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

March 11, 1992

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

Attention: Mr. Gil Wistar

RE: Unocal Service Station #5781
3535 Pierson Street
Oakland, California 94619

Dear Mr. Wistar:

Per the request of Mr. Robert Boust of Unocal Corporation, enclosed please find our report dated March 4, 1992, for the above referenced site.

If you have any questions, please call our office at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

jad\82

Enclosure

cc: Bob Boust, Unocal Corporation

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Consulting Engineers
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KEI-P89-1204.QR4
March 4, 1992

Unocal Corporation
2000 Crow Canyon Place, Suite 400
P.O. Box 5155
San Ramon, California 94583

Attention: Mr. Robert Boust

RE: Quarterly Report
Unocal Service Station #5781
3535 Pierson Street
Oakland, California 94619

Dear Mr. Boust:

This report presents the results of the most recent quarter of monitoring and sampling of the monitoring well at the referenced site by Kaprealian Engineering, Inc. (KEI), per proposal KEI-P89-1204.P4 dated January 21, 1991. The well is currently monitored monthly and sampled on a quarterly basis. This report covers the work performed by KEI from December 1991 through February 1992.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a gasoline station. The station occupies the northwest corner of the intersection of Pierson Street with MacArthur Boulevard in Oakland, California. In addition, the site is situated southwest of and adjacent to the Highway 580 off-ramp for MacArthur Boulevard. The site is located near the base of an east-northeast trending hillside area on relatively gently sloping, developed property. Also, a City sewer easement crosses the west corner of the subject site (as shown on the attached Site Plans, Figures 1 and 2). Based on review of the City of Oakland Public Works utility maps, the sewer pipeline that crosses the western corner of the site has a flow line (the bottom inside of the pipeline) at the northwest perimeter of the site of approximately 146.5 feet (Mean Sea Level [MSL]), with a flow line near the southwest perimeter of the site at approximately 142.5 feet (MSL). A Location Map and Site Plans are attached to this report.

KEI's initial field work was conducted on December 14, 1989, when three underground storage tanks were removed from the site. The tanks consisted of two 10,000 gallon fuel storage tanks and one 280 gallon waste oil tank. The fuel tanks were made of steel and no apparent holes or cracks were observed in either tank. However,

the waste oil tank had one hole of approximately 1.25 square inches.

Three soil samples, labeled A1, B1, and A2/B2, were collected from beneath the fuel tanks at depths of about 12.5 feet below grade. In addition, two soil samples, labeled SW1 and SW2, were collected from the fuel tank pit sidewall samples at depths of 10.5 feet below grade. The fuel tank pit sidewall samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline and benzene, toluene, xylenes, and ethylbenzene (BTX&E). The samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California. The analytical results of soil samples collected from the fuel tank pit indicated levels of TPH as gasoline ranging from non-detectable to 46 ppm, and non-detectable levels of BTX&E in all samples (except for samples A2/B2 and SW2, which showed benzene levels at 0.10 ppm and 0.65 ppm, respectively).

Also on December 14, 1989, one soil sample, labeled WO1, was collected from beneath the waste oil tank at a depth of 6 feet below grade. The waste oil tank pit sample was analyzed by Sequoia Analytical Laboratory in Redwood City, California, for TPH as gasoline, BTX&E, TPH as diesel, total oil and grease (TOG), EPA method 8010 compounds, and the metals cadmium, chromium, lead, and zinc. The analytical results of soil sample WO1 indicated TPH as gasoline at **670 ppm, benzene at 5.4 ppm, TPH as diesel at 8,300 ppm, and TOG at 48,000 ppm.** EPA method 8010 results showed 1,2-dichlorobenzene at 10 ppb, tetrachloroethene at 77 ppb, and 1,1,1-trichloroethane at 15 ppb. Metals concentrations were as follows: cadmium was non-detectable, chromium was 8.3 ppm, lead was 340 ppm, and zinc was 70 ppm.

On January 17, 1990, two soil samples, labeled P1 and P2, were collected from beneath the product pipe trenches at depths of 5.5 to 6 feet below grade. Analytical results of these samples indicated non-detectable levels of TPH as gasoline and BTX&E constituents for both samples.

Based on the analytical results, KEI recommended further soil excavation in the area of the waste oil tank, and the installation of three monitoring wells at the site (in order to begin to define the vertical extent of soil contamination, to determine the ground water flow direction, and to determine if the ground water had been impacted by hydrocarbon contamination). Documentation of the tank and piping removal procedures, sample collection techniques, and the analytical results are presented in KEI's report (KEI-J89-1204.R2) dated February 9, 1990. The analytical results of the soil samples collected from the underground storage tanks and from the pipe trenches are summarized in Table 4, and the sample collection locations are shown on the attached Site Plan, Figure 3.

On February 22, 1990, KEI returned to the site to collect additional soil samples from the excavated waste oil tank pit. On this date, one soil sample, labeled WO1(16), was collected from beneath the waste oil tank at a depth of 16 feet below grade. In addition, four soil samples, labeled SWA through SWD, were collected from the sidewalls of the waste oil tank pit excavation at depths of 9 to 10 feet below grade. The lateral excavation was terminated due to the presence of underground sewer and gas lines on the south and west sides, and the existing building on the north side. The area of additional excavation in the vicinity of the waste oil pit is as shown on the attached Site Plans, Figures 1 and 2. A 12-inch diameter conductor casing was installed in the excavation at sample location WO1(16) prior to backfilling.

All soil samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, for TPH as gasoline, BTX&E, TPH as diesel, TOG, and EPA method 8010 compounds. Analytical results of sidewall soil sample SWB indicated non-detectable levels of all constituents analyzed, except for TPH as gasoline, which was 2.0 ppm. Analytical results of the soil sample, WO1(16), collected from the bottom of the excavation at a depth of 16 feet below grade, indicated levels of TPH as gasoline at 15 ppm, with 0.06 ppm benzene, 74 ppm TPH as diesel, 910 ppm TOG, and non-detectable levels of all EPA method 8010 compounds. Analytical results of the remaining three sidewall samples, SWA, SWC, and SWD, showed levels of TOG ranging from 4,100 ppm to 17,000 ppm, TPH as diesel ranging from 360 ppm to 1,400 ppm, TPH as gasoline ranging from 40 ppm to 220 ppm, benzene levels ranging from 0.31 ppm to 2.3 ppm, and non-detectable levels of all EPA method 8010 compounds, except tetrachloroethene, which ranged from 40 ppb to 160 ppb. Sample SWD also showed 1,1,1-trichloroethane at 5.8 ppb. The results of the additional soil sampling activities are presented in KEI's report (KEI-P89-1204.R3) dated March 30, 1990. The analytical results of the soil samples collected from the waste oil tank pit are summarized in Table 5, and the locations of the soil samples are shown on the attached Site Plan, Figure 2.

On April 9 and 10, 1990, three eight-inch diameter exploratory borings (designated as MW1, MW2, and MW3 on the attached Site Plan, Figure 1) were drilled at the site. The borings were drilled to total depths ranging from 40 to 50 feet below grade. Ground water was not encountered during drilling activities. The borings were observed for ground water accumulation for a period of up to 15 hours prior to backfilling with neat cement. The borings were not converted to monitoring wells (as originally proposed) because ground water was not encountered.

Soil samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California. The samples were analyzed for TPH as

gasoline and BTX&E. In addition, the samples collected from MW1 were analyzed for TPH as diesel, TOG, and for EPA method 8010 compounds.

Analytical results of all of the soil samples collected from the borings for MW1, MW2, and MW3 indicated non-detectable levels of TPH as gasoline and BTX&E in all soil samples. In boring MW1, TPH as diesel, TOG and EPA method 8010 compounds were non-detectable in all samples. Results of the soil analyses are summarized in Table 6.

Due to the confirmed soil contamination in the vicinity of the waste oil tank pit, and in order to determine the lateral and vertical extent of the soil contamination, KEI recommended that three additional exploratory borings be drilled closely adjacent to the former waste oil tank pit (to a maximum depth of 50 feet below grade). Documentation of the exploratory boring drilling procedures, sample collection techniques, and the analytical results are summarized in KEI's report (KEI-P89-1204.R6) dated May 21, 1990.

On July 5 and 6, 1990, two exploratory borings (designated as EB1 and EB2 on the attached Site Plan, Figure 1) were drilled at the site. A third proposed boring could not be drilled, as originally proposed, within the conductor casing in the waste oil tank pit (due to drill rig access limitation with the roof overhang).

The two borings were drilled to depths of 34.5 to 38 feet below grade. Ground water was encountered at depths of 33.5 to approximately 36.7 feet beneath the surface. Drilling was stopped about 1 to 1.5 feet after intersecting the first water table, and water samples were collected from each of the borings. After the water samples were collected, the borings were backfilled to the surface using a 9-sack sand slurry.

Samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California. Water and selected soil samples collected from borings EB1 and EB2 were analyzed for TPH as gasoline, TPH as diesel, BTX&E, TOG, and purgeable halocarbons by EPA method 8010. The results of soil analyses are summarized in Table 7, and the results of the water analyses are summarized in Table 8.

Analytical results of the soil samples collected from borings EB1 and EB2 showed non-detectable levels of TPH as gasoline, TPH as diesel, and benzene in all soil samples, except EB2(9.5), which showed a level of TPH as gasoline at 1.2 ppm, and sample EB2(12.5), which showed a level of benzene at 0.0090 ppm. Also, TOG and EPA method 8010 compounds were non-detectable in all samples, except for sample EB1(28.5), which showed 6.2 ppb of 1,1,1-trichloroethane.

Analytical results of the water samples collected from borings EB1 and EB2 showed non-detectable levels of TPH as gasoline, TPH as diesel, benzene, TOG, and EPA method 8010 compounds, except in sample EB1, which showed a level of TPH as diesel at 6.7 ppb, and in sample EB2, which showed a level of benzene at 0.61 ppb.

Based on the analytical results, KEI concluded that soil contamination previously identified in the waste oil tank pit was isolated to the immediate vicinity of the waste oil tank pit. However, because ground water was encountered in borings EB1 and EB2, KEI recommended that one monitoring well be installed to determine if the ground water had been impacted at the site. Results of the supplemental subsurface investigation are presented in KEI's report (KEI-P89-1204.R7) dated August 23, 1990.

On December 11, 1990, one two-inch diameter monitoring well (designated as MWA on the attached Site Plan, Figure 1) was installed at the site. The well was drilled and completed to a total depth of 45 feet below grade. Ground water was encountered at a depth of 33 feet beneath the surface during drilling. The well was developed on December 13, 1990, and was initially sampled on December 18, 1990.

A water sample and one soil sample (collected from a depth of 32.5 feet below grade at the soil/ground water interface) were analyzed at Sequoia Analytical Laboratory in Concord, California. The soil and water samples were analyzed for TPH as gasoline, BTX&E, TPH as diesel, TOG, and for EPA method 8010 compounds. Since well MWA was drilled within 8 feet laterally of boring EB1, in which soil samples were previously analyzed from 8.5 feet to 28.5 feet, additional soil samples from this interval were not analyzed.

The analytical results of the soil sample (MWA{32.5}) showed non-detectable levels of TPH as gasoline, TPH as diesel, BTX&E, and all EPA method 8010 constituents. However, TOG was detected in the soil sample collected from the soil/ground water interface at a level of 36 ppm. The analytical results of the water sample collected from monitoring well MWA showed non-detectable levels of TPH as gasoline, BTX&E, TOG, and all EPA method 8010 constituents. TPH as diesel was detected at a level of 73 ppb. Results of the soil analyses are summarized in Table 3, and results of the water analyses are summarized in Table 2. Based on the analytical results, KEI recommended the implementation of a monthly monitoring and quarterly sampling program. Documentation of well installation protocol, sample collection techniques, and the analytical results are presented in KEI's report (KEI-P89-1204.R8) dated January 21, 1991.

RECENT FIELD ACTIVITIES

The one well (MWA) was monitored three times and was sampled once during the quarter. During monitoring, the well was checked for depth to water and the presence of free product. During sampling, the well was also checked for the presence of a sheen. No free product or sheen was noted in the well during the quarter. Monitoring data are summarized in Table 1.

A water sample was collected from the well on February 6, 1992. Prior to sampling, the well was purged of 17 gallons by the use of a bailer. A sample was then collected by the use of a clean Teflon bailer. The sample was decanted into clean VOA vials and/or one-liter amber bottles, as appropriate, which were then sealed with Teflon-lined screw caps and stored in a cooler, on ice, until delivery to the State certified laboratory.

HYDROLOGY AND GEOLOGY

The measured depth to ground water at the site on February 6, 1992, was 19.88 feet below grade. The regional ground water flow direction is not known to KEI at this time. Water levels have fluctuated in well MWA during the monitoring period, showing a net decrease of 1.23 feet since November 8, 1991.

Ground water was not encountered during drilling activities of MWA until a depth of 33 feet below grade. Thus, the depth to ground water in well MWA indicates that a confined ground water table exists at the site. However, it should be pointed out that ground water was not encountered during drilling of borings MW1, MW2, or MW3, which were drilled to depths of between 40 and 50 feet below grade. In addition, ground water was encountered in boring EB1 at a depth of 33.5 feet below grade (drilled approximately 8 feet laterally from MWA) and was encountered in boring EB2 at a depth of 37.7 feet below grade. It should also be noted that ground water was only encountered at the site in the area located approximately due west of the City of Oakland sewer pipeline easement, which crosses the western corner of the subject site. However, the significance of the sewer pipeline and the limited area of encountered ground water is unclear.

Based on review of regional geologic maps ("Areal and Engineering Geology of the Oakland East Quadrangle, California" by Dorothy H. Radbruch (1969) in U.S.G.S. Map GQ-769; and "Map Showing Recently Active Breaks Along the Hayward Fault Zone and the Southern Part of the Calaveras Fault Zone, California" by Dorothy H. Radbruch-Hall (1974) in U.S.G.S. Map I-813), the subject site is underlain by undivided Quaternary deposits (Qu) and is closely adjacent to a mapped geologic contact with the upper member of the Quaternary San

Antonio Formation (Qsu). In addition, the site is situated approximately 1,200 to 2,800 feet southwest of mapped splays of the active Hayward Fault Zone.

The results of our previous subsurface studies indicate that the site is generally underlain by very stiff clay and silty clay to the maximum depth explored (50 feet below grade). Locally, interbedded zones of clayey gravel, well-to-poorly-graded gravel, clayey sand, and silt beds were encountered in each boring to depths below grade of about 22-1/2, 20 and 14-1/2 feet in borings MW1, MW2, and MW3, respectively, and to depths of only 6 and 5 feet below grade in borings EB1 and EB2, respectively. However, in boring EB2, a clayey silt bed was encountered between depths below grade of 29.5 to about 34.5 feet, and is inturn underlain by a clayey sand bed to the maximum depth explored (38 feet below grade).

The results of our recent subsurface study (the log of boring for well MWA) indicates that the vicinity of MWA is underlain by silty clay and clayey silt materials to a depth of approximately 41 feet below grade. This thick zone of fine-grained materials is inturn underlain by a well-graded saturated sand layer, which is approximately 2 feet thick, and which is underlain by clayey silt to the maximum depth explored (45 feet below grade).

ANALYTICAL RESULTS

The ground water sample from MWA was analyzed at Sequoia Analytical Laboratory in Concord, California, and was accompanied by properly executed Chain of Custody documentation. The sample was analyzed for TPH as gasoline using EPA method 5030 in conjunction with modified 8015, BTX&E using EPA method 8020, TPH as diesel using EPA method 3510 in conjunction with modified 8015, TOG using Standard Method 5520B&F, and halogenated volatile organics using EPA method 8010.

Analytical results of the ground water sample collected from monitoring well MWA indicated non-detectable levels of TPH as gasoline, BTX&E, TPH as diesel, TOG, and all EPA method 8010 constituents. Results of the analyses are summarized in Table 2. Copies of the analytical results and Chain of Custody documentation are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results collected and evaluated to date, and no evidence of free product or sheen in the well, KEI recommends a reduction in the frequency of monitoring and sampling of the existing well (MWA). The analytical results of the ground

water samples collected from well MWA during four consecutive quarters of sampling (one hydrologic cycle) have shown non-detectable levels of TPH as gasoline, TPH as diesel, BTX&E, TOG, and all EPA method 8010 constituents. Therefore, KEI recommends that well MWA be monitored and sampled on a semi-annual basis. Recommendations for altering or terminating this modified monitoring and sampling program will be made as warranted.

Five soil borings have been drilled and sampled to depths ranging from 28.5 to 50 feet below grade, and all soil samples analyzed showed non-detectable levels of TPH as diesel, TPH as gasoline, and benzene, except for samples EB2(9.5), which showed a level of TPH as gasoline of 1.2 ppm, and sample EB2(12.5), which indicated a level of benzene of 0.0090 ppm.

Limited soil contamination is known to exist locally around the perimeter of the overexcavated waste oil tank pit; however, adjacent soil samples analyzed from exploratory borings MW1, MWA, EB1, and EB2 indicate that the soil contamination is limited to the immediate vicinity of the waste oil tank pit. In addition, minor soil contamination was detected from areas underneath the fuel tanks and at the sidewall areas of the fuel tank pit. However, borings MW2 and MW3 were drilled and sampled adjacent to the fuel tank pit, and detectable soil contamination was not encountered.

In summary, it appears that localized soil contamination is isolated to the immediate vicinity of the waste oil tank pit. However, based upon the ground water samples collected to date, it does not appear that the soil contamination has significantly impacted the ground water underlying the site.

DISTRIBUTION

A copy of this report should be sent to the Alameda County Health Care Services Agency, and to the Regional Water Quality Control Board, San Francisco Bay Region.

LIMITATIONS

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 analyses obtained from a State certified laboratory. 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, regarding the above, including laboratory analyses, 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.

for Thomas J. Berkins

Thomas J. Berkins
Senior Environmental Engineer

Don R. Braun
Certified Engineering Geologist

License No. 1310
Exp. Date 6/30/92

Timothy R. Ross
Project Manager

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Attachments: Tables 1 through 8
Location Map
Site Plans - Figures 1, 2 & 3
Laboratory Analyses
Chain of Custody documentation

KEI-P89-1204.QR4
March 4, 1992

TABLE 1

SUMMARY OF MONITORING DATA

Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness	Sheen	Water Bailed (gallons)
(Monitored and Sampled on February 6, 1992)					
MWA	N/A	19.88	0	No	17
(Monitored on January 8, 1992)					
MWA	N/A	22.53	0	--	0
(Monitored on December 9, 1991)					
MWA	N/A	27.60	0	--	0

N/A = Not Applicable.

-- Sheen determination was not performed.

KEI-P89-1204.QR4
March 4, 1992

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Well #	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
2/06/92	MWA*	ND	ND	ND	ND	ND	ND
11/08/91	MWA*	ND	ND	ND	ND	ND	ND
8/07/91	MWA*	ND	ND	ND	ND	ND	ND
5/03/91	MWA*	ND	ND	ND	ND	ND	ND
12/18/90	MWA*	73	ND	ND	ND	ND	ND
Detection Limits		50	30	0.30	0.30	0.30	0.30

* TOG and all EPA method 8010 compounds were non-detectable.

ND = Non-detectable.

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

KEI-P89-1204.QR4
March 4, 1992

TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample Number	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
12/11/90	MWA(32.5)*	32.5	ND	ND	ND	ND	ND	ND
Detection Limits			1.0	1.0	0.0050	0.0050	0.0050	0.0050

* TOG was detected at 36 ppm, and all halogenated volatile organics per EPA method 8010 were non-detectable.

ND = Non-detectable.

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

KEI-P89-1204.QR4
March 4, 1992

TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
12/14/89	A1	12.5	3.5	ND	ND	ND	ND
&	B1	12.5	ND	ND	ND	ND	ND
1/17/90	A2/B2	12.5	5.8	0.10	ND	ND	ND
	SW1	10.5	15	ND	ND	ND	ND
	SW2	10.5	46	0.65	ND	ND	ND
	P1	5.5	ND	ND	ND	ND	ND
	P2	6.0	ND	ND	ND	ND	ND
	WO1*	6.0	670	5.4	15	17	2.3
Detection Limits			1.0	0.05	0.1	0.1	0.1

* All EPA method 8010 compounds were non-detectable, except for 1,2-dichlorobenzene at 10 ppb, tetrachloroethene at 77 ppb, and 1,1,1-trichloroethane at 15 ppb. Metals concentrations were as follows: cadmium was non-detectable, chromium was 8.3 ppm, lead was 340 ppm, and zinc was 70 ppm. TPH as diesel showed 8,300 ppm, and TOG showed 48,000 ppm.

ND = Non-detectable.

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

KEI-P89-1204.QR4
March 4, 1992

TABLE 5

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on February 22, 1990)

Sample	Depth (feet)	TOG	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
WO1(16)*	16.0	910	74	15	0.060	ND	2.0	0.10
SWA**	9.0	17,000	1,400	220	2.3	2.1	23	7.3
SWB*	10.0	ND	ND	2.0	ND	ND	ND	ND
SWC***	10.0	4,100	460	63	0.31	0.33	2.2	1.3
SWD+	10.0	6,400	360	40	0.32	ND	4.0	0.49
Detection Limits		50	1.0	1.0	0.05	0.10	0.10	0.10

* All EPA method 8010 compounds were non-detectable.

** All EPA method 8010 compounds were non-detectable, except tetrachloroethene at 160 ppb.

*** All EPA method 8010 compounds were non-detectable, except tetrachloroethene at 56 ppb.

\+ All EPA method 8010 compounds were non-detectable, except tetrachloroethene at 40 ppb and 1,1,1-trichloroethane at 5.8 ppb.

ND = Non-detectable.

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

KEI-P89-1204.QR4
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TABLE 6

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample Number	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
4/09/90	MW1(5)*	5.0	ND	ND	ND	ND	ND	ND
&	MW1(9.5)*	9.5	ND	ND	ND	ND	ND	ND
4/10/90	MW1(15)*	15.0	ND	ND	ND	ND	ND	ND
	MW1(20)*	20.0	ND	ND	ND	ND	ND	ND
	MW1(25)*	25.0	ND	ND	ND	ND	ND	ND
	MW1(30)*	30.0	ND	ND	ND	ND	ND	ND
	MW1(35)*	35.0	ND	ND	ND	ND	ND	ND
	MW1(40)*	40.0	ND	ND	ND	ND	ND	ND
	MW1(45)*	45.0	ND	ND	ND	ND	ND	ND
	MW1(50)*	50.0	ND	ND	ND	ND	ND	ND
	MW2(5)	5.0	ND	ND	ND	ND	ND	ND
	MW2(10)	9.5	ND	ND	ND	ND	ND	ND
	MW2(12)	12.0	ND	ND	ND	ND	ND	ND
	MW2(15)	15.0	ND	ND	ND	ND	ND	ND
	MW2(20)	20.0	ND	ND	ND	ND	ND	ND
	MW2(25)	25.0	ND	ND	ND	ND	ND	ND
	MW2(30)	30.0	ND	ND	ND	ND	ND	ND
	MW2(35)	35.0	ND	ND	ND	ND	ND	ND
	MW2(40)	39.5	ND	ND	ND	ND	ND	ND
	MW3(5)	5.0	ND	ND	ND	ND	ND	ND
	MW3(10)	10.0	ND	ND	ND	ND	ND	ND
	MW3(15)	15.0	ND	ND	ND	ND	ND	ND
	MW3(20)	20.0	ND	ND	ND	ND	ND	ND
	MW3(25)	25.0	ND	ND	ND	ND	ND	ND
	MW3(30)	30.0	ND	ND	ND	ND	ND	ND
	MW3(35)	35.0	ND	ND	ND	ND	ND	ND
	MW3(40)	40.0	ND	ND	ND	ND	ND	ND
Detection Limits			1.0	1.0	0.0050	0.0050	0.0050	0.0050

* TOG and all EPA method 8010 compounds were all non-detectable.

ND = Non-detectable.

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

KEI-P89-1204.QR4
March 4, 1992

TABLE 7

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
7/05/90	EB1(8.5)*	ND	ND	ND	0.014	0.0056	ND
&	EB1(13.5)*	ND	ND	ND	0.015	ND	ND
7/06/90	EB1(18.5)*	ND	ND	ND	0.017	0.024	0.011
	EB1(23.5)*	ND	ND	ND	0.011	ND	ND
	EB1(28.5)*	ND	ND	ND	0.012	ND	ND
	EB2(9.5)*	ND	1.2	ND	0.038	0.016	0.012
	EB2(12.5)*	ND	ND	0.0090	0.025	0.0060	ND
	EB2(16.5)*	ND	ND	ND	0.021	0.0050	ND
	EB2(22)*	ND	ND	ND	0.020	ND	ND
	EB2(26.5)*	ND	ND	ND	0.017	ND	ND
	EB2(32)	ND	ND	ND	ND	ND	ND
Detection Limits		1.0	1.0	0.0050	0.0050	0.0050	0.0050

* TOG and all EPA method 8010 compounds were non-detectable, except 1,1,1-trichloroethane at 6.2 ppb in EB1(28.5).

ND = Non-detectable.

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

KEI-P89-1204.QR4
March 4, 1992

TABLE 8

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
7/6/90	EB1*	6.7	ND	ND	1.5	1.0	ND
	EB2*	ND	ND	0.61	1.5	1.0	ND
Detection Limits		50	30	0.30	0.30	0.30	0.30

* TOG and EPA method 8010 compounds were non-detectable.

ND = Non-detectable.

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

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Consulting Engineers
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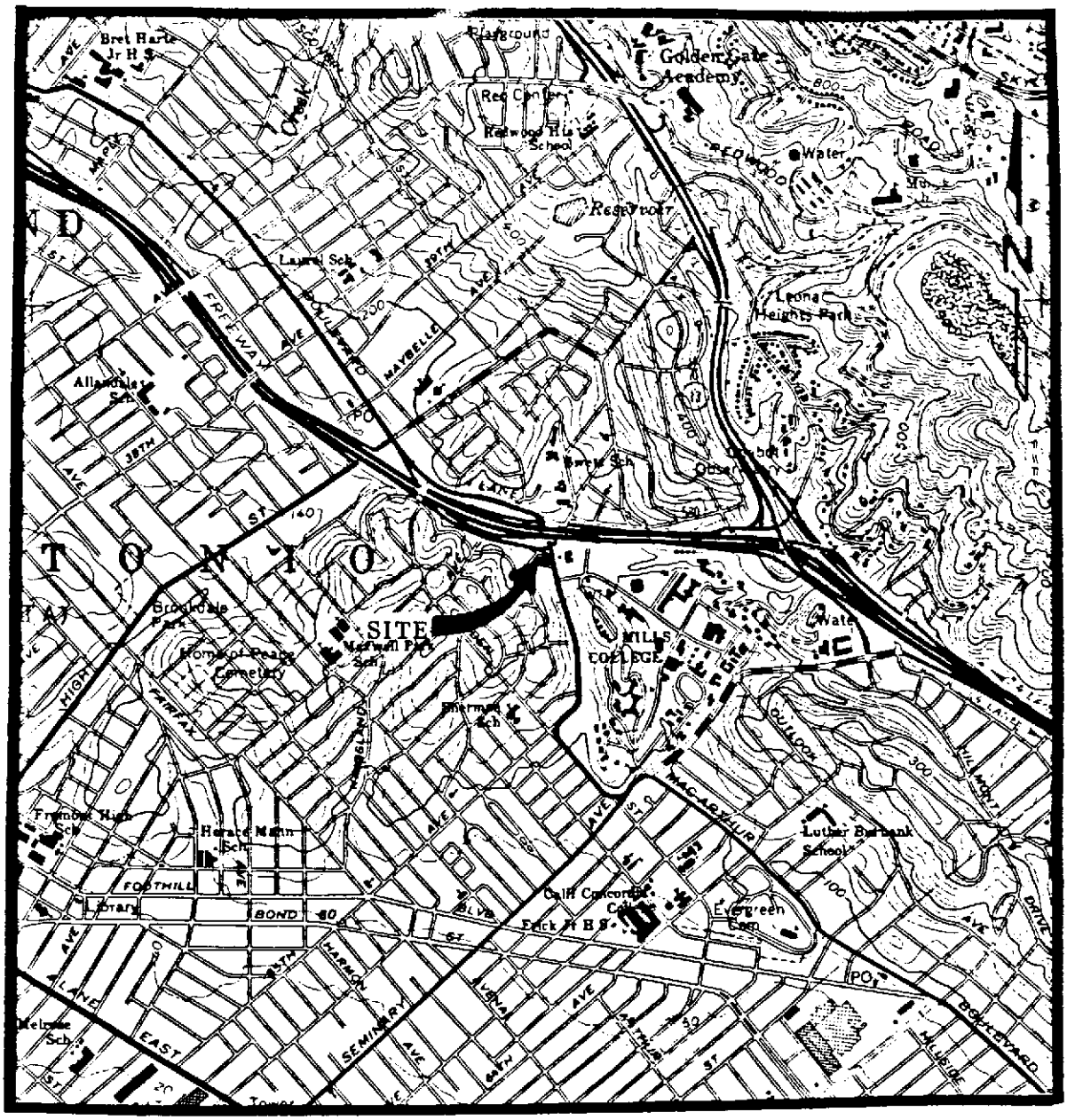

LOCATION MAP

Base from U.S.G.S 7.5 minute Oakland East Quadrangle
(photorevised 1980)

Unocal S/S #5781
3535 Pierson Street
Oakland, CA

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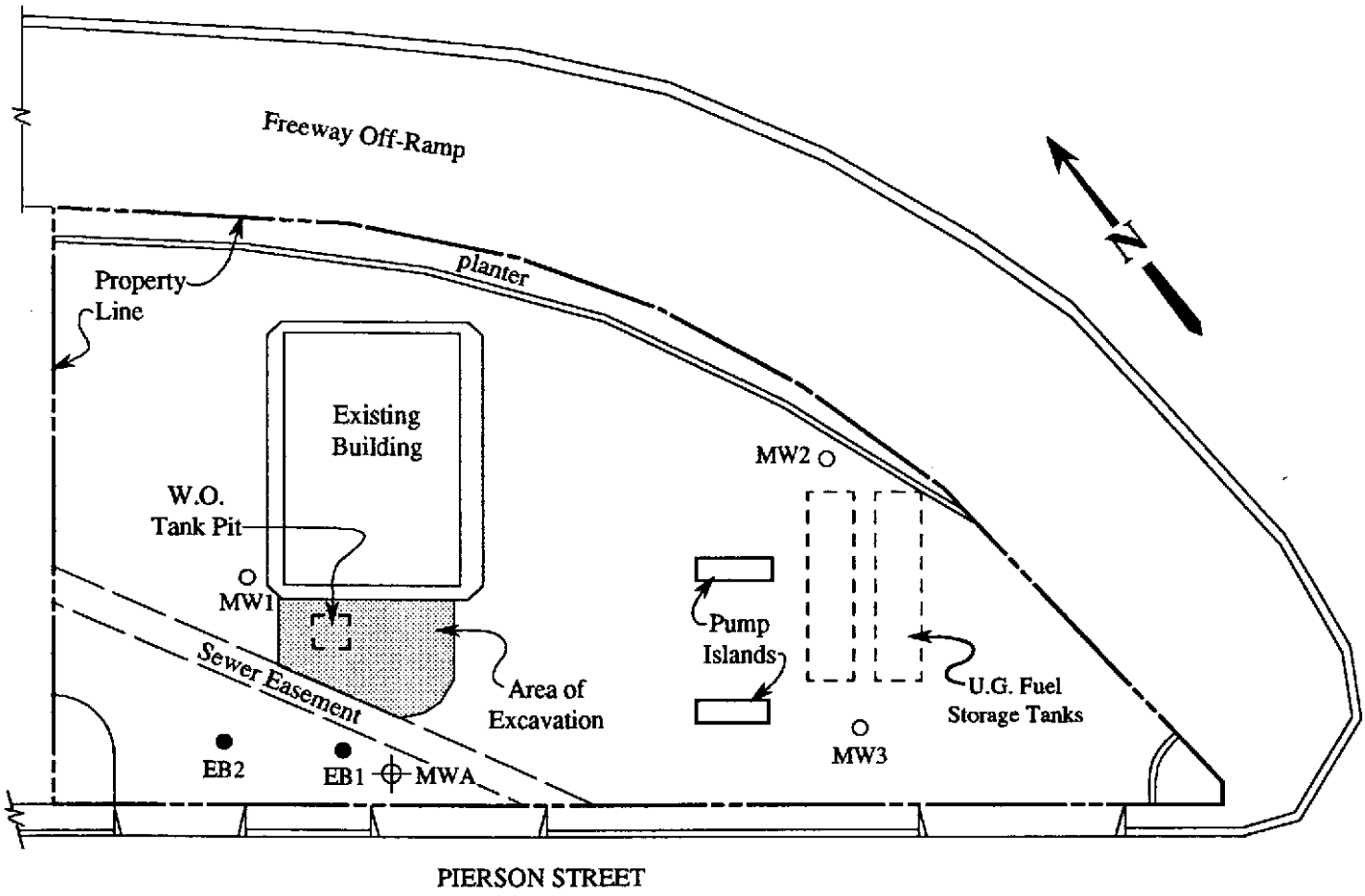

SITE PLAN
Figure 1

LEGEND

- ⊕ Monitoring well
- ● Exploratory boring (drilled 7/5 & 7/6/90)
- ○ Exploratory boring (drilled 4/9 & 4/10/90)

0 30 60
Approx. scale feet

Unocal Service Station #5781
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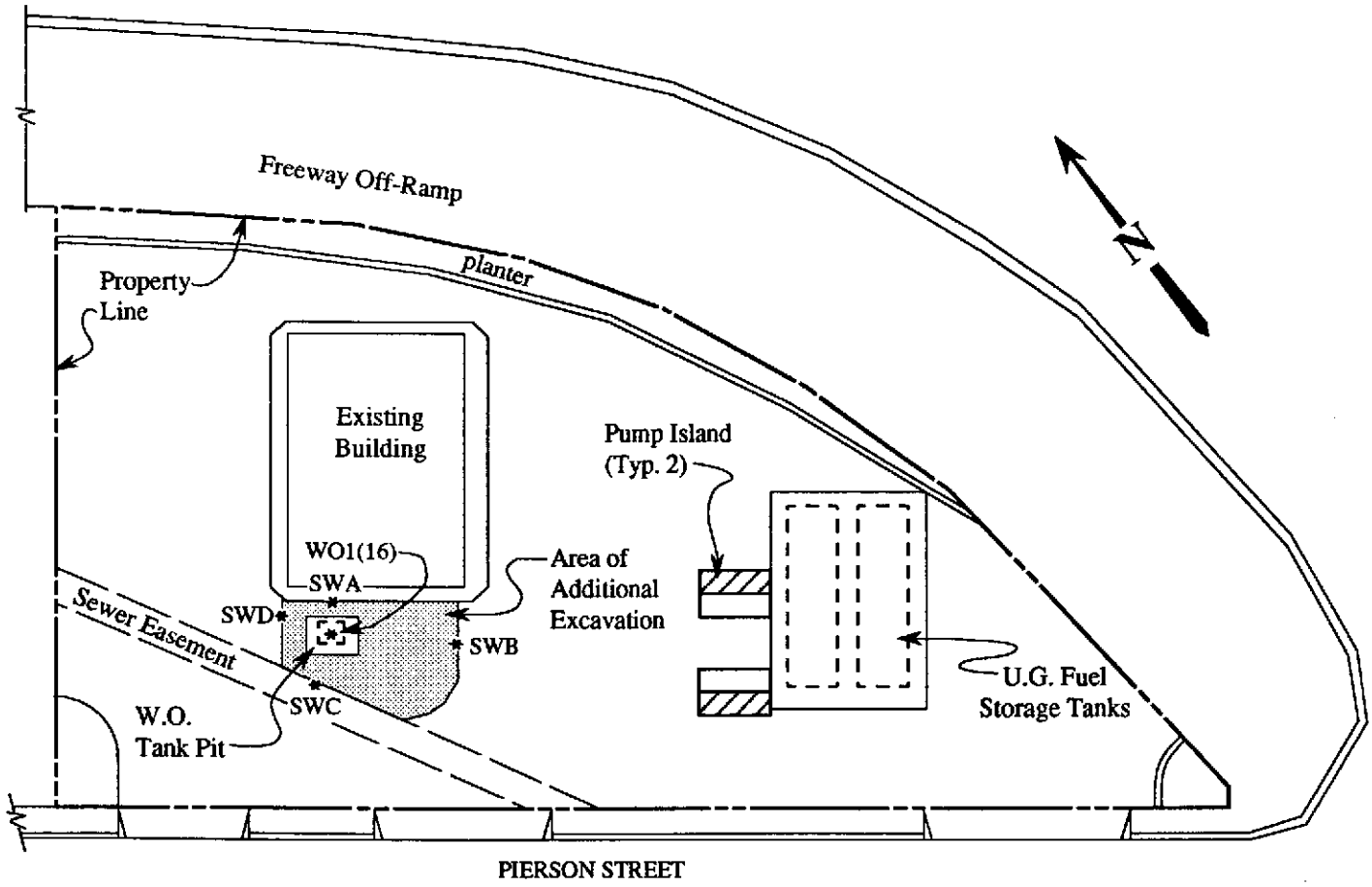

SITE PLAN
Figure 2

LEGEND

* Sample point location

0 30 60
Approx. scale feet

Unocal Service Station #5781
3535 Pierson Street
Oakland, CA

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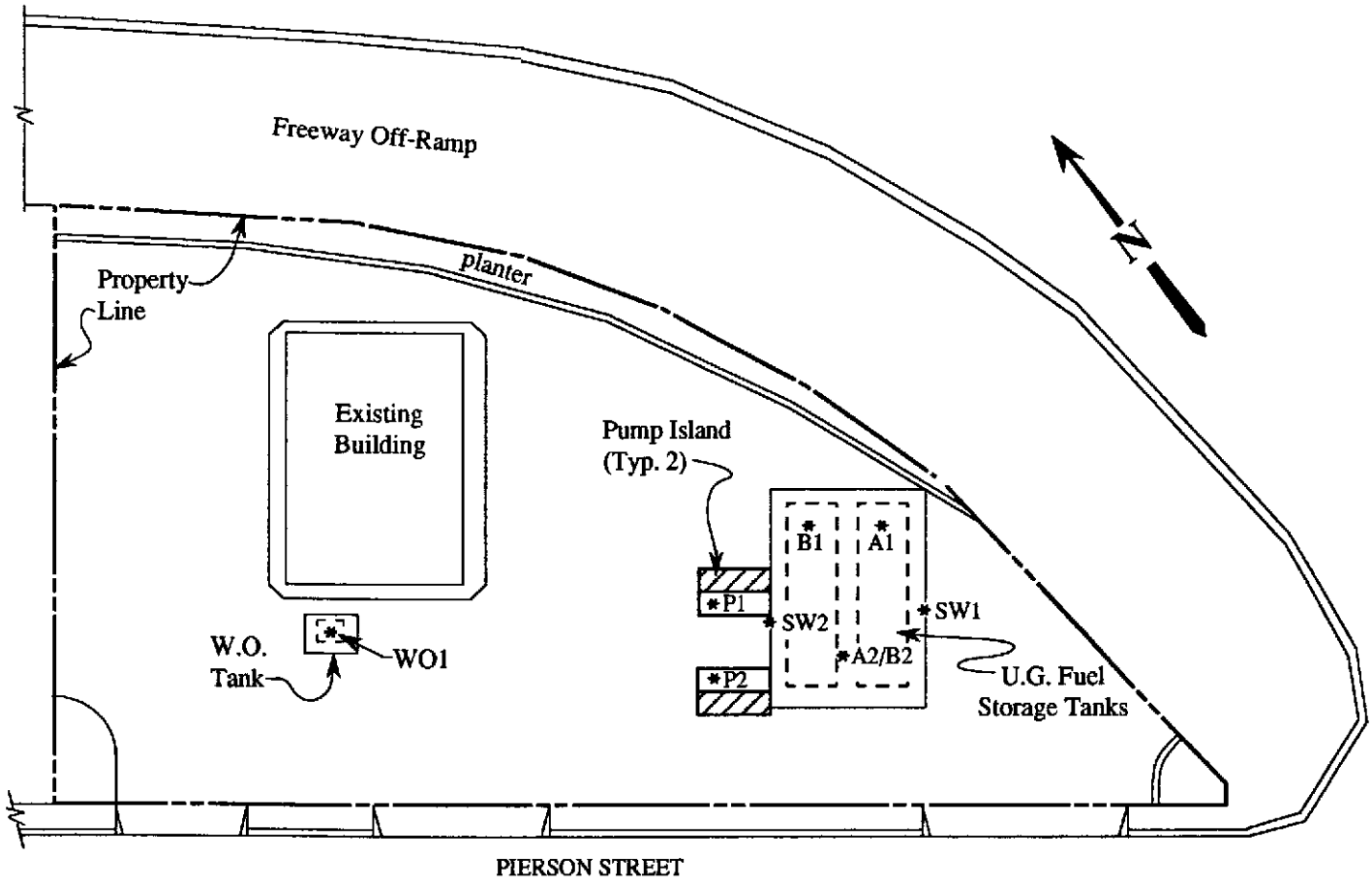

SITE PLAN
Figure 3

LEGEND

* Sample point location

0 30 60
Approx. scale feet

Unocal Service Station #5781
3535 Pierson Street
Oakland, CA

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
(510) 686-9600 • FAX (510) 686-9689

Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 3535 Pierson, Oakland	Sampled:	Feb 6, 1992
P.O. Box 996	Sample Descript.:	Water, MW-A	Received:	Feb 6, 1992
Benicia, CA 94510	Analysis Method:	EPA 5030/ 8015/8020	Analyzed:	Feb 10, 1992
Attention: Mardo Kaprealian, P.E.	Lab Number:	202-0314	Reported:	Feb 25, 1992

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

Analyte	Method Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Low to Medium Boiling Point Hydrocarbons	30	N.D.
Benzene	0.30	N.D.
Toluene	0.30	N.D.
Ethyl Benzene	0.30	N.D.
Xylenes	0.30	N.D.

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 3535 Pierson, Oakland	Sampled:	Feb 6, 1992
P.O. Box 996	Matrix Descript:	Water	Received:	Feb 6, 1992
Benicia, CA 94510	Analysis Method:	EPA 3510/8015	Extracted:	Feb 13, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	202-0314	Analyzed:	Feb 20, 1992
			Reported:	Feb 25, 1992

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons µg/L (ppb)
202-0314	MW-A	N.D.

Method Detection Limits:	**50**

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.

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Belinda C. Vega
Laboratory Director

2020314.KEI <2>

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 3535 Pierson, Oakland	Sampled:	Feb 6, 1992
P.O. Box 996	Sample Descript:	Water, MW-A	Received:	Feb 6, 1992
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	2/19-2/20/92
Attention: Mardo Kaprealian, P.E.	Lab Number:	202-0314	Reported:	Feb 25, 1992

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane	0.50	N.D.
Bromoform	0.50	N.D.
Bromomethane	0.50	N.D.
Carbon tetrachloride	0.50	N.D.
Chlorobenzene	0.50	N.D.
Chloroethane	0.50	N.D.
2-Chloroethylvinyl ether	0.50	N.D.
Chloroform	0.50	N.D.
Chloromethane	0.50	N.D.
Dibromochloromethane	0.50	N.D.
1,3-Dichlorobenzene	0.50	N.D.
1,4-Dichlorobenzene	0.50	N.D.
1,2-Dichlorobenzene	0.50	N.D.
1,1-Dichloroethane	0.50	N.D.
1,2-Dichloroethane	0.50	N.D.
1,1-Dichloroethene	0.50	N.D.
cis-1,2-Dichloroethene	0.50	N.D.
trans-1,2-Dichloroethene	0.50	N.D.
1,2-Dichloropropane	0.50	N.D.
cis-1,3-Dichloropropene	0.50	N.D.
trans-1,3-Dichloropropene	0.50	N.D.
Methylene chloride	5.0	N.D.
1,1,2,2-Tetrachloroethane	0.50	N.D.
Tetrachloroethene	0.50	N.D.
1,1,1-Trichloroethane	0.50	N.D.
1,1,2-Trichloroethane	0.50	N.D.
Trichloroethene	0.50	N.D.
Trichlorofluoromethane	0.50	N.D.
Vinyl chloride	0.50	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 996
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 3535 Pierson, Oakland
QC Sample Group: 202-0314
Reported: Feb 25, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel	Oil and Grease
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015	SM5520
Analyst:	K. N.	K. N.	K. N.	K. N.	A. Tuzon	D. Newcomb
Reporting Units:	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
Date Analyzed:	Feb 10, 1992	Feb 10, 1992	Feb 10, 1992	Feb 10, 1992	Feb 19, 1992	Feb 12, 1992
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60	300	100
Conc. Matrix Spike:	21	21	22	67	260	85
Matrix Spike % Recovery:	105	105	110	111	86	85
Conc. Matrix Spike Dup.:	19	19	20	61	290	93
Matrix Spike Duplicate % Recovery:	95	95	100	102	98	93
Relative % Difference:	10	10	9.5	9.4	13	9.0

Labortory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}}$	x 100
Relative % Difference:	$\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{\text{(Conc. of M.S. + Conc. of M.S.D.) / 2}}$	x 100

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Client Project ID: Unocal, 3535 Pierson, Oakland
QC Sample Group: 202-0314
Reported: Feb 25, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	1,1-Dichloroethene	Trichloro-ethene	Chloro-benzene
Method:	EPA 8010	EPA 8010	EPA 8010
Analyst:	M. Nguyen	M. Nguyen	M. Nguyen
Reporting Units:	ug/L	ug/L	ug/L
Date Analyzed:	Feb 19, 1992	Feb 19, 1992	Feb 19, 1992
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10
Conc. Matrix Spike:	9.4	10	10
Matrix Spike % Recovery:	94	100	100
Conc. Matrix Spike Dup.:	9.6	9.4	9.7
Matrix Spike Duplicate % Recovery:	96	94	97
Relative % Difference:	2.1	6.2	3.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

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Belinda C. Vega
Laboratory Director

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

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Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 3535 Pierson, Oakland
QC Sample Group: 202-0314
Reported: Feb 25, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015/8020	EPA 8015/8020	EPA8015	EPA8015
Analyst:	K. N.	K. N.	A. Tuzon	A. Tuzon
Reporting Units:	ug/L	ug/L	ug/L	ug/L
Date Analyzed:	Feb 10, 1992	Feb 10, 1992	Feb 20, 1992	Feb 20, 1992
Sample #:	202-0314	Blank	202-0314	Blank
Surrogate % Recovery:	110	110	120	110

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

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

Client Project ID: Unocal, 3535 Pierson, Oakland
QC Sample Group: 202-0314
Reported: Feb 25, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8010	EPA 8010
Analyst:	M. Nguyen	M. Nguyen
Reporting Units:	ug/L	ug/L
Date Analyzed:	2/19-2/20/92	2/19-2/20/92
Sample #:	202-0314	Blank
Surrogate #1 % Recovery:	80	98
Surrogate #2 % Recovery:	96	95

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: JOE

WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal / Oakland 3535 Pierson

TURN AROUND TIME: Regular

ANALYSES REQUESTED

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHG, BTXE	8010	TOG (5520B&F)	TPHD				REMARKS
MW-A	2/6/92	9:45 AM		✓	✓		6	MW	✓	✓	✓	✓	2020314AF			VOAs preserved

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Joe Benison	2/6/92	A. Nagra
K. Wallace	2/7/92 12:20 PM	[signature]

The following MUST BE completed by the laboratory accepting samples for analysis:

1. Have all samples received for analysis been stored in ice? YES
2. Will samples remain refrigerated until analyzed? YES
3. Did any samples received for analysis have head space? NO
4. Were samples in appropriate containers and properly packaged? YES

Signature: A. Nagra Title: Analyst Date: 2/6