KAPREALIAN ENGINEERING
INCORPORATED

December 4, 1992

Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621 [redacted] ST10.3627

Attention: Mr. Tom Peacock

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

Dear Mr. Peacock:

Per the request of Mr. Tim Howard of Unocal Corporation, enclosed please find our report dated November 3, 1992, for the above referenced site.

If you should have any questions, please feel free to call our office at (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

jad\82

Enclosure

cc: Tim Howard, Unocal Corporation

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

KAPREALIAN ENGINEERING
INCORPORATED

KEI-P89-0703.QR12
November 3, 1992

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

Attention: Mr. Tim Howard

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

Dear Mr. Howard:

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-P89-0703.P3) dated February 28, 1991, and as modified in KEI's quarterly reports (KEI-P89-0703.QR7) dated August 20, 1991, and (KEI-P89-0703.QR11) dated August 12, 1992. All of the wells are currently monitored quarterly, and wells MW2 and MW3 are sampled on a quarterly basis. Wells MW1 and MW4 are sampled on an annual basis. This report covers the work performed by KEI from August through October of 1992.

BACKGROUND

The subject site contains a Unocal service station facility. Two underground fuel storage tanks, one waste oil tank, and the product piping were removed from the site in July of 1989 during tank replacement activities. The fuel tank pit was subsequently overexcavated four feet laterally and to the then ground water depth (10.5 feet below grade) in order to remove contaminated soil. 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 quarterly report (KEI-P89-0703.QR10) dated May 15, 1992.

RECENT FIELD ACTIVITIES

The four existing wells (MW1 through MW4) were monitored once, and wells MW2 and MW3 were sampled once during the quarter. Prior to sampling, the wells were checked for depth to water and the

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presence of free product and sheen. No free product or sheen was noted in any of the wells during the quarter. The monitoring data collected this quarter are summarized in Table 1.

Water samples were collected from wells MW2 and MW3 on October 12, 1992. Prior to sampling, these wells were each purged of between 5 and 6 gallons of water by the use of a surface pump. Water 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 site on October 12, 1992, ranged between 18.55 and 18.83 feet below grade. The water levels in all of the wells have shown net decreases ranging from 0.12 to 0.20 feet since July 14, 1992. Based on the water level data gathered on October 12, 1992, the ground water flow direction appeared to be to the east, as shown on the attached Potentiometric Surface Map, Figure 1. The flow direction reported this quarter is relatively unchanged from the easterly flow direction reported in the previous quarters. The average hydraulic gradient across the site on October 12, 1992, was approximately 0.006.

ANALYTICAL RESULTS

The ground water samples 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.

The ground water sample analytical results are summarized in Table 2. The concentrations of TPH as gasoline and benzene detected in the ground water samples collected this quarter are shown on the attached Figure 2. Copies of the laboratory analytical results and 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 wells, KEI recommends continuation of the current ground water monitoring and sampling program, per KEI's proposal (KEI-P89-0703.P3) dated February 28, 1991, and as modified in KEI's quarterly reports (KEI-P89-0703.QR7) dated August 20, 1991, and (KEI-P89-0703.QR11) dated August 12, 1992.

KEI previously proposed the installation of two off-site monitoring wells (MW5 and MW6, as shown on the attached Figure 3), in order to further define the extent of the ground water contamination. KEI understands that Unocal encountered delays in obtaining satisfactory access agreements for these proposed locations. Therefore, the proposed locations for wells MW5 and MW6 have been relocated to the adjoining streets, as shown on the attached Figure 3. KEI has obtained the necessary encroachment permits, and the wells are scheduled to be installed in November 1992.

DISTRIBUTION

A copy of this report should be sent to the Alameda County Health Care Services Agency, 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 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 me 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 & 2
Location Map
Potentiometric Surface Map - Figure 1
Concentrations of Petroleum Hydrocarbons - Figure 2
Locations of Proposed Monitoring Wells - Figure 3
Laboratory Analyses
Chain of Custody documentation

KEI-P89-0703.QR12
November 3, 1992

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 October 12, 1992)					
MW1	81.99	18.83	0	--	0
MW2	81.44	18.56	0	No	6
MW3	81.64	18.77	0	No	5
MW4	81.80	18.55	0	--	0

Well No.	Well Cover Elevation (feet)*
MW1	100.82
MW2	100.00
MW3	100.41
MW4	100.35

-- Sheen determination was not performed.

* The elevations of the tops of the well covers have been surveyed relative to an assumed datum of 100.00 feet at the of top of the MW2 well cover.

KEI-P89-0703.QR12
November 3, 1992

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	PCE
10/12/92	MW2	--	370	3.4	0.56	11	ND	--
	MW3	--	3,200	160	10	540	230	--
7/14/92	MW1+	--	ND	ND	ND	ND	ND	1.4
	MW2	--	130	3.7	ND	ND	ND	--
	MW3	--	21,000	890	200	4,300	1,200	--
	MW4	--	ND	1.3	2.5	1.0	ND	--
4/14/92	MW2	--	150	6.2	ND	1.4	ND	--
	MW3	--	14,000	660	48	2,000	560	--
1/15/92	MW2	--	220	37	0.52	7.0	1.1	--
	MW3	--	3,000	590	14	750	310	--
10/15/91	MW2	--	140	44	0.56	12	1.5	--
	MW3	--	3,100	390	34	390	150	--
7/15/91	MW1*	ND	ND	ND	ND	ND	ND	1.8
	MW2	--	2,200	770	12	370	72	--
	MW3	--	9,200	1,300	230	1,900	490	--
	MW4	--	ND	ND	ND	ND	ND	--
4/12/91	MW1*	ND	ND	ND	ND	ND	ND	2.0
	MW2	--	2,200	160	4.3	62	23	--
	MW3	--	880	170	1.1	110	34	--
	MW4	--	ND	ND	ND	ND	ND	--
1/15/91	MW1*	ND	ND	ND	ND	ND	ND	2.1
	MW2	--	680	170	0.7	81	19	--
	MW3	--	3,200	460	1.5	270	120	--
	MW4	--	ND	ND	ND	ND	ND	--
10/16/90	MW1*	ND	ND	ND	ND	ND	ND	2.0
	MW2	--	1,400	430	2.0	240	48	--
	MW3	--	740	210	1.4	82	2.5	--
	MW4	--	ND	ND	ND	ND	ND	--
7/17/90	MW1*	ND	ND	ND	ND	ND	ND	1.7
	MW2	--	490	76	0.59	46	11	--
	MW3	--	4,000	270	48	250	130	--
	MW4	--	ND	ND	ND	ND	ND	--

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	PCE
4/19/90	MW1*	ND	ND	ND	ND	ND	ND	2.2
	MW2	--	3,900	550	5.1	390	91	--
	MW3	--	3,100	600	27	220	54	--
	MW4	--	ND	ND	0.48	ND	ND	--
1/23/90	MW1**	ND	ND	1.5	2.3	4.3	ND	2.1
	MW2	--	400	73	36	40	10	--
	MW3	--	450	110	1.2	11	4.4	--
	MW4	--	ND	ND	0.40	ND	ND	--
9/15/89	MW1***	ND	ND	ND	0.61	ND	ND	2.7
	MW2	--	290	ND	12	ND	ND	--
	MW3	--	32	ND	ND	ND	ND	--
	MW4	--	ND	ND	ND	ND	ND	--

-- Indicates analysis was not performed.

+ All EPA method 8010 compounds were non-detectable, except for PCE.

* TOG was non-detectable. All EPA method 8010 compounds were non-detectable, except for PCE.

** TOG was 1.5 ppm. All EPA method 8010 compounds were non-detectable, except for PCE.

*** TOG was <50 ppm. All EPA method 8010 compounds were non-detectable, except for PCE.

ND = Non-detectable.

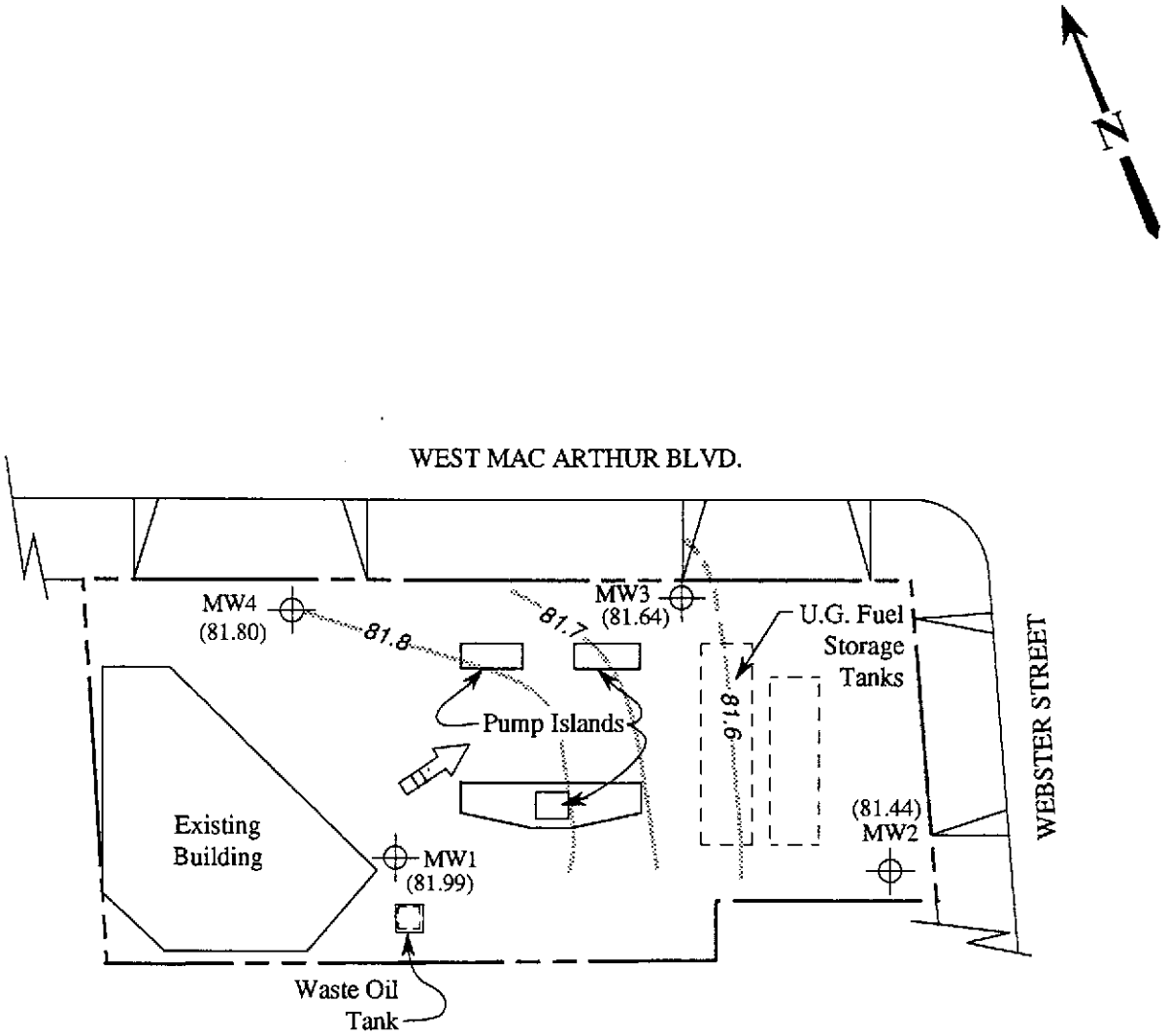
Results in parts per billion (ppb), unless otherwise indicated.

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

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION # 3538 411 W. MACARTHUR BOULEVARD OAKLAND, CA	LOCATION MAP



LEGEND

- Monitoring well
- ( ) Ground water elevation in feet
  Top of MW2 well cover assumed 100.00 feet as datum.
- Direction of ground water flow
- Contours of ground water elevation

0 30 60

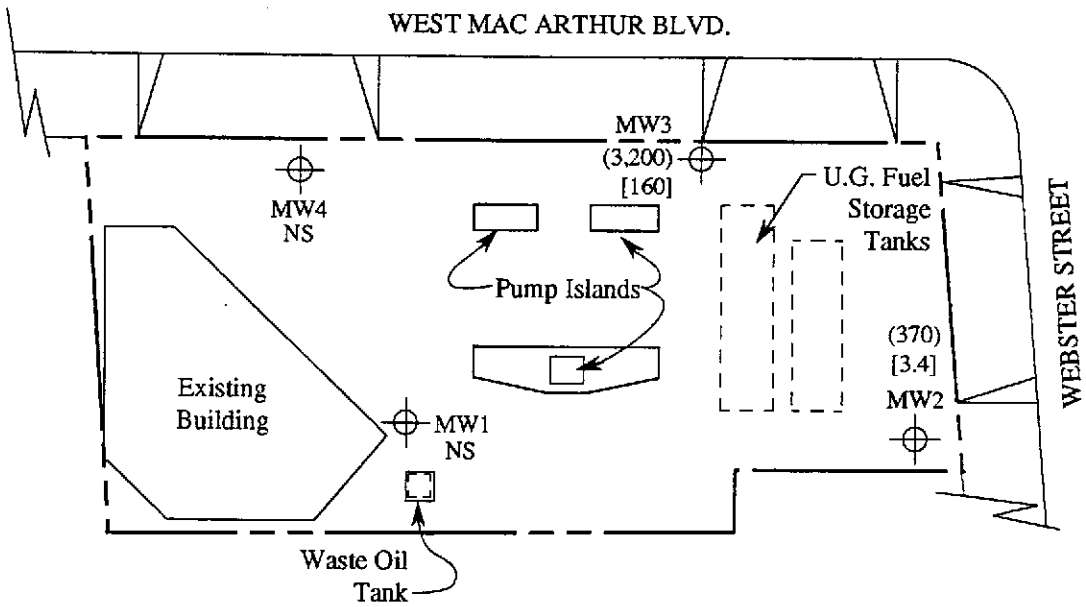
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE OCTOBER 12, 1992 MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION # 3538
411 W. MACARTHUR BOULEVARD
OAKLAND, CA

FIGURE
1



LEGEND

- Monitoring well
- ( ) Concentration of TPH as gasoline in ppb
- [ ] Concentration of benzene in ppb
- ND = Non-detectable
- NS = Not sampled

0 30 60

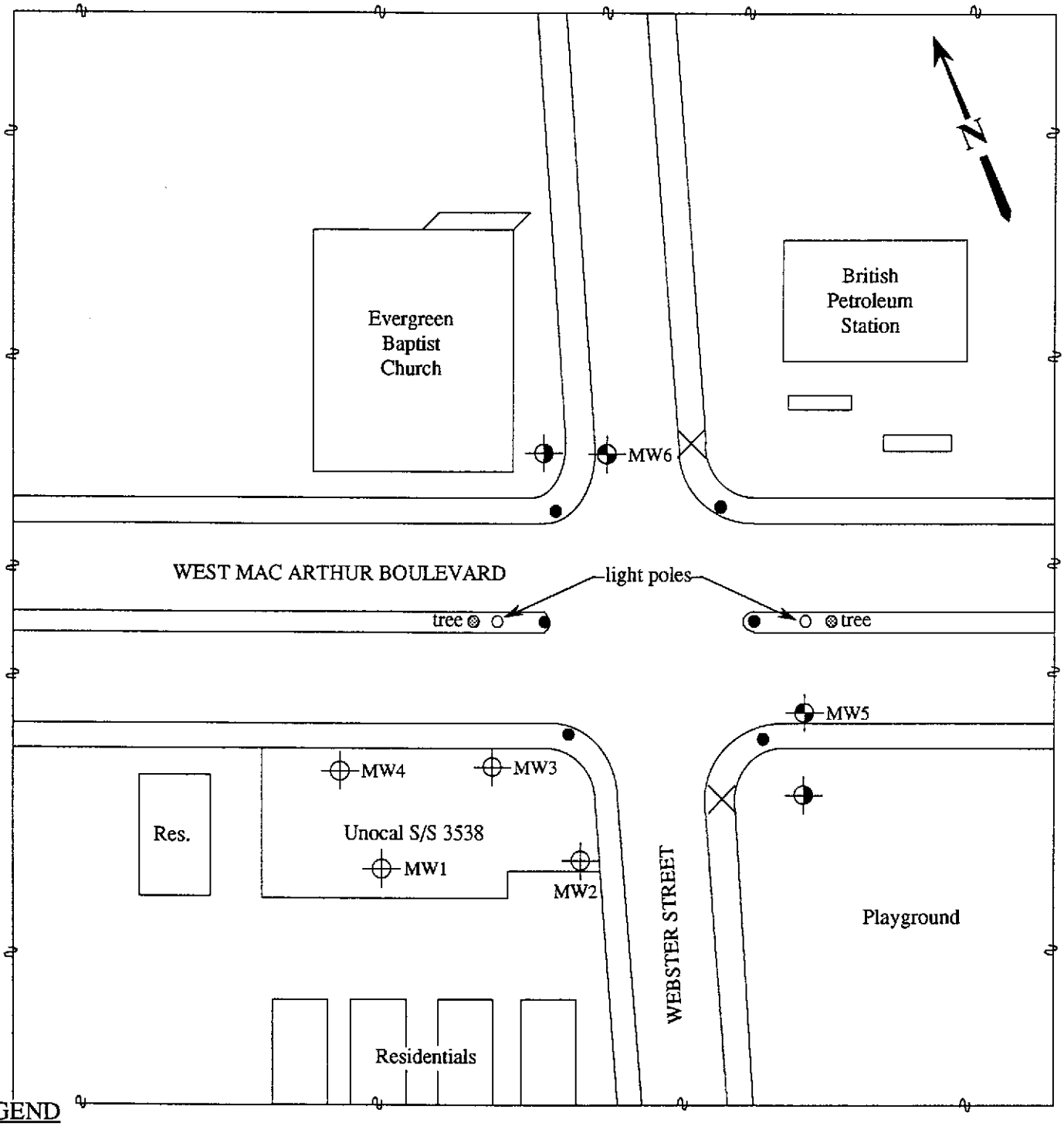
Approx. scale feet

PETROLEUM HYDROCARBON CONCENTATIONS IN GROUND WATER ON OCTOBER 12, 1992

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION # 3538
411 W. MACARTHUR BOULEVARD
OAKLAND, CA

FIGURE
2



LEGEND

- Monitoring well (existing)
- Monitoring well (original proposed location)
- Monitoring well (proposed relocation)
- Utility pole and overhead lines
- Traffic lights

0 60 120

Approx. scale feet

LOCATIONS OF PROPOSED OFF-SITE MONITORING WELLS

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION # 3538
411 W. MACARTHUR BOULEVARD
OAKLAND, CA

FIGURE
3

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(510) 686-9600 • FAX (510) 686-9689

Kapreallan Engineering, Inc.	Client Project ID:	Unocal, 411 W. MacArthur Blvd., Oakland	Sampled:	Oct 12, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Oct 12, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Oct 20, 1992
Attention: Mardo Kapreallan, P.E.	First Sample #:	210-0393		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 210-0393 MW 2	Sample I.D. 210-0394 MW 3	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	370	3,200	
Benzene	0.5	3.4	160	
Toluene	0.5	0.56	10	
Ethyl Benzene	0.5	N.D.	230	
Total Xylenes	0.5	11	540	
Chromatogram Pattern:		Gasoline	Gasoline	

Quality Control Data

Report Limit Multiplication Factor:	1.0	10	1.0
Date Analyzed:	10/14/92	10/19/92	10/14/92
Instrument Identification:	HP-5	HP-2	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	106	108	107

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

1900 Bates Avenue • Suite LM • Concord, California 94520
(510) 686-9600 • FAX (510) 686-9689

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

Client Project ID: Unocal, 411 W. MacArthur Blvd., Oakland
QC Sample Group: 2100393-394
Reported: Oct 20, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020
Analyst:	J.F.	J.F.	J.F.	J.F.
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Oct 14, 1992	Oct 14, 1992	Oct 14, 1992	Oct 14, 1992
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60
Conc. Matrix Spike:	22	21	22	65
Matrix Spike % Recovery:	110	105	110	108
Conc. Matrix Spike Dup.:	24	22	23	67
Matrix Spike Duplicate % Recovery:	120	110	115	112
Relative % Difference:	8.6	4.6	4.4	4.5

Laboratory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

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, INC.

CHAIN OF CUSTODY

SAMPLER: Vartkes

WITNESSING AGENCY:

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

ANALYSES REQUESTED: TPHG ; BTXE

TURN AROUND TIME: Regular

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHG ; BTXE	REMARKS
MW 2	10/12/92	11:05 am.		X	X		2	Monitoring Well	X	210393AB
MW 3	"	11:45 am.		X	X		2	" "	X	394AB

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
W. Dalgin	10/12/92 5:40	[illegible] 10/12/92 5:40pm
Jim Hoff	10-13-92 1300	
[illegible]	10-13-92 1418	
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? /

[illegible] — Signature; [illegible] — Title; 10/12/92 — Date