THRIFTY OIL CO.

6/26/89

ALAMEDA COUNTY
DEPT. OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS

June 20, 1989

Dennis Byrn
Alameda County
Environmental Health Services
Hazardous Materials Division
80 Swan Way
Oakland, CA 94621

RE: Thrifty Oil Co. Station #049
3400 San Pablo Avenue
Oakland, Ca 94608

Dear Mr. Byrn,

The enclosed proposal for groundwater remediation was inadvertently sent to your old address on April 5, 1989 to Mr. Lowell Miller's attention. He has advised me to direct it to your attention.

Thrifty Oil Co. has contracted with Woodward-Clyde Consultants, Inc. to design a groundwater remediation system for the above referenced location. The site is owned by Thrifty Oil Co. and operated by Circle K Corporation.

Enclosed please find a copy of Woodward-Clyde Consultants' "Work Plan for Groundwater Remediation" dated April 4, 1989. If, upon review of the proposal you have any questions, please contact me at (213) 923-9876.

Very truly yours,

Peter D'Amico

Peter D'Amico
Manager
Environmental Affairs

PD/dmt
Enclosure

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

WORK PLAN
FOR GROUNDWATER REMEDIATION
THRIFTY SERVICE STATION 49
3400 SAN PABLO AVENUE
OAKLAND, CALIFORNIA

Prepared for

Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

April 4, 1989

Prepared by

Woodward-Clyde Consultants
500 12th Street, Suite 100
Oakland, CA 94607-4014

WORK PLAN FOR GROUNDWATER REMEDIATION

Thrifty Service Station 49
3400 San Pablo Avenue
Oakland, California

INTRODUCTION

This report outlines a plan to remediate subsurface petroleum product contamination at the Thrifty Service Station 49 located at 3400 San Pablo Avenue, in Oakland, California. It has been prepared to comply with the Alameda County Health Department (ACHD) requirements for remediating subsurface petroleum product contamination. The proposed activities described below are designed to satisfy the remedial requirements of both the ACHD and the Regional Water Quality Control Board. This work plan will, however, only address those items related to free product and groundwater remediation at the subject site. A site location map is provided in Figure 1. Detailed descriptions of the investigative activities conducted previously are included in Woodward-Clyde Consultants' (WCC) environmental assessment report submitted to the ACHD on December 10, 1986.

BACKGROUND

In November 1986, Thrifty Oil Company retained WCC to conduct a followup subsurface site assessment at the service station to further delineate the extent of the existing contamination. The initial site investigation was conducted by Groundwater Technology in August 1986 and consisted of advancing six borings and installing three 2-inch diameter monitoring wells. Boring and well locations are shown on Figure 2. Soil samples were taken at 5-foot intervals in all borings and field analyzed for volatile organic vapors using a photoionization detector. The samples taken at a

depth of 9 feet in Borings SB-1, MW-1 and MW-2; and 4 feet in Borings SB-2, SB-3 and MW-3 were submitted to a laboratory for analysis. Only the samples from SB-1 and MW-3 were found to contain dectectable levels of total petroleum hydrocarbons (TPH) of 67 and 22 ppm, respectively. Groundwater samples were also taken from each well and analyzed for TPH and benzene, ethyl benzene, toulene and xylene (BTEX). Total dissolved hydrocarbons in MW-1, MW-2 and MW-3 were 85.3, 93.7 and 2.1 ppm, respectively. The total BTEX from each of the three wells was 54.1, 52.4 and 0.75 ppm, respectively.

The followup site assessment was conducted by WCC and consisted of advancing four 15-foot deep borings and installing four monitoring wells. Soil samples were taken at the approximate location of the water table at a depth of 7 feet in all of the borings except MW-5 where a sample could not be recovered. Only the samples from MW-4 and MW-7 exhibited hydrocarbon odors and were submitted to a laboratory for analysis. Only the sample from MW-4 was found to have detectable levels of TPH of 1,200 ppm and total BTEX of 107 ppm. Water samples were taken from each of the newly installed wells and submitted for laboratory analysis. Only the water samples from MW-4 and MW-7 had detectable levels of TPH of 97 and 38 ppm, respectively, and total BTEX of 18.8 and 13.9 ppm, respectively.

Subsequent to the WCC site assessment, water levels and product thicknesses (if any) have been monitored in each of the seven wells every three weeks. Free product, if present, has then been recovered by manual bailing. The thickest measured free product was found in MW-1 at 0.3 feet (measured during WCC site assessment). The product thicknesses vary in each of the wells, but have been decreasing over time since the well bailing was started. Recent product level measurements (March 10, 1989) indicate that product exists in only MW-1 at 0.1 feet in thickness.

PROPOSED REMEDIATION

The proposed remediation involves the installation of a 4- to 6-inch diameter recovery well. A two-phase pump system will be placed in the recovery well. The use of a two-phase recovery system will remove both the floating product as well as much of the contaminated groundwater. One pump will be situated at the bottom of the recovery well to depress the water table, while a second pump will be positioned at the oil/water interface to recover the product as it flows into the well. The water will be passed through an oil/water separator prior to treatment by activated carbon adsorption to ensure that free product does not reach the carbon beds. The recovered product will be pumped to the product tank. The product tank will be equipped with secondary containment and a high level switch to shut down the system should it become full. The product drain from the oil/water separator will also be connected to the product tank. Piping will be double contained and installed below grade between the tank and recovery well. A hazardous materials management plan (HMMP) will be prepared for storage of the recovered product. The water recovered from the oil/water separator will be pumped to the holding tank connected to the carbon filtration system.

The groundwater and dissolved hydrocarbons within the area of influence will migrate toward the recovery well and be removed by the depression pump. The groundwater will be pumped first through the oil/water separator and then to a holding tank and finally through a pair of activated carbon filters to remove the dissolved hydrocarbons before being discharged into the sanitary sewer or a storm drain. An NPDES or local discharge permit will be required prior to discharging the treated water. The recovery system will incorporate a series of controls and switches to regulate pumping rates and prevent the tank from overfilling. A diagram of the

system layout and potential area of influence limits are shown in Figure 2, while a conceptual schematic is shown in Figure 3.

Prior to installation of the system, a pump test will be conducted in the existing wells to evaluate various physical parameters of the local hydrogeological regime. The data acquired from these tests will be used to estimate recovery system pumping rates, area of influence and the rate of groundwater movement as well as to size the water table drawdown pump, oil/water separator and piping. Well spacing, should more than one well be required to cover the entire contaminated area, will also be estimated from the results of the pump test.

At this time, it is anticipated that the two-phase system will be installed in a recovery well located at the center of the current tank backfill location as shown on Figure 2. The existing tanks are scheduled to be replaced in the near future with the new tank complex located to the east of the current location. Situating the recovery well in the former tank complex, assuming it is backfilled with coarse-grained materials, should greatly increase the effective diameter of the well. The recovery well will be installed to a depth of approximately 25 feet below grade. A 0.020-inch slot well screen and #2 sand filter pack will be used in the installation of the recovery well. During the installation of the recovery well, samples will be taken at 5-foot intervals.

The recovery system will consist of separate water table depression and product recovery pumps, control panels, water and product tanks, oil/water separator, water treatment equipment, air compressor and associated wiring and hoses. All plumbing and control lines will be installed below grade in a shallow trench cut in the concrete and paved over. With the exception of the skimmer and depression pump, all of the equipment will be installed in a secure storage area constructed behind the station office. A diagram of the proposed system location is shown in Figure 2.

Route EBA when received.

THRIFTY OIL CO.

4/11/89

ALAMEDA COUNTY
DEPT. OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS

April 1, 1989

Mr. Steven R. Ritchie
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street
Room 6000
Oakland, CA 94607

RE: **Fuel Leaks Region 2**
Your File No. 1123.64 (PWJ)

Dear Mr. Ritchie,

Your letter of November 23, 1988 requested Thrifty Oil Co. (T.O.C.) to provide information relative to potential underground leaks at thirteen (13) locations owned by T.O.C. For your information, all but three of these locations are leased to and operated by Circle K Corporation. As owner of the property, T.O. C. is the responsible party for all subsurface investigation and/or remediation. Your letter stated that the reports were due on January 15, 1989, but I requested an extension to April 15, 1989 by my letter to you dated January 12, 1989.

I am happy to be able to send you these reports today, ahead of schedule, for each location. I believe that you will find them complete, giving a short summary of: **I - History of Investigation, II - Actions Taken During Previous Quarter, III - Actions Planned for Next Quarter, IV - Status of Definition of Subsurface Contamination, V - Status of Remediation.**

Copies of each report will be sent to the local agency as indicated on attachment 4 of your letter.

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

Please contact me if you have any questions or require more information related to this project.

Very truly yours,

Peter D'Amico
Manager
Environmental Affairs

PD/dmt
Enclosures

cc: Beau Goldie, Santa Clara Valley Water District (W/Enc.)
Rafat Shahid, County of Alameda (W/Enc.)
Steve Faelz, City of Hayward (W/Enc.)
Joe Afong, City of San Jose (W/Enc.)
Rubin Grijalva, City of Sunnyvale (W/Enc.)
Michael S. Young, Campbell Fire Department (W/Enc.)

STATION NO. 049
3400 San Pablo Avenue
Oakland, CA
Alameda County 01
*I. D. #*_____

I. *HISTORY OF INVESTIGATION AND REMEDIAL ACTIONS*

08-86 *Groundwater Technology drilled six borings. Soil sampling was conducted at five foot intervals. Three borings were converted into groundwater monitoring wells. Depth to groundwater is less than 8 feet below grade. Soil and water samples were analyzed by a laboratory.*

11-86 *Woodward-Clyde Consultants installed four 4-inch monitoring wells to a depth of 15 feet. Soil and water samples were collected and analyzed by a laboratory. Gradient calculations were performed. Local groundwater use was determined.*

02-13-87 *Woodward-Clyde Consultants Proposal for Remediation submitted to Alameda County Environmental Health Services.*

08-08-87 *Woodward-Clyde Consultants begins bailing free product weekly.*

08-31-87 *Woodward-Clyde Consultants proposal for installation of a two-phase recovery system submitted to R.W.Q.C.B. & A.C.H.S.*

09-11-87 *Hydrotech Consultants completed five borings to a depth of 15 feet. Soil samples were collected and analyzed (EPA 8015) by a laboratory. No water samples were collected with groundwater encountered at 15 feet.*

II. *ACTIONS TAKEN DURING PREVIOUS QUARTER*

Woodward-Clyde Consultant quarterly report (Aug., Sept. & Oct.) submitted to San Francisco Bay R.W.Q.C.B. of 3 week well measurements, product thickness with free product removed by bailing for the seven monitoring wells.

III. *ACTIONS PLANNED FOR NEXT QUARTER*

Woodward-Clyde consultant to complete quarterly report (Nov., Dec.i?0H to San Francisco Bay R.W.Q.C.B. of three week well measurements, product thickness with free product removed by bailing for the seven monitoring wells.

IV. STATUS OF DEFINITION OF SUBSURFACE CONTAMINATION

Seven monitor&?2Hnortheast, M-7 center of site north of tanks.

Soil contamination ppm total petroleum hydrocarbons:
08-86 - 97 ppm
11-86 - 1200 ppm
09-87 - 3600 ppm

Groundwater contamination - total dissolved petroleum hydrocarbons:
08-86 - 93.7 ppm - No free product
11-86 - 97 ppm with free product in one well MW-1
11-88 - Latest quarterly report free product in 4 of 7 wells (MW-1, MW-2, MW-3 & MW-4).

I. STATUS OF REMEDIATION

Woodward-Clyde Consultants' proposed remediation plan dated 1/26/87 submitted to Ted Gerow, Alameda County Environmental Health Services with a copy to Peter Johnson, Regional Water Quality Control Board. The remediation plan proposed is a two-phase system with dual pumps one for product and one for water with wastewater discharge to sewer or storm drain system. The remediation system has not been approved.

Woodward-Clyde Quarterly reports of well measurements and free product data with free product removed by bailing submitted to Greg Zentner at San Francisco Bay R.W.Q.C.B. with a copy to Ted Gerow, A.C.E.H.S.

Removeal of existing underground tanks and installation of 3 new double wall tanks and double wall piping.

Following 30 days of continuous system operation, a report will be prepared evaluating the performance of the remedial system. Included in this evaluation will be a summary of water flow and product recovery rates, TPH concentrations in the effluent and water table contour maps showing the area of influence from pumping. Modifications will be proposed in the evaluation report should the system be deficient in complying with the effluent limitations or providing an adequate area of influence.

SCHEDULE

The station is currently being operated by Circle K, who will be responsible for replacing the underground storage tanks. Once the new tanks are in place, Thrifty Oil Co. will implement this remedial plan.

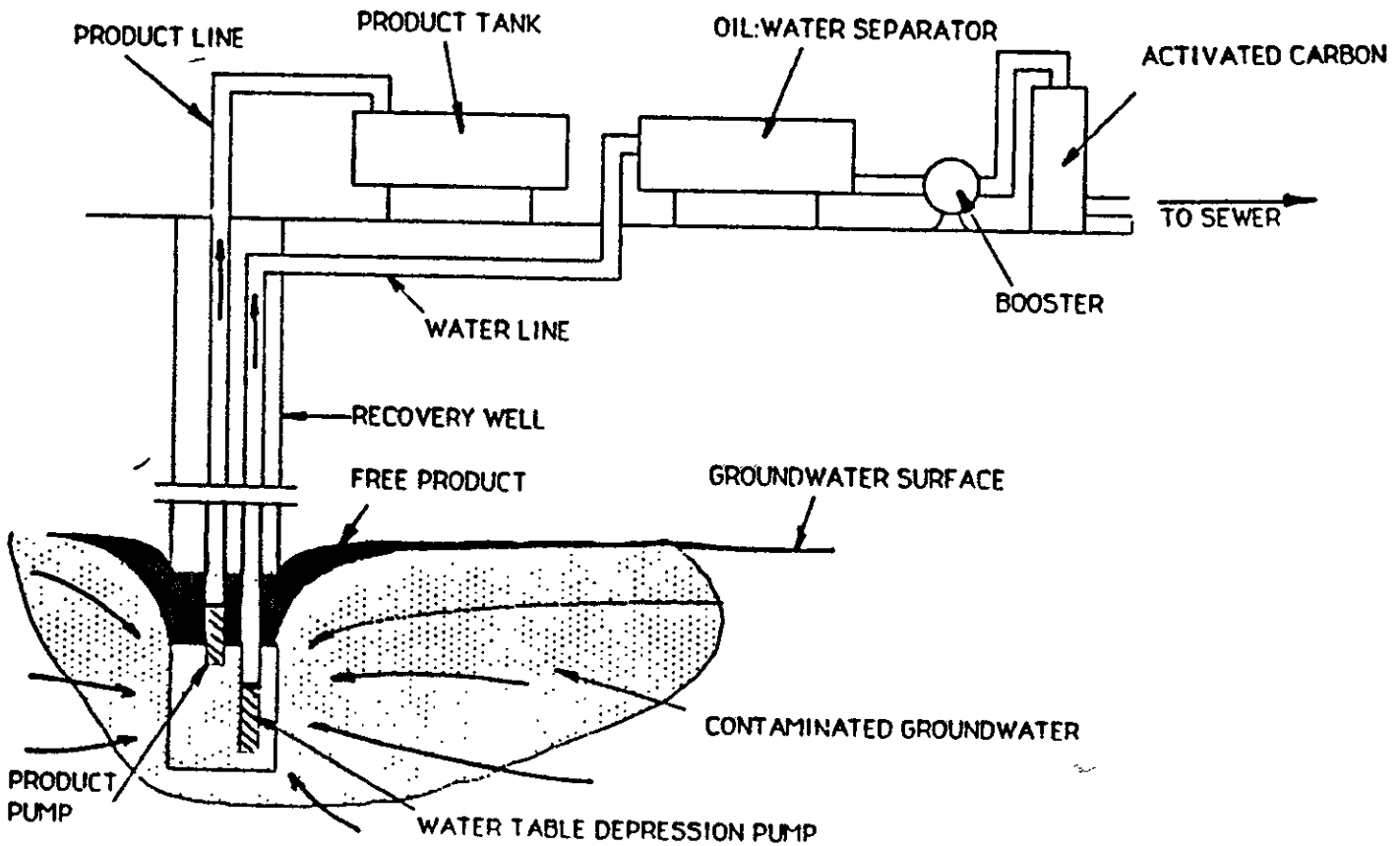


Figure 3. CONCEPTUAL RECOVERY SYSTEM SCHEMATIC

Woodward-Clyde Consultants

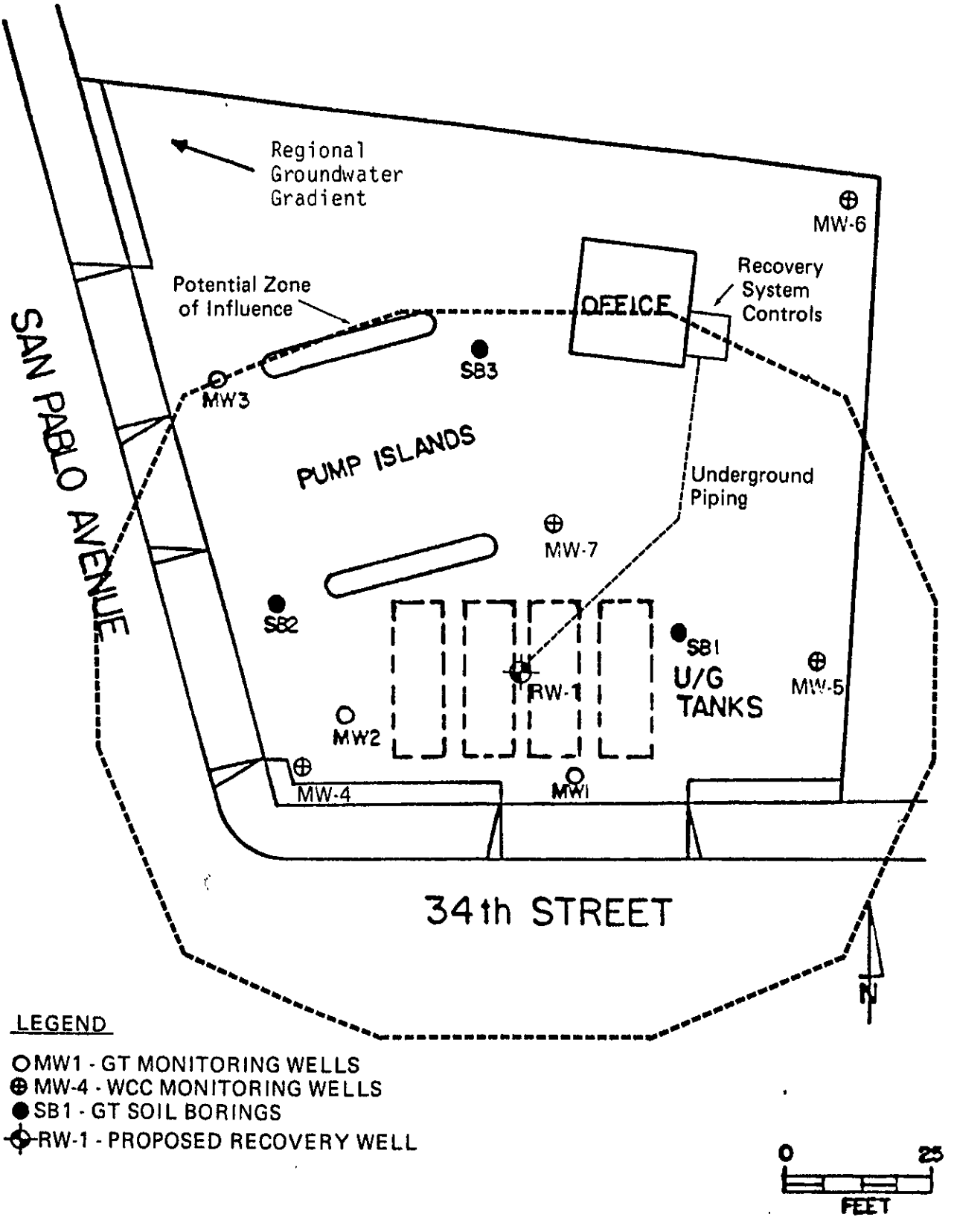


Figure 2. SITE PLAN AND RECOVERY SYSTEM LOCATION

ATTACHMENT A

Michael S. Young, Campbell Fire Department
SS #166 1820 Winchester, Campbell 95008

Steve Faelz, City of Hayward
SS #052 20200 Hesperian Bl., @ W. Sunset, Hayward 94541
SS #055 25225 Mission Blvd., @ Berry Ave., Hayward 94541
SS #062 207 "A" St., @ Burbank St., Hayward 94541

Joe Afong, City of San Jose
SS #060 3010 Union Ave., @ Foxworthy, San Jose 95124
SS #167 4144 Monterey Rd., @ Senter, San Jose 95100
SS #175 1256 E. Julian St., @ 26th North, San Jose 95100

Rubin Grijalva, City of Sunnyvale
SS #165 773 Mathilda, @ Almanor, Sunnyvale 94088

Rafat Shahid, County of Alameda
SS #049 3400 San Pablo Ave., @ 34th, Oakland 94608 DB
SS #054 2504 Castro Valley, @ Staton, Castro Valley 94546 LS
SS #063 6125 Telegraph Ave., @ 62nd, Oakland 94603 AL
] DISTRI-BUTED

Beau Goldie, Santa Clara Valley Water District
SS #039 545 Alma St., @ Belmont, San Jose 95125
SS #174 3501 Homestead, @ Bing, Santa Clara 95050

THRIFTY OIL CO.

November 25, 1988

Greg Zentner
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street
Room 6000
Oakland, CA 94607

RE: Thrifty Oil Co. Station #049 CIRCLE K
3400 San Pablo Avenue
Oakland, Ca 94608

Dear Mr. Zentner,

Enclosed is a copy of Woodward-Clyde Consultant's report of Monitoring Well and Product Recovery dated November 16, 1988 for the above referenced facility.

If you have any questions, please feel free to contact me.

Very truly yours,

Peter D'Amico

Peter D'Amico
Manager
of Environmental Affairs

PD/HAP/dmt
Enclosures

cc: Ted Gerow, Alameda County Environmental Health Services (W/Enc.)

RECEIVED
DEC 02 1988
HAZARDOUS MATERIALS/
WASTE PROGRAM

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9871

500 12th Street
Suite 100
Oakland, CA 94607-4014
(415) 893-3600

Woodward-Clyde Consultants

November 16, 1988
8720083A

Mr. Pete D'Amico
Manager, Environmental Affairs
Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

Subject: Sixth Progress Report on Well Monitoring and Product Recovery at Station 49

Dear Mr. D'Amico:

The well monitoring and manual product recovery program at Thrifty Station 49 in Oakland, California has proceeded approximately once every three weeks for the last three months. During each visit, the depth to water and product thickness measurements were taken and any free product encountered was bailed from the wells. As before, the recovered product was taken to Station 63 in Oakland and placed in the new product recovery drum located at that station. The well measurements and product recovery data are provided in Table 1, while well locations are shown in Figure 1. The product thicknesses have fluctuated somewhat recently but in general have shown an increase in August and September. Wells MW-1, MW-2, MW-3, and MW-4 all contained measurable product during the last monitoring exercise, most likely in response to the seasonal water table decline.

If you have any questions or comments, please feel free to call.

Sincerely,

Martin Cramer
Senior Project Scientist

MC/sst
COT/8720083PR6

8720083-t6 COT-1

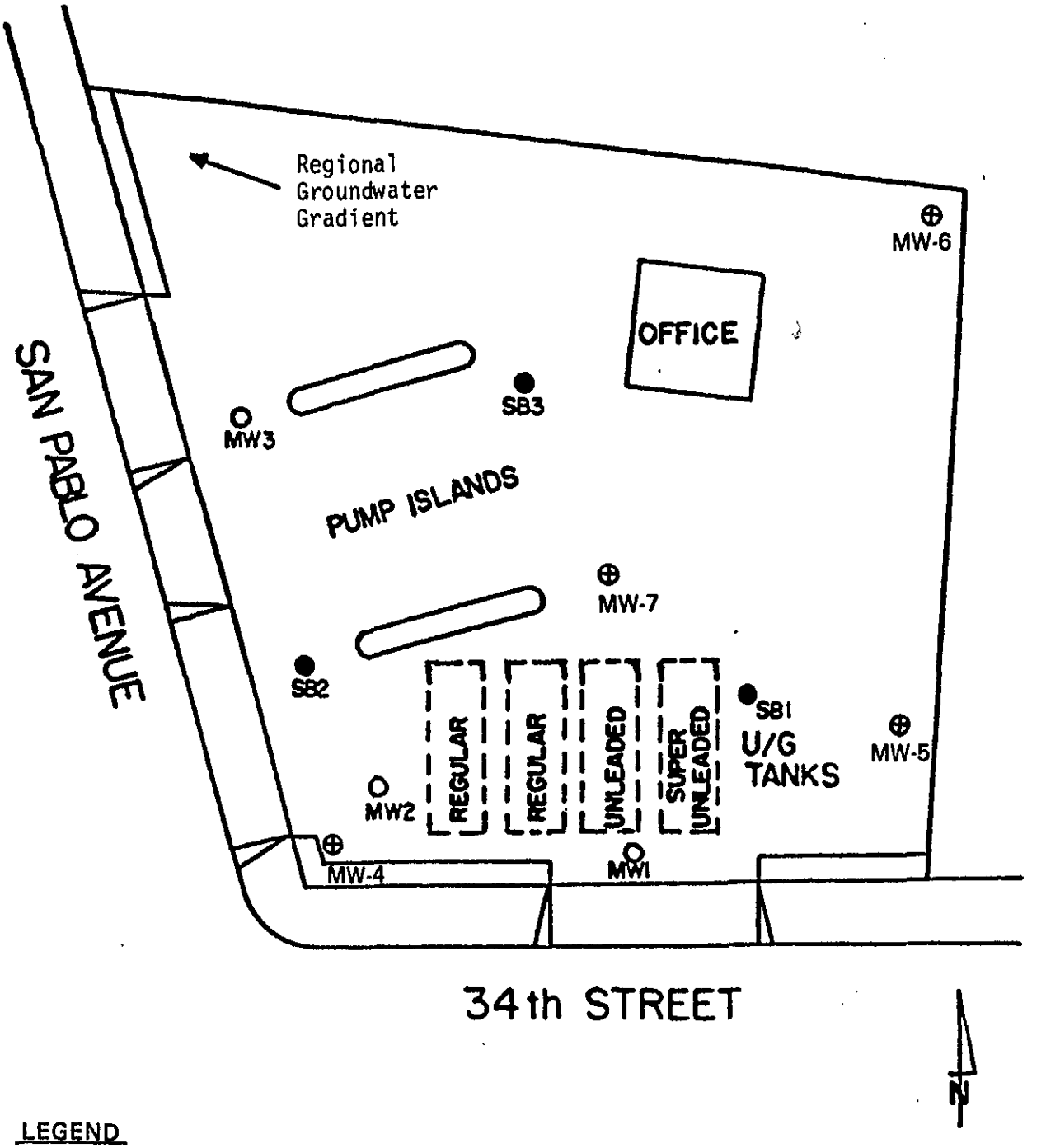
Table 1. STATION 49 WELL MEASUREMENT AND PRODUCT RECOVERY DATA*

Well No.	Relative Casing Elev.	8-4-88 Depth to Water	8-4-88 Corrected** Water Elev.	8-4-88 Product Thickness	8-24-88 Depth to Water	8-24-88 Corrected** Water Elev.	8-24-88 Product Thickness	9-21-88 Depth to Water	9-21-88 Corrected** Water Elev.	9-21-88 Product Thickness	10-5-88 Depth to Water	10-5-88 Corrected** Water Elev.	10-5-88 Product Thickness	10-26-88 Depth to Water	10-26-88 Corrected** Water Elev.	10-26-88 Product Thickness
MW-1	98.03	6.58	91.52	0.10	7.19	90.88	0.06	7.83	90.32	0.16	8.20	90.10	0.36	9.04	90.10	1.46
MW-2	97.44	5.81	91.63	0	6.51	90.94	0.02	7.26	90.28	0.14	8.07	90.04	0.88	7.67	90.06	0.38
MW-3	97.69	7.41	90.28	Trace	7.80	89.96	0.09	8.35	89.51	0.23	8.81	89.38	0.66	8.54	89.58	0.45
MW-4	97.33	5.73	91.71	0.15	6.48	90.96	0.14	7.10	90.43	0.27	7.61	90.15	0.57	7.62	90.24	0.70
MW-5	98.85	6.93	91.92	0	7.57	91.28	0	7.92	90.93	0	8.27	90.58	0	8.24	90.61	0
MW-6	99.67	7.35	92.32	0	8.18	91.49	0	8.80	90.87	0	9.02	90.65	0	8.93	90.74	0
MW-7	99.02	7.08	91.94	0	7.80	91.22	0	8.49	90.53	0	8.71	90.31	0	8.69	90.33	0
Product Recovered (gal)																
Current			0.10			0.13			0.30			1.2			2.0	
Cumulative			8.58			8.71			9.01			10.21			12.21	

* All measurements given in feet except where noted otherwise

** Water table elevation corrections assume a gasoline-specific gravity of 0.75

N.T. - Not Taken



LEGEND

○MW1 - GT MONITORING WELLS
⊕ MW-4 - WCC MONITORING WELLS
● SB1 - GT SOIL BORINGS

0 25
FEET

Figure 1. MONITORING WELL AND BORING LOCATIONS

Table 1. STATION 49 WELL MEASUREMENT AND PRODUCT RECOVERY DATA*

Well No.	Relative Casing Elev.	4-20-88 Depth to Water	4-20-88 Corrected** Water Elev.	4-20-88 Product Thickness	5-11-88 Depth to Water	5-11-88 Corrected** Water Elev.	5-11-88 Product Thickness	6-1-88 Depth to Water	6-1-88 Corrected** Water Elev.	6-1-88 Product Thickness	6-22-88 Depth to Water	6-22-88 Corrected** Water Elev.	6-22-88 Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness
MW-1	98.03	5.46	92.57	Trace	5.04	93.06	0.09	5.49	92.54	0.01	5.76	92.27	0.01						
MW-2	97.44	5.32	92.12	0	4.90	92.55	0.03	5.24	92.20	0	5.28	92.16	0						
MW-3	97.69	7.29	90.41	0.03	6.66	91.24	0	6.64	91.26	0.01	6.92	90.98	0						
MW-4	97.33	4.92	92.41	0	4.59	92.74	0	4.99	92.34	0.01	5.24	92.09	0.08						
MW-5	98.85	4.78	94.07	0	4.37	94.48	0	5.27	93.58	0	5.84	93.01	0						
MW-6	99.67	6.85	92.82	0	5.47	94.20	0	5.65	94.02	0	6.39	93.28	0						
MW-7	99.02	6.06	92.96	0	5.61	93.41	0	6.27	92.75	0	6.43	92.59	0						
Product Recovered (gal)																			
Current			0			0.05			0			0.20							
Cumulative			8.23			8.28			8.28			8.48							

* All measurements given in feet except where noted otherwise

** Water table elevation corrections assume a gasoline-specific gravity of 0.75

N.T. - Not Taken

THRIFTY OIL CO.

July 8, 1988

Greg Zentner
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street
Room 6000
Oakland, CA 94607

RE: Thrifty Oil Co. Station #049
3400 San Pablo Avenue
Oakland, Ca 94608

Dear Mr. Zentner,

Enclosed is a copy of Woodward-Clyde Consultant's report of Monitoring Well and Product Recovery dated July 1, 1988 for the above referenced facility.

If you have any questions, please feel free to contact me.

Very truly yours,

Peter D'Amico
Manager
of Environmental Affairs

PD/HAP/dmt
Enclosures

cc: Ted Gerow, Alameda County Environmental Health Services (W/Enc.)

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

500 12th Street
Suite 100
Oakland, CA 94607-4014
(415) 893-3600

Woodward-Clyde Consultants

July 1, 1988
8720083A

Mr. Pete D'Amico
Manager, Environmental Affairs
Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

Subject: Fifth Progress Report on Well Monitoring and Product Recovery at Station 49

Dear Mr. D'Amico:

The well monitoring and manual product recovery program at Thrifty Station 49 in Oakland, California has proceeded once every three weeks for the last three months. During each visit, the depth to water and product thickness measurements were taken and any free product encountered was bailed from the wells. As before, the recovered product was taken to Station 63 in Oakland and placed in the new product recovery drum located at that station. The well measurements and product recovery data are provided in Table 1, while well locations are shown in Figure 1. The product thicknesses have fluctuated somewhat recently but in general have shown an increase in May and June. Only wells MW-1 and MW-4 contained measurable product during the last monitoring exercise. Product thicknesses may continue to increase or reappear in other wells as the water table continues to decline.

If you have any questions or comments, please feel free to call.

Sincerely,

Martin Cramer
Senior Project Scientist

MC/sst
COT/8720083PR5

500 12th Street
Suite 100
Oakland, CA 94607-4014
(415) 893-3600

Woodward-Clyde Consultants

April 7, 1988
8720083A

Mr. Pete D'Amico
Manager, Environmental Affairs
Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

Subject: Fourth Progress Report on Well Monitoring and Product Recovery at Station 49

Dear Mr. D'Amico:

The well monitoring and manual product recovery program at Thrifty Station 49 in Oakland, California has proceeded once every three weeks for the last three months. Per our agreement, the schedule was changed from the weekly monitoring in response to the drastic reduction in product recovery. During each visit, the depth to water and product thickness measurements were taken and any free product encountered was bailed from the wells. As before, the recovered product was taken to Station 63 in Oakland and placed in the new product recovery drum located at that station. The well measurements and product recovery data are provided in Table 1, while well locations are shown in Figure 1. The product thicknesses have fluctuated recently but in general have shown an increase in February and March. The initial increases in wells MW-1 through MW-4 could have been the result of the declining water table conditions, while the following fluctuations are probably due to recovery activities. None of the other wells contained measurable product during this monitoring period. Product thicknesses may continue to increase or reappear in other wells as the water table continues to decline.

If you have any questions or comments, please feel free to call.

Sincerely,

Martin Cramer
Senior Project Scientist

MC/sst
COT/8720083PR4

THRIFTY OIL CO.

May 25, 1988

Greg Zenter
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street
Room 6000
Oakland, CA 94607

RE: Thrifty Oil Co. Station #049
3400 San Pablo Avenue
Oakland, Ca 94608

Dear Mr. Zenter,

Enclosed is a copy of Woodward-Clyde Consultant's report of Monitoring Well and Product Recovery dated April 7, 1988 for the above referenced facility.

If you have any questions, please feel free to contact me.

Very truly yours,

Peter D'Amico
Manager
Environmental Affairs

PD/HAP/dmt

cc: Ted Gerow, Alameda County Environmental Health Services (W/Enc.)

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

THRIFTY OIL CO.

April 28, 1988

Alameda County Health
Care Services
470 - 27th Street
Third Floor
Oakland, CA 94612

ATTN: Gerald H. Winn, Director
Department of Env. Health

REF: Thrifty Oil Co. #049 and #054

Dear Mr. Winn,

In regards to the attached letters. Thrifty Oil Co. no longer operates the above mentioned stations. They have been leased to the Circle K Corporation. All future correspondance should be directed to the address listed below.

Thank you.

Sincerely,
THRIFTY OIL CO.

Trish Guzman
Environmental Affairs Coordinator

CIRCLE K CORPORATION (714) 746-7598
P.O. Box 52084
Phoenix, Arizona 85072

ENV DEPT (916) 334-2445
Pat Wright

THRIFTY OIL CO.

January 28, 1988

Greg Zenter
Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street
Room 6000
Oakland, CA 94607

RE: Thrifty Oil Co. Station #049
3400 San Pablo Avenue
Oakland, Ca 94608

Dear Mr. Zenter,

Enclosed is a copy of Woodward-Clyde Consultant's report of Monitoring Well and Product Recovery dated January 20, 1988 for the above referenced facility.

If you have any questions, please feel free to contact me.

Very truly yours,

Peter D'Amico
Manager
Environmental Affairs

PD/HAP/dmt

cc: Ted Gerow, Alameda Co. Environmental Health Services (W/Enc.)

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

500 12th Street
Suite 100
Oakland, CA 94607-4014
(415) 893-3600

Woodward-Clyde Consultants

January 20, 1988
8720083A

Mr. Pete D'Amico
Manager, Environmental Affairs
Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

Subject: Third Progress Report on Well Monitoring and Product Recovery at Station 49

Dear Mr. D'Amico:

The well monitoring and manual product recovery program at Thrifty Station 49 in Oakland, California has proceeded on a weekly basis for seven weeks since the last report. During each visit, the depth to water and product thickness measurements were taken and any free product encountered was bailed from the wells. Per our agreement, the recovered product was taken to Station 63 in Oakland and placed in the new product recovery drum located at that station.

In general, the product thicknesses have fluctuated somewhat but have shown a continued decreasing trend with no measurable product found in any of the wells during the last visit. The reason for the decreasing thicknesses is probably due to the quantity of product in the formation surrounding the wells being depleted, while replenishment from other areas is slow. The seasonal increase in water table elevation may also be partially responsible, as observed product thicknesses typically decrease under rising water table conditions. It is unlikely, however, that this decrease in product thickness is uniform under the entire site, as manual bailing typically influences only the area in the immediate vicinity of the well. Due to the significant decrease in product recovery, we recommend and have already implemented a reduced monitoring and recovery program of once every three weeks.

If you have any questions or comments, please feel free to call.

Sincerely,

Martin Cramer
Project Manager

MC/sst
COT/8720083-5

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JAN 25 1988
ENV./CONSTR

Table 1. STATION 4y WELL MEASUREMENT AND PRODUCT RECOVERY DATA* (continued)

Well No.	Relative Casing Elev.	12-30 Depth to Water	12-30 Corrected** Water Elev.	12-30 Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness
MW-1	98.03	5.01	93.02	0															
MW-2	97.44	4.77	92.67	0															
MW-3	97.69	6.79	90.90	0															
MW-4	97.33	4.52	92.81	0															
MW-5	98.85	4.31	94.54	0															
MW-6	99.67	4.95	94.72	0															
MW-7	99.02	4.40	94.62	0															

Product Recovered (gal)

Current	0
Cumulative	8.08

* All measurements given in feet except where noted otherwise

** Water table elevation corrections assume a gasoline-specific gravity of 0.75

N.T. - Not Taken

Table 1. STATION 49 WELL MEASUREMENT AND PRODUCT RECOVERY DATA*

Well No.	Relative Casing Elev.	11-18			11-25			12-2			12-11			12-17			12-23		
		Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness
MW-1	98.03	6.23	91.80	0	6.90	91.15	0.02	5.46	92.58	0.01	4.81	93.23	0.01	4.88	93.15	0	5.11	92.92	Trace
MW-2	97.44	6.03	91.43	0.02	5.61	91.85	0.02	5.36	92.09	0.01	4.82	92.70	0.11	4.88	92.64	0.10	5.02	92.42	Trac
MW-3	97.69	7.83	89.90	0.05	7.48	90.24	0.04	7.16	90.54	0.01	6.88	90.81	0	6.40	91.29	0	6.90	90.79	Trac
MW-4	97.33	5.69	91.64	0	5.33	92.00	0	4.90	92.43	0	4.46	92.87	0	4.59	92.76	0.03	4.94	92.44	0.06
MW-5	98.85	6.00	92.85	0	5.77	93.08	0	5.19	93.66	0	4.05	94.80	0	4.16	94.69	0	4.58	94.27	0
MW-6	99.67	7.74	91.93	0	6.91	92.76	0	6.73	92.94	0	6.12	93.55	0	5.25	94.42	0	5.17	94.50	0
MW-7	99.02	7.13	91.89	0	6.70	92.32	0	6.23	92.79	0	5.36	93.66	0	5.64	93.38	0	6.50	92.52	0
Product Recovered (gal)																			
Current			0			0			0			0.05			0.02			0.01	
Cumulative			8.00			8.00			8.00			8.05			8.07			8.08	

All measurements given in feet except where noted otherwise

** Water table elevation corrections assume a gasoline-specific gravity of 0.75

N.T. - Not Taken

100 Pringle Avenue, Suite
Walnut Creek, CA 94596-3564
415-945-3000

Woodward-Clyde Consultants

October 21, 1987
8720083A

Mr. Pete D'Amico
Manager, Environmental Affairs
Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

Subject: Monthly Report on Well Monitoring and Product Recovery at Station 49

Dear Mr. D'Amico:

The well monitoring and manual product recovery program at Thrifty Station 49 in Oakland, California has proceeded on essentially a weekly basis for over one month. During each visit, the depth to water and product thickness measurements were taken and any free product encountered was bailed from the wells. Per our agreement, the recovered product was taken to Station 63 in Oakland and placed in the waste oil tank. The well measurements and product recovery data are provided in Table 1. A plot plan of the station showing well locations is given in Figure 1.

In general, the product thickness and extent of free product contamination has increased since the last readings were taken in December of 1986. Previously, only well MW-1 contained free product, whereas it is now found in wells MW-1 through MW-4. The reason for this could be the continued spread of existing product thought to have been relatively contained in the tank backfill or possibly a new or ongoing leak. As shown in Table 1, the product thicknesses have fluctuated considerably but, in most cases, indicate a slight overall increase since the program began. The reason for the fluctuations is unclear, while the slight increases could be attributed to the same factors as those mentioned above for the increased extent.

If you have any questions or comments, please feel free to contact me.

Sincerely,

Martin Cramer

MC/sst
COT/8720083-1

100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596-3564
415-945-3000

Woodward-Clyde Consultants

March 19, 1987
90390A/0000

Mr. Ted Gerow
Public Health Engineer
Alameda County Division
of Environmental Health
470 27th Street
Oakland, CA 94612

Dear Mr. Gerow:

Pursuant to our conversation several weeks ago regarding the subsurface petroleum product spill investigations currently underway at two Thrifty Oil Co. service stations in Oakland, I would like to confirm that the county does not require a periodic written progress report on the investigations. The service stations in question are located at 6125 Telegraph Avenue and 3400 San Pablo Avenue. As I recall, you did request that we inform you of any plans for remediation and provide a periodic update once the recovery systems are in operation. Apparently, Thrifty Oil Co. has already submitted to you copies of our proposed recovery systems for each station. We would also like to inform you that we are in the process of obtaining a water discharge permit at the Telegraph Avenue station such that we can proceed with system installation and site remediation. We will notify you once the permit has been obtained and the system installed. If we do not hear from you within ten working days, we will assume the above understanding is correct.

If you have any questions or comments, please do not hesitate to contact me at 945-3000.

Sincerely,

Martin Cramer

Martin Cramer
Project Scientist

MC/sst
COT/90390-L5

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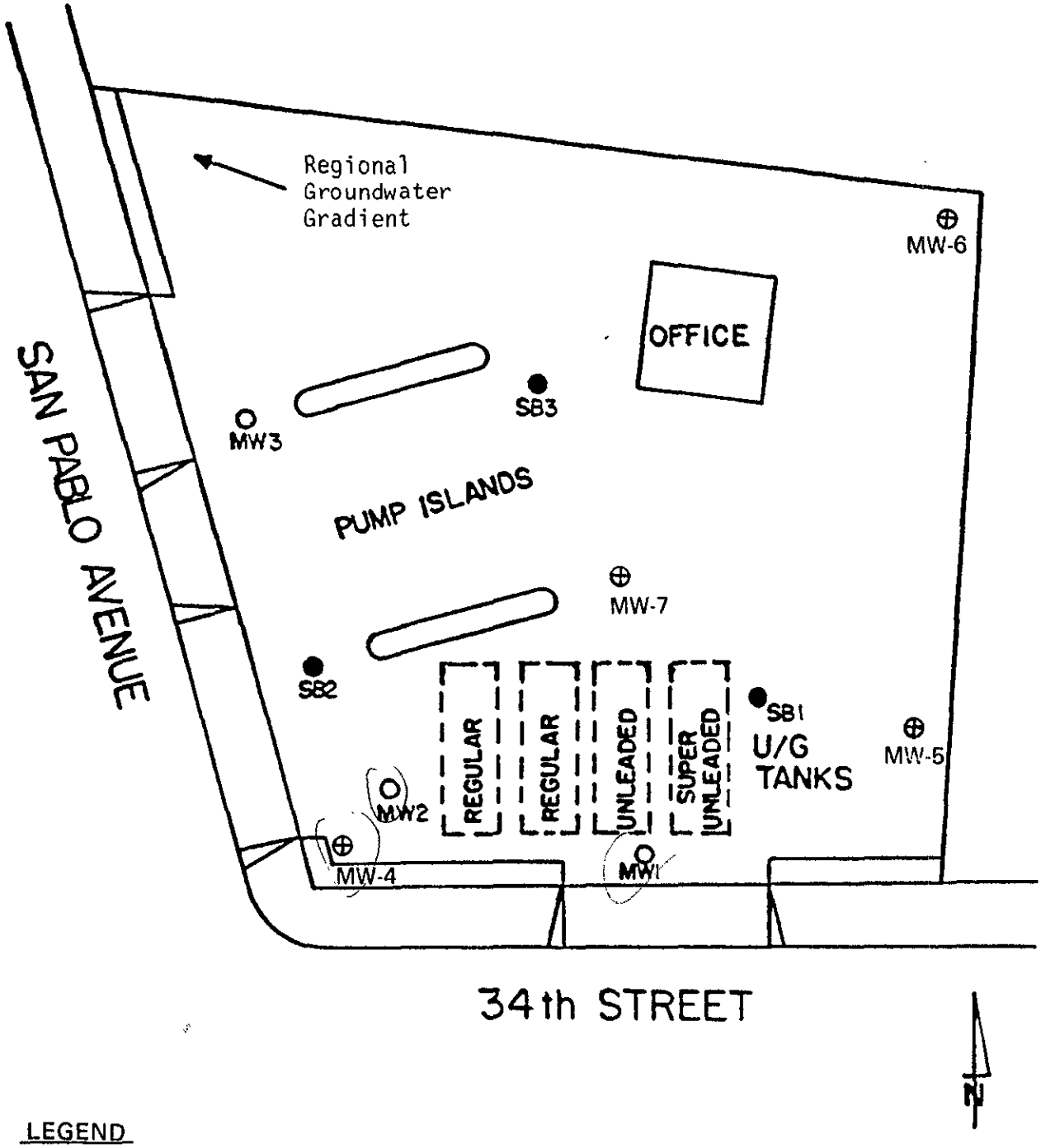
MAR 23 1987
ENVIRONMENTAL HEALTH
ADMINISTRATION



LEGEND

○MW1 - GT MONITORING WELLS
⊕ MW-4 - WCC MONITORING WELLS
● SB1 - GT SOIL BORINGS

0 25
FEET

Figure 1. MONITORING WELL AND BORING LOCATIONS

Table 1. STATION 49 WELL MEASUREMENT AND PRODUCT RECOVERY DATA*

Well No.	Relative Casing Elev.	12-3-86			8-26-87			9-10-87			9-18-87			9-27-87			10-7-87		
		Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness
MW-1	98.03	7.45	90.58	0.30	7.56	90.83	0.47	7.65	90.38	0.29	7.75	90.28	0.17	7.52	90.49	0.02	7.58	90.53	0.11
MW-2	97.44	6.60	90.84	0	7.18	90.67	0.54	7.21	90.23	0.42	8.67	89.65	1.17	8.25	90.03	1.11	8.08	90.33	1.29
MW-3	97.69	7.77	89.92	0	7.95	89.74	0	8.21	89.48	0	N.T.	N.T.	N.T.	8.52	89.40	0.31	8.08	89.82	0.28
MW-4	97.33	6.28	91.05	0	7.02	90.76	0.60	7.15	90.40	0.29	7.50	89.83	0.50	7.66	90.32	0.87	7.36	90.46	0.65
MW-5	98.85	8.10	90.75	0	7.74	91.11	0	7.98	90.87	0	N.T.	N.T.	N.T.	7.98	90.87	0	8.10	90.75	0
MW-6	99.67	9.00	90.67	0	8.67	91.00	0	8.97	90.70	0	N.T.	N.T.	N.T.	9.13	90.54	0	9.07	90.60	0
MW-7	99.02	8.04	90.98	0	8.15	90.87	0	8.58	90.44	0	N.T.	N.T.	N.T.	8.57	90.45	0	8.59	90.43	0
Product Recovered (gal)																			
Current			0			0.75			0.75			1.0			1.2			1.25	
Cumulative			0			0.75			1.50			2.50			3.70			4.95	

* All measurements given in feet except where noted otherwise

** Water table elevation corrections assume a gasoline-specific gravity of 0.75

N.T. - Not Taken

THRIFTY OIL CO.

1/2 fuel tanks

February 13, 1987

RECEIVED
FEB 19 1987
ENVIRONMENTAL HEALTH
ADMINISTRATION

Mr. Ted Gerow
Alameda County
Environmental Health Services
470 27th Street
Suite 324
Oakland, CA 94612

RE: Thrifty Oil Co. Station #49
3400 San Pablo Avenue
Oakland, CA 94608

Dear Mr. Gerow,

Enclosed please find Woodward-Clyde Consultants proposed Remediation Plan dated January 26, 1987 for the above referenced site.

Please review this report and advise if you concur or have any specific requirements. Do not hesitate to contact Howard Platt or the undersigned if you have any questions or desire to discuss this project.

Very truly yours,

Peter D'Amico
Manager
Environmental Affairs

PD/dmt
Enclosure

cc: Peter Johnson, Regional Water Quality Control Board (W/Enc.)
Mark B. Gilmartin, Straw & Gilmartin
James D. Sartor, Woodward-Clyde Consultants

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596-3564
415-945-3000

Woodward-Clyde Consultants

January 26, 1987
90386A/0000

Mr. Pete D'Amico
Manager, Environmental Affairs
Thrifty Oil Co.
10000 Lakewood Blvd.
Downey, CA 90240

Subject: Proposal for Remediation of Subsurface Contamination at
Service Station No. 49
3400 San Pablo Avenue, Oakland, California

Dear Mr. D'Amico:

Woodward-Clyde Consultants is pleased to submit the following proposal for the installation of a subsurface petroleum product recovery system at your service station No. 49 in Oakland, California. The proposal is based on information generated by Woodward-Clyde Consultants' investigations during November of 1986.

No formal cleanup action levels for petroleum products exist, although the California Regional Water Quality Control Board, San Francisco Bay Region, Guidelines for Addressing Fuel Leaks (1985) states that "Removal of free product from the groundwater surface is required in all cases where more than 1/4 inch of floating free material is detected in an appropriately designed monitoring well or where lesser quantities contaminate or threaten to contaminate groundwater that is being used for domestic water supply." No known wells nor use of shallow groundwater in the area of concern has been identified. Local regulatory concerns also lie with the removal of the free product and heavily contaminated soil (State guidelines suggest a heavy contamination limit of 1000 mg/kg). A soil concentration exceeding this level (1200 mg/kg) was reported in only a single sample from the site, suggesting that the primary recovery operation should be directed toward cleanup of free floating product.

The proposed recovery plan involves the application of a two-phase system. The two-phase system functions by pumping groundwater to draw down the water table in the well and tank backfill, thus creating a "cone of depression." By changing the local groundwater gradient, the product will flow toward the center of the depression (recovery well) where a second pump (skimmer) will move the product from the the surface of the water and pump it to a storage tank. As a result of the

groundwater depression pumping, contaminated water will be produced. If the level of hydrocarbons in this water is sufficient (usually in excess of 15 ppm), it will require treatment prior to disposal in a storm or sanitary sewer. Therefore, the produced water will be pumped first to a holding tank where gravity separation can occur, then through a pair of activated carbon filters prior to discharge to the sewer. Pending the results of discharge water monitoring, it may be possible to eventually bypass these filters. The entire system will be equipped with a series of sensors and automatic controls to regulate pumping rates and prevent tank overfilling. A diagram of the system layout and estimated zone of contamination is shown in Figure 1. A schematic of the conceptual system is shown in Figure 2.

Prior to installation, tests will be conducted in existing wells to evaluate various physical parameters of the local hydrogeological regime. In a addition to providing information for sizing of components of the system, these tests will provide insight into the likely rate and effectiveness of the recovery system operation.

The two-phase system will be installed in a 6-inch diameter well located at the edge (and at least party within) the tank backfill. The system will include water table and depression pumps, control panels, water treatment equipment, air compressor and associated wiring and hoses. All plumbing will be installed below grade in shallow trenches. To facilitate inspection and repair, these trenches should be covered with steel plate. With the exception of the skimmer and depression pump, all of the equipment will be installed in a secure storage area behind the existing station office.

The proposed technique may require an NPDES or local permit for discharging the treated water to the sanitary sewer system. The permit will probably stipulate that samples of the discharge water be taken periodically to ensure that any effluent limitations are not exceeded. The frequency for sampling is assumed to be once per month. Other operating costs would include a system check and well monitoring once a week. Water samples may also be taken and analyzed periodically to chart the anticipated decreases in hydrocarbon levels, if desired.

The estimated costs for the proposed remediation are outlined in Table 1. As discussed previously, the proposed methods, and therefore the associated costs, are based on several assumptions concerning ambient subsurface conditions at the site. Should these conditions vary significantly from those assumed, system modification may be

necessary. Costs also assume that no significant problems are encountered during well or system installation and that sampling frequencies required by the agencies will not exceed those described above. These costs also do not include the disposal of contaminated cuttings or fluids that may be generated during well installation or any other activities conducted during remediation. In addition, the recovery system equipment, installation and maintenance costs are based on Thrifty Oil contracting directly with the supplier (Clean Environment Engineers).

If you have any questions or comments, please feel free to contact Mr. Martin Cramer, as he will be the manager of this project.

Sincerely,

James D. Sartor
Manager
Environmental and Engineering Services

MC/sst
COT/90386P

TABLE 1. ESTIMATED COST BREAKDOWN

1.	Project Management - regulatory interaction, permits, Q.A., health and safety, field coordination, etc.		
	20 hrs Project Management	1,920	
	2 hrs Health and Safety	120	
	2 hrs Project Review	200	
			2,240
2.	Well Installation		
	5 hrs Driller	625	
	8 hrs Geologist	480	
	1 Materials	350	
	1 Equipment Rental	250	
	3 Soil Sample Analyses	600	
	1 Concrete Cutter	125	
			2,430
3.	Recovery System Installation		
	1 Hardware (pumps, controls, hoses, compressor, etc.)	11,000	
	1 Water Tank	500	
	1 Product Tank	500	
	1 Secure Cage	2,000	
	1 Concrete Cutting and Paving	1,000	
	1 Carbon Water Treatment System	6,000	
	1 Misc. Materials	500	
	1 Labor	5,000	
			26,500
	Total Installation Costs		$31,170
4.	*Monthly Recovery System Operation Costs*		
	1 Checkup and Maintenance	400	
	1 Effluent Sample	200	
	20 hrs Field Technician - well monitoring and sampling	1,000	
	1 Activated Carbon Replacement	500	
	1 Equipment Rental	400	
			$2,500

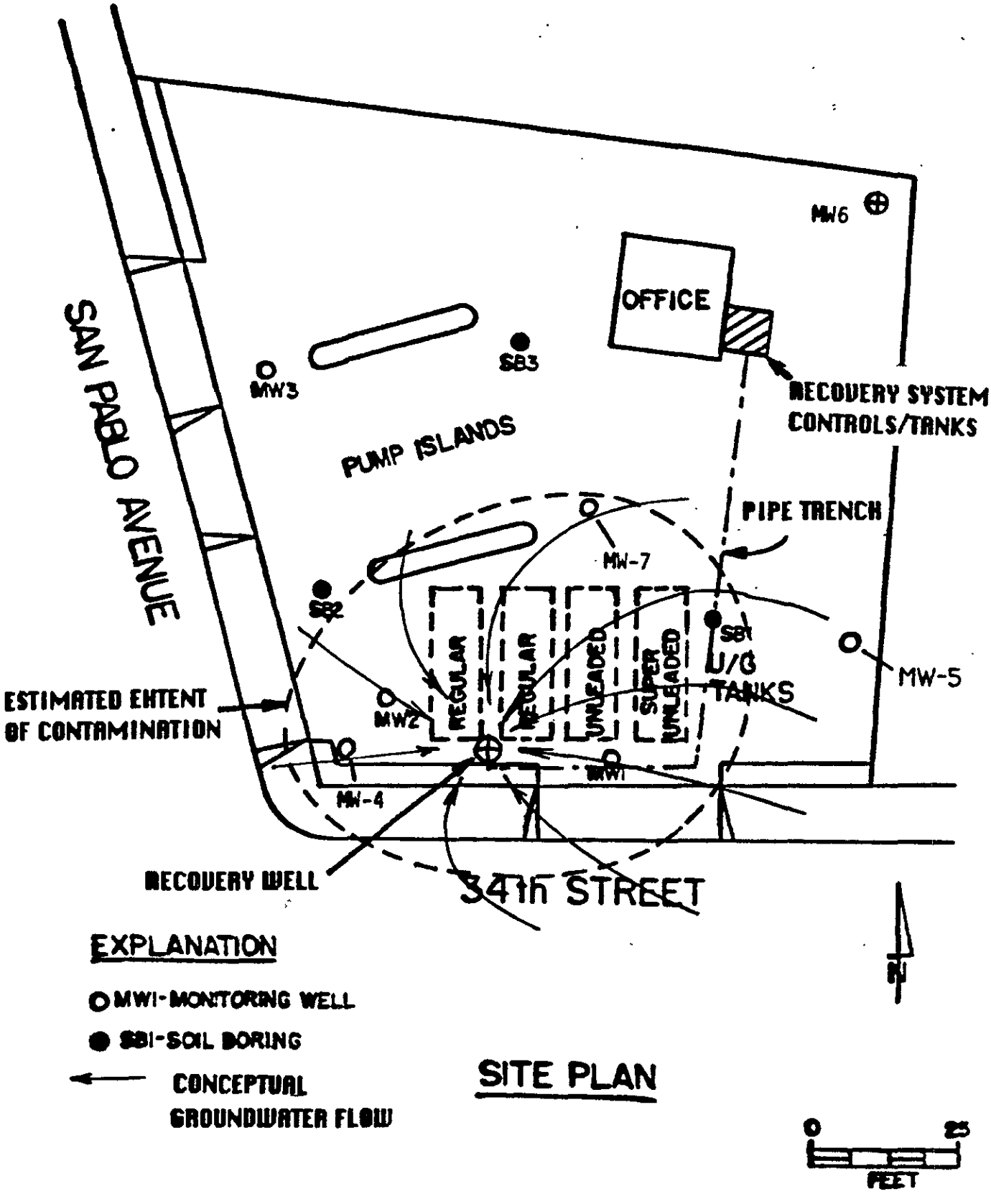


FIGURE 1 CONCEPTUAL RECOVERY SYSTEM LAYOUT

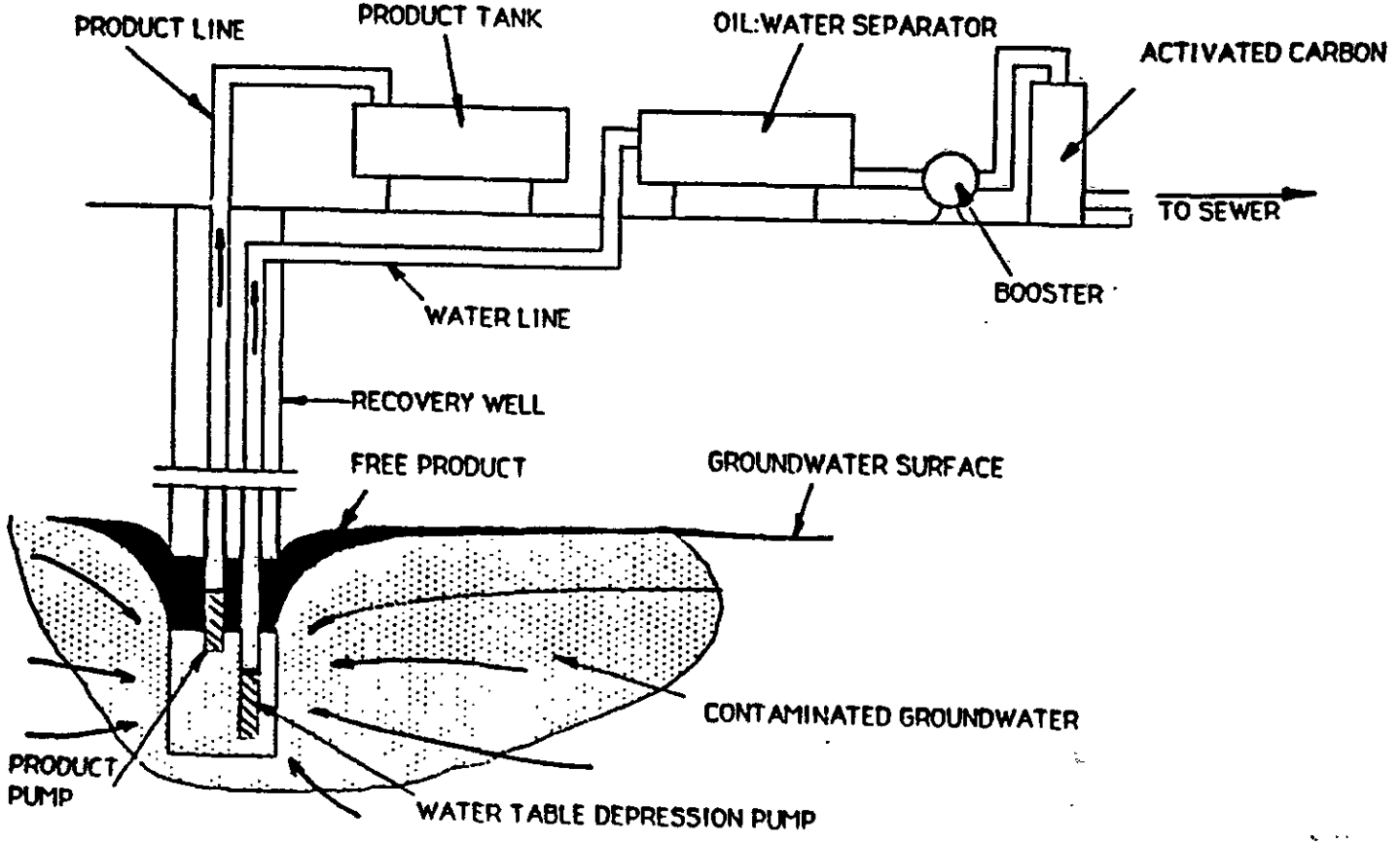


FIGURE 2. CONCEPTIONAL RECOVERY SYSTEM SCHEMATIC

Woodward-Clyde Consultants

THRIFTY OIL CO.

December 10, 1986

Ltr file UGTANKS

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DEC 12 1986
ENVIRONMENTAL HEALTH
ADMINISTRATION

Alameda County
Environmental Health Services
470 27th Street
Suite 324
Oakland, CA 94612

ATTENTION: Ted Gerow

RE: Thrifty Oil Co. Station #49
3400 San Pablo Avenue
Oakland, CA 94608

Dear Mr. Gerow,

Enclosed please find Woodward-Clyde Consultants subsurface assessment dated December 4, 1986 of the above referenced location.

You will note that the testing results seem to indicate some contamination in the area of the tank pit. We propose to recover all free product from the existing wells and to install two additional wells in the tank backfill (see figure 1). The purpose of the additional wells is to facilitate product removal and to provide a means to add surfactants to flush backfill and remove any residual contamination.

Please review this report and advise if you concur with our proposed well locations. Do not hesitate to contact me if you have any questions or comments.

Yours truly,

Peter D'Amico

Peter D'Amico
Manager
Environmental Affairs

PD/dmt
Enclosure

cc: Peter Johnson, Regional Water Quality Control Board
Mark B. Gilmartin, Straw & Gilmartin (W/out Enclosure)
Marty Cramer, Woodward-Clyde Consultants

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

90393A COT-1

SUBSURFACE ASSESSMENT
SERVICE STATION 49
OAKLAND, CALIFORNIA

Prepared for

Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 90240

DECEMBER 4, 1986

Woodward-Clyde Consultants
100 Pringle Avenue
Walnut Creek, CA 94596

INTRODUCTION

In November of 1986, Thrifty Oil Co. retained Woodward-Clyde Consultants to conduct a subsurface site assessment at their Service Station #49 located at 3400 San Pablo Avenue in Oakland, California. This assessment was in response to groundwater contamination discovered during a previous assessment at the site by another firm. The objective was to further delineate the extent of the existing contamination.

The initial site assessment was conducted by Groundwater Technology in August of 1986 and consisted of advancing six borings and installing three 2-inch monitoring wells. Boring and well locations are shown in Figure 1. Soil samples were taken at 5-foot intervals in all borings and field analyzed for volatile organic vapors using a photoionization detector. The samples taken at a depth of 9.0 in Borings SB-1, MW-1 and MW-2 and 4.0 feet in Borings SB-2, SB-3 and MW-3 were submitted to a lab for analysis. Only the samples from SB-1 and MW-3 were found to contain detectable hydrocarbons (67 and 22 ppm respectively). Groundwater samples were also taken from each well and analyzed for hydrocarbons. Total hydrocarbons in MW-1, MW-2 and MW-3 were 85.3, 93.7 and 2.1 ppm, respectively. Respective benzene, ethyl benzene, toluene and xylene (BTEX) levels in the three wells totaled 54.1, 52.4 and 0.75 ppm.

The subsequent site assessment was conducted by Woodward-Clyde and consisted of advancing four 15-foot deep borings and installing four monitoring wells. Soil samples were taken at the approximate location of the water table in all borings except MW-5 where a sample could not be recovered. Only samples from MW-4 and MW-7 exhibited hydrocarbon odors and were submitted to a lab for analysis. Water samples were taken later from each of the four newly-installed wells and also submitted for laboratory analysis. Relative well casing elevations were also established to calculate the local groundwater gradient. In addition, an attempt was made to determine the ambient groundwater quality and existing uses in the area.

ASSESSMENT ACTIVITIES

Boring/Well Installation

The installation of the four borings and monitoring wells was conducted on November 14, 1986 using a Mobile B-53 rig with 8-inch hollow stem augers. Locations of the boring/monitoring wells are shown in Figure 1. MW-4 and MW-7 were located to better delineate the groundwater contamination found previously in MW-1 and MW-2, while MW-6 was to serve as a background well. MW-5 was originally to be located in the northwest corner of the site and also to serve as a background well and/or to assess the northerly extent of contamination found in MW-3. However, height restrictions and potential underground utilities created difficulties for drilling at that location. Observations made during the installation of MW-4 and MW-7 and the known contamination in wells MW-1 and MW-2 suggested that the primary area of contamination was centered around the tank pit area. Therefore, MW-5 was relocated to the southeast corner to facilitate some control for potential contaminant migration to the east and provide better delineation of the groundwater and soil contamination found in MW-1 and SB-1, respectively. Both MW-6 and MW-5 were found to be clean with no hydrocarbon odors or vapors detected in The samples or cuttings. The majority of these cuttings were placed in an onsite dumpster for general disposal. Because of the hydrocarbon odors noted in MW-4 and MW-7, a composite sample of the cuttings was taken for analysis. These cuttings were then placed in five drums, sealed, labeled and left onsite pending sample analysis.

The four wells were completed to a depth of 15 feet and constructed of 2- or 4-inch I.D. PVC casing. Four-inch I.D. casing was used for MW-4 and MW-7 to allow them to be utilized for extraction wells if required. Two-inch I.D. casing was used for MW-5 and MW-6, as they were to be used primarily as background wells. The wells were originally to be completed

to a depth of 20 feet, but high water-table conditions necessitated screening the wells to within 4 feet of The surface. Craig Mayfield of the Alameda County Flood Control and Water Conservation District Zone 7 then requested that the wells be limited to a depth of 15 feet due to the resulting shallow well seal (3 feet). The boring/well construction logs are included in Appendix A. Permitting and installation of the monitoring wells were conducted in accordance with the Zone 7 guidelines.

Soil Sampling

Based on the findings of the previous investigation, soil contamination was not considered to be a problem and, as such, no soil sampling was proposed. However, because moderate hydrocarbon odors were detected in the cuttings in the first boring (MW-4), a sample was taken at the approximate location of the water table in that and each subsequent boring. At the time of drilling, the water table was about 6 feet below grade as measured in MW-2. Samples were obtained using a modified California sampler containing three brass tubes measuring 2.5 inches in diameter by 6 inches long. The sampler was driven ahead of the augers by a 140-pound drop hammer. After each sample drive, one tube was extruded into a plastic bag in the field, and a headspace analysis was performed using a flame-ionization organic vapor analyzer. Samples from both MW-4 and MW-7 resulted in headspace readings of >1,000 ppm while the MW-6 sample contained only 20 ppm in the headspace. No soil was recovered in the MW-5 sample after three attempts. Due to the high headspace readings, one of the adjacent tubes from the MW-4 and MW-7 samples was sealed at each end with aluminum foil, PVC end caps and tape and submitted to Brown and Caldwell Laboratories in Emeryville for analysis.

Well Monitoring, Development and Sampling

On November 24, 1986, fluid level measurements were taken in each of the new wells which were then developed by bailing to remove silts and sand and

to improve well performance. Due to the clayey nature of the substrate, groundwater recharge to the wells was very slow. After bailing each well dry, they were allowed to recover to at least 80 percent of their original water level before sampling per the Regional Water Quality Control Board guidelines. Bailing and sampling were conducted with Teflon bailers which were decontaminated between wells. Samples were collected in two sterilized VOA vials and also submitted to Brown and Caldwell Laboratories for analysis. The bailed water was placed in two drums which were secured, labeled and left onsite pending results of the sample analyses.

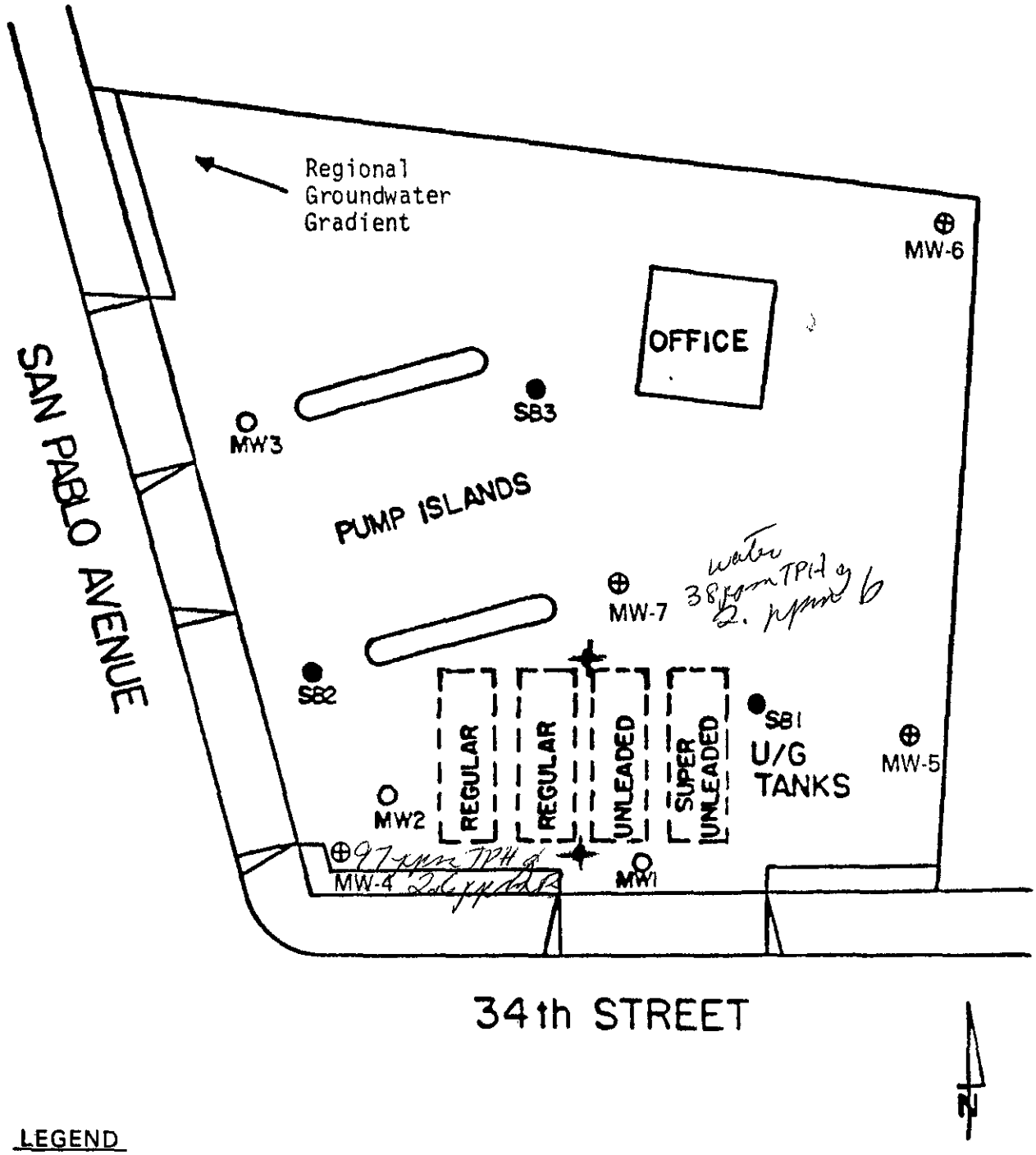
The relative well casing elevations were surveyed to enable calculation of the local groundwater gradient. Calculations indicated that the gradient was to the east northeast. A closer analysis of the data revealed a mound or ridge in the water table near the tank pit area and more specifically between wells MW-7 and MW-4. Although the reason for the mounding is uncertain, it is not unusual in urbanized areas where pavement or buildings cover most of the ground surface and open areas available for groundwater recharge are sporadic. In addition, the region is known to contain old buried stream channels and subsurface faults which will influence local gradients. Other contributing factors could be leaking water, sewer or storm drain piping. There is a storm drain inlet adjacent to MW-4 which could be a source of recharge if it contains water and is leaking. It would not, however, be expected to influence water levels in MW-7 due to the distance from the source.

The presence of the mound has resulted in the groundwater gradient below the site sloping in two separate directions. Gradient calculations using wells to the north of the mound indicate that it slopes to the west northwest whereas the use of wells to the south of the mound results in the gradient sloping to the south southeast. Free product measuring 0.3 feet was discovered in MW-1, which is to the south of the storage tank area. All measurements are listed in Table 1.

TABLE 1. WELL MEASUREMENT DATA

Well Number	Relative Casing Elevation	11-24-86			12-2-86			12-3-86		
		Depth to Water	Elev. of Water	Product Thick.	Depth to Water	Elev. of Water	Product Thick.	Depth to Water	Elev. of Water	Product Thick.
MW-1	98.03	--			--			7.45	90.58	0.3
MW-2	97.44	--			--			6.60	90.84	0
MW-3	97.69	--			--			7.77	89.92	0
MW-4	97.33	5.94	91.39	0	6.21	91.12	0	6.28	91.05	0
MW-5	98.85	7.93	90.92	0	8.04	90.81	0	8.10	90.75	0
MW-6	99.67	9.08	90.59	0	9.04	90.63	0	9.00	90.67	0
MW-7	99.02	7.92	90.10	0	7.98	91.04	0	8.04	90.98	0

*All measurements given in feet



LEGEND

OMW1 - GT MONITORING WELLS
⊕ MW-4 - WCC MONITORING WELLS
● SB1 - GT SOIL BORINGS
✦ PROPOSED WELLS

0 25
FEET

Figure 1. MONITORING WELL AND BORING LOCATIONS

The regional gradient is to the west northwest, and if wells MW-4, MW-2 and MW-7 were excluded from the calculations, the local gradient would also be to the west northwest. The well locations and respective contaminant levels would indicate that migration is occurring to the west northwest along the regional gradient. The mounding could, therefore, be a recent or temporary phenomenon that occurs seasonally or in response to unknown parameters. The recent appearance of product in MW-1 would tend to support this premise.

Laboratory Analyses

All samples were analyzed by gas chromatography using various EPA methods. Total fuel hydrocarbons in both soils and water were analyzed by method 8015 while soil BTX was analyzed by method 8020. The BTEX in the water samples was analyzed by method 602. The lead concentration in the MW-7 soil sample was analyzed by method 7420/7421. The MW-7 sample was chosen for lead analysis because the field observations and headspace readings of the adjacent tube suggested that it was the most heavily contaminated of the two samples submitted for analysis. The results of these analyses are listed in Table 2, and a discussion is provided below in the Conclusions section. Copies of the lab reports are appended.

Local Groundwater Use

The Regional Water Quality Control Board (RWQCB) and the Alameda County Flood Control and Water Conservation District (ACFC&WCD) were contacted to assess the ambient quality and identify existing and potential uses of the groundwater in the vicinity of the site. The ACFC&WCD maintains records, to the extent possible, of all wells in the district and does periodic water quality testing in selected wells. Unfortunately, they are primarily concerned with salt water intrusion and do not test any of the wells within several miles of the site. They did indicate that salt water intrusion was not a problem in the vicinity of the site.

TABLE 2. ANALYTICAL RESULTS*

Sample Type and Number	Depth Taken	Total Fuel HC	Benzene	Ethyl Benzene	Toluene	Xylene	Total BTEX	Lead
Soil								
7-1-2	6.50 ft	<10	<0.5	N.T.	<0.5	<0.5	<0.5	<10
4-1-3	6.75 ft	1200	12	N.T.	53	42	107	N.T.
C-1 (Cuttings Composite)	N/A	140	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.
Water								
MW-4	N/A	97	2.6	2.7	2.5	11	18.8	N.T.
MW-5	N/A	>1	>0.002	>0.002	>0.002	>0.002	>0.002	N.T.
MW-6	N/A	>1	>0.002	>0.002	>0.002	>0.002	>0.002	N.T.
MW-7	N/A	38	2.0	1.6	1.6	8.7	13.9	N.T.

N/A - Not Applicable
N.T. - Not Tested
* - Results are given in ppm

The records on active wells in the area appear to be complete but outdated, and very little data is available on well construction. The records indicate that approximately five wells exist within a 1-mile radius of the site. This information, however, is rarely updated unless the well owner contacts the ACFC&WCD which means the wells may or may not currently be in operation. Four of the wells in the area are, or were, used for industrial purposes with the other being an irrigation well. No municipal or domestic wells were identified anywhere near the site. The closest well is an industrial well located approximately 1/2 mile to the south. The locations of the wells are shown in Figure 2.

According to the ACFC&WCD personnel contacted, there were several industrial and domestic wells installed in the early-to-mid 1900's, but since the East Bay Municipal Utility District began supplying water, the majority of these wells were either abandoned or inactivated. The low permeability of the sediments inhibits water production in the wells, which further deters the use of groundwater wells for water supply. The ACFC&WCD personnel did not know of any potential future uses of the groundwater in the area other than the few existing industrial and irrigation wells.

CONCLUSIONS

The laboratory results and observations made during drilling and sampling indicate that subsurface contamination does exist in both the soil and groundwater at the site, although it does not appear to be extensive. The product storage tanks and pipelines were reported to have been tested and found to be tight, which suggests that the contamination is the result of occasional tank overfills. The location of the existing groundwater contamination does appear to be centered around the tank pit area and is generally migrating to the west or northwest. It is probable that some free product is present within the tank backfill but has been relatively well contained by the surrounding silty clay substrate.

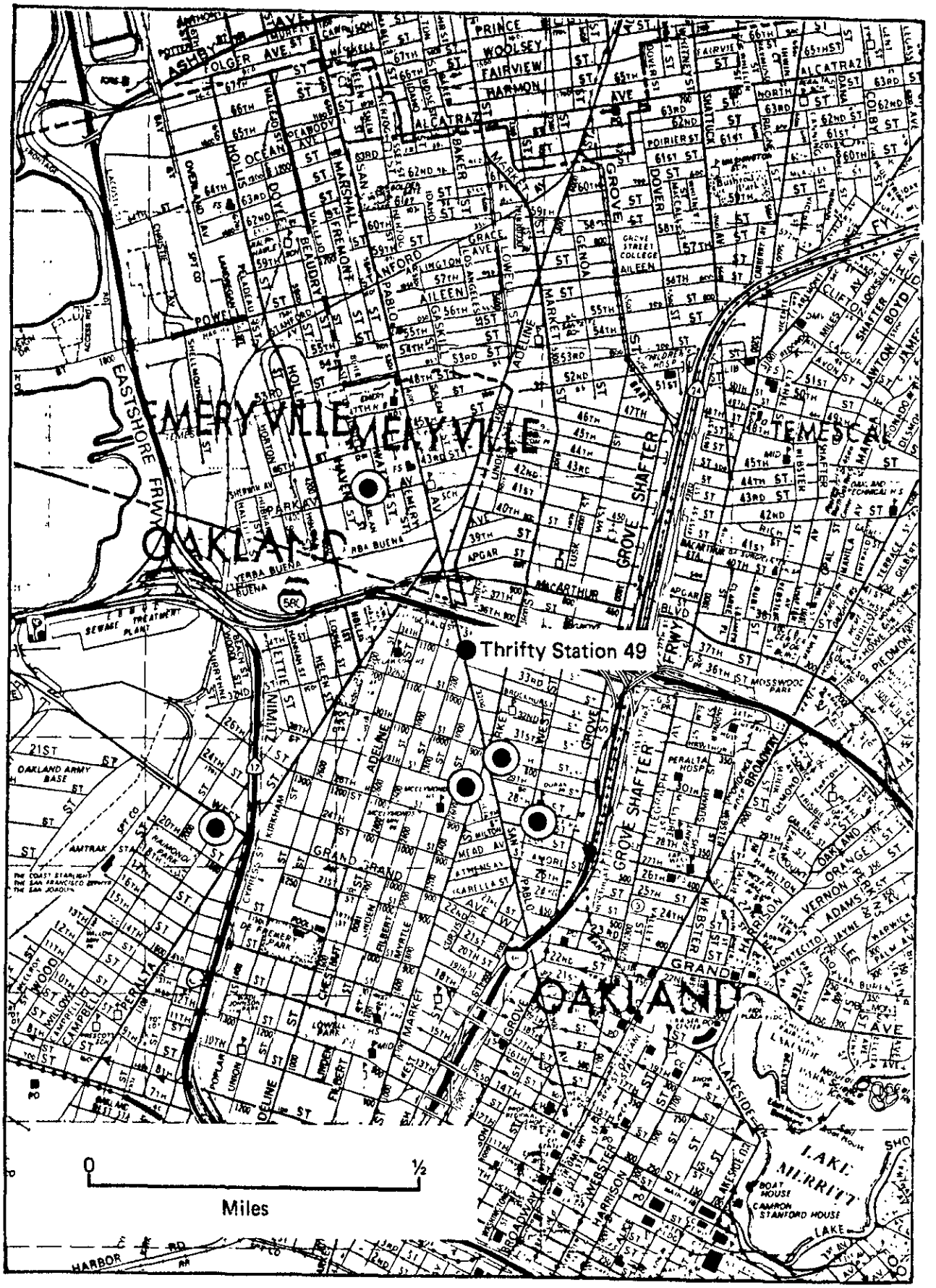


Figure 2. LOCATIONS OF INDUSTRIAL AND IRRIGATION WELLS

The soil contamination at the site does not seem to be extensive although there are some inconsistencies in the data. In the previous assessment, samples were taken either a few feet above or below the water table, while the current samples were taken at the water table. Further difficulties resulted from high headspace readings being found in samples from both MW-4 and MW-7 while lab analysis of the adjacent sample tubes found a significant level of hydrocarbons in MW-4 (1200 mg/kg), and non-detectable in MW-7. Observations made in the initial assessment also detected moderate hydrocarbon odors in several of the borings, while the corresponding sample analyses were below the detection limit. It is possible that the samples taken in the previous assessment and from MW-7 could have been just above or below the zone of actual contamination or that the contamination is somewhat discontinuous.

Past WCC spill experience in clayey, low permeability materials such as these suggest that free product may typically migrate slowly downgradient along the water table and be distributed vertically through the substrate from seasonal water table fluctuations. The high retention capacity of the fine-grained materials rapidly immobilizes the free product prior to migrating any great distance. The relatively high hydrocarbon contamination in the soil in MW-4 and the absence of free product in the well would appear to support this.

The presence of free product in MW-1 endorses a previous assumption that some free product may still be present in the tank backfill. Apparently, the presence of product in this well is a recent occurrence, as none was detected in the initial assessment, and it is our understanding that Thrifty has been monitoring the original wells periodically. The sudden appearance of free product in MW-1 could be related to the aforementioned water table mound and the resulting gradient towards MW-1. Also, the water table has been receding recently which tends to stimulate downgradient migration of free product. The low permeability nature of the clayey

substrate surrounding the tank pit area would tend to contain, within the backfill, any free product that may have accumulated from occasional overfills or historical leaks. The product would, however, eventually migrate into the surrounding clays. Because MW-1 is closest to the tank backfill, it would be expected to accumulate product first.

The dissolved hydrocarbon levels found in the wells adjacent to the storage tanks suggest the nearby presence of free product possibly in the tank backfill. The substantial decrease in hydrocarbon concentrations between MW-2 and MW-3 would suggest that the dissolved contaminant plume does not extend very far offsite. The significant decrease in BTX levels between MW-2 and MW-4 would tend to agree with this, although the wells were sampled at different times and the samples analyzed by different labs.

Disposition of the drummed soil cuttings and well development water will have to be coordinated with the Regional Water Quality Control Board due to the hydrocarbon levels found in the sample analyses. Soil containing between 100 and 1000 mg/kg hydrocarbons generally requires disposal in a Class II-1 landfill. There are five drums of soil and one drum of water. It may be possible to aerate the soil onsite to avoid transportation and disposal costs at a regulated landfill.

The discussions, conclusions, and recommendations contained herein are based on the results of the field exploration and laboratory test program and the assumption that the site subsurface conditions do not deviate substantially from those disclosed in the borings and monitoring wells. If subsequent events indicate deviations from the conditions disclosed by our investigation, Woodward-Clyde Consultants should be contacted for further recommendations.

Project No.: 90386A

Date: 11-14-86

Elevation.

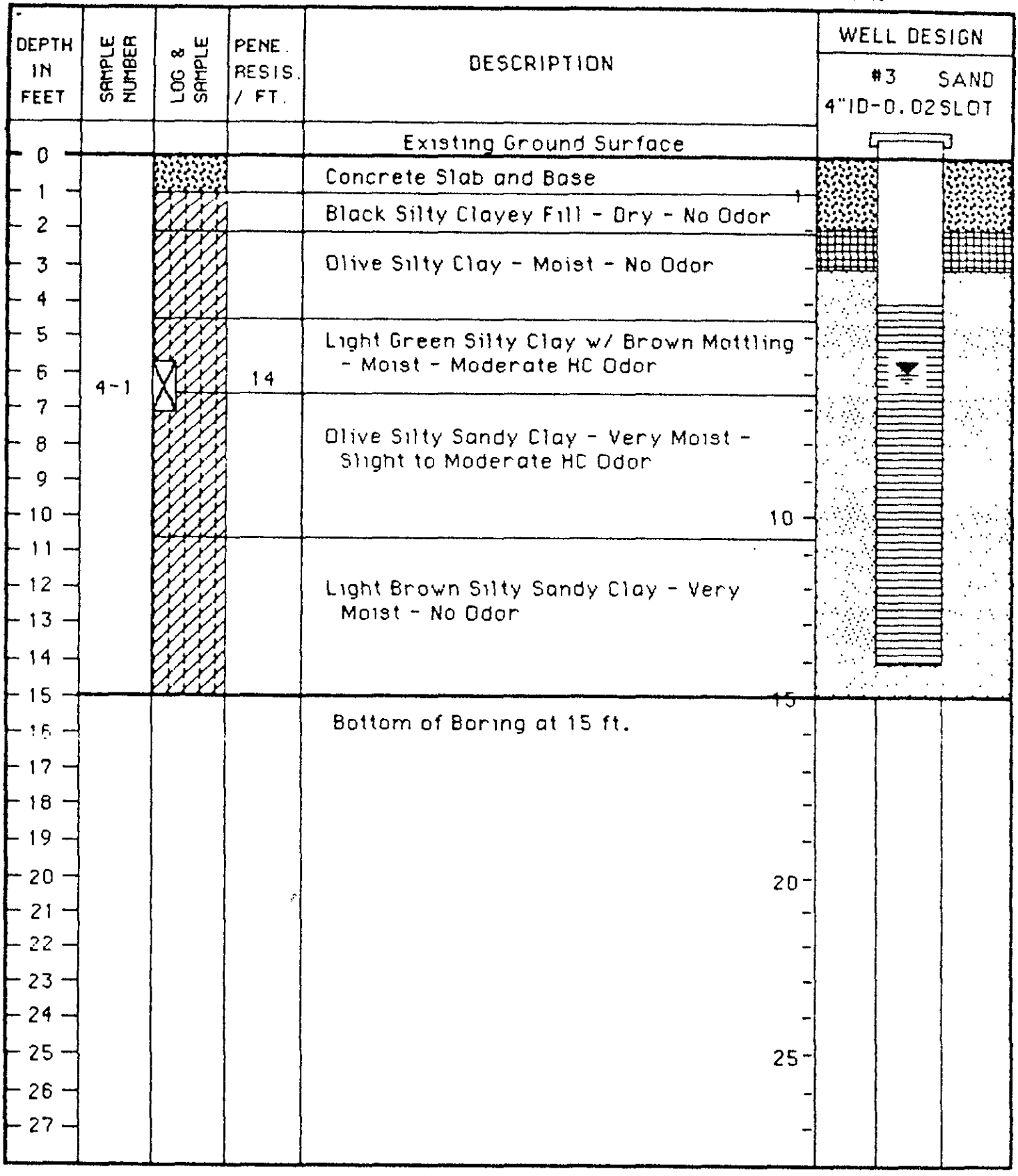


Figure 2 - Test Boring Log No. B-1
- Monitoring Well No. MW-4

Woodward-Clyde Consultants

Project No.: 90386A

Date: 11-14-86

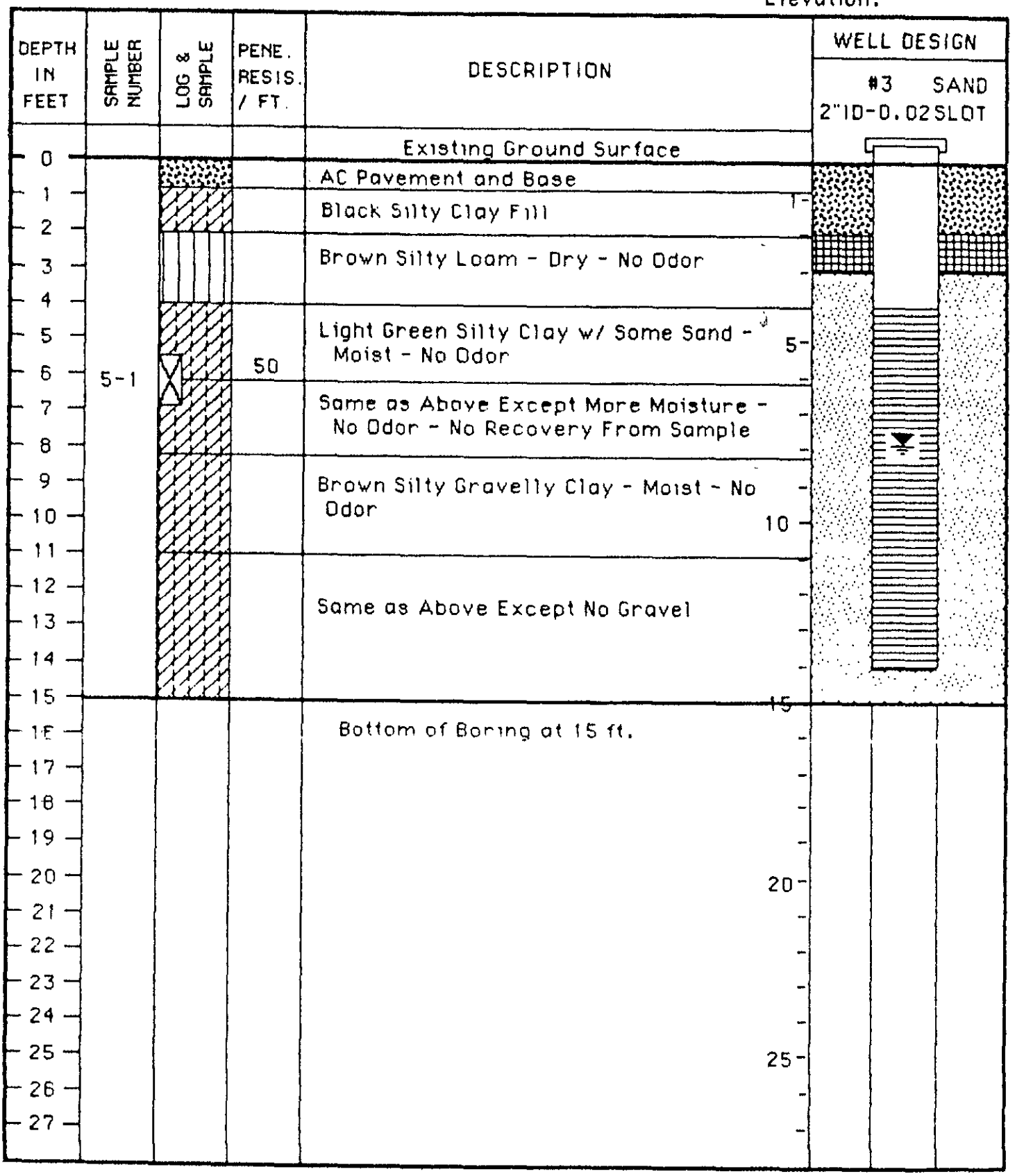


Figure 3 – Test Boring Log No. B-2
– Monitoring Well No. MW-5

Woodward-Clyde Consultants

Project No.: 90386A

Date: 11-14-86

Elevation.

DEPTH IN FEET	SAMPLE NUMBER	LOG & SAMPLE	PENE. RESIS. / FT.	DESCRIPTION	WELL DESIGN
					#3 SAND 2"ID-0.02SLOT
0				Existing Ground Surface	
1				AC Pavement and Base	
2				Black Silty Clayey Fill- Dry - No Odor	
3				Light Brown Silty Clay - Moist - No Odor	
4				Light Brown to Light Green Silty Clay - Moist No Odor	
5					
6	6-1		26	Olive Silty Clay - Moist - No Odor	
7					
8				Light Brown Gravelly Silty Clay - Moist - No Odor	
9					
10					
11				Brown Gravelly Silty Clay, Less Gravel w/ Depth - Very Moist - No Odor	
12					
13					
14					
15					
16				Bottom of Boring at 15 ft.	
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					

Figure 4 - Test Boring Log No. B-3
- Monitoring Well No. MW-6

Woodward-Clyde Consultants

Project No.: 90386A

Date: 11-14-86

Elevation.

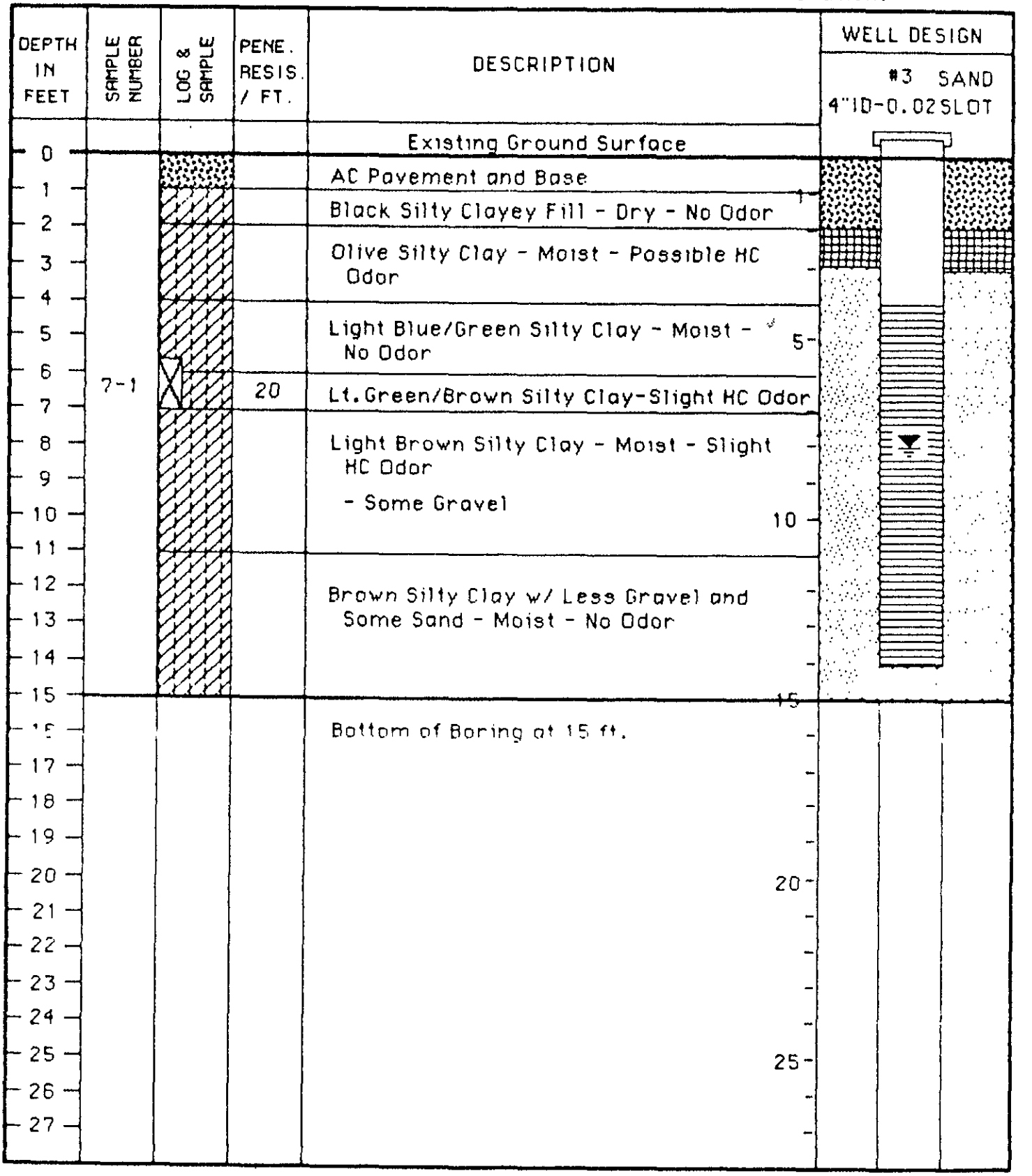


Figure 5 - Test Boring Log No. B-7
- Monitoring Well No. MW-7

Woodward-Clyde Consultants

THRIFTY OIL CO.

November 10, 1986

Alameda County
Environmental Health Services
470 27th Street
Suite 324
Oakland, CA 94612

ATTENTION: Ted Gerow

RE: Thrifty Oil Co. SS #49
3400 San Pablo Avenue
Oakland, California

Dear Mr. Gerow,

Pursuant to our telephone conversation of November 6, 1986 I have enclosed a revised copy of Woodward-Clyde Consultants propsal dated November 7, 1986 for subsurface site assessment for the above referenced location.

As discussed, we will proceed to install wells as outlined by letter and site plan and will submit the results of soil/water analysis to you as they become available.

Please contact me if you have any questions regarding this program.

Yours truly,

Peter D'Amico
Manager
Environmental Affairs

PD/dmt
Enclosure

cc: Peter Johnson, Regional Water Quality Control Board
Mark B. Gilmartin, Straw & Gilmartin

10000 Lakewood Boulevard, Downey, California 90240 (213) 923-9876

100 Pringle Avenue, Suite 30
Walnut Creek, CA 94596-3564
415-945-3000

Woodward-Clyde Consultants

November 7, 1986

Mr. Peter D'Amico
Manager, Environmental Affairs
Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 92040

Subject: Remedial Investigation Proposal for:
Thrifty Oil Company
Service Station No. 49
3400 San Pablo Avenue
Oakland, California

Dear Mr. D'Amico:

Woodward-Clyde Consultants is pleased to submit this revised proposal for the remedial investigation of subsurface contamination at Station 49 in Oakland, California. This proposal is in response to your request of November 5, 1986. The objective of the proposed work will be to delineate the extent of the groundwater contamination identified in a previous investigation at the site and to determine what remedial actions, if any, will be necessary. In light of the results of the previous investigation's groundwater analyses, and the current policies of the cognizant regulatory agencies, we feel that the limits of the contaminate plume should be better defined. Therefore, we propose that four additional groundwater monitoring wells be installed at the site as shown in Figure 1. Well MW-4 is located in the southwest corner of the site to better assess the extent of contamination found in MW-2 and, to some degree, MW-1. The two wells (MW-5 and MW-6) located along the northern boundary of the site will serve to assess the limits of the plume in the northerly direction and/or provide a means for determining background contaminate levels. Well MW-7 has been added to provide some control for potential contamination that could be migrating north from the tank area.

Shallow groundwater in heavily urbanized areas such as the Station 49 site would be expected to contain hydrocarbons and although an active local well was identified in the previous investigation, it is expected to be drawing from a deeper aquifer. Establishing the ambient water quality, existing or potential beneficial uses of the nearsurface groundwater and the construction details of the active well will be required in establishing cleanup levels if such action is deemed necessary. Therefore, we propose that a literature review be conducted to determine, to the extent possible, the above parameters. We anticipate that the proposed well in the northeast corner of the site may be outside the plume and provide the necessary background water quality data.

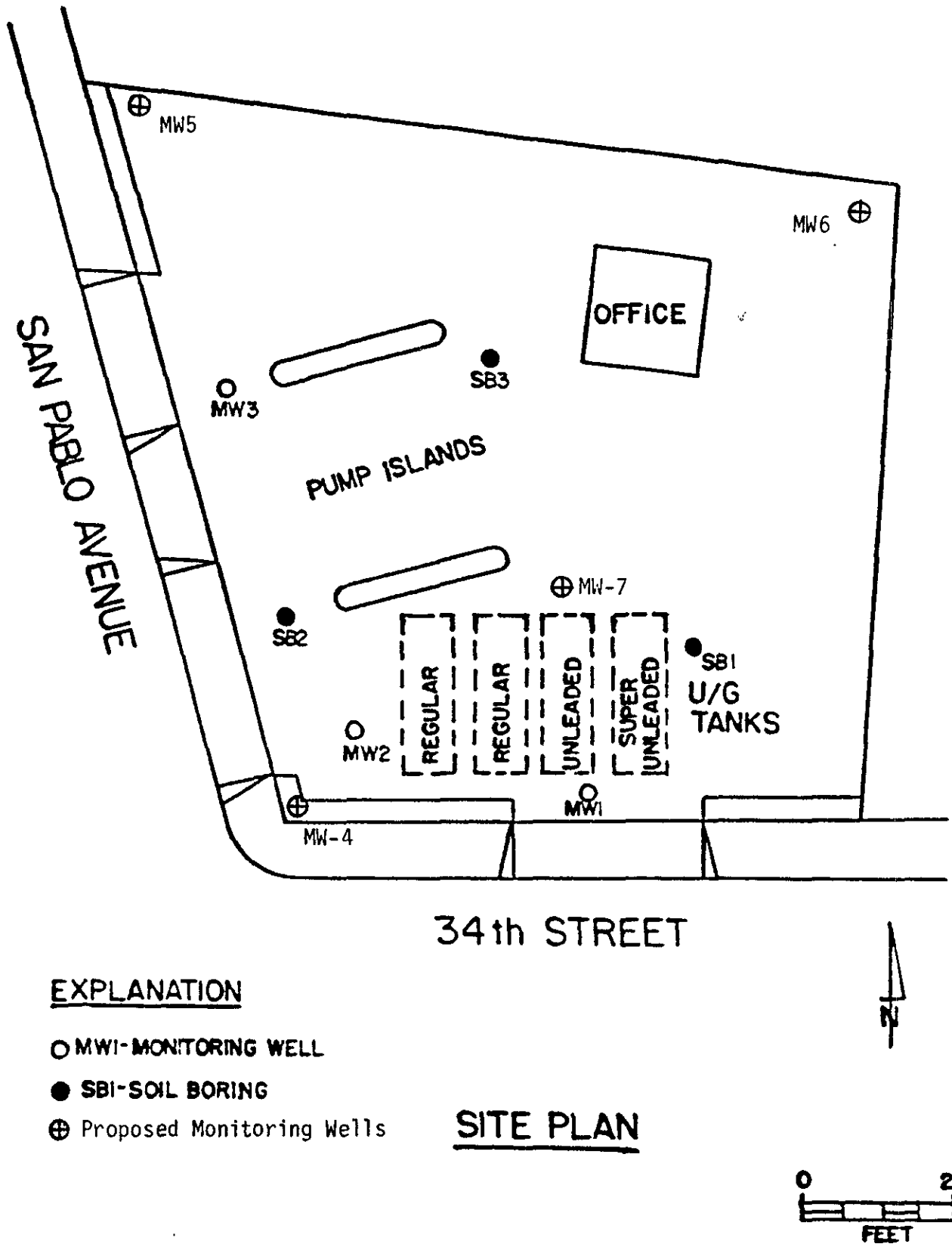


Figure 1. PROPOSED MONITORING WELL LOCATIONS

The monitoring wells will be constructed of PVC casing and extend to a depth of 20 ft. Wells MW-4 and MW-7 will be 4 inches in diameter such that they can be used for recovery should significant levels of contamination be found. Wells MW-5 and MW-6 will be 2 inches in diameter as they will be used for monitoring only. Due to the close proximity of the groundwater to the surface (6 to 7 ft) and the relative absence of soil contamination encountered in the previous investigation, no soil sampling is proposed. The wells will be screened from approximately four feet below grade to the 20 foot completion depth. An annular seal of concrete and bentonite will extend from the surface to a depth of three feet. Locking well caps and traffic rated Christy Boxes will be used to complete the wells at the surface. A composite sample will be taken of the boring cuttings and analyzed for total petroleum hydrocarbons. The cuttings will be drummed, secured, appropriately labeled and left onsite pending the lab results. If the soils are found to contain elevated hydrocarbon levels, then various disposal options will be explored.

All wells will be developed following installation and sampled. As with the cuttings, the development water will be placed in drums, secured, appropriately labeled and left onsite pending the lab results of the well samples. Should the contaminant levels require special disposal, a hazardous material disposal service will be contracted to provide transportation and proper disposal. The water samples will be analyzed for total petroleum hydrocarbons, benzene, toluene and xylene using EPA Method 602 or equivalent. Upon completion of the site investigation and receipt of the laboratory results, a report will be prepared and submitted to Thrifty Oil Co. The report will include a summary of activities conducted at the site, boring/well logs, laboratory results and a description of local groundwater uses and ambient water quality. Based on the findings of the investigation, a discussion of our conclusions and recommendations for additional investigative or remedial activities, if any, will also be included in the report.

The estimated costs for completing the proposed investigation are given in Table 1. A schedule of our current fees and charges is also attached. The costs assume no extenuating circumstances or problems will arise in obtaining well permits and that all permit fees and deposits will be paid by Thrifty.

We look forward to working with you on this project and if you have any questions or require additional detail, please contact Mr. Martin Cramer who will be the engineer managing the investigation.

Sincerely,

James D. Sartor
Manager,
Environmental and Engineering Services

JDS:lnb
THRIFTY-LR

TABLE 1. ESTIMATED COST BREAKDOWN*

1.	Project Management - regulatory interaction, Q.A. health and safety, field coordination, etc.		
	24 hrs Project Manager	$ 1,920	
	4 hrs Project Reviewer	400	
	2 hrs Health and Safety Officer	120	
			$ 2,440
2.	Well Installation, Development, Permits and Sample Analysis		
	10 hrs Driller	$ 1,500	
	4 hrs Project Manager	320	
	14 hrs Geologist	780	
	1 Equipment Rental	140	
	1 Materials	1100	
	6 ea Sample Analysis	1300	
	8 hrs Field Technician	320	
			$ 5,460
3.	Groundwater Use Survey		
	16 hrs Hydrogeologist	1040	
			$ 1,040
4.	Waste Disposal**		
	2 drum Development Water	400	
	4 drums Soil Cuttings	800	
			$ 1,200
5.	Report Preparation		
	8 hrs Geologist	480	
	16 hrs Project Manager	1,280	
	4 hrs Secretary	160	
			$ 1,920
6.	Miscellaneous		
	Travel and miscellaneous expenses	150	
	Phone, copying, mailing charges	50	
	Contingency-10 percent	1,400	
			$ 1,440
			$13,500

* Assumes no additional sampling or analysis will be required by the agencies

** May not be required.

WOODWARD-CLYDE CONSULTANTS

Environmental and Engineering Services

1986 SCHEDULE OF CHARGES

This Schedule of Charges applies to services rendered in the current year and until a new schedule of charges is issued. A new schedule of charges is issued at the beginning of each year. Unless other arrangements have been made, charges for all services, including those for projects initiated in the prior year, will be based on the new schedule of charges.

Service of Personnel

Personnel charges are for professional, technical, and support services directly related to projects. Personnel charges are not made for secretarial service, office management, accounting and maintenance, since these items are included in overhead. Personnel categories and corresponding hourly rates are as follows:

Personnel Category	Hourly Rate
Principal, Senior Consultant	$125
Senior Associate	115
Associate	105
Senior Project*	100
Project*	80
Senior Staff*	65
Staff*	55
Draft person, Editor	50
Technical Field or Office Assistant	40
Technical Typist, Word Processor, Printer	40

*Includes Engineer, Geologist, Chemist, Scientist, Etc.

Time for preparation of and providing expert testimonies and depositions is charged at a rate of $150 per hour with a minimum of 4 hours per day. A premium of $15 per hour is added to the hourly rates of nonexempt personnel for overtime. Travel time is charged at hourly rates with a maximum of 8 hours per day. Charges for contract personnel are made according to the hourly rate of their category.

WCC Laboratory and Computer Services

Services rendered by WCC laboratories and computer facilities are charged in accordance with the applicable Schedule of Laboratory Charges and Schedule of Computer Charges, which are available upon request.

WCC Equipment and Vehicle Rentals

WCC equipment (such as surveying, geotechnical, geology, water resources, geophysical, seismology, microcomputer, health and safety, etc.) and WCC vehicles used on a project are charged in accordance with the applicable Schedule of Equipment and Vehicle Rentals which is available upon request.

Other Direct Expenses

Other expenses directly identifiable to the project including (but not limited to) those examples listed below will be charged at cost times 1.15.

Personal Expenses (such as travel, subsistence and vehicle rentals incurred by personnel while on project activities)
Subcontracts
Outside Consultants and Services
Equipment or Sample Shipping
Communications (telephone, telex, telecopy, courier, etc.)
Special Supplies (drafting and printing, photos, reference materials, expendable materials such as containers and chemicals, etc.)
Special Fees, Licenses, Permits, Insurances, etc.

100 Pringle Avenue, Suite 300
Walnut Creek, CA 94596-3564
415-945-3000

Woodward-Clyde Consultants

October 18, 1986

Mr. Peter D'Amico
Manager, Environmental Affairs
Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, CA 92040

Dear Mr. D'Amico:

Woodward-Clyde Consultants is pleased to submit this letter proposal for the remedial investigation of subsurface contamination at Station 49 in Oakland, California. This proposal is in response to your request of October 1, 1986. The objective of the proposed work will be to delineate the extent of the groundwater contamination identified in a previous investigation at the site and to determine what remedial actions, if any, will be necessary. In light of the results of the previous investigation's groundwater analyses, and the current policies of the cognizant regulatory agencies, we feel that the limits of the contaminate plume should be better defined. Therefore, we propose that three additional groundwater monitoring wells be installed at the site as shown in Figure 1. Due to the close proximity of wells MW-1 and MW-2 to the property boundary, one of the proposed wells will have to be located in the adjacent street. Special permits and precautions (e.g. traffic control) will be required for the installation of those wells but should not present any significant problems. The other two wells are located onsite and serve to assess the limits of the plume in the northerly direction and/or provide a means for determining background contaminate levels.

Shallow groundwater in heavily urbanized areas such as the Station 49 site would be expected to contain hydrocarbons and although an active local well was identified in the previous investigation, it is expected to be drawing from a deeper aquifer. Establishing the ambient water quality, existing or potential beneficial uses of the nearsurface groundwater and the construction details of the active well will be required in establishing cleanup levels if such action is deemed necessary. Therefore, we propose that a literature review be conducted to determine, to the extent possible, the above parameters. We anticipate that the proposed well in the northeast corner of the site may be outside the plume and provide the necessary background water quality data. The monitoring wells will be constructed of 2 inch PVC casing and extend to a depth of 20 ft. Due to the close proximity of the groundwater to the surface (6 to 7 ft) and the relative absence of soil contamination encountered in the previous investigation, no soil sampling is proposed. The wells will be screened from approximately four feet below grade to the 20 foot completion depth. An annular seal of concrete and bentonite will extend from the surface to a depth of three feet. Locking well caps and traffic rated Christy Boxes

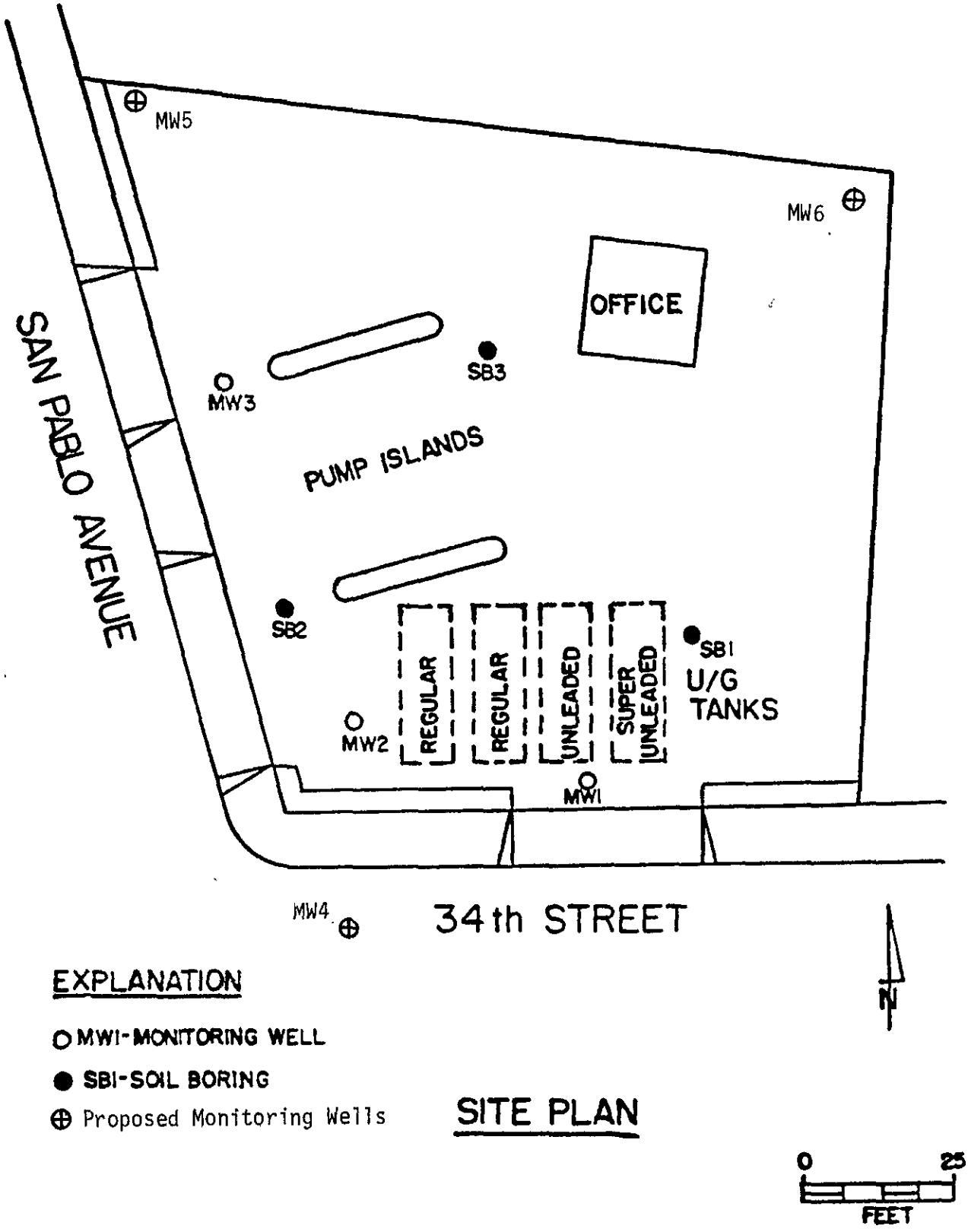


Figure 1. PROPOSED MONITORING WELL LOCATIONS

will be used to complete the wells at the surface. A composite sample will be taken of the boring cuttings and analyzed for total petroleum hydrocarbons. The cuttings will be drummed, secured, appropriately labeled and left onsite pending the lab results. If the soils are found to contain elevated hydrocarbon levels, then various disposal options will be explored.

All wells will be developed following installation and sampled. As with the cuttings, the development water will be placed in drums, secured, appropriately labeled and left onsite pending the lab results of the well samples. Should the contaminant levels require special disposal, a hazardous material disposal service will be contracted to provide transportation and proper disposal. The water samples will be analyzed for total petroleum hydrocarbons, benzene, toluene and xylene using EPA Method 602 or equivalent. Upon completion of the site investigation and receipt of the laboratory results, a report will be prepared and submitted to Thrifty Oil Co. The report will include a summary of activities conducted at the site, boring/well logs, laboratory results and a description of local groundwater uses and ambient water quality. Based on the findings of the investigation, a discussion of our conclusions and recommendations for additional investigative or remedial activities, if any, will also be included in the report.

The estimated costs for completing the proposed investigation are given in Table 1. A schedule of our current fees and charges is also attached. The costs assume no extenuating circumstances or problems will arise in obtaining well permits and that all permit fees and deposits will be paid by Thrifty.

We look forward to working with you on this project and if you have any questions or require additional detail, please contact Mr. Martin Cramer who will be the engineer managing the investigation.

Sincerely,

James D. Sartor

James D. Sartor
Manager, Environmental and Engineering Services

JDS:lnb
THRIFTY-LR

Table 1. STATION 49 WELL MEASUREMENT AND PRODUCT RECOVERY DATA*

Well No.	Relative Casing Elev.	1/6/88 Depth to Water	1/6/88 Corrected** Water Elev.	1/6/88 Product Thickness	1/27/88 Depth to Water	1/27/88 Corrected** Water Elev.	1/27/88 Product Thickness	2/17/88 Depth to Water	2/17/88 Corrected** Water Elev.	2/17/88 Product Thickness	3/9/88 Depth to Water	3/9/88 Corrected** Water Elev.	3/9/88 Product Thickness	3/30/38 Depth to Water	3/30/38 Corrected** Water Elev.	3/30/38 Product Thickness	Depth to Water	Corrected** Water Elev.	Product Thickness
MW-1	98.03	4.72	93.31	0	4.94	93.09	0	5.43	92.62	0.03	5.89	92.20	0.08	6.24	91.84	0.07			
MW-2	97.44	4.54	92.90	0	4.92	92.52	0	5.41	92.04	0.03	5.74	91.70	0.01	5.78	91.66	0			
MW-3	97.69	6.71	90.98	0	6.83	90.86	0	7.01	90.69	0.03	7.20	90.49	0	7.32	90.37	0.05			
MW-4	97.33	4.40	92.93	0	4.81	92.52	0.01	5.20	92.14	0.03	5.50	91.85	0.06	5.60	91.74	0.04			
MW-5	98.85	3.62	95.23	0	4.00	94.85	0	4.32	94.53	0	5.27	93.58	0	5.88	92.97	0			
MW-6	99.67	4.45	95.22	0	4.30	95.37	0	5.15	94.52	0	5.59	94.08	0	6.80	92.87	0			
MW-7	99.02	5.13	93.89	0	5.81	93.21	0	6.52	92.50	0	6.85	92.17	0	7.02	92.0	0			

Product Recovered (gal)												
Current	0		0		0		0.1		0.05			
Cumulative	8.08		8.08		8.08		8.18		8.23			

* All measurements given in feet except where noted otherwise

** Water table elevation corrections assume a gasoline-specific gravity of 0.75

N.T. - Not Taken