

KAPREALIAN ENGINEERING, INC.

Consulting Engineers

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> KEI-P89-0301.QR4 July 30, 1990

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

Attention: Mr. Ron Bock

RE: Quarterly Report

Unocal Service Station #6277

15803 E. 14th Street San Leandro, California

Dear Mr. Bock:

This report presents the results of the fourth quarter of monitoring and sampling of the monitoring wells at the referenced site by Kaprealian Engineering, Inc. (KEI), per proposal KEI-P89-0301.P2 dated June 19, 1989. The wells are currently monitored monthly and sampled on a quarterly basis. This report covers the work performed by KEI from April through June, 1990.

BACKGROUND

The subject site is presently used as a gasoline station. A Location Map and Site Plans are attached to this report.

KEI's work at the site began when KEI was asked to install two exploratory borings at the site. The borings were installed at the request of Alameda County to explore for the possible presence of soil contamination in the vicinity of the pit for a proposed new underground storage tank. The borings were installed on March 6, 1989 to depths of 10.5 and 13.5 feet. Water was encountered in the borings at depths of 11 and 12 feet. Analytical results of selected soil samples collected from the borings showed total petroleum hydrocarbons (TPH) as gasoline ranging from non-detectable to 620 ppm. Based on results of the preliminary investigation, KEI recommended that the contractor excavate the tank pit to a depth of approximately 13 feet. Results of the exploratory boring investigation are presented in KEI's report (KEI-P89-0301.R1) dated March 13, 1989. Soil sample results from that report are summarized in Table 3. Exploratory boring locations are as shown on the attached Site Plan, Figure 1.

On March 13, 1989, three underground storage tanks were removed from the site. The tanks consisted of two 10,000 gallon fuel storage tanks and one 550 gallon waste oil tank. The tanks were made of steel with a tar and wrapping coating, and no apparent holes or cracks were observed in the tanks. Due to the tar coating and wrapping, very little of the actual tank walls could be observed. Water was encountered in the fuel tank pit at a depth of 11 feet, thus prohibiting the collection of any soil samples from immediately beneath the tanks. Six soil samples, labeled SW1, SW2, SW3, SW4, SW5 and SW6, were collected from the sidewalls of the fuel tank pit at a depth approximately 1 foot above the water table, and one sample, labeled WO1, was collected from beneath the waste oil tank.

Based on the subjective evidence observed in the field, it was decided to excavate additional soil from three of four tank pit walls. (The fourth wall is adjacent to the existing building.) On March 14, 1989 four trenches were dug to define the limits of additional soil excavation needed. Four soil samples were then collected, SW3(15), SW4/5(6), SW6(12) and SW7(14). SW7(14) was from the sidewall of the waste oil tank pit. After the soil sampling was completed, approximately 5,000 gallons of ground water was pumped from the fuel tank pit on March 15, 1989; however, due to ongoing soil excavation, contaminated soil was falling into the water and a representative ground water sample could not be collected.

On March 17, 1989 KEI again returned to the site. Additional soil, approximately 2 feet laterally, was excavated from the fourth tank pit wall adjacent to the building. One additional sidewall soil sample, labeled SW1(2), was taken. Following soil sampling, an additional 1,000 gallons of ground water were pumped from the excavation. One sample of water from the fuel tank pit, labeled W1, was collected in clean, glass VOA vials with Teflon screw caps.

On March 23, 1989, KEI returned to the site for pipe trench sampling. Six soil samples, labeled P1, P2, P3, P4, P5 and P6, were collected beneath the product lines.

Soil samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, and were accompanied by properly executed Chain of Custody documentation. Samples from the fuel tank pit were analyzed for TPH as gasoline using EPA method 3810 or 5030 in conjunction with modified 8015, and benzene, toluene, xylenes and ethylbenzene (BTX&E) using EPA methods 5030 and 8020. The samples from the waste oil tank pit (WO1 and SW7{14}) were analyzed for TPH as gasoline, TPH as diesel using EPA method 3550

in conjunction with modified 8015, total oil and grease (TOG) by 413.1 and EPA 8240 constituents.

Soil sample analyses from the fuel tank pit indicated TPH as gasoline ranging from 24 ppm to 150 ppm for samples SW3(15), SW4/5(6), and SW6(12). SW1, adjacent to the existing building, showed 3,500 ppm of TPH as gasoline; however, SW1(2), which was collected after excavating 2 feet of sidewall toward the building, showed 100 ppm of TPH of gasoline. Sample SW2 showed 390 ppm of TPH as gasoline. Samples SW3, SW4, SW5 and SW6 were not analyzed because their locations were excavated and new samples [SW3(15), SW4/5(6), and SW6(12)] were collected. Analyses of the soil samples collected from the waste oil tank pit indicated 280 ppm TOG for WO1 and 41 ppm TOG for SW7(14). Analytical results of the soil samples (P1, P2, P3, P4, P5 and P6) collected from pipe trenches indicated levels of TPH as gasoline ranging from 1.1 ppm to 6.8 ppm.

The water sample analysis indicated 19,000 ppb of TPH as gasoline and 230 ppb of benzene. The analytical results for the water sample are summarized in Table 2, and for the soil samples in Table 3.

On May 24, 1989, four two-inch diameter monitoring wells, designated as MW1 through MW4, were installed at the site (see attached Site Plan, Figure 1). Documentation of the well installation, sampling and sample results are provided in KEI's report (KEI-P89-0301.R6) dated June 26, 1989. Sample results from that report are summarized in Tables 1, 2 and 4. Based on the sample results, KEI recommended a monthly monitoring and quarterly sampling program for all of the wells and additional excavation of contaminated soil in the vicinity of MW2. The monitoring and sampling program was initiated in July, 1989, and the wells have been monitored on a monthly basis and sampled on a quarterly basis since that time. In KEI's second quarterly report (KEI-P89-0301.QR2) dated January 16, 1990, KEI recommended the installation of one additional off-site well (MW5) to further define the extent of ground water contamination at the site.

On February 1, 1990, well MW2 was destroyed in preparation for additional excavation in the vicinity of well MW2. Documentation of the well destruction is presented in a letter report dated March 7, 1990 addressed to Unocal Corporation.

In an attempt to remove as much of the contaminated soil as possible, KEI visited the site on March 30 and April 3, 1990 to observe soil excavation in the vicinity of previously abandoned monitoring well MW2. The location of MW2 is indicated on the

attached Site Plan, Figure 1. Soil was excavated to a grade corresponding to approximately 6 to 12 inches below ground water, encountered at a depth of about 11.5 feet below grade.

After excavation, four soil samples, labeled SW8A, SW9A, SW10A and SW11A, were collected from the sidewalls of the excavation approximately 6 to 12 inches above ground water. Sample locations and the area excavated are as shown on the attached Site Plan, Figure 2. Soil excavation activities were terminated due to the close proximity of the former and new underground storage tank pits and the property line of the site (see attached Site Plan, Figure 2). After sampling, approximately 9,400 gallons of water were pumped from the excavation.

All samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California and were accompanied by properly executed Chain of Custody documentation.

Analyses of soil sample SW9A indicate non-detectable levels of TPH as gasoline and TPH as diesel. Analyses of soil samples SW8A, SW1OA, and SW11A indicate levels of TPH as gasoline ranging from 140 ppm to 1,100 ppm, while levels of TPH as diesel range from non-detectable to 280 ppm. Analyses indicate non-detectable levels of all EPA 8010 constituents and TOG for all four samples, except for sample SW11A, which showed 210 ppm of TOG. Results of the soil analyses are summarized in Table 4. Copies of the laboratory analyses and the Chain of Custody documentation are attached to this report.

FIELD ACTIVITIES

The existing wells were monitored three times and sampled once during the quarter. During monitoring, the wells were checked for depth to water and presence of free product and sheen. No free product or sheen was noted in any of the wells during the quarter. Monitoring data are summarized in Table 2.

Water samples were collected from the wells (MW1, MW3 and MW4) on June 25, 1990. Prior to sampling, the wells were purged of between 15 and 35 gallons using a surface pump. Samples were then collected using a clean Teflon bailer. Samples were decanted into clean VOA vials and/or one liter amber bottles as appropriate which were sealed with Teflon-lined screw caps and stored in a cooler on ice until delivery to the state certified laboratory.

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REGIONAL GEOLOGY AND SUBSURFACE CONDITIONS

Based on review of regional geologic maps (U.S. Geological Survey Professional Paper 943 "Flatland Deposits - Their Geology and Engineering Properties and Their Importance to Comprehensive Planning" by E.J. Helley and K.R. Lajoie, 1979), the subject site is underlain by Late Pleistocene alluvium (Qpa). The Late Pleistocene alluvium is described as typically consisting of weakly consolidated, poorly sorted, irregular interbedded clay, silt, sand, and gravel with a reported unknown maximum thickness, but is at least 150 feet thick. This alluvium is assumed to overly bedrock and deformed older sedimentary deposits on the alluvial plain marginal to San Francisco Bay.

In addition, the site is situated approximately 1,700 to 3,600 feet southwest of various mapped splays of the active Hayward Fault.

The subsurface soils exposed in the excavations consisted primarily of silt, sand and gravel fill to a depth of about 3 feet below grade, underlain by sandy gravel with clay to a depth of about 7 feet below grade, and in turn underlain by clay to the maximum depth excavated (about 12 feet).

HYDROLOGY

Based on the water level data gathered during the quarter, ground water flow direction appeared to be to the north-northwest on June 25, 1990, slightly changed from the northwesterly flow direction observed during the previous quarter. Water levels have fluctuated during the quarter, but have shown net decreases in MW1 and MW4 of 0.04 to 0.10 feet, respectively, from the previous quarter. The water level in MW3 was unchanged. The measured depth to water at the site on June 25, 1990 ranged from 9.90 to 10.59 feet.

ANALYTICAL RESULTS

All samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California, and were accompanied by properly executed Chain of Custody documentation. The samples were analyzed for TPH as gasoline using EPA method 5030 in conjunction with modified 8015, and BTX&E using EPA method 8020.

Analytical results of the ground water samples, collected from monitoring wells MW1, MW3 and MW4, indicate levels of TPH as gasoline at concentrations of 310 ppb, 190 ppb and 66 ppb, respectively. Benzene was detected in wells MW1 and MW3 at

concentrations of 10 ppb and 1.5 ppb, respectively, and was non-detectable in MW4. Results of the analyses are summarized in Table 4. Copies of the analytical results and Chain of Custody documentation are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results, KEI recommends the continuation of the monitoring and sampling program. It is KEI's understanding that Unocal Corporation is making arrangements with the off-site property owner for site access for installation of the proposed off-site monitoring well (MW5). Once permission for off-site access is obtained, KEI will acquire the necessary permits and schedule the installation of monitoring wells. In addition, KEI will obtain necessary permits for the installation of monitoring well MW2A, which will replace well MW2.

DISTRIBUTION

A copy of this report should be sent to the City of San Leandro, and to the Regional Water Quality Control Board, 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 this 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 me at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.

Jeffrey F. Eppink Senior Geologist

Don R. Braun Certified Engineering Geologist

License No. 1310 Exp. Date 6/30/92

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Attachments: Tables 1 through 4

Location Map

Site Plans - Figures 1 & 2

Laboratory Analyses

Chain of Custody documentation

TABLE 1
SUMMARY OF MONITORING DATA

6/25/90 MW1 10.59 0 None 35 MW3 10.08 0 None 15 MW4 9.90 0 None 20 None 25 None 20 None 25 None 20 None 25 None 20 None 25 None 20 Non	<u>Date</u>	Well No.	Depth to Water <u>(feet)</u>	Product <u>Thickness</u>	Sheen	Water Bailed (gallons)
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11/07/89 MW1 10.62 0 None 30 MW2 11.45 0 None 20 MW3 10.20 0 None 0						
MW2 11.45 0 None 20 MW3 10.20 0 None 0		FIW4	3.37	U	HOHE	12
MW2 11.45 0 None 20 MW3 10.20 0 None 0	11/07/89	MW1	10.62	0	None	30
MW3 10.20 0 None 0	•		11.45	0	None	20
MW4 9.90 0 None 0				0		0
		MW4	9.90	0	None	0

TABLE 1 (Continued)
SUMMARY OF MONITORING DATA

<u>Date</u>	Well No.	Depth to Water <u>(feet)</u>	Product <u>Thickness</u>	Sheen	Water Bailed (gallons)
10/09/89	MW1	10.70	0	None	30
	MW2	11.52	0	None	20
	MW3	10.30	0	None	0
	MW4	9.99	0	None	0
9/13/89	MW1	10.63	0	None	15
	MW2	11.33	0	None	15
	MW3	10.09	0	None	15
	MW4	9.87	0	None	15
8/17/89	MW1	10.56	0	None	25
	MW2	11.26	0	None	10
	MW3	10.06	0	None	10
	MW4	9.88	0	None	10
7/21/89	MW1	10.53	0	None	25
	MW2	11.28	0	None	15
	MW3	10.13	0	None	15
	MW4	9.86	0	None	15
6/05/89	MW1	10.32	0	None	40
	MW2	11.12	0	None	40
	MW3	9.95	0	None	30
	MW4	8.28	0	None	55

NOTE: Well MW2 was destroyed on February 1, 1990.

TABLE 2
SUMMARY OF LABORATORY ANALYSES
WATER

<u>Date</u>	Sample Well #	TPH as <u>Gasoline</u>	<u>Benzene</u>	Toluene	<u>Xylenes</u>	Ethylbenzene
6/25/90	MW1	310	10	0.89	2.1	0.37
-,, -	MW3	190	1.5	0.68	5.3	ND
	MW4	66	ND	ND	ND	ND
3/29/90		320	12	1.6	3.5	0.31
	MW3	85	ND	ND	ND	ND
	MW4	120	0.39	ND	ND	ND
12/12/89	9 MW1	340	100	13	44	3.4
	MW2*	660	220	6.6	36	13
	MW3	120	6.7	0.64	1.5	0.46
	MW4	97	4.6	ND	ND	ND
9/13/89		550	32	17	52	3.4
	MW2**	170	2.0	0.38	9.5	ND
	MW3	76	ND	ND	ND	ND
	MW4	77	ND	ND	ND	ND
6/06/89	9 MW1	590	ND	ND	ND	ND
	MW2***	• 7 7	ND	ND	ND	ND
	MW3	32	ND	ND	ND	ND
	MW4	37	ND	ND	ND	ND
3/17/89	9 W1	19,000	230	79	1,300	ND
Detect	tion					
Limits		30	0.3	0.3	0.3	0.3

NOTE: Well MW2 was destroyed on February 1, 1990.

4 5 × 6

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES WATER

- * TPH as diesel showed 1,700 ppb, TOG showed 1.2 ppm and EPA method 8010 showed 30 ppb of tetrachloroethane and 9.0 ppb of trichloroethene.
- ** Analysis was also performed for TOG, TPH as diesel and EPA method 8010. TOG was <50 ppm. TPH as diesel was non-detectable. EPA 8010 showed 4.2 ppb of 1,2-dichloroethane; 1.2 ppb of total 1,2-dichloroethene; 18 ppb of tetrachloroethene, and 6.1 ppb of trichloroethene.
- *** TPH as diesel and TOG were non-detectable. EPA method 8010 showed 2.8 ppb of 1,2-dichloroethane, 110 ppb of tetrachloroethane, and 4.4 ppb of trichloroethene.

ND = Non-detectable.

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

TABLE 3
SUMMARY OF LABORATORY ANALYSES
SOIL

Sample <u>Number</u>	Depth (feet)	TPH as <u>Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	Xylenes	<u>Ethylbenzene</u>					
(Collected on March 6, 1989)											
EB1(5)	5	2.1	ND	0.11	ND	0.14					
EB1(10)	10	200	2.3	7.7	5.7	33					
EB2(5)	5	ND	ND	ND	ND	ND					
EB2(10)	10	620	2.2	20	13	78					
(Collected on March 13, 14 & 17, 1989)											
SW1 SW1(2) SW2 SW3(15) SW4/5(6 SW6(12) SW7(14) P1 P2 P3 P4 P5 P6	10	3,500 100 390 60 24 150 ND 2.3 1.5 1.1 5.6 6.8 5.5	22 1.3 40 1.6 2.6 3.1 0.3 ND ND ND ND ND ND	280 6.6 4.3 2.9 1.7 6.2 ND 0.15 0.31 0.1 0.15 0.58 0.18	600 16 71 7.8 2.7 5.6 ND ND ND ND 0.39 0.55 0.15	100 2.9 10 1.5 0.56 3.6 ND ND ND ND ND ND ND ND					
_				ay 24, 19							
MW1	5	2.3	0.08	ND	0.62	ND					
MW1	10	290	1.0	11	48	8.8					
MW2***	5	230	13	1.7	3.2	1.5					
MW2+	10	31	1.2	1.0	5.5	1.1					
MW3	5	3.2	0.29	0.1	0.7	ND					
MW3	10	4.6	ND	ND	0.44	0.3					
MW4	5	3.1	ND	0.11	ND	ND					
MW4	10	ND	ND	ND	ND	ND					

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES SOIL

- * TPH as diesel was 6.2 ppm; TOG was at 41 ppm; all 8240 constituents are non-detectable, except as noted above.
- ** TPH as diesel was non-detectable; TOG was at 280 ppm; all 8240 constituents are non-detectable, except as noted above.
- *** This sample showed non-detectable level of TPH as diesel, 7,700 ppm of TOG, and 0.063 ppm trichloroethene.
- + This sample showed a non-detectable level of TPH as diesel, 38 ppm of TOG, and 0.065 ppm of trichloroethene.

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

TABLE 4
SUMMARY OF LABORATORY ANALYSES
SOIL

(Samples collected on April 3, 1990)

Sample	Depth (feet)	TPH as <u>Diesel</u>	TPH as <u>Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	Xylenes	Ethyl- <u>benzene</u>
SW8A*	10.5	62	260	1.4	8.0	40	7.0
SW9A*	10.5	ND	ND	0.017	0.041	0.033	0.0092
SW10A*	10.5	ND	140	0.085	0.12	5.0	1.4
SW11A**	10.5	280	1,100	8.0	43	230	37
Detection Limits	on	1.0	1.0	0.0050	0.0050	0.0050	0.0050

^{*} TOG and all EPA 8010 constituents were non-detectable for these samples.

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

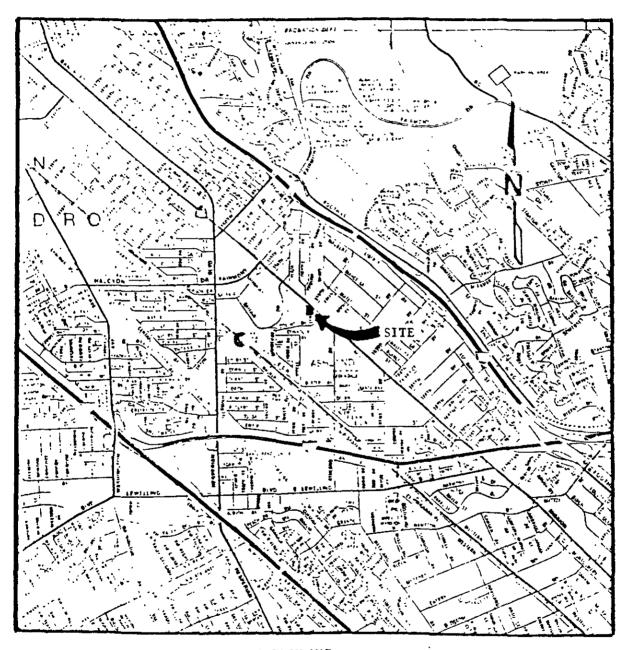
^{**} TOG showed 210 ppm, while all EPA 8010 constituents were non-detectable.



KAPREALIAN ENGINEERING, INC.

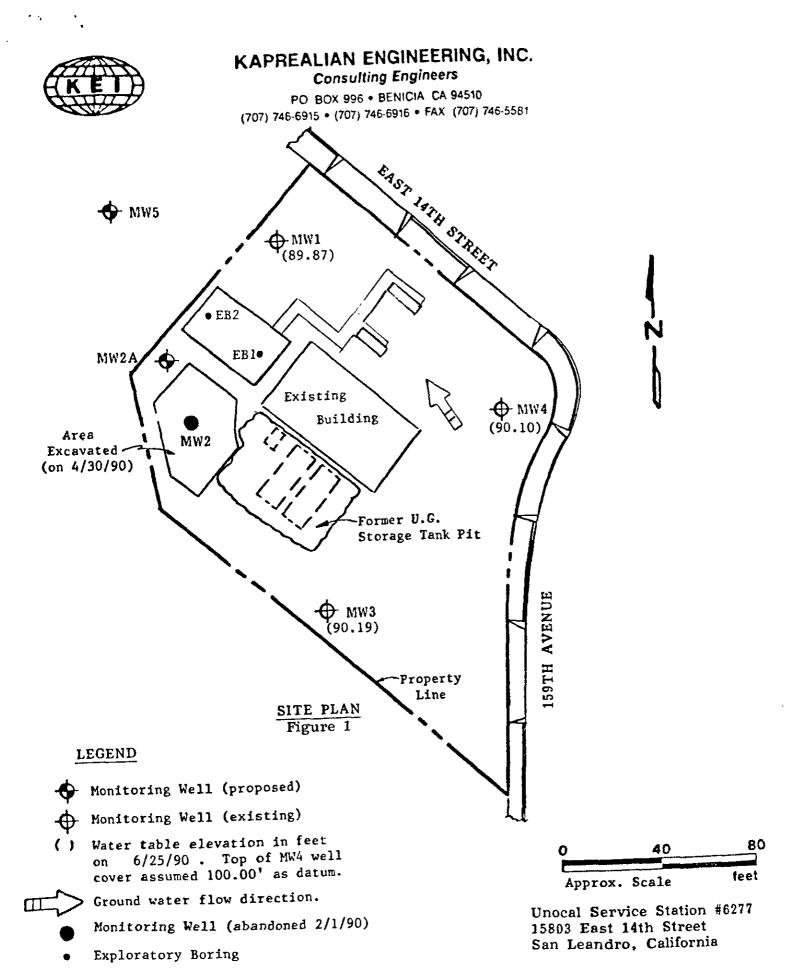
Consulting Engineers

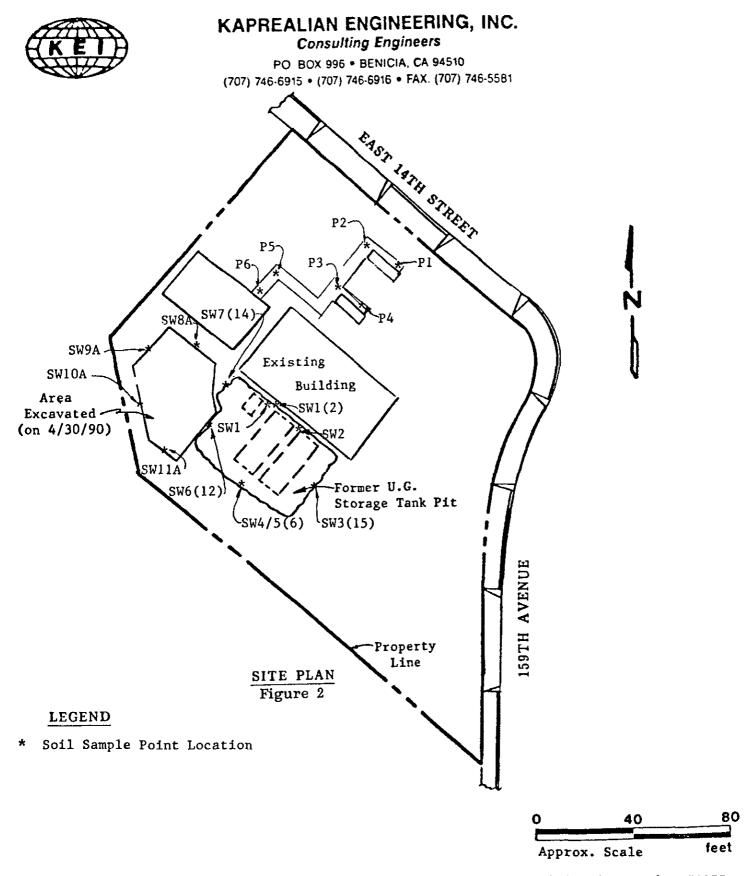
P.O BOX 996 • BENICIA, CA 94510 (707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



LOCATION MAP

Unocal Service Station #6277 15803 E. 14th Street San Leandro, California





Unocal Service Station #6277 15803 East 14th Street San Leandro, California

Kaprealian Engineering, Inc. P.O. Box 996

Client Project ID: Matrix Descript:

tik deletilik deletik ingelik kangarangan kangarangan kangarangan kangarangan kangarangan kangarangan kangaran Unocal, 15803 E. 14th St., San Leandro Water

Sampled: Received:

Jun 25, 1990 Jun 25, 1990

Benicia, CA 94510 Attention: Mardo Kaprealian, P.E. First Sample #: 006-3847 A-B

Analysis Method:

EPA 5030/8015/8020

Analyzed: Jun 28, 1990 Reported:

Jun 29, 1990 ยัง และของ โดยเด็ก เดยเลื่องได้เลื่อง ค่าเลื่องเลือด เลื่อ

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number		Sample Description	Low/Medium B.P. Hydrocarbons μg/L (ppb)	Toluene μg/L (ppb)	Ethyl Benzene μg/L (ppb)	Xylenes μg/L (ppb)	
	006-3847 A-B	MW1	310	10	0.89	0.37	2.1
	006-2848 A-B	MW3	190	1.5	0.68	N.D.	5.3
	006-2849 A-B	MW4	6 6	N.D.	N.D.	N.D.	N.D.

Detection Limits:	30	0.30	0.30	0.30	0.30	

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard. Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Belinda C. Vega **Project Manager**



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER CEY (157) WITHESSING AGENCY		1	SITE HAME & ADDRESS UNOCAL SAN LEANDRO 15803 E. 1474 St.					ļ 	ANALYSES REQUESTED						TURN AROUND TIME:	
		- 						B	1				1	1	1 Week	
SAMPLE ID NO.	DATE	TIME	SOIL	 WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	121	S.		 	: - -		1	RENARKŚ
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i (1) .	elinquished by: (Signature) Date/Time Received by: (Signature) The following MUST BE completed by the laborator for analysis:				!											
(Relinquished	d ^l by: (Si	gnature)	(Date/T	ime	1	Receiv	red by: (Signature)	2. Will samples remain refrigerated until analyzed?			ed until analyzed?				
Rel inquished	d by: (S	ignature)	1 1	Date/T	ime	- - 	Receiv	red by: (Signature)	3. Did any samples received for analysis have head space?			nalysis have head space?				
			Date/T	ime	Received by: (Signature)			{ ! !	4.		X	in app	Propri	ate co	ntainers and proper(y packaged?	
			1			<u> </u>					-Æifgr	ature		. —	- -	Title /Dato/