BRUNSING ASSOCIATES

Consulting Engineers

P.O. Box 586

Windsor, California 95492

(707) 838-3027

February 29, 1988

SR-029

Mr. Phil Harless
Pacific Coast Builders
3001 I Street
Sacramento, CA 95816

RE: WORK PLAN: GROUNDWATER AND SOIL INVESTIGATION AT THE PACIFIC SUPPLY COMPANY - WEST OAKLAND SITE

Dear Mr. Harless;

Please find enclosed a description of work to be performed by BRUNSING ASSOCIATES in order to complete the investigation of groundwater quality at your West Oakland facility.

We propose that five monitoring wells be installed on the West Oakland site in order to determine if groundwater contamination exists below the site. If such contamination is found, then the chemical and physical data obtained from these wells will enable us to determine whether the contamination is attributable to on-site or off-site sources. Should the investigation result in the recommendation for product and groundwater extraction, the well system has been designed for extraction and remedial monitoring.

Please contact us if you have any questions concerning our work plan.

Respectfully yours,

Tom Brunsing, Ph.D/P.E.
Principal

Greg Eiche
Hydrogeologist

cc: Storm Goranson
Harry Macintosh

WORK PLAN
PACIFIC SUPPLY COMPANY
WEST OAKLAND SITE

Efforts were initiated to abandon an underground gasoline storage tank at Pacific Supply Company's West Oakland site in May, 1987. Gas chromate graphic analysis of soil and associated vapor from exploratory boreholes at the site carried out by CHIPS Environmental Consultants, indicated that soil in the vicinity of the tank was contaminated with gasoline and raised the possibility that gasoline may have reached groundwater below the site. During subsequent removal of the tank by Erikson Industrial Services substancial deterioration of the tank body was documented. Gasoline odors were also detected during tank removal operations.

In order to assess the extent of soil contamination and the quality of groundwater below the site, and determine whether or not off-site sources may exist, BRUNSING ASSOCIATES proposes the following scope of work:

- o Installation of five (5) monitoring well. Three monitoring wells will be installed immediately adjacent to the former tank location, one of which will monitor for the possible contribution of contamination from offsite sources to the north. Another two monitoring wells will be installed at remote locations on-site, one of which will monitor the possible contribution of contamination from offsite sources to the east.

- o borehole soil analysis;

- o groundwater analysis;

- o groundwater elevation survey;

- o interpretation of data and preparation of report;

These five tasks comprising BRUNSING ASSOCIATES work plan are described below.

1. Installation of five monitoring wells on-site

Five monitoring wells are proposed for installation on the West Oakland property in order to assess the local groundwater gradient, the extent of soil and possible groundwater contamination, and to determine whether off-site sources of contamination exist.

Three monitoring wells will be installed within 50 feet of the former gasoline tank location in a triangular monitoring pattern (see figure 1) in order investigate the distribution of possible gasoline contamination in soil and water in the immediate vicinity of the excavation. The location of monitoring well MW-1 is specifically designed to assess whether or not groundwater

contamination, if it exists, could have originated from offsite sources to the north. Wells MW-2 and MW-3 will provide groundwater quality information to the immediate west and south of the excavation.

Two monitoring wells will be installed approximately 150 feet south and east of the former tank location, and will be instrumental in determining the groundwater gradient beneath the site. One of these wells, MW-4 (see Figure 1), is located on the eastern property boundary and will provide information for assessing the possible contribution of groundwater contamination from offsite sources to the east. Excavated well, MW-5, will provide necessary groundwater quality and gradient information on the southern boundary of the site.

Monitoring wells MW-1, MW-3, MW-4, and MW-5 will be constructed with two-inch PVC casing. Monitoring well MW-2 will comprise four-inch PVC casing in order to make it possible to undertake an aquifer test if contamination is found in the groundwater. An aquifer test would provide information about transmissivity and storativity of the water-bearing zone and would make it possible to assess the rate of contaminant migration.

At each well location, hollow stem auger borings will be drilled and logged at two foot intervals. Upon completion of logging, the boring will be over-cored to well completion depth. Selection of screened zones will be based on field observations of well boring samples. Although information is not specifically available concerning the hydrostratigraphy below the site, it is anticipated that an unconfined water-bearing zone will be encountered at a depth of 20 feet or less in Bay Mud or overlying fill material. In order to understand groundwater conditions below the site, it will be important to identify the geologic contact between the fill material and the Bay Mud. Core logging will focus specifically on identifying this contact. The monitoring wells will be designed to screen the upper five to ten feet of the water-bearing zone in which floating product is most likely to occur.

The well casing and screen will be constructed with Schedule 40, flush-joint threaded PVC. The casing bottom will be plugged with a seven-inch long threaded plug. The screen will consist of 0.010 inch factory milled slots. The screen interval will be equivalent to and be placed adjacent to the upper five feet of water-bearing Bay Mud material.

A sand pack of clean water-washed sand will be placed adjacent to the entire screened interval and will extend a distance of two feet above the top of the screen. The sand pack will be placed by pouring it down the annulus between the hollow stem and the well casing. the auger will be raised periodically and an auger flight removed to allow the sand to fill the annulus between the casing and the borehole wall. A one- to two- foot thick bentonite pellet seal will be placed above the sand pack. The seal will be placed in the same manner as the sand pack. The annulus above the

bentonite seal will be grouted with a cement/bentonite grout. the bentonite content of the grout will not exceed five percent by weight. The grout will consist of clean water mixed with Portland cement. The grout will be placed in the same manner as the sand pack, or after the auger flights have been entirely withdrawn from the borehole.

Due to the heavy vehicular traffic on-site, a locking PVC cap will be placed below grade and within a precast utility box (ie. Christy box) approximately 1/4 inch above ground over the well casing. The utility box will be set in concrete. All wells will be footed in cement/bentonite grout to ensure that they are securely set in place.

After the concrete and cement/bentonite grout have set at least 24 hours, each well will be developed by bailing and/or pumping until the well water is visually clear and free of sediment. The adequacy of well development will be determined by the site geologist or engineer.

Upon completion of development, wells will be allowed at least 48 hours to recover prior to purging and sampling. Just prior to purging, water levels will be measured to within Ø.Ø1 feet the top of each PVC casing. Top of casing elevations will be surveyed to within Ø.Ø1 feet by a licensed land surveyor.

2. Borehole soil analysis

In order to better understand the distribution of the gasoline contamination in the vadose zone which is apparent from existing data, BRUNSING ASSOCIATES will analyze soil samples collected from the three monitoring well borings which are within 5Ø feet of the original tank location. The samples will be collected from the vadose zone just above the interface with the saturated zone.

3. Groundwater Analysis

One round of water samples will be collected from all monitoring wells following the protocol described in Appendix A. Chemical analysis for Total Hydrocarbons will be undertaken by an EPA-certified laboratory to determine if gasoline is present below the site. The specific concentration of possible hydrocarbon and geographic distribution of this constituent in the groundwater will enable us to evaluate the nature and location of the contaminant source.

4. Groundwater Elevation Survey

The local groundwater gradient below the site will be evaluated by measuring static water levels in monitoring wells prior to sampling. If hydrocarbon contamination is found below the site and if there is evidence that it originated from the former on-site storage tank, then it may be necessary to undertake an aquifer test in order to assess the rate of groundwater movement.

This information would make it possible to predict the rate of contaminant migration by taking into account retardation and dispersion of the contaminant. An aquifer test would be undertaken by constant rate pumping of the four-inch monitoring well designated as MW-2, and monitoring drawdown over time in the four two-inch wells designated as MW-1, MW-3, MW-4, and MW-5.

5. Interpretation of Data and Preparation of Report

The chemical and physical data collected from the five monitoring wells and associated borings will be interpreted in order to assess the extent and distribution of soil and possible groundwater contamination underlying the West Oakland site. The results will be presented in text and graphical form in a technical report which will be certified by Dr. T. Brunsing.

Appendix A

WATER SAMPLING

Pacific Supply Company
West Oakland Site

1.0 INTRODUCTION

This document describes procedures to be followed during sampling of groundwater from newly-installed monitoring wells at the Pacific Supply Company, West Oakland Site. As the work progresses, and if warranted, appropriate revisions were made and approved by the Project Manager.

2.0 SAMPLING

2.1 Sample Collection

Individual samples from will be collected as follows:

A. Wells will be pumped at least until the volume of water pumped was equal to five volumes of the well's casing. To assure that the water samples are representative of the aquifer, periodic measurements of the temperature, pH and specific conductance will be mad. The sample will be collected only when the temperature, pH, and specific conductance reach a more or less constant value. For newly completed wells (such as monitoring wells), it may be necessary to pump the well for a longer period of time because of water contamination by drilling mud and/or cement.

B. A positive-displacement pump (bladder or reciprocating) will be used for evacuating the well casing (purging) of the monitoring wells. If the discharge rate using this equipment is too slow to be practical, an electric submersible pump will be used. Water samples will be collected using a teflon bailer.

TPH G
TPH D
TPH
BTX

C. Sample containers shall be of the type specified in Table 1 and shall be obtained from the analytical laboratory or other approved source.

Viles will be used for collection of water for Total Hydrocarbon analysis. The container will be filled to overflowing to avoid trapping air at the top of the container and exposure to the atmosphere shall be minimized during sampling. A container cap will be screwed on tightly immediately after filling the sample container.

D. The sampling sequence will begin with the well having the least suspected contamination. Successive samples will be obtained from wells of increasing suspected contamination. If the relative degree of contamination at each well cannot be reasonably assumed, the sampling sequence will be arranged in such a way that wells are sampled in order of increasing proximity to the suspected source of contamination.

2.2 Sample Labelling

Sample containers were labelled with self-adhesive tags. Field personnel shall label each tag, using waterproof ink, with the following information:

A. Project number
B. Sample number
C. Date and time samples were obtained
D. Treatment (preservative added, filtered, etc.)
E. Initials of sample collector(s)

2.3 Sample Storage and Transportation

Subsequent to collection, the samples shall be immediately stored on packed ice or blue ice in an appropriate container. Samples shall be transported under chain-of-custody procedures to a State-certified analytical laboratory on the day of their collection.

2.4 Quality Assurance

In order to document the precision and accuracy of analytical data generated by the subcontracted analytical laboratory, one or more of the following procedures will be employed at a frequency determined by the Project Manager:

A. **Duplicate Sample** - A double volume of water is collected and preserved. The sample is then divided into identical containers that are given different location identification names or sample numbers. These numbers are recorded in a field log book for later reference. Both samples are submitted to a laboratory for identical analyses.

C. **Blank Sample** - Blank samples consist of travel blanks and field blanks. A travel blank consists of certified deionized water that is added to the various sample bottles by the analytical laboratory before the sampling kits are delivered to the Site Engineer or Geologist. Travel blanks will be kept in separate containers from the water samples collected onsite. A field blank consists of certified deionized water that was added to the sample bottles at the time of the sample collection.

3.Ø DOCUMENTATION

3.1 Log Book

A field log book or individual log sheets shall be maintained throughout the sampling operations. The following information was recorded:

- o Sample number
- o Date and time sampled
- o Sampling location
- o Types of sampling equipment used
- o Name of sampler(s)

3.2 Chain-of-Custody

After samples have been collected and labelled, they will be maintained under chain-of-custody procedures. These procedures document the transfer of custody of samples from the field to a designated laboratory.

A Chain-of-Custody Record will be filled out for each shipment of samples to be sent to the laboratory for analysis. Information contained on the duplicate, carbonless form shall includes:

- o date and time the sample was taken
- o sample number and the number of containers
- o analyses required
- o remarks including preservatives added and any special conditions
- o container number in which sample has been packaged

Cross out any blank space on the Chain-of-Custody Record between last sample number listed and signatures at the bottom of the sheet, was crossed out.

After carefully packaging the samples into numbered containers for transfer to the laboratory, the field sampler will sign the Chain-of-Custody Record and record the time and the date. The original imprint of the Chain-of-Custody Record will accompany the sample containers. The duplicate copy will be retained by the BRUNSING ASSOCIATE representative on the site.

Sample containers will be sealed with filament tape such that they may not be opened without breaking the seal. This seal is not to be removed until the container was opened at the laboratory.

When shipping the containers by a common carrier, a Bill of Lading should be used. Receipts of Bill of Lading should be retained as part of the documentation in the project file.

4.Ø EQUIPMENT CLEANING

Sample bottles, bottle caps and septa will be cleaned by the analytical laboratory subcontractor using standard EPA-approved protocols. Sample bottles, bottle caps, and septa will be protected from solvent contact, dust or other contamination between time of receipt by the Site Engineer or Geologist and time of actual usage at the sampling site.

Sampling equipment will be cleaned after its use at each sampling location. Thermometers, pH electrodes, and conductivity probes shall also be cleaned after sampling of each well at a particular location.

Cleaning procedures shall be accomplished as follows:

A. Scrub with a detergent-potable water solution or other solutions deemed appropriate using a hard bristle brush,
B. Rinse with potable water,
C. Rinse with organic-free or deionized water,
D. Air-dry, and
E. Package and seal equipment in plastic bags or other appropriate containers to prevent contact with solvents, dust, or other contaminants.

Care shall be taken to collected all excess solutions resulting from the cleaning procedures. These solutions will be contained in a prelabelled barrel and disposed of properly.

Appendix B

HEALTH AND SAFETY PLAN

Pacific Supply Company
West Oakland Site

1.Ø INTRODUCTION

This document provides recommended health and safety procedures to be followed during the remedial investigation activities at the West Oakland site. The procedures presented herein are intended to serve as guidelines; they are not a substitute for the sound judgment of on-site personnel. As work progresses, and if warranted, appropriate revisions will be made and approved by the Project Manager.

2.Ø SITE SPECIFICS

2.1 Type

Building Products Distribution Facility

2.2 History

An udergground fuel storage tanks was excavated in May, 1987, when it was found to be leaking. Soil and vapor analysis indicates that gasoline contamination occurs in the vicinity of the excacation.

2.3 Existing Information on Chemical Hazards

Previous soil and vapor analysis in the immediate vicinity of the excavation indicate that gasoline occurs in concentrations as high as 3700 ± 400 ppm, while benzene, toluene, and xylenes occur individually in concentrations of less than 10 ppm.

3.Ø WORK DESCRIPTION

The work to which this health and safety plan applies is described below.

3.1 Sampling Activities

A. Soil boring for continuous sampling
B. Groundwater sampling

3.2 Soil boring Activities

A. Installation of monitoring wells

4.0 HAZARD ASSESSMENT

According to Title 22 of the California Administrative Code, a waste or material is considered to be hazardous if it contains constituents of concern which exceed either the Soluble Threshold Limit Concentration (STLC) or the total Threshold Limit Concentration (TTLC) value. There are no STLC of TTLC standards set by the California Department of Health Services (DOHS) for benzene toluene, or xylene. However, Drinking Water Standards have been established for these compounds and are presently 0.7 ppb, 10 ppb, and 10 ppb, respectively.

In dealing with any hazardous or potentially hazardous substance, all routes of exposure must be protected. Protection of the four basic routes of exposure (inhalation, skin absorption, ingestion, and eye contact) will be required as described in Section 5.0.

5.0 OPERATIONS

5.1 Inhalation

Breathing a gas, vapor, mist, fume, or dust is the most common accidental form of exposure, and this route of entry is the most likely to cause systemic illness.

Half face masks with organic vapor/acid gas cartridges and dust filters may be required while conducting sampling operations. No excessive facial hair, which interferes with a satisfactory fit of the mask-to-face seal, will be allowed on personnel required to wear respiratory protective equipment.

5.2 Skin Absorption

Skin exposure to hazardous materials may result in skin irritation or penetration. Skin penetration is probably the second most common accidental means of entry of chemicals into the body. The following precautions must be used when performing any on-site activities as described in this plan:

- Insure that all skin areas which may be contacted are protected during the site work by wearing rubber boots and disposable coveralls and gloves.
- After completing the day's work, remove and dispose of contaminated clothing in designated drums at the site.
- Contaminated rags and other disposable items, such as gloves, should be bagged for disposal in the designated on-site drums, avoiding skin contact.

- Boots and equipment which have come in contact with the soil at the site should be thoroughly cleaned in the designated area before leaving the site.

- Unnecessary contact with contaminated or suspected contaminated surfaces should be avoided. Whenever possible, avoid walking through puddles, mud, and other discolored surfaces, kneeling on the ground, leaning, sitting, or placing equipment on drums, containers vehicles, and the ground.

5.3 Ingestion

Hazardous material may be carried to the mouth by hand when eating, drinking, chewing gum or tobacco, or smoking. These activities are prohibited during and after work until decontamination procedures have been completed. Furthermore, liquids will not be pipetted or syphoned by mouth under any circumstances.

Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other ingestion occurs.

Medically-prescribed drugs used by personnel during response operations where the potential for absorption, inhalation, or ingestion of toxic substances exists should only be used after consultation with a qualified physician.

5.4 Eye Contact

The eyes may be harmed by chemicals in solid, liquid, or vapor form. Irritant effects vary in degree from mild to severe. Most chemicals have the ability to injure the eye to some degree through surface contact or absorption. The following precautions to avoid eye injury will be taken when entering the site:

- Do not rub eyes while working.

- Do not wear contact lenses when working in areas where hazardous materials may be encountered.

- Safety goggles or glasses (without side perforations) may be required as deemed necessary by the Site Engineer or Geologist.

5.5 Other field procedures which shall be implemented at the West Oakland Site consistent with the protective practices listed above shall include:

- All field operations will be performed by trained personnel familiar with the procedures.

- The number of personnel and equipment in the contaminated area will be minimized consistent with site operations.

- o Work areas for support, contamination reduction, and disposal will be estasblished at the site.

- o Decontamination procedures for leaving the site will be planned and implemented. Work area designations and decontamination procedures will be developed to meet site-specific conditions.

6.0 PERSONAL PROTECTIVE EQUIPMENT

A. The chief constituent of concern at the site is expected to be gasoline. The protective equipment required at all times for work described at the West Oakland Site is as follows:

- Rubber Gloves (disposable)

- Coveralls (one-piece, Saranex-coated Tyvek or equivalent)

- Boots (Neoprene, rubber of PVC)

B. Half face masks with organic vapor/acid gas cartridges and dust filters wil be worn at the discretion of the on-site Health and Safety officer.

C. Safety goggles or glasses shall be worn at the discretion of the Site Engineer or Health and Safety Officer.

D. Gloves and coveralls should be replaced daily; if they become damaged, they should be replaced immediately. Disposal receptacles will be provided. As mentioned above, boots and equipment which have come in contact with the soil should be cleaned thoroughly before leaving the site.

7.0 EMERGENCIES

The procedures listed below should be used in the event of an accident (physical injury or exposure to toxic materials):

1. Remove the injured or exposed person(s) from immediate danger.

2. Render FIRST AID if necessary.

3. Call AMBULANCE (often provided by FIRE DEPARTMENT) for transport to local hospital. **This procedure should be followed even if there is no apparent serious injury.** EMERGENCY NUMBERS ARE LISTED IN THIS HEALTH AND SAFETY PLAN.

4. Evacuate other on-site personnel to a safe place until the Project Manager determines that it is safe for work to resume.

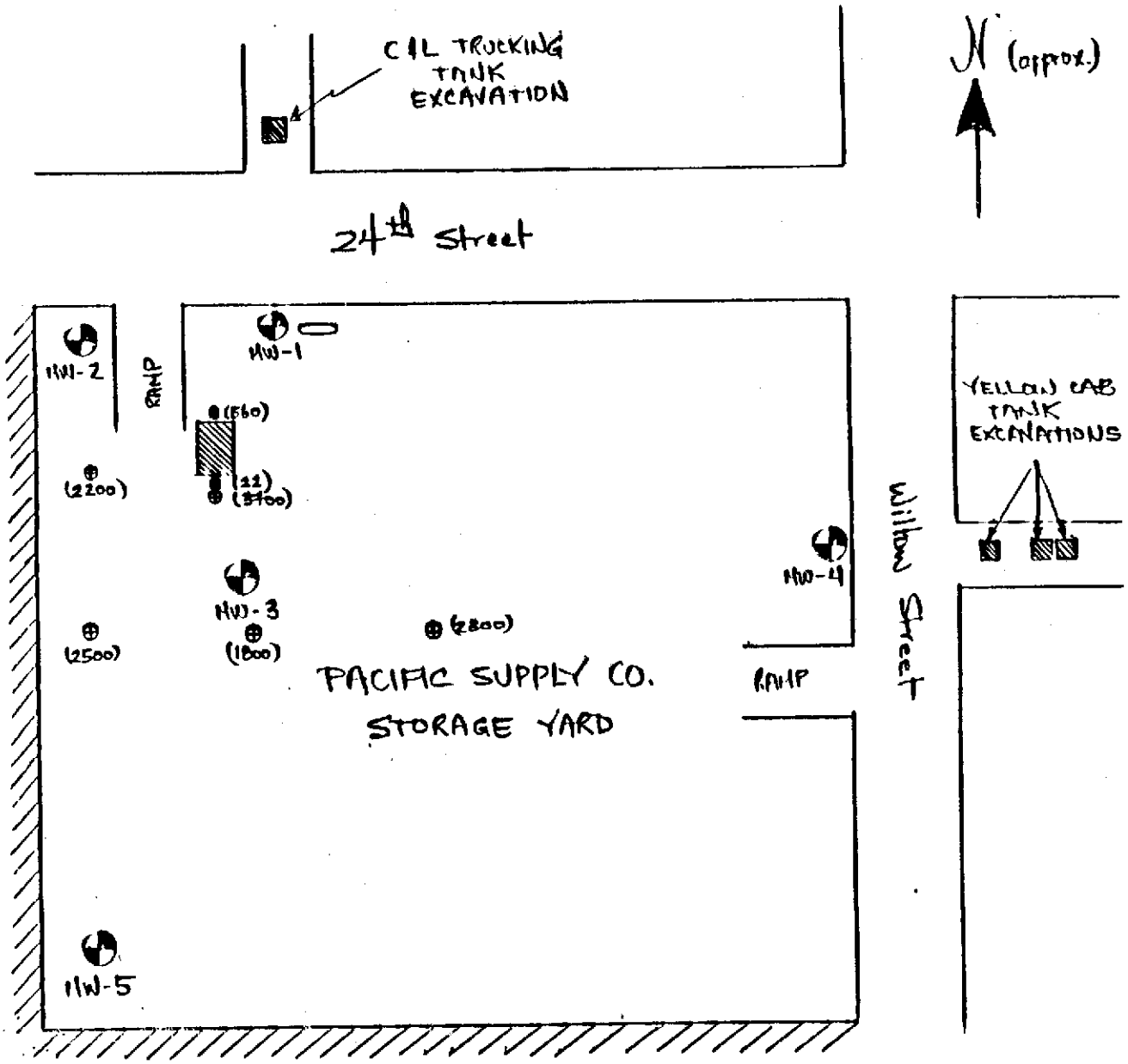
5. Steps to prevent a recurrence of the accident should be implemented immediately.

Emergency telephone numbers and addresses for the West Oakland area are:

Fire Department, Ambulance, and Police	911
Providence Hospital 3100 Summit	415-835-4500

8.0 HEALTH AND SAFETY MEETING

A safety orientation meeting will be held at this site before field work commences. The purpose of this meeting is to review this safety plan with all field personnel. All personnel will be required to read the plan and agree to comply with it.



NOT TO SCALE

LEGEND

MW-1 — PROPOSED MONITORING WELL LOCATION

● — SOIL ANALYSIS (mg/kg Total Hydrocarbon)

⊕ — VAPOR ANALYSIS (ppm gasoline)

FIGURE 1.

SITE MAP
PACIFIC SUPPLY COMPANY
WEST OAKLAND SITE

BRUNSING ASSOCIATES
Consulting Engineers