cannot be used. For these situations, workers should be monitored when the temperature in the work area is above 70°F (21°C).

E. ACTION LEVELS

TABLE 1

Monitoring Work Zone	Action* Equipment	Level	Action
Breathing Zone	**PID****	**1-5 units**	**Monitor and record results initially and at least every 30 minutes.**
		5-20 units	**All personnel will immediately leave the work area and contact the Project Manager and CEMI Plan Reviewer. When levels of hydrocarbons, 5 ppm for 60 seconds, are detected, draeger tubes will be used as an indicator for benzene. With their approval, personnel may re-enter the work zone using Level C protection. Monitor and record results at least every 15 minutes.**
		20+ units	All personnel will immediately leave the work area after covering the contaminated soils and contact the

			Project Manager and CEMI Plan Reviewer.
3 inches	**PID****	**<10 units**	**Monitor and record**
Above Soil			**results initially and at least every 30 minutes.**
		10-50 units	**All personnel will immediately leave the work area after covering the contaminated soils and contact the Project Manager and Plan Reviewer.**

*** Action levels are above background.**
****These action levels are set for an instrument calibrated to Isobutylene**

TABLE 2

Frequency of Physiological Monitoring for Fit and Acclimated Worker

ADJUSTED TEMPERATURE· ENSEMBLE	NORMAL WORK ENSEMBLE	IMPERMEABLE
	After Each:	After Each:
90·F (32.2·C) or above	45 minutes of work	15 minutes of work
87.5-909 F (30.8 -32.3 C)	60 minutes of work	30 minutes of work
82.5 -87.5 F (28.1-30.8 C)'	90 minutes of work	60 minutes of work
77.5 -82.5 F (25.3 028.1 C)	120 minutes of work	990 minutes of work
72.5-77.5 F (22.5-25.3 C)	150 minutes of work	120 minutes of work

1. For work levels of 250 kilocalories/hour.

2. Calculated the adjusted air temperature (ta adj) by using this equation:

   ta adj ·F = + (13 x % sunshine)

   Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat Estimate the percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow.

   (100 percent sunshine = no cloud cover and a sharp, distinct shadow; zero percent sunshine = no shadow)

3. A normal work ensemble consists of coveralls or other cotton clothing with long sleeves and pants.

When monitoring the worker or when self monitoring, the following parameters will be measured:

Heart rate-count the radial pulse during a 30-second period as early as possible in the rest period.

- If the heart rate exceeds 110 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same.

- If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.

Rest periods are dependent on the worker's ability to perform under stress, the temperature, the level of protection, and the level of activity. Each worker is responsible for self monitoring as well as looking out for their buddy when heat stress conditions are prevalent. Table 1 can be used to determine monitoring frequency. This table will be used to determine the initial frequency when a work/rest scenario will be employed. Once the employees have begun a work/rest scenario, monitoring of pulse and temperature will determine future rest periods.

Rest break will be in a sheltered area. The site Safety Officer will encourage workers to drink 16 oz. of water at each rest break even if they are not thirsty. (The normal thirst mechanism is not sensitive enough to ensure enough water will be drunk to replace fluids lost in sweat.) The site Safety Officer will check each person for signs of heat exhaustion and heat stroke.

Heat exhaustion symptoms include pale, cool, moist skin, heavy sweating, dizziness, nausea, and fainting. If these symptoms occur move the person to the shade and give them a salt solution that consists of 2 pinches of salt per glass of water every 15 minutes for 1 hour. (See Appendix B).

Heatstroke symptoms are red, hot, dry skin, lack of or reduced perspiration, nausea, dizziness and confusion, and strong and rapid pulse. If any of theses symptoms are present, medical help will be obtained immediately. Heat stress is a life-threatening condition. (See Appendix B)

If any employee experiences heat exhaustion or heatstroke, the CEMI Project Manager or Plan Reviewer will be contacted as soon as possible.

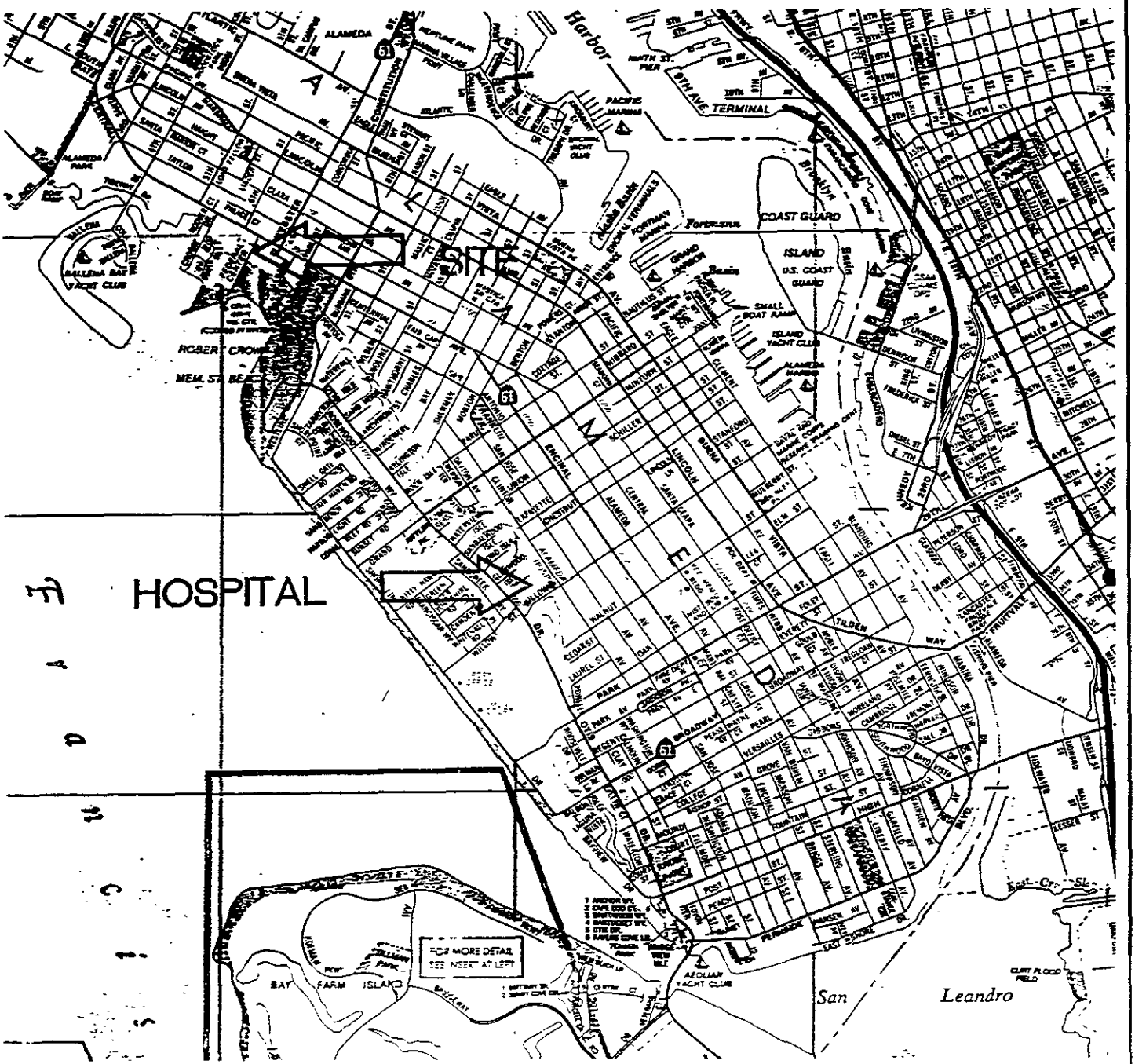
5.0 EMERGENCY CONTACTS AND PROCEDURES

In case of any situation or unexpected occurrence which requires outside assistance or support, the proper contact from the following list should be made:

Agency	Name of contact	Telephone No.
Ambulance		911
Fire		911
Police		911
Hospital	Alameda Hospital 2070 Clinton Ave Alameda CA 94501	510 522 3700
Project Manager:	Larry M. Harlan	O: (310) 532-4500 H: (714) 675-4569

In the event of an emergency, call 911. Figure 3 shows the hospital nearest to the site capable of handling chemical injuries.

C A P E
ENVIRONMENTAL
MANAGEMENT
I N C
20280 S Vermont Ave.
Suite 250
Torrance, CA 90502
(3 1 0) 5 3 2 - 4 5 0 0



ALAMEDA HOSPITAL
2070 CLINTON AVE.
ALAMEDA, CA 94501
(510) 522-3700

SHEET TITLE: HOSPITAL LOCATION MAP	CHECKED BY: L HARLAN	PROJECT NUMBER: 2403C.16	
PROJECT TITLE: ALAMEDA FEDERAL CENTER, ALAMEDA, CA	DRAWN BY: J GONZALES	DATE: MAR 30 '95	SHEET: 1 OF 1

6.0 GENERAL SITE REGULATIONS AND SAFETY GUIDELINES FOR DRILLING AND EXCAVATION

A. Overhead and Buried Utilities

The use of heavy equipment (e.g. drill rig, backhoe, crane, etc.) on a site or project within the vicinity of electrical power lines and other utilities requires that special precautions be taken by both supervisors and members of the exploration crew.

Overhead and buried utilities should be located, noted and emphasized on all boring location plans and boring assignment sheets.

When overhead electrical power lines exist at or near drilling or excavation site, consider all wires to be alive and dangerous.

B. Clearing the Work Area

Prior to drilling or excavation, adequate site cleaning and leveling should be performed to accommodate the heavy equipment and supplies. Care should be taken to provide a safe working area. Drilling or excavation should not commence when tree limbs, unstable ground or site obstructions cause unsafe tool handling conditions.

Before raising masts of drill rigs, backhoes, or cranes on a site in the vicinity of powerlines, walk completely around the drill rig. Determine what the minimum distance from any point on the drill rig, the backhoe, or the crane to the nearest power line will be when the mast is raised and/or being raised. Do not raise the mast or operate the drill rig, the backhoe, or the crane of this distance is less that 20 feet. Underground electricity is as dangerous as overhead electricity. Be aware and always suspect the existence of underground utilities such as electrical power, gas, petroleum, telephone, sewer, and water. Ask for assistance.

If a sign warning of underground utilities are located on or near the boundary or property line or under the sign. Telephone the utility company and check it out. The underground utilities may be at a considerable distance away from the warning sign.

C. Safe Use of Hand Tools

There are almost an infinite number of hand tools that can be used on or around heavy equipment. "Use of the tool for its intended purpose" is the most important rules. The following are a few specific and general suggestions which apply to safe use of several hand tools that are often used on and around heavy equipment:

o When a tool becomes damaged either repair it or replace it.

- **When using a hammer, any kind of hammer, for any purpose, wear safety glasses and require all others near you to wear safety glasses.**

- **When using a chisel, any kind of chisel, for any purpose, wear safety glasses and require all others around you to wear safety glasses.**

- **When using a hand auger, wear gloves and safety boots.**

- **Keep all tools cleaned and orderly, and store when not in use.**

D. Safe Use of Wire Line Hoists, Wire Rope, and Hoisting Hardware

The use of wire line hoists, wire rope and hoisting hardware will be as stipulated by the American Iron and Steel Institute's Wire Rope User's Manual, a copy of which is located with the drill rig.

E. Safe Use of Drilling Augers

The following general procedures will be used when starting a boring with continuous flight of hollow-stem augers:

- **Never place hands of fingers under the bottom of an auger section when hoisting the auger over the top of the auger section in the ground or over other hard surfaces such as the drill rig platform.**

- **Never allow feet to get under the auger section that is being hoisted.**

- **When rotating augers, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason whatever.**

- **Use a long-handled shovel to move auger cuttings away from the auger. Never use your hands or feet to move cuttings away from the auger.**

- **Augers should be cleaned only when the drill rig is in neutral and the augers have stopped from rotating.**

F. Safety During Drilling and Excavation Operations

Safety requires the attention and cooperation of every worker and site visitor.

Do not drive the drill rig, backhoe, or the crane from one boring or another excavation location with the mast in the raised position.

Before raising the mast, look up to check for overhead obstructions. (Refer to Section 7.1 on Overhead and Buried Utilities).

Before raising the mast, all heavy equipment personnel and visitors (with exception of the operator) should be cleared from the areas immediately to the rear and the sides of the mast. All heavy equipment personnel and visitors will be informed that the mast is being raised prior to raising it.

For the operation of a drill rig, the operator will only operate from the position of the controls, the operator will shift the transmission controlling the rotary drive into neutral and place the feed control lever in neutral. The operator will shut down the drill engine before leaving the vicinity of the drill.

Throwing or dropping tools will not be permitted. All tools should be carefully passed by hand between personnel or a hoist line should be used.

Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting to work heavy equipment or while on the job.

The walls and faces of all excavations in which employees are exposed to danger from moving ground will be guarded by a shoring system, sloping of the ground, or some other equivalent means.

If the stability of adjoining buildings or walls is endangered by excavations then shoring, bracing, or underpinning will be provided as necessary to insure their safety. Such shoring, bracing, or underpinning will be inspected daily or more often, as conditions warrant, by a competent person, and protection will be effectively maintained.

Diversion ditches, dikes, or other suitable means will be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. Water will not be allowed to accumulate in an excavation.

Excavations will be inspected by a competent person after every rainstorm or other hazard-increasing occurrence, and the protection against slides and cave-ins will be increased if necessary.

Employees will not be permitted to enter excavations that are greater than 5 feet in depth unless the walls have been sufficiently shored, sheeted, braced, or sloped. The sides of excavations less than 5 feet in depth will also be effectively protected if examination of the ground indicates hazardous ground movement may be expected.

Unattended boreholes or excavations must be adequately covered or otherwise protected to prevent heavy equipment personnel, site visitors or animals from stepping or falling into the hole. All open boreholes and excavations will be covered, protected or

adequately backfilled according to local or state regulations on completion of the project.

G. Electrical Equipment Safety

Almost everyone is aware that electricity can kill. Many people however, do not realize how little electricity it takes to cause death. Electricity gives little warning of impending death or injury. Electricity kills approximately 1000 people a year, with many fatalities resulting from contact with 120 volts AC., the voltage that operates a common lightbulb.

There are many instances when field and lab personnel may be exposed to electrical currents. Improperly or un-grounded lab equipment, exposed wires, extension cords running through water, and many other conditions can increase the probability of an electrical shock.

Factors such as perspiration or relative humidity will further reduce the resistance to, and raise the probability of sever damage to the body due to electrical shock. The severity of the shock can also depend on the amount of current flowing through the body, the path of the current through the body, and the time of exposure to an electrical current.

The following are general guidelines, that if followed will reduce the chance of being injured by electrical shock.

* Only Underwriters Laboratories (UL) listed electrical equipment shall be used, and this equipment must be free from all recognized hazards, such as exposed wiring or missing ground plugs.

* Unless you have been trained and licensed, do not attempt to repair defective electrical equipment.

* When working in wet environments, be sure that the outlet providing the power is protected by a ground fault circuit interrupter (MUST). OSHA regulations require ground fault circuit interrupters or an extension cord maintenance program on all construction projects.

* When using extension cords, be sure that the cord is the proper wire gauge, all of the terminals are intact, and that the sockets are free from defects.

* All power tools and other electrical equipment must be grounded or double insulate. Ensure that all power tools are grounded or double insulated before the job begins. Include pumps, vacuums, etc. when performing these checks. Grounding plugs should never be removed for any reason.

7.0 WORK ZONES

The Exclusion Zone will be delineated prior to performance of field work on a minimum 20-foot radius around the proposed area of work operations. Exclusion zones less than a 20-foot radius will require approval of the project manager and CEMI's Plan Reviewer. This zone will be "moved" as the work activities are moved.

Untrained and unauthorized personnel will not be allowed in the Exclusion Zone. The movement of personnel in to and out of the Exclusion Zone will be controlled by the Site Safety Officer. The Site Safety Officer will have the authority to eject unauthorized personnel. If he is unable to maintain this control, the job will be shut down.

All personnel entering the Exclusion Zone will be in the appropriate level of protection and upon leaving will exit through the Contamination Reduction Zone and will be properly decontaminated.

The Contamination Reduction Zone will be delineated upwind of the Exclusion Zone. The Site Safety Officer is responsible to oversee that the decontamination procedures are carried out properly.

Personnel decontamination will consist of the following:

1. **Washing outer gloves and boots with trisodium Phosphate (TSP) solution.**
2. **Rinsing outer gloves and boots with tap water.**
3. **Removing outer gloves and boots.**
4. **If applicable, removing respirator and setting it aside for proper decontamination.**
5. **Removing inner gloves.**
6. **Washing hands and face.**

The equipment decontamination process will include rinsing the equipment and reusable personal protective equipment (PPE) in a mild TSP solution, a tap water rinse, and finally a distilled water rinse. The monitoring equipment is too delicate to undergo this type of decontamination; it will be wrapped in plastic and the plastic will be properly discarded or the instrument will be wipe clean with a cloth dampened with the TSP solution.

All potentially contaminated PPE, plastic etc. and decontamination liquids will be placed in drums and properly labeled. It is the responsibility of the Site Owner/Operator to

dispose of the drums in accordance with appropriate regulations.

The Support Zone (i.e. safe zone) will be established upwind of the Contamination Reduction Zone. All equipment and personnel entering the support Zone must be properly decontaminated prior to entering this zone.

Wind indicators will be put up to help establish these zones. The indicators will remain up and visible to all field personnel throughout the field work. In the event of the need to evacuate the contaminated area, all personnel will leave through an upwind route, thus ensuring they are moving away from the contamination.

8.0 AIR MONITORING

Personnel and environmental exposure to airborne hazards will be monitored to ensure that exposures do not exceed acceptable limits. Airborne contamination will be measured by a PID and/or Explosimeter.

The data provided from these field monitoring activities will be used to determine levels of protection required and to help establish decontamination and disposal procedures.

Periodic readings shall be taken with the PID to monitor volatile vapors. During operations, PID readings will be taken at least every 30 minutes to determine the amount of volatile vapors in the breathing zone and 3 inches above the work area. Additionally, before handling the sample a PID reading will be taken and recorded. If the action levels listed in Table 1 indicate it is necessary, air monitoring will be conducted at least every 15 minutes.

The Explosimeter will be continuously monitoring. If PID readings approach action levels, results in working areas will be recorded at least every 30 minutes.

All applicable monitoring or analytical instruments shall be calibrated daily. Calibration data, site reading, date, time, weather conditions, wind direction, and monitoring locations shall be recorded in Appendix D.

The PID and Explosimeter readings which require an action such as donning PPE or leaving the work area are summarized in Table 1.

APPENDIX A

PERSONAL PROTECTIVE EQUIPMENT

APPENDIX A

PERSONAL PROTECTIVE EQUIPMENT
Partially adopted from OSHA 3077, Personal Protective Equipment 1992

Personal protective equipment (PPE) includes all clothing and other work accessories designed to create a barrier against workplace hazards. In certain situations, the use of this equipment can make the difference between life and death.

OSHA has always required that engineering controls and training be utilized before the utilization of PPE. It is important to remember that although PPE may protect against the hazards, it does not eliminate them altogether. If the equipment fails or is worn improperly, an exposure will occur.

All PPE must be maintained in a clean and serviceable condition. The equipment should be washed or otherwise decontaminated after each use, and maintained in such a manner that the next person to use the equipment can do so without having to perform maintenance or cleaning.

With the exception of properly trained personnel, PPE shall not be altered by an employee except in the event of an emergency.

Selection of the proper PPE for the hazard is essential. Like the PPE that fails, improper selection will also cause exposure to the hazard encountered. The following guide is to be used for reference only. It lists PPE for the most commonly exposed portions of the body; the head, eyes, ears (hearing), torso, arms, and legs. If you can not find the type of protection that you need, or need assistance in selecting the proper PPE, contact the Health and Safety director or his Assistant for further information.

A. Eye and Face Protection

Eye and face protective equipment is required by OSHA when it is a reasonable probability that the PPE will prevent injury to the eyes or face. The bureau of Labor Statistics (BLS) found the about 60% of workers who suffered eye injuries were not wearing eye protection equipment. The typical injury to the eye was caused by falling or flying blunt objects. The survey also showed that few workers ever complained about poor vision or discomfort with personal eye protective equipment. Compare this to the number of workers who would complain after being wounded or blinded because they were not wearing eye protection.

Suitable eye protectors must be worn where machines or operations present the hazard of flying objects, liquids, injurious radiation, or a combination of these hazards. The equipment must meet some basic requirements:

- They must provide adequate protection against the particular hazards for

which they are designed

- **They must be reasonably comfortable when worn under the designated conditions**
- **They must fit snugly without interfering with the movements or vision of the wearer**
- **They must be durable**
- **They must be capable of being easily cleaned and disinfected**
- **They must be kept clean and in good condition**

1. **Selection**

Each eye, face, or face-and eye protector is designed for a particular hazard. When selecting the protector, consideration should be given to the kind and degree of hazard, and the protection should be determined from that information. Whenever safety glasses are worn, they shall be the type that have built-in side shields and an upper ledge to prevent contamination from either the side or top of the glasses, and shall meet or exceed ANSI standard Z87.1 - 1979.

When working in asbestos-related areas, either a 1/2 face or full face respirator shall be worn (please refer to CEMI's Respirator Selection Policy in Section 7.0). When a half face respirator is used during bulk sampling, safety glasses should be worn. This will minimize the occurrence of eye injury from falling material or a broken knife blade. When full face respirators are being worn, the eyes will be protected by the plastic shield.

When working in Environmental areas, eye protection will be provided by the full face respirator. Again, if 1/2 face respirators are being used, then safety glasses shall be worn as needed to prevent materials entering the eye.

2. **Special Note For Corrective Eyeglass Wearers**

For those people who wear corrective eyeglasses and are required by OSHA to wear eye protection, the eye protection must be a face shield, goggles, or glasses of one of the following types:

- **Glasses with protective lenses providing optical correction**
- Goggles worn over corrective glasses without disturbing the adjustment of the glasses
- Goggles that incorporate corrective lenses mounted behind the protective lenses

Safety glasses require special frames. Combinations of normal street-wear frames and safety lenses shall not be allowed. all face and eye protection used shall be in accordance with ANSI A87.1-1968. Prescription safety glasses should only be fitted by qualified optical personnel.

In order to reduce eye strain and improve vision, it is imperative that the lenses of the glasses or goggles be kept clean, and free of pits. Daily washing of the glasses, goggles, or face pieces in a hot, soapy solution is recommended. With a cleaner lens, it is less likely that the employee will suffer from eye strain, and more likely that he or she will utilize the protective equipment.

B. Ear (Hearing) Protection

Exposure to high noise levels can cause hearing loss or impairment, and it can create physical and psychological stress. There is no cure for noise-induced hearing loss, so the prevention of excessive noise exposure is the only way to avoid hearing damage.

While employees ar not generally exposed to high noise levels in the office environment, there are occasions when field people will be in high ambient noise areas. Large boiler rooms, drilling sites, or hazardous waste remediation sites may all have noise levels from machinery which near the harmful level.

1. Selection

Specifically designed protection is required, depending on the type of noise encountered. There are basically two types of hearing protection, ear plugs (preformed, molded, or disposable) or ear muffs. Certified recommends having ear plugs or ear muffs readily available at all times for entering high noise environments. For extremely noisy situations, earplugs should be worn in addition to earmuffs. When used together earplugs and ear muffs change the nature of sounds. All sounds are reduced including one's own voice, but other voices or warning signals may be easier to hear.

Preformed or molded ear plugs should be individually fitted by a professional. Waxed cotton, foam, or fiberglass earplugs are self-forming. When properly inserted, they work as well as most molded earplugs.

Some ear plugs are disposable, to be used one time and then thrown away. The non-disposable type must be cleaned after each use, to insure proper protection.

Ear muffs need to make a perfect seal around the ear to be effective. Glasses, long sideburns or hair, and facial movements may reduce protection. Special equipment is available for use with glasses or beards.
Please note the cotton is not an acceptable substitute for the proper hearing protection. Plain cotton has no noise attenuating features (it will not block out any damaging noise). At no time will an employee be allowed to substitute plain cotton for the proper hearing protection.

C. Torso Protection

Protection of the torso (the chest area) is extremely important. This is the area where most of the vital organs are located, and a serous injury to this area could be fatal.

Many hazards can threaten the torso: heat, splashes from hot metal and liquids, impacts, cuts, acids, and radiation. These area a variety of protective clothing available to protect the employee; vests, jackets, aprons, coveralls, and full body suites.

Wool and specially treated cotton are two natural fibers which are fire resistant and comfortable, since they adapt well to changing workplace temperatures.

Duck, a closely woven cotton fabric, is good for light duty protective clothing. It can protect against cuts and bruises from rough, heavy, or sharp objects.

Heat resistant clothing such as leather is often used to guard against dry heat and flame.

Rubber and rubberized fabrics, neoprene, and plastics give protection against some acids and chemicals.

Disposable suits of paper-like material (such as Tyvek$_{TM}$ are particularly important for protection from dusty materials.

For some highly toxic materials, a completely enclosed body suit may be necessary.

If there are any questions pertaining to what type of protective clothing should be used in what situation, please contact the Health and Safety Officer or his Assistant for assistance.

D. Arm and Hand Protection

Injuries to the arms or hands are quite common, and are also responsible for a large amount of lost-time from work. Arm and hand injuries can also affect the employee off-the-job by restricting movement, etc. Examples of arm or hand injuries include burns, cuts, electrical shock, amputation, cumulative trauma, and absorption of chemicals.

There is a wide variety of gloves, hand pads, sleeves, and wristlets for protection from various hazardous situations. Protective devices should be selected to fit the job. For example, some gloves are designed to protect against specific chemical hazards. CEMI recommends that employees become familiar with the limitations of the protective equipment being used.

As is true with all protective equipment, a failure of a pair of gloves, or any other hand and arm protection, may lead to an increased exposure to the substance, take the time to find the right gloves for the material you are working with.

1. **Selection**

Employee performing Environmental Services shall wear gloves that will protect against the expected contaminant. While it is not possible to predict exactly what will be

encountered, it is possible to predict the general class of contaminants which might be present. Selection of PPE will largely depend on the inspector's best judgement regarding each site.

Employees performing Industrial Hygiene services should wear gloves as needed.

End of Section

APPENDIX B

FIRST AID

Appendix B

FIRST AID

This section is designed to provide some first aid principles which are easy to understand and administer. While performing normal work duties, it is quite likely that you, or some person you are working with or for, could become injured. It is important to know how to react to a given situation in order to minimize any further aggravation of the injury.

The information contained here is not intended to take the place of formalized training, nor should it be used to. The most important point to remember is to do only those procedures that you have been taught to do, or are certified to do by some outside agency, and no more! You should know how to contact the nearest fire department or emergency medical services at any of your job-sites, because most likely it will be you that workers, especially abatement workers, will come to for help in an emergency.

It is also important that all injuries, no matter how small or insignificant they may seem at the time, should be reported to your supervisor as soon as possible.

The subject matter in this section will be limited to the four following areas:

1) **Bleeding**

2) **Breathing**

3) **Burns**

4) **Shock**

5) **Heat Exhaustion and Heatstroke**

The first step in the application of first aid is to call the EMS service or ambulance, or some other trained personnel immediately. If the victim is hurt badly, and you cannot leave, do whatever is necessary to get the attention of someone who can.

CEMI strongly urges you to obtain first aid certification through the American Red Cross or some other qualified training provider.

1). **Bleeding (Cuts, Scrapes, Punctures)**

* **First Concern - Stop the bleeding**

Steps that can be taken:

1. Apply sterile cloth or gauze directly over the injury.

2. **Apply direct pressure to the wound.**

3. **Elevate the affected area, if possible.**

NEVER remove a sterile pad once it has been applied to the wound. If it has become soaked through, add another sterile pad on top of it.

The applications of a sterile pad does not mean the application of a tourniquet. A tourniquet is used only as a last resort of a qualified person deems it necessary. DO NOT administer a tourniquet unless you have been trained to do so.

2). **Breathing (Suffocation, choking, electrical shock, heart failure)**

* **First Concern - Restore the victim's breathing using mouth-to-mouth resuscitation**

1. **Remove any foreign matter or obstacles from the victim's mouth**

2. **Lay the victim on their back**

3. **Tilt the victim's head back by placing one hand on the forehead, one hand under the neck, and carefully tilt the head back.**

4. **Pinch the victim's nostrils closed.**

5. **Begin breathing into the victim's mouth, about once every five seconds for an adult, every 2-3 seconds for a child.**

6. **Make sure that the victim's chest rises and falls with each breath. If it is not, the air you are breathing in is not reaching the victim's lungs and you will need to repeat the process from step one.**

****IMPORTANT****

SEND SOMEONE FOR HELP IMMEDIATELY

AFTER THE VICTIM HAS BEEN RESTORED, TREAT THE VICTIM FOR SHOCK

3). **Burns (Flames, steam, liquids, chemicals)**

A. **There are three degrees of burns:**

1. First Degree - the skin is reddened, with mild pain

2. Second Degree - the skin blisters, with great pain

3. Third Degree - the skin is charred, destroyed. There is little or no pain,

due to nerve damage.

* First Concern - The first aid depends upon the degree of the burn

First Degree Burns:

1. Immerse as soon as possible in cold water to relieve the pain.
2. Cover lightly with a sterile bandage.
3. DO NOT apply greasy ointments or butter.

Second Degree Burns:

1. Cut away loose clothing.
2. If the burn is mile, immerse in cold water.
3. Apply a clean, moist, sterile cloth.
4. DO NOT disturb blisters or apply ointment.
5. Treat for shock.

Third Degree Burns:

1. DO NOT REMOVE CLOTHING OF APPLY WET BANDAGES.
2. Keep the victim quiet and lying down.
3. Elevate the burned area if possible.
4. Treat the victim for shock.

B. OTHER BURNS

Sunburn

* First Concern - relieve the pain

1. Use a non-medicated, mild cream.
2. If blisters occur, get medical treatment.

Chemical

* First Concern - Dilute and/or rinse away the chemical.

1. Flood the affected area with lukewarm water (if water is compatible with the chemical) for at least 5-10 minutes.
2. Cover with a sterile dressing.
3. Get medical help as soon as possible.
4. DO NOT attempt to neutralize acid or caustic materials.

4). Shock (caused by bleeding, heart stoppage, falls, and numerous other injuries)

* First concern - begin treatment for shock

A. Signs of shock:

1. Cold, clammy skin

2. Rapid pulse

3. Quick, irregular breathing

4. Weakness, nausea

B. What to do when the signs of shock are noticed:

1. If the victim is breathing, control the breathing to prevent hyperventilation.

2. If the breathing has stopped, restore using mouth-to-mouth resuscitation.

3. Keep the victim lying down and quiet, and elevate the victim's legs.

4. Keep the victim warm and dry.

5. If the victim is unconscious, lay the victim on one side to allow the drainage of fluids from the mouth.

6. DO NOT administer stimulants by mouth.

** STAY WITH THE VICTIM AND MONITOR HIS/HER BREATHING **
** GET MEDICAL HELP AS SOON AS POSSIBLE **

NOTE: Shock, by itself, can be fatal, even though the injury itself may appear to be minor or not critical. Be alert for the signs of shock.

5. Heatstroke and Heat Exhaustion

Heatstroke and heat exhaustion can occur when personnel work in a hot environment such as a hot boiler room, or over-exerting while performing field duties such as monitoring or surveying.

Avoiding direct sunlight will not necessarily protect you from the ill effects of heat. It is possible to suffer heatstroke even when the temperature is fairly low. Excessive humidity can induce over-heating by interfering with the perspiration-evaporation-cooling process of the body, causing excessive sweating and the loss of salt and water.

A. Heat Exhaustion

The signs and symptoms of heat stroke or heat exhaustion are variable with the developing condition. Headache, slight to severe dizziness, some mental

confusion or loss of physical coordination; and pale, sweaty skin are all symptoms of heat exhaustion. To care for a person who has suffered heat exhaustion, move them to a cool place and keep them at rest. Fan the patient's body to expedite the cooling process, and watch for the signs of shock. If the patient becomes unconscious, or fails to recover rapidly, alert the local EMS service.

B. Heatstroke ("Sunstroke")

Heatstroke is a much more serious condition than heat exhaustion. The temperature of the body can rise to such a point that the victim's brain cells may be damaged. The EMS system must be notified immediately upon determination that heatstroke has or is occurring. Symptoms of heatstroke are dry, hot skin, deep breaths followed by shallow breathing, dilated (large) pupils, loss of consciousness, and convulsions or twitching of the muscles. Care for the patient includes cooling the body as quickly as possible, in any manner possible. Removing the clothing and placing wetted towels or sheets over the patient will help cool the body down. If available, ice packs can be placed in strategic locations on the body, such as under the armpits, on the ankles, or resting on the neck, in order to speed the cooling. Remember that the EMS system must be alerted immediately upon the determination that heatstroke is occurring or has occurring.

Replacement of the electrolytes lost during sweating is very important when working in hot environments. Copious amounts of liquids must be consumed to replace these and balance out the blood. Quickick, Squincher, or Gatorade are the three brands of beverages that will allow the electrolyte balance to be restored. Contractors should have drinks of this type available for their personnel. Employees performing work in hot environments should be encouraged to drink liquids as often as possible, even when they are not thirsty. Make sure that the proper drinks are specified.

The choice of on-the-job clothing is also very important. Cotton is a very good choice for hot summer weather. Due to the regulatory requirements, however, workers in asbestos related occupations do not have a choice for clothing. When working in Personal Protective Equipment such as Tyvek suits, it is essential to wear as few heat retaining articles of clothing as possible.

Careful monitoring of the employees engaged in demanding work during hot, humid days is a must to guard against the dangers of heat exhaustion and heatstroke, but as an employee of CEMI, you need to protect yourself first from the dangers of overheating in the field. Know the warning signs and first aid necessary to prevent heatstroke and heat exhaustion.

* End of Section *

APPENDIX C

EXPOSURE LIMITS

Name: **Benzene**

Exposure and Explosive Limits:

- **EXPOSURE LIMITS:**

  OSHA 8 hour permissible exposure limit = 1.0 ppm
  OSHA 15 minute short term exposure limit = 5.0 ppm
  ACGIH 8 hour time weighted average = 10 ppm

  * **ACGIH recommends the substance be treated as a suspected human carcinogen.**

- **EXPLOSIVE LIMITS: Not applicable**

Appearance and Odor:

- **Colorless to light yellow liquid**
- **Odor threshold = 1.5-5 ppm; aromatic odor**

Symptoms:

- **CONTACT: Eye and skin irritation**
- **INHALATION/INGESTION: Nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, gastro-intestinal irritation, vomiting, diarrhea.**

First Aid:

- **EYE CONTACT: Immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Seek medical attention immediately.**
- **SKIN CONTACT: Wash the contaminated skin with soap and water. If this chemical penetrated through the clothing, immediately remove the clothing, wash the skin with soap and water, and seek medical attention promptly.**
- **INHALATION: If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Seek medical attention as soon as possible.**
- **INGESTION: Seek medical attention immediately.**

Sources:
1) NIOSH Pocket Guide to Chemical Hazards.
2) Threshold Limit Values and Biological Exposure Indices for 1989-1990 (ACGIH).

Name: **Diesel (Fuel Oil No.2)**

Exposure and Explosive Limits:

- **EXPOSURE LIMITS: None established**
- **EXPLOSIVE LIMIT: Not applicable**

Appearance and Odor:

- **Colorless to yellow brown oily liquid**
- **Odor threshold = 0.082 ppm; mild petroleum odor**

Symptoms:

- **CONTACT: Eye and skin irritation**
- **INHALATION/INGESTION: Pneumonitis, convulsions, abdominal pain, cough, headache, dizziness, nausea, vomiting, incoordination, and stupor.**

First Aid:

- **EYE CONTACT: Immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids, until no evidence of chemical remains (approximately 15-20 minutes). Seek medical attention immediately.**
- **SKIN CONTACT: Remove contaminated clothing and shoes immediately. Wash the contaminated skin with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). Seek medical attention immediately.**
- **INHALATION: Move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Treat symptomatically and supportively. Seek medical attention immediately.**
- **INGESTION: Seek medical attention immediately.**

Name: **Ethyl Benzene**

Exposure and Explosive Limits:

- **EXPOSURE LIMITS:**

  OSHA 8-hour permissible exposure limit average = 100 ppm
  ACGIH 8 hour time weighed average = 100 ppm
  ACGIH short term exposure limit = 125 ppm

- **EXPLOSIVE LIMITS:**

  Low explosive limit = 1.0%
  Upper explosive limit = 6.7%

Appearance and Odor:

- **Colorless liquid**
- **Aromatic Odor**

Symptoms:

- **CONTACT: Irritation**
- **INHALATION/INGESTION: Mucous membrane irritation, headache, and dermatitis.**

First Aid:

- **EYE CONTACT: Immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Seek medical attention immediately.**
- **SKIN CONTACT: Wash the contaminated skin with soap and water. If this chemical penetrated through the clothing, immediately remove the clothing, wash the skin with soap and water, and seek medical attention promptly.**
- **INHALATION: If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Seek medical attention as soon as possible.**

Sources: 1) NIOSH Pocket Guide to Chemical Hazards.
2) Threshold Limit Values and Biological Exposure Indices for 1989-1990 (ACGIH).

Name: **Gasoline**

Exposure and Explosive Limits:

- **EXPOSURE LIMITS:**

  ACGIH 8 hour time weight average = 300 ppm
  ACGIH 15 minute short term exposure limit = 500 ppm

- **EXPLOSIVE LIMITS:**

  Lower explosive limit = 1.4%
  Upper explosive limit = 7.6%

Appearance and Odor:

- **Colorless to dark liquid**
- **Odor threshold = 0.5 ppm; gasoline odor**

Symptoms:

- **CONTACT: Eye and skin irritation**
- **INHALATION/INGESTION: Drowsiness and unconsciousness**

First Aid:

- **EYE CONTACT: Immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids, until no evidence of chemical remains (approximately 15-20 minutes). Seek medical attention immediately.**
- **SKIN CONTACT: Remove contaminated clothing and shoes immediately. Wash the contaminated skin with soap or mild detergent and large amounts of water until no evidence of chemical remains (approximately 15-20 minutes). Seek medical attention immediately.**
- **INHALATION: Move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Treat symptomatically and supportively. Seek medical attention immediately.**
- **INGESTION: Seek medical attention immediately.**

Source: **Threshold Limit Values and Biological Exposure Indices for 1989-1990 (ACGIH)**

Name: **Lead (Inorganic Fumes and Dusts)**

Exposure and Explosive Limits:

- **EXPOSURE LIMITS:**

  OSHA 8 hour permissible exposure limit - 0.05 mg/m^3
  NIOSH 10 hour time weighted average < 0.1 mg/m^3
  ACGIH 8 hour time weighted average = .15 mg/m^3

- **EXPLOSIVE LIMITS: Varies with particular compounds**

Appearance/Odor:

- **Varies with particular compounds**

Symptoms:

- **INHALATION/INGESTION: Lassitude, insomnia, malnutrition, abdominal pains, anemia, tremors, and paralysis.**

First Aid:

- **EYE CONTACT: Immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids, until no evidence of chemical remains (approximately 15-20 minutes). Seek medical attention immediately.**

- **SKIN CONTACT: Promptly flush the contaminated skin with soap and water. If this chemical penetrates through the clothing, promptly remove the clothing and flush skin with water. If irritation persists after washing seek medical attention.**

- **INHALATION: Move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Treat symptomatically and supportively. Seek medical attention immediately.**

- **INGESTION: Seek medical attention immediately.**

Sources:
1) NIOSH Pocket Guide to Chemical Hazards.
2) Threshold Limit Values and Biological Exposure Indices for 1989-1990 (ACGIH).

Name: **Toluene**

Exposure and Explosive Limits:

- EXPOSURE LIMITS:
  OSHA 8 hour permissible exposure limit = 200 ppm
  OSHA ceiling limit = 300 ppm
  OSHA 10 minute peak = 500 ppm
  NIOSH 10 hour time weighted average = 100 ppm
  NIOSH 10 minute ceiling = 200 ppm
  ACGIH 8 hour time weighted average = 100 ppm
  ACGIH 15 minute short term exposure limit = 150 ppm
  OSHA immediately dangerous to life and health = 200 ppm

- EXPLOSIVE LIMITS:
  Lower explosive limit = 1.3%
  Upper explosive limit = 7.1%

Appearance and Odor:

- Colorless liquid
- Odor threshold = 4- ppm; aromatic odor

Symptoms:

- CONTACT: Eye and skin irritation, absorbed through skin and drying effect
- INHALATION/INGESTION: Unconsciousness, fatigue, confusion, dizziness, headache, nervousness, gastro-intestinal irritation, nausea, and vomiting.

First Aid:

- EYE CONTACT: Immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Seek medical attention immediately.

- SKIN CONTACT: Wash the contaminated skin with soap and water. If this chemical penetrates through the clothing, immediately remove the clothing, wash the skin with soap and water, and seek medical attention promptly.

- INHALATION: If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Seek medical attention as soon as possible.

- INGESTION: Seek medical attention immediately.

Sources: 1) Occupational Health Services, Inc.
2) Threshold Limit Values and Biological Exposure Indices for 1989-1990 (ACGIH).

Name: **Waste Oil (uncontaminated)**

Exposure and Explosive Limits:

- **EXPOSURE LIMITS: None established**
- **EXPLOSIVE LIMITS: Varies with particular compounds**

Appearance and Odor:

- **Appearance: Thick, dark liquid**
- **Odor: Petroleum**

Symptoms:

- **CONTACT: Skin and eye irritation; skin carcinogen**

First Aid:

- **EYE CONTACT: Immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Seek medical attention immediately.**
- **SKIN CONTACT: Wash the contaminated skin with soap and water. If this chemical penetrated through the clothing, immediately remove the clothing, wash the skin with soap and water, and seek medical attention promptly.**
- **INHALATION: If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Seek medical attention as soon as possible.**

Sources: 1) NIOSH Pocket Guide to Chemical Hazards.
2) Threshold Limit Values and Biological Exposure Indices for 1989-1990 (ACGIH).

Name: **Xylene**

Exposure and Explosive Limits:

- **EXPOSURE LIMITS:**

  OSHA 8 hour permissible exposure limit = 100 ppm
  NIOSH 10 hour time weighted average = 100 ppm
  NIOSH 10 minute ceiling = 200 ppm
  ACGIH 8 hour time weighted average = 100 ppm
  ACGIH 15 minute short term exposure limit = 150 ppm
  OSHA immediately dangerous to life and health = 1,000 ppm

- **EXPLOSIVE LIMITS:**

Flash points: Explosive Limit:	Lower Explosive Limit:	Upper
O-isomer = 90°F	O-isomer = 1%	O-isomer = 6%
M-isomer = 84°F	M-isomer = 1.1%	M-isomer = 7%
P-isomer = 81°F	P-isomer = 1.1%	P-isomer = 7%

Appearance and Odor:

- **Colorless liquid**
- **Odor Threshold = 0.5 ppm; aromatic odor**

Symptoms:

- **CONTACT: Eye and skin irritation**
- **INHALATION/INGESTION: Nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, headache, gastro-intestinal irritation, vomiting, and diarrhea**

First Aid:

- **EYE CONTACT: Immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Seek medical attention immediately.**
- **SKIN CONTACT: Wash the contaminated skin with soap and water. If this chemical penetrated through the clothing, immediately remove the clothing, wash the skin with soap and water, and seek medical attention promptly.**
- **INHALATION: If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Seek medical attention as soon as possible.**

Trichloroethylene

IMIS 2490 CAS 79-01-6
SYN Ethylene trichloride; Triclene
NIOSH RTECS KX4550000 DOT 1710 74
OSHA 100 ppm TWA, 200 ppm ceiling, 300 ppm peak for 5 min in any 2 hrs. (Z-2)
TLV 50 ppm, 270 mg/m3 TWA; 200 ppm, 1080 mg/m3 STEL
DESC Colorless liquid, unless dyed, with a sweet odor like chloroform. MW: 131 BP: 188 F VP: 58 mm MP: -123 F
INCOM Strong caustics; when acidic reacts with aluminum; chemically active metals; barium, lithium, sodium, magnesium, titanium
HLTH Narcosis (HE8); Cumulative systemic toxicity (HE3) Mutagen/Suspect carcinogen (HE2); Suspect teratogen (HE5)
SYMPT Headaches; vertigo; visual disturbance; tremor; somnolence; nausea, vomiting; eye irritation; dermatitis; cardiac arrhythmias; paresthesia
ORGAN Respiratory system, heart, liver, kidneys, CNS, skin
SLC1 MEDIA: Charcoal Tube (100/50 mg sections, 20/40 mesh)
ANL SOLVENT: Carbon disulfide
ALT SOLVENT: 99:1 Carbon Disulfide: Dimethylformamide
MAX V: 3 Liters (Ceiling) MAX F: 0.2 L/min (Ceiling)
ANL 1: Gas chromatography; GC/FID
. REF: 1 (NIOSH S336) SAE: 0.11 CLASS: Fully Validated
SAM2 Det. Tube Available from OSHA Cincinnati Lab:Trichloroethylene 4-132H
DET. TUBE: Sensidyne, 132L, 2-50 ppm
. Draeger, 67 28541, 2-200 ppm
. Draeger, CH 24401, 10-500 ppm
. MSA, 85834, 50-600 ppm
. MSA, 460328, 25-600 ppm
. Kitagawa, 134SA, 5-300 ppm
HNU Photoionization Detector
MIRAN 1A & 1B: MIN. Det.Con. 0.2 ppm at 10.7 um
MIRAN 103: Range 0-200 ppm at 12.8 um
Century Organic Vapor Analyzer

Tetrachloroethylene

IMIS 2020 CAS 127-18-4
SYN Perchloroethylene
NIOSH RTECS KX3850000 DOT 1897 74
OSHA 100 ppm TWA, 200 ppm ceiling, 300 ppm peak for 5 min. in any 3 hrs. (Z-2)
TLV 50 ppm, 335 mg/m3 TWA; 200 ppm, 1340 mg/m3 STEL
DESC Colorless liquid with an odor like ether or chloroform.
MW: 166 BP: 250 F VP: 14 mm MP: -8 F
INCOM Strong oxidizers, chemically active metals, such as barium, lithium, beryllium
HLTH Cumulative liver and CNS damage (HE3); Narcosis (HE8)
Mutagen (HE2)
SYMPT Eye, nose, throat irritation; nausea; flushed face, neck; vertigo, dizziness, incoordination; headaches; somnolence; erythema
ORGAN Liver, kidneys, eyes, upper respiratory system, CNS
SLC1 MEDIA: Charcoal Tube (100/50 mg sections, 20/40 mesh)
ANL SOLVENT: Carbon disulfide
ALT SOLVENT: 99:1 Carbon Disulfide: Dimethylformamide
MAX V: 3.0 Liters (Ceiling or Peak) MAX F: 0.2 L/min
MAX V: 10.0 Liters (TWA) MAX F: 0.2 L/min
ANL 1: Gas chromatography; GC/FID
. REF: 1 (NIOSH S335) SAE: 0.13 CLASS: Fully Validated
SAM2 Det. Tube Available from OSHA Cincinnati Lab: Perchloroethylene 4-133
DET. TUBE: Sensidyne, 133, 22-625 ppm
. MSA, 85834, 25-350 ppm
. MSA, 460467, 0-800 ppm
. Draeger, 67 26699, 5 to 50 ppm
. Draeger, CH 30701, 10 to 500 ppm
. Kitagawa, 135SA, 5-300 ppm
MIRAN 1A: MIN. Det. Con. 0.08 ppm at 11.0 um
MIRAN 103: Range 0-200 ppm at 12.8 um
Century Organic Vapor Analyzer

1,2-Dichloroethylene

IMIS 0870 CAS 540-59-0
SYN Acetylene dichloride; cis-Acetylene dichloride; Dioform; trans-Acetylene dichloride; sym-Dichloroethylene; Dichloroethylene
NIOSH RTECS KV9360000 DOT 1150 29
OSHA 200 ppm, 790 mg/m3
TLV 200 ppm, 790 mg/m3 TWA; 250 ppm, 1000 mg/m3 STEL
DESC Colorless liquid with an ether-like, slightly acrid odor, like chloroform.
MW: 97 BP: 113 to 140 F VP: 180 to 265 mm MP: -56 to 115 F
INCOM Strong oxidizers
HLTH Narcosis (HE8)
CNS effects (HE7)
SYMPT Eye, respiratory system irritation; CNS depression
ORGAN Respiratory system, eyes, CNS
SLC1 MEDIA: Charcoal Tube (100/50 mg sections, 20/40 mesh)
ANL SOLVENT: Carbon disulfide
MAX V: 3 Liters MAX F: 0.2 L/min
ANL 1: Gas chromatography; GC/FID
. REF: 1 (NIOSH S110) SAE: 0.09 CLASS: Fully Validated
SAM2 DET. TUBE: Sensidyne, 132H, 10-450 ppm
. MSA, 85834, 10-300 ppm (CIS-1-2)
. MSA, 85834, 50-400 ppm (TRANS-1-2)
. Kitagawa, 145S, 5-400 ppm
MIRAN 1A & 1B: MIN. Det. Con. 0.2 ppm at 12.2 um
MIRAN 103: Range 400 ppm at 11.1 um

APPENDIX D

FORMS

PLAN ACCEPTANCE FORM

PROJECT HEALTH AND SAFETY PLAN

Instructions: This form is to be completed by all CEMI and subcontractor personnel prior to the commencement of work on the subject project.

Project No.: 2403C.16

Client: General Services Administration

I represent that I have read and understood the contents of the above plan and agree to perform my work in accordance with it.

Signature:_____ **Date:**_____

Signature:_____ **Date:**_____

Signature:_____ **Date:**_____

Signature:_____ **Date:**_____

Signature:_____ **Date:**_____

Signature:_____ **Date:**_____

Signature:_____ **Date:**_____

Signature:_____ **Date:**_____

Signature:_____ Date:_____

Signature:_____ Date:_____

SUBCONTRACTOR PLAN ACCEPTANCE FORM

The following subcontractors have been hired to perform work during this operation. All employees of subcontractors hired to perform work with the potential for exposure to hazardous waste shall meet the requirements of 29 CFR 1910.120.

Name: West Hazmat, Drilling Company **Tel No:** (800) 886-7456

Address: 8261 Enterprise Drive, Newark, California 94560

Authorized Representative: Michael Walik

Services Provided: Drilling and Well Installation

Contract No. P.O. No. **Date:**_____

Name:_____ **Tel No:**_____

Address:_____

Authorized Representative:_____

Services Provided:_____

Contract No._____ **Date:**_____

For Subcontractor: CEMI is informing the subcontractor on this project of the known potential for encountering hazardous materials during this field investigation. The subcontractor will indemnify and hold harmless from and against all loss, damage and expense arising out of the work to be performed by the subcontractor at the site where hazardous materials may be expected.

FIELD EXPOSURE FORM

Name: Larry M. Harlan OTHER CEMI PERSONNEL ONSITE (Initials)_____

PROJECT NAME: Alameda Federal Center PROJECT NUMBER: 2403C.16
DATE(S) ONSITE:_____ DURATION ONSITE:_____

FIELD ACTIVITIES:

X DRILLING (Method: HSA X AIR ROTARY_ MUD ROTARY_
REVERSE MUD_ OTHER_)
__EXCAVATION (Equipment Type: Backhoe_ Gradall_ Dozer_ Other_)
__WATER SAMPLING (Quarterly Sampling Yes__ No__)
X SOIL SAMPLING
X AIR MONITORING (Equipment Type: PID X OVA_ Explosimeter_ Other_
__AIR SAMPLING
__OTHER _____

REMARKS: _____
_____
_____

PERSONAL PROTECTIVE EQUIPMENT (PPE)

___ LEVEL A X HARD HAT X GLOVES (Nitrile)
___ LEVEL B X SAFETY VEST __ GLOVES (Leather
___ LEVEL C X SAFETY GLASSES/GOGGLES __ RESPIRATOR
X LEVEL D X GLOVES (Disposable) (Type: _____)
X HEARING PROTECTION

OTHER: Steel toed safety boots _____

_____

INDICATE ANY PROBLEMS ENCOUNTERED WHILE ONSITE:

_____

_____

SIGNATURE_____ DATE_____

APPENDIX E

EQUIPMENT CHECKLIST

APPENDIX E

EQUIPMENT CHECKLIST

Personal Protective Equipment

__ APR available
___ Full Face
_X_ Half Face
Cartridge Type: Organic Vapor
___ Escape pack
_X_ Surgical Gloves
_X_ Outer work Gloves
___ Type: Solvex
_X_ Protective Clothing
Type: TYVEK Coated__ Uncoated_X_
_X_ Rain Suit
Butyl apron
_X_ Safety glasses
_X_ Hard hat
___ Neoprene safety boots
_X_ Steel-toed boots
___ Boot covers
_X_ Hearing protection
___ Nomex Coveralls

Instrumentation

___ OVA
___ HNU-PID
_X_ OVM
___ TIP
___ Explosimeter (GasTech)
___ Draeger kit:
Tubes: Benzene
___ Low flow air pumps
___ Radiation monitor
___ Radiation dosimeters
___ Noise meter
___ WBGT
___ pH meter
___ Magnetometer
___ GPR
___ EM
___ Hydrogen sulfide meter
___ Blue Litmus paper

Site Security

_X_ Traffic cones
_X_ Flagging tape
_X_ Warning signs
_X_ Waste Drum labels
___ Security guard
Other:_____

Decontamination Equipment

_X_ Plastic Sheeting
_X_ Large Washtubs
_X_ Small Washtubs
_X_ Scrub Washtubs
_X_ Pressurized Sprayers
___ Solvent Sprayers(s)
___ Plastic Trash Cans
_X_ Trash Bags
_X_ Water bottles
_X_ Paper towels
_X_ Duct tape
___ Masking tape
_X_ Zip lock bags
_X_ Detergent
___ TSP
_X_ Distilled Water
___ Sodium Hypochlorite
___ Sodium Bicarbonate
___ Bleach
_X_ Hand soap
___ Solvent Rinse
___ Acetone
___ Hexane
___ Methanol
___ Isopropyl Alcohol
Other:_____

First Aid Equipment/Supplies

- X First Aid Kit (10 unit minimum)
- ___ Oxygen
- X Eye wash
- ___ Thermometer(s)
- ___ Blood pressure monitor
- X Drinking water
- X Fire Extinguisher
- ___ Stretcher

Sampling Equipment

- X Brass Rings (2 inch)
- X Brass Ring Caps
- X Teflon Tape
- __ 40 ml Vials
- __ Sampling Jars
- X Ice Chest and Ice
- __ Sampler Rack
- __ Soil Gas Survey Kit
- __ Rope
- X Pipe wrenches (2)
- Other:_____
- X Chain of Custody Forms (Blanks)
- ___ Bladder Pump
- ___ Foot Pump
- ___ Hand Auger
- ___ Teflon Hose (__ ft)
- ___ Hose Connector
- ___ Bailer
- ___ Submersible Pump
- ___ Breaker Bar
- ___ Drive Sampler

Other Equipment

- X Camera
- X Film
- X Drum Dolly
- X Trowels (stainless steel)
- __ Pick
- __ Shovels
- __ Fencing
- __ Thieving Rods
- X Bung wrench (brass)
- __ Step ladder
- X Radio/Mobile Telephone
- X Clipboard
- X Field Report Forms (Blanks)
- __ Binoculars
- __ Megaphone
- X Tool kit
- __ Tables
- __ Chairs
- Other:_____