KAPREALIAN ENGINEERING
INCORPORATED

Vle
10/21

KEI-P88-0205.QR21
September 23, 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). 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 August 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 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.

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

On August 12, 1993, a joint monitoring event was conducted with the consultants for the nearby BP, Arco, and former Shell service station sites. For this quarter, the Arco data was unavailable. Monitoring data from the former Shell station and the BP station are summarized in Table 2 and Table 3, 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 August 12, 1993. Prior to sampling, the well was purged of 6.5 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 August 12, 1993, ranged between 9.91 and 10.34 feet below grade. The water levels in all of the Unocal monitoring wells have shown net decreases of 0.34 to 0.43 feet since May 10, 1993, except for well MW2, which showed a net increase of 0.64 feet. Based on the water level data gathered during the joint monitoring event conducted with the adjacent former Shell station and existing BP station on August 12, 1993, the ground water flow appears to be complex, but predominantly to the east-northeast, as shown on the attached Potentiometric Surface Map, Figure 1. The hydraulic gradient at the site and vicinity on August 12, 1993, ranged from approximately 0.01 to 0.001.

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 4 and 5. 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 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 MW1 (KEI-P88-0205.P1 dated July 7, 1993). The well is scheduled to be installed next month. OCT 1993 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.

Lastly, on August 16, 1993, a representative of KEI visited the Oakland office of the Regional Water Quality Control Board (RWQCB) and reviewed the file for the nearby Arco site. This file review was performed to determine the status and effectiveness of any remedial measures that have been performed at the Arco site. However, no new information was contained in the file. KEI will continue to periodically review the file for the Arco site in an attempt to obtain any new information pertaining to the implementation and effectiveness of any remedial activities performed at the Arco site.

Alameda Co. Hlth may have more up to date file

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.

per Tim Ross - well to go in december 1993

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.

Talin Kaloustian
Staff Engineer

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

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

Timothy R. Ross
Project Manager

/bp

Attachments: Tables 1 through 5
Location Map
Potentiometric Surface Map - Figure 1
Laboratory Analyses
Chain of Custody documentation

KEI-P88-0205.QR21
September 23, 1993

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 August 12, 1993)					
MW1	326.17	9.91	0	No	6.5
MW2*	326.67	10.11	0	--	0
MW3*	326.64	10.34	0	--	0
MW4*	326.10	10.32	0	--	0

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

* Monitored only.

** The elevations of the tops of the well casings have been surveyed relative to Mean Sea Level, as of August 12, 1993. Previously, the elevations of the well covers were used as datums.

-- Sheen determination was not performed.

KEI-P88-0205.QR21
September 23, 1993

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 and Sampled on August 12, 1993)			
MW1	326.29	8.54	334.83
MW2	326.26	10.70	336.96
MW3	326.57	10.36	336.93
MW4	326.46	10.68	337.14
MW5	326.21*	8.75	334.96
MW6	326.24	9.18	335.42
MW7	326.40	6.83	333.23
MW8	326.80	9.00	335.80
MW9	326.32	8.25	334.57
MW11	326.10	8.10	334.20
MW12	326.30	6.23	332.53
MW13	326.91	8.73	335.64

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

KEI-P88-0205.QR21
September 23, 1993

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 August 12, 1993)		
MW1	326.18	8.99	335.17
MW2	326.00	8.58	334.58
MW3	326.02	9.11	335.13
MW4	WELL DESTROYED		
AW5	325.94	8.87	334.81
AW6	326.26	8.64	334.90

KEI-P88-0205.QR21
September 23, 1993

TABLE 4

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes
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 4 (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 5

SUMMARY OF LABORATORY ANALYSES
WATER

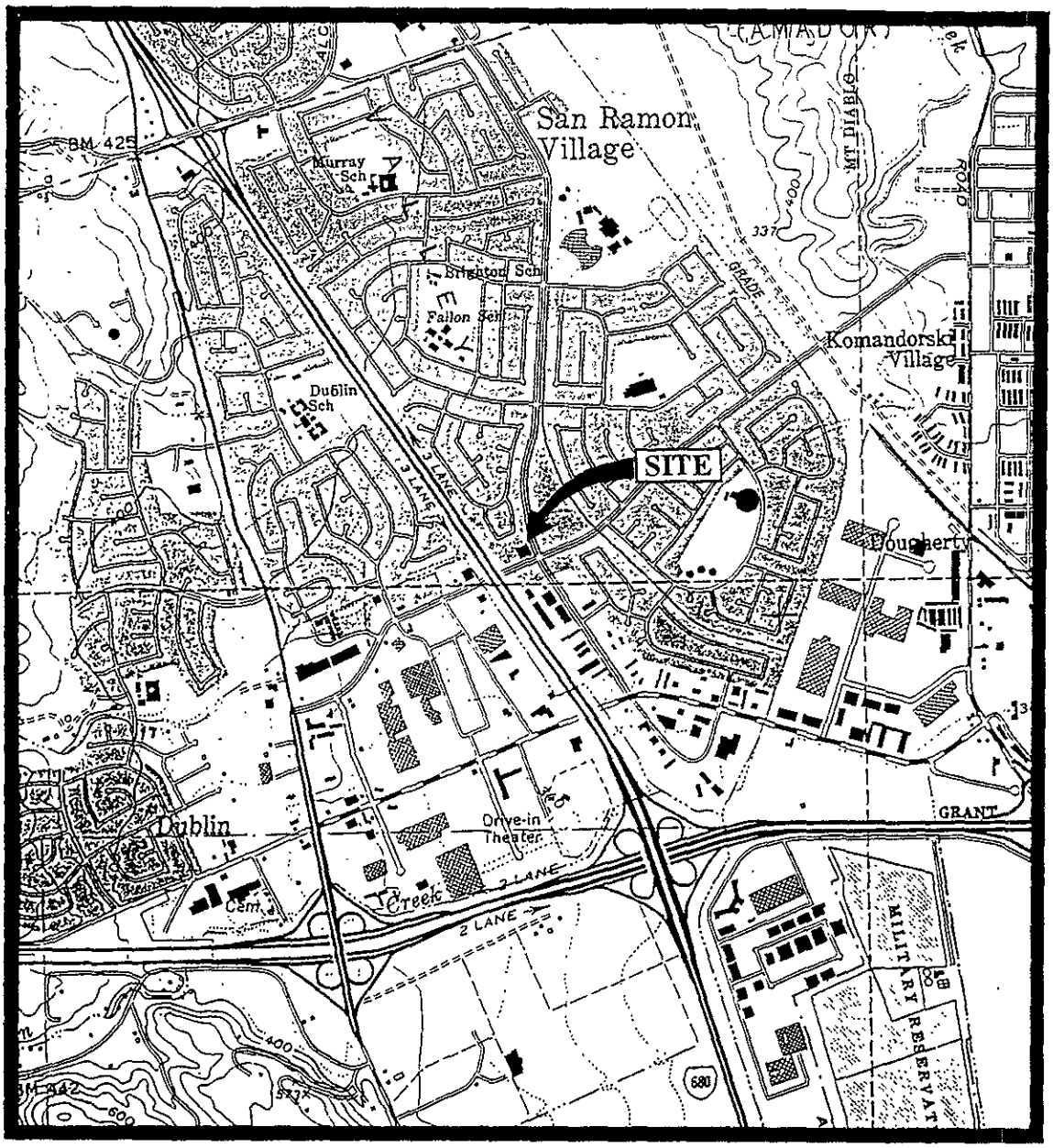
Date	Sample Well #	TPH as Diesel	TOG (ppm)	EPA 8010 Constituents
5/10/93	MW1	730*	--	--
2/10/93	MW3	200	ND	--
5/18/90	MW3	ND	ND	ND
2/06/90	MW3	ND	ND	ND
10/20/89	MW3	ND	2.5	ND
7/27/89	MW3	ND	1.6	ND
5/22/89	MW3	--	--	--
4/28/89	MW3	72	ND	ND
1/26/89	MW3	ND	--	ND
10/28/88	MW3	ND	--	ND
7/25/88	MW3	ND	--	ND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

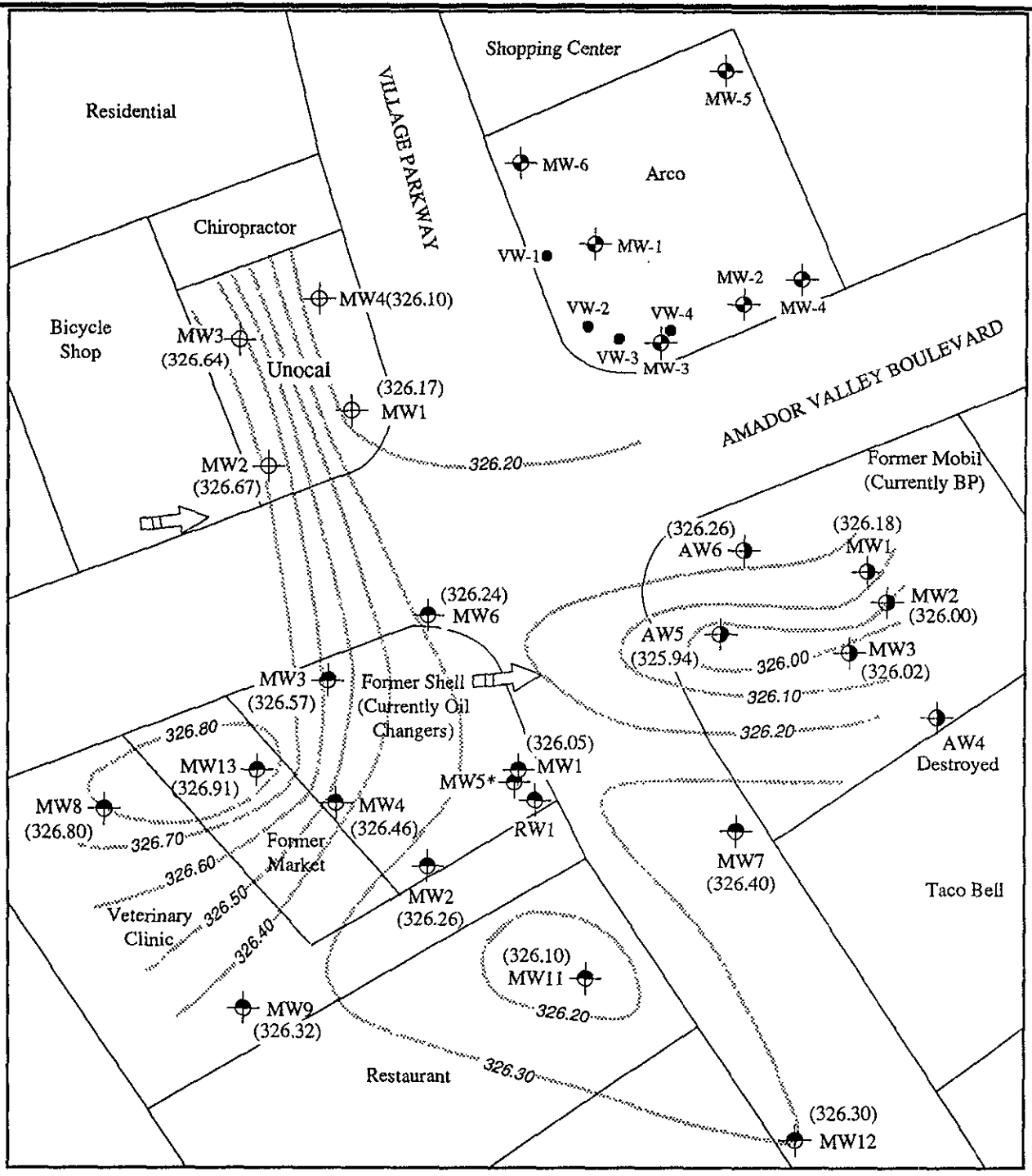


Base modified from 7.5 minute U.S.G.S. Dublin Quadrangle
(photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #5366 7375 AMADOR VALLEY BLVD. DUBLIN, CA	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 AUGUST 12, 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

Kapreallan Engineering, Inc.	Client Project ID:	Unocal #5366, 7375 Amador Valley Blvd., Dublin	Sampled:	Aug 12, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Aug 13, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Aug 24, 1993
Attention: Avo Avedessian	First Sample #:	308-0543		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 308-0543 MW-1	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	1,000	
Benzene	0.5	46	
Toluene	0.5	N.D.	
Ethyl Benzene	0.5	29	
Total Xylenes	0.5	6.3	
Chromatogram Pattern:		Gasoline	

Quality Control Data

Report Limit Multiplication Factor:	10	1.0
Date Analyzed:	8/18/93	8/18/93
Instrument Identification:	HP-2	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	107	99

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

Kapreallan Engineering, Inc.
2401 Stanwell Dr., Ste. 400
Concord, CA 94520
Attention: Avo Avedessian

Client Project ID: Unocal #5366, 7375 Amador Valley Blvd., Dublin
Matrix: Water
QC Sample Group: 308-0543

Reported: Aug 24, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J.F.	J.F.	J.F.	J.F.
Conc. Spiked:	20	20	20	60
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	1LCS081893	1LCS081893	1LCS081893	1LCS081893
Date Prepared:	8/18/93	8/18/93	8/18/93	8/18/93
Date Analyzed:	8/18/93	8/18/93	8/18/93	8/18/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
LCS % Recovery:	112	100	100	100
Control Limits:	70-130	70-130	70-130	70-130
MS/MSD Batch #:	3080587	3080587	3080587	3080587
Date Prepared:	8/18/93	8/18/93	8/18/93	8/18/93
Date Analyzed:	8/18/93	8/18/93	8/18/93	8/18/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Matrix Spike % Recovery:	105	105	105	107
Matrix Spike Duplicate % Recovery:	105	105	100	103
Relative % Difference:	0.0	0.0	4.9	3.8

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 LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

KAPREALIAN ENGINEERING
INCORPORATED

CHAIN OF CUSTODY

SAMPLER: STEVE

WITNESSING AGENCY:

SITE NAME & ADDRESS: UNO. # 5366 DUBLIN. 7375 AMADOR VALLEY BLVD.

ANALYSES REQUESTED: TPH-G, BTXE

TURN AROUND TIME: REGULAR

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPH-G BTXE	REMARKS
MW-1	8/12/93	12:30pm		X	X		2	MW	X	3080543 AB

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
STEVE	8/13/93 6:05pm	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
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?
2. Will samples remain refrigerated until analyzed?
3. Did any samples received for analysis have head space? NO
4. Were samples in appropriate containers and properly packaged?

Signature: _____ Title: _____ Date: 8/13/93

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel. 510 602 5100 Fax 510 687 0602