KAPREALIAN ENGINEERING
INCORPORATED

May 8, 1992

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

Attention: ~~Mr. Gil Wistar~~ Jennifer Eberle

RE: Unocal Service Station #0752
800 Harrison Street
Oakland, California

Dear Mr. Wistar:

Per the request of Mr. Tim Ripp of Unocal Corporation, enclosed please find our report dated April 30, 1992, for the above referenced site.

If you should have any questions, please feel free to call our office at (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

jad\82

Enclosure

cc: Tim Ripp, Unocal Corporation

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel: 510.602.5100 Fax: 510.687.0602

KAPREALIAN ENGINEERING
INCORPORATED

KEI-P90-1103.QR3
April 30, 1992

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

Attention: Mr. Tim Ripp

RE: Quarterly Report
Unocal Service Station #0752
800 Harrison Street
Oakland, California

Dear Mr. Ripp:

This report presents the results of the most recent quarter of monitoring and sampling of the monitoring wells at the referenced site by Kaprealian Engineering, Inc. (KEI), per KEI's proposal KEI-P90-1103.P1 dated February 1, 1991. The wells are currently monitored monthly and sampled on a quarterly basis. This report covers the work performed by KEI from January through April 1992.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a service station. The site is characterized by gently sloping, southward trending topography, and is located approximately 0.5 miles north-northeast of the Oakland Inner Harbor. The site is also located northeast and across 8th Street from a Shell service station that is located adjacent to and northeast of a currently closed Arco service station (which is located at the intersection of 7th Street with Harrison). In addition, a gasoline and diesel service station referred to as "Mandrin Auto Service" is located east-southeast of the site at Alice Street and 8th Street. A Location Map, Site Vicinity Map, and Site Plans are attached to this report.

KEI's initial field work was conducted on November 9, 1990, when two underground gasoline storage tanks and one waste oil tank were removed from the site. The tanks consisted of one 10,000 gallon regular unleaded gasoline tank, one 10,000 gallon super unleaded gasoline storage tank, and one 280 gallon waste oil tank. The tanks were made of steel and no apparent holes or cracks were observed in the fuel tanks; however, the waste oil tank contained one 1/8th-inch square hole. Mr. Dennis Byrne of the Alameda County Health Care Services Agency (ACHCS) was present during tank removal and subsequent soil sampling.

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Two soil samples, labeled A1 and B1, were collected from beneath the fuel tanks at depths of approximately 14 feet below grade. Two soil samples, labeled A2 and B2, were collected from the fuel tank pit east sidewall at depths of approximately 12 feet below grade. One soil sample, labeled WO1, was collected from beneath the waste oil tank at a depth of approximately 6.5 feet below grade. Sample point locations are as shown on the attached Site Plan, Figure 2.

On November 12, 1990, due to observed soil contamination in the area of sample point A1, KEI collected an additional soil sample, labeled C(19), from the fuel tank pit at a depth of approximately 19 feet below grade.

KEI returned to the site on December 20, 1990, in order to collect soil samples from beneath the pump islands. Six samples, labeled D1 through D6, were collected from beneath the six fuel dispensers; one sample, labeled P1, was collected from the product pipe trench. These samples were collected at depths of about 2.5 feet below grade. Sample point locations are shown on the attached Site Plan, Figure 2.

KEI again returned to the site on December 26, 1990, in order to collect a sample from the pump island excavation (due to obvious contamination observed in the area beneath sample point D2 during previous excavation activities). One additional soil sample, labeled D2(6), was collected from beneath the fuel dispenser and below the sample point D2 at a depth of about 6 feet below grade.

At the request of the ACHCS, on January 3, 1991, KEI returned to the site in order to collect one additional soil sample, labeled WO1(9.5), from the waste oil tank pit. Sample point locations are as shown on the attached Site Plan, Figure 2. After sampling, the waste oil tank pit was excavated to the sample depth of 9.5 feet below grade.

All samples were analyzed by Sequoia Analytical Laboratory in Concord, California. All soil samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes, and ethylbenzene (BTX&E). In addition, the soil sample (WO1) collected from the waste oil tank pit was analyzed for TPH as diesel, total oil and grease (TOG), EPA method 8010 and 8270 constituents, and the metals cadmium, chromium, lead, zinc, and nickel. Soil sample WO1(9.5), collected beneath sample WO1, was analyzed for TPH as gasoline, BTX&E, TOG, and the metals chromium, lead, zinc, and nickel.

Analytical results of the soil samples (A2 and B2) collected from the fuel tank pit sidewall indicated non-detectable levels of TPH as gasoline. Analytical results of the soil samples [A1, B1, and C(19)] collected from the bottom of the fuel tank pit indicated levels of TPH as gasoline at 1,200 ppm, 45 ppm, and 3,800 ppm, respectively.

Analytical results of soil samples collected from beneath the dispensers and the pipe trench indicated non-detectable levels of TPH as gasoline and benzene for samples P1 and D1 through D6, except for sample D2, which showed 45 ppm of TPH as gasoline, and 0.22 ppm of benzene. However, sample D2(6), collected beneath sample D2 at a depth of 6 feet below grade, showed 1,200 ppm of TPH as gasoline, and 0.24 ppm of benzene.

Analytical results of the soil sample (WO1) collected from beneath the waste oil tank pit indicated non-detectable levels of TPH as gasoline, BTX&E, TPH as diesel, TOG, EPA methods 8010 and 8270 constituents, and cadmium. Chromium, lead, zinc, and nickel were detected at concentrations of 43 ppm, 1,100 ppm, 130 ppm, and 12 ppm, respectively. However, sample WO1(9.5), collected from beneath sample WO1 at a depth of 9.5 feet below grade, showed non-detectable levels of TPH as gasoline, BTX&E, TOG, and lead. Chromium, zinc, and nickel were detected at concentrations of 61 ppm, 20 ppm, and 40 ppm, respectively. The results of the soil analyses are summarized in Table 5.

Based on the analytical results, KEI recommended that an in-situ remediation system design be developed and implemented to remediate the residual soil contamination in the fuel tank pit in the vicinity of sample point locations A1 and C(19), and at the southerly pump island in the vicinity of sample location D2(6). However, prior to designing the recommended remediation system, and in order to comply with the requirements of the Regional Water Quality Control Board (RWQCB) and the ACHCS, KEI recommended the installation of three monitoring wells and two exploratory borings at the site. Documentation of the tank and piping removal procedures, sample collection techniques, and the analytical results are summarized in KEI's report (KEI-J90-1103.R1) dated February 1, 1991.

On May 29 and 30, 1991, three two-inch diameter monitoring wells and two exploratory borings (designated as MW1, MW2, and MW3, and EB1 and EB2, respectively, on the attached Site Plan, Figure 1) were installed at the site. The monitoring wells were drilled and completed to total depths ranging from 33 to 35 feet below grade. The exploratory borings were each drilled to total depths of 23 feet below grade and were subsequently fully grouted with neat

Portland cement. Ground water was encountered at depths ranging from about 22.5 to 24 feet beneath the surface during drilling. The wells were developed on June 1, 1991, and were initially sampled on June 5, 1991.

Water samples from MW1, MW2, and MW3, and selected soil samples from EB1, EB2, MW1, MW2, and MW3, were analyzed at Sequoia Analytical Laboratory in Concord, California. All of the soil and water samples were analyzed for TPH as gasoline and BTX&E. In addition, the soil and water samples collected from MW1 (adjacent to the waste oil tank) were analyzed for TPH as diesel, TOG, EPA method 8010 constituents, and for the metals cadmium, chromium, lead, nickel, and zinc.

Analytical results of the soil samples collected from the borings for monitoring wells MW1, MW2, and MW3, and from soil borings EB1 and EB2, indicated non-detectable levels of TPH as gasoline and benzene in all samples, except for samples MW1(5), MW1(10), MW1(15), and MW3(23), which showed levels of TPH as gasoline at levels of 1.1 ppm, 43 ppm, 250 ppm, and 2.9 ppm, respectively, and in samples EB1(15), MW1(15), MW2(15.5), MW2(20), and MW3(23), which showed benzene levels ranging from 0.0079 ppm to 0.80 ppm. In MW1, TPH as diesel, TOG, and all EPA method 8010 compounds were non-detectable in all samples, except for samples MW1(5), MW1(10), and MW1(15), which showed levels of TPH as diesel at 2.2 ppm, 43 ppm, and 120 ppm, respectively. Also in MW1, cadmium was non-detectable for all samples; chromium was detected at levels ranging from 20 ppm to 110 ppm; lead was detected at levels ranging from 4.2 ppm to 11 ppm; nickel was detected at levels ranging from 24 ppm to 42 ppm; and zinc was detected at levels ranging from 23 ppm to 30 ppm.

Analytical results of the ground water samples collected from monitoring wells MW1 and MW2 indicated levels of TPH as gasoline ranging from 47 ppb to 49 ppb, with non-detectable levels of BTX&E. In MW3, TPH as gasoline was detected at a level of 5,800 ppb and benzene was detected at a level of 1,200 ppb. In MW1, TPH as diesel, TOG, and EPA method 8010 constituents were all non-detectable, except for chloroform at 7.8 ppb, tetrachloroethene at 2.9 ppb, and trichloroethene at 1.3 ppb. Also in MW1, chromium, lead, nickel, and zinc were detected at concentrations of 0.0083 ppm, 0.011 ppm, 0.063 ppm and 0.023 ppm, respectively, and cadmium was non-detectable. The results of the soil analyses are summarized in Tables 3 and 4, and the results of the water analyses are summarized in Tables 2, 2a, and 2b.

Based on the analytical results, KEI recommended the implementation of a monthly monitoring and quarterly sampling program. Documentation of monitoring well and exploratory boring installation

procedures, sample collection techniques, and the analytical results are presented in KEI's report (KEI-P90-1103.R4) dated July 5, 1991.

A representative of KEI reviewed the RWQCB's files on August 13, 1991, in order to obtain information on sites with ground water contamination in the vicinity of the Unocal site. KEI conducted a follow-up file review at the RWQCB on March 25, 1992. The following is a summary of these file reviews:

Fire Station #12, 822 Alice Street

This site is located southeast of and within 300 feet of the Unocal site (see the attached Site Vicinity Map). A 280 gallon underground diesel tank was removed in 1989. The analytical results of the soil samples collected from immediately beneath the tank showed total extractable hydrocarbons and TOG, which were detected at levels up to 860 ppm and 250 ppm, respectively. On June 12 through June 14, 1989, one monitoring well and two piezometers were drilled to a depth of between 20 and 21 feet below grade. The analytical results of the soil samples from well MW1 indicated non-detectable levels of TPH as gasoline and BTX&E. In addition, TOG was detected at concentrations ranging from 74 ppm to 78 ppm in the soil samples collected from depths of 5 to 20 feet below grade. The analytical results of the ground water samples collected from well MW1 (at high detection limits) indicated non-detectable levels of TPH as gasoline, BTX&E, and TPH as diesel. Also, TPH as diesel was non-detectable in the ground water samples collected from monitoring well MW1 as of May 2, 1990. Based on a south to southwesterly ground water flow direction at the Unocal site, it is not considered likely that contamination from the Unocal site and the fire station have commingled. All of the above information was based on a report prepared by Subsurface Consultants, Inc., dated August 3, 1989.

Former Shell Station, 416 Eighth Street at Broadway

This site is located three blocks north-northwest of the Unocal site. This site reportedly had seven monitoring wells (S-1 through S-7), which were apparently installed by Groundwater Technology Inc. (GTI) in August 1981. In 1985, monitoring well S-7 was destroyed for freeway construction. Monitoring wells S-1 through S-3 were reported as "inaccessible" and "believed to be destroyed" during a station demolition. Quarterly ground water sampling of wells S-4, S-5, and S-6 began in October of 1988. Ground water samples collected from these wells were analyzed for TPH as gasoline and BTX&E. Free product levels of

up to 0.25 feet have been detected in well S-5 since October of 1990. Monitoring well S-4 was not sampled since June 1991, due to insufficient water for sampling. The ground water flow direction was reported as varying from the north-northwest to the northwest on April 8, 1991. Based on the opposing directions of ground water flows and the distance from the Unocal site, it is not considered likely that contamination from the Unocal site and the former Shell station have commingled. All of the above information was based on a quarterly report prepared by GeoStrategies, Inc. dated January 6, 1992.

Other Sites

No information was contained in the RWQCB files for the adjacent Shell service station, the former Arco service station (Seventh Street at Harrison Street), the Auto service station, or the Rind gas station (both the Auto and Rind stations are located at the intersection of Eighth Street and Alice Street).

Based upon the lack of information available for these nearby sites, KEI recommended that the RWQCB files be periodically re-reviewed to determine if any new information is available for the sites.

RECENT FIELD ACTIVITIES

The three wells (MW1, MW2, and MW3) were monitored three times and were sampled once during the quarter. During monitoring, the wells were checked for depth to water and the presence of free product. During sampling, the wells were also checked for the presence of sheen. No free product or sheen was noted in any of the wells during the quarter. Monitoring data are summarized in Table 1.

Water samples were collected from the wells on April 2, 1992. Prior to sampling, the wells were each purged of 11 gallons by the use of a surface pump. Samples were then collected by the use of a clean Teflon bailer. Samples were 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

Based on the water level data gathered on April 2, 1992, the ground water flow direction appeared to be toward the south (at a hydraulic gradient of approximately 0.007), which is relatively unchanged from the flow direction recorded on December 30, 1991. Water levels have fluctuated during the quarter, showing a net

increase of between 1.72 and 1.8 feet in all wells since December 30, 1991. The measured depth to ground water at the site on April 2, 1992, ranged between 19.65 and 20.82 feet below grade.

Based on review of regional geologic maps (U.S. Geological Survey Professional Paper 943 "Flatland Deposits - Their Geology and Engineering Properties and Their Importance to Comprehensive Planning" by E.J. Helley and K.R. Lajoie, 1979), the subject site is underlain by Quaternary-age dune sand deposits referred to as the Merritt Sand (Qps). The Merritt Sand is described as typically consisting of loose, well-sorted, fine-to medium-grained sand with silt. This sand apparently reaches a maximum depth of about 50 feet below grade in the Oakland area.

The results of our subsurface study indicated that the site is immediately underlain by artificial fill materials that extend to depths of about 2.5 to 5.5 feet below grade, except at MW3, where the fill materials were confirmed to only extend to a depth of about 1 foot below grade. The native earth materials underlying the fill consist of very fine-to fine-grained sand that is predominantly poorly graded, or is clayey or silty sand. These sandy materials extend to depths below grade of about 32 to 33 feet, where a silty to sandy clay layer was encountered that extends to at least the maximum depth explored (33 to 35 feet below grade). However, at MW3, this clay bed varies from a very sandy clay to a very clayey sand.

ANALYTICAL RESULTS

Ground water samples were analyzed at Sequoia Analytical Laboratory in Concord, California, and were accompanied by properly executed Chain of Custody documentation. The samples were analyzed for TPH as gasoline by EPA method 5030 in conjunction with modified 8015, and BTX&E by EPA method 8020. In addition, the ground water sample collected from monitoring well MW1 was analyzed for TPH as diesel by EPA method 3510 in conjunction with modified 8015, TOG by Standard Method 5520B&F, EPA method 8010 constituents, and the metals cadmium, chromium, nickel, lead, and zinc.

Analytical results of the ground water sample collected from monitoring well MW1 indicated non-detectable levels of TPH as gasoline and BTX&E. Analytical results of the ground water samples collected from monitoring wells MW2 and MW3 indicated levels of TPH as gasoline at concentrations of 88 ppb and 8,000 ppb, respectively. Benzene was detected in monitoring wells MW2 and MW3 at concentrations of 12 ppb and 1,400 ppb, respectively. In monitoring well MW1, TOG and all EPA method 8010 constituents were non-detectable, except for 7.1 ppb of chloroform, 2.6 ppb of tetrachlo-

roethene, and 1.4 ppb of trichloroethene. TPH as diesel was also detected in well MW1 at a level of 94 ppb. Also in MW1, cadmium and nickel were non-detectable, and chromium, lead, and zinc were detected at concentrations of 0.015 ppm, 0.016 ppm, and 0.020 ppm, respectively. The results of the analyses are summarized in Tables 2, 2a, and 2b. 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 any of the wells, KEI recommends the continuation of the current monitoring and sampling program of the existing wells, per KEI's proposal (KEI-P90-1103.P1) dated February 1, 1991.

KEI previously concluded that only limited soil contamination is present at the site, specifically at MW1 at depths of 5 to 15 feet below grade, at the area of the southern most fuel dispenser [sample D2(6)], and in the central areas of the fuel tank pit [samples A1 and C(19)].

However, KEI also concluded that the extent of ground water contamination at and in the vicinity of the site has not been defined, especially in the downgradient direction (south); therefore, additional monitoring wells are warranted. A work plan/proposal (KEI-P90-1103.P2) dated November 13, 1991, was previously submitted that recommended the installation of three additional monitoring wells. The locations of the proposed wells are shown on the attached Site Plan, Figure 3. Unocal has submitted the required deed and title information to the City of Oakland in application for an encroachment permit for proposed wells MW5 and MW6. The three proposed wells will be installed as soon as all encroachment and well installation permits have been obtained.

DISTRIBUTION

A copy of this report should be sent to the ACHCS, and to the RWQCB, 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 (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.

Thomas J. Berkins
Senior Environmental Engineer

Joel G. Greger, C.E.G.
Senior Engineering Geologist

License No. 1633
Exp. Date 6/30/92

Timothy R. Ross
Project Manager

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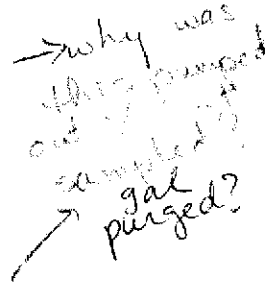
Attachments: Tables 1, 2, 2a, 2b & 3 through 5
Location Map
Site Vicinity Map
Site Plans - Figures 1, 1a, 2 & 3
Laboratory Analyses
Chain of Custody documentation

KEI-P90-1103.QR3
April 30, 1992

TABLE 1

SUMMARY OF GROUND WATER MONITORING AND PURGING DATA

Well #	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness	Sheen	Gallons Pumped
(Monitored and Sampled on April 2, 1992)					
MW1	14.12	20.82	0	No	11
MW2	14.39	20.58	0	No	11
MW3	13.74	19.65	0	No	11
(Monitored on February 27, 1992)					
MW1	13.44	21.50	0	--	0
MW2	13.75	21.22	0	--	0
MW3	13.09	20.30	0	--	55
(Monitored on January 27, 1992)					
MW1	12.70	22.24	0	--	0
MW2	13.04	21.93	0	--	0
MW3	12.22	21.17	0	--	55



Well #	Surface Elevation* (feet)
MW1	34.94
MW2	34.97
MW3	33.39

-- Sheen determination was not performed.

* The elevations of the tops of the well covers have been surveyed to Mean Sea Level (MSL), per the City of Oakland disk stamped "25/A" at elevation 28.81 feet MSL.

KEI-P90-1103.QR3
April 30, 1992

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
4/02/92	MW1	94	ND	ND	ND	ND	ND
	MW2	--	88	12	0.32	7.2	6.3
	MW3	--	8,000	1,400	200	310	300
12/30/91	MW1	ND	ND	ND	ND	ND	ND
	MW2	--	91	16	0.89	1.9	11
	MW3	--	7,200	2,100	690	550	410
9/30/91	MW1	ND	ND	ND	ND	ND	ND
	MW2	--	130	18	0.53	9.6	14
	MW3	--	6,800	1,400	130	240	290
6/05/91	MW1	ND	47	ND	ND	ND	ND
	MW2	--	49	ND	ND	ND	ND
	MW3	--	5,800	1,200	40	97	140
Detection Limits		50	30	0.30	0.30	0.30	0.30

ND = Non-detectable.

-- Indicates analysis was not performed.

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

KEI-P90-1103.QR3
April 30, 1992

TABLE 2a

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TOG	Cadmium	Chromium	Lead	Nickel	Zinc
4/02/92	MW1	ND	ND	0.015	0.016	ND	0.020
12/30/91	MW1	ND	ND	0.0078	0.0057	ND	0.046
9/30/91	MW1	ND	ND	0.019	ND	ND	0.11
6/05/91	MW1	ND	ND	0.0083	0.011	0.063	0.023
Detection Limits		5.0	0.01	0.005	0.005	0.05	0.01

ND = Non-detectable.

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

KEI-P90-1103.QR3
April 30, 1992

TABLE 2b

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	Chloroform	Tetrachloroethene	Trichloroethene (TCE)
4/02/92	MW1*	7.1	2.6	1.4
12/30/91	MW1*	6.4	2.1	0.9
9/30/91	MW1	--	--	--
6/04/91	MW1*	7.8	2.9	1.3
Detection Limits		0.50	0.50	0.50

* All EPA method 8010 constituents were non-detectable except for the above compounds.

-- Indicates analysis was not performed.

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

KEI-P90-1103.QR3
April 30, 1992

TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample Number	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
5/23/91	MW1(5)*	5.0	2.2	1.1	ND	ND	0.010	ND
&	MW1(10)*	10.0	43	43	ND	0.0059	0.43	0.0074
5/30/91	MW1(15)*	15.0	120	250	0.80	0.73	2.9	0.91
	MW1(20)*	20.0	ND	ND	ND	ND	ND	ND
	MW1(24)*	24.0	ND	ND	ND	ND	0.0073	ND
	MW2(5)	5.0	--	ND	ND	ND	0.0054	ND
	MW2(10)	10.0	--	ND	ND	ND	ND	ND
	MW2(15.5)	15.5	--	ND	0.015	ND	0.025	0.0064
	MW2(20)	20.0	--	ND	0.0086	ND	ND	ND
	MW2(22)	22.0	--	ND	ND	ND	ND	ND
	MW3(5)	5.0	--	ND	ND	ND	ND	ND
	MW3(10)	10.0	--	ND	ND	ND	ND	ND
	MW3(15)	15.0	--	ND	ND	ND	ND	ND
	MW3(20)	20.0	--	ND	ND	ND	ND	ND
	MW3(23)	23.0	--	2.9	0.0079	ND	0.031	0.012
	EB1(5.5)	5.5	--	ND	ND	ND	ND	ND
	EB1(10)	10.0	--	ND	ND	ND	ND	ND
	EB1(15)	15.0	--	ND	0.0087	ND	ND	ND
	EB1(20)	20.0	--	ND	ND	ND	ND	ND
	EB1(22)	22.0	--	ND	ND	ND	ND	ND
	EB2(5.5)	5.5	--	ND	ND	ND	ND	ND
	EB2(10)	10.0	--	ND	ND	ND	ND	ND
	EB2(15)	15.0	--	ND	ND	ND	ND	ND
	EB2(20)	20.0	--	ND	ND	ND	ND	ND
	EB2(22.5)	22.5	--	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 constituents were non-detectable.

ND = Non-detectable.

-- Indicates analysis was not performed.

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

KEI-P90-1103.QR3
April 30, 1992

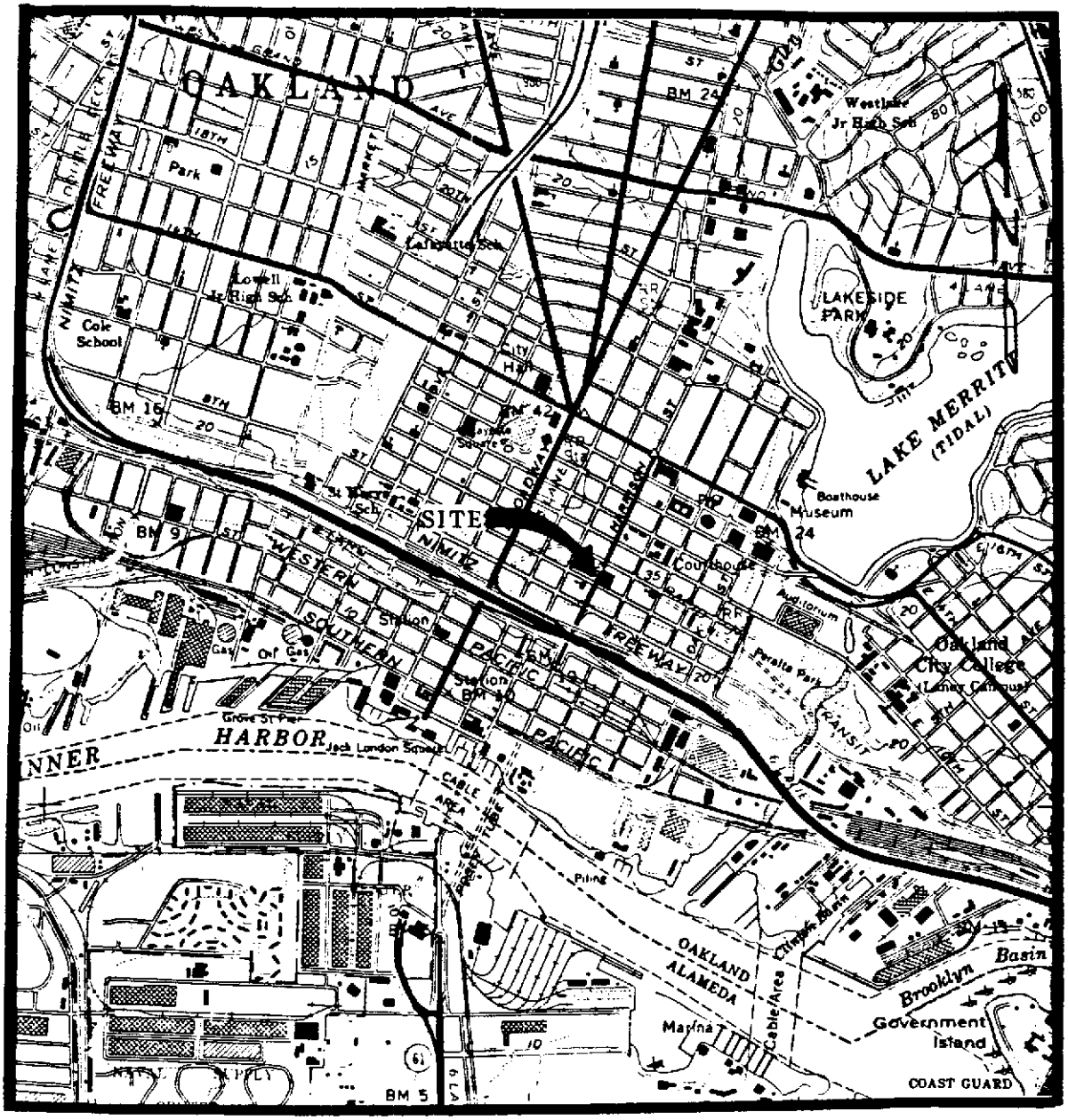
TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample	Depth (feet)	Cadmium	Chromium	Lead	Nickel	Zinc
5/29/91	MW1(5)	5	ND	64	11	32	30
	MW1(10)	10	ND	48	7.1	24	27
	MW1(15)	15	ND	110	6.0	42	28
	MW1(20)	20	ND	32	4.2	36	23
	MW1(24)	24	ND	20	5.0	31	23
Detection Limits			0.50	0.25	0.25	2.5	0.50

ND = Non-detectable.

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

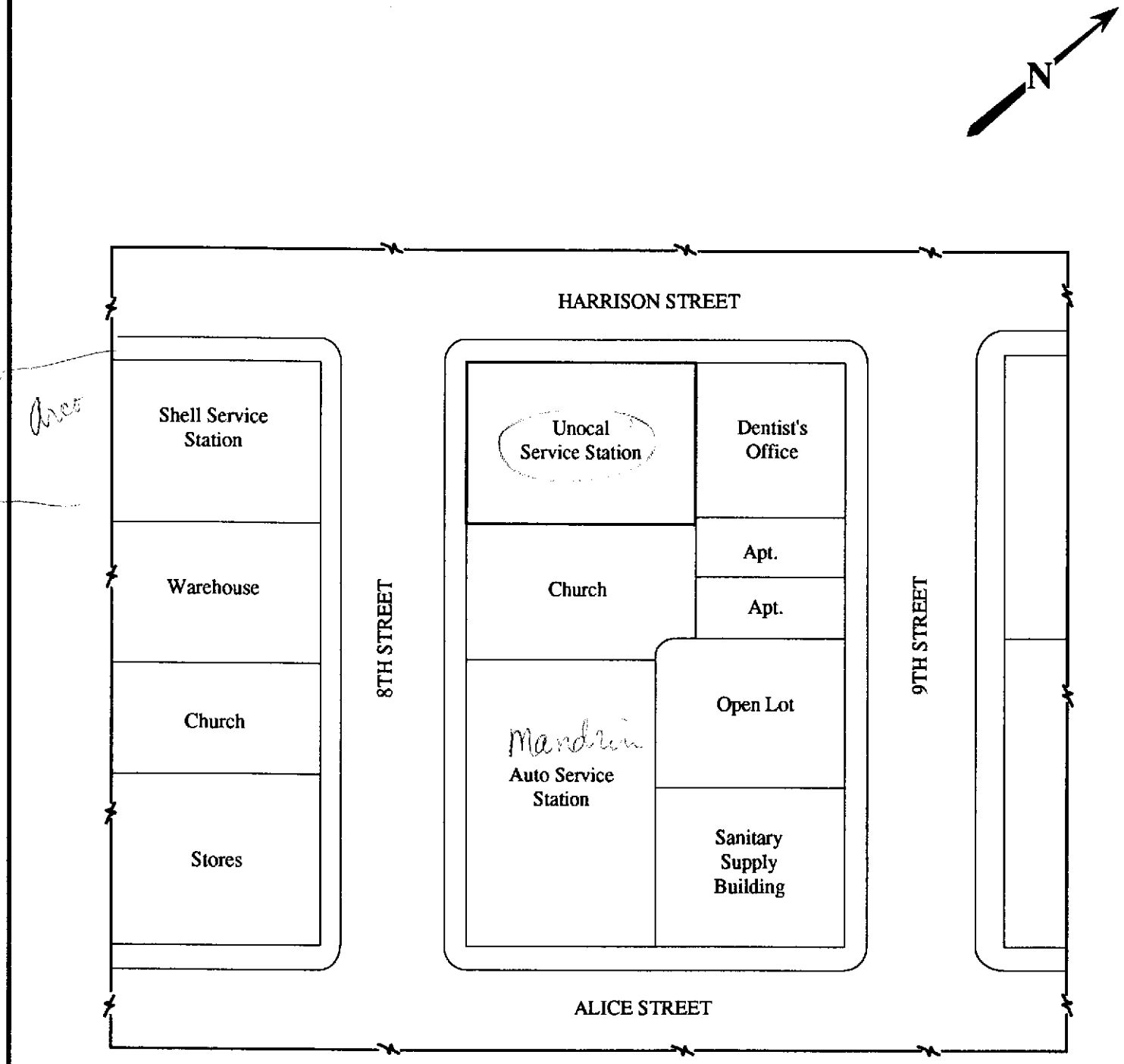


Base modified from 7.5 minute U.S.G.S. Oakland West Quadrangle
(photorevised 1980)

0 2000 4000

Approx. scale feet

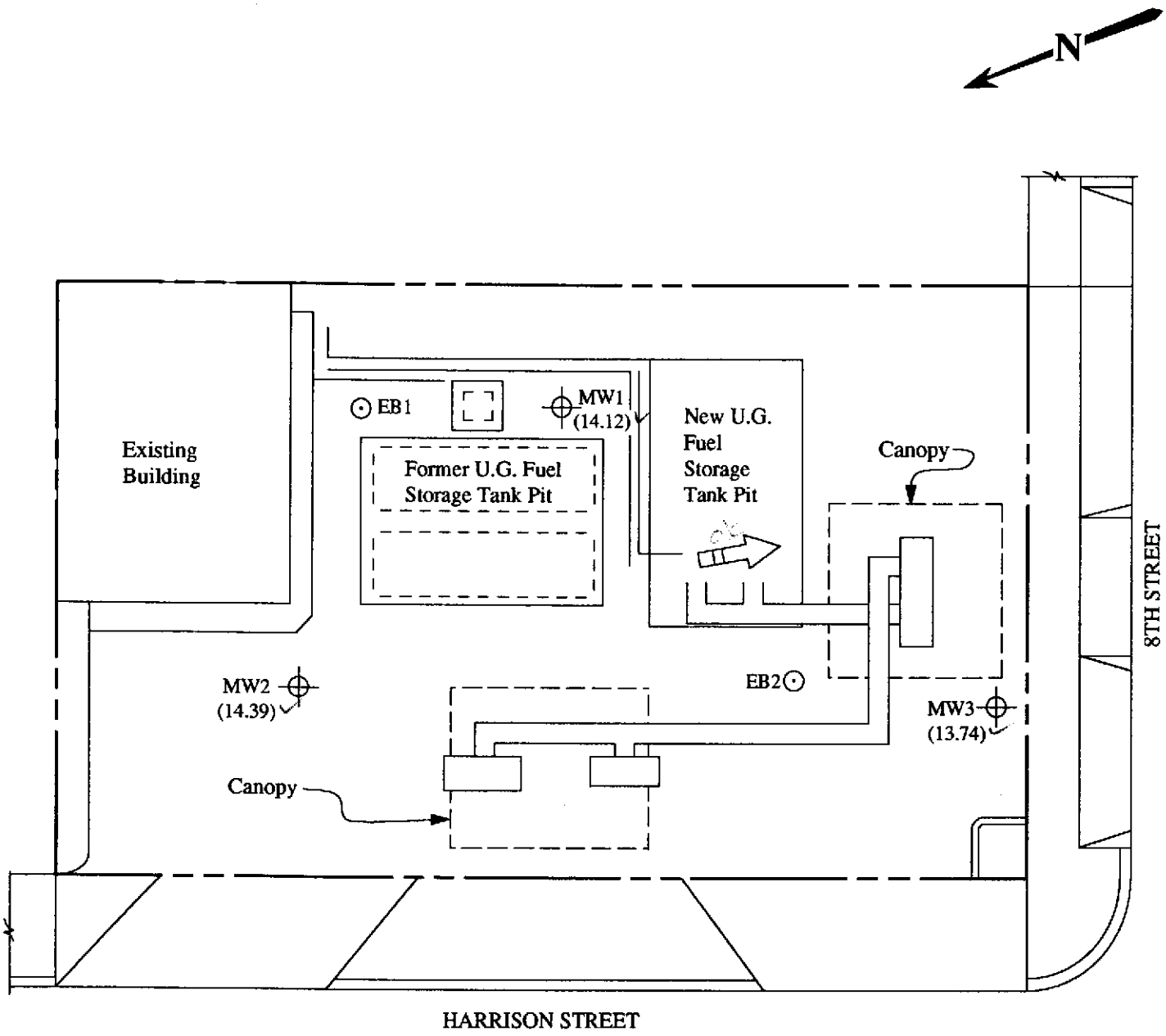
KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #0752 800 HARRISON STREET OAKLAND, CA	LOCATION MAP



KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

SITE VICINITY MAP



SITE PLAN

LEGEND

- Monitoring well
- Exploratory boring
- ( ) Ground water elevation in feet above Mean Sea Level on 4/2/92
- Direction of ground water flow

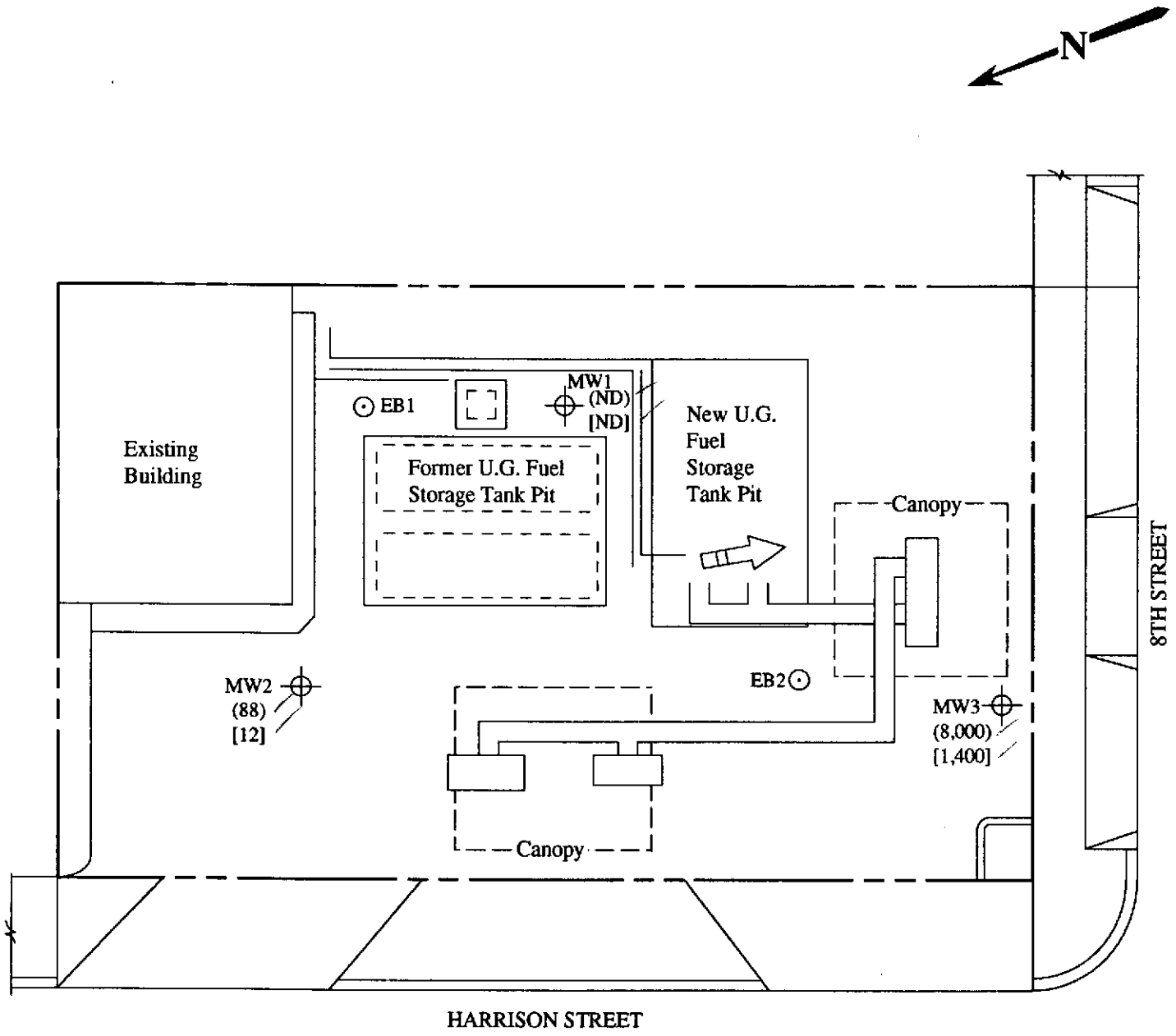
0 20 40

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE
1



SITE PLAN

(Samples collected on 4/2/92)

LEGEND

- Monitoring well
- Exploratory boring
- ( ) Concentrations of TPH as gasoline in ppb
- [ ] Concentrations of benzene in ppb
- Direction of ground water flow

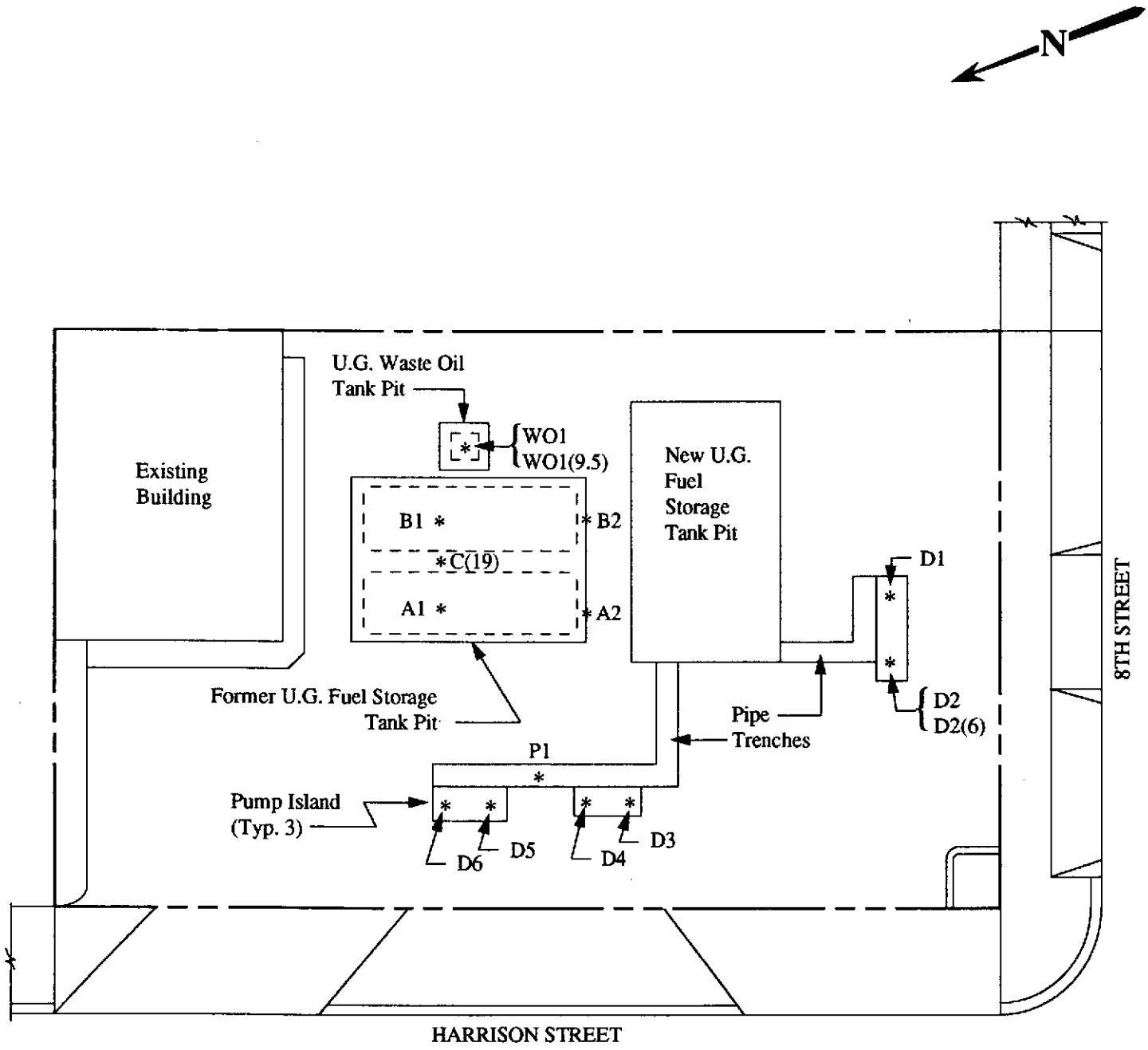
0 20 40

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE **1a**



SITE PLAN

LEGEND

* Sample Point Location

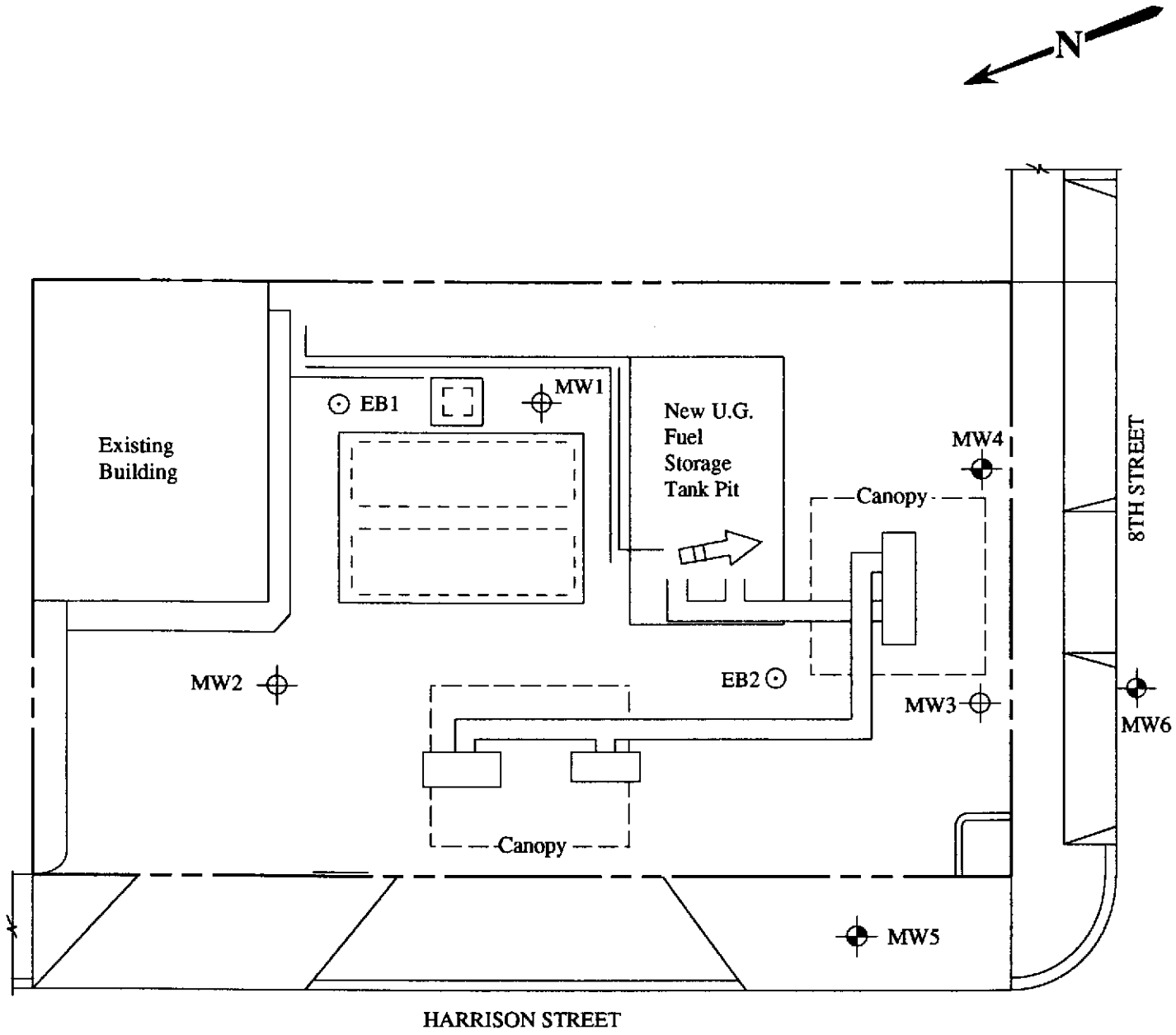
0 20 40

Approx. scale feet

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE
2



SITE PLAN

LEGEND

- Monitoring well (Existing)
- Exploratory boring (Existing)
- Monitoring well (Proposed)
- Direction of ground water flow

0 20 40

Approx. scale feet

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE
3

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 800 Harrison St, Oakland	Sampled:	Apr 2, 1992
P.O. Box 996	Matrix Descript:	Water	Received:	Apr 2, 1992
Benicia, CA 94510	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Apr 9, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	204-0102	Reported:	Apr 20, 1992

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
204-0102	MW1	N.D.	N.D.	N.D.	N.D.	N.D.
204-0103	MW2	88	12	0.32	6.3	7.2
204-0104	MW3	8,000	1,400	200	300	310

Method Detection Limits:	**30**	**0.30**	**0.30**	**0.30**	**0.30**

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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Kapreallan Engineering, Inc.	Client Project ID:	Unocal, 800 Harrison St., Oakland	Sampled:	Apr 2, 1992
P.O. Box 996	Matrix Descript:	Water	Received:	Apr 2, 1992
Benicia, CA 94510	Analysis Method:	EPA 3510/8015	Extracted:	Apr 9, 1992
Attention: Mardo Kapreallan, P.E.	First Sample #:	204-0102	Analyzed:	Apr 16, 1992
			Reported:	Apr 20, 1992

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

TPHd

Sample Number	Sample Description	High B.P. Hydrocarbons µg/L (ppb)
204-0102	MW1	94 ✓

Method Detection Limits:	50

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 800 Harrison St, Oakland	Sampled:	Apr 2, 1992
P.O. Box 996	Matrix Descript:	Water	Received:	Apr 2, 1992
Benicia, CA 94510	Analysis Method:	SM 5520 B&F (Gravimetric)	Extracted:	Apr 15, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	204-0102	Analyzed:	Apr 16, 1992
			Reported:	Apr 20, 1992

TOTAL RECOVERABLE PETROLEUM OIL

Sample Number	Sample Description	Oil & Grease mg/L (ppm)
204-0102	MW1	N.D.

Detection Limits:	5.0

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.	Client Project ID:	Unocal, 800 Harrison St, Oakland	Sampled:	Apr 2, 1992
P.O. Box 996	Sample Descript:	Water, MW1	Received:	Apr 2, 1992
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	Apr 10, 1992
Attention: Mardo Kaprealian, P.E.	Lab Number:	204-0102	Reported:	Apr 20, 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**	**7.1**
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**	**2.6**
1,1,1-Trichloroethane	0.50	N.D.
1,1,2-Trichloroethane	0.50	N.D.
Trichloroethene	**0.50**	**1.4**
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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Kapreallan Engineering, Inc.	Client Project ID:	Unocal, 800 Harrison St, Oakland	Sampled:	Apr 2, 1992
P.O. Box 996	Sample Descript:	Water, MW1	Received:	Apr 2, 1992
Benicia, CA 94510			Analyzed:	4/13-4/16/92
Attention: Mardo Kaprealian, P.E.	Lab Number:	204-0102	Reported:	Apr 20, 1992

LABORATORY ANALYSIS

Analyte	Detection Limit mg/L	Sample Results mg/L
Cadmium	0.010	N.D.
Chromium	0.0050	0.015
Lead	0.0050	0.016
Nickel	0.050	N.D.
Zinc	0.010	0.020

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 996
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 800 Harrison St, Oakland
QC Sample Group: 2040102-104
Reported: Apr 20, 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.E.	K.E.	K.E.	K.E.	A. Tuzon	D. Newcomb
Reporting Units:	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
Date Analyzed:	Apr 9, 1992	Apr 9, 1992	Apr 9, 1992	Apr 9, 1992	Apr 13, 1992	Apr 15, 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:	22	22	22	69	232	81
Matrix Spike % Recovery:	110	110	110	115	77	81
Conc. Matrix Spike Dup.:	20	20	21	64	220	80
Matrix Spike Duplicate % Recovery:	100	100	105	107	73	80
Relative % Difference:	9.5	9.5	4.6	7.5	5.3	1.0

Laboratory blank contained the following analytes: None Detected

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

SEQUOIA ANALYTICAL

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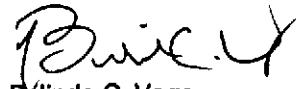
Kaprealian Engineering, Inc. Client Project ID: Unocal, 800 Harrison St, Oakland
P.O. Box 996
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E. QC Sample Group: 2040102-104 Reported: Apr 20, 1992

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:	Apr 10, 1992	Apr 10, 1992	Apr 10, 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:	12	11	10
Matrix Spike % Recovery:	120	110	100
Conc. Matrix Spike Dup.:	12	11	11
Matrix Spike Duplicate % Recovery:	120	110	110
Relative % Difference:	0.0	0.0	9.5

Laboratory blank contained the following analytes: None Detected
Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

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

Client Project ID: Unocal, 800 Harrison St, Oakland
QC Sample Group: 2040102-104
Reported: Apr 20, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Cadmium	Chromium	Lead	Nickel	Zinc
Method:	EPA 213.1	EPA 218.2	EPA 239.2	EPA 249.1	EPA 289.1
Analyst:	T.Mascarenas	T.Mascarenas	K. Anderson	T.Mascarenas	K. Anderson
Reporting Units:	mg/L	mg/L	mg/L	mg/L	mg/L
Date Analyzed:	Apr 16, 1992	Apr 16, 1992	Apr 13, 1992	Apr 16, 1992	Apr 15, 1992
QC Sample #:	204-0071	204-0071	204-0071	204-0071	204-0071
Sample Conc.:	0.013	N.D.	0.026	N.D.	0.16
Spike Conc. Added:	0.10	0.10	0.050	0.50	0.50
Conc. Matrix Spike:	0.10	0.10	0.087	0.44	0.73
Matrix Spike % Recovery:	87	100	122	88	114
Conc. Matrix Spike Dup.:	0.11	0.10	0.087	0.44	0.74
Matrix Spike Duplicate % Recovery:	97	100	122	88	116
Relative % Difference:	9.5	0.0	0.0	0.0	1.4

Laboratory 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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Kaprealian Engineering, Inc.
P.O. Box 996
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 800 Harrison St, Oakland
QC Sample Group: 2040102-104
Reported: Apr 20, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015	EPA8015
Analyst:	K.E.	K.E.	K.E.	K.E.	A. Tuzon	A. Tuzon
Reporting Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Date Analyzed:	Apr 9, 1992	Apr 9, 1992	Apr 9, 1992	Apr 9, 1992	Apr 16, 1992	Apr 13, 1992
Sample #:	204-0102	204-0103	204-0104	Blank	204-0102	Blank
Surrogate % Recovery:	92	96	99	98	117	100

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

Client Project ID: Unocal, 800 Harrison St, Oakland
QC Sample Group: 2040102-104
Reported: Apr 20, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8010	EPA 8010
Analyst:	M.N.	M.N.
Reporting Units:	ug/L	ug/L
Date Analyzed:	Apr 10, 1992	Apr 10, 1992
Sample #:	204-0102	Blank
Surrogate #1 % Recovery:	78	93
Surrogate #2 % Recovery:	88	85

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

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: RAY (KE)
WITNESSING AGENCY:

SITE NAME & ADDRESS: UNOCAL OAKLAND 800 HARRISON ST

ANALYSES REQUESTED

TURN AROUND TIME: REGULAR

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHG / BTXE	TPHd	TOG 5520 C/F	8010	5 METALS	REMARKS
MW1	4-2			X	X		2/4	VOA & Plastic Container	X	X	X	X	X	X	204010 2AG
MW2	4			X	X		2	VOA	X	X					103AB
MW3	4			X	X		4		X	X					104AB

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Ray (KE)	4-2-92 1750	A. Nogora
Jim Gatt	4/3 12:25	

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

A. Nogora — Signature; Analyst — Title; 4/2/92 — Date