Robert Elbert & Associates
18 Anacapa Street, Second Floor
Santa Barbara, California 93101
P. O. Box 40180, Santa Barbara CA 93140-0180
TELEPHONE (805) 963-1808

FEDERAL EXPRESS

February 3, 1988

Mr. Larry Seto
Alameda County Health Care Services
470 27th Street
3rd Floor
Oakland, CA 94612

Re: Thrifty Oil Company
Station No. 054
2504 Castro Valley Blvd.
Castro Valley, CA

Dear Mr. Seto:

As per your request please find enclosed a copy of our work plan for the above referenced station. We have scheduled a drilling rig for Tuesday, February 9, 1988, all drilling sampling and completions will be as per the Bay Area RWQCB guidelines. A copy of our guidelines is also included.

Let me know if you have any questions.

Sincerely;
ROBERT ELBERT AND ASSOCIATES

David M. Henry

cc P. D'Amico

FEDERAL EXPRESS

QUESTIONS? CALL 800-238-5355 TOLL FREE.

AIRBILL NUMBER [redacted]

Date 2/3/88

From (Your Name) Please Print

Your Phone Number (Very Important) (805) 963-1808

Company ROBERT ELBERT & ASSOC

Department/Floor No.

Street Address 19 ANACAPA 2ND FL

City SANTA BARBARA **State** CA

ZIP Required For Correct Invoicing 93101

To (Recipient's Name) Please Print Mr. Larry Seto

Recipient's Phone Number (Very Important) ( )

Company Alameda County Health Care Servics

Department/Floor No.

Exact Street Address *(Use of P.O. Boxes or P.O. # Zip Codes Will Delay Delivery And Result in Extra Charge.)* 470 27th Street 3rd floor

City Oakland **State** CA

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Proposal for Further Site Assessment
THRIFTY OIL COMPANY
Station No. 054
2504 Castro Valley Boulevard
Castro Valley, CA

for
THRIFTY OIL COMPANY
10000 Lakewood Blvd.
Downey, CA 90240

by
ROBERT ELBERT AND ASSOCIATES, INC.
121 Gray Avenue, Suite 203
Santa Barbara, CA 93101

July 8, 1987

Introduction

A preliminary assessment of Thrifty Oil Company Station #054 2504 Castro Valley Blvd., Castro Valley, CA by Hydrotech Consultants, Inc. in January 1987 has found that soils surrounding the tanks have been contaminated with hydrocarbons. Rafat A. Shahid, Chief, Hazardous Materials Program of the Alameda County Health Care Services Agency, in a letter dated May 28, 1987, to Mr. Darrell Fah of Thrifty, requires a plan of correction which includes definition of the lateral and vertical extent of contamination of soils and groundwater and proposed clean up actions.

Thrifty has retained Robert Elbert and Associates, Inc, to do additional studies to assess this problem and design a remedial action plan. Additional borings and monitor wells must be advanced to further define conditions. This report outlines our plan for this work.

Summary of Previous Investigations

Four 20' deep borings were completed on December 17, 1987 by Interstate Soils Sampling under observation of an engineering geologist from Hydrotech. The borings show that the site is underlain by 12-15' of clayey soil overlying shale bedrock. None of the borings encountered groundwater.

The contamination was found in all of the wells with the maximum contamination occurring between 5 and 10' deep. Contamination decreases with depth thereafter as determined both by Gastechtor Readings and lab analysis. Only boring B-1 showed any significant contamination below 15' with 420

ppm Total Petroleum Hydrocarbons (EPA method 418.1) at total depth of 20'.

Proposed Investigation

In order to estimate the depth required for water monitor wells, our office checked with the flood control district for groundwater information. They estimated that groundwater would be at 16' and flow to the west. The previous borings did not encounter groundwater however, and the soil and rock types present are not conducive to an unconfined water table, as these rock types are normally aquitards rather than aquifers. More background information of the local geology and groundwater occurrence seems warranted.

Nevertheless, a site assessment plan may be proposed. To define the lateral and vertical extent of contaminated soil additional borings would be advanced in stages.

Stage 1. Five (5) borings: Four (4) borings at the corners of the tank impoundment but further away from the tanks than the original borings, about 15 to 20' out from the corners (Figure 1, MW-1 through MW-4). In addition a boring near B-1 but deeper (MW-5) will assess groundwater contamination at the site of the worst soil discovered this far.

Stage 2. If significant contamination is found in Stage 1 wells, additional wells such as locations MW-6 and MW-7 will be advanced.

To evaluate the vertical extent of contamination the borings will be drilled to 20' below the encountered water table. If groundwater is not encountered, drilling will proceed to

40'. Based on the previous borings this should be out of the contaminated zone.

If the soil is obviously contaminated, drilling will continue until clean soil or 20' below groundwater is reached. Typical well construction is shown in Figure 2. If groundwater is encountered, MW-1, MW-2, MW-3, and MW-5 will be completed as groundwater monitoring wells. In MW-5 this screen will be extended to 5' below the surface so that it may be used as a vapor extraction well.

Sampling and Analysis

The wells will be sampled at least every 5 feet while drilling with a modified California Sampler, with two 6" brass rings. One ring will be capped with foil, plastic caps and tape, labeled and put in cold storage and saved for possible lab analysis. The other will be used for soil description and analyzed for possible hydrocarbon contamination with an HNU photoionization detector. This is done by putting some of the sample in a sealable (ziplock) plastic bag, disaggregating the sample by kneading the bag and after a few minutes inserting the vapor probe into a corner of the bag and recording the highest reading obtained.

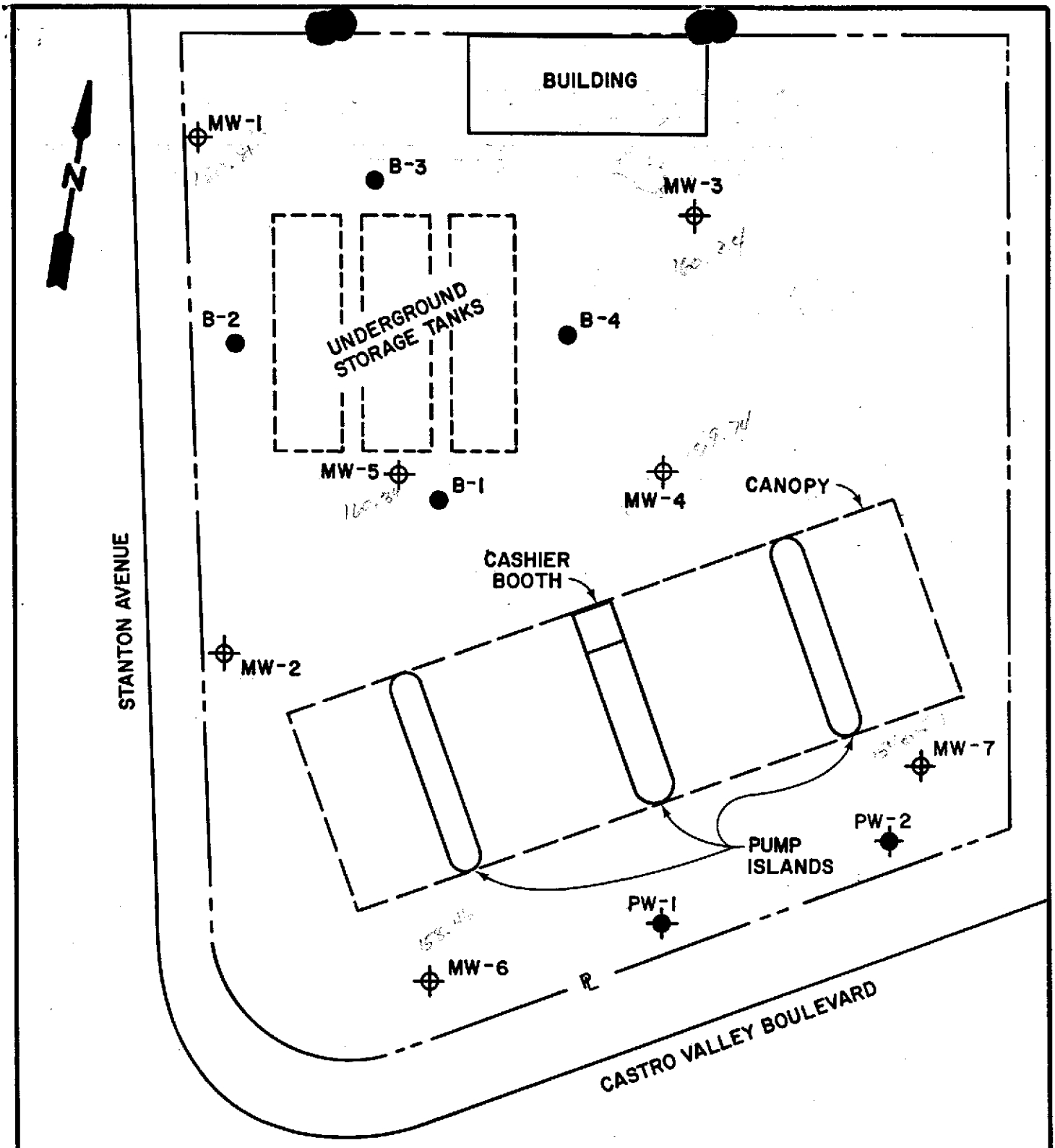
At least two samples from each boring will be selected for laboratory analysis. One sample will be that with the highest PID reading, and the other sample will be at TD or that nearest the groundwater surface.

If PID readings are above 100ppm, at least one sample every 10 feet will be laboratory analyzed. The soil samples will be analyzed by a State Certified laboratory EPA method 8240

(Fuel Fingerprint + EDB, BTX, Ethylbenzene and Total Purgeable Hydrocarbons) and organic lead.

Water samples will be collected after well development, approximately 2 days after the wells are installed. The wells will be developed using a bailer to withdraw 4 to 5 casing volumes of water or until the water appears clear. Water withdrawn will be collected in drums pending analysis. Proper disposal will be Thrifty Oil Company's responsibility. Water samples will be analyzed for the same constituents as the soils analysis by EPA method 624. Water level measurements will also be taken at this time to establish the water table gradient.

After the lab analyses are received, a report will be prepared outlining the results, and a conceptual remediation plan proposed.



EXPLANATION:

B-4 ● Exploratory Boring

MW-7 ⊕ Proposed Monitoring Well

PW-1 ⊕ Pre-existing Well

0 20' 40'

SCALE

SITE PLAN
THRIFTY OIL STATION NO. 054
CASTRO VALLEY, CALIFORNIA
Prepared for
THRIFTY OIL COMPANY
DOWNEY, CALIFORNIA

Rev. 7/27
JULY 1987
RE & A
Santa Barbara
California

Figure 1

REQUIREMENTS FOR CONSTRUCTION OF VADOSE
AND GROUNDWATER MONITORING WELLS
(Modified from San Diego County,
California General Requirements)

A. GENERAL CONSTRUCTION

1. Drill rigs shall be inspected by the operator prior to drilling to assure the rig is free of hydraulic or oil leaks.

2. Prior to drilling any boring, the drill rig shall be cleaned by an approved method to insure that there is no contamination introduced by drilling and/or cross-contamination between borings.

3. Drilling should be accomplished with a hollow stem continuous flight auger drill rig. No drilling fluids can be used unless approved prior to drilling or otherwise specified.

4. Any drilling fluid additives should be limited to inorganic, nonhazardous materials which will not mask nor alter the constituents being monitored. Use of all additives must be indicated on the boring log as to depth, quantity and type. Representative samples of the additive should be retained for a period of 90 days.

5. Soil sampling equipment, drilling equipment and materials used to construct a well must be compatible with contaminants expected and should not donate, capture, mask nor alter the constituents to be analyzed.

6. Representative samples of all imported materials used for sand/gravel pack, cement and bentonite should be retained for a period of 90 days in case an evaluation of compatibility may be required.

7. Prior to installation (same day) all well casings, casing fittings, screen and all other components to be installed in the well should be thoroughly cleaned by an approved method such as steam cleaning. Cleaning is not necessary for factory cleaned and wrapped materials.

8. The well head should be provided with a water-tight security structure and adequate well protection to prevent entry of surface water, accidental damage, unauthorized access and vandalism.

9. Pertinent well information including well identification, well type, well depth, well casing diameter (if more than one size used), and perforated or slotted interval should be permanently affixed to the interior of the security structure.

10. Permanently affixed to the exterior of the well security structure is the well identification number and well type.

11. Any exploratory boring should be sealed from the ground surface to the bottom of the boring preferably with bentonite grout.

12. All slurry-type grouts used to destroy a boring or for well seals should be emplaced by the tremie method.

13. Vadose and groundwater monitoring wells should be designed by a qualified person such as a hydrologist, geologist, certified civil engineer or engineering geologist.

14. Reports concerning the construction, alteration or destruction of vadose and groundwater monitoring wells should be prepared for each well or boring information. These reports should contain at least the following:

    a. A detailed plot plan giving location of property lines, existing improvements such as structures, underground tanks, underground utilities, underground piping and the location of the monitoring well.

    b. Provide a detailed log giving the color, grain size distribution and character of all the litholgic units penetrated.

    c. Provide a detailed "as-built" well construction diagram giving type of well casing, perforated or screened interval, perforation or screen size, type of gravel pack, location of bentonite seal, type of annual seal and quantities of materials used.

    d. Provide all sample analysis testing results.

B. SOIL TESTING

1. Undisturbed (intact) soil sample should be recovered from all borings utilizing Shelby tubes, a modified California Drive Sampler, or continuous core sampler.

2. Soil samples should be taken at a minimum interval of 5 feet or at a change in material type beginning at the ground surface.

3. Borings should be drilled and sampled by techniques that do not introduce liquids into the boring and that allow accurate detection of saturated zones, perched groundwater and the water table.

4. All materials encountered during drill should be described in detail.

5. Soil samples should be of sufficient volume to perform designated analyses including soil vap0r and soil extract analyses and to provide replicate analyses.

6. Soil samples should be capped with teflon or aluminum foil, maintained air and water tight, and preserved according to field preservation techniques.

7. Soil samples should be preserved immediately after collection and during transportation to the laboratory for analysis. Samples shall be preserved and kept within an ideal temperature of 0 to 10^{o} C (use of ice in an insulated ice chest is acceptable).

8. All soil sample should be labeled and include information as follows:
   - sample description (i.e., soil, water)
   - sample source (i.e., well number, location, site)
   - sampler's identity
   - time and date of sample collection
   - laboratory number and field identity
   - sampling method (i.e., split-spoon, drive tube)
   - type of analysis to be performed

9. Proper chain of custody procedures should be followed with all soil samples from the time the sample is collected to delivery of samples to the laboratory.

10. All soil sampling equipment must be properly cleaned by an approved method before each sample is taken.

GROUNDWATER MONITORING WELLS

1. The groundwater monitoring well must be capable of detecting the stored substances being monitored.

2. Groundwater monitoring well casing should extend to the bottom of the boring and be factory perforated from a point 1 foot above the bottom of casing to an elevation which is either 10 feet above the highest anticipated groundwater level or to the bottom of the surface seal.

3. All well casings must have a bottom cap or plug.

4. The minimum inside diameter of a groundwater monitoring well is 2 inches.

5. The following are minimum boring diameters for the various well casings:

Casing O.D.	Minimum Boring Diameter
2 inches	6 inches
4 inches	8 inches
6 inches	10 inches
>6 inches	casing O.D. + 4 inches

6. Perforated or screened casing and solid casing must be suspended from the ground surface and not allowed to rest on the hole bottom. When casing is installed in a hollow stem auger, hole centralizers are not required because the auger centers the perforated or screened casing. In borings that do not have the hollow stem auger in hole at the time of installing casing, centralizers should be placed form the bottom up, every 20 feet on screens greater than 20 feet in length. For well casing that is perforated or screened less than 20 feet in length, centralizers should be place on the top and bottom of the screened interval and every 40 feet on the solid casing.

7. The groundwater monitoring well should be constructed as a sand or gravel packed well with the pack designed to prevent the migration of the natural soil into the well.

8. The sand or gravel pack should extend to at least 2 feet above the top of the perforated zones.

Where the ground surface is less than 10 feet above the highest groundwater level, HMMU may reduce this requirement on a case-by-case basis.

9. The sand or gravel pack should be placed using the tremie method in open holes or placed down the hollow stem auger between the inside of the auger and the well casing. Care must be taken to prevent bridging of the pack when being placed. Provide records of the amount of gravel used in well construction.

10. Place directly on top of the pack a minimum 3 foot thick bentonite seal. In dry conditions the bentonite should be a granular type of 8-20 mesh gradation. In wet or saturated conditions the bentonite should be in 1/4-inch pellets. Depending on site conditions the bentonite may have to be tremied into place. After placing the bentonite one gallon of potable water should be added for every two pounds of bentonite and a minimum of thirty minutes shall be allowed for hydration of the bentonite seal.

11. A grout seal should be placed in the remaining portion of the annular space above the bentonite seal to the ground surface. The grout seal should consist of a cement or bentonite-cement mix and be placed utilizing the tremie method for cement grouts. When using a hollow stem auger, the auger can function as a tremie. This is done by filling the auger with grout and then pulling augers in sections. As each section is removed the augers will be refilled with grout until all the hollow stem augers have been removed.

12. All groundwater monitoring wells must be appropriately developed until the discharge water contains less than 10ppm settleable solids.

VAPOR MONITORING WELLS (VADOSE ZONE)

1. Wells for vapor monitoring must be fully perforated except for that portion of the well that is adjacent to the surface seal and the bottom of the well where a plugged blank segment is provided as a free liquid trap.

2. Vapor monitoring wells that are placed in the backfill should be constructed so that any liquid substance ponded at the horizontal interface between the backfill and natural soil can be detected in the vapor well.

3. Vapor monitoring wells should be constructed with a well seal.

4. The vadose monitoring well must be capable of detecting the substances being monitored.

5. No drilling additives should be used during drilling and construction of vadose monitoring wells.