KAPREALIAN ENGINEERING
INCORPORATED

June 17, 1993

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

Attention: Ms. Jennifer Eberle

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

Dear Ms. Eberle:

Per the request of Ms. Tina Berry of Unocal Corporation, enclosed please find our report dated May 24, 1993, 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: Tina Berry, Unocal Corporation

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

KAPREALIAN ENGINEERING
INCORPORATED

KEI-P90-1103.R6
May 24, 1993

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

Attention: Mr. Edward C. Ralston

RE: **Continuing Ground Water Investigation and Quarterly Report**
Unocal Service Station #0752
800 Harrison Street
Oakland, California

Dear Mr. Ralston:

This report presents the results of Kaprealian Engineering, Inc's. (KEI) most recent soil and ground water investigation for the referenced site, in accordance with KEI's proposal (KEI-P90-1103.P3) dated January 21, 1993. The purpose of the investigation was to further define the degree and extent of soil and ground water contamination at and in the vicinity of the site. This report also presents the results of the most recent quarter of ground water monitoring and sampling at the referenced site. The wells are currently monitored monthly and sampled on a quarterly basis. This report covers the work performed by KEI from January through April of 1993. The scope of the work performed by KEI consisted of the following:

Coordination with regulatory agencies

Geologic logging of two borings for the installation of two monitoring wells

Soil sampling

Ground water monitoring, purging, and sampling

Laboratory analyses

Data analysis, interpretation, and report preparation

SITE DESCRIPTION AND BACKGROUND

The subject site contains a Unocal service station facility. 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

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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 "Mandarin Auto Service" is located east-southeast of the Unocal site at Alice Street and 8th Street.

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 storage 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 (ACHCS) Agency was present during tank removal and subsequent soil sampling.

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 south 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. The sample point locations are as shown on the attached Figure 6.

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. The sample point locations are shown on the attached Figure 6.

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. The sample point location

is shown on the attached Figure 6. 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 concentrations 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 concentrations 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 concentrations 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 concentrations 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 7.

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 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.

The 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 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.

The 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 5 and 6, and the results of the water analyses are summarized in Tables 2, 3, and 4.

Based on the analytical results, KEI recommended the implementation of a monthly ground water monitoring and quarterly ground water sampling program. Documentation of the 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.

On August 13, 1991, a representative of KEI reviewed files at the offices of the RWQCB in order to obtain information on sites with documented 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 (between 8th Street and 9th Street). 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 at concentrations 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. 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 is 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 flow 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 is based on a quarterly report prepared by GeoStrategies, Inc., dated January 6, 1992.

Other Sites

No information was contained in the RWQCB files at the time of our review for the adjacent Shell service station, the former Arco service station (Seventh Street at Harrison Street), the Mandarin Auto service station, or the Rind gas station located at the intersection of Eighth Street and Alice Street. The immediate site vicinity of the Unocal site is shown on the attached Figure 7. KEI recommended that the RWQCB files be periodically re-reviewed to determine if any information becomes available for the sites.

On September 30 and October 1, 1992, three additional two-inch diameter monitoring wells (designated as MW4, MW5, and MW6 on the attached Figure 1) were installed at and in the vicinity of the site. The three new wells were each drilled and completed to total depths ranging from 32 to 33 feet below grade. Ground water was encountered at depths ranging from 21.5 to 23 feet below grade during drilling. The three new wells (MW4, MW5, and MW6) were developed on October 15, 1992, and were initially sampled on October 19, 1992.

Water and selected soil samples from the borings of MW4, MW5 and MW6 were analyzed at Sequoia Analytical Laboratory. The samples were analyzed for TPH as gasoline and BTX&E. The results of the soil analyses are summarized in Table 5, and the results of the water analyses are summarized in Table 2. Documentation of the well installation procedures, sample collection techniques, and the

we do not have it with us

analytical results are presented in KEI's report (KEI-P90-1103.R5) dated November 17, 1992.

In KEI's report (KEI-P90-1103.QR6) dated January 21, 1993, KEI concluded that the extent of ground water contamination had not been defined in the vicinity of the site. Therefore, KEI recommended the installation of two additional off-site monitoring wells in order to further define the extent of ground water contamination.

RECENT FIELD ACTIVITIES - WELL INSTALLATION

On April 14, 1993, two additional two-inch diameter monitoring wells (designated as MW7 and MW8 on the attached Figure 1) were installed in the vicinity of the site. The wells were each drilled, constructed, and completed in accordance with the guidelines of the RWQCB and the California Well Standards (per Bulletin 74-90). The subsurface materials penetrated and details of the construction of the wells are described in the attached Boring Logs and Well Construction Diagrams, respectively.

Monitoring well MW7 was drilled and completed to a total depth of 33 feet below grade. Well MW8 was drilled and sampled to a depth of 31 feet, but was completed to a depth of 29 feet below grade. During drilling, ground water was encountered at a depth of 21.5 feet below grade in MW7, and at a depth of 21 feet below grade in MW8. Soil samples were collected for laboratory analysis and for lithologic logging purposes at a maximum spacing of 5 foot intervals, at significant changes in lithology, at obvious areas of contamination, and at or within the soil/ground water interface, beginning at a depth of approximately 5 feet below grade and continuing until ground water was encountered. Soil sampling conducted below the water table was for lithologic logging purposes only. The undisturbed soil samples were collected by driving a California-modified split-spoon sampler (lined with brass liners) ahead of the drilling augers. The two-inch diameter brass liners holding the samples were then sealed with aluminum foil, plastic caps and tape, labeled, and stored in a cooler, on ice, until delivery to a state-certified laboratory.

Each well casing was installed with a watertight cap and a padlock. A round, watertight, flush-mounted well cover was cemented in place over each well casing. The surface of each well cover was surveyed by Kier & Wright of Pleasanton, California, to Mean Sea Level (MSL) and to a vertical accuracy of 0.01 foot.

The new wells were developed on April 21, 1993. Prior to development, the wells were checked for the depth to the water table (by the use of an electronic sounder) and the presence of free product

(by the use of an interface probe or paste tape). No free product was noted in either of the wells. After recording the monitoring data, the two new wells were each purged (by the use of a surface pump) of 60 to 65 gallons of water, until the evacuated water was clear and free of visible suspended sediment. Monitoring and well development data are summarized in Table 1.

RECENT FIELD ACTIVITIES - MONITORING AND SAMPLING

The six previously existing monitoring wells (MW1 through MW6) were monitored four times and were sampled once during the quarter. During monitoring, the wells were checked for depth to water and the presence of free product. Prior to 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 previously existing wells (MW1 through MW6) on April 28, 1993. Prior to sampling, the wells were each purged of between 9 and 11 gallons of water by the use of a surface pump. The water samples were collected by the use of a clean Teflon bailer. The samples were decanted into clean VOA vials and/or one-liter amber bottles, as appropriate, which were then sealed with Teflon-lined screw caps, labeled, and stored in a cooler, on ice, until delivery to a state-certified laboratory.

The new wells (MW7 and MW8) were also sampled on April 28, 1993. Prior to sampling, monitoring data were collected, and the wells were each purged of between 8 and 10 gallons of water. The samples were collected, handled, and delivered to a state-certified laboratory as previously described.

ANALYTICAL RESULTS

Water samples from all of the wells, and selected soil samples from the borings for MW7 and MW8, were analyzed at Sequoia Analytical Laboratory. All samples analyzed were accompanied by properly executed Chain of Custody documentation. The samples were analyzed for TPH as gasoline by EPA method 5030/modified 8015, and BTX&E by EPA method 8020. In addition, the ground water sample collected from MW1 was analyzed for TPH as diesel by EPA method 3510/modified 8015, and for EPA method 8010 constituents.

Concentrations of TPH as gasoline and benzene detected in the ground water samples collected on April 28, 1993, are shown on the attached Figure 5. The results of the soil analyses are summarized in Table 5, and the results of the water analyses are summarized in Tables 2 and 3. Copies of the laboratory analyses and the Chain of Custody documentation are attached to this report.

HYDROLOGY AND GEOLOGY

The measured depth to ground water at the site on April 28, 1993, ranged between 17.60 and 19.62 feet below grade. The water levels in all of the previously existing wells have shown net increases ranging from 1.44 to 1.57 feet since December 21, 1992. Based on the water level data gathered during the quarter, the ground water flow direction appeared to be to the southwest or south-southwest, as shown on the attached Figures 1 through 4. The flow directions reported this quarter are similar to the flow direction reported in the previous six quarters. The average hydraulic gradient at the site on April 28, 1993, was approximately 0.007.

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.

Based on the results of our subsurface studies, the site is underlain by fill materials to a depth of between 1 and 3.5 feet below grade. The fill is in turn underlain by unconsolidated sediments to the maximum depth explored (35 feet below grade).

The deposits underlying the site consist initially of fine-grained sand with silt. This sand sequence is in turn underlain by silty to sandy clay, clayey sand, and clayey or sandy silt, beginning at a depth of between 30 and 33 feet below grade and extending to the total depth explored (35 feet below grade).

As of April of 1993, the unsaturated zone beneath the site is approximately 18 to 20 feet thick and consists of fine-grained sand with silt. The base of the unsaturated zone and the saturated zone also predominantly consists of fine-grained sand with silt. This material is the predominant soil encountered in the existing wells.

A particle size analysis (sieve analysis) was previously performed on a saturated sample collected from the boring for well MW2 at a depth of 30 feet below grade. The analysis indicated that the sample consisted of approximately 90% fine sand, 8% medium sand, and 2% silt and clay. The sample is classified as fine-grained brown sand (SP).

DISCUSSION AND RECOMMENDATIONS

The analytical results of all of the soil samples collected from the borings for the two new monitoring wells (MW7 and MW8) indicated non-detectable concentrations of TPH as gasoline and BTX&E. It therefore appears that the horizontal extent of the soil contamination at the Unocal site has been defined, and that the contamination is limited to the areas beneath the fuel tanks and the southernmost pump island.

Based on the monitoring data (ground water level and free product measurements) collected and evaluated to date, KEI recommends a modification to the current monthly monitoring program. The ground water flow direction has been consistently to the southwest or south-southwest during the past six consecutive quarters of monitoring. In addition, no free product or sheen has been detected in any well to date. Therefore, KEI recommends that the monitoring frequency for all of the wells be reduced from monthly to quarterly.

Based on the analytical results of the ground water samples collected and evaluated to date, **the extent of ground water contamination in the downgradient direction of the Unocal site appears to have been reasonably well defined.** However, in order to verify the analytical results of the ground water samples collected from the two recently installed wells, KEI recommends the continuation of the current ground water sampling program, per KEI's proposal (KEI-P90-1103.P3) dated January 29, 1993. The wells are currently sampled quarterly. Based on the analytical results for the future ground water samples collected from the Unocal wells, KEI will make recommendations for any additional monitoring, contamination delineation, or contamination remediation work that is warranted for the subject site.

DISTRIBUTION

Copies of this report should be sent to Ms. Jennifer Eberle of the ACHCS, and to the RWQCB, San Francisco Bay Region.

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-occurring or artificially-induced, may cause changes in 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 us 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 6/30/94

Timothy R. Ross
Project Manager

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Attachments: Tables 1 through 7
Location Map
Figures 1 through 7
Boring Logs
Well Construction Diagrams
Laboratory Analyses
Chain of Custody documentation

KEI-P90-1103.R6
May 24, 1993

TABLE 1

SUMMARY OF MONITORING DATA

Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen	Water Purged (gallons)
(Monitored and Sampled on April 28, 1993)					
MW1	15.32	19.62	0	No	10
MW2	15.56	19.41	0	No	9
MW3	14.94	18.45	0	No	10
MW4	14.95	18.17	0	No	11
MW5	15.02	18.23	0	No	10
MW6	14.82	17.60	0	No	10
MW7	14.49	18.00	0	No	10
MW8	14.50	17.83	0	No	8
(Monitored and Developed on April 21, 1993)					
MW7	14.58	17.91	0	--	60
MW8	14.63	17.70	0	--	65
(Monitored on March 30, 1993)					
MW1	15.59	19.35	0	--	0
MW2	15.74	19.23	0	--	0
MW3	15.24	18.15	0	--	0
MW4	15.31	17.81	0	--	0
MW5	15.26	17.99	0	--	0
MW6	15.10	17.32	0	--	0
(Monitored on February 18, 1993)					
MW1	15.38	19.56	0	--	0
MW2	15.60	19.37	0	--	0
MW3	15.07	18.32	0	--	50
MW4	15.08	18.04	0	--	0
MW5	15.10	18.15	0	--	0
MW6	14.95	17.47	0	--	0

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May 24, 1993

TABLE 1 (Continued)

SUMMARY OF MONITORING DATA

Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen	Water Purged (gallons)
(Monitored on January 18, 1993)					
MW1	14.63	20.31	0	--	0
MW2	14.81	20.16	0	--	0
MW3	14.28	19.11	0	--	0
MW4	14.14	18.98	0	--	0
MW5	14.30	18.95	0	--	0
MW6	14.02	18.40	0	--	0

Well	Well Cover Elevation* (feet)
MW1	34.94
MW2	34.97
MW3	33.39
MW4	33.12
MW5	33.25
MW6	32.42
MW7	32.49
MW8	32.33

-- Sheen determination was not performed.

* The elevations of the tops of the well covers have been surveyed relative to MSL, per the City of Oakland benchmark located at the northeast corner of 7th Street and Harrison Street.

KEI-P90-1103.R6
May 24, 1993

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TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
4/28/93	MW1	470♦	920	3.1	2.3	9.7	1.2
	MW2	--	1,300	76	1.9	87	130
	MW3	--	2,600	220	7.6	27	41
	MW4	--	ND	ND	ND	ND	ND
	MW5	--	6,700	200	190	430	250
	MW6	--	1,200	54	1.5	5.3	11
	MW7	--	110	2.8	1.3	1.7	1.4
	MW8	--	450	18	1.8	1.4	1.8
12/21/92	MW1	ND	95	0.69	ND	1.0	ND
	MW2	--	960	97	3.2	96	74
	MW3	--	8,500	1,500	150	330	310
	MW4	--	220*	ND	ND	0.74	0.97
	MW5	--	1,700	51	4.7	34	83
	MW6	--	2,300	370	11	15	39
10/19/92	MW4	--	480	0.51	2.1	6.8	2.8
	MW5	--	2,700	61	5.0	61	100
	MW6	--	3,900	420	12	28	60
9/15/92	MW1	ND	76	1.0	ND	ND	ND
	MW2	--	1,300	91	5.7	110	80
	MW3	--	10,000	1,900	330	580	400
6/30/92	MW1	120	ND	ND	ND	ND	ND
	MW2	--	76	9.3	0.76	6.9	4.8
	MW3	--	8,900	1,900	210	550	430
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

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
6/05/91	MW1	ND	47	ND	ND	ND	ND
	MW2	--	49	ND	ND	ND	ND
	MW3	--	5,800	1,200	40	97	140

♦ Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a diesel and non-diesel mixture.

* Sequoia Analytical Laboratory reported that the hydrocarbons detected appeared to be a gasoline and non-gasoline mixture.

ND = Non-detectable.

-- Indicates analysis was not performed.

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

KEI-P90-1103.R6
May 24, 1993

TABLE 3

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	Chloroform	Tetrachloroethene	Trichloroethene
4/28/93	MW1♦	12	0.89	0.85
12/21/92	MW1*	12	1.4	0.83
9/15/92	MW1*	12	2.2	1.3
6/30/92	MW1*	9.5	2.2	1.3
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

♦ All EPA method 8010 constituents were non-detectable, except for the above compounds, and 1,2-Dichloroethane, which was detected at a concentration of 1.1 ppb.

* 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.R6
May 24, 1993

TABLE 4

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

ND = Non-detectable.

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

KEI-P90-1103.R6
May 24, 1993

TABLE 5

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
5/23/91	MW1(5)*	2.2	1.1	ND	ND	0.010	ND
&	MW1(10)*	43	43	ND	0.0059	0.43	0.0074
5/30/91	MW1(15)*	120	250	0.80	0.73	2.9	0.91
	MW1(20)*	ND	ND	ND	ND	ND	ND
	MW1(24)*	ND	ND	ND	ND	0.0073	ND
	MW2(5)	--	ND	ND	ND	0.0054	ND
	MW2(10)	--	ND	ND	ND	ND	ND
	MW2(15.5)	--	ND	0.015	ND	0.025	0.0064
	MW2(20)	--	ND	0.0086	ND	ND	ND
	MW2(22)	--	ND	ND	ND	ND	ND
	MW3(5)	--	ND	ND	ND	ND	ND
	MW3(10)	--	ND	ND	ND	ND	ND
	MW3(15)	--	ND	ND	ND	ND	ND
	MW3(20)	--	ND	ND	ND	ND	ND
	MW3(23)	--	2.9	0.0079	ND	0.031	0.012
	EB1(5.5)	--	ND	ND	ND	ND	ND
	EB1(10)	--	ND	ND	ND	ND	ND
	EB1(15)	--	ND	0.0087	ND	ND	ND
	EB1(20)	--	ND	ND	ND	ND	ND
	EB1(22)	--	ND	ND	ND	ND	ND
	EB2(5.5)	--	ND	ND	ND	ND	ND
	EB2(10)	--	ND	ND	ND	ND	ND
	EB2(15)	--	ND	ND	ND	ND	ND
	EB2(20)	--	ND	ND	ND	ND	ND
	EB2(22.5)	--	ND	ND	ND	ND	ND
9/30/92	MW4(5)	--	ND	ND	ND	ND	ND
&	MW4(10)	--	ND	ND	ND	ND	ND
10/01/92	MW4(15)	--	ND	ND	ND	ND	ND
	MW4(20)	--	ND	ND	ND	ND	ND
	MW4(22.5)	--	27♦	ND	ND	ND	ND
	MW5(5)	--	ND	ND	ND	ND	ND
	MW5(10)	--	ND	ND	ND	ND	ND
	MW5(15)	--	ND	ND	ND	ND	ND
	MW5(20)	--	ND	ND	ND	ND	ND
	MW5(22)	--	1.1	ND	0.0060	0.014	ND

KEI-P90-1103.R6
May 24, 1993

TABLE 5 (Continued)

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
9/30/92 & 10/01/92	MW6(5)	--	ND	ND	ND	ND	ND
	MW6(10)	--	ND	ND	ND	ND	ND
	MW6(15)	--	ND	ND	ND	ND	ND
	MW6(20)	--	ND	ND	ND	ND	ND
	MW6(21.5)	--	170	ND	0.38	4.5	1.8
4/14/93	MW7(5)	--	ND	ND	ND	ND	ND
	MW7(10)	--	ND	ND	ND	ND	ND
	MW7(15)	--	ND	ND	ND	ND	ND
	MW7(21)	--	ND	ND	ND	ND	ND
	MW8(5)	--	ND	ND	ND	ND	ND
	MW8(10)	--	ND	ND	ND	ND	ND
	MW8(15)	--	ND	ND	ND	ND	ND
	MW8(20.5)	--	ND	ND	ND	ND	ND

NOTE: The soil samples were collected at the depths below grade indicated in the ( ) of the respective sample number.

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

♦ Sequoia Analytical Laboratory reported that the hydrocarbons detected did not appear to be gasoline.

ND = Non-detectable.

-- Indicates analysis was not performed.

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

KEI-P90-1103.R6
May 24, 1993

TABLE 6

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample	Cadmium	Chromium	Lead	Nickel	Zinc
5/29/91	MW1(5)	ND	64	11	32	30
	MW1(10)	ND	48	7.1	24	27
	MW1(15)	ND	11	06.0	42	28
	MW1(20)	ND	32	4.2	36	23
	MW1(24)	ND	20	5.0	31	23

NOTE: The soil samples were collected at the depths below grade indicated in the ( ) of the respective sample number.

ND = Non-detectable.

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

KEI-P90-1103.R6
May 24, 1993

TABLE 7

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on November 9 & 12, December 20 & 26, 1990, and January 3, 1991)

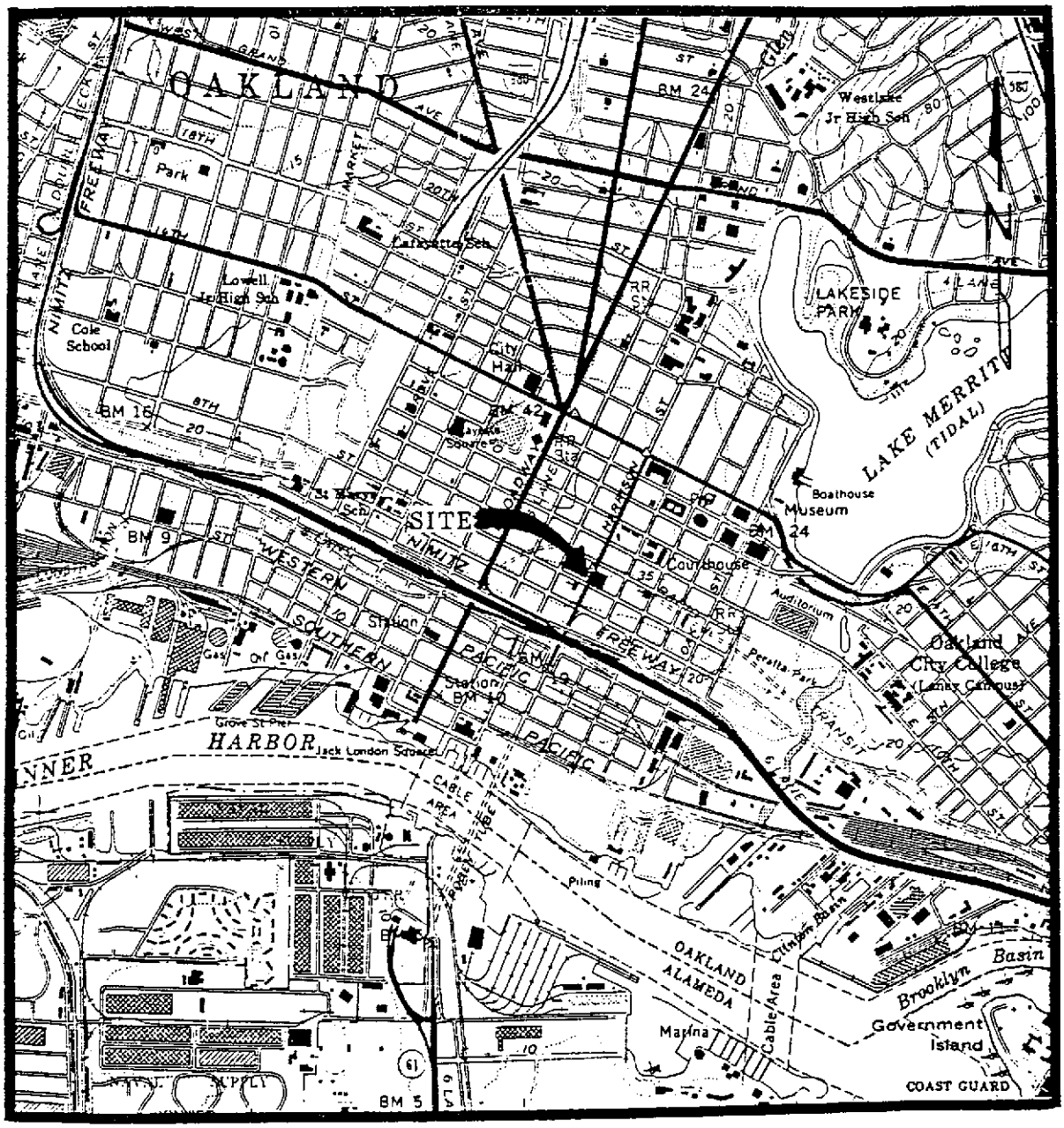
Sample	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
A1	14.0	1,200	3.0	38	170	25
A2	12.0	ND	ND	0.0082	0.024	ND
B1	14.0	45	0.29	2.7	10	1.4
B2	12.0	ND	0.0063	0.0056	0.011	ND
C(19)	19.0	3,800	11	90	210	36
WO1*	6.5	ND	ND	ND	ND	ND
WO1(9.5)**	9.5	ND	ND	ND	ND	ND
D1	2.5	ND	ND	ND	ND	ND
D2	2.5	45	0.22	1.8	5.5	0.71
D2(6)	6.0	1,200	0.24	28	170	28
D3	2.5	ND	ND	ND	ND	ND
D4	2.5	ND	ND	ND	ND	ND
D5	2.5	ND	ND	ND	ND	ND
D6	2.5	ND	ND	ND	ND	0.018
P1	2.5	ND	ND	ND	ND	ND

* TOG, TPH as diesel, cadmium, and all EPA methods 8010 and 8270 constituents were non-detectable. Chromium, lead, zinc, and nickel were detected at 43 ppm, 1,100 ppm, 130 ppm, and 12 ppm, respectively.

** TOG and lead were non-detectable. Chromium, zinc, and nickel were detected at 61 ppm, 20 ppm, and 40 ppm, respectively.

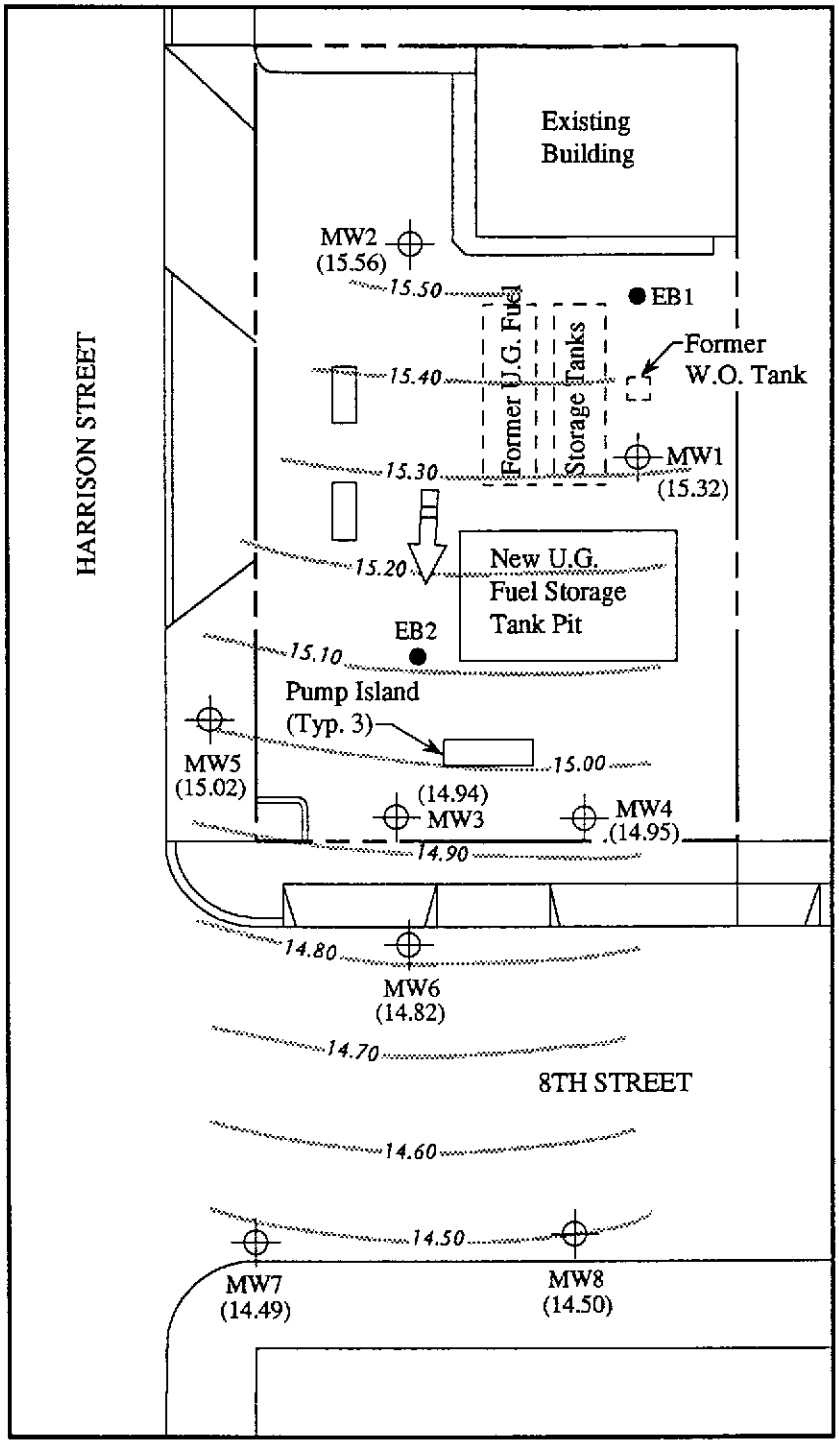
ND = Non-detectable.

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



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

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



LEGEND

- Monitoring well
- Exploratory boring
- ( ) Ground water elevation in feet above Mean Sea Level
- Contours of ground water elevation
- Direction of ground water flow

0 30 60

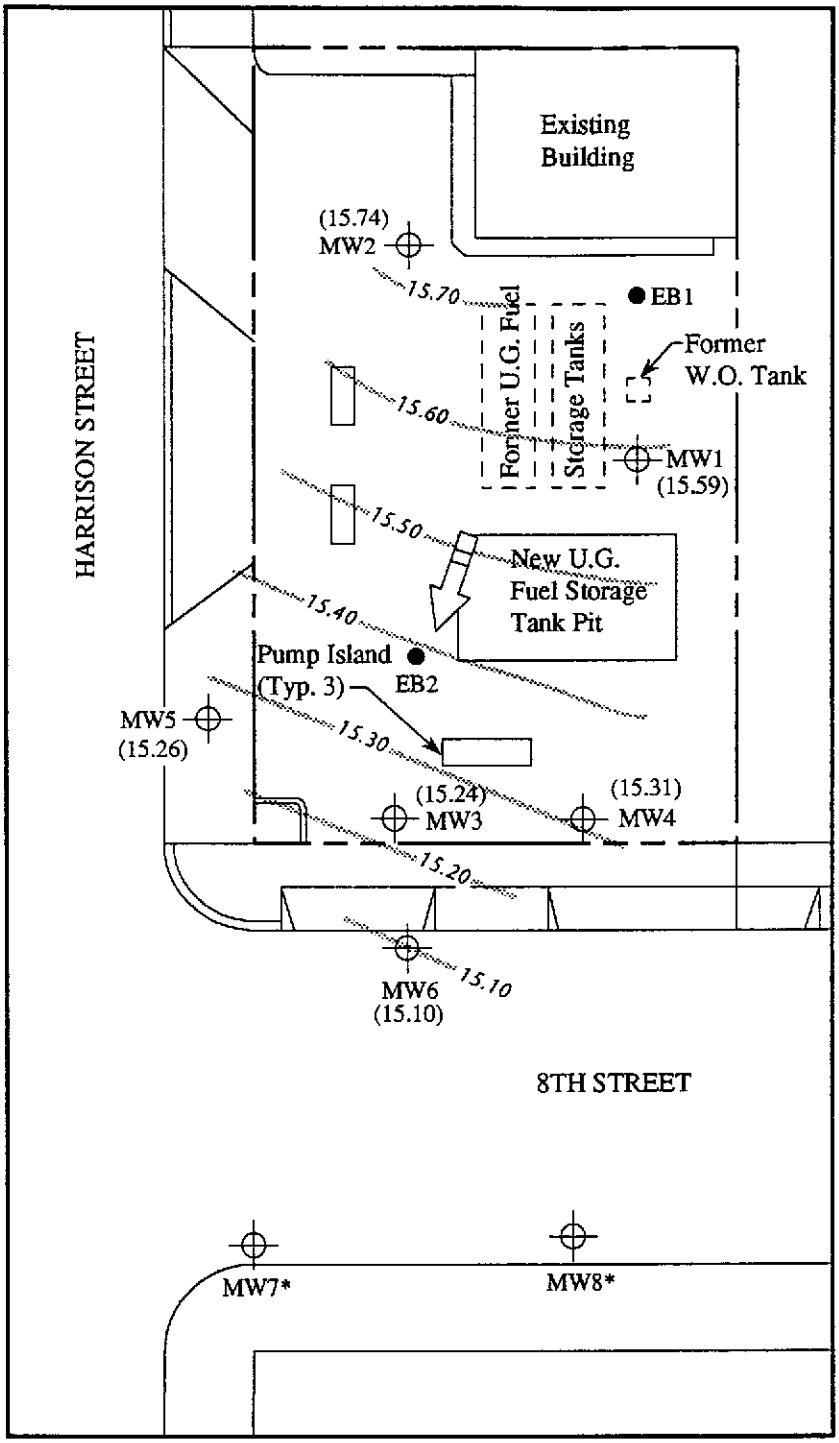
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE APRIL 28, 1993 MONITORING EVENT

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE
1



LEGEND

- Monitoring well
- Exploratory boring
- ( ) Ground water elevation in feet above Mean Sea Level
- Contours of ground water elevation
- Direction of ground water flow

* Well drilled on April 14, 1993

0 30 60

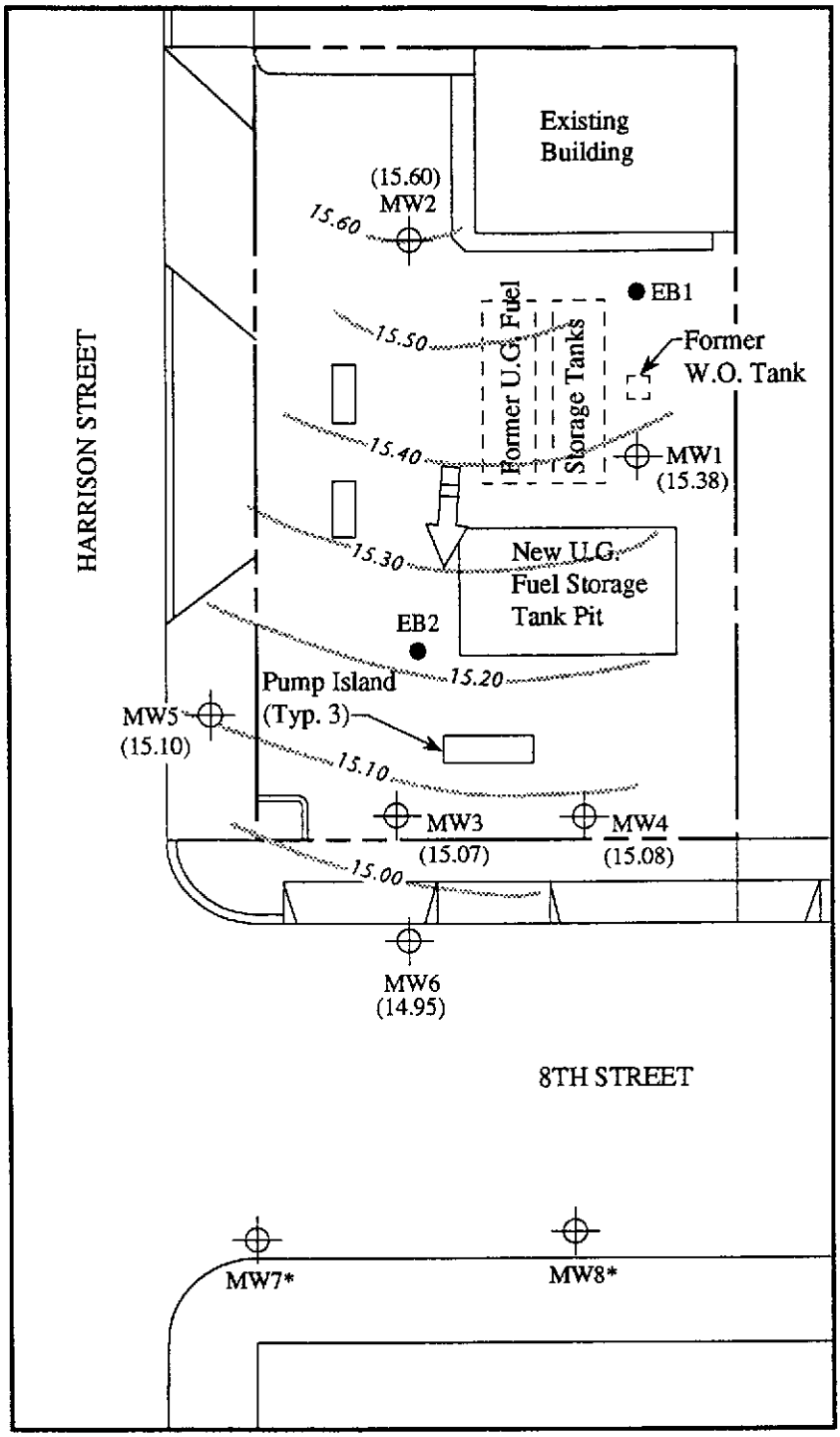
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE MARCH 30, 1993 MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE
2



LEGEND

- Monitoring well
- Exploratory boring
- ( ) Ground water elevation in feet above Mean Sea Level
- Contours of ground water elevation
- Direction of ground water flow
- * Well drilled on April 14, 1993

0 30 60

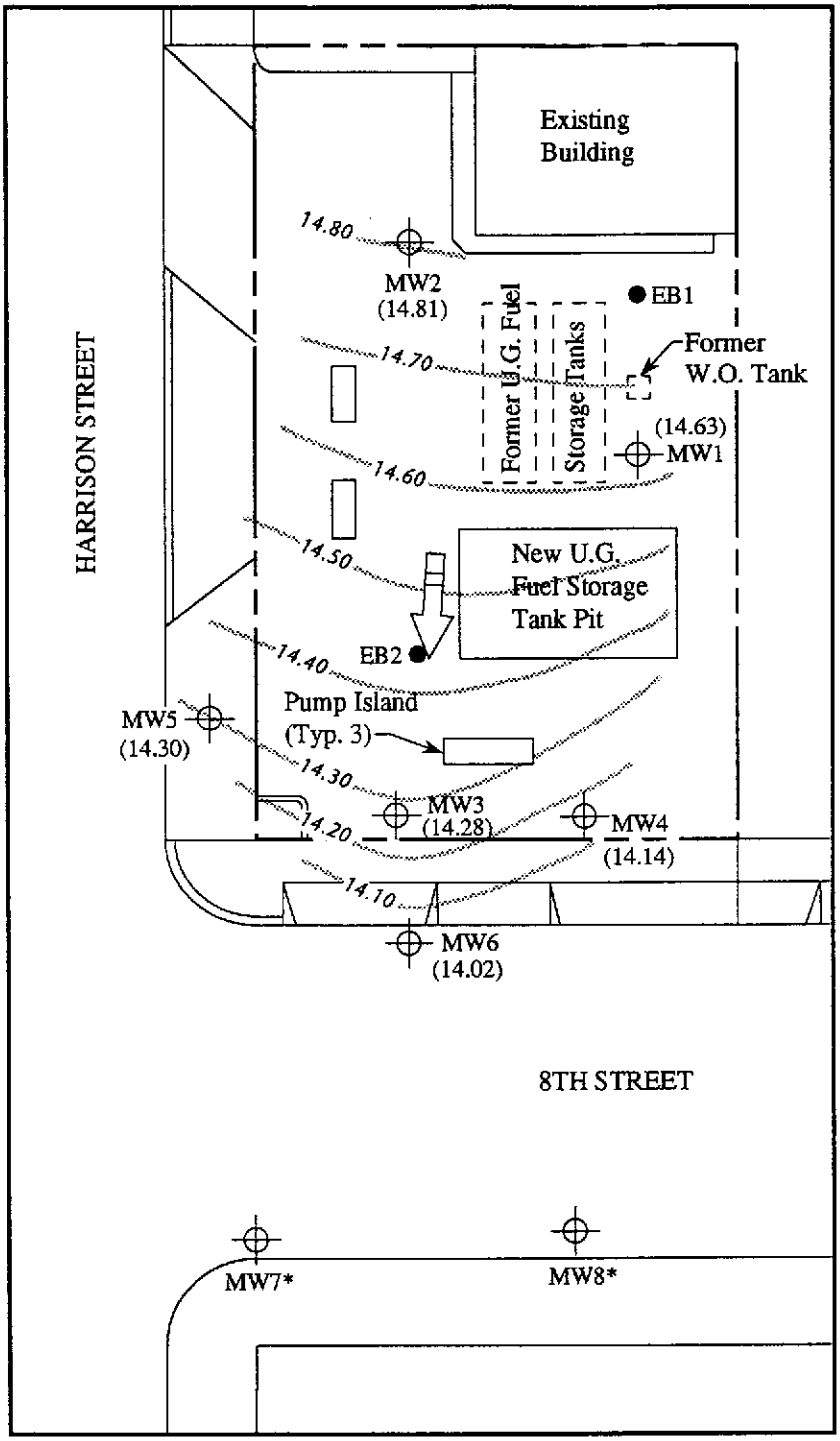
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE FEBRUARY 18, 1993 MONITORING EVENT

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE **3**



LEGEND

- Monitoring well
- Exploratory boring
- ( ) Ground water elevation in feet above Mean Sea Level
- Contours of ground water elevation
- Direction of ground water flow

* Well drilled on April 14, 1993

0 30 60

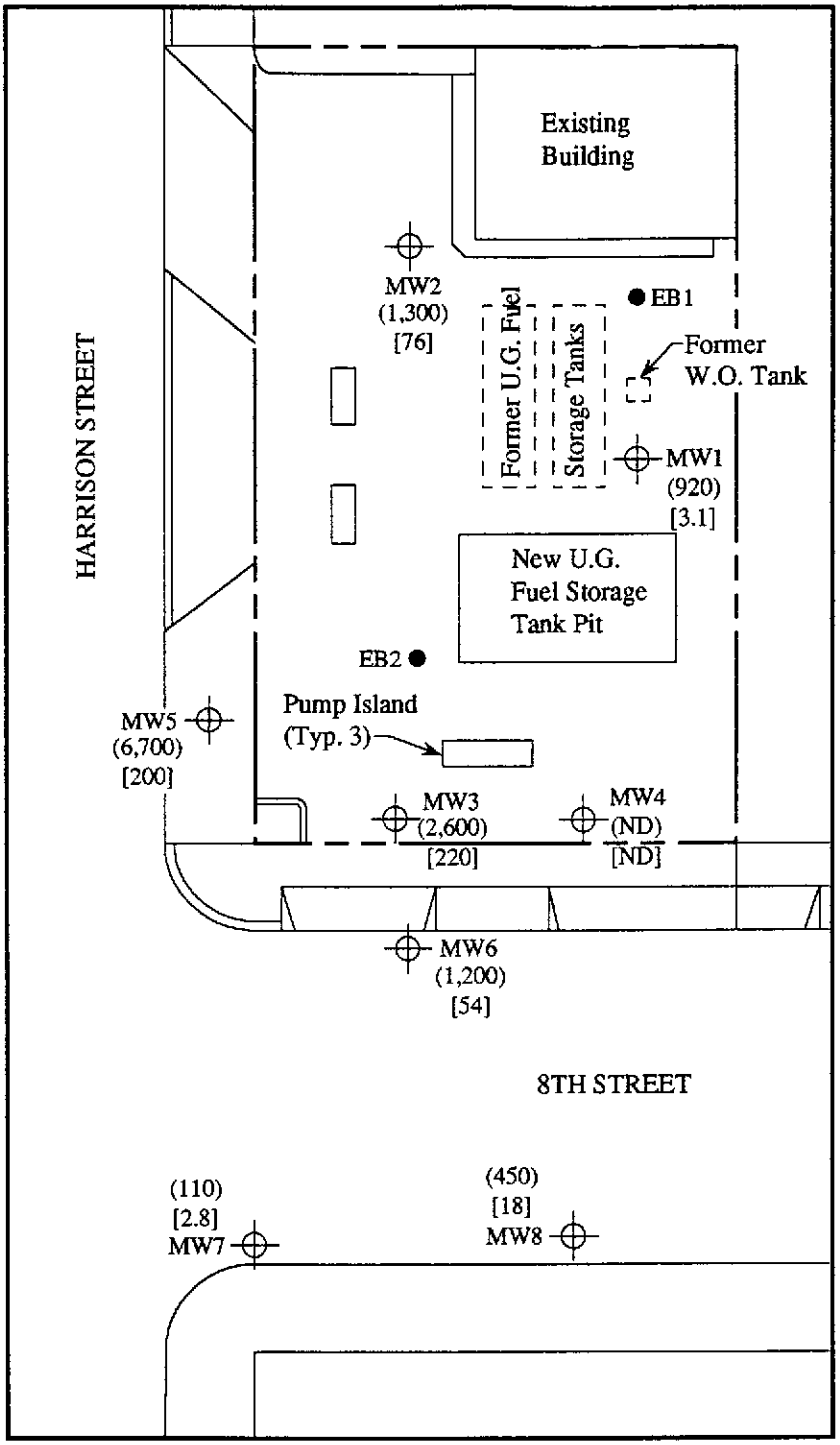
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE JANUARY 18, 1993 MONITORING EVENT

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE **4**



LEGEND

- Monitoring well
- ● Exploratory boring
- ( ) Concentration of TPH as gasoline in ppb
- [ ] Concentration of benzene in ppb
- ND = Non-detectable

0 30 60

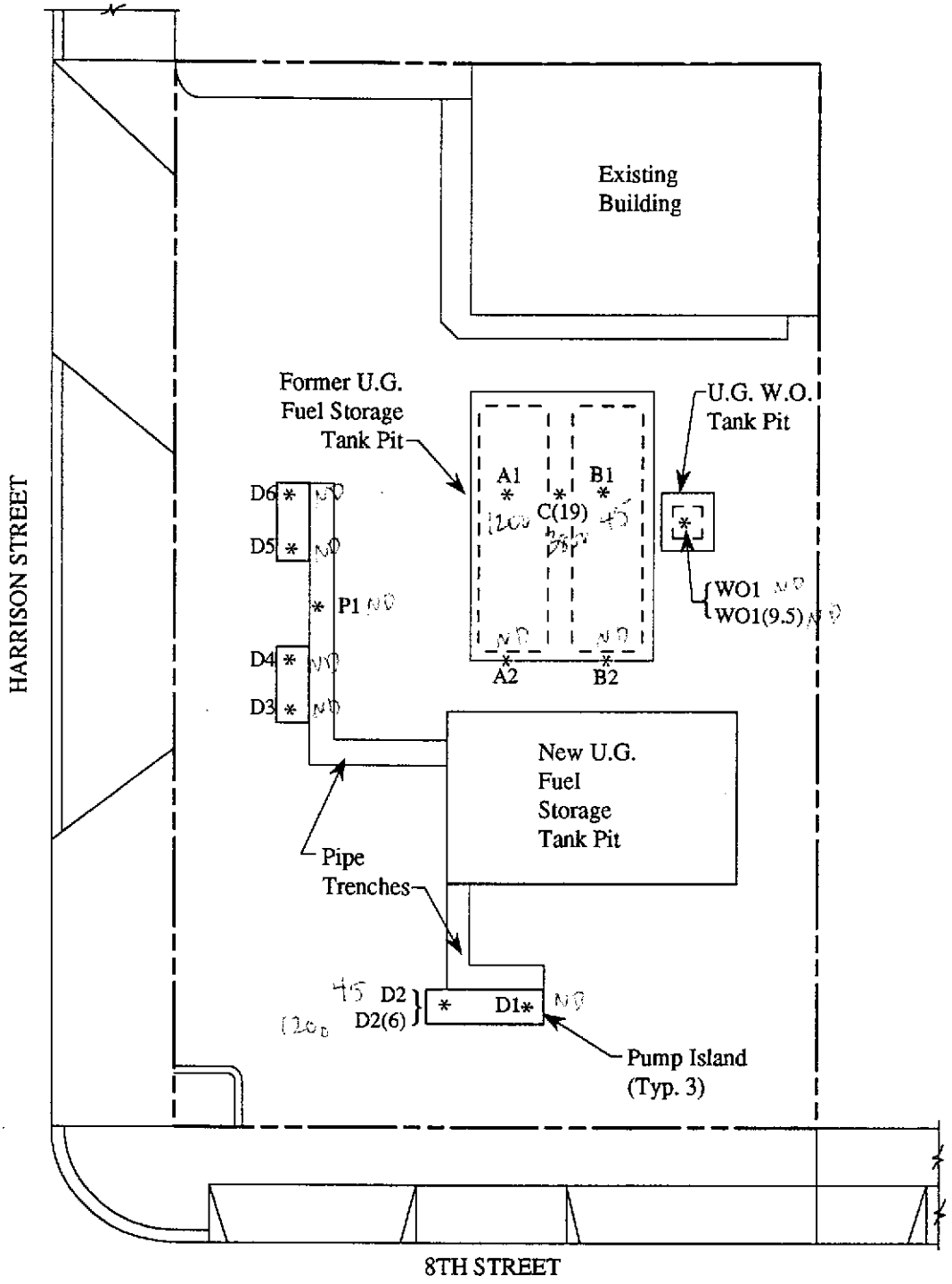
Approx. scale feet

PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUND WATER ON APRIL 28, 1993

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE
5



LEGEND

* Sample Point Location

0 20 40

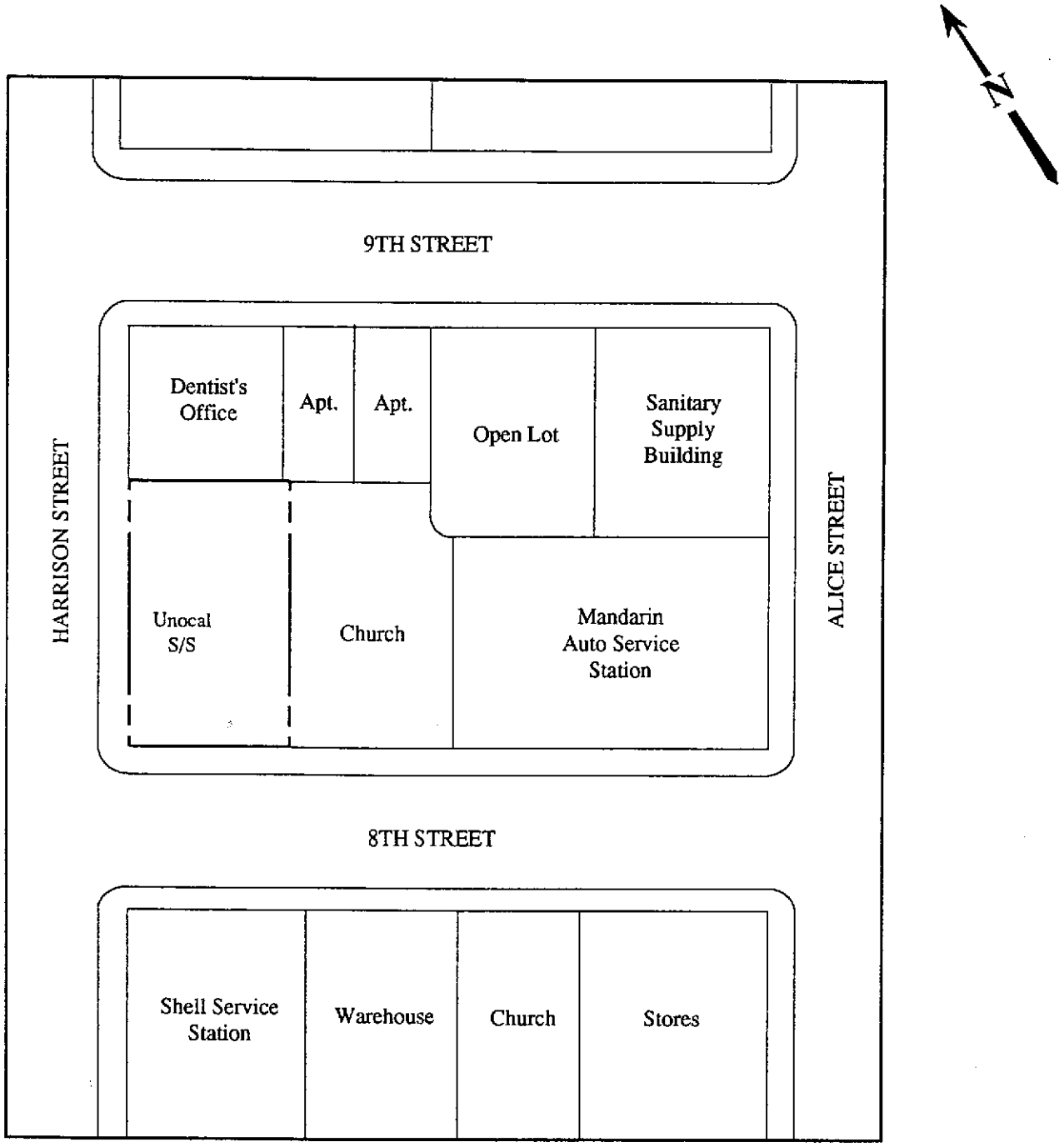
Approx. scale feet

UNDERGROUND TANK AND PIPING SOIL SAMPLE POINT LOCATIONS

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE
6



0 75 150

Approx. scale feet

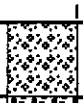
SITE VICINITY MAP

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #0752
800 HARRISON STREET
OAKLAND, CA

FIGURE 7

KAPREALIAN ENGINEERING
INCORPORATED

MAJOR DIVISIONS	SYMBOLS		TYPICAL SOIL DESCRIPTIONS
GRAVELS (More than 1/2 of coarse fraction > No. 4 sieve size)	GW		Well graded gravels or gravel - sand mixtures, little or no fines
	GP		Poorly graded gravels or gravel - sand mixtures, little or no fines
	GM		Silty gravels, gravel - sand - silt mixtures
	GC		Clayey gravels, gravel - sand - clay mixtures
SANDS (More than 1/2 of coarse fraction < No. 4 sieve size)	SW		Well graded sands or gravelly sands, little or no fines
	SP		Poorly graded sands or gravelly sands, little or no fines
	SM		Silty sands, sand - silt mixtures
	SC		Clayey sands, sand - clay mixtures
SILTS & CLAYS LL < 50	ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL		Organic silts and organic silty clays of low plasticity
SILTS & CLAYS LL > 50	MH		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH		Inorganic clays of high plasticity, fat clays
	OH		Organic clays of medium to high plasticity, organic silty clays, organic silts
HIGHLY ORGANIC SOILS	Pt		Peat and other highly organic soils
DUAL (TRANSITION) SOILS			Soil characterisitics are transitional between the soil classifications listed above

CLASSIFICATION CHART (Unified Soil Classification System)

BORING LOG

Project No. KEI-P90-1103	**Boring Diameter** 8" **Casing Diameter** 2"	**Logged By** JGG D.L. CEG 1633
Project Name Unocal S/S #0752 800 Harrison St., Oakland	**Well Cover Elevation**	**Date Drilled** 4/14/93
Boring No. MW7	**Drilling Method** Hollow-stem Auger	**Drilling Company** Great Sierra Exploration

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Concrete slab over sand, gravel and concrete (fill).
				Poorly graded sand, medium-grained, loose, moist, dark yellowish brown.
4/8/6		5		Clayey sand, estimated at 15% clay, medium dense, moist, brown, with iron oxide staining.
				Poorly graded sand, estimated at 5-10% silt, medium dense, moist, dark yellowish brown.
9/14/22		10	SP	Poorly graded sand, trace silt, medium dense to dense, moist to very moist, olive and dark greenish gray, mottled.
6/14/19		15		Poorly graded sand as above, predominantly medium-grained, estimated at 5-10% silt, medium dense to dense, moist, dark greenish gray.
8/15/20				Poorly graded sand, medium-grained, trace silt, medium dense to dense, moist, dark olive.
9/16/22		20		Poorly graded sand, predominantly medium-grained, trace to 10% silt, medium dense to dense, moist to saturated, greenish gray.
7/16/18	▼			

BORING LOG

Project No. KEI-P90-1103	**Boring Diameter** 8" **Casing Diameter** 2"	**Logged By** JGG D.L. CEG 1633
Project Name Unocal S/S #0752 800 Harrison St., Oakland	**Well Cover Elevation**	**Date Drilled** 4/14/93
Boring No. MW7	**Drilling Method** Hollow-stem Auger	**Drilling Company** Great Sierra Exploration

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
6/13/18		25	SP	Poorly graded sand, predominantly medium-grained, trace to 10% silt, medium dense to dense, saturated, dark greenish gray and dark olive gray, mottled.
18/50		30		Poorly graded sand, medium-grained, clean, dense to very dense, saturated, dark olive grading to dark olive brown.
4/10/18			ML	Sandy silt, trace clay, hard, friable, moist, light olive brown, sand is fine to medium-grained.
		35		TOTAL DEPTH: 33'
		40		

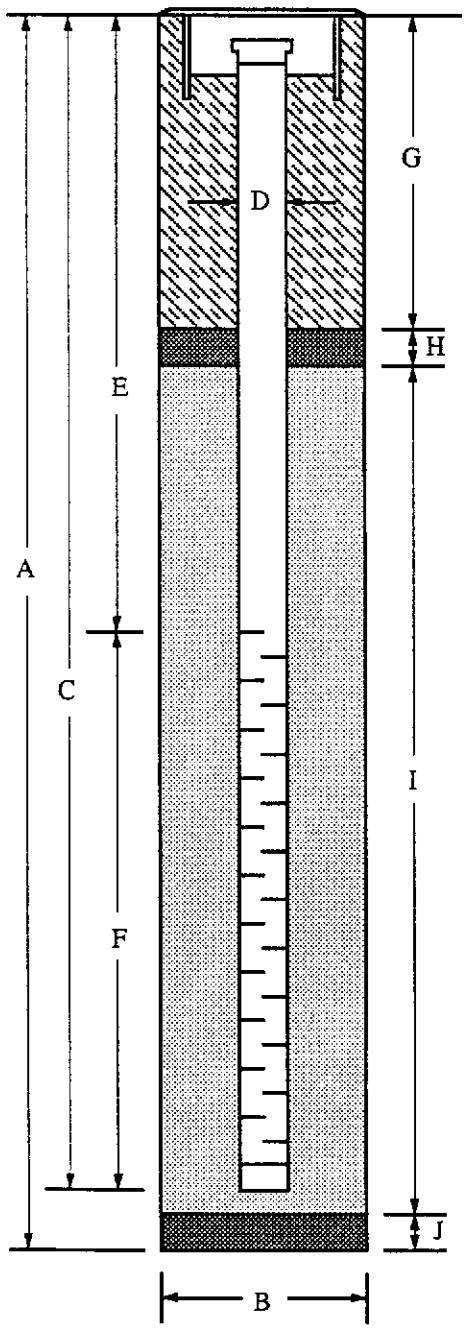
WELL CONSTRUCTION DIAGRAM

PROJECT NAME: Unocal #0752, 800 Harrison St., Oakland **WELL NO.:** MW7

PROJECT NUMBER: KEI-P90-1103

WELL PERMIT NO.: ACFC&WCD 93076

Flush-mounted Well Cover



A. Total Depth : 33'

B. Boring Diameter: 8"

Drilling Method: Hollow Stem Auger

C. Casing Length: 33'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 13'

F. Perforated Length: 20'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 9'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 22'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

BORING LOG

Project No. KEI-P90-1103	**Boring Diameter** 8" **Casing Diameter** 2"	**Logged By** JGG D.L. CEG 1633
Project Name Unocal S/S #0752 800 Harrison St., Oakland	**Well Cover Elevation**	**Date Drilled** 4/14/93
Boring No. MW8	**Drilling Method** Hollow-stem Auger	**Drilling Company** Great Sierra Exploration

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		Concrete slab over sand (fill).
				Granite slab or oblong boulder.
				Poorly graded sand, medium-grained, loose, moist, dark yellowish brown.
6/13/19		5		Poorly graded sand, predominantly fine-grained, estimated at 5-10% silt and trace clay, medium dense to dense, moist, brown and dark yellowish brown mottled, grades to dark olive gray.
11/14/14		10	SP	Poorly graded sand, predominantly medium-grained, estimated at 5-10% silt, medium dense, moist, light olive brown with iron oxide staining.
7/17/24		15		Poorly graded sand as above, except olive gray to dark olive gray.
5/10/17		20		Poorly graded sand, predominantly medium-grained, estimated at 5 to 10% silt, medium dense to dense, moist to saturated, greenish gray.
6/11/20	▼			

BORING LOG

Project No. KEI-P90-1103	**Boring Diameter** 8" **Casing Diameter** 2"	**Logged By** JGG D.L. CEG 1633
Project Name Unocal S/S #0752 800 Harrison St., Oakland	**Well Cover Elevation**	**Date Drilled** 4/14/93
Boring No. MW8	**Drilling Method** Hollow-stem Auger	**Drilling Company** Great Sierra Exploration

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
6/13/18		25	SP	Poorly graded sand, medium-grained, trace silt, medium dense, saturated, olive brown.
				Poorly graded sand, medium-grained, clean, medium dense, saturated, dark olive, with iron oxide staining.
18/50		30	SM	Silty sand, estimated at 20-25 silt, dense, cohesive, moist, light olive brown.
			ML	Clayey silt, trace sand, hard, moist, light olive green.
4/10/18		35		TOTAL DEPTH: 31'
		40		

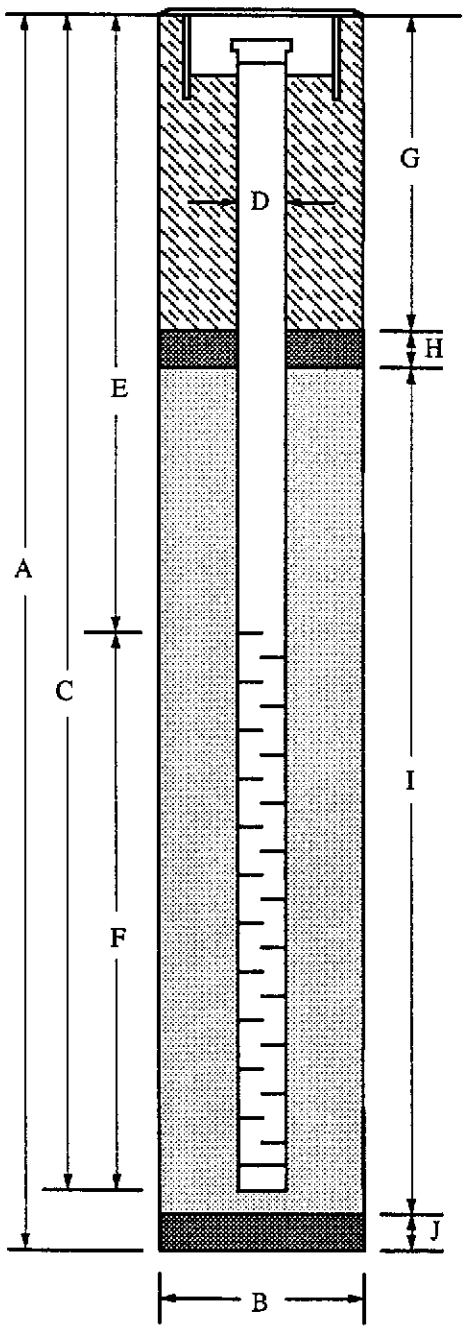
WELL CONSTRUCTION DIAGRAM

PROJECT NAME: Unocal #0752, 800 Harrison St., Oakland **WELL NO.:** MW8

PROJECT NUMBER: KEI-P90-1103

WELL PERMIT NO.: ACFC&WCD 93076

Flush-mounted Well Cover



A. Total Depth : 31'

B. Boring Diameter: 8"

Drilling Method: Hollow Stem Auger

C. Casing Length: 29'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 11'

F. Perforated Length: 18'

Perforation Type: Machined Slot

Perforation Size: 0.020"

G. Surface Seal: 7'

Seal Material: Neat Cement

H. Seal: 2'

Seal Material: Bentonite

I. Filter Pack: 22'

Pack Material: RMC Lonestar Sand

Size: #3

J. Bottom Seal: None

Seal Material: N/A

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, Oakland	Sampled:	Apr 28, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Apr 28, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	May 10, 1993
Attention: Mardo Kaprealian, P.E.	First Sample #:	304-1238		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 304-1238 MW-1	Sample I.D. 304-1239 MW-2	Sample I.D. 304-1240 MW-3	Sample I.D. 304-1241 MW-4	Sample I.D. 304-1242 MW-5	Sample I.D. 304-1243 MW-6
Purgeable Hydrocarbons	50	920	1,300	2,600	N.D.	6,700	1,200
Benzene	0.5	3.1	76	220	N.D.	200	54
Toluene	0.5	2.3	1.9	7.6	N.D.	190	1.5
Ethyl Benzene	0.5	1.2	130	41	N.D.	250	11
Total Xylenes	0.5	9.7	87	27	N.D.	430	5.3
Chromatogram Pattern:		Gasoline	Gasoline	Gasoline	--	Gasoline	Gasoline

Quality Control Data

Report Limit Multiplication Factor:	1.0	10	10	1.0	20	2.0
Date Analyzed:	4/29/93	4/29/93	4/29/93	4/29/93	4/30/93	4/30/93
Instrument Identification:	HP-2	HP-4	HP-4	HP-4	HP-2	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	118	100	101	103	129	110

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

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, Oakland	Sampled:	Apr 28, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Apr 28, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	May 10, 1993
Attention: Mardo Kaprealian, P.E.	First Sample #:	304-1244		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 304-1244 MW-7	Sample I.D. 304-1245 MW-8	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	110	450	
Benzene	0.5	2.8	18	
Toluene	0.5	1.3	1.8	
Ethyl Benzene	0.5	1.4	1.8	
Total Xylenes	0.5	1.7	1.4	
Chromatogram Pattern:		Gasoline	Gasoline	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0
Date Analyzed:	4/29/93	4/29/93	4/29/93
Instrument Identification:	HP-5	HP-5	HP-5
Surrogate Recovery, %: (QC Limits = 70-130%)	123	121	127

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

for Scott A. Chieffo
Project Manager

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, Oakland	Sampled:	Apr 28, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Apr 28, 1993
Concord, CA 94520	Analysis Method:	EPA 3510/3520/8015	Reported:	May 10, 1993
Attention: Mardo Kaprealian, P.E.	First Sample #:	304-1238		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 304-1238 MW-1*
Extractable Hydrocarbons	50	470
Chromatogram Pattern:		Diesel and Non-Diesel Mixture (<C14)

Quality Control Data

Report Limit Multiplication Factor:	1.0
Date Extracted:	5/5/93
Date Analyzed:	5/7/93
Instrument Identification:	HP-3A

Extractable Hydrocarbons are quantitated against a fresh diesel standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

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Scott A. Chieffo
Project Manager

Please Note: * "Non-Diesel Mixture" is probably due to TPH-Gasoline.

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 800 Harrison, Oakland	Sampled:	Apr 28, 1993
2401 Stanwell Dr., Ste. 400	Sample Descript:	Water, MW-1	Received:	Apr 28, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8010	Analyzed:	May 3, 1993
Attention: Mardo Kaprealian, P.E.	Lab Number:	304-1238	Reported:	May 10, 1993

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	1.0	N.D.
Carbon tetrachloride	0.50	N.D.
Chlorobenzene	0.50	N.D.
Chloroethane	1.0	N.D.
2-Chloroethylvinyl ether	1.0	N.D.
Chloroform	**0.50**	**12**
Chloromethane	1.0	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**	**1.1**
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**	**0.89**
1,1,1-Trichloroethane	0.50	N.D.
1,1,2-Trichloroethane	0.50	N.D.
Trichloroethene	**0.50**	**0.85**
Trichlorofluoromethane	0.50	N.D.
Vinyl chloride	1.0	N.D.

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

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Scott A. Chieffo
Project Manager

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 800 Harrison, Oakland
2401 Stanwell Dr., Ste. 400	Matrix:	Water
Concord, CA 94520		
Attention: Mardo Kaprealian, P.E.	QC Sample Group	3041238-45

Reported: May 10, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015
Analyst:	J.F.	J.F.	J.F.	J.F.	K. Wimer
Conc. Spiked:	0.40	0.40	0.40	1.2	300
Units:	mg/kg	mg/kg	mg/kg	mg/kg	µg/L
LCS Batch#:	2LCS043093	2LCS043093	2LCS043093	2LCS043093	BLK050593
Date Prepared:	4/30/93	4/30/93	4/30/93	4/30/93	5/5/93
Date Analyzed:	4/30/93	4/30/93	4/30/93	4/30/93	5/6/93
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4	HP-3B
LCS % Recovery:	102	102	104	119	96
Control Limits:	70-130%	70-130%	70-130%	70-130%	80-120%
MS/MSD Batch #:	3041252	3041252	3041252	3041252	BLK050593
Date Prepared:	4/30/93	4/30/93	4/30/93	4/30/93	5/5/93
Date Analyzed:	4/30/93	4/30/93	4/30/93	4/30/93	5/6/93
Instrument I.D.#:	HP-4	HP-4	HP-4	HP-4	HP-3B
Matrix Spike % Recovery:	105	110	110	125	96
Matrix Spike Duplicate % Recovery:	110	110	110	125	92
Relative % Difference:	4.6	0.0	0.0	0.0	4.3

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

Please Note:

The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 800 Harrison, Oakland
2401 Stanwell Dr., Ste. 400	Matrix:	Water
Concord, CA 94520		
Attention: Mardo Kaprealian, P.E.	QC Sample Group: 3041238-45	Reported: May 10, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	1,1-Dichloro ethene	Trichloro ethene	Chloro benzene
Method:	EPA 8010	EPA 8010	EPA 8010
Analyst:	K. Nill	K. Nill	K. Nill
Conc. Spiked:	10	10	10
Units:	µg/L	µg/L	µg/L
LCS Batch#:	LCS050393	LCS050393	LCS050393
Date Prepared:	5/3/93	5/3/93	5/3/93
Date Analyzed:	5/3/93	5/3/93	5/3/93
Instrument I.D.#:	HP5890/1	HP5890/1	HP5890/1
LCS % Recovery:	78	94	91
Control Limits:	70-130%	70-130%	70-130%
MS/MSD Batch #:	3041238	3041238	3041238
Date Prepared:	5/3/93	5/3/93	5/3/93
Date Analyzed:	5/3/93	5/3/93	5/3/93
Instrument I.D.#:	HP5890/1	HP5890/1	HP5890/1
Matrix Spike % Recovery:	92	80	89
Matrix Spike Duplicate % Recovery:	86	93	86
Relative % Difference:	6.7	15	3.4

SEQUOIA ANALYTICAL

Karen Gustin
for Scott A. Chieffo
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

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Kaprealian Engineering, Inc.
2401 Stanwell Dr., Ste. 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 800 Harrison, Oakland
QC Sample Group: 3041238-45
Reported: May 10, 1993

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer
Reporting Units:	µg/L	µg/L
Date Analyzed:	May 7, 1993	May 6, 1993
Sample #:	304-1238	Matrix Blank
Surrogate % Recovery:	94	99

SEQUOIA ANALYTICAL

for Scott A. Chieffo
Project Manager

% 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.
2401 Stanwell Dr., Ste. 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 800 Harrison, Oakland
QC Sample Group: 3041238-45
Reported: May 10, 1993

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8010	EPA 8010
Analyst:	K. Nill	K. Nill
Reporting Units:	µg/L	µg/L
Date Analyzed:	May 3, 1993	May 3, 1993
Sample #:	304-1245	Matrix Blank
Surrogate % Recovery:	107	110
Surrogate % Recovery:	108	109

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

% 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
INCORPORATED

CHAIN OF CUSTODY

SAMPLER: Joe

WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal / Oakland
800 Harrison

TURN AROUND TIME: Regular

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHG BTXE	8010	TPHD					REMARKS
MW-1	4-28-93	12:10		✓	✓		5	MW	✓	✓	✓					3041238AE
MW-2	"			✓	✓		2	"	✓							1239AB
MW-3	"			✓	✓		2	"	✓							1240AB
MW-4	"			✓	✓		2	"	✓							1241AB
MW-5	"			✓	✓		2	"	✓							1242AB
MW-6	"			✓	✓		2	"	✓							1243AB
MW-7	"			✓	✓		2	"	✓							1244AB
MW-8	"	3:50		✓	✓		2	"	✓							1245AB

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature]	4-28-93 1630	[signature]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)

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

1. Have all samples received for analysis been stored in ice? Y
2. Will samples remain refrigerated until analyzed? Y
3. Did any samples received for analysis have head space? N
4. Were samples in appropriate containers and properly packaged? Y

SV — Signature; FS — Title; 4/28/93 — Date

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

SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520
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Kaprealian Engineering, Inc.	Client Project ID:	Unocal #0752, 800 Harrison, Oakland	Sampled:	Apr 14, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Soil	Received:	Apr 15, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Apr 27, 1993
Attention: Mardo Kaprealian, P.E.	First Sample #:	304-0689		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 304-0689 MW7(5)	Sample I.D. 304-0690 MW7(10)	Sample I.D. 304-0691 MW7(15)	Sample I.D. 304-0692 MW7(21)	Sample I.D. 304-0693 MW8(5)	Sample I.D. 304-0694 MW8(10)
Purgeable Hydrocarbons	1.0	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Benzene	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Toluene	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Ethyl Benzene	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.005	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	--	--	--	--	--

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	4/26/93	4/26/93	4/26/93	4/26/93	4/26/93	4/26/93
Instrument Identification:	GCHP-1	GCHP-1	GCHP-1	GCHP-1	GCHP-1	GCHP-1
Surrogate Recovery, %: (QC Limits = 70-130%)	114	120	120	118	117	118

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #0752, 800 Harrison, Oakland	Sampled:	Apr 14, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Soil	Received:	Apr 15, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Apr 27, 1993
Attention: Mardo Kaprealian, P.E.	First Sample #:	304-0695		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 304-0695 MW8(15)	Sample I.D. 304-0696 MW8(20.5)	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	1.0	N.D.	N.D.	
Benzene	0.005	N.D.	N.D.	
Toluene	0.005	N.D.	N.D.	
Ethyl Benzene	0.005	N.D.	N.D.	
Total Xylenes	0.005	N.D.	N.D.	
Chromatogram Pattern:		--	--	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0
Date Analyzed:	4/26/93	4/26/93	4/26/93
Instrument Identification:	GCHP-1	GCHP-1	GCHP-1
Surrogate Recovery, %: (QC Limits = 70-130%)	119	117	112

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

SEQUOIA ANALYTICAL
1900 Bates Avenue • Suite LM • Concord, California 94520
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Kaprealian Engineering, Inc.	Client Project ID:	Unocal #0752, 800 Harrison, Oakland
2401 Stanwell Dr., Ste. 400	Matrix:	Soil
Concord, CA 94520		
Attention: Mardo Kaprealian, P.E.	QC Sample Group	3040689-696

Reported: Apr 27, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	P.Madden	P.Madden	P.Madden	P.Madden
Conc. Spiked:				
Units:	mg/kg	mg/kg	mg/kg	mg/kg
LCS Batch#:	MB042693	MB042693	MB042693	MB042693
Date Prepared:	4/26/93	4/26/93	4/26/93	4/26/93
Date Analyzed:	4/26/93	4/26/93	4/26/93	4/26/93
Instrument I.D.#:	GCHP-1	GCHP-1	GCHP-1	GCHP-1
LCS % Recovery:	94	94	105	106
Control Limits:	80-120%	80-120%	80-120%	80-120%
MS/MSD Batch #:	3040577	3040577	3040577	3040577
Date Prepared:	4/26/93	4/26/93	4/26/93	4/26/93
Date Analyzed:	4/26/93	4/26/93	4/26/93	4/26/93
Instrument I.D.#:	GCHP-1	GCHP-1	GCHP-1	GCHP-1
Matrix Spike % Recovery:	120	140	140	123
Matrix Spike Duplicate % Recovery:	130	145	140	128
Relative % Difference:	8.0	3.5	0.0	4.0

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

Please Note:

The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

KAPREALIAN ENGINEERING
INCORPORATED

CHAIN OF CUSTODY

SAMPLER: [signature]
WITNESSING AGENCY:

SITE NAME & ADDRESS: UNOCAL #0752 / OAKLAND
800 HARRISON

TURN AROUND TIME: REGULAR

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	ANALYSES REQUESTED: 8015	ANALYSES REQUESTED: BTEX	REMARKS
MW7(5)	4/14/93		X		X		1	SEE SAMPLE ID NO.	X	X	3040689
MW7(10)	4/14/93		X		X		1		X	X	690
MW7(15)	4/14/93		X		X		1		X	X	691
MW7(21)	4/14/93		X		X		1		X	X	692
MW8(5)	4/14/93		X		X		1		X	X	693
MW8(10)	4/14/93		X		X		1		X	X	694
MW8(15)	4/14/93		X		X		1		X	X	695
MW8(20.5)	4/14/93		X		X		1		X	X	696

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[signature] (KEI)	4/15/93 1640	[signature]
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)

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

1. Have all samples received for analysis been stored in ice? Y
2. Will samples remain refrigerated until analyzed? Y
3. Did any samples received for analysis have head space? N
4. Were samples in appropriate containers and properly packaged? Y

Signature	Title	Date
EV	FS	4/15/93

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Concord, California 94520
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