KAPREALIAN ENGINEERING
INCORPORATED

JEL
1/18/94

KEI-P88-0205.QR22
December 22, 1993

1/18/94
5th MW installed on 1/11/94. called Ed Ralston to analyze GW also for TPH-D since it was detected in MW-1 on 5/10/93 sampling.

Unocal Corporation
2000 Crow Canyon Place, Suite 400
P.O. Box 5155
San Ramon, California 94583

Attention: Mr. Edward C. Ralston

RE: Quarterly Report
Unocal Service Station #5366
7375 Amador Valley Boulevard
Dublin, California

Dear Mr. Ralston:

This report presents the results of the most recent quarter of monitoring and sampling of the monitoring wells at the referenced site by Kaprealian Engineering, Inc. (KEI). The Unocal wells are currently monitored quarterly. Unocal well MW1 is sampled on a quarterly basis, and Unocal wells MW2, MW3, and MW4 are sampled on an annual basis. This report covers the work performed by KEI during November of 1993.

BACKGROUND

The subject site contains a Unocal service station facility. Three underground fuel storage tanks were removed from the site in February of 1988 during tank replacement activities. Contaminated soil in the tank pit was overexcavated to a depth of 13 feet below grade (2 feet below the depth of ground water at the time). Four monitoring wells have been installed at the site.

A site description, detailed background information including a summary of all of the soil and ground water subsurface investigation/remediation work conducted to date, site hydrogeologic conditions, and tables that summarize all of the soil and ground water sample analytical results are presented in KEI's report (KEI-P88-0205.QR16) dated June 30, 1992.

RECENT FIELD ACTIVITIES

The four Unocal monitoring wells (MW1 through MW4) were monitored once during the quarter. Monitoring well MW1 was also sampled once during the quarter. Monitoring wells MW2, MW3, and MW4 are currently sampled annually, and thus were not sampled this quarter. During monitoring, the wells were checked for depth to water and the presence of free product. Prior to sampling, monitoring well

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel: 510.602.5100 Fax: 510.687.0602

MW1 was also checked for the presence of a sheen. No free product or sheen was noted in any of the Unocal wells during the quarter.

On November 11, 1993, a joint monitoring event was conducted with the consultants for the nearby BP, Arco, and former Shell service station sites. Monitoring data from the former Shell, BP, and Arco stations are summarized in Tables 2, 3, and 4, respectively. The monitoring data collected for the Unocal site this quarter is summarized in Table 1.

A water sample was collected by KEI from Unocal's well MW1 on November 11, 1993. Prior to sampling, the well was purged of 7 gallons of water by the use of a surface pump. The sample was collected by the use of a clean Teflon bailer. The sample was decanted into clean VOA vials that were then sealed with Teflon-lined screw caps, labeled, and stored in a cooler, on ice, until delivery to a state-certified laboratory.

HYDROLOGY

The measured depth to ground water at the Unocal site on November 11, 1993, ranged between 10.17 and 10.64 feet. The water levels in all of the Unocal monitoring wells have shown net decreases of 0.16 to 0.40 feet since August 12, 1993. Based on the water level data gathered during the joint monitoring event conducted with the adjacent former Shell station and the existing Arco and BP stations on November 11, 1993, the direction of ground water flow appears to be complex, but predominantly to the east-northeast at the Unocal site, as shown on the attached Potentiometric Surface Map, Figure 1. The hydraulic gradient at the Unocal site on November 11, 1993, was approximately 0.006.

ANALYTICAL RESULTS

The ground water sample collected from Unocal monitoring well MW1 this quarter was analyzed at Sequoia Analytical Laboratory and was accompanied by properly executed Chain of Custody documentation. The sample was analyzed for total petroleum hydrocarbons (TPH) as gasoline by EPA method 5030/modified 8015, and benzene, toluene, ethylbenzene, and xylenes by EPA method 8020.

The analytical results of all of the ground water samples collected from the Unocal monitoring wells to date are summarized in Tables 5 and 6. Copies of the laboratory analytical results and the Chain of Custody documentation for the Unocal sample are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results of the ground water samples collected and evaluated from the Unocal site to date, and no evidence of free product or sheen in any of the Unocal wells, KEI recommends the continuation of the current ground water monitoring and sampling program. All four existing Unocal monitoring wells are currently monitored quarterly; well MW1 is sampled quarterly; and wells MW2, MW3, and MW4 are sampled annually. In addition, KEI will attempt to continue the joint monitoring program with the consultants for the adjacent BP, Arco, and former Shell service station sites. Recommendations for modifying or terminating the monitoring and sampling program will be made as warranted.

In order to further define the extent of soil and ground water contamination at the Unocal site, KEI previously proposed the installation of one additional monitoring well downgradient of Unocal well MW1 (KEI-P88-0205.P1 dated July 7, 1993). The well is scheduled to be installed on January 11, 1994. A separate technical report documenting the installation of this well will subsequently be prepared; this report will include recommendations for any additional work that is warranted for the Unocal site.

DISTRIBUTION

A copy of this report should be sent to Alameda County Health Care Services Agency, and to Mr. Lester Feldman of the RWQCB, San Francisco Region.

LIMITATIONS

Environmental changes, either naturally-occurring or artificially-induced, may cause changes in ground water levels and flow paths, thereby changing the extent and concentration of any contaminants.

Our studies assume that the field and laboratory data are reason-5ably representative of the site as a whole, and assume that subsurface conditions are reasonably conducive to interpolation and extrapolation.

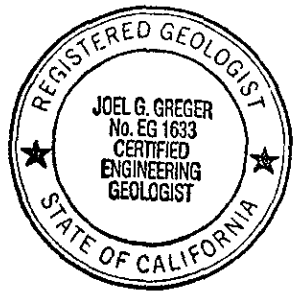
The results of this study are based on the data obtained from the field and laboratory analyses obtained from a state-certified laboratory. We have analyzed these data using what we believe to be currently applicable engineering techniques and principles in the Northern California region. We make no warranty, either expressed or implied, regarding the above, including laboratory analyses, except that our services have been performed in accordance with generally accepted professional principles and practices existing for such work.

If you have any questions regarding this report, please do not hesitate to call at (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.

Haig (Gary) Tejirian
Project Geologist



Joel G. Greger, C.E.G.
Senior Engineering Geologist

License No. EG 1633
Exp. Date 6/30/94

Thomas J. Berkins
Project Manager

/jad

Attachments: Tables 1 through 6
Location Map
Potentiometric Surface Map - Figure 1
Laboratory Analyses
Chain of Custody documentation

KEI-P88-0205.QR22
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TABLE 1

SUMMARY OF MONITORING DATA

Well #	Ground Water Elevation (feet)	Depth to Water (feet)♦	Product Thickness (feet)	Sheen	Water Purged (gallons)
(Monitored and Sampled on November 11, 1993)					
MW1	325.91	10.17	0	No	7
MW2*	326.27	10.51	0	--	0
MW3*	326.34	10.64	0	--	0
MW4*	325.94	10.48	0	--	0

Well #	Well Casing Elevation** (feet)
MW1	336.08
MW2	336.78
MW3	336.98
MW4	336.42

♦ The depth to water level measurement was taken from the top of the well casing.

* Monitored only.

** Based on the County of Alameda Benchmark, standard brass disk in the westerly center island of Amador Valley Boulevard at Village Parkway, 15 feet from the nose and 0.8 feet from the northerly curb, stamped "VL PK AM VY, 1977" (elevation = 337.40 Mean Sea Level).

-- Sheen determination was not performed.

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TABLE 2

SUMMARY OF MONITORING DATA

(Former Shell Service Station Wells
Monitored by EMCON)

Well #	Ground Water Elevation (feet)	Depth to Water (feet)	Top of Casing Elevation (feet)
	(Monitored on November 11, 1993)		
MW1	326.27	8.56	334.83
MW2	325.60	11.36	336.96
MW3	326.29	10.64	336.93
MW4	325.17	11.97	337.14
MW5	325.64*	9.32	334.96
MW6	326.04	9.38	335.42
MW7	326.33	6.90	333.23
MW8	326.33	9.47	335.80
MW9	324.27	10.30	334.57
MW11	325.64	8.56	334.20
MW12	325.10	7.43	332.53
MW13	326.49	9.15	335.64

* Ground water elevation was not used for contours. The well is reportedly screened across a deeper aquifer.

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TABLE 3

SUMMARY OF MONITORING DATA

(BP Service Station Wells
Monitored by Alisto Engineering Group)

Well #	Ground Water Elevation (feet)	Depth to Water (feet)	Top of Casing Elevation (feet)
	(Monitored on November 11, 1993)		
MW1	325.52	9.65	335.17
MW2	325.30	9.28	334.58
MW3	325.35	9.78	335.13
AW4	325.41	8.00	333.41
AW5	325.68	9.13	334.81
AW6	326.23	8.67	334.90

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TABLE 4

SUMMARY OF MONITORING DATA
(Arco Service Station Wells
Monitored by RESNA)

Well #	Ground Water Elevation (feet)	Depth to Water (feet)	Top of Casing Elevation (feet)
	(Monitored on November 11, 1993)		
MW1	325.86	10.70	336.56
MW2	325.78	9.02	334.80
MW3	325.72	9.81	335.53
MW4	325.74	8.48	334.22
MW5	325.78	10.09	335.87
MW6	325.82	10.02	335.84

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TABLE 5

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes
11/11/93	MW1	350	19	2.5	2.7	3.4
8/12/93	MW1	1,000	46	ND	29	6.3
5/10/93	MW1	1,600	39	0.40	25	3.3
2/10/93	MW1	3,000	230	ND	340	200
	MW2	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND
11/10/92	MW1	1,100	49	ND	71	21
8/12/92	MW1	1,700	51	ND	93	21
5/22/92	MW1	2,500	120	ND	230	37
	MW2	ND	ND	ND	ND	ND
2/25/92	MW1	3,900	500	ND	450	400
11/13/91	MW1	860	40	ND	11	2.5
8/12/91	MW1	1,100	68	2.6	210	9.3
5/15/91	MW1	2,100	220	ND	360	27
2/14/91	MW1	1,900	150	2.9	340	43
11/14/90	MW1	2,000	110	0.52	410	16
8/15/90	MW1	2,200	160	ND	570	45
5/18/90	MW1	2,000	140	1.8	460	19
	MW2	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND
2/06/90	MW1	2,700	170	ND	350	29
	MW2	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND

TABLE 5 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes
10/20/89	MW1	ND	ND	ND	ND	ND
	MW2	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	0.38	ND
	MW4	ND	ND	ND	ND	ND
7/27/89	MW1	1,900	130	6.3	ND	68
	MW2	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND
	MW4	ND	0.34	ND	ND	ND
5/22/89	MW3	ND	ND	ND	ND	ND
4/28/89	MW1	1,000	97	0.8	170	24
	MW2	ND	ND	ND	ND	ND
	MW3	880	9.6	9.7	19	12.7
	MW4	ND	0.3	ND	ND	ND
1/26/89	MW1	1,900	240	1.8	81	30
	MW2	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND
	MW4	ND	0.67	ND	ND	ND
10/28/88	MW1	5,200	150	ND	250	12
	MW2	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND
7/25/88	MW1	6,100	170	2.1	94	94
	MW2	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND
4/29/88	MW1	10,000	960	17	870	1,500
	MW2	170	2.7	0.6	ND	13
	MW3	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND

ND = Non-detectable.

-- Indicates analysis was not performed.

Results in parts per billion (ppb), unless otherwise indicated.

TABLE 6

SUMMARY OF LABORATORY ANALYSES
WATER

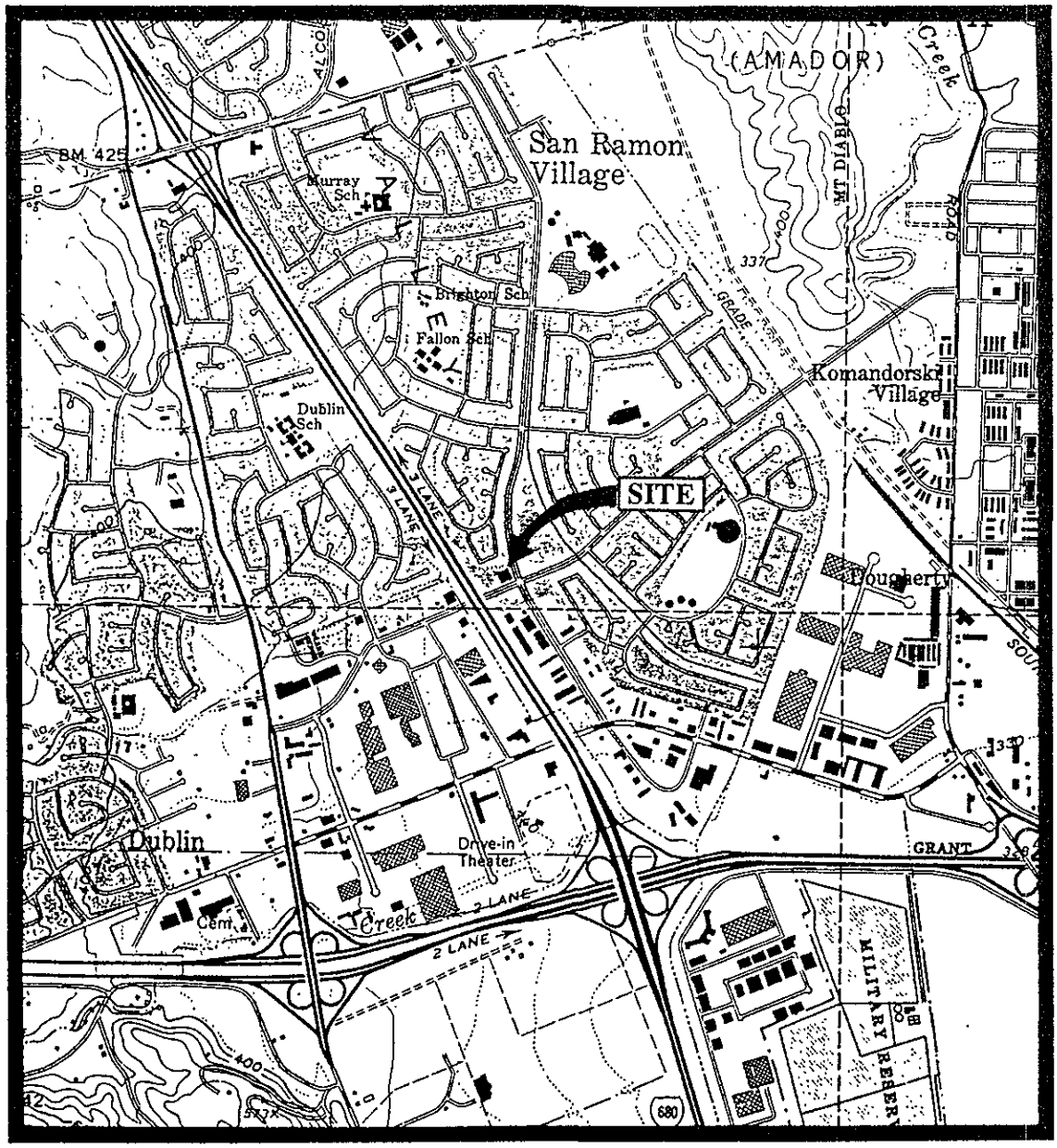
Date	Sample Well #	TPH as Diesel	TOG (ppm)	EPA 8010 Constituents
5/10/93	MW1	730*	--	--
2/10/93	MW3	200	ND	--
5/18/90	MW3	ND	ND	ND
2/06/90	MW3	ND	ND	ND
10/20/89	MW3	ND	2.5	ND
7/27/89	MW3	ND	1.6	ND
5/22/89	MW3	--	--	--
4/28/89	MW3	72	ND	ND
1/26/89	MW3	ND	--	ND
10/28/88	MW3	ND	--	ND
7/25/88	MW3	ND	--	ND
4/29/88	MW3	ND	--	ND

* Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a diesel and non-diesel mixture.

ND = Non-detectable.

-- Indicates analysis was not performed.

Results in parts per billion (ppb), unless otherwise indicated.

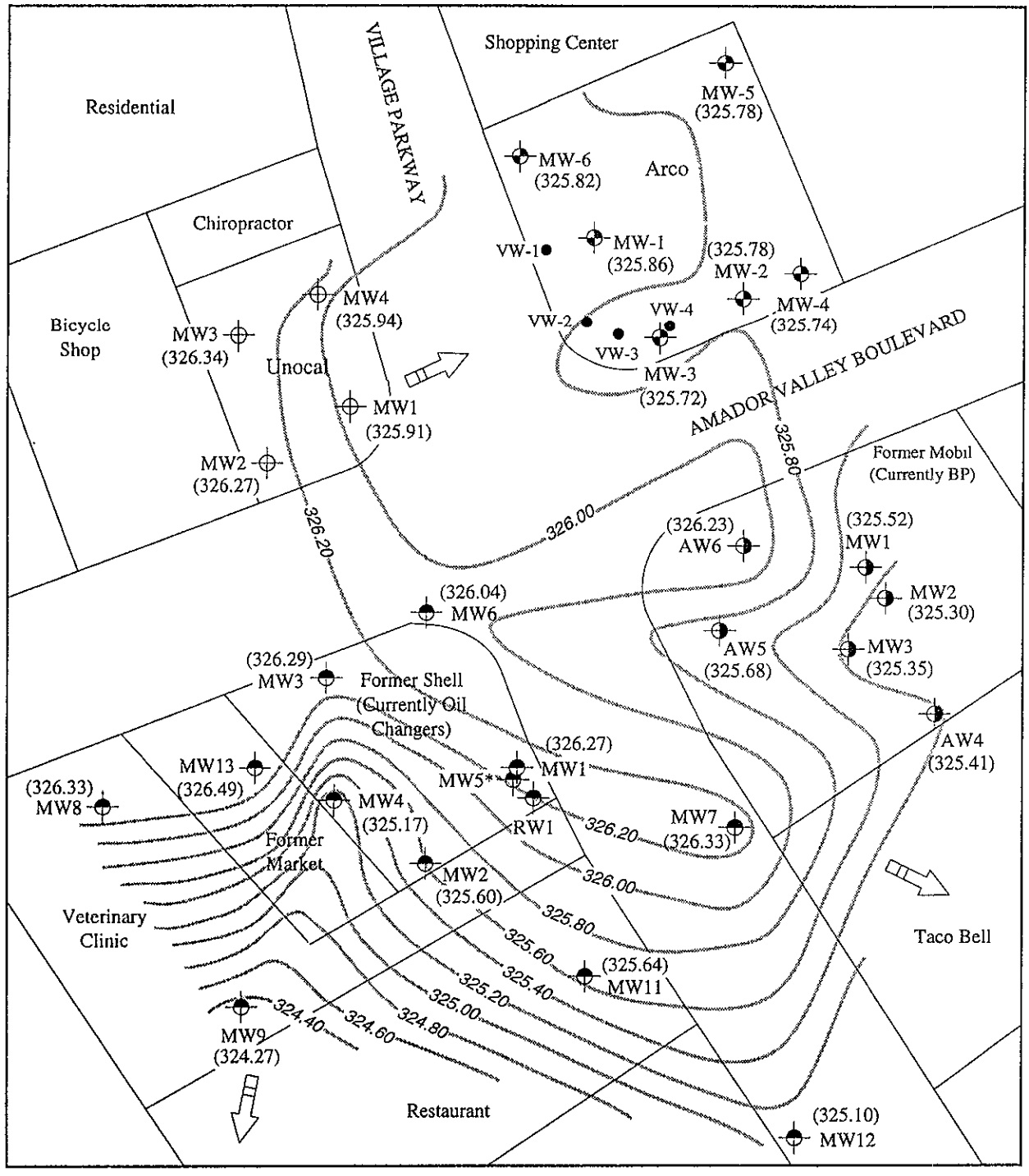


Base modified from 7.5 minute U.S.G.S. Dublin Quadrangle
(photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #5366 7375 AMADOR VALLEY BLVD. DUBLIN, CALIFORNIA	LOCATION MAP



LEGEND

- Monitoring well (Unocal)
- Monitoring well (BP)
- Monitoring well (Shell)
- Monitoring well (Arco)
- Vapor extraction well (Arco)
- ( ) Ground water elevation in feet above Mean Sea Level
- Contours of ground water elevation
- Direction of ground water flow
- * Ground water elevation not used for contours (well screened across deeper aquifer).

0 100 200

Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE NOVEMBER 11, 1993 JOINT MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5366
7375 AMADOR VALLEY BLVD.
DUBLIN, CALIFORNIA

FIGURE
1

SEQUOIA ANALYTICAL
1900 Bates Avenue • Suite LM • Concord, California 94520
(510) 686-9600 • FAX (510) 686-9689

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #5366, 7375 Amador Valley Rd.,		Sampled:	Nov 11, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Dublin	Received:	Nov 11, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020		Reported:	Nov 30, 1993
Attention: Avo Avedissian	First Sample #:	311-1591			

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 311-1591 MW-1	Sample I.D. Method Blank
Purgeable Hydrocarbons	50	350	
Benzene	0.5	19	
Toluene	0.5	2.5	
Ethyl Benzene	0.5	2.7	
Total Xylenes	0.5	3.4	
Chromatogram Pattern:		Gasoline	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0
Date Analyzed:	11/22/93	11/22/93
Instrument Identification:	ML #2	ML #2
Surrogate Recovery, %: (QC Limits = 70-130%)	93	103

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Alan B. Kemp
Project Manager

SEQUOIA ANALYTICAL
1900 Bates Avenue • Suite LM • Concord, California 94520
(510) 686-9600 • FAX (510) 686-9689

Kaprealian Engineering, Inc.
2401 Stanwell Dr., Ste. 400
Concord, CA 94520
Attention: Avo Avedissian

Client Project ID: Unocal #5366, 7375 Amador Valley Rd., Dublin
Matrix: Water
QC Sample Group: 311-1591

Reported: Nov 30, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Dinsay	J. Dinsay	J. Dinsay	J. Dinsay
MS/MSD Batch#:	3111457	3111457	3111457	3111457
Date Prepared:	11/22/93	11/22/93	11/22/93	11/22/93
Date Analyzed:	11/22/93	11/22/93	11/22/93	11/22/93
Instrument I.D.#:	ML #2	ML #2	ML #2	ML #2
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Matrix Spike % Recovery:	100	100	110	111
Matrix Spike Duplicate % Recovery:	99	100	109	109
Relative % Difference:	1.0	0.0	1.0	1.8
LCS Batch#:	GBLK112293	GBLK112293	GBLK112293	GBLK112293
Date Prepared:	11/22/93	11/22/93	11/22/93	11/22/93
Date Analyzed:	11/22/93	11/22/93	11/22/93	11/22/93
Instrument I.D.#:	ML #2	ML #2	ML #2	ML #2
LCS % Recovery:	104	104	106	104
% Recovery Control Limits:	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Alan B. Kemp
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

UNOCAL 76

☒ 680 Chesapeake Drive • Redwood City, CA 94063 • (415) 364-9600
☐ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600
☐ 1900 Bates Ave., Suite LM • Concord, CA 94520 • (510) 686-9600
☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9800

Company Name: Kaprealian Engineering, Inc.	Project Name: 7375 Amador Valley Rd. / Dublin
Address: 2401 Stanwell Dr. suite 400	UNOCAL Project Manager:
City: Concord State: ca. Zip Code: 94520	
Telephone: (510) 602-5100 FAX #: (510) 687-0602	Site #: 5366
Report To: Avo Avedissian Sampler: Vartkes.	QC Data: ☒ Level A (Standard) ☐ Level B ☐ Level C ☐ Level D

Turnaround Time:
☒ 10 Working Days ☐ 2 Working Days
☐ 5 Working Days ☐ 24 Hours
☐ 3 Working Days ☐ 2 - 8 Hours

☐ Drinking Water
☒ Waste Water
☐ Other

Analyses Requested

	Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	TPHG & BTEX	Comments
1.	MW 1	11/11/93 10:00		2	VOA		X	311591A-F
2.								
3.								
4.								
5.								
6.								
7.								
8.								
9.								
10.								

Relinquished By: M. Thelgin	Date: 11/11/93	Time: 12:45	Received By: [signature]	Date: 11/11/93	Time: 1245
Relinquished By: [signature]	Date: 11/12/93	Time: 11 30	Received By: [signature]	Date:	Time:
Relinquished By: [signature]	Date: 11/12/93	Time: 1430	Received By Lab: Melissa Crumpton	Date: 11/12/93	Time: 1430

Were Samples Received in Good Condition? ☐ Yes ☐ No Samples on Ice? ☐ Yes ☐ No Method of Shipment _____ Page __ of __

To be completed upon receipt of report:
1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____
2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Signature: _____ Company: _____ Date: _____