KAPREALIAN ENGINEERING
INCORPORATED

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December 14, 1993

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

Attention: Mr. Tom Peacock

RE: Unocal Service Station #3538
411 W. MacArthur Blvd.
Oakland, California 609

Dear Mr. Peacock:

Per the request of Mr. Tim Howard of Unocal Corporation, enclosed please find our report dated November 10, 1993, 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.QR16
November 10, 1993

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). All of the wells are currently monitored quarterly, and wells MW2, MW3, MW5, and MW6 are sampled on a quarterly basis. Wells MW1 and MW4 are sampled on an annual basis. This report covers the work performed by KEI in October of 1993.

BACKGROUND

The subject site contains a Unocal service station facility. Two underground fuel storage tanks, one waste oil storage 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 4 feet laterally and to the ground water depth (10.5 feet below grade) in order to remove contaminated soil. Six monitoring wells have been installed at and in the vicinity of 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-P89-0703.R6) dated January 18, 1993.

RECENT FIELD ACTIVITIES

The six existing monitoring wells (MW1 through MW6) were monitored once, and wells MW2, MW3, MW5, and MW6 were sampled once during the quarter. Monitoring wells MW1 and MW4 are currently sampled on an annual basis, and thus were not sampled this quarter. During monitoring, all of the wells were checked for depth to water and

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the presence of free product. Prior to sampling, monitoring wells MW2, MW3, MW5, and MW6 were also checked for the presence of a 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.

Ground water samples were collected from wells MW2, MW3, MW5, and MW6 on October 14, 1993. Prior to sampling, these wells were each purged of between 5 and 9 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, labeled, 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 14, 1993, ranged between 17.21 and 18.45 feet. The water levels in all of the wells have shown net decreases ranging from 0.07 to 0.36 feet since July 14, 1993. Based on the water level data gathered on October 14, 1993, the ground water flow direction appeared to be predominantly to the east-southeast over the majority of the Unocal site, and to the south-southwest over the northeast portion of the site vicinity, as shown on the attached Potentiometric Surface Map, Figure 1. The ground water flow direction has been predominantly to the east over the majority of the Unocal site since October of 1990 (12 consecutive quarters). In addition, since the installation of off-site wells MW5 and MW6 in November of 1992, a south-southwest ground water flow direction has been observed at the northeast portion of site vicinity during the last four consecutive quarters. The average hydraulic gradient at the site on October 14, 1993, was approximately 0.005.

ANALYTICAL RESULTS

The ground water samples collected this quarter 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, ethylbenzene, and xylenes by EPA method 8020.

The analytical results of all of the ground water samples collected from the monitoring wells to date are summarized in Tables 2 and 3. 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 the Chain of Custody documentation are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results of the ground water samples collected and evaluated to date, and based on no evidence of free product or sheen in any of the wells, KEI recommends the continuation of the current ground water monitoring and sampling program. All of the wells are currently monitored quarterly, and wells MW2, MW3, MW5, and MW6 are sampled on a quarterly basis. Monitoring wells MW1 and MW4 are currently sampled on an annual basis. Recommendations for further alterations to or termination of the monitoring and sampling program will be made as warranted.

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 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. EG 1633
Exp. Date 6/30/94

Timothy R. Ross
Project Manager

/bp

Attachments: Tables 1, 2 & 3
Location Map
Potentiometric Surface Map - Figure 1
Concentrations of Petroleum Hydrocarbons - Figure 2
Laboratory Analyses
Chain of Custody documentation

KEI-P89-0703.QR16
November 10, 1993

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 14, 1993)					
MW1*	53.78	18.32	0	--	0
MW2	53.18	18.20	0	No	6.5
MW3	53.41	18.45	0	No	5
MW4*	53.56	18.08	0	--	0
MW5	53.41	17.82	0	No	8.5
MW6	54.23	17.21	0	No	9

Well #	Top of Casing Elevation in feet above Mean Sea Level (MSL)**
MW1	72.10
MW2	71.38
MW3	71.86
MW4	71.64
MW5	71.23
MW6	71.44

♦ The depth to water level measurement was taken from the top of the well casing. Prior to October 14, 1993, the water level measurement was taken from the top of the well cover.

* Monitored only.

** Based on the City of Oakland Benchmark #9NW10 (elevation = 75.50 MSL).

-- Sheen determination was not performed.

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November 10, 1993

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
10/14/93	MW2	230♦	5.3	ND	ND	2.1	--
	MW3	2,500	52	ND	110	250	--
	MW5	ND	ND	ND	ND	ND	--
	MW6	ND	ND	0.64	ND	ND	--
7/14/93	MW1	ND	2.2	2.1	1.1	6.2	--
	MW2	110♦	6.5	ND	ND	1.1	250
	MW3	6,300	190	ND	430	1,000	860
	MW4	ND	ND	ND	ND	ND	--
	MW5	ND	ND	0.57	ND	ND	--
	MW6	ND	0.99	2.4	ND	1.9	--
4/13/93	MW2	410♦♦	42	7.7	6.4	28	200
	MW3	12,000♦♦	290	38	760	2,300	1,400
	MW5	ND	ND	ND	ND	ND	--
	MW6	ND	ND	ND	ND	ND	--
1/08/93	MW2	510♦	ND	ND	ND	ND	--
	MW3	1,100♦♦	48	0.99	0.90	93	--
	MW5	ND	ND	ND	ND	ND	--
	MW6	ND	ND	ND	ND	ND	--
11/30/92	MW5	ND	ND	ND	ND	ND	--
	MW6	ND	ND	ND	ND	ND	--
10/12/92	MW2	370	3.4	0.56	ND	11	--
	MW3	3,200	160	10	230	540	--
7/14/92	MW1	ND	ND	ND	ND	ND	--
	MW2	130	3.7	ND	ND	ND	--
	MW3	21,000	890	200	1,200	4,300	--
	MW4	ND	1.3	2.5	ND	1.0	--
4/14/92	MW2	150	6.2	ND	ND	1.4	--
	MW3	14,000	660	48	560	2,000	--
1/15/92	MW2	220	37	0.52	1.1	7.0	--
	MW3	3,000	590	14	310	750	--
10/15/91	MW2	140	44	0.56	1.5	12	--
	MW3	3,100	390	34	150	390	--

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TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
7/15/91	MW1	ND	ND	ND	ND	ND	--
	MW2	2,200	770	12	72	370	--
	MW3	9,200	1,300	230	490	1,900	--
	MW4	ND	ND	ND	ND	ND	--
4/12/91	MW1	ND	ND	ND	ND	ND	--
	MW2	2,200	160	4.3	23	62	--
	MW3	880	170	1.1	34	110	--
	MW4	ND	ND	ND	ND	ND	--
1/15/91	MW1	ND	ND	ND	ND	ND	--
	MW2	680	170	0.7	19	81	--
	MW3	3,200	460	1.5	120	270	--
	MW4	ND	ND	ND	--	ND	
10/16/90	MW1	ND	ND	ND	ND	ND	--
	MW2	1,400	430	2.0	48	240	--
	MW3	740	210	1.4	2.5	82	--
	MW4	ND	ND	ND	ND	ND	--
7/17/90	MW1	ND	ND	ND	ND	ND	--
	MW2	490	76	0.59	11	46	--
	MW3	4,000	270	48	130	250	--
	MW4	ND	ND	ND	ND	ND	--
4/19/90	MW1	ND	ND	ND	ND	ND	--
	MW2	3,900	550	5.1	91	390	--
	MW3	3,100	600	27	54	220	--
	MW4	ND	ND	0.48	ND	ND	--
1/23/90	MW1	ND	1.5	2.3	ND	4.3	--
	MW2	400	73	36	10	40	--
	MW3	450	110	1.2	4.4	11	--
	MW4	ND	ND	0.40	ND	ND	--
9/15/89	MW1	ND	ND	0.61	ND	ND	--
	MW2	290	ND	12	ND	ND	--
	MW3	32	ND	ND	ND	ND	--
	MW4	ND	ND	ND	ND	ND	--

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TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

-- Indicates analysis was not performed.

♦ Sequoia Analytical Laboratory reported that the hydrocarbons detected did not appear to be gasoline.

♦♦ Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a gasoline and a non-gasoline mixture.

ND = Non-detectable.

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

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TABLE 3

SUMMARY OF LABORATORY ANALYSES
WATER

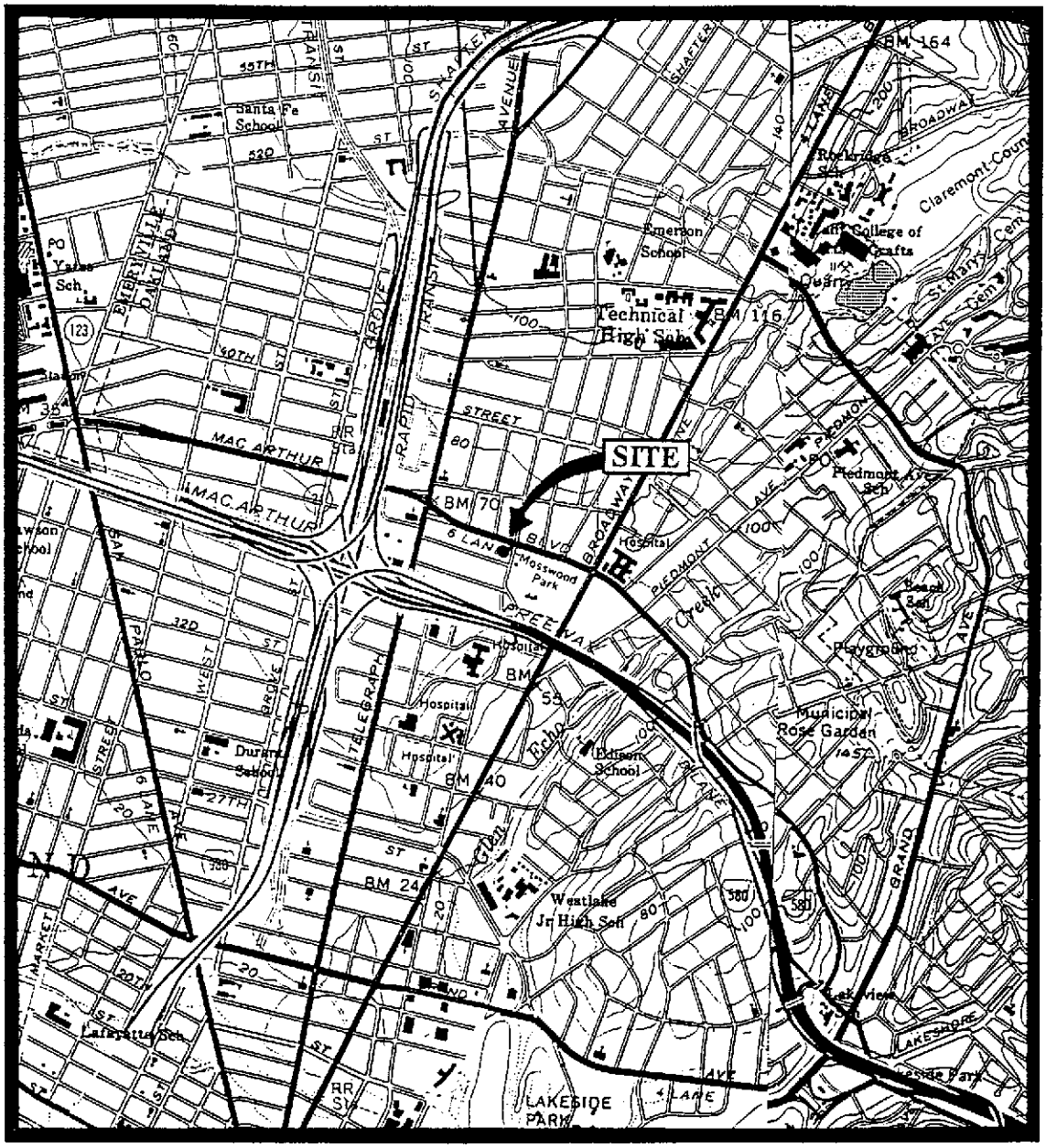
Date	Sample Well #	TPH as Diesel	TOG (ppm)	Tetrachloro-ethene*
7/14/93	MW1	--	--	0.95
7/14/92	MW1	--	--	1.4
7/15/91	MW1	ND	ND	1.8
4/12/91	MW1	ND	ND	2.0
1/15/91	MW1	ND	ND	2.1
10/16/90	MW1	ND	ND	2.0
7/17/90	MW1	ND	ND	1.7
4/19/90	MW1	ND	ND	2.2
1/23/90	MW1	ND	1.5	2.1
9/15/89	MW1	ND	ND	2.7

-- Indicates analysis was not performed.

* All EPA method 8010 constituents were non-detectable, except for tetrachloroethene as indicated.

ND = Non-detectable.

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

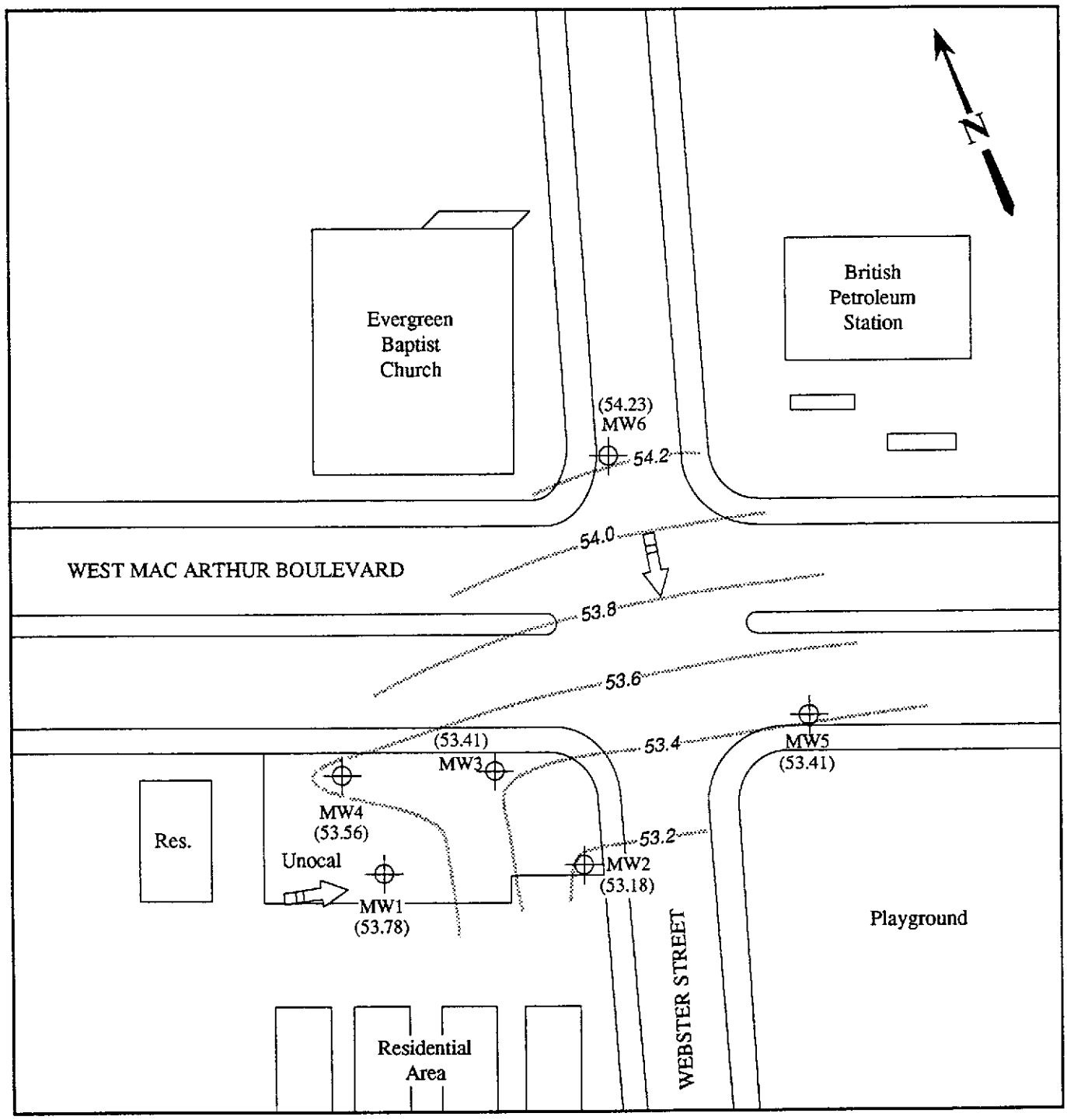


Base modified from 7.5 minute U.S.G.S. Oakland East & West Quadrangles
(both photorevised 1980)

0 2000 4000

Approx. scale feet

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



LEGEND

- Monitoring well
- ( ) Ground water elevation in feet above Mean Sea Level
- Direction of ground water flow
- Contours of ground water elevation

0 60 120

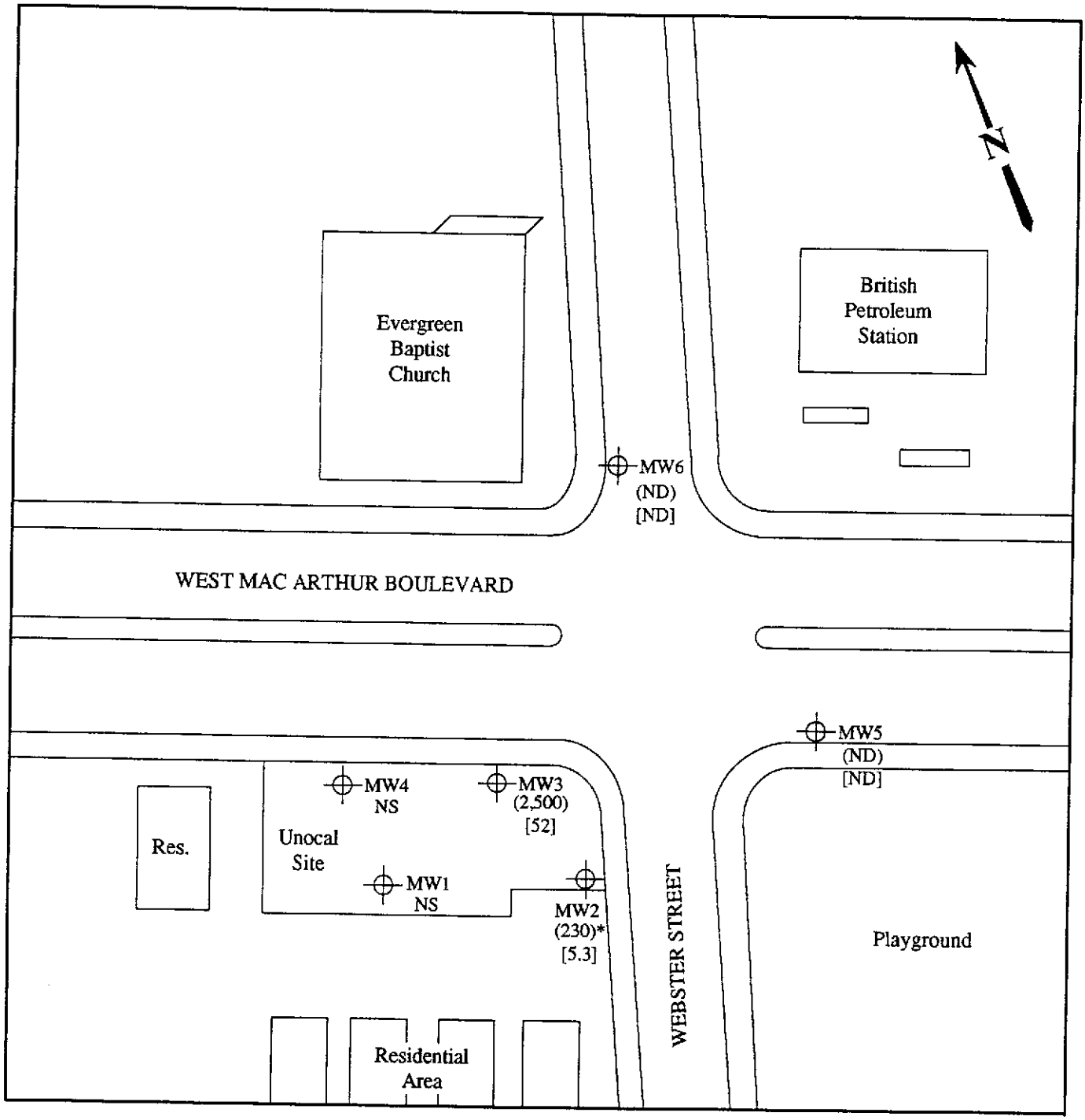
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE OCTOBER 14, 1993 MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

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

FIGURE
1



LEGEND

- Monitoring well
- ( ) Concentration of TPH as gasoline in ppb
- [ ] Concentration of benzene in ppb

ND = Non-detectable, NS = Not sampled

* The lab reported that the hydrocarbons detected did not appear to be gasoline.

0 60 120

Approx. scale feet

PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUND WATER ON OCTOBER 14, 1993

KAPREALIAN ENGINEERING
INCORPORATED

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

FIGURE
2

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #3538 , 411 W. McArthur Blvd., Oakland	Sampled:	Oct 14, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Oct 14, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Oct 28, 1993
Attention: Avo Avedessian	First Sample #:	310-0916		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 310-0916 MW-2*	Sample I.D. 310-0917 MW-3	Sample I.D. 310-0918 MW-5	Sample I.D. 310-0919 MW-6	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	230	2,500	N.D.	N.D.	N.D.
Benzene	0.5	5.3	52	N.D.	N.D.	N.D.
Toluene	0.5	N.D.	N.D.	N.D.	0.64	N.D.
Ethyl Benzene	0.5	N.D.	110	N.D.	N.D.	N.D.
Total Xylenes	0.5	2.1	250	N.D.	N.D.	N.D.
Chromatogram Pattern:		Discrete Peaks	Gasoline	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	2.0	20	1.0	1.0	1.0
Date Analyzed:	10/25/93	10/25/93	10/21/93	10/21/93	10/21/93
Instrument Identification:	HP-4	HP-4	HP-4	HP-4	HP-4
Surrogate Recovery, %: (QC Limits = 70-130%)	89	90	98	97	114

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

Please Note:

* Discrete Peaks includes unidentified peak in the MTBE range.

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #3538 , 411 W. McArthur Blvd., Oakland
2401 Stanwell Dr., Ste. 400	Matrix:	Water
Concord, CA 94520		
Attention: Avo Avedessian	QC Sample Group: 3100916-19	Reported: Oct 28, 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#:	2LCS102193	2LCS102193	2LCS102193	2LCS102193
Date Prepared:	10/21/93	10/21/93	10/21/93	10/21/93
Date Analyzed:	10/21/93	10/21/93	10/21/93	10/21/93
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
LCS % Recovery:	96	95	96	98
Control Limits:	70-130	70-130	70-130	70-130
MS/MSD Batch #:	3100663	3100663	3100663	3100663
Date Prepared:	10/21/93	10/21/93	10/21/93	10/21/93
Date Analyzed:	10/21/93	10/21/93	10/21/93	10/21/93
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4
Matrix Spike % Recovery:	100	100	95	97
Matrix Spike Duplicate % Recovery:	100	100	95	97
Relative % Difference:	0.0	0.0	0.0	0.0

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: Ray

WITNESSING AGENCY:

SITE NAME & ADDRESS: UNOCAL # 3538 OAKLAND 411 W. McArthur Blvd.

ANALYSES REQUESTED: TPH G / BTEX

TURN AROUND TIME: REGULAR

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPH G / BTEX							REMARKS
MW2	10-14			x	x		2	VOA	x					3100916 AB		VOA's Preserved
MW3	"			x	x		"	"	x					917		
MW5	"			x	x		"	"	x					918		
MW6	"			x	x		"	"	x					919		

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Ray	10-14-93	John Miller 10-14-93 15:25
John Miller	10-15-93 1415	[signature]
[signature]	10-15-93 13	Melissa Creusere

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

Signature	Title	Date
J. Miller	Analyst	10-14-93

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