KAPREALIAN ENGINEERING
INCORPORATED

KEI-P89-0111.QR17
December 16, 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 September through November 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 once and wells MW5 and MW6 were sampled once during the quarter. Monitoring wells MW1 through MW4 are currently sampled on an annual basis and thus were not sampled this quarter. During monitoring, the wells were checked for depth to water and the presence of free product. Prior to sampling, wells MW5 and MW6 were also checked for the presence of a sheen. No free product or sheen was noted in any of

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the wells during the quarter. The monitoring data collected this quarter are summarized in Table 1.

Ground water samples were collected from wells MW5 and MW6 on November 5, 1993. Prior to sampling, wells MW5 and MW6 were purged of 12 and 7.5 gallons of water, respectively, 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 November 5, 1993, ranged between 6.81 and 7.97 feet. The water levels in all of the wells have shown net decreases ranging from 0.23 to 0.33 feet since August 5, 1993. Based on the water level data gathered on November 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 (ten consecutive quarters). The average hydraulic gradient at the site on November 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 of 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. All of the wells are currently monitored quarterly, wells MW1 through MW4 are

sampled annually, and wells MW5 and MW6 are sampled quarterly. The results of the monitoring and sampling program will be documented and evaluated after each monitoring and sampling event. Recommendations for altering or terminating this 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.

Sarkis A. Soghomonian
Staff Engineer

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

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

Thomas J. Berkins
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 November 5, 1993)				
MW1*	4.75	6.98	0	--	0
MW2*	4.61	7.97	0	--	0
MW3*	4.64	7.35	0	--	0
MW4*	4.51	7.07	0	--	0
MW5	3.98	6.81	0	No	12
MW6	4.16	7.02	0	No	7.5

Well	Top of Casing Elevation in feet above Mean Sea Level (MSL)**
MW1	11.73
MW2	12.58
MW3	11.99
MW4	11.58
MW5	10.79
MW6	11.18

♦ The depth to water level measurement was taken from the top of the well casing. Prior to November 5, 1993, the water level measurement was taken from the top of the well cover.

-- Sheen determination was not performed.

* Monitored only.

** Based on City of Hayward Benchmark (elevation = 10.97 MSL)

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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
11/05/93	MW5	--	110	12	ND	2.3	2.3
	MW6	--	100	1.8	ND	0.79	2.2
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.

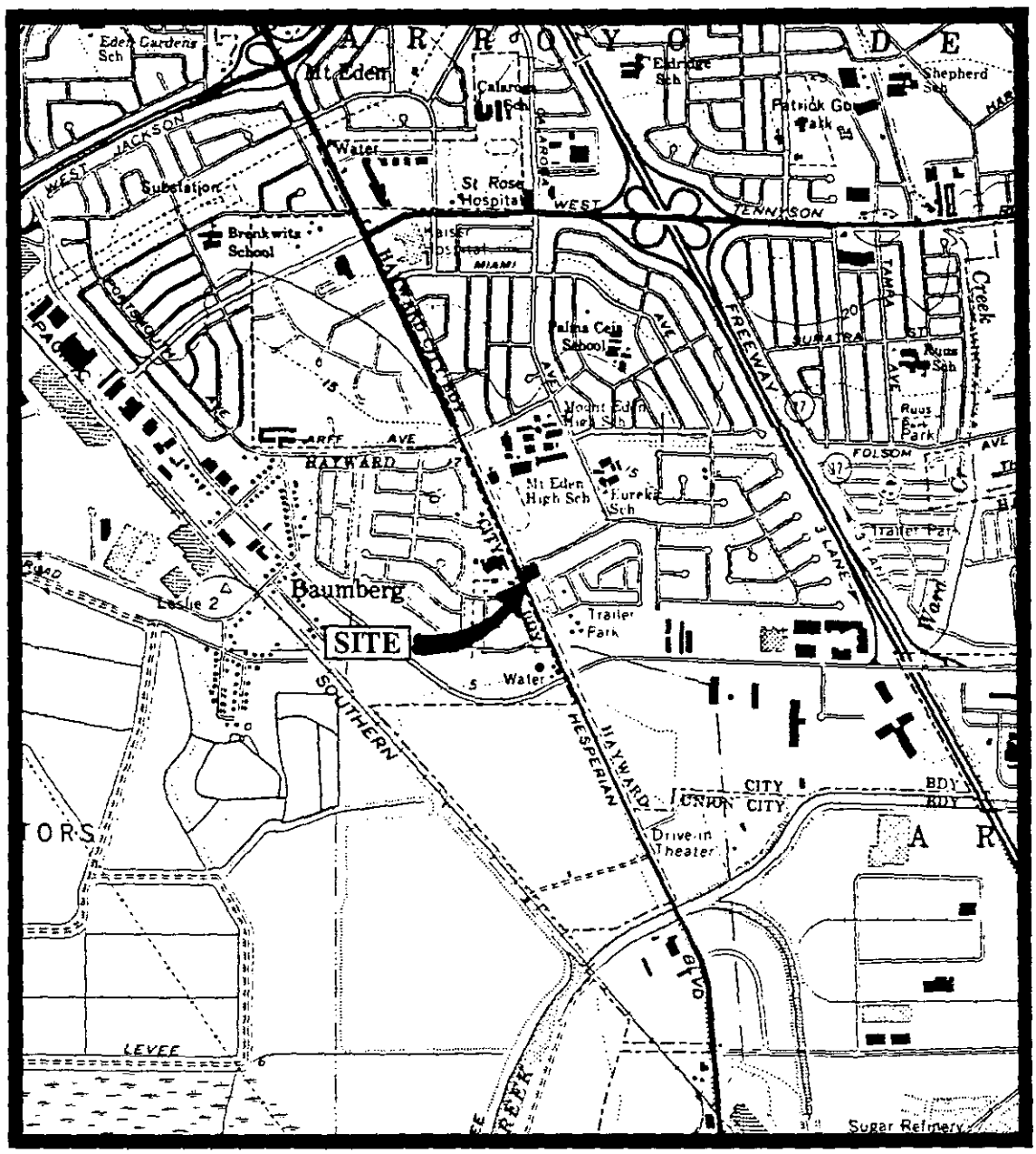
* TOG and all EPA method 8010 constituents were non-detectable.

** 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.

-- Indicates analysis was not performed.

ND = Non-detectable.

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

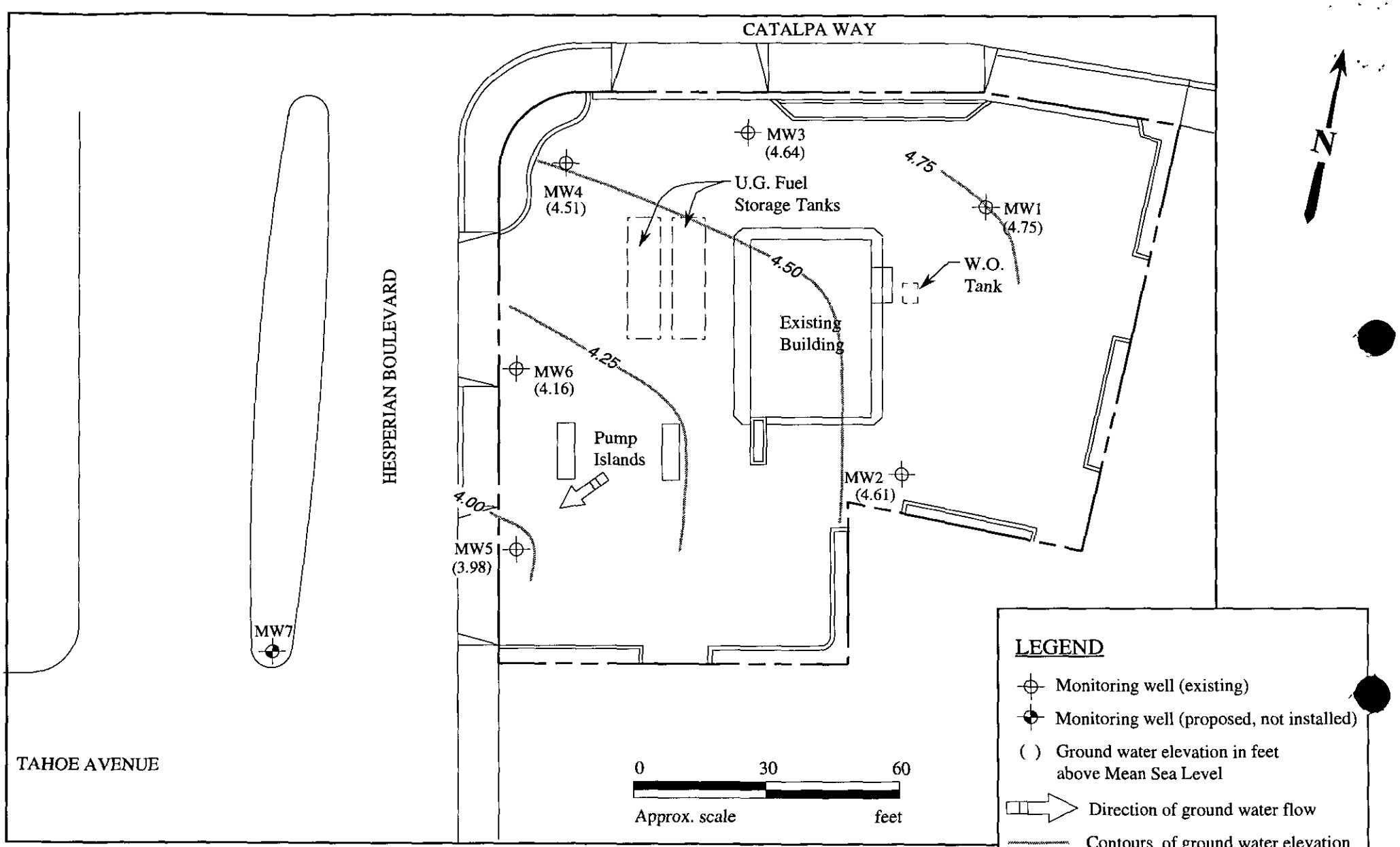


Base modified from 7.5 minute U.S.G.S. Hayward and Newark Quadrangles (both photorevised 1980)

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 NOVEMBER 5, 1993 MONITORING EVENT

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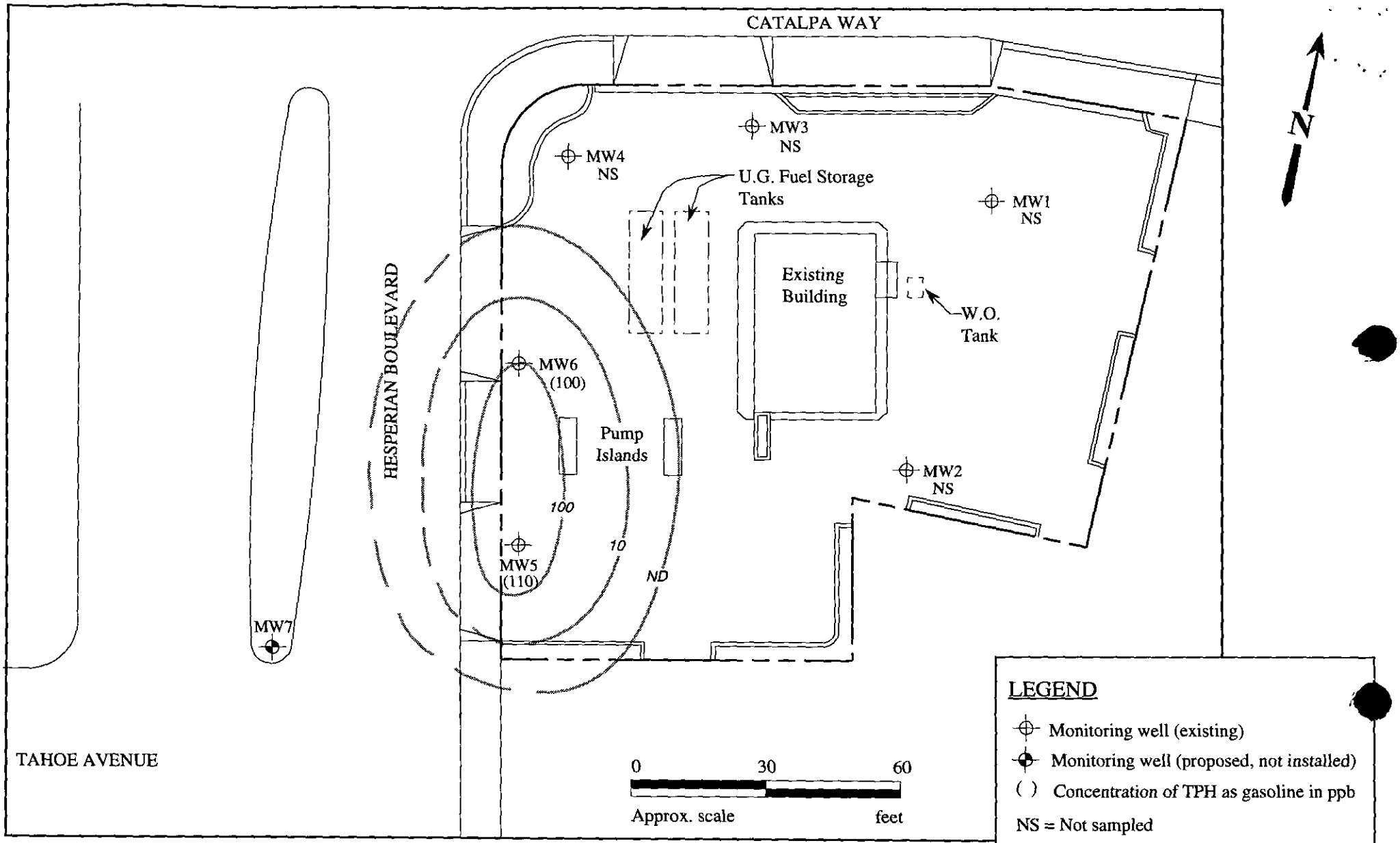
INCORPORATED

UNOCAL SERVICE STATION #5487
28250 HESPERIAN BOULEVARD
HAYWARD, CALIFORNIA

FIGURE
1

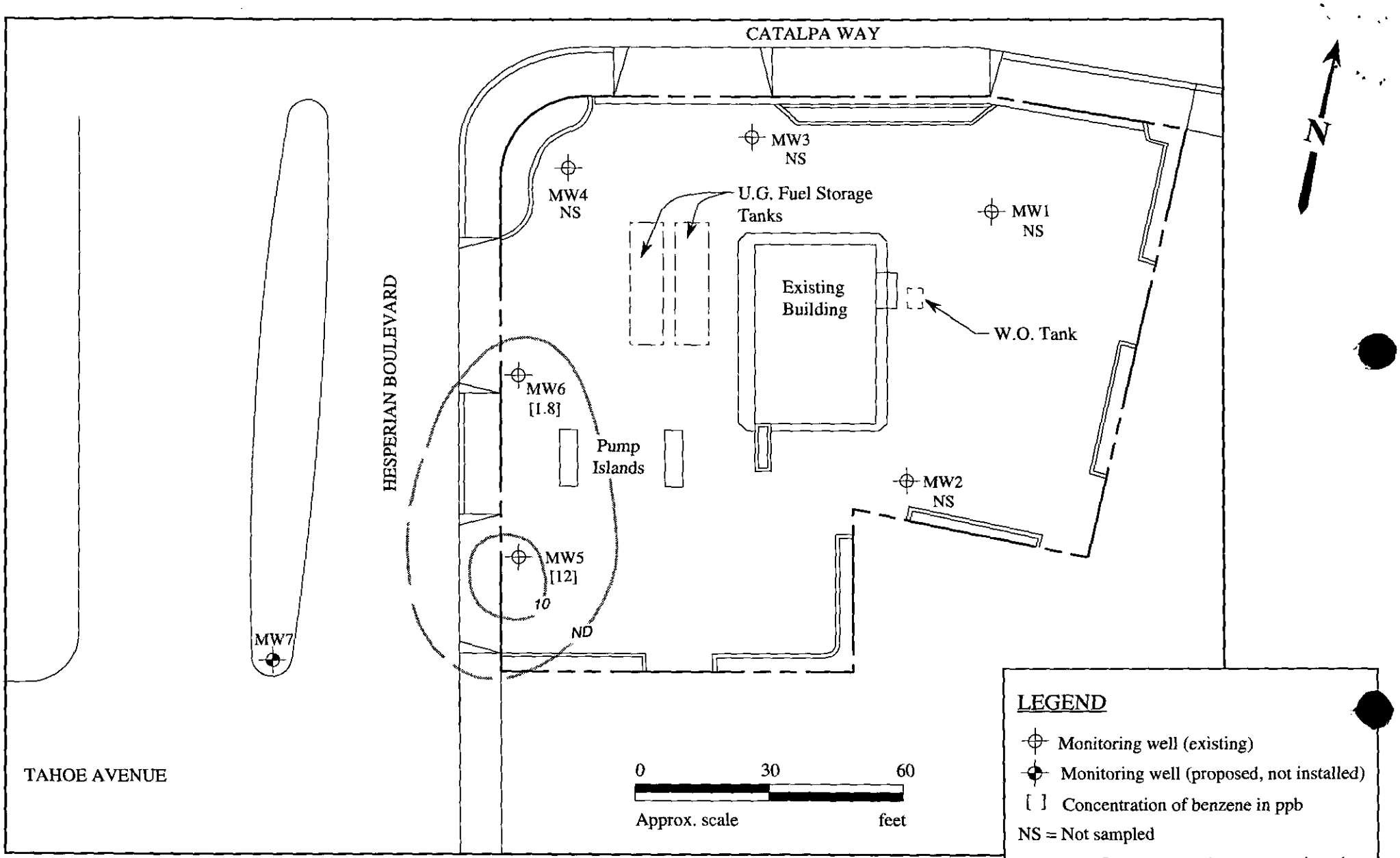


TPH AS GASOLINE CONCENTRATIONS IN GROUND WATER ON NOVEMBER 5, 1993

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5487
28250 HESPERIAN BOULEVARD
HAYWARD, CALIFORNIA

FIGURE
2



BENZENE CONCENTRATIONS IN GROUND WATER ON NOVEMBER 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:	Nov 5, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Nov 8, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 23, 1993
Attention: Avo Avedessian	First Sample #:	311-1117		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 311-1117 MW-5	Sample I.D. 311-1118 MW-6	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	110	100	
Benzene	0.5	12	1.8	
Toluene	0.5	N.D.	N.D.	
Ethyl Benzene	0.5	2.3	0.79	
Total Xylenes	0.5	2.3	2.2	
Chromatogram Pattern:		Gasoline	Gasoline	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0
Date Analyzed:	11/16/93	11/17/93	11/17/93
Instrument Identification:	HP-2	HP-2	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	102	105	104

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.
2401 Stanwell Dr., Ste. 400
Concord, CA 94520
Attention: Avo Avedessian

Client Project ID: Unocal #5487, 28250 Hesperian Blvd.,
Matrix: Water
QC Sample Group: 3111117-18

Reported: Nov 23, 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.
MS/MSD Batch#:	3111227	3111227	3111227	3111227
Date Prepared:	11/17/93	11/17/93	11/17/93	11/17/93
Date Analyzed:	11/17/93	11/17/93	11/17/93	11/17/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L
Matrix Spike % Recovery:	105	100	105	105
Matrix Spike *Duplicate* % Recovery:	105	100	100	103
Relative % Difference:	0.0	0.0	4.9	1.9
LCS Batch#:	1LCS111793	1LCS111793	1LCS111793	1LCS111793
Date Prepared:	11/17/93	11/17/93	11/17/93	11/17/93
Date Analyzed:	11/17/93	11/17/93	11/17/93	11/17/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
LCS % Recovery:	106	101	101	102
% Recovery Control Limits:	71-133	72-128	72-130	71-120

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 matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

UNOCAL 76

☐ 680 Chesapeake Drive • Redwood City, CA 94063 • (415) 364-9600
☐ 819 Striker Ave., Suite 8 • Sacramento, CA 95834 • (916) 921-9600
☒ 1900 Bates Ave., Suite LM • Concord, CA 94520 • (510) 686-9600
☐ 18939 120th Ave., N.E., Suite 101 • Bothell, WA 98011 • (206) 481-9200
☐ East 11115 Montgomery, Suite B • Spokane, WA 99206 • (509) 924-9200
☐ 15055 S.W. Sequoia Pkwy, Suite 110 • Portland, OR 97222 • (503) 624-9600

Company Name: KAPREALIAN ENGINEERING, INC.	Project Name: HAYWARD, 28250 HESPERIAN BLVD.
Address: 2401 STANWELL DRIVE, SUITE 400	UNOCAL Project Manager:
City: CONCORD State: CA Zip Code: 94583	
Telephone: (510) 602-5100 FAX #: (510) 687-0602	Site #: UNOCAL SERVICE STATION # 5487
Report To: AVO AVEDISSIAN Sampler: STEVE	QC Data: ☒ Level A (Standard) ☐ Level B ☐ Level C ☐ Level D

Turnaround Time: ☒ 10 Working Days ☐ 2 Working Days ☐ 5 Working Days ☐ 24 Hours ☐ 3 Working Days ☐ 2 - 8 Hours

☐ Drinking Water ☒ Waste Water ☐ Other

Analyses Requested

Client Sample I.D.	Date/Time Sampled	Matrix Desc.	# of Cont.	Cont. Type	Laboratory Sample #	TPH-Gas BTXE									Comments
1. MW-5	11/5/93		2	VOA		X								3	1117 AB
2. MW-6	"		2	"		X									1118 ↓
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															

Relinquished By: STEVE	Date: 11/8/93	Time: 0900	Received By: [signature]	Date: 11/8/93	Time: 0900
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By Lab:	Date:	Time:

Were Samples Received in Good Condition? ☒ Yes ☐ No Samples on Ice? ☒ Yes ☐ No Method of Shipment SAL Page __ of __

To be completed upon receipt of report:
1) Were the analyses requested on the Chain of Custody reported? ☐ Yes ☐ No If no, what analyses are still needed? _____
2) Was the report issued within the requested turnaround time? ☐ Yes ☐ No If no, what was the turnaround time? _____

Approved by: _____ Signature: _____ Company: _____ Date: _____

Pink - Client
Yellow - Sequoia
White - Sequoia