KAPREALIAN ENGINEERING
INCORPORATED

December 23, 1992

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

Attention: Ms. Cynthia Chapman

RE: Unocal Service Station #3135
845 - 66th Avenue
Oakland, California

Dear Ms. Chapman:

Per the request of Mr. Tim Howard of Unocal Corporation, enclosed please find our report dated December 10, 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 Howard, Unocal Corporation

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

KAPREALIAN ENGINEERING
INCORPORATED

KEI-P88-1203.R13
December 10, 1992

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

Attention: Mr. Tim Howard

RE: Continuing Ground Water Investigation
and Quarterly Report
Unocal Service Station #3135
845 - 66th Avenue
Oakland, California

Dear Mr. Howard:

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-P88-1203.P4) dated April 22, 1991. The purpose of the investigation was to further determine 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 monitoring and sampling of the monitoring wells 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 September through November of 1992. The scope of the work performed by KEI consisted of the following:

Coordination with regulatory agencies

Geologic logging of three borings for the installation of three 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 vicinity of the site is characterized by gently sloping, southwest trending topography. The site is located approximately 3,400 feet northeast of the present shoreline of San Leandro Bay and approximately 500 feet northwest of Lion Creek.

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Available historical data indicate that the subject site has been used as a service station from sometime prior to 1967. During 1967, the station (as it probably existed for approximately 20 years) was demolished, and a more modern facility was constructed in its place. At this time, a strip of land (approximately 11 feet wide) along the northeasterly property line was dedicated to the Bay Area Rapid Transit District (BART), and a strip of land (approximately 40 feet wide) located along the southwesterly property line was added to the site. The station layout has not significantly changed since 1967, other than building modifications. The service station facilities, including the building, pump islands, and underground fuel storage tank locations, are indicated on the attached Figure 8, for both the station as it existed prior to 1967, and the station as it presently exists.

KEI's initial work at the site began on December 8, 1988, during modifications to the pump island located along San Leandro Street. Three soil samples were collected from undisturbed soil at depths ranging from 2 to 3 feet below grade. The samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California, for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes, and ethylbenzene (BTX&E). Analytical results of the soil samples collected from beneath the pump island indicated non-detectable levels of all constituents for all three samples. Documentation of the sample collection techniques and the analytical results are presented in KEI's report (KEI-J88-1203.R1) dated December 16, 1988.

KEI returned to the site on November 29, 1989, when two 10,000 gallon underground gasoline storage tanks and one 280 gallon waste oil tank were removed from the site. The gasoline tanks and the waste oil tank were all made of steel, and no apparent cracks or holes were observed in any of the tanks.

Water was initially encountered in the fuel tank pit at a depth of approximately 10.5 feet below grade, thus prohibiting the collection of any soil samples from immediately beneath the tanks. Six soil samples, labeled SW1 through SW6, were collected from the sidewalls of the fuel tank pit (each approximately 18 to 30-inches above the water table). One soil sample, labeled WO1, was collected from beneath the waste oil tank at a depth of 8.5 feet below grade. The soil beneath the waste oil tank was then excavated until ground water was encountered. Two sidewall soil samples, labeled SWA and SWB, were collected from the waste oil tank pit sidewalls (each approximately 12-inches above the water table). The sample point locations are as shown on the attached Figure 7.

All soil samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California. All of the fuel tank pit sidewall samples were analyzed for TPH as gasoline and BTX&E. Analytical

Based on the analytical results, and in accordance with the guidelines established by the Regional Water Quality Control Board (RWQCB), KEI recommended the installation of three monitoring wells at the site to begin to define the extent of the soil and ground water contamination, and to determine the ground water flow direction.

On April 26 and 27, 1990, three two-inch diameter monitoring wells (designated as MW1, MW2, and MW3 on the attached Figure 1) were installed at the site. During drilling, an attempt was made to install MW2 near the pump island; however, drill bit refusal was encountered, and MW2 was installed at the modified location (as indicated on the attached Figure 1). The earlier attempts to install well MW2 resulted in the drilling of two shallow exploratory borings, designated as EB1 and EB2 and as shown on the attached Figure 1. The exploratory borings were backfilled to the surface with neat cement.

The three monitoring wells were each drilled and completed to total depths ranging from 22 to 23 feet below grade. The exploratory borings were each drilled and/or sampled to depths of 8.5 and 10.5 feet below grade. Ground water was encountered at depths ranging from 9.5 to 14.5 feet beneath the surface during drilling. The wells were developed on May 3 and 4, 1990, and were initially sampled on May 11, 1990.

Water and selected soil samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California, for TPH as gasoline and BTX&E. In addition, sample EB2(9), collected from boring EB2, was analyzed for TPH as diesel and TOG.

Analytical results of the soil samples collected from the borings for monitoring wells MW1 and MW3 indicated non-detectable levels of TPH as gasoline in all soil samples. Analytical results of the soil samples collected from the boring for monitoring well MW2 indicated levels of TPH as gasoline ranging from 2.2 ppm to 6.8 ppm. However, analytical results of the soil samples collected from boring EB2 indicated levels of TPH as gasoline ranging from 2,400 ppm to 12,000 ppm. In sample EB2(9), TPH as diesel was detected at 1,400 ppm, and TOG was detected at 7,000 ppm. Benzene was detected in all soil samples collected from MW1, MW2, and MW3, [except for samples MW2(10) and MW2(12)], at levels ranging from 0.0075 ppm to 0.012 ppm. Benzene was also detected in samples EB2(7) and EB2(9) at concentrations of 5.0 ppm and 84 ppm, respectively.

Analytical results of the ground water samples collected from monitoring wells MW1 and MW2 indicated levels of TPH as gasoline at 22,000 ppb and 65,000 ppb, respectively. Benzene was detected in samples MW1 and MW2 at levels of 590 ppb and 3,300 ppb, respectively. Analytical results of the ground water sample collected

from monitoring well MW3 showed non-detectable levels of all constituents analyzed. The results of the soil analyses are summarized in Table 3, and the results of the water analyses are summarized in Table 2.

Based on the analytical results, KEI recommended the implementation of a monthly monitoring and quarterly sampling program. In addition, KEI recommended the installation of three additional monitoring wells to further define the extent of ground water contamination. Also, KEI recommended that additional soil excavation be conducted in the vicinity of borings EB1 and EB2 because of the level of the soil contamination detected in these borings. Documentation of the well installation procedures, sample collection techniques, and the analytical results are presented in KEI's report (KEI-P88-1203.R7) dated May 31, 1990.

On August 14, 1990, three additional two-inch diameter monitoring wells (designated as MW4, MW5, and MW6 on the attached Figure 1) were installed at the site. The three wells were each drilled and completed to total depths of 26 feet below grade, except for well MW4, which was completed at a depth of 25 feet below grade. Ground water was encountered at depths ranging from 13.5 to 16.5 feet beneath the surface during drilling. The new wells were developed on August 21, 1990, and all of the wells were sampled on August 28, 1990.

Water samples from all of the wells, and selected soil samples from the borings for MW4, MW5, and MW6, were analyzed at Sequoia Analytical Laboratory in Concord, California, for TPH as gasoline and BTX&E. In addition, soil samples collected from the boring for monitoring well MW6, and water samples collected from monitoring wells MW2 and MW6, were also analyzed for TPH as diesel and TOG.

The analytical results of the soil samples collected from the borings for wells MW4, MW5, and MW6 showed non-detectable levels of TPH as gasoline and benzene in all samples analyzed, except for MW6(10), MW6(12.5), and MW6(15.5), which showed levels of TPH as gasoline at 18 ppm, 160 ppm, and 2.5 ppm, respectively, and levels of benzene at 0.24 ppm, 3.4 ppm, and 0.43 ppm, respectively. In addition, TPH as diesel was detected only in samples MW6(10) and MW6(12.5), at levels of 5.1 ppm and 93 ppm, respectively. Also, TOG was detected in sample MW6(12.5) at a level of 200 ppm.

The analytical results of the water samples collected from monitoring wells MW3 and MW5 indicated non-detectable levels of TPH as gasoline and benzene. Levels of TPH as gasoline and benzene were detected in wells MW1, MW2, MW4, and MW6 at concentrations ranging from 1,700 ppb to 62,000 ppb for TPH as gasoline, with benzene concentrations ranging from 140 ppb to 2,600 ppb. Also, TPH as diesel was detected in wells MW2 and MW6 at levels of 3,100 ppb and 1,000 ppb, respectively. The results of the soil analyses

are summarized in Table 3, and the results of the water analyses are summarized in Table 2.

Based on these results, KEI recommended that a Hydropunch study be performed at and in the vicinity of the site to aid in determining the extent of ground water contamination. Documentation of the well installation protocol, sample collection techniques, and the analytical results are presented in KEI's report (KEI-P88-1203.R8) dated September 24, 1990.

On January 19 and 20, 1991, CHIPS Environmental Consultants, Inc. (CEC) of Sunnyvale, California, conducted a ground water sampling study under the direction of KEI. Sampling methods and the analytical results are presented in the CEC report dated February 1991 and are summarized below.

Ground water samples were collected from seven locations (designated as P1 through P7 on the attached Figure 9). The ground water samples were collected from depths of about 14 to 17 feet below grade. After sample collection, the holes were grouted with a bentonite-cement mixture.

Ground water samples collected from the probe holes were analyzed at CEC's laboratory in Sunnyvale, California. The samples were analyzed for TPH as diesel, TPH as gasoline, and BTX&E.

The analytical results of the water samples collected from the sample probes P2 through P7 showed non-detectable levels of TPH as gasoline, BTX&E, and TPH as diesel, except for sample P2, which showed 0.6 ppb of xylenes. The analytical results of the water sample collected from probe P1 indicated a level of TPH as gasoline at 92 ppb, a level of benzene at 0.8 ppb, and a non-detectable level of TPH as diesel. Analytical results of the ground water samples are summarized in Table 6. Documentation of the sampling methods and the analytical results are presented in KEI's report (KEI-P88-1203.R9) dated April 22, 1991.

As previously recommended, a representative of KEI was present at the site on March 12, 1991, to observe the excavation of contaminated soil in the immediate vicinity of the previously drilled exploratory borings EB1 and EB2. The excavation revealed two large concrete slabs (each approximately 13 feet long by 5.5 feet wide and 1 foot thick, which were located at depths of about 8.5 feet and 10 feet below grade). Inspection of the slab surfaces showed evidence of the previous boring attempts in this area (EB1 and EB2).

KEI returned to the site on March 19, 1991, to observe the removal of the above-mentioned concrete slabs. The removal had been scheduled to permit the installation of shoring along the northeasterly side of the 66th Avenue pump islands. The shoring was

necessary to avoid potential damage to the product piping, since this area had been overexcavated during the fuel tank replacement in November and December of 1989. Concrete removal and subsequent soil excavation to a depth of about 1 foot below ground water (which was encountered at a depth of approximately 11 feet below grade) confirmed the previous removal of underground fuel storage tanks from this area.

Also on March 19, 1990, KEI collected two soil samples, labeled SW1 and SW2, from the sidewalls of the former fuel tank pit excavation (at depths of 6 to 12 inches above ground water). Sample point locations are as shown on the attached Figure 5.

In response to a letter (dated August 1, 1990) from the Alameda County Health Care Services Agency, KEI evaluated the effects of possible tidal action on ground water levels at the subject site. On January 18, 1991, a representative of KEI was at the site for an approximate seven-hour period to monitor any changes in the ground water table elevation that might have been related to tidal effects. All six monitoring wells were monitored 13 times for depth to water. All monitoring data is presented as Table 8. The water table continuously decreased in each well during the seven-hour monitoring period (from 0.09 feet to 0.11 feet), which represents only a 0.02 foot differential. The constant decrease in the water table at the site may be related to tidal action; however, the near uniform decrease in the wells indicates that the ground water flow direction does not change appreciably in response to any tidal actions. Therefore, KEI recommended that no further study be conducted at the site in relation to the possible effects of tidal actions.

KEI returned to the site on March 21 and 22, 1991, to observe the continuing excavation of contaminated soil from the former fuel tank pit. On March 21, 1991, two soil samples, labeled SW3 and SW4, were collected from the sidewalls of the excavation, each approximately 6 to 12 inches above the ground water level. On March 22, 1991, three soil samples, labeled SW5, SW6, and SW2(12), were collected from the sidewalls of the excavation (each approximately 6 to 12 inches above the level of the ground water). Sample point locations are as shown on the attached Figure 5.

KEI again returned to the site on April 3, 4, and 5, 1991. One soil sample, labeled SW5(7), was collected on April 3, one soil sample, labeled SW7, was collected on April 4, and three soil samples, labeled SW4(6), SW3(2), and SW10, were collected on April 5, 1991. All samples were collected from the excavation sidewalls (approximately 6 to 12 inches above the level of the ground water). Sample point locations are as indicated on the attached Figure 5.

On April 11, 1991, KEI collected four soil samples, labeled SW2(30), SW6(5), SW8, and SW9, from the sidewalls of the excavation

(each approximately 6 to 12 inches above the level of the ground water). Sample point locations are as shown on the attached Figure 5.

On March 27, 1991, approximately 10,000 gallons of ground water were pumped prior to backfilling a portion of the excavation along the northeasterly side of 66th Avenue pump islands. An additional 10,000 gallons of ground water were pumped from the excavation after completion of the soil sampling activities on April 11, 1991.

All samples were analyzed by Sequoia Analytical Laboratory in Concord, California. All soil samples were analyzed for TPH as gasoline and BTX&E. In addition, all soil samples, except samples SW2(30) and SW6(5), were also analyzed for TOG.

Analytical results of the soil samples (SW1 and SW9) collected from the former fuel tank pit excavation indicated non-detectable levels of TPH as gasoline. Analytical results of soil samples SW2, SW2(12), SW3, SW4, SW5, and SW6, indicated levels of TPH as gasoline at 1,000 ppm, 2,400 ppm, 310 ppm, 1,400 ppm, 2,200 ppm, and 260 ppm, respectively. Analytical results of the final soil samples {SW1, SW2(30), SW3(2), SW4(6), SW5(7), SW6(5), SW7, SW8, SW9, and SW10} collected from the boundaries of the excavation (see the attached Figure 5) indicated levels of TPH as gasoline ranging from non-detectable to 53 ppm, except for samples SW2(30), SW8, and SW10, which indicated levels of TPH as gasoline at 340 ppm, 310 ppm, and 1,400 ppm, respectively. However, KEI was unable to further excavate laterally in the vicinity of sample point SW10 due to limited access (the product piping).

Analytical results of sidewall soil samples SW1, SW3, and SW6 through SW9, which were collected after the initial excavation, indicated non-detectable levels of TOG for all samples. Analytical results of sidewall soil samples SW2, SW4, SW5, and SW10, also collected after the initial excavation, indicated levels of TOG at concentrations of 58 ppm, 160 ppm, 85 ppm, and 60 ppm, respectively. However, the analytical results of soil samples collected after additional excavation at sample point locations SW2, SW4, and SW5 indicated non-detectable levels of TOG for all three samples. The results of the soil analyses are summarized in Table 8. The results of the excavation and soil sampling activities are presented in KEI's report (KEI-J88-1203.R10) dated April 26, 1991.

The review of site historical data indicated that borings EB1 and EB2 had been drilled in the area of the former underground fuel storage tank pit as it existed prior to 1967. The previous work at the site had shown that the site is underlain by artificial fill materials to a depth of about 7.5 feet below grade. This layer of fill, coupled with the drill bit refusal experienced at depths of about 8.5 and 10.5 feet below grade for borings EB1 and EB2, respectively, suggested that this area may have been filled with assorted refuse from the pre-1967 version of the station.

In all, approximately 2,000 cubic yards of contaminated soil have been removed from the area in the vicinity of the pre-1967 tank pit. All soil in the pre-1967 tank pit was excavated laterally until the sidewall soil samples indicated less than 100 ppm of both TPH as gasoline and TOG, except at sample point locations SW2(30), SW8, and SW10, where the excavation was terminated because the existing product piping prevented further excavation. In addition, soil was not excavated from the southwesterly end of the pre-1967 tank pit, due to its location between the existing pump islands located along 66th Avenue.

RECENT FIELD ACTIVITIES - WELL INSTALLATION

On September 28 and September 29, 1992, three additional two-inch diameter monitoring wells (designated as MW8, MW9, and MW10 on the attached Figure 1) were installed at the site. The wells were each drilled, constructed, and completed in accordance with the guidelines of the Regional Water Quality Control Board (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.

The three new wells were each drilled and completed to total depths of 23 feet below grade. Ground water was encountered in each well at a depth of 13.5 feet beneath the surface during drilling. Soil samples were collected for laboratory analysis and for lithologic logging purposes at a maximum spacing of 5 feet 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 ground 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 sealed with aluminum foil, plastic caps and tape, labeled, and stored in a cooled ice chest for delivery to a state-certified laboratory. Each well casing was installed with a watertight cap and 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 feet.

The new wells were developed on October 16, 1992. 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 any of the wells. After recording the monitoring data, the three new wells were each purged (by the use of a surface pump) of 50 to 55 gallons, until the evacuated water was clear and free of 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 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 previously existing wells (MW1 through MW6) on November 3, 1992. Prior to sampling, the wells were each purged of between 8 to 11 gallons of water by the use of a surface pump. Samples were 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, labeled, and stored in a cooler, on ice, until delivery to a state-certified laboratory.

The new wells (MW8, MW9, and MW10) were also sampled on November 3, 1992. Prior to sampling, monitoring data were collected, and the wells were each purged of between 9 to 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 MW8, MW9, and MW10, 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, TPH as diesel by EPA method 3550/modified 8015 (soil) and 3510/3520/modified 8015 (water), and BTX&E by EPA method 8020. In addition, water samples from wells MW2 and MW6 were analyzed for TOG by Standard Methods 5520B&F.

Concentrations of TPH as gasoline, TPH as diesel, and benzene detected in the ground water samples collected on November 3, 1992, are shown on the attached Figure 4. The results of the soil analyses are summarized in Table 3, and the results of the water analyses are summarized in Table 2. 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 November 3, 1992, ranged between 9.24 and 11.73 feet below grade. The water levels in all of the previously existing wells have shown net decreases ranging from 0.58 to 1.05 feet since August 3, 1992. Based on the water level data gathered during the quarter, the ground water flow direction appeared complex, but predominantly to the northeast at the Unocal site, as shown on the attached Figures 1, 2, and 3. During the monitoring event of November 3, 1992, ground water flow was to the northwest in the area to the east of the Unocal site. The flow directions on October 16 and September 3, 1992, are relatively similar to the predominantly northeasterly flow direction reported in the previous quarters. The average hydraulic gradient across the site was approximately 0.002 on November 3, 1992.

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," 1979), the subject site is underlain by relatively unconsolidated alluvial deposits that are described as fine-grained alluvium (Qhaf) and that typically consist of clay and silt materials. In addition, the site is closely adjacent to a mapped geologic contact with Bay Mud (Qhbm) to the west.

Based on inspection of the tank pit excavation, the site is underlain by artificial fill materials to a depth of about 7.5 feet below grade. The fill materials are underlain by about 1.5 feet of highly expansive silty clay material that appears to in turn be underlain by light brown, sandy silt. This silt contains a trace of fine gravel and light brown, very fine-grained sand.

Based on the results of our subsurface studies, the site is underlain by fill materials to a depth of about 1.5 to 7 feet below grade. The fill is in turn underlain by alluvium to the maximum depth explored (26 feet below grade). The alluvium underlying the site consists predominantly of clayey gravel with interbeds of clay, silty/clayey sand, and clayey silt.

The unsaturated zone beneath the site is approximately 11 feet thick and consists predominantly of clay, clayey gravel, silty/clayey sand, and clayey silt, in order of decreasing abundance.

The first water bearing unit underlying the site (first aquifer) consists largely of clayey gravel, with subordinate amounts of silty/clayey sand, clayey silt, and clay.

In the nine existing wells at and in the vicinity of the site, various units consisting of clayey gravel, clay, silty/clayey sand, and clayey silt characterize the zones immediately above and below the water table.

DISCUSSION AND RECOMMENDATIONS

KEI previously recommended the installation of an additional on-site monitoring well (designated as MW7 on the attached Figure 1). KEI attempted to install the proposed well on September 28, 1992, but encountered difficulties with the service station dealer; therefore, the well was not installed at that time. KEI understands that Unocal is negotiating with the service station dealer to allow the well to be installed. KEI will install the well once an agreement is obtained.

Based on the analytical results of the samples collected and evaluated to date, the extent of ground water contamination has been predominantly defined at and in the vicinity of the site. The ground water samples collected from the new wells (MW8 and MW9) installed to the east of the site showed non-detectable concentrations of TPH as gasoline, BTX&E, and TPH as diesel. However, petroleum hydrocarbon contamination was detected in the new well (MW10) installed to the southeast of the site. In order to verify the analytical results of the ground water samples collected from the three recently installed wells, KEI recommends the continuation of the ground water monitoring and sampling program, per KEI's proposal (KEI-P88-1203.P4) dated April 22, 1991, for an additional quarter. The wells are currently monitored monthly and sampled quarterly. At the end of the next quarter, KEI will make recommendations pertaining to any additional monitoring, contamination delineation, or contamination remediation work that is warranted for the subject site.

DISTRIBUTION

A copy of this report should be sent to Ms. Cynthia Chapman of the Alameda County Health Care Services Agency, 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 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 6/30/94

Timothy R. Ross
Project Manager

/bp

Attachments: Tables 1 through 8
Location Map
Potentiometric Surface Maps - Figures 1, 2 & 3
Petroleum Hydrocarbon Concentration Map - Figure 4
Sample Point Locations Maps - Figures 5, 6 & 7
Station Layout Map - Figure 8
Monitoring Well and Sample Point Locations Map - Figure 9
Boring Logs
Laboratory Analyses
Chain of Custody documentation

KEI-P88-1203.R13
December 10, 1992

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 November 3,1992)					
MW1	-6.27	11.45	0	No	8
MW2	-6.07	9.90	0	No	9
MW3	-5.94	9.24	0	No	9
MW4	-6.46	11.73	0	No	10
MW5	-6.30	10.91	0	No	11
MW6	-6.18	10.49	0	No	11
MW8	-6.12	11.24	0	No	9
MW9	-6.08	10.92	0	No	9
MW10	-6.13	9.47	0	No	10
(Monitored and Developed on October 16, 1992)					
MW1*	-6.66	11.84	0	--	0
MW2*	-6.61	10.44	0	--	0
MW3*	-6.50	9.80	0	--	0
MW4*	-6.78	12.05	0	--	0
MW5*	-6.68	11.29	0	--	0
MW6*	-6.74	11.05	0	--	0
MW8	-6.71	11.83	0	--	50
MW9	-7.70	12.54	0	--	55
MW10	-6.78	10.12	0	--	55
(Monitored on September 3,1992)					
MW1	-6.12	11.30	0	--	0
MW2	-6.05	9.88	0	--	0
MW3	-5.66	8.96	0	--	0
MW4	-6.23	11.50	0	--	0
MW5	-6.19	10.80	0	--	0
MW6	-6.17	10.48	0	--	0

TABLE 1 (Continued)

SUMMARY OF MONITORING DATA

Well #	Surface Elevation** (feet)
MW1	5.18
MW2	3.83
MW3	3.30
MW4	5.27
MW5	4.61
MW6	4.31
MW8	5.12
MW9	4.84
MW10	3.34

-- Sheen determination was not performed.

* Monitored only.

** The elevations of the tops of the well covers have been surveyed relative to MSL, per the City of Oakland Benchmark No. 3881 at an elevation of 4.72 MSL.

KEI-P88-1203.R13
December 10, 1992

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	TOG
			(Collected on November 3, 1992)				
MW1	400♦	1,100	28	ND	78	80	--
MW2	9,600♦	40,000	5,600	130	6,100	3,000	ND
MW3	52♦	ND	ND	ND	ND	ND	--
MW4	8,300♦	36,000	69	ND	7,400	3,000	--
MW5	ND	ND	ND	ND	ND	ND	--
MW6	220♦	920	45	0.76	110	12	ND
MW8	ND	ND	ND	ND	ND	ND	--
MW9	ND	ND	ND	ND	ND	ND	--
MW10	160♦	740	11	2.1	56	32	--
			(Collected on August 3, 1992)				
MW1	220♦	980	22	0.69	82	77	--
MW2	3,300♦♦	37,000	4,500	480	9,700	3,300	ND
MW3	58	ND	ND	ND	ND	ND	--
MW4	2,400♦	24,000	61	ND	5,400	2,100	--
MW5	ND	ND	ND	ND	ND	ND	--
MW6	170♦	1,100	180	1.1	78	62	ND
			(Collected on May 5, 1992)				
MW1	120	310	5.7	ND	15	7.1	--
MW2	4,600	26,000	2,300	110	6,900	2,700	ND
MW3	56	ND	ND	ND	1.8	0.43	--
MW4	3,200	15,000	82	12	5,600	2,000	--
MW5	72	ND	ND	ND	1.4	0.42	--
MW6	47	ND	ND	ND	1.3	ND	ND
			(Collected on February 7, 1992)				
MW1	ND	220	2.1	ND	16	10	--
MW2	2,300	11,000	1,400	30	1,400	1,900	ND
MW3	ND	ND	ND	ND	ND	ND	--
MW4	2,300	8,100	24	4.9	3,200	1,800	--
MW5	ND	ND	ND	ND	0.94	0.36	--
MW6	ND	180	22	0.68	20	22	ND

KEI-P88-1203.R13
December 10, 1992

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	TOG
			(Collected on November 5, 1991)				
MW1	260	4,900	80	ND	160	150	--
MW2	3,900	110,000	4,200	200	8,600	3,400	78
MW3	ND	31	ND	ND	0.65	ND	--
MW4	7,700	140,000	320	ND	13,000	4,800	--
MW5	ND	ND	ND	ND	ND	ND	--
MW6	300	7,100	200	ND	580	190	ND
			(Collected on August 5, 1991)				
MW1	200	1,200	95	6.2	80	230	--
MW2	4,200	33,000	2,900	190	7,900	3,400	ND
MW3	63	ND	ND	ND	ND	ND	--
MW4	6,200	37,000	310	70	9,700	3,600	--
MW5	ND	ND	ND	ND	ND	ND	--
MW6	130	860	130	11	150	92	ND
			(Collected on February 21, 1991)				
MW1	690	26,000	280	39	1,900	1,200	--
MW2	7,000	3,400	160	61	490	200	ND
MW3	--	ND	ND	ND	0.64	ND	--
MW4	4,100	33,000	210	21	12,000	3,800	--
MW5	--	56	ND	ND	4.7	ND	--
MW6	160	750	77	14	140	23	ND
MWD (MW6 duplicate)	--	740	74	12	140	33	--
			(Collected on November 26, 1990)				
MW1	--	2,900	160	2.3	320	330	--
MW2	3,800	15,000	1,600	450	2,100	1,100	ND
MW3	--	ND	ND	ND	ND	ND	--
MW4	--	49,000	360	36	11,000	3,800	--
MW5	--	ND	ND	ND	ND	ND	--
MW6	320	4,800	1,000	200	650	340	ND
MW7 (MW6 duplicate)	--	4,000	800	120	440	250	--

KEI-P88-1203.R13
December 10, 1992

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	TOG
(Collected on August 28, 1990)							
MW1	--	1,700	140	1.4	150	180	--
MW2	3,100	27,000	2,600	1,300	3,000	1,900	ND
MW3	--	ND	ND	ND	0.70	ND	--
MW4	--	62,000	810	72	4,600	4,400	--
MW5	--	ND	ND	ND	1.2	ND	--
MW6	1,000	12,000	1,700	1,400	2,100	230	16
MW7	--	2,600	180	3.0	270	810	--
(MW1 duplicate)							
(Collected on May 11, 1990)							
MW1	--	22,000	590	42	3,600	1,200	--
MW2	--	65,000	3,300	3,300	12,000	4,100	--
MW3	--	ND	ND	ND	ND	ND	--

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

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

ND = Non-detectable.

-- Indicates analysis was not performed.

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

KEI-P88-1203.R13
December 10, 1992

TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	TOG
4/26/90	MW1(5)	--	ND	0.012	0.16	ND	ND	--
&	MW1(10)	--	ND	0.0094	0.024	ND	ND	--
4/27/90	MW1(14)	--	ND	0.0075	0.031	ND	ND	--
	MW2(5)	--	2.4	0.075	0.0071	ND	ND	--
	MW2(10)	--	2.2	ND	0.017	0.018	0.0088	--
	MW2(12)	--	6.8	ND	0.028	0.015	0.10	--
	MW3(5)	--	ND	0.0094	0.048	ND	ND	--
	MW3(10)	--	ND	0.0088	0.015	ND	ND	--
	EB2(7)	--	2,400	5.0	16	230	62	--
	EB2(9)	1,400	12,000	84	12	860	360	7,000
8/14/90	MW4(14.5)	--	ND	ND	ND	ND	ND	--
	MW5(13)	--	ND	ND	0.010	ND	ND	--
	MW6(5)	ND	ND	ND	0.042	ND	ND	ND
	MW6(10)	5.1	18	0.26	0.22	1.2	0.34	ND
	MW6(12.5)	93	160	3.4	12	3.6	20	200
	MW6(15.5)	ND	2.5	0.43	0.41	0.12	0.50	ND
9/28/92	MW8(5)	ND	ND	ND	ND	ND	ND	--
&	MW8(10)	ND	ND	ND	ND	ND	ND	--
9/29/92	MW8(13)	ND	ND	ND	ND	ND	ND	--
	MW9(5.5)	ND	ND	ND	ND	ND	ND	--
	MW9(10)	ND	ND	ND	ND	ND	ND	--
	MW9(13)	ND	ND	ND	ND	ND	ND	--
	MW10(5)	ND	ND	ND	ND	ND	ND	--
	MW10(10.5)	39*	210	0.58	0.38	10	4.4	--
	MW10(13)	ND	ND	ND	ND	0.0063	0.0090	--

* Sequoia Analytical Laboratory reported that the hydrocarbons detected did not appear to be diesel.

-- Indicates analysis was not performed.

ND = Non-detectable.

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

KEI-P88-1203.R13
December 10, 1992

TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on November 29, and
December 5 & 29, 1989)

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
SW1	9.0	--	1.6	ND	ND	ND	ND
SW2	9.0	--	3.8	ND	ND	ND	ND
SW3	9.0	--	5.6	ND	ND	2.3	0.42
SW4	9.0	--	32	1.2	ND	1.0	2.1
SW5	9.0	--	4.8	0.20	ND	0.11	ND
SW6	8.0	--	ND	ND	ND	ND	ND
D1	3.5	--	ND	ND	ND	ND	ND
D2	3.5	--	1.5	0.08	ND	ND	ND
D3	3.5	--	6.6	0.14	ND	0.31	ND
D4	3.5	--	7.4	0.11	ND	0.1	ND
D5	3.5	--	1.9	ND	ND	ND	ND
D6	3.5	--	2.0	ND	0.17	0.25	ND
P1	6.0	--	15	0.086	ND	8.5	0.18
P2	5.5	--	3,800	6.1	290	750	140
P2(12)	12.0	--	ND	ND	ND	ND	ND
P3	5.0	--	11	0.13	ND	1.3	0.18
P4	4.5	--	1.4	ND	ND	0.23	ND
P5	4.5	--	ND	ND	ND	ND	ND
P6	3.0	--	ND	ND	ND	ND	ND
P7	4.0	--	ND	ND	ND	ND	ND
SWP2E	11.0	--	20	ND	0.16	3.1	0.50
SWP2W	11.0	--	ND	ND	ND	ND	ND
WO1*	8.5	ND	1.6	ND	ND	ND	ND

TABLE 4 (Continued)

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on November 29, and
December 5 & 29, 1989)

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
SWA**	9.5	ND	2.1	ND	ND	ND	ND
SWB***	9.5	ND	3.9	ND	ND	ND	ND

* TOG was <50 ppm, and all EPA method 8010 constituents were non-detectable. Metal concentrations were as follows: cadmium was non-detectable, chromium was 20 ppm, lead was 75 ppm, and zinc was 65 ppm.

** TOG was <50 ppm, and all EPA method 8010 constituents were non-detectable. Metals concentrations were as follows: cadmium was non-detectable, chromium was 20 ppm, lead was 5.9 ppm, and zinc was 44 ppm.

*** TOG was <50 ppm, and all EPA method 8010 constituents were non-detectable. Metals concentrations were as follows: cadmium was non-detectable, chromium was 15 ppm, lead was 5.0 ppm, an zinc was 39 ppm.

-- Indicates analysis was not performed.

ND = Non-detectable.

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

KEI-P88-1203.R13
December 10, 1992

TABLE 5

SUMMARY OF LABORATORY ANALYSES
WATER

(Collected on December 5, 1989)

Sample #	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
W1*	7,900	850	150	720	ND

* All EPA method 8010 constituents were non-detectable.

ND = Non-detectable.

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

KEI-P88-1203.R13
December 10, 1992

TABLE 6

SUMMARY OF LABORATORY ANALYSES
WATER

(Collected on January 9 through 11, 1991 by CEC)

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
P1	15	ND	90.0	0.8	0.6	2.4	0.5
P2	15	ND	ND	ND	ND	0.6	ND
P3	16	ND	ND	ND	ND	ND	ND
P4	17	ND	ND	ND	ND	ND	ND
P5	14	ND	ND	ND	ND	ND	ND
P6	15	ND	ND	ND	ND	ND	ND
P7	14	ND	ND	ND	ND	ND	ND

ND = Non-detectable.

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

KEI-P88-1203.R13
December 10, 1992

TABLE 7

SUMMARY OF MONITORING DATA

(Conducted on January 18, 1991)

Well #	Time	Ground Water Elevation (feet)	Depth to Water (feet)
MW1	9:55 a.m.	-7.27	12.45
	10:22	-7.27	12.45
	10:34	-7.27	12.45
	10:55	-7.25	12.43
	11:29	-7.24	12.42
	11:57	-7.23	12.41
	12:29 p.m.	-7.21	12.39
	1:04	-7.21	12.39
	1:27	-7.21	12.39
	1:58	-7.20	12.38
	2:29	-7.18	12.36
	4:36	-7.19	12.37
	5:01	-7.19	12.37
MW2	9:37 a.m.	-7.21	11.04
	10:08	-7.20	11.03
	10:25	-7.20	11.03
	10:46	-7.18	11.01
	11:20	-7.17	11.00
	11:49	-7.15	10.98
	12:23 p.m.	-7.14	10.97
	12:55	-7.13	10.96
	1:18	-7.14	10.97
	1:50	-7.12	10.95
	2:22	-7.11	10.94
	4:24	-7.10	10.93
	4:53	-7.10	10.93
MW3	9:34 a.m.	-6.13	9.43
	10:04	-6.12	9.42
	10:23	-6.11	9.41
	10:43	-6.11	9.41
	11:18	-6.09	9.39
	11:47	-6.08	9.38
	12:21 p.m.	-6.07	9.37
	12:53	-6.06	9.36
	1:16	-6.06	9.36
	1:48	-6.05	9.35
	2:20	-6.04	9.34
	4:21	-6.02	9.32
	4:51	-6.02	9.32

TABLE 7 (Continued)

SUMMARY OF MONITORING DATA

(Conducted on January 18, 1991)

Well #	Time	Ground Water Elevation (feet)	Depth to Water (feet)
MW4	9:51	-7.31	12.58
	10:17	-7.31	12.58
	10:31	-7.31	12.58
	10:53	-7.30	12.57
	11:27	-7.28	12.55
	11:55	-7.27	12.54
	12:27 p.m.	-7.24	12.51
	1:01	-7.24	12.51
	1:25	-7.25	12.52
	1:56	-7.23	12.50
	2:28	-7.22	12.49
	4:34	-7.22	12.49
	4:59	-7.22	12.49
MW5	9:47 a.m.	-7.27	11.88
	10:14	-7.27	11.88
	10:29	-7.26	11.87
	10:50	-7.25	11.86
	11:25	-7.23	11.84
	11:53	-7.22	11.83
	12:25 p.m.	-7.20	11.81
	1:00	-7.20	11.81
	1:23	-7.20	11.81
	1:54	-7.19	11.80
	2:26	-7.17	11.78
	4:30	-7.17	11.78
	4:57	-7.17	11.78
MW6	9:42 a.m.	-7.24	11.55
	10:11	-7.23	11.54
	10:27	-7.22	11.53
	10:48	-7.21	11.52
	11:23	-7.19	11.50
	11:50	-7.18	11.49
	12:24 p.m.	-7.17	11.48
	12:57	-7.17	11.48
	1:21	-7.17	11.48
	1:53	-7.14	11.45
	2:23	-7.14	11.45
	4:26	-7.14	11.45
	4:55	-7.14	11.45

KEI-P88-1203.R13
December 10, 1992

TABLE 8

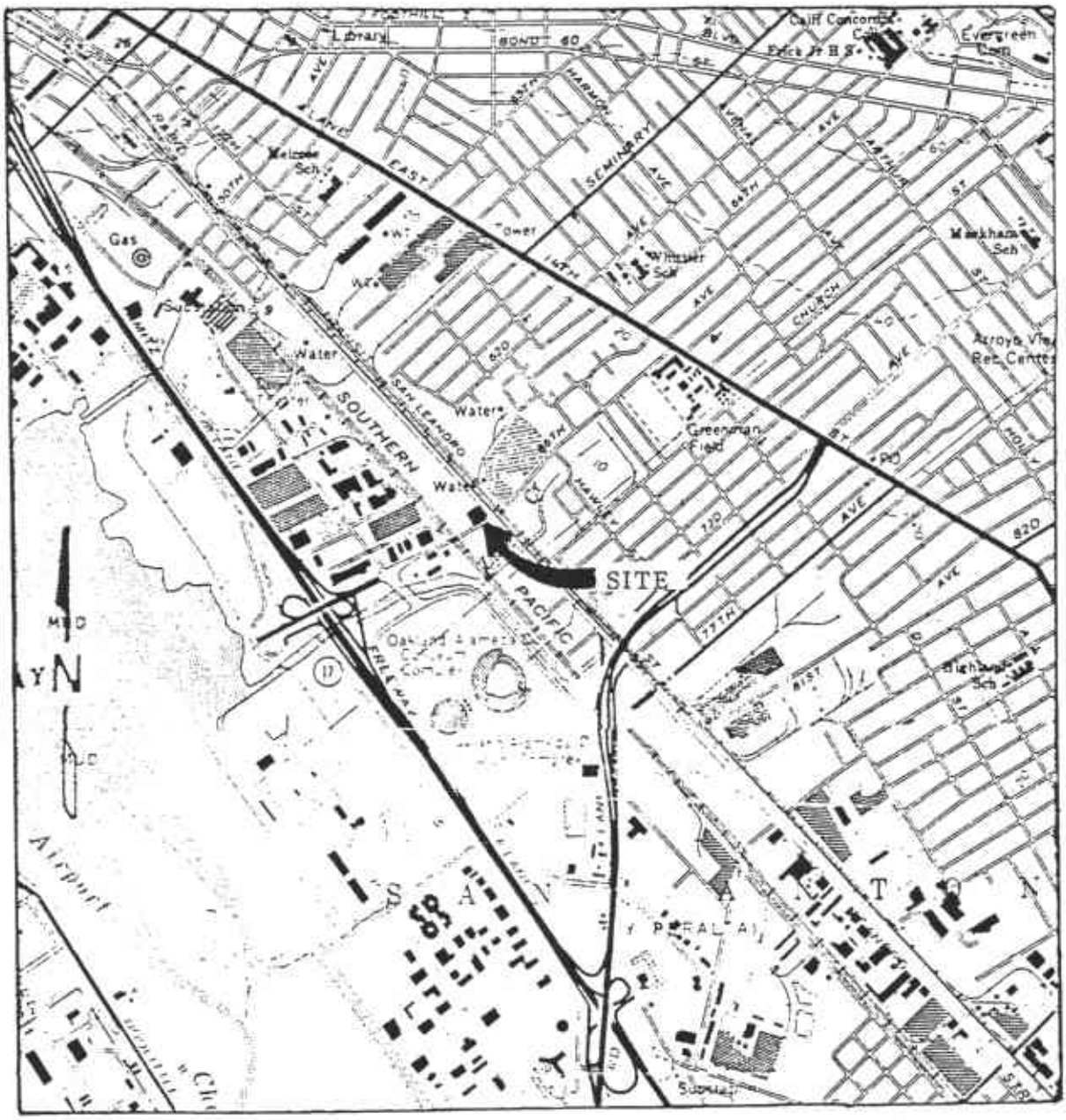
SUMMARY OF LABORATORY ANALYSES
SOIL - FUEL TANK PIT
PRE-1967

Date	Sample	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	TOG
3/19/91	SW1	10.5	ND	ND	ND	ND	ND	ND
3/19/91	SW2	11.0	1,000	14	65	98	19	58
3/22/91	SW2(12)	11.0	2,400	38	180	280	54	ND
4/11/91	SW2(30)	11.0	340	1.6	1.2	21	9.9	--
3/21/91	SW3	10.5	310	3.3	4.8	26	6.5	ND
4/05/91	SW3(2)	10.5	5.3	ND	ND	0.14	0.13	ND
3/21/91	SW4	10.5	1,400	14	41	110	30	160
4/05/91	SW4(6)	10.5	53	0.023	1.4	4.1	0.85	ND
3/22/91	SW5	10.5	2,200	28	140	260	52	85
4/03/91	SW5(7)	10.5	29	0.44	0.052	2.8	0.89	ND
3/22/91	SW6	10.5	260	3.6	7.5	29	7.2	ND
4/11/91	SW6(5)	10.5	44	0.34	0.32	2.5	1.1	--
4/04/91	SW7	11.0	2.5	0.41	0.0070	0.018	0.15	ND
4/11/91	SW8	11.0	310	1.9	2.9	8.1	2.8	ND
4/11/91	SW9	11.0	ND	0.17	ND	0.0052	0.0062	ND
4/05/91	SW10	11.0	1,400	18	130	200	36	60

-- Indicates analysis not performed.

ND = Non-detectable.

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

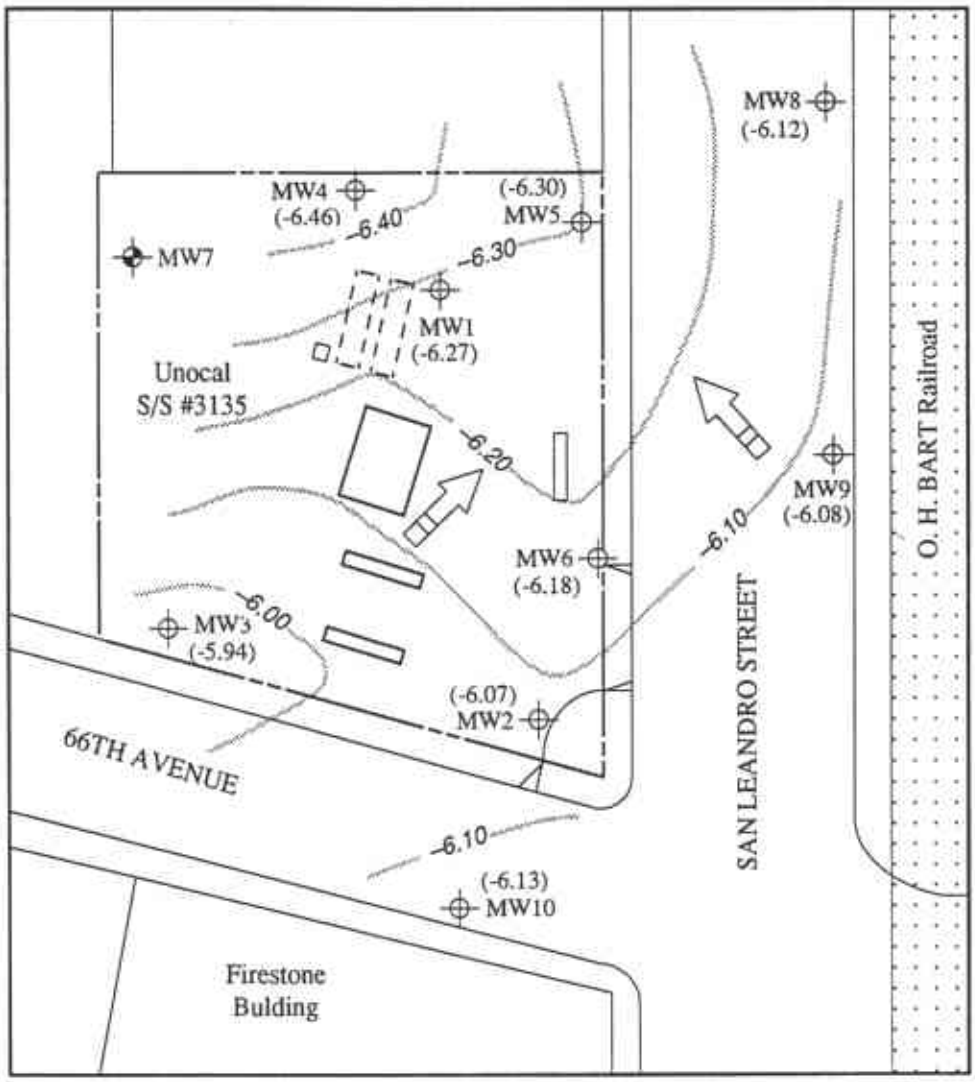


Base modified from 7.5 minute U.S.G.S. Oakland East and San Leandro Quadrangles (both photorevised 1980)

0 2000 4000

Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #3135 845 - 66TH AVENUE OAKLAND, CA	LOCATION MAP



LEGEND

- Monitoring well (existing)
- Monitoring well (proposed)
- Direction of ground water flow
- ( ) Ground water elevation in feet relative to Mean Sea Level
- Contours of ground water elevation

0 60 120

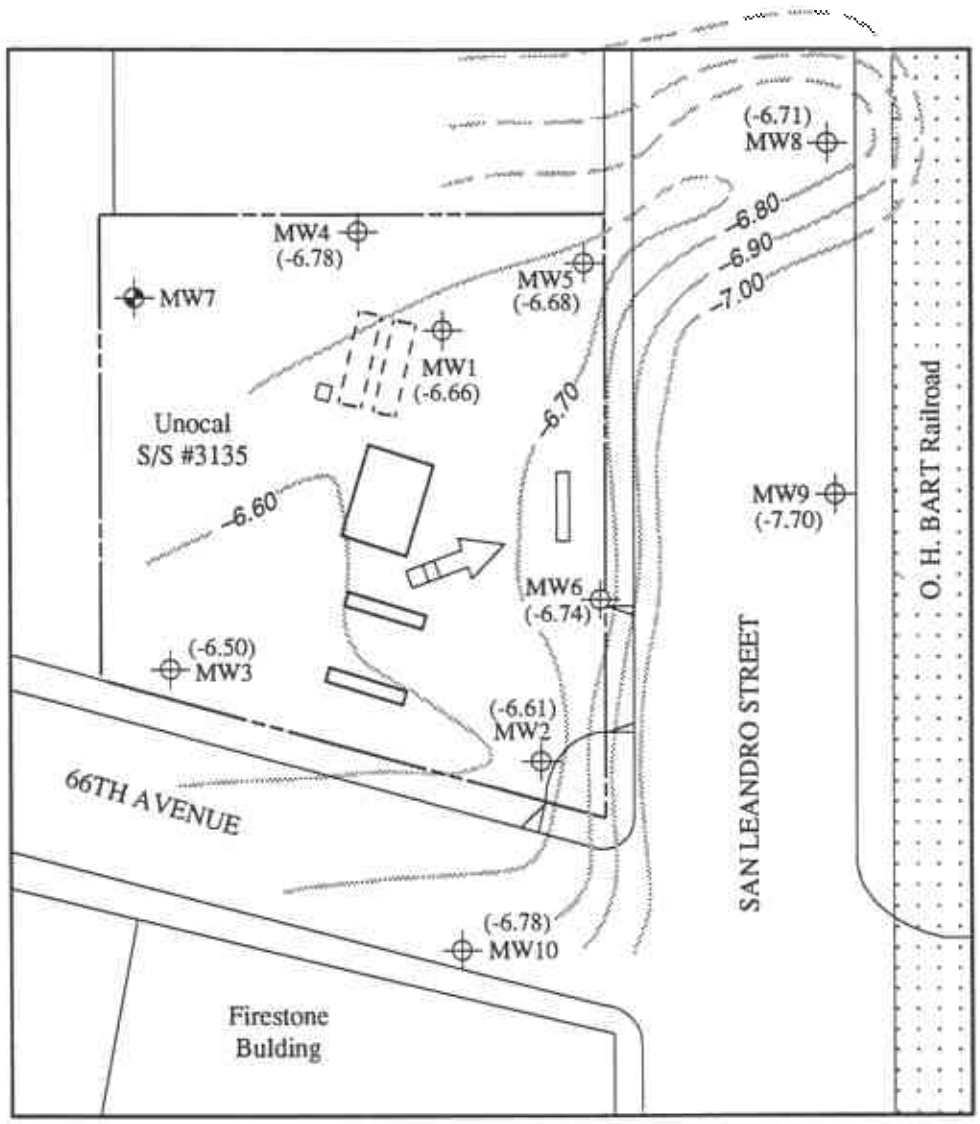
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE NOVEMBER 3, 1992 MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE
1



LEGEND

- Monitoring well (existing)
- Monitoring well (proposed)
- Direction of ground water flow
- ( ) Ground water elevation in feet relative to Mean Sea Level
- Contours of ground water elevation

0 60 120

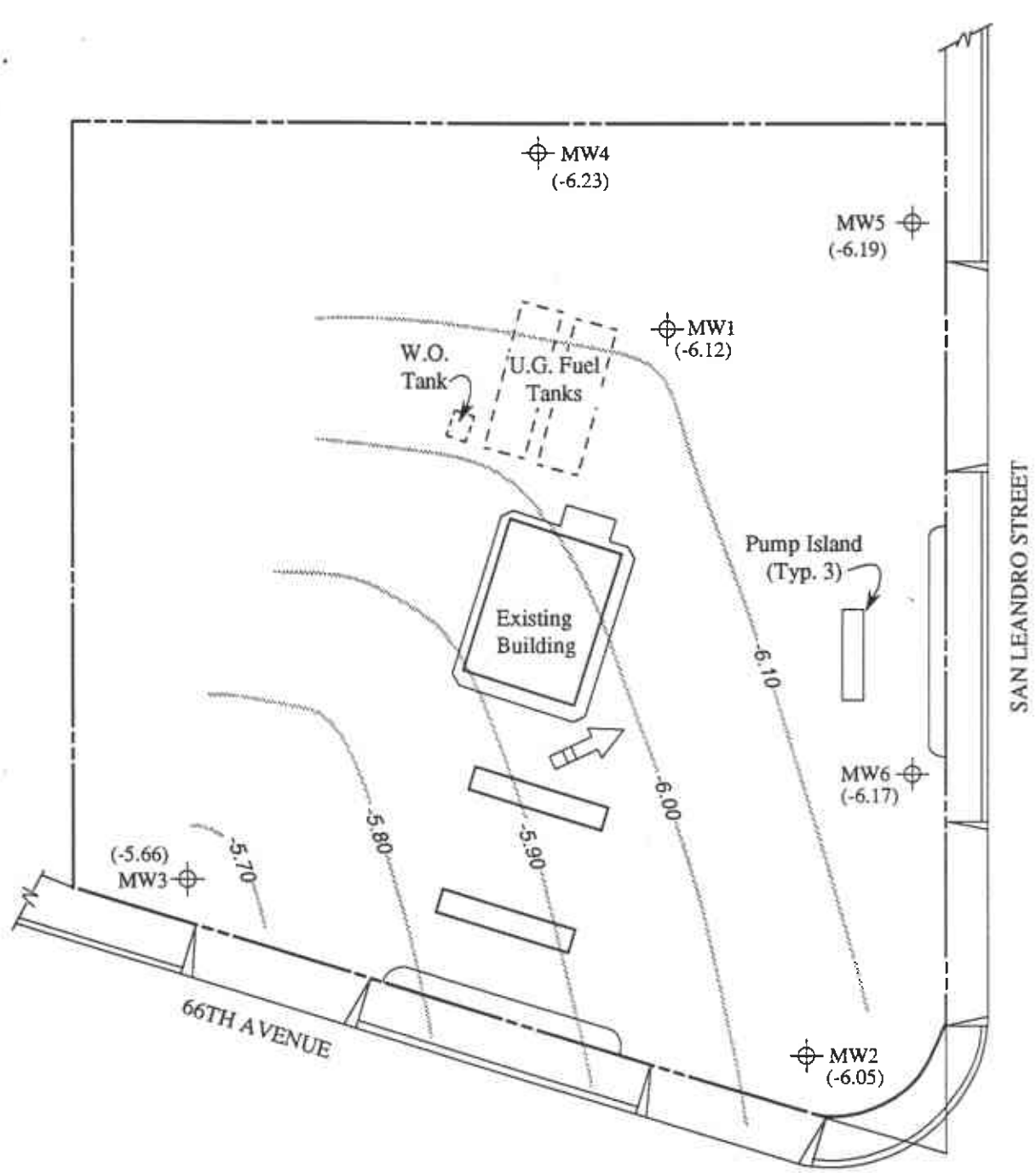
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE OCTOBER 16, 1992 MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE
2



LEGEND

- Monitoring well
- Direction of ground water flow
- ( ) Ground water elevation in feet relative to Mean Sea Level
- Contours of ground water elevation

0 30 60

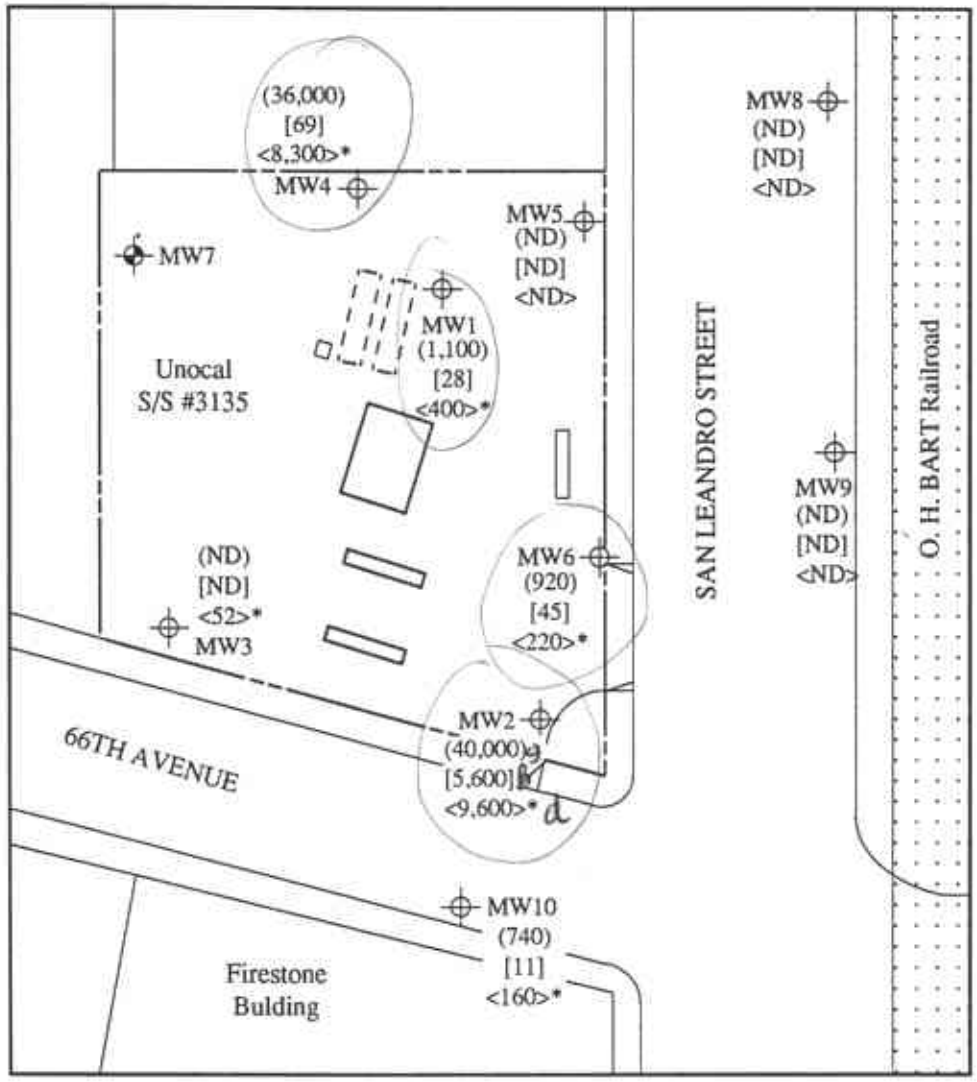
Approx. scale feet

POTENTIOMETRIC SURFACE MAP FOR THE SEPTEMBER 3, 1992 MONITORING EVENT

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE
3



LEGEND

- Monitoring well (existing)
- Monitoring well (proposed)
- ( ) Concentration of TPH as gasoline in ppb
- [ ] Concentration of benzene in ppb
- < > Concentration of TPH as diesel in ppb
- ND= Non-detectable

* The lab reported that the hydrocarbons detected do not appear to be diesel.

0 60 120

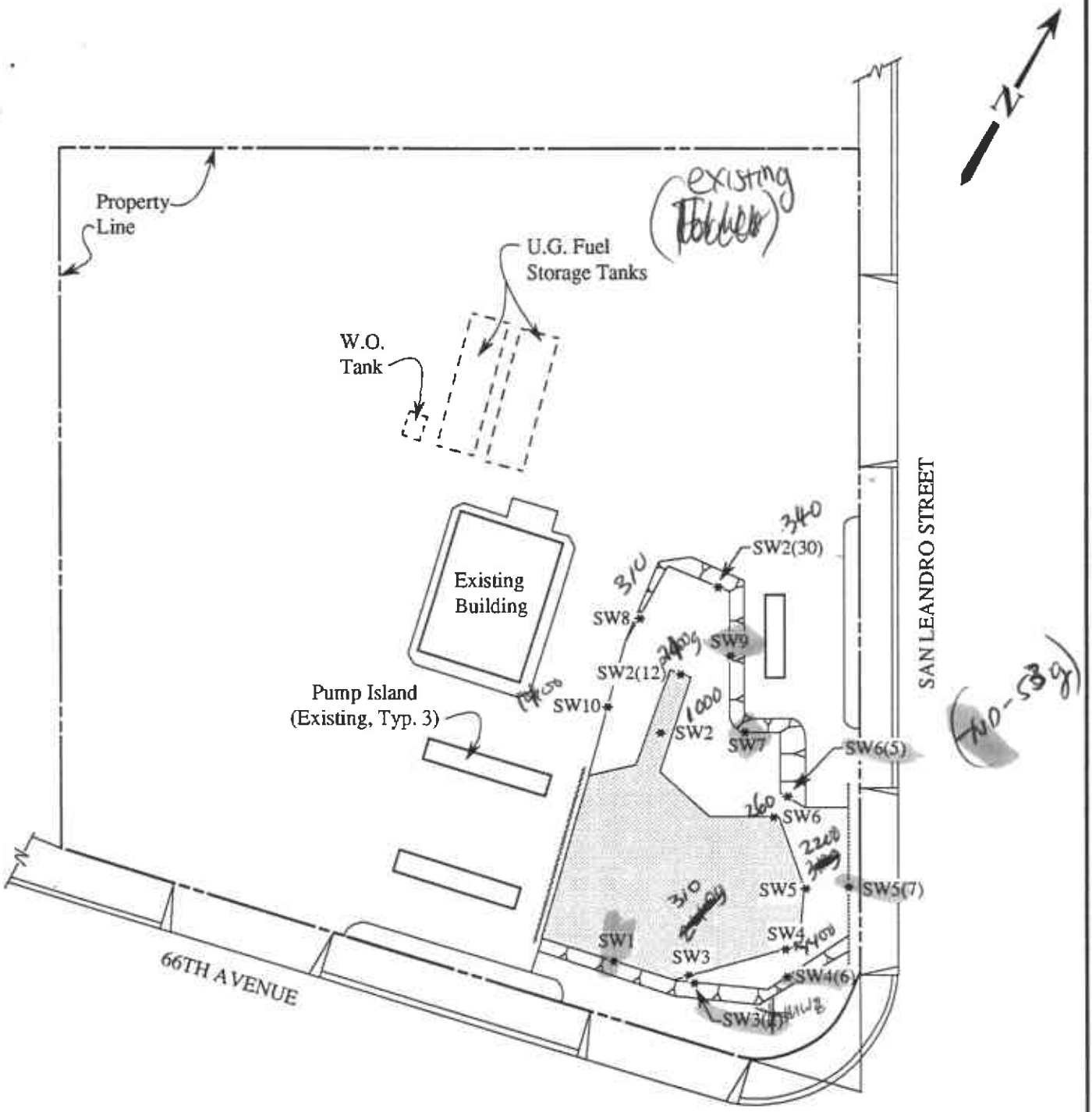
Approx. scale feet

PETROLEUM HYDROCARBON CONCENTRATIONS IN GROUND WATER ON NOVEMBER 3, 1992

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE
4



LEGEND

- * Sample Point Location
- Intermediate excavation boundary
- ..... Shoring

0 30 60

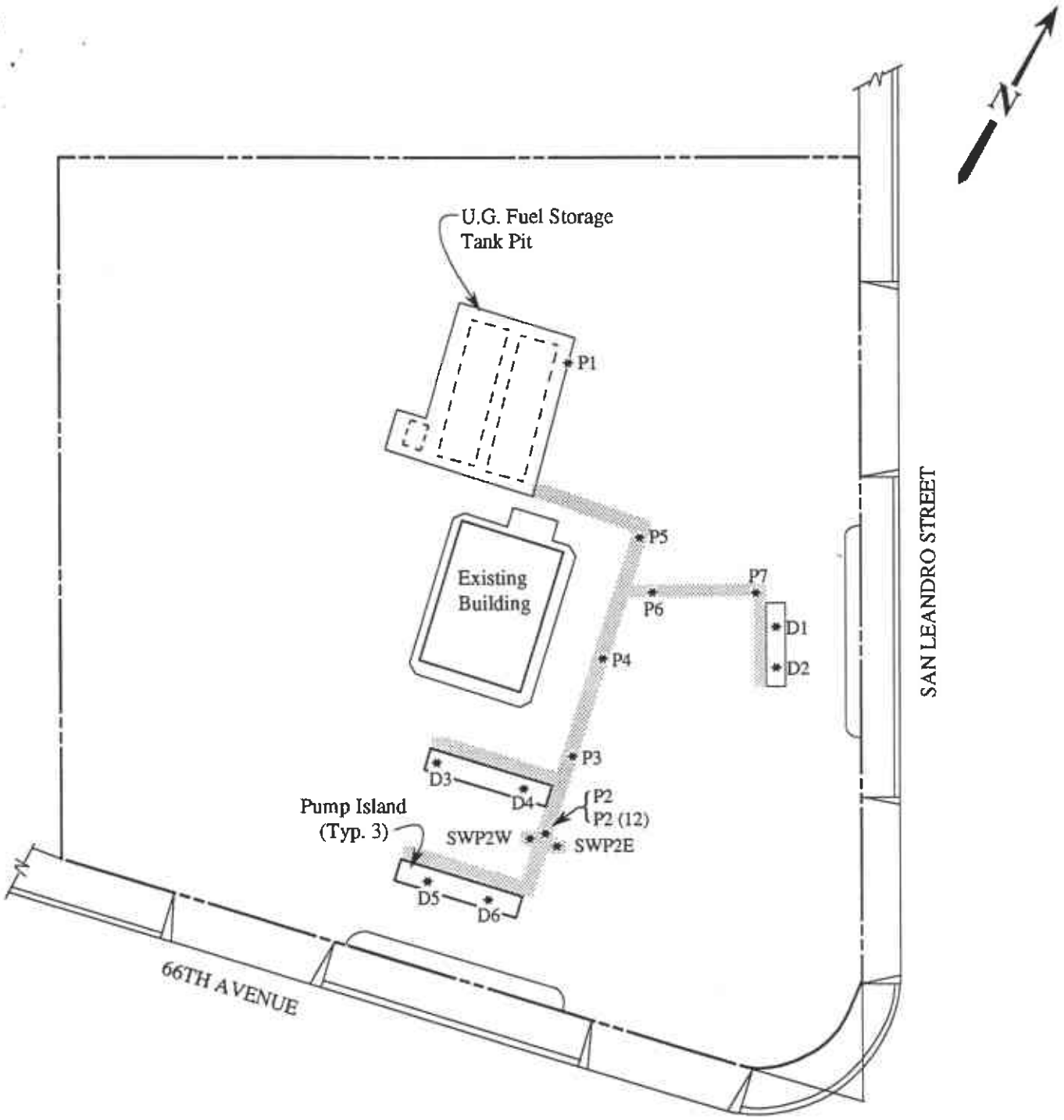
Approx. scale feet

SAMPLE POINT LOCATIONS MAP

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE 5



LEGEND

* Sample point location

0 30 60

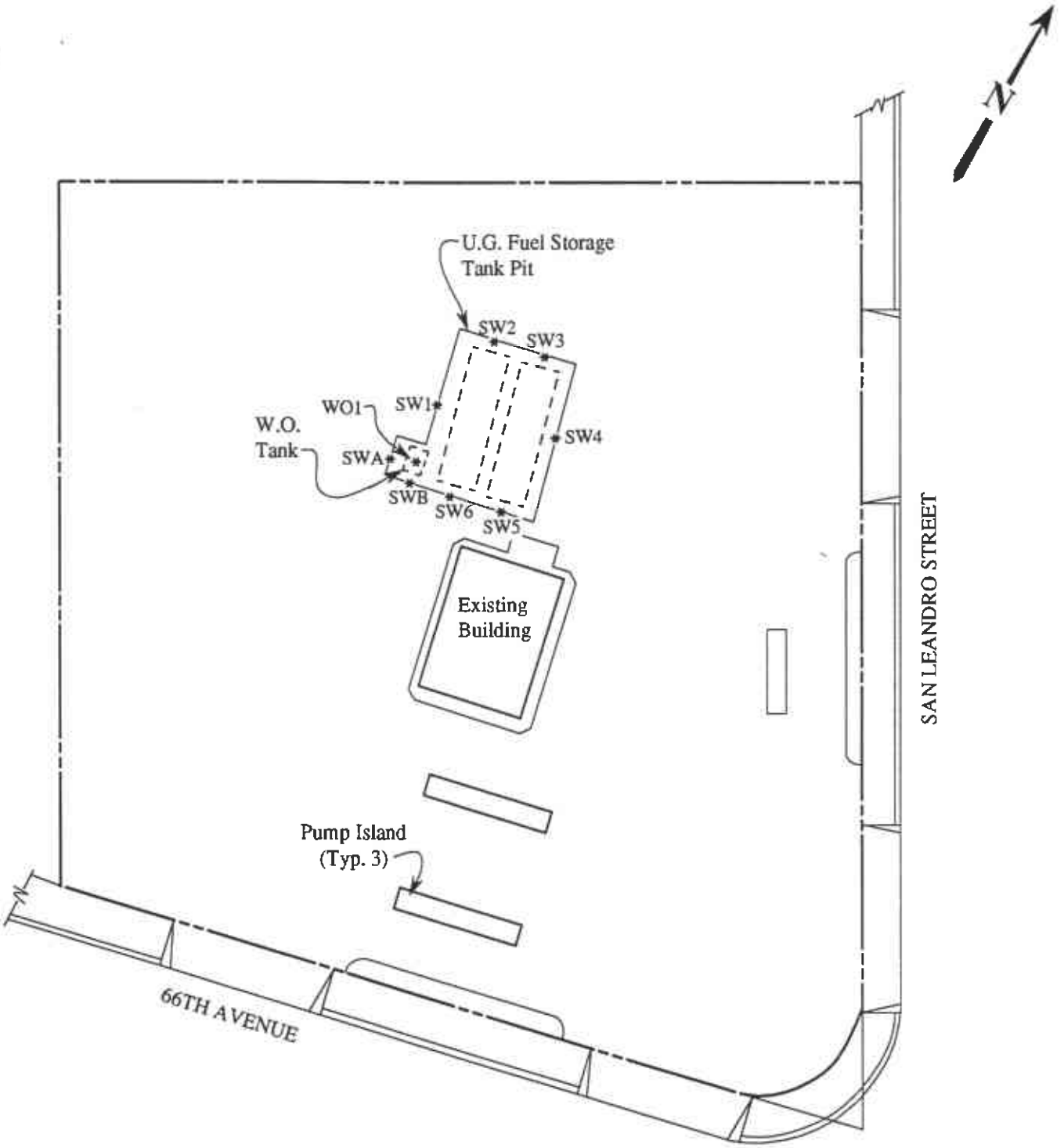
Approx. scale feet

SAMPLE POINT LOCATIONS MAP

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE
6



LEGEND

* Sample point location

0 30 60

Approx. scale feet

SAMPLE POINT LOCATIONS MAP

KAPREALIAN ENGINEERING
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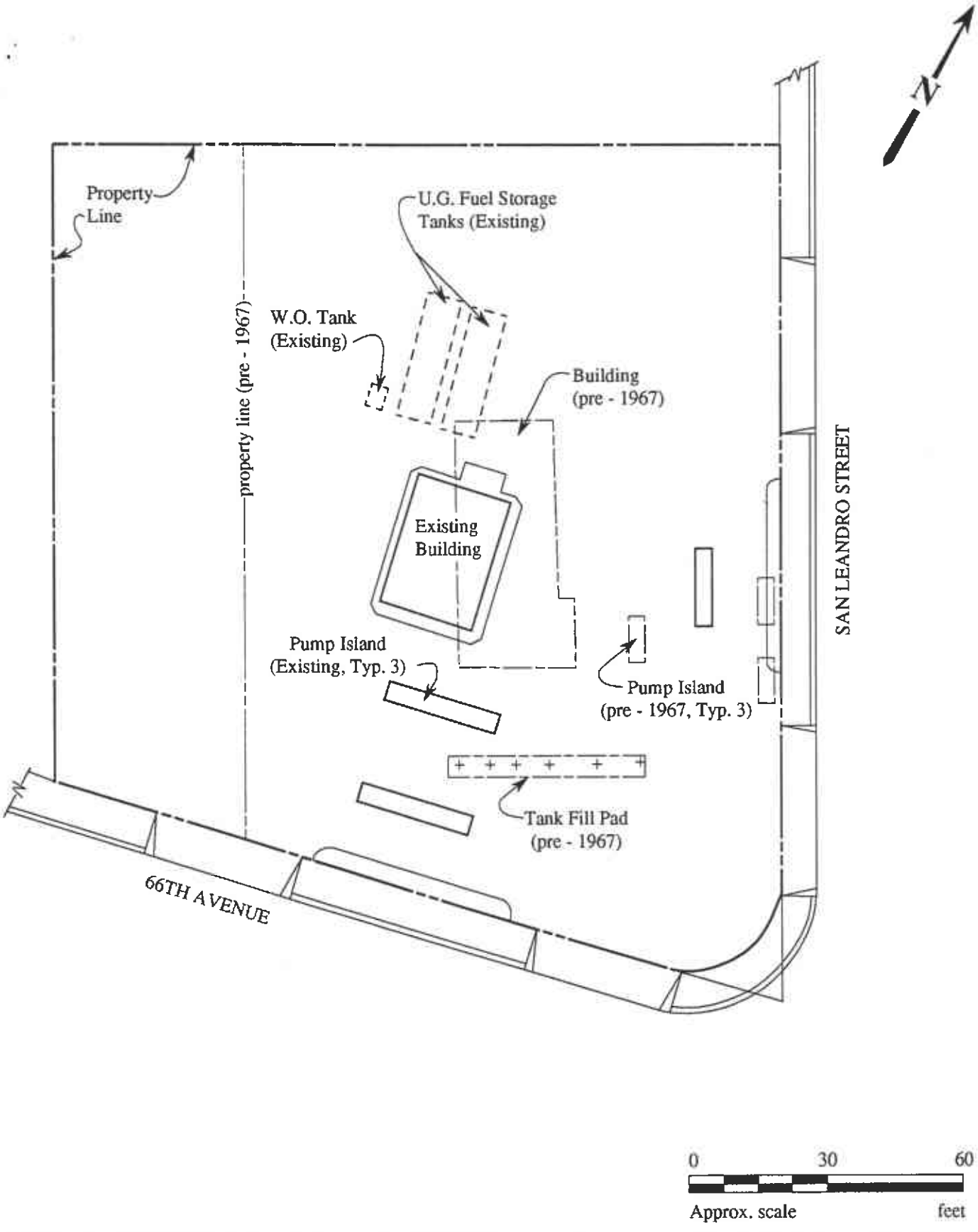
UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE
7

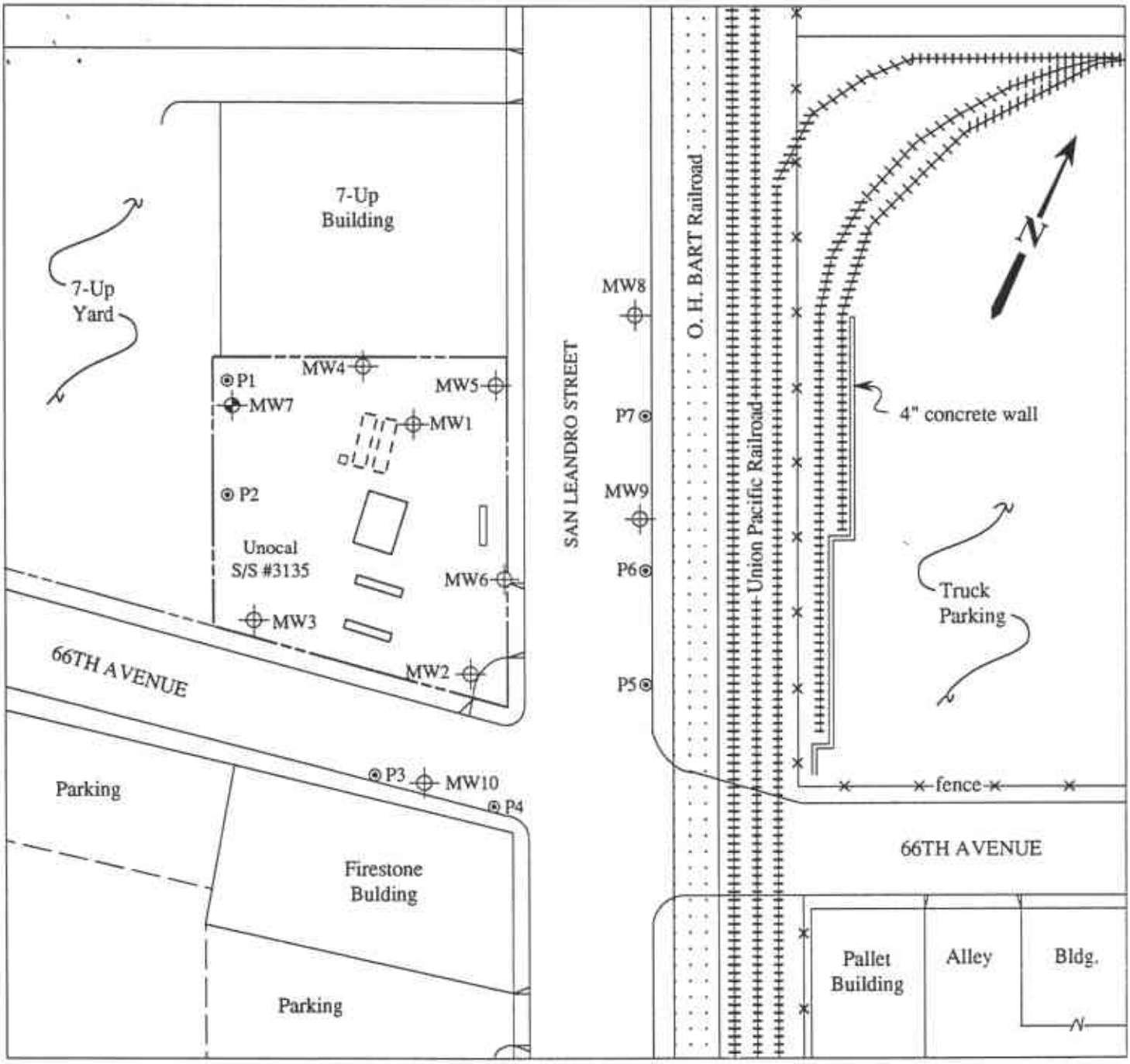


STATION LAYOUT MAP

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE
8



LEGEND

- Monitoring well (existing)
- Monitoring well (proposed)
- Ground water sample point location

0 80 160

Approx. scale feet

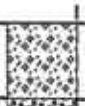
MONITORING WELLS AND SAMPLE POINTS LOCATION MAP

KAPREALIAN ENGINEERING INCORPORATED

UNOCAL SERVICE STATION #3135
845 - 66TH AVENUE
OAKLAND, CA

FIGURE
9

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-P88-1203	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG W.W. CEG 1633
Project Name Unocal S/S #3135 845 - 66th Ave., Oakland	**Well Cover Elevation**	**Date Drilled** 9/29/92
Boring No. MW8	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		10 inches of concrete over sand and gravel base.
5/10/11		5		Silty gravel with sand and clay, estimated at 15-20% silt, 10-15% clay, and 10-15% sand, subangular gravel to 1 inch in diameter, medium dense, moist, yellowish brown (10 YR 5/4), (fill).
			ML	Clayey silt, estimated at 20% clay and 10-15% sand, stiff to very stiff, moist, black (10YR 2/1).
4/6/9		10	CL	Silty clay, estimated at 10-15% silt and 5% sand, stiff, moist. brown (10YR 5/3) with greenish gray (5G 5/1) mottling around common pores.
7/11/21	▼			Sandy silt, estimated at 20% fine-grained sand and 5% clay. very stiff, very moist to saturated, greenish gray (5GY 5/1).
6/14/27		15	ML	Sandy silt as above, estimated at 15-20% sand, 5-10% gravel, and 5% clay, gravel to 3/4 inch in diameter, hard, saturated. greenish gray (5GY 5/1).
9/17/27		20	GM	Sandy gravel with silt, estimated at 20% sand and 15% silt, trace clay, subangular gravel to 1-3/4 inches in diameter, dense. saturated, yellowish brown (10YR 5/4) with greenish gray (5GY 5/1) mottling.
12/			GW	

BORING LOG

Project No. KEI-P88-1203	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG W.W. CEG 1633
Project Name Unocal S/S #3135 845 - 66th Ave., Oakland	**Well Cover Elevation**	**Date Drilled** 9/29/92
Boring No. MW8	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
16/26			GW	Sandy gravel, trace silt, subangular gravel to 2 inches in diameter, dense, saturated, yellowish brown (10YR 5/4) with greenish gray (5GY 5/1) mottling.
		25		TOTAL DEPTH: 23'
		30		
		35		
		40		

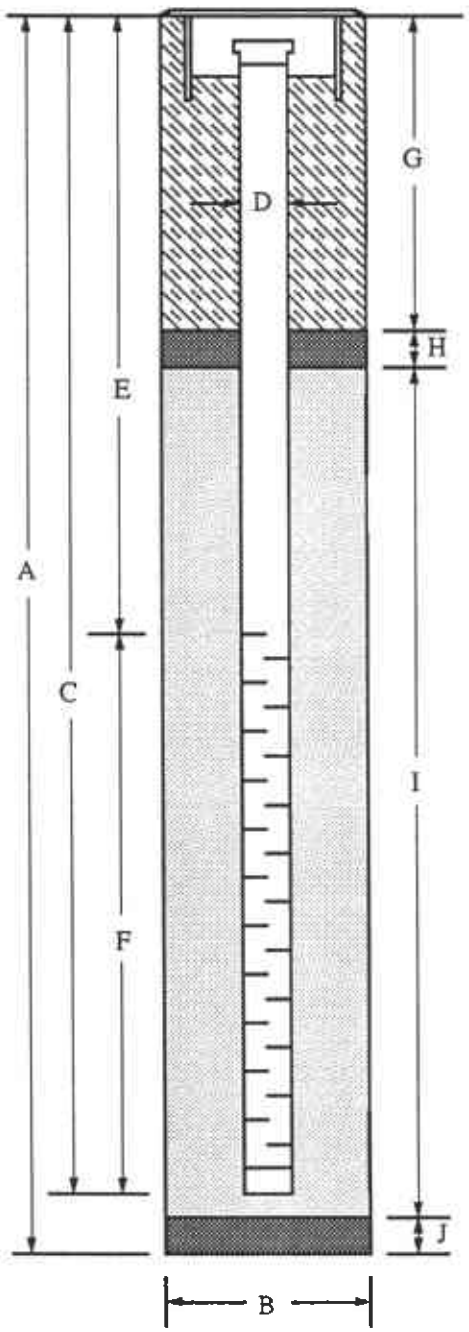
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal #3135, 845 - 66th Ave., Oakland WELL NO. MW8

PROJECT NUMBER: KEI-P88-1203

WELL PERMIT NO.: 92354

Flush-mounted Well Cover



A. Total Depth : 23'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 23'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 6'

F. Perforated Length: 17'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 4'

Seal Material: Neat Cement

H. Seal: 1'

Seal Material: Bentonite

I. Filter Pack: 18'

Pack Material: RMC Lonestar Sand

Size: 2/12

J. Bottom Seal: None

Seal Material: N/A

* Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

BORING LOG

Project No. KEI-P88-1203	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG W.W. LOG 1633
Project Name Unocal S/S #3135 845 - 66th Ave., Oakland	**Well Cover Elevation**	**Date Drilled** 9/28/92
Boring No. MW9	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		10 inches of concrete pavement over sand and gravel base.
7/8/3		5	GW-GC	Sandy gravel with clay, estimated at 15% clay and 10% silt, well graded gravel to 1-1/2 inches in diameter, medium dense, moist, yellowish brown (10YR 5/6), (fill).
4/6/7		10	ML	Clayey silt, estimated at 15% clay and 5-10% sand, silt is fine-grained, stiff, moist, black (5Y 2.5/1). Clayey silt, estimated at 20% clay and trace fine-grained sand, stiff, moist to very moist, yellowish brown (10YR 5/4), trace pores.
4/6/9	▼			Clayey silt as above, estimated at 5-10% sand, very moist to saturated below 13 feet.
5/8/11		15	SM	Clayey silt as above, estimated at 10% sand, trace gravel, saturated, yellowish brown (10YR) Silty sand, estimated at 15% silt, trace clay, trace gravel to 1/2 inch in diameter, sand is predominantly fine-grained, medium dense, saturated, light yellowish brown (10YR 6/4).
12/17/24		20	GW	Well graded gravel with sand, estimated at 5% silt, subrounded gravel to 2-1/2 inches in diameter, dense, saturated, light yellowish brown (10YR 6/4)).
14				

BORING LOG

Project No. KEI-P88-1203	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG W.W. CEG 1633
Project Name Unocal S/S #3135 845 - 66th Ave., Oakland	**Well Cover Elevation**	**Date Drilled** 9/28/92
Boring No. MW9	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
15/15		25	GW-GC	Well graded sand and gravel with clay, estimated at 15-20% sand, 10-15% clay, and 5% silt, dense, saturated, light yellowish brown (10YR 6/4).
		30		TOTAL DEPTH: 23'
		35		
		40		

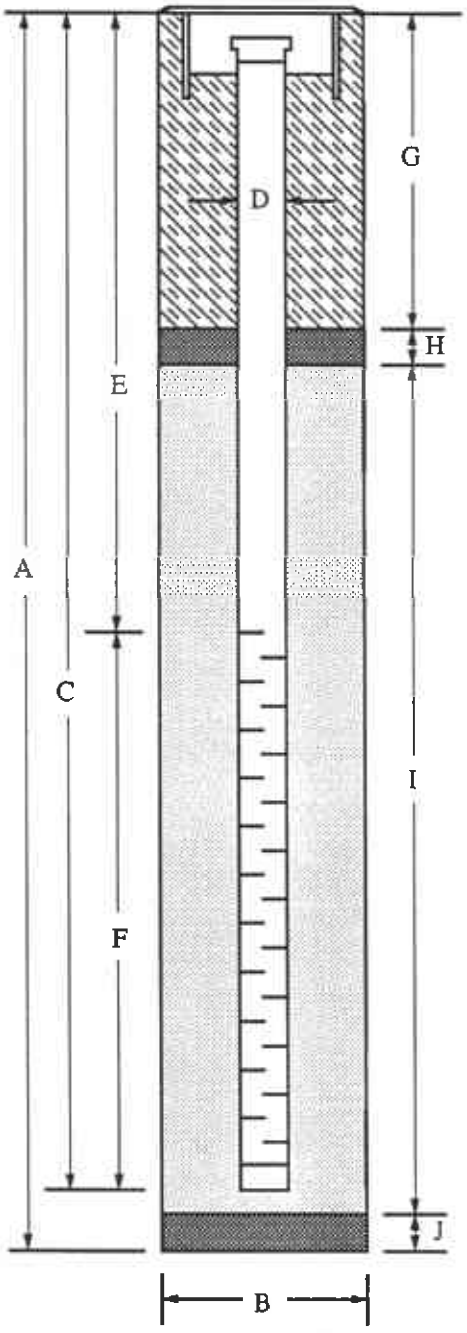
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal #3135, 845 - 66th Ave., Oakland WELL NO. MW9

PROJECT NUMBER: KEI-P88-1203

WELL PERMIT NO.: 92354

Flush-mounted Well Cover



A. Total Depth : 23'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 23'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 6'

F. Perforated Length: 17'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 4'

Seal Material: Neat Cement

H. Seal: 1'

Seal Material: Bentonite

I. Filter Pack: 18'

Pack Material: RMC Lonestar Sand

Size: 2/12

J. Bottom Seal: None

Seal Material: N/A

* Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

BORING LOG

Project No. KEI-P88-1203	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG W.W. CEG 1633
Project Name Unocal S/S #3135 845 - 66th Ave., Oakland	**Well Cover Elevation**	**Date Drilled** 9/28/92
Boring No. MW10	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
		0		8 inches of asphalt pavement over sand and gravel base.
			GM	Silty gravel, traces of brick and concrete, moist, yellowish brown (10YR 5/4), (fill).
4/4/5		5	CL-ML	Silty clay, estimated at 30% silt and 5-10% sand, stiff, moist, black (5Y 2.5/1).
			CL	Clay, estimated at 5% silt and 5% sand, stiff, moist, olive gray (5Y 5/2), trace root pores and caliche.
7/10/15		10	ML	Clayey silt, estimated at 30% clay, very stiff, moist, greenish gray (5GY 5/1), trace pores.
			SM	Silty sand, estimated at 30% silt, sand is fine-grained, medium dense, very moist, greenish gray (5GY 5/1), trace pores.
			GW	Sandy gravel, estimated at 5% silt, trace clay, gravel is subangular to 1 inch in diameter, dense, very moist, greenish gray (5GY 5/1).
12/19/21	▼		ML	Silt, estimated at 10-15% fine-grained sand, trace clay, hard, very moist to saturated, greenish gray (5GY 5/1).
4/7/11		15	SM	Silty sand, estimated at 15% silt, sand is fine grained, medium dense, saturated, yellowish brown (10YR 5/4).
8/15/21		20	GW	Sandy gravel, estimated at 5% silt, sand and gravel well graded to 1-3/4 inches in diameter, dense, saturated, yellowish brown (10YR 5/4).

BORING LOG

Project No. KEI-P88-1203	**Boring Diameter** 9" **Casing Diameter** 2"	**Logged By** JGG W.W. LEG1633
Project Name Unocal S/S #3135 845 - 66th Ave., Oakland	**Well Cover Elevation**	**Date Drilled** 9/28/92
Boring No. MW10	**Drilling Method** Hollow-stem Auger	**Drilling Company** Woodward Drilling

Penetration blows/6"	G. W. level	Depth (feet) Samples	Strati-graphy USCS	Description
			GW	Well graded sandy gravel, estimated at 5-10% clay and 5% silt, dense, saturated, yellowish brown (10YR 5/4).
				TOTAL DEPTH: 23'

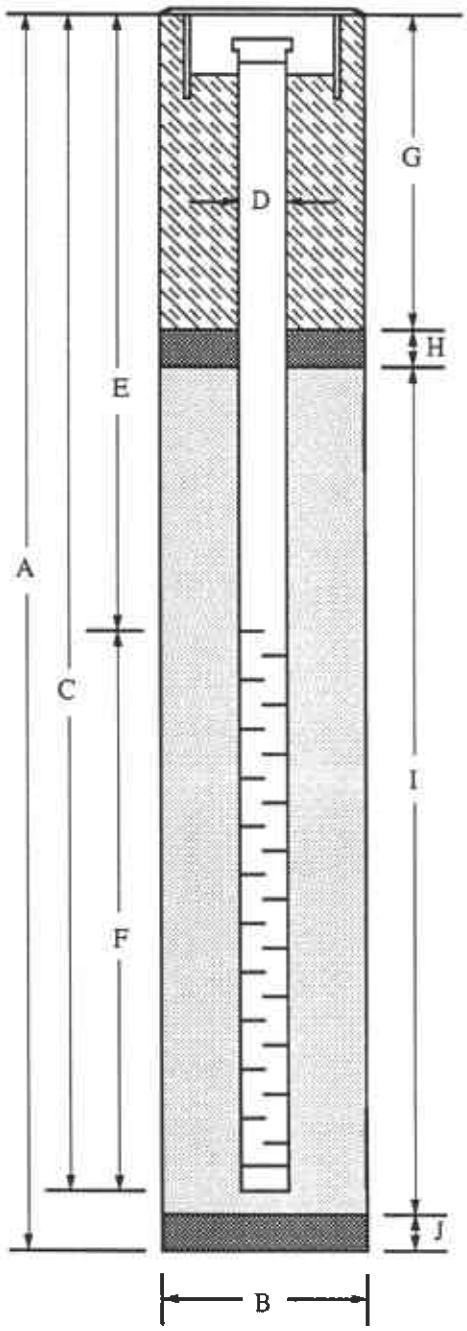
WELL COMPLETION DIAGRAM

PROJECT NAME: Unocal #3135, 845 - 66th Ave., Oakland WELL NO. MW10

PROJECT NUMBER: KEI-P88-1203

WELL PERMIT NO.: 92354

Flush-mounted Well Cover



A. Total Depth : 23'

B. Boring Diameter*: 9"

Drilling Method: Hollow Stem Auger

C. Casing Length: 23'

Material: Schedule 40 PVC

D. Casing Diameter: OD = 2.375"

ID = 2.067"

E. Depth to Perforations: 5'

F. Perforated Length: 18'

Perforation Type: Machined Slot

Perforation Size: 0.010"

G. Surface Seal: 3'

Seal Material: Neat Cement

H. Seal: 1'

Seal Material: Bentonite

I. Filter Pack: 19'

Pack Material: RMC Lonestar Sand

Size: 2/12

J. Bottom Seal: None

Seal Material: N/A

* Boring diameter can vary from 8-1/4" to 9" depending on bit wear.

SEQUOIA ANALYTICAL

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

Kapreallan Engineering, Inc.	Client Project ID:	Unocal, 845 66th Ave., Oakland	Sampled:	Nov 3, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Nov 3, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 16, 1992
Attention: Mardo Kapreallan, P.E.	First Sample #:	211-0106		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 211-0106 MW 1	Sample I.D. 211-0107 MW 2	Sample I.D. 211-0108 MW 3	Sample I.D. 211-0109 MW 4	Sample I.D. 211-0110 MW 5	Sample I.D. 211-0111 MW 6
Purgeable Hydrocarbons	50	1,100	40,000	N.D.	36,000	N.D.	920
Benzene	0.5	28	5,600	N.D.	69	N.D.	45
Toluene	0.5	N.D.	130	N.D.	N.D.	N.D.	0.76
Ethyl Benzene	0.5	80	3,000	N.D.	3,000	N.D.	12
Total Xylenes	0.5	78	6,100	N.D.	7,400	N.D.	110
Chromatogram Pattern:		Gasoline	Gasoline	--	Gasoline	--	Gasoline

Quality Control Data

Report Limit Multiplication Factor:	1.0	200	1.0	50	1.0	1.0
Date Analyzed:	11/5/92	11/6/92	11/6/92	11/6/92	11/6/92	11/5/92
Instrument Identification:	HP-2	HP-2	HP-4	HP-2	HP-4	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	128	99	99	107	101	130

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

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 845 66th Ave., Oakland	Sampled:	Nov 3, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Nov 3, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 16, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	211-0112		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 211-0112 MW 8	Sample I.D. 211-0113 MW 9	Sample I.D. 211-0114 MW 10	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	N.D.	N.D.	740	
Benzene	0.5	N.D.	N.D.	11	
Toluene	0.5	N.D.	N.D.	2.1	
Ethyl Benzene	0.5	N.D.	N.D.	32	
Total Xylenes	0.5	N.D.	N.D.	56	
Chromatogram Pattern:		--	--	Gasoline	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0
Date Analyzed:	11/5/92	11/5/92	11/5/92	11/5/92
Instrument Identification:	HP-2	HP-2	HP-2	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	104	101	106	100

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

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 845 66th Ave., Oakland	Sampled:	Nov 3, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Nov 3, 1992
Concord, CA 94520	Analysis Method:	EPA 3510/3520/8015	Reported:	Nov 16, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	211-0106		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 211-0106 MW 1	Sample I.D. 211-0107 MW 2	Sample I.D. 211-0108 MW 3	Sample I.D. 211-0109 MW 4	Sample I.D. 211-0110 MW 5	Sample I.D. 211-0111 MW 6
Extractable Hydrocarbons	50	400	9,600	52	8,300	N.D.	220
Chromatogram Pattern:		Non-Diesel Mixture (<C14)	Non-Diesel Mixture (<C14)	Non-Diesel Mixture (>C22)	Non-Diesel Mixture (<C14)	--	Non-Diesel Mixture (<C14)

Quality Control Data

Report Limit Multiplication Factor:	1.0	10	1.0	10	1.0	1.0
Date Extracted:	11/10/92	11/10/92	11/10/92	11/10/92	11/10/92	11/10/92
Date Analyzed:	11/13/92	11/16/92	11/13/92	11/16/92	11/13/92	11/13/92
Instrument Identification:	HP-3B	HP-3B	HP-3B	HP-3A	HP-3B	HP-3B

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

SEQUOIA ANALYTICAL

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Kapreallan Engineering, Inc.	Client Project ID:	Unocal, 845 66th Ave., Oakland	Sampled:	Nov 3, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Water	Received:	Nov 3, 1992
Concord, CA 94520	Analysis Method:	EPA 3510/3520/8015	Reported:	Nov 16, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	211-0112		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit µg/L	Sample I.D. 211-0112 MW 8	Sample I.D. 211-0113 MW 9	Sample I.D. 211-0114 MW 10	Sample I.D. Matrix Blank
Extractable Hydrocarbons	50	N.D.	N.D.	160	
Chromatogram Pattern:		--	--	Non-Diesel Mixture (<C14)	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0
Date Extracted:	11/10/92	11/10/92	11/10/92	11/10/92
Date Analyzed:	11/13/92	11/13/92	11/13/92	11/13/92
Instrument Identification:	HP-3B	HP-3B	HP-3A	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

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 845 66th Ave., Oakland	Sampled:	Nov 3, 1992
2401 Stanwell Drive, Suite 400	Matrix Descript:	Water	Received:	Nov 3, 1992
Concord, CA 94520	Analysis Method:	SM 5520 B&F (Gravimetric)	Extracted:	Nov 5, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	211-0107	Analyzed:	Nov 9, 1992
			Reported:	Nov 16, 1992

TOTAL RECOVERABLE PETROLEUM OIL

Sample Number	Sample Description	Oil & Grease mg/L (ppm)
211-0107	MW 2	N.D.
211-0111	MW 6	N.D.

Detection Limits:	5.0

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.
2401 Stanwell Drive, Suite 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 845 66th Ave., Oakland
QC Sample Group: 2110106-114
Reported: Nov 16, 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	EPA 8015	SM 5520
Analyst:	A.T.	A.T.	A.T.	A.T.	K.Wimer	D. Newcomb
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L	mg/L
Date Analyzed:	Nov 5, 1992	Nov 5, 1992	Nov 5, 1992	Nov 5, 1992	Nov 13, 1992	Nov 5, 1992
QC Sample #:	211-0112	211-0112	211-0112	211-0112	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:	19	21	21	61	269	94
Matrix Spike % Recovery:	95	105	105	102	90	94
Conc. Matrix Spike Dup.:	19	21	21	61	276	96
Matrix Spike Duplicate % Recovery:	95	105	105	102	92	96
Relative % Difference:	0.0	0.0	0.0	0.0	2.6	2.0

Laboratory blank contained the following analytes: None Detected

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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 Drive, Suite 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 845 66th Ave., Oakland
QC Sample Group: 2110106-114
Reported: Nov 16, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Nov 13, 1992	Nov 16, 1992	Nov 13, 1992	Nov 16, 1992	Nov 13, 1992	Nov 13, 1992	Nov 13, 1992
Sample #:	211-0106	211-0107	211-0108	211-0109	211-0110	211-0111	211-0112
Surrogate % Recovery:	100	85	84	98	92	89	86

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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 Drive, Suite 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 845 66th Ave., Oakland
QC Sample Group: 2110106-114
Reported: Nov 16, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer	K. Wimer
Reporting Units:	µg/L	µg/L	µg/L
Date Analyzed:	Nov 13, 1992	Nov 13, 1992	Nov 13, 1992
Sample #:	211-0113	211-0114	Matrix Blank
Surrogate % Recovery:	101	100	106

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, INC.

CHAIN OF CUSTODY

SAMPLER: Vartkes

WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal / Oakland, 845 66th Ave.

TURN AROUND TIME: Regular

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TAHG & BTXE	TPHD	TOG (5520 B&F)	REMARKS
MW 1	11/3/92	2:05 PM.		X	X		3	Monitoring Well	X	X		2110106AC
MW 2	"			X	X		4	" "	X	X	X	107AD
MW 3	"			X	X		3	" "	X	X		108AC
MW 4	"			X	X		3	" "	X	X		109AC
MW 5	"			X	X		3	" "	X	X		110AC
MW 6	"			X	X		4	" "	X	X	X	111AD
MW 8	"			X	X		3	" "	X	X		112AC
MW 9	"			X	X		3	" "	X	X		113AC
MW 10	"	6:15 PM.		X	X		3	" "	X	X		114AC

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
W. Vartkes	11/3/92 7:15		11/3/92 1915
Sophia Patiga	11/4/92 1315		
	11-4-92 1437		

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

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

Signature: [signature] Title: analyst Date: 11/3/92

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal #3135, 66th Ave., Oakland	Sampled: 9/28 & 9/29/92
2401 Stanwell Drive, Suite 400	Sample Matrix:	Soil	Received: Sep 30, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported: Oct 8, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	209-1166	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 209-1166 MW8-(5)	Sample I.D. 209-1167 MW8-(10)	Sample I.D. 209-1168 MW8-(13)	Sample I.D. 209-1169 MW9-(5.5)	Sample I.D. 209-1170 MW9-(10)	Sample I.D. 209-1171 MW9-(13)
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:	10/1/92	10/1/92	10/1/92	10/1/92	10/1/92	10/1/92
Instrument Identification:	HP-4	HP-4	HP-4	HP-4	HP-4	HP-4
Surrogate Recovery, %: (QC Limits = 70-130%)	104	97	99	98	100	104

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 #3135, 66th Ave., Oakland	Sampled:	Sep 28, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Soil	Received:	Sep 30, 1992
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Oct 8, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	209-1172		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit mg/kg	Sample I.D. 209-1172 MW10-(5)	Sample I.D. 209-1173 MW10-(10.5)	Sample I.D. 209-1174 MW10-(13)	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	1.0	N.D.	210	N.D.	
Benzene	0.005	N.D.	0.58	N.D.	
Toluene	0.005	N.D.	0.38	N.D.	
Ethyl Benzene	0.005	N.D.	4.4	0.0090	
Total Xylenes	0.005	N.D.	10	0.0063	
Chromatogram Pattern:		--	Gasoline	--	

Quality Control Data

Report Limit Multiplication Factor:	1.0	20	1.0	1.0
Date Analyzed:	10/1/92	10/1/92	10/1/92	10/1/92
Instrument Identification:	HP-4	HP-4	HP-4	HP-4
Surrogate Recovery, %: (QC Limits = 70-130%)	104	94	99	102

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

SEQUOIA ANALYTICAL

Karen Cushon for

Scott A. Chieffo
Project Manager

SEQUOIA ANALYTICAL

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Kaprealian Engineering, Inc.	Client Project ID:	Unocal #3135, 66th Ave., Oakland	Sampled: 9/28 & 9/29/92
2401 Stanwell Drive, Suite 400	Sample Matrix:	Soil	Received: Sep 30, 1992
Concord, CA 94520	Analysis Method:	EPA 3550/8015	Reported: Oct 8, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	209-1166	

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit mg/kg	Sample I.D. 209-1166 MW8-(5)	Sample I.D. 209-1167 MW8-(10)	Sample I.D. 209-1168 MW8-(13)	Sample I.D. 209-1169 MW9-(5.5)	Sample I.D. 209-1170 MW9-(10)	Sample I.D. 209-1171 MW9-(13)
Extractable Hydrocarbons	1.0	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 Extracted:	10/1/92	10/1/92	10/1/92	10/1/92	10/1/92	10/1/92
Date Analyzed:	10/5/92	10/5/92	10/5/92	10/5/92	10/5/92	10/5/92
Instrument Identification:	HP-3A	HP-3A	HP-3B	HP-3A	HP-3B	HP-3B

Extractable Hydrocarbons are quantitated against a fresh diesel 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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Kapreallan Engineering, Inc.	Client Project ID:	Unocal #3135, 66th Ave., Oakland	Sampled:	Sep 28, 1992
2401 Stanwell Drive, Suite 400	Sample Matrix:	Soil	Received:	Sep 30, 1992
Concord, CA 94520	Analysis Method:	EPA 3550/8015	Reported:	Oct 8, 1992
Attention: Mardo Kapreallan, P.E.	First Sample #:	209-1172		

TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

Analyte	Reporting Limit mg/kg	Sample I.D. 209-1172 MW10-(5)	Sample I.D. 209-1173 MW10-(10.5)	Sample I.D. 209-1174 MW10-(13)	Sample I.D. Matrix Blank
Extractable Hydrocarbons	1.0	N.D.	39	N.D.	
Chromatogram Pattern:		--	Non-Diesel Mixture (<C14)	--	

Quality Control Data

Report Limit Multiplication Factor:	1.0	10	1.0	1.0
Date Extracted:	10/1/92	10/1/92	10/1/92	10/1/92
Date Analyzed:	10/5/92	10/5/92	10/5/92	10/5/92
Instrument Identification:	HP-3A	HP-3B	HP-3B	HP-3B

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

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

SEQUOIA ANALYTICAL

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

Client Project ID: Unocal #3135, 66th Ave., Oakland
QC Sample Group: 2091166-1174
Reported: Oct 8, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015
Analyst:	A.P.	A.P.	A.P.	A.P.	K.Wimer
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 1, 1992	Oct 1, 1992	Oct 1, 1992	Oct 1, 1992	Oct 5, 1992
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.40	0.40	0.40	1.2	10
Conc. Matrix Spike:	0.40	0.40	0.41	1.3	9.2
Matrix Spike % Recovery:	100	100	102	108	92
Conc. Matrix Spike Dup.:	0.41	0.41	0.42	1.3	9.5
Matrix Spike Duplicate % Recovery:	102	102	105	108	95
Relative % Difference:	2.4	2.4	2.4	0.0	3.2

Laboratory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

Scott A. Chieffo
Project Manager

% 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

SEQUOIA ANALYTICAL

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

Client Project ID: Unocal #3135, 66th Ave., Oakland
QC Sample Group: 2091166-1174
Reported: Oct 8, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer	K. Wimer
Reporting Units:	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 5, 1992	Oct 5, 1992	Oct 5, 1992	Oct 5, 1992	Oct 5, 1992	Oct 5, 1992	Oct 5, 1992
Sample #:	209-1166	209-1167	209-1168	209-1169	209-1170	209-1171	209-1172
Surrogate % Recovery:	110	101	102	109	106	105	113

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

SEQUOIA ANALYTICAL

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Kapreallan Engineering, Inc.
2401 Stanwell Drive, Suite 400
Concord, CA 94520
Attention: Mardo Kapreallan, P.E.

Client Project ID: Unocal #3135, 66th Ave., Oakland
QC Sample Group: 2091166-1174
Reported: Oct 8, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015	EPA 8015
Analyst:	K. Wimer	K. Wimer	K. Wimer
Reporting Units:	mg/kg	mg/kg	mg/kg
Date Analyzed:	Oct 5, 1992	Oct 5, 1992	Oct 5, 1992
Sample #:	209-1173	209-1174	Matrix Blank
Surrogate % Recovery:	103	100	94

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: Wade Weston
WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal # 3135
66 Th Ave Oakland

TURN AROUND TIME: Regular

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPH-G/BTXE	TPH-D	REMARKS
MW8-(5)	9/29/92		✓		✓		1	See Sample ID#	✓	✓	2091166
MW8-(10)	"		✓		✓		1		✓	✓	1167
MW8-(13)	"		✓		✓		1		✓	✓	1168
MW9-(5.5)	9/28/92		✓		✓		1		✓	✓	1169
MW9-(10)	"		✓		✓		1		✓	✓	1170
MW9-(13)	"		✓		✓		1		✓	✓	1171
MW10-(5)	"		✓		✓		1		✓	✓	1172
MW10-(10.5)	"		✓		✓		1		✓	✓	1173
MW10-(13)	"		✓		✓		1		✓	✓	1174

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Wade Weston	9-30-92 2:10PM	
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/A
4. Were samples in appropriate containers and properly packaged? Y

SP (Signature) — F.J. (Title) — 9-30-92 (Date)

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel: 510 602.5100 Fax: 510 687.0902