



**KAPREALIAN ENGINEERING, INC.**

*Consulting Engineers*

P.O. BOX 996 • BENICIA, CA 94510  
(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581

90 FEB 15 AM 10:35

February 9, 1990

Alameda County Health Agency  
80 Swan Way, Rm. 200  
Oakland, CA 94621

Attention: Mr. Ariu Levi

RE: Unocal Service Station #6129  
3420 - 35th Avenue  
Oakland, California

Dear Mr. Levi:

Per the request of Mr. Ron Bock of Unocal Corporation, enclosed please find our report and proposal, both dated February 5, 1990, for the above referenced site.

Should you have any questions, please feel free to call our office at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

Enclosure

cc: Ron Bock, Unocal Corporation

94619



## KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P.O. BOX 996 • BENICIA, CA 94510  
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KEI-P89-0902.R5  
February 5, 1990

Unocal Corporation  
2175 N. California Blvd., Suite 650  
Walnut Creek, CA 94596

Attention: Mr. Rick Sisk

RE: Preliminary Ground Water Investigation at  
Unocal Service Station #6129  
3420 - 35th Avenue  
Oakland, California

Dear Mr. Sisk:

This report presents the results of soil and ground water investigation for the referenced site in accordance with proposal KEI-P89-0902.P1 dated October 9, 1989. The purpose of the investigation was to determine the ground water flow direction, and to begin to determine the degree and extent of the subsurface soil and ground water contamination at the site. The work performed consisted of the following:

Coordination with regulatory agencies.

Drilling, installation and development 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 is presently used as a gasoline station. The site occupies the south corner at the intersection of 35th Avenue and Quigley Street in Oakland, California. A Site Location Map and Site Plan are attached to this report.

On September 11, 1989, Kaprealian Engineering, Inc. (KEI) collected soil samples following the removal of two fuel storage tanks and one waste oil tank at the referenced site. Four soil

samples were collected at a depth of 14 feet from the fuel tank pit, and one sample at a depth of 9.5 feet from the waste oil tank pit. Five piping trench samples were also collected at depths ranging from 3 to 7.5 feet. All samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, for total petroleum hydrocarbon (TPH) as gasoline, benzene, toluene, xylenes and ethylbenzene (BTX&E). In addition, the sample collected from the waste oil pit was analyzed for TPH as diesel, total oil and grease (TOG) and EPA method 8010 constituents. Analytical results of the soil samples collected from the fuel storage tank pit showed TPH as gasoline ranging from 1.8 ppm to 10 ppm. Analyses of pipe trench soil samples indicate levels of TPH as gasoline ranging from non-detectable to 17 ppm for all samples except for sample P3 at 3.5 feet which showed 690 ppm. However, after further excavation, analyses of soil sample P3 at 7.5 feet indicate non-detectable levels of TPH and BTX&E. The results of the soil sample collected from the waste oil tank pit indicated levels of TPH as diesel at 3.3 ppm, and TOG at 58 ppm. Documentation of soil sample collection and analytical results are presented in KEI's report (KEI-J89-0902.R2) dated October 9, 1989. Based on the analytical results, KEI proposed installation of three monitoring wells.

#### FIELD ACTIVITIES

On December 12, 1989, three two-inch diameter monitoring wells, designated as MW1, MW2 and MW3, were installed at the site. The wells were drilled, constructed and completed in accordance with the guidelines of the Regional Water Quality Control Board (RWQCB) and the County well standards.

The subsurface materials penetrated and details of the construction of the wells are described in the attached Boring Logs.

The three wells were drilled and completed to total depths of 44 feet each. Ground water was encountered at depths of about 35 feet beneath the surface during drilling. Soil samples were taken at 5 foot intervals and changes in lithology beginning at about 5 feet below grade until ground water was encountered. The undisturbed soil samples were taken 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 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 wells were developed on December 28 and 29, 1989. Prior to development, the wells were checked for depth to the water table using an electronic sounder, presence of free product (using paste tape) and sheen. No free product or sheen was noted in any of the wells. After recording the monitoring data, the wells were developed with a surface pump until the evacuated water was clear and free of suspended sediment. Monitoring and well development data are summarized in Table 1.

The wells were sampled on January 5, 1990. Prior to sampling, monitoring data were collected and water samples were then collected using a clean Teflon bailer. The samples were decanted into clean glass VOA vials, sealed with Teflon lined screw caps, and labeled and stored on ice until delivery to a certified laboratory.

#### ANALYTICAL RESULTS

Soil and ground water samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California. All samples were accompanied by properly executed Chain of Custody documentation. Samples were analyzed for TPH by EPA method 5030 in conjunction with modified 8015 and BTX&E by EPA method 8020.

Soil sample analyses show non-detectable levels of TPH as gasoline and BTX&E in all samples except in MW3 at 5 feet, which had TPH as gasoline levels of 1,200 ppm, and benzene at 4.5 ppm. The water sample analyses show non-detectable levels of TPH as gasoline and BTX&E in wells MW1, MW2 and MW3. Results of the soil analyses are summarized in Table 2, and the water analyses on Table 3. Copies of the laboratory analyses and Chain of Custody documentation are attached to this report.

#### HYDROLOGY AND GEOLOGY

The water table stabilized in the monitoring wells at depths ranging from 31.87 to 32.99 feet below the surface. The ground water flow direction appeared to be toward the south-southwest on January 5, 1990, (based on water level data collected from the three monitoring wells prior to pumping).

Based on review of regional geologic maps (U.S. Geological Survey Map GQ-769, "Areal and Engineering Geology of the Oakland East Quadrangle, California" by Dorothy H. Radbruch, 1969), the site is underlain by the lower member of the Quaternary-age San Antonio Formation (Qs1). This unit typically consists of gravel with a silty clay matrix.

The results of our subsurface exploration (three borings) indicates that the site is underlain by artificial fill materials up to a maximum of about 5 feet in thickness. The native earth materials at the site typically consist of clayey gravel and well graded gravel interbedded with sandy to gravelly clay to the maximum depth explored (44 feet).

#### DISCUSSION AND RECOMMENDATIONS

Based on the analytical results, KEI recommends implementation of a monitoring and sampling program. The wells should be monitored on a monthly basis and sampled on a quarterly basis. The proposed program should be conducted for a period of 12 months. The results of the monitoring program will be documented and evaluated after each monitoring and sampling event. Recommendations for altering or terminating the program will be made as needed. In addition, KEI recommends the installation of four exploratory borings to a depth of 10 feet in locations shown on the attached Site Plan to define the extent of the soil contamination encountered in boring MW3 at a depth of 5 feet (TPH at 1,200 ppm). Our proposal for this work is attached for your consideration.

#### DISTRIBUTION

Copies of this report should be sent to the Alameda County Health Agency, and to the RWQCB, 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 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.

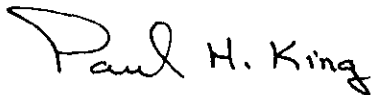
The results of this study are based on the data obtained from the field and laboratory investigations. We have analyzed this data using what we believe to be currently applicable engineering techniques and principles in the Northern California region. We make no warranty, either expressed or implied, except that our services have been performed in accordance with generally accepted professional principles and practices existing for such work.

KEI-P89-0902.R5  
February 5, 1990  
Page 5

Should you have any questions regarding this report, please do not hesitate to call me at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.



Paul H. King  
Hydrogeologist



Don R. Braun  
Certified Engineering Geologist

License No. 1310  
Exp. Date 6/30/90



Mardo Kaprealian  
President

c11

Attachments: Tables 1, 2 & 3  
Location Map  
Site Plan  
Boring Logs  
Laboratory Results  
Chain of Custody documentation  
Proposal

KEI-P89-0902.R5  
February 5, 1990

TABLE 1

SUMMARY OF GROUND WATER MONITORING AND DEVELOPMENT DATA

<u>Well #</u>	<u>Depth to Water (feet)</u>	<u>Product Thickness</u>	<u>Sheen</u>	<u>Gallons Pumped</u>
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(Monitored, Purged and Sampled on January 5, 1990)

MW1	32.80	0	None	8
MW2	33.02	0	None	8
MW3	31.88	0	None	8

(Monitored and Developed on December 29, 1990)

MW1	32.80	0	None	0
MW2	32.99	0	None	35
MW3	31.87	0	None	50

(Monitored and Developed on December 28, 1989)

MW1	32.70	0	None	90
MW2	32.90	0	None	55
MW3	33.80	0	None	0

KEI-P89-0902.R5  
February 5, 1990

TABLE 2

SUMMARY OF LABORATORY ANALYSES  
SOIL

(Collected on December 12, 1989)

<u>Sample Number</u>	<u>Depth (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
MW1(5)	5	ND	ND	ND	ND	ND
MW1(10)	10	ND	ND	ND	ND	ND
MW1(15)	15	ND	ND	ND	ND	ND
MW1(20)	20	ND	ND	ND	ND	ND
MW1(25)	25	ND	ND	ND	ND	ND
MW1(29.5)	29.5	ND	ND	ND	ND	ND
MW1(34.5)	34.5	ND	ND	ND	ND	ND
MW2(5)	5	ND	ND	ND	ND	ND
MW2(10)	10	ND	ND	ND	ND	ND
MW2(15)	14.5	ND	ND	ND	ND	ND
MW2(20)	20	ND	ND	ND	ND	ND
MW2(25)	25	ND	ND	ND	ND	ND
MW2(27)	27	ND	ND	ND	ND	ND
MW2(30)	30	ND	ND	ND	ND	ND
MW2(33.5)	33	ND	ND	ND	ND	ND
MW2(35)	35	ND	ND	ND	ND	ND
MW3(5)	5	1,200	4.5	2.0	6.3	21
MW3(10)	10	ND	ND	ND	ND	ND
MW3(15)	15	ND	ND	ND	ND	ND
MW3(20)	20	ND	ND	ND	ND	ND
MW3(25)	25	ND	ND	ND	ND	ND
MW3(30)	30	ND	ND	ND	ND	ND
MW3(34.5)	34.5	ND	ND	ND	ND	ND
MW3(36)	36	ND	ND	ND	ND	ND
Detection Limits		1.0	0.05	0.1	0.1	0.1

ND = Non-detectable.

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



KEI-P89-0902.R5  
February 5, 1990

TABLE 3

SUMMARY OF LABORATORY ANALYSES  
WATER

(Collected on January 5, 1990)

<u>Sample Number</u>	<u>Depth to Water (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
MW1	32.80	ND	ND	ND	ND	ND
MW2	32.99	ND	ND	ND	ND	ND
MW3	31.87	ND	ND	ND	ND	ND
Detection Limits		30	0.3	0.3	0.3	0.3

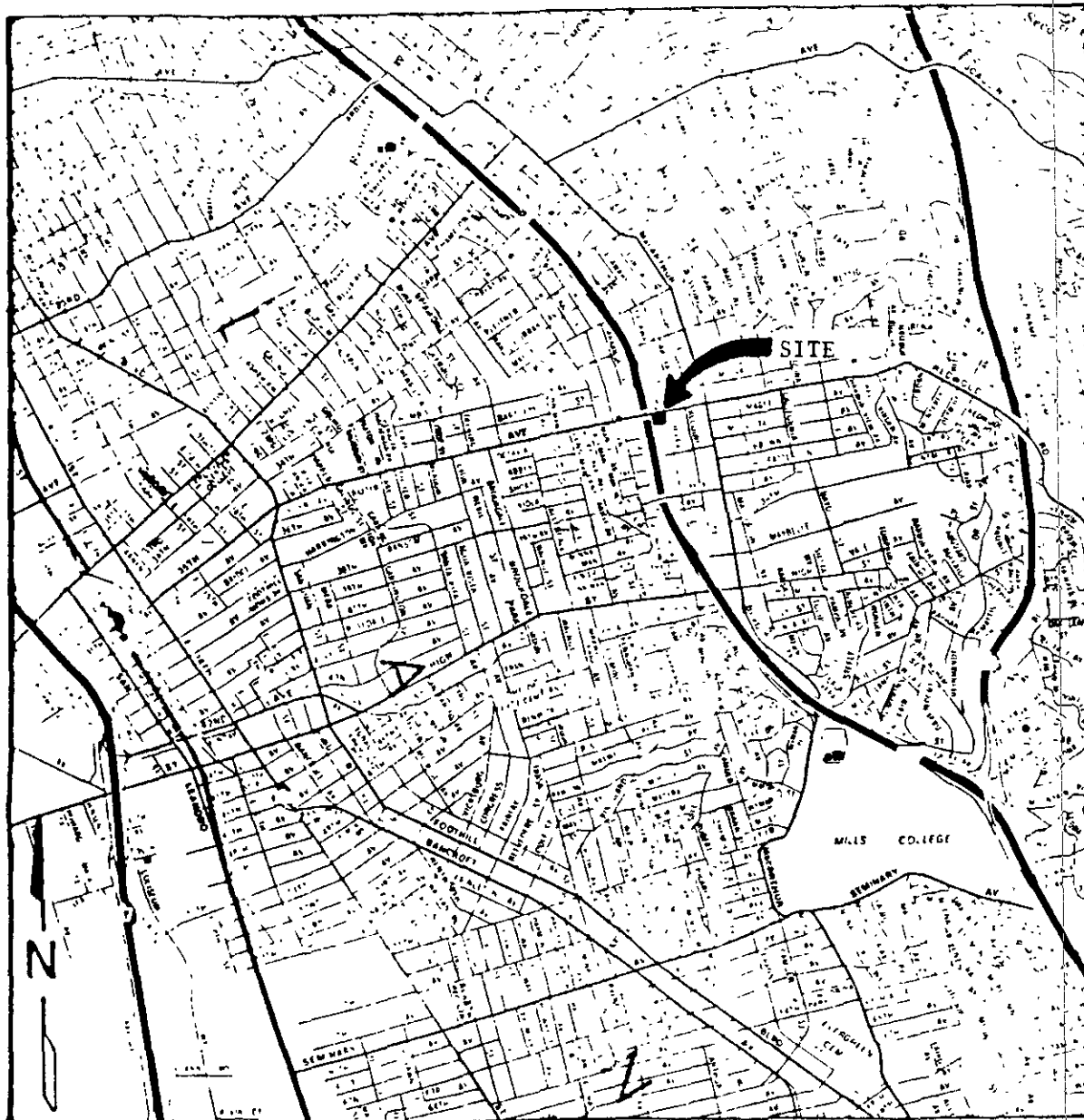
ND = Non-detectable.

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



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LOCATION MAP

Unocal Service Station #6129  
3420 - 35th Avenue  
Oakland, California

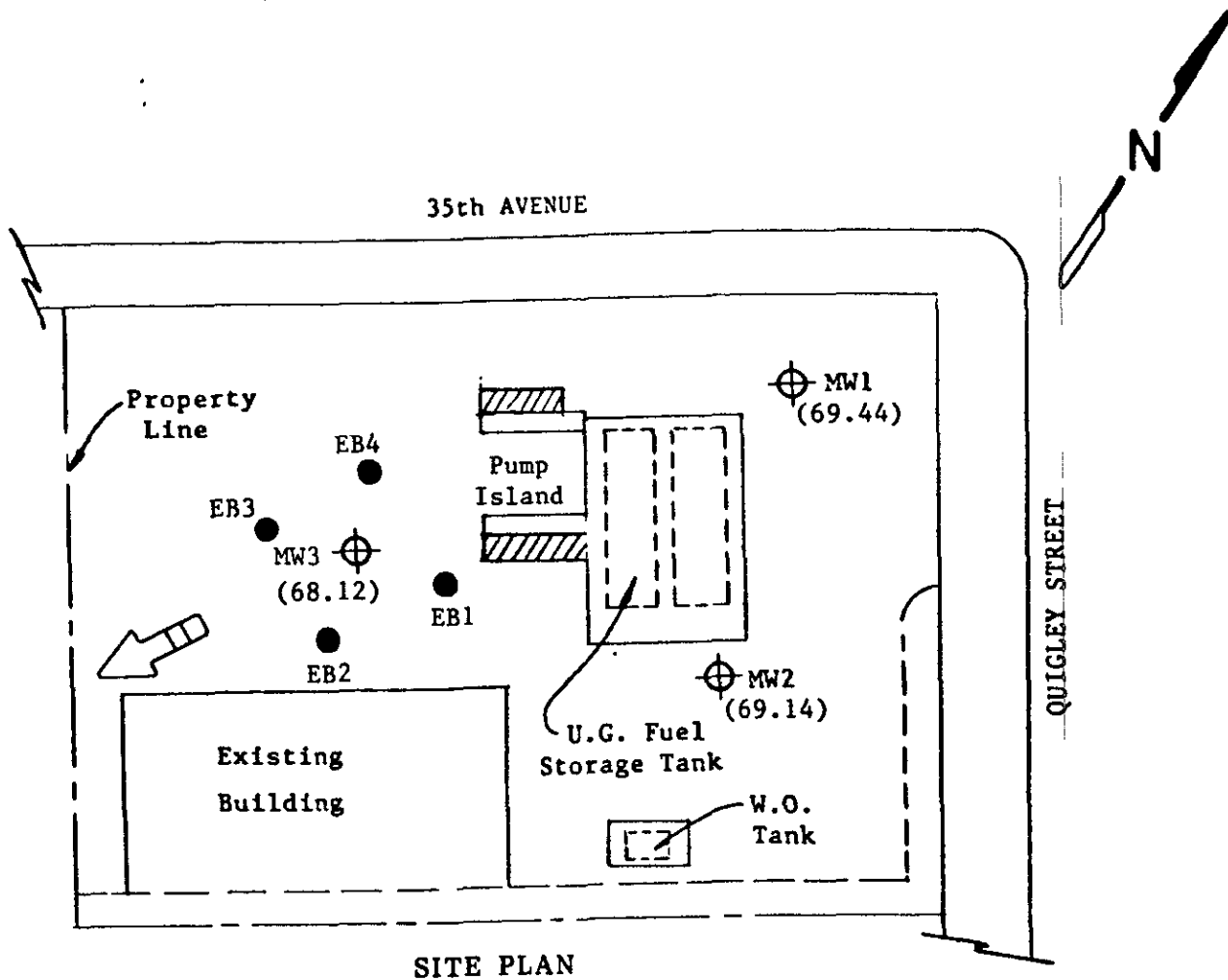


# KAPREALIAN ENGINEERING, INC.

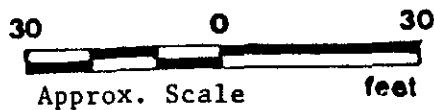
Consulting Engineers

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SITE PLAN



## LEGEND

● Exploratory Boring (Proposed)

⊕ Monitoring Well

( ) Water table elevation in feet on 1/5/90. Top of MW3 well cover assumed 100.00 feet as datum.

➡ Direction of ground water flow.

Unocal Service Station #6129  
3420 - 35th Avenue  
Oakland, California


**B O R I N G   L O G**

<b>Project No.</b> KEI-P89-0902	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L. <i>DRB</i> <i>CE 6/3/10</i>
<b>Project Name</b> Unocal Oakland - 35th Ave.	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 12/12/89
<b>Boring No.</b> MW1	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement Clay, sand and gravel: fill; large chert boulder at 6", dark yellowish brown.
5/7/11		5	CH	Clay, high plasticity, with gravel, 5% sand, stiff, moist, dark yellowish brown.
11/15/30		10	GC/ CH	Clayey gravel, 5-10% sand, dense, moist, dark yellowish brown, lensed with gravelly clay and clay, high plasticity, very stiff, moist, dark yellowish brown, gravel to 3/4".
18/30/48		15	GC	Clayey gravel with sand, 15-35% clay, very dense, slightly moist to wet, dark yellowish brown, gravel to 1".
18/29		20		Color change at 20 feet to dark brown.

**B O R I N G   L O G**

<b>Project No.</b> KEI-P89-0902	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L.
<b>Project Name</b> Unocal Oakland - 35th Ave.	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 12/12/89
<b>Boring No.</b> MW1	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
			GC	Clayey gravel with sand, as above.
16/33		25	CH	Gravelly clay, high plasticity, 10 - 15% sand, gravel to 3/4", very stiff, moist, dark yellowish brown and dark brown, mottled.
19/40		30	GC	Clayey gravel with sand, 15-30% coarse sand, very dense, moist, dark brown, gravel to 1".
26/50- 5 1/2		35		Clayey gravel with sand, 15-20% clay, gravel to 1 1/2", very dense, moist to wet, dark brown.
12/22		40		Clayey gravel, as above, strong brown.

B O R I N G   L O G

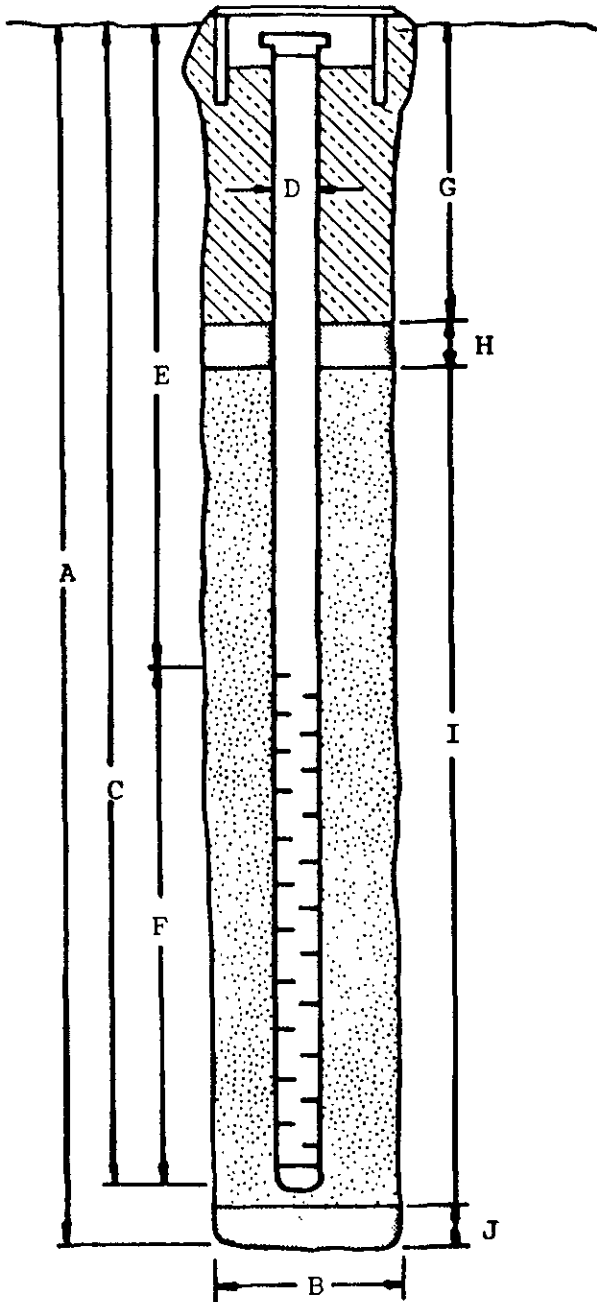
Project No. KEI-P89-0902	Boring & Casing Diameter 9"                              2"	Logged By D.L.
Project Name Unocal Oakland - 35th Ave.	Well Head Elevation N/A	Date Drilled 12/12/89
Boring No. MW1	Drilling Method      Hollow-stem Auger	Drilling Company EGI

Penetra- tion blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		<div style="display: flex; align-items: center;"> <div style="flex: 1; border-right: 1px solid black; border-bottom: 1px solid black; margin-right: 5px;"> <div style="text-align: center; margin-top: 10px;">45</div> <div style="text-align: center; margin-top: 100px;">50</div> <div style="text-align: center; margin-top: 100px;">55</div> <div style="text-align: center; margin-top: 100px;">60</div> </div> <div style="flex: 1; border-right: 1px solid black; border-bottom: 1px solid black; position: relative;"> <!-- This area represents the depth scale markings --> </div> </div>	GC	<div style="border: 1px solid black; width: 20px; height: 30px; background-image: radial-gradient(circle, black 1px, transparent 0); background-size: 4px 4px; background-position: 2px 2px;"> <span style="position: absolute; top: 0; right: 0; font-size: 8px;">Clayey gravel, as above.</span> </div>
TOTAL DEPTH 44'				

W E L L C O M P L E T I O N D I A G R A M

PROJECT NAME: Unocal - Oakland - 35th Avenue BORING/WELL NO. MW1  
 PROJECT NUMBER: KEI-P89-0902  
 WELL PERMIT NO.: 89689

Flush-mounted Well Cover



- A. Total Depth: 44'
- B. Boring Diameter\*: 9"  
 Drilling Method: Hollow Stem Auger
- C. Casing Length: 44'  
 Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 24'
- F. Perforated Length: 20'  
 Perforation Type: Machined Slot  
 Perforation Size: 0.020"
- G. Surface Seal: 20'  
 Seal Material: Concrete
- H. Seal: 2'  
 Seal Material: Bentonite
- I. Gravel Pack: 22'  
 Pack Material: RMC Lonestar Sand  
 Size: #3
- J. Bottom Seal: None  
 Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

**B O R I N G   L O G**

<b>Project No.</b> KEI-P89-0902	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L. <i>Don Brown</i> CEG/310
<b>Project Name</b> Unocal Oakland - 35th Ave.	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 12/12/89
<b>Boring No.</b> MW2	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement
10/15/16		5	GC	Well graded gravel with clay, 10-15% sand, very dense, moist, yellowish brown to dark yellowish brown, gravel to 5", sand content decreases with depth.
13/36/ 50-5"				Clayey gravel, 25-45% clay, 10-15% sand, very dense, very moist, dark yellowish brown, gravel to 1".
29/39/40		10	GC/ CH	Clayey gravel, as above, lensed with gravelly clay, same.
27/38/ 50-5"			GC	Color change at 12 feet, dark yellowish brown and strong brown, mottled.
37/50- 5 1/2		15		Color change at 14 feet to dark yellowish brown.
27/37/47				Clayey gravel with sand, very dense, slightly moist to moist, dark yellowish brown, gravel to 1 1/2".
16/30/39		20		Clayey gravel, very dense, moist, dark brown.



**B O R I N G   L O G**

<b>Project No.</b> KEI-P89-0902	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L.
<b>Project Name</b> Unocal Oakland - 35th Ave.	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 12/12/89
<b>Boring No.</b> MW2	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
30/50			GC	Clayey gravel to gravelly clay, very dense, moist, dark brown, clay is high plasticity, very stiff.
25/34/ 50-6"		25	GW- GC	Well graded gravel with clay and sand, 25-35% coarse sand, very dense, moist, dark brown.
15/20/33			CH	Sandy clay, high plasticity, 5-10% sand, very stiff, moist, dark brown to dark reddish brown.
16/22/35		30	GC	Clayey gravel with sand, gravel to 1", 15-30% sand, very dense, moist, dark brown.
13/24/48				
27/37/40 40/25/34	▼	35	GW- GC	Well graded gravel with clay and sand, gravel to 2".
19/22/32		40	CH	Sandy clay, high plasticity, with gravel, very stiff, moist, dark brown 15-30% gravel to 5/8".

**B O R I N G   L O G**

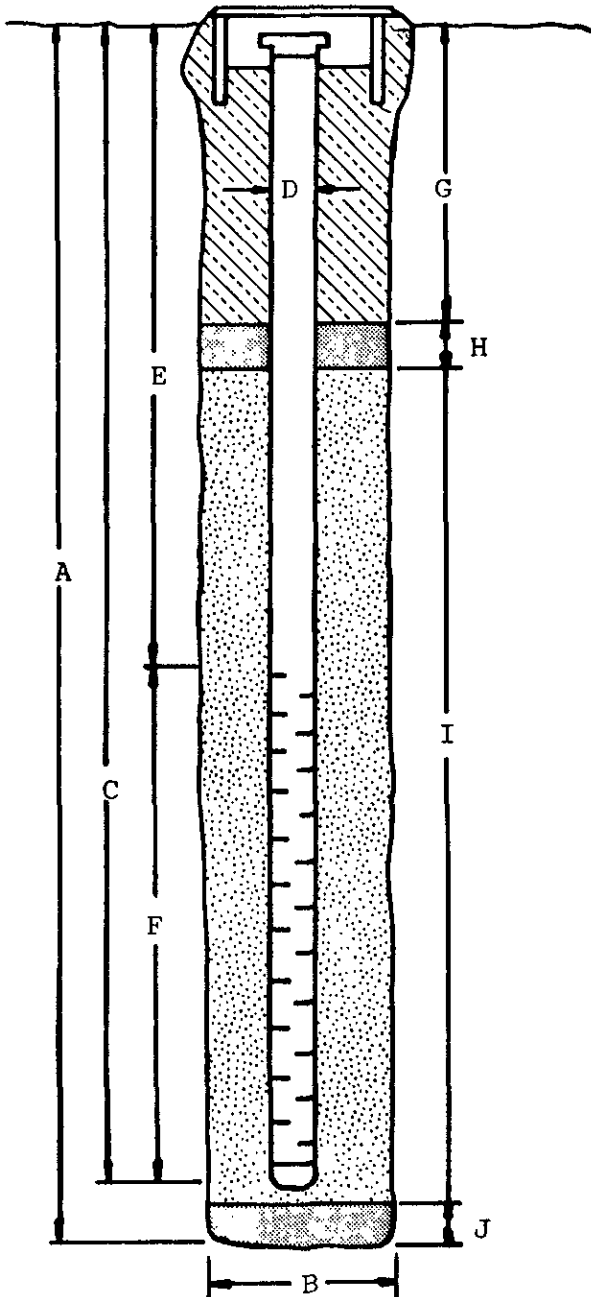
<b>Project No.</b> KEI-P89-0902	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L.
<b>Project Name</b> Unocal Oakland - 35th Ave.	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 12/12/89
<b>Boring No.</b> MW2	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
17/24/25			CH	Sandy clay as above.
				Gravelly clay, high plasticity, with sand, very stiff, moist, dark brown, gravel to 5/8".
				<b>TOTAL DEPTH 44'</b>

## W E L L   C O M P L E T I O N   D I A G R A M

PROJECT NAME: Unocal - Oakland - 35th Avenue      BORING/WELL NO. MW2  
 PROJECT NUMBER: KEI-P89-0902  
 WELL PERMIT NO.: 89689

Flush-mounted Well Cover



- A. Total Depth: 44'
- B. Boring Diameter\*: 9"  
 Drilling Method: Hollow Stem Auger
- C. Casing Length: 44'  
 Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 24'
- F. Perforated Length: 20'  
 Perforation Type: Machined Slot  
 Perforation Size: 0.020"
- G. Surface Seal: 20'  
 Seal Material: Concrete
- H. Seal: 2'  
 Seal Material: Bentonite
- I. Gravel Pack: 22'  
 Pack Material: RMC Lonestar Sand  
 Size: #3
- J. Bottom Seal: None  
 Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

**B O R I N G   L O G**

<b>Project No.</b> KEI-P89-0902	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L. <i>DRB CEG 1310</i>
<b>Project Name</b> Unocal Oakland - 35th Ave.	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 12/13/89
<b>Boring No.</b> MW3	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
		0		A.C. Pavement
11/12 8/21/36		5	GC	No sample recovery first attempt. Clayey gravel with sand, very dense, very moist to wet, olive, dark yellowish brown below 6 feet.
13/29		10		Clayey gravel with sand, 25-35% clay, gravel to 1 1/2", very dense, moist, dark yellowish brown, clay is high plasticity.
16/30/ 50-5 1/2		15	CH	Gravelly clay, high plasticity, with sand, very stiff to hard, moist, dark brown and dark yellowish brown, mot- tled.
26/34		20	GC	Clayey gravel with sand, lensed with with clay sand with gravel to 3/8", very dense, moist, dark brown, 15% clay throughout, gravel to 1".

**B O R I N G   L O G**

<b>Project No.</b> KEI-P89-0902	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L.
<b>Project Name</b> Unocal Oakland - 35th Ave.	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 12/13/89
<b>Boring No.</b> MW3	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
19/33		25	GC	Clayey gravel with sand, 15-25% sand, very dense, moist, dark brown.
8/8/12		30	CH	Sandy clay, high plasticity, firm to stiff, moist, strong brown. Gravelly clay, high plasticity with sand, dense, moist to very moist, strong brown to dark brown.
40/50/50		35	GW- GC	Well graded gravel with clay and sand, very dense, moist to wet, dark brown, gravel to >2".
43/50-5"			GC/ CH	Undifferentiated clayey gravel and gravelly clay, very dense, very stiff, dark brown.

**B O R I N G   L O G**

<b>Project No.</b> KEI-P89-0902	<b>Boring &amp; Casing Diameter</b> 9"                      2"	<b>Logged By</b> D.L.
<b>Project Name</b> Unocal Oakland - 35th Ave.	<b>Well Head Elevation</b> N/A	<b>Date Drilled</b> 12/13/89
<b>Boring No.</b> MW3	<b>Drilling Method</b> Hollow-stem Auger	<b>Drilling Company</b> EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Strati- graphy USCS	Description
			GC/ CH	Undifferentiated clayey gravel and gravelly clay, as above.
		45		
		50		
		55		
		60		
				<b>TOTAL DEPTH 44'</b>

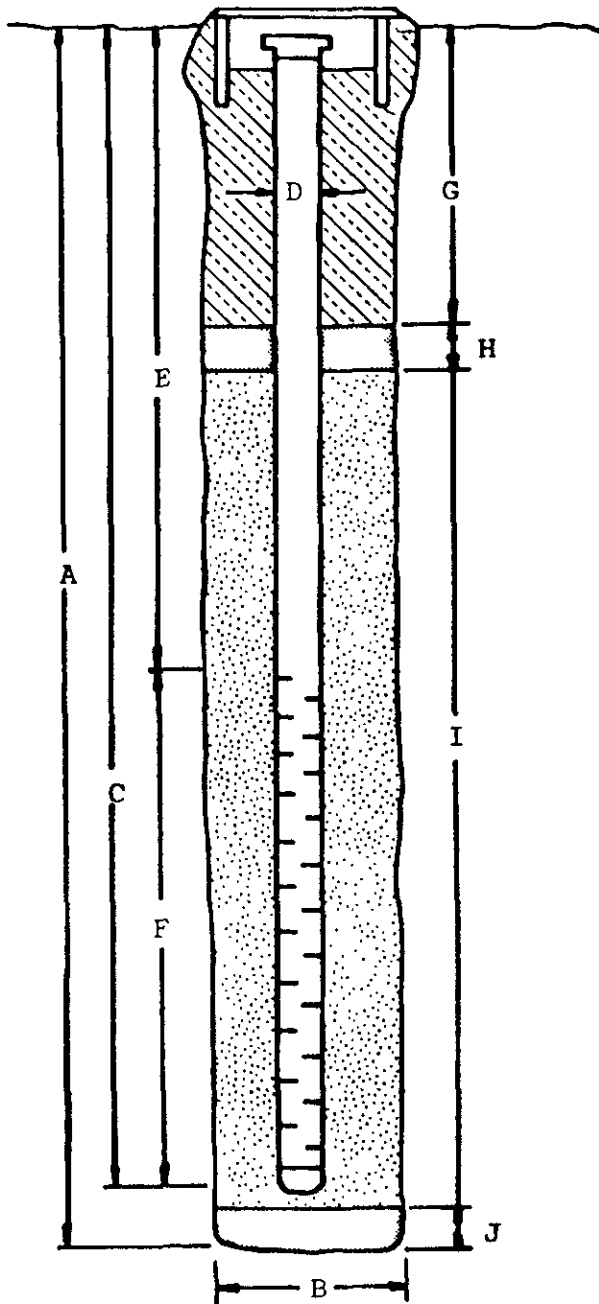
**W E L L C O M P L E T I O N D I A G R A M**

PROJECT NAME: Unocal - Oakland - 35th Avenue BORING/WELL NO. MW3

PROJECT NUMBER: KEI-P89-0902

WELL PERMIT NO.: 89689

Flush-mounted Well Cover



- A. Total Depth: 44'
- B. Boring Diameter\*: 9"  
Drilling Method: Hollow Stem Auger
- C. Casing Length: 43'  
Material: Schedule 40 PVC
- D. Casing Diameter: OD = 2.375"  
ID = 2.067"
- E. Depth to Perforations: 23'
- F. Perforated Length: 20'  
Perforation Type: Machined Slot  
Perforation Size: 0.020"
- G. Surface Seal: 19'  
Seal Material: Concrete
- H. Seal: 2'  
Seal Material: Bentonite
- I. Gravel Pack: 22'  
Pack Material: RMC Lonestar Sand  
Size: #3
- J. Bottom Seal: None  
Seal Material: N/A

\*Boring diameter can vary from 8-1/4" to 9" depending on bit wear.



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Kaprealian Engineering, Inc.	Client Project ID: Unocal, Oakland, 35th Ave/Quigley	Sampled: Dec 12, 1989
P.O. Box 996	Matrix Descript: Soil	Received: Dec 14, 1989
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: Dec 22, 1989
Attention: Mardo Kaprealian, P.E.	First Sample #: 912-1854	Reported: Jan 3, 1990

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
912-1854	MW1- (5)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1855	MW1- (10)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1856	MW1- (15)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1857	MW1- (20)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1858	MW1- (25)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1859	MW1 (29.5)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1860	MW1- (34.5)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1861	MW2- (5)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1862	MW2- (10)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1863	MW2- (15)	N.D.	N.D.	N.D.	N.D.	N.D.

<b>Detection Limits:</b>	<b>1.0</b>	<b>0.05</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Belinda C. Vega  
Project Manager





# SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID: Unocal, Oakland, 35th Ave/Quigley	Sampled: Dec 12, 1989
P.O. Box 996	Matrix Descript: Soil	Received: Dec 14, 1989
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: Dec 22, 1989
Attention: Mardo Kaprealian, P.E.	First Sample #: 912-1864	Reported: Jan 3, 1990

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
912-1864	MW2- (20)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1865	MW2- (25)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1866	MW2- (27)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1867	MW2- (30)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1868	MW2- (33.5)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1869	MW2- (35)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1870	MW3- (5)	1,200	4.5	2.0	21	6.3
912-1871	MW3- (10)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1872	MW3- (15)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1873	MW3- (20)	N.D.	N.D.	N.D.	N.D.	N.D.

<b>Detection Limits:</b>	<b>1.0</b>	<b>0.05</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>
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Low to Medium BOLLING Point Hydrocarbons are quantitated against a gasoline standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

*Belinda C. Vega*  
Belinda C. Vega  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Kaprealian Engineering, Inc. P.O. Box 996 Benicia, CA 94510 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, Oakland, 35th Ave/Quigley Matrix Descript: Soil Analysis Method: EPA 5030/8015/8020 First Sample #: 912-1874	Sampled: Dec 12, 1989 Received: Dec 14, 1989 Analyzed: Dec 22, 1989 Reported: Jan 3, 1990
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## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)
912-1874	MW3- (25)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1875	MW3- (30)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1876	MW3- (34.5)	N.D.	N.D.	N.D.	N.D.	N.D.
912-1877	MW3- (36)	N.D.	N.D.	N.D.	N.D.	N.D.

<b>Detection Limits:</b>	<b>1.0</b>	<b>0.05</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard. Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Belinda C. Vega  
Project Manager



# KAPREALIAN ENGINEERING, INC.

## CHAIN OF CUSTODY

SAMPLER		SITE NAME & ADDRESS						ANALYSES REQUESTED		TURN AROUND TIME:
<i>[Signature]</i>		UNCAL/OAKLAND 35TH AVE. AND QUIGLEY								REGULAR
WITNESSING AGENCY										
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	REMARKS	
MW1-(5)	12-12-89		X		X		1	SEE SAMPLE ID NO.	X X	
MW1-(10)	12-12-89		X		X		1		X X	
MW1-(15)	12-12-89		X		X		1		X X	
MW1-(20)	12-12-89		X		X		1		X X	
MW1-(25)	12-12-89		X		X		1		X X	
MW1-(30)	12-12-89		X		X		1		X X	
MW1-(35)	12-12-89		X		X		1		X X	
MW1-(40)	12-12-89		X		X		1		X X	
MW2-(5)	12-12-89		X		X		1		X X	
MW2-(10)	12-12-89		X		X		1		X X	

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time 9:35 12/14/89	Received by: (Signature) <i>Tom Bolan</i>
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature) <i>Tom Bolan</i>	Date/Time 4:43 12-14-89	Received by: (Signature) <i>Brenda Oh</i>

- The following MUST BE completed by the laboratory accepting samples for analysis:
- Have all samples received for analysis been stored in ice? Y
  - Will samples remain refrigerated until analyzed? Y
  - Did any samples received for analysis have head space? N
  - Were samples in appropriate containers and properly packaged? Y
- Signature: BLO Title: log-in Date: 12/14



# KAPREALIAN ENGINEERING, INC.

## CHAIN OF CUSTODY

SAMPLER <i>[Signature]</i>	SITE NAME & ADDRESS UNDER OAKLAND 35TH AVE. AND QUIGLEY	ANALYSES REQUESTED	TURN AROUND TIME: REGULAR
WITNESSING AGENCY			

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	NO. OF COMP.	SAMPLING LOCATION	TAM CO	CITY CO							REMARKS	
MW2-(15)	12-12-89		X	X		1	SEE SAMPLE ID NO.	X	X								
MW2-(20)	12-12-89		X	X		1		X	X								
MW2-(25)	12-12-89		X	X		1		X	X								
MW2-(21)	12-12-89		X	X		1		X	X								
MW2-(30)	12-12-89		X	X		1		X	X								
MW2-(35)	12-12-89		X	X		1		X	X								
MW2-(35)	12-12-89		X	X		1		X	X								
MW3-(5)	12-13-89		X	X		1		X	X								
MW3-(10)	12-13-89		X	X		1		X	X								

Relinquished by: (Signature) <i>[Signature]</i>	Date/Time 9:30 12-14-89	Received by: (Signature) <i>Tom Bolan</i>	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? 4. Were samples in appropriate containers and properly packaged?
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature) <i>Tom Bolan</i>	Date/Time 11:43 12-14-89	Received by: (Signature) <i>Brenda Oh</i>	

Signature: *[Signature]* Title: *log in* Date: *12/14*



# KAPREALIAN ENGINEERING, INC.

## CHAIN OF CUSTODY

SAMPLER <i>[Signature]</i>		SITE NAME & ADDRESS UNOCAL / OAKLAND 35TH AVE. AND QUINCY				ANALYSES REQUESTED				TURN AROUND TIME: REGULAR
WITNESSING AGENCY										

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	NO. OF CONT.	SAMPLING LOCATION	ANALYSES REQUESTED		REMARKS
								1	2	
MW3-(16)	12-13-89		X		X	1	SEE SAMPLE ID NO.	X	X	
MW3-(20)	12-13-89		X		X	1	↓	X	X	
MW3-(25)	12-13-89		X		X	1		X	X	
MW3-(30)	12-13-89		X		X	1		X	X	
MW3-(34.5)	12-13-89		X		X	1		X	X	
MW3-(36)	12-13-89		X		X	1		X	X	

Relinquished by: (Signature) <i>[Signature]</i> (KEI)	Date/Time 12-14-89 5:35	Received by: (Signature) <i>Tom Bolan</i>	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? 4. Were samples in appropriate containers and properly packaged?
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature) <i>Tom Bolan</i>	Date/Time 12-14-89	Received by: (Signature) <i>Brenda Oh</i>	
			Signature: <i>[Signature]</i> Title: <i>log-n</i> Date: <i>12/14</i>



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Kapreallan Engineering, Inc.	Client Project ID: Unocal, Oakland, 35th Ave.	Sampled: Jan 5, 1990
P.O. Box 996	Matrix Descript: Water	Received: Jan 5, 1990
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: Jan 9, 1990
Attention: Mardo Kapreallan, P.E.	First Sample #: 001-0580 A-B	Reported: Jan 10, 1990

## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P.	Benzene	Toluene	Ethyl Benzene	Xylenes
		Hydrocarbons				
		$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)
0010580 A-B	MW1	N.D.	N.D.	N.D.	N.D.	N.D.
0010581 A-B	MW2	N.D.	N.D.	N.D.	N.D.	N.D.
0010582 A-B	MW3	N.D.	N.D.	N.D.	N.D.	N.D.

<b>Detection Limits:</b>	<b>30.0</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>	<b>0.3</b>
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard. Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

*Belinda Vega*  
Belinda C. Vega  
Project Manager



# KAPREALIAN ENGINEERING, INC.

## CHAIN OF CUSTODY

SAMPLER <b>RAY KEI</b>		SITE NAME & ADDRESS <b>UNOCAL OAKLAND 35TH AVE</b>						ANALYSES REQUESTED				TURN AROUND TIME: <b>1 WEEK</b>	
WITNESSING AGENCY								<b>TAP</b>				<b>REMARKS</b>	
								<b>BTK</b>					
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB OR GMP	NO. OF CONT.	SAMPLING LOCATION						
MW1	1/5	15:30		X	X	2V			X	X			
MW2	1/5	"		X	X	X			X	X			
MW3	1/5	"		X	X	X			X	X			
Relinquished by: (Signature) <b>Ray Kei</b>		Date/Time <b>1/5/90</b>		Received by: (Signature)		The following MUST BE completed by the laboratory accepting samples for analysis:							
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		1. Have all samples received for analysis been stored in ice? <b>YES</b>							
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		2. Will samples remain refrigerated until analyzed? <b>YES</b>							
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		3. Did any samples received for analysis have head space? <b>NO</b>							
Relinquished by: (Signature)		Date/Time <b>5:02 PM 1-5-90</b>		Received by: (Signature) <b>[Signature]</b>		4. Were samples in appropriate containers and properly packaged? <b>YES</b>							
						<b>DN</b> Signature		<b>SK</b> Title		<b>1-5-90</b> Date			