



KAPREALIAN ENGINEERING, INC.

Consulting Engineers
P. O. BOX 913
BENICIA, CA 94510
(707) 746-6915

KEI-J89-0801.R2
August 15, 1989

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

Attention: Mr. Ron Bock

RE: Soil Sampling Report
Unocal Service Station #6034
4700 First Street
Livermore, California

Dear Mr. Bock:

This report summarizes the soil sampling performed by Kaprealian Engineering, Inc. (KEI) at the referenced site. All work was performed in compliance with the guidelines established by the Regional Water Quality Control Board (RWQCB), and the Alameda County Health Agency.

The scope of the work performed by KEI consisted of the following:

Coordination with regulatory agencies.

Collection of samples of native soil from beneath the tanks, and from the product pipe trenches.

Collection of a composite sample of soil excavated from the waste oil tank pit and stockpiled on-site.

Collection of a water sample from the fuel storage tank pit.

Delivery of samples, including proper Chain of Custody documentation, to a certified analytical laboratory.

Technical review of field data and laboratory analyses, and preparation of this report.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a gasoline station. Site vicinity and site descriptions are shown on the attached sketch. No leaks or previous subsurface work performed at the site are known to KEI.

FIELD ACTIVITIES

KEI's field work was conducted on August 2, 1989. On this date, three underground fuel storage tanks were removed from the site. The tanks consisted of two 12,000 gallon fuel storage tanks and one 550 gallon waste oil tank. The tanks were made of steel and no apparent holes or cracks were observed in the tanks. Mr. Lowell Miller of the Alameda County Health Agency, and Mr. R. Bohannon and Mr. R. Griffith of the City of Livermore Fire Department, were present during tank removal.

Six soil samples, labeled A1, A2, A3, B1, B2, and B3, were taken of native soil from beneath the fuel tanks at depths of 15 to 16 feet. In an attempt to remove as much of the contaminated soil as possible, additional soil was excavated in the area of sample point A3. Ground water was encountered at a depth of 17.5 feet. After sampling, the fuel tank pit was excavated to a depth of 15 feet with the area around sample point A3 further excavated to 1 foot below ground water. One soil sample, labeled W01, was collected from the native soil beneath the waste oil tank location at a depth of 8.5 feet. After sampling, the waste oil tank pit was excavated to a depth of 9 feet. Samples were collected from bulk material excavated by backhoe. Samples were placed in clean, 2" diameter brass tubes, sealed with aluminum foil, plastic caps and tape, and stored in a cooled ice chest for delivery to a certified laboratory. Sample locations and the additional area excavated in the vicinity of sample point A3 are as shown on the attached Site Plan.

KEI returned to the site on August 7, 1989, to take the required product pipe trench samples. Seven undisturbed samples of native soil were collected from bulk material excavated by backhoe. These samples, labeled P1 through P7 inclusive, were at depths of 2.5 to 3.5 feet. Samples were collected and handled as described above. Sample point locations are shown on the attached Site Plan.

Also on August 7, 1989, after approximately 1,000 gallons of ground water were pumped from the fuel tank pit, one water sample, labeled W1, was collected in clean glass VOA vials with Teflon screw caps. The water sample was also stored as described above.

Finally, one composite soil sample, labeled Comp WOA, was collected from approximately 50 cubic yards of soil stockpiled on-site. The soil was generated during waste oil tank excavation and removal. The composite consisted of four individual grab samples taken at various locations and depths ranging from 1 to 2 feet and composited as one sample by the lab. This sample was also handled and stored as described above. The location of composite sample Comp WOA is shown on the attached Site Plan.

SUBSURFACE CONDITIONS

The subsurface soils exposed in the excavations consisted primarily of silty clay to a depth of 8 feet, clay from 8 to 17 feet, with sandy gravel below.

ANALYTICAL RESULTS

All samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California and were accompanied by properly executed Chain of Custody documentation. All samples, except Comp WOA, were analyzed for total petroleum hydrocarbon (TPH) as gasoline using EPA method 5030 or 3810 in conjunction with modified 8015, and benzene, toluene, xylenes and ethylbenzene (BTX&E) using EPA method 8020. In addition, the sample from beneath the waste oil tank, W01, was analyzed for TPH as diesel using EPA method 3550 in conjunction with modified 8015, total oil and grease (TOG) using method 503 D&E, EPA 8010 constituents and EPA 8270. The waste oil stockpile composite sample was analyzed for TPH as diesel and TOG only.

Analyses of soil samples from the fuel tank pit indicate levels of TPH as gasoline ranging from non-detectable to 390. TPH as gasoline ranged from non-detectable to 9.6 ppm for the samples taken from the product pipe trenches. The water sample showed 47,000 ppb TPH as gasoline and 260 ppb benzene.

The soil sample from beneath the waste oil tank, W01, showed 1.4 ppm TPH as diesel and non-detectable levels of TOG, all 8010 and all 8270 constituents. Analyses indicated a TOG concentration of 350 ppm for Comp WOA.

The analytical results for soil samples are summarized in Table 1. The water sample analytical results are summarized in Table 2. Copies of the laboratory analyses and the Chain of Custody documentation are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results, the stockpile represented by sample Comp WOA can be disposed of at a Class I landfill.

In accordance with the guidelines established by the RWQCB, further work is necessary at the site because of the level of contamination found in the soil and in the ground water. To comply with the requirements of the RWQCB and the Alameda County Health Agency, KEI recommends the installation of four monitoring wells at the site to begin to define the extent of the soil and ground water contamination, and to determine the ground water flow direction. KEI's proposal for this work is attached for your review and consideration.

A copy of this report should be sent to Mr. Lowell Miller of the Alameda County Health Agency, Mr. R. Griffith of the City of Livermore Fire Department, and to the RWQCB, San Francisco Bay Region.

LIMITATIONS

The results of this study are based on the data obtained from the field work and laboratory analyses. 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.

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Should you have any questions regarding this report, please feel free to call me at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.



Hagop Kevork
Civil Engineer



Richard M. Bradish
Staff Engineer



Mardo Kaprealian
President

Attachments: Table 1 & 2
Site Plan
Laboratory Analyses
Chain of Custody documentation
Proposal

KEI-J89-0801.R2
 August 15, 1989

TABLE 1

SUMMARY OF LABORATORY ANALYSES
 SOIL

(Results in ppm)
 (Samples collected on August 2 & 7, 1989)

<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl- benzene</u>
A1	15	---	2.1	ND	ND	0.21	ND
A2	15	---	1.6	ND	ND	ND	ND
A3	16	---	390	1.7	45	86	16
B1	15	---	ND	ND	ND	0.10	ND
B2	15	---	ND	ND	ND	ND	ND
B3	15	---	2.3	ND	ND	0.30	0.12
P1	3.5	---	9.6	ND	ND	0.94	0.16
P2	3.5	---	ND	ND	ND	ND	ND
P3	3.5	---	ND	ND	ND	ND	ND
P4	3.5	---	ND	ND	ND	ND	ND
P5	2.5	---	ND	ND	ND	ND	ND
P6	2.5	---	ND	ND	ND	ND	ND
P7	2.5	---	1.5	ND	ND	ND	ND
*W01	8.5	1.4	ND	ND	ND	ND	ND
**Comp WOA	---	4.9	---	---	---	---	---
Detection Limits		1.0	1.0	0.05	0.1	0.1	0.1

* For sample W01, TOG, all 8010 constituents, and 8270 constituents were non-detectable.

** For Comp WOA, TOG concentration was 350 ppm.

ND = Non-detectable.

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August 15, 1989

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

(Results in ppb)
(Sample collected on August 7, 1989)

<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
W1	17.5	47,000	260	840	9,400	830
Detection Limits		30	0.3	0.3	0.3	0.3



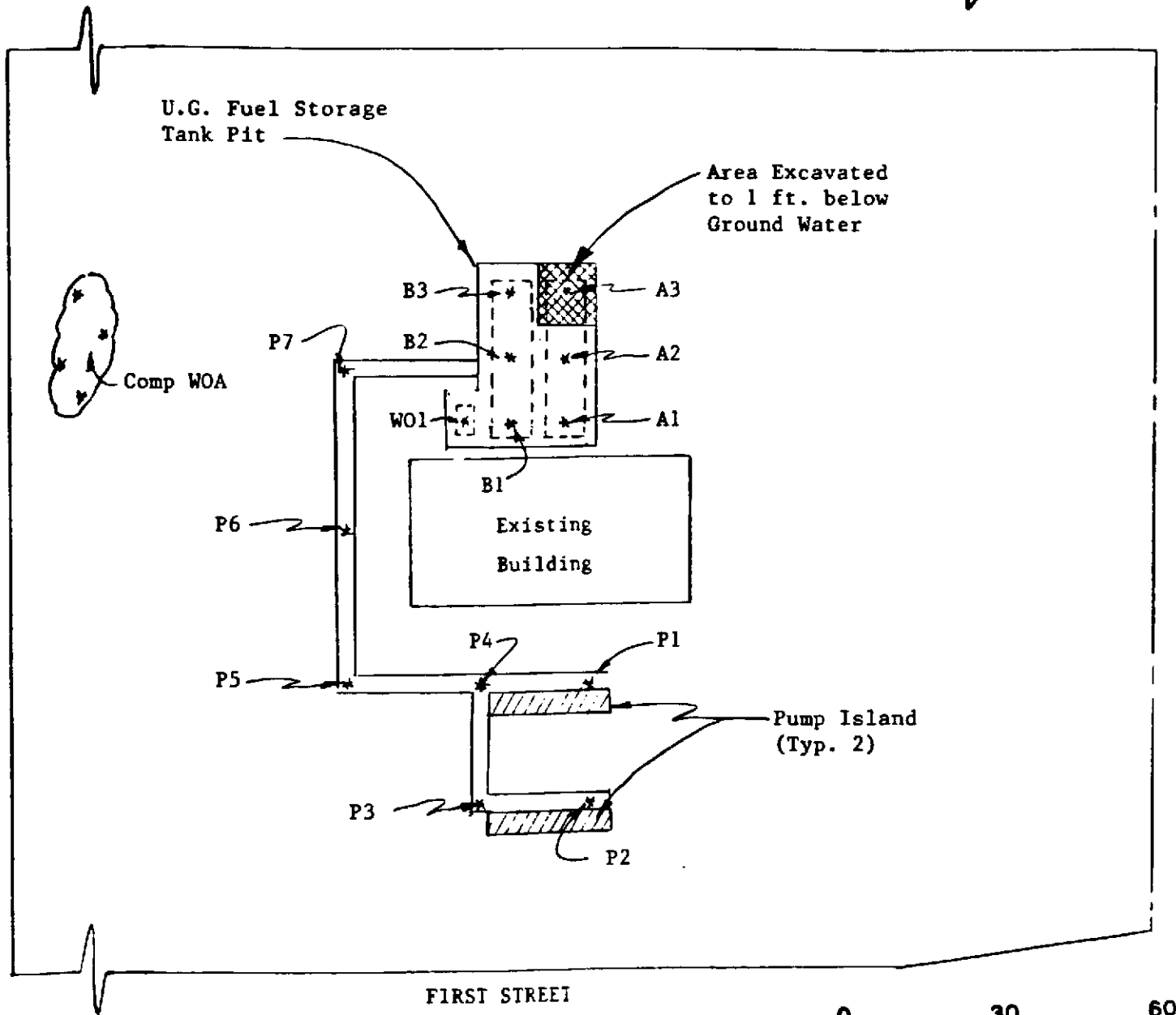
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Consulting Engineers

P. O. BOX 913

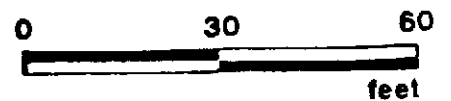
BENICIA, CA 94510

(707) 746-6915



FIRST STREET

SITE PLAN



* Sample Point Location

Unocal Service Station #6034
4700 First Street
Livermore, California



SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc. P.O. Box 913 Benicia, CA 94510 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, Livermore, 1st St./Hwy 580 Matrix Descript: Soil Analysis Method: EPA 5030/8015/8020 First Sample #: 908-0170	Sampled: Aug 2, 1989 Received: Aug 3, 1989 Analyzed: Aug 3, 1989 Reported: Aug 4, 1989
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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)
908-0170	A1	2.1	N.D.	N.D.	N.D.	0.21
908-0171	A2	1.6	N.D.	N.D.	N.D.	N.D.
908-0172	A3	390	1.7	45	16	86
908-0173	B1	N.D.	N.D.	N.D.	N.D.	0.10
908-0174	B2	N.D.	N.D.	N.D.	N.D.	N.D.
908-0175	B3	2.3	N.D.	N.D.	0.12	0.30

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

9080170.KEI <1>



KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P. O. BOX 913

BENICIA, CA 94510

(415) 676-9100 (707) 746-6915

CHAIN OF CUSTODY

SAMPLER: R.M. Bradish DATE/TIME OF COLLECTION: 8-2-89 TURN AROUND TIME: 24 HR
 (Signature)

SAMPLE DESCRIPTION AND PROJECT NUMBER:

Unocal - Livermore
First St & Hwy 580

SAMPLE #	ANALYSES	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
A1	TPH-G & BTXE	G	1	S
A2	" "	G	1	S
A3	" "	G	1	S
B1	" "	G	1	S
B2	" "	G	1	S
B3	" "	G	1	S

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
1. <u>R.M. Bradish</u>	<u>9:50 am 8/3/89</u>	<u>Tom McLean</u>	<u>9:50 8/3/89</u>
2. <u>Tom McLean</u>	<u>11:00 8/3/89</u>	<u>Ron Ac</u>	<u>8/3/89 11:00 AM</u>
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.



SEQUOIA ANALYTICAL

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(415) 364-9600 • FAX (415) 364-9233

Kaprealian Engineering, Inc. P.O. Box 913 Benicia, CA 94510 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, Livermore, 4700 1st St. Matrix Descript: Soil Analysis Method: EPA 5030/8015/8020 First Sample #: 908-0647	Sampled: Aug 7, 1989 Received: Aug 7, 1989 Analyzed: 8/7, 8/8/89 Reported: Aug 9, 1989
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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)
908-0647	P1	9.6	N.D.	N.D.	0.16	0.94
908-0648	P2	N.D.	N.D.	N.D.	N.D.	N.D.
908-0649	P3	N.D.	N.D.	N.D.	N.D.	N.D.
908-0650	P4	N.D.	N.D.	N.D.	N.D.	N.D.
908-0651	P5	N.D.	N.D.	N.D.	N.D.	N.D.
908-0652	P6	N.D.	N.D.	N.D.	N.D.	N.D.
908-0653	P7	1.5	N.D.	N.D.	N.D.	N.D.

Detection Limits:	1.0	0.05	0.1	0.1	0.1
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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.

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Arthur G. Burton
Laboratory Director

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KAPREALIAN ENGINEERING, INC.

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BENICIA, CA 94510

(415) 676-9100 (707) 746-6915

CHAIN OF CUSTODY

SAMPLER: HAGOP DATE/TIME OF COLLECTION: 8-07-89 TURN AROUND TIME: 24 HRS
 (Signature)

SAMPLE DESCRIPTION AND PROJECT NUMBER:

UNOCAL-4700 First St. - LIVERMORE

SAMPLE #	ANALYSES	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
<u>P1</u>	<u>TPH-G/BTXE</u>	<u>G</u>	<u>1</u>	<u>S</u> 9080647
<u>P2</u>	<u>TPH-G/BTXE</u>	<u>G</u>	<u>1</u>	<u>S</u>
<u>P3</u>	<u>TPH-G/BTXE</u>	<u>G</u>	<u>1</u>	<u>S</u>
<u>P4</u>	<u>TPH-G/BTXE</u>	<u>G</u>	<u>1</u>	<u>S</u>
<u>P5</u>	<u>TPH-G/BTXE</u>	<u>G</u>	<u>1</u>	<u>S</u>
<u>P6</u>	<u>TPH-G/BTXE</u>	<u>G</u>	<u>1</u>	<u>S</u>
<u>P7</u>	<u>TPH-G/BTXE</u>	<u>G</u>	<u>1</u>	<u>S</u> 9080653

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
<u>Hagop Kevork</u>	<u>4:00</u> <u>8-07-89</u>	<u>Ben Bonnet</u>	<u>4:00</u> <u>8/17/89</u>
<u>Ben Bonnet</u>	<u>5:30</u> <u>8/17/89</u>	<u>David Reed</u>	<u>5:30</u> <u>8-17-89</u>
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.
P.O. Box 913
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, Livermore, 1st St/Hwy 580
Matrix Descript: Soil
Analysis Method: SM 503 D&E (Gravimetric)
First Sample #: 908-0176

Sampled: Aug 2, 1989
Received: Aug 3, 1989
Extracted: Aug 4, 1989
Analyzed: Aug 4, 1989
Reported: Aug 4, 1989

TOTAL RECOVERABLE OIL & GREASE

Sample Number	Sample Description	Oil & Grease mg/kg (ppm)
908-0176	WO1	N.D.

Detection Limits:

30.0

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

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Laboratory Director

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Kaprealian Engineering, Inc.
P.O. Box 913
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, Livermore, 1st St/Hwy 580
Matrix Descript: Soil
Analysis Method: EPA 3550/8015
First Sample #: 908-0176

Sampled: Aug 2, 1989
Received: Aug 3, 1989
Extracted: Aug 4, 1989
Analyzed: Aug 4, 1989
Reported: Aug 4, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
908-0176	WO1	1.4

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.

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Kaprealian Engineering, Inc.	Client Project ID: Unocal, Livermore, 1st St/Hwy 580	Sampled: Aug 2, 1989
P.O. Box 913	Sample Descript.: Soil, WO1	Received: Aug 3, 1989
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: Aug 3, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number: 908-0176	Reported: Aug 4, 1989

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

Analyte	Detection Limit mg/kg (ppm)	Sample Results mg/kg (ppm)
Low to Medium Boiling Point Hydrocarbons.....	1.0	N.D.
Benzene.....	0.05	N.D.
Toluene.....	0.1	N.D.
Ethyl Benzene.....	0.1	N.D.
Xylenes.....	0.1	N.D.

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.

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Kaprealian Engineering, Inc.	Client Project ID: Unocal, Livermore, 1st St/Hwy 580	Sampled: Aug 2, 1989
P.O. Box 913	Sample Descript: Soil, WO1	Received: Aug 3, 1989
Benicia, CA 94510	Analysis Method: EPA 5030/8010	Analyzed: Aug 4, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number: 908-0176	Reported: Aug 4, 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.
Total 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.

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Kaprealian Engineering, Inc.
P.O. Box 913
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, Livermore, 1st St/Hwy 580
Sample Descript: Soil, WO1
Analysis Method: EPA 8270
Lab Number: 908-0176

Sampled: Aug 2, 1989
Received: Aug 3, 1989
Extracted: Aug 3, 1989
Analyzed: Aug 4, 1989
Reported: Aug 4, 1989

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
Acenaphthene.....	100.0	N.D.
Acenaphthylene.....	100.0	N.D.
Aniline.....	100.0	N.D.
Anthracene.....	100.0	N.D.
Benzidine.....	2,500.0	N.D.
Benzoic Acid.....	500.0	N.D.
Benzo(a)anthracene.....	100.0	N.D.
Benzo(b)fluoranthene.....	100.0	N.D.
Benzo(k)fluoranthene.....	100.0	N.D.
Benzo(g,h,i)perylene.....	100.0	N.D.
Benzo(a)pyrene.....	100.0	N.D.
Benzyl alcohol.....	100.0	N.D.
Bis(2-chloroethoxy)methane.....	100.0	N.D.
Bis(2-chloroethyl)ether.....	100.0	N.D.
Bis(2-chloroisopropyl)ether.....	100.0	N.D.
Bis(2-ethylhexyl)phthalate.....	500.0	N.D.
4-Bromophenyl ether.....	100.0	N.D.
Butyl benzyl phthalate.....	100.0	N.D.
4-Chloroaniline.....	100.0	N.D.
2-Chloronaphthalene.....	100.0	N.D.
4-Chloro-3-methylphenol.....	100.0	N.D.
2-Chlorophenol.....	100.0	N.D.
4-Chlorophenyl phenyl ether.....	100.0	N.D.
Chrysene.....	100.0	N.D.
Dibenz(a,h)anthracene.....	100.0	N.D.
Dibenzofuran.....	100.0	N.D.
Di-N-butyl phthalate.....	500.0	N.D.
1,3-Dichlorobenzene.....	100.0	N.D.
1,4-Dichlorobenzene.....	100.0	N.D.
1,2-Dichlorobenzene.....	100.0	N.D.
3,3-Dichlorobenzidine.....	500.0	N.D.
2,4-Dichlorophenol.....	100.0	N.D.
Diethyl phthalate.....	100.0	N.D.
2,4-Dimethylphenol.....	100.0	N.D.
Dimethyl phthalate.....	100.0	N.D.
4,6-Dinitro-2-methylphenol.....	500.0	N.D.
2,4-Dinitrophenol.....	500.0	N.D.



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Kaprealian Engineering, Inc.
P.O. Box 913
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, Livermore, 1st St/Hwy 580
Sample Descript: Soil, WO1
Analysis Method: EPA 8270
Lab Number: 908-0176

Sampled: Aug 2, 1989
Received: Aug 3, 1989
Extracted: Aug 3, 1989
Analyzed: Aug 4, 1989
Reported: Aug 4, 1989

SEMI-VOLATILE ORGANICS by GC/MS (EPA 8270)

Analyte	Detection Limit µg/kg	Sample Results µg/kg
2,4-Dinitrotoluene.....	100.0	N.D.
2,6-Dinitrotoluene.....	100.0	N.D.
Di-N-octyl phthalate.....	100.0	N.D.
Fluoranthene.....	100.0	N.D.
Fluorene.....	100.0	N.D.
Hexachlorobenzene.....	100.0	N.D.
Hexachlorobutadiene.....	100.0	N.D.
Hexachlorocyclopentadiene.....	100.0	N.D.
Hexachloroethane.....	100.0	N.D.
Indeno(1,2,3-cd)pyrene.....	100.0	N.D.
Isophorone.....	100.0	N.D.
2-Methylnaphthalene.....	100.0	N.D.
2-Methylphenol.....	100.0	N.D.
4-Methylphenol.....	100.0	N.D.
Naphthalene.....	100.0	N.D.
2-Nitroaniline.....	100.0	N.D.
3-Nitroaniline.....	100.0	N.D.
4-Nitroaniline.....	100.0	N.D.
Nitrobenzene.....	100.0	N.D.
2-Nitrophenol.....	100.0	N.D.
4-Nitrophenol.....	500.0	N.D.
N-Nitrosodiphenylamine.....	100.0	N.D.
N-Nitroso-di-N-propylamine.....	100.0	N.D.
Pentachlorophenol.....	500.0	N.D.
Phenathrene.....	100.0	N.D.
Phenol.....	100.0	N.D.
Pyrene.....	100.0	N.D.
1,2,4-Trichlorobenzene.....	100.0	N.D.
2,4,5-Trichlorophenol.....	100.0	N.D.
2,4,6-Trichlorophenol.....	100.0	N.D.

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, Livermore, 1st St/Hwy 580	Sampled: Aug 2, 1989
P.O. Box 913	Sample Descript: Soil, WO1	Received: Aug 3, 1989
Benicia, CA 94510	Analysis Method: EPA 8270 & "Open Scan"	Extracted: Aug 3, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number: 908-0176	Analyzed: Aug 4, 1989
		Reported: Aug 4, 1989

SEMI-VOLATILE ORGANICS by GC/MS, TENTATIVELY IDENTIFIED COMPOUNDS

Analyte

Detection Limit
 $\mu\text{g}/\text{kg}$

Sample Results
 $\mu\text{g}/\text{kg}$

No additional peaks > 250 $\mu\text{g}/\text{kg}$ were identified by the Mass Spectral Library.

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Laboratory Director

Please Note:

All identifications are tentative and concentrations are estimates based upon spectral comparison to the EPA/NIH library. Positive identification or specification between isomers cannot be made without retention time standards.

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KAPREALIAN ENGINEERING, INC.

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

CHAIN OF CUSTODY

SAMPLER: R.M. Beadish DATE/TIME OF COLLECTION: 8-2-89 TURN AROUND TIME: 24 HR
(Signature)

SAMPLE DESCRIPTION AND PROJECT NUMBER: Unocal - Lawrence
First St & Hwy 580

SAMPLE #	ANALYSES	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
<u>W01</u>	<u>TPH-G & BTXE</u>			
	<u>TPH-D; TOG (SOBATE)</u>			
	<u>8010 & 8270 For</u>			
	<u>PCB, PCP, PNA &</u>			
	<u>CREOSOTE</u>			

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
1. <u>R.M. Beadish</u>	<u>9:50 am</u> <u>8/3/89</u>	<u>Tom McPain</u>	<u>9⁵⁰</u> <u>8/3/89</u>
2. <u>Tom McPain</u>	<u>11⁰⁰</u> <u>8/3/89</u>	<u>[Signature]</u>	<u>11:00 AM</u>
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, Livermore, 4700 1st St.	Sampled: Aug 4, 1989
P.O. Box 913	Sample Descript.: Water, W1	Received: Aug 7, 1989
Benicia, CA 94510	Analysis Method: EPA 5030/ 8015/8020	Analyzed: Aug 8, 1989
Attention: Mardo Kaprealian, P.E.	Lab Number: 908-0725 A-B	Reported: Aug 9, 1989

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

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Low to Medium Boiling Point Hydrocarbons.....	30.0	47,000
Benzene.....	0.3	260
Toluene.....	0.3	840
Ethyl Benzene.....	0.3	830
Xylenes.....	0.3	9,400

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



KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P. O. BOX 913

BENICIA, CA 94510

(415) 676-9100 (707) 746-6915

CHAIN OF CUSTODY

SAMPLER: HAGOP DATE/TIME OF COLLECTION: 8-04-89 TURN AROUND TIME: 24 HRS
(Signature)

SAMPLE DESCRIPTION AND PROJECT NUMBER: UNOCAL - LIVERMORE - 4700 1ST ST.

<u>SAMPLE #</u>	<u>ANALYSES</u>	<u>GRAB OR COMP.</u>	<u>NUMBER OF CONTAINERS</u>	<u>SOIL/ WATER</u>
<u>W1</u>	<u>TPH - G/BTXE</u>	<u>C</u>	<u>2</u>	<u>W</u>

<u>RELINQUISHED BY*</u>	<u>TIME/DATE</u>	<u>RECEIVED BY*</u>	<u>TIME/DATE</u>
<u>Hagop Kevork</u>	<u>4:00</u> <u>8-04-89</u>	<u>Benjamin</u>	<u>4:00</u> <u>8/7/89</u>
<u>Benjamin</u>	<u>5:30</u> <u>8/7/89</u>	<u>Ken N</u>	<u>12:00 PM</u> <u>8/8/89</u>
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. P.O. Box 913 Benicia, CA 94510 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, Livermore, 4700 1st St. Matrix Descript: Soil Analysis Method: EPA 3550/8015 First Sample #: 908-0646 A-B	Sampled: Aug 7, 1989 Received: Aug 7, 1989 Extracted: Aug 8, 1989 Analyzed: Aug 8, 1989 Reported: Aug 9, 1989
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TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
9080646 A-B	Composite WOA	4.9

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

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SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc. P.O. Box 913 Benicia, CA 94510 Attention: Mardo Kaprealian, P.E.	Client Project ID: Unocal, Livermore, 4700 1st St. Matrix Descript: Soil Analysis Method: SM 503 D&E (Gravimetric) First Sample #: 908-0646 A-B	Sampled: Aug 7, 1989 Received: Aug 7, 1989 Extracted: Aug 8, 1989 Analyzed: Aug 8, 1989 Reported: Aug 9, 1989
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TOTAL RECOVERABLE OIL & GREASE

Sample Number	Sample Description	Oil & Grease mg/kg (ppm)
9080646 A-B	Composite WOA	350

Detection Limits: 30.0

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

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Arthur G. Burton
Laboratory Director

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KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P. O. BOX 913

BENICIA, CA 94510

(415) 676-9100 (707) 746-6915

CHAIN OF CUSTODY

SAMPLER: HAGOP DATE/TIME OF COLLECTION: 8-07-89 TURN AROUND TIME: 24 HRS
(Signature)

SAMPLE DESCRIPTION AND PROJECT NUMBER: UNOCAL - LIVERMORE - 4700' 1ST ST.

SAMPLE #	ANALYSES	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER	
COMPWOA	TPH-D/TOG	C	2	S	9080639
COMPA	TPH-G/BTXE	C	2	S	
COMPB	TPH-G/BTXE	C	2	S	
COMPC	TPH-G/BTXE	C	2	S	
COMPD	TPH-G/BTXE	C	2	S	
COMPE	TPH-G/BTXE	C	2	S	
COMP F	TPH-G/BTXE	C	2	S	
COMP G	TPH-G/BTXE	C	2	S	9080646

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
1. <u>Hagop Reevok</u>	<u>4:00</u> <u>8-07-89</u>	<u>Ben Reevok</u> Priority	<u>4:00</u> <u>8/17/89</u>
2. <u>Ben Reevok</u> Priority	<u>5:30</u> <u>8/17/89</u>	<u>Frank Reevok</u>	<u>5:30pm</u> <u>8-7-89</u>
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.