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

December 4, 1990

Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

Attention: ~~Mr. Gil Wistar~~ DB

RE: Unocal Service Station #3538
411 W. MacArthur Blvd.
Oakland, California

Dear Mr. Wistar:

Per the request of Mr. Rick Sisk of Unocal Corporation, enclosed please find our report dated November 21, 1990, for the above referenced site.

Should you have any questions, please feel free to call our office at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

jad\82

Enclosure

cc: Rick Sisk, Unocal Corporation

90 DEC -5 AM 10:49

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
P.O. BOX 996 • BENICIA, CA 94510
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90 DEC -5 AM 10: 59

KEI-P89-0703.QR4
November 21, 1990

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

Attention: Mr. Rick Sisk

RE: Quarterly Report
Unocal Service Station #3538
411 W. MacArthur Blvd.
Oakland, California

Dear Mr. Sisk:

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-P89-0703.P2 dated October 23, 1989. The wells are currently monitored monthly and sampled on a quarterly basis. This report covers the work performed by KEI from August through October, 1990.

BACKGROUND

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

KEI's work at the site began in July, 1989 when KEI was asked to collect soil samples following the removal of two underground fuel storage tanks and one waste oil tank at the site. The tanks consisted of one 10,000 gallon super unleaded, one 12,000 gallon regular unleaded, and one 550 gallon waste oil tank. No apparent holes or cracks were observed in the fuel tanks; however, the waste oil tank had four small holes. Water was encountered in the fuel tank pit at a depth of 10.5 feet, prohibiting sampling directly from beneath the fuel tanks. Sidewall samples were collected at a depth of 10 feet. The sample from beneath the waste oil tank was collected at a depth of 8.5 feet. KEI also collected samples from the piping trenches at depths of 5 to 10 feet. After sampling, the water was pumped from the pit. Since there was no recharge, a water sample was not collected. All samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes and ethylbenzene (BTX&E). In addition, the waste oil sample was analyzed for TPH as diesel, total oil and grease (TOG), EPA method 8010 and EPA 8270 compounds.

The analytical results of the fuel tank pit soil samples showed levels of TPH as gasoline ranging from non-detectable to 11 ppm, except for sample SW1, which had 3,100 ppm of TPH as gasoline. However, following excavation of approximately 4 feet of the sidewall where sample SW1 was collected, an additional sample, labeled SW1(4), was collected, analyzed, and indicated non-detectable levels of TPH as gasoline and BTX&E. The sample from the waste oil pit showed TOG levels of 36 ppm. Results of these analyses are summarized in Table 3, and locations are as shown on the attached Site Plan, Figure 2. Analytical results of the soil samples are summarized in Table 3. Documentation of soil sample collection and sample analytical results from the tank excavation are summarized in KEI's report (KEI-J89-0703.R1) dated July 31, 1989. To comply with the requirements of the regulatory agencies and based on the results of the laboratory analyses, KEI proposed the installation of four monitoring wells.

On September 6 and 7, 1989, four two-inch diameter monitoring wells, designated as MW1, MW2, MW3 and MW4 on the attached Site Plan, Figure 1, were installed at the site. Soil sample analyses showed levels of TPH as gasoline ranging from non-detectable to 20 ppm in all samples. TPH as diesel and EPA 8010 compounds were non-detectable in all samples from MW1. All TOG levels in MW1 were less than 50 ppm. Benzene levels were non-detectable in all samples except MW2 at 19 feet and MW3 at 10 feet, which were 1.5 and 0.29 ppm, respectively. The water sample analyses indicated non-detectable levels of benzene in all wells. MW1 also revealed non-detectable levels of TPH as diesel and less than 50 ppm of TOG, however, 2.7 ppb of tetrachloroethene was detected. TPH as gasoline levels were 290 ppb in MW2, 32 ppb in MW3, and non-detectable in wells MW1 and MW4. Laboratory results of the soil samples are summarized in Table 3 and water samples in Table 2. The details of the monitoring well installation are presented in KEI's report (KEI-P89-0703.R5) dated October 23, 1989. Based on these analytical results, KEI recommended the implementation of a monthly monitoring and quarterly sampling program.

FIELD ACTIVITIES

The four 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 1.

Water samples were collected from the wells on October 16, 1990. Prior to sampling, the wells were purged of between 15 and 55 gallons using a bailer. Samples were then collected using a clean Teflon bailer, and decanted into clean VOA vials and/or one liter

Teflon bailer, and decanted into clean VOA vials and/or one liter amber bottles as appropriate. These were sealed with Teflon-lined screw caps and stored in a cooler on ice until delivery to the state certified laboratory.

HYDROLOGY

Based on the water level data gathered during the quarter, ground water flow direction appeared to be predominantly due east with a local flow direction toward the northeast and east-southeast on October 16, 1990, relatively unchanged from the previous quarter. Calculations of the hydraulic gradient show an average gradient across the site of approximately 0.0077. Water levels have continually decreased showing an overall decrease in all of the wells ranging from 0.16 to 0.30 feet since July 17, 1990. The measured depth to ground water at the site on October 16, 1990 ranged from 18.44 to 18.68 feet.

ANALYTICAL RESULTS

Ground water samples were analyzed at Sequoia Analytical Laboratory in Concord, 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. In addition, the water sample collected from well MW1 was analyzed for TPH as diesel using EPA method 3510 in conjunction with modified 8015, TOG using EPA method 503A&E, and halogenated volatile organics using EPA method 8010.

Analytical results of the ground water samples collected from monitoring wells MW1 and MW4 indicate non-detectable levels of TPH as gasoline and benzene. In wells MW2 and MW3, TPH as gasoline was detected at 1,400 and 740 ppb, respectively, and benzene was detected at concentrations of 430 and 210 ppb, respectively. In well MW1, TPH as diesel, TOG and all EPA method 8010 compounds were non-detectable, except for 2.0 ppb of tetrachloroethene. Results of the analyses are summarized in Table 2. Copies of the analytical results and Chain of Custody documentation are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results collected and evaluated to date, as well as no evidence of free product or sheen in any of the wells, KEI recommends the continuation of the current monitoring and sampling program of the existing wells per KEI's proposal (KEI-P89-0703.P2) dated October 23, 1989. In addition, KEI will conduct a

detailed review of Regional Water Quality Control Board (RWQCB) files for adjacent sites and will also evaluate adjacent areas for possible consideration of additional monitoring wells.

DISTRIBUTION

A copy of this report should be sent to Alameda County Health Care Services, 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 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.

Aram B. Kaloustian
Staff Engineer

Don R. Braun
Certified Engineering Geologist

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

Mardo Kaprealian
President

\jad

Attachments: Tables 1, 2 & 3
Location Map
Site Plans - Figures 1 & 2
Laboratory Analyses
Chain of Custody documentation

KEI-P89-0703.QR4
November 21, 1990

TABLE 1

SUMMARY OF MONITORING DATA

Date	Well No.	Depth to Water (feet)	Product Thickness	Sheen	Water Bailed (gallons)
10/16/90	MW1	18.68	0	None	15
	MW2	18.47	0	None	55
	MW3	18.64	0	None	55
	MW4	18.44	0	None	15
9/19/90	MW1	18.65	0	None	0
	MW2	18.42	0	None	55
	MW3	18.63	0	None	55
	MW4	18.40	0	None	0
8/20/90	MW1	18.57	0	None	0
	MW2	18.37	0	None	55
	MW3	18.54	0	None	55
	MW4	18.32	0	None	0

KEI-P89-0703.QR4
November 21, 1990

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Sample Well #	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
(Collected on October 16, 1990)						
MW1*	ND	ND	ND	ND	ND	ND
MW2	--	1,400	430	2.0	240	48
MW3	--	740	210	1.4	82	2.5
MW4	--	ND	ND	ND	ND	ND
(Collected on July 17, 1990)						
MW1**	ND	ND	ND	ND	ND	ND
MW2	--	490	76	0.59	46	11
MW3	--	4,000	270	48	250	130
MW4	--	ND	ND	ND	ND	ND
(Collected on April 19, 1990)						
MW1***	ND	ND	ND	ND	ND	ND
MW2	--	3,900	550	5.1	390	91
MW3	--	3,100	600	27	220	54
MW4	--	ND	ND	0.48	ND	ND
(Collected on January 23, 1990)						
MW1+	ND	ND	1.5	2.3	4.3	ND
MW2	--	400	73	36	40	10
MW3	--	450	110	1.2	11	4.4
MW4	--	ND	ND	0.40	ND	ND
(Collected on September 15, 1989)						
MW1++	ND	ND	ND	0.61	ND	ND
MW2	--	290	ND	12	ND	ND
MW3	--	32	ND	ND	ND	ND
MW4	--	ND	ND	ND	ND	ND
Detection Limits	50	30	0.3	0.3	0.3	0.3

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

* TOG was non-detectable. EPA method 8010 compounds were non-detectable, except for 2.0 ppb of tetrachloroethane.

** TOG was non-detectable. EPA method 8010 compounds were non-detectable, except for 1.7 ppb of tetrachloroethane.

*** TOG was non-detectable. EPA method 8010 compounds were non-detectable, except for 2.2 ppb of tetrachloroethene.

\+ TOG was 1.5 ppm. EPA method 8010 compounds were non-detectable, except for 2.1 ppb of tetrachloroethene.

++ TOG was <50 ppm. EPA method 8010 were non-detectable, except for 2.7 ppb of tetrachloroethene.

ND = Non-detectable.

-- Indicates analysis not performed.

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

KEI-P89-0703.QR4
November 21, 1990

TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
(Collected on July 12 & 17, 1989)							
SW1	10	--	3,100	12	300	730	110
SW1(4)	10	--	ND	ND	ND	ND	ND
SW2	10	--	1.1	0.10	ND	0.18	ND
SW3	10	--	5.7	0.26	ND	0.45	0.23
SW4	10	--	2.5	ND	ND	0.24	ND
SW4(2)	10	--	11	0.61	0.51	1.3	0.44
P1	6.5	--	ND	ND	ND	ND	ND
P2	6.5	--	ND	ND	ND	ND	ND
P3	5.5	--	ND	ND	ND	ND	ND
P4	10	--	170	0.71	12	47	6.8
WO1*	8.5	ND	ND	ND	ND	ND	ND
(Collected on September 6 & 7, 1989)							
MW1**	5	ND	3.4	ND	ND	ND	ND
MW1**	10	ND	5.0	ND	ND	ND	ND
MW1**	15	ND	2.2	ND	ND	ND	ND
MW1**	19	ND	ND	ND	ND	ND	ND
MW2	5	--	1.4	ND	ND	ND	ND
MW2	10	--	ND	ND	ND	ND	ND
MW2	15	--	1.8	ND	ND	ND	ND
MW2	19	--	13	1.5	2.1	1.8	0.34
MW3	5	--	1.3	ND	ND	ND	ND
MW3	10	--	1.8	0.29	ND	ND	ND
MW3	15	--	3.3	ND	ND	ND	ND
MW3	18.5	--	ND	ND	ND	ND	ND
MW4	5	--	3.1	ND	ND	ND	ND
MW4	10	--	17	ND	ND	0.10	ND
MW4	15	--	20	ND	ND	0.27	ND
MW4	18.5	--	2.1	ND	ND	ND	ND
Detection Limits		1.0	1.0	0.05	0.1	0.1	0.11

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES
SOIL

* TOG 36 ppm, and 8010 and 8270 constituents were non-detectable.

** TOG was <50 ppm for these samples. EPA method 8010 was non-detectable for these samples.

ND = Non-detectable.

-- Indicates analysis not performed.

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LOCATION MAP

Unocal S/S #3538
411 W. MacArthur Blvd.
Oakland, CA

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
P.O. BOX 996 • BENICIA, CA 94510
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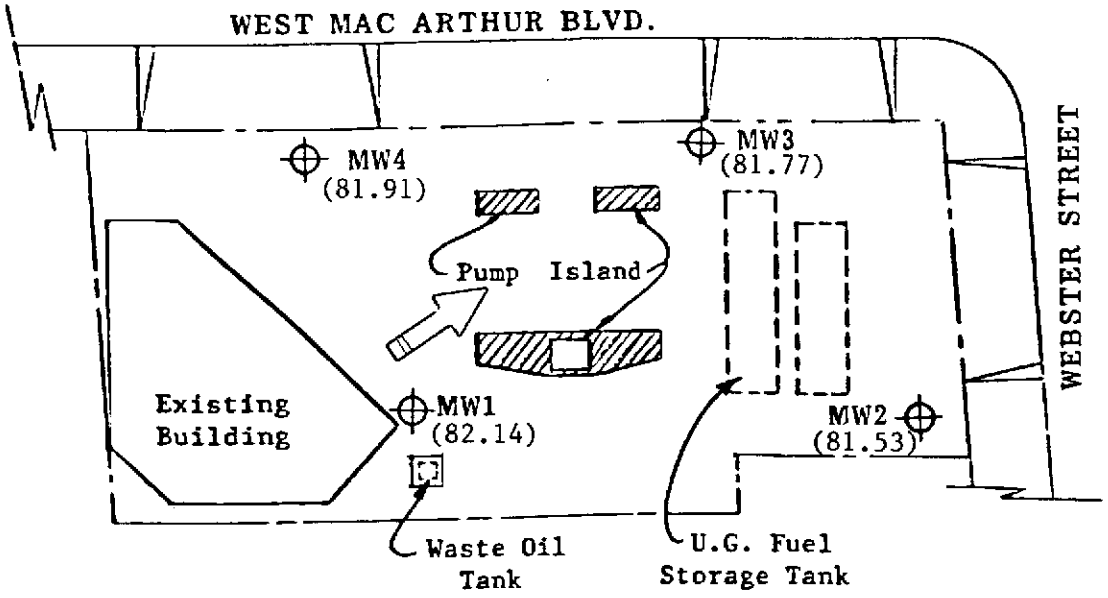

SITE PLAN
Figure 1

LEGEND

⊕ Monitoring Well

( ) Water Table elevation in feet on 10/16/90. Top of MW2 wellcover assumed 100.00 feet as datum

⇨ Ground water flow direction

0 30 60
Approx. Scale feet

Unocal S/S #3538
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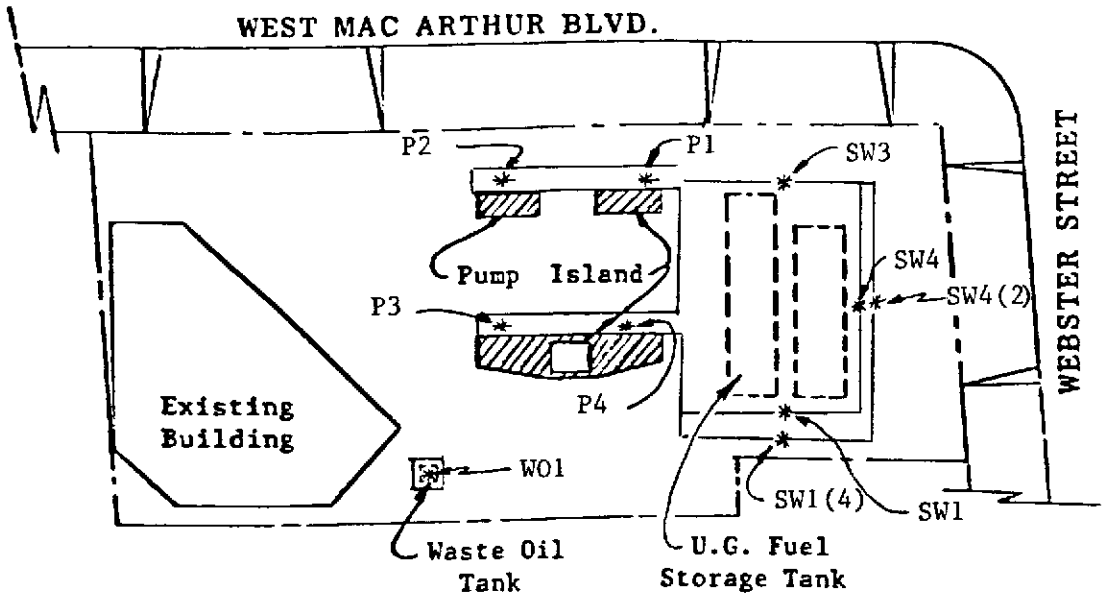

SITE PLAN
Figure 2

LEGEND

* Soil Sample Point Location

0 30 60
Approx. Scale feet

Unocal S/S #3538
411 W. MacArthur Blvd.
Oakland, CA

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #3538, 411 W. Mac Arthur, Oakland	Sampled:	Oct 16, 1990
P.O. Box 996	Matrix Descript:	Water	Received:	Oct 17, 1990
Benicia, CA 94510	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Oct 18, 1990
Attention: Mardo Kaprealian, P.E.	First Sample #:	010-0513 A-B	Reported:	Oct 25, 1990

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
010-0513 A-B	MW-1	N.D.	N.D.	N.D.	N.D.	N.D.
010-0514 A-B	MW-2	1,400	430	2.0	48	240
010-0515 A-B	MW-3	740	210	1.4	2.5	82
010-0516 A-B	MW-4	N.D.	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
Laboratory Director

100513.KEI <1>

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #3538, 411 W. Mac Arthur, Oakland	Sampled:	Oct 16, 1990
P.O. Box 996	Matrix Descript:	Water	Received:	Oct 17, 1990
Benicia, CA 94510	Analysis Method:	EPA 3510/8015	Extracted:	Oct 18, 1990
Attention: Mardo Kaprealian, P.E.	First Sample #:	010-0513 C	Analyzed:	Oct 18, 1990
			Reported:	Oct 25, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons µg/L (ppb)
010-0513 C	MW-1	N.D.

Detection Limits:	50

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

100513.KEI <2>

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #3538, 411 W. Mac Arthur, O	Sampled:	Oct 16, 1990
P.O. Box 996	Matrix Descript:	Water	Received:	Oct 17, 1990
Benicia, CA 94510	Analysis Method:	SM 503 A&E (Gravimetric)	Extracted:	Oct 18, 1990
Attention: Mardo Kaprealian, P.E.	First Sample #:	010-0513 D	Analyzed:	Oct 23, 1990
			Reported:	Oct 25, 1990

TOTAL RECOVERABLE PETROLEUM OIL

Sample Number	Sample Description	Oil & Grease mg/L (ppm)
010-0513 D	MW-1	N.D.

Detection Limits:	5.0

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

100513.KEI <3>

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(415) 686-9600 • FAX (415) 686-9689

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #3538, 411 W. Mac Arthur, O	Sampled:	Oct 16, 1990
P.O. Box 996	Sample Descript:	Water, MW-1	Received:	Oct 17, 1990
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	Oct 23, 1990
Attention: Mardo Kaprealian, P.E.	Lab Number:	010-0513 E-F	Reported:	Oct 25, 1990

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane	1.0	N.D.
Bromoform	1.0	N.D.
Bromomethane	1.0	N.D.
Carbon tetrachloride	1.0	N.D.
Chlorobenzene	1.0	N.D.
Chloroethane	5.0	N.D.
2-Chloroethylvinyl ether	1.0	N.D.
Chloroform	0.50	N.D.
Chloromethane	0.50	N.D.
Dibromochloromethane	0.50	N.D.
1,2-Dichlorobenzene	2.0	N.D.
1,3-Dichlorobenzene	2.0	N.D.
1,4-Dichlorobenzene	2.0	N.D.
1,1-Dichloroethane	0.50	N.D.
1,2-Dichloroethane	0.50	N.D.
1,1-Dichloroethene	1.0	N.D.
Total 1,2-Dichloroethene	1.0	N.D.
1,2-Dichloropropane	0.50	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	2.0	N.D.
1,1,2,2-Tetrachloroethane	0.50	N.D.
Tetrachloroethene	0.50	2.0
1,1,1-Trichloroethane	0.50	N.D.
1,1,2-Trichloroethane	0.50	N.D.
Trichloroethene	0.50	N.D.
Trichlorofluoromethane	1.0	N.D.
Vinyl chloride	2.0	N.D.

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: JOE

WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal/Oakland #3538
411 W. MacArthur

ANALYSES REQUESTED: TPHG, BTXE | 8010 | TOG (5034 & E) | TPHD

TURN AROUND TIME: Regular

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHG, BTXE	8010	TOG (5034 & E)	TPHD	REMARKS
MW 1	10/16/90			✓	✓		6	MW	✓	✓	✓	✓	~~BTXE~~
" 2	"	2:11 - 2:36		✓	✓		2	"	✓				SM4 ΔB
" 3	"	"		✓	✓		2	"	✓				515
" 4	"	1:36		✓	✓		2	"	✓				516

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Kaprealian	10/16/90	
A. Jankowski	10/17 11:50	
	10/17/90 11:45	B.V.
hed 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

DS Logan 10/16/90