JRC
4/15/93

KAPREALIAN ENGINEERING
INCORPORATED

KEI-P88-0205.QR19
March 29, 1993

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), per KEI's report (KEI-P88-0205.QR3) dated February 15, 1989, and as modified in KEI's quarterly report (KEI-P88-0205.QR16) dated June 30, 1992. The wells are currently monitored quarterly. Well MW1 is sampled on a quarterly basis and wells MW2, MW3, and MW4 are sampled on an annual basis. This report covers the work performed by KEI during February 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 monitoring wells (MW1 through MW4) were monitored and sampled once during the quarter. Prior to sampling, the wells were checked for depth to water and the presence of free product or a sheen. No free product or sheen was noted in any of the wells during the quarter. On February 10, 1993, a joint monitoring

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

program was also conducted with the nearby BP and former Shell service station sites. Monitoring data from the BP and former Shell stations are summarized in Table 2. The monitoring data collected for the Unocal site this quarter are summarized in Table 1.

Water samples were collected from all of the Unocal monitoring wells on February 10, 1993. Prior to sampling, the wells were each purged of 15 gallons of water by the use of a surface pump. The samples were collected by the use of a clean Teflon bailer. The samples were decanted into clean VOA vials that were then sealed with Teflon-lined screw caps 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 February 10, 1993, ranged between 8.63 and 8.95 feet below grade. Water levels in all of the Unocal monitoring wells have shown net increases of 3.34 to 3.38 feet since November 10, 1992. Based on the water level data gathered during the joint monitoring event conducted with the adjacent BP and former Shell service stations on February 10, 1993, the ground water flow over the majority of the site vicinity was to the southeast, as shown on the attached Potentiometric Surface Map, Figure 1. Based on water level data gathered from Unocal's wells MW1 through MW4, the flow direction at the Unocal site was to the east-southeast. The ground water flow direction this quarter is similar to the easterly flow direction reported in most previous quarters. The average hydraulic gradient over the majority of the site vicinity on February 10, 1993, was approximately 0.005.

ANALYTICAL RESULTS

The ground water samples collected from the four Unocal wells were analyzed at Sequoia Analytical Laboratory and were accompanied by properly executed Chain of Custody documentation. The samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline by EPA method 5030/modified 8015, and benzene, toluene, xylenes, and ethylbenzene (BTX&E) by EPA method 8020. In addition, the ground water sample collected from well MW3 was also analyzed for TPH as diesel by EPA method 3510/modified 8015, and total oil and grease (TOG) by Standard Methods 5520B&F.

The ground water sample analytical results for Unocal's monitoring wells are summarized in Tables 3 and 4. Copies of the laboratory analytical results and the Chain of Custody documentation are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results for the ground water samples collected and evaluated 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, per KEI's report (KEI-P88-0205.QR3) dated February 15, 1989, and as modified in KEI's quarterly report (KEI-P88-0205.QR16) dated June 30, 1992. All four monitoring wells are monitored quarterly, well MW1 is sampled quarterly, and well MW2 is sampled annually. Per a request from the Alameda County Health Care Services (ACHCS) Agency, and as agreed to by Unocal in a meeting on November 18, 1992, wells MW3 and MW4 will also be sampled on an annual basis for a one-year period (one additional sampling event). Wells MW2, MW3, and MW4 will next be sampled during February of 1994. In addition to TPH as gasoline and BTX&E constituents, well MW3 will also be analyzed for TPH as diesel and TOG.

KEI will continue the joint monitoring program with the respective consultants for the BP and former Shell service stations. Recommendations for altering or terminating the monitoring and sampling program will be made as warranted. In addition, the Arco station located at 7249 Village Parkway (across the street and to the east of the Unocal site) is now on the most recent Regional Water Quality Control Board's (RWQCB) list of fuel leak sites. KEI will review the file for this site during the next quarter, and, if possible, will arrange to include Arco in future joint monitoring events. It is also KEI's understanding that Arco recently conducted a pilot vapor extraction test to determine the feasibility of vapor extraction as a remedial technique for their site. During the proposed file review, KEI will determine if there is any information in the Arco file regarding this pilot test.

DISTRIBUTION

A copy of this report should be sent to ACHCS, and to 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 reasonably 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.

Thomas J. Berkins
Senior Environmental Engineer

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

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

Timothy R. Ross
Project Manager

/bp

Attachments: Tables 1 through 4
Location Map
Potentiometric Surface Map - Figure 1
Petroleum Hydrocarbon Concentrations - Figure 2
Laboratory Analyses
Chain of Custody documentation

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March 29, 1993

TABLE 1

SUMMARY OF MONITORING DATA

Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen	Water Purged (gallons)
(Monitored and Sampled on February 10, 1993)					
MW1	328.09	8.63	0	No	15
MW2	328.55	8.81	0	No	15
MW3	328.58	8.95	0	No	15
MW4	328.06	8.94	0	No	15

Well #	Surface Elevation* (feet)
MW1	336.72
MW2	337.36
MW3	337.53
MW4	337.00

* The elevations of the tops of the well covers have been surveyed relative to Mean Sea Level (MSL), per a County of Alameda Benchmark (Elevation = 337.40 MSL).

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TABLE 2

SUMMARY OF MONITORING DATA

(BP Service Station)

Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Top of Casing Elevation (feet)
(BP Service Station Wells Monitored by Alisto Engineering Group on February 10, 1993)			
MW1	329.92	5.25	335.17
MW2	328.12	6.46	334.58
MW3	327.97	7.16	335.13
AW4	WELL WAS DESTROYED		333.41
AW5	327.52	7.29	334.81
AW6	327.77	7.13	334.90
(Former Shell Service Station Wells Monitored by Emcon on February 10, 1993)			
MW1	327.59	7.24	334.83
MW2	327.68	9.28	336.96
MW3	328.11	8.82	336.93
MW4	327.74	9.40	337.14
MW5	326.99*	7.97	334.96
MW6	327.77	7.65	335.42
MW7	327.17	6.06	333.23
MW8	328.45	7.35	335.80
MW9	327.37	7.20	334.57
MW11	327.41	6.79	334.20
MW12	325.78	6.75	332.53
MW13	328.15	7.49	335.64

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

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TABLE 3

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
2/10/93	MW1	3,000	230	ND	200	340
	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	21	71
8/12/92	MW1	1,700	51	ND	21	93
5/22/92	MW1	2,500	120	ND	37	230
	MW2	ND	ND	ND	ND	ND
2/25/92	MW1	3,900	500	ND	400	450
11/13/91	MW1	860	40	ND	2.5	11
8/12/91	MW1	1,100	68	2.6	9.3	210
5/15/91	MW1	2,100	220	ND	27	360
2/14/91	MW1	1,900	150	2.9	43	340
11/14/90	MW1	2,000	110	0.52	16	410
8/15/90	MW1	2,200	160	ND	45	570
5/18/90	MW1	2,000	140	1.8	19	460
	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	29	350
	MW2	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND
10/20/89	MW1	ND	ND	ND	ND	ND
	MW2	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	0.38
	MW4	ND	ND	ND	ND	ND

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
7/27/89	MW1	1,900	130	6.3	68	ND
	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	24	170
	MW2	ND	ND	ND	ND	ND
	MW3	880	9.6	9.7	12.7	19
	MW4	ND	0.3	ND	ND	ND
1/26/89	MW1	1,900	240	1.8	30	81
	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	12	250
	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	1,500	870
	MW2	170	2.7	0.6	13	ND
	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.

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TABLE 4

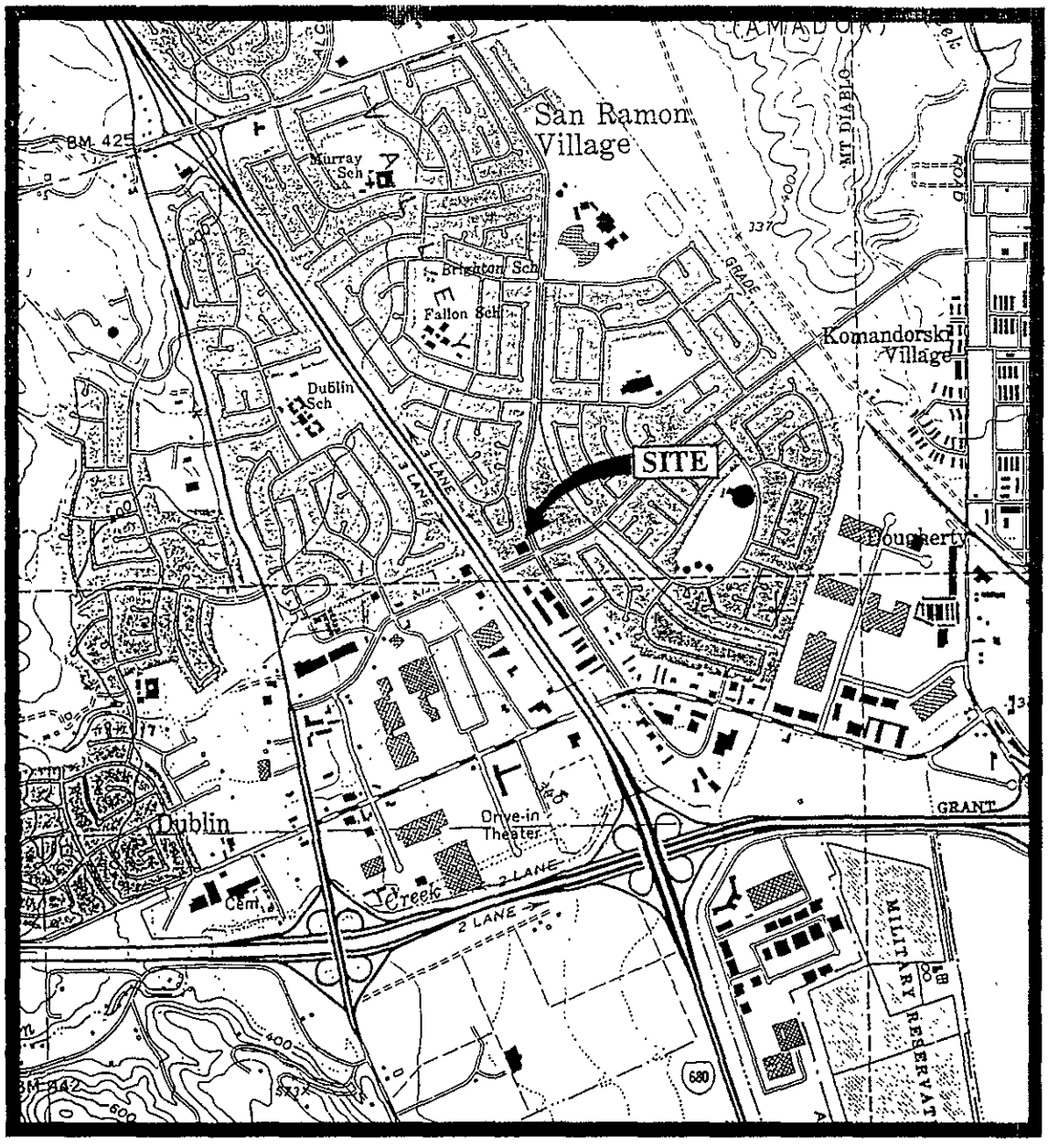
SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Diesel	TOG (ppm)	EPA 8010 Constituents
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

ND = Non-detectable.

-- Indicates analysis was not performed.

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

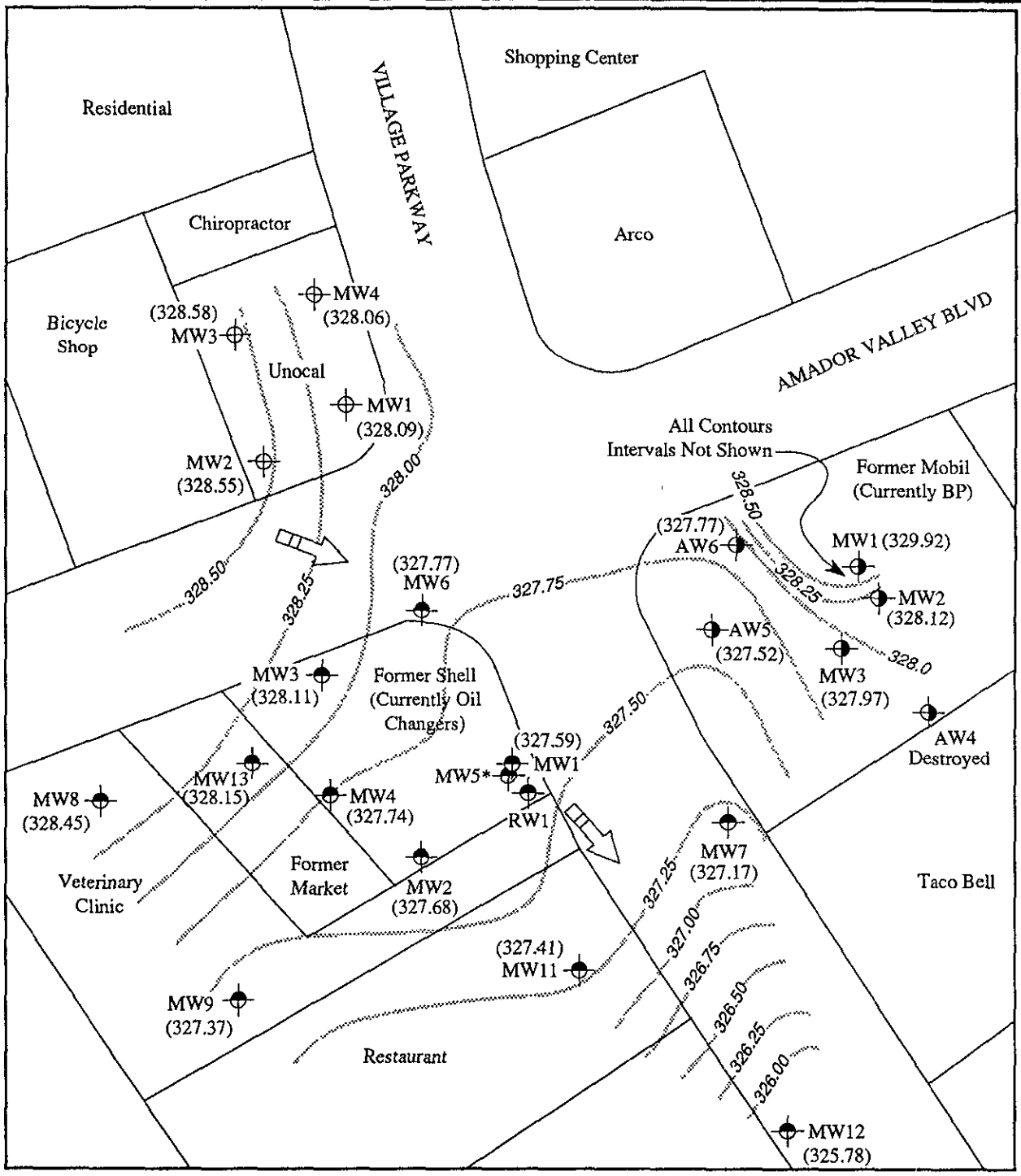


Base modified from 7.5 minute U.S.G.S. Dublin Quadrangle
(photorevised 1980)

0 2000 4000

Approx. scale feet

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



LEGEND

- Monitoring well (Unocal)
- Monitoring well (BP)
- Monitoring well (Shell)
- ( ) 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

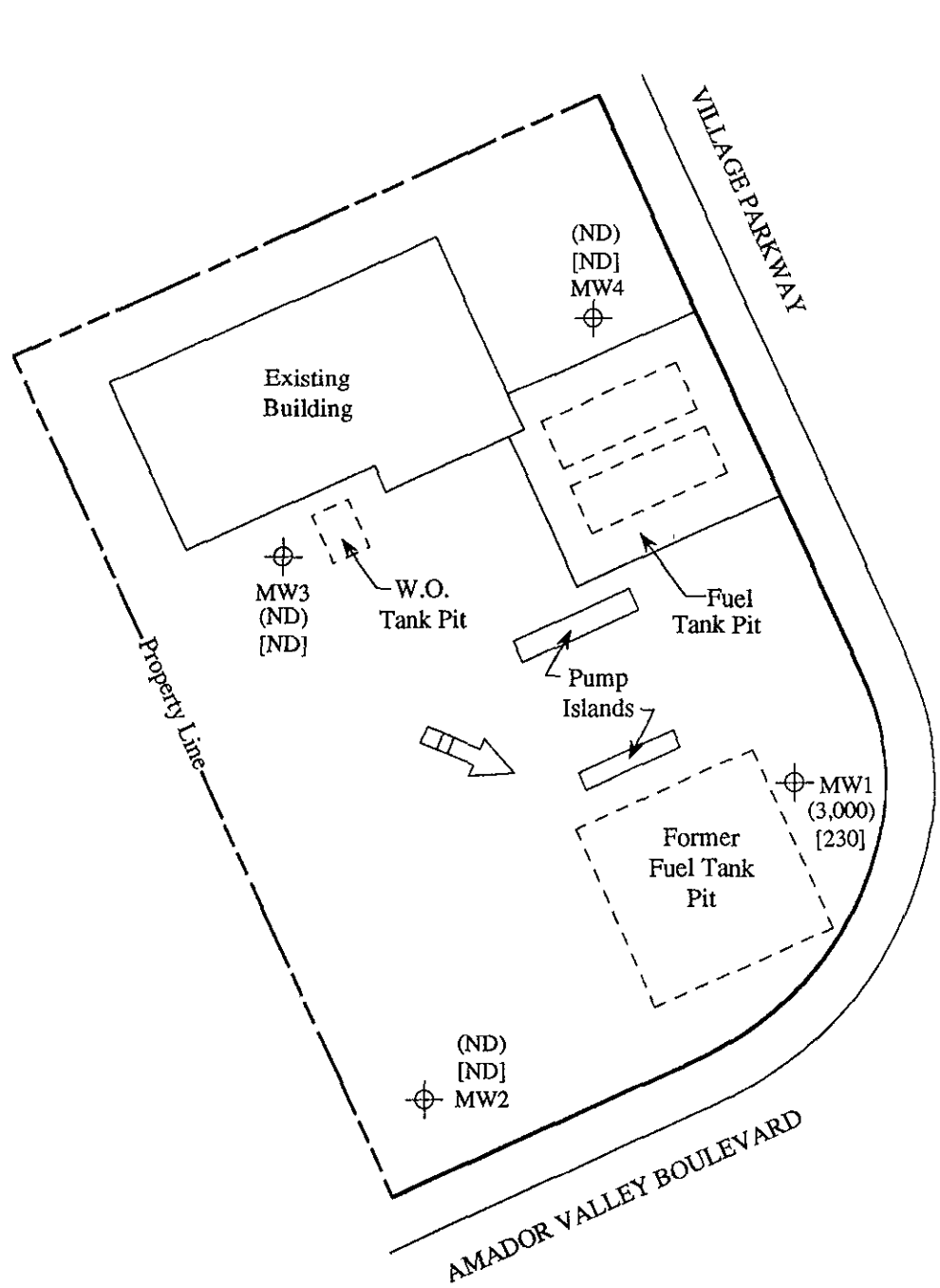
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE FEBRUARY 10, 1993 JOINT MONITORING EVENT

KAPREALIAN ENGINEERING INCORPORATED

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

FIGURE **1**



LEGEND

- Monitoring well
- ( ) Concentration of TPH as gasoline in ppb
- [ ] Concentration of benzene in ppb
- ND = Non-detectable
- Direction of ground water flow

0 30 60

Approx. scale feet

PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUND WATER ON FEBRUARY 10, 1993

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INCORPORATED

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

FIGURE
2

SEQUOIA ANALYTICAL

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Kapreallan Engineering, Inc.	Client Project ID:	Unocal, 7375 Amador Valley Blvd, Dublin	Sampled:	Feb 10, 1993
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Feb 10, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Feb 24, 1993
Attention: Mardo Kapreallan, P.E.	First Sample #:	302-0447		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 302-0447 MW-1	Sample I.D. 302-0448 MW-2	Sample I.D. 302-0449 MW-3	Sample I.D. 302-0450 MW-4	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	3,000	N.D.	N.D.	N.D.	
Benzene	0.5	230	N.D.	N.D.	N.D.	
Toluene	0.5	N.D.	N.D.	N.D.	N.D.	
Ethyl Benzene	0.5	340	N.D.	N.D.	N.D.	
Total Xylenes	0.5	200	N.D.	N.D.	N.D.	
Chromatogram Pattern:		Gasoline	--	--	--	

Quality Control Data

Report Limit Multiplication Factor:	20	1.0	1.0	1.0	1.0
Date Analyzed:	2/16/93	2/16/93	2/16/93	2/16/93	2/16/93
Instrument Identification:	HP-4	HP-4	HP-4	HP-4	HP-4
Surrogate Recovery, %: (QC Limits = 70-130%)	94	105	105	104	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

Scott A. Chieffo
Project Manager

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 7375 Amador Valley Blvd, Dublin	Sampled:	Feb 10, 1993
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Feb 10, 1993
Concord, CA 94520	Analysis Method:	EPA 3510/3520/8015	Reported:	Feb 24, 1993
Attention: Mardo Kaprealian, P.E.	First Sample #:	302-0449		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 302-0449 MW-3	Sample I.D. Matrix Blank
Extractable Hydrocarbons	50	200	
Chromatogram Pattern:		Diesel	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0
Date Extracted:	2/16/93	2/16/93
Date Analyzed:	2/17/93	2/17/93
Instrument Identification:	HP-3A	HP-3B

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

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 7375 Amador Valley Blvd, Dublin	Sampled:	Feb 10, 1993
2401 Stanwell Drive, Suite 400	Matrix Descript:	Water	Received:	Feb 10, 1993
Concord, CA 94520	Analysis Method:	SM 5520 B&F (Gravimetric)	Extracted:	Feb 16, 1993
Attention: Mardo Kaprealian, P.E.	First Sample #:	302-0449	Analyzed:	Feb 18, 1993
			Reported:	Feb 24, 1993

TOTAL RECOVERABLE PETROLEUM OIL

Sample Number	Sample Description	Oil & Grease mg/L
302-0449	MW-3	N.D.

Detection Limits:	5.0

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.
2401 Stanwell Drive, Suite 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 7375 Amador Valley Blvd, Dublin
QC Sample Group: 3020447-450
Reported: Feb 24, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel	Oil and Grease
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015	SM 5520 BF
Analyst:	A.T.	A.T.	A.T.	A.T.	K. Wimer	D. Newcomb
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L
Date Analyzed:	Feb 16, 1993	Feb 16, 1993	Feb 16, 1993	Feb 16, 1993	Feb 17, 1993	Feb 16, 1993
QC Sample #:	302-0366	302-0366	302-0366	302-0366	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60	250	100
Conc. Matrix Spike:	26	24	23	67	208	92
Matrix Spike % Recovery:	130	120	115	112	83	92
Conc. Matrix Spike Dup.:	22	21	21	61	231	96
Matrix Spike Duplicate % Recovery:	110	105	105	102	92	96
Relative % Difference:	16	13	9.0	9.4	10.5	4.0

Laboratory blank contained the following analytes: None Detected

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Scott A. Chieffo
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

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Kaprealian Engineering, Inc.
2401 Stanwell Drive, Suite 400
Concord, CA 94520
Attention: Mardo Kapreallan, P.E.

Client Project ID: Unocal, 7375 Amador Valley Blvd, Dublin
QC Sample Group: 3020447-450
Reported: Feb 24, 1993

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer
Reporting Units:	µg/L	µg/L
Date Analyzed:	Feb 17, 1993	Feb 17, 1993
Sample #:	302-0449	Matrix Blank
Surrogate % Recovery:	95	106

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Scott A. Chieffo
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

KAPREALIAN ENGINEERING
INCORPORATED

CHAIN OF CUSTODY

ADD ANALYSIS AFTER CLIENT 2-16-93 8:20AM ABK for S.C

SAMPLER	SITE NAME & ADDRESS
JOE	Unocal / Dublin
WITNESSING AGENCY	7375 Amador Valley Blvd.

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHG BTXE	TPH-D	TOG					ANALYSES REQUESTED
MW-1	2-10/93	10:05 Am		✓	✓		2	MW	✓							
MW-2	"			✓	✓		2	"	✓							
MW-3	"			✓	✓		4	"	✓	X	X					
MW-4	"	12:20 P.m		✓	✓		2	"	✓							

TURN AROUND TIME: Regular

REMARKS

3020447AB
448AB
449AB
450AB

~~ONLY 2 VOAS~~ ~~RECEIVED FOR~~ MW-3

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Joe Devin	2-10-93	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	2:11 93	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
	2-11-93	2:15
Relinquished by: (Signature)	Date/Time	Received by: (Signature)

The following MUST BE completed by the laboratory accepting samples for analysis:

1. Have all samples received for analysis been stored in ice? YES
2. Will samples remain refrigerated until analyzed? YES
3. Did any samples received for analysis have head space? NO
4. Were samples in appropriate containers and properly packaged? YES

Signature | Title | Date

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