STATE OF CALIFORNIA, TRANSPORTATION AGENCY PETE WILSON, Governor
DEPARTMENT OF TRANSPORTATION
DIST 04 CONSTRUCTION FIELD OFFICE
680 8TH STREET SUITE 240
SAN FRANCISCO, CA 94103
Ph: (415) 557-7912
Fax: (415) 557-7776

June 25, 1996

04-043434
04-ALA-80-1.0/1.3
Seismic Retrofit

Alameda County
Environmental Health Services
1131 Harbor Bay Parkway, #250
Alameda CA 94502-6577

Attn: Dale Klettke, CHMM
Hazardous Materials Specialist

Letter # 02

RE: **Removal and Disposal of Contaminated Soil from the Project Site.**

Dear Mr. Klettke,

Following our phone conversation on June 24, 1996, and in reference to your letters dated June 3 and June 17, 1996, enclosed please find:

- One copy of the Special Provisions and the Contract Plans for this project;
✓ - One copy of the Sampling and Analysis Procedure;
- One copy of the test results representing the soil material excavated on this project to date; and
✓ - One copy of the Site Specific Health and Safety Plan.

If I can be of further assistance please call me directly at (510) 286-6781.

Sincerely,

JOE BROWNE
District Director

By: Jit S. Pandher

Jit S. Pandher
Senior Construction Engineer
Division of Construction - North

Enclosures
cc w/o enc.: - Sumadhu Arigala, RWQCB.
- Gil Jensen, Alameda County District Attorney.
- Andrew B. Fremier, Caltrans District 4.
- Daniel Murphy, Caltrans District 4.
- Allan Baradar, Caltrans District 4.
- Nader Eshghipour, Caltrans District 4.

BALFOUR BEATTY CONSTRUCTION, INC
BICC GROUP-WESTERN DIVISION

SITE SPECIFIC HEALTH AND SAFETY PLAN

SAN FRANCISCO-OAKLAND BAY BRIDGE
RETROFIT PROJECT

CAL-TRANS CONTRACT NO. 04-043434

PREPARED BY

COHRSSEN ENVIRONMENTAL, INC.
1990 LOMBARD STREET
SAN FRANCISCO, CA 94123

OCTOBER 31, 1995
Revision 2

ACKNOWLEDGMENT

THE SITE SPECIFIC HEALTH AND SAFETY PLAN FOR RETROFIT PROJECT OF THE SAN FRNACISCO-OAKLAND BAY BRIDGE (EAST BAY SPANS), CALTRANS CONTRACT-NO: 04-043434 WAS PREPARED BY ENVIROMATRIX, CO. FOR THE USE OF BALFOUR BEATTY CONSTRUCTION, INC. EMPLOYEES AND SUB-CONTRACTORS.

THIS PLAN WAS REVIEWED AND APPROVED BY MR. ANOUSH ZEBARJADIAN, P.E.

APPROVED BY: _____ *DATE* 9-14-95

Anoush Zebarjadian, PE.

(415) 642-1828 Tel
(415) 824-7120 Fax

3221 20th Street, Suite B
San Francisco, CA 94110

BALFOUR BEATTY CONSTRUCTION, INC.
BICC GROUP-WESTERN DIVISION

SITE SAFETY PLAN

Work Order # _____ Division _____

Office _____ Plan Approved by _____

Plan Prepared by Barbara C. Hessler Date Plan Prepared 10/26/95

Plan Reviewed by Michael Hayes Date Plan Reviewed 10/26/95

Jeff Rocca Date Plan Reviewed 10/26/95

Red Reppe, Inc. Date Plan Reviewed 10/26/95

by J.K. Mahoney

DESCRIPTION OF WORK LOCATION

Site/Facility Name: Campbell Bates BB 10/26/95

Dave Kaye BB.

Alameda County in Oakland on the San Francisco-Oakland Bay Bridge

Location of Project Site:

The project site is the area immediately under the elevated portion of the East Bay Spans of the San Francisco-Oakland Bay Bridge, north west of the toll plaza.

Access to Project office/Site:

Via access road west and north of the toll plaza.

Site/Facility:

( )	HW Site	( )	Industrial
(X)	Construction	( )	Emergency Response
(X)	Other Seismic retrofit project		

Project Status:

Project is scheduled to begin September 12, 1995 and continue for 450 working days.

Charles A. Powell

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1.0 PURPOSE AND OBJECTIVES

This Site Specific Health and Safety Plan (HSP) has been prepared in accordance with 29 CFR (Code of Federal Regulations) Part 1910.120 and 8 CCR (California Code of Regulations) 5192, Hazardous Waste Operations and Emergency Response, and 29 CFR Part 1926.62 and 8 CCR 1532.1, Lead Exposure in Construction Industry. The HSP is for the use by Balfour Beatty Construction, Inc. (BBCI) during retrofit project of the San Francisco-Oakland Bay bridge, East Bay Spans, (Caltrans Contract No: 04-043434) in the City of Oakland, County of Alameda. This document is an extension of the BBCI's Accident Prevention Program, Procedure 5000 (APP-P5000) and the Code of Safe Practices, which describes policies and procedures for general site safety, employee's training program and accident investigation and reporting, as specified under various Sections of Title 8. The BBCI's APP-P5000 is submitted to CalTrans, as a separate document.

The purpose of this HSP is to describe the potential chemical and physical hazards, and the health and safety procedures that will be followed by BBCI so that employees, subcontractors and the surrounding community are protected against exposure to potential airborne contaminants and other health and safety hazards which could occur during excavation and off-haul of potential hazardous and contaminated soils and the work of the project. The removal of these hazardous substances from the site will be in accordance with Section 25914.1 of the Health and Safety Code.

This plan provides contingencies to minimize personal exposure to toxic metals, hydrocarbons, and volatile organics when these contaminants maybe encountered and/or identified at the sites. The workers protection program described in this plan must be followed by everyone working at the site. Medical surveillance, personal protection, and hazardous waste training requirements in accordance with 8 CCR Section 5192 shall be met by all persons working in any exclusion zone established at this project site. Specific procedures to be employed for personnel protection when working in areas where significant concentration of contaminants are present are addressed in this plan.

Since site conditions are subject to change and unforeseen conditions may arise, amendments or additions may be need to be made to this Site Specific Safety Plan during the course of work. Modifications to the plan can be made by the Contract with the assistance of the Certified Industrial Hygienist.

This Site Specific Health and Safety Plan will be available in the on-site Balfour Beatty Construction, Inc. office and the offices located in El Dorado Hills, California.

2.0 SITE DESCRIPTION AND GEOLOGY

The project site is the area immediately under the elevated portion of the east bay spans of the San Francisco-Oakland Bay Bridge, north west of the toll plaza. The east bay spans crosses through the San Francisco Bay, and is located within a region of the bay that is

predominately industrial and commercial, including several ship yards, naval stations, and refineries on the south and north end of the project side (Figure 1, Site Location Map).

Subsurface soil conditions primarily consisted of sands, silty sands with gravel, and silts with gravel. These materials are presumed to be fill. Considerable debris including asphalt, concrete, and trash were encountered in several borings during the site's last investigations. The site geology typically consists of 10 to 15 foot thick layers of fill material on top of Bay Mud. Groundwater was encountered at depths of between 1.5 and 10 feet below the grade. Heaving sand and gravel were frequently encountered below ground water. The site also contains hazardous and contaminated soils and several locations (Figure 2, Location of Hazardous & Contaminated Footings).

3.0 KEY MANAGEMENT PERSONNEL

3.1 PROJECT MANAGER

Mr. Bev Trautman
Balfour Beatty Construction , Inc.

Main Office: (916)-939-9260
Site Office: (510)-836-8971
Home No: (916)-677-2546

The Project Manager (PM) will interact with Caltrans Engineers and local and state agencies as required to ensure proper implementation of the plan. The Project Manager, as the project team leader, will decide on stopping construction activity if any operation threatens worker or public health and safety.

3.2 Site Superintendent

Bart Trautman
Balfour Beatty Construction, Inc.

Main Office: (916)-939-9260
Site Office: (510)-836-8971
Cellular No.: (510)-772-3138
Home No.: (707)-425-7570

The Site Superintendent will also be responsible for site safety and the day to day operations of the job. The Site Superintendent will conduct the weekly tail gate meetings.

3.3 SITE SAFETY OFFICER

Mr. Crandall Bates
Balfour Beatty Construction , Inc.

Main Office: (916)-939-9260
Site Office: (510)-836-8971
Cellular No.: (510)-772-3139
Home No.: (916)-644-2329

The Site Safety Officer (SSO) will be responsible for the proper implementation and enforcement of this plan. He may designate other individuals, to perform some of the duties in an effort to maintain close supervision of the work performed under this plan. The SSO may stop the job if an operation threatens worker or public health and safety.

The Site Safety Officer will be assisted by the project Industrial Hygienist for ensuring worker health and safety and for periodically updating this plan as new information about the site is obtained.

The SSO responsibilities include:

1) Ensuring that the Hazardous Waste Training Program in accordance with Title 8 CCR, 5192, 5194 is completed and documented prior to any work in an exclusion zone.

2) Ensuring that training and medical surveillance requirements are fulfilled.

3) Developing the program for air sampling and personnel air monitoring for potential exposures to toxic metals and volatile organic compounds during excavation and truck loading, and general movement of hazardous soils as per Special Provisions.

4) Providing the personal protective equipment and to ensure that workers are properly equipped before entering designated exclusion zones or confined spaces.

5) Training site personnel in proper work practices, dust control procedures, and applicable engineering controls to minimize exposure to soil contaminants.

6) Developing the decontamination procedures for personnel and equipment.

7) Ensuring that personnel are familiar with emergency procedures, evacuation routes, site access and security procedures.

8) Documentation of personnel training records, medical screening tests, air monitoring results, and notification to all regulatory agencies in the event of an accident or hazardous material release into the environment.

3.4 ASSISTANT SITE SAFETY OFFICER

Dan Kingery	Main Office: (916)-939-9260
Balfour Beatty Construction, Inc.	Site Office: (510)-836-8971
	Cellular No.: (510)-772-3141
	Home No.: (510)-654-0731

The assistant site safety officer will assist and back up the site safety officer during off-hours emergencies.

3.5 Caltrans Representative

Mr. Jit Pandher (RE) Resident Engineer	Tel. No.:	(415)-557-7846 (510)-286-6781

All phases of the construction will be conducted under general observation of the Resident Engineer. As the State representative, the RE will decide on stopping construction activity if any operation threaten workers or the public health and safety.

4.0 DESCRIPTION OF WORK

4.1 SCOPE OF WORK

The general scope of work in this project consists of performing seismic retrofit around structural columns, footings and foundations scheduled to be removed or replaced, and new columns to be built, supporting the San Francisco-Oakland Bay Bridge, east bay spans. (Bents 24 to 39).

For the purpose of heavy equipment activities and limited height clearance, BBCI will excavate the ground, under the elevated portion of the bridge and along the service road, between Bents 28 to 39, approximately 5 to 15 feet below the ground surface. This will result in generating large quantities of excavated fill materials. It is anticipated the majority of the excavated soil can be used as backfill, or as directed by the RE.

There are a total of 29 existing footings and columns to be retrofitted. The scope of work covered under this plan is the excavation of approximately 9,000 cubic yards of potentially contaminated or hazardous soil from the general excavation and the footing foundations scheduled to be modified. The approximate quantity of contaminated or hazardous soil may decrease with additional soil sampling and analysis. The analyses to date show that most of the contamination is located within the first two to three feet of the surface of the soil.

CEECON will be responsible for the removal of Class I hazardous materials from the project site. CEECON's Site Specific Health and Safety Plan for this project has been provided to Balfour Beatty Construction, Inc. and is available in Balfour Beatty's on-site project office and in the corporate offices of CEECON.

4.2 DESCRIPTION OF WORK TASKS

The proposed Bridge footings and columns will be supported on piles. The initial phase of construction activities, covered by this plan, consist of the following tasks.

1. Drive sheetpiles around the perimeter of the work area to approximately 15 ft. below the ground surface. This task provides shoring prior to excavation.

2. Removal of contaminated and hazardous soils from the site.

3. Cut-off wall installation. This task will be performed prior to footing excavation, and provide barriers between ground water and excavation .

4. Excavation of footings, grading, and filling.

5. Soil off-haul and movement of excavated soil and drill cuttings.

6. Dewatering, and treatment of ground water, if applicable.

7. Pile driving, pile caps, concrete and steel foundation/support work.

8. Demolition of the existing bridge columns structure, and construction of new columns.

4.3 EXCAVATION AND SHORING PROCEDURES

Throughout the excavation and removal of contaminated and hazardous soils, work procedures will be employed to minimize the generation of airborne dust and volatile organic hydrocarbons.

A small rubber tired backhoe and a large track mount excavator will be used for footing excavation. A loader may be used for hauling and/or loading of contaminated and hazardous material, into the designated containers or truck beds, within the work zones.

Shoring will be used in many footings due to the depth of excavation and the presence of contaminants. Each shoring system will provide a physical barrier between the soil and the excavation. Different types of shoring systems will be used. Sheet pile cut-off wall will be driven next to the selected footings below the water table to minimize flow of water into the excavation. Shallow cuts, with 1:1 slope ratio will extend along the service road to access footing in Bents 24 to 39. A combination of Z-piles and 1:1 sloped excavation will be in place at Bents 28 to 38 left and right.

4.4 DEWATERING PROCEDURES

BBCI shall take all necessary precautions and preventative measures to prevent flow of water, including ground water, from entering any excavation as per the Special Provisions Specifications 10-1.23, Water Control.

Ground water entering an excavation will be discharged to closed top and water tight holding tanks for treatment and further analytical testing prior to discharge. Ground water monitoring and sampling will be conducted in accordance with Region 2 Water Quality Control Board permit.

4.5 DUST CONTROL

To reduce health risks to workers and the general public, work procedures will be employed to minimize exposure to the soil contaminants and to achieve a goal of "No Visible Dust Emissions."

During excavation of the footings containing hazardous and/or contaminated materials, emissions of airborne dusts is not anticipated as the water table is relatively high and the soil is generally moist. However, a spray of water may be used as a minimum engineering control during excavation, soil removal and piling operations.

Dust control of the exposed soils includes wetting the soil, controlling vehicle speed, covering soils with tarps, and minimizing the area of exposed soil.

4.6 WORK ZONES

When heavy metals are present in hazardous concentrations in the material to be excavated, as determined by soil sampling and analysis, work zones will be established and enforced to ensure that workers and the public are properly protected from potential hazards and that soil contaminates are properly confined to the work zone.

Prior to surface excavation of the footings where soil has been previously identified as contaminated and/or hazardous, the Site Safety Officer will establish, as necessary, an exclusion zone (contaminated area). The exclusion zone will be clearly marked by placards, hazard tape and/or signs and will be enclosed by a temporary orange mesh plastic fencing (around the footings), while the excavation, truck loading, and piling operations are in progress. A decontamination area will also be located immediately outside the exclusion zone (clear zone) for decontamination of personnel and equipment. All other areas not designated as exclusion or decontamination zones will be designated as clear zones.

BBCI is planning to establish several exclusion zones around designated hazardous footings. Generally, excavation and off-hauling of hazardous materials from Bent 24 to 26 left will take place within an exclusion zone. The exclusion zone(s) shown in Figures 3 and 4 may be relocated based on confirmation soil sample results and designation of hazardous footings.

4.7 TRANSPORTATION PROCEDURES

Transportation of all hazardous/contaminated materials will be done by Ned Pepper, Inc. (NPI), in compliance with all laws and regulations in California. Truck loading and movement of hazardous soils will take place inside the exclusion zones.

5.0 DESCRIPTION OF POTENTIAL HAZARDS

5.1 HAZARD RISK ANALYSIS

Potential exposure pathways, chemical hazards, physical hazards, and protective equipment are all involved in an analysis of risk. Table 1 provides a risk analysis of each task to be performed. Table 2 provides a checklist to identify physical hazards for the work tasks listed in Section 4.2 The physical and chemical hazards are summarized below:

5.2 POTENTIAL PHYSICAL AND SAFETY HAZARDS

The potential safety hazards referred as physical hazards posed by this project are those normally found at any site in which excavation, shoring, drilling, and pile driving occur. The safety procedures pertaining to this work are covered in the Code of Safe Practices found in the BBCI "Accident Prevention Program Procedure 5000," and are not repeated in detail in this Site Specific Health and Safety Plan.

5.2.1 Mechanical Injury

Heavy equipment will be operated by trained and qualified workers and subcontractors. If subcontractors are observed to be operating equipment in an inappropriate or incompetent manner, the Site Safety Officer (SSO) shall immediately notify the Project Manager (PM), who will take appropriate action. All workers will be notified of safety precautions to take when working near large machinery during construction activities (e.g., backhoes, loader, excavators).

BBCI will ensure that warning devices, such as rollover cages, horns, back-up-alarms, and seat belts, are in proper working order. Equipment requiring repair will be de-energized before repair begins; this may require bleeding hydraulic lines and blocking elevated equipment.

In addition, employees and visitors will be instructed to remain clear of all heavy equipment. Heavy equipment such as crane booms and crane lines must be prevented from coming any closer than 10 feet from overhead power lines up to 50 KV, plus 0.4 inches for each 1 KV over 50 KV.

If persons must work near heavy equipment to sample soils or perform other duties, the equipment operator will be informed. Traffic spotters will be used when operating near public roadways or other hazardous areas. Finally, spotters and other workers working near heavy equipment or roadway shall wear traffic vests to increase their visibility.

5.2.2 Physical Injury

To avoid physical injury, employees will be prohibited from working in or entering unshored trenches or excavations greater than five feet deep, or excavations where shoring or other

protection from cave-ins is required but not supplied (even if less than five feet deep). Employees shall follow safety procedures and Code of Safe Practices. Hard hats, and safety shoes are required in all areas of the site. Safety glasses shall be worn whenever conditions warrant them.

Underground Service Alert (USA) will be contacted prior to any excavation activities to determine if underground utilities may be present on-site. Caltrans or other property owners or occupants will also be contacted to verify information on underground utilities and or/overhead structures or lines.

Trip, slips, and falls are a leading cause of serious injuries at construction sites. Slip and trip hazards are often a result of poor housekeeping. BBCI will ensure that the site is maintained clear of any debris and surface encumbrance.

Trenches, holes, and other openings that employees could trip on or fall on will be covered or otherwise secured. BBCI will also be implementing a fall prevention program in *conformance with CCR Title 8, Subchapter 4 and California regulations for work on* elevated surfaces.

The entire project site is designated as a hard-hat area; all personnel will wear ANSI approved head protection. Manual handling strains will be prevented through the use of mechanical handling devices such as forklift and drum dollies. Where manual handling is necessary, workers will be instructed in proper lifting techniques and limitations.

Other on-site potential safety hazards are covered under Code of Safe Practices in the *BBCI Accident Prevention Program manual.*

5.2.3 Heat Stress

Heat stress is a major hazard for workers wearing protective clothing. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. In its early stages, heat stress can cause rashes, cramps, discomfort and drowsiness. Continued heat stress can lead to heat stroke and death.

It is unlikely that heat stress will be a significant hazard at the site. However, a work rest regime will be initiated when ambient temperature and protective clothing create a potential heat stress situation.

In the event that unseasonably warm weather is experienced, the Project SSO will institute preventive measures. Preventive measures include training (during tailgate safety meetings) work slow down , personnel rotation, consumption of at least 8 ounces of cool water, or diluted fruit juice at each rest break, and work/rest schedules.

If protective clothing being worn and ambient temperature exceeds 75 degrees Fahrenheit, the following work rest regimes are recommended:

Temperature	Work	Rest*
75 - 80	90 min.	15 min.
80 - 85	60 min.	15 min.*
85 - 90	45 min.	15 min.*
90 - 95	30 min.	15 min.*

* Rest in a shaded area. ACGIH Guidelines assume light to moderate work.

Heat exhausted workers should retire to a cooler area and slowly drink cool liquids. Heat stroke victims must be cooled immediately and medical attention sought.

5.2.4 Illumination, Noise, and Sanitation.

It is anticipated that some of the construction activities will be conducted during night hours. All on-site illumination will meet the minimum illumination intensities for specific on-site operations as listed in Title 8 Section 1523 of the California Code of Regulations.

Major sources of noise on this construction site are pile driving, drilling operations and traffic. Noise levels that exceed 85 decibels (dBA) averaged over an eight-hour work period will require the General Contractor to implement a Hearing Conservation Program. As a minimum, personnel will wear hearing protection in the vicinity of the drill rig or pile driving operation, if conversation can not be easily conducted at distances of 3.0 feet.

Sanitation facilities (including toilet and portable water) will be provided for workers on the site. All workers will be required to wash their hands prior to leaving the job site. Although shower facilities are not available on-site, workers will be able to decontaminate themselves with the on-site facilities. They are urged, however, to shower immediately upon returning home. See also Decontamination procedures, Section 8.0.

5.2.5 Electrical Hazards

Overhead power lines, downed electrical wires, and buried cables can pose a danger of shock or electrocution if workers contact or sever them during site operations. Electrical equipment used on site may also pose a hazard to workers. To help minimize this hazard, low-voltage equipment with ground fault interrupters and water tight, corrosion-resistant connecting cables will be used on site. Assured grounding will also be used.

5.3 POTENTIAL HEALTH HAZARDS

There are potential health hazards associated with exposures to contaminants in the soil at the site. Figure 2 in the Appendix, shows the locations of contaminated and hazardous footings and the corresponding concentrations of contaminants in the soil. Table 3 lists the potential site contaminants, health hazards associated with exposures to them and

their Permissible Exposure Limits. The sections below discuss each contaminant and the potential health hazards associated with soil or ground water contamination.

A preliminary site investigation included drilling soil test borings at each of the columns and footings in Bents 24 to 36. The soil samples were collected at the surface and in approximately 3-foot intervals to depths of between 4 and 17.5 feet below grade. The Site Investigation for Oakland Bay Bridge East Bay Spans was conducted by APEX Environmental Recovery, dated August 22, 1994.

To provide for the health and safety of workers and the public, BBCI will assume that the excavated fill material along the service road, particularly within three feet of the surface, is potentially hazardous and/or contaminated. This assumption is based on the subsurface investigations at the footings (Bent-24 to Bent-36) which are in close proximity to the service road. Elevated concentrations of heavy metals (particularly lead) and hydrocarbons were found at several Bents. Traces of organochlorine pesticides, and PCB's were detected at several Bents. Figure 2 shows the locations of contaminated and hazardous soils.

5.3.1 Heavy Metals

Eleven columns studied in SF-Line and eight columns in S1-Line indicated elevated concentrations of heavy metals in the material to be excavated. Analysis of the soils detected concentrations of lead above the total threshold limit concentration (TTLC) in five samples. The soluble threshold limit concentration (STLC), which is the regulatory level for the soluble fraction of metals, indicate that eighteen samples had concentrations of lead above the STLC of 5 mg/L.

Hazardous concentrations of total lead, 11,500, 4,520 and 4,510 ppm were detected in the surface soil samples (0-4') collected from Bent 24-C1, Bent 30-C2, and 36 left, respectively. The TTLC is the regulatory level for total concentrations of metals (TTLC for lead = 1000 mg/kg or 1000 ppm). Elevated concentrations of total lead from 34 to 930 ppm were detected in most of the soil collected from Bents 27- to 32.

Concentrations of arsenic, chromium, and zinc were also detected in the soil samples collected from the investigated footings including Bents-27, 32, and 36.

Exposure to lead and other heavy metals can be prevented by using engineering controls, respiratory protection and protective clothing. See Table 3 and Section 6.0, Personal Protective Equipment.

5.3.2 Petroleum Hydrocarbons

Concentrations of total recoverable petroleum hydrocarbons (TRPH) ranged from 8.4 ppm to a maximum concentration of 7800 ppm in the soil sample B27C1-8. TRPH concentrations (hydrocarbon <1000 ppm) are present in Bents 32 and 36 in SF and S1

Lines. APEX investigations indicate that significant TRPH concentrations (above 100 ppm) were encountered primarily within three (3) feet of the surface.

The TRPH contamination relates to motor oil and diesel fuel residues. Exposure can be prevented by using protective clothing and gloves.

5.3.3 *Pesticides and PCB's*

Traces of organochlorine pesticides and PCB's were detected in thirteen of the soil samples, with concentrations ranging from 3.6 ppb to 312 ppb (B28 C2-0'). These substances are not considered to be a health hazard (see Table 3). Any potential exposure may be prevented by wearing protective clothing and gloves.

5.3.4 Volatile & Semi Volatile Organic Compounds (SVOC's)

No Volatile Organic Compounds (VOC's) were detected in any of the soil samples. Traces to low concentrations of semi volatile organic compounds (SVOC's) were detected in four of the surface soil samples at Bents-24, 26, and 28 (benzo (b) fluoranthene and benzo (k) fluoranthene were detected at 4,000 ppb in sample B26C1-0'. These concentrations of *polynuclear aromatic hydrocarbons are not considered to be health hazards. Generally,* the presence of asphalt debris in the soil can cause these contaminants. Potential exposure is prevented by using protective clothing and gloves.

5.4 HAZARDOUS SUBSTANCES INFORMATION

Soil contamination with heavy metals, particularly aerially deposited lead, in the soil is considered to be the primary health hazard at this project site. Air monitoring will be conducted to assess potential worker exposure to lead and other heavy metals, and the results will be evaluated and compared to the PEL standards.

The concentrations above the Cal/OSHA Permissible Exposure Limits (PEL) could cause health hazards due to inhalation, skin contact, and ingestion. See Section 7.0 for Air Monitoring procedures.

5.4.1 Lead

Exposure to airborne lead dust may occur as a result of work related activities. Exposure to lead dust can cause severe health effects, as a result of acute and chronic exposures. Therefore, employees' exposure should be carefully monitored and reduced to a minimum.

Lead exposure by inhalation poses the greatest risk because lead fumes and fine lead dust are readily absorbed into blood stream and distributed throughout the body; ingestion is another possible route of entry into the body. Skin absorption is not of major concern with exception of leaded gasoline additives. Repeated excessive exposures can cause a

gradual accumulation of lead, particularly in bones. Elimination of lead from the body is slow.

5.4.1.1 Symptoms of Lead poisoning

Most lead poisoning is the result of long term (chronic) overexposure, not single events. Symptoms of chronic overexposure include anxiety, weakness, headaches, excessive tiredness, and other indicators of central nervous system damage. Anemia, kidney damage, and reproductive effects in both men and women (sterility, miscarriages, birth defects) can also be caused by excessive exposures to lead. Fatigue, constipation, and disturbance of sleep may result from significant short-term (acute) exposures. With increased exposure, anemia may also occur.

5.4.2 Other Heavy Metals

Analyses of soil samples collected to date on this project site indicate that in addition to lead, the soil may be contaminated with low concentrations of heavy metals such as arsenic, chromium, nickel, and zinc. Concentrations of lead, nickel, and zinc in the soil samples collected at various bents, are typical contaminants in fill materials and are expected to be present in the excavated roadway material. Significant exposure to nickel dusts may cause eye and skin irritation. Ingestion is unlikely.

5.4.3 Petroleum Hydrocarbons

Analysis of soil samples collected at the footings in this project indicated presence of low to significant concentrations of total recoverable petroleum hydrocarbons (TRPH) in most of the soil samples during the APEX investigations. TRPH concentrations represent a wide range of petroleum hydrocarbon contamination in soil ranging from constituents of petroleum products in gasoline, diesel fuel, and motor oil to long chained hydrocarbons such as tar and asphalt.

Petroleum hydrocarbon fuel constituents such as benzene, toluene, ethylbenzene, xylene (BTEX), and other common petroleum related volatile organic compounds were not detected at or above the laboratory detection limits in the soil samples submitted for analysis and are not considered to be a health hazard.

To prevent exposure to airborne soil contaminants, BBCI will follow engineering controls and work practices, outlined in the following sections, to minimize any potential health and safety effects on the construction personnel as well as the general public.

6.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Careful selection and use of adequate PPE will prevent contact and minimize worker exposure to site contaminants. Use of personal protective equipment will vary according to the contaminants present in the area.

Initially workers will be provided with and required to wear the personal protective equipment listed below under Level-C protection whenever work involves direct contact with contaminated soil and ground water. Balfour Beatty Construction, Inc. employees will not have contact with contaminated soil and ground water. The employees of the subcontractors, Ned Pepper, Inc. and CEECON will have contact with these materials and they have had the appropriate training and required Respiratory Protection Programs in place.

Industrial hygiene air monitoring will be conducted during excavation of soil containing hazardous contaminants to evaluate exposure levels and adequacy of protective clothing. If the results of personnel air monitoring data indicate that the concentration of airborne contaminants is at or above the Cal-OSHA permissible exposure limit (PEL), workers will be required to wear the PPE listed for Level C protection in Table 4. If personal air monitoring data indicate that the concentration of airborne contaminants is below the CalOSHA PEL, workers shall wear the PPE in accordance with Level D protection.

Respiratory protection must be MSHA and NIOSH approved air purifying respirators equipped with HEPA filters or appropriate cartridge. Should contaminant levels exceed the protection factors of the air purifying respirators, an upgrade to Level B respiratory protection (SCBA) will be required. Tyvek suits or chemical resistant Saranex suits must be worn at all times by individuals working within the Exclusion Zones of the site when the PEL is exceeded.
Level-C protection would require worker training and medical screening for use of respirators under contractor's respiratory protection program. Title 8, Section 1531 of the CCR Construction Safety Orders and other applicable regulations.

By implementing work practices and engineering controls, respiratory protection is not expected to be required to prevent exposures to the soil generated airborne contaminants.

Personal protective clothing such as rain gear, boots, and vinyl gloves will be provided to the workers involved in dewatering operations at the footings containing potentially contaminated ground water.

6.1 REASONS TO UPGRADE OR DOWNGRADE PERSONAL PROTECTIVE EQUIPMENT

UPGRADE

a) Request of individual performing task.

b) Change in work task that will increase contact or potential contact with hazardous material.

c) Occurrence or likely occurrence of gas or vapor emission.

d) Known or suspect presence of dermal hazards.

e) Air monitoring data (Section 7.0).

DOWNGRADE

a) New information indicating that situation is less hazardous than originally thought.

b) Change in site condition that decreases the hazards.

c) Change in work task that reduces contact with hazardous material

d) Air monitoring data (Section 7.0).

6.2 PPE Limitations

The PPE selected for use at the site provides limited protection against chemical contaminants. Tyvek is selected because of it protective abilities against contact against soils containing low levels of contamination. Tyvek protective clothing must not be worn in areas where splashing of hazardous liquids on the skin is possible such as hazardous liquid storage areas. In such areas, a splash apron must be worn in addition to the Tyvek coverall or a polylaminated Tyvek coveralls must be worn. In addition, Tyvek clothing must not be worn by persons performing hot work such as welding, brazing, and metal cutting.

Half face air purifying respirators must not be worn in oxygen deficient atmospheres (where the oxygen concentration is below 19.5%) or where concentrations exceed the capabilities of the respirator cartridge. Also, respirator cartridges must conform to the chemical hazards present at the site. Always read the respirator cartridge prior to use to ensure that it is the correct type.

6.3 PPE Work Mission Duration

Disposable protective clothing is to be disposed of after each use. Disposable protective clothing must be replaced upon re-entry into the Exclusion Zone, or if the suit becomes damaged or saturated during use. Repairs to small rips may be made to protective clothing using duct tape.

6.4 PPE Maintenance and Storage

All PPE, including overboots and gloves, shall be maintained in good condition. Any PPE found to be torn, cut, punctured, or otherwise damaged shall be disposed of immediately. After use and decontamination, they shall be stored overnight in a closed container. The following day, the closed container shall be transported to the PPE donning area for reuse.

6.5 PPE Training and Proper Fitting

All personnel shall be thoroughly trained in the proper use and limitations of the equipment they are assigned to wear. Annual qualitative respirator fit tests are required of all personnel wearing air purifying respirators. Qualitative fit tests will use isoamyl acetate or irritant smoke. Additionally, a positive and negative fit check shall be conducted each time a respirator is donned.

6.6 Donning and Doffing Procedures

All PPE shall be donned prior to entering the contamination reduction zone. PPE shall be donned with the assistance of a "buddy" to verify that equipment is worn properly. All PPE shall be worn in accordance with the manufacturer's recommendations. At no time shall a person remove the designated PPE while in the work areas. Disposable PPE shall only be removed in the Contamination Reduction Zone upon exiting the Exclusion Zone. Personnel shall use seating in the contamination reduction zone to prevent tripping and falling during decontamination and doffing procedures.

6.7 PPE Inspection Procedures

PPE shall be inspected by employees prior to donning. Boots, gloves, and disposable clothing found to be defective shall not be worn and shall be properly disposed of. Defective respirators, safety glasses, and hard hats shall be reported to the Site Safety Officer and replaced.

6.8 Evaluation of the Effectiveness of the PPE Program

Periodic inspections and observations of the personnel using PPE shall be made by the Site Safety Officer to ensure that the PPE Programs elements are being followed.

7.0 AIR MONITORING

A primary concern on this project is the workers' potential exposure to contaminants in the soil contaminants. Air monitoring will determine compliance with CalOSHA regulations, permissible exposure limits, and to evaluate the effectiveness of engineering controls, work practices and personal protective equipment.

Air monitoring for heavy metals will be conducted in accordance with Title 8 California Code of Regulations (8-CCR), Sections 1532.1 and 5155. The regulations require employers to perform an initial exposure assessment by collecting full shift personal breathing zone samples. The results of the initial assessment determine implementation of the lead standard and the potential exposures to other airborne contaminants.

Air monitoring shall be performed for all personnel working in the Exclusion Zones (including State personnel). The monitoring shall be performed to quantify airborne concentrations of hazardous substances to determine the appropriate level of employee protection needed on site.

Monitoring shall be performed continuously when and where airborne concentrations of hazardous substances are anticipated to be the highest. Air monitoring results will be used to determine and evaluate engineering controls, work practices, and PPE so that employees are not exposed to concentrations that exceed PELs.

PROCEDURES

Health hazards at this site include potential exposures to chemicals in the soil via inhalation, ingestion or dermal contact. Personal air sampling pumps will be used to determine workers' potential exposure to nuisance dusts and lead containing dusts during excavation in hazardous locations. This personal air sampling will provide not only the assessments of workers conducting the activities associated with the excavation, but also it will show what the air concentrations are closest to the work activities.

Air monitoring will be performed by the on-site industrial hygienist, as directed by the Site Safety Officer. All monitoring will be in accordance with CalOSHA regulations. The monitoring results will be recorded and shall be forwarded to the Site Safety Officer. Each employee will be notified of the results of his/her air monitoring.

Area air samples may also be collected from selected locations around the excavation sites to determine the extent to which fugitive dust emissions maybe migrating off-site. The results of these analysis will be used to determine if dust suppression practices are adequate.

The personal air samples will be collected in the worker's breathing zone at 1.5 to 2.0 lpm flow rate for the entire shift. SKC sampling pumps, Model 224-PCXR3, operating at approximately 2 liters per minute for 8 hours in line 37 mm, 0.8 um pore size Mixed Cellulose Ester Filters (MCEF)will be used. The pumps will be calibrated before and after sampling using a precision rotometer which has been calibrated with a Gilibrator, serial

number 6033-H. The personal air sampling will be for full shift (or at least 7 hours) to reflect a time weighted average exposure. An example of the form on which the sampling data are collected and documented may be found in Appendix B.

The sampling will be conducted by an industrial hygiene technician who has had training in monitoring airborne concentrations of lead and will be under the supervision of a certified industrial hygienist.

Sampling and analysis procedures for nuisance dusts, lead and other heavy metals will follow those described in the National Institute of Occupational Safety and Health (NIOSH) Manual of Analytical Methods. Some of the samples will also be analyzed for chromium, copper, nickel, and zinc.

8.0 DECONTAMINATION PROCEDURES

The decontamination procedure will take place in a designated area within the work area called the Contamination Reduction Zone (CRZ). Depending on the specific job task, decontamination may include the workers and/or heavy equipment.

Prior to commencing excavation activities containing hazardous materials, BBCI's Safety Officer will establish and designate personnel decontamination zones and procedures to be employed. Figure-4 is a contingency plan, showing the proposed decontamination location. The exclusion and decontamination zones may be relocated based on the project needs.

Heavy equipment used for drilling, excavation, and transportation will be decontaminated prior to personnel decontamination. Vehicles that become contaminated with soil will be cleaned prior to leaving the site. The wheel wells, tires, sides of vehicles, etc. will be wiped clean, and/or high pressured washed, if needed, at a location to be determined by the SSO. All material scraped from the equipment will be placed in the current transport vehicle as the remainder of the material or be placed into the excavation.

Personnel will use steps and procedures outlined below as guidelines for personnel decontamination:

* Brush loose soil from protective clothing and body
* Remove boot (where appropriate)
* Remove all disposable clothing and gloves.
* Hard hat and respirator removal (where appropriate)
* Respirator wash (where appropriate)
* Field wash hands

Disposable personal protective clothing along with contaminated brushes and rags should be removed, bagged, and labeled as Hazardous Waste (they may be disposed of with excavation spoils). Reusable clothing such as boots, gloves, safety glasses will be decontaminated and stored on site inside sealed polyethylene bags for future use. Exteriors of respirators (if used) must be wiped clean with water and simple detergents and stored separately in protective bags. All personnel should shower as soon as possible after leaving the site.

9.0 MEDICAL SURVEILLANCE

A comprehensive medical surveillance is an essential component of a health and safety program. It is important for the health of prospective employees and for the potential liability of the employer that the health status of the employees be determined and documented prior to beginning employment.

According to the CalOSHA lead in construction industry standard, initial medical surveillance consisting of biological monitoring to include blood lead level (BLL) and zinc protoporphyrin (ZPP) level should be provided to all employees exposed to lead at or above the action level (30 ug/m3) on any one day.

The frequency of testing is increased to every two months for employees whose BLL exceeds 40 ug/dl. In addition, each employee whose blood level exceeds 50 ug/dl will be notified in writing and must be removed from further exposure to lead in any work environment.

Based upon previous air monitoring data collected on similar construction activities, and foreseeable work conditions, along with safe work practices, the exposure to airborne contaminants such as lead dust is not expected to approach the Cal-OSHA permissible exposure level. However, if respiratory protection is required, the targeted personnel will receive a medical examination, including pulmonary function testing, in accordance with California Code of Regulation (8-CCR, Section 1531).

All employees on the job site, who have a potential exposure to lead will be included in a blood lead surveillance program.

If an employee is overexposed to any hazardous substance at the job site and is sent to a physician for medical examination, the physician will be informed as to the nature of the overexposure, prior to the admittance at the facility. Any personnel decontamination procedures of the facility will be followed.

The results of any medical tests or physician reports will be provided to the affected employee and to the corporate offices of BBCI. This information is to remain confidential.

10.0 EMERGENCY PROCEDURES

10.1 PRE-EMERGENCY PLANNING

The Site Safety Officer will perform the applicable pre-emergency planning tasks before commencing field activities and coordinate emergency response with the facility and local emergency services provided as appropriate.

- Locate nearest telephone to the site and inspect on-site communications.
- Locate chemical and safety hazards.
- Confirm and post emergency telephone numbers and route to the hospitals. Figure 6 provides a route to the nearest emergency health care facility.
- Post site map marked with location of emergency equipment and supplies
- Review emergency response plan for applicability to any changed site conditions, alterations, in on-site operations, or personnel availability.
- Evaluate capabilities of local response team, if any.
- Where appropriate, inform emergency room/ambulance services and emergency response team of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.
- Inventory and check site emergency equipment and supplies.
- Review emergency procedures for personnel injuries, exposure, fire, explosion, chemical, and possible vapor releases with field personnel.
- Locate on-site emergency equipment and supplies of clean water.
- Verify local emergency contact, hospital routes, evacuation routes, and assembly points.

  Review names of on-site personnel trained in first aid and CPR.
- Review notification procedures for contacting designated medical consultant and team member's occupational physician.
- Brief new workers on the emergency response plan.

10.2 EMERGENCY EQUIPMENT AND SUPPLIES.

The Site Safety Officer (SSO) marks the locations of emergency equipment on the site map and post the map in the Support Zone.

- 20 lb ABC fire extinguisher
- Industrial first aid kit
- Additional emergency equipment: heat stress relief fluid (Gatorade, etc.).

10.3 EMERGENCY MEDICAL TREATMENT

The SSO will assume charge during a medical emergency until the ambulance arrives, or the injured person is admitted to the emergency room. The SSO will then respond to the medical emergencies in the following sequence:

Remove all unaffected personnel from the scene;

Assess the severity of the incident;

Contact the emergency assistance (paramedics) by dialing " 911";

Determine if decontamination will make injury worse. If yes, seek medical treatment immediately.

Notify the Project Manager of the injury.

Interview and investigate the circumstances surrounding the injury or exposure, complete an accident investigation report, and notify the State regulatory agencies.

10.4 EVACUATION

1. Evacuation routes will be designated by the SSO prior to beginning of work.
2. Onsite and offsite assembly points will be designated prior to beginning of work.
3. Personnel will exit the exclusion zones and assemble at the designated onsite assembly point upon hearing the emergency signal for evacuation of the exclusion zone.
4. Personnel will assemble at the designated offsite point upon hearing emergency signal for a site evacuation

5. The SSO and a "buddy" will remain on-site after the site has been evacuated (if possible) to assist local responders and advise them of the location and nature of the incident.

6. The SSO account for all personnel in the on-site assembly zone.

7. A person designated by the SSO (prior to work) will account for personnel at the offsite assembly area.

8. The SSO is to write up the incident as soon as possible after it occurs, and submit a report to the State and Project Manager.

In the event of an emergency such as a gas line leak or other hazardous condition, all personnel will evacuate immediately along predetermined routes and assemble at the designated points.

10.5 EVACUATION ROUTES AND ASSEMBLY POINTS

In the event of an emergency, personnel will evacuate the site using an upwind or crosswind route and if safe, assemble at the BBCI construction site or command post at the project site (not assigned yet). The SSO will designate specific evacuation routes prior to beginning work in a new area.

To institute and facilitate the responses to emergency situation, the SSO will conduct a safety meeting as outlined in sections 11.0 of this plan. Copies of this Health and Safety Plan will be distributed to all personnel working in the effected areas, such personnel will be required to sign a consent agreement, as shown in the last page of this HSP, which states that they have read the plans and understand all the requirements of the plan.

10.6 COMMUNICATION PROTOCOLS

The SSO or his designee will instruct all personnel with the emergency communications protocol. The following visual signals will be used as emergency communication signals:

a)	hand clutching throat:	out of air/can't breathe
b)	hands on top of head:	need assistance
c)	thumbs up:	OK/I'm allright/ I understand
d)	thumbs down:	no/negative

10.7 COMMUNICATION EQUIPMENT

The SSO and other key employees will be equipped with special two way radios. These radios can be used as telephones as well as pagers. The operation of this equipment and the phone numbers for this equipment will be provided in an Addendum to this Site Safety Plan when they are available. All onsite phone numbers are located in Appendix B.

10.8 EMERGENCY RESPONSE NOTIFICATION PHONE NUMBERS

Fire Control	911 (415)-861-8000
Police	911 (415)-553-0123
Ambulance	911 (510)-657-0777
Poison Control Hotline	(415) 656-2845
Underground Service Alert	1-800-642-2444
Western Utilities Underground Alert	1-800-424-3447
California Highway Patrol Dispatch	(707)648-5550
California Office of Emergency Assistance	1-800-852-7550
Fish and Game Department	(510)-667-7750
Regional Water Quality Control Board	(510)-286-1255
Department of Transportation/Coast Guard	(510)-286-4444
U.S. Environmental Protection Agency	(415)744-2000
U.S. Fish and Wildlife Service	(510)-792-0222
CalOSHA	(415)-557-1677
PG&E John Robinson	(510)-534-3265 (415)-807-8924 (pager)
San Francisco Department of Public Works Randy King	(415)-395-3962
Pacific Telephone Company Bill Price	1-(800)-86P-RICE
California Highway Patrol (CHP) Oakland San Francisco	 (510)-450-3821 (415)-557-1094
East Bay MUD Carey Barnecut	(510)-287-1685

11.0 TRAINING

The contents and requirements of this plan, along with potential hazards, health effects, personal protective equipment, medical screening practices, air monitoring procedures and exposure results, decontamination procedures and personal hygiene practices, and emergency protocols will be reviewed with each employee prior to their working in hazardous areas of the project covered by this plan.

All personnel working in direct contact with hazardous soil will receive at minimum 24-hour hazardous waste training program in accordance with Title 8 CCR, 5192, and 5194. In addition all personnel working in areas with exposure to lead at or above the action level will receive lead awareness training, included but not limited to the following:

* Review of the regulation (8-CCR , 1532.1)
* Description and location of lead containing material on-site;
* Sources of potential exposures;
* Health effects of exposure to lead;
* Personal Protective Equipment (PPE);
* Decontamination procedures;
* Exposure assessment and air monitoring procedures;
* Medical surveillance requirements; and
* Waste handling and disposal.

The area of work will be monitored and fully characterized. If it is determined that exposures are at/above the PELs and published exposure levels where respirators are necessary, and the characterization indicates that there are health hazards or of an emergency developing, all personnel shall have the additional 16 hours/two days of training. This determination will be done within three days of the start of work.

All training will be documented on a form similar in content to the one found in this plan.

11.1 Qualifications of Trainers

Trainers shall be qualified to instruct employees about the subject matter that is being presented in the training;. Such trainers shall have satisfactorily completed a training program for teaching the subjects they are expected to teach, or they shall have the academic credentials and instruction experience necessary for teaching the subjects. Instructors shall demonstrate competent instructional skills and knowledge of the applicable subject matter.

11.2 Emergency Response Training

Employees who are engaged in responding to hazardous emergency situations that may expose them to hazardous substances shall be trained in how to respond to such expected emergencies. At least two employees trained and currently certified in first aid and CPR shall be on site at all times.

11.3 Refresher Training

Employees, managers and supervisors specified in Section 3.4.2 shall receive eight hours of refresher training annually on the items specified under Training and any critique of incidents that have occurred in the past year that can serve as training examples of related work, or other relevant topics will be covered.

12. RECORD KEEPING

The records related to the health and safety of all personnel and visitors during construction of this project will be maintained by the Project Manager. These records will include:

* Medical screening and surveillance records
* Training records
* Air monitoring exposure records
* Site access log
* Daily log of Field Coordinator or his designee

APPENDIX A: FIGURE AND TABLES

ABLE 1

Risk Analysis of Job Tasks

BAY BRIDGE EAST BAY SPANS

Job Tasks Scheduled *	Media Of Concern	* Exposure Pathway	Physical Hazard*	Potential Chemical * Hazard	Biological Hazrds	Personal Protective Equipment
1. Sheet piling/trenching for Shoring installation	Surface Soil (Fill) and other debris	Inh (p), derm.	S , U , H , N, TR , FD	Metals (Pb, Cr, Ni, As,Zn.) TRPH	None	Modified Level - D
2. Cut-off wall Shoring installation	drill cutting: Soil / Bay mud / Water	Inh (p), derm.	S , U , H , N, TR , FD	Metals (Pb, Cr, Ni, As,Zn.) TRPH	None	Modified Level - D
3. Excavation, grading, and earthmoving	Soil & Ground Water	Inh (p), Ing. derm.	S , U , H , N, TR , FD, O CSE (excav. entry > 5.0').	Metals (Pb, Cr, Ni, As,Zn.) TRPH, possibly PCB's	None	Modified Level - D
4. Truck loading, and soil off-haul	Soil and other construction debris	Inh (p), derm.	S , N , H , N, O , TR , FD	Metals (Pb, Cr, Ni, As,Zn.) TRPH, possibly PCB's	None	Modified Level - D
5. Dewatering and water treatment	Water	Derm, ingestion	S, H, N, I, CSE	Metals (Pb, Cd, Ni, As, Cr.)	None	Modified Level - D Rubber Gloves
6. Pile driving and pile installation	Soil / Bay mud / Water	Inh (p), derm.	S , H , N, O. FD.	Metals (Pb, Cr, Ni, As,Zn.) TRPH, possibly PCB's	None	Modified Level - D
7. Demolition of existing Columns/concrete	Concrete and steel	Inh (p)	S , N , O, H , I, FD.	Nuisance dust	None	Modified Level - D Face shield
8. Bridge steel structure Paint removal, chipping	Lead based paint	Inh (p, f), Ing., derm.	S , N , O, H , I, FD.	Metals (pb)	None	Modified Level - C

*** Job Tasks:**
See Section 4.2 for description of job tasks

*** Exposure Pathway:**
Inh = Inhalation
(p) = particulate (dust)
(f) = fume
Derm = Dermal contact
Ing. = Ingestion

*** Potential Chemical Hazards**
See Table 3 for Chemical Hazard Assessment

*** Physical Hazards:**
U = Underground utilities
H = Heavy equipment
S = General safety: slip, trip, fall
N = Noise
O = Overhead hazards
I = Illumination limited
E = Explosivity
TR = Traffic
FD = Flying debris/objects
CSE = Confined Space Entry. (entering trenches deeper than 5.0 feet)

TABLE 2
POTENTIAL PHYSICAL HAZARDS
SF-Oakland Bay Bridge, East Bay Spans

	EXPECTED TASKS
ELECTRICAL HAZARDS	
Overhead power lines	1 through 6
Underground cable/power lines	1 through 6
GAS LINES/WATER LINES	1, 2, 3 and 6
EQUIPMENT HAZARDS	1 through 7
Drilling equipment	1 and 3
Excavation (Backhoe, loader, excavator)	1 and 3
Machinery (cranes, pile driving equipment)	7
SHORING	1 and 2
HEAT EXPOSURE	all tasks
CONFINED SPACES	3
NOISE	1 through 7
NON-IONIZING RADIATION	
Laser	used by surveyors
Ultraviolet	sunlight
FIRE	
SAFETY: SLIP, TRIP, FALL, TRAFFIC	all tasks
Holes/ditches	
Steep grades/Uneven terrain	
Slippery surfaces	
Unstable surfaces	
Elevated work surfaces	

TABLE 3

CHEMICAL HAZARD RECOGNITION TABLE

San Francisco-Oakland Bay Bridge, East Bay Spans

CONTAMINANT	SAMPLE LOCATION	OSHA PEL*	IDLH**	ROUTES OF ENTRY	HEALTH HAZARD
Lead	Most of the footings and columns in Bents E 24 to E 39	0.05 mg/m3	100 mg/m3	inhalation ingestion	Cumulative organ toxicity low-wgt, malnut, constipation, abd pain Central nervous system (CNS) disorder
Cadmium	Most of the footings, within 2 ft. in Bents E 24 to E 39	1.0 mg/m3	10 mg/m3	inhalation skin	Eyes, nose, and skin irritation Overexposure may result in metal fever.
Chromium	Most of the footings, within 3 ft. in Bents E 24 to E 39	1.0 mg/m3	250 mg/m3	inhalation ingestion skin	Eye irritant. skin; lung
Arsenic	Most of the footings, within 3 ft. in Bents E 24 to E 39	0.01 mg/m3	5 mg/m3	inhalation ingestion	derm, GI disturbances Ulceration of nasal septum, resp. irritant hyperpig of skin (carcinog)
TRPH (diesel,oil/grease/ GAS. NO	Most of the footings and columns in Bents E 24 to E 39	100 ppm 600 ppm	N/A	skin inhalation ingestion	Eyes & nasal mucus memb. irritant indecision, head, ftg, weak, low wgt.
PCB's	Bents 24 (C1-C2), 28 (C1-C2), 30 (C1-C2) within 2 feet of surface soil	1 mg/m3	10 mg/m3	inhalation ingestion skin	Suspect Carc. (liver tumors) skin, eye, and throat narcosis
Nuisance Dust	All locations	10.0 mg/m3	N/A	inhalation	Eye, skin and respiratory irritant
Nickel, Metal	Most of footings and columns in Bents E 24 to E 39	1.0 mg/m3	N/A	inhalation ingestion	Eye, skin and respiratory irritant
Copper	Most of footings and columns in Bents E 24 to E 39	0.5 mg/m3	N/A	inhalation ingestion	Eye, skin and respiratory irritant

* (PEL) Permissible Exposure Limits (Cal/OSHA CCR title 8, section 5155)

** (IDLH) Immediate danger to life and health

TABLE 3

CHEMICAL HAZARD RECOGNITION TABLE

San Francisco-Oakland Bay Bridge, East Bay Spans

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Arsenic	Most of the footings, within 3 ft. in Bents E 24 to E 39	0.01 mg/m3	5 mg/m3	inhalation ingestion	derm, GI disturbances Ulceration of nasal septum, resp. irritant hyperpig of skin (carcinog)
TRPH (diesel,oil/grease) GAS. NO	Most of the footings and columns in Bents E 24 to E 39	100 ppm 600 ppm	N/A	skin inhalation ingestion	Eyes & nasal mucus memb. irritant indecision, head, ftg, weak, low wgt.
PCB's	Bents 24 (C1-C2), 28 (C1-C2), 30 (C1-C2) within 2 feet of surface soil	1 mg/m3	10 mg/m3	inhalation ingestion skin	Suspect Carc. (liver tumors) skin, eye, and throat narcosis
Nuisance Dust	All locations	10.0 mg/m3	N/A	inhalation	Eye, skin and respiratory irritant
Nickel, Metal	Most of footings and columns in Bents E 24 to E 39	1.0 mg/m3	N/A	inhalation ingestion	Eye, skin and respiratory irritant
Copper	Most of footings and columns in Bents E 24 to E 39	0.5 mg/m3	N/A	inhalation ingestion	Eye, skin and respiratory irritant

* (PEL) Permissible Exposure Limits (Cal/OSHA CCR title 8, section 5155)

** (IDLH) Immediate danger to life and health

TABLE 4

Personal Protective Equipment Guidelines

San Francisco-Oakland Bay Bridge, East Bay Spans

LEVEL D PROTECTION

* WHITE TYVEK COVERALLS
* BOOTIES DISPOSABLE (OPTIONAL)
* VINYL GLOVES
* STURDY CONSTRUCTION BOOTS
* HARD HAT
* SAFETY GLASSES

LEVEL C PROTECTION

*HALF FACE RESPIRATORS WITH APPROPRIATE CARTRIDGES

*ONE OR TWO WHITE TYVEK COVERALLS WITH BOOTIES

*INNER/OUTER VINYL GLOVES

*HARD HAT

*STURDY CONSTRUCTION BOOTS

*SAFETY GLASSES

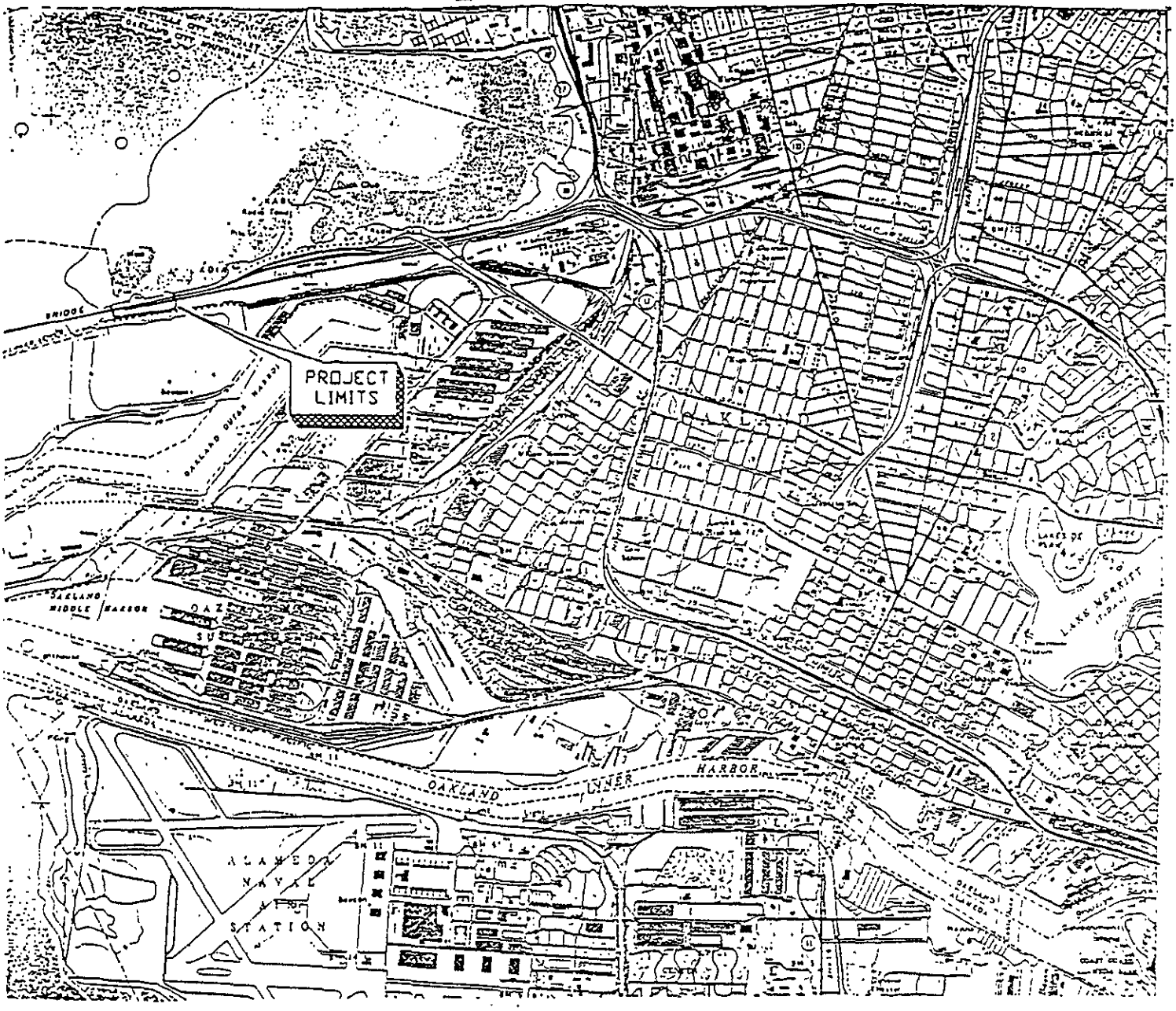


FIGURE 1

SITE LOCATION MAP
OAKLAND BAY BRIDGE

PREPARED FOR
CAL. DEPART. OF TRANSPORTATION
DISTRICT 4
OAKLAND, CALIFORNIA

USGS MAP
OAKLAND WEST, QUADRANGLE

ENVIRONMENTAL RECOVERY
SMARTER SOLUTIONS FOR A CLEANER TOMORROW

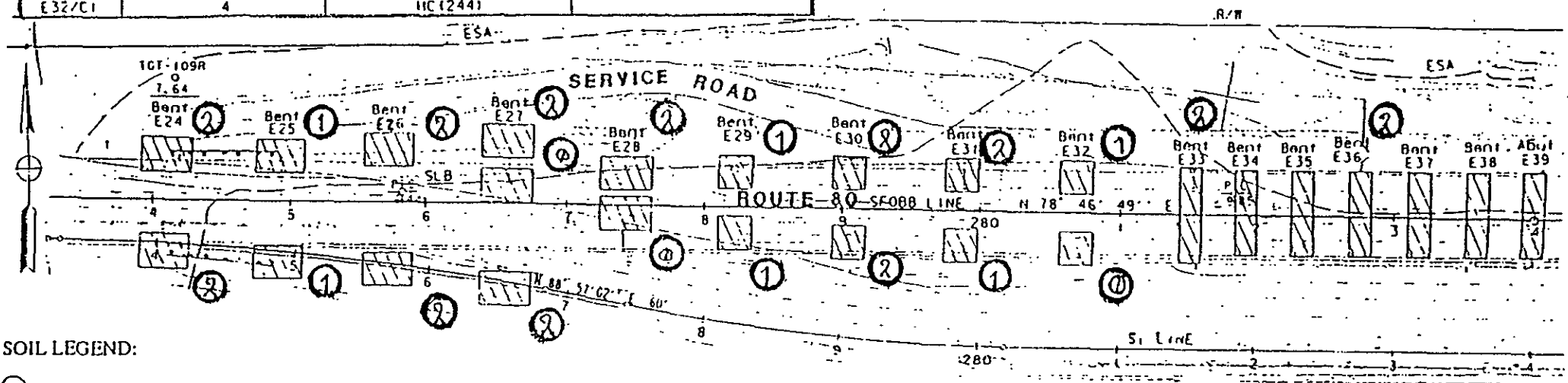
SCALE 1:3000	APPROXIMATE SCALE IN FEET 0 3000 6000		NORTH	DRAWING NO. 15301111
DRAWN BY	N. MURTHA	01/19/94		
CHECKED BY	N. MURTHA	01/19/94		
APPROVED BY	G. KIRKPATRICK	01/19/94		

FIGURE - 2

LOCATION OF HAZARDOUS & CONTAMINATED FOOTINGS

BENT/ COL No	DEPTH OF CONT OR HAZ (FT)	CONTAMINATED	HAZARDOUS
E24/C1	10'	HC(756)	Pb(1500)(69), P(136)
E24/C2	10'	HC(108)	Pb(410)(6), P(38)
E25/C1	10'	HC(1280), Pb(82)(1)	
E25/C2	10'	HC(135)	
E26/C1	10'	HC(152)	Pb(930)(18), P(208)
E26/C2	10'	HC(2340), Pb(89)(2.9)	P(34)
E27/C1	10'	HC(7800)	Pb(299)(8)
E27/C2	10'		
E27/C3	10'	HC(940)	Pb(372)(6)
E28/C1	4	HC(228)	Pb(923)(96), SVoc(82701), P(312)
E28/C2	4		
E29/C1	4	HC(1300)	
E29/C2	4	HC(4100)	
E30/C1	4		Pb(48)(80)
E30/C2	4	HC(2100)	Pb(4520), P(171)
E31/C1	4		Pb(73)(5.4)
E31/C2	4	HC(3440), Pb(168)	
E32/C1	4	HC(244)	

Cont Contaminated
Haz Hazardous
HC Total Recoverable Petroleum Hydrocarbon, analyzed by EPA 418.
Pb Lead, analyzed by EPA 6010
Voc Volatile Organic Compounds, analyzed by EPA 8020 or 8240
SVoc Semi-volatile Organic Compounds, analyzed by EPA 8270
P Organochlorine Pesticides and PCB's, analyzed by EPA 8080
ND Not Detected
( ) Values shown are maximum concentrations (PPM)
< > Values shown are maximum soluble concentrations (PPM)



SOIL LEGEND:

⓪ NOT CONTAMINATED
① CONTAMINATED
② HAZARDOUS

BENT/ COL No	DEPTH OF EXCAVATION CONT OR HAZ (FT)	CONTAMINATED	HAZARDOUS
E32/C2	4		
E33	4	HC(316)	Pb(249)(94), P(175)
E34	4		
E35	4		
E36	4	HC(456)	Pb(4510)(249), P(95)
E37	4		
E38	4		
E39	4		

NOTES:

1. HC above 100 ppm are shown as contaminated.
2. Metal total concentration above 10X STLC and below TTLC, and solubility below STLC shown as contaminated.
3. The entire work site is contaminated. Any excavation in and near Bent E-27 and westerly thereof, shall be handled as contaminated and hazardous material to the depth of 10 feet below original ground surface.
   Any excavation easterly of Bent E-27 shall be handled as as contaminated and hazardous material to a depth of four feet below original ground surface.
4. For excavation details not shown, see Standard Plans.
5. See Sheet L-1 for additional Abbreviations.

CONSTRUCTION DETAILS

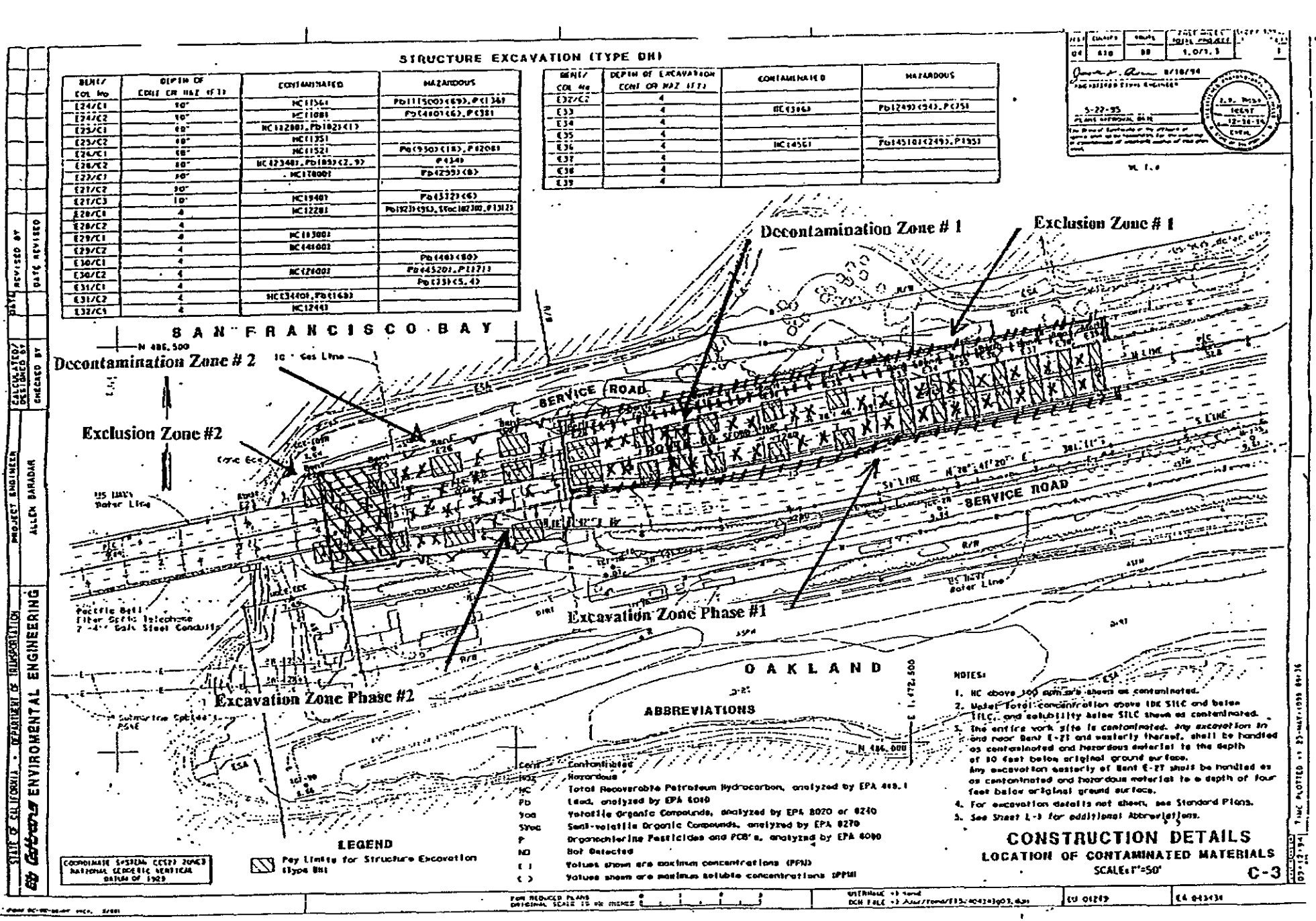


Figure 3 Site Overview

Balfour Beatty Construction, Inc.
Site Specific Health and Safety Plan
Phase 1 & 2 Exclusion Zone

Legend

Exclusion Zone Phase #1	=/=/=/=/	Pile Cut Off Wall Phase #1	+++++++
Exclusion Zone Phase #2	^-^-^-^-	Pile Cut Off Wall Phase #2	+_+_+_+
Excavation Zone Phase #1	XXXXX	Decontamination Zone & Wash Facilities Ph 2 & 3	//////////
Excavation Zone Phase #2	XXXXX		

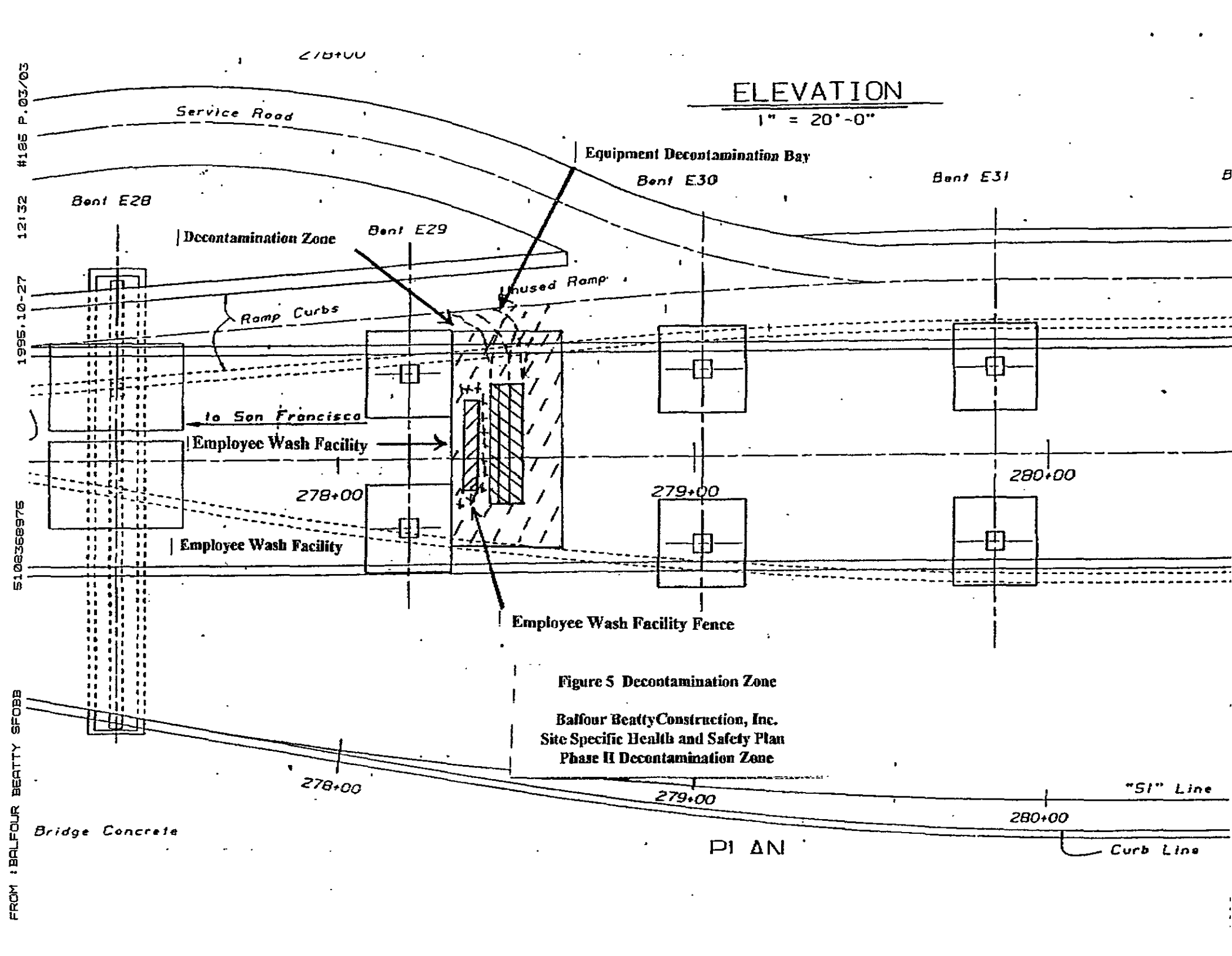


Figure 5 Decontamination Zone

Balfour BeattyConstruction, Inc.
Site Specific Health and Safety Plan
Phase II Decontamination Zone

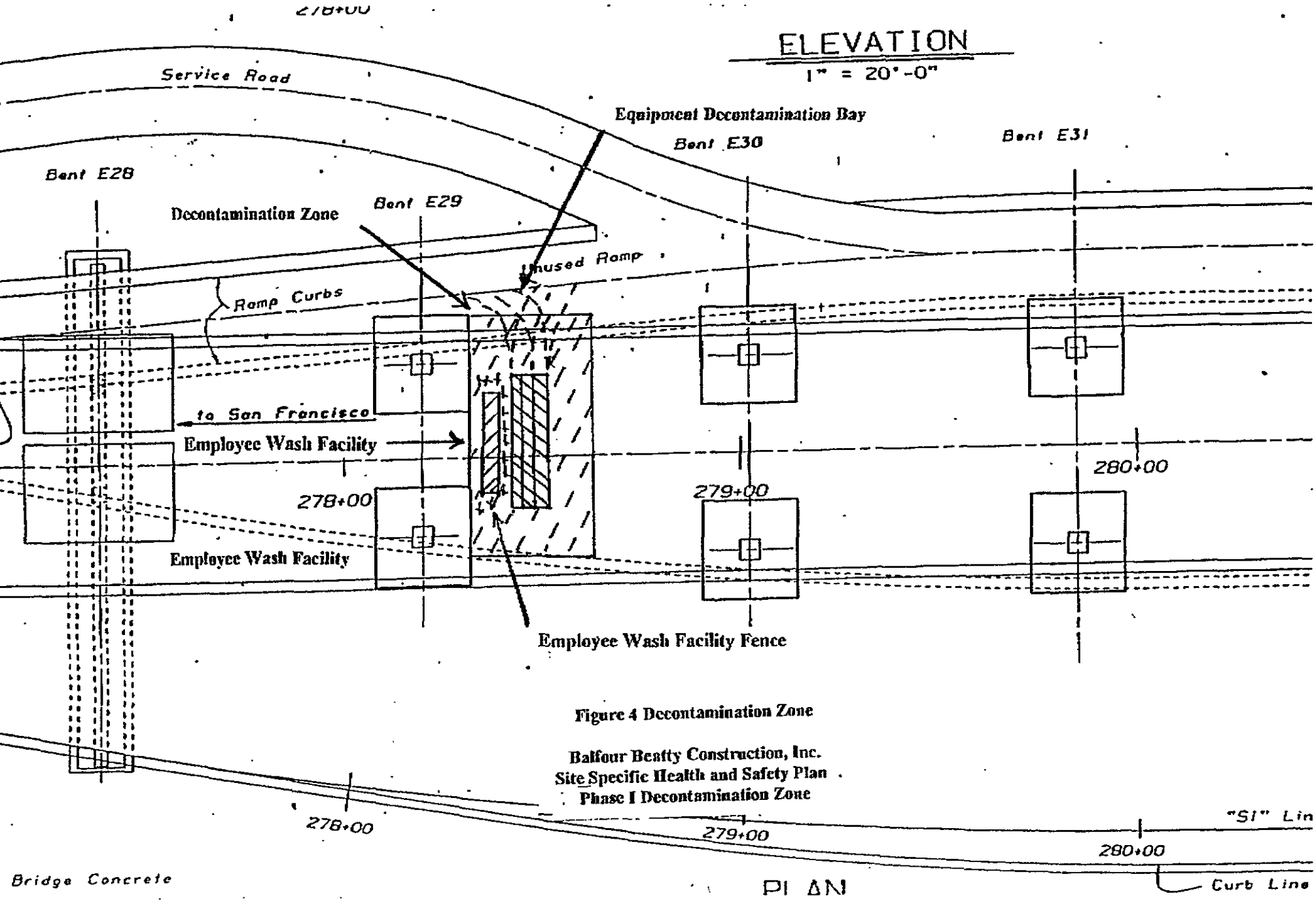


Figure 4 Decontamination Zone

Balfour Beatty Construction, Inc.
Site Specific Health and Safety Plan
Phase I Decontamination Zone

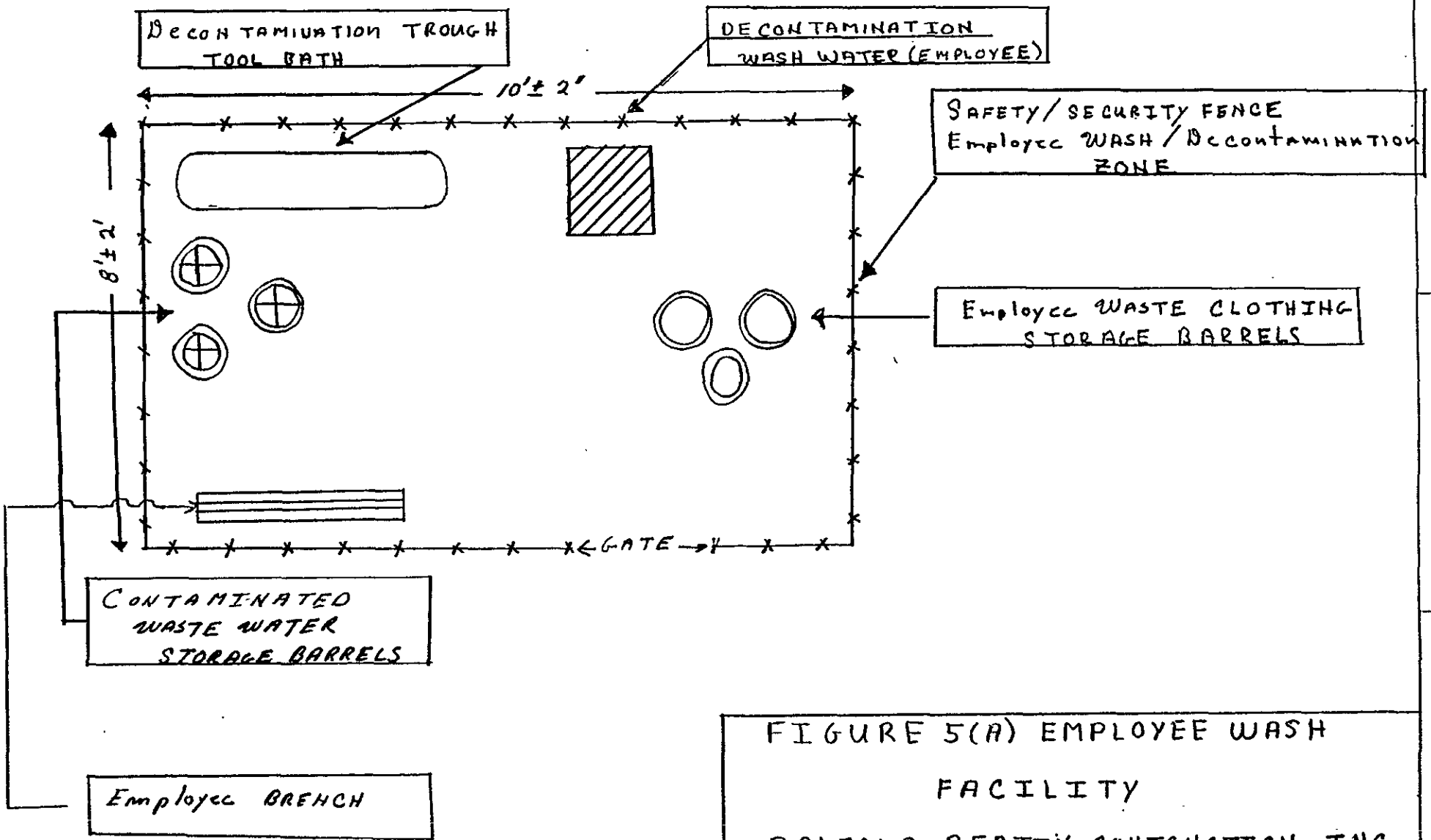


FIGURE 5(A) EMPLOYEE WASH FACILITY

BALFOUR BEATTY CONTRUCTION, INC.
SITE SPECIFIC HEALTH & SAFETY PLAN
PHASE I & II Decontamination ZONE

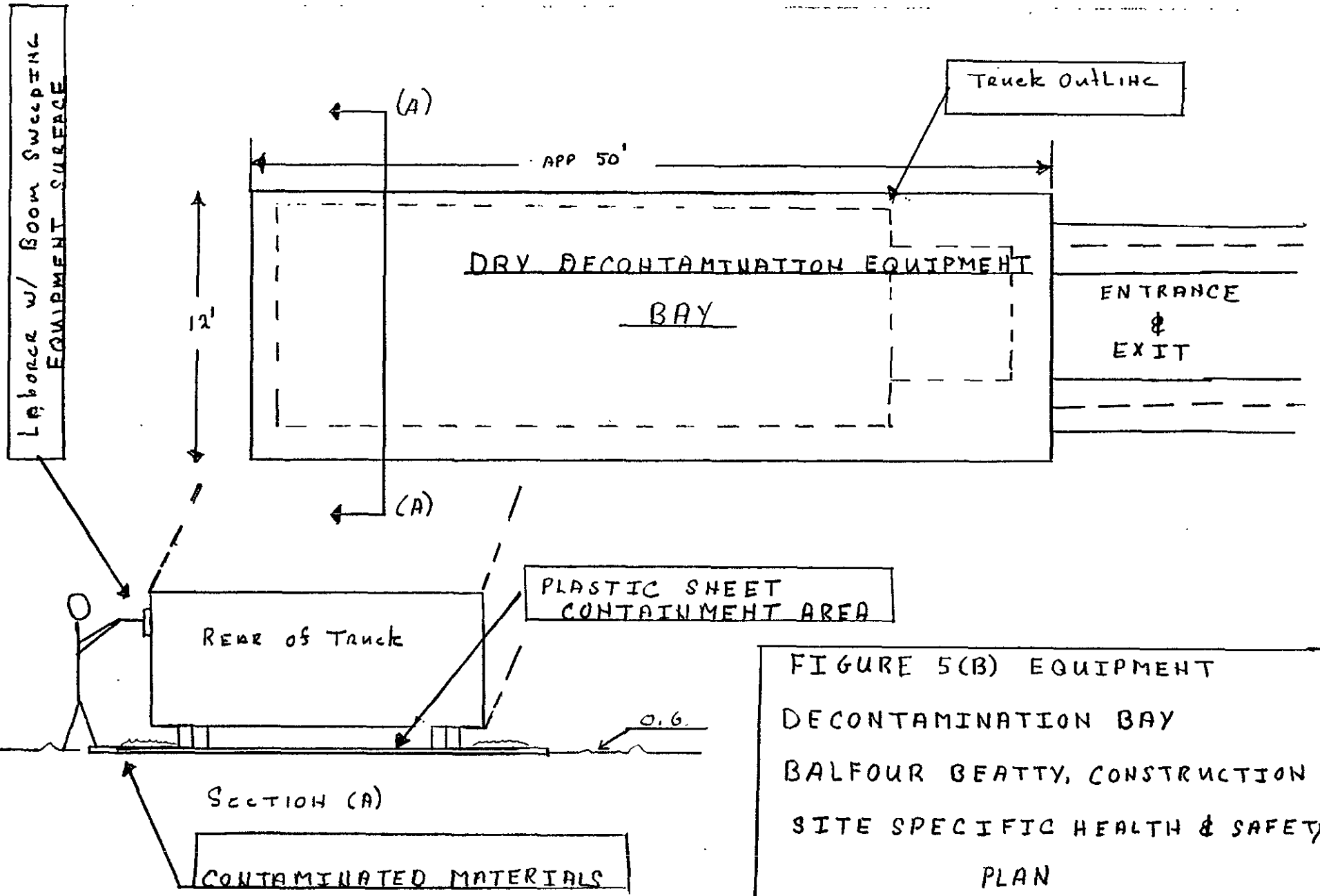


FIGURE 5(B) EQUIPMENT DECONTAMINATION BAY

BALFOUR BEATTY, CONSTRUCTION

SITE SPECIFIC HEALTH & SAFETY PLAN

PHASE I & II CONSTRUCTION

READICARE
1350 OCEAN AVE.
EMERYVILLE, CA 94608
(510) 652-5800

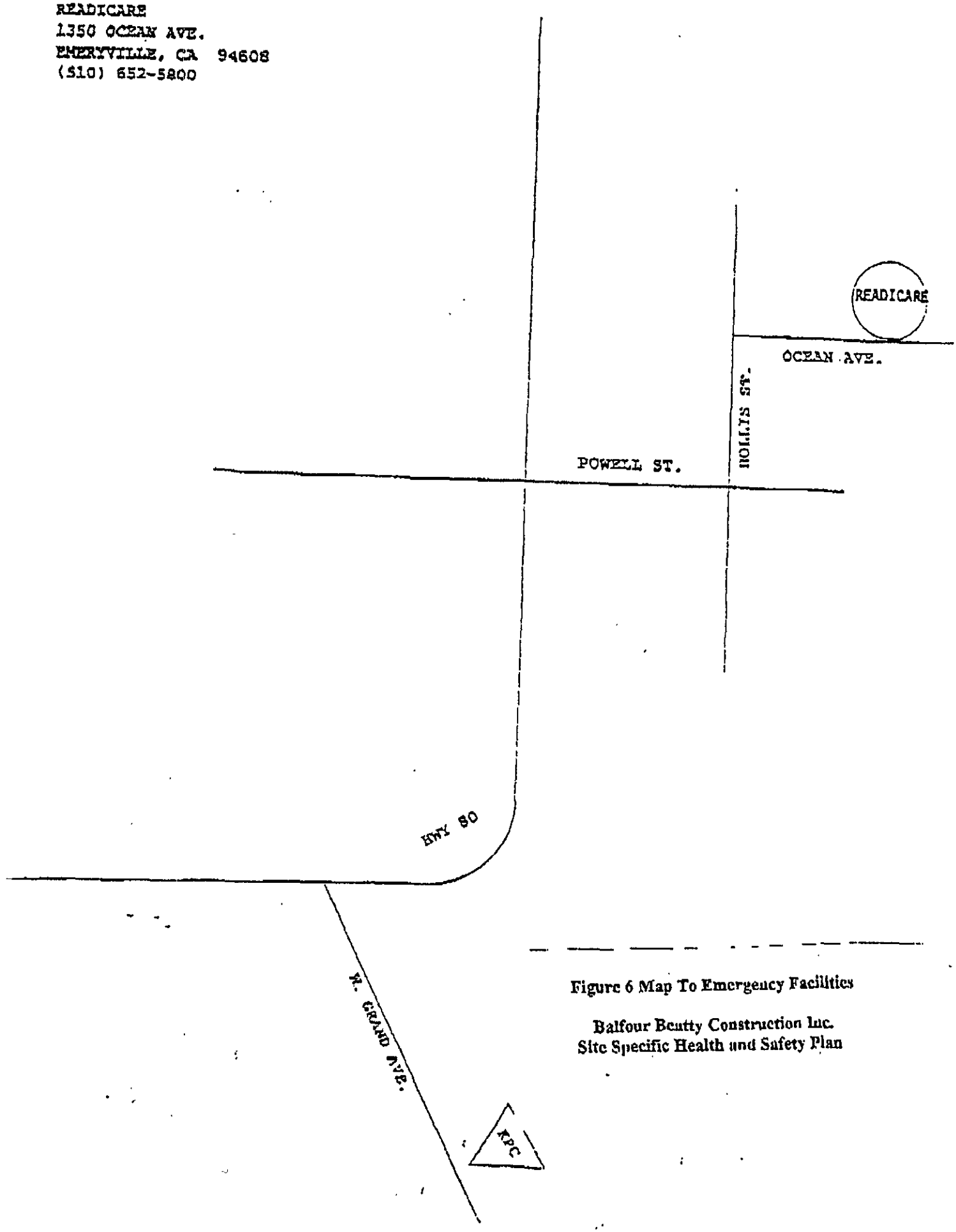


Figure 6 Map To Emergency Facilities

Balfour Beatty Construction Inc.
Site Specific Health and Safety Plan

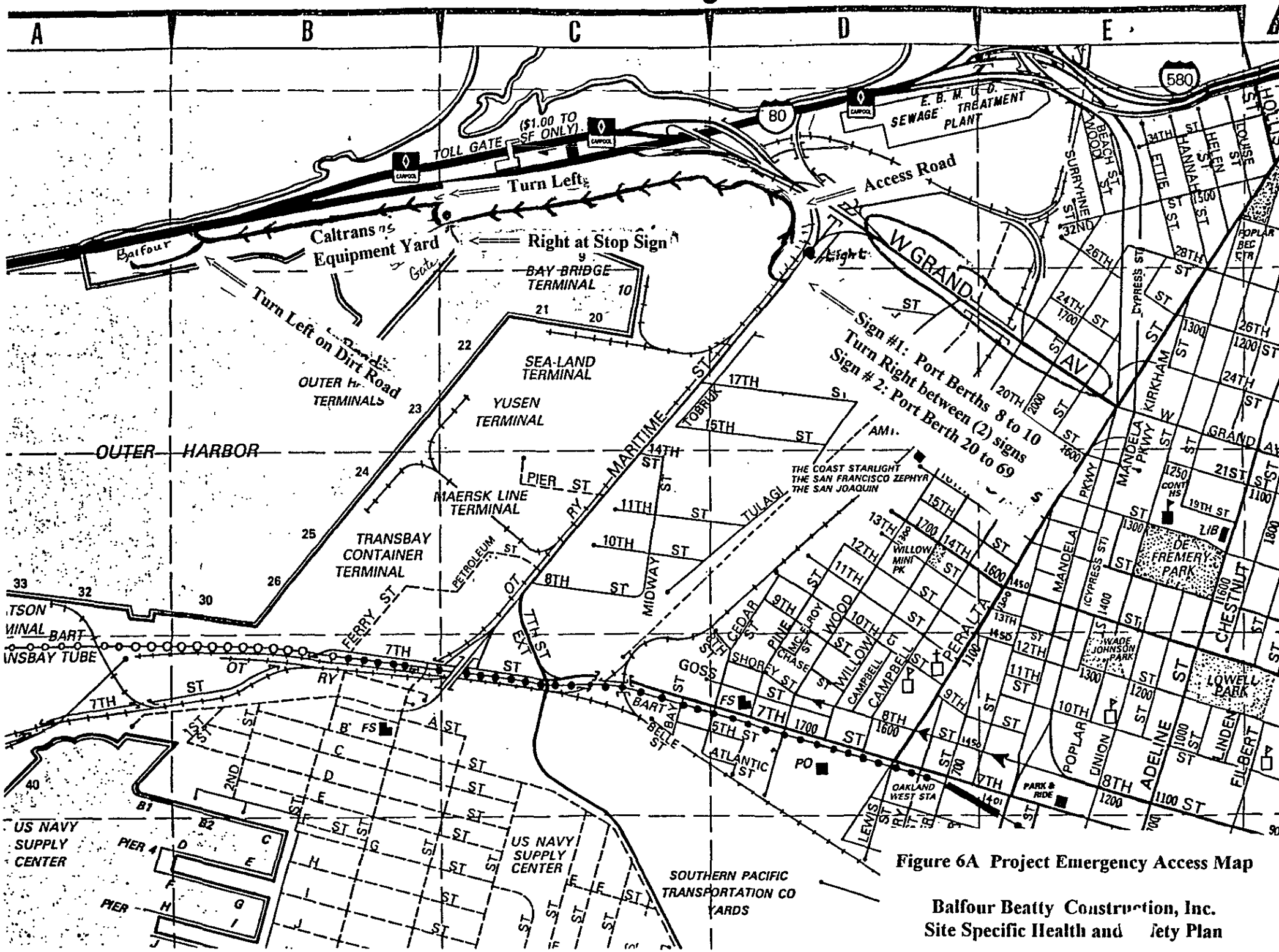


Figure 6A Project Emergency Access Map

Balfour Beatty Construction, Inc.
Site Specific Health and Safety Plan

APPENDIX B: FORMS

Employee Notification of Personal Air Sampling Results
Air Sampling Data Form
Request for Analysis Form (Chain of Custody)
On Site Telephone Numbers
Health and Safety Plan Consent Agreement

_____, 1995

TO: _____

(Address):_____

_____

Dear _____:

In accordance with the provisions of the California Code of Regulations, Title 8, Section 1532.1, you were monitored for exposure to airborne lead on _____. The results of this personal air sampling reveal that you were exposed to a time weighted average (TWA) concentration of _____ µg/m³ over _____ hours and minutes.

- Your exposure is below the California Occupational Safety and Health Administration (CalOSHA) action level (AL) of 30 µg/m³.

  As long as conditions and your work activities remain the same, no additional monitoring is required.

- Your exposure is above the California Occupational Safety and Health Administration CalOSHA action level (AL) of 30 µg/m³ and below the CalOSHA permissible exposure limit of 50 µg/m³.

  You will be monitored again at least every six months until your exposure is below the action level for two consecutive monitoring periods at least seven days apart. Please discuss obtaining medical surveillance with your supervisor.

- Your exposure is above the California Occupational Safety and Health Administration (CalOSHA) permissible exposure limit (PEL).

  You will be monitored again at least every three months until your exposure is below the PEL for two consecutive monitoring periods at least seven days apart. Please discuss workplace requirements with your supervisor if your exposure was above the PEL.

Please contact me if you have any questions concerning this monitoring.

Sincerely,

Bev Trautman
Project Manager
Balfour Beatty Construction, Inc.

COHRSSEN ENVIRONMENTAL, Inc.

1990 Lombard St., Suite 200
San Francisco, CA 94123
PHONE: 415-775-1105
FAX: 415-775-4163

Job Number _____ Date _____ Sampled By _____

Sample Type
- B Blank
- PM Perimeter
- PS Personal
- C Clearance
- A Abatement
- BK Bulk

Filter Type
- _____ 0.45 µm
- _____ 0.8 µm

Analysis Type
- [ ] PCM Fiber Type
- [ ] TEM Fiber Count
  - {} Level I
  - {} Level II
  - {} AHERA
- [ ] PLM Bulk Analysis

SAMPLE COLLECTION | **SAMPLE ANALYSIS - PCM**

Sample Number	Pump Number	Location and/or Employee Name	Sample Type	Time minutes			Flowrate L/min			Volume Liters	Fiber Count	Fibers in Blank	Detection Limit f/cc	Concentration f/cc
				Start	Stop	Total	Start	Stop	Avg.					

CHAIN OF CUSTODY

Relinquished by: _____ Date/Time _____
Relinquished by: _____ Date/Time _____
Shipment Method: _____
Authorized By: _____ Date _____
(Client Signature Must Accompany Request)

Received by: _____ Date/Time _____
Received at Lab by: _____ Date/Time _____
Sample Condition Upon Receipt: _____ Acceptable
_____ Other (explain)

REQUEST FOR ANALYSIS

COHRSSEN ENVIRONMENTAL, Inc.

1990 Lombard St., Suite 200
San Francisco, CA 94123
PHONE: 415-775-1105
FAX: 415-775-4163

Turn Around Time

[ ] Rush: Under 2 hours
[ ] Same Day
[ ] Evening turn around
[ ] 24 hours
[ ] 48 hours
[ ] 3-5 days

Special Instructions:

Job Number _____ **Sampling Medium** **Analysis Type**

Date _____ _____ [ ] _____

Sampled by _____ _____ [ ] _____

_____ [ ] _____

Sample Number	Sample Type	Volume Liters	Comments

CHAIN OF CUSTODY

Relinquished by:	Date/Time
Received by:	Date/Time
Relinquished by:	Date/Time
Received at Lab by:	Date/Time
Shipment Method:	

Authorized By: _____ Date _____
(Client Signature Must Accompany Request)

Sample Condition Upon Receipt: Acceptable _____
Other (explain) _____

BALFOUR BEATTY CONSTRUCTION, INC.
SFOBB Seismic Retrofit

ON SITE TELEPHONE NUMBERS
(Radio/Phone Call Numbers)

Number	Name	Position	Work Number	Cellular Number	Home Number
10	Bev Trautman	Project Manager	916-939-9260		916-677-2546
11	Crandall Bates	Asst. Proj. Mgr.	510-836-8971	510-772-3139	916-644-2329
20	Bart Trautman	Gen'l Supt.	510-836-8971	510-772-3138	707-425-7570
21	Elias De Loza	Labor Foreman	510-836-8971		707-428-6467
22	Celestino Rodriguez	Labor Foreman	510-836-8971		
30	Sean Tarp	Project Engineer	510-836-8971	510-772-3140	
31	Chris Peterson	Office Engineer	510-836-8971		408-246-5887
40	Dan Kingery	Op Foreman/ Master Mech.	510-836-8971	510-772-3141	510-654-0731
Base Station	Eve White	Office Mgr.	510-836-8971		510-934-9810

BALFOUR BEATTY CONSTRUCTION, INC.

HEALTH AND SAFETY PLAN CONSENT AGREEMENT

I have reviewed the Balfour Beatty Construction, Inc. (BBCI) Site Specific Health and Safety Plan for the retrofit project of the San Francisco-Oakland Bay Bridge, East Bay Spans. (Caltrans Contract No: 04-043434).

I understand its purpose and consent to adhere to its policies, procedures, and guidelines while working at this site as an employee of BBCI or its subcontractor.

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

Employee Signature _____ Date: _____

APPENDIX C: TRAINING CERTIFICATES

COHRSSEN ENVIRONMENTAL, INC.

24 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

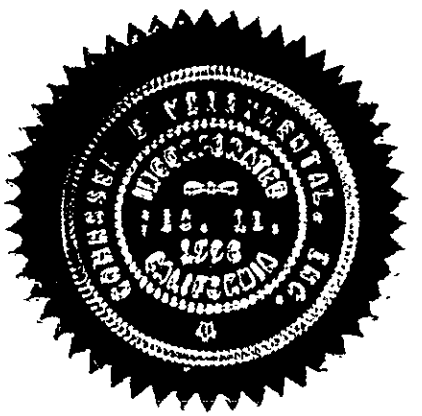
Recognizes the completion by

Eyad Ghani 397-94-6719

October 2, 5 and 6, 1995

Instructor

Instructor



COHRSSEN ENVIRONMENTAL, INC.

24 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

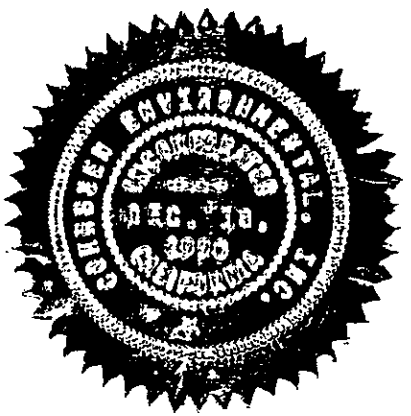
Recognizes the completion by

Dan Kingery 273-36-3023

October 2, 5 and 6, 1995

Barbara Cohrssen
Instructor

Charles Cohrssen
Instructor



COHRSSEN ENVIRONMENTAL, INC.

24 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

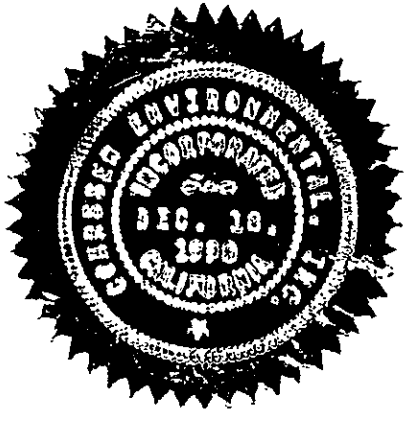
Recognizes the completion by

Francois Le 586-14-4383

October 2, 5 and 6, 1995

Barbara Cohrssen
Instructor

Charles Bruce
Instructor



COHRSSEN ENVIRONMENTAL, INC.

24 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

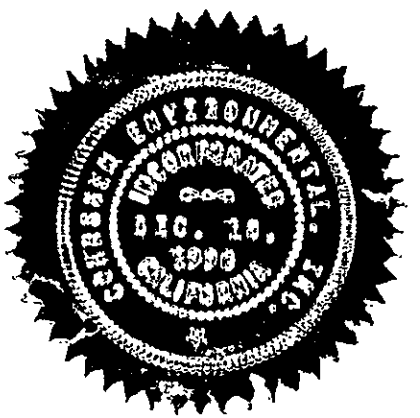
Recognizes the completion by

Tom Meinholz 393-56-3301

October 2, 5 and 6, 1995

Instructor

Instructor



COHRSSEN ENVIRONMENTAL, INC.

24 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

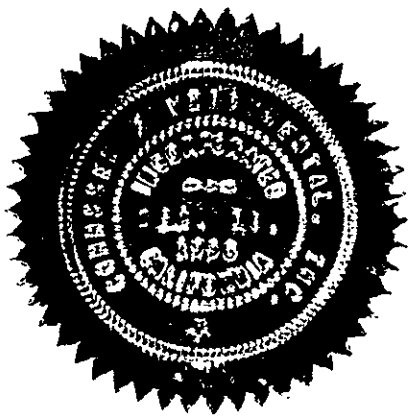
Recognizes the completion by

John Prokop 099-52-0113

October 2, 5 and 6, 1995

Instructor

Instructor



COHRSSEN ENVIRONMENTAL, INC.

24 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

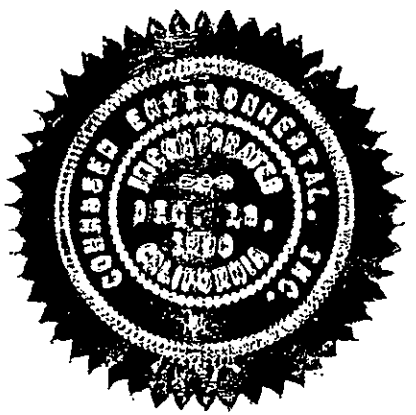
Recognizes the completion by

Leo Scott 549-90-0728

October 2, 5 and 6, 1995

Instructor

Instructor



COHRSSEN ENVIRONMENTAL, INC.

24 Hour Hazardous Waste Operations and Emergency Response (HAZWOPER) Training

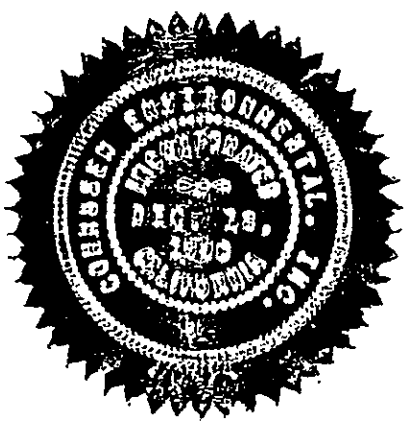
Recognizes the completion by

Leo Scott 549-90-0728

October 2, 5 and 6, 1995

Instructor

Instructor



APPENDIX D: REVISION LISTING

1.0	Physical Barrier:	Insertion Number 1	Section Number 4.3.1
2.0	Site Cleanup	Insertion Number 2	Section Number 4.3.2
3.0	Applicable Rule and Regulations	Insertion Number 3	Section Number 5.4.4
4.0	Engineering Control	Insertion Number 4	Section Number 1.1
5.0	Employee Wash Facility Contaminated Water Control	Insertion Number 5	Section Number 8.1

SITE SPECIFIC HEALTH AND SAFETY PLAN
INSERTION NUMBER 1

Balfour Beatty Construction, Inc. Site Specific Health and Safety Plan is amended to include the follow provisions.

Insertion Section: 4.3.1

Physical Barrier

When excavations are completed to total depth(s), cleaned and ready for forming or retrofit materials, a physical barrier shall be placed into the excavation. The physical barrier shall be designed so as to limit exposures to workers not specifically trained per the requirements of the Site Specific Safety Plan.

Actual design of the physical barrier for each excavation shall be based on the following variables: shape and size of excavation, soil type and moisture content, type of work to be accomplished in the excavation, and microclimate covered from rain, sheltered or windy). The installation of the barriers shall be done by workers trained as specified in the Site Specific Safety Plan.

Types of physical barriers may include the following: visqueen (6 ml-10) draped and staked around perimeter and bottom; burlap or mesh material (placed in similar fashion); cofferdams; grout curtains.

The physical barrier shall be maintained for the life of the excavation by the Subcontractor or Contractor to prevent exposure of personnel to the in-place hazardous or contaminated materials.

When the physical barrier is no longer required of the excavation is to be back filled the physical barrier shall be removed and either decontaminated or disposed of by the Contractor.

Referance: Contract No. 04-043434

SITE SPECIFIC HEALTH AND SAFETY PLAN
INSECTION NUMBER 3

Balfour Beatty Construction, Inc. Site Specific Health and Safety Plan is amended to include the follow contractual provision.

Insertion Section: 5.4.4

APPLICABLE RULES AND REGULATIONS

Excavation, transport and disposal of contaminated material and hazardous material and hazardous material shall be in accordance with the rules and regulations of the following agencies:

United States Department of Transportation (USDOT)

United States Environmental Protection Agency (USEPA)

California Environmental Protection Agency (CAL-EPA)

Department of Toxic Substance Control (DTSC)

Integrated Waste Management Board

Regional Water Quality control Board, Region (RWQCB)

State Air Resources Board

Bay Area Air Quality Management District (BAAQMD)

East Bay Municipal Utilities District (EBMUD)

California Division of Occupational Safety and Health Administration (CAL-OSHA)

Referance: Contract No. 04-043434

Special Provisions pages 22

SITE SPECIFIC HEALTH AND SAFETY PLAN
INSERTION NUMBER 2

Balfour Beatty Construction, Inc. Site Specific Health and Safety Plan is amended to in the following provisions.

Insertion Section: 4.3.2

Site Cleanup

Site cleanup shall be accomplished, when necessary, by means that will eliminate exposure to dust and will facilitate complete removal of Contaminated or Hazardous materials for the site. Examples of such cleanup as follows.

Material shall be removed from the exteriors of transportation vehicles prior to the vehicle leaving the site. Material removed from the exteriors of vehicles shall be placed either into the vehicle for transport or shall be placed back into the stockpile from which it came. No lead containing materials shall be deposited on public roadways.

Stockpile areas shall be moist broomed (to eliminated dust) and the material disposed of with the Contaminated or Hazardous previously stockpiled soils.

Referance: Contract No. 04-043434

SITE SPECIFIC HEALTH AND SAFETY PLAN
INSERTION NUMBER 4

Balfour Beatty Construction, Inc. Site Specific Health and Safety Plan is amended to include the following provisions.

Insertion Section: 1.1

Engineering Control

To prevent exposure to airborne soil contaminants, BBCI will follow engineering controls and work practices, outlined in the following sections, to minimize any potential health and safety effects on the construction personnel as well as the general public.

Reference: Contract No. 04-043434

SITE SPECIFIC HEALTH AND SAFETY PLAN
INSERTION NUMBER 5

Balfour Beatty Construction, Inc. Site Specific Health and Safety Plan is amended to include the following provisions.

Insertion Section: 8.1

Employee Wash Facility Contaminated Water Control

Water utilized by the Employee Wash Facility will be stored inside barrels in a safe / secure location. This water will be later transferred to Baker tanks. These tanks are tentatively schedule to be on site mid November 1995.

Balfour Beatty proposes to use a dry decontamination method for all vehicle and equipment exposed to contaminants. Employee Wash water along with other waters that is contaminated will be shipped to REMCO recycle/ treatment facility. REMCO will provide Balfour Beatty Construction, Inc. with profiles, manifests, and Certificates of Remediation connect to stated work. REMCO phone number and address are shown below:

REMCO
2717 Goodrick Avenue
Richmond, CA 94801

Phone No: (510) 237-5866
Fax No: (510) 529-2483

Reference: Contract No: 04-043434

APPENDIX E: EMPLOYEE INJURY AND ILLNESS PREVENTION / RESPIRATOR PROGRAM

5.3.5 Inspection of Protective Clothing

After the Branch Safety Officer has determined what protective clothing must be worn for personal protection on-site, this clothing must be examined for defects. The following checklist for inspecting chemical protective clothing should be reviewed both immediately before use and periodically when not in use:

- Spread suit on a flat surface
- Examine suit for the following:
  - Fabrics and seams for abrasions, cuts, holes, or tears
  - Seams for separations
  - Zippers and other connecting devices for proper sealing and operation
  - Signs of previous chemical attack or incomplete decontamination
  - Exhaust valves (if applicable) for inhibiting debris and proper functioning

Fully encapsulating suits need additional, regular inspection. This inspection should include the following:

- Using an air source, seal and inflate suit. Check for leaks on surface and seams using a mild soap solution. Alternately, the suit can be checked for small holes by placing a flashlight inside the suit in a dark room and looking for pinpoints of light from outside the suit.
- Record each suit's use, inspection, and repair status if reusable.
- Return reusable suits to factory annually for a thorough inspection.

Hand Protection: Gloves should be inspected prior to each use. Inflate the gloves and check for small holes or holes.

Eye Protection: Ensure lenses are not scratched or cracked, and that the frame fits without slipping.

Foot Protection: Ensure that laces are in place and in good condition. Protective toe or shank should not be damaged. The sole must not be loose and the sole tread should be clean of debris and not overly worn.

Head Protection: Inspect daily for cracks, sharp edges, missing pieces and proper fit.

5.3.6 Respiratory Protection

RESNA's respiratory protection program is part of RESNA's overall effort to provide a safe and healthful workplace. Respiratory protection is of primary importance, because the lungs present the body's greatest exposed surface area and their proper functioning is critical to life. The Corporate Health and Safety Director is responsible for updating the Company Respiratory Protection Program. The Branch Safety Officer is responsible for implementing the Program at the branch level, and maintaining each Branch's respiratory equipment. This Program has the following objectives:

- Establish written standard operating procedures governing the selection, use, and maintenance of respirators.
- Establish minimum training requirements for personnel using respirators.
- Specify proper use and limitations of respirators.
- Establish minimum guidelines for medical surveillance related to respirator program.
- Serve as a reference for fit-testing, cleaning, and storage of respirators.

Respirators are not issued to employees until an occupational physician, approved by RESNA, conducts a complete physical and finds that the employee can wear PPE and wear a respirator. After this clearance, the following required training is provided by the branch safety officer. This training is also provided on an annual basis as a part of the 8-hour HAZWOPER refresher training.

- Applicable OSHA regulations 1910.134 and 1910.120
- Nature of respiratory hazards to be encountered in the work environment and how to select proper respiratory equipment
- Use of respirators and individual fit-testing.
- Capabilities and limitations of respirators, warning properties of contaminants.
- Cleaning, disinfection, inspection, maintenance, and storage of respirators

Respiratory protective devices (respirators) consist of a facepiece connected to an air or oxygen source. The three major categories of respirators differ with respect to the air or oxygen source:

- Self-contained breathing apparatus (SCBA) supplies air from a source carried by the user
- Air-line respirators (ALR) supply air from a remote source connected to the user by a hose or "umbilical cord"
- Air-purifying respirators allow user to inhale "purified" ambient air.

Because ALR and SCBA both supply air to the user, they are often referred to as supplied- air respirators. Respirators are further differentiated by the type of air flow supplied to the facepiece:

- Negative-pressure respirators (also referred to as demand respirators) draw air into the facepiece via the negative pressure created by user during inhalation. The disadvantage of demand respirators is that, if leaks develop in the system because of an ill-fitting mask or facepiece, the user draws contaminated air into the facepiece during inhalation.
- Pressure-demand respirators maintain a slight positive pressure in the facepiece during both inhalation and exhalation. A pressure regulator and exhalation valve on the mask maintain positive pressure in the facepiece. If a leak develops, the regulator sends a continuous stream of clean air into the facepiece preventing penetration of contaminated ambient air into the facepiece.
- Continuous-flow respirators send a continuous stream of air into the facepiece. Continuous air flow prevents intrusion of contamination within the facepiece but exhausts the air supply much more rapidly than positive-pressure or negative-pressure respirators.

Different types of facepieces are also available for the various types of respirators:

- Full facepieces cover the face from the hairline to below the chin. They are recommended for use on uncontrolled sites because they provide respiratory and eye protection.
- Half-mask facepieces cover the face from below the chin to over the nose. They can be used when airborne contaminants have been identified and are judged unlikely to irritate the eyes.

Only respiratory equipment jointly tested and approved (must meet requirements specified in 30 CFR 11) by the National Institute of Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) may be used. NIOSH/MSHA approval numbers are clearly written on the device or package of approved respiratory equipment. The Branch Safety Officers purchase only NIOSH/MSHA approved respiratory equipment as allowed by RESNA.

Protection Factor

Protection factors are jointly derived by the American National Standards Institute (ANSI) and National Institute of Occupational Safety and Health (NIOSH) for respiratory protection devices.

The protection factor (PF), described by a number, is an estimate of the overall level of protection provided by the respirator. The protection factor assigned depends on the fit cartridge efficiency (air-purifying respirators only), air source and type of air flow. The number indicates the relative difference in concentrations of substances outside and inside the facepiece that can be maintained by the respirator. The following are the ANSI/NIOSH-assigned protection factors for the most commonly used respiratory-protection systems:

Table 2

ANSI/NIOSH Assigned Protection Factors

Respiratory Protection System	Facepiece Pressure	Protection Factor ANSI	NIOSH
Self-contained breathing apparatus (SCBA)			
- open-circuit, positive-pressure, full facepiece	+	10,000	10,000
- open-circuit, negative pressure, full facepiece	–	100	50
Air-Line			
- positive-pressure, full facepiece with escape provision	+	10,000	10,000
- positive-pressure, full facepiece without escape provision	+	-----	2,000
- negative-pressure, full facepiece	–	100	50
Air-purifying			
- Negative-pressure, gas- and vapor-removing, full facepiece	–	10	50
- Negative-pressure, gas- and vapor-removing, half mask facepiece	–	10	10

To decide if the type of respiratory protection apparatus provides adequate protection for the intended use, multiply the protection factor by the OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit value (TLV), or NIOSH-recommended exposure limit (REL). The lowest value (PEL, TLV, or REL) should be used to decide if protection is adequate. Do not use the respiratory protection apparatus if the protection factor is inadequate for the given contaminant level expected or encountered.

An adequate protection factor is provided against the contaminated atmosphere using the chosen type of respiratory protection apparatus when the product of the protection factor (of the type of unit) and exposure limit is greater than the ambient concentration of the contaminant encountered.

Example: PF x PEL (or TLV, REL) > ambient concentration

The protection factor can be compromised in several situations, however; most notably these occur (1) if the respirator is not properly fit, or is not worn properly, (2) if a worker has a high respiration rate or (3) if the ambient temperature is high or low. For example, if a worker's respiration rate exceeds 67 liters per minute, many positive-pressure respirators will fail to maintain positive pressure during peak inhalation. This "inboard" facepiece leakage occurs in both ALR and SCBA.

If this occurs, the positive-pressure respirator offers no more protection than a similarly equipped negative-pressure respirator, resulting in a reduction of the protection factor from 10,000 to approximately 50. Actual protection reduction is difficult to estimate and would vary from unit to unit.

Respirator Selection

Respirators must be selected based on a decision logic similar to that provided in the American National Standard Practices for Respiratory Protection Z88.2-1969. The selection sequence for routine use is as follows:

1) Consider skin irritation and sorption of the material through the skin.

2) Odor, taste, or irritant effects are not detectable and persistent at concentrations below the permissible exposure limit -eliminate all air purifying respirators.

3) Eye irritation-eliminate or restrict the use of half-mask respirators.

4) Presence of unidentified contaminants or contaminants in unknown concentrations-eliminate all air-purifying respirators.

5) Atmosphere less than 19.5% oxygen or IDLH levels-eliminate all air-purifying respirators.

6) Presence of incompatible contaminants that might react in the cartridge or canister to produce a toxic or hazardous condition

7) Relative humidity greater than 65 percent

8) List all respirators which offer protection below the PEL for the likely airborne contaminant level. List appropriate cartridges for air-purifying respirators if available.

Air-Purifying Respirators

Level C protection uses air-purifying respirators. An air-purifying respirator can be used only if the atmosphere in which it is to be used has 19.5% oxygen or greater, and if the contaminant is not at IDLH (Immediately Dangerous to Life or Health) levels. Air-purifying respirators will not provide adequate protection unless properly fitted initially and prior to each use. The protection afforded the wearer depends on the fit. The contaminated ambient air must be pulled through the cartridges to purify the air. Leakage from a poor fit will allow some contaminated ambient air to be breathed in directly, providing reduced protection.

When a site's hazards require that self-contained or air-line-supplied air systems be used, Branch Safety Officer conducts or coordinates site-specific safety training with emphasis on respiratory hazards. The rest of the Respiratory Protection Program will focus on air-purifying respirators; however, most of the information is equally applicable to supplied-air systems as well. Also, for the remainder of this section, respirator will be understood to mean "air-purifying full face respirator" unless stated otherwise.

Half-face air-purifying respirators are issued to field employees (after training and medical clearance) to limit exposure from toxicants such as harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors that are associated with occupational disease. The primary objective is to prevent or reduce atmospheric contamination as far as feasible through engineering and other control measures. When control measures are not practical or are inadequate, respiratory protective equipment may be required.

Capabilities and Limitations

Air purifying respirators cannot be used safely unless the wearer understands their capabilities and limitations. If respirators are used improperly, serious injury or death may result. Air purifying respirators are not intended for and may not be used in atmospheres that are, or may become, immediately dangerous to life or health or in atmospheres where the identity or concentration of the contaminants is unknown; in these cases Self Contained Breathing Apparatus (SCBA) must be used.

Cartridges or canisters and filters for respirators are selected and supplied to employees by the Branch Safety Officers. Failing to use a respirator equipped with cartridges or filters suitable for the contaminants in the atmosphere may result in little or no protection.

Assuming that the respirator is properly fitted, in good condition, free from leaks, and has the proper cartridges for the contaminants present, the length of time the respirator will provide protection also depends on the conditions of use. The conditions of use include but are not limited to the following:

- The concentration of contaminants in the atmosphere
- The temperature and humidity of the ambient atmosphere
- Previous use of the cartridges or filters
- The elapsed time since the removal of the cartridges or filters from their protective packaging
- The emotional and/or physical state of the wearer
- The level of physical activity of the wearer.

Cartridges designed to protect the wearer against airborne particles are not appropriate for protection against gases and vapors. Cartridges designed and specified for protection against specific gases and vapors are not appropriate for protection against airborne particles or other gases or vapors beyond the scope of that type of cartridge. Every cartridge is labeled with specific instructions defining the use and limitations of that particular type of cartridge. If the label is missing or the type of cartridge is inappropriate, it must not be used; it will provide little or no protection to the wearer.

Identification of Cartridges for Respirators

The Occupational Safety and Health Administration (OSHA) requires manufacturers to label and color-code cartridges according to OSHA regulations. This requirement allows the user of respirators to recognize the type of cartridge and intended use regardless of the manufacturer. At a minimum, the labeling must state: "cartridge for (name of atmospheric contaminant)" or "type X gas mask canister." The labeling will also give a maximum level of contaminant for which the cartridge or canister is effective. There will be breakthrough of the contaminant if the maximum is exceeded. The following is from Table I-1 of OSHA Standard 29 CFR 1910.134.

Color Coding

Color coding of canisters is required as follows:

Atmospheric Contaminant	*Color Assigned*
Acid Gases	- White
Hydrocyanic Acid Gas	- White with 1/2-inch green stripe completely around the canister near the bottom
Chlorine Gas	- White with 1/2-inch yellow stripe completely around the canister near the bottom
Organic Vapor	- Black
Ammonia Gas	- Green
Acid Gas and Ammonia Gas	- Green with 1/2-inch stripe completely around the canister near the bottom
Carbon Monoxide	- Blue
Acid Gases and Organic Vapor	- Yellow
Hydrocyanic Acid Gas and Chloropicrin Vapor	- Yellow with 1/2-inch blue stripe completely around the canister near the bottom
Acid Gases, Organic Vapor, and Ammonia Gases	- Brown
Radioactive Material (except Tritium and Noble Gas)	- Purple (Magenta)
Particulates (dust, fumes, mist, fog, or smoke)	- Canister color according to contaminant with 1/2-inch gray stripe completely around cartridge near the top
All of the above atmospheric contaminants	- Red with 1/2-inch gray stripe completely around the canister near the top
Gases not listed above	- Orange, see canister label for specifics

Do not rely on color-coding alone. The instructions must be on the cartridge and checked specifically for use and limitations. If the instructions on the cartridge are missing, the cartridge must be discarded.

5.3.7 Danger Signals Indicating Possible Respirator Failure

If the following danger signals are experienced while wearing a respirator, immediately return to fresh air. The cartridges or filters may be inappropriate or used up, or abnormal conditions may be creating vapor concentrations that are beyond the limitations of the cartridges or filters.

- Smell or taste chemicals or if eyes, nose, or throat become irritated
- Difficulty breathing
- Breathing air becomes uncomfortably warm
- Headaches, dizziness, cramps, nausea, or blurred vision
- Changes in complexion or skin color
- Changes in motor coordination, personality, or demeanor
- Changes in speech ability or pattern
- Excessive salivation or changes in pupillary response.
- Any suspected respirator malfunction

At a minimum, cartridges must be replaced at the end of each 8-hour shift.

5.3.8 Fit Testing Respirators

As discussed earlier, the protection afforded the wearer by air-purifying respirators depends on the fit as well as other parameters. A poorly fitting respirator will provide little or no protection. For this reason, employees with beards or long sideburns that may interfere with a respirator's face-sea may not participate in activities that require the use of a respirator. Furthermore, federal law (29 CFR 1910.134) states, and RESNA requires that "wearing of contact lenses in contaminated atmospheres with a respirator shall not be allowed."

The following procedure is used by the Branch Safety Officers to fit employees:

(1) The employee is allowed to pick the most comfortable respirator from a selection of various sizes from different manufacturers.

(2) The selection process is conducted in a separate room from the fit-test area to prevent odor fatigue. The employee is shown how to put on a respirator, how it should be positioned on the face, how to set strap tension, and how to assess the comfort level of the respirator for working conditions. A mirror is available for employee use.

(3) Fit-testing begins with a half-mask. If a good fit cannot be obtained, the employee will be tested with full-face respirators. The employee understands that the purpose of this exercise is to obtain a good, comfortable fit.

(4) The employee wears the most comfortable respirator for at least 5 to 10 minutes, taking it off and on and readjusting it as needed.

(5) Assessment of comfort includes reviewing the following points, allowing the test subject adequate time to determine the comfort of the respirator:

- Position of mask on nose
- Room for eye protection
- Room to talk
- Position of mask on face and cheeks

(6) The following criteria are used to help evaluate the adequacy of the respirator fit:

- Chin placement
- Strap tension
- Fit across nose bridge
- Distance from nose to chin
- Tendency to slip
- Self observation in mirror

(7) The employee conducts the negative and positive pressure leak checks as outlined in the Qualitative Facepiece Testing section below.

Fit Checking

First, put on harness and pull straps equally to avoid distorting the mask. Do not over- tighten mask straps. Over-tightening the head harness will tend to distort the face seal and may cause leakage. It also causes unnecessary discomfort.

(1) Check the facepiece and cartridges as described in the following section on "Inspection, Cleaning, and Storage."

(2) Don facepiece with cartridge or filters.

(3) Adjust facepiece without over-tightening.

(4) Negative Pressure Leak Check: Close off both inlet connections with palms of hands, inhale slowly, and hold breath momentarily. No leakage should be detected and the facepiece should be drawn slightly to the face.

(5) Positive Pressure Leak Check: Close opening in the exhalation valve guard by placing palm of one hand over face of guard; exhale slowly, maintaining slight positive pressure. No leakage should be detected between the face seal and the face.

(6) If leakage is noted:
(a) Adjust the head straps and facepiece slightly; recheck for leakage.
(b) Check condition of exhalation valve and seat. Check that both inlet gaskets are present and in proper condition.

In the event the facepiece cannot be adjusted in the field so there is no leakage, DO NOT ENTER THE AREA REQUIRING PROTECTION. A different style or size facepiece may be required to obtain a proper fit.

Fit checking must take place each time the respirator is donned. Failure to perform a qualitative leak check each time the respirator is donned may result in little or no respiratory protection.

Qualitative Facepiece Testing

(1) A fit-test chamber is made with a clear 55-gallon drum liner suspended above the employee's head for isolation.

(2) The employee equips the respirator with organic vapor cartridges (for amyl acetate test) or HEPA filters (for irritant smoke test).

(3) After selecting, donning, and properly adjusting the respirator, the employee wears it into the separate fit-testing chamber.

(4) The employee wears the respirator for at least 10 minutes before starting the fit test.

(5) Amyl acetate or irritant smoke is released into the drum liner or applied in the ambient air in the employee's breathing zone.

(6) After entering the fit-test chamber, the employee is instructed to:
- Breathe normally
- Breathe deeply
- Turn head in all directions; up and down and side to side
- Talk aloud to test a wide range of facial expressions.

(7) If the employee smells the banana-like odor of amyl acetate or reacts to the irritant smoke during the test, the respirator has failed the test and the entire process of evaluation must be repeated.

(8) When a respirator is found that passes the test, the seal is broken in the chamber and the employee takes a breath to verify that he or she can still smell amyl acetate, which is an olfactory deadening agent, or the irritant smoke.

(9) Properly fit-tested respirator is issued to the employee. A copy of the respirator fit check record is maintained in the employee's general safety file.

Employee's may only wear respirators for which they have been fit-tested. Respirators fit should be re-tested whenever conditions have changed which might prevent a good face seal.

5.3.9 Inspection, Cleaning, and Storage of Respirators

A. Inspection (before each use)

(1) Examine face seal for rips, tears, holes, deformation, or stiffness.

(2) Examine facepiece plastic center shell for cracks, missing components, or damaged threads.

(3) Examine harness for breaks, cuts, frays, tears, and missing or damaged hardware.

(4) Examine inhalation and exhalation valves and valve seats for cuts, cracks, or foreign matter that may not allow the valve to close completely. Verify that valves are properly installed and are not distorted.

(5) Examine cartridges for signs of abuse or damage. Discard damaged items.

(6) Malfunction or deficiencies involving a respirator must be reported to the Branch Safety Officer, who will issue a new respirator or correct the deficiencies with only approved spare parts from the manufacturer. Spare parts from manufacturers of other respirators may not be used. Replacement and repair is done according to the instructions provided by the manufacturer. No repairs are to be done by field personnel on respirators.

B. Cleaning

(1) Unthread cartridges and filters (do not wash).

(2) Wash the facepiece with warm water and a mild detergent at the end of each work day. Rinse in clean, warm water. Shake to remove excess water. Air dry away from direct sunlight or heat.

(3) The mask should be routinely disinfected monthly. A hypochlorite solution may be used (2 tablespoons of chlorine bleach to 1 gallon of water).

(4) After cleaning and air-drying, verify that the facepiece is not damaged and that components removed prior to cleaning have been installed properly.

C. Storage

(1) Place the respirator in its storage box in a heat-sealed or resealable plastic bag. Store in a single layer with the facepiece and exhalation valve in a normal position to prevent the face seal from taking a distorted permanent set.

(2) Replacement components should be stored in sealed packages in a cool, clean, low-humidity location until ready for use.

The Branch Safety Officer explains the RESNA Respiratory Protection Program in detail to new employees who will require a respirator. The employee is asked if the information is understood. If the Company physician has cleared the employee for respirator use and the Branch Safety Officer has verified the fit of the respirator, the employee will be issued a respirator. The employee and Branch Safety Officer signs and dates the RESNA Respiratory Training Record. A copy is maintained in the individual's Branch Employee Safety File and the original is kept in the individual's Corporate Safety File in the Health and Safety Office in Fremont. A copy of the Respiratory Training Record form is attached in Appendix A.

5.3.10 Supplied Air Respirators

A. Compressed Air Tanks

(1) All compressed air cylinders used to supply breathing air to supplied air respirators will be filled with air which meets the criteria for grade "D" breathing air as specified by the Gas Associations Commodity Specifications G-7.1 (ANSI 286.1-1973).

(2) A proper label must be affixed to each compressed air cylinder containing grade "D" breathing air. Any cylinder received from a supplier which lacks such a label must be treated as suspect and returned to the supplier. air-line couplings shall be incompatible with outlets for other gas systems. The air pressure at the hose connection to positive-pressure respiratory equipment shall be within the range specified in the approval of the equipment.

B. Compressor Supplied Air

(1) Wherever possible, breathing air compressors should be of the water lubricated (oil-less) type.

(2) Air compressor intakes must be located in an area where contaminated air cannot enter the system.

(3) An air receiver (tank) must be employed. It must be of sufficient capacity to enable the user(s) to escape in the event of a compressor failure.

(4) Alarms to indicate compressor failure and overheating must be installed in the system.

(5) All breathing air line couplings must be incompatible with outlets for other gas systems.

(6) If the compressor is of the oil-lubricated type, the following additional criteria must be met:

a. A high temperature alarm must be installed.
b. A carbon monoxide (CO) alarm must be installed.
c. Calibration of the carbon monoxide alarm is required on a regular preventative maintenance schedule at least semi-annually.
d. In-line mechanical filters and air-purifying sorbent beds are required to reduce oil mist and hydrocarbon vapors to a minimum.

(7) All output air from compressors used for breathing purposes must meet the requirements for grade "D" breathing air.

5.3.11 Basic PPE Issued to Field Employee and Employee Responsibility

The safe execution of projects entails training, preparation, and field implementation of Site Safety Plans and Company policy. It is the responsibility of each Branch Safety Officer to maintain an adequate inventory of safety equipment and to outfit new employees with safety equipment.

It is also the responsibility of every field employee to wear required PPE in the field when requested by the Branch Safety Officer or when called for by regulations. Field employees are issued specific safe

equipment and instructions when such equipment must be worn. An adequate supply of additional safety equipment is maintained in the branches for more complex projects.

The following safety equipment is issued to new employees before field work and makes up the basic safety-related field attire.

- Hard hat
- Safety glasses and splash goggles
- Steel-toed rubber boots
- Safety vest
- Air-purifying respirator (after completion of fit testing and training).

It is the responsibility of each employee to keep this equipment accessible and in usable condition at all times.

Regardless of the purpose of the site visit, a hard hat, safety glasses, and steel-toed rubber boots are the minimum safety equipment to be worn on all projects. This requirement applies to project and staff personnel and technicians without exception.

Splash goggles are issued to all field personnel and must be worn whenever there is a possibility that a contaminated fluid could be splashed into the eyes. Burns of the eyes are quite common and extremely painful and can result in partial or total loss of vision. Personnel must wear splash goggles when purging wells or other similar activities. If acidic, caustic, or toxic compounds are suspected, a full-face shield must be worn in addition to the goggles.

Safety vests are issued to field personnel. The risk from moving vehicles on-site is very serious. Employees in the field must wear safety vests when moving vehicles or heavy equipment with moving parts are on-site or when the employee is working near streets or vehicle traffic.

Field personnel must keep air-purifying respirators in their vehicles or with them at all times. The respirator does not have to be worn unless required by the Site Safety Plan; however, respirators must be worn if the PEL of the Occupational Safety and Health Administration or TLV of the American Conference of Governmental Industrial Hygienists, whichever is lower, may be exceeded in the breathing zone, or when the Site Safety Officer designates that such protection is needed. The PEL and TLV are listed in each Site Safety Plan for the contaminants expected on the site. The use of a respirator is encouraged whenever discomfort is felt, even if the level is well below the exposure limits.

It is the responsibility of each employee to maintain the respirator in a usable condition. The respirator should be cleaned and inspected after each use and kept in a resealable plastic bag. A defect in the respirator must be reported to the Branch Safety Officer and a new respirator issued. **No repairs are to be done by field personnel on respirators.**

TX # 7

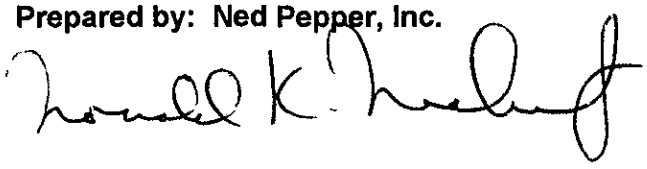
SAMPLING AND ANALYSIS PROCEDURE

Prepared For:

Balfour Beatty Construction, Inc.

CDOT CONTRACT # 04-043434
SFOBB Seismic Retrofit
OAKLAND, CALIFORNIA

Prepared by: Ned Pepper, Inc.



Ronald K. Rinehart
RMO Engineering Contractor A-HAZ, License #663596

September 19, 1995

Submitted by:

Ned Pepper, Inc.
P. O. Box 208
Folsom, Ca. 95763
(916) 983-2241

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1.0 Introduction

This document has been prepared in accordance with the Plans, Specifications and Special Provisions of Contract # 04-043434. The purpose of this document is to describe the sampling and analysis procedures used to characterize the soil prior to the transportation and disposal of material generated in structure excavation.

1.1 Background

Caltrans contracted with APEX Environmental Recovery, Inc. (APEX) to perform subsurface environmental investigation for the project under Contract Area 53U495.

The purpose of these investigations was to determine for Caltrans the potential presence of contaminated material in and around structure bents, columns, footings and foundations scheduled to be removed, replaced or retrofit. The contaminants of concern included total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), organochlorine pesticides and polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), and metals.

The objective of the investigations was to evaluate foundation conditions in areas to be excavated for the presence of contaminates that could impact construction worker's health and safety and to provide data for soil disposal alternatives. A total of twenty one borings were drilled to depths of 4 and 17.5 feet below grade. The results of these investigations are contained in Apex Project No. 153DT - Report Site Investigation, Volumes I & II dated March 22, 1994. The Investigative Summary and Tables summarizing the results are contained in Appendix A.

2.0 Scope of Work

Waste Characterization forms will be completed, signed by a Caltrans representative and submitted to the individual disposal facilities. Previous analytical data for each bent location will be individually packaged and submitted for acceptance. The necessary documents will be submitted to: Non-RCRA (CA-Haz) - Chemical Waste Management, Kettleman City, and Class II - Altamont Landfill, Inc. facility in Livermore, CA.

Based on the review, by the disposal facilities, of data collected from the previous subsurface environmental investigation, Ned Pepper, Inc. (NPI) must perform additional sampling and analysis for the characterization of soils. Sampling can be accomplished by advancing borings or the digging of test pits with a backhoe. The depth and frequency of sampling will be determined by the disposal facilities. Previous analytical data, size, shape and depth of excavation will be key factors.

2.1 Schedule

Soils properly characterized will be off-hauled the same day as they are excavated. The off-haul schedule will be the same as the General Contractor's excavation schedule. When additional analytical is required, NPI will collect samples at least three weeks prior to work scheduled by the General Contractor. The disposal facility will determine the analytical required. Turn-around time for the analysis is five (5) working days.

2.2 Health and Safety

All workers associated with the collection of samples and profiling of soil will be 40-hour trained and wear personal protective equipment as specified in the Site Specific Health and Safety Plan. In general, all personnel entering an Exclusion Zone will don hard hats, Tyvec, leather gloves, orange vest and leather work boots.

A Site Specific Health and Safety Plan identifying physical and chemical hazards, establishing protective clothing requirements and emergency response procedures has been prepared. A copy will be provided prior to the start of the work and another maintained on-site during all operations.

3.0 In-Situ Sampling

This Procedure presents criteria for sampling, analysis and profiling the soil for acceptance. The soil to be excavated will be sampled to identify whether it will be disposed of as CA-Haz or Class II material. The depth and frequency of sampling will be determined, in advance, by the disposal facilities after receiving a bent location summary as described in the example in Appendix B.

3.1 Sampling Plan

A. *Class I Landfill* - Based on the review of the preliminary data by Chemical Waste Management, lead (Pb) appears to be the contaminant of concern. In general, Non-RCRA materials with Soluble Threshold Limit Concentrations (STLC's) greater than 5 mg/l lead (Pb) are acceptable. Previous investigations have identified these CA-Haz materials within the top 1 feet of the excavations. A gridded sampling plan has been described in Appendix C to more accurately quantify the lateral extent of lead (Pb) contamination. Four-point composite samples will be collected at a depth of 1 foot representing each .100 cubic yards of soil and analyzed for STLC lead (Pb). In some cases, additional samples at greater depths will be required. The results of this investigation will be used for the excavation, segregation and offhaul of Class I soil. A copy of the results will be submitted to the Resident Engineer prior to excavation and offhaul.

B. *Class II Landfills* - In order to obtain representative samples at each location, the landfills have requested that following criteria be employed during soil sampling: 1) bottom of excavation or Class II level and, 2) at levels, equally spaced from the surface to the bottom, that will represent not more than 250 cubic yards. A gridded sampling plan has been described in Appendix C to more accurately quantify the lateral extent of lead (Pb) and hydrocarbon (418.1) contamination. Four-point composite samples will be collected at each level. The results of previous investigations will be used to determine the laboratory analyses to be performed. Where previous analytical findings are accepted by the landfill for the characterization of the soil, they will be included and no further analysis will be performed.

   Discrete samples from each boring (A, B, C, D and then E, F, G, H, etc...) at each level will be composited in the laboratory and analyzed for TRPH Total Recoverable Petroleum Hydrocarbons - EPA method 418.1 and heavy metals - EPA method 6010. Laboratory turn-around time will be 5 days. Specific metals to be analyzed will include: antimony, arsenic, barium, beryllium cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc.

3.1 Sampling Plan (Cont,,,)

The composite sample which exhibits the highest TRPH will be analyzed for Total Petroleum Hydrocarbons in the gasoline and diesel ranges (TPH-g and TPH-d) - EPA method 8015M, for volatile aromatic hydrocarbons (BTEX) - EPA 8020, for volatile organic hydrocarbons EPA 8240 and for semi-volatile organic hydrocarbons EPA 8270. Laboratory turn-around time will be 5 days.

C. *Excavated soil to be used as backfill* - In order to obtain representative samples at each location, the following criteria will be employed during soil sampling: 1) bottom of excavation or Class II level and, 2) at levels, equally spaced from the surface to the bottom, that will represent not more than 100 cubic yards.

Discrete samples from each boring (A, B, C, D and then E, F, G, H, etc...) at each level will be composited in the laboratory and analyzed for TRPH Total Recoverable Petroleum Hydrocarbons - EPA method 418.1 and heavy metals - EPA method 6010. Laboratory turn-around time will be 5 days. Specific metals to be analyzed will include: lead (Pb).

3.2 Sample Collection Procedures

Borings will be advanced to a predetermined depth utilizing an electric flighted auger equipped with a two inch (2") bit. After the bit is advanced to the desired depth, the auger is removed and the sampler is lowered back into the borehole. Samples will be collected with a 1 1/2" drive sampler. A slide hammer will drive the sampler, loaded with a 1 1/2 by 6 inch brass sleeve, approximately one-half foot into native soil. The brass sleeve is then removed for inspection, covered with teflon sheets, capped immediately, labeled, placed in a cooled ice chest chilled to 4 degrees Celsius and transported under continuous chain of custody documentation to Sparger Technology, Inc., a state certified analytical laboratory (Sample chain of custody form is included in Apendix D).

Samples will be numbered in the following manner: bent & column, boring location, depth, (Example: 24L-A7, bent 24 left - boring A, 7 feet in depth.

3.3 Decontamination Procedures

Drilling augers and bit will be cleaned between borings to prevent cross-contamination. Sampling equipment will be cleaned in TSP solution and rinsed in two buckets containing clean water between samples. After a final rinse in deionized water, sampling equipment will be allowed to air-dry. Rinseate water will be stored in labeled 55 gallon DOT-approved drums and, after analytical data has been received, disposed of properly.

3.4 Backfill

As boring locations will be completely excavated by the General Contractor, boreholes will be backfilled with native soil. Any remaining auger returns will be placed by shovel into a labeled 55 gallon DOT-approved drums. At a later date, after analytical data has been received, the auger returns will be disposed of properly.

3.5 Analytical Program

A courier will deliver the samples to Sparger Technology, Inc. in Sacramento, California, a State of California certified laboratory, within 24 hours of collection. Copies of Sparger's certification, their extension from the Dept. of Health Services and a list of approved analytical methods are presented in Appendix E. The analytical program for the samples collected during this investigation includes the following methods, detection limits and holding times:

EPA Method 418.1, Total Recoverable Petroleum Hydrocarbons (TRPH) - 5 mg/kg, 28 days
EPA Modified Method 8015, Total Petroleum Hydrocarbons as Diesel (TPH-d) - 1 mg/kg, 14 days
EPA Modified Method 8015, Total Petroleum Hydrocarbons as Gas (TPH-g) - 1 mg/kg, 14 days
EPA Modified Method 8020, Volatile Aromatic Hydrocarbons (BTEX) - .005 mg/kg, 14 days
EPA Method 6010, Metals (CAM 17) - .005 mg/kg, 6 months
EPA Method 8240, Volatile Organic Compounds (VOCs) - .005 mg/kg, 14 days
EPA Method 8270, Semi-Volatile Organic Compounds (SVOCs) - .33 mg/kg, 14 days
22 CCR 667000 Waste Extraction Test (WET) - .005 mg/l, 6 months

If the levels of any given metal analyzed by EPA 6010 exceeds 10 times its STLC value, a WET test may be performed at the request of the landfill.

3.6 Quality Assurance / Quality Control

Quality Assurance / Quality Control (QA/QC) will be performed by the analytical laboratory for each method of analysis with specificity for every appropriate analyte requested and/or representative analytes listed in the test method's QA/QC. QA/QC data will be reported in summary form for all samples submitted. QA/QC procedures specified by each test method will include the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever is more frequent;
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever is more frequent;
- One spiked sample for every ten samples, batch of samples or type of matrix, whichever is more frequent, with spike made at ten times the detection limit or at the analyte level and;
- One quality control sample analyzed with every ten samples, batch of samples or type of matrix, whichever is more frequent.

Laboratory blanks, spiked samples, and duplicate sample analyses will be reported on either laboratory testing report or the QA/QC summary report. Spiked samples will be reported a percent spike recovery.

Field personnel will prevent accidental sample contamination by observing the sample handling procedures specified above. Because groundwater samples will not be collected, bailer, purge pump, or cooler blanks will not be collected.

4.0 Profiling

Analytical reports will be reviewed to determine the classification of the soil. Additional analytical will be combined with previously developed data and resubmitted to the individual disposal facilities for review and acceptance. Each disposal facility will issue a letter of acceptance and a control number for each footing excavation. The footing and control number will be included on each manifest or bill of lading. A copy of the acceptance letter will be submitted to the Resident Engineer.

APPENDIX A

APEX Investigative Summary and Tables

INVESTIGATIVE SUMMARY

On October 17, 1989 the San Francisco Bay area experienced an earthquake of magnitude 7.1 on the Richter Scale. The epicenter of the quake was located in Loma Prieta about 60 miles southeast of San Francisco. In the epicentral area the ground motion lasted for about 5 to 7 seconds and about 10 to 15 seconds in Oakland. Following the earthshaking event, the California Department of Transportation (Caltrans) decided to retrofit portions of the bridge to higher seismic standards.

Caltrans contracted APEX Environmental Recovery, Inc. (APEX) to perform the environmental investigation for the project under Contract No. 53U495, Task Order No. 04-04343K-01. This investigation covers bents 24 through 36 of the east bay span of the bridge

The purpose of this investigation was to determine, for Caltrans, the potential presence of contaminated material in and around structure's columns, footings, and foundations scheduled to be modified. The contaminants of concern include total petroleum hydrocarbons (TRPH), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), organochlorine pesticides and polychlorinated biphenyl's (PCB's), and metals. The objective of the project was to evaluate foundation conditions in areas that are to be excavated for the presence of contaminants that could impact construction workers health and safety and provide data for soil disposal alternatives. The scope of work consisted of: 1) drilling a minimum of one soil boring at each of the columns and footing locations; 2) collecting soil samples at the surface and in approximately three-foot intervals thereafter to the termination of the borings; 3) collecting five surface soil samples; 4) collecting groundwater samples from some of the borings; 5) laboratory analysis of all soil and groundwater samples; and 6) preparing a report with our findings and conclusions. Caltrans provided APEX with specific drilling locations, specified sample collection depths, and analytical methods for each boring.

A total of twenty one borings were drilled to depths of between 4 and 17.5 feet below grade. In addition, five surface samples and four groundwater samples were collected

The soil and groundwater samples were analyzed for total petroleum hydrocarbons (TRPH), volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), organochlorine pesticides, polychlorinated biphenyl's (PCB's), and CAC metals.

Soils encountered primarily consisted of sands, silty sands with gravel, and silts with gravel. These materials are presumed to be fill. Considerable debris including asphalt, concrete, and trash were encountered in several borings.

Groundwater was encountered at depths of between 1.5 and 9.5 feet below grade. Heaving sands and gravels were frequently encountered below groundwater.

Concentrations of TRPH ranged from below detection limit (4 ppm) to 7,800 ppm in sample B27C1-8. No VOCs were detected in any of the soil samples.

SVOCs were detected in four of the soil samples, B24C1-0, B26C1-0, B28C2-0, and B28C2-2. Compounds detected include naphthalene, 2 methyl naphthalene, acenaphthylene, dibenzofuran, fluorene, phenathrene, anthracene, fluoranthene, pyrene, benzo (a) anthracene, and benzo (a) pyrene, bis (2 ethylhexyl) phthalate, chrysene, benzo (b) fluoranthene, benzo (k) fluoranthene, and butylbenzylphalate. The highest concentration of a SVOC detected was 6080 ppm of acenaphthene in sample B26C1-0.

Organochlorine pesticides and PCB's were detected in thirteen samples, B24C1-0, B24C2-0, B25C1-0, B26C1-0, B26C1-3, B26C2-0, B27C1-0, B28C2-0, B28C2-2, B29C1-0, B30C2-0, B33C2-0 and B36C1-0. Beta BHC was detected in 12 samples, with concentrations ranging from 3.6 ppb to a maximum of 312 ppb (B28C2-0). The compound 4, 4 DDD was detected in four of the samples at concentrations ranging from 5.2 ppb to a maximum of 24 ppb (B30C2-0). The compound 4, 4 DDT was detected in seven of the samples at concentrations ranging from 4.8 ppb to a maximum of 32 ppb (B28C2-0). Aroclor was detected in nine samples. Concentrations ranged from 34 ppb to a maximum of 171 ppb (B30C2-0). Heptachlor Epoxide was detected in seven of the samples, with concentrations ranging from 6.9 ppb to a maximum of 54 ppb in sample B28C2-0.

Metals analysis detected concentrations of lead above the total threshold limit concentration (TTLC) in five samples, B24C1-0, B30C2-0, B36C1-0, 24/25 50S, and 32/33 50N. Concentrations of lead above ten times the soluble threshold limit concentration (STLC) were detected in 18 additional samples, B24C1-3, B24C2-0, B25C1-0, B26C1-0, B26C1-3, B26C2-0, B27C1-0, B27C2-3, B28C2-0, B28C2-2, B31C1-0, B31C2-2, B33C1-0, B33C2-0, B33C2-3, 24/25-50N, 26/27-50N, and 30 50N. A concentration of 49 ppm of total chromium was detected in sample B27C1-0. This sample has the potential to exceed the STLC for hexavalent chromium.

Based on these analyses for metals, Waste Extraction Tests (WET) were performed for lead on 23 samples. Samples B24C1-0, B24C2-0, B26C1-0, B27C1-0, B27C2-3, B28C2-0, B28C2-2, B30C2-0, B31C10, B33C1-0, B33C2-0, B33C2-3, B26C1-0, 24/25-50S, 26/27-50N, and 32/33 50N had concentrations of lead above the STLC of 5 ppm. Sample B27C1-0 was analyzed for chromium; a concentration of 0.29 ppm was detected. This indicates that hexavalent chromium is not present in a hazardous concentration in this sample.

In general, soil contamination appears to be primarily present in the first three feet of the soil horizon.

TRPH was detected in groundwater samples B24C1W AND B25C1W at concentrations of 0.2 ppm and 0.14 ppm, respectively. No VOCs, SVOCs, organochlorine pesticides or PCB's were detected in any of the samples.

Concentrations of antimony, cadmium, chromium, nickel, silver, and thallium above maximum contaminant levels (MCLs) were detected in all of the groundwater samples. All other metals were either not detected or detected in concentrations below the respective MCLs. Concentrations of metals detected may have been influenced by the presence of suspended solids, which is inherent in the groundwater sampling technique used.

TABLE 1
Bent, Boring, and Sample Depths
OAKLAND BAY BRIDGE
Oakland, California

Bent No.	Column No.	Boring No.	Sample Depths
B24	1	B24C1	0, 3
B24	2	B24C2	0, 7, 11
B25	1	B25C1	0, 7
B25	2	B25C2	3
B26	1	B26C1	0, 3
B26	2	B26C2	0
B27	1	B27C1	0, 5, 8
B27	2	B27C2	3, 7, 11
B28	2	B28C2	0, 2
B29	1	B29C1	0, 3, 16
B29	2	B29C2	0, 3, 16
B30	1	B30C1	0, 3
B30	2	B30C2	0, 3, 16
B31	1	B31C1	0, 3, 9, 15
B31	2	B31C2	0, 3, 15
B32	1	B32C1	0, 3, 9, 15
B32	2	B32C2	0, 3, 9
B33	1	B33C1	0, 3, 14
B33	2	B33C2	0, 3, 9
B36	1	B36C1	0, 3, 14
B36	2	B36C2	0, 3, 6

TABLE 2
ANALYTICAL SUMMARY FOR SOIL
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS
San Francisco - Oakland Bay Bridge
East Bay Spans

Sample No.	Sample Date	418.1 (ppm)
B24C1-0	12/30/93	600
B24C1-3	12/30/93	756
B24C2-0	12/30/93	108
B24C2-7	12/30/93	50
B25C1-0	12/30/93	588
B25C1-7	12/30/93	1280
B25C2-3	12/30/93	135
B26C1-0	12/30/93	152
B26C1-3	12/30/93	145
B26C2-0	12/30/93	2340
B27C1-0	12/30/93	400
B27C1-5	12/30/93	6500
B27C1-8	12/30/93	7800
B27C2-3	12/30/93	940
B27C2-7	12/30/93	8.4
B27C2-11	12/30/93	ND
B28C2-0	12/31/93	228
B28C2-2	12/31/93	65
B29C1-0	12/30/93	1300
B29C1-3	12/30/93	11
B29C1-16	12/30/93	ND
B29C2-0	12/30/93	4100
B29C2-3	12/30/93	ND
B29C2-16	12/30/93	ND
B30C1-0	12/29/93	34
B30C1-3	12/29/93	4.4
B30C2-0	12/30/93	2100
B30C2-3	12/30/93	ND
B30C2-16	12/30/93	4.4
B31C1-0	12/29/93	42
B31C1-3	12/29/93	12
B31C1-9	12/29/93	ND
B31C1-15	12/23/93	ND
B31C2-0	12/29/93	3440
B31C2-3	12/29/93	8.8
B31C2-15	12/29/93	ND

Note: ND= Not Detected
NA = Not Analyzed

T.O. 04-04343K-01
Contract No. 53U495

TABLE 2
ANALYTICAL SUMMARY FOR SOIL
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS
San Francisco - Oakland Bay Bridge
East Bay Spans

Sample No.	Sample Date	418.1 (ppm)
B32C1-0	12/29/93	16
B32C1-3	12/29/93	ND
B32C1-9	12/29/93	21
B32C1-15	12/29/93	244
B32C2-0	12/31/93	ND
B32C2-3	12/31/93	6
B32C2-9	12/31/93	48
B33C1-0	12/29/93	256
B33C1-3	12/29/93	ND
B33C1-14	12/29/93	4.8
B33C2-0	12/31/93	316
B33C2-3	12/31/93	22
B33C2-9	12/31/93	ND
B36C1-0	12/29/93	456
B36C1-3	12/29/93	ND
B36C1-14	12/29/93	ND
B36C2-0	12/31/93	8
B36C2-3	12/31/93	4
B36C2-6	12/31/93	ND

Note: ND= Not Detected
NA = Not Analyzed

TABLE 7
ANALYTICAL SUMMARY FOR SOIL
WET TEST FOR METALS
San Francisco - Oakland Bay Bridge
East Bay Spans

Sample No.	Sample Date	Analyte	EPA Analytical Method	Concentration	Detection Limit (ppm)
B24C1-0	12/30/93	Lead	7420	69	1.2
B24C1-3	12/30/93	Lead	7420	2.8	0.12
B24C2-0	12/30/93	Lead	7420	6.1	0.12
B25C1-0	12/30/93	Lead	7420	1	0.12
B26C1-0	12/30/93	Lead	7420	18	0.48
B26C1-3	12/30/93	Lead	7420	3.2	0.12
B26C2-0	12/30/93	Lead	7420	2.9	0.12
B27C1-0	12/30/93	Chromium	7420	0.29	0.1
B27C1-0	12/30/93	Lead	7420	8	0.12
B27C2-3	12/30/93	Lead	7420	6	0.12
B28C2-0	12/31/93	Lead	7420	96	1.2
B28C2-2	12/31/93	Lead	7420	87	1.2
B30C2-0	12/30/93	Lead	7420	80	1.2
B31C1-0	12/29/93	Lead	7420	5.4	0.12
B31C2-0	12/29/93	Lead	7420	ND	0.12
B33C1-0	12/29/93	Lead	7420	7.6	0.12
B33C2-0	12/31/93	Lead	7420	94	1.2
B33C2-3	12/31/93	Lead	7420	69	1
B36C1-0	12/29/93	Lead	7420	249	4.8
24/25-50N-0	12/30/93	Lead	7420	3.1	0.12
24/25-50S-0	12/30/93	Lead	7420	100	1.2
26/27-50N-0	12/30/93	Lead	7420	6.4	0.12
3050N-0	12/29/93	Lead	7420	26	0.48
32/3350-N-0	12/29/93	Lead	7420	59	1.2

APPENDIX B

Letter from Altamont / Bent Location Summary

Altamont Landfill and Resource Recovery Facility
10840 Altamont Pass Road
Livermore, California 94550
510/449-6349 • FAX: 510/455-7331

A Waste Management Company

September 8, 1995

Mr. Ron Rinehart
Ned Pepper, Inc.
P.O. Box 208
Folsom, CA 95763

RE: Cypress Freeway, Contract 'F', Oakland, CA
CDOT 04-192244

Dear Mr. Rinehart:

Based on the review of Ned Pepper's (NPI) format for submitting analytical data results, Altamont will assign one profile and then assign control numbers to each individual footing location within 48 hours of receiving supporting documentation. Altamont will verify the profile and control number in a letter addressed to NPI.

The documentation NPI will submit on a footing specific basis will be:

1) Pre-approved analytical requirements as agreed upon by Altamont and NPI.

2) A one page analytical summary including previous and supplemental analytical data.

3) Analytical data results with associated chain-of-custody.

The assignment of the profile and individual control numbers will be contingent upon material meeting all Altamont acceptance requirements.

Please call me at 510-455-7306 if you have any questions.

Sincerely,

Robert Thompson
Technical Manager

4 F (L)

	PREVIOUS ANALYTICAL — SAMPLE DEPTH						SUPPLIMENTAL ANALYTICAL — COMPOSITE SAMPLE DEPTH				SOIL CLASSIFICATION			
	1.0 FEET		4.0 FEET		6.0 FEET		TOP - 1.0' BOT - 4.0'		TOP - 4.0' BOT - 7.0'		CA-HAZ	LNDFLL	COVER	
											HYDROCARBON CRITERIA — ALTAMONT			
ANALYTE	TTLC (mg/kg)	TCLP (mg/l)	TTLC (mg/kg)	TCLP (mg/l)	TTLC (mg/kg)	TCLP (mg/l)	TTLC (mg/kg)	TCLP (mg/l)	TTLC (mg/kg)	TCLP (mg/l)	LNDFLL (mg/kg)	COVER (mg/kg)		
TRPH (418.1)	ND		200		ND		—		—		5,900	50		
TPH - G/BTEX (8015-M)	—		—		—		—		—		5,900	50		
TPH - Diesel (8015-M)	—		ND		—		—		—		20,000	2,500		
TPH - O&D (3550/8015-M)	—		—		—		—		—		20,000	2,500		
TPH - O&G (5520)	—		—		—		—		—		10,000	2,500		
Benzene (8015-M)	—	—	—	—	—	—	—	—	—	—	0.5	0.5	TCLP	
Toluene (8015-M)	—		—		—		—		—		NA	NA		
Ethylbenzene (8015-M)	—		—		—		—		—		NA	NA		
Xylenes (8015-M)	—		—		—		—		—		NA	NA		

											METALS CRITERIA — TITLE 22			
ANALYTE	TTLC (mg/kg)	STLC (mg/l)	TTLC (mg/kg)	STLC (mg/l)	TTLC (mg/kg)	STLC (mg/l)	TTLC (mg/kg)	STLC (mg/l)	TTLC (mg/kg)	STLC (mg/l)	TTLC (mg/kg)	STLC (mg/l)	10x STLC (mg/l)	20x STLC (mg/l)
Antimony	—	—	40	—	—	—	—	—	—	—	500	15	150	3,000
Arsenic	—	—	6.3	—	—	—	—	—	—	—	500	5	50	1,000
Barium	—	—	68	—	—	—	—	—	—	—	10,000	100	1,000	20,000
Beryllium	—	—	1.5	—	—	—	—	—	—	—	75	0.75	8	150
Cadmium	—	—	3	—	—	—	—	—	—	—	100	1	10	200
Chromium (III)	—	—	9.6	—	—	—	—	—	—	—	2,500	5	50	1,000
Chromium (VI)	—		—	—	—	—	—	—	—	—	500	5	50	1,000
Chromium (total)	—	—	—	—	—	—	—	—	—	—	2,500	560	5,600	112,000
Cobalt	—	—	9.6	—	—	—	—	—	—	—	8,000	80	800	16,000
Copper	—	—	13	—	—	—	—	—	—	—	2,500	250	2,500	50,000
Lead	49.0	—	29.0	—	—	—	—	—	—	—	1,000	5	50	1,000
Mercury	—	—	70	—	—	—	—	—	—	—	20	0.2	2	40
Molybdenum	—	—	1.2	—	—	—	—	—	—	—	3,500	350	3,500	70,000
Nickel	—	—	22	—	—	—	—	—	—	—	2,000	20	200	4,000
Selenium	—	—	ND	—	—	—	—	—	—	—	100	1	10	200
Silver	—	—	0.9	—	—	—	—	—	—	—	500	5	50	1,000
Thallium	—	—	1.7	—	—	—	—	—	—	—	700	7	70	1,400
Vanadium	—	—	11	—	—	—	—	—	—	—	2,400	24	240	4,800
Zinc	—	—	51	—	—	—	—	—	—	—	5,000	250	2,500	50,000

ANALYTE	TTLC (mg/kg)		TTLC (mg/kg)		TTLC (mg/kg)		ANALYTICAL PERFORMED		ANALYTICAL PERFORMED	
Volatiles (8240)	—		—		ND					
Volatiles (8260)	—		—		—		Yes	No	Yes	No
Semi-Volatiles (8270)	—		ND		—					
PCB (8080)	—		—		—					

07-Sep-95 : DATE
03:55 PM TIME

TABLE 2
ANALYTICAL SUMMARY FOR SOIL
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS
Cypress Reconstruction
Oakland, California
EA# 192241-Contract Area F
F Line

Sample No.	Sample Date	418.1 (ppm)	Detection Limit (ppm)
1F-1	8/11/93	ND	4
1F-6	8/11/93	ND	4
2FL-1	8/13/93	ND	4
2FL-4	8/7/93	ND	4
2FL-6	8/7/93	ND	4
2FR-1	8/7/93	6.4	4
2FR-4	8/7/93	ND	4
2FR-6	8/7/93	ND	4
3FL-1	8/7/93	22	4
3FL-4	8/7/93	ND	4
3FL-6	8/7/93	ND	4
[redacted]			
4FL-1	8/27/93	ND	4
4FL-4	8/27/93	200	20
4FL-6	8/27/93	ND	4
[redacted]			
4FR-6	8/7/93	ND	4
5FL-1	8/9/93	ND	4
5FL-4	8/9/93	ND	4
5FL-6	8/9/93	ND	4
5FR-1	8/9/93	ND	4
5FR-4	8/9/93	ND	4
5FR-6	8/9/93	63	4
6FL-1	8/7/93	ND	4
6FL-4	8/7/93	ND	4
6FL-6	8/7/93	5.6	4
6FR-1	8/7/93	24	4
6FR-4	8/7/93	ND	4
6FR-6	8/7/93	45	4
7FL-1	8/7/93	ND	4
7FL-4	8/7/93	ND	4
7FL-6	8/7/93	ND	4
7FR-1	8/7/93	ND	4
7FR-4	8/7/93	110	4
7FR-6	8/7/93	ND	4
8FL-1	8/9/93	ND	4
8FL-4	8/9/93	ND	4
8FL-6	8/9/93	19	4
8FR-1	8/9/93	14	4
8FR-4	8/9/93	ND	4
8FR-6	8/9/93	6	4

T.O. 04-192231-01
Contract No. 53S515
Cypress Reconstruction
Oakland, California

TABLE 3
ANALYTICAL SUMMARY FOR SOIL
TOTAL PETROLEUM HYDROCARBONS
Cypress Reconstruction
Oakland, California
EA# 192241-Contract Area F

Sample No.	Sample Date	8015m Diesel (ppm)	Detection Limit (ppm)
1F-1	8/11/93	ND	10
2FL-4	8/7/93	ND	10
4FL-4	8/27/93	ND	10
5FL-4	8/9/93	ND	10
5FR-6	8/9/93	ND	100
6FR-4	8/7/93	ND	10
6FL-1	8/7/93	ND	10
6FL-4	8/7/93	ND	10
7FL-4	8/7/93	ND	10
7FR-4	8/7/93	ND	100
7H-4	9/2/93	ND	10
8H-4	9/2/93	ND	10
23RL-4	9/1/93	ND	10
24RL-4	9/1/93	ND	10
25RR-4	8/31/93	ND	10
26LR-4	9/1/93	ND	10
26RL-4	8/31/93	ND	10
27RL-4	8/31/93	ND	10
28LM-4	9/1/93	ND	10
28RR-4	8/31/93	ND	10
29R-4	8/31/93	ND	100
30L-4	8/31/93	ND	100

Notes: ND = Not Detected

TABLE 7
ANALYTICAL SUMMARY FOR SOIL
TITLE 22 METALS
Cypress Reconstruction
Oakland, California
EA# 192241-Contract Area F

Metal (ppm)	Preliminary Remedial Goals (ppm)	Sample Number and Date Anal						
		1F-1 8/11/93	1F-6 8/11/93	3FL-1 8/7/93	4FL-4 8/27/93	6FL-4 8/7/93	24RL-4 9/1/93	26RL-4 9/1/93
Antimony	67	NA	NA	ND	40	ND	ND	ND
Arsenic	0.51 - 4.6	NA	NA	6	6.3	9.5	6.3	2.4
Barium	12,000	NA	NA	39	68	33	53	49
Beryllium	0.2 - 1.8	NA	NA	0.6	1.5	ND	ND	ND
Cadmium	2.7 - 24	NA	NA	2.1	3	1.5	1.3	ND
Chromium (III)	170,000	NA	NA	1.9	9.6	44	25	20
Cobalt	*	NA	NA	4.4	9.6	9.9	5.2	4.3
Copper	5,000	NA	NA	14	13	23	25	5
Lead	340	21	13	24	29	35	47	7.9
Mercury	45	NA	NA	ND	70	ND	ND	ND
Molybdenum	830	NA	NA	1.1	1.2	1.5	ND	1.1
Nickel	44 -400	NA	NA	1.9	22	45	26	13
Selenium	830	NA	NA	2.4	ND	ND	ND	ND
Silver	830	NA	NA	ND	0.9	ND	ND	ND
Thallium	14	NA	NA	1.6	1.7	ND	ND	ND
Vanadium	1,200	NA	NA	12	11	34	18	14
Zinc	50,000	NA	NA	124	51	55	45	11

See Appendix D for information on Preliminary Remedial Goals
NOTE: ND = Not Detected, NA=Not Analyzed
* Preliminary Remedial Goals not available

T.O 04-192231-01
Contract No. 535515
Cypress Reconstruction
Oakland, California

417-9010.XLS

TABLE 8
ANALYTICAL SUMMARY FOR SOIL
Total Lead
Cypress Reconstruction
Oakland, California
EA#192241-Contract Area F
F Line

Sample No.	Sample Date	Total Lead (ppm)	Detection Limit (ppm)
1F-1	8/11/93	21	1
1F-6	8/11/93	13	1
2FL-1	8/7/93	16	1
2FL-4	8/7/93	8.6	1
2FL-6	8/7/93	6.3	1
2FR-1	8/7/93	9.4	1
2FR-4	8/7/93	19	1
2FR-6	8/7/93	5.9	1
3FL-1	8/7/93	24	1
3FL-4	8/7/93	8.7	1
3FL-6	8/7/93	13	1
[redacted]			
4FL-1	8/27/93	49	1
4FL-4	8/27/93	5.1	1
[redacted]			
4FR-6	8/7/93	17	1
5FL-1	8/9/93	18	1
5FL-4	8/9/93	17	1
5FL-6	8/9/93	17	1
5FR-1	8/9/93	31	1
5FR-4	8/9/93	18	1
5FR-6	8/9/93	53	1
6FL-1	8/7/93	24	1
6FL-4	8/7/93	35	1
6FL-6	8/7/93	24	1
6FR-1	8/7/93	20	1
6FR-4	8/7/93	26	1
6FR-6	8/7/93	21	1
7FL-1	8/7/93	19	1
7FL-4	8/7/93	30	1
7FL-6	8/7/93	25	1
7FR-1	8/7/93	43	1
7FR-4	8/7/93	42	1
7FR-6	8/7/93	31	1
8FL-1	8/9/93	41	1
8FL-4	8/9/93	29	1
8FL-6	8/9/93	23	1
8FR-1	8/9/93	15	1
8FR-4	8/9/93	14	1
8FR-6	8/9/93	32	1

T.O. 04-192231-01
Contract No. 535515
Cypress Reconstruction
Oakland, California

418-PB.XLS

ANALYTICAL SUMMARY FOR SOIL
VOLATILE ORGANICS
Cypress Reconstruction
Oakland, California
EA# 192241-Contract Area F

8240 ANALYTE (ppm)	Preliminary Remedial Goals (ppm)	Sample Nu[illegible] and Sam[illegible] Date 4FR-4 8/7/93	4FL-6 8/27/93	6FR-4 8/7/93	25RR-4 8/31/93	27RL-1W 8/31/93	27RL-4 8/31/93
Acetone	*	ND	ND	ND	ND	ND	ND
Benzene	1.8 - 16	ND	ND	ND	ND	ND	ND
Bromodichloromethane	*	ND	ND	ND	ND	ND	ND
Bromoform	*	ND	ND	ND	ND	ND	ND
Bromomethane	*	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	*	ND	ND	ND	ND	ND	ND
Carbon Disulfide	*	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.5^	ND	ND	ND	ND	ND	ND
Chlorobenzene	314	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	*	NA	NA	NA	NA	NA	NA
Chloroethane	*	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	*	ND	ND	ND	ND	ND	ND
Chloroform	6.5 - 59	ND	ND	ND	ND	ND	ND
Chloromethane	*	ND	ND	ND	ND	ND	ND
Dibromoethane	*	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	*	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	*	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	7.5^	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	231	ND	ND	ND	ND	ND	ND
Dibromochloromethane	*	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	*	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.5^	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	*	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	*	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethene	*	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	*	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	*	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	*	ND	ND	ND	ND	ND	ND
Ethylbenzene	68	ND	ND	ND	ND	ND	ND
2-Hexanone	*	ND	ND	ND	ND	ND	ND
Methylene chloride	*	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone(MIBK)	*	ND	ND	ND	ND	ND	ND
Styrene	*	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	*	ND	ND	ND	ND	ND	ND
Tetrachloroethene	283	ND	ND	ND	ND	ND	ND
Toluene	49	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	*	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	*	ND	ND	ND	ND	ND	ND
Trichloroethene	*	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	*	ND	ND	ND	ND	ND	ND
Vinyl Acetate	*	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.053 - 0.47	ND	ND	ND	ND	ND	ND
Xylene (total)	99	ND	ND	ND	ND	ND	ND

See Appendix D for Preliminary Remedial Goals information
* Preliminary Remedial Goals not available
^ Regulatory Levels as per Title 22, CCR
Notes: NA = Not Analyzed, ND = Not Detected

T.O. 04-192231-01
Contract No. 535515
Cypress Reconstruction
Oakland, California

TABLE 5
ANALYTICAL SUMMARY FOR SOIL
SEMIVOLATILE ORGANICS
Cypress Reconstruction
Oakland, California
EA# 19224I-Contract Area F

8270 ANALYTE (ppm) (DL = 0.3 ppm)	PRG** (ppm)	Sample Number / Sample Date 4FL-4 8/27/93	5FR-4 8/9/93	25RL-6 8/31/93
N-Nitrosodimethylamine	•	NA	NA	NA
Aniline	•	NA	NA	NA
Phenol	•	ND	ND	ND
Bis(-2-Chloroethyl) Ether	•	ND	ND	ND
2-Chlorophenol	•	ND	ND	ND
1,3-Dichlorobenzene	•	ND	ND	ND
1,4-Dichlorobenzene	7.1 - 63	ND	ND	ND
Benzyl Alcohol	•	ND	ND	ND
1,2-Dichlorobenzene	•	ND	ND	ND
2-Methylphenol	•	ND	ND	ND
Bis(2-Chloroisopropyl) Ether	•	ND	ND	ND
4-Methylphenol	•	ND	ND	ND
N-Nitroso-Di-n-propylamine	•	NA	NA	NA
Hexachloroethane	3^	ND	ND	ND
Nitrobenzene	2^	ND	ND	ND
Isophorone	•	ND	ND	ND
2-Nitrophenol	•	ND	ND	ND
2,4-Dimethylphenol	•	ND	ND	ND
Bis(2-Chloroethoxy) Methane	•	ND	ND	ND
2,4-Dichlorophenol	•	ND	ND	ND
Benzoic Acid	•	ND	ND	ND
1,2,4-Trichlorobenzene	•	ND	ND	ND
Naphthalene	•	ND	ND	ND
4-Chloroaniline	0.5^	ND	ND	ND
Hexachlorobutadiene	•	ND	ND	ND
4-Chloro-3-Methylphenol	•	ND	ND	ND
2-Methylnaphthalene	•	ND	ND	ND
Hexachlorocyclopentadiene	•	ND	ND	ND
2,4,6-Trichlorophenol	•	ND	ND	ND
2,4,5-Trichlorophenol	•	ND	ND	ND
2-Chloronaphthalene	•	ND	ND	ND
2-Nitroaniline	•	ND	ND	ND
Dimethylphthalate	•	ND	ND	ND
Acenaphthylene	•	ND	ND	ND
3-Nitroaniline	•	ND	ND	ND

8270 ANALYTE (ppm) (DL = 0.3 ppm)	PRG** (ppm)	Sample Number / Sample Date 4FL-4 8/27/93	5FR-4 8/9/93	25RL-6 8/31/93
Acenaphthene	•	ND	ND	ND
2,4-Dinitrophenol	•	ND	ND	ND
4-Nitrophenol	•	ND	ND	ND
Dibenzofuran	•	ND	ND	ND
2,4-Dinitrotoluene	0.13^	ND	ND	ND
2,6-Dinitrotoluene	•	ND	ND	ND
Diethylphthalate	•	ND	ND	ND
4-Chlorophenyl-Phenyl Ether	•	ND	ND	ND
Fluorene	•	ND	ND	ND
4-Nitroaniline	•	NA	NA	NA
Azobenzene	•	ND	ND	ND
4,6-Dinitro-2-Methylphenol	•	ND	ND	ND
N-Nitrosodiphenylamine	•	ND	ND	ND
4-Bromophenyl-Phenyl Ether	•	ND	ND	ND
Hexachlorobenzene	0.13^	ND	ND	ND
Pentachlorophenol	100^	ND	ND	ND
Phenanthrene	•	ND	ND	ND
Anthracene	•	ND	ND	ND
Di-n-Butylphthalate	1760	ND	ND	ND
Fluoranthene	•	NA	NA	NA
Benzidine	1320	ND	ND	ND
Pyrene	•	ND	ND	ND
Butylbenzylphthalate	•	ND	ND	ND
3,3'-Dichlorobenzidine	0.02 -0.18	ND	ND	ND
Benzo(a) Anthracene	•	ND	ND	ND
Bis(2-Ethylhexyl) Phthalate	0.02 -0.18	ND	ND	ND
Chrysene	•	ND	ND	ND
Di-n-Octyl Phthalate	0.02 -0.18	ND	ND	ND
Benzo(b) Fluoranthene	0.02 -0.18	ND	ND	ND
Benzo(k) Fluoranthene	0.02 -0.18	ND	ND	ND
Benzo(a) Pyrene	0.02 -0.18	ND	ND	ND
Indeno(1,2,3-cd) Pyrene	0.02 -0.18	ND	ND	ND
Dibenzo(a,h) Anthracene	•	ND	ND	ND
Benzo(g,h,i) Perylene				

See Appendix D for Preliminary Remedial Goals
** Preliminary Remedial Goals
• Preliminary Remedial Goals not available
^ Regulatory Levels as per Title 22, CCR
Notes: NA = Not Analyzed, ND = Not Detected

T.O. 04-19223I-01
Contract No. 535515
Cypress Reconstruction
Oakland, California

Ship To: Advance Tech Labs
Attn: Maribel

Page 2 of 4
Project Name: Cypress
Project No.: 139-07
Site Location: Army - CF
Date: 8/7/93

CHAIN OF CUSTODY RECORD

EA # 192241

Boring/Well No.	Sample No.	Depth	Date	Time	Sample Type: Water	Solid	Other	Comp.	Grab.	Sample Containers: Vol.	No.	Type	Pres	Analysis: 418.1/TRPH	6010/Lead	6010/Scan+17	8015-M/TPH-D	8020/Scan	8240/VOC	8080/PEST	Remarks
4FL	1																X	X			
4FL	4																				
4FL	6																				
6FR	4																X				
6FR	6																				
6FL	1																X	X	X	X	
6FL	4																				
6FL	6																X				
7FL	1																X				
7FL	4																				
7FL	6		↓		↓						↓			↓	↓						

Total Number of Samples Shipped: 13
Shipper's Signature: Wade Weston

	Signature	Company	Date	Time
Relinquished by:	Wade Weston	Apex	8/7/93	
Received by:				
Relinquished by:				
Received by:				
Relinquished by:				
Received by:		ATL	8-10-93	11:30 A

Special Instructions / Shipment / Handling / Storage Requirements:

APEX ENVIRONMENTAL RECOVERY
SMARTER SOLUTIONS FOR A CLEANER TOMORROW
15661 Producer Lane, Suite N
Huntington Beach, California 90649

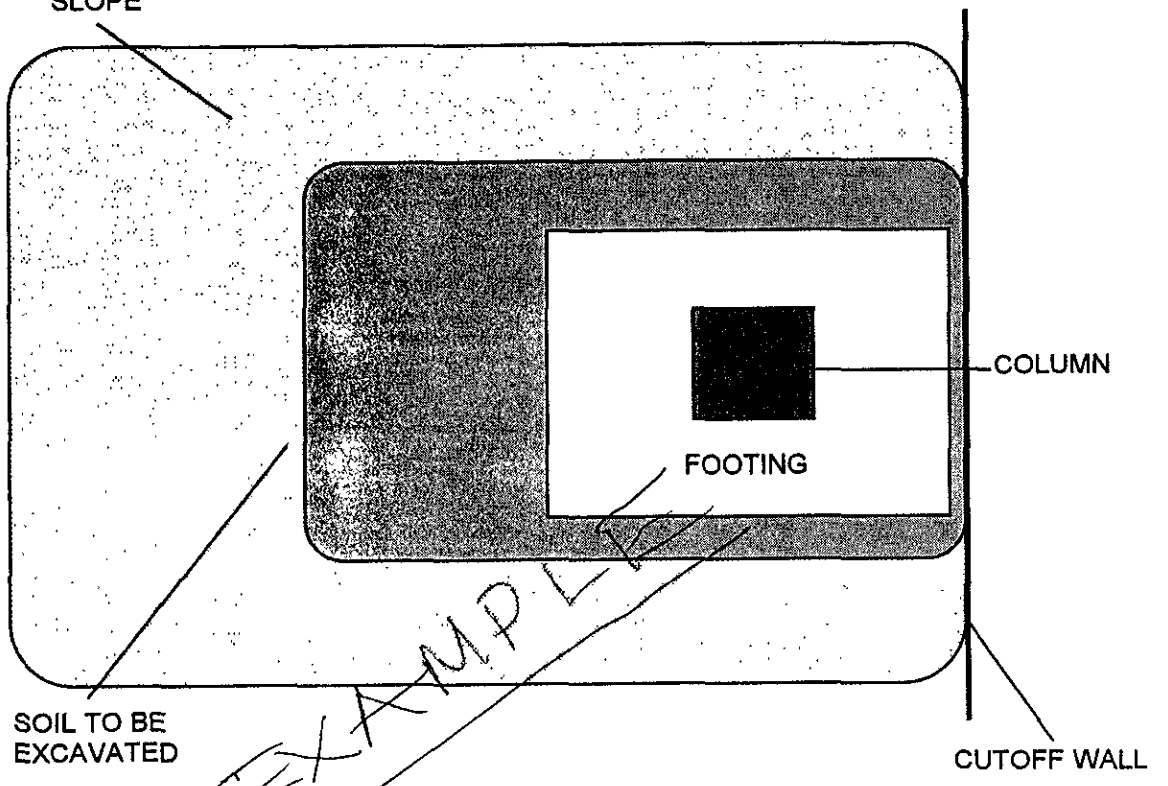
APPENDIX C

Gridded Sample Locations

BORING / SAMPLE LOCATION - BENTS 24 - 29

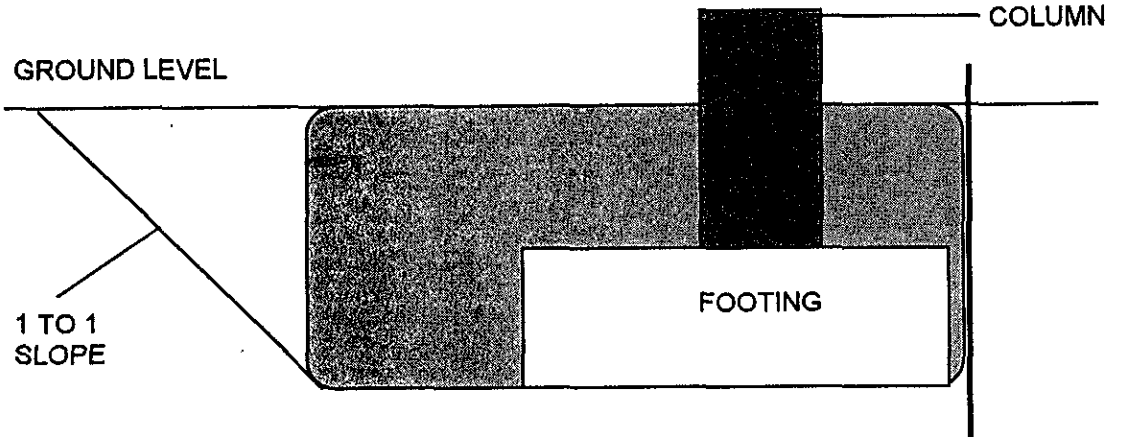
BENT#: _____ **COLUMN:** RIGHT **SECTION:** _____ **VOLUME:**_____**CY**

PLAN VIEW



EXAMPLE

ELEVATION



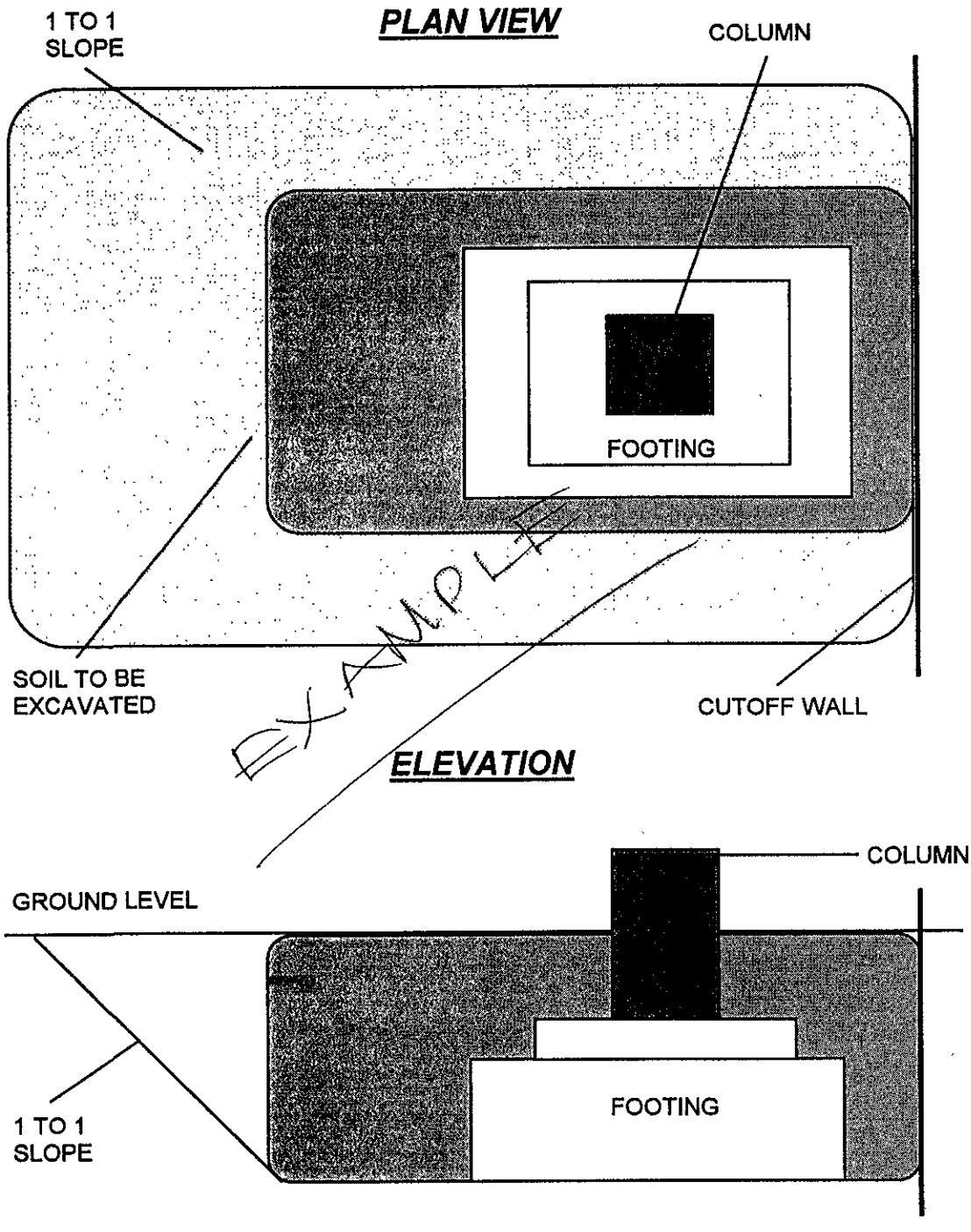
KEY:

BORING LOCATION
SAMPLE LOCATION

NED PEPPER, INC.
P.O Box 208, Folsom, Ca. 95763
(916) 983-2241
Drawn By: R.K.RINEHART

BORING / SAMPLE LOCATION - BENTS 29 - 33

BENT#: _____ **COLUMN:** RIGHT **SECTION:** _____ **VOLUME:**_____**CY**



KEY:

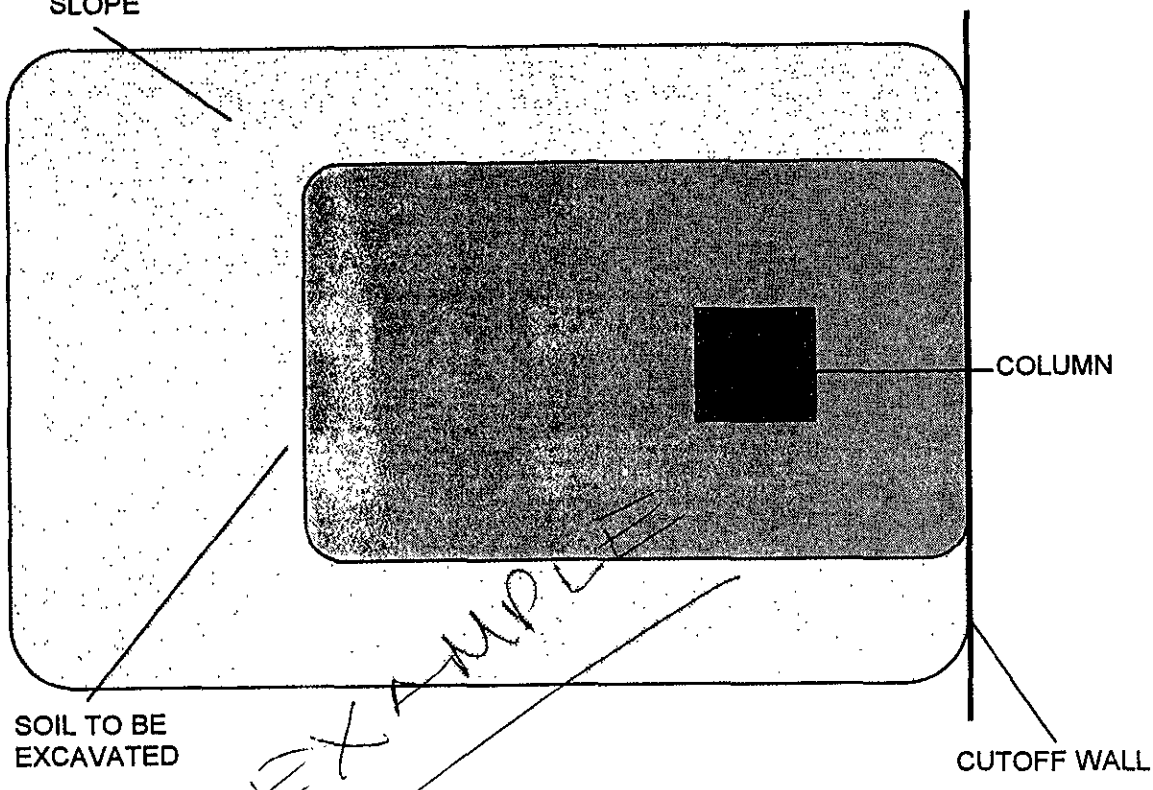
BORING LOCATION
SAMPLE LOCATION

NED PEPPER, INC.
P.O Box 208, Folsom, Ca. 95763
(916) 983-2241
Drawn By: R.K.RINEHART

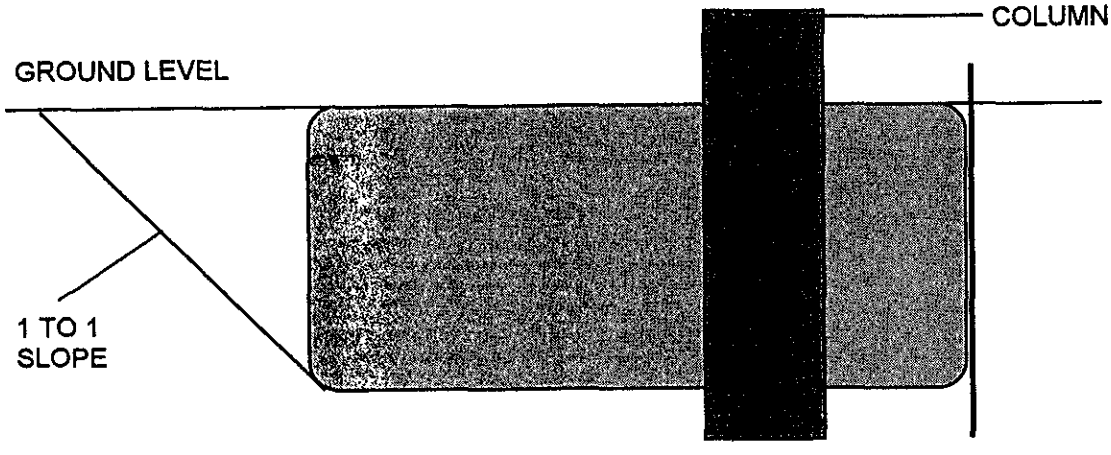
BORING / SAMPLE LOCATION - BENTS 33 - 39

BENT#: _____ **COLUMN:** RIGHT **SECTION:** _____ **VOLUME:**_____**CY**

PLAN VIEW



ELEVATION



KEY:

BORING LOCATION
SAMPLE LOCATION

NED PEPPER, INC.
P.O Box 208, Folsom, Ca. 95763
(916) 983-2241
Drawn By: R.K.RINEHART

APPENDIX D

Sample Chain of Custody

SPARGER TECHNOLOGY, INC.
Analytical Laboratory
3050 Fite Circle, #112 Sacramento, CA 95827
Phone: (916) 362-8947
FAX: (916) 362-0947

CHAIN OF CUSTODY RECORD

Company: Phone:

Project Manager: FAX:

STAL Invoice Number:

Report Address: Billing Name & Address:

ANALYSIS REQUEST

Project Name: Project/Job #:

Project Location: P.O. #:

REMARKS:

TEMP. UPON ARRIVAL _____

WET (STLC)

TCLP

Total

TAT

SAMPLE ID	Sampling: Date	Sampling: Time	Container: 40 mL VOA	Container: Brass Sleeve	Container: 1 L amber bottle	Container: 250 mL Plastic	Container: Other:	Preservative Used: HCl/HNO3/ICE	Preservative Used: None	Preservative Used: Other:	Matrix: Water	Matrix: Soil	Matrix: Air	Matrix: Other:	TCLP: BTEX (602/8020/503.1)	TCLP: BTEX/TPHgas (602/8020/8015)	TCLP: TPHdiesel/TPHmotor oil/kerosene(8015)	TCLP: EPA 601/8010/502.2/504	TCLP: EPA 602/8020	TCLP: EPA 608/8080 (Pesticides/505/508	TCLP: EPA 608/8080 (PCB's)	TCLP: EPA 624/8240/524.2	TCLP: EPA 625/8270/525	Total Oil & Grease (5520)	Non-Polar O & G/TRPH (418.1)	Organic Lead	RCI	Total: CAM-17 Metals	Total: CAM-5 Metals (Cd, Cr, Pb, Ni, Zn)	Total: Lead	TAT: Standard	TAT: Rush Services (72hr / 48hr / 24hr / 12hr)	TAT: Holiday/Weekend Rush

SAMPLE

Relinquished by:	Date:	Time:	Received by:	Date:	Time:	Relinquished by:	Date:	Time:	Received by:	Date:	Time:

APPENDIX E

Sparger Technologies, Inc. Certifications

E OF CALIFORNIA—HEALTH AND WELFARE AGENCY PETE WILSON, Governor

DEPARTMENT OF HEALTH SERVICES
2151 BERKELEY WAY
BERKELEY, CA 94704-1011
(510)540-2800

August 31, 1995

Certificate Number: 1614

Mr. Raymond L. James
Sparger Technology, Inc.
3050 Fite Circle, Suite 112
Sacramento, Calif 95827

Dear Mr. James:

This is to advise you that the laboratory named above, Certificate Number 1614, has been certified/registered as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act of 1988 (Health and Safety Code, Division 1, Part 2, Chapter 7.5, commencing with Section 1010). Certificate Number 1614 has an expiration date of August 31, 1995.

An application for the renewal of certification has been received by this department for Certificate Number 1614. This office will grant the continued use of Certificate Number 1614 until we can complete the evaluation of your laboratory with respect to the renewal of certification. Continued certification is subject to compliance with all other provisions of the Health and Safety Code and Regulations.

Your continued cooperation is essential in order to establish a reputation for the high quality of the data produced by environmental laboratories certified by the State of California.

If you have any questions, please call our office ant 510-540-5800.

Sincerely,

George C. Kulasingam

George C. Kulasingam, Ph.D.
Manager
Environmental Laboratory
Accreditation Program

STATE OF CALIFORNIA—HEALTH AND WELFARE AGENCY

PETE WILSON, Governor

DEPARTMENT OF HEALTH SERVICES
2151 BERKELEY WAY
BERKELEY, CA 94704-1011
(510)540-2800

July 26, 1994

Raymond L. James
Sparger Technology, Inc.
Analytical Division
3050 Fite Circle, Suite 112
Sacramento, CA 95827

Certificate No.: 1614

Dear Mr. James:

This is to advise you that the laboratory named above has been certified/ registered as an environmental testing laboratory pursuant to the provisions of the California Environmental Laboratory Improvement Act of 1988 (Health and Safety Code, Division 1, Part 2, Chapter 7.5, commencing with Section 1010).

The fields of testing for which this laboratory has been certified/registered under this Act are indicated in the enclosed "List of Approved Fields of Testing and Analytes." Certification/registration shall remain in effect until August 31, 1995 unless revoked. This certificate is subject to an annual fee as prescribed by Section 1017(a), Health and Safety Code, on the anniversary date of the certificate.

Please note that your laboratory is required to notify the Environmental Laboratory Accreditation Program of any major changes in the laboratory such as the transfer of ownership, change of laboratory director, change in location, or structural alterations which may affect adversely the quality of analyses (Section 1014(b), California Health & Safety Code).

Until the new regulations pertaining to environmental laboratories are adopted under the Act, the existing regulations pertaining to drinking water and hazardous waste testing laboratories (California Code of Regulations, Title 22, Sections 64481-64499 and 67440.1-67440.7) will remain in effect to the extent that they are not superseded by the provisions of the Act.

Your continued cooperation is essential in order to establish a reputation for the high quality of the data produced by environmental laboratories certified by the State of California.

If you have additional questions, please contact Mr. William Ray at (510) 540-2800.

Sincerely,

George C. Kulasingam, Ph.D., Manager
Environmental Laboratory
Accreditation Program

Enclosure

ENVIRONMENTAL LABORATORY ACCREDITATION/REGISTRATION
List of Approved Fields of Testing and Analytes

Sparger Technology, Inc.
3050 Fite Circle, Suite 112
Sacramento, CA 95827

TELEPHONE No: (916) 362-8947
CALIFORNIA COUNTY: Sacramento

CERTIFICATE NUMBER: 1614
EXPIRATION DATE: 08/31/95

****

1 Microbiology of Drinking Water and Wastewater (--------)

1.1	Total Coliforms in Drinking Water by Multiple Tube Fermentation	N
1.2	Fecal Coliforms/E. Coli in Drinking Water by MIF	N
1.3	Total Coliforms in Drinking Water by Membrane Filter Technics	N
1.4	Fecal Coliforms/E. Coli in Drinking Water by Membrane Filter Technics	N
1.5	Total Coliforms and E. Coli in Drinking Water by MMO-MUG	N
1.6	Total Coliforms in Drinking Water by Clark's Presence/Absence	N
1.7	Fecal Coliforms/E. Coli in Drinking Water by Clark's Presence/Absence	N
1.8	Heterotrophic Plate Count	N
1.9	Total Coliforms in Wastewater by Multiple Tube Fermentation	N
1.10	Fecal Coliforms in Wastewater by MIF	N
1.11	Total Coliforms in Wastewater by Membrane Filter Technics	N
1.12	Fecal Coliforms in Wastewater by Membrane Filter Technics	N
1.13	Fecal Streptococci or Enterococci by Multiple Tube Technics	N
1.14	Fecal Streptococci or Enterococci by Membrane Filter Technics	N

2 Inorganic Chemistry and Physical Properties of Drinking Water excluding Toxic Chemical Elements (07-26-94-)

2.1	Alkalinity	Y
2.2	Calcium	Y
2.3	Chloride	N
2.4	Corrosivity	Y
2.5	Fluoride	Y
2.6	Hardness	Y
2.7	Magnesium	Y
2.8	MBAS	Y
2.9	Nitrate	N
2.10	Nitrite	N
2.11	Sodium	N
2.12	Sulfate	N
2.13	Total Filterable Residue and Conductivity	Y
2.14	Iron (Colorimetric Methods Only)	N
2.15	Manganese (Colorimetric Methods Only)	N
2.16	Phosphate, ortho	N
2.17	Silica (Colorimetric Methods Only)	N
2.18	Cyanide	Y

3 Analysis of Toxic Chemical Elements in Drinking Water (05-13-92)

3.1	Arsenic	Y
3.2	Barium	Y
3.3	Cadmium	Y
3.4	Chromium, total	Y
3.5	Copper	Y
3.6	Iron	Y
3.7	Lead	Y
3.8	Manganese	Y
3.9	Mercury	Y
3.10	Selenium	Y
3.11	Silver	Y
3.12	Zinc	Y
3.13	Aluminum	Y
3.14	Asbestos	N
3.15	EPA Method 200.7	Y
3.16	EPA Method 200.8 (Unregulated Elements and Lead Only)	N
3.17	Antimony	Y
3.18	Beryllium	Y
3.19	Nickel	Y
3.20	Thallium	Y

4 Organic Chemistry of Drinking Water (measurement by GC/MS combination) (--------)

4.1	EPA Method 501.3	N
4.2	EPA Method 524.2	N
4.3	EPA Method 525	N
4.4	EPA Method 513	N

5 Organic Chemistry of Drinking Water (excluding measurements by GC/MS combination) (07-26-94)

5.1	EPA Method 501.1	N
5.2	EPA Method 501.2	N
5.3	EPA Method 502.1	N
5.4	EPA Method 502.2	Y
5.5	EPA Method 503.1	N
5.6	EPA Method 504	Y
5.7	EPA Method 505	N
5.8	EPA Method 506	N
5.9	EPA Method 507	N
5.10	EPA Method 508	N
5.11	EPA Method 508A	N
5.12	EPA Method 510.1	N
5.13	EPA Method 515.1	N
5.14	EPA Method 531.1	N
5.15	EPA Method 547	N
5.16	EPA Method 548	N
5.17	EPA Method 549	N
5.18	EPA Method 550	N
5.19	EPA Method 550.1	N
5.20	EPA Method 551	N
5.21	EPA Method 552	N

CERTIFICATE NUMBER: 1614
EXPIRATION DATE: 08/31/95

6 Radiochemistry (--------)

6.1 Gross Alpha and Beta Radiation ----- N
6.2 Total Radium ----- N
6.3 Radium 226 ----- N
6.4 Uranium ----- N
6.5 Radon 222 ----- N
6.6 Radioactive Cesium ----- N
6.7 Iodine 131 ----- N
6.8 Radioactive Strontium ----- N
6.9 Tritium ----- N
6.10 Gamma and Photon Emitters ---------- N
6.11 Gross Alpha by Co-precipitation --------- N
6.12 Radium 228 ----- N
6.13 Radioactive Iodine ----- N
6.14 Gross Alpha & Beta in Hazardous Wastes -- N
6.15 Alpha Emitting Radium Isotopes in Haz. Wastes ----- N
6.16 Radium 228 in Hazardous Wastes ---------- N

7 Shellfish Sanitation (--------)

7.1 Shellfish meat Microbiology ----- N
7.2 Paralytic Shellfish Poison ----- N
7.3 Domoic Acid ----- N

8 Aquatic Toxicity Bioassays (------)

8.1 Hazardous Waste Aquatic Toxicity Bioassay (Title 22, CCR, 66261.24(a)(6)) ----- N
8.2 Wastewater Testing According to Kopperdahl (1976) using Freshwater Fish. ----- N
8.3 Wastewater Testing According to EPA/600/4-85/013 using Freshwater and/or Marine Organisms --------- N
8.4 Wastewater Testing by EPA Method 1000.0 ----- N
8.5 Wastewater Testing by EPA Method 1002.0 ----- N
8.6 Wastewater Testing by EPA Method 1003.0 ----- N
8.7 Wastewater Testing by EPA Method 1006 ----- N
8.8 Wastewater Testing by EPA Method 1007 ----- N
8.9 Wastewater Testing by EPA Method 1009 ----- N
8.10 Wastewater Testing According to Anderson, et. al. (1990) using Giant Kelp (Macrocystis pyrifera) -- N
8.11 Wastewater Testing According to Anderson, et. al. (1990) using Red Abalone (Haliotus rufescens) --- N
8.12 Wastewater Testing According to Dinnel and Stober (1987) using Purple Sea Urchin (Strongylocentrotus purpuratus) ----- N
8.13 Wastewater Testing According to Dinnel and Stober (1987) using Red Sea Urchin (Strongylocentrotus franciscanus) ----- N
8.14 Wastewater Testing According to Dinnel and Stober (1987) using Sand Dollar (Dendraster excentricus) ----- N
8.15 Wastewater Testing According to procedure E 724-89 (ASTM, 1989) using Pacific Oyster (Crassostrea gigas) ----- N
8.16 Wastewater Testing According to procedure E 724-89 (ASTM, 1989) using California Bay Mussel (Mytilus edulis) ----- N
8.17 Wastewater Testing According to Standard Methods (APHA, 1989) using an alga (Skeletonema costatum) ----- N
8.18 Wastewater Testing According to EPA/600/4-90/027 using Freshwater and/or Marine Organisms --------- N

9 Physical Properties Testing of Hazardous Waste (05-13-92)

9.1 Ignitability by Flashpoint determination (Title 22, CCR, 66261.21) ----- Y
9.2 Corrosivity - pH determination (Title 22, CCR, 66261.22) ----- Y
9.3 Corrosivity - Corrosivity towards steel (Title 22, CCR, 66261.22) ----- Y
9.4 Reactivity (Title 22, CCR, 66261.23) ----- Y

10 Inorganic Chemistry and Toxic Chemical Elements of Hazardous Waste

10.1 Antimony
7040(--------) ----- N
7041(07-26-94) ----- Y
10.2 Arsenic
7060(07-26-94) ----- Y
7061(--------) ----- N
10.3 Barium
7080(--------) ----- N
7081(--------) ----- N
10.4 Beryllium
7090(--------) ----- N
7091(--------) ----- N
10.5 Cadmium
7130(--------) ----- N
7131(--------) ----- N
10.6 Chromium, total
7190(--------) ----- N
7191(--------) ----- N
10.7 Cobalt
7200(--------) ----- N
7201(--------) ----- N
10.8 Copper
7210(--------) ----- N
7211(--------) ----- N
10.9 Lead
7420(--------) ----- N
7421(--------) ----- N
10.10 Mercury
7470(07-22-94) ----- Y
7471(07-22-94) ----- Y
10.11 Molybdenum
7480(--------) ----- N
7481(--------) ----- N
10.12 Nickel
7520(--------) ----- N

10.13 Selenium
7740(·····) ····· N
7741(·····) ····· N
10.14 Silver
7760(·····) ····· N
7761(·····) ····· N
10.15 Thallium
7840(·····) ····· N
7841(·····) ····· N
10.16 Vanadium
7910(·····) ····· N
7911(·····) ····· N
10.17 Zinc
7950(·····) ····· N
7951(·····) ····· N
10.18 Chromium (VI)
7195(·····) ····· N
7196(07-26-94) ····· Y
7197(·····) ····· N
7198(·····) ····· N

10.19 Cyanide
9010(10-19-92) ····· Y
10.20 Fluoride
300.0(·····) ····· N
340.1(·····) ····· N
340.2(07-26-94 ····· Y
340.3(·····) ····· N
10.21 Sulfide
9030(·····) ····· N
10.22 Total Organic Lead
(10-19-92) ····· Y
10.23 EPA Method 6010(05-13-92) ····· Y
10.24 EPA Method 6020(·····) ····· N

11 Extraction Tests of Hazardous Waste (10-19-92)

11.1 California Waste Extraction Test (WET) (Title 22, CCR, 66261.100, Appendix II) ····· Y
11.2 Extraction Procedure Toxicity ····· Y
11.3 Toxicity Characteristic Leaching Procedure (TCLP) All Classes ····· Y
11.4 Toxicity Characteristic Leaching Procedure (TCLP) Inorganics Only ····· N
11.5 Toxicity Characteristic Leaching Procedure (TCLP) Extractables Only ····· N
11.6 Toxicity Characteristic Leaching Procedure (TCLP) Volatiles Only ····· N

12 Organic Chemistry of Hazardous Waste (measurement by GC/MS combination)

12.1 EPA Method 8240(05-13-92)····· Y
12.2 EPA Method 8250(·····)····· N
12.3 EPA method 8270(05-13-92)····· Y
12.4 EPA Method 8280(·····)····· N
12.5 EPA Method 8290(·····)····· N
12.6 EPA Method 8260(07-26-94)····· Y

13 Organic Chemistry of Hazardous Waste (excluding measurements by GC/MS combination)

13.1 EPA Method 8010(07-26-94) ····· Y
13.2 EPA Method 8015(·····) ····· N
13.3 EPA Method 8020(08-28-91) ····· Y
13.4 EPA Method 8030(07-26-94) ····· Y
13.5 EPA Method 8040(·····) ····· N
13.6 EPA Method 8060(·····) ····· N
13.7 EPA Method 8080(05-13-92) ····· Y
13.8 EPA Method 8090(·····) ····· N
13.9 EPA Method 8100(·····) ····· N
13.10 EPA Method 8120(·····) ····· N
13.11 EPA Method 8140(·····) ····· N
13.12 EPA Method 8150(07-26-94) ····· Y
13.13 EPA Method 8310(·····) ····· N
13.14 EPA Method 632 (·····) ····· N
13.15 Total Petroleum Hydrocarbons (LUFT Manual) (08-28-91)····· Y
13.16 EPA Method 8011(07-26-94) ····· Y
13.17 EPA Method 8021(·····) ····· N
13.18 EPA Method 8070(·····) ····· N
13.19 EPA Method 8110(·····) ····· N
13.20 EPA Method 8141(·····) ····· N
13.21 EPA Method 8330(·····) ····· N

14 Bulk Asbestos Analysis (·····)

14.1 1% or Greater Asbestos Concentrations (Title 22, CCR, 66261.24(a)(2)(A))

15 Substances Regulated Under the California Safe Drinking Water and Toxic Enforcement Act (Proposition 65) and Not Included in Other Listed Groups.

16 Wastewater Inorganic Chemistry, Nutrients and Demand (10-19-92)

16.1 Acidity ····· Y
16.2 Alkalinity ····· Y
16.3 Ammonia ····· Y
16.4 Biochemical Oxygen Demand ····· N
16.5 Boron ····· Y
16.6 Bromide ····· Y
16.7 Calcium ····· Y
16.8 cBOD ····· N
16.9 Chemical Oxygen Demand ····· Y
16.10 Chloride ····· Y
16.11 Chlorine Residual, total ····· Y
16.12 Cyanide ····· Y
16.13 Cyanide amenable to Chlorination ····· Y
16.14 Fluoride ····· Y
16.15 Hardness ····· Y
16.16 Kjeldahl Nitrogen ····· Y
16.17 Magnesium ····· Y
16.18 Nitrate ····· Y
16.19 Nitrite ····· Y
16.20 Oil and Grease ····· Y
16.21 Organic Carbon ····· N
16.22 Oxygen, Dissolved ····· N

16.23 pH ..... Y
16.24 Phenols ..... N
16.25 Phosphate, ortho ..... N
16.26 Phosphorus, total ..... N
16.27 Potassium ..... Y
16.28 Residue, Total ..... N
16.29 Residue, Filterable (TDS) ..... Y
16.30 Residue, Nonfilterable (TSS) ..... N
16.31 Residue, Settleable (SS) ..... N
16.32 Residue, Volatile ..... N
16.33 Silica ..... N
16.34 Sodium ..... Y
16.35 Specific Conductance ..... Y
16.36 Sulfate ..... N
16.37 Sulfide (includes total & soluble) - N
16.38 Sulfite ..... N
16.39 Surfactants (MBAS) ..... Y
16.40 Tannin and Lignin ..... N
16.41 Turbidity ..... N
16.42 Iron (Colorimetric Only) ..... N
16.43 Manganese (Colorimetric Only) ..... N
16.44 Total Recoverable Petroleum Hydrocarbons ..... Y
16.45 Total Organic Halides ..... N

17 Toxic Chemical Elements in Wastewater (05-13-92)

17.1 Aluminum ..... N
17.2 Antimony ..... N
17.3 Arsenic ..... Y
17.4 Barium ..... N
17.5 Beryllium ..... N
17.6 Cadmium ..... Y
17.7 Chromium (VI) ..... N
17.8 Chromium, total ..... Y
17.9 Cobalt ..... N
17.10 Copper ..... N
17.11 Gold ..... N
17.12 Iridium ..... N
17.13 Iron ..... N
17.14 Lead ..... Y
17.15 Manganese ..... Y
17.16 Mercury ..... Y
17.17 Molybdenum ..... Y
17.18 Nickel ..... N
17.19 Osmium ..... N
17.20 Palladium ..... N
17.21 Platinum ..... N
17.22 Rhodium ..... N
17.23 Ruthenium ..... N
17.24 Selenium ..... Y
17.25 Silver ..... N
17.26 Strontium ..... Y
17.27 Thallium ..... Y
17.28 Tin ..... N
17.29 Titanium ..... N
17.30 Vanadium ..... Y
17.31 Zinc ..... N
17.32 EPA Method 200.7 ..... Y
17.33 EPA Method 200.8 ..... N
17.34 DCP ..... N
17.35 Asbestos ..... N

18 Organic Chemistry of Wastewater (measurements by GC/MS combination (05-13-92)

18.1 EPA Method 624 ..... Y
18.2 EPA Method 625 ..... Y
18.3 EPA Method 1613 ..... N
18.4 EPA Method 1625 ..... N
18.5 EPA Method 613 ..... N

19 Organic Chemistry of Wastewater (excluding measurements by GC/MS combination) (08-28-91)

19.1 EPA Method 601 ..... Y
19.2 EPA Method 602 ..... Y
19.3 EPA Method 603 ..... Y
19.4 EPA Method 604 ..... N
19.5 EPA Method 605 ..... N
19.6 EPA Method 606 ..... N
19.7 EPA Method 607 ..... N
19.8 EPA Method 608 ..... Y
19.9 EPA Method 609 ..... N
19.10 EPA Method 610 ..... N
19.11 EPA Method 611 ..... N
19.12 EPA Method 632 ..... N
19.13 EPA Method 619 ..... N

20 Inorganic Chemistry and Toxic Chemical Elements of Pesticide Residues in Food (--------)

20.1 Processed Foods by One of the Following Methods
Atomic Absorption Spectrophotometry ..... N
Inductively Coupled Plasma Atomic Emission Spectrophotometry ..... N
Inductively Coupled Plasma/Mass Spectrometry ..... N
Colorimetry ..... N
20.2 Raw Commodities by One of the Following Methods
Atomic Absorption Spectrophotometry ..... N
Inductively Coupled Plasma Atomic Emission Spectrophotometry ..... N
Inductively Coupled Plasma/Mass Spectrometry ..... N
Colorimetric ..... N
20.3 Dairy Products by One of the Following Methods
Atomic Absorption Spectrophotometry ..... N
Inductively Coupled Plasma Atomic Emission Spectrophotometry ..... N
Inductively Coupled Plasma/Mass Spectrometry ..... N
Colorimetry ..... N

20.4 Feed Products by One of the Following Methods
- Atomic Absorption Spectrophotometry ..... N
- Inductively Coupled Plasma Atomic Emission Spectrophotometry ..... N
- Inductively Coupled Plasma/Mass Spectrometry ..... N
- Colorimetry ..... N

21 Organic Chemistry of Pesticide Residues in Food (measurements by GC/MS) (--------)

21.1 Gas Chromatographic/Mass Spectrometric Methods in Processed Foods ..... N
21.2 Gas Chromatographic/Mass Spectrometric Methods in Raw Commodities ..... N
21.3 Gas Chromatographic/Mass Spectrometric Methods in Dairy Products ..... N
21.4 Gas Chromatographic/Mass Spectrometric Methods in Feed Products ..... N

22 Organic Chemistry of Pesticide Residues in Food (Excluding Measurement by GC/MS Combination) (---------)

22.1 Halogenated Compounds in Processed Foods by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.2 Organophosphorous Compounds in Processed Foods by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.3 Carbamates in Processed Foods by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.4 Halogenated Compounds in Raw Commodities by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.5 Organophosphorous Compounds in Raw Commodities by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.6 Carbamates in Raw Commodities by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.7 Halogenated Compounds in Dairy Products by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.8 Organophosphorous Compounds in Dairy Products by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.9 Carbamates in Dairy Products by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.10 Halogenated Compounds in Feed Products by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.11 Organophosphorous Compounds in Feed Products by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N

22.12 Carbamates in Feed Products by One of the Following Methods
- Gas Chromatography ..... N
- High Pressure Liquid Chromatography ..... N
- Liquid Chromatography/Mass Spectrometry ..... N