



KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P. O. BOX 913

BENICIA, CA 94510

(707) 746-6915 (707) 746-6916

FAX: (707) 746-5581

December 1, 1989

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

Attention: Mr. Scott Seery

RE: Unocal Service Station #3072
2445 Castro Valley Blvd.
Castro Valley, California

Dear Mr. Seery:

Per the request of Mr. Tim Ross of Unocal Corporation,
enclosed please find our work plan/proposal dated November
30, 1989 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: Tim Ross, Unocal



KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P. O. BOX 913

BENICIA, CA 94510

(707) 746-6915 (707) 746-6916

FAX: (707) 746-5581

KEI-P89-1106.P1

November 30, 1989

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

Attention: Mr. Tim Ross

RE: Work Plan/Proposal
Unocal Service Station #3072
2445 Castro Valley Blvd.
Castro Valley, California

INTRODUCTION

1. Background:

On November 14, 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. The soil samples under the fuel storage tanks were collected at a depth of 13.5 feet. The soil sample under the waste oil tank was collected at a depth of 10.5 feet. All soil samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California. The samples under the fuel storage tanks were analyzed for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes and ethylbenzene (BTX&E). In addition, the two samples from under the diesel tank were analyzed for TPH as diesel. Analytical results showed TPH ranging from non-detectable to 11 ppm, with non-detectable BTX&E concentrations in each case. TPH as diesel concentrations were non-detectable for the two diesel tank bottom samples. The soil sample from under the waste oil tank was analyzed for TPH as gasoline, BTX&E, TPH as diesel, TOG, 8010, 8270, and metals - cadmium, chromium, lead and zinc. Laboratory analyses showed TPH as gasoline at 5.9 ppm, metals ranging from non-detectable to 45 ppm, 55 ppb of 1,1-dichloroethene, with non-detectable levels of all other constituents analyzed.

On November 16, 1989, KEI collected six sidewall soil samples and a water sample from the fuel tank pit. The sidewall soil samples were collected approximately 6 to 12 inches above the tank pit water level measured at 11.5 feet. All samples were analyzed for TPH as gasoline and BTX&E. Three of the six sidewall soil samples (labeled SW2, SW3 and SW4) and the water sample were also analyzed for TPH as

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diesel. Laboratory analyses of the soil samples showed TPH as gasoline ranging from non-detectable to 29 ppm for four of the six samples, with samples SW1 and SW4 showing 140 and 160 ppm, respectively. TPH as diesel levels were non-detectable for two of the sidewall samples with sample SW4 showing 24 ppm. Analyses of the water sample showed 11,000 ppb TPH as diesel, 26,000 ppb TPH as gasoline, and 670 ppb benzene. To date, approximately 1,800 cubic yards of soil have been excavated from the fuel tank pit.

Soil sample point locations are shown on the attached Site Plan. Laboratory results are summarized in Tables 1 and 2 attached. Laboratory analyses and Chain of Custody documentation are also attached.

On November 28, 1989, KEI returned to the site to meet with the representative of the Alameda County Health Agency (ACHA) to clarify ACHA guidelines as applied to the subject site for fuel tank pit excavation and sampling. Phase I of this proposal has been developed in response to this meeting.

2. Site Description:

The service station site occupies the southwest corner at the intersection of Castro Valley Boulevard and Strobridge Avenue in Castro Valley, California. A Site Plan is attached.

Based on the analytical results obtained from the certified laboratory, KEI proposes the following field work.

PROPOSED FIELD WORK

PHASE I - FUEL TANK PIT EXCAVATION

1. KEI proposes first excavation of the northerly fuel tank pit sidewall in the vicinity of sample point location SW1. In addition, KEI proposes that one additional sidewall soil sample be taken at a depth of approximately 9 feet after lateral excavation.
2. KEI also proposes excavation of the easterly fuel tank pit sidewall to remove additional fill material located along this sidewall to a depth of 9-10 feet. Again, KEI proposes that additional sidewall soil samples be collected at a depth of 9 feet, taking a minimum of one sample per 20 linear feet of pit perimeter bounding the excavated area.

Samples will be collected after lateral excavation. The lateral extent of excavation may be terminated in the event that further excavation, considering soil conditions, presents the risk of damage to the public walkway located at the property boundary along Strobridge Avenue.

3. KEI proposes further excavation of half of the southerly fuel tank pit sidewall in the vicinity of sample point location SW4. KEI proposes that additional sidewall soil samples be collected at a depth of approximately 9 feet, taking a minimum of one sample per 20 linear feet of pit perimeter bounding the excavated area. Samples will be collected after lateral excavation. The lateral extent of excavation may be terminated in the event that further excavation, considering soil conditions, presents risk of damage to the canopy. In this event, KEI proposes that the concrete barrier installation and pipe trench sampling (as presented in Item 5 below) be performed.
4. KEI proposes that no further lateral excavation be performed along the westerly tank pit wall at this time. Rather a concrete barrier should be installed along this wall. Product pipe trench sampling will be conducted generally west of the barrier after completion of the fuel tank pit excavation and tank reinstallation.
5. Sample frequency and depth may be reasonably adjusted for any sidewall excavated to account for post excavation sidewall face lithology, and for environmental indications.
6. KEI proposes the use of a mobile, state certified laboratory to be located at the site during the sample collection process. The collection of all soil samples will be witnessed by ACHA. The undisturbed samples will be collected from bulk material excavated by backhoe. The samples will be placed in clean, 2" diameter brass tubes, sealed with aluminum foil, and plastic caps, and analyzed on-site by the certified laboratory.
7. All samples will be analyzed for TPH as gasoline (EPA 5030/8015) and BTX&E (EPA 5030/8020). In addition, samples collected from the easterly and southerly tank pit walls will be analyzed for TPH as diesel (EPA 3550/8015).
8. All excavated soil will be stockpiled on-site for further sampling to determine appropriate disposition.

PHASE II - SOIL AND GROUND WATER INVESTIGATION

Upon completion of Phase I as described above, KEI will develop a work plan to investigate the extent of the soil and ground water contamination, and to determine the ground water flow direction. These will be evaluated through the installation of monitoring wells. The work plan defining monitoring well locations and installation details will be submitted to the regulatory agencies.

#s ??

4 wells where??

1. KEI proposes to install ~~four~~ 2" diameter monitoring wells using hollow stem auger equipment. Permits will be obtained from the Alameda County Health Agency as necessary prior to beginning work.

2 wells

The wells will be drilled 15 feet into the saturated zone of the first encountered ground water unless a five foot thick clay aquitard is encountered first, at which time drilling will be terminated.

2. Soil samples will be collected at five foot intervals or changes in lithology beginning at a depth of five feet. Sampling will continue until the first water table is encountered. Classification of soil will be done using the Unified Soils Classification System (USCS) by KEI's field engineer or geologist. Samples will be collected in a California modified split-spoon sampler with 2" diameter brass liners. The sampler will be advanced ahead of the drilling augers at designated depths by dropping a 140 pound hammer 30". Blow counts will be recorded. The samples will be removed from the sampler, retained in the brass liners, and sealed with aluminum foil, plastic caps and tape. They will be labeled and stored on ice for delivery to a state certified laboratory.
3. Finalized boring logs will be prepared from field logs and submitted to the Alameda County Health Agency, and to the Regional Water Quality Control Board (RWQCB), San Francisco Bay Region.

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at ... well near ...
to ...

4. Well Construction:

Casing Type: Schedule 40 PVC, flush threaded joints, 0.02" factory slot, 2" diameter. Screen to run from total depth of the well to approximately 5 feet above first encountered ground water. Monterey sand (#3) will fill the annular space from total depth to 2 feet above the screened interval. A two foot thick bentonite seal will be placed in the annular space on top of the sand pack. Concrete will be poured from the top of the bentonite seal to the surface.

Well casings will be secured with a waterproof cap and a padlock. A round, watertight, flush-mounted well cover will be concreted in place over the top of the casing.

5. Wells will be checked for depth to the water table, the presence of free product and sheen (using an interface probe and/or paste tape) prior to both development and sampling. Water levels will be measured with an electronic sounder. The wells will be developed using a surface pump approximately one week after well completion. Wells will be pumped until expelled water is clear and free of turbidity. Effluent generated during well development will be contained in barrels and hauled from the site by a licensed hazardous materials hauler.

Casing elevations will be surveyed to an assumed datum.

6. Ground Water Sampling:

The wells will be purged with a surface bailer approximately five casing volumes prior to sampling, at least 24 hours after development. After recovery, samples will be collected using a clean Teflon bailer and will be promptly decanted into 40 ml VOA vials and/or one liter amber bottles as appropriate. Vials and/or bottles will be sealed with Teflon-lined screw caps, labeled and stored on ice for delivery to a state certified laboratory. Properly executed chain of custody documentation will accompany all samples. The sampling bailer will be cleaned with soap and a clean water rinse between uses.

7. Laboratory Analyses:

Selected soil and all water samples will be analyzed by Sequoia Analytical Laboratory in Redwood City, California, a state certified laboratory, for TPH as gasoline and BTX&E using EPA analytical methods (EPA 5030/8015/8020) recommended by the RWQCB, as specified in the Tri-regional guidelines.

Analytical results will be presented in tabular form, showing sample depths, results and detection limits. The results will be used to delineate the vertical and lateral extent of the subsurface contaminants. A cross sectional profile will be constructed as appropriate showing subsurface lithology to depth drilled and first water table depth.

If TPH levels in excess of action levels, set by the regulatory agencies, are found in the soil during well installation, additional monitoring wells and/or borings will be proposed and installed until zero-lines for soil and ground water contamination are defined.

8. Hydrology:

Ground water flow direction will be determined from survey data and water table depths. The ground water flow direction will be shown on the Site Plan.

9. Discussion and Recommendations:

Results of Phase II will be described in a technical report. If levels of contaminants in the ground water are found to be near or below action levels, KEI will recommend a 12 month program of monthly monitoring and quarterly sampling to document the levels.

If contaminant levels in the ground water are found to significantly exceed action levels, Phase III will be initiated.

The technical report will be submitted to the Alameda County Health Agency, and to the RWQCB, San Francisco Bay Region.

PHASE III

Phase III will discuss the alternatives for continuing the subsurface investigation if Phase II reveals contamination levels in the ground water significantly in excess of action levels.

Phase III will include a proposal for additional monitoring wells to define a zero line of ground water contamination. It will also propose a ground water monitoring and sampling program for the wells installed during Phase II.

The main purpose of Phase III will be to establish a zero line of ground water contamination. The proposal/work plan will be submitted to the regulatory agencies.

PHASE IV

Once the zero line is established through the completion of Phase III, a final remedial plan will be developed. This plan will also be submitted.

The first step of phase IV will be to conduct pumping tests to define aquifer characteristics.

Interpretations of the subsurface stratigraphy will be used in consideration of various remedial options.

PHASE V

Implementation of the remediation plan.

Sincerely,

Kaprealian Engineering, Inc.



Don R. Braun
Certified Engineering Geologist

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

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

KEI-P89-1106.P1
November 30, 1989

TABLE 1

SUMMARY OF LABORATORY ANALYSES
SOIL

(Results in ppm)
(Samples collected on November 14 & 16, 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>Ethylbenzene</u>
A1	13.5	ND	2.4	ND	ND	ND	ND
A2	13.5	ND	ND	ND	ND	ND	ND
B1	13.5	ND	1.9	ND	ND	ND	ND
B2	13.5	ND	11	ND	ND	ND	ND
C1	13.5	ND	1.5	ND	ND	ND	ND
C2	13.5	ND	7.5	ND	ND	ND	ND
SW1	10.5	--	140	0.31	0.12	3.0	0.88
SW2	10.5	ND	ND	ND	ND	ND	ND
SW3	10.5	ND	ND	ND	ND	ND	ND
SW4	9.5	24	160	0.33	6.4	30	9.4
SW5	9.5	--	3.5	0.06	0.27	0.76	0.19
SW6	10	--	29	0.12	0.21	2.0	0.58
WO1(11)*	11	ND	5.9	ND	ND	ND	ND
Detection Limits		1.0	1.0	0.05	0.1	0.1	0.1

* TOG and all 8270 constituents were non-detectable. All 8010 constituents were non-detectable except 1,1-dichloroethene as follows: cadmium 2.5 ppm, chromium 39 ppm, lead 1.1 ppm, and zinc 45 ppm.

ND = Non-detectable.

KEI-P89-1106.P1
November 30, 1989

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

(Results in ppb)
(Sample collected on November 16, 1989)

<u>Sample #</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>
W1	11,000	26,000	670	1,100	9,100	120
Detection Limits	50.0	30.0	0.3	0.3	0.3	0.3

ND = Non-detectable.



KAPREALIAN ENGINEERING, INC.

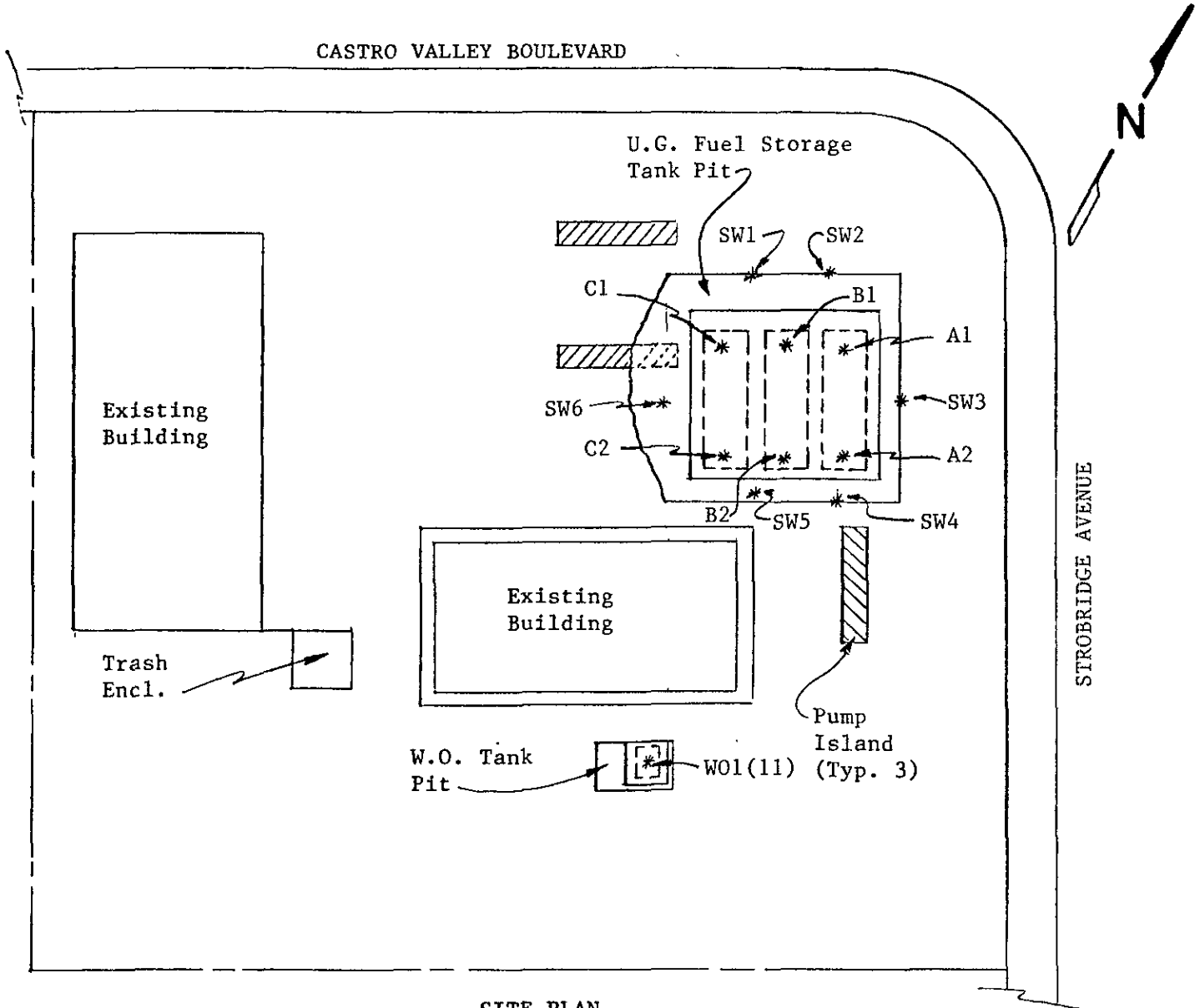
Consulting Engineers

P. O. BOX 913

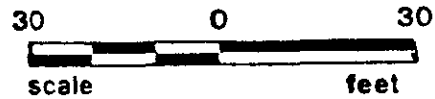
BENICIA, CA 94510

(707) 746-6915 (707) 746-6916

FAX: (707) 746-5581



SITE PLAN



* Sample Point Location

Unocal S/S #3072
2445 Castro Valley Blvd.
Castro Valley, CA



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, Castro Valley
Matrix Descript: Soil, SW1 thru SW6
Analysis Method: EPA 5030/8015/8020
First Sample #: 911-2338

Sampled: Nov 16, 1989
Received: Nov 17, 1989
Analyzed: Nov 17, 1989
Reported: Nov 20, 1989

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons	Benzene	Toluene	Ethyl Benzene	Xylenes
		mg/kg (ppm)	mg/kg (ppm)	mg/kg (ppm)	mg/kg (ppm)	mg/kg (ppm)
911-2338	SW1	140	0.31	0.12	0.88	3.0
911-2339	SW2	N.D.	N.D.	N.D.	N.D.	N.D.
911-2340	SW3	N.D.	N.D.	N.D.	N.D.	N.D.
911-2341	SW4	160	0.33	6.4	9.4	30
911-2342	SW5	3.5	0.06	0.27	0.19	0.76
911-2343	SW6	29	0.12	0.21	0.58	2.0

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.

SEQUOIA ANALYTICAL

Belinda C. Vega
Project Manager



SEQUOIA ANALYTICAL

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

Kapreallan Engineering, Inc.
P.O. Box 913
Benicla, CA 94510
Attention: Mardo Kapreallan, P.E.

Client Project ID: Unocal, Castro Valley
Matrix Descript: Soil, SW2 thru SW4
Analysis Method: EPA 3550/8015
First Sample #: 911-2339

Sampled: Nov 16, 1989
Received: Nov 17, 1989
Extracted: Nov 18, 1989
Analyzed: Nov 18, 1989
Reported: Nov 20, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
911-2339	SW2	N.D.
911-2340	SW3	N.D.
911-2341	SW4	24

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


Belinda C. Vega
Project Manager



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER		SITE NAME & ADDRESS					ANALYSES REQUESTED				TURN AROUND TIME:	
K.M. Bradish		Unocal Castro Valley & Strabridge Castro Valley, CA					TPH-44 BTKE TPH-D				24 HR	
WITNESSING AGENCY												
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	NO. OF CONT.	COMP	SAMPLING LOCATION		TPH-44 BTKE	TPH-D	REMARKS
SW1	11/16/89		✓	✓		1		FUEL TR PIT SIDEWALLS		✓		9112338-43
SW2	"		✓	✓		1			✓	✓		
SW3	"		✓	✓		1			✓	✓		
SW4	"		✓	✓		1			✓	✓		
SW5	"		✓	✓		1			✓			
SW6	"		✓	✓		1			✓			
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? <u>YES</u> 2. Will samples remain refrigerated until analyzed? <u>YES</u> 3. Did any samples received for analysis have head space? <u>NO</u> 4. Were samples in appropriate containers and properly packaged? <u>YES</u>						
K.M. Bradish		11/17/89 8:10		Tom McLean								
Tom McLean		11/17/89 9:57										
Relinquished by: (Signature)		Date/Time		Received by: (Signature)		Signature		Title		Date		
		11-1787 10:00 AM		David Rowland		D.N.		S.R.		11-18-89		



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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, Castro Valley
Matrix Descript: Soil
Analysis Method: EPA 5030/8015/8020
First Sample #: 911-1771

Sampled: Nov 14, 1989
Received: Nov 15, 1989
Analyzed: Nov 15, 1989
Reported: Nov 20, 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)
911-1771	A1	2.4	N.D.	N.D.	N.D.	N.D.
911-1772	A2	N.D.	N.D.	N.D.	N.D.	N.D.
911-1773	B1	1.9	N.D.	N.D.	N.D.	N.D.
911-1774	B2	11	N.D.	N.D.	N.D.	N.D.
911-1775	C1	1.5	N.D.	N.D.	N.D.	N.D.
911-1776	C2	7.5	N.D.	N.D.	N.D.	0.10

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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Belinda C. Vega
Belinda C. Vega
Project Manager



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

Client Project ID: Unocal, Castro Valley
Matrix Descript: Soil
Analysis Method: EPA 3550/8015
First Sample #: 911-1771

Sampled: Nov 14, 1989
Received: Nov 15, 1989
Extracted: Nov 15, 1989
Analyzed: Nov 15, 1989
Reported: Nov 20, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
911-1771	A1	N.D.
911-1772	A2	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.

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Belinda C. Vega
Project Manager

9111771.KEI <1>



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER <i>R.M. Bradish</i>		SITE NAME & ADDRESS <i>Unocal Castro Valley & Strabridge Castro Valley, CA</i>						ANALYSES REQUESTED TPH-G & BTK TPH-D				TURN AROUND TIME: <i>24 HR</i>
WITNESSING AGENCY -												
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPH-G & BTK	TPH-D		REMARKS
A1	11/4/89		✓	✓			1	FUEL TK PIT - BTM	✓	✓		
A2	"		✓	✓			1	" " " "	✓	✓		
B1	"		✓	✓			1	" " " "	✓			
B2	"		✓	✓			1	" " " "	✓			
C1	"		✓	✓			1	" " " "	✓			
C2	"		✓	✓			1	" " " "	✓			
Relinquished by: (Signature) <i>R.M. Bradish</i>		Date/Time <i>11/15/89 9:25</i>		Received by: (Signature) <i>Tom M'Pain</i>		The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? <u>Y</u> 2. Will samples remain refrigerated until analyzed? <u>Y</u> 3. Did any samples received for analysis have head space? <u>N</u> 4. Were samples in appropriate containers and properly packaged? <u>Y</u>						
Relinquished by: (Signature) <i>Tom M'Pain</i>		Date/Time		Received by: (Signature)								
Relinquished by: (Signature)		Date/Time		Received by: (Signature)								
Relinquished by: (Signature)		Date/Time <i>11/15 11:10 a.m.</i>		Received by: (Signature) <i>B.L. O'Neil</i>								
						Signature <i>BW</i>		Title <i>sample</i>		Date <i>11-15</i>		



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

Client Project ID: Unocal, Castro Valley
Sample Descript: Soil, WO1 (11)
Lab Number: 911-1788

Sampled: Nov 14, 1989
Received: Nov 15, 1989
Extracted: Nov 21, 1989
Analyzed: Nov 21, 1989
Reported: Nov 22, 1989

LABORATORY ANALYSIS

Analyte	Detection Limit mg/kg	Sample Results mg/kg
Cadmium.....	0.5	2.5
Chromium.....	0.5	39
Lead.....	0.05	1.1
Zinc.....	0.5	45

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

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Belinda C. Vega
Project Manager



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Benicia, CA 94510
Attention: Mardo Kapreallan, P.E.

Client Project ID: Unocal, Castro Valley
Sample Descript.: Soil, WO1 (11)
Analysis Method: EPA 5030/8015/8020
Lab Number: 911-1788

Sampled: Nov 14, 1989
Received: Nov 15, 1989
Analyzed: Nov 21, 1989
Reported: Nov 22, 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	5.9
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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Project Manager



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Kapreallan Engineering, Inc.	Client Project ID: Unocal, Castro Valley	Sampled: Nov 14, 1989
P.O. Box 913	Matrix Descript: Soil	Received: Nov 15, 1989
Benicia, CA 94510	Analysis Method: EPA 418.1 (I.R. with clean-up)	Extracted: Nov 16, 1989
Attention: Mardo Kapreallan, P.E.	First Sample #: 911-1788	Analyzed: Nov 16, 1989
		Reported: Nov 22, 1989

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

Sample Number	Sample Description	Petroleum Oil mg/kg (ppm)
911-1788	WO1 (11)	N.D.

Detection Limits:

1.0

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

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Belinda C. Vega
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Project Manager

9111788.KEI <3>



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

Client Project ID: Unocal, Castro Valley
Matrix Descript: Soil
Analysis Method: EPA 3550/8015
First Sample #: 911-1788

Sampled: Nov 14, 1989
Received: Nov 15, 1989
Extracted: Nov 22, 1989
Analyzed: Nov 22, 1989
Reported: Nov 22, 1989

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons mg/kg (ppm)
911-1788	WO1 (11)	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.

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Belinda C. Vega
Project Manager

9111788.KEI <4>



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

Client Project ID: Unocal, Castro Valley
Sample Descript: Soil, WO1 (11)
Analysis Method: EPA 5030/8010
Lab Number: 911-1788

Sampled: Nov 14, 1989
Received: Nov 15, 1989
Analyzed: Nov 21, 1989
Reported: Nov 22, 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	55
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.
1,1,1,2-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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Project Manager



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

Client Project ID: Unocal, Castro Valley
Sample Descript: Soil, WO1 (11)
Analysis Method: EPA 8270
Lab Number: 911-1788

Sampled: Nov 14, 1989
Received: Nov 15, 1989
Analyzed: Nov 20, 1989
Reported: Nov 22, 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 phenyl 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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Kapreallan Engineering, Inc.	Client Project ID: Unocal, Castro Valley	Sampled: Nov 14, 1989
P.O. Box 913	Sample Descript: Soil, WO1 (11)	Received: Nov 15, 1989
Benicia, CA 94510	Analysis Method: EPA 8270	
Attention: Mardo Kapreallan, P.E.	Lab Number: 911-1788	Analyzed: Nov 20, 1989
		Reported: Nov 22, 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.....	500.0	N.D.
3-Nitroaniline.....	500.0	N.D.
4-Nitroaniline.....	500.0	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.....	500.0	N.D.
2,4,6-Trichlorophenol.....	100.0	N.D.

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

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Belinda C. Vega
 Belinda C. Vega
 Project Manager



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

Client Project ID: Unocal, Castro Valley
Sample Descript: Soil, WO1 (11)
Analysis Method: EPA 8270 & "Open Scan"
Lab Number: 911-1788

Sampled: Nov 14, 1989
Received: Nov 15, 1989
Analyzed: Nov 20, 1989
Reported: Nov 22, 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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Belinda C. Vega
Project Manager

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.



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER <i>R. M. Bradish</i>		SITE NAME & ADDRESS <i>Unocal - Castro Valley of Steubridge Castro Valley</i>					ANALYSES REQUESTED					TURN AROUND TIME: <i>5 Day</i>		
WITNESSING AGENCY							TPH-G + BTK	TPH-D	TOG (A.B.1)	8010	8270 For Pb, Pcp, Puh & Cd	METALS - Cd, Cr, Pb, Sn		
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	NO. OF CONT.	SAMPLING LOCATION	TPH-G + BTK	TPH-D	TOG (A.B.1)	8010	8270 For Pb, Pcp, Puh & Cd	METALS - Cd, Cr, Pb, Sn	REMARKS
W01(U)	4/14/85		✓		✓	1	W.O.T.E PIT	✓	✓	✓	✓	✓	✓	

Relinquished by: (Signature) <i>R. M. Bradish</i>	Date/Time <i>4/15/85 9:25</i>	Received by: (Signature) <i>Tom M. Fair</i>	The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? _____ <i>Y</i> _____ 2. Will samples remain refrigerated until analyzed? _____ <i>Y</i> _____ 3. Did any samples received for analysis have head space? _____ <i>Y</i> _____ 4. Were samples in appropriate containers and properly packaged? _____ <i>Y</i> _____
Relinquished by: (Signature) <i>Tom M. Fair</i>	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time <i>11-15</i>	Received by: (Signature) <i>D. I. Hill</i>	

BLD *Sample* *11-15*



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

Client Project ID: Unocal, Castro Valley
Matrix Descript: Water
Analysis Method: EPA 3510/8015
First Sample #: 911-2337 C

Sampled: Nov 16, 1989
Received: Nov 17, 1989
Extracted: Nov 18, 1989
Analyzed: Nov 20, 1989
Reported:

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons $\mu\text{g/L}$ (ppb)
9112337 C	w1	11,000

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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Belinda C. Vega
Project Manager



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

Client Project ID: Unocal, Castro Valley
Sample Descript.: Water, W1
Analysis Method: EPA 5030/ 8015/8020
Lab Number: 911-2337 A-B

Sampled: Nov 16, 1989
Received: Nov 17, 1989
Analyzed: Nov 20, 1989
Reported: Nov 20, 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	26,000
Benzene	0.3	670
Toluene	0.3	1,100
Ethyl Benzene	0.3	120
Xylenes	0.3	9,100

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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Belinda C. Vega
Project Manager



KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER <i>E.M. Braddock</i>		SITE NAME & ADDRESS <i>Unocal Castro Valley & Steubridge Castro Valley</i>				ANALYSES REQUESTED <i>TPH-G & BTK TPH-D</i>				TURN AROUND TIME: <i>24HR</i>
WITNESSING AGENCY										REMARKS
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION		
<i>W-1</i>	<i>11/14/89</i>			<i>✓</i>	<i>✓</i>		<i>3: 1-4 2-6</i>	<i>Fuel Tank Pit</i>		

Relinquished by: (Signature) <i>E.M. Braddock</i>	Date/Time <i>11/17/89 8:10</i>	Received by: (Signature) <i>Tom M. Lein</i>	The following MUST BE completed by the laboratory accepting samples for analysis: 1. Have all samples received for analysis been stored in ice? <i>YES</i> 2. Will samples remain refrigerated until analyzed? <i>YES</i> 3. Did any samples received for analysis have head space? <i>NO</i> 4. Were samples in appropriate containers and properly packaged? <i>YES</i>
Relinquished by: (Signature) <i>Tom M. Lein</i>	Date/Time <i>11/17/89/952</i>	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	
Relinquished by: (Signature)	Date/Time <i>10:00 AM</i>	Received by: (Signature) <i>Tom M. Lein</i>	
Signature	Date <i>11-17-89</i>	Title <i>SK</i>	