REPORT
SUBSURFACE ENVIRONMENTAL INVESTIGATION
at
UNOCAL Service Station No. 5367
500 Bancroft Avenue
San Leandro, California

AGS Job No. 87091-1

Report prepared for

UNOCAL Corporation
2175 North California Boulevard, Suite 650
Walnut Creek, California 94596

by
Applied Geosystems

Charles L. Ard
Project Geologist

Michael N. Clark
C.E.G. 1264

December 16, 1987

December 16, 1987
87091-1

Mr. Don Terry
UNOCAL Corporation
2175 North California Boulevard, Suite 650
Walnut Creek, California 94596

Subject: Executive Summary of Report No. 87091-1, Subsurface Environmental Investigation at UNOCAL Service Station No. 5367, 500 Bancroft Avenue, San Leandro, California

Mr. Terry:

This report presents the results of soil aeration operations and a limited environmental investigation that we conducted at the above-referenced site. Approximately 250 cubic yards of soil was excavated during tank removal operations, from in, and beneath the gasoline-tank pit backfill and was sampled and deemed by chemical analyses to contain average hydrocarbon contamination levels in excess of 100 parts per million. The contaminated soil was spread for aeration to a thickness of approximately 6 inches, over available space behind and on both sides of the station building. The soil was turned and mixed several times over a period of approximately 4 weeks before being sampled for chemical analysis. After chemical analyses indicated that average levels of hydrocarbon contamination in laboratory composited samples were below 100 parts per million, the soil was stockpiled for transport to the Durham Road Landfill for disposal. Disposal operations were completed on November 19, 1987.

The limited environmental investigation included the drilling of one borehole and the construction and development of one 2-inch-diameter ground-water monitoring well. The investigation indicates that floating gasoline product is present on the ground water beneath the site. Approximately 1/4-inch of clear gasoline product was measured at the time of completion of the monitoring well. Four subsequent measurements of product thickness were obtained between September 25 and November 19, 1987 during floating product removal operations. Product thicknesses ranged from 1/16-inch on October 6, 1987, to 4.5 inches on November 13,

1987. The most recent observation on November 19, 1987, indicated approximately 3/4-inch of floating product. Approximately 2.5 gallons of gasoline product have been removed from the well to date.

The new product tanks and lines recently passed precision testing before being put into service, and a subsequent product inventory check has failed to disclose any significant product loss since the installation of the new tanks. At UNOCAL's request Applied GeoSystems filed an Unauthorized Release Report with the appropriate agency.

Applied GeoSystems will continue to monitor the thickness of the floating product, and will remove the accumulated product on a weekly basis. This procedure will continue until such time as the product thickness decreases to the point that further collection is not practical or until a more appropriate remediation effort is recommended.

In our opinion, based on the quanity of hydrocarbons encountered in the soil and ground water at the site, the extent of ground-water contamination should be further investigated. We recommend that a soil vapor probe survey be performed in the vicinity of the contamination, and that three or more boreholes, which are selectively located based on the results of the vapor probe survey should be drilled; and ground water-monitoring wells should be installed in the boreholes.

These monitoring wells are necessary to characterize the vertical and lateral extent of the soil and ground-water contamination, to establish a zero line of hydrocarbon contamination, and to evaluate a local ground-water gradient accurately. A work plan incorporating the work outlined above should be prepared and submitted to the San Francisco Bay Regional Water Quality Control Board for their review and approval.

We also recommend that a well search be performed to locate any nearby public, private, or irrigation wells that could be potentially impacted by hydrocarbon contamination released at the site.

We recommend that a copy of this report be sent to Mr. Greg Zentner of the Regional Water Quality Control Board, San Francisco Bay Region, 1111 Jackson Street, Room 6040, Oakland, California 94607, and to Mr. Joe Ferreira at the San Leandro Fire Department, 835 East 14th Street, San Leandro, California 94577. Please do not hesitate to call if you have any questions regarding the content of this report.

Sincerely,
Applied GeoSystems

Charles L. Ard
Project Geologist

REPORT
SUBSURFACE ENVIRONMENTAL INVESTIGATION
at
UNOCAL Service Station No. 5367
San Leandro, California

for: UNOCAL CORPORATION

INTRODUCTION

This report describes the work performed to aerate and dispose of approximately 250 cubic yards of hydrocarbon contaminated soil, and to drill one soil boring and install one ground-water monitoring well near the product tank pit at UNOCAL Service Station No. 5367, which is located at the intersection of Bancroft Avenue and Dowling Street in San Leandro, California. UNOCAL contracted with Applied GeoSystems to observe the aeration and disposal of approximately 250 cubic yards of gasoline contaminated soil that had previously been excavated from the vicinity of the tank pit during tank removal operations. Applied

GeoSystems also contracted to evaluate potential subsurface soil and ground-water contamination at the site. This report describes the work elements conducted during the investigation, presents our interpretations of the data collected, and presents recommendations for future work.

SITE DESCRIPTION

UNOCAL Service Station No. 5367 is located at 500 Bancroft Avenue, in San Leandro as shown on the Site Vicinity Map, Plate P-1. Approximate locations of the facilities at the site are shown on the Generalized Site Plan, Plate P-2.

SAMPLING OF SOIL IN THE TANK PIT AND SPOILS PILE

An Applied GeoSystems' field geologist was present at the site on August 25, 1987, and collected one soil sample from the native soil beneath the excavation from which two underground gasoline storage tanks had been removed. Eighteen soil samples were collected from the spoils pile (composed of soil removed from the tank pit) located south of the station building. The 18 samples were combined in the laboratory into six composite samples. The soil samples were collected by driving a laboratory-cleaned brass

sleeve into the soil material with a hand-operated percussion sampler immediately after it was brought to the surface with a backhoe. The samples were immediately sealed with aluminum foil, plastic caps, and airtight tape. They were then labeled and placed in iced storage for transport to Applied Geosystems' state-certified laboratory in Fremont, California. Sample locations are shown on the Generalized Site Plan, Plate P-2.

ANALYSES OF TANK PIT AND SPOILS PILE SOIL SAMPLES

The soil samples from the tank pit and spoils pile were analyzed for total volatile hydrocarbons (TVH) using gas chromatography with photo-and flame-ionization detection (EPA Method 8020). The results of the chemical analyses are presented in Table 1 and in the Appendix of this report.

TABLE 1
RESULTS OF SOIL ANALYSES
UNOCAL Service Station No. 5367
San Leandro, California

Soil Sample Identifier:		TVH	Detection Limit
S-22-PIT	Tank pit	161.87	0.05
S-0825-1(ABC)	Composite	247.90	0.05
S-0825-2(ABC)	Composite	3.14	0.05
S-0825-3(ABC)	Composite	9.63	0.05
S-0825-4(ABC)	Composite	9.62	0.05
S-0825-5(ABC)	Composite	17.89	0.05
S-0825-6(ABC)	Composite	0.93	0.05

Results in milligrams/kilogram - parts per million (ppm)
TVH = total volatile hydrocarbons

Results of the analysis from the sample (S-22-PIT) collected from beneath the product tanks indicated gasoline product contamination levels in the soil that were less than 1,000 parts per million but that exceeded 100 parts per million. According to guidelines promulgated by the San Francisco Bay Regional Water Quality Control Board, these levels require the installation of a ground-water monitoring well to further assess soil and possible ground-water contamination. It is our understanding that permission to install new product tanks and to backfill the tank pit cavity was granted, and that the station is presently dispensing gasoline products.

SOIL AERATION

Results of chemical analyses performed on the six composite samples collected from soil excavated from the tank pit cavity indicated average hydrocarbon contamination levels in excess of 100 parts per million. These levels require mitigation (aeration) to less than 100 parts per million before the soil can be disposed of in a Class III landfill. The contaminated soil was spread for aeration to a thickness of approximately 6 inches over available space behind and on both sides of the station building. The soil was turned and mixed several times over a period of approximately 4 weeks before it was sampled for chemical analysis. After chemical analyses of the composited samples indicated that hydrocarbon contamination levels were below 100 parts per million, the soil was stockpiled for transport to and disposal at the Durham Road Landfill. Results of the additional sample analyses are shown below in Table 2. The Chain of Custody Record and Record of Analysis for the additional composited samples are included in the Appendix of this report. Disposal operations were completed on November 19, 1987.

TABLE 2
RESULTS OF SOIL ANALYSES
UNOCAL Service Station No. 5367
San Leandro, California

Soil Sample Identifier:		TVH	Detection Limit
S0922-1(ABC)	Composite	0.41	0.05
S1006-1(ABC)	Composite	0.46	0.05
S1006-2(ABC)	Composite	0.23	0.05

Results in milligrams/kilogram - parts per million (ppm)
TVH = total volatile hydrocarbons

DRILLING OPERATIONS

A geologist from Applied GeoSystems observed soil borehole drilling and well construction on September 23, 1987. One boring was drilled with a Mobile B-61, truck-mounted drill rig operated by Datum Exploration, Inc., of Pittsburg, California. Steam-cleaned, 8-inch-diameter, continuous flight, hollow stem augers were used to drill boring B-1 to 36 feet. The boring was drilled in the inferred downgradient direction of ground water flow and within 10 feet of the old tank pit.

Ground water was initially encountered at approximately 15 feet in the boring. Monitoring well MW-1, was installed in boring

B-1. After the installation and development of MW-1 static ground water stabilized at approximately 33 feet. The location of the boring/monitoring well at the site is shown on the Generalized Site Plan, Plate P-2.

Soil samples were collected from the borehole with a California-modified, split-spoon sampler. Plate P-4 shows the Unified Soil Classification System used to identify the soils encountered in boring B-1. Descriptions of earth materials encountered in boring B-1 are presented on the Log of Boring, Plate P-5. The native earth materials encountered at this site consist primarily of silty clay. The boring was terminated at a depth of 35 feet because this depth was considered sufficiently below the first ground water encountered during drilling (15 feet) for well emplacement.

PROCEDURE FOR SOIL SAMPLING

Eight soil samples were collected and described from boring B-1 during drilling. These samples, labeled as indicated on the Boring Log, were collected at 5-foot intervals from the ground surface to total depth. Soil samples were collected

by advancing the boring point immediately above the sampling depth and then driving a California-modified, split-spoon sampler (2-1/2-inch inside diameter) into the soil through the hollow center of the auger. The sampler was driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler for each 6-inche increment was counted and recorded to evaluate the relative consistency of soil materials.

The samples were removed from the sampler and immediately sealed in their brass sleeves with aluminum foil, plastic caps, and airtight tape. They were then labeled and placed in iced storage. The samples were delivered to Applied GeoSystems' laboratory for analytical testing. The completed Chain of Custody Record and Record of Analysis for the soil samples tested is included in the Appendix of this report. One sample was analyzed (S-15-B1) that was collected from at or just above the apparent saturated zone, as encountered during drilling, and one sample (S-35-B1) was also analyzed because it exhibited a strong hydrocarbon odor.

CONSTRUCTION OF MONITORING WELL

The ground-water monitoring well was constructed at the site in soil boring B-1. The well, MW-1, was completed with 2-inch inside diameter (I.D.) polyvinyl chloride (PVC) casing. The casing consists of machine-slotted PVC with 0.020-inch-wide slots set from 35 feet below grade to approximately 9 feet below the surface. Blank PVC casing was set from the top of the screened casing to the surface. All casing joints are threaded; and no glues, chemical cements, or solvents were used in well construction. The top of the casing is covered with a slip cap and the bottom has a threaded end plug.

The annular space of the well was backfilled with No.3 size graded sand from total depth to approximately 2 foot above the screened casing. A bentonite plug approximately 2 feet thick was placed above the sand as a seal against cement entering the sand pack, and the remaining annulus was backfilled with neat cement to within a few inches of grade. Graphic representation of well construction is shown on the right column of the Boring Log.

An aluminum utility box with a PVC apron was placed over the well head and concreted into place flush with the surrounding surface

grade. The utility box has a watertight threaded seal to protect the well against surface-water infiltration, and it requires a specially designed wrench to open. This reduces the possibilities of vandalism or accidental disturbance of the well.

PROCEDURE FOR WATER SAMPLING

A subjective water sample was collected from the monitoring well by gently lowering a Teflon bailer approximately halfway through the air/water interface. The sample was retrieved and inspected for floating product, sheen, and product odor. The sample contained approximately 1/4-inch of clear, amber colored, floating gasoline product.

The well was developed by air- and water-jetting and was purged by pumping approximately five well volumes of liquid. Water samples were not collected for chemical analyses because the presence of floating product indicates inherently high dissolved hydrocarbon concentrations.

ANALYTICAL METHODS AND RESULTS

Two soil samples (S-15-B1 and S-35-B1) were analyzed for total volatile hydrocarbons (TVH) and for the hydrocarbon constituents benzene, ethylbenzene, toluene, and total xylene isomers by using gas chromatography with photo- and flame-ionization detection (EPA methods 8020 and 602). The results of the chemical analyses are presented in Table 3 and in the Appendix of this report.

TABLE 3
RESULTS OF CHEMICAL ANALYSES
OF SOIL SAMPLES
UNOCAL Service Station No. 5367
San Leandro, California

Sample Identifier	TVH	B	E	T	X	Detection Limit
S-20-B1	20.04	ND	0.65	1.24	3.93	0.05
S-35-B1	587.3	22.1	29.7	20.5	167.1	0.5

Soil results in milligrams/kilogram (mg/kg)=parts per million
TVH: Total volatile hydrocarbons
Sample Designation: S-05-B1
- S — Soil sample
- 05 — Sample depth in feet
- B1 — Boring number

DISCUSSION

This investigation indicates that floating gasoline product is present on the ground water beneath the site. Approximately 1/4-inch of gasoline product was measured at the time of completion of the monitoring well. Four subsequent measurements of product thickness were obtained between September 25 and November 19, 1987, during well purging and product recovery operations. Product thicknesses ranged from 1/16-inch on October 6, 1987, to 4.5 inches on November 13, 1987. The most recent observation on November 19, 1987, indicated approximately 3/4-inch of floating product. Approximately 2.5 gallons of gasoline product have been removed from the well to date.

The new product tanks and lines recently passed precision testing before being put into service, and a subsequent product inventory check has failed to disclose any significant product loss since the installation of the new tanks. At the request of UNOCAL an Unauthorized Release Report has been filed with the appropriate agency by Applied GeoSystems.

Applied GeoSystems will continue to monitor the thickness of the floating product. The accumulated product will be removed on a weekly basis until such time as the product thickness decreases to the point that further collection is not practical or until an alternative remediation method is recommended.

RECOMMENDATIONS

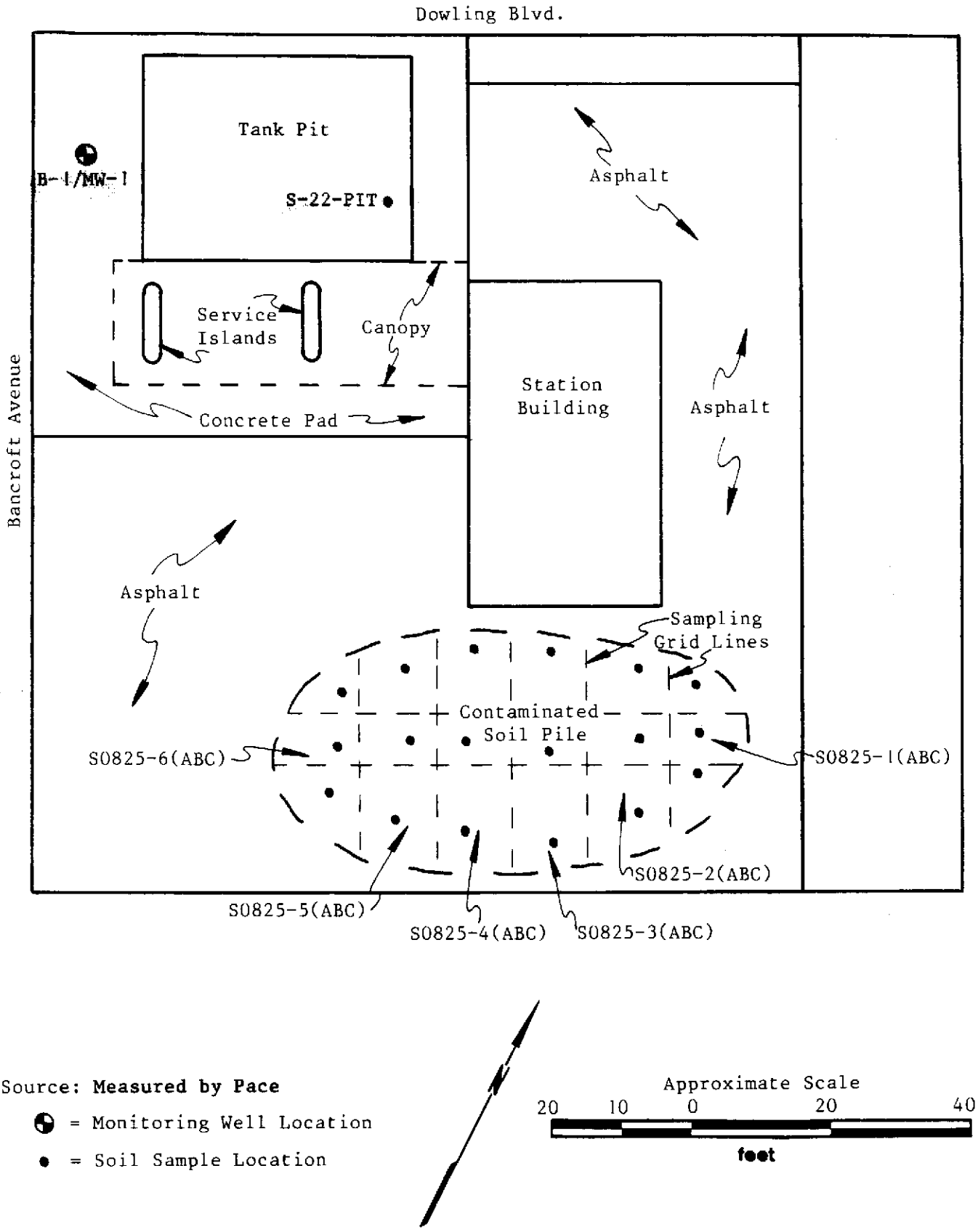
In our opinion, the extent of ground water contamination should be further investigated. We recommend a soil vapor probe survey be conducted in the vicinity of the contamination, and that three or more boreholes be drilled and that ground-water monitoring wells be installed in the boreholes. The locations of the boreholes and monitoring wells should be selected based on the results of the soil vapor probe survey.

These monitoring wells are necessary to characterize the vertical and lateral extent of the soil and ground-water contamination, to establish a zero line of hydrocarbon contamination, and to evaluate a local ground-water gradient accurately. A work plan incorporating the work outlined above should be prepared and submitted to the San Francisco Bay Regional Water Quality Control Board for their review and approval.

We also recommend that a well search be performed to locate any nearby public, or private wells that could be impacted by hydrocarbon contamination released at the site.

LIMITATIONS

This study has been conducted in accordance with generally accepted standards of environmental geological practice in California at the time this report was prepared. This investigation was conducted solely for the purpose of evaluating environmental conditions of the soil and ground water with respect to hydrocarbon product contamination in the vicinity of the subject property. No soil engineering or geotechnical recommendations are implied or inferred. Evaluation of geologic conditions at the site for the purpose of this investigation is made from a limited number of observation points. Subsurface conditions may vary away from the data points available. Additional work, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of investigation.



Source: **Measured by Pace**

= Monitoring Well Location

• = Soil Sample Location

Approximate Scale

20 10 0 20 40

feet

Applied GeoSystems

43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

PROJECT NO. 87091-1

GENERALIZED SITE PLAN
UNOCAL Station No. 5367
500 Bancroft Avenue
San Leandro, California

PLATE

P-2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	DESCRIPTION	MAJOR DIVISIONS		LTR	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel sand mixtures, little or no fines.	FINE GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		GP	Poorly-graded gravels or gravel sand mixture, little or no fines			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		GM	Silty gravels, gravel-sand-clay mixtures.			OL	Organic silts and organic silt-clays of low plasticity.
		GC	Clayey gravels, gravel-sand-clay mixtures.		SILTS AND CLAYS LL<50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	SAND AND SANDY SOILS	SW	Well-graded sands or gravelly sands, little or no fines.			CH	Inorganic clays of high plasticity, fat clays.
		SP	Poorly-graded sands or gravelly sands, little or no fines.			OH	Organic clays of medium to high plasticity.
		SM	Silty sands, sand-silt mixtures.	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.
		SC	Clayey sands, sand-clay mixtures.				


Depth through which sampler is driven


Relatively undisturbed sample


Missed sample


Ground water level observed in boring

S-10 Sample number


Sand pack


Bentonite annular seal

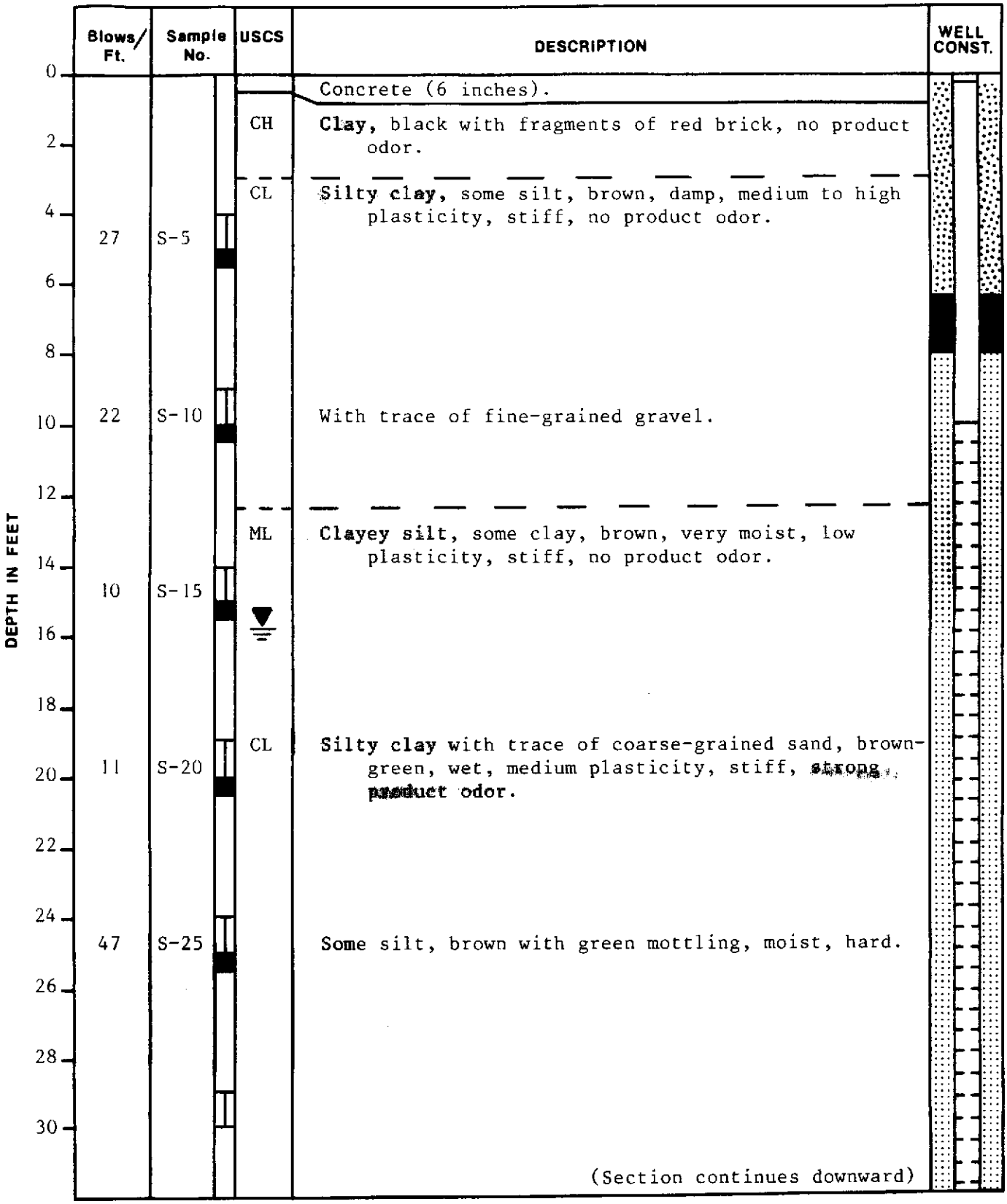

Neat cement annular seal


Blank PVC


Machine-slotted PVC

BLOW/FT. REPRESENTS THE NUMBER OF BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES TO DRIVE THE SAMPLER THROUGH THE LAST 12 INCHES OF AN 18 INCH PENETRATION.

DASHED LINES SEPARATING UNITS ON THE LOG REPRESENT APPROXIMATE BOUNDARIES ONLY. ACTUAL BOUNDARIES MAY BE GRADUAL. LOGS REPRESENT SUBSURFACE CONDITIONS AT THE BORING LOCATION AT THE TIME OF DRILLING ONLY.



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PROJECT NO. 87091-1

LOG OF BORING B-1/MW-1

UNOCAL Station No. 5367
500 Bancroft Avenue
San Leandro, California

PLATE P-4

DEPTH IN FEET	Blows/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
30	25	S-30	CL	**Silty clay**, some silt, brown with green mottling, moist, medium plasticity, very stiff, **strong product odor**.	
32					
34	28	S-35			
36				Total Depth = 36 feet. Boring terminated at sufficient depth to evaluate contamination above and below water table.	
38					
40					

Applied GeoSystems
41255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

PROJECT NO. 87091-1

LOG OF BORING B-1/MW-1

UNOCAL Station No. 5367
500 Bancroft Avenue
San Leandro, California

PLATE P-5

CHAIN OF CUSTODY RECORD

Applied GeoSystems
43277 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-19

SAMPLER (signature): Dan Kirkman
Phone: 251-4027

LABORATORY: Applied GeoSystems

TURNAROUND TIME: 48 hrs.
Attention: Charles Acd
Phone No. 331-4433

SHIPPING INFORMATION:
Shipper
Address
Date Shipped
Service Used
Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Dan Kirkman			
	Received for laboratory by:	8-25-87	17:40

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-0825-1a	87091-1	8-25-87	TVH	iced
S-0825-1b				
S-0825-1c				
S-0825-2a				
S-0825-2b				
S-0825-2c				
S-0825-3a				
S-0825-3b				
S-0825-3c				
S-0825-4a				
S-0825-4b				
S-0825-4c				
S-0825-5a				
S-0825-5b				
S-0825-5c				
S-0825-6a				
S-0825-6b				
S-0825-6c				

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 8-26-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: Charles L. Ard

Date Received: 8-25-87
Date Analyzed: 8-26-87

Laboratory# 8708S134

Procedure:

The soil samples referenced on the attached Chain-of-Custody were analyzed for Total Volatile Hydrocarbons (TVH) by EPA method 8020. The samples were concentrated on a Tekmar LSC-2 and ALS automatic sampler prior to injection into a 5890 Hewlett Packard gas chromatograph fitted with a Flame Ionization detector (FID). The limit of detection for these samples is 0.05 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

SAMPLE	SITE	TOTAL VOLATILE HYDROCARBONS
S0825-1(ABC)	87091-1	247.90
S0825-2(ABC)	87091-1	3.14
S0825-3(ABC)	87091-1	9.63
S0825-4(ABC)	87091-1	9.62
S0825-5(ABC)	87091-1	17.89
S0825-6(ABC)	87091-1	0.93

Results in milligrams/kilogram (parts per million = ppm).

Tia Tran, Chemist

Applied GeoSystems is a State of California, Department of Health Services Certified Hazardous Waste Testing Laboratory (No. 153).

CHAIN OF CUSTODY RECORD

Applied GeoSystems

43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature):

Phone:

LABORATORY: Applied GeoSystems

TURNAROUND TIME: <24 HR

Project Leader: Charles Ard

Phone No. 651-1906

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
	Received for laboratory by:	8-21-87	9:30 AM

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-22-PIT	87091-1	8-21-87	TVH	ICED

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 8-24-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: Charles L. Ard

Date Received: 8-21-87
Date Analyzed: 8-21-87

Laboratory# 8708S111

Procedure:

The soil sample referenced on the attached Chain-of-Custody was analyzed for Total Volatile Hydrocarbons (TVH) by EPA method 8020. The sample was concentrated on a Tekmar LSC-2 and ALS automatic sampler prior to injection into a 5890 Hewlett Packard gas chromatograph fitted with a Flame Ionization detector (FID). The limit of detection for this sample is 0.05 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

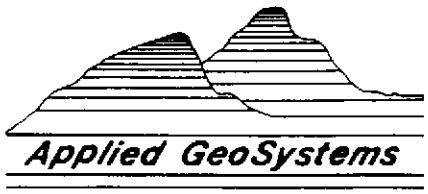
SAMPLE	SITE	TOTAL VOLATILE HYDROCARBONS
S-22-P1T	87091-1	161.87

Results in milligrams/kilogram (parts per million = ppm).

Tia Tran, Chemist

Applied GeoSystems is a State of California, Department of Health Services Certified Hazardous Waste Testing Laboratory (No. 153).

CHAIN OF CUSTODY RECORD



43255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): [signature]

Phone:

LABORATORY: Applied GeoSystems

TURNAROUND TIME: 2 WEEKS

Project Leader: C. Aud

Phone No.

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
[signature]			
	Received for laboratory by: [signature]	9-29-87	9:00 AM

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-20-B1	87091-1	9/24	TVH BTEX	ICED
S-35-B1	"		↓	↓

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 10-15-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: Charles L. Ard

Date Received: 9-29-87
Date Analyzed: 10-07-87

Laboratory# 8710S049

Procedure:

The soil sample referenced on the attached Chain-of-Custody was analyzed for the presence and concentration of Benzene, Ethyl-Benzene, Toluene, and Xylenes (BETX) and for Total Volatile Hydrocarbons (TVH) by EPA method 8020. The sample was concentrated on a Tekmar LSC-2 and ALS automatic sampler prior to injection into a 5890 Hewlett Packard gas chromatograph fitted with a Photo-Ionization detector (PID) and a Flame Ionization detector (FID). The limit of detection for this sample is 0.05 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

SAMPLE	SITE	BENZENE	ETHYL BENZENE	TOLUENE	TOTAL XYLENES	TVH
S-20-B1	87091-1	ND	0.65	1.24	3.93	20.04

Results in milligrams/kilogram (parts per million = ppm).
ND=Non Detectable - Less than 0.05 milligrams/kilogram (ppm).

Tia Tran, Chemist

Applied GeoSystems is a State of California, Department of Health Services Certified Hazardous Waste Testing Laboratory (No. 153).

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 10-15-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: Charles L. Ard

Date Received: 9-29-87
Date Analyzed: 10-07-87

Laboratory# 8710S050

Procedure:

The soil sample referenced on the attached Chain-of-Custody was analyzed for the presence and concentration of Benzene, Ethyl-Benzene, Toluene, and Xylenes (BETX) and for Total Volatile Hydrocarbons (TVH) by EPA method 8020. The sample was concentrated on a Tekmar LSC-2 and ALS automatic sampler prior to injection into a 5890 Hewlett Packard gas chromatograph fitted with a Photo-Ionization detector (PID) and a Flame Ionization detector (FID). The limit of detection for this sample is 0.5 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

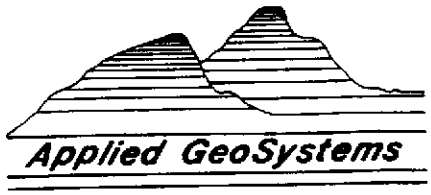
SAMPLE	SITE	BENZENE	ETHYL BENZENE	TOLUENE	TOTAL XYLENES	TVH
S-35-B1	87091-1	22.1	29.7	20.5	167.1	587.3

Results in milligrams/kilogram (parts per million = ppm).

Tia Tran, Chemist

Applied GeoSystems is a State of California, Department of Health Services Certified Hazardous Waste Testing Laboratory (No. 153).

CHAIN OF CUSTODY RECORD



43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): Dan Kickman

Phone: 651-1906

LABORATORY: Applied GeoSystems

TURNAROUND TIME: 24 hrs

Project Leader: Charles Ard

Phone No. 651-1906

SHIPPING INFORMATION:

Shipper

Address

Date Shipped

Service Used

Airbill No. Cooler No.

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
Dan Kickman			
	Received for laboratory by:	10-7-87	8:00AM

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-1006-1a	87091-1	10-6-87	TVH	iced
S-1006-1b				
S-1006-1c				
S-1006-2a				
S-1006-2b				
S-1006-2c				

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 10-08-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: Charles L. Ard

Date Received: 10-07-87
Date Analyzed: 10-07-87

Laboratory# 8710S047

Procedure:

The soil samples referenced on the attached Chain-of-Custody were analyzed for Total Volatile Hydrocarbons (TVH) by EPA method 8020. The samples were concentrated on a Tekmar LSC-2 and ALS automatic sampler prior to injection into a 5890 Hewlett Packard gas chromatograph fitted with a Flame Ionization detector (FID). The limit of detection for these samples is 0.05 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

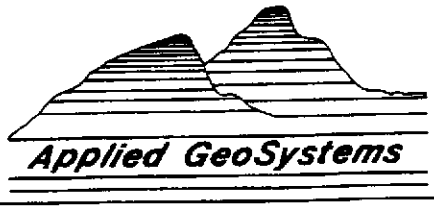
SAMPLE	SITE	TOTAL VOLATILE HYDROCARBONS
S1006-1(ABC)	87091-1	0.46
S1006-2(ABC)	87091-1	0.23

Results in milligrams/kilogram (parts per million = ppm).

Tia Tran, Chemist

Applied GeoSystems is a State of California, Department of Health Services Certified Hazardous Waste Testing Laboratory (No. 153).

CH :N OF CUSTODY RE' ORD



43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): William C Rivers

Phone: (415) 651-1906

LABORATORY: Applied GeoSystems

TURNAROUND TIME: 1 week

Attention: Charles Aid

Phone No. (415) 651-1906

SHIPPING INFORMATION:

Shipper _____

Address _____

Date Shipped _____

Service Used _____

Airbill No. _____ Cooler No. _____

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
William C Rivers			
	Received for laboratory by:	9.22.97	15:00

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S092221A (Composite)	87091-1	9/22/97	TVH + BTEX	ICE
S092221B	"	"	"	"
S092316	"	"	"	"

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 9-23-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: Charles L. Ard

Date Received: 9-22-87
Date Analyzed: 9-23-87

Laboratory# 8709S130

Procedure:

The soil sample referenced on the attached Chain-of-Custody was analyzed for the presence and concentration of Benzene, Ethyl-Benzene, Toluene, and Xylenes (BETX) and for Total Volatile Hydrocarbons (TVH) by EPA method 8020. The sample was concentrated on a Tekmar LSC-2 and ALS automatic sampler prior to injection into a 5890 Hewlett Packard gas chromatograph fitted with a Photo-Ionization detector (PID) and a Flame Ionization detector (FID). The limit of detection for this sample is 0.05 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

SAMPLE	SITE	BENZENE	ETHYL BENZENE	TOLUENE	TOTAL XYLENES	TVH
S0922-1(ABC)	87091-1	ND	ND	ND	ND	0.41

Results in milligrams/kilogram (parts per million = ppm).
ND=Non Detectable - Less than 0.05 milligrams/kilogram (ppm).

Tia Tran, Chemist

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