TRANSMITTAL FORM

Applied GeoSystems
43255 Mission Boulevard Fremont, California 94539
(415) 651-1906
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Date 2/14/89	Project No. 18061-2
Subject: Letter Report Quarterly Ground-Water Monitoring, UNOCAL Station No. 5484 Castro Valley, CA.	

TO Mr. Larry Seto
Hazardous Materials Specialist
Alameda County Health Care Services
470 27th Street Third Floor
Oakland, California 94612

FROM Jon Lyellen

TITLE Project Geologist

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REMARKS As per Tim Ross's request of 2/14/89, this report is being sent to you for your information and files.

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Tim Ross, UNOCAL

ALAMEDA COUNTY
DEPT. OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS
2/17/89

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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LETTER REPORT
QUARTERLY GROUND-WATER MONITORING
at
UNOCAL Service Station No. 5484
18950 Lake Chabot Road
Castro Valley, California

AGS Job No. 18061-2

Feb. 9, 1994

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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February 9, 1989
0209tros
18061-2

Mr. Tim Ross
UNOCAL Corporation
2175 North California Boulevard
Suite 650
Walnut Creek, California 94596

Subject: Letter Report Regarding Quarterly Ground-Water Monitoring and Sampling and Biweekly Monitoring of Free Product at UNOCAL Station No. 5484, 18950 Lake Chabot Road, Castro Valley, California.

Mr. Ross:

This letter report summarizes the results of quarterly and biweekly ground-water monitoring performed to date by Applied GeoSystems at UNOCAL Station No. 5484 with the authorization of UNOCAL Corporation. The site is located on the southeast corner of the intersection of Lake Chabot Road and Quail Avenue in Castro Valley, California, as shown on the Site Vicinity Map (Plate P-1). The work included measuring depth to ground water in three ground-water monitoring wells at the site; subjectively inspecting ground-water samples collected from the three wells; purging and sampling ground water from two of the wells for laboratory analysis; and measuring the thickness and bailing floating product from well MW-3. The locations of the monitoring wells MW-1 through MW-3 are shown on the Generalized Site Plan, Plate P-2.

The quarterly ground-water monitoring and sampling program was recommended by Applied GeoSystems in Report No. 18061-1, dated August 30, 1988. The purpose of this program is to evaluate whether hydrocarbon-contamination levels in the ground water are decreasing with time downgradient of the locations of suspected former leaks in the fiberglass adapter and the sub-pump swing joint of the underground unleaded product-storage tank. On October 14, 1988, a 9-inch-thick layer of brown floating product

was detected in monitoring well MW-3. Based on this discovery, a program of biweekly monitoring of ground water in the three wells and removal of floating product from well MW-3 was recommended (Applied GeoSystems Report No. 18061-2, dated January 6, 1989).

A geologist arrived at the site on [redacted] 1989, to measure depth to ground water in the three ground-water monitoring wells; to inspect water samples collected from the wells for subjective evidence of contamination; and to record the thickness of floating product and bail it from well MW-3. On [redacted] 1989, an Applied GeoSystems geologist revisited the site to perform identical tasks and to purge wells MW-1 and MW-2 and collect ground-water samples for laboratory analysis.

The static water level in each well was measured to the nearest 0.01-foot using a Solinst electric water-level indicator. After static ground-water levels were recorded, an initial sample of ground water was collected from each well and checked for floating product, sheen, and emulsion. The samples were collected by gently lowering approximately half the length of a clean Teflon bailer past the air/water interface and collecting a sample from near the suface of the water in each well. The water in wells MW-1 and MW-2 showed no floating product, sheen, or emulsion during either the January 3 or January 16 site visits. On [redacted] the water in well MW-3 contained 1.08 inches of dark brown-colored floating product; [redacted], an approximately 2.64-inch-thick layer of dark brown-colored floating product was observed in MW-3. Cumulative results of subjective analyses are presented in Table 1.

After performing the subjective analyses on [redacted] 16, wells MW-1 and MW-2 were purged of approximately two to three well volumes of water and were allowed time to recover to approximately 80 percent of the static water level. Recharge rates into the wells were low. Purge water from the two sampling and bailing episodes was temporarily stored onsite in three Department of Transportation 17E 55-gallon, waste-liquid drums for subsequent removal and consignment at UNOCAL's request.

Ground-water samples for laboratory analyses were then collected with a clean Teflon bailer. Samples from each well were collected immediately below the surface of the water column. The samples were slowly transferred to laboratory-cleaned 40-milliliter glass vials. Hydrochloric acid was added to the vials to discourage bacterial degradation of the samples. A Chain of

Custody Record and Analysis Reports for the samples are included in this report.

The ground-water samples were analyzed at the Applied GeoSystems Laboratory in Fremont for total petroleum hydrocarbons (TPH) as gasoline and the purgeable gasoline constituents benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) by Modified EPA Methods 8015 and EPA Method 602, respectively. Results of these and previous analyses are shown in Table 2.

Results of the analyses indicate that concentrations of TPH and BTEX have increased in monitoring well MW-2 and decreased in well MW-1 since the previous quarter. The concentration of benzene in well MW-2 (0.103-part per million [ppm]) was above the maximum concentration for drinking water (0.0007-ppm) recommended by the California Department of Health Services (DHS). Toluene concentrations were above the DHS-recommended maximum drinking-water concentration (0.100-ppm) in water samples collected from well MW-2 but were below this recommended concentration in water samples from MW-1. Concentrations of ethylbenzene and total xylene isomers were below the DHS-recommended maximum concentrations for these constituents (0.680-ppm and 0.620-ppm, respectively) in both water samples.

The measured ground-water depths were combined with wellhead elevations surveyed by Applied GeoSystems on November 12, 1987, to calculate the differences in water-level elevation. Results of the calculations for ground-water measurements taken on January 16, 1989, are presented in Table 3. Plate P-3 presents a graphical interpretation of the ground-water table based on the January 1989 measurements. A ground-water gradient was calculated by applying a correction factor of 0.8 (to correct for differences in the specific gravities of gasoline and water) to the measured thickness of product in monitoring well MW-3 and then subtracting this number from the measured depth to water. The interpreted ground-water gradient calculated from the above measurements is approximately 0.124 (about 12.4 feet in vertical distance per 100 feet in horizontal distance), and the direction of flow is approximately south 38 degrees west.

We recommend that quarterly monitoring of ground-water conditions in monitoring wells MW-1 through MW-3 be continued. We also recommend that the thickness of any floating product in well MW-3 be monitored and the product be removed on a bi-weekly basis. Water samples collected during quarterly monitoring should be analyzed for total petroleum hydrocarbons (TPH) and for benzene, toluene, ethylbenzene, and total xylene isomers (BTEX).

At the request of UNOCAL Corporation, a letter work plan is being prepared describing an investigation to evaluate the extent of dissolved hydrocarbon contamination southwest (downgradient) of the site and to delineate the downgradient edge of the floating product plume.

We recommend that UNOCAL submit a copy of this report to Mr. Larry Seto, Hazardous Materials Specialist, Alameda County Health Care Services, 470 27th Street, Third Floor, Oakland, California 94612, and Ms. Lisa McCann, Water Quality Control Board, San Francisco Bay Region, 1111 Jackson Street, Room 6040, Oakland, California 94607.

Sincerely,
Applied GeoSystems

Jon R. Luellen
Project Geologist

Gillian S. Holmes
G.E. 2023

Enclosures: Site Vicinity Map, Plate P-1
Generalized Site Plan, Plate P-2
Ground-Water Potentiometric Surface Map, January 16, 1989, Plate P-3
Results of Subjective Analyses, Table 1
Results of Laboratory Analyses, Table 2
Ground-Water Elevation Differences, Table 3
Chain of Custody Record
Analysis Reports (2)

Source: U.S. Geological Survey
7.5-Minute Quadrangle
Hayward, California
Photorevised 1980

N

Approximate Scale

2000 1000 0 2000 4000

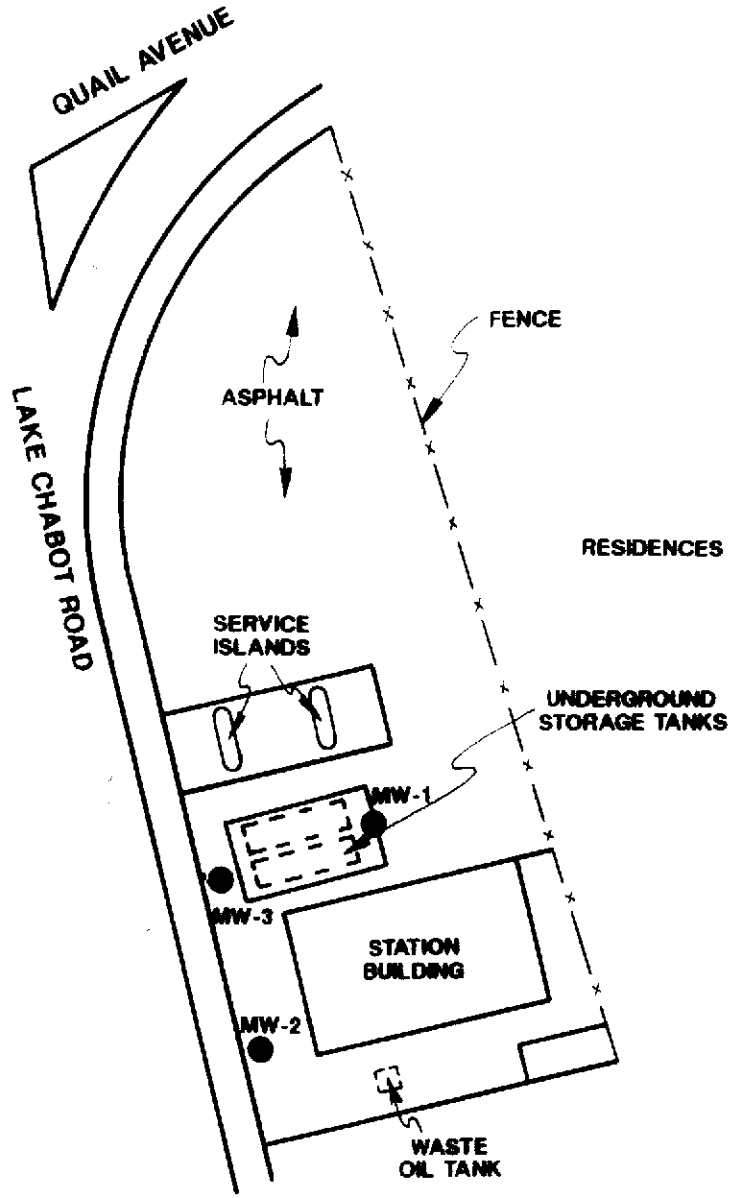
feet

Applied GeoSystems

PROJECT NO. 018061-2

SITE VICINITY MAP
UNOCAL Station No. 5484
18950 Lake Chabot Road
Castro Valley, California

PLATE
P - 1



MW-3● = Approximate location of boring and monitoring well

Source: Measured by tape and compass

N

Approximate Scale

40 20 0 40 80

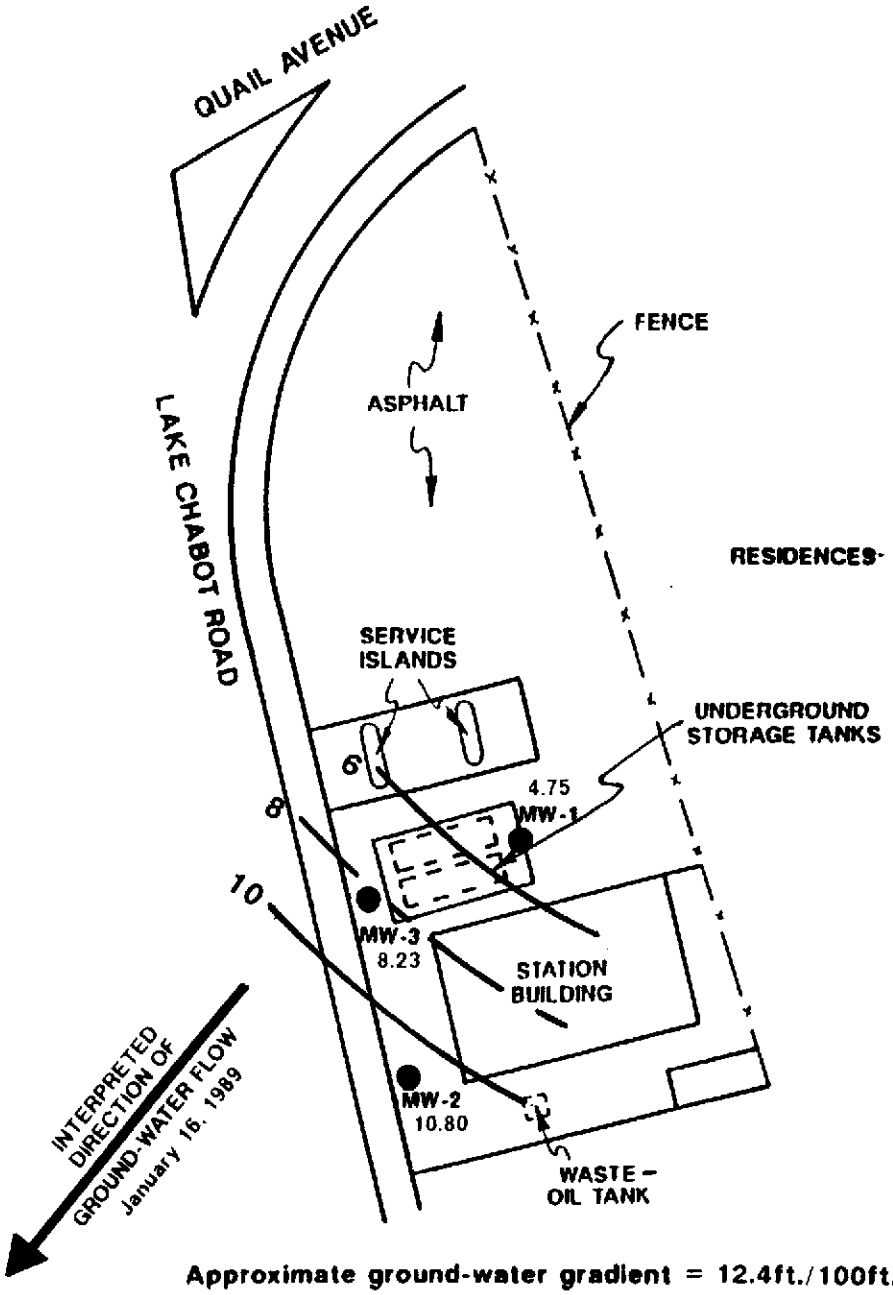
feet

Applied GeoSystems

PROJECT NO. 018061-2

GENERALIZED SITE PLAN
UNOCAL Station No. 5484
18950 Lake Chabot Road
Castro Valley, California

PLATE
P - 2



Approximate ground-water gradient = 12.4ft./100ft.

10 = Line of equal depth in feet to ground water

MW-3 ● = Monitoring well location

Source: Measured by tape and compass

N

Approximate Scale

40 20 0 40 80

feet

Applied GeoSystems

PROJECT NO. 18061-2

GROUND-WATER POTENTIOMETRIC SURFACE MAP
UNOCAL Station No. 5484
18950 Lake Chabot Road
Castro Valley, California

PLATE

P - 3

TABLE 1
CUMULATIVE RESULTS OF SUBJECTIVE ANALYSES
OF WATER IN WELLS
UNOCAL Service Station No. 5484
18950 Lake Chabot Road
Castro Valley California

Well	Date	Depth to Water*	Inches of Floating Product	Sheen	Emulsion
MW-1	7/88	5.16	NONE	NONE	NONE
	10/88	7.10	NONE	NONE	NONE
	11/2/88	6.08	NONE	NONE	NONE
	11/9/88	6.14	NONE	NONE	NONE
	12/15/88	6.51	NONE	SLIGHT	NONE
	1/3/89	5.10	NONE	NONE	NONE
	1/16/89	4.75	NONE	NONE	NONE
MW-2	7/88	6.85	NONE	NONE	NONE
	10/88	7.81	NONE	SLIGHT	NONE
	11/2/88	7.83	NONE	NONE	NONE
	11/9/88	7.98	NONE	NONE	NONE
	12/15/88	7.89	NONE	NONE	NONE
	1/3/89	6.50	NONE	NONE	NONE
	1/16/89	6.02	NONE	NONE	NONE
MW-3	7/88	7.49	NONE	NONE	NONE
	10/88	9.06	9.0	NA	NA
	11/2/88	9.12	11.5	NA	NA
	11/9/88	7.60	0.75	NA	NA
	12/15/88	7.97	6.72	NA	NA
	1/3/89	7.20	1.08	NA	NA
	1/16/89	6.36	2.64	NA	NA

* = Depth measured in feet below top of casing
NA = Not applicable

TABLE 2
RESULTS OF LABORATORY ANALYSES
UNOCAL Service Station No. 5484
18950 Lake Chabot Road
Castro Valley, California

SAMPLE	DATE	B	T	E	X	TPH
W-7-MW1	7/88	0.0061	0.0827	0.0356	0.1803	0.540
W-8-MW1	10/88	0.0132	0.0041	0.1638	0.0581	1.420
W-5-MW1	1/89	0.0065	0.0104	0.0118	0.0442	0.41
W-9-MW2	7/88	0.072	0.139	0.033	0.1570	1.080
W-9-MW2	10/88	0.080	0.010	0.025	0.0260	1.140
W-6-MW2	1/89	0.103	0.673	0.078	0.527	4.04
W-9-MW3	7/88	0.385	0.640	0.369	2.258	7.800
	10/88	Well not sampled				
	1/89	Well not sampled				

Results in parts per million (ppm)
BTEX = Benzene, Ethylbenzene, Toluene, and Total Xylene
TPH = Total Petroleum Hydrocarbons as gasoline
Sample designation: W-15-MW1

- W — Water sample
- 15 — Approximate depth of sample
- MW1 — Monitoring well (MW) well number

TABLE 3
GROUND-WATER ELEVATION DIFFERENCES
UNOCAL Service Station No. 5484
18950 Lake Chabot Road
Castro Valley, California

Monitoring Well Number	Top of Casing Below Datum (c)	Static Water Level (w)	Water Level Below Datum (c + w)
July 14, 1988			
MW-1	0.00	5.16	5.16
MW-2	4.78	6.85	11.63
MW-3	2.05	7.49	9.54
October 14, 1988			
MW-1	0.00	7.10	7.10
MW-2	4.78	7.81	12.59
MW-3	2.05	8.46*	10.51*
November 2, 1988			
MW-1	0.00	6.08	6.08
MW-2	4.78	7.83	12.61
MW-3	2.05	8.35*	10.40*
January 16, 1989			
MW-1	0.00	4.75	4.75
MW-2	4.78	6.02	10.80
MW-3	2.05	6.18*	8.23*

Measurements in feet.
Static water level measured in feet below top of casing.
Datum is an arbitrary elevation equal to the top of the highest well casing (MW-1).
* = Water levels corrected for presence of floating product : (w[measured]-0.8x(product thickness in feet))

CHAIN OF CUSTODY RECORD

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

SAMPLER (signature): James On
Phone: (415) 651-1906

LABORATORY: Applied GeoSystems

TURNAROUND TIME: Two Weeks

Project Leader: Jon Luellen
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
James On			
	Received for laboratory by:	1-16-89	1720

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
W-5-MW1	18061-2	1-16-89	TPH, BTEX	Iced + HCL
W-6-MW2	18061-2	1-16-89	TPH, BTEX	Iced + HCL

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ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Blvd.
Fremont, CA 94539
Attention: Jon R. Luellen

Date Received: 01-16-89
Laboratory Number: 90119W01
Project: 18061-2
Sample: W-5-MW1
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		0.41		0.02	01-18-89	
TEH as Diesel						NR
Benzene		0.0065		0.0005	01-18-89	
Toluene		0.0104		0.0005	01-18-89	
Ethylbenzene		0.0118		0.0005	01-18-89	
Total Xylenes		0.0442		0.0005	01-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

01-23-89
Date Reported

Applied GeoSystems 43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

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ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
43255 Mission Blvd.
Fremont, CA 94539
Attention: Jon R. Luellen

Date Received: 01-16-89
Laboratory Number: 90119W02
Project: 18061-2
Sample: W-6-MW2
Matrix: Water

Parameter	Result (mg/kg)	Result (mg/L)	Detection Limit (mg/kg)	Detection Limit (mg/L)	Date Analyzed	Notes
TVH as Gasoline						NR
TPH as Gasoline		4.04		0.02	01-18-89	
TEH as Diesel						NR
Benzene		0.103		0.005	01-18-89	
Toluene		0.673		0.005	01-18-89	
Ethylbenzene		0.078		0.005	01-18-89	
Total Xylenes		0.527		0.005	01-18-89	

mg/kg = milligrams per kilogram = parts per million (ppm).
mg/L = milligrams per liter = ppm.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
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PROCEDURES

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Tia Tran, Laboratory Supervisor

01-23-89
Date Reported