



**KAPREALIAN ENGINEERING, INC.**

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

SE  
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DEC 1 1987  
KEI-J87-111  
December 1, 1987

Shell Oil Corporation  
P.O. Box 7004  
Lafayette, CA 94549

Attention: Mr. Ray Newsome

Re: Soil Sampling Investigation  
Shell Service Station  
230 W. Mac Arthur Blvd.  
Oakland, California

Dear Mr. Newsome:

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

The scope of the work performed in our investigation consisted of the following:

Coordination with the regulatory agencies

Collection of samples of native soil beneath the storage tanks

Delivery of soil samples with proper chain of custody to a certified analytical laboratory

Technical review and preparation of this report

FIELD INVESTIGATION

KEI's field investigation was conducted on November 3 to November 6, 1987. Four (4) underground fuel storage tanks were removed from the site. The tanks consisted of two 8000 and two 6000 fuel tanks. Tank removal and the soil sampling were performed in the presence of Inspector Bryant of the City of Oakland Fire Prevention Bureau. The tanks were made of steel and all appeared to be in good condition.

Eight (8) soil samples, labeled A1, A2, B1, B2, C1, C2, D1 and D2 were collected from the native soil beneath the tanks. The

undisturbed samples were collected from bulk material excavated by backhoe. The samples were placed in clean, two-inch diameter brass tubes, sealed with aluminum foil and plastic caps, and were delivered on the site to HAZCAT Mobile Organics Lab for analyses.

#### SUBSURFACE CONDITIONS

The subsurface soils exposed in the excavations consisted primarily of silty sand and gravel. The excavated soil was sampled and analyzed on site by HAZCAT Mobile Lab and transferred to trucks to be hauled to the Shell Station located at the corner of 10th St. and Cutting Blvd. in Richmond where it was stockpiled for aeration. Approximately 400 cubic yards of soil was excavated and sampled. The analytical results are summarized in Table 2.

#### ANALYTICAL RESULTS

Samples A1 through D2 were analyzed on site by HAZCAT Mobile Organics Laboratory of San Carlos, California and were accompanied by the proper chain of custody forms. The samples were analyzed for total petroleum hydrocarbon (TPH) as gasoline, benzene, toluene and xylene (BTX) concentrations. The analytical results are summarized in Table 1. Copies of the laboratory analyses and the chain of custody forms are attached to this report.

#### DISCUSSION AND RECOMMENDATIONS

Analytical results of the soil samples from the fuel tank pit indicate low levels of TPH and BTX for all samples except A1, A2, B1 and C2 which had THC levels of 380, 310, 480 and 170 parts per million (ppm) respectively. According to the guidelines established by the Regional Water Quality Control Board (RWQCB), additional investigation is necessary at the site. To comply with the requirements of the RWQCB, KEI recommends installation of groundwater monitoring wells in order to determine if the groundwater has been impacted.

A copy of this report should be sent to the Alameda County Health Agency, to the Fire Prevention Bureau of the City of Oakland and to the Regional Water Quality Control Board.

#### 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-

KEI-J87-111  
December 1, 1987  
Page 3

occurring or artificially-induced, may cause changes in groundwater 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 feel free to call me at (415) 676-9100 or (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.



Mardo Kaprealian

License #C29326  
Exp. date 3/31/91

Attachments: Location plan  
Laboratory analyses  
Chain of custody forms  
Tables 1 & 2

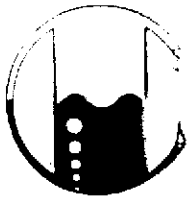
TABLE 1  
SUMMARY OF LABORATORY ANALYSES  
(all analyses are in parts per million)

<u>Sample #</u>	<u>Depth</u>	<u>Total Hydrocarbon</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylene</u>
A1	15.0'	380	1.6	2.2	55
A2	15.0'	310	1.3	1.3	33
B1	15.0'	480	4.3	0.5	22
B2	15.0'	9.1	1.6	0.3	0.1
C1	15.0'	12	1.5	<0.1	1.1
C2	15.0'	170	4.1	<0.1	2.4
D1	15.0'	8.6	<0.1	<0.1	<0.1
D2	15.0'	44	<0.1	<0.1	5.3

} high

TABLE 2  
SUMMARY OF STOCKPILED SOIL SAMPLING  
(all analyses in parts per million)

<u>Sample #</u>	<u>Total Hydrocarbons</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylene</u>
Comp 1	24	0.2	<0.1	5.7
Comp 2	26	<0.1	0.2	12
Comp 3	150	1.8	1.9	36
Comp 4	8.4	0.1	0.1	2.8
Comp 5	250	1.8	9.3	52



# HAZCAT Mobile Organics Lab

733 Dartmouth Avenue  
San Carlos, CA 94070 • (415) 591-5820

Kaprealian Engineering, Inc.  
P.O. BOX 913  
Benicia, CA 94510  
Attn: Mardo Kaprealian, P.E.  
President

Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number

107063

Sample Description

Shell Oakland  
230 W. MacArthur  
A-1

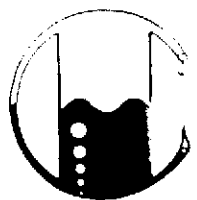
ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1	380
Benzene	0.1	1.6
Toluene	0.1	2.2
Xylenes	0.1	55

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

HAZCAT

*Ronald G. Evans*  
Ronald G. Evans  
Lab Director



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Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number

107059

Sample Description

Shell Oakland  
230 W. MacArthur  
A-2

ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1	310
Benzene	0.1	1.3
Toluene	0.1	1.3
Xylenes	0.1	33

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number

107062

Sample Description

Shell Oakland  
230 W. MacArthur  
B-1

ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1	480
Benzene	0.1	4.3
Toluene	0.1	0.5
Xylenes	0.1	22

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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President

Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number  
-----  
107060

Sample Description  
-----  
Shell Oakland  
230 W. MacArthur  
B-2

## ANALYSIS

-----

	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1	9.1
Benzene	0.1	1.6
Toluene	0.1	0.3
Xylenes	0.1	0.1

Note: Analysis was performed using EPA methods 5020 and 8015 with  
method 8020 used for BTX distinction.

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Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number

107061

Sample Description

Shell Oakland  
230 W. MacArthur  
C-1

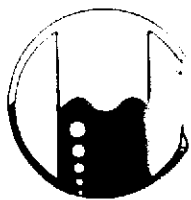
ANALYSIS

	Detection Limit	Sample Results
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1	12
Benzene	0.1	1.5
Toluene	0.1	<0.1
Xylenes	0.1	1.1

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number  
-----

107058

Sample Description  
-----

Shell Oakland  
230 W. MacArthur  
C-2

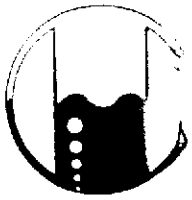
ANALYSIS  
-----

	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1	170
Benzene	0.1	4.1
Toluene	0.1	<0.1
Xylenes	0.1	2.4

Note: Analysis was performed using EPA methods 5020 and 8015 with  
method 8020 used for BTX distinction.

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Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number  
-----  
107056

Sample Description  
-----  
Shell Oakland  
230 W. MacArthur  
D-1

## ANALYSIS

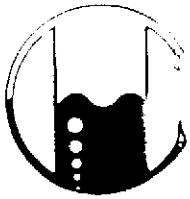
-----

	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1	8.6
Benzene	0.1	<0.1
Toluene	0.1	<0.1
Xylenes	0.1	<0.1

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number  
-----  
107057

Sample Description  
-----  
Shell Oakland  
230 W. MacArthur  
D-2

## ANALYSIS

-----

	Detection Limit ----- ppm	Sample Results ----- ppm
Total Petroleum Hydrocarbons as Gasoline	1	44
Benzene	0.1	<0.1
Toluene	0.1	<0.1
Xylenes	0.1	5.3

Note: Analysis was performed using EPA methods 5020 and 8015 with  
method 8020 used for BTX distinction.

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*Ronald G. Evans*  
Ronald G. Evans  
Lab Director

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: *William R. ...* DATE/TIME OF COLLECTION: 11/5/87 TURNAROUND TIME: 24 HRS.  
 (signature)

SAMPLE DESCRIPTION AND PROJECT NUMBER: Shell - Oakland - 230 W. MacArthur Ave

SAMPLE #	ANALYSIS	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/WATER
A-1	TMC - BTX	Grab	1	S
A-2	" "	"	1	S
B-1	" "	"	1	S
B-2	" "	"	1	S
C-1	" "	"	1	S
C-2	" "	"	1	S
D-1	" "	"	1	S
D-2	" "	"	1	S

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
<i>William R. ...</i>	11/5/87 1:00 PM	<i>Evans Hayes</i>	11/5/87 1 PM
<i>[Signature]</i>			

\* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: \_\_\_\_\_



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Benicia, CA 94510  
Attn: Mardo Kaprealian, P.E.  
President

Date Sampled: 11-03-87  
Date Received: 11-03-87  
Date Reported: 11-03-87

Sample Number

-----  
107052

Sample Description

-----  
Shell Oakland  
230 W. MacArthur  
Comp 1

ANALYSIS

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1	24
Benzene	0.1	0.2
Toluene	0.1	<0.1
Xylenes	0.1	5.7

Note: Analysis was performed using EPA methods 5020 and 8015 with  
method 8020 used for BTX distinction.

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Kaprealian Engineering, Inc.  
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Attn: Mardo Kaprealian, P.E.  
President

Date Sampled: 11-04-87  
Date Received: 11-04-87  
Date Reported: 11-04-87

Sample Number

107053

Sample Description

Shell Oakland  
230 W. MacArthur  
Comp 2

ANALYSIS

	<u>Detection Limit</u>	<u>Sample Results</u>
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1	26
Benzene	0.1	<0.1
Toluene	0.1	0.2
Xylenes	0.1	12

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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President

Date Sampled: 11-04-87  
Date Received: 11-04-87  
Date Reported: 11-04-87

Sample Number

-----  
107054

Sample Description

-----  
Shell Oakland  
230 W. MacArthur  
Comp 3

ANALYSIS

	Detection Limit	Sample Results
	-----	-----
	ppm	ppm
Total Petroleum Hydrocarbons as Gasoline	1	150
Benzene	0.1	1.8
Toluene	0.1	1.9
Xylenes	0.1	36

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

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*Ronald G. Evans*  
Ronald G. Evans  
Lab Director



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President

Date Sampled: 11-04-87  
Date Received: 11-04-87  
Date Reported: 11-04-87

Sample Number

-----  
107055

Sample Description

-----  
Shell Oakland  
230 W. MacArthur  
Comp 4

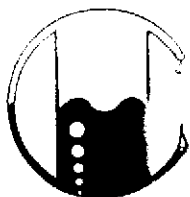
ANALYSIS

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1	8.4
Benzene	0.1	0.1
Toluene	0.1	0.1
Xylenes	0.1	2.8

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

HAZCAT

*Ronald G. Evans*  
Ronald G. Evans  
Lab Director



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Benicia, CA 94510  
Attn: Mardo Kaprealian, P.E.  
President

Date Sampled: 11-05-87  
Date Received: 11-05-87  
Date Reported: 11-05-87

Sample Number

-----  
107064

Sample Description

-----  
Shell Oakland  
230 W. MacArthur  
Comp. 5

ANALYSIS

	Detection Limit	Sample Results
	----- ppm	----- ppm
Total Petroleum Hydrocarbons as Gasoline	1	250
Benzene	0.1	1.8
Toluene	0.1	9.3
Xylenes	0.1	52

Note: Analysis was performed using EPA methods 5020 and 8015 with method 8020 used for BTX distinction.

HAZCAT

Ronald G. Evans  
Lab Director

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: [Signature] DATE/TIME OF COLLECTION: 11/3/87 TURNAROUND TIME: 24 HRS  
 (signature)

SAMPLE DESCRIPTION AND PROJECT NUMBER: Shell - Oakland - 230 West  
MacArthur

<u>SAMPLE #</u>	<u>ANALYSIS</u>	<u>GRAB OR COMP.</u>	<u>NUMBER OF CONTAINERS</u>	<u>SOIL/WATER</u>
<u>Comp 1</u>	<u>T.H.C. BTEX</u>	<u>Comp</u>	<u>1 (8 grab.)</u>	<u>S</u>

<u>RELINQUISHED BY*</u>	<u>TIME/DATE</u>	<u>RECEIVED BY*</u>	<u>TIME/DATE</u>
<u>[Signature]</u>	<u>11/3/87</u>	<u>Revens</u> <u>Haysat</u>	<u>11-3-87</u>
<u>[Signature]</u>			

\* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: \_\_\_\_\_

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: *W. Seibert* DATE/TIME OF COLLECTION: 11/4/87 TURNAROUND TIME: 24 Hrs.  
 (signature)

SAMPLE DESCRIPTION AND PROJECT NUMBER: Shell. Oakland. 230 West  
MacArthur.

SAMPLE #	ANALYSIS	GRAB OR COMP.	NUMBER OF CONTAINERS	SOIL/ WATER
<u>Comp 2</u>	<u>THC. BTEX</u>	<u>Comp</u>	<u>1 (8-10 g/abs)</u>	<u>S</u>
<u>Comp 3</u>	<u>✓ ✓</u>	<u>✓</u>	<u>✓</u>	<u>S</u>
<u>Comp 4</u>	<u>✓ ✓</u>	<u>✓</u>	<u>✓</u>	<u>S</u>

RELINQUISHED BY*	TIME/DATE	RECEIVED BY*	TIME/DATE
<u><i>W. Seibert</i></u>	<u>11/4/87</u>	<u><i>R Evans</i></u> <u><i>Hagart</i></u>	<u>11-4-87</u>
2.			
3.			
4.			

\* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: \_\_\_\_\_

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: *William Stei* DATE/TIME OF COLLECTION: 11/5/87 TURNAROUND TIME: 24 hrs.  
 (signature) 2:05 p.m.

SAMPLE DESCRIPTION AND PROJECT NUMBER: Shell - Oakland, 730 W.  
MacArthur Ave.

<u>SAMPLE #</u>	<u>ANALYSIS</u>	<u>GRAB OR COMP.</u>	<u>NUMBER OF CONTAINERS</u>	<u>SOIL/WATER</u>
<u>Comp 5</u>	<u>THC, BTEX</u>	<u>Comp</u>	<u>1</u>	<u>S</u>

<u>RELINQUISHED BY*</u>	<u>TIME/DATE</u>	<u>RECEIVED BY*</u>	<u>TIME/DATE</u>
<u><i>William Stei</i></u>	<u>11/5/87</u> <u>2:05 p.m.</u>	<u><i>W Evans</i></u> <u>Report</u>	<u>11-5-87</u> <u>2:05 PM</u>
<u> </u>			
<u> </u>			
<u> </u>			

\* STATE AFFILIATION NEXT TO SIGNATURE

REMARKS: \_\_\_\_\_