KAPREALIAN ENGINEERING
INCORPORATED

93 OCT -5 PM 12:47

October 4, 1993

RO 759
cc

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

Attention: Mr. Barney Chan

RE: Unocal Service Station #2656
4251 E. 14th Street
Oakland, California

Gentlemen:

Per the request of Mr. David J. Camille of Unocal Corporation, enclosed please find our report dated September 27, 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.

Brenda M. Pepito

Brenda M. Pepito

bmp/82

Enclosure

H 1140

cc: David J. Camille, Unocal Corporation

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel 510.602.5100 Fax: 510 687 0602

KAPREALIAN ENGINEERING
INCORPORATED

KEI-P90-0102.QR8
September 27, 1993

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

Attention: Mr. David J. Camille

RE: Quarterly Report
Unocal Service Station #2656
4251 E. 14th Street
Oakland, California

Dear Mr. Camille:

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. Monitoring wells MW1 through MW4 are sampled semi-annually, and wells MW5 and MW6 are sampled quarterly. This report covers the work performed by KEI during September of 1993.

BACKGROUND

The subject site contains a Unocal service station facility. One waste oil tank was removed from the site in January of 1990. The waste oil tank pit was subsequently overexcavated in order to remove contaminated soil. Two underground gasoline storage tanks and the associated product piping were removed from the site in April of 1992 during tank replacement activities. The fuel tank pit and the product pipe trenches were subsequently overexcavated in order to remove contaminated soil. Six monitoring wells and three vapor extraction wells have been installed at the site. In addition, a pilot vapor extraction test was conducted at the site in April of 1993.

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-P90-0102.R9) dated May 24, 1993.

RECENT FIELD ACTIVITIES

The six monitoring wells (MW1 through MW6) were monitored once during the quarter, and wells MW5 and MW6 were sampled once during

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the quarter. Monitoring wells MW1 through MW4 are sampled on a semi-annual basis, and thus were not sampled this quarter. Prior to sampling, wells MW5 and MW6 were checked for depth to water and the presence of free product or 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 MW5 and MW6 on September 3, 1993. Prior to sampling, the wells were each purged of 12 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, 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 September 3, 1993, ranged between 30.21 and 31.97 feet below well casings. The water levels in all of the wells have shown increases ranging from 0.05 to 0.13 feet since June 3, 1993. Based on the water level data gathered on September 3, 1993, the ground water flow direction appeared to be complex, varying from the north-northeast to the south-southwest, as shown on the attached Potentiometric Surface Map, Figure 1. The ground water flow direction has varied from the northeast to the southwest since December of 1990 (ten consecutive quarters). The average hydraulic gradient at the site on September 3, 1993, was 0.003.

ANALYTICAL RESULTS

The ground water samples collected this quarter from all of the monitoring wells 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 method 5030/modified 8015, 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 were non-detectable (as 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 ground water monitoring and sampling program. All of the monitoring wells will continue to be monitored quarterly and sampled semi-annually, except for wells MW5 and MW6, which will be sampled quarterly.

DISTRIBUTION

A copy of this report should be sent to Mr. Barney Chan of 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.

Talin Kaloustian
Staff Engineer

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

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

Aram Kaloustian
Project Engineer

\bp

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

KEI-P90-0102.QR8
September 27, 1993

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 September 3, 1993)					
MW1*	-7.47	30.55	0	--	0
MW2*	-7.67	30.21	0	--	0
MW3*	-7.68	31.53	0	--	0
MW4*	-7.65	30.62	0	--	0
MW5	-7.66	31.97	0	No	12
MW6	-7.63	31.20	0	No	12

Well #	Well Casing Elevation** (feet)
MW1	23.08
MW2	22.54
MW3	23.85
MW4	22.97
MW5	24.31
MW6	23.57

* Monitored only.

** Per a City of Oakland Benchmark #20-F (elevation = 23.90 Mean Sea Level).

NOTE: Depth to water measurements as of September 3, 1993, were from the tops of the well casings. Prior to this date, depth to water measurements were taken from the tops of the well covers.

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September 27, 1993

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes	TOG (ppm)
9/03/93	MW1	SAMPLED SEMI-ANNUALLY						
	MW2	SAMPLED SEMI-ANNUALLY						
	MW3	SAMPLED SEMI-ANNUALLY						
	MW4	SAMPLED SEMI-ANNUALLY						
	MW5	--	ND	ND	ND	ND	ND	--
	MW6	--	ND	ND	ND	ND	ND	--
6/03/93	MW1	ND	ND	ND	ND	ND	ND	ND
	MW2	ND	ND	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND	ND
	MW5	ND	ND	ND	ND	ND	ND	ND
	MW6	ND	ND	ND	ND	ND	ND	ND
3/04/93	MW1	SAMPLED SEMI-ANNUALLY						
	MW2	SAMPLED SEMI-ANNUALLY						
	MW3	SAMPLED SEMI-ANNUALLY						
	MW4	SAMPLED SEMI-ANNUALLY						
	MW5	ND	ND	ND	ND	ND	ND	ND
	MW6	ND	ND	ND	ND	ND	ND	ND
12/04/92	MW1	ND	ND	ND	ND	ND	ND	ND
	MW2	ND	ND	ND	0.65	0.91	ND	ND
	MW3	ND	ND	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND	ND
	MW5	--	ND	ND	ND	ND	ND	--
	MW6	--	ND	ND	ND	ND	ND	--
9/24/92	MW1	ND	ND	ND	ND	ND	ND	ND
	MW2	ND	ND	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND	ND
3/18/92	MW1	ND	ND	ND	ND	ND	ND	ND
	MW2	ND	ND	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND	ND
11/21/91	MW1*	ND	ND	ND	ND	ND	ND	ND
	MW2*	ND	ND	ND	ND	ND	ND	ND
	MW3*	ND	ND	ND	ND	ND	ND	ND

KEI-P90-0102.QR8
September 27, 1993

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

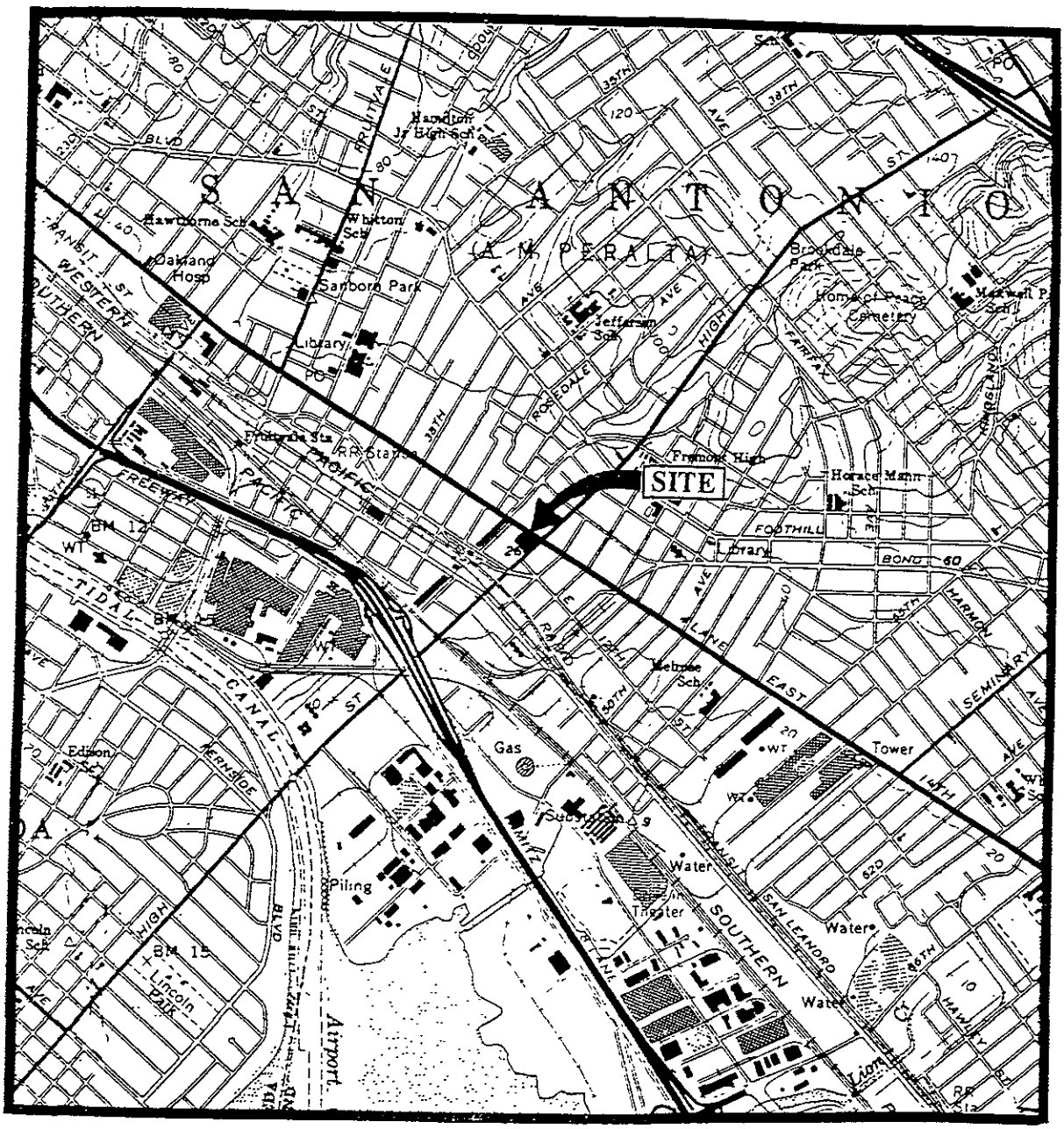
Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Xylenes	TOG (ppm)
8/22/91	MW1*	ND	ND	ND	ND	ND	ND	ND
	MW2*	ND	ND	ND	ND	ND	ND	ND
	MW3*	ND	ND	ND	ND	ND	ND	ND
5/22/91	MW1	ND	ND	ND	ND	ND	ND	ND
	MW2	ND	ND	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND	ND	ND
2/22/91	MW1	ND	ND	ND	ND	0.30	ND	ND
	MW2	ND	ND	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND	ND	ND
	MWD	ND	ND	ND	ND	ND	ND	ND
10/02/90	MW1	ND	ND	ND	0.84	ND	ND	ND
	MW2	ND	ND	ND	ND	ND	ND	ND
	MW3	ND	ND	ND	ND	ND	ND	ND

* Quality assurance duplicate water sample collected from monitoring well MW1.

ND = Non-detectable.

-- Indicates analysis was not performed.

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

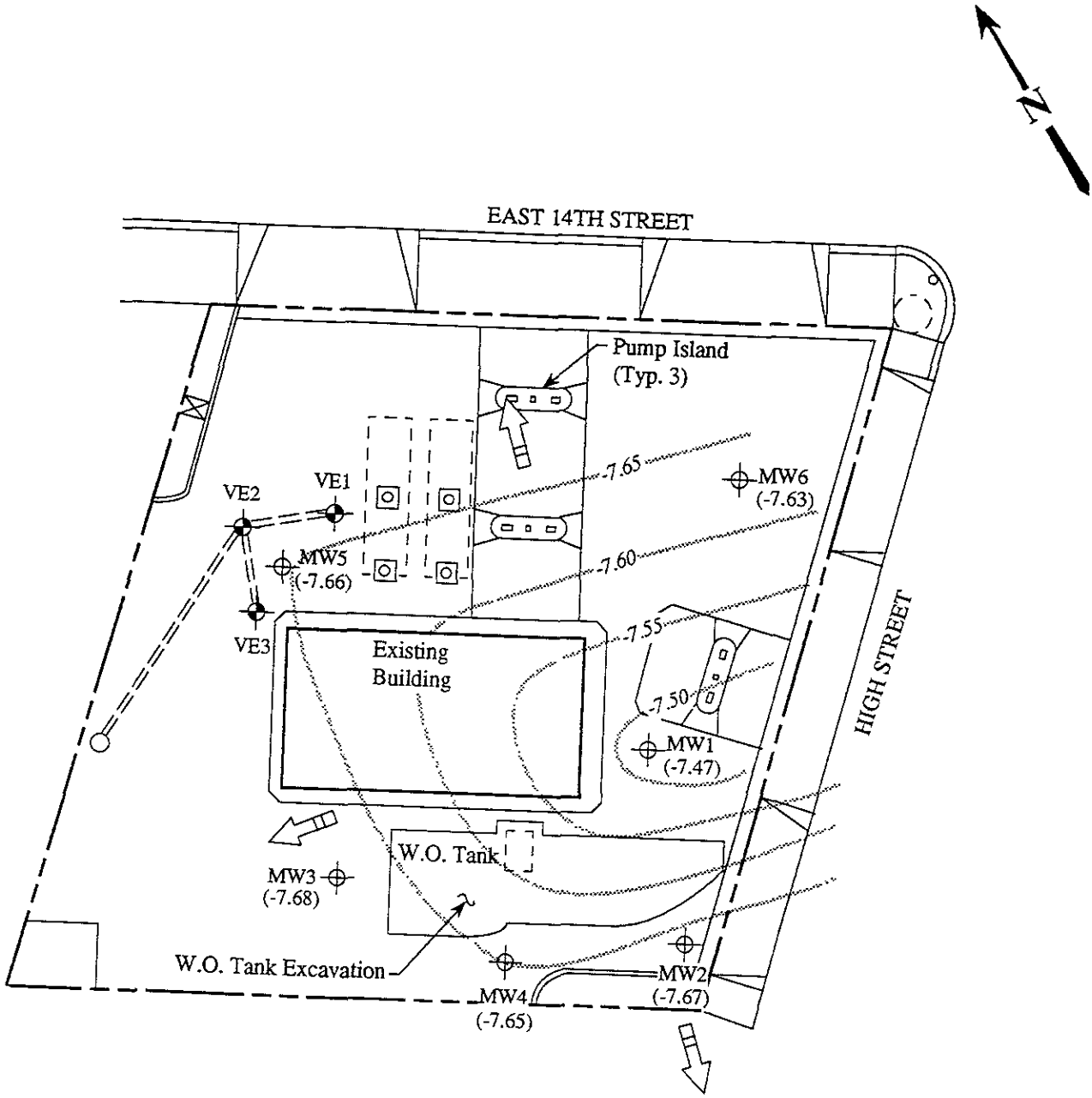


Base modified from 7.5 minute U.S.G.S. Oakland East Quadrangle
(photorevised 1980)

0 2000 4000

Approx. scale . feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #2656 4251 EAST 14TH STREET OAKLAND, CA LIFORNIA	LOCATION MAP



LEGEND

- Monitoring well
- Vapor extraction well
- Vapor extraction subsurface conduit
- ( ) Ground water elevation in feet relative to Mean Sea Level
- Direction of ground water flow
- Coutours of ground water elevation

0 30 60

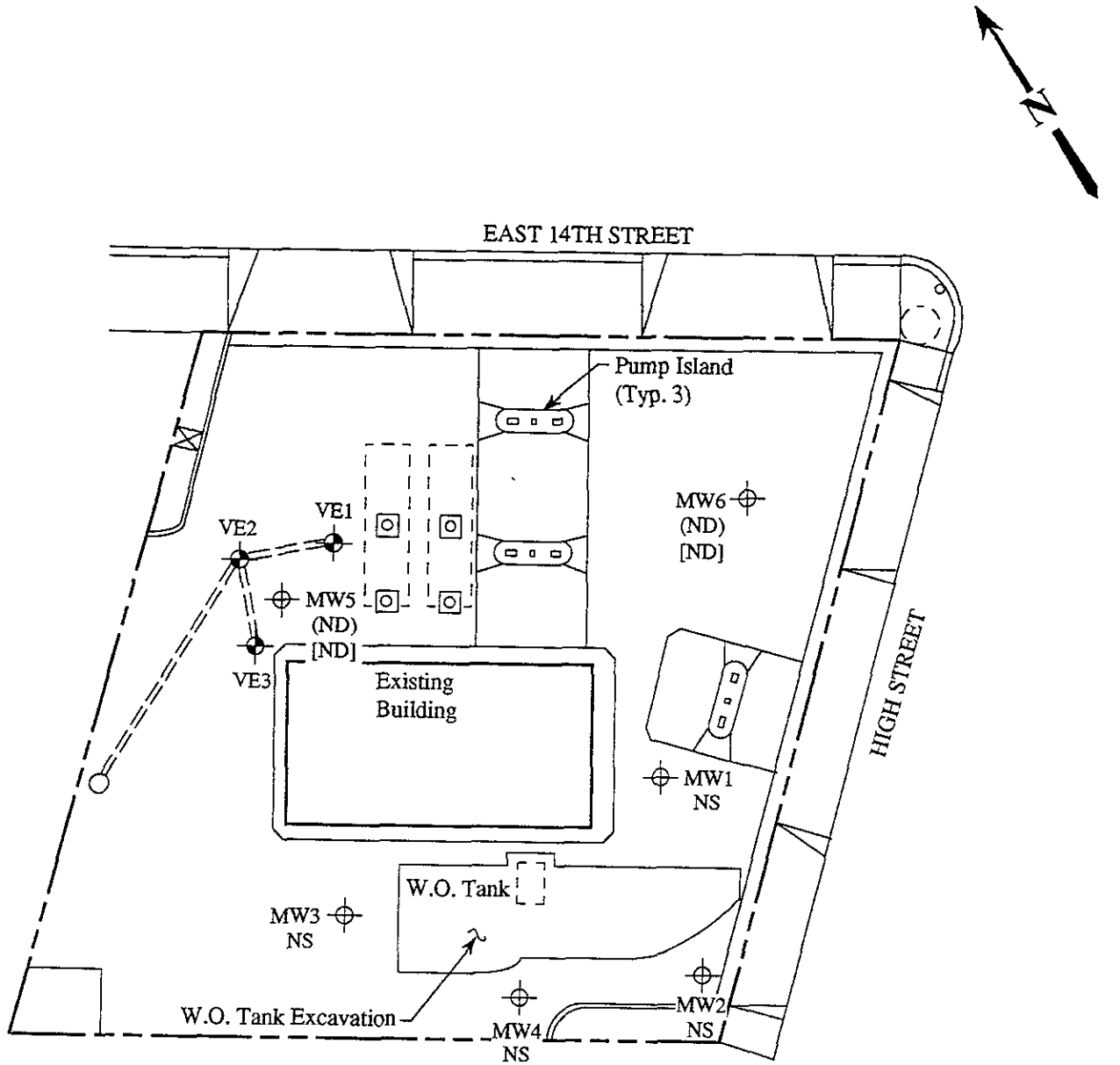
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE SEPTEMBER 3, 1993 MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #2656
4251 EAST 14TH STREET
OAKLAND, CALIFORNIA

FIGURE
1



LEGEND

- Monitoring well
- Vapor extraction well
- Vapor extraction subsurface conduit
- ( ) 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 CONCENTRATIONS IN GROUND WATER ON SEPTEMBER 3, 1993

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #2656
4251 EAST 14TH STREET
OAKLAND, CA

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, 4251 E. 14th Street, Oakland	Sampled:	Sep 3, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Sep 3, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 16, 1993
Attention: Avo Avedessian	First Sample #:	309-0211		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 309-0211 MW-5	Sample I.D. 309-0212 MW-6	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	N.D.	N.D.	
Benzene	0.5	N.D.	N.D.	
Toluene	0.5	N.D.	N.D.	
Ethyl Benzene	0.5	N.D.	N.D.	
Total Xylenes	0.5	N.D.	N.D.	
Chromatogram Pattern:		--	--	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0
Date Analyzed:	9/15/93	9/15/93	9/15/93
Instrument Identification:	HP-5	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	100	103	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

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(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, 4251 E. 14th Street, Oakland
Matrix: Water
QC Sample Group: 3090211-212

Reported: Sep 16, 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#:	2LCS091493	2LCS091493	2LCS091493	2LCS091493
Date Prepared:	9/14/93	9/14/93	9/14/93	9/14/93
Date Analyzed:	9/14/93	9/14/93	9/14/93	9/14/93
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5
LCS % Recovery:	123	120	116	115
Control Limits:	70-130	70-130	70-130	70-130
MS/MSD Batch #:	3090195	3090195	3090195	3090195
Date Prepared:	9/14/93	9/14/93	9/14/93	9/14/93
Date Analyzed:	9/14/93	9/14/93	9/14/93	9/14/93
Instrument I.D.#:	HP-5	HP-5	HP-5	HP-5
Matrix Spike % Recovery:	140	135	130	128
Matrix Spike Duplicate % Recovery:	120	120	115	115
Relative % Difference:	11	12	12	11

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: Joe

WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal / Oakland 4251 E. 14th st.

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-5	9/3/93	12:15 P.M		✓	✓		2	MW	✓	3090211 AB
MW-6	"	1:25 P.M		✓	✓		2	"	✓	↓ 0212 AB

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Joe Qerian	9-3-93 1515	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
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? Y
2. Will samples remain refrigerated until analyzed? Y
3. Did any samples received for analysis have head space? N
4. Were samples in appropriate containers and properly packaged? Y

Signature / Title / Date

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel: 510 602 5100 Fax: 510 617 0402