Eva

KEI-P89-0801.QR12 May 13, 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 #6034
4700 First Street
Livermore, California

nears roots in well-unable to collect water sample. Told him they need to make well accessible for next Qm 1 Also shaned consider some remoderation at not " MW-2

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 proposal (KEI-P89-0801.P3) dated January 31, 1991, and as modified in KEI's quarterly reports (KEI-P89-0801.QR5) dated August 7, 1991, and (KEI-P89-0801.QR8) May 4, 1992. The wells are currently monitored and sampled on a quarterly basis, except for well MW1, which is no longer sampled. This report covers the work performed by KEI from February through April of 1993.

BACKGROUND

The subject site contains a Unocal service station facility. Two underground gasoline storage tanks, one waste oil tank, and the product piping were removed from the site in August of 1989 during tank replacement activities. The fuel tank pit was subsequently overexcavated to a depth of 17.5 feet below grade (the ground water depth at that time) in order to remove contaminated soil. Seven 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 quarterly report (KEI-P89-0801.QR8) dated May 4, 1992.

RECENT FIELD ACTIVITIES

The seven Unocal monitoring wells (MW1 through MW7) were monitored and sampled once during the quarter, except for well MW1, which is no longer sampled, and well MW6, which was not sampled this quarter since the well was dry on the sampling date. Prior to sampling,

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the Unocal wells were checked for depth to water and the presence of free product or sheen. No free product or sheen was noted in any of the Unocal wells during the quarter. The monitoring data collected by KEI this quarter for the Unocal wells are summarized in Table 1.

A joint monitoring and sampling event was conducted with the nearby Chevron service station on April 22, 1993. The monitoring data collected by Groundwater Technology, Inc. (GTI) for the Chevron monitoring wells are summarized in Table 2, and the ground water sample analytical results for the Chevron wells are summarized in Table 4.

Water samples were collected by KEI from all of the Unocal wells (except MW1 and MW6) on April 22, 1993. Prior to sampling, the wells were each purged of 10 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 April 22, 1993, ranged between 14.25 to 15.47 feet below grade. The water levels in all of the Unocal wells have shown net decreases ranging from 0.22 to 0.27 feet since January 14, 1993. Based on the joint monitoring ground water level data gathered on April 22, 1993, the ground water flow direction in the vicinity of the Unocal and Chevron sites appeared to be predominantly to the west-northwest, as shown on the attached Potentiometric Surface Map, Figure 1. The flow direction reported this quarter is relatively similar to the predominantly northwesterly flow direction reported in the previous 13 quarters. The average hydraulic gradient across the Unocal site on April 22, 1993, was approximately 0.007.

ANALYTICAL RESULTS

The ground water samples collected from the 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 by EPA method 8020. The ground water sample collected from well MW5 was also analyzed for methyl tert butyl ether (MTBE) by EPA method 8020/modified.

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The analytical results of all of the ground water samples collected from the Unocal wells to date are summarized in Table 3, and the ground water sample analytical results for the Chevron wells are summarized in Table 4. The concentrations of TPH as gasoline and benzene detected in the ground water samples collected this quarter from the Unocal and Chevron wells are shown on the attached Figure 2. Copies of the laboratory analytical results and the Chain of Custody documentation for the Unocal samples are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results for the ground water samples collected and evaluated to date from the Unocal site, and no evidence of free product or sheen in any of the Unocal wells, KEI recommends the continuation of the current quarterly ground water monitoring and sampling program, per KEI's proposal (KEI-P89-0801.P3) dated January 31, 1991, and as modified in KEI's quarterly reports (KEI-P89-0801.QR8) dated May 4, 1992, and (KEI-P89-0801.QR5) dated August 7, 1991. In addition, KEI recommends the continuation of the joint monitoring and sampling program with the nearby Chevron site.

DISTRIBUTION

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

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

Sincerely,

Kaprealian Engineering, Inc.

Thomas J. Berkins

Senior Environmental Engineer

Joel G. Greger, C.E.G.

Gal AM

Senior Engineering Geologist

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

Timothy R. Ross Project Manager

/bp

Attachments: Tabl

Tables 1 through 4

Sewery for Thomas J. Ber Rome

Location Map

Potentiometric Surface Map - Figure 1

Concentrations of Petroleum Hydrocarbons - Figure 2

Laboratory Analyses

Chain of Custody documentation

TABLE 1
SUMMARY OF GROUND WATER MONITORING
AND PURGING DATA

Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen	Water Purged (gallons)
	(Monitored	and Sample	d on April	22, 199	93)
MW1*	505.41	15.47	0		0
MW2	505.19	14.98	0	No	10
MW3	505.58	14.33	0	No	10
MW4	505.82	14.30	0	No	10
MW5	505.34	15.24	0	No	10
MW6	NOT SAMPLED	- WELL DRY	Ý		
MW7	505.12	14.25	0	No	10

Well #	Surface Elevation** (feet)
MW1	520.88
MW2	520.17
MW3	519.91
MW4	520.12
MW5	520.58
MW6	519.34
MW7	519.37

- * Monitored only.
- ** The elevations of the tops of the well covers have been surveyed relative to Mean Sea Level (MSL), per the City of Livermore Benchmark No. C-18-5 (elevation = 551.77 MSL).
- -- Sheen determination was not performed.

TABLE 2
SUMMARY OF MONITORING DATA
CHEVRON WELLS

<u>Date</u>	<u>Well</u>	Well Case Elevation (feet above MSL)	Ground Water Elevation (feet)	Depth to Water (feet)
4/22/93	C1	520.39	504.14	16.25
	C2	520.76	507.83	12.93
	C3	521.31	508.70	12.61
	C5	520.82	508.70	12.12
	C6	519.62	508.30	11.32
	C7	520.30	508.46	11.84
	C8	519.74	507.67	12.07
	C 9	519.72	508.29	11.43
	C10	520.41	506.67	13.74
	C11	520.04	507.10	12.94
	C12	519.82	506.61	13.21
	C13	522.24	509.08	13.16
	C14	520.08	507.98	12.10
	C15	522.41	508.81	13.60
	C16	519.68	507.38	12.30
	C17	520.82	507.52	13.30
	C18	518.96	506.38	12.58
	C19	520.99	506.81	14.18

TABLE 3
SUMMARY OF LABORATORY ANALYSES
WATER

<u>Date</u>	Sample T	<u>iesel</u>	TPH as <u>Gasoline</u>		<u>Toluene</u>	Xylenes	Ethyl- <u>benzene</u>	MTBE
4/22/93	Milian Nas	· 	49,000	150	1,000		3,000	
	MW3		ND	ND	ND	ИD	ND	
	MW4 14.30		1,100	8.8	1.0	6.0		
	MW5 (5.24	 WDII I	94	1.2	ND	1.3	ND	0.82
		METL A	WAS DRY	MD	ND	ND	MD	
	MW7		ИД	ND	ИО	ИП	ND	
1/14/93	MW2 (ቂ.ገ (19,000	75	430	8,400	900	
, ,	MW3		ND	ND	ND	, ND	ND	
	MW4 14.05		920	ND	6.3		12	
	MW5 (5 50		91	ND	0.53		1.2	1.2
	MW6	WELL	WAS DRY					
	MW7		ND	ИD	ND	ND	ND	
10/16/92	MW2 (6.44)	#	290	2.3	ND	15	5.1	
10/10/92	MW3	,	ND	ND	ND	ND	ND	
	MW4 (5 18		300	2.1	ND	13	4.8	
	MW5 14.70		180	7.8	1.1	6.4	17	2.0
	MW6		WAS DRY	,		V. 1	Δ,	2.0
	MW7		ND	ND	ND	ND	ND	
7/07/92	MW2 6.67	:	44,000	160	1 100	17 000	1,000	
1/01/92	MW3		44,000 ND	160 ND	1,100 ND	17,000 ND	ND	
	MW4 15.07		340	ND	2.2	2.4	2.4	
	MW5 (6.17)		76	0.48	1.1	1.3	0.32	1.5
	MW6		ND	ND	ND	ND	ND	
	MW7		ND	ND	ND	ND	ND	
	*****		11.5	112	112	112	11.5	
4/06/92	MW2 15, 5%		760	6.3	2.1	130	ND	
	MW3		ND	ND	ND	ND	ND	
	MW4 14(3		660	1.3	3.8	4.1	2.9	
	MW5 15.42		240♦	ND	ND	ИD	0.35	
	MW6		ND	ND	ND	ND	ND	
	MW7		ND	ND	ND	ND	ND	
1/14/92	MW2 15.55		5,600	36	120	2,600	450	
· •	MW3		ND	ND	ND	ND	ND	
	MW4 14.65		1,500	4.2	7.1	9.2	18	
	MW5 (5,60		99	1.0	1.2	0.32		
	MW6 13,00		ND	ND	ND	ND	ND	
	MW7		ИD	ND	ND	ND	ND	

TABLE 3 (Continued)
SUMMARY OF LABORATORY ANALYSES

WATER

<u>Date</u>	Sample Well #	TPH as <u>Diesel</u>	TPH as <u>Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	Ethyl- <u>benzene</u>	MTBE
10/14/91	MW2		11,000	79	130	4,700	660	
	EWM.		ND	ND	ND	ND	ND	
	MW4		880	3.8	2.2	5.8	8.6	
	MW5		660	55	4.4	66	50	
	MW6		ND	ND	ИD	ND	ND	
	MW7		ND	ND	ND	ND	ND	
7/10/91	MW1*	ND	ND	ND	ND	ND	ND	
	MW2		14,000	70	160	5,400	570	
	MW3		ND	ND	ND	ND	ND	
	MW4		830	8.4	19	7.2	7.7	
	MW5		220	5.1	8.7	9.7	9.1	
	MW6		ND	ND	ND	ND	ND	
	MW7		ND	ND	ND	ND	ND	
4/10/91	MW1*	ND	ND	ND	ND	ND	ND	
	MW2		22,000	170	190	6,200	490	
	EWM		ND	ND	ND	ND	ND	
	MW4		950	0.84	4.3	5.0	9.6	
	MW5		630	35	14	30	47	
	MW6		ND	ND	ND	ND	ND	
	MW7		ИD	ND	ND	ND	ND	
12/24/90	MW1*	ND	ND	ND	ND	0.40		
	MW2		32,000	440	340	13,000	460	
	MW3		ND	ND	ND	ND	ND	
	MW4		1,400	ND	8.7	10	15	
9/07/90	MW1*	ND	ND	ND	1.2	ND	ND	
	MW2		ND	ND	1.5	ND	ND	
	MW3		1,100	11	ND	16	6.6	
	MW4		15,000	100	140	4,600	210	
6/05/90	MW1*	ND	ND	ND	ND	ND	ND	
	MW2		31,000	250	460	9,200	950	
	KWM3		ND	ND	ND	ND	ND	
	MW4		1,400	1.2	4.7	12	24	
3/08/90	MW1**	ND	ND	ND	ND	ND	ND	
	MW2		26,000	230	410	2,100	1,300	
	MW3		ND	ИD	ND	ND	ND	
	MW4		1,200	18	8.4	28	37	

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES WATER

<u>Date</u>	Sample Well #	TPH as <u>Diesel</u>	TPH as <u>Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	Xylenes	Ethyl- <u>benzene</u>	MTBE
11/18/89	MW1***	400	ND	ND	ND	ND	ND	~
, ,	MW2		53,000	540	500	22,000	130	
	EWM		ND	0.35	ND	ND	ND	
	MW4		990	9.8	10	4.7	7.1	

- Sequoia Analytical Laboratory reported that the hydrocarbons detected did not appear to be gasoline.
- * TOG and all EPA method 8010 constituents were non-detectable.
- ** TOG showed 4.7 ppm. All EPA method 8010 compounds were non-detectable.
- *** TOG showed 3.1 ppm. All EPA method 8010 compounds were non-detectable, except for trichloroethene at 0.55 ppb.
- ND = Non-detectable.
- -- Indicates analysis was not performed.

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

TABLE 4
SUMMARY OF LABORATORY ANALYSES
CHEVRON WELLS

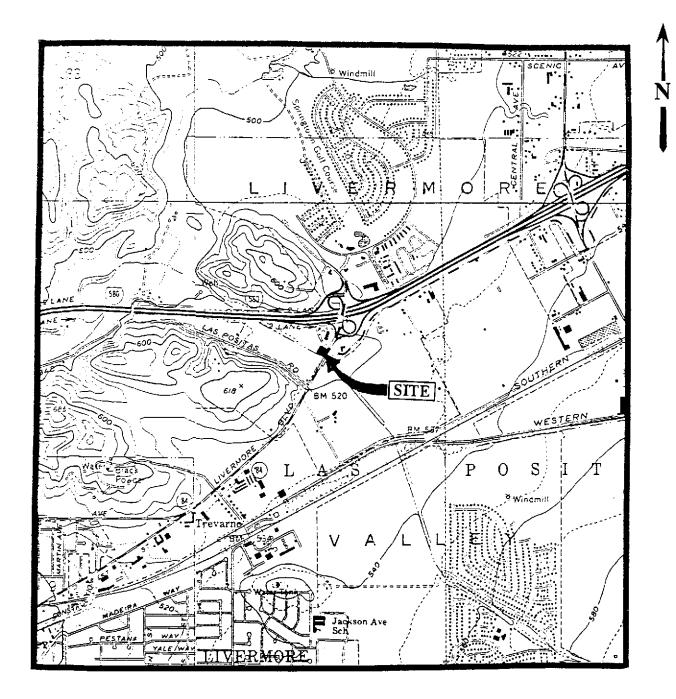
Well #	TPH as <u>Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>								
	(S	ampled on 1	April 22, 19	93, by GTI)									
C-1	18,000	26	44	330	580								
C-2	2,000	12	12	29	28								
C-3	ND	ND	ND	ND	ND								
C-4	WELL DESTRO	YED											
C-5	2,300	220	18	65	120								
		29	170										
	•	130	18										
			•	•									
C-19	250	0.6	1	1	1								
C-15 ND ND ND ND ND ND C-16 850 46 ND 6 24 C-17 8,900 16 68 97 44 C-18 ND ND ND ND ND ND C-19 250 0.6 1 1 1 1 (Sampled on January 14, 1993, by GTI) C-1 2,000 24 ND 62 98													
Campled on April 22, 1993, by GTI C-1													
	•												
	•												
			ND	1.3	นบ								
			ND.	1.0	110								
	•												
	•												
	-												

TABLE 4 (Continued)

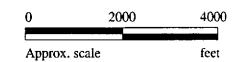
SUMMARY OF LABORATORY ANALYSES CHEVRON WELLS

ND = Non-detectable.

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

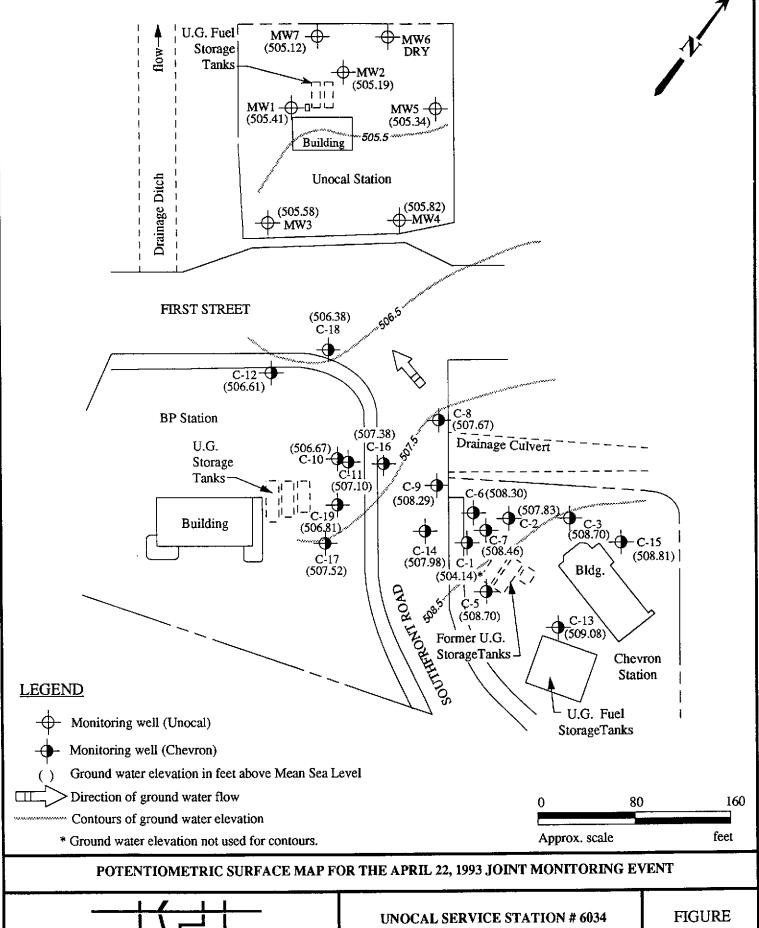


Base modified from 7.5 minute U.S.G.S. Livermore and Altamont Quadrangles (photorevised 1980 and 1981, respectively)



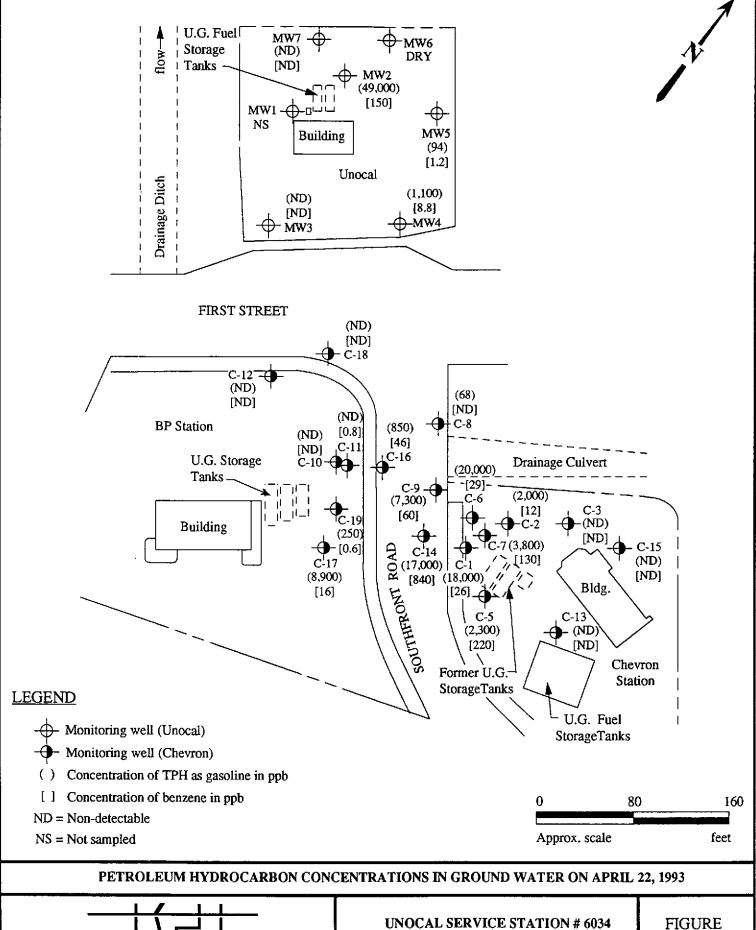


UNOCAL SERVICE STATION # 6034 4700 FIRST STREET LIVERMORE, CA LOCATION MAP





UNOCAL SERVICE STATION # 6034 4700 FIRST STREET LIVERMORE, CA FIGURE 1





4700 FIRST STREET LIVERMORE, CA

2

Kaprealian Engineering, Inc. 2401 Stanwell Dr., Ste. 400

Concord, CA 94520

Client Project ID: Sample Matrix:

Unocal, 4700 1st St., Livermore Water

Sampled: Received: Apr 22, 1993 Apr 22, 1993

Analysis Method:

EPA 5030/8015/8020

Reported:

Apr 30, 1993

Attention: Mardo Kaprealian, P.E.

First Sample #:

304-0991

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit μg/L	Sample I.D. 304-0991 MW-2	Sample I.D. 304-0992 MW-3	Sample I.D. 304-0993 MW-4	Sample I.D. 304-0994 MW-5	Sample I.D. 304-0995 MW-7	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	49,000	N.D.	1,100	94	N.D.	
Benzene	0.5	150	N.D.	8.8	1.2	N.D.	
Toluene	0.5	1,000	N.D.	1.0	N.D.	N.D.	
Ethyl Benzene	0.5	3,000	N.D.	7.2	N.D.	N.D.	
Total Xylenes	0.5	18,000	N.D.	6.0	1.3	N.D.	
Chromatogram Pat	tern:	Gasoline		Gasoline	Gasoline		

Quality Control Data

Report Limit Multiplication Factor:	100	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	4/28/93	4/26/93	4/26/93	4/26/93	4/26/93	4/26/93
Instrument Identification:	HP-5	HP-2	HP-2	HP-2	HP-2	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	99	101	129	106	104	121

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

SEQUQIA ANALYTICAL

Scott A. Chieffo Project Manager



Kaprealian Engineering, Inc. Client Project ID: 2401 Stanwell Dr., Ste. 400

Attention: Mardo Kaprealian, P.E.

Sample Descript:

Unocal, 4700 1st St., Livermore

Sampled: Received:

Apr 22, 1993 Apr 22, 1993

Concord, CA 94520

Analysis for: First Sample #: Water MTBE (EPA 8020 - Modified)

304-0994

Analyzed: Apr 26, 1993 Apr 30, 1993

Reported:

LABORATORY ANALYSIS FOR:

MTBE (EPA 8020 - Modified)

Sample Number	Sample Description	Detection Limit μg/L	Sample Result μg/L
304-0994	MW-5	0.60	0.82

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

SEQUOIA ANALYTICAL

Project Manager

Kaprealian Engineering, Inc. 2401 Stanwell Dr., Ste. 400

Client Project ID: Unocal, 4700 1st St., Livermore

Matrix:

Water

Concord, CA 94520

Attention: Mardo Kaprealian, P.E. QC Sample Group 3040991-995

Reported: Apr 30, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	_		Ethyl-	
	Benzene	Toluene	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:	μ g/L	μg/L	μg/L	μg/L
LCS Batch#:	1LCS042693	1LCS042693	1LCS042693	1LCS042693
Date Prepared:	4/26/93	4/26/93	4/26/93	4/26/93
Date Analyzed:	4/26/93	4/26/93	4/26/93	4/26/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
LCS %				
Recovery:	118	117	116	132
Control Limits:	70-130	70-130	70-130	70-130
MS/MSD				
Batch #:	3040993	3040993	3040993	3040993
Date Prepared:	4/26/93	4/26/93	4/26/93	4/26/93
Date Analyzed:	4/26/93	4/26/93	4/26/93	4/26/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Matrix Spike				
% Recovery:	85	100	125	105
Matrix Spike				
Duplicate %				
Recovery:	85	115	105	116
Relative %				
Difference:	0.0	14	9.1	10
Dilicicile.	0.0	17	Ų.,	, ,

SEQUOIA ANALYTICAL

// Ine L

Scott A. Chieffo Project Manager 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.

XAPREALIAN ENGINEERING

CHAIL OF CUSTODY

SAMPLER	づると		Jυ	Jocal / Livermore 4700 1st st.				E & ADDRESS	ANALYSES REQUESTED						TURN AROUND TIME:	TUBH AROUND TIME:	
HESSING	AGENCY			1700	, /	15-	- - -	r •	M	ıħ							
SAHPLE ID NO.	DATE	TIHE	SOIL (HATER	GRAB	сонр	HO. OF COHT.	SAMPLING LOCATION	1 PHC	81W					REHARKS		
Mw-2	4/2 1/43	9:45		1	J		2	MLU	7						3040991 A	B	
MW-3	1,			V	1		2		J						992 A	化	
mw-4	7			<i>J</i>	1		2	4,	J		<u> </u>		<u> </u>		995	Y	
mw-5	1,			~	1		4	"	J	✓ 			-		994	AL	
mw-7	′/	12:10		J	U	-	2	1,	\ <u>\</u>			 			995	AF	
			-	-		-	-		_			-		-			
				-	-	-	-			;	-				·		
		-	-														
Relinquish	ear by: (\$	ignature)	4/	Date/1 22/9	line 2, 17	20	<u></u>	ed by: (Signature)			4 -	1			ted by the laboratory accepting sampled for analysis been stored in ice?	les	
Relinquish	red by: (S	ignature)		Date/I	line		Receiv	red by: (Signature)		2.					igerated until analyzed?	<u> </u>	
Retinquish	red by: (S	ignature)		Date/I	ine		Receiv	red by: (Signature)		3. 4.					i for analysis have head space? ate containers and properly packaged	<u>/</u>	
Relinquist	ied by: (S	(gnature)		Date/1	line		Recel	red by: (Signature)				inature		· ·	1/32/ Title Date	<u>45</u>	

2401 Stanwell Drive, Suite 400 Concord, California 94520 Tel: 510:602.5100 Fax: 510:687.0502