KAPREALIAN ENGINEERING
INCORPORATED

KEI-P91-1004.R4
October 12, 1992

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

5101 521

Attention: Mr. Tim Howard

RE: ~~Continuing~~ Ground Water Investigation
and Quarterly Report
Unocal Service Station #5043
449 Hegenberger Road
Oakland, California

Dear Mr. Howard:

This report presents the results of Kaprealian Engineering, Inc's. (KEI) soil and ground water investigation for the referenced site, in accordance with KEI's proposal (KEI-P91-1004.P2) dated July 7, 1992. The purpose of the investigation was to further determine the degree and extent of soil and ground water contamination at the site. This report also presents the results of the most recent quarter of monitoring and sampling of the monitoring wells at the referenced site. The wells are currently monitored monthly and sampled on a quarterly basis. This report covers the work performed by KEI from June through August of 1992. The scope of the work performed by KEI consisted of the following:

Coordination with regulatory agencies

Geologic logging of three borings for the installation of three monitoring wells

Soil sampling

Ground water monitoring, purging, and sampling

Laboratory analyses

Data analysis, interpretation, and report preparation

SITE DESCRIPTION AND BACKGROUND

The subject site contains a Unocal service station facility. The site is characterized by gently sloping, west to west-southwest trending topography, and is located approximately 1,250 feet northeast of the existing drainage channel of San Leandro Creek.

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

KEI's initial field work was conducted on October 25, 1991, when four soil samples, labeled P1 through P4, were collected from the product pipe trenches (at depths of approximately 3 feet below grade) during an island modification project at the site. Sample point locations are as shown on the attached Figure 3. In addition, two shallow borings were drilled to ground water (which was encountered at a depth of approximately 4 to 4.5 feet below grade) by the use of a hand auger. The product pipe trenches were subsequently excavated to the ground water depth.

All samples were analyzed by Sequoia Analytical Laboratory in Concord, California. All soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline, benzene, toluene, xylenes, and ethylbenzene (BTX&E), and TPH as diesel.

The analytical results of the soil samples indicated a level of TPH as gasoline at 370 ppm for sample P4, while samples P1, P2, and P3 showed levels of TPH as gasoline at 3,200 ppm, 9,000 ppm, and 7,100 ppm, respectively. The analytical results further indicated levels of TPH as diesel at 420 ppm and 460 ppm for samples P1 and P4, respectively. Samples P2 and P3 indicated levels of TPH as diesel at 8,400 ppm and 1,100 ppm, respectively. The results of the soil analyses are summarized in Table 4.

Excavated to GW at (~4.5')

To comply with the requirements of the regulatory agencies and based on the analytical results, KEI proposed the installation of three monitoring wells. Documentation of the sample collection techniques and the analytical results of the soil samples collected from the product pipe trenches are summarized in KEI's report (KEI-J91-1004.R1) dated December 17, 1991.

On February 5, 1992, three two-inch diameter monitoring wells (designated as MW1, MW2, and MW3 on the attached Figure 1) were installed at the site. The monitoring wells were drilled and completed to total depths ranging from 13.5 to 15 feet below grade. Ground water was encountered at depths ranging from approximately 3 to 5 feet beneath the surface during drilling. The surface of each well cover was surveyed by Kier & Wright of Pleasanton, California, to Mean Sea Level (MSL) and to a vertical accuracy of 0.01 feet. The wells were developed on February 10, 1992, and were initially sampled on February 18, 1992.

Water and selected soil samples were analyzed at Sequoia Analytical Laboratory in Concord, California. The soil and water samples were analyzed for TPH as gasoline, BTX&E, and TPH as diesel.

The analytical results of the soil samples collected from the boring for monitoring well MW3 indicated non-detectable levels of TPH as gasoline and BTX&E, except for 0.011 ppb of xylenes in

sample MW3(3). Also in MW3, both soil samples showed non-detectable levels of TPH as diesel, except for sample MW3(3), which showed a level of 49 ppm. All soil samples analyzed from MW1 and MW2 showed levels of TPH as gasoline ranging from 31 ppm to 14,000 ppm, levels of benzene ranging from 2.4 ppm to 160 ppm, and levels of TPH as diesel ranging from 29 ppm to 2,400 ppm.

The analytical results of the ground water samples collected from monitoring wells MW1, MW2, and MW3 indicated levels of TPH as gasoline ranging from 230 ppb to 150,000 ppb, benzene levels ranging from 4.8 ppb to 17,000 ppb, and levels of TPH as diesel ranging from 4,300 ppb to 13,000 ppb, except for MW3, which showed a non-detectable level of TPH as diesel. The results of the soil analyses are summarized in Table 3, and the results of the water analyses are summarized in Table 2.

Based on the analytical results, KEI recommended the implementation of a monthly monitoring and quarterly sampling program. Documentation of the well installation protocol, sample collection techniques, and the analytical results are presented in KEI's report (KEI-P91-1004.R3) dated March 26, 1992. In KEI's first quarterly report (KEI-P91-1004.QR1) dated July 7, 1992, KEI recommended the installation of three additional monitoring wells at the site in order to further define the extent of contamination.

RECENT FIELD ACTIVITIES - WELL INSTALLATION

On August 21, 1992, three additional two-inch diameter monitoring wells (designated as MW4, MW5, and MW6 on the attached Figure 1) were installed at the site. The wells were each drilled, constructed, and completed in accordance with the guidelines of the Regional Water Quality Control Board (RWQCB) and the California Well Standards (per Bulletin 74-90). The subsurface materials penetrated and details of the construction of the wells are described in the attached Boring Logs.

The three wells were each drilled and completed to total depths of 13.5 feet below grade. Ground water was encountered between 5.5 to 6.5 feet beneath the surface during drilling. Soil samples were collected for laboratory analysis and for lithologic logging purposes at a maximum spacing of 5 foot intervals, at significant changes in lithology, at obvious areas of contamination, and at or within the soil/ground water interface, beginning at a depth of approximately 5 feet below grade and continuing until ground water was encountered. A representative soil sample of the saturated zone was collected from well MW5 at a depth of 9 feet below grade, and was submitted to Harlan Tait Associates of San Francisco for particle size analysis (sieve and hydrometer analysis) for verification of casing slot size and filter pack design. Other

soil sampling conducted below the ground water table was for lithologic logging purposes only. The undisturbed soil samples were collected by driving a California-modified split-spoon sampler (lined with brass liners) ahead of the drilling augers. The two-inch diameter brass liners holding the samples were sealed with aluminum foil, plastic caps and tape, and stored in a cooled ice chest for delivery to a state-certified laboratory. Each well casing was installed with a watertight cap and padlock. A round, watertight, flush-mounted well cover was cemented in place over each well casing.

The surface of each well cover was surveyed by Kier & Wright of Pleasanton, California, to MSL and to a vertical accuracy of 0.01 feet.

The new wells (MW4, MW5, and MW6) were developed on August 24, 1992. Prior to development, the wells were checked for the depth to the water table (by the use of an electronic sounder) and the presence of free product (by the use of an interface probe or paste tape). No free product was noted in any of the wells. After recording the monitoring data, the three new wells were each purged (by the use of a surface pump) of 18 to 40 gallons (until the evacuated water was clear and free of suspended sediment). Monitoring and well development data are summarized in Table 1.

RECENT FIELD ACTIVITIES - MONITORING AND SAMPLING

The three previously existing monitoring wells (MW1 through MW3) were monitored three times and were sampled once during the quarter. Monitoring well MW3 was not monitored during two of the monitoring events due to inaccessibility. During monitoring, the wells were checked for depth to water and the presence of free product. During sampling, the wells were also checked for the presence of sheen. No free product or sheen was noted in any of the wells during the quarter, except for well MW1, where free product was noted during two of the three monitoring events. Monitoring data are summarized in Table 1.

Water samples were collected from the previously existing wells (MW1 through MW3) on August 31, 1992. Prior to sampling, the wells were each purged of between 6.5 and 7.5 gallons by the use of a surface pump. Samples were collected by the use of a clean Teflon bailor. 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.

The new wells (MW4 through MW6) were also sampled on August 31, 1992. Prior to sampling, monitoring data were collected, and the

wells were each purged of between 4 to 5.5 gallons of water. The samples were collected, handled, and delivered to a state-certified laboratory as previously described.

ANALYTICAL RESULTS

Water samples from all of the wells, and selected soil samples from the borings for MW4 through MW6, were analyzed at Sequoia Analytical Laboratory. All samples analyzed were accompanied by properly executed Chain of Custody documentation. The samples were analyzed for TPH as gasoline by EPA method 5030/modified 8015, TPH as diesel by EPA methods 3550/Modified 8015(soil) and 3510/Modified 8015(water), and BTX&E by EPA method 8020.

Concentrations of TPH as gasoline, benzene, and TPH as diesel detected in the ground water samples collected on August 31, 1992, are shown on the attached Figure 2. The results of the soil analyses are summarized in Table 3, and the results of the water analyses are summarized in Table 2. Copies of the laboratory analyses and Chain of Custody documentation are attached to this report.

HYDROLOGY AND GEOLOGY

The measured depth to ground water at the site on August 31, 1992, ranged between 3.13 and 7.80 feet below grade. The water levels in all of the three previously existing wells have shown net decreases ranging from 0.47 to 0.88 feet since May 20, 1992. Based on the water level data gathered on August 31, 1992, the predominant ground water flow direction appeared to be to the west, as shown on the attached Figure 1. The flow direction reported this quarter is unchanged from the westerly flow direction reported in the previous two quarters. The average hydraulic gradient across the site on August 31, 1992, varied between approximately 0.022 and 0.07.

Based on review of regional geologic maps (U.S. Geological Survey Professional Paper 943 "Flatland Deposits - Their Geology and Engineering Properties and their Importance to Comprehensive Planning" by E.J. Helley and K.R. Lajoie, 1979), the subject site is underlain by Holocene-age Bay Mud (Qhbm). The Bay Mud typically consists of unconsolidated, saturated clay and silty clay that is rich in organic material. The Bay Mud locally contains lenses and stringers of well-sorted silt, sand, and beds of peat.

The results of our subsurface studies to date (the borings for wells MW1 through MW6) indicate that the site is underlain by artificial fill materials that extend to approximately 2 to 4 feet below grade. The fill materials are underlain by Bay Mud, which consists predominantly of organic-rich silty clay and clayey silt,

with minor interbeds of sand, peat, sandy silt, and silty clay. The unsaturated zone (in August 1992) at the site ranges between 3 and 8 feet thick.

A representative soil sample of the saturated zone was collected from MW5 at a depth of 9 feet below grade. The sample was submitted to Harlan Tait Associates of San Francisco for particle size analysis (sieve and hydrometer analysis) for verification of casing slot size and filter pack design. The results of the analysis indicated that the sample is composed of approximately 70% clay, 27% silt, and 3% fine-grained sand. The sample is classified as an organic clay with silt (OH). The results of the particle size analysis are shown on Plate 1.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results of the samples collected to date, KEI recommends the continuation of the current ground water monitoring and sampling program, per KEI's proposal (KEI-P91-1004.P2) dated July 7, 1992. The wells are currently monitored monthly and 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 the program will be made as warranted.

Based on the analytical results from the recently installed monitoring wells, the extent of contamination at the subject site has not been defined. Because of the need to complete the delineation of contamination over an area encompassing both the Unocal site and the site vicinity, KEI proposes conducting a Hydropunch study, followed by the installation of additional wells. KEI will perform a site reconnaissance to determine feasible locations for the Hydropunch study, and a work plan/proposal for the study will be submitted in the near future. After review of the analytical results of samples obtained during the Hydropunch study, KEI will make recommendations for additional monitoring wells.

As an interim measure until remediation of the site can be implemented, KEI has installed a free-product skimming device in MW1. This device is designed to continuously skim free product from the water table in the vicinity of this well. The free product is removed from the device during the regular monitoring events.

DISTRIBUTION

A copy of this report should be sent to Alameda County Health Care Services Agency, and to the Regional Water Quality Control Board, San Francisco Bay Region.

LIMITATIONS

Soil deposits and rock formations may vary in thickness, lithology, saturation, strength and other properties across any site. In addition, environmental changes, either naturally-occurring or artificially-induced, may cause changes in 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 this 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.

Should you have any questions regarding this report, please do not hesitate to call me 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

Timothy R. Ross
Project Manager

/bp

Attachments: Tables 1 through 4
Location Map
Potentiometric Surface Map - Figure 1
Petroleum Hydrocarbon Concentration Map - Figure 2
Sample Point Locations Map - Figure 3
Particle Size Analysis - Plate 1
Boring Logs
Laboratory Analyses
Chain of Custody documentation

KEI-P91-1004.R4
October 12, 1992

TABLE 1

SUMMARY OF GROUND WATER MONITORING AND PURGING DATA

Well #	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen	Gallons Pumped
(Monitored and Sampled on August 31, 1992)					
MW1	4.65	3.13	0	No	7
MW2	5.18	3.78	0	No	7.5
MW3	2.77	5.07	0	No	6.5
MW4	3.51	5.49	0	No	5.5
MW5	2.67	6.60	0	No	5
MW6	1.32	7.80	0	No	4
(Monitored and Developed on August 24, 1992)					
MW4	3.51	5.49	0	--	40
MW5	-1.80	11.07	0	--	18
MW6	-3.38	12.50	0	--	18
(Monitored on July 13, 1992)					
MW1*	5.06	2.87	0.2	N/A	0
MW2	5.66	3.30	0	--	0
MW3	WELL WAS INACCESSIBLE				
(Monitored on June 18, 1992)					
MW1*	5.75	2.95	1.2	N/A	2
MW2	5.71	3.25	0	--	0
MW3	WELL WAS INACCESSIBLE				

TABLE 1 (Continued)

SUMMARY OF GROUND WATER MONITORING AND PURGING DATA

Well #	Surface Elevation** (feet)
MW1	7.78
MW2	8.96
MW3	7.84
MW4	9.00
MW5	9.27
MW6	9.12

-- Sheen determination was not performed.

* The ground water elevation was modified due to the presence of free product by using an assumed specific gravity of 0.77.

** The elevations of the tops of the well covers have been surveyed relative to MSL, per the City of Oakland Benchmark #3880. (Elevation = 20.37 MSL).

KEI-P91-1004.R4
October 12, 1992

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
8/31/92	MW1	8,900♦	64,000	13,000	12,000	22,000	2,500
	MW2	1,600♦	9,000	1,800	640	2,000	140
	MW3	92♦♦	210*	1.0	ND	ND	ND
	MW4	90♦♦	240*	ND	ND	0.54	ND
	MW5	690♦	78	0.89	ND	13	ND
	MW6	750♦♦	ND	ND	ND	ND	ND
5/20/92	MW1	NOT SAMPLED DUE TO THE PRESENCE OF FREE PRODUCT					
	MW2	4,300♦	24,000	2,200	7,600	11,000	630
	MW3	WELL WAS INACCESSIBLE FOR SAMPLING					
2/18/92	MW1	13,000	150,000	17,000	26,000	26,000	5,200
	MW2	4,300	29,000	1,000	5,300	7,900	260
	MW3	ND	230	4.8	22	33	1.8

* 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 diesel and non-diesel mixture.

ND = Non-detectable.

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

KEI-P91-1004.R4
October 12, 1992

TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample Number	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
2/05/92	MW1(2.5)	2.5	1,200	14,000	160	680	2,400	470
	MW2(3.5)	3.5	2,400	9,000	74	440	1,400	280
	MW2(4.5)	4.5	29	31	2.4	0.14	9.0	3.0
	MW3(3)	3.0	49	ND	ND	ND	0.011	ND
	MW3(4.5)	4.5	ND	ND	ND	ND	ND	ND
8/21/92	MW4(5)	5.0	ND	ND	ND	ND	0.0066	ND
	MW5(6)	6.0	43*	340	1.1	1.2	13	7.8
	MW6(5)	5.0	1.2	3.7	0.90	ND	0.05	1.0

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

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

KEI-P91-1004.R4
October 12, 1992

TABLE 4

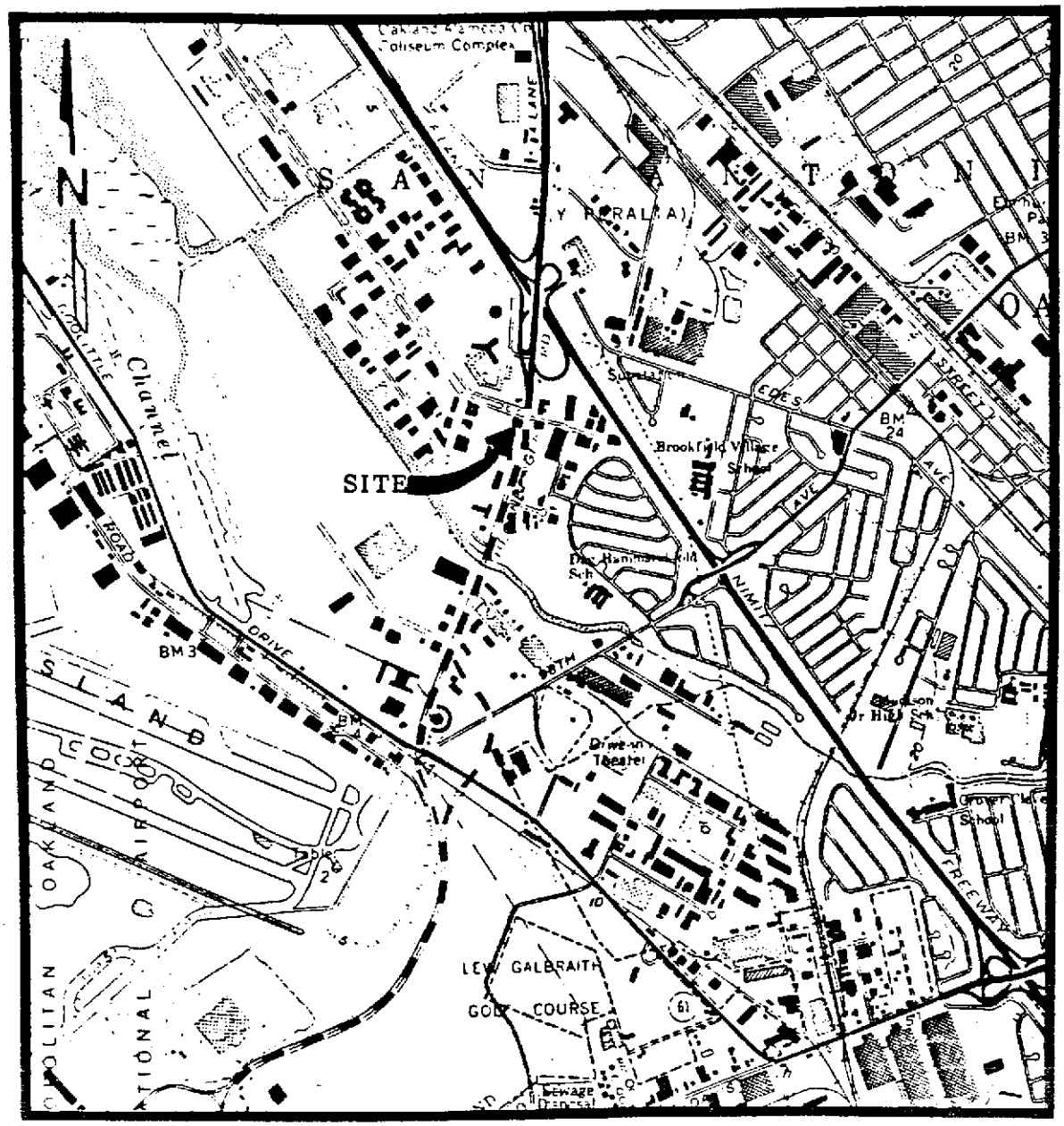
SUMMARY OF LABORATORY ANALYSES
SOIL

initial trench piping samples

Date	Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
10/25/91	P1	3	420	3,200	33	120	540	110
	P2	3	8,400	9,000	46	120	1,500	330
	P3	3	1,100	7,100	48	410	1,200	220
	P4	3	460	370	7.4	39	77	12

ND = Non-detectable.

Results in parts per million (ppm), unless otherwise indicated.

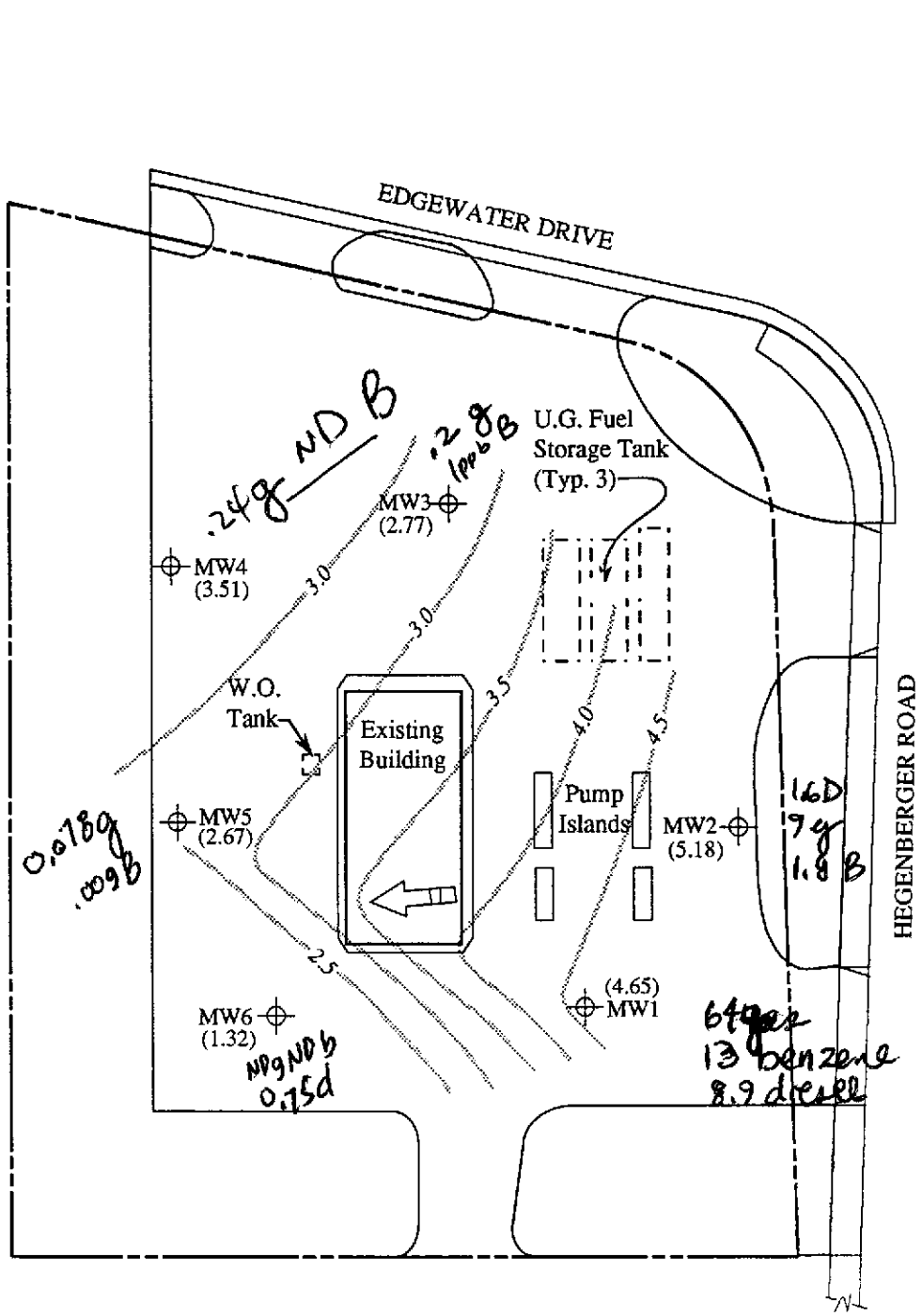


Base modified from 7.5 minute U.S.G.S. San Leandro Quadrangle
(photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	**UNOCAL SERVICE STATION #5043** **449 HEGENBERGER ROAD** **OAKLAND, CA**	**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 40 80

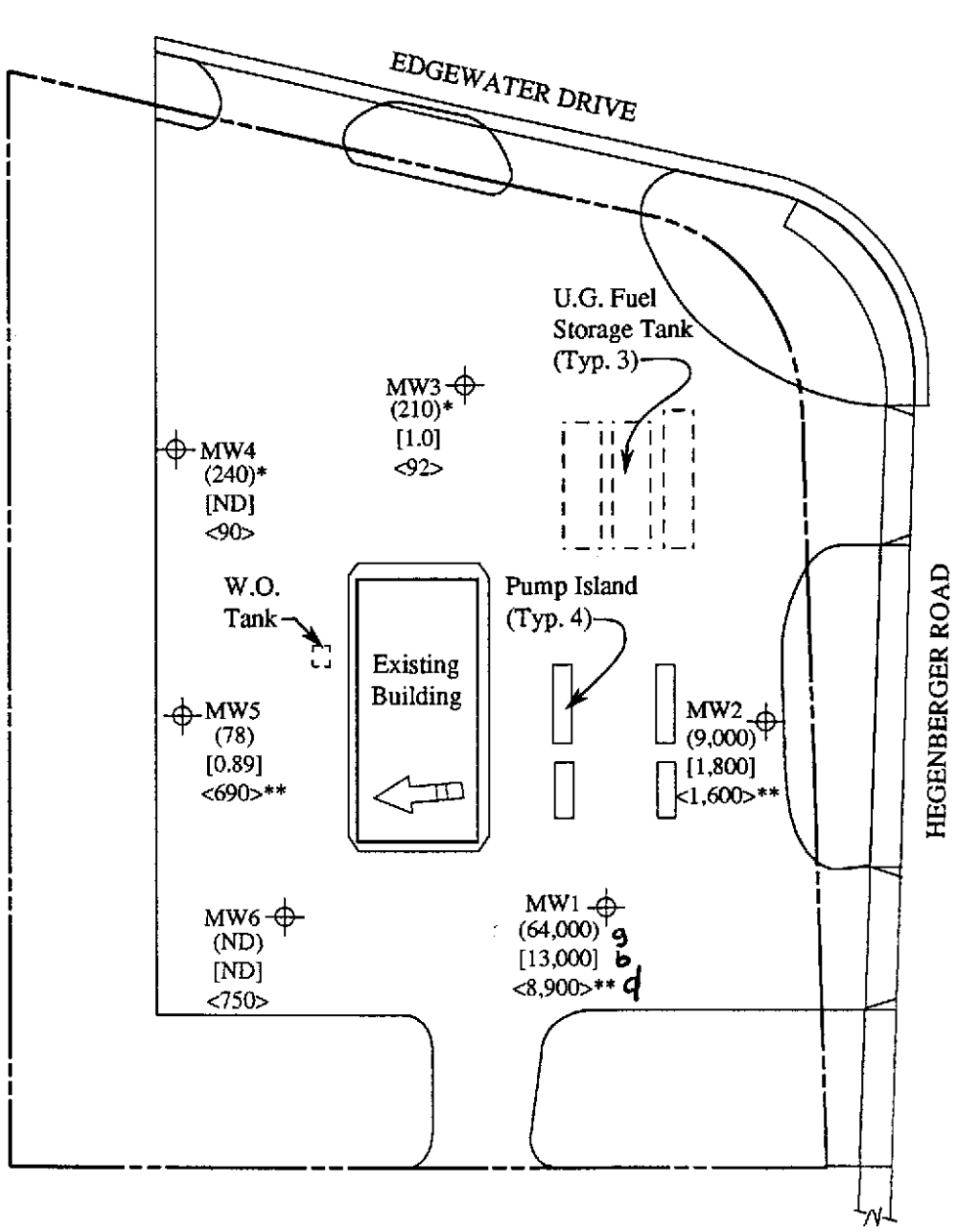
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE AUGUST 31, 1992 MONITORING EVENT

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #5043
449 HEGENBERGER ROAD
OAKLAND, CA

FIGURE **1**



LEGEND

- ⊕ Monitoring well
- ( ) Concentrations of TPH as gasoline in ppb
- [ ] Concentrations of benzene in ppb
- < > Concentrations of TPH as diesel in ppb
- ND = Non-detectable

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

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

0 40 80

Approx. scale feet

PETROLEUM HYDROCARBONS IN GROUND WATER ON AUGUST 31, 1992

KAPREALIAN ENGINEERING
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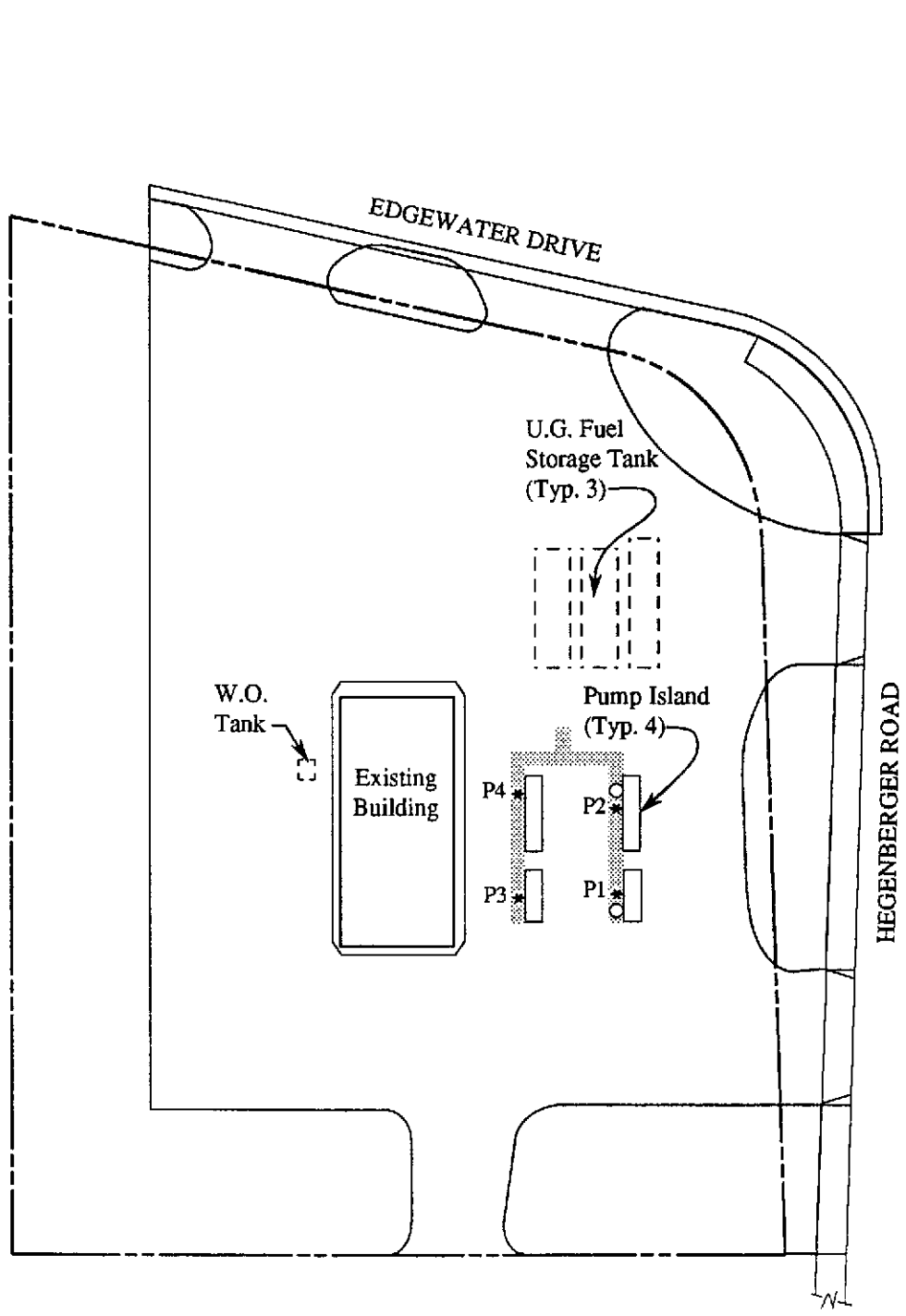
UNOCAL SERVICE STATION #5043
449 HEGENBERGER ROAD
OAKLAND, CA

FIGURE
2



LEGEND

* Sample point location

O Hand augered boring location

Area excavated to ground water (approx. 4 – 4.5 feet below grade)

Samples collected on 10/25/91

0 40 80

Approx. scale feet

SAMPLE POINT LOCATIONS MAP

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UNOCAL SERVICE STATION #5043
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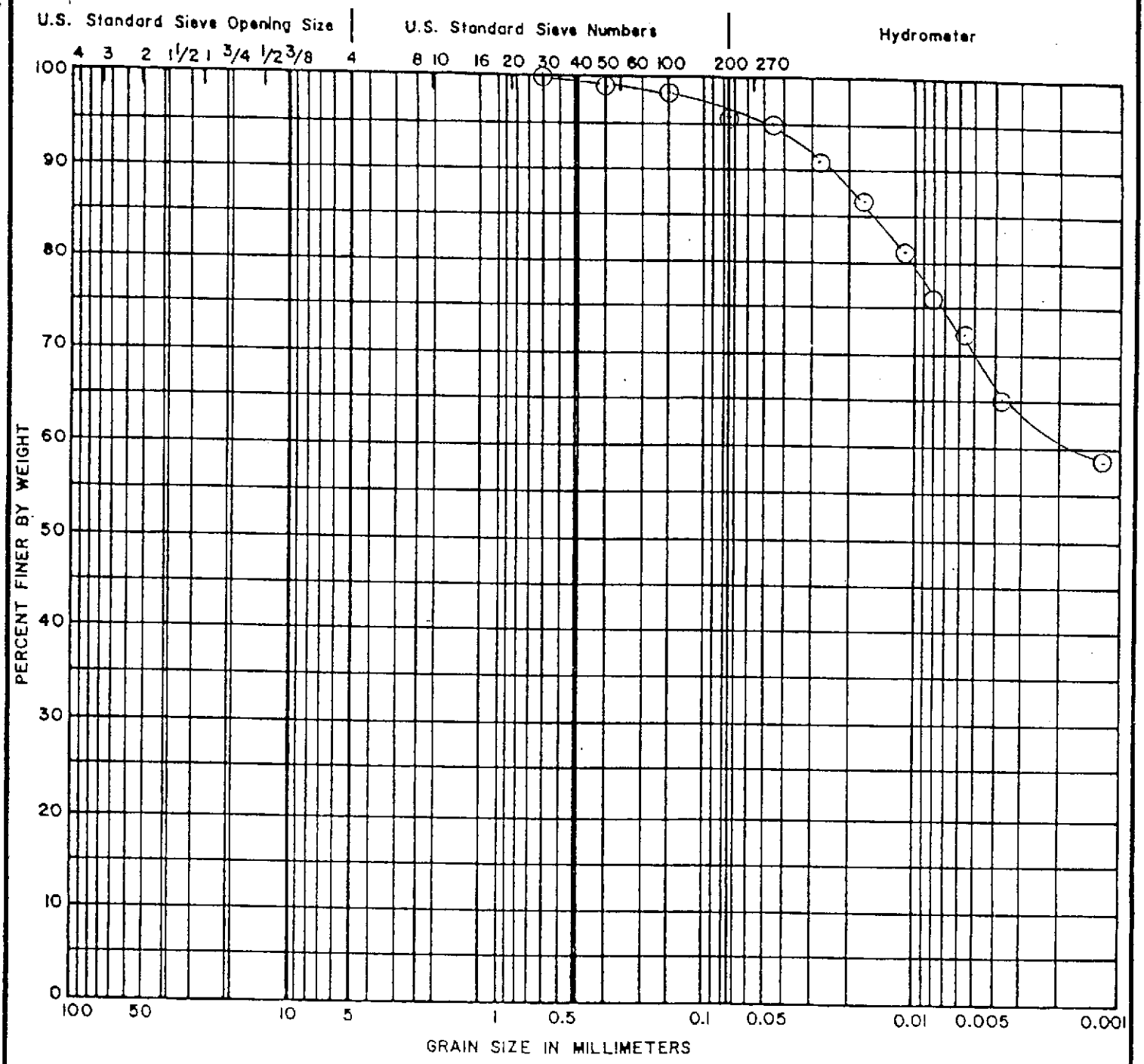
OAKLAND, CA

FIGURE
3



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Sample Source	Classification
	MW5 (9')	(Organic) Clay with silt (OH)

Unocal S/S #5043
449 Hegenberger Road
Oakland, CA

Job No:

Appr:

Date: 9/2/92

PARTICLE SIZE ANALYSIS

PLATE 1

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MAJOR DIVISIONS		SYMBOLS	TYPICAL SOIL DESCRIPTIONS
GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)		GW	Well graded gravels or gravel - sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel - sand mixtures, little or no fines
		GM	Silty gravels, gravel - sand - silt mixtures
		GC	Clayey gravels, gravel - sand - clay mixtures
SANDS (More than 1/2 of coarse fraction < No. 4 sieve size)		SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand - silt mixtures
		SC	Clayey sands, sand - clay mixtures
SILTS & CLAYS LL < 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS & CLAYS LL > 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils
DUAL (TRANSITION) SOILS			Soil characterisitics are transitional between the soil classifications listed above

CLASSIFICATION CHART (Unified Soil Classification System)

BORING LOG

Project No. KEI-P91-1004	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** D.L. JGG CEG 1633
Project Name Unocal S/S #5043 449 Hegenberger Rd., Oakland	**Well Cover Elevation**	**Date Drilled** 8/21/92
Boring No. MW4	**Drilling Method** Hollow-stem Auger	**Drilling Company** West Hazmat

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt pavement.
				Gravelly clay with sand, stiff, moist, black (5Y 2.5/1) and olive gray (5Y 5/3), disturbed (fill).
7/7/8			CH	Silty clay, trace sand, stiff, moist, black (5Y 2.5/1) with thin lenses of fine-grained sand, olive gray (5Y 5/3).
8/15/15	5.5' ▼	5		
			ML	Sandy silt, firm, wet, black (5Y 2.5/1) with organic matter, sand is medium to fine-grained.
2/2/5			SW	Well graded sand, loose, saturated, very dark gray (5Y 3/1).
			CH	Silty clay, stiff, moist, black (5Y 2.5/1), organic matter (bay mud).
3/4/8		10	CH/ SW	Silty clay, firm, moist, black (5Y 2.5/1) lensed with well graded sand, loose, saturated, very dark gray (5Y 3/1).
6/6/9			CH	Silty clay, stiff, moist, black (5Y 2.5/1) with organic matter, grades to dark greenish gray (5G 4/1), becomes stiffer with depth.
				TOTAL DEPTH 13.5'
		15		
		20		

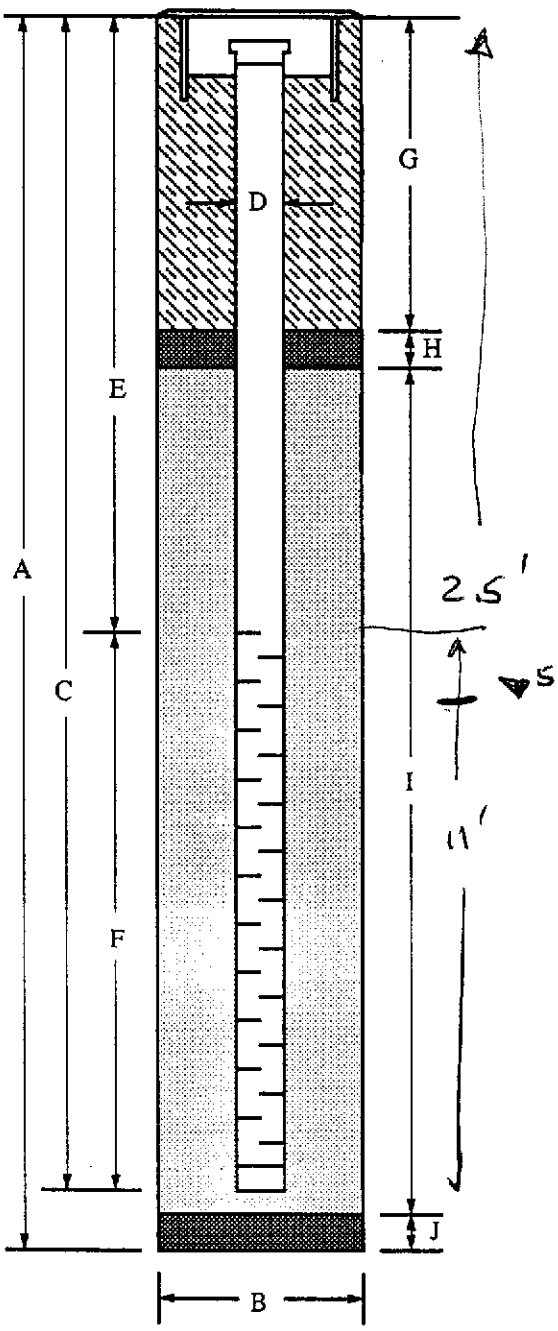
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #5043, 449 Hegenberger Rd., Oakland WELL NO. MW4

PROJECT NUMBER: KEI-P91-1004

WELL PERMIT NO.: ACFCD & WCD #92368

Flush-mounted Well Cover



A. Total Depth : 13.5'

B. Boring Diameter: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 13.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 2.5'

F. Perforated Length: 11'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 1'

Seal Material: Neat Cement

H. Seal: 0.5'

Seal Material: Bentonite

I. Filter Pack: 12'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: None

Seal Material: N/A

BORING LOG

Project No. KEI-P91-1004	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG D.L. CEG/1633
Project Name Unocal S/S #5043 449 Hegenberger Rd., Oakland	**Well Cover Elevation**	**Date Drilled** 8/21/92
Boring No. MW5	**Drilling Method** Hollow-stem Auger	**Drilling Company** West Hazmat

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt pavement.
				Intermixed clays, silts and sands, stiff, moist, many colors, disturbed (fill).
3/5/7			CH	Clay with silt, stiff, moist, very dark gray (5Y 3/1), lensed with poorly graded sand.
5/9/14	6.5'	5		
4/3/3	▼		ML/ GM	Clayey silt, firm, very moist, black (5Y 2.5/1), interbedded with silty, poorly graded gravel, loose, wet, black (5Y 2.5/1).
			Pt	Peat with trace clayey silt, soft, very moist, brown and black, fibrous.
6/8/8			OL	Clayey silt, trace sand, stiff, very moist, black (5Y 2.5/1), abundant organic matter.
			OH	Clay with silt, stiff, moist, black (2.5YR 2.5/0), abundant organic matter.
		10		
4/5/9			CH	Silty clay, stiff, moist, black (5Y 2.5/1), organic matter.
5/8/12				Silty clay, trace fine-grained sand, very stiff, moist, dark greenish gray (5GY 4/1), organic matter.
				TOTAL DEPTH 13.5'
		15		
		20		

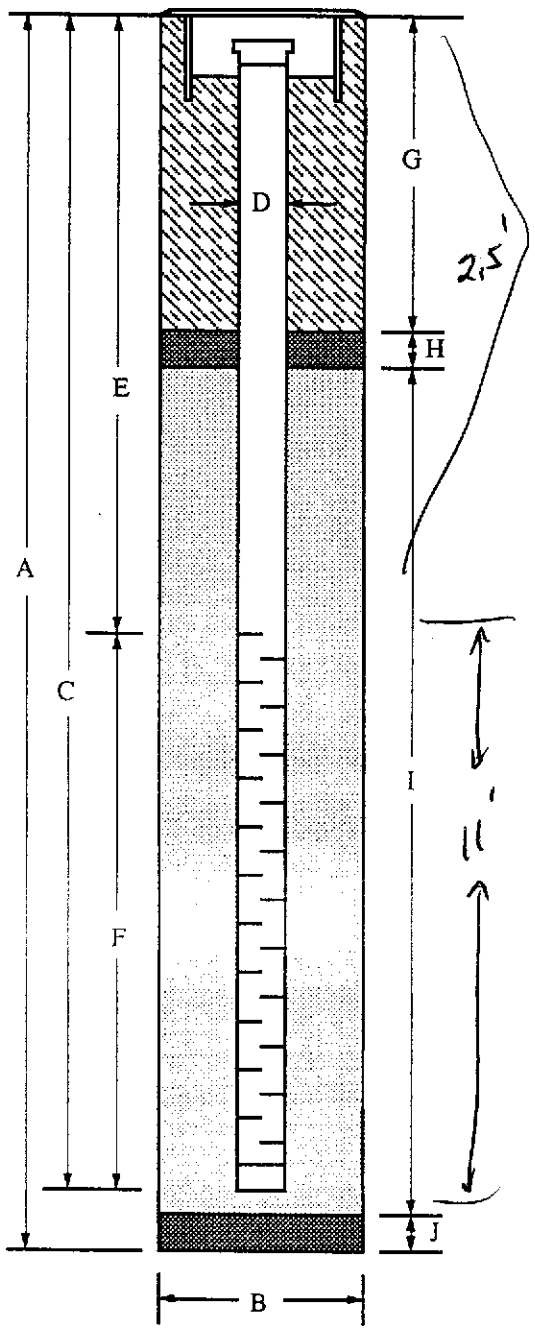
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #5043, 449 Hegenberger Rd., Oakland WELL NO. MW5

PROJECT NUMBER: KEI-P91-1004

WELL PERMIT NO.: ACFCD & WCD #92368

Flush-mounted Well Cover



A. Total Depth : 13.5'

B. Boring Diameter: 8"

Drilling Method: Hollow Stem Auger

C. Casing Length: 13.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 2.5'

F. Perforated Length: 11'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 1'

Seal Material: Neat Cement

H. Seal: 0.5'

Seal Material: Bentonite

I. Filter Pack: 12'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: None

Seal Material: N/A

BORING LOG

Project No. KEI-P91-1004	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG D.L. CEG 1633
Project Name Unocal S/S #5043 449 Hegenberger Rd., Oakland	**Well Cover Elevation**	**Date Drilled** 8/21/92
Boring No. MW6	**Drilling Method** Hollow-stem Auger	**Drilling Company** West Hazmat

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Asphalt pavement over sand and gravel base.
				Gravelly clay with sand, stiff, moist, black and olive gray, disturbed (fill).
3/4/4	5.5'		CH	Clay with silt, stiff, moist, black (5Y 2.5/1) lensed with poorly graded and well graded sand.
4/5/7		5	ML	Silt with very fine-grained sand, stiff, moist to wet, dark greenish gray (5GY 4/1), lensed with clayey silt between 4.5 and 5.5 feet.
3/3/4			OL	Clayey silt, stiff, moist, black (5Y 2.5/1) and very dark gray (5Y 3/1) mottled, with abundant organic matter (bay mud).
5/7/8		10	OH	Silty clay, stiff, moist, black (2.5YR 2.5/0), with abundant organic matter.
5/7/9			CH	Silty clay, stiff, moist, very dark gray (5Y 3/1), with organic matter.
				Silty clay, trace fine-grained sand, stiff, moist, dark greenish gray (5GY 4/1).
		15		TOTAL DEPTH 13.5'
		20		

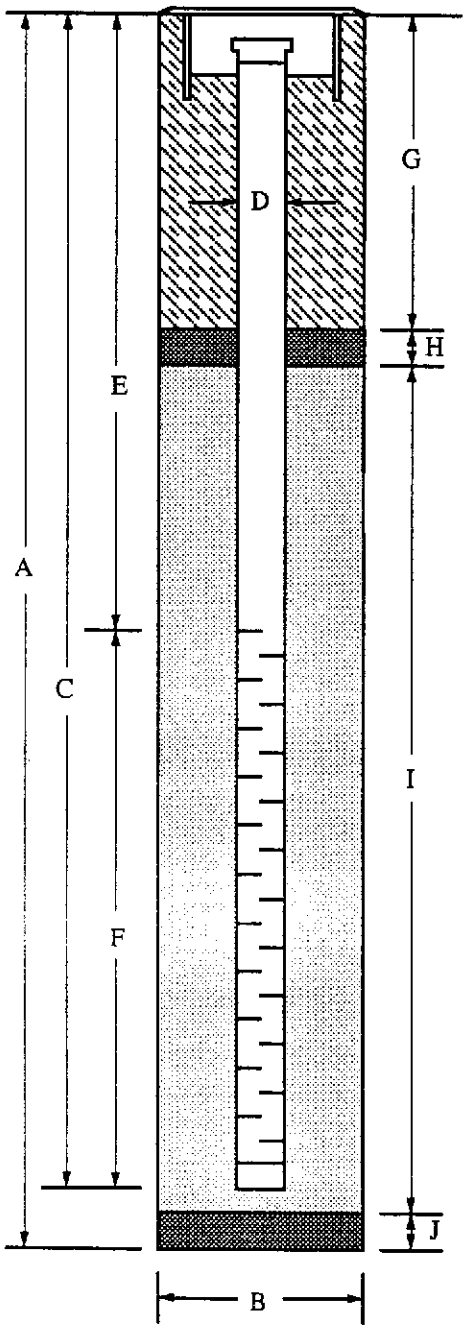
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal S/S #5043, 449 Hegenberger Rd., Oakland WELL NO. MW6

PROJECT NUMBER: KEI-P91-1004

WELL PERMIT NO.: ACFCD & WCD #92368

Flush-mounted Well Cover



A. Total Depth : 13.5'

B. Boring Diameter: 8"

Drilling Method: Hollow Stem Auger

C. Casing Length: 13.5'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 2.5'

F. Perforated Length: 11'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 1'

Seal Material: Neat Cement

H. Seal: 0.5'

Seal Material: Bentonite

I. Filter Pack: 12'

Pack Material: RMC Lonestar Sand

Size: #2/12

J. Bottom Seal: None

Seal Material: N/A

KAPREALIAN ENGINEERING
INCORPORATED

MAJOR DIVISIONS		SYMBOLS	TYPICAL SOIL DESCRIPTIONS
GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)		GW	Well graded gravels or gravel - sand mixtures, little or no fines
		GP	Poorly graded gravels or gravel - sand mixtures, little or no fines
		GM	Silty gravels, gravel - sand - silt mixtures
		GC	Clayey gravels, gravel - sand - clay mixtures
SANDS (More than 1/2 of coarse fraction < No. 4 sieve size)		SW	Well graded sands or gravelly sands, little or no fines
		SP	Poorly graded sands or gravelly sands, little or no fines
		SM	Silty sands, sand - silt mixtures
		SC	Clayey sands, sand - clay mixtures
SILTS & CLAYS LL < 50		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS & CLAYS LL > 50		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils
DUAL (TRANSITION) SOILS		Soil characterisitics are transitional between the soil classifications listed above	

CLASSIFICATION CHART (Unified Soil Classification System)

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 449 Hegenberger Rd., Oakland	Sampled:	Aug 31, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Aug 31, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 11, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	208-1344		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 208-1344 MW 1	Sample I.D. 208-1345 MW 2	Sample I.D. 208-1346 MW 3*	Sample I.D. 208-1347 MW 4*	Sample I.D. 208-1348 MW 5	Sample I.D. 208-1349 MW 6
Purgeable Hydrocarbons	50	64,000	9,000	210	240	78	N.D.
Benzene	0.5	13,000	1,800	1.0	N.D.	0.89	N.D.
Toluene	0.5	12,000	640	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.5	2,500	140	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.5	22,000	2,000	N.D.	0.54	13	N.D.
Chromatogram Pattern:		Gasoline	Gasoline	Discrete Peak	Discrete Peak	Gasoline	--

Quality Control Data

Report Limit Multiplication Factor:	200	5.0	1.0	1.0	1.0	1.0
Date Analyzed:	9/8/92	9/8/92	9/8/92	9/8/92	9/8/92	9/8/92
Instrument Identification:	ML-2	ML-2	ML-2	ML-2	ML-2	ML-2
Surrogate Recovery, %: (QC Limits = 70-130%)	101	96	93	93	82	82

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

SEQUOIA ANALYTICAL

Scott A. Chiello
Project Manager

Please Note: * The above samples do not appear to contain gasoline.
Purgeable Hydrocarbons are due to discrete peaks in the MTBE range.

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 449 Hegenberger Rd., Oakland	Sampled:	Aug 31, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Aug 31, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 11, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	Matrix 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:	9/8/92
Instrument Identification:	ML-2
Surrogate Recovery, %: (QC Limits = 70-130%)	88

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

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 449 Hegenberger Rd., Oakland	Sampled:	Aug 31, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Aug 31, 1992
Concord, CA 94520	Analysis Method:	EPA 3510/3520/8015	Reported:	Sep 11, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	208-1344		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 208-1344 MW-1	Sample I.D. 208-1345 MW-2	Sample I.D. 208-1346 MW-3	Sample I.D. 208-1347 MW-4	Sample I.D. 208-1348 MW-5	Sample I.D. 208-1349 MW-6
Extractable Hydrocarbons	50	8900	1600	92	90	690	750
Chromatogram Pattern:		Non-Diesel Mixture (< 16)	Non-Diesel Mixture (< 16)	Diesel and Non-Diesel Mixture (<C16)	Diesel and Non-Diesel Mixture (<C16)	Non-Diesel Mixture (< 16)	Diesel and Non-Diesel Mixture (< 16)

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Extracted:	9/5/92	9/5/92	9/5/92	9/5/92	9/5/92	9/5/92
Date Analyzed:	9/10/92	9/10/92	9/10/92	9/10/92	9/10/92	9/10/92
Instrument Identification:	HP-3B	HP-3B	HP-3B	HP-3B	HP-3B	HP-3B

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

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Scott A. Chieffo
Project Manager

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 449 Hegenberger Rd., Oakland	Sampled:	Aug 31, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Aug 31, 1992
Concord, CA 94520	Analysis Method:	EPA 3510/3520/8015	Reported:	Sep 11, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	Matrix Blank		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. Matrix Blank
Extractable Hydrocarbons	50	

Chromatogram Pattern:

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Extracted:	9/5/92
Date Analyzed:	9/10/92
Instrument Identification:	HP-3B

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

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Scott A. Chieffo
Project Manager

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Kaprealian Engineering, Inc. Client Project ID: Unocal, 449 Hegenberger Rd., Oakland
2401 Stanwell Drive, Suite 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E. QC Sample Group: 2081344-1349 Reported: Sep 11, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015
Analyst:	J. Dinsay	J. Dinsay	J. Dinsay	J. Dinsay	K.Wimer
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Sep 8, 1992	Sep 8, 1992	Sep 8, 1992	Sep 8, 1992	Sep 10, 1992
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:	10	10	10	30	300
Conc. Matrix Spike:	9.9	9.8	9.8	29	343
Matrix Spike % Recovery:	99	98	98	97	114
Conc. Matrix Spike Dup.:	10	10	9.8	30	291
Matrix Spike Duplicate % Recovery:	100	100	98	98	97
Relative % Difference:	1.0	2.0	0.0	1.0	16

Laboratory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

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

Client Project ID: Unocal, 449 Hegenberger Rd., Oakland
QC Sample Group: 2081344-1349
Reported: Sep 11, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992
Sample #:	208-1344	208-1345	208-1346	208-1347	208-1348	208-1349	Matrix Blank
Surrogate % Recovery:	102	97	83	94	95	102	117

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Scott A. Chieffo
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: Vartkes

WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal / Oakland
449 Hegenberger Rd.

TURN AROUND TIME: Regular

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHS;BTXE	TPHD	ANALYSES REQUESTED	REMARKS
MW 1	8/31/92	10:45 am.		X	X		3	Monitoring Well	X	X	208 1344AC	VOA's HCl Preserved.
MW 2	"			X	X		3	" "	X	X	1345AC	
MW 3	"			X	X		3	" "	X	X	1346AC	
MW 4	"			X	X		3	" "	X	X	1347AC	
MW 5	"			X	X		3	" "	X	X	1348AC	
MW 6	"	2:05 pm.		X	X		3	" "	X	X	1349AC	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
W. Tekulsve	8/31/92 4:05	[illegible] 8/31/92 4:05 pm
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Jim Willis	9/1/92 12:00pm	[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? ✓
2. Will samples remain refrigerated until analyzed? ✓
3. Did any samples received for analysis have head space? N/A
4. Were samples in appropriate containers and properly packaged? ✓

Signature [signature] Title [illegible] Date 9/3/92

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 449 Hegenberger Rd., Oakland	Sampled:	Aug 31, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Aug 31, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 11, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	208-1344		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 208-1344 MW 1	Sample I.D. 208-1345 MW 2	Sample I.D. 208-1346 MW 3*	Sample I.D. 208-1347 MW 4*	Sample I.D. 208-1348 MW 5	Sample I.D. 208-1349 MW 6
Purgeable Hydrocarbons	50	64,000	9,000	210	240	78	N.D.
Benzene	0.5	13,000	1,800	1.0	N.D.	0.89	N.D.
Toluene	0.5	12,000	640	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.5	2,500	140	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.5	22,000	2,000	N.D.	0.54	13	N.D.
Chromatogram Pattern:		Gasoline	Gasoline	Discrete Peak	Discrete Peak	Gasoline	--

Quality Control Data

Report Limit Multiplication Factor:	200	5.0	1.0	1.0	1.0	1.0
Date Analyzed:	9/8/92	9/8/92	9/8/92	9/8/92	9/8/92	9/8/92
Instrument Identification:	ML-2	ML-2	ML-2	ML-2	ML-2	ML-2
Surrogate Recovery, %: (QC Limits = 70-130%)	101	96	93	93	82	82

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

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

Please Note: * The above samples do not appear to contain gasoline.
Purgeable Hydrocarbons are due to discrete peaks in the MTBE range.

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 449 Hegenberger Rd., Oakland	Sampled:	Aug 31, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Aug 31, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Sep 11, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	Matrix 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:	9/8/92
Instrument Identification:	ML-2
Surrogate Recovery, %: (QC Limits = 70-130%)	88

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

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 449 Hegenberger Rd., Oakland	Sampled:	Aug 31, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Aug 31, 1992
Concord, CA 94520	Analysis Method:	EPA 3510/3520/8015	Reported:	Sep 11, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	208-1344		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 208-1344 MW-1	Sample I.D. 208-1345 MW-2	Sample I.D. 208-1346 MW-3	Sample I.D. 208-1347 MW-4	Sample I.D. 208-1348 MW-5	Sample I.D. 208-1349 MW-6
Extractable Hydrocarbons	50	8900	1600	92	90	690	750
Chromatogram Pattern:		Non-Diesel Mixture (< 16)	Non-Diesel Mixture (< 16)	Diesel and Non-Diesel Mixture (<C16)	Diesel and Non-Diesel Mixture (<C16)	Non-Diesel Mixture (< 16)	Diesel and Non-Diesel Mixture (< 16)

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Extracted:	9/5/92	9/5/92	9/5/92	9/5/92	9/5/92	9/5/92
Date Analyzed:	9/10/92	9/10/92	9/10/92	9/10/92	9/10/92	9/10/92
Instrument Identification:	HP-3B	HP-3B	HP-3B	HP-3B	HP-3B	HP-3B

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
Project Manager

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 449 Hegenberger Rd., Oakland	Sampled:	Aug 31, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Aug 31, 1992
Concord, CA 94520	Analysis Method:	EPA 3510/3520/8015	Reported:	Sep 11, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	Matrix Blank		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. Matrix Blank
Extractable Hydrocarbons	50	

Chromatogram Pattern:

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Extracted:	9/5/92
Date Analyzed:	9/10/92
Instrument Identification:	HP-3B

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
Project Manager

SEQUOIA ANALYTICAL

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

Client Project ID: Unocal, 449 Hegenberger Rd., Oakland
QC Sample Group: 2081344-1349
Reported: Sep 11, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015
Analyst:	J. Dinsay	J. Dinsay	J. Dinsay	J. Dinsay	K.Wimer
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Sep 8, 1992	Sep 8, 1992	Sep 8, 1992	Sep 8, 1992	Sep 10, 1992
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:	10	10	10	30	300
Conc. Matrix Spike:	9.9	9.8	9.8	29	343
Matrix Spike % Recovery:	99	98	98	97	114
Conc. Matrix Spike Dup.:	10	10	9.8	30	291
Matrix Spike Duplicate % Recovery:	100	100	98	98	97
Relative % Difference:	1.0	2.0	0.0	1.0	16

Laboratory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

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

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc. Client Project ID: Unocal, 449 Hegenberger Rd., Oakland
2401 Stanwell Drive, Suite 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E. QC Sample Group: 2081344-1349 Reported: Sep 11, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992	Sep 10, 1992
Sample #:	208-1344	208-1345	208-1346	208-1347	208-1348	208-1349	Matrix Blank
Surrogate % Recovery:	102	97	83	94	95	102	117

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: V. Settles
WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal / Oakland
449 Hegenberger Rd.

TURN AROUND TIME: Regular

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPH:G; BTX&E	TPH D	ANALYSES REQUESTED	REMARKS
MW 1	8/31/92	10:45 am.		X	X		3	Monitoring Well	X	X	208/344AC	VOA's HCl Preserved.
MW 2	"			X	X		3	" "	X	X	345AC	
MW 3	"			X	X		3	" "	X	X	346AC	
MW 4	"			X	X		3	" "	X	X	347AC	
MW 5	"			X	X		3	" "	X	X	348AC	
MW 6	"	2:05 pm.		X	X		3	" "	X	X	349AC	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
W. Tuckfield	8/31/92 4:05	[signature] 8/31/92 4:05
[signature]	9/1/92 12:00pm	[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/A
4. Were samples in appropriate containers and properly packaged? Y

Signature [signature] Title [signature] Date 9/1/92