

SUBSURFACE INVESTIGATION FOR PETROLEUM
HYDROCARBON CONTAMINATION ASSESSMENT

THRIFTY OIL STATION #054
2504 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

PREPARED FOR:

Thrifty Oil Co.
1000 Lakewood Boulevard
Downey, California 90240

PREPARED BY:

Hydrotech Consultants, Inc.
5 Mason
Irvine, California 92718

JOB NO: 13-6782-002-34-00
LOG NO: H7-1070

JANUARY 14, 1987

SUBSURFACE INVESTIGATION FOR
PETROLEUM HYDROCARBON CONTAMINATION ASSESSMENT
THRIFTY OIL STATION #054

TABLE OF CONTENTS

	<u>Page</u>
1.0 INTRODUCTION	1
1.1 Site Description	1
1.2 Scope of Investigation	2
2.0 GEOLOGY AND GEOHYDROLOGY	2
3.0 INVESTIGATION PROCEDURES	3
3.1 Drilling and Soil Sampling	3
3.2 Laboratory Analysis	4
4.0 DATA EVALUATION	5
4.1 Findings and Conclusions	5
4.2 Conceptual Remedial Action Plan	7
5.0 LIMITATIONS OF INVESTIGATION	8

ATTACHMENTS

TABLES

- I Depth of Soil Sample Collection
- II Results of Laboratory Analyses

FIGURES

- 1 Location Map

APPENDICES

- A References
- B Field Investigation
Description of Sampling, Handling and
Preparation Procedures
Plot Plan, Figure B-1
Key to Logs, Figure B-2
Boring Logs, Figures B-3 through B-6
- C Laboratory Test Results
Laboratory Results Reports from
Truesdail Laboratories, Inc.
- D Chain-of-Custody Documents
- E Thrifty Oil Co. - Scope of Work

SUBSURFACE INVESTIGATION FOR PETROLEUM
HYDROCARBON CONTAMINATION ASSESSMENT

THRIFTY OIL STATION #054
2504 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

PREPARED FOR:

Thrifty Oil Co.
10000 Lakewood Boulevard
Downey, California 90240

PREPARED BY:

Hydrotech Consultants, Inc.
5 Mason
Irvine, California 92718

JOB NO: 13-6782-002-34-00
LOG NO: H7-1070

JANUARY 14, 1987



HYDROTECH CONSULTANTS, INC.
GROUNDWATER AND HAZARDOUS WASTE MANAGEMENT

SUBSURFACE INVESTIGATION FOR
PETROLEUM HYDROCARBON CONTAMINATION ASSESSMENT
THRIFTY OIL STATION #054
CASTRO VALLEY, CALIFORNIA

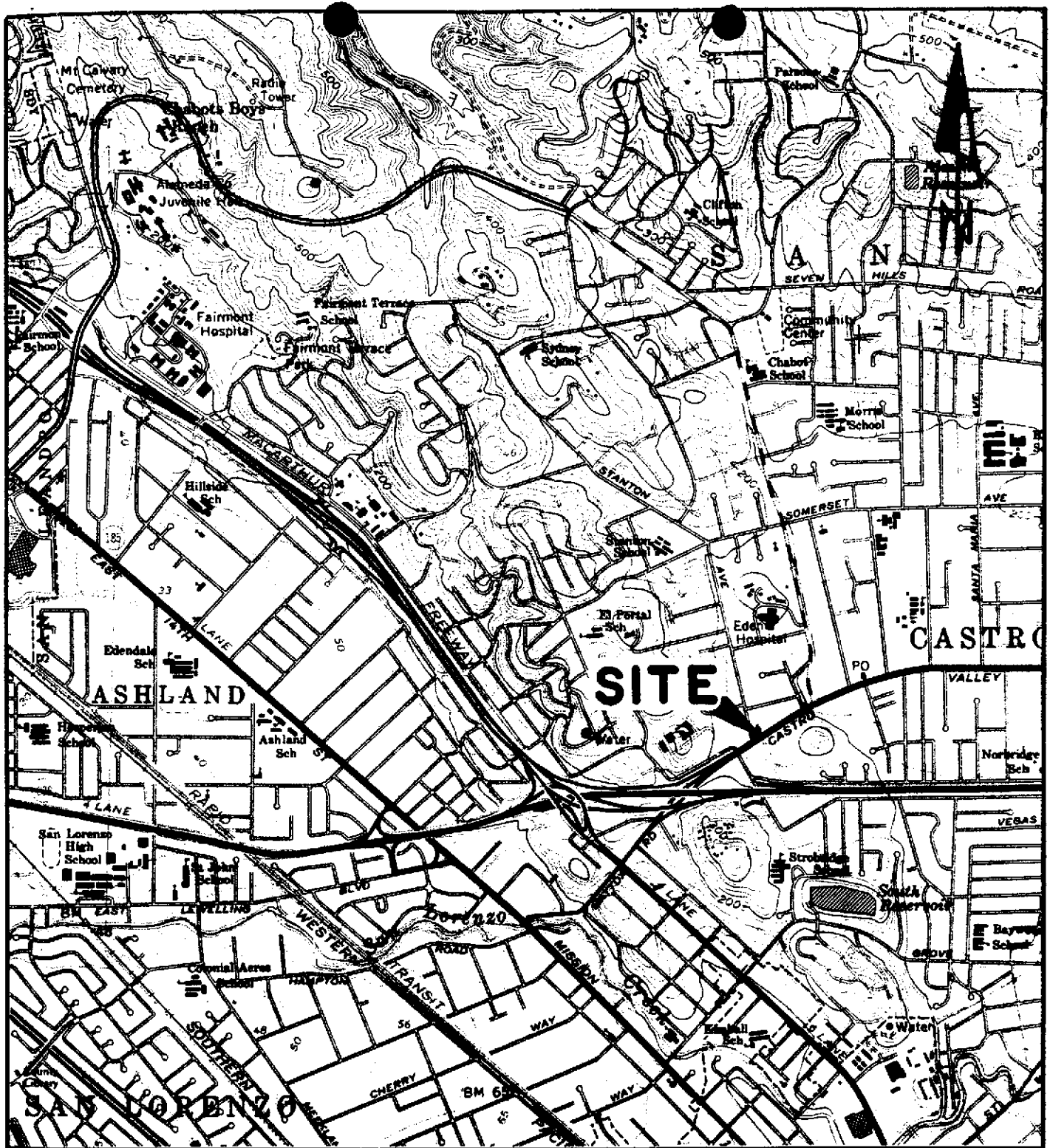
1.0 INTRODUCTION

This report presents the results of a subsurface investigation performed at the subject site located at 2504 Castro Valley Boulevard in the City of Castro Valley, California (see Figure 1, Location Map). The site is currently occupied by an operating Thrifty Oil Co. (Thrifty) Service Station for the retail sale of various gasoline and petroleum products. This investigation was performed in response to a request from Thrifty to evaluate the site for the presence of any petroleum hydrocarbon contamination. The investigation was confined to the subsurface soil materials surrounding the underground storage tanks located in the northwest portion of the site. The purpose of this report is to document the specific procedures and equipment utilized during the investigation and to describe the observations, findings and results of our investigation.

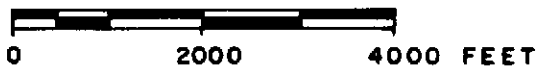
1.1 Site Description

The subject site is located at the northeast corner of the intersection of Castro Valley Boulevard and Stanton Avenue in the City of Castro Valley, California. An operating Thrifty Oil Co. service station currently exists on-site. The Thrifty facilities consist of: three pump islands, a cashier's booth, and three underground fuel storage tanks.

The storage tanks contain regular unleaded, regular leaded, and unleaded premium gasoline. The storage



SCALE:



ADAPTED FROM U.S.G.S. 7.5' HAYWARD QUADRANGLE, (1959)

LOCATION MAP

JOB NO.:
13-6782-002-34-00

DATE:
JANUARY 1987

FIGURE:
1

capacity of each individual tank is 12,000 gallons. Locations of the tanks are shown relative to existing structures on Figure B-1, Plot Plan.

1.2 Scope of Investigation

The scope of work for this investigation is in direct response to parameters established by Thrifty Oil Co. Appendix E contains the original scope of work for this investigation as presented by Thrifty.

2.0 GEOLOGY AND GEOHYDROLOGY

The site is located within the San Francisco Bay structural depression of the Coast Ranges Physiographic Province in Alameda County. Bedrock in the vicinity is composed of Cretaceous age sandstones, shales, and conglomerates. Specifically, shallow bedrock beneath the site consists primarily of shale. Based on the local topographic gradient, shallow groundwater is expected to flow towards the west. However, groundwater was not encountered in any of the exploratory excavations, each drilled to a maximum depth of 20 feet.

Fill materials observed during our subsurface investigation consist of dark gray to black clay, moist, soft, and locally containing bricks and construction debris. Maximum thickness of fill observed was four feet. Subsurface native soil (interpreted to represent weathered bedrock) encountered during drilling operations consisted of red to greenish gray clay and silty clay with traces of shale clasts; it was firm near ground surface and very stiff at depths exceeding 10 feet. Bedrock was encountered at

approximately 14 feet below ground surface and consisted of fractured yellowish brown and red shale. Bedrock was hard, well indurated, and intermittently fractured. Detailed lithologic descriptions of each boring are shown in Appendix B, Figures B-3 through B-6.

3.0 INVESTIGATIVE PROCEDURES

The investigation was conducted according to the planned scope of work. Four vertical borings were completed, each to a depth of 20 feet. Sampling of soil was performed at five foot intervals. All borings were backfilled with a 50-50 mixture of clean sand and bentonite to within six inches of the existing ground surface. Each boring was then capped with approximately six inches of asphalt. Soil cuttings which appeared contaminated were placed into D.O.T. approved hazardous waste drums (17-H), sealed, and left on site for future disposal.

3.1 Drilling and Soil Sampling

The borings were completed on December 17, 1986 by Interstate Soils Sampling under the observation of an engineering geologist from Hydrotech. Drilling was conducted using a truck-mounted hollow stem auger rig. Standard care and practice relating to sample collection and handling was employed. Details of sample collection, care and handling are described in Appendix B.

Table I shows the borings with the corresponding depths at which soil samples were collected.

TABLE I

Boring Number	Sample Depth Depth (feet)	OVM Reading(ppm)	Visual Inspection
B-1	5	>500	No discoloration observed
B-1	10	>500	"
B-1	15	50	"
B-1	20	20	"
B-2	5	>500	"
B-2	10	70	"
B-2	15	20	"
B-3	5	500	"
B-3	10	95	"
B-3	15	70	"
B-4	5	500	"
B-4	10	300	"
B-4	15	75	"

3.2 Laboratory Analysis

Chemical analyses were performed on selected soil samples by Truesdail Laboratories, Inc., an independent testing laboratory located in Tustin, California. Soil samples were analyzed for total petroleum hydrocarbons, the constituent stored in the underground tanks, using infrared spectrophotometry, EPA approved method 418.1. Official laboratory results are included in Appendix C. Chain-of-custody procedures were followed and copies of these documents are included in Appendix D.

4.0 DATA EVALUATION

4.1 Findings and Conclusions

Indications of petroleum hydrocarbons were detected in significant amounts with the organic vapor (OVM) meter in samples from all borings at depths ranging from 5 to 10 feet below ground surface. OVM readings exceeding 500 ppm were observed in all samples collected from 5 feet and readings from the 10 foot depth ranged from 70 ppm to over 500 ppm. Readings taken on samples from depths exceeding 10 feet below ground surface were considered low or possibly background and ranged from 20 to 75 ppm. A corresponding petroleum odor was detected in soil samples collected from depths of less than 10 feet and only slight petroleum odors were detected in the sample collected from below the 15 foot depth.

Visible staining or discoloration of soil materials was not observed in any boring. Strong indications of contamination observed in the field were confirmed by results of laboratory analyses on corresponding samples. The soil sample collected from a depth of 20 feet in Boring B-1 showed no field indications; but, 420 ppm was detected in the laboratory results. Hydrocarbon concentrations ranging from 250 ppm to 1,120 ppm were detected in samples from depths of 10 feet or less. Results of laboratory analyses are presented below in Table II.

The following list of samples are those selected for laboratory analysis due to field indications of petroleum hydrocarbon contamination.

TABLE II

<u>Boring Number</u>	<u>Sample Depth (feet)</u>	<u>Petroleum Hydrocarbon Concentration mg/kg</u>	<u>Sample Type</u>
B-1	5	230	Soil
B-1	10	1,120	Soil
B-1	20	420	Soil
B-2	5	320	Soil
B-2	15	<1	Soil
B-3	5	830	Soil
B-3	15	<1	Soil
B-4	5	850	Soil
B-4	15	4	Soil

The findings from our investigation indicate that contamination has been released into the soils around the tank cluster. However, because of the impervious nature of the native soil materials underlying the site, the contamination is generally confined to the upper 10 feet, with a possibly isolated pocket at a depth of 20 feet near Boring B-1. It is not possible within the scope of this investigation to determine if contamination is a result of overspillage during past refueling operations or a result of a leaking underground storage tank system. Shallow soil material (0 to 15 feet) generally consists of clay. Typically, gasoline entering this soil type will migrate at a very slow rate. Thus, it is quite possible that the contamination found in the subsurface is confined to the tank backfill and has migrated only a short distance into the native soil materials. This possibility should be investigated as part of a remedial action for this site and incorporated into an additional drilling program.

4.2 Conceptual Remedial Action Plan

We have concluded, based upon our exploratory borings, laboratory testing, and field observations that petroleum hydrocarbons have been released into the surrounding soils around the tank cluster to a depth of at least 20 feet. We recommend the following steps be initiated to begin mitigation of contamination.

- o A program of hydrostatic tank testing as outlined by the California Administrative Code Title 23.
- o Further drilling and soil testing around the tank cluster to further define the lateral and vertical extent of the contamination plume. Given the horizontal and vertical distribution of contamination found during this investigation, it is quite possible that the tank backfill material is very highly contaminated. Thus, an attempt should be made to drill into this backfill material to obtain representative soil samples.
- o Due to the finding of substantial concentrations of contamination in the subsurface soil materials, regulatory agencies may regard this site as a possible threat to groundwater quality. Hydrotech recommends that the appropriate agencies be contacted and advised of the results of this investigation. Any additional investigations performed at this site prior to consultation with regulatory agencies, could be inadequate in scope.

5.0 LIMITATIONS OF INVESTIGATION

Our investigation was performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable Soils Engineers and Geologists practicing in this or similar localities. No other warranty, expressed or implied, is made as to the conclusions and professional advice included in this report.

The samples taken and used for testing and the observations made are believed representative of the entire project; however, soil and geologic conditions as well as groundwater conditions can vary significantly between borings, test pits, and surface outcrops.

As in most major projects, conditions revealed by excavation may be at variance with preliminary findings. If this occurs, the changed conditions must be evaluated by the Project Soils Engineer and Geologist and designs adjusted as required or alternate designs recommended.

This report is issued with the understanding that it is the responsibility of the owner, or of his representative, to ensure that the information and recommendations contained herein are brought to the attention of the regulatory agencies.

The findings of this report are valid as of the present date. However, changes in the conditions of a property can occur with the passage of time, whether they be due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly,

Thrifty Oil Co.
January 14, 1987

JOB NO: 13-6782-002-34-00
LOG NO: H7-1070
Page 9

the findings of this report may be invalidated wholly or partially by changes outside our control.

The opportunity to be of service is appreciated. If you have any questions, please call.

Very truly yours,

HYDROTECH CONSULTANTS, INC.

Scott Neville
Scott Neville
Staff Geologist

Mary T. Carlin
Gary T. Carlin
Senior Engineering Geologist

REVIEWED BY:

John H. Foster
Dr. John H. Foster, C.E.G. 1134
Vice President
Registration expires June 30, 1988

SN:GTC:JHF/cle

Distribution: (3) Addressee

APPENDIX A

REFERENCES

REFERENCES

1. California Division of Mines and Geology, 1966, Geology of Northern California, Bulletin 190.
2. California Administrative Code, Title 23 Waters; Chapter 3 Water Resources Control Board; Subchapter 16: Underground Tank Regulations; Table 4.1: Monitoring Alternatives.
3. Alt, David D. and Hyndman, Donald W., 1978, Roadside Geology of Northern California, Mountain Press Publishing Co.
4. Norris, Robert M. and Webb, Robert W., 1975, Geology of California, John Wiley and Sons, Inc.

APPENDIX B

FIELD INVESTIGATION

DESCRIPTION OF SAMPLING, HANDLING AND PREPARATION PROCEDURES

Auger flights were hollow-stem types with an inside diameter of 3.25 inches and an outside diameter of 8.0 inches. Individual auger flights were five feet in length. Soil samples were collected at five foot intervals. A retractable plug prevented soil from entering into the auger flights during the boring process. The plug, which is inserted or retrieved by a wireline, is at the end of a 140 pound drive hammer. When a target depth is reached, a Modified California Sampler is placed at the bottom of the hammer and lowered by wireline to the bottom of the boring. The sampler is then driven into the soil by repeatedly raising and dropping the hammer 30 inches until the sampler has been advanced 12 inches. This driving action forces relatively undisturbed soil into the sampler barrel. Details of the components of the Modified California Sampler are described below. Following the driving operation, the hammer and sampler are retrieved from the boring and separated; soil is removed from the sampler and prepared for shipment to an analytical laboratory.

The Modified California Sampler consists of an outer sampler barrel and an inner, thin-walled set of rings. As soil is forced into the sample barrel by the driving action described above, a soil sample is collected in the inner rings. For this application, two 6-inch long by 2.5-inch diameter brass rings were used. After retrieval from the boring and subsequent detachment from the hammer, the sampler was dismantled and the inner rings containing the soil sampler were removed. The lower ring was sealed by covering the ends with aluminum foil, placing plastic caps on each tube end, and securing the caps with duct tape. The sample was then labeled and placed in an ice chest for cold storage. These soil samples were later placed in a refrigerator for temporary storage.

Each soil sample collected was analyzed for possible hydrocarbon contamination by use of an organic vapor meter (Gastechtor model 1314). A portion of the sample was placed in a sealable (ziplock) plastic bag. After the bag had been sealed for a minimum of 5 minutes the sample was "sniffed" and the meter readings (parts per million) recorded on the boring log. The model 1314 Gastechtor-Hydrocarbon Surveyor is a battery-powered instrument that can detect and indicate concentrations of combustible gas or vapor in air, in the explosibility and parts per million ranges. Samples under test are drawn continuously by means of a built-in pump and analyzed for combustible gas on a heated catalytic platinum element. This instrument will respond to at least 23 different gases including various petroleum products. Because the Gastechtor will show positive readings for gases which occur naturally in soil materials (for example, methane, hydrogen sulfide and chloroform), the readings produced by the instrument were used along with visual inspection of soil materials in determining whether or not soil samples were believed contaminated and should be sent to the laboratory. After a

DESCRIPTION OF SAMPLING, HANDLING AND PREPARATION PROCEDURES

- CONTINUED -

review of all field data, selected soil and/or groundwater samples would then be forwarded to the analytical lab.

To avoid cross-contamination between samples and boreholes, the Modified California Sampler and the brass ring inserts were cleaned before each use. The sampling equipment was washed with an aqueous solution of trisodium phosphate, rinsed twice with tap water and allowed to air dry.

During drilling operations the groundwater surface was checked for free floating petroleum product using a fiberglass measuring tape coated with petroleum indicating paste (Kolor Kut).

Groundwater samples were collected after checking for floating product during drilling operations using a stainless steel hand bailer attached to a nylon cord. The bailer was lowered into the boring through the auger stems to extract a groundwater sample. Prior to sampling of each individual boring, the bailer was washed with an aqueous solution of commercial detergent (TSP) and rinsed with tap water. Groundwater samples from the bailer were then placed into two 500 ml polyurethane bottles and put into an ice chest for temporary storage. After a review of all field data, selected groundwater samples were delivered to the analytical lab.

DATE OBSERVED: 12-17-86 METHOD OF DRILLING: Hollow Stem Auger

LOGGED BY: SAW GROUND ELEVATION: 180' LOCATION: See Plot Plan Station #054

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	BORING NO. B-1	SOIL TEST
							DESCRIPTION	
0							ARTIFICIAL FILL: Dark gray to brown CLAY, moist, construction debris, brick, asphalt present, petroleum odor noted	Gastechtor Reading
5	CL	13	█				NATURAL GROUND: WEATHERED BEDROCK Gray to gray green, CLAY, moist stiff, petroleum odor noted	>500 ppm
10		25	█				@ 10' petroleum odor noted	>500 ppm
15		54	█				BEDROCK: Greenish brown SHALE, slightly moist, hard	50 ppm
20		44 6"	█					20 ppm
25							TOTAL DEPTH: 20 FEET NO GROUNDWATER	
30								
35								
40								

DATE OBSERVED: 12-17-86 METHOD OF DRILLING: Hollow Stem Auger

LOGGED BY: SAW GROUND ELEVATION: 180' LOCATION: See Plot Plan Station #054

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	BORING NO. B-2	SOIL TEST
							DESCRIPTION	
0							NATURAL GROUND: WEATHERED BEDROCK	Gastechtor Reading
6	CL	19	█				Greenish gray CLAY, slightly moist very stiff @ 5' petroleum odor noted	> 500 ppm
10		22	█				@ 10' color change to light brown	70 ppm
15		59	█				BEDROCK: Reddish brown fractured SHALE, dry hard	20 ppm
20							TOTAL DEPTH: 15 FEET NO GROUNDWATER	
25								
30								
35								
40								

JOB NO.: 13-6782-002-34-00 LOG OF BORING FIGURE: B-4

DATE OBSERVED: 12-17-86 METHOD OF DRILLING: Hollow Stem Auger

LOGGED BY: SAW GROUND ELEVATION: 180' LOCATION: See Plot Plan #054

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	BORING NO. <u>B-3</u>	SOIL TEST
							DESCRIPTION	
0	CL						ARTIFICIAL FILL: Black CLAY, moist, stiff	Gastector Reading
5	CL	19	█				NATURAL GROUND: WEATHERED BEDROCK Green-brown CLAY, slightly moist, very stiff, shale fragments, petroleum odor noted	500 ppm
10		22	█				@ 10' slight petroleum odor noted	95 ppm
15		68	█				BEDROCK Yellowish brown SHALE, dry, hard, fractured	70 ppm
20							TOTAL DEPTH: 15 FEET NO GROUNDWATER	
25								
30								
35								
40								

JOB NO.: 13-6782-002-34-00

LOG OF BORING

FIGURE: B-5

DATE OBSERVED: 12-17-86 METHOD OF DRILLING: Hollow Stem Auger

LOGGED BY: SAW GROUND ELEVATION: 180' LOCATION: See Plot Plan Station #054

DEPTH (FEET)	CLASSIFICATION	BLOWS/FOOT	UNDISTURBED SAMPLE	BULK SAMPLE	MOISTURE CONTENT (%)	IN PLACE DRY DENSITY (PCF)	BORING NO. <u>B-4</u>	SOIL TEST
							DESCRIPTION	
0							ARTIFICIAL FILL:	Gastechtor Reading
5	CL	16	■				NATURAL GROUND: WEATHERED BEDROCK Gray green CLAY, slightly moist, very stiff, petroleum odor noted	500 ppm
10		15	■				@ 10' slight petroleum odor noted	300 ppm
15		34 4"	■				@ 15' becomes hard, slight petroleum odor	75 ppm
20							TOTAL DEPTH: 15 FEET NO GROUNDWATER	
25								
30								
35								
40								

JOB NO.: 13-6782-002-34-00

LOG OF BORING

FIGURE: B-6



STANTON AVENUE

BUILDING

UNDERGROUND STORAGE TANKS

B-2

B-3

B-4

B-1

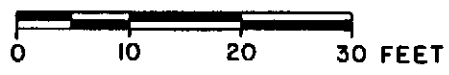
CASHIER BOOTH

CANOPY

PUMP ISLANDS

CASTRO VALLEY BOULEVARD

APPROXIMATE SCALE:



EXPLANATION:

B-4 EXPLORATORY BORING

PLOT PLAN OF THRIFTY OIL STATION #054

JOB NO.: 13-6782-002-34-00

DATE: JANUARY 1987

FIGURE: B-1

DEFINITION OF TERMS						
PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS		
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)		GW	Well graded gravels, gravel-sand mixtures, little or no fines.	
		GRAVEL WITH FINES		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.	
				GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.	
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)		SW	Well graded sands, gravelly sands, little or no fines.	
		SANDS WITH FINES		SP	Poorly graded sands or gravelly sands, little or no fines.	
				SM	Silty sands, sand-silt mixtures, non-plastic fines.	
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.		
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays.	
			OL	Organic silts and organic silty clays of low plasticity.		
			MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty silts, elastic silts.		
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50%		CH	Inorganic clays of high plasticity, fat clays.		
			OH	Organic clays of medium to high plasticity, organic silts.		
		HIGHLY ORGANIC SOILS		PI	Peat and other highly organic soils.	

GRAIN SIZES

SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
	200	40	10	4	3/4"	3"	12"
	U.S. STANDARD SERIES SIEVE			CLEAR SQUARE SIEVE OPENINGS			

RELATIVE DENSITY

SANDS, GRAVELS AND NON-PLASTIC SILTS	BLOWS/FOOT*
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

CONSISTENCY

CLAYS AND PLASTIC SILTS	STRENGTH**	BLOWS/FOOT*
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 15
VERY STIFF	2 - 4	15 - 32
HARD	OVER 4	OVER 32

*NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30-INCHES TO DRIVE A 2-INCH O.D. (1-3/8-INCH I.D.) SPLIT SPOON (ASTM D-1586).

**UNCONFINED COMPRESSIVE STRENGTH IN TONS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST (ASTM D-1586), POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION

TYPE OF SAMPLES:

RING SAMPLE STANDARD PENETRATION TEST GEOCHEMICAL SAMPLE

DRILLING NOTES:

1. SAMPLING AND BLOW COUNTS

RING SAMPLER - NUMBER OF BLOWS PER FOOT OF A 140 POUND HAMMER FALLING 30 INCHES

STANDARD PENETRATION TEST - NUMBER OF BLOWS PER 12 INCHES SHOWN

GEOCHEMICAL SAMPLER - 2.5 I.D. TUBE DRIVEN BY 140 POUND HAMMER FALLING 30 INCHES

2. P.P. - POCKET PENETROMETER (TONS/SQUARE FOOT)

KEY TO LOGS

JOB NO.: 13-6782-002-34-00

DATE: JANUARY 1987

FIGURE: B-2

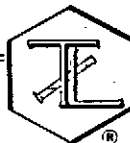
APPENDIX C

LABORATORY RESULTS

PRESENTED BY TRUESDAIL LABORATORIES, INC.

REPORT

TRUESDAIL LABORATORIES, INC.



14201 FRANKLIN AVENUE
TUSTIN, CALIFORNIA 92680
AREA CODE 714 • 730-6239
AREA CODE 213 • 225-1564
CABLE: TRU ELABS

CHEMISTS - MICROBIOLOGISTS - ENGINEERS
RESEARCH - DEVELOPMENT - TESTING

Hydrotech Consultants, Inc.
15 Mason
Irvine, CA 92718
Attention: Mary Huper

DATE Dec. 30, 1986
RECEIVED Dec. 24, 1986
LABORATORY NO. 14491

SAMPLE Soils from Thrifty Oil Station #054
P.O. #14919

INVESTIGATION

Total Petroleum Hydrocarbons (EPA 418.1)

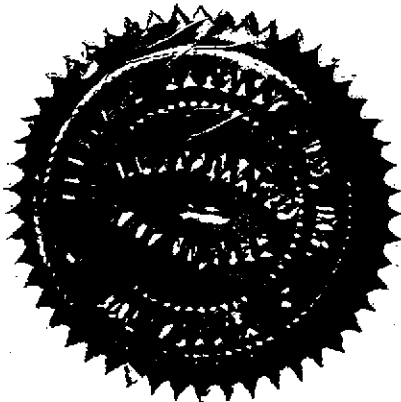
RESULTS

<u>Sample</u>	<u>Milligrams per Kilogram</u>
B1-5'	230
10'	1,120.
20'	420.
B2-5'	320.
15'	<1.
B3-5'	830.
15'	<1.
B4-5'	850.
15'	4.

Total Petroleum Hydrocarbons (Modified EPA 418.1): The total petroleum hydrocarbons analyzed in soils utilizes an infrared method similar to the procedure designated for waters (EPA 418.1). The soils are extracted with freon TF on an equal weight to volume basis with anhydrous sodium sulfate added to aid in extraction. The method detection limit is 1 mg/kg. All results have been blank corrected.

Respectfully submitted,
TRUESDAIL LABORATORIES, INC.

Richard D. Reid
Richard D. Reid
Chief Water Chemist



This report applies only to the sample, or samples, investigated and is not necessarily indicative of the quality or condition of apparently identical or similar products. As a mutual protection to clients, the public and these Laboratories, this report is submitted and accepted for the exclusive use of the client to whom it is addressed and upon the condition that it is not to be used, in whole or in part, in any advertising or publicity matter without prior written authorization from these Laboratories.

APPENDIX D

CHAIN-OF-CUSTODY DOCUMENTS

HYDROTECH CONSULTANTS, INC.
 15 MASON
 IRVINE, CALIFORNIA 92718
 (714) 951-8686

CHAIN OF CUSTODY RECORD

PROJECT NO.		PROJECT NAME		SAMPLE TYPE										OTHER	NUMBER OF CONTAINERS	REMARKS
STATION NUMBER		DATE	TIME	DESCRIPTION	GENERAL INORGANIC	METALS	NUTRIENTS	OIL & GREASE	CYANIDE	ORGANICS	SOLIDS-INORGANICS	VOLATILE ORGANICS	FUEL	OIL		
054		Thriftly oil #054														
SAMPLERS: (Signature) <i>Scott We</i>																
B1-5	12/17	1000	Rings												X	1
10															X	1
15															X	1
20															X	1
B2-5															X	1
10															X	1
15															X	1
B3-5															X	1
10															X	1
15															X	1
TOTAL NUMBER OF CONTAINERS																

RELINQUISHED BY: (Signature) <i>Scott We</i>	DATE/TIME 12/20/1000	RECEIVED BY: (Signature) <i>Mary Hope</i>	RELINQUISHED BY: (Signature) <i>Mary Hope</i>	DATE/TIME 12/29/1000	RECEIVED BY: (Signature) <i>Scott We</i>
RELINQUISHED BY: (Signature) <i>Scott We</i>	DATE/TIME 12/29	RECEIVED BY: (Signature) <i>Scott We</i>	RELINQUISHED BY: (Signature) <i>Scott We</i>	DATE/TIME	RECEIVED BY: (Signature)
METHOD OF SHIPMENT:		SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME

HYDROTECH CONSULTANTS, INC.
 15 MASON
 IRVINE, CALIFORNIA 92718
 (714) 951-8686

CHAIN OF CUSTODY RECORD

PROJECT NO.		PROJECT NAME		SAMPLE TYPE											OTHER	NUMBER OF CONTAINERS	REMARKS	
*054		Thirty oil #054		GENERAL INORGANIC	METALS	NUTRIENTS	OIL & GREASE	CYANIDE	ORGANICS	SOLIDS-INORGANICS	VOLATILE ORGANICS	FUEL	OIL	INDUSTRIAL HYGIENE				
SAMPLERS: (Signature) <i>Scott (W) a</i>																		
STATION NUMBER	DATE	TIME	DESCRIPTION															
B4-5	12/17	1000	Ring												X		1	
10			Ring															
15															X		1	

TOTAL NUMBER OF CONTAINERS **9**

RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE/TIME 12/20/1000	RECEIVED BY: (Signature) <i>May Johnson</i>	RELINQUISHED BY: (Signature) <i>May Johnson</i>	DATE/TIME 12/20/1000	RECEIVED BY: (Signature) <i>[Signature]</i>
RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE/TIME 12/24	RECEIVED BY: (Signature) <i>[Signature]</i>	RELINQUISHED BY: (Signature) <i>[Signature]</i>	DATE/TIME	RECEIVED BY: (Signature)
METHOD OF SHIPMENT:		SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	
				DATE/TIME	

APPENDIX E

THRIFTY OIL CO.

SCOPE OF WORK

SCOPE OF WORK
SUBSURFACE SITE ASSESSMENT

PURPOSE

The purpose of work as outlined is to provide a subsurface assessment of the presence of petroleum hydrocarbon contamination in the soil and/or groundwater at the Thrifty Oil Co. ("Thrifty") properties referenced on the attached lists.

SOIL BORINGS

Four soil borings will be installed in the area adjacent to the underground gasoline/diesel storage tanks. The location of these borings shall be subject to Thrifty's approval. The borings will be a minimum of 2" in diameter and to a depth of twenty feet or groundwater, whichever first occurs.

Borings will be installed with a truck mounted hollow stem auger drill rig equipped with a continuous core sampler.

Soil cuttings shall be placed in 55 gallon drums pending results of laboratory analysis. If the soil is free of contamination, the disposition shall be the responsibility of the contractor. If contamination exists, disposition shall be Thrifty's responsibility.

The borings shall be backfilled to a depth of five feet with a mixture of bentonite and clean native soil. The remaining five feet will be back-filled with a bentonite cement mixture.

Prior to drilling, underground utilities, gasoline/diesel tanks and piping will be verified in the field.

Drilling permits for boring installations will be obtained where required by local agencies.

SOIL SAMPLES

Soil samples shall be taken every 5 feet and evaluated in the field with an organic vapor meter (OVM) and a head space analysis technique for the purpose of identifying the visible presence or odor of hydrocarbons.

In the event a material presence or odor of hydrocarbons is detected in the samples, the soil samples taken every ten feet shall be analyzed in a laboratory for the presence of hydrocarbons. Results shall be reported as total petroleum hydrocarbons (TPH) using E.P.A. method 418.1.

WATER SAMPLES

If the groundwater table is encountered, it shall be characterized as to the presence or absence of free floating hydrocarbons. If free floating hydrocarbons are not encountered at the groundwater table, a sample of the water shall be taken and analyzed for the presence of dissolved hydrocarbons. The results shall be reported as total petroleum hydrocarbons (TPH) using E.P.A. method 418.1.

REPORT

Upon completion of the Subsurface Site Assessment and receipt of the laboratory results, a report will be prepared and submitted to Thrifty together with 2 additional copies for a total of 3 copies. The report will include a summary of activities conducted at the site, boring logs, laboratory results and a site plan outlining the locations of the borings. If contamination is evidenced by the results of the laboratory analysis, the report shall include a conceptual remedial action plan with an estimated cost range.