KAPREALIAN ENGINEERING INCORPORATED

KEI-P89-0111.QR16
August 26, 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 #5487
28250 Hesperian Boulevard
Hayward, 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). The wells are currently monitored on a quarterly basis. Wells MW1 through MW4 are sampled on an annual basis, and wells MW5 and MW6 are sampled on a quarterly basis. This report covers the work performed by KEI from June through August of 1993.

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 January of 1989 during tank replacement activities. Both the fuel and waste oil tank pits were overexcavated 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 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-P89-0111.R6) dated August 26, 1992.

RECENT FIELD ACTIVITIES

The six monitoring wells (MW1 through MW6) were monitored and sampled once during the 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.

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

Water samples were collected from all of the wells on August 5, 1993. Prior to sampling, wells were each purged of between 8 and 15 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 August 5, 1993, ranged between 6.97 and 7.97 feet below grade. The water levels in all of the wells have shown net decreases ranging from 0.21 to 0.98 feet since May 3, 1993, except for well MW6, which showed a net increase of 0.29 feet. Based on the water level data gathered on August 5, 1993, the ground water flow direction appeared to be to the southwest, as shown on the attached Potentiometric Surface Map, Figure 1. The ground water flow direction has been to the southwest since July of 1991 (nine consecutive quarters). The average hydraulic gradient at the site on August 5, 1993, was approximately 0.006.

ANALYTICAL RESULTS

The ground water samples collected from the wells 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 Table 2. The concentrations of TPH as gasoline and benzene detected in the ground water samples collected this quarter are shown on the attached Figures 2 and 3, respectively. 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 ground water monitoring and sampling program. The results of the monitoring and sampling program will be documented and evaluated after each monitoring and sampling event. Recommendations for altering or terminating the program will be made as warranted.

DISTRIBUTION

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

Talin Kaloustian
Staff Engineer

Joel G. Greger, C.E.G.
Senior Engineering Geologist

License No. EG 1633
Exp. Date 6/30/94

Timothy R. Ross
Project Manager

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Attachments: Tables 1 & 2
Location Map
Potentiometric Surface Map - Figure 1
Concentrations of TPH as Gasoline - Figure 2
Concentrations of Benzene - Figure 3
Laboratory Analyses
Chain of Custody documentation

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TABLE 1

SUMMARY OF MONITORING DATA

Well #	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen	Water Purged (gallons)
(Monitored and Sampled on August 5, 1993)					
MW1	5.08	7.49	0	No	15
MW2	4.92	7.97	0	No	11
MW3	4.96	7.50	0	No	12
MW4	4.81	7.28	0	No	13
MW5	4.21	6.97	0	No	12
MW6	4.42	7.05	0	No	8

Well #	Surface Elevation* (feet)
MW1	12.57
MW2	12.89
MW3	12.46
MW4	12.09
MW5	11.18
MW6	11.47

* The elevations of the tops of the well covers have been surveyed relative to Mean Sea Level, per a City of Hayward benchmark (elevation = 10.97).

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TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes
8/05/93	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	530	210	0.62	54	44
	MW6	--	230	25	1.6	12	29
5/03/93	MW5	--	260	35	ND	2.3	3.1
	MW6	--	520	47	2.6	33	48
2/02/93	MW5	--	77♦	5.0	ND	1.2	1.3
	MW6	--	400♦	66	5.5	32	13
11/05/92	MW5	--	120	16	ND	3.5	3.0
	MW6	--	300	16	2.3	14	14
8/04/92	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	80	13	ND	4.5	6.9
	MW6	--	540	12	7.9	35	110
5/05/92	MW5	--	170	45	0.48	9.0	6.8
2/05/92	MW5	--	120	20	ND	4.4	4.7
11/07/91	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	700	43	1.7	29	24
8/02/91	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	100	43	0.33	12	5.2

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TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes
5/10/91	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	ND	ND	ND	ND	ND
	MWD+	--	ND	ND	ND	ND	ND
2/11/91	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	58	23	ND	2.9	1.3
11/15/90	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	ND	ND	ND	ND	0.47
8/29/90	MW1*	ND	ND	ND	ND	ND	0.74
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	0.52	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	ND	0.70	ND	0.57	1.1
5/16/90	MW1*	ND	ND	ND	ND	ND	ND
	MW2*	ND	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	1,100	310	2.8	70	110
2/16/90	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	ND	ND	ND	ND	ND

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TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes
11/14/89	MW1*	ND	ND	ND	ND	ND	ND
	MW2*	ND	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	73	4.7	0.97	2.9	16
8/31/89	MW5	--	910	120	7.1	50	53
8/16/89	MW1**	ND	ND	ND	ND	ND	ND
	MW2**	ND	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	4,400	1,400	84	200	950
4/26/89	MW1***	ND	ND	2.1	ND	ND	ND
	MW2***	ND	ND	ND	ND	ND	ND
	MW3***	ND	ND	ND	ND	ND	ND
	MW4***	ND	ND	0.33	ND	ND	ND
	MW5***	ND	ND	ND	ND	ND	ND

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

\+ MWD was a quality assurance duplicate water sample collected from well MW5.

* TOG and all EPA method 8010 constituents were non-detectable.

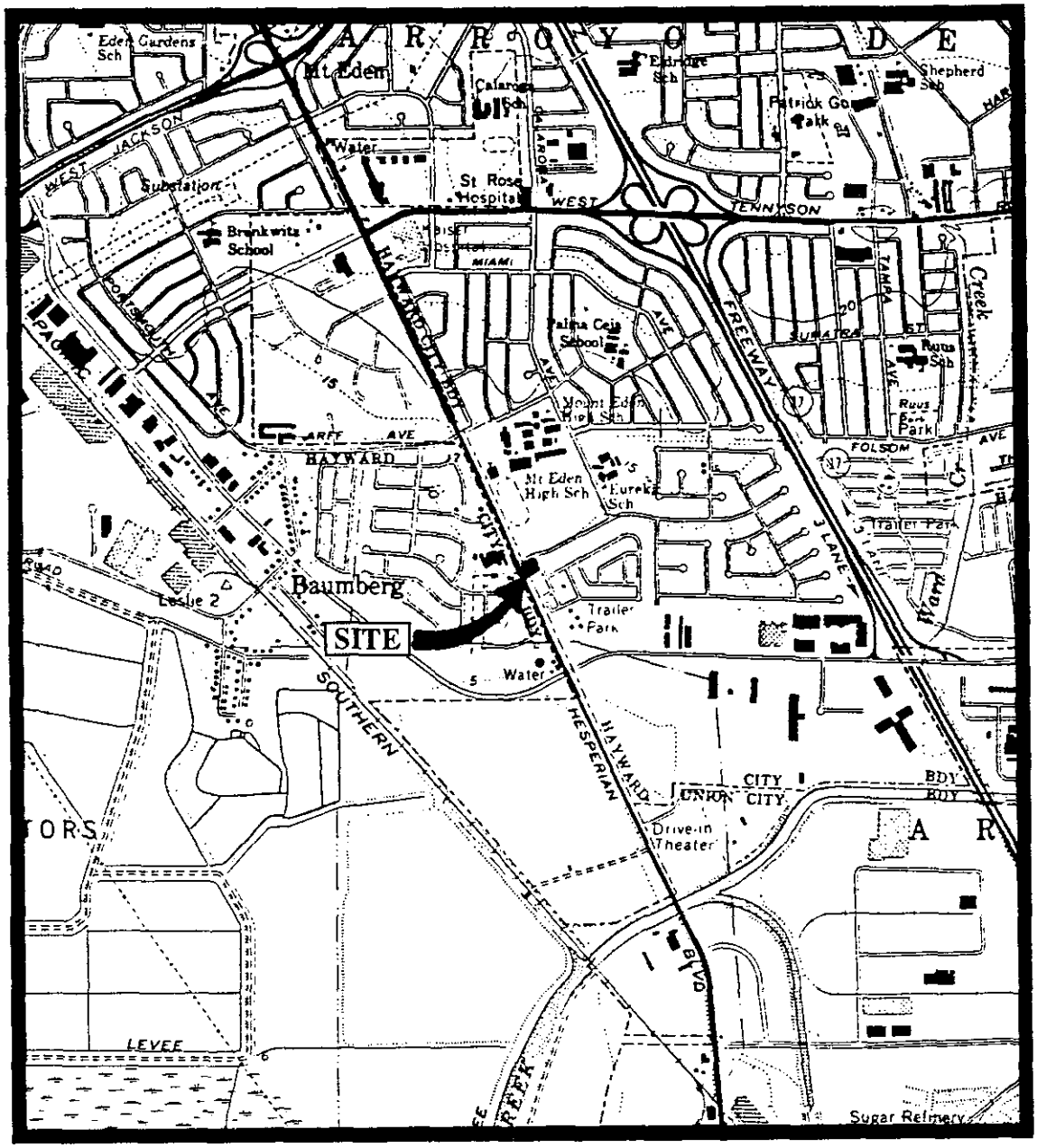
** TOG for the samples collected from MW1 and MW2 were 23 ppm and 7.4 ppm, respectively. All EPA method 8010 constituents were non-detectable for both samples.

*** TOG and all EPA method 8010 constituents were non-detectable.

-- Indicates analysis was not performed.

ND = Non-detectable.

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

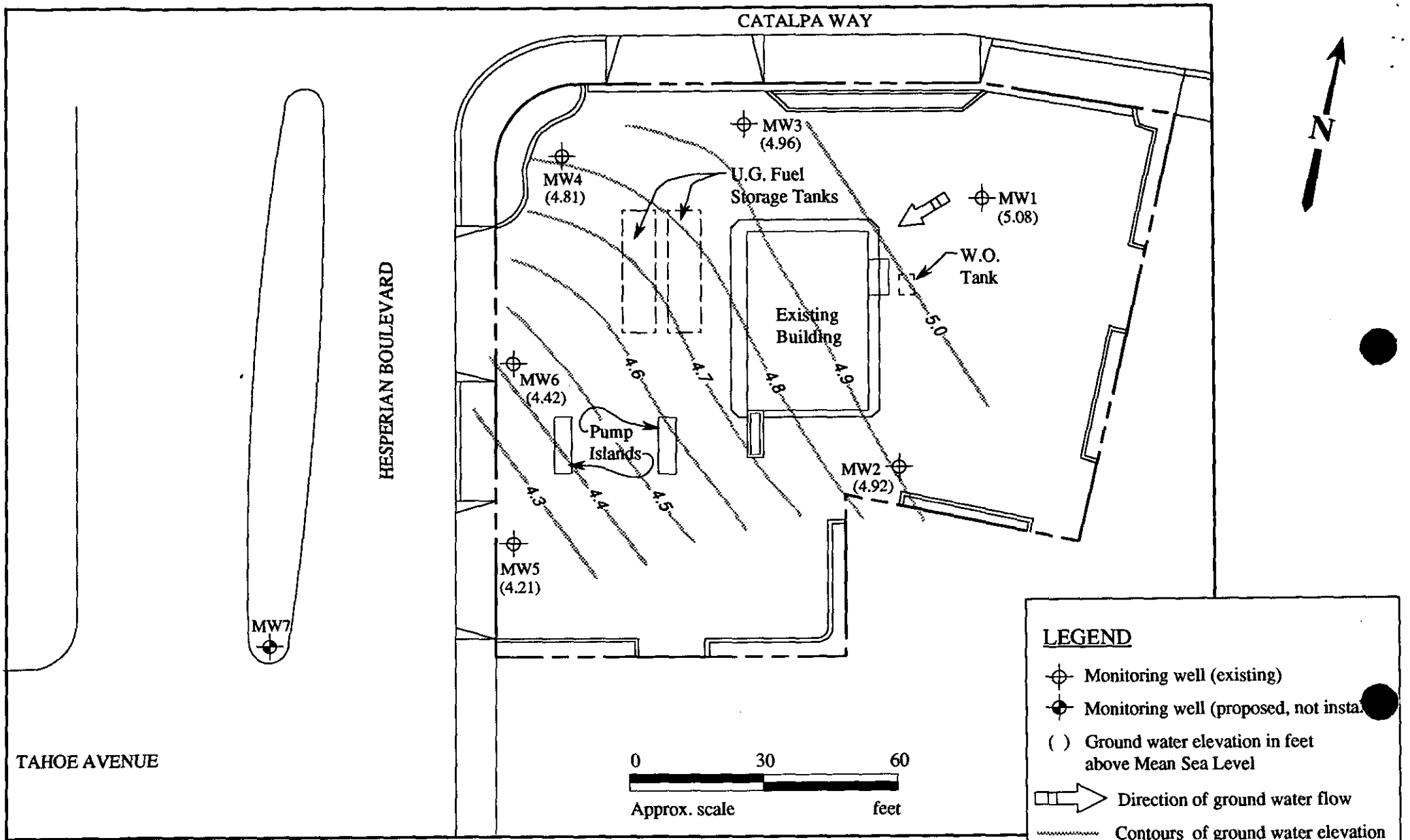


Base modified from 7.5 minute U.S.G.S. Hayward and Newark Quadrangles
(both photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #5487 28250 HESPERIAN BOULEVARD HAYWARD, CA	LOCATION MAP

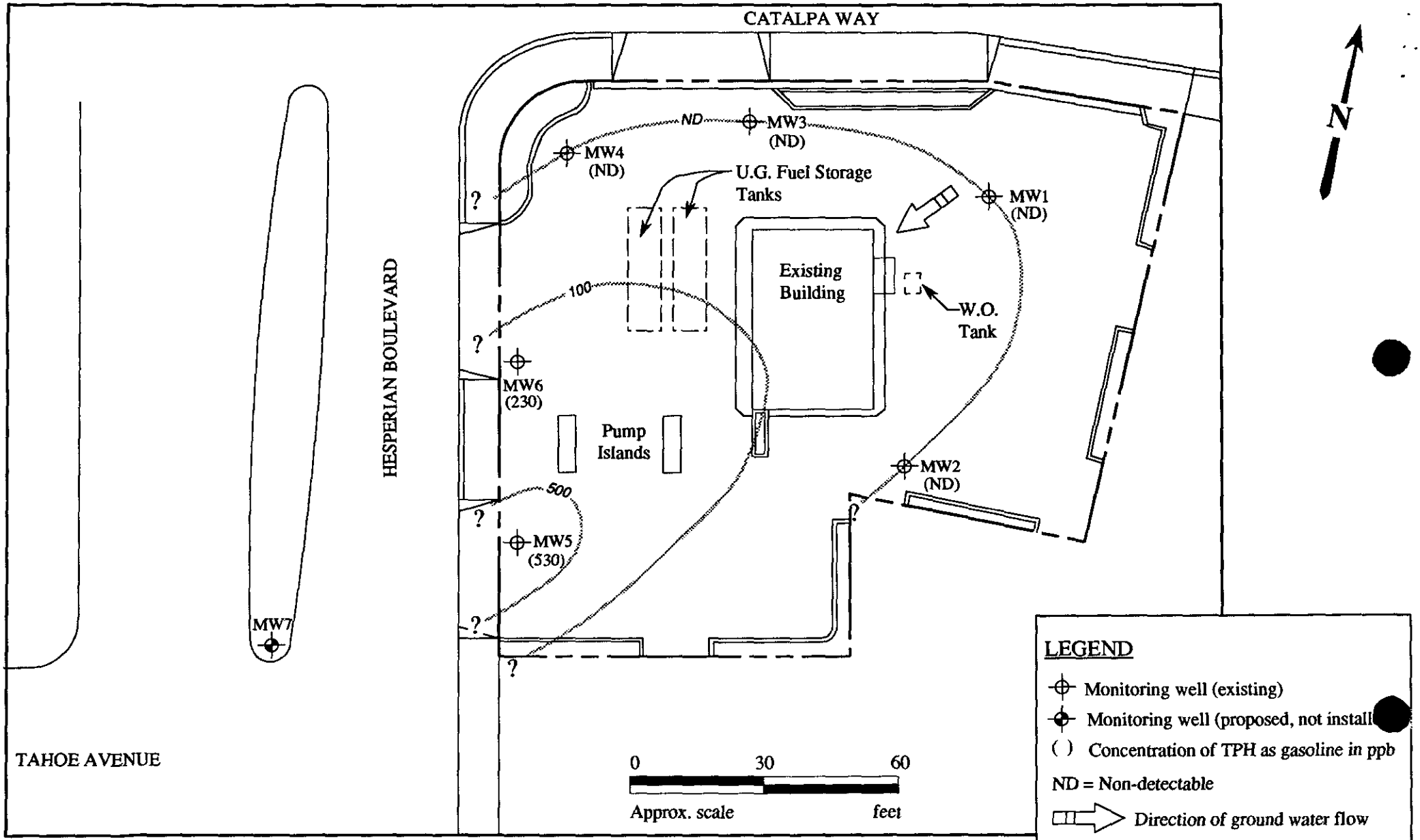


POTENTIOMETRIC SURFACE MAP FOR THE AUGUST 5, 1993 MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5487
28250 HESPERIAN BOULEVARD
HAYWARD, CALIFORNIA

FIGURE
1

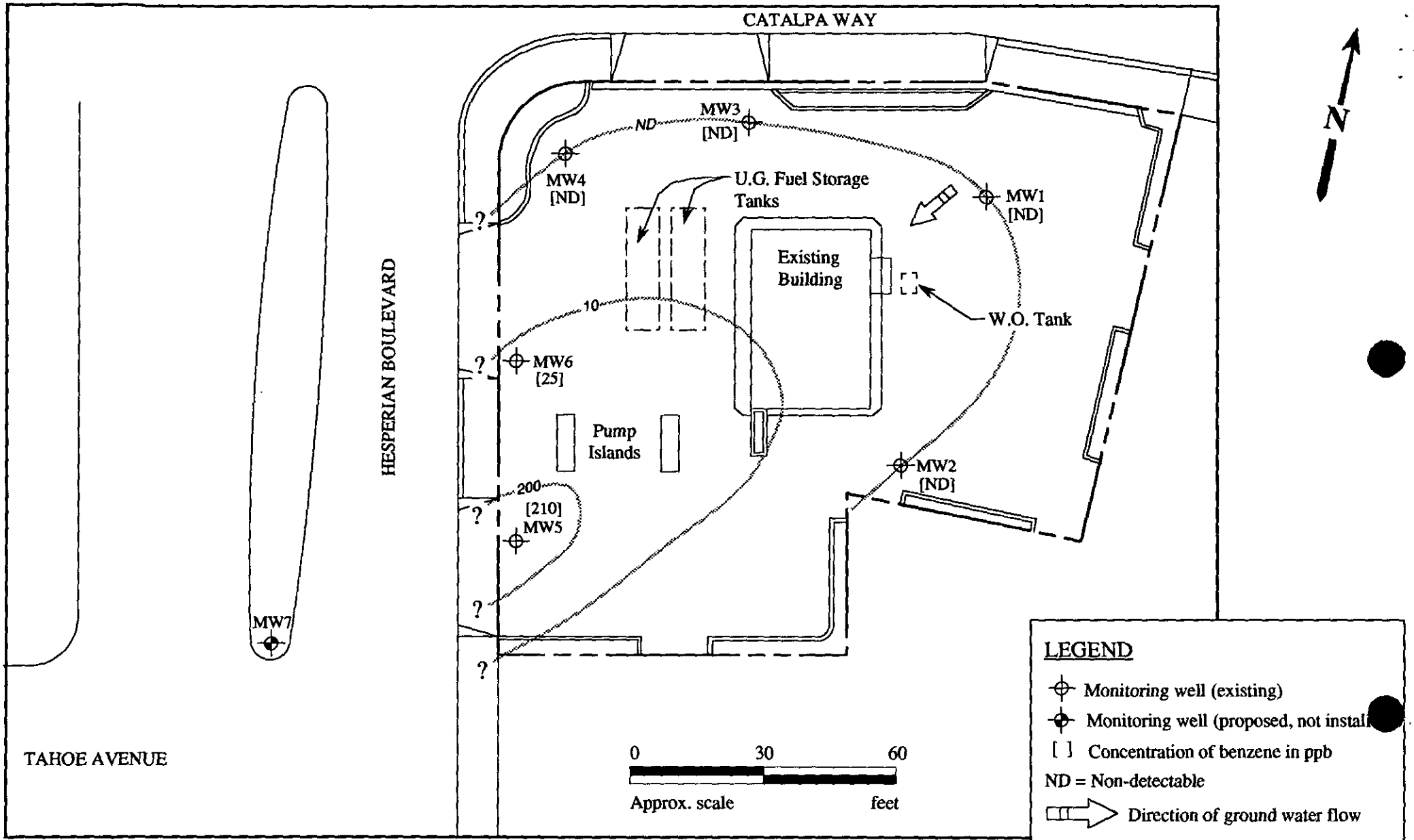


TPH AS GASOLINE CONCENTRATIONS IN GROUND WATER ON AUGUST 5, 1993

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5487
28250 HESPERIAN BOULEVARD
HAYWARD, CALIFORNIA

FIGURE
2



BENZENE CONCENTRATIONS IN GROUND WATER ON AUGUST 5, 1993

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5487
28250 HESPERIAN BOULEVARD
HAYWARD, CALIFORNIA

FIGURE
3

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #5487, 28250 Hesperian Blvd., Hayward	Sampled:	Aug 5, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Aug 5, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Aug 17, 1993
Attention: Avo Avedessian	First Sample #:	308-0235		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 308-0235 MW 1	Sample I.D. 308-0236 MW 2	Sample I.D. 308-0237 MW 3	Sample I.D. 308-0238 MW 4	Sample I.D. 308-0239 MW 5	Sample I.D. 308-0240 MW 6
Purgeable Hydrocarbons	50	N.D.	N.D.	N.D.	N.D.	530	230
Benzene	0.5	N.D.	N.D.	N.D.	N.D.	210	25
Toluene	0.5	N.D.	N.D.	N.D.	N.D.	0.62	1.6
Ethyl Benzene	0.5	N.D.	N.D.	N.D.	N.D.	54	12
Total Xylenes	0.5	N.D.	N.D.	N.D.	N.D.	44	29
Chromatogram Pattern:		--	--	--	--	Gasoline	Gasoline

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	8/13/93	8/13/93	8/13/93	8/13/93	8/13/93	8/13/93
Instrument Identification:	HP-2	HP-2	HP-2	HP-2	HP-2	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	103	104	101	102	119	111

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

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #5487, 28250 Hesperian Blvd., Hayward	Sampled:	Aug 5, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Aug 5, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Aug 17, 1993
Attention: Avo Avedessian	First Sample #:	Blank		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	
Benzene	0.5	
Toluene	0.5	
Ethyl Benzene	0.5	
Total Xylenes	0.5	

Chromatogram Pattern:

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Analyzed:	8/13/93
Instrument Identification:	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	106

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

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #5487, 28250 Hesperian Blvd., Hayward
2401 Stanwell Dr., Ste. 400	Matrix:	Water
Concord, CA 94520		
Attention: Avo Avedessian	QC Sample Group: 3080235-240	Reported: Aug 17, 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#:	1LCS081393	1LCS081393	1LCS081393	1LCS081393
Date Prepared:	8/13/93	8/13/93	8/13/93	8/13/93
Date Analyzed:	8/13/93	8/13/93	8/13/93	8/13/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
LCS % Recovery:	100	95	95	100
Control Limits:	70-130	70-130	70-130	70-130
MS/MSD Batch #:	3080243	3080243	3080243	3080243
Date Prepared:	8/13/93	8/13/93	8/13/93	8/13/93
Date Analyzed:	8/13/93	8/13/93	8/13/93	8/13/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Matrix Spike % Recovery:	105	105	100	105
Matrix Spike Duplicate % Recovery:	105	105	105	105
Relative % Difference:	0.0	0.0	4.8	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, INC.

CHAIN OF CUSTODY

SAMPLER: Varthes

WITNESSING AGENCY:

S/S # 5487 SITE NAME & ADDRESS: Unocal / Hayward
28250 Hesperian 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 1	8/5/93	10:25 am.		X	X		2	Monitoring well	X	3080235 AB
MW 2	"			X	X		2	" "	X	236 AB
MW 3	"			X	X		2	" "	X	237 AB
MW 4	"			X	X		2	" "	X	238 AB
MW 5	"			X	X		2	" "	X	239 AB
MW 6	"	1:10 pm.		X	X		2	" "	X	240 AB

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
W. Radelyan	8/5/93 2:10	
	8-16-93 1245	
	8-6-93 1404	Melissa Cruise

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: [signature] Title: Assistant Date: 8/5/93