WORK PLAN
CONTAMINATED SOIL REMOVAL
4300 SAN PABLO AVENUE
EMERYVILLE, CALIFORNIA
SCI 537.004

Prepared for:

Mr. Ignacio Dayrit
City of Emeryville
2200 Powell Street, 12th Floor
Emeryville, California 94608

By:

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Geotechnical Engineer 892 (expires 12/31/92)

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171 - 12th Street, Suite 201
Oakland, California 94607
(415) 268-0461

June 19, 1991

I INTRODUCTION

The City of Emeryville is planning to remove contaminated soil from a former service station site at 4300 San Pablo Avenue in Emeryville, California. The site is located at the intersection of 43rd Street and San Pablo Avenue, as shown on the Site Plan, Plate 1.

Subsurface Consultants, Inc. (SCI) previously performed a geotechnical investigation and preliminary contamination assessments of the site, and presented the results in reports dated January 19, 1990, and December 4, 1989, July 13, 1990 and January 8, 1991.

The site currently contains an unoccupied self-service carwash. Between about 1926 and 1966, the site was occupied by a service station. Subsurface exploration at the known former underground tank locations indicated that soil at one tank site has gasoline concentrations of up to 490 mg/kg. In our January 8, 1991 report, we stated that the regulatory agencies will likely require that soil containing petroleum hydrocarbon concentrations greater than 100 mg/kg be remediated. We also recommended that a groundwater monitoring program be developed which meets regulatory agency requirements.

In their letter dated June 4, 1991, the Alameda County Health Care Services Agency (ACHCSA) requested that a Work Plan be developed for remediation of dissolved constituents and contaminated soil.

II INVESTIGATION TO DATE

SCI has obtained soil and groundwater samples from 30 test borings and 6 monitoring wells at and near the site. Analytical tests of the samples indicated that they contain gasoline (detected as total volatile hydrocarbons and as total extractable hydrocarbons), and benzene, toluene, xylene, and ethylbenzene (BTXE). No diesel, nor other volatile organic compounds were detected.

Based upon the data to date, the approximate limits of soil containing gasoline concentrations greater than 100 mg/kg are estimated to be as shown on the Site Plan.

III WORK PLAN

A. Soil Remediation

1. General

The estimated area of soil remediation is shown on the Site Plan. It will include soil within about 5 feet of the former fuel tank site along 43rd Street and in the vicinity of Boring 1 (from our geotechnical investigation). The excavation(s) will extend to groundwater (at a depth of about 8 feet) or to the bottom of the former fuel tank excavation backfill, which ever is deeper. In addition, the remediation will include all soil that is encountered with gasoline concentrations greater than 100 mg/kg.

The remediation method will include excavation, on-site treatment of the contaminated materials (if necessary), and transport to the appropriate disposal facilities. On-site treatment will be by aeration, in accordance with Bay Area Air Quality Management District (BAAQMD) requirements.

A Site Safety Plan accompanies this Work Plan. Supplemental project information follows:

Property Owner:

City of Emeryville
2200 Powell Street, 12th Floor
Emeryville, California 94608
Contact: Mr. Ignacio Dayrit (415-596-4356)

Company Overseeing Remediation (Consultant):

Subsurface Consultants, Inc.
171 - 12th Street, Suite 201
Oakland, California 94607
Contact: Mr. William K. Wikander (415) 268-0461

Company Performing the Work (Contractor):

Bay Area Tank & Marine
5702-Q Marsh Drive
Pacheco, California 94553
Contact: Mr. Forrest G. Canutt (415-372-4270)

Site Location:

4300 San Pablo Avenue
Emeryville, California

Tank Information

Three underground fuel storage tanks formerly existed at the site. We estimate that the tanks were removed sometime prior to 1969. Analytical test results of contaminated soil samples from the site indicate that at least one of the tanks contained gasoline.

2. Contaminated Soil Excavation

The estimated area to be excavated is shown on the Site Plan. The actual area excavated may vary from that shown if soil with gasoline concentrations greater than 100 mg/kg are encountered at the proposed excavation perimeter. We estimate that about 100 to 150 cubic yards (cy) of soil will be excavated.

During excavation, soil samples will be obtained and analytically tested on-site using a mobile analytical laboratory. Additional soil will be excavated in areas from which soil samples have gasoline concentrations greater than 100 mg/kg, until all perimeter and bottom samples have gasoline concentrations less than 100 mg/kg. The excavated soil will be temporarily stockpiled on-site, covered with polyethylene sheeting until aeration, if necessary, and/or disposal.

3. Soil Aeration

Soil samples will be obtained (one sample per 12.5 cy), composited (4 samples per composite) and analyzed for gasoline, as required by the BAAQMD. Based upon the test results, soil containing hydrocarbon concentrations greater than 100 mg/kg will be aerated on-site in accordance with the attached BAAQMD requirements. During aeration, the contaminated soil will be spread in a layer about 6 inches thick, and turned frequently until analytical tests indicate gasoline concentrations less than 100 mg/kg. The aerated soil will likely be disposed of at a Class III landfill.

4. Sampling and Analysis

During excavation, samples of the material anticipated to be left in-place will be obtained. At least one soil sample will be taken from the excavation bottom for each 500 square feet (in plan) and at least one soil sample will be taken from the excavation side walls for each 20 linear feet (4 samples minimum).

For each sample from the excavation, a backhoe bucket of soil will be brought to the surface. Samples from stockpiles will be obtained directly. Our technician will cut away several inches of soil, and a clean brass liner (4 to 6 inches long) will be driven into the soil. The ends of the filled sample liner will be covered with Teflon sheets before capping, sealing with plastic tape and labeling. Each sample will be refrigerated on-site and transported to an analytical testing laboratory. Chain-of-custody records will be maintained.

Analytical testing will be performed by a State of California Department of Health Services (DHS) certified laboratory. Our investigations to date at the site have only encountered gasoline contamination. In addition, Class III landfills require testing for lead. Accordingly, the following analytical tests will be performed:

1. Total volatile hydrocarbons, as gasoline, sample preparation and analysis using EPA Methods 5030 (purge and trap) and 8015 modified (gas chromatograph coupled to a flame ionization detector),

2. Total extractable hydrocarbons, as diesel, sample preparation and analysis using EPA Methods 3550 (sonication) and 8015 modified (gas chromatograph coupled to a flame ionization detector),

3. Benzene, toluene, xylenes and ethylbenzene sample preparation and analysis using EPA Methods 5030 and 8020 (gas chromatograph coupled to a flame ionization detector),

4. Total and soluble lead, analysis using EPA Method 7420 (graphite furnace atomic absorption spectrophotometry), extraction by Waste Extraction Test: CCR Title 26, Section 22-66700.

5. Backfilling

All water and free product (if encountered) exposed in the excavation will be pumped out by a vacuum truck to the lowest possible level. The removed product/water will be transported under manifest to a recycling facility. Disturbed, loose soil will be removed from the excavation bottom. If necessary, a 1.5-foot-thick layer of granular soil will be placed in one lift at the bottom of the excavation to "bridge" the wet soil beneath and provide a firm base over which to compact backfill. The excavation will then be backfilled with compacted soil. All fill will be free of perishable materials and rocks greater than 6 inches in largest dimension. It will have low expansion potential, as indicted by a Plasticity Index less than 15 percent and a Liquid Limit less than 40 percent.

All fill will be moisture conditioned to near optimum moisture content, placed in layers not exceeding 8 inches in loose thickness, and compacted to at least 90 percent relative compaction

(ASTM D1557). The upper 6 inches of pavement and slab subgrades will be compacted to at least 95 percent relative compaction. The subgrade will be smooth and non-yielding under heavy equipment loads. SCI personnel will observe excavation backfilling and perform field density tests to check soil compaction.

6. Proposed Subcontractors

1. Mobile Laboratory

Net Pacific, Inc.
435 Tesconi Circle
Santa Rosa, California 95401
Contact: Mr. Troy Mikell (707) 526-7200
Hazardous Waste Testing Laboratory Certificate No. 334

2. Other Analytical Testing

Curtis and Tompkins, Ltd.
2323 Fifth Street
Berkeley, California 94710
Contact: John Gouyette (415) 486-0900
Hazardous Waste Testing Laboratory Certificate Number 159

7. Miscellaneous

A. Receipts will be obtained from the landfill(s) documenting disposal of the material. If hazardous waste manifests are required to transport any materials, they will be prepared and accompany transport of the materials.

B. Chain-of-Custody Records will be used to document all sample transfers from the site to the analytical laboratory.

C. A report will be submitted to the ACHCSA describing the closure activities, presenting sample analysis results and documenting the final disposal of waste materials. Copies of

laboratory reports, Chain-of-Custody Records and Manifests (if required) will be included in the report.

B. Groundwater Monitoring

Groundwater monitoring will be performed quarterly for at least one year (a total of 4 sampling events). Four of the existing six wells will be monitored (MW-1, MW-4, MW-5 and MW-6). Our engineering services during each groundwater monitoring event will be limited to the following:

1. Measuring the groundwater level in each of the six wells, and determining the direction of groundwater flow,

2. Purging each of the four wells to be sampled of at least 4 well volumes of water,

3. Storing the purged water on-site, in DOT rated drums, for later disposal by others,

4. Performing analytical tests of the water samples; the tests will include total volatile hydrocarbons, as gasoline (EPA 5020/8015 modified), and benzene, toluene, xylene, and ethylbenzene (EPA 5030/8020), and

5. Recording the results in a written report, including a site plan showing groundwater contours, analytical test results and Chain-of-Custody records.

Recommendations for future work will be provided based upon the results of monitoring for one year. The recommendations could include either of the following:

1. Cease Monitoring

If the results indicate no contamination for 4 consecutive quarters, a request to cease monitoring and properly abandon the wells should be submitted to the ACHCSA.

2. Continue Monitoring

If the results indicate low levels of contamination and that the contaminated water is not migrating beyond the west side of San Pablo Avenue, a Work Plan should be prepared for monitoring the wells for an additional year, with reevaluation at the end of the year.

3. Groundwater Remediation

If the results indicate groundwater contamination increasing significantly and/or migrating beyond the west side of San Pablo Avenue, a Work Plan should be prepared for groundwater remediation and continued monitoring.

List of Attachments

Plate 1 Site Plan

Regulation 8, Rule 40 (BAAQMD)

Site Safety Plan

Distribution:

2 copies: Mr. Ignacio Dayrit
City of Emeryville
2200 Powell Street, 12th Floor
Emeryville, California 94608

1 copy: Mr. Forrest G. Canutt
Bay Area Tank & Marine
5702-Q Marsh Drive
Pacheco, California 94553

1 copy: Ms. Susan Hugo
Division of Hazardous Materials
Alameda County Health Care Services Agency
80 Swan Way, Room 200
Oakland, California 94621

WKW:RWR:JPB:sld

EMERYVILLE POST OFFICE
4310 SAN PABLO AVENUE

CAR WASH
4300
SAN PABLO
AVENUE

MW-1

B-1

MW-4

43RD STREET

MW-3

MW-2

SIDEWALK

B-3

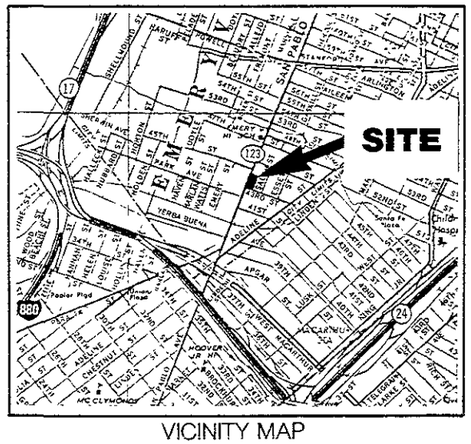
B-2

ELEVATION REFERENCE
(ASSUMED AT 100.00 FEET)

MW-5

MEDIAN

SAN PABLO AVENUE
(STATE ROUTE 123)



VICINITY MAP

MONITORING WELL
TEST BORING
(PREVIOUS INVESTIGATION)
TEST BORING
APPROXIMATE FORMER
TANK LOCATION

ESTIMATED AREA OF SOIL REMEDIATION

MW-6

SIDEWALK

APPROXIMATE SCALE (feet)

0 20 40

RETAIL
BUILDING

EMERYVILLE
FIRE STATION #1

SITE PLAN

Subsurface Consultants

EMERYVILLE SENIOR HOUSING

JOB NUMBER	DATE	APPROVED
537 004	6/18/91	

PLATE 1

REGULATION 8
ORGANIC COMPOUNDS
RULE 40
AERATION OF CONTAMINATED SOIL
AND
REMOVAL OF UNDERGROUND STORAGE TANKS

INDEX

8-40-500 MONITORING AND RECORDS (Not Included)

8-40-600 MANUAL OF PROCEDURES

8-40-601 Soil Sampling
8-40-602 Measurement of Organic Content
8-40-603 Determination of Emissions

REGULATION 8
ORGANIC COMPOUNDS
RULE 40
AERATION OF CONTAMINATED SOIL
AND
REMOVAL OF UNDERGROUND STORAGE TANKS
(Adopted July 16, 1986)

8-40-100 GENERAL

8-40-101 **Description:** The purpose of this Rule is to limit the emission of organic compounds from soil that has been contaminated by organic chemical or petroleum chemical leaks or spills; to describe an acceptable soil aeration procedure, and to describe an acceptable procedure for controlling emissions from underground storage tanks during removal or replacement. (Amended February 15, 1989)

8-40-110 **Exemption, Storage Piles:** Calculations of aeration volume under Section 8-40-204 shall not include storage piles that are covered per Section 8-40-303; nor shall they include active storage piles.

8-40-111 **Exemption, Excavated Hole:** The exposed surfaces of an excavated hole shall not be included in calculations of aerated volume under Section 8-40-204.

8-40-112 **Exemption, Sampling:** Contaminated soil exposed for the sole purpose of sampling shall not be considered to be aerated. Removal of soil for sampling shall not qualify a pile as "active."

8-40-113 **Exemption, Non-volatile Hydrocarbons:** The requirements of all sections of this Rule shall not apply if the soil is contaminated solely by a known organic chemical or petroleum liquid, and that chemical or liquid has an initial boiling point of 302^{o}F or higher, provided that the soil is not heated. (Amended February 15, 1989)

8-40-114 **Exemption, Soil Excavation During Pipeline Leak Repairs:** The requirements of Section 8-40-402 shall not apply if soil is being excavated in order to repair leaking pipelines and if no more than 5 cubic yards are generated, and provided the requirements in Section 8-40-404 are satisfied. (Adopted February 15, 1989)

8-40-115 **Exemption, Soil Excavation Unrelated to Underground Storage Tank Activities:** The requirements of Section 8-40-402 shall not apply where contaminated soil is discovered during excavations unrelated to underground storage tank activites, and provided the requirements in Section 8-40-405 are satisfied. (Adopted February 15, 1989)

8-40-200 DEFINITIONS

8-40-201 **Active Storage Pile:** A pile of contaminated soil to which soil is currently being added or from which soil is currently being removed. Activity must have occurred or be anticipated to occur within one hour to be current.

8-40-202 **Aeration:** Exposure of excavated contaminated soil to the air.

8-40-203 **Aeration Depth:** The smaller of the following: the actual average depth of contaminated soil; or 0.15 meters (0.5 feet) multiplied by the daily frequency with which soil is turned. (Amended February 15, 1989)

8-40-204 **Aeration Volume:** The volume of soil being aerated shall be calculated as follows: the exposed surface area (in square feet or square meters) shall be multiplied by the aeration depth. The exposed surface area includes the pile of excavated soil unless the pile is covered per Section 8-40-303. (Amended February 15, 1989)

8-40-205 **Contaminated Soil:** Soil which has an organic content, as measured using the procedure in Section 8-40-502, exceeding 50 ppm(wt).

8-40-206 **Organic Compound:** Any compound of carbon, excluding methane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates and ammonium carbonate

8-40-207 **Organic Content:** The concentration of organic compounds measured in the composite sample collected and analyzed using the procedures in Sections 8-40-601 and 8-40-602.

8-40-208 **Vapor Free:** The process of purging gases from a tank using dry ice to replace organic vapors with an inert atmosphere

8-40-209 **Ventilation:** The process of purging gases from a tank by blowing or drawing another gas through the tank.

8-40-210 **Emergency Removal or Replacement or Excavation:** A removal or replacement of a tank or an excavation of soil carried out pursuant to an order of a state or local government agency issued because the contaminated soil poses an imminent threat to public health and safety. (Adopted February 15, 1989)

8-40-300 **STANDARDS**

8-40-301 **Uncontrolled Aeration:** A person shall not aerate contaminated soil at a rate in excess of that specified in Table 1 for the degree of organic content. The limitations in Table 1 apply to the entire facility, and indicate the volume of contaminated soil that may be added, on any one day, to soil that is already aerating.

Table 1
Allowable Rate of Uncontrolled Aeration

ORGANIC CONTENT ppm(weight)	RATE OF UNCONTROLLED AERATION Cubic meters/day	Cubic yards/day
<50	Exempt	Exempt
50 - 99	459.0	600
100 - 499	91.8	120
500 - 999	45.9	60
1000 - 1999	22.9	30
2000 - 2999	11.5	15
3000 - 3999	7.6	10
4000 - 4999	5.7	8
>5000	0.08	0.1

(Amended February 15, 1989)

8-40-302 **Controlled Aeration:** Soil may be aerated at rates exceeding the limitations of 8-40-301 provided emissions of organic compounds to the atmosphere are reduced by at least 90% by weight.

8-40-303 **Storage Piles:** Contaminated soil which is not being aerated shall be covered except when soil is being added or removed. Any uncovered contaminated soil will be considered to be aerated. The soil may be covered with a layer of uncontaminated soil no less than six inches deep; or it may be covered with a tarp or other covering, provided no head space where vapors may accumulate is formed and provided the covering is in good condition and is secured adequately so as to minimize emissions to the atmosphere. (Amended February 15, 1989)

8-40-310 **Underground Storage Tanks - Removal or Replacement:** Any person wishing to permanently remove or replace an underground storage tank which previously contained organic compounds shall follow the following procedure:

310.1 All piping shall be drained or flushed into the tank or other container.

310.2 All liquids and sludges shall be removed, to the extent possible, from the tank. A hand pump shall be used to remove the bottom few inches of product if necessary.

310.3 Vapors shall be removed from the tank using one of the following three methods:

3.1 The tank may be filled with water, displacing vapors and hydrocarbon liquids. Water used for this purpose must be collected and, or disposed of in a manner approved by the APCO.

3.2 Vapor freeing.

3.3 Ventilation.

(Amended February 15, 1989)

8-40-311 Vapor Freeing: No person shall vapor free a tank containing more than 0.001 gallons of liquid organic compounds per gallon of tank capacity unless emissions of organic compounds to the atmosphere are reduced by at least 90%.

8-40-312 Ventilation: No person shall ventilate a tank containing more than 0.001 gallons of liquid organic compounds per gallon of tank capacity unless emissions of organic compounds to the atmosphere are reduced by at least 90%.

8-40-400 ADMINISTRATIVE REQUIREMENTS

8-40-401 Reporting, Removal or Replacement of Tanks: The person responsible for the removal or replacement of tanks which are subject to the provisions of Sections 8-40-310 shall provide written notice to the APCO of intention to remove or replace tanks. The written notice shall be postmarked at least 5 days prior to commencement of such removal or replacement. In the case of emergency removal or replacement of tanks, notice shall be provided as early as possible prior to the commencement of such emergency removal or replacement, to be followed by written verification. The written notice of intention shall include:

401.1 Names and addresses of persons performing and responsible for the tank removal or replacement.

401.2 Location of site at which tank removal or replacement will occur.

401.3 Scheduled starting date of tank removal or replacement. The scheduled starting date may be delayed for no more than 5 working days, provided the APCO is notified by telephone as early as possible prior to the new starting date.

401.4 Procedures to be employed to meet the requirements of Sections 8-40-310.

401.5 If applicable, name, title and authority of the state or local government representative who has ordered a tank removal or replacement which is subject to emergency procedures.

(Adopted, February 15, 1989)

8-40-402 Reporting, Excavation of Soil: The person responsible for the excavation of soil subject to the provisions of Sections 8-40-301 or 302 shall provide written notice to the APCO of intention to excavate. The written notice shall be postmarked at least 5 days prior to commencement of such excavation. In the case of emergency excavations, notice shall be provided as early as possible prior to the commencement of such emergency excavation, to be followed by written verification. Written notice of intention to excavate may be submitted to the APCO at the same time written notice of intention to remove or replace tanks is submitted provided that such notification precedes the commencement of either tank removal or replacement or soil excavation by at least 5 days as indicated by postmark. The written notice of intention shall include:

402.1 Names and addresses of persons performing and responsible for excavation.

402.2 Location of site at which excavation will occur.

402.3 Scheduled starting date of excavation. The scheduled starting date may be delayed for no more than 5 working days, provided the APCO is notified by telephone as early as possible prior to the new starting date.

402.4 Procedures to be employed to meet the requirements of Sections 8-40-301 or 302

402.5 If applicable, name, title and authority of the state or local government representative who has ordered an excavation which is subject to emergency procedures

(Adopted February 15, 1989)

8-40-403 **Reporting, Aeration of Contaminated Soil:** The person responsible for aeration of any contaminated soil shall provide the District, by telephone, with the following information. This shall be provided no less than 24 hours prior to the spreading or heating of any contaminated soil. The District shall again be notified within 24 hours of a change in one or more of the following parameters.

403.1 Estimated total quantity of soil to be aerated.

403.2 Estimated quantity of soil to be aerated per day.

403.3 Estimated average degree of contamination, or total organic content of soil

403.4 Chemical composition of contaminating organic compounds (i.e., gasoline, methylene chloride, etc.)

403.5 A description of the basis on which these estimates were derived (soil analysis test reports, etc.).

(Amended, Renumbered February 15, 1989)

8-40-404 **Reporting, Soil Excavation During Pipeline Leak Repairs:** The person responsible for the excavation of no more than 5 cubic yards of soil generated by a pipeline leak repair shall provide written notice to the APCO as early as possible, but not later than 10 working days, after excavation is completed. The written notice shall include:

404.1 Names and addresses of persons performing and responsible for excavation.

404.2 Location of site at which excavation occurred.

404.3 Date of excavation.

404.4 Quantity of soil excavated.

404.5 Estimated average degree of contamination, or total organic content of soil.

(Adopted February 15, 1989)

8-40-405 **Reporting, Soil Excavations Unrelated to Underground Storage Tank Activities** The person responsible for soil excavations unrelated to underground storage tank activities where contaminated soil is discovered shall provide notice as early as possible upon detection of such contaminated soil, to be followed by written verification. The written verification shall include:

405.1 Names and addresses of persons performing and responsible for excavation.

405.2 Location of site at which excavation occurred.

405.3 Date of excavation.

405.4 Quantity of soil excavated.

405.5 Estimated average degree of contamination, or total organic content of soil

(Adopted February 15, 1989)

8-40-600 MANUAL OF PROCEDURES

8-40-601 **Soil Sampling:** One composite sample shall be collected and analyzed for every 50 cubic yards of excavated contaminated soil to be aerated. At least one composite sample shall be collected from each inactive, uncovered storage pile within 24 hours of excavation. Samples are not required if the soil is uncontaminated

601.1 Each composite sample shall consist of four separate soil samples taken using the procedures described below. The soil samples shall remain separate until they are combined in the laboratory just prior to analysis.

601.2 Each 50 cubic yard pile for which a composite sample is required shall be considered to have four equal sectors. One sample shall be taken from the center of each sector. Samples shall be taken from at least three inches below the surface of the pile. Samples shall be taken using one of the following methods:

1.1 Samples shall be taken using a driven-tube type sampler, capped and sealed with inert materials, and extruded in the lab in order to reduce the loss of volatile materials; or

1.2 Samples shall be taken using a clean brass tube (at least three inches long) driven into the soil with a suitable instrument. The ends of the brass tube shall then be covered with aluminum foil, then plastic end caps, and finally wrapped with a suitable tape. The samples shall then be immediately placed on ice, or dry ice, for transport to a laboratory.

(Amended February 15, 1989)

8-40-602 **Measurement of Organic Content:** Organic content of soil shall be determined by the Regional Water Quality Control Board's Revised Analytical Methods, Attachment 2, 11/8/85, any other method approved by the APCO, or EPA Reference Method 8010 or 8015. (Amended February 15, 1989)

8-40-603 **Determination of Emissions:** Emissions of organic compounds as specified in Sections 8-40-302, 8-40-311 and 8-40-312, shall be measured as prescribed in the Manual of Procedures, Volume IV, ST-7. (Amended February 15, 1989)

SITE SAFETY PLAN
SOIL REMEDIATION
4300 SAN PABLO AVENUE
EMERYVILLE, CALIFORNIA
SCI 537.004

Prepared for:

Mr. Ignacio Dayrit
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2200 Powell Street, 12th Floor
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By:

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(415) 268-0461

June 18, 1991

I INTRODUCTION

This Site Safety Plan pertains to remediation of contaminated soils at 4300 San Pablo Avenue in Emeryville, California. The project location is shown on Plate 1, Site Plan.

The site currently contains an unoccupied self-service car wash. Between about 1926 and 1966, the site was occupied by a service station. Subsurface exploration at the known former underground tank locations indicated that soil at one tank site has gasoline concentrations of up to 490 mg/kg.

The contaminated soil will be remediated to gasoline concentrations less than 100 mg/kg. This Site Safety Plan outlines a personnel and work site safety program to minimize the risk of actions endangering personnel and/or nearby property.

II HEALTH AND SAFETY CONSIDERATIONS

A. Key Personnel

Mr. R. William Rudolph: Health and Safety Officer/Project Manager

Responsible for planning, implementing and auditing the health and safety program for the project and supervising field activities. He will be contacted if and when emergency situations develop.

Mr. Dennis Alexander: Field Coordinator/Technician/Safety Officer

Responsible for coordinating field health and safety activities.

B. Hazardous Substance Description

Light petroleum hydrocarbons (gasoline) have been detected in soil at the site. Gasoline concentrations in soil of up to 490 mg/kg have been measured.

C. Chemical Hazards

Potential chemical hazards include skin and eye contact, dust inhalation, and exposure to gasoline and volatile organic chemical vapors. The identified toxic compounds that exist at the site are listed below, with descriptions of specific health effects of each. The list includes the primary toxic constituents of gasoline (benzene, toluene, xylene and ethylbenzene).

1. Benzene

   a. **Characteristics:**

      Clear, colorless, highly flammable liquid with characteristic odor

   b. **High exposure levels may cause:**

      Acute restlessness, convulsions, depression, respiratory failure; a suspected carcinogen

   c. **Permissible exposure level (PEL) for a time weighted average (TWA) over an eight hour period:**

      1.0 ppm

2. Toluene

   a. **Characteristics:**

      Colorless, flammable liquid with benzene-like odor

   b. **High exposure levels may cause:**

      Weakness, dizziness, headache, dermatitis, skin irritation

   c. **PEL for an 8-hour TWA:**

      100 ppm

3. Xylene

   a. **Characteristics:**

      Colorless, flammable liquid with aromatic odor

   b. **High exposure levels may cause:**

      Dizziness, drowsiness, irritation of the eyes, nose and throat; narcosis at high concentrations

   c. **PEL for an 8-hour TWA:**

      100 ppm

4. Ethylbenzene

a. **Characteristics:**

Clear, colorless, highly flammable liquid with characteristic odor

b. **High exposure levels may cause:**

Irritation to skin, nose and throat, dizziness, constriction in chest, loss of consciousness, respiratory failure.

c. **PEL for an 8-hour TWA:**

100 ppm

D. Physical Hazards

Other on-site hazards may include physical injuries due to the proximity of workers to excavation equipment and tools. Excavation equipment and tools will include a backhoe, loader and trucks. Only trained personnel will operate and use the equipment; all equipment will be kept clean and in good repair. Safety apparel required around the excavation equipment will include a hard hat and steel-toed boots.

III WORK PLAN INSTRUCTIONS

A. Level of Protection

Regular surveys of the site and knowledge of the anticipated hazards will determine the level of protection and the proper safety procedures to be employed. Initially, workers coming into contact with contaminated materials will wear disposable coveralls, disposable latex gloves, hard hats, steel-toed boots and eye protection.

The level of protection for personnel working in the area will be upgraded if organic vapor levels in the workers' breathing zone exceed 5 ppm above background levels continuously for more than 5 minutes. In this event, personnel protective equipment will include double cartridge respirators for organic vapors, disposable coveralls, gloves, and hard hats with safety shields or safety glasses.

All work will cease, equipment will be shut down, and personnel will withdraw from the area if either (1) the organic vapor concentration in the workers' breathing zone exceeds 200 ppm for a period of 5 minutes, or (2) the organic vapor concentration two feet above the excavation exceeds 2000 ppm or 25 percent of the lower explosive limit. The Health and Safety Officer will determine when personnel may return to the work area. If work proceeds in an environment where organic vapor concentrations exceed 200 ppm, a self-contained breathing apparatus or an airline respirator will be utilized by the personnel. Where cartridge

respirators are in use, work will cease if oxygen concentrations fall below 19.5 percent.

B. Combustible Gas and Organic Vapor Monitoring

Site personnel will monitor on-site levels of combustible gas vapors using a Gastech Hydrocarbon Supersurveyor, Model 1314 and a portable Organic Vapor Meter (OVM). The Health and Safety Officer will be notified if organic vapor levels in the samples exceed ambient concentrations.

C. Site Entry Procedures

The general work area is shown on the Site Plan. All personnel entering the work zone will be qualified personnel wearing the proper level of protection. Eating, drinking, smoking and any other practices which increase the probability of hand-to-mouth transfer will be prohibited in the work zone. All personnel will be instructed to thoroughly wash their hands and face upon leaving the work area. A first aid kit and a 20-pound ABC fire extinguisher and potable water will be available at the site.

D. Decontamination Procedures

Equipment decontamination areas will be designated by the Health and Safety Officer at the start of excavation. To prevent the transfer of contamination from the work zone into clean areas, all tools will be cleaned with a high pressure, hot water washer prior to removal from the work zone.

All disposable protective clothing will be put into plastic bags and disposed of in a garbage receptacle.

In the event of a medical emergency, the injured party will be taken through decontamination procedures, if possible. However, the procedures will be omitted when it may aggravate or cause more harm to the injured party. A member of the work team will accompany the injured party to the medical facility to advise on matters concerning chemical exposure.

IV EMERGENCY MEDICAL CARE

In the event of an injury or suspected chemical exposure, the first responsibility of the Field Safety Officer will be to prevent further injury. This objective will normally require an immediate end to work until the situation is rectified. The Field Safety Officer may order evacuation of the work party.

The Field Safety Officer's primary responsibilities in the event of an accident will be evacuation, first aid, and decontamination of injured team members. The Field Safety Officer will determine safe evacuation areas and begin first aid.

V EMERGENCY PROCEDURES

A. Response to Emergency

In case of an injury, the Field Safety Officer will employ the appropriate first aid and contact off-site medical help, if appropriate. The Health and Safety Officer/Project Manager will be notified. The telephone number for Health and Safety Officer/Project Manager is **(415) 268-0461.**

If medical evacuation to a hospital is required, the route shown on Plate 2 will be followed.

B. Emergency Contacts & Telephone Numbers

Ambulance, Fire, Police:	911
Hospital:	Alta Bates Hospital 3001 Colby (At Ashby) Berkeley, California 94705 (415) 540-4444
Chemical Spills:	National Response Center (24 hours) (800) 424-8802
Chemtrec:	Chemical Releases (24 hours) (800) 424-9300
Environmental Protection Agency - Emergency Response Section:	(415) 974-7511
Poison Control Center:	(24 hours) (415) 928-3248
Cal-OSHA District Office:	Occupational Injuries (415) 557-1677

C. Acute Exposure Symptoms and First Aid

Exposure Route	Symptoms	First Aid
Skin	Dermatitis	Wash immediately with soap and water, contact ambulance if evacuation is necessary.
Eye	Irritated eyes	Flush eyes with water, transport directly to emergency room, if necessary.
Inhalation	Vertigo, tremor	Move person to fresh air, cover source of chemicals
Ingestion	Nausea, vomiting	Call Poison Control Center, arrange transport to emergency medical facility.

D. Contingency Plan

The following procedures will be used in case of an unpredictable event.

Fire: Use fire extinguisher if localized and call the fire department if uncontrolled.

Chemical Exposure: Follow first aid treatment specified previously.

Physical Injury: Provide first aid treatment and contact ambulance for evacuation, if appropriate.

List of Attached Plates:

Plate 1	Site Plan
Plate 2	Hospital/Emergency Room Route Plan

Distribution:

2 copies: Mr. Ignacio Dayrit
City of Emeryville
2200 Powell Street, 12th Floor
Emeryville, California 94539

1 copy: Mr. Forrest G. Canutt
Bay Area Tank & Marine
5702-Q Marsh Drive
Pacheco, California 94553

1 copy: Ms. Susan Hugo
Alameda County Health Care Services Agency
80 Swan Way, Room 200
Oakland, California 94612

WKW:RWR:sld

EMERYVILLE POST OFFICE
4310 SAN PABLO AVENUE

CAR WASH
4300
SAN PABLO
AVENUE

MW-1

B-1

MW-4

43RD STREET

MW-3

MW-2

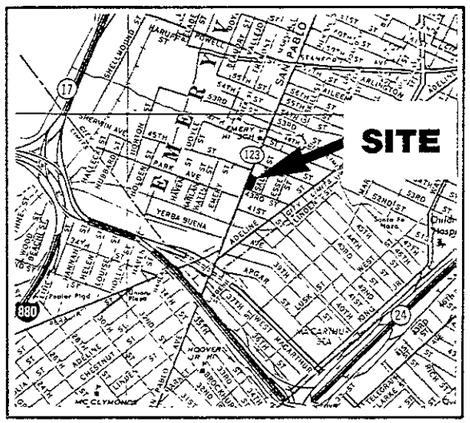
SIDEWALK

B-3

B-2

ELEVATION REFERENCE
(ASSUMED AT 100.00 FEET)

MW-5



VICINITY MAP

MEDIAN

SAN PABLO AVENUE
(STATE ROUTE 123)

MW-6

SIDEWALK

RETAIL
BUILDING

EMERYVILLE
FIRE STATION #1

MONITORING WELL
TEST BORING
(PREVIOUS INVESTIGATION)
TEST BORING
APPROXIMATE FORMER
TANK LOCATION
ESTIMATED AREA OF SOIL REMEDIATION

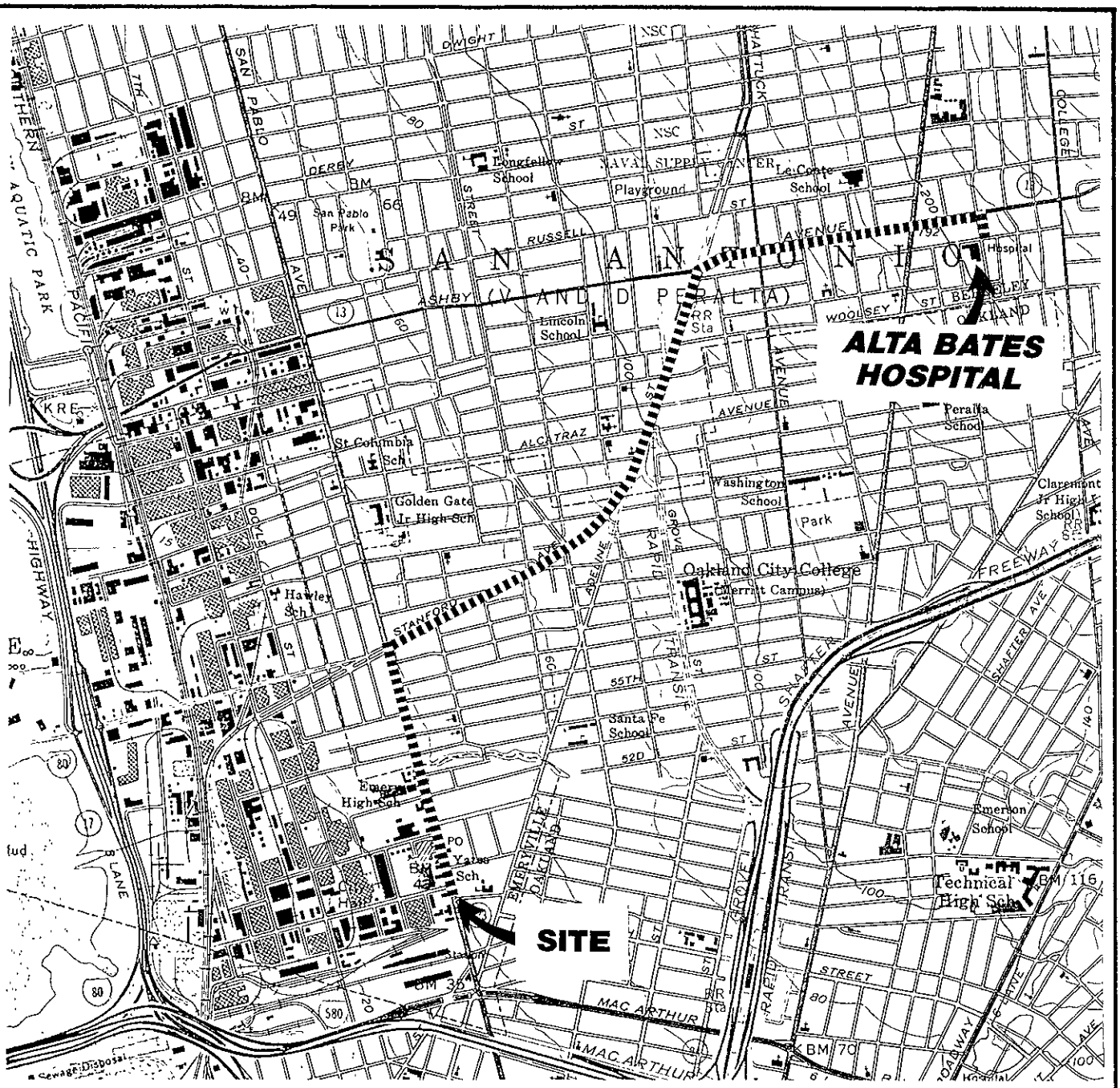
APPROXIMATE SCALE (feet)
0 20 40

SITE PLAN

Subsurface Consultants

EMERYVILLE SENIOR HOUSING

JOB NUMBER	DATE	APPROVED	PLATE
537 004	6/18/91		1



HOSPITAL/EMERGENCY ROOM ROUTE PLAN

Subsurface Consultants

HYDROGEOLOGIC INVESTIGATION – PHASE III

JOB NUMBER	DATE	APPROVED	PLATE
537.004	6/18/91		2