



KAPREALIAN ENGINEERING  
INCORPORATED

93-75-15

April 5, 1993

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

RE: Unocal Service Station #5484  
18950 Lake Chabot Road  
Castro Valley, California

Gentlemen:

Per the request of Mr. Ron Bock of Unocal Corporation, enclosed please find our report dated March 30, 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: Ron Bock, Unocal Corporation



KAPREALIAN ENGINEERING  
INCORPORATED

KEI-P90-0806.QR7  
March 30, 1993

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

Attention: Mr. Ron Bock

RE: Quarterly Report  
Unocal Service Station #5484  
18950 Lake Chabot Road  
Castro Valley, California

Dear Mr. Bock:

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-P90-0806.P1) dated January 9, 1991, and as modified in KEI's reports (KEI-P90-0806.R2) dated June 27, 1991, and (KEI-P90-0806.QR6) dated January 15, 1993. The wells are currently monitored and sampled on a quarterly basis, except for well MW6, which is sampled on a semi-annual basis. This report covers the work performed by KEI in March of 1993.

#### BACKGROUND

The subject site contains a Unocal service station facility. Two underground gasoline storage tanks and one waste oil tank were removed from the site in June of 1989 during tank replacement activities. The fuel tank pit and the waste oil tank pit were subsequently overexcavated in order to remove contaminated soil. Seven monitoring wells and six exploratory borings have been previously installed at the site; however, two of the monitoring wells (MW1 and MW3) were destroyed during tank replacement activities.

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-P90-0806.QR3) dated April 27, 1992.

#### RECENT FIELD ACTIVITIES

The five existing wells (MW2 and MW4 through MW7) were monitored once, and wells MW2, MW4, MW5, and MW7 were sampled once during the

quarter. Well MW6 is sampled on a semi-annual basis, and thus was not sampled this quarter. Prior to sampling, the wells were checked for depth to water and the presence of free product or 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.

Water samples were collected from wells MW2, MW4, MW5, and MW7 on March 10, 1993. Prior to sampling, the wells were each purged of between 9 and 31 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 and/or one-liter amber bottles, as appropriate, which 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 March 10, 1993, ranged between 4.69 and 7.69 feet below grade. Since December 10, 1992, the water levels in all five wells have shown net increases ranging from 2.45 to 3.32 feet. Based on the water level data gathered on March 10, 1993, the ground water flow direction appeared to be to the south-southwest, as shown on the attached Potentiometric Surface Map, Figure 1. The flow direction reported this quarter is unchanged from the flow directions reported since May 23, 1991. The hydraulic gradient at the site on March 10, 1993, was approximately 0.07.

#### 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. In addition, the ground water samples collected from monitoring wells MW5 and MW7 were analyzed for TPH as diesel by EPA method 3510/modified 8015, EPA method 8010 constituents, and EPA method 8270 compounds (including the open scan). The ground water sample collected from well MW2 was also analyzed for methyl tert butyl ether (MTBE) by EPA 8020/modified.

The ground water sample analytical results 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 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 the continuation of the current monitoring and sampling program, per KEI's proposal (KEI-P90-0806.P1) dated January 9, 1991, and as modified in KEI's reports (KEI-P90-0806.R2) dated June 27, 1991 and (KEI-P90-0806.QR6) dated January 15, 1993. All of the wells are currently monitored and sampled on a quarterly basis, except for well MW6, which is sampled on a semi-annual basis. The ground water samples collected from all of the wells will be analyzed for TPH as gasoline and BTX&E. The ground water samples collected from wells MW5 and MW7 will also be analyzed for TPH as diesel and EPA method 8010 constituents, and the ground water sample collected from well MW2 will also continue to be analyzed for MTBE.

The ground water sample collected from monitoring well MW5 this quarter showed non-detectable concentrations of all EPA method 8270 constituents (including the open scan); therefore, KEI recommends that this analysis be discontinued for well MW5. However, based on the concentrations (10 ppb to 59 ppb) of various EPA method 8270 compounds that were detected in well MW7, KEI recommends that the EPA method 8270 analysis be continued for well MW7.

### 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 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 accor-

KEI-P90-0806.QR7

March 30, 1993

Page 4

dance 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. 1633  
Exp. Date 6/30/94

\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-P90-0806.QR7  
March 30, 1993

TABLE 1

SUMMARY OF MONITORING DATA

<u>Well No.</u>	<u>Ground Water Elevation (feet)</u>	<u>Depth to Water (feet)</u>	<u>Product Thickness (feet)</u>	<u>Sheen</u>	<u>Water Purged (gallons)</u>
(Monitored and Sampled on March 10, 1993)					
MW2	224.78	4.69	0	No	11
MW4	220.84	7.24	0	No	31
MW5	217.75	7.67	0	No	26
MW6*	234.06	5.32	0	--	0
MW7	223.97	7.69	0	No	9

<u>Well</u>	<u>Well Cover Elevation** (feet)</u>
MW2	229.47
MW4	228.08
MW5	225.42
MW6	239.38
MW7	231.66

\* Monitored only.

\*\* The elevations of the tops of the well covers have been surveyed relative to Mean Sea Level.

-- Sheen determination was not performed.

KEI-P90-0806.QR7  
 March 30, 1993

TABLE 2

SUMMARY OF LABORATORY ANALYSES  
 WATER

<u>Date</u>	<u>Sample Well #</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>	<u>MTBE</u>
3/10/93	MW2	--	110*	ND	ND	ND	ND	350
	MW4	--	ND	ND	ND	ND	ND	--
	MW5	69**	ND	ND	ND	ND	ND	--
	MW6	SAMPLED ON A SEMI-ANNUALLY BASIS						
	MW7	1,100**	4,400	310	ND	330	300	--
12/10/92	MW2	--	100*	ND	ND	ND	ND	170
	MW4	--	ND	ND	ND	ND	ND	--
	MW5	83♦	ND	ND	ND	ND	ND	--
	MW6	--	ND	ND	ND	ND	ND	--
	MW7	200♦	1,200	28	ND	13	37	--
9/10/92	MW2	--	61*	ND	ND	ND	ND	110
	MW4	SAMPLED ON A SEMI-ANNUAL BASIS						
	MW5	110**	ND	ND	ND	ND	ND	--
	MW6	SAMPLED ON A SEMI-ANNUAL BASIS						
	MW7	290**	2,100	160	1.9	150	140	--
6/18/92	MW2	--	140*	ND	ND	ND	ND	--
	MW4	--	ND	0.41	0.84	0.55	ND	--
	MW5	ND	ND	ND	ND	ND	ND	--
	MW6	--	ND	ND	ND	ND	ND	--
	MW7	990*	5,500	340	4.2	410	380	--
3/20/92	MW2	--	120	ND	ND	ND	ND	--
	MW4	SAMPLED ON A SEMI-ANNUAL BASIS						
	MW5	170	ND	ND	ND	ND	ND	--
	MW6	SAMPLED ON A SEMI-ANNUAL BASIS						
	MW7	3,200	11,000	980	ND	1,600	990	--
12/19/91	MW2	--	140	0.66	ND	1.2	0.64	--
	MW4	--	ND	ND	ND	ND	ND	--
	MW5	--	ND	ND	ND	ND	ND	--
	MW6	--	ND	ND	ND	ND	ND	--
	MW7	770	3,900	240	2.4	270	280	--
10/10/91	MW5	ND	--	--	--	--	--	--
9/20/91	MW2	--	ND	ND	ND	ND	ND	--
	MW4	SAMPLED ON A SEMI-ANNUAL BASIS						
	MW5	450	ND	ND	ND	ND	ND	--
	MW6	SAMPLED ON A SEMI-ANNUAL BASIS						
	MW7	580	1,400	160	0.75	130	89	--

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES  
WATER

<u>Date</u>	<u>Sample Well #</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>	<u>MTBE</u>
5/23/91	MW2	--	ND	ND	ND	ND	ND	--
	MW4	--	ND	ND	ND	ND	ND	--
	MW5	--	ND	ND	ND	ND	ND	--
	MW6	--	ND	ND	ND	ND	ND	--
	MW7	540	3,000	160	1.2	120	25	--

-- Indicates analysis was not performed.

ND = Non-detectable.

- \* Sequoia Analytical Laboratory reported that the hydrocarbons detected did not appear to be gasoline.
- \*\* Sequoia Analytical Laboratory reported that the hydrocarbons detected did not appear to be diesel.
- ♦ Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a diesel and non-diesel mixture.

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



KEI-P90-0806.QR7  
March 30, 1993

TABLE 3  
SUMMARY OF LABORATORY ANALYSES  
WATER

<u>Date</u>	<u>Sample Well#</u>	<u>TOG (ppm)</u>	<u>1,2-Dichloroethane</u>
3/10/93	MW5*	--	ND
	MW7**	--	1.7
12/10/92	MW7	--	2.0
9/10/92	MW7	--	2.3
6/18/92	MW7	ND	ND
3/20/92	MW7	ND	ND
12/19/91	MW7	ND	3.1
9/20/91	MW7	ND	ND
5/23/91	MW7	ND	3.4

\* All EPA method 8270 compounds (including the open scan) were non-detectable.

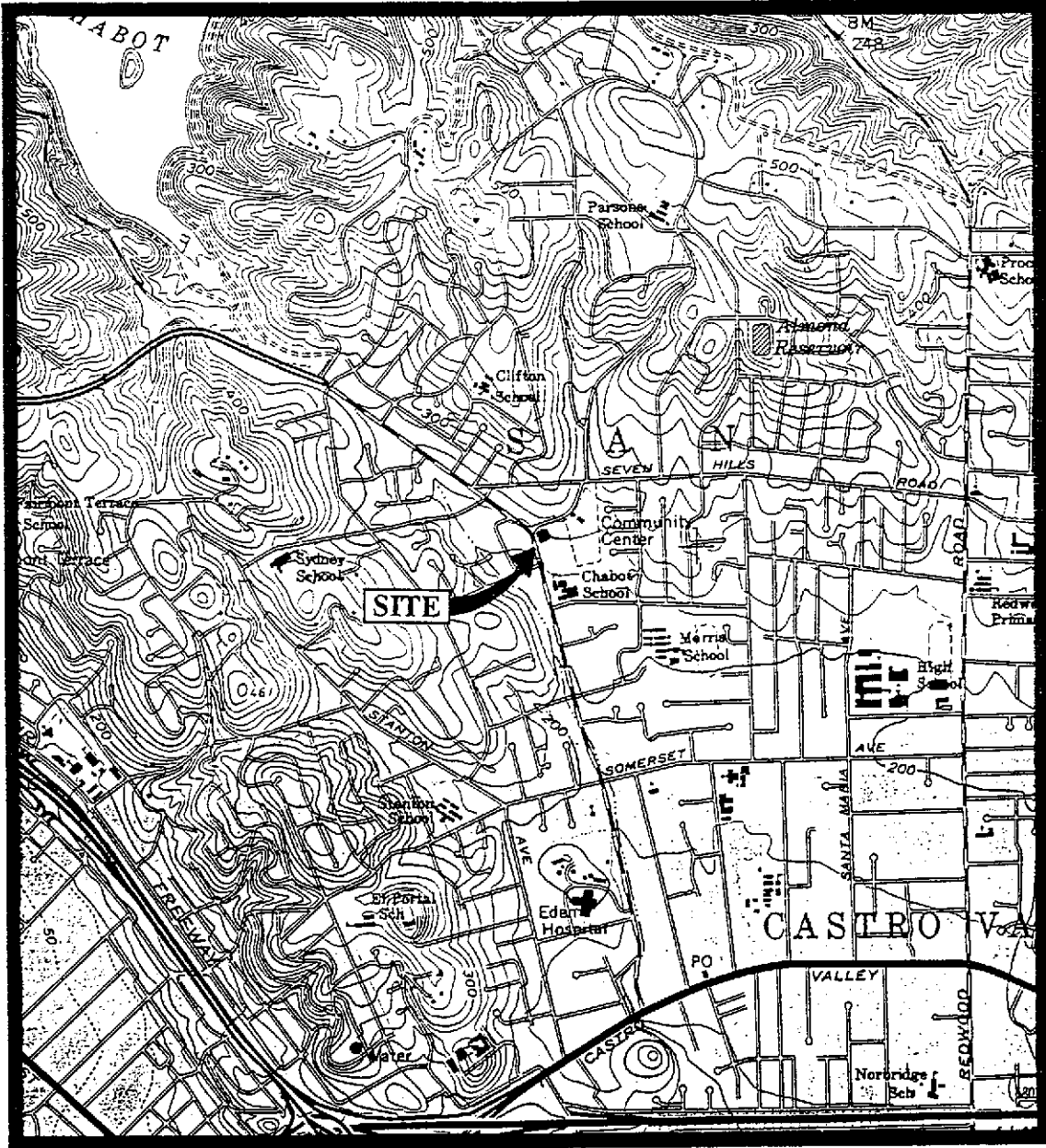
\*\* All EPA method 8270 compounds were non-detectable, except for 16 ppb of bis(2-ethylhexyl) phthalate, 11 ppb of 2-methyl naphthalene, and 54 ppb of naphthalene. In addition, nine "tentatively identified compounds" were detected by the EPA method 8270 open scan at concentrations ranging from 10 ppb to 59 ppb. Refer to the laboratory analysis sheets for the specific compounds and concentrations.

-- Indicates analysis was not performed.

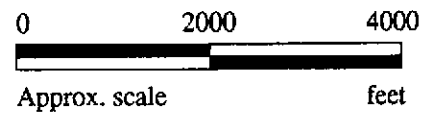
ND = Non-detectable.


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

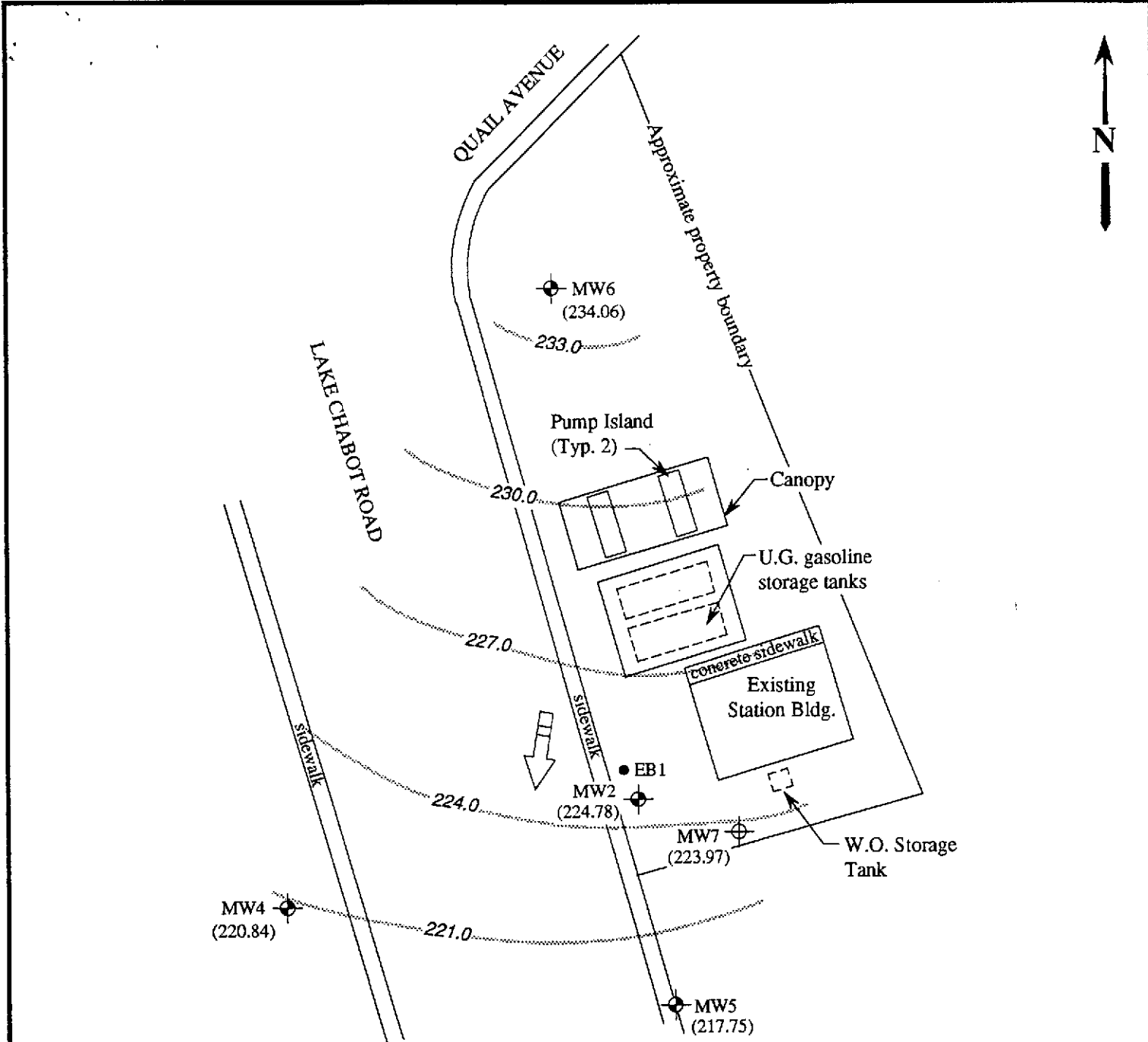
NOTE: All EPA method 8010 compounds were non-detectable, except for 1,2-dichloroethane.



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

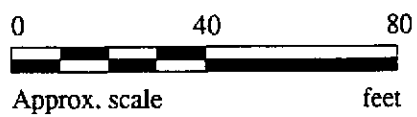


 <p><b>KAPREALIAN ENGINEERING INCORPORATED</b></p>	<p><b>UNOCAL SERVICE STATION #5484 18950 LAKE CHABOT ROAD CASTRO VALLEY, CA</b></p>	<p><b>LOCATION MAP</b></p>
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**LEGEND**

- ⊕ Monitoring well (by KEI)
- ⊕ Monitoring well (by AGS)
- Exploratory boring (by KEI)
- ( ) Elevation of ground water table in feet above Mean Sea Level
- ..... Contours of ground water elevation
- ➡ Direction of ground water flow



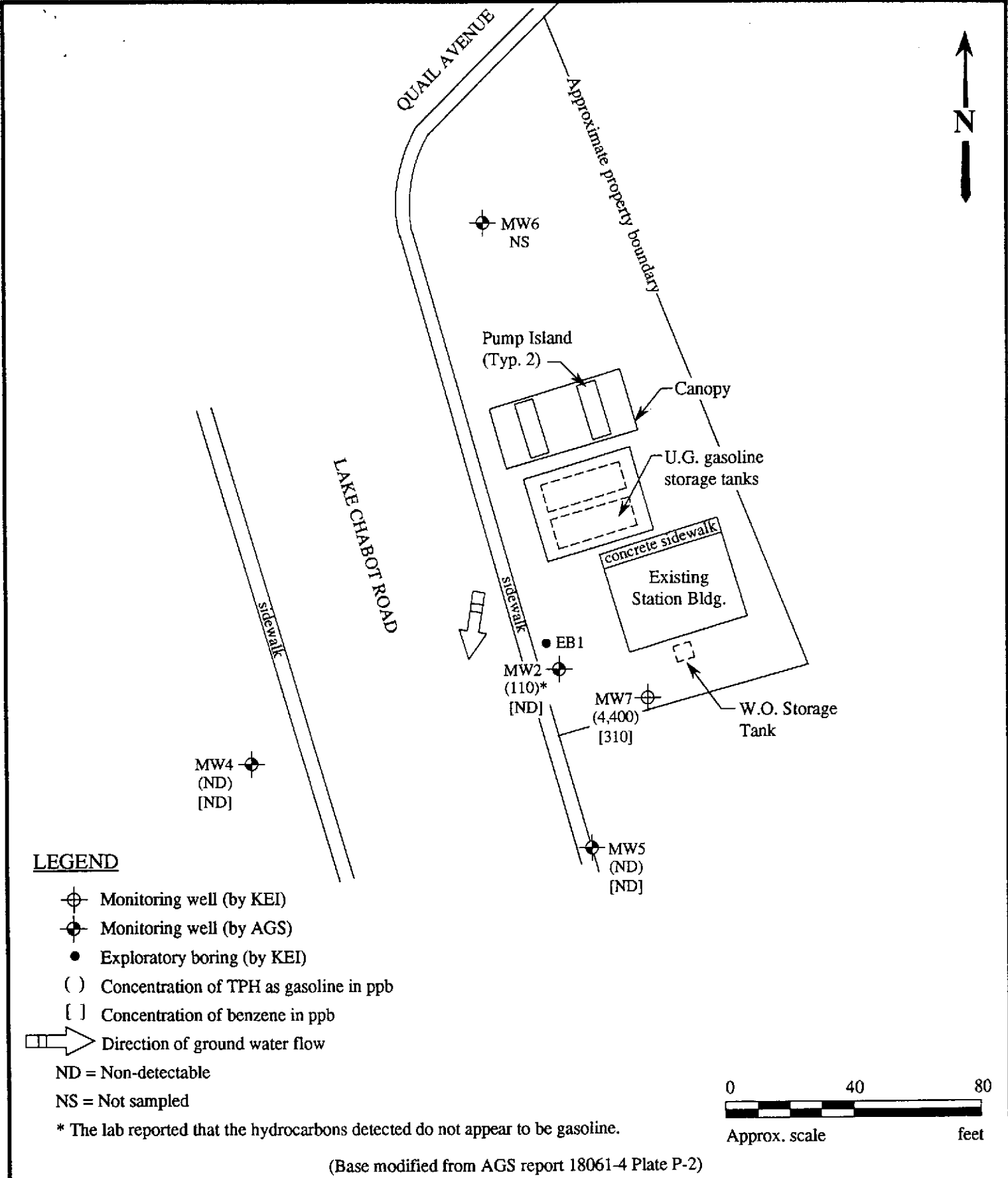
(Base modified from AGS report 18061-4 Plate P-2)

**POTENTIOMETRIC SURFACE MAP FOR THE MARCH 10, 1993 MONITORING EVENT**



**UNOCAL SERVICE STATION #5484  
18950 LAKE CHABOT ROAD  
CASTRO VALLEY, CA**

**FIGURE  
1**



**PETROLEUM HYDROCARBONS DETECTED IN GROUND WATER ON MARCH 10, 1993**



**UNOCAL SERVICE STATION #5484  
18950 LAKE CHABOT ROAD  
CASTRO VALLEY, CA**

**FIGURE  
2**



# SEQUOIA ANALYTICAL

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


Kaprealian Engineering, Inc. 2401 Starwell Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Sample Descript: Water Analysis for: MTBE (EPA 8020 - Modified) First Sample #: 303-0382	Castro Valley	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Analyzed: Mar 12, 1993 Reported: Mar 19, 1993
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## LABORATORY ANALYSIS FOR: MTBE (EPA 8020 - Modified)

Sample Number	Sample Description	Detection Limit $\mu\text{g/L}$	Sample Result $\mu\text{g/L}$
303-0382	MW2	0.60	350

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

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 Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Sample Matrix: Water Analysis Method: EPA 3510/3520/8015 First Sample #: 303-0384	Castro Valley	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Reported: Mar 19, 1993
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## TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 303-0384 MW5*	Sample I.D. 303-0385 MW7	Sample I.D. Matrix Blank
Extractable Hydrocarbons	50	69	1,100	
Chromatogram Pattern:		Discrete Peaks	Non-Diesel Mixture (<C16)	

### Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0
Date Extracted:	3/15/93	3/15/93	3/15/93
Date Analyzed:	3/18/93	3/18/93	3/18/93
Instrument Identification:	HP-3A	HP-3A	HP-3A

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

SEQUOIA ANALYTICAL

*Scott A. Chieffo*  
Scott A. Chieffo  
Project Manager

Please Note:	* The above sample does not appear to contain diesel. Extractable Hydrocarbons are due to unidentifiable peaks <C16.
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# SEQUOIA ANALYTICAL

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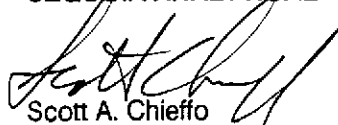
Kapreallan Engineering, Inc. 2401 Stanwell Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kapreallan, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Sample Descript: Water, MW5 Analysis Method: EPA 5030/8010 Lab Number: 303-0384	Castro Valley	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Analyzed: Mar 15, 1993 Reported: Mar 19, 1993
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## HALOGENATED VOLATILE ORGANICS (EPA 8010)

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

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

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager



# SEQUOIA ANALYTICAL

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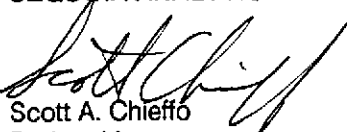
Kaprealian Engineering, Inc. 2401 Stanwell Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Sample Descript: Water, MW7 Analysis Method: EPA 5030/8010 Lab Number: 303-0385	Castro Valley	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Analyzed: Mar 15, 1993 Reported: Mar 19, 1993
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## HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane.....	0.50	N.D.
Bromoform.....	0.50	N.D.
Bromomethane.....	1.0	N.D.
Carbon tetrachloride.....	0.50	N.D.
Chlorobenzene.....	0.50	N.D.
Chloroethane.....	1.0	N.D.
2-Chloroethylvinyl ether.....	1.0	N.D.
Chloroform.....	0.50	N.D.
Chloromethane.....	1.0	N.D.
Dibromochloromethane.....	0.50	N.D.
1,3-Dichlorobenzene.....	0.50	N.D.
1,4-Dichlorobenzene.....	0.50	N.D.
1,2-Dichlorobenzene.....	0.50	N.D.
1,1-Dichloroethane.....	0.50	N.D.
<b>1,2-Dichloroethane.....</b>	<b>0.50</b>	<b>17</b>
1,1-Dichloroethene.....	0.50	N.D.
cis-1,2-Dichloroethene.....	0.50	N.D.
trans-1,2-Dichloroethene.....	0.50	N.D.
1,2-Dichloropropane.....	0.50	N.D.
cis-1,3-Dichloropropene.....	0.50	N.D.
trans-1,3-Dichloropropene.....	0.50	N.D.
Methylene chloride.....	5.0	N.D.
1,1,2,2-Tetrachloroethane.....	0.50	N.D.
Tetrachloroethene.....	0.50	N.D.
1,1,1-Trichloroethane.....	0.50	N.D.
1,1,2-Trichloroethane.....	0.50	N.D.
Trichloroethene.....	0.50	N.D.
Trichlorofluoromethane.....	0.50	N.D.
Vinyl chloride.....	1.0	N.D.

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

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 Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Sample Descript: Water, MW5 Analysis Method: EPA 8270 Lab Number: 303-0384	Castro Valley	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Extracted: Mar 17, 1993 Analyzed: Mar 18, 1993 Reported: Mar 19, 1993
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## SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acenaphthene.....	2.0	N.D.
Acenaphthylene.....	2.0	N.D.
Aniline.....	2.0	N.D.
Anthracene.....	2.0	N.D.
Benzidine.....	50	N.D.
Benzoic Acid.....	10	N.D.
Benzo(a)anthracene.....	2.0	N.D.
Benzo(b)fluoranthene.....	2.0	N.D.
Benzo(k)fluoranthene.....	2.0	N.D.
Benzo(g,h,i)perylene.....	2.0	N.D.
Benzo(a)pyrene.....	2.0	N.D.
Benzyl alcohol.....	2.0	N.D.
Bis(2-chloroethoxy)methane.....	2.0	N.D.
Bis(2-chloroethyl)ether.....	2.0	N.D.
Bis(2-chloroisopropyl)ether.....	2.0	N.D.
Bis(2-ethylhexyl)phthalate.....	10	N.D.
4-Bromophenyl phenyl ether.....	2.0	N.D.
Butyl benzyl phthalate.....	2.0	N.D.
4-Chloroaniline.....	2.0	N.D.
2-Chloronaphthalene.....	2.0	N.D.
4-Chloro-3-methylphenol.....	2.0	N.D.
2-Chlorophenol.....	2.0	N.D.
4-Chlorophenyl phenyl ether.....	2.0	N.D.
Chrysene.....	2.0	N.D.
Dibenz(a,h)anthracene.....	2.0	N.D.
Dibenzofuran.....	2.0	N.D.
Di-N-butyl phthalate.....	10	N.D.
1,3-Dichlorobenzene.....	2.0	N.D.
1,4-Dichlorobenzene.....	2.0	N.D.
1,2-Dichlorobenzene.....	2.0	N.D.
3,3-Dichlorobenzidine.....	10	N.D.
2,4-Dichlorophenol.....	2.0	N.D.
Diethyl phthalate.....	2.0	N.D.
2,4-Dimethylphenol.....	2.0	N.D.
Dimethyl phthalate.....	2.0	N.D.
4,6-Dinitro-2-methylphenol.....	10	N.D.
2,4-Dinitrophenol.....	10	N.D.



# SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc. 2401 Stanwell Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Sample Descript: Water, MW5 Analysis Method: EPA 8270 Lab Number: 303-0384	Castro Valley	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Extracted: Mar 17, 1993 Analyzed: Mar 18, 1993 Reported: Mar 19, 1993
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## SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/L	Sample Results µg/L
2,4-Dinitrotoluene.....	2.0	N.D.
2,6-Dinitrotoluene.....	2.0	N.D.
Di-N-octyl phthalate.....	2.0	N.D.
Fluoranthene.....	2.0	N.D.
Fluorene.....	2.0	N.D.
Hexachlorobenzene.....	2.0	N.D.
Hexachlorobutadiene.....	2.0	N.D.
Hexachlorocyclopentadiene.....	2.0	N.D.
Hexachloroethane.....	2.0	N.D.
Indeno(1,2,3-cd)pyrene.....	2.0	N.D.
Isophorone.....	2.0	N.D.
2-Methylnaphthalene.....	2.0	N.D.
2-Methylphenol.....	2.0	N.D.
4-Methylphenol.....	2.0	N.D.
Naphthalene.....	2.0	N.D.
2-Nitroaniline.....	10	N.D.
3-Nitroaniline.....	10	N.D.
4-Nitroaniline.....	10	N.D.
Nitrobenzene.....	2.0	N.D.
2-Nitrophenol.....	2.0	N.D.
4-Nitrophenol.....	10	N.D.
N-Nitrosodiphenylamine.....	2.0	N.D.
N-Nitroso-di-N-propylamine.....	2.0	N.D.
Pentachlorophenol.....	10	N.D.
Phenanthrene.....	2.0	N.D.
Phenol.....	2.0	N.D.
Pyrene.....	2.0	N.D.
1,2,4-Trichlorobenzene.....	2.0	N.D.
2,4,5-Trichlorophenol.....	10	N.D.
2,4,6-Trichlorophenol.....	2.0	N.D.

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

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 Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Sample Descript: Water, MW5 Analysis Method: EPA 8270 & "TIC" Lab Number: 303-0384	Castro Valley	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Extracted: Mar 17, 1993 Analyzed: Mar 18, 1993 Reported: Mar 19, 1993
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## SEMI-VOLATILE ORGANICS by GC/MS, TENTATIVELY IDENTIFIED COMPOUNDS

No peaks > 10 µg/L were identified by the Mass Spectral Library.

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager

**Please Note:**

All identifications are tentative and concentrations are estimates based upon spectral comparison to the EPA NIST library. Positive identification or specification between isomers cannot be made without retention time standards.



# SEQUOIA ANALYTICAL

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Kapreallan Engineering, Inc.  
2401 Stanwell Dr., Ste. 400  
Concord, CA 94520  
Attention: Mardo Kapreallan, P.E.

Client Project ID: Unocal, 18950 Lake Chabot Road,  
Sample Descript: Water, MW7 Castro Valley  
Analysis Method: EPA 8270  
Lab Number: 303-0385

Sampled: Mar 10, 1993  
Received: Mar 10, 1993  
Extracted: Mar 17, 1993  
Analyzed: Mar 18, 1993  
Reported: Mar 19, 1993

## SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acenaphthene.....	2.0	N.D.
Acenaphthylene.....	2.0	N.D.
Aniline.....	2.0	N.D.
Anthracene.....	2.0	N.D.
Benzidine.....	50	N.D.
Benzoic Acid.....	10	N.D.
Benzo(a)anthracene.....	2.0	N.D.
Benzo(b)fluoranthene.....	2.0	N.D.
Benzo(k)fluoranthene.....	2.0	N.D.
Benzo(g,h,i)perylene.....	2.0	N.D.
Benzo(a)pyrene.....	2.0	N.D.
Benzyl alcohol.....	2.0	N.D.
Bis(2-chloroethoxy)methane.....	2.0	N.D.
Bis(2-chloroethyl)ether.....	2.0	N.D.
Bis(2-chloroisopropyl)ether.....	2.0	N.D.
<b>Bis(2-ethylhexyl)phthalate.....</b>	<b>10</b>	<b>16</b>
4-Bromophenyl phenyl ether.....	2.0	N.D.
Butyl benzyl phthalate.....	2.0	N.D.
4-Chloroaniline.....	2.0	N.D.
2-Chloronaphthalene.....	2.0	N.D.
4-Chloro-3-methylphenol.....	2.0	N.D.
2-Chlorophenol.....	2.0	N.D.
4-Chlorophenyl phenyl ether.....	2.0	N.D.
Chrysene.....	2.0	N.D.
Dibenz(a,h)anthracene.....	2.0	N.D.
Dibenzofuran.....	2.0	N.D.
Di-N-butyl phthalate.....	10	N.D.
1,3-Dichlorobenzene.....	2.0	N.D.
1,4-Dichlorobenzene.....	2.0	N.D.
1,2-Dichlorobenzene.....	2.0	N.D.
3,3-Dichlorobenzidine.....	10	N.D.
2,4-Dichlorophenol.....	2.0	N.D.
Diethyl phthalate.....	2.0	N.D.
2,4-Dimethylphenol.....	2.0	N.D.
Dimethyl phthalate.....	2.0	N.D.
4,6-Dinitro-2-methylphenol.....	10	N.D.
2,4-Dinitrophenol.....	10	N.D.



# SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc. 2401 Stanwell Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Sample Descript: Water, MW7 Analysis Method: EPA 8270 Lab Number: 303-0385	Castro Valley	Sampled: Mar 10, 1993 Received: Mar 10, 1993 Extracted: Mar 17, 1993 Analyzed: Mar 18, 1993 Reported: Mar 19, 1993
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## SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/L	Sample Results µg/L
2,4-Dinitrotoluene.....	2.0	N.D.
2,6-Dinitrotoluene.....	2.0	N.D.
Di-N-octyl phthalate.....	2.0	N.D.
Fluoranthene.....	2.0	N.D.
Fluorene.....	2.0	N.D.
Hexachlorobenzene.....	2.0	N.D.
Hexachlorobutadiene.....	2.0	N.D.
Hexachlorocyclopentadiene.....	2.0	N.D.
Hexachloroethane.....	2.0	N.D.
Indeno(1,2,3-cd)pyrene.....	2.0	N.D.
Isophorone.....	2.0	N.D.
<b>2-Methylnaphthalene.....</b>	<b>2.0</b>	<b>11</b>
2-Methylphenol.....	2.0	N.D.
4-Methylphenol.....	2.0	N.D.
<b>Naphthalene.....</b>	<b>2.0</b>	<b>54</b>
2-Nitroaniline.....	10	N.D.
3-Nitroaniline.....	10	N.D.
4-Nitroaniline.....	10	N.D.
Nitrobenzene.....	2.0	N.D.
2-Nitrophenol.....	2.0	N.D.
4-Nitrophenol.....	10	N.D.
N-Nitrosodiphenylamine.....	2.0	N.D.
N-Nitroso-di-N-propylamine.....	2.0	N.D.
Pentachlorophenol.....	10	N.D.
Phenanthrene.....	2.0	N.D.
Phenol.....	2.0	N.D.
Pyrene.....	2.0	N.D.
1,2,4-Trichlorobenzene.....	2.0	N.D.
2,4,5-Trichlorophenol.....	10	N.D.
2,4,6-Trichlorophenol.....	2.0	N.D.

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

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager



# SEQUOIA ANALYTICAL

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

Client Project ID: Unocal, 18950 Lake Chabot Road,  
Sample Descript: Water, MW7 Castro Valley  
Analysis Method: EPA 8270 & "TIC"  
Lab Number: 303-0385

Sampled: Mar 10, 1993  
Received: Mar 10, 1993  
Extracted: Mar 17, 1993  
Analyzed: Mar 18, 1993  
Reported: Mar 19, 1993

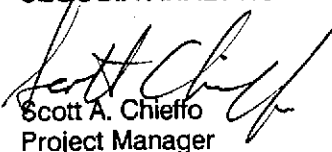
## SEMI-VOLATILE ORGANICS by GC/MS, TENTATIVELY IDENTIFIED COMPOUNDS

Analyte	Detection Limit µg/L	Sample Results µg/L
Benzene, ethyl	10	59
Benzene, 1,3 dimethyl	10	42
Benzene, 1,2 dimethyl	10	42
Cyclohexanone	10	12
Benzene, 1-ethyl-4-methyl	10	10
Benzene, 1,3,5-trimethyl	10	24
Benzene, 1-ethenyl-2-methyl	10	47
Benzene, diethyl	10	10
1H-Indene, 2,3-dihydro-4-methyl	10	18

No additional peaks > 5 µg/L were identified by the Mass Spectral Library.

Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager

**Please Note:**

All identifications are tentative and concentrations are estimates based upon spectral comparison to the EPA NIST library. Positive identification or specification between isomers cannot be made without retention time standards.



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Kaprealian Engineering, Inc.  
2401 Stanwell Dr., Ste. 400  
Concord, CA 94520

Client Project ID: Unocal, 18950 Lake Chabot Road, Castro Valley

Attention: Mardo Kaprealian, P.E. QC Sample Group: 3030382-385

Reported: Mar 19, 1993

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015
Analyst:	J.F.	J.F.	J.F.	J.F.	K.Wimer
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Mar 12, 1993	Mar 12, 1993	Mar 12, 1993	Mar 12, 1993	Mar 18, 1993
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60	300
Conc. Matrix Spike:	20	20	20	65	266
Matrix Spike % Recovery:	100	100	100	108	89
Conc. Matrix Spike Dup.:	19	20	20	67	282
Matrix Spike Duplicate % Recovery:	95	100	100	112	94
Relative % Difference:	5.1	0.0	0.0	3.0	5.8

Laboratory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



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Client Project ID: Unocal, 18950 Lake Chabot Road, Castro Valley

Attention: Mardo Kaprealian, P.E. QC Sample Group: 3030382-385

Reported: Mar 19, 1993

## QUALITY CONTROL DATA REPORT

ANALYTE	1,1-Dichloroethene	Trichloro-ethene	Chloro-benzene
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Method:	EPA 8010	EPA 8010	EPA 8010
Analyst:	K.Nill	K.Nill	K.Nill
Reporting Units:	µg/L	µg/L	µg/L
Date Analyzed:	Mar 15, 1993	Mar 15, 1993	Mar 15, 1993
QC Sample #:	303-0384	303-0384	303-0384

Sample Conc.: N.D. N.D. N.D.

Spike Conc. Added: 10 10 10

Conc. Matrix Spike: 11 10 10

Matrix Spike % Recovery: 110 100 100

Conc. Matrix Spike Dup.: 11 10 10

Matrix Spike Duplicate % Recovery: 110 100 100

Relative % Difference: 0.0 0.0 0.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.  
Laboratory Blank contained the following analytes: None detected.

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$





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Kaprealian Engineering, Inc. 2401 Stanwell Dr., Ste. 400 Concord, CA 94520 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, 18950 Lake Chabot Road, Castro Valley Method: EPA 8270 Analyst(s): Son Le QC Sample #: Matrix Blank	Q.C. Sample Dates Extracted: Mar 17, 1993 Analyzed: Mar 19, 1993
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## QUALITY CONTROL DATA REPORT

Analyte	Sample Conc.	Spike Conc. Added	Conc. Matrix Spike	Matrix Spike % Recovery	Conc. Matrix Spike Duplicate	Matrix Spike % Recovery	Relative % Difference
Phenol	N.D.	200	72	36	74	37	2.7
2-Chlorophenol	N.D.	200	100	50	100	50	0.0
1,4-Dichloro-benzene	N.D.	100	58	58	54	54	7.1
N-Nitroso-Di-N-propylamine	N.D.	100	62	62	52	52	18
1,2,4-Trichloro-benzene	N.D.	100	60	60	58	58	3.4
4-Chloro-3-Methylphenol	N.D.	200	134	67	122	61	9.4
Acenaphthene	N.D.	100	72	72	62	62	15
4-Nitrophenol	N.D.	200	90	45	76	38	17
2,4-Dinitro-toluene	N.D.	100	62	62	54	54	14
Pentachloro-phenol	N.D.	200	100	50	88	44	13
Pyrene	N.D.	100	70	70	74	74	5.6

Laboratory Blank contained the following analytes: None detected.

### SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



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Kaprealian Engineering, Inc.  
2401 Stanwell Dr., Ste. 400  
Concord, CA 94520

Client Project ID: Unocal, 18950 Lake Chabot Road, Castro Valley

Attention: Mardo Kaprealian, P.E. QC Sample Group: 3030382-385

Reported: Mar 19, 1993

## QUALITY CONTROL DATA REPORT

### SURROGATE

Method:	EPA 8015	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer	K. Wimer
Reporting Units:	µg/L	µg/L	µg/L
Date Analyzed:	Mar 18, 1993	Mar 18, 1993	Mar 18, 1993
Sample #:	303-0384	303-0385	Matrix Blank

<b>Surrogate</b>			
<b>% Recovery:</b>	92	89	98

SEQUOIA ANALYTICAL

*Scott A. Chieffo*  
Scott A. Chieffo  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



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Kaprealian Engineering, Inc.  
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Client Project ID: Unocal, 18950 Lake Chabot Road, Castro Valley

Attention: Mardo Kaprealian, P.E. QC Sample Group: 3030382-385

Reported: Mar 19, 1993

## QUALITY CONTROL DATA REPORT

### SURROGATE

	EPA 8010	EPA 8010	EPA 8010
Method:	EPA 8010	EPA 8010	EPA 8010
Analyst:	K. Nill	K. Nill	K. Nill
Reporting Units:	µg/L	µg/L	µg/L
Date Analyzed:	Mar 15, 1993	Mar 15, 1993	Mar 15, 1993
Sample #:	303-0384	303-0385	Matrix Blank

<b>Surrogate #1</b>			
<b>% Recovery:</b>	101	98	111

<b>Surrogate #2</b>			
<b>% Recovery:</b>	111	108	109

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$

**CHAIN OF CUSTODY**

SAMPLER <i>Vartkes</i>		SITE NAME & ADDRESS <i>Unocal / Castro Valley 18950 Lake Chabot Rd.</i>							ANALYSES REQUESTED					TURN AROUND TIME: <i>Regular</i>	
WITNESSING AGENCY									TPHG:BTXE	TPHD	8010	MTBE	OPEN 8270 SCAN		
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION							
MW 2	3/10/93	10:45 am.		X	X		4	Monitoring well	X			X			
MW 4	"			X	X		2	" "	X						
MW 5	"			X	X		6	" "	X	X	X		X		
MW 7	"	12:40 pm.		X	X		6	" "	X	X	X		X		

**REMARKS**

3030382AD  
383AB  
384AF  
385AF

↓

Relinquished by: (Signature) <i>W. Vartkes</i>	Date/Time <i>3/10/93 2:00</i>	Received by: (Signature) <i>J.M.</i>
Relinquished by: (Signature) <i>Sheryl Ann Banks</i>	Date/Time <i>3/11/93 1:00</i>	Received by: (Signature) <i>Sheryl Ann Banks</i>
Relinquished by: (Signature) <i>Sheryl Ann Banks</i>	Date/Time <i>3/11/93 2:45</i>	Received by: (Signature) <i>[Signature]</i>
Relinquished by: (Signature)	Date/Time	Received by: (Signature)

The following MUST BE completed by the laboratory accepting samples for analysis:

- Have all samples received for analysis been stored in ice? Y
- Will samples remain refrigerated until analyzed? Y
- Did any samples received for analysis have head space? N
- Were samples in appropriate containers and properly packaged? Y

J.C.                      Analyst                      3-10-93  
 Signature                      Title                      Date