



**Health and Safety Plan
Engineering Services for
7825 San Leandro Street
Oakland, California**

**July 30, 1991
LF 2408**

Prepared for:

**American Brass and Iron
7825 San Leandro Street
Oakland, California**



LEVINE·FRICKE

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OSHA NOTICE

July 30, 1991

LF 2408

HEALTH AND SAFETY PLAN
ENGINEERING SERVICES FOR
UNDERGROUND TANK REMOVAL

7825 San Leandro Street
Oakland, California

1.0 INTRODUCTION

This Health and Safety Plan (HSP) addresses the hazards associated with the planned field activities at the American Brass and Iron (AB&I) foundry located at 7825 San Leandro Street, Oakland, California ("the Site"; see Figure 1). It presents baseline health and safety requirements for establishing and maintaining a safe working environment during the course of work. The planned field activities at the Site include removing three underground tanks from the Site: one 550-gallon capacity gasoline tank; one 8,000-gallon 1,1,1-trichloroethane (TCA) tank; and one 8,000-gallon unleaded gasoline tank.

In addition to the procedures and safeguards outlined in this HSP, Levine·Fricke and contractor/subcontractor personnel shall follow applicable Federal, State of California, County of Alameda, and City of Oakland regulations. In the event of conflicting requirements, the procedures/practices that provide the highest degree of personnel protection shall be implemented. Deviations from this HSP must be approved by the Levine·Fricke Health and Safety Director prior to implementation.

If work plan specifications change during or after the preparation of this HSP, or if during the course of the work site conditions encountered are found to differ substantially from those anticipated as the result of more information, the Levine·Fricke Corporate Health Safety Director shall be informed immediately and appropriate changes shall be made to this HSP.

At a minimum, all Levine·Fricke contractor/subcontractor personnel working on site must:

1. Have read and understood the requirements of this HSP.

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2. Have completed all training requirements in 29 Code of Federal Regulations (CFR) 1910.120.
3. Provide their own health and safety equipment as indicated in this HSP, and comply with the minimum requirements established by this HSP. If the contractor/subcontractor has prepared his/her own HSP, it must minimally meet requirements contained herein and all applicable federal, state, and local health and safety requirements.

This HSP shall be approved by the Levine·Fricke Health and Safety Director, the Levine·Fricke Project Manager, and a Levine·Fricke Quality Assurance Reviewer.

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A copy of this HSP shall be kept on site, easily accessible to all employees and government inspectors, and in Levine·Fricke files during the course of the project.

This HSP was prepared using the following documents:

- 29 CFR 1910 -- Occupational Safety and Health Standards, 1990.
- 29 CFR 1926 -- Safety and Health Regulations for Construction.
- 29 CFR 1910.1000 -- OSHA Air Contaminants - Permissible Exposure Limits, 1990.
- Title 8, California Code of Regulations, Occupation Health and Safety Standards.
- American Conference of Governmental Industrial Hygienists (ACGIH). Threshold Limit Values and Biological Exposure Indices for 1990 - 1991. Cincinnati, Ohio, ACGIH.
- California Department of Health Services (DHS), Toxic Substances Control Division (TSCD), Technical and Support Unit, Region 3, Los Angeles, California, August 1988. Site Safety Plan Guidance Document.
- Levine·Fricke, 1991. "Work Order, Engineering Services for Underground Tank Removal: American Brass & Iron Foundry, Oakland, California" June 2, 1991.
- National Institute for Occupational Safety and Health (NIOSH); Occupational Safety and Health Administration (OSHA); U.S. Coast Guard (USCG); U.S. Environmental Protection Agency (EPA), October 1985. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. Washington D.C.: U.S. Government Printing Office.
- NIOSH/OSHA, 1981. Occupational Health Guidelines for Chemical Hazards.
- Regional Water Quality Control Board (RWQCB), San Francisco Bay Region, California, June 1986. Site Safety Plan Format.

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- Sax, N. Irving, 1984, Dangerous Properties of Materials, 6th edition, Van Nostrand Reinhold Company, Inc., New York, New York.
- U.S. EPA, Office of Emergency and Remedial Response, Hazardous Response Support Division, November 1984. Standard Operating Safety Guides.

2.0 SITE CHARACTERISTICS

The Site is located at 7825 San Leandro Street, Oakland, California. The Site comprises about 10 acres and is generally flat. The Site is bordered to the north by 77th Avenue and to the east by San Leandro Street.

The AB&I foundry has been in operation for over 85 years at the Site. Currently, the foundry does not manufacture brass products. At this time, the foundry manufactures gray iron castings that are formed in molds that are also produced at the Site. Molds are produced from a combination of sand, clay, a carbon material, and water. Iron is melted at a temperature in excess of 2700°F and poured into the molds.

TCA is stored underground in a tank, and is used to reduce the viscosity of the asphalt coating which they place on iron pipe. In addition, gasoline tanks are used at the Site to fuel vehicles. One diesel tank that will not be removed is also used to fuel AB&I vehicles.

AB&I conducts a safety program at the Site that includes hazard communication, weekly safety meetings, safety equipment supplies, and a safety committee.

3.0 WORK DESCRIPTION

Tasks to be performed at the Site include: excavating and removing three underground tanks and piping and collecting samples of native soils and/or ground water below the subject tanks. The three underground storage tanks include: one 550-gallon gasoline tank; one 8,000-gallon 1,1,1-TCA tank; and one 8,000-gallon unleaded gasoline tank (see Figure 2).

Planned work activities are scheduled to be performed in the following order (some activities may be performed concurrently with one another). These activities are discussed in detail in the Work Plan (Levine·Fricke, June 2, 1991), and are presented below.

- identifying and locating utility lines in and near the proposed work area using plant drawings, and possibly magnetic and geophysical methods
- removing asphalt and concrete and relocating utility lines, if necessary, in the area to be excavated (electrical lines will be verified to be disconnected or off before worker contact)
- cleaning of liquid and vapors in tanks and piping with high-pressure steam-cleaning equipment
- removing electrical equipment and pumps associated with the tanks
- inerting tanks with dry ice (CO_2) prior to removal by placing approximately 100 pounds of dry ice in each of the tanks to purge out volatile compounds
- removing tanks and associated piping with a backhoe and/or crane (includes loading of the excavated soils on trucks to be transported to an appropriate disposal facility)
- collecting native soil samples from the bottom of each tank excavation pit by removing samples from the backhoe bucket
- collecting water samples from the tank excavation using a Teflon bailer lowered by nylon rope into the excavation
- excavating gasoline-affected soils or 1,1,1-TCA-affected soils around tanks, if encountered, with the backhoe

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- temporary stockpiling of any affected soils encountered on 10 mil polyethylene sheeting and covering the stockpiled soils with the 10 mil polyethylene sheets

4.0 KEY PERSONNEL AND RESPONSIBILITIES

4.1 Levine·Fricke Health and Safety Director

The Levine·Fricke Health and Safety Director is Ms. Shari A. Samuels. Ms. Samuels is responsible for:

1. Monitoring the health and safety impacts of this project for on-site Levine·Fricke personnel.
2. Assessing the potential health and safety hazards at the Site.
3. Recommending appropriate safeguards and procedures.
4. Modifying the HSP, when necessary.
5. Approving changes in safeguards used or operating procedures employed at the Site.

The Levine·Fricke Health and Safety Director shall have the authority to:

1. Require that additional safety precautions or procedures be implemented.
2. Order an evacuation of the Site, or portion of the Site, or shut down any operation, if she believes a health or safety hazard exists.
3. Deny unauthorized personnel access to the Site.
4. Require that any worker obtain immediate medical attention.
5. Approve or disallow any proposed modifications to safety precautions or working procedures.

4.2 Levine·Fricke Project Manager and Site Safety Officer

The Levine·Fricke Project Manager and Site Safety Officer (SSO) have been designated as Mr. John Sturman. Mr. Sturman is a Senior Project Engineer with Levine·Fricke. He has fulfilled the 40 hour safety training requirements of 29 CFR 1910.120.

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The SSO, or designated alternate, will be present at the Site during work activities. The SSO shall be notified of and approve activities in which persons may be reasonably expected to be exposed to affected soils and/or ground water.

The SSO shall be responsible for:

1. Subcontractors being informed of the expected hazards and appropriate protective measures at the Site.
(Subcontractors will be given a copy of Levine·Fricke's site-specific HSP for review.)
2. Limiting access to the Site.
3. Reporting unusual or potentially hazardous conditions to the Levine·Fricke Health and Safety Director.
4. Reporting injuries, exposures, or illnesses to the Levine·Fricke Health and Safety Director.
5. Communicating proposed changes in work scope or procedures to the Levine·Fricke Health and Safety Director for approval.
6. Recommending to the Levine·Fricke Health and Safety Director additional safety procedures or precautions that might be implemented.
7. Providing a safe and healthy work environment.

The SSO shall have the authority to:

1. Order an evacuation of the Site, or portion(s) of the Site, or shut down any operation if he/she believes a health or safety hazard exists.
2. Deny site access to unauthorized personnel.
3. Require that any worker, including the subcontractor's personnel, obtain immediate medical attention.

5.0 HAZARD ANALYSIS

Potential chemical, physical and general safety hazards during the tank removal program at the Site include the following:

Chemical hazards: - respiratory (exposure to volatile organic compounds)
- dermal (contact with petroleum products)

Physical hazards: - excavation instability
- noise
- electric shock
- heavy equipment
- falling tank
- rolling tank
- fire and explosion

Work procedures to protect workers from chemical and physical hazards are discussed in Section 6.0.

5.1 Chemical Hazards

The primary chemical hazard at the Site is exposure to chemical compounds from the gasoline and TCA tanks. Of particular concern is the potential for workers to be exposed to aromatic compounds especially associated with gasoline such as benzene, toluene, xylenes, and ethylbenzene, 1,1,1-TCA and the major aliphatic gasoline components in the vicinity of the tank excavations. Chemical Descriptions are presented in Appendix A.

5.2 Physical Hazards

The potential physical hazards at the Site during the planned activities stem from heavy machinery use and the hazardous nature of excavation work, and the potential for fire and explosion of hydrocarbons during tank removal. The potential physical hazards are listed under Section 5.0.

6.0 WORK REQUIREMENTS

6.1 Respiratory Protection

Field operations will be initiated in Level D. The primary route of potential exposure for chemicals is inhalation. Inhalation hazards due to volatilization will be monitored using a photo-ionization detector (PID) to measure concentrations of volatile organic chemicals (VOCs) in the breathing zone. If ambient air concentrations of VOCs in the breathing zone reach 25 ppm or greater, Sensidyne brand low-range benzene detector tubes (0.25 to 12 ppm, with pump model 800) will be used to detect the presence of benzene. If benzene is detected, a temporary stop work will take place and the area will be ventilated and monitored until no benzene is detected in the breathing zone. If no benzene is detected, half-facepiece air-purifying respirators will be worn by all personnel in the exclusion zone.

It is necessary that respirators be kept available during field activities. Respirators will be equipped with NIOSH-approved high efficiency particulate/organic vapor combination cartridges (such as North 7600).

6.2 Dermal Protection

Unless adequate precautions are taken, chemicals may contact the skin or clothing. Physical contact can be made with the above chemicals of concern under the following circumstances:

- cleaning and purging the existing tank
- excavating and removing the existing tank
- sampling the soils and ground water in the tank excavation pit
- excavation of affected soil

Personal Protective Equipment

Levine·Fricke and contractor/subcontractor personnel will wear the following protective clothing on site:

- hard hats
- steel-toed/steel-shank boots
- inner and outer disposable PVC gloves
- safety glasses (face shield during tank cleaning and purging with the steam cleaner)
- polyethylene coated Tyvek coveralls (if the potential for splashing exists)
- hearing protection around heavy equipment

6.3 Action Levels

Action Levels for a Temporary Stop Work

The SSO shall impose a temporary stop work and contact the Levine·Fricke Health and Safety Director immediately if the following conditions are observed, or if there is a question about site conditions:

1. uncontrolled dust generation
2. indications of heat stress
3. changes in the general health profile of on-site personnel, including symptoms discussed in Appendix A and headaches, dizziness, breathing difficulties, irritation to the eyes, nose, throat and hands
4. vapors detected in excess of 10 percent of the lower explosive limit (LEL) of gasoline. Depending on the grade of gasoline, the LEL is 1.2 to 1.5 percent. The action level for stop work and site withdrawal will be 1,200 ppm or 0.12% LEL
5. detection of benzene in the breathing zone.

6.4 Protection Against Physical Hazards

Explosion and Fire Prevention

To reduce the possibility of an explosion, residual product will be pumped from tanks prior to actual excavation. Proper bonding and grounding procedures shall be used prior to initiating the removal of any free product. No more than 1 inch of free product will be allowed to remain in tanks during actual removal. To minimize the potential for fire, only spark-proof tools will be used around tanks. A combustible gas monitor will be used on site during tank removals to measure explosive vapors within and around the tanks. To purge volatile hydrocarbons from tanks prior to removal, at least 100 pounds of dry ice will be added to each tank. If residual vapors detected exceed 10 percent of the LEL, the work activities will be temporarily stopped until the combustible liquid and vapors are removed by using N₂ gas or more dry ice to flush the air in the tank until the concentrations of combustible vapor in the tank is less than 10 percent of the LEL.

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Excavation Instability - The limits of excavation and method(s) of excavation support proposed by the contractor shall be presented to the Levine·Fricke SSO prior to initiating the excavation. Workers will not enter excavations.

Noise - Noise results primarily from concrete-breaking and excavation equipment and other machinery. Workers will wear ear plugs when operating heavy machinery.

Electric Shock - All electrical equipment to be used during field activities will be suitably grounded and insulated.

Heavy Equipment - Hazards related to excavating and compacting equipment will necessitate securing the work area.

General Safety - All Levine·Fricke and contractor/subcontractor personnel will wear approved head protection while working around heavy equipment in the site area. Fire hydrants, electrical and underground lines and pipes will be identified before operations begin. Two 10-pound fire extinguishers will be kept on site near the exclusion zone.

Tank Rolling/Falling - Hazards associated with the physical removal of the tanks will necessitate securing the work area. During removal and in preparation for transport off site of the tanks, the tanks will be suitably secured to the crane (during removal) and to the truck (for transport).

6.5 Work Area Definition

An exclusion zone will be delineated using caution tape or equivalent material to secure the work area from unauthorized entry. No smoking signs will be posted around the exclusion zone.

6.6 Entry Procedures

At a minimum, all visitors entering the Site must wear the protective clothing and equipment worn by Levine·Fricke and contractor/subcontractor personnel. Permission to enter the work area must be obtained from at least one of the personnel named in Section 4.0, Site Safety Responsibilities. Visitor's name and purpose of visit will be recorded in the field notes.

Entry into the tank is prohibited.

6.7 Decontamination Procedures

Gloves, coveralls and other disposable clothing or equipment worn by Levine·Fricke personnel will be placed in a suitable disposal container on site at the end of each work day. Protective clothing and equipment will be replaced if their protective function is compromised through holes or tears. New air-purifying cartridges (combination organic vapor and dust and fume) will be placed in the respirators used by Levine·Fricke personnel at the beginning of each field day. Used respirator cartridges will be placed in a suitable disposal container on site at the end of each work day. Equipment that comes in contact with on-site soils or ground water will be cleaned with high-pressure water before removal from the site area. Wash water from appropriate tank cleaning activities will be collected, placed in drums, and appropriately transported and disposed as hazardous waste at an off-site disposal facility.

A formal decontamination zone will not be required provided no petroleum-affected soil or ground water is encountered. It is recommended that a shower be taken at the end of the work day upon reaching one's residence, prior to the next meal.

6.8 Disposal Procedures

Soil sample analysis results will be evaluated to assess the appropriate disposal method for soils suspected to be affected. The testing methods to be used are discussed in the Work Order (Levine·Fricke, June 2, 1991). If any soils below the tanks and piping are removed from the Site, approval must be granted from the State of California Regional Water Quality Control Board. All soils, wash water, and personal protective equipment shall remain the property of AB&I. Levine·Fricke will assist with identifying appropriate methods of disposal in accordance with all applicable regulations.

7.0 EMERGENCY PROCEDURES

7.1 General Injury

- Step 1: Use first aid kit on site, if appropriate.
- Step 2: Use off-site help and/or assistance if appropriate.
- Step 3: Notify SSO, Project Manager and Health and Safety Director.

7.2 Specific Treatments

- Eye Exposure: flush eye with eye wash located on site, call ambulance.
- Skin Exposure: wash immediately with soap and water; call ambulance if necessary.
- Fire (localized): Use fire extinguisher and activate alarm system if necessary.
- Fire (uncontrolled): call Fire Department.
- Chemical Spill: call Fire Department and National Response Center for Toxic Chemical and Oil Spills.
- Inhalation: call Fire Department if potential for additional explosions or fire danger exists.
- Swallowing: call ambulance service.

7.3 Emergency Phone Numbers

Medical/General Services

Police Department	911
Fire Department	911
Ambulance	911

Hospital

Humana Hospital	(415) 357-8450	(Emergency)
13855 East 14th Street	(415) 357-6500	
San Leandro, California 94578		

Figure 3 shows the route from the Site to the Hospital and presents written directions of the route.

Hazardous Materials Response/Reporting

National Emergency Response Center (800) 424-8802
California State Office of Emergency Services (800) 852-7550
Regional Water Quality Control Board (805) 549-3147

7.4 Accident Reporting Procedures

In the event of an emergency, contact the following:

Levine·Fricke: (415) 652-4500
Shari A. Samuels (Health & Safety Director)*
John Sturman (Project Manager and Site Safety Officer)

If an exposure or injury occurs, work shall be temporarily halted until the SSO in consultation with the Health and Safety Director decide it is safe to continue work.

*Pager Number 633-8653

8.0 DOCUMENTATION

The SSO will record field observations of health and safety procedures by workers conducting the planned activities outlined in Section 3.0, including necessary deviations from the recommended health and safety procedures.

9.0 MEDICAL MONITORING

Appropriate medical monitoring will be required of Levine·Fricke personnel to:

- Meet requirements of 29 CFR 1910.120 (f).
- Meet requirements for respirator use.
- Meet other legal requirements.

A signed physician's statement qualifying the individual for the work to be performed will be required as part of the medical monitoring program.

10.0 TRAINING PROGRAM

1. The Levine·Fricke SSO shall have fulfilled all appropriate training requirements indicated by 29 CFR 1910.120 (e), including the 40-hour training requirement and required refresher courses.
2. A tailgate session will be held prior to commencing field activities to discuss this HSP. All Levine·Fricke personnel and contractor/subcontractor employees shall receive, at a minimum, the following information:
 - The names of personnel and alternates responsible for site safety and health.
 - Safety, health, and other hazards at the Site.
 - Instruction to use personal protective equipment.
 - Employee work practices to minimize risks from on-site hazards.
 - Instruction for safe use of engineering controls and equipment on site.
 - Site control measures.
 - Emergency plans.
 - Proposition 65 Warnings.

11.0 PROPOSITION 65

Under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65), individuals who may be exposed in the work place to chemicals that may cause cancer or birth defects must be warned of such hazards pursuant to California Health and Safety Code (HSC) Section 25249.6. At this Site, the chemicals that may cause cancer or reproductive abnormalities, and their respective warnings, are listed below.

11.1 Carcinogens

Of the chemicals that may be present at the Site, benzene is known to the State of California to cause cancer, as listed in Title 22, California Code of Regulations (CCR) Section 12000(b).

11.2 Warnings

Pursuant to HSC Section 25249.6 and CCR Sections 12601(c)(3)(A) and 12601(c)(3)(B), the following warnings must be made:

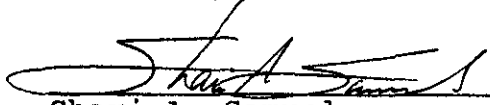
"This area contains chemicals known to the State of California to cause cancer."

This warning will be disclosed to workers during the pre-work "tailgate" meeting.


12.0 SIGNATURES

12.1 Levine·Fricke Personnel

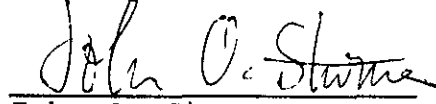
This HSP for the tank removal to be conducted at 7825 San Leandro Street, Oakland, California is approved by the following Levine·Fricke personnel:


Shari A. Samuels
Health and Safety Director

7/31/91
Date


Glenn M. Leong
Quality Assurance Reviewer

7/31/91
Date


John O. Sturman
Project Manager

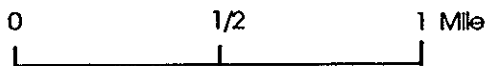
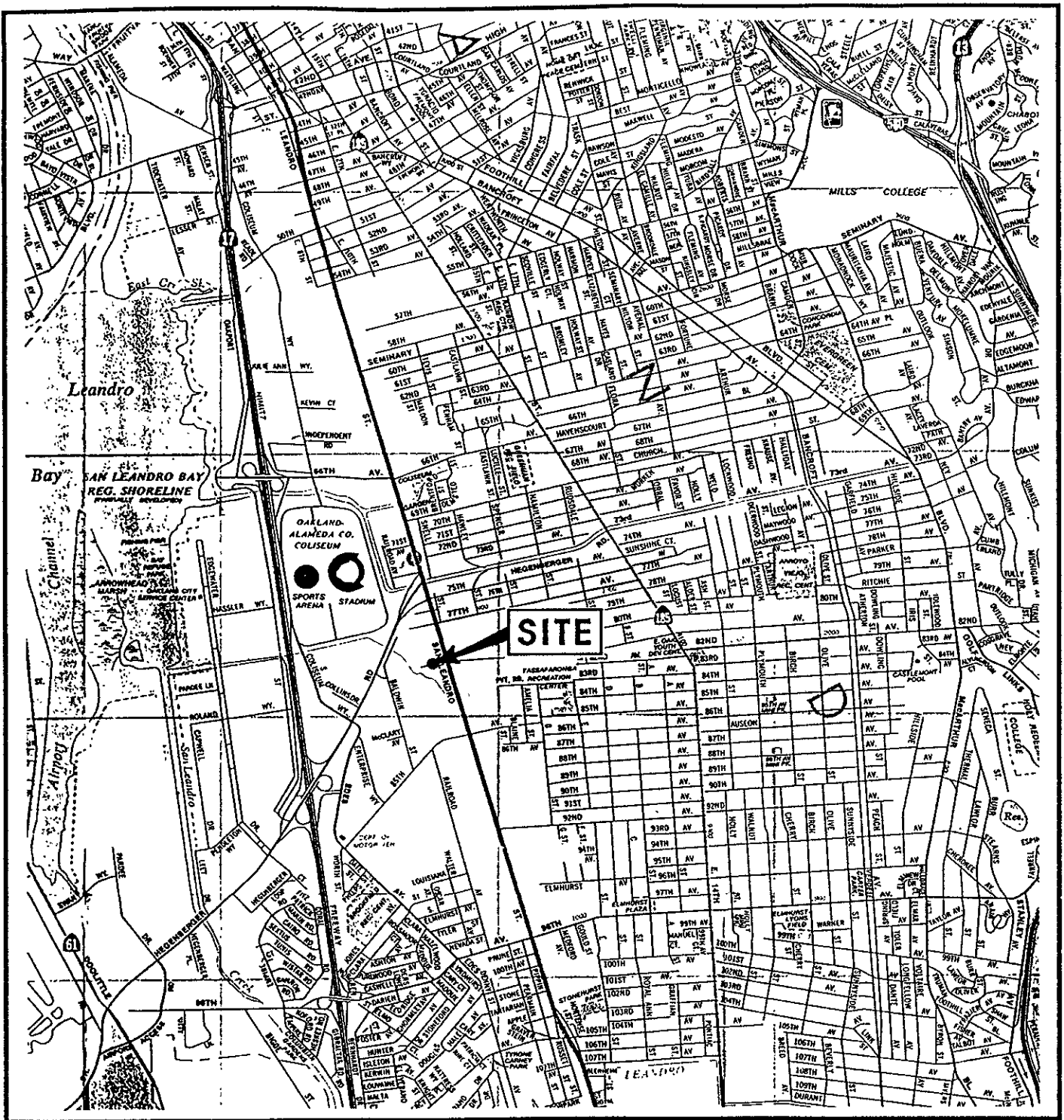
7/31/91
Date

12.2 Contractor and Subcontractors

Contractor and Subcontractor Agreement:

1. Contractor certifies that the following personnel to be employed on the tank removal project at 7825 San Leandro Street in Oakland, California, have met the requirements of the OSHA Hazardous Waste Operations and Emergency Response Standard 29 CFR 1910.120 and other applicable OSHA Standards.
2. Contractors certifies that in addition to meeting the OSHA requirements, it has received a copy of this HSP, and will ensure that its employees are informed and will comply with both OSHA requirements and the guidelines in this HSP.
3. Contractor further certifies that it has read, understands and will comply with all provisions of this HSP, and it will take full responsibility for the health and safety of its employees.

<u>Contractor</u>	<u>Signature</u>	<u>Date</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____



MAP SOURCE:
 Oakland, Berkeley, Alameda
 California State Automobile Association
 7-86

Figure 1 : SITE VICINITY



HUMANA HOSPITAL SAN LEANDRO
 13855 East 14th St.
 San Leandro, CA 94578
 Telephone: (415) 357-8450 (Emergency)
 (415) 357-6500

DIRECTION TO HOSPITAL:
 From the site, turn left on San Leandro Street, turn left on Hegenberger road, proceed on Hegenberger road and turn to H-880 South. Proceed approximately 3.5 miles on H-880 and turn right on Davis Street. Proceed 1 mile on Davis Street and turn right on East 14th Street. Proceed approximately 1.25 miles and turn right. The Hospital is on the corner of East 14th and 136th Avenue.

MAP SOURCE:
 Thomas Bros. Map
 Alameda County
 1990 Edition

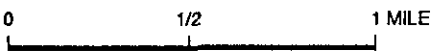


Figure 3 : LOCATION AND ROUTE TO HUMANA HOSPITAL

APPENDIX A
CHEMICAL DESCRIPTIONS

APPENDIX A

CHEMICAL DESCRIPTIONS

Chemical descriptions present short-term exposure effects and permissible exposure limits (PELs) for a time weighted average (TWA) over an eight-hour period. In addition to this information, the chemical description for gasoline presents the short-term exposure limit (STEL).

Gasoline

Gasoline is produced from the light distillates during petroleum fractionation, with its major components including paraffins, olefins, naphthenes, aromatics, and recently ethanol. Gasoline also contains various functional additives as required for different uses, such as anti-knock fluids, antioxidants, metal deactivators, corrosion inhibitors, anti-icing agents, preignition preventors, upper-cylinder lubricants, dyes, and decolorizers. Lead additives in particular were widely used in gasoline until the introduction of vehicle catalytic converters.

Mild cases of gasoline ingestion can cause inebriation, vomiting, vertigo, drowsiness, confusion, and fever. Aspiration into the lungs and secondary pneumonia may occur unless prevented. Gasoline can cause hyperemia of the conjunctiva and other eye disturbances. Inhalation of gasoline during bulk handling operations produced no physiological effects. Gasoline is a skin irritant and a possible allergen. Repeated or chronic dermal contact can result in drying of the skin, lesions, and other dermatologic conditions.

The PEL for gasoline is 300 ppm and the STEL is 500 ppm.

Benzene

Benzene is a clear colorless liquid.

Exposure to high concentrations (3,000 parts per million [ppm]) may result in acute poisoning, characterized by the narcotic action of benzene on the central nervous system. Chronic poisoning occurs most commonly through inhalation and dermal adsorption. Benzene is also a human carcinogen. Unleaded regular gasoline commercially available in the United States typically contains less than about 2 percent benzene.

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PEL for TWA over an eight-hour period is 1 ppm in air (OSHA Standard 29 CFR 1910.1000).

Toluene

Toluene is a colorless liquid with a benzol-like odor.

Inhalation of high vapor concentrations may cause impairment of coordination and reaction time, headaches, nausea, eye irritation, loss of appetite, a bad taste, and weariness.

PEL for TWA over an eight-hour period is 100 ppm in air (OSHA Standard 29 CFR 1910.1000).

Xylene

Xylene is clear, colorless liquid.

Exposure to high concentrations of vapor may result in eye and skin irritation. Eye irritation may occur at concentrations of about 200 ppm.

PEL for TWA over an eight-hour period is 100 ppm in air (OSHA Standard 29 CFR 1910.1000).

Ethylbenzene

Ethylbenzene is a clear, colorless liquid.

Exposure to high concentrations of vapor (approximately 1,000 ppm) may result in irritation to the skin and mucous membranes, dizziness, irritation of the nose and throat and a sense of constriction of the chest.

PEL for TWA over an eight-hour period is 100 ppm in air (OSHA Standard 29 CFR 1910.1000).

1,1,1-Trichloroethane (1,1,1-TCA) (Methyl Chloroform)

1,1,1-TCA is a colorless liquid with a mild odor, like chloroform.

Short-term exposure to 1,1,1-TCA vapor may cause headaches, dizziness, drowsiness, unconsciousness, irregular heart beat, and death. 1,1,1-TCA liquid splashed in the eye may cause irritation.

The PEL for 1,1,1-TCA is 350 ppm.