KAPREALIAN ENGINEERING, INC.
Consulting Engineers
P. O. BOX 913
BENICIA, CA 94510
(415) 676 - 9100 (707) 746 - 6915

KEI-P89-0111.R5
May 18, 1989

Unocal Corporation
2175 N. California Blvd., Suite 650
Walnut Creek, CA 94569

Attention: Mr. Tim Ross

RE: Preliminary Ground Water Investigation at
Unocal Service Station #5487
28250 Hesperian Blvd.
Hayward, California

Dear Mr. Ross:

This report presents the results of soil and ground water investigation for the referenced site in accordance with proposal KEI-P89-0111.P1 dated March 1, 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 five 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 vicinity and site details are shown on the attached sketches.

KEI's work at the site began on January 30, 1989 when KEI was asked to collect soil samples following the removal of two underground fuel storage tanks and one waste oil tank at the site. Soil and water samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, for total petroleum

hydrocarbon (TPH) as gasoline, and benzene, toluene, xylenes and ethylbenzene (BTX&E). The waste oil sample was also analyzed for TPH as diesel, TOG, EPA 8010 and EPA 8270 constituents, and metals (cadmium, chromium, lead and zinc).

On February 14, 1989, in preparation for setting of the new fuel storage tanks, approximately 17,500 gallons of water were pumped from the fuel tank pit. On February 17, 1989, additional soil was excavated from the waste oil tank pit and 4,500 gallons of water was pumped and disposed of by H&H Haulers. Based on the results of the laboratory analyses, and in order to comply with the requirements of the regulatory agencies, KEI proposed installation of five monitoring wells. The results of the soil and ground water samples are summarized in KEI's report KEI-J89-0111.R2 dated March 1, 1989.

FIELD ACTIVITIES

On April 20 & 21, 1989, five 2" diameter monitoring wells (designated as MW1, MW2, MW3, MW4 and MW5 on the attached Site Plan) 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 five wells were drilled and completed to total depths ranging from 24 to 28 feet. Ground water was encountered at depths ranging from seven to ten feet beneath the surface during drilling. Soil samples were taken at five foot intervals beginning at five feet below grade until ground water was encountered. The undisturbed soil samples were taken by driving a California-modified split-spoon sampler ahead of the drilling augers. The 2" 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 April 25, 1989. Prior to development, the wells were checked for depth to the water table using an electronic water level meter, presence of free product (using gauging paste) 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 April 26, 1989. 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 and one liter amber bottles sealed with Teflon lined screw caps, and labeled and stored on ice until delivery to a certified laboratory.

ANALYTICAL RESULTS

Water and selected soil 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 as gasoline by EPA method 5030 or 3810 in conjunction with modified 8015 and BTX&E by EPA methods 5030 and 8020. In addition, the soil samples from MW1 and MW2 and all the water samples were analyzed for TPH as diesel using EPA method 3550 in conjunction with modified 8015, TOG using EPA method 413.1, and purgeable halocarbons using EPA method 8010.

Soil sample analyses show non-detectable levels of all constituents analyzed, except in MW4 at nine feet, which showed 1.4 ppm of TPH as gasoline, and in MW5 at five feet, which showed 900 ppm of TPH as gasoline, and BTX&E ranging from 3.1 to 110 ppm. The water sample analyses show non-detectable levels of all constituents analyzed except water samples from MW1 and MW4, which had benzene levels of 2.1 ppb and 0.33 ppb, respectively. Results of the soil analyses are summarized in Table 2 and water analyses in 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 6.90 to 7.71 feet below the surface. The ground water flow direction appeared to be north-northeasterly, (based on water level data collected from the five monitoring wells on April 26, 1989).

Subsurface formations at the site consist of sandy silt and clayey silt, high plasticity clay and sandy clay to the total depth explored.

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. In addition, the wells should be purged 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. Our proposal for this work is attached for your consideration.

Copies of this report should be sent to the Alameda County Flood Control District, the Hayward Fire Department, 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.

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

Sincerely,

Kaprealian Engineering, Inc.

J. A. Stewart for Doug Lee

Doug Lee
Geologist

Jae Yang, P.E.
License No. 25337
Exp. Date 12/31/89

Mardo Kaprealian
President

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

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TABLE 1

SUMMARY OF GROUND WATER MONITORING AND DEVELOPMENT DATA

(Developed on April 25, 1989)

Well #	Product Thickness	Sheen	Gallons Pumped
MW1	0	None	30
MW2	0	None	25
MW3	0	None	25
MW4	0	None	25
MW5	0	None	25

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May 18, 1989

TABLE 2

SUMMARY OF LABORATORY ANALYSES
SOIL

(Results in ppm)
(Collected on April 20, 1989)

Sample Number	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
MW1*	5	ND	ND	ND	ND	ND
MW2*	5	ND	ND	ND	ND	ND
MW3	5	ND	ND	ND	ND	ND
MW3	9	ND	ND	ND	ND	ND
MW4	5	ND	ND	ND	ND	ND
MW4	9	1.4	ND	ND	ND	ND
MW5	5	900	3.1	3.1	110	30
MW5	9	ND	ND	ND	ND	ND
Detection Limits		1.0	0.05	0.1	0.1	0.1

* TPH as diesel, TOG, and 8010 were non-detectable in both samples.

ND = Non-detectable.

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TABLE 3

SUMMARY OF LABORATORY ANALYSES
WATER

(Results in ppb)
(Collected on April 26, 1989)

Sample Number	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
MW1*	7.38	ND	2.1	ND	ND	ND
MW2*	7.71	ND	ND	ND	ND	ND
MW3*	7.34	ND	ND	ND	ND	ND
MW4*	7.07	ND	0.33	ND	ND	ND
MW5*	6.90	ND	ND	ND	ND	ND
Detection Limits		30	0.3	0.3	0.3	0.3

* These samples were non-detectable for TPH as diesel, TOG, and EPA 8010.

ND = Non-detectable.

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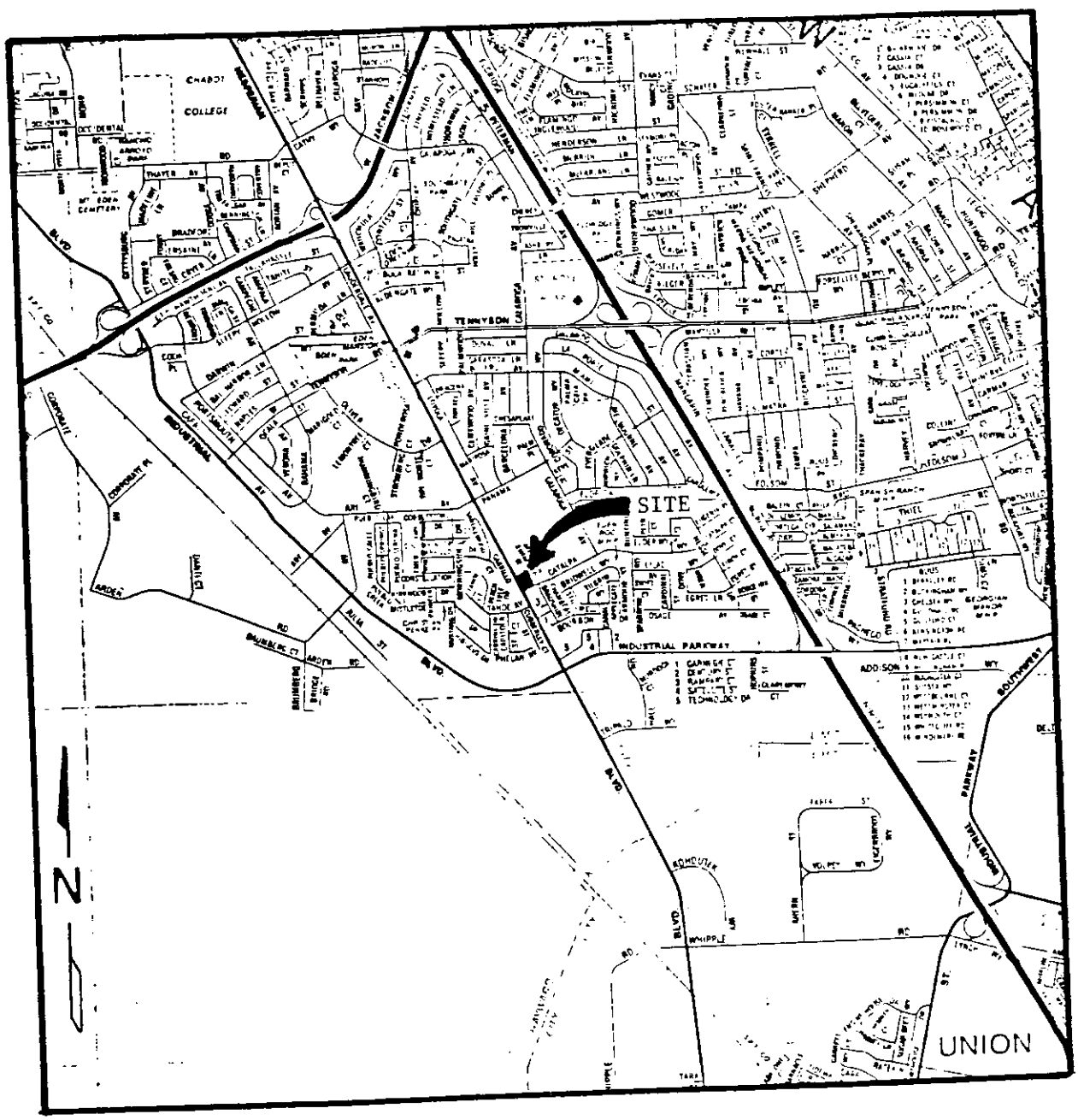

LOCATION MAP

Unocal Service Station #5487
28250 Hesperian Blvd.
Hayward, California

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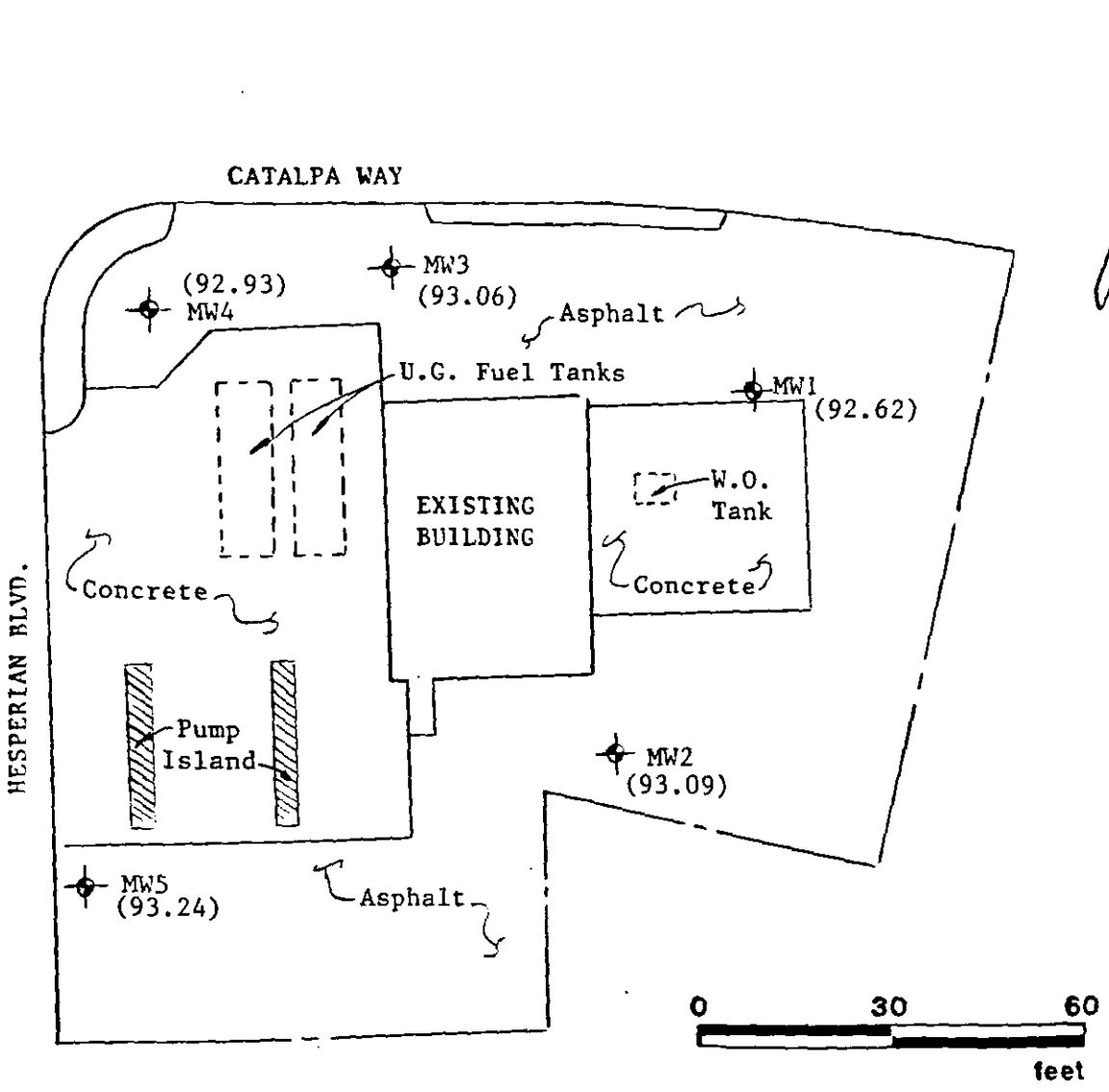


SITE PLAN

Monitoring Well

( ) Ground Water Elevation in feet (4/26/89). Subsurface Elevation at top of MW1 assumed 100' as datum.

Unocal Service Station #5487
28250 Hesperian Blvd.
Hayward, California

BORING LOG

Project No.	Boring & Casing Diameter	Logged By
KEI-P89-0111	9" 2"	Doug Lee
Project Name Unocal Hesperian - Hayward	**Well Head Elevation** N/A	**Date Drilled** 4/21/89
Boring No. MW1	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement
				Silt, sand & gravel: fill
			OH	Sandy clay, high plasticity, black, firm, slightly moist.
6/8/10		5		Sandy clay, high plasticity, dark greenish gray, firm, moist.
	▼			Clay, with sand, high plasticity, dark grayish brown, stiff, moist.
7/8/10		10		
		15		
			CH	Clay, high plasticity, very dark gray, stiff, slightly moist.
		20		
				Sandy clay, high plasticity, brown, very stiff, moist.
		25		
			SC	Clayey sand, dark yellowish brown, firm, wet.
		30		
				TOTAL DEPTH 28'

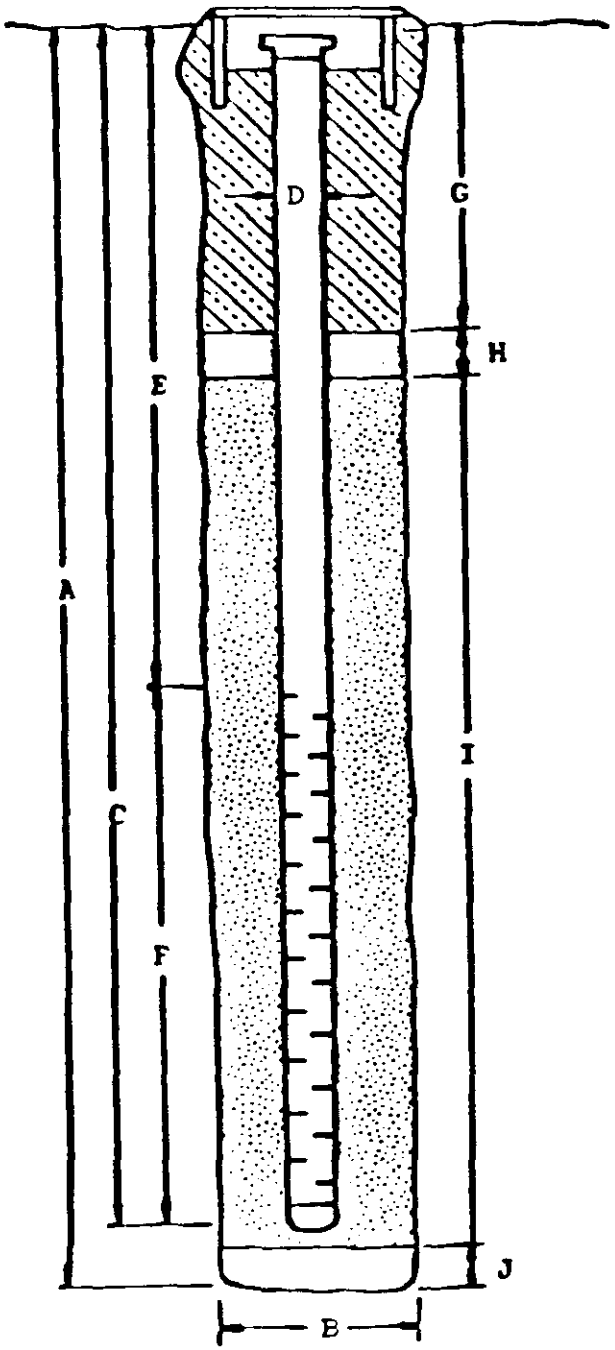
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal/Hayward/Hesperian & Catalpa BORING/WELL NO. MW1

PROJECT NUMBER: KEI-P89-0111

WELL PERMIT NO.: 89127

Flush-mounted Well Cover



A. Total Depth: 28'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 28'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375" ID = 2.067"

E. Depth to Perforations: 4'

F. Perforated Length: 24'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 1.5'

Seal Material: Concrete

H. Seal: 1.5'

Seal Material: Bentonite

I. Gravel Pack: 25'

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

Project No.	Boring & Casing Diameter	Logged By
KEI-P89-0111	9" 2"	Doug Lee
Project Name Unocal Hesperian - Hayward	**Well Head Elevation** N/A	**Date Drilled** 4/21/89
Boring No. MW2	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement
				Silt, sand & gravel: fill
			OH	Silty clay, 10-15% sand, high plasticity, black, firm to stiff, slightly moist.
9/12/17		5		Sandy clay, 10-15% gravel, very dark gray, stiff, slightly moist, gravel to 1/2".
5/6/8	▼			
		10		Clay, with sand and silt, dark grayish brown, firm, very moist, high plasticity.
		15	CH	Clay, very dark gray, very stiff, slightly moist, high plasticity.
		20		Sandy clay, brown, firm, wet.
		25		
		30		TOTAL DEPTH 24'

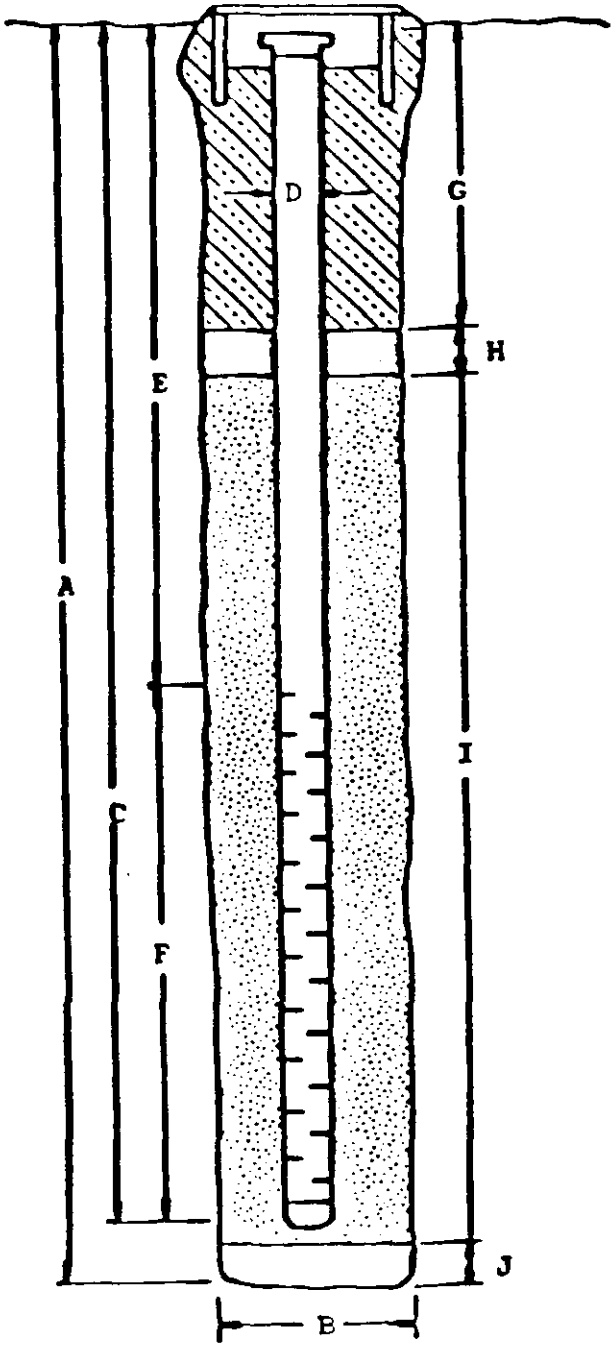
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal/Hayward/Hesperian & Catalpa BORING/WELL NO. MW2

PROJECT NUMBER: KEI-P89-0111

WELL PERMIT NO.: 89127

Flush-mounted Well Cover



A. Total Depth: 24'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 24'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"
ID = 2.067"

E. Depth to Perforations: 4'

F. Perforated Length: 20'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 1.5'

Seal Material: Concrete

H. Seal: 1.5'

Seal Material: Bentonite

I. Gravel Pack: 21'

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.

BORING LOG

Project No.	Boring & Casing Diameter	Logged By
KEI-P89-0111	9" 2"	Doug Lee
Project Name Unocal Hesperian - Hayward	**Well Head Elevation** N/A	**Date Drilled** 4/21/89
Boring No. MW3	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement
				Silt, sand & gravel: fill
			OH	Sandy elastic silt, 10-15% clay, moderate plasticity,
8/15/7		5		black, firm, moist.
				Sandy clay, high plasticity, sand is mostly fine, very dark gray, stiff, moist.
			CH	
6/6/8	▼	10		Sandy clay, high plasticity, dark grayish brown, firm, very moist.
11/14/18		15		Clay, high plasticity, very dark gray, very stiff, slightly moist.
		20	CH	Undifferentiated clay and sandy clay.
		25		
		30		
				TOTAL DEPTH 25'

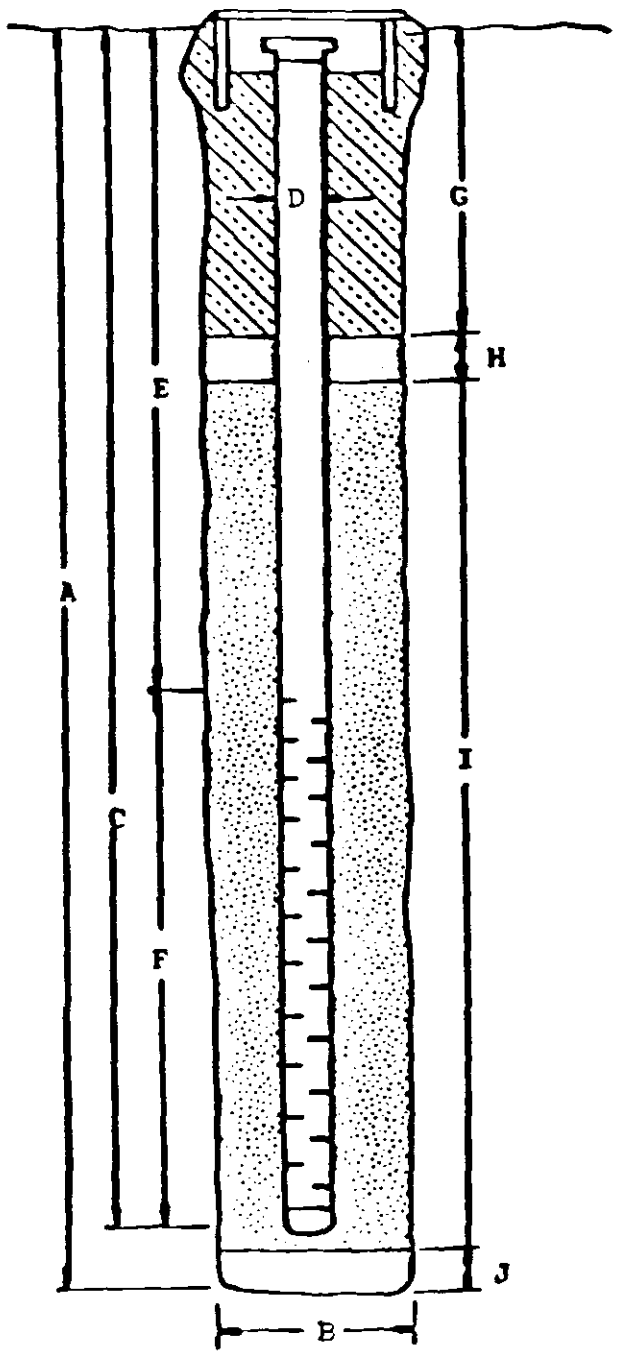
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal/Hayward/Hesperian & Catalpa BORING/WELL NO. MW3

PROJECT NUMBER: KEI-P89-0111

WELL PERMIT NO.: 89127

Flush-mounted Well Cover



A. Total Depth: 25'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 25'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375" ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 20'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 1.5'

Seal Material: Concrete

H. Seal: 1.5'

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.

BORING LOG

Project No.	Boring & Casing Diameter	Logged By
KEI-P89-0111	9" 2"	Doug Lee
Project Name Unocal Hesperian - Hayward	**Well Head Elevation** N/A	**Date Drilled** 4/20/89
Boring No. MW4	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement
				Silt, sand & gravel: fill
			OL	Sandy silt, some clay, black, firm, moist, low plasticity.
4/8/11		5		
				Sandy clay, high plasticity, very dark grayish brown, stiff, moist, with root holes.
4/5/9	▼	10		
10/15/27			CH	
12/14/18		15		Clay, high plasticity, dark olive gray & very dark gray, mottled, very stiff, moist, with weak cementation below 13'.
				Clay, with silt, high plasticity, dark grayish brown & gray, mottled, firm, wet, with moderate cementation, blocky.
8/9/11		20		
9/15/21			SC	Clayey sand, dark grayish brown, firm, wet.
		25		
		30		
				TOTAL DEPTH 25'

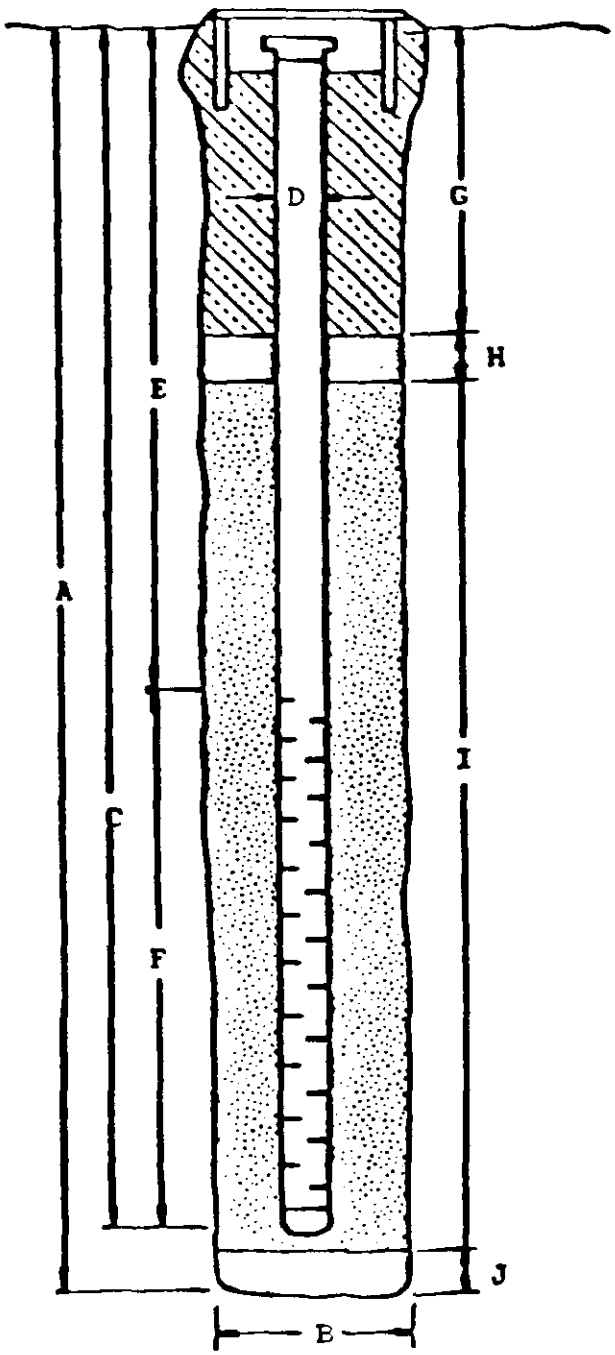
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal/Hayward/Hesperial & Catalpa BORING/WELL NO. MW4

PROJECT NUMBER: KEI-P89-0111

WELL PERMIT NO.: 89127

Flush-mounted Well Cover



A. Total Depth: 25'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 25'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375" ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 20'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 2'

Seal Material: Concrete

H. Seal: 2'

Seal Material: Bentonite

I. Gravel Pack: 21'

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

Project No.	Boring & Casing Diameter	Logged By
KEI-P89-0111	9" 2"	Doug Lee
Project Name Unocal Hesperian - Hayward	**Well Head Elevation** N/A	**Date Drilled** 4/21/89
Boring No. MW5	**Drilling Method** Hollow-stem Auger	**Drilling Company** EGI

Penetration blows/6"	G. W. level	Depth (ft) Samples	Stratigraphy USCS	Description
		0		A.C. Pavement Silt, sand & gravel: fill
5/8/10		5	MH	Clayey silt, with fine sand, high plasticity, olive brown, firm, moist.
9/16/20	▼	10		Clay, high plasticity, dark grayish brown & dark gray, mottled, very stiff, slightly moist, with root holes.
		15		Undifferentiated clay & sandy clay.
			CH	
		20		
		25		
		30		TOTAL DEPTH 24'

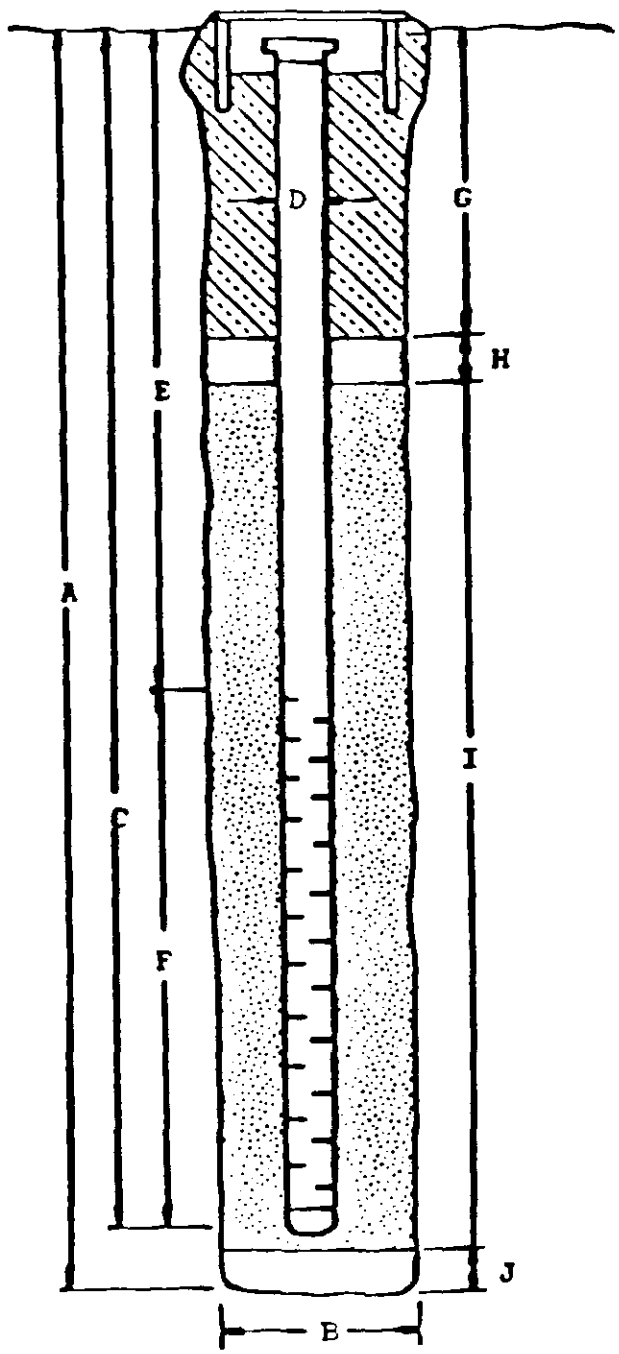
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal/Hayward/Hesperian & Catalpa BORING/WELL NO. MW5

PROJECT NUMBER: KEI-P89-0111

WELL PERMIT NO.: 89127

Flush-mounted Well Cover



A. Total Depth: 24'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 24'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375" ID = 2.067"

E. Depth to Perforations: 4'

F. Perforated Length: 20'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 1.5'

Seal Material: Concrete

H. Seal: 1.5'

Seal Material: Bentonite

I. Gravel Pack: 21'

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, Hayward, Hesperian/Catalpa	Sampled:	4/20-4/21/89
P.O. Box 913	Matrix Descript:	Soil	Received:	Apr 24, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8015/8020	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	First Sample #:	904-2391	Reported:	May 9, 1989

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)
904-2391	MW1 (5)	N.D.	N.D.	N.D.	N.D.	N.D.
904-2392	MW2 (5)	N.D.	N.D.	N.D.	N.D.	N.D.
904-2393	MW3 (5)	N.D.	N.D.	N.D.	N.D.	N.D.
904-2394	MW3 (9)	N.D.	N.D.	N.D.	N.D.	N.D.
904-2395	MW4 (5)	N.D.	N.D.	N.D.	N.D.	N.D.
904-2396	MW4 (9)	1.4	N.D.	N.D.	N.D.	N.D.
904-2397	MW5 (5)	900	3.1	3.1	30	110
904-2398	MW5 (9)	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**1.0**	**0.05**	**0.1**	**0.1**	**0.1**

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

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian/Catalpa	Sampled:	4/20-4/21/89
P.O. Box 913	Matrix Descript:	Soil	Received:	Apr 24, 1989
Benicia, CA 94510	Analysis Method:	EPA 413.1 (Gravimetric)	Extracted:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	First Sample #:	904-2391	Analyzed:	May 8, 1989
			Reported:	May 9, 1989

TOTAL RECOVERABLE OIL & GREASE

Sample Number	Sample Description	Oil & Grease mg/kg (ppm)
904-2391	MW1 (5)	N.D.
904-2392	MW2 (5)	N.D.

Detection Limits:	**30.0**

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian/Catalpa	Sampled:	4/20-4/21/89
P.O. Box 913	Matrix Descript:	Soil	Received:	Apr 24, 1989
Benicia, CA 94510	Analysis Method:	EPA 3550/8015	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	First Sample #:	904-2391	Reported:	May 9, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
904-2391	MW1 (5)	N.D.
904-2392	MW2 (5)	N.D.

Detection Limits:	**1.0**

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

SEQUOIA ANALYTICAL

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(415) 364-9600 • FAX (415) 364-9233

Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian/Catalpa	Sampled:	4/20-4/21/89
P.O. Box 913	Sample Descript:	Soil, MW1 (5)	Received:	Apr 24, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	May 3, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number:	903-2391	Reported:	May 9, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Bromodichloromethane	5.0	N.D.
Bromoform	5.0	N.D.
Bromomethane	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	5.0	N.D.
Chloroethane	25.0	N.D.
2-Chloroethylvinyl ether	5.0	N.D.
Chloroform	5.0	N.D.
Chloromethane	5.0	N.D.
Dibromochloromethane	5.0	N.D.
1,2-Dichlorobenzene	10.0	N.D.
1,3-Dichlorobenzene	10.0	N.D.
1,4-Dichlorobenzene	10.0	N.D.
1,1-Dichloroethane	5.0	N.D.
1,2-Dichloroethane	5.0	N.D.
1,1-Dichloroethene	5.0	N.D.
trans-1,2-Dichloroethene	5.0	N.D.
1,2-Dichloropropane	5.0	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	10.0	N.D.
1,1,2,2-Tetrachloroethane	5.0	N.D.
Tetrachloroethene	5.0	N.D.
1,1,1-Trichloroethane	5.0	N.D.
1,1,2-Trichloroethane	5.0	N.D.
Trichloroethene	5.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	10.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian/Catalpa	Sampled:	4/20-4/21/89
P.O. Box 913	Sample Descript:	Soil, MW2 (5)	Received:	Apr 24, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	May 3, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number:	903-2392	Reported:	May 9, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Bromodichloromethane	5.0	N.D.
Bromoform	5.0	N.D.
Bromomethane	5.0	N.D.
Carbon tetrachloride	5.0	N.D.
Chlorobenzene	5.0	N.D.
Chloroethane	25.0	N.D.
2-Chloroethylvinyl ether	5.0	N.D.
Chloroform	5.0	N.D.
Chloromethane	5.0	N.D.
Dibromochloromethane	5.0	N.D.
1,2-Dichlorobenzene	10.0	N.D.
1,3-Dichlorobenzene	10.0	N.D.
1,4-Dichlorobenzene	10.0	N.D.
1,1-Dichloroethane	5.0	N.D.
1,2-Dichloroethane	5.0	N.D.
1,1-Dichloroethene	5.0	N.D.
trans-1,2-Dichloroethene	5.0	N.D.
1,2-Dichloropropane	5.0	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	10.0	N.D.
1,1,2,2-Tetrachloroethane	5.0	N.D.
Tetrachloroethene	5.0	N.D.
1,1,1-Trichloroethane	5.0	N.D.
1,1,2-Trichloroethane	5.0	N.D.
Trichloroethene	5.0	N.D.
Trichlorofluoromethane	5.0	N.D.
Vinyl chloride	10.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
P. O. BOX 913
BENICIA, CA 94510
(415) 676 · 9100 (707) 746 · 6915

CHAIN OF CUSTODY

SAMPLER: [signature] (Signature)

DATE/TIME OF COLLECTION: 4-20-89 / 4-21-89

TURN AROUND TIME: Reg/RUSH

SAMPLE DESCRIPTION AND PROJECT NUMBER: Union / Hayward / Hesperian & Castro

SAMPLE #	ANALYSES	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/ WATER
MW-1-(S)	TPH-G/BTXE / TPH-D/8010/TOG(413.1)	G	1	S
MW-2-(S)	TPH-G/BTXE / TPH-D/8010/TOG(413.1)	G	1	S
MW-3-(S)	TPH-G/BTXE	G	1	S
MW-3-(9)	TPH-G/BTXE	G	1	S
MW-3-(15)	TPH-G/BTXE	G	1	S
MW-4-(S)	TPH-G/BTXE	G	1	S
MW-4-(9)	TPH-G/BTXE	G	1	S
MW-4-(12)	TPH-G/BTXE	G	1	S

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
1. [signature] (KEI)	4/24/89	Tim McLain	855 4/24/89
2. Tim McLain	4/24/89 1020	[signature]	10:20 4/24/89
3.			

* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS:

NOTE: IF REGULAR TURNAROUND, SOIL ANALYSES MUST BE COMPLETED WITHIN 14 CALENDAR DAYS OF SAMPLE COLLECTION. WATER ANALYSES MUST BE COMPLETED WITHIN 7 CALENDAR DAYS FOR BTX&E (UNLESS SAMPLE HAS BEEN PRESERVED), AND 14 CALENDAR DAYS FOR TPH AS GASOLINE; EXTRACT TPH AS DIESEL WITHIN 14 CALENDAR DAYS.

KAPREALIAN ENGINEERING, INC.
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CHAIN OF CUSTODY

SAMPLER: _____ (Signature)

DATE/TIME OF COLLECTION: 4-20-89/4-21-89

TURN AROUND TIME: Regular

SAMPLE DESCRIPTION AND PROJECT NUMBER: Unocal/Hayward/Hesperian & Castro

SAMPLE #	ANALYSES	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/ WATER
Hold MW-4-(14)	TPH-G/BTXHE	G	1	S
MW-5-(5)	TPH-G/BTXHE	G	1	S
MW-5-(9)	TPH-G/BTXHE	G	1	S

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
1. _____ (KEI)	4-24-89	Tim M'Lain BSF	4-24-89
2. Tim M'Lain	4/24/89 10:20	_____	4/24/89 10:20
3.			

* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: _____

NOTE: IF REGULAR TURNAROUND, SOIL ANALYSES MUST BE COMPLETED WITHIN 14 CALENDAR DAYS OF SAMPLE COLLECTION. WATER ANALYSES MUST BE COMPLETED WITHIN 7 CALENDAR DAYS FOR BTX&E (UNLESS SAMPLE HAS BEEN PRESERVED), AND 14 CALENDAR DAYS FOR TPH AS GASOLINE; EXTRACT TPH AS DIESEL WITHIN 14 CALENDAR DAYS.

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian	Sampled:	Apr 26, 1989
P.O. Box 913	Matrix Descript:	Water	Received:	Apr 27, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8015/8020	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	First Sample #:	904-2861 A-B	Reported:	May 5, 1989

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
9042861 A-B	MW1	N.D.	2.1	N.D.	N.D.	N.D.
9042862 A-B	MW2	N.D.	N.D.	N.D.	N.D.	N.D.
9042863 A-B	MW3	N.D.	N.D.	N.D.	N.D.	N.D.
9042864 A-B	MW4	N.D.	0.33	N.D.	N.D.	N.D.
9042865 A-B	MW5	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**30.0**	**0.3**	**0.3**	**0.3**	**0.3**

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

Arthur G. Burton
Laboratory Director

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian	Sampled:	Apr 26, 1989
P.O. Box 913	Matrix Descript:	Water	Received:	Apr 27, 1989
Benicia, CA 94510	Analysis Method:	EPA 3510/8015	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	First Sample #:	904-2861 C	Reported:	May 5, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons µg/L (ppb)
9042861 C	Mw1	N.D.
9042862 C	MW2	N.D.
9042863 C	MW3	N.D.
9042864 C	MW4	N.D.
9042865 C	MW5	N.D.

Detection Limits:	**50.0**

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.
Analytes reported as N.D. were not present above the stated limit of detection.

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian	Sampled:	Apr 26, 1989
P.O. Box 913	Matrix Descript:	Water	Received:	Apr 27, 1989
Benicia, CA 94510	Analysis Method:	EPA 413.1 (Gravimetric)	Extracted:	May 3, 1989
Attention: Mardo Kaprealian, P.E.	First Sample #:	9042861 D	Analyzed:	May 4, 1989
			Reported:	May 5, 1989

TOTAL RECOVERABLE OIL & GREASE

Sample Number	Sample Description	Oil & Grease mg/L (ppm)
9042861 D	MW1	N.D.
9042862 D	MW2	N.D.
9042863 D	MW3	N.D.
9042864 D	MW4	N.D.
9042865 D	MW5	N.D.

Detection Limits:	**5.0**

Analytes reported as N.D. were not present above the stated limit of detection.

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian	Sampled:	Apr 26, 1989
P.O. Box 913	Sample Descript:	Water, MW1	Received:	Apr 27, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number:	904-2861 E-F	Reported:	May 5, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane	1.0	N.D.
Bromoform	1.0	N.D.
Bromomethane	1.0	N.D.
Carbon tetrachloride	1.0	N.D.
Chlorobenzene	1.0	N.D.
Chloroethane	5.0	N.D.
2-Chloroethylvinyl ether	1.0	N.D.
Chloroform	0.5	N.D.
Chloromethane	0.5	N.D.
Dibromochloromethane	0.5	N.D.
1,2-Dichlorobenzene	2.0	N.D.
1,3-Dichlorobenzene	2.0	N.D.
1,4-Dichlorobenzene	2.0	N.D.
1,1-Dichloroethane	0.5	N.D.
1,2-Dichloroethane	0.5	N.D.
1,1-Dichloroethene	1.0	N.D.
trans-1,2-Dichloroethene	1.0	N.D.
1,2-Dichloropropane	0.5	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	2.0	N.D.
1,1,2,2-Tetrachloroethane	0.5	N.D.
Tetrachloroethene	0.5	N.D.
1,1,1-Trichloroethane	0.5	N.D.
1,1,2-Trichloroethane	0.5	N.D.
Trichloroethene	0.5	N.D.
Trichlorofluoromethane	1.0	N.D.
Vinyl chloride	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian	Sampled:	Apr 26, 1989
P.O. Box 913	Sample Descript:	Water, MW2	Received:	Apr 27, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number:	904-2862 E-F	Reported:	May 5, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane	1.0	N.D.
Bromoform	1.0	N.D.
Bromomethane	1.0	N.D.
Carbon tetrachloride	1.0	N.D.
Chlorobenzene	1.0	N.D.
Chloroethane	5.0	N.D.
2-Chloroethylvinyl ether	1.0	N.D.
Chloroform	0.5	N.D.
Chloromethane	0.5	N.D.
Dibromochloromethane	0.5	N.D.
1,2-Dichlorobenzene	2.0	N.D.
1,3-Dichlorobenzene	2.0	N.D.
1,4-Dichlorobenzene	2.0	N.D.
1,1-Dichloroethane	0.5	N.D.
1,2-Dichloroethane	0.5	N.D.
1,1-Dichloroethene	1.0	N.D.
trans-1,2-Dichloroethene	1.0	N.D.
1,2-Dichloropropane	0.5	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	2.0	N.D.
1,1,2,2-Tetrachloroethane	0.5	N.D.
Tetrachloroethene	0.5	N.D.
1,1,1-Trichloroethane	0.5	N.D.
1,1,2-Trichloroethane	0.5	N.D.
Trichloroethene	0.5	N.D.
Trichlorofluoromethane	1.0	N.D.
Vinyl chloride	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Arthur G. Burton
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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian	Sampled:	Apr 26, 1989
P.O. Box 913	Sample Descript:	Water, MW3	Received:	Apr 27, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number:	904-2863 E-F	Reported:	May 5, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane	1.0	N.D.
Bromoform	1.0	N.D.
Bromomethane	1.0	N.D.
Carbon tetrachloride	1.0	N.D.
Chlorobenzene	1.0	N.D.
Chloroethane	5.0	N.D.
2-Chloroethylvinyl ether	1.0	N.D.
Chloroform	0.5	N.D.
Chloromethane	0.5	N.D.
Dibromochloromethane	0.5	N.D.
1,2-Dichlorobenzene	2.0	N.D.
1,3-Dichlorobenzene	2.0	N.D.
1,4-Dichlorobenzene	2.0	N.D.
1,1-Dichloroethane	0.5	N.D.
1,2-Dichloroethane	0.5	N.D.
1,1-Dichloroethene	1.0	N.D.
trans-1,2-Dichloroethene	1.0	N.D.
1,2-Dichloropropane	0.5	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	2.0	N.D.
1,1,2,2-Tetrachloroethane	0.5	N.D.
Tetrachloroethene	0.5	N.D.
1,1,1-Trichloroethane	0.5	N.D.
1,1,2-Trichloroethane	0.5	N.D.
Trichloroethene	0.5	N.D.
Trichlorofluoromethane	1.0	N.D.
Vinyl chloride	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian	Sampled:	Apr 26, 1989
P.O. Box 913	Sample Descript:	Water, MW4	Received:	Apr 27, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number:	904-2864 E-F	Reported:	May 5, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane	1.0	N.D.
Bromoform	1.0	N.D.
Bromomethane	1.0	N.D.
Carbon tetrachloride	1.0	N.D.
Chlorobenzene	1.0	N.D.
Chloroethane	5.0	N.D.
2-Chloroethylvinyl ether	1.0	N.D.
Chloroform	0.5	N.D.
Chloromethane	0.5	N.D.
Dibromochloromethane	0.5	N.D.
1,2-Dichlorobenzene	2.0	N.D.
1,3-Dichlorobenzene	2.0	N.D.
1,4-Dichlorobenzene	2.0	N.D.
1,1-Dichloroethane	0.5	N.D.
1,2-Dichloroethane	0.5	N.D.
1,1-Dichloroethene	1.0	N.D.
trans-1,2-Dichloroethene	1.0	N.D.
1,2-Dichloropropane	0.5	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	2.0	N.D.
1,1,2,2-Tetrachloroethane	0.5	N.D.
Tetrachloroethene	0.5	N.D.
1,1,1-Trichloroethane	0.5	N.D.
1,1,2-Trichloroethane	0.5	N.D.
Trichloroethene	0.5	N.D.
Trichlorofluoromethane	1.0	N.D.
Vinyl chloride	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, Hayward, Hesperian	Sampled:	Apr 26, 1989
P.O. Box 913	Sample Descript:	Water, MW5	Received:	Apr 27, 1989
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	May 4, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number:	904-2865 E-F	Reported:	May 5, 1989

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane	1.0	N.D.
Bromoform	1.0	N.D.
Bromomethane	1.0	N.D.
Carbon tetrachloride	1.0	N.D.
Chlorobenzene	1.0	N.D.
Chloroethane	5.0	N.D.
2-Chloroethylvinyl ether	1.0	N.D.
Chloroform	0.5	N.D.
Chloromethane	0.5	N.D.
Dibromochloromethane	0.5	N.D.
1,2-Dichlorobenzene	2.0	N.D.
1,3-Dichlorobenzene	2.0	N.D.
1,4-Dichlorobenzene	2.0	N.D.
1,1-Dichloroethane	0.5	N.D.
1,2-Dichloroethane	0.5	N.D.
1,1-Dichloroethene	1.0	N.D.
trans-1,2-Dichloroethene	1.0	N.D.
1,2-Dichloropropane	0.5	N.D.
cis-1,3-Dichloropropene	5.0	N.D.
trans-1,3-Dichloropropene	5.0	N.D.
Methylene chloride	2.0	N.D.
1,1,2,2-Tetrachloroethane	0.5	N.D.
Tetrachloroethene	0.5	N.D.
1,1,1-Trichloroethane	0.5	N.D.
1,1,2-Trichloroethane	0.5	N.D.
Trichloroethene	0.5	N.D.
Trichlorofluoromethane	1.0	N.D.
Vinyl chloride	2.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Arthur G. Burton
Laboratory Director

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CHAIN OF CUSTODY

SAMPLER (signature) Ray KET DATE/TIME OF COLLECTION: 4/26/89 TURN AROUND TIME: 1 Week

SAMPLE DESCRIPTION AND PROJECT NUMBER: UNOCAL HAYWARD / HESPERIAN

SAMPLE #	ANALYSES	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/ WATER
MW1	TPHG. BTXE	Grab	2V	W
MW2	TPHD as Diesel	"	1L	"
MW3	TOG (413.1)	"	1L	"
MW4	601	"	2V	"
MW5				
	All the same analysis			

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
1. Ray (KET)	7:30PM 4/26/89	[signature]	1930 20 April 89
2.			
3.			
4.			

* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: