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KEI-P88-1203.QR4
December 11, 1991

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

Attention: Mr. Rick Sisk

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

Dear Mr. Sisk:

This report presents the results of the most recent quarter of monitoring and sampling of the monitoring wells at the referenced site by Kaprealian Engineering, Inc. (KEI), per KEI's proposal KEI-P88-1203.P4 dated April 22, 1991. The wells are currently monitored monthly and sampled on a quarterly basis. This report covers the work performed by KEI during September through November, 1991.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a gasoline station. The vicinity of the site is characterized by gently sloping, southwest trending topography, and is located approximately 3,400 feet northeast of the present shoreline of San Leandro Bay and approximately 500 feet northwest of Lion Creek. A Location Map, Site Vicinity Map, and Site Plans are attached to this report.

Available historical data indicate that the subject site has been used as a service station from sometime prior to 1967. During 1967, the gasoline 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 Site Plan, Figure 5, for both the station as it existed prior to 1967, and the station as it currently 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. This work was previously 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 area beneath the waste oil tank was then excavated to ground water and 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. Sample point locations are as shown on the attached Site Plan, Figure 4.

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 results of the samples collected from the fuel tank pit showed TPH as gasoline levels ranging from non-detectable to 32 ppm, with benzene levels ranging from non-detectable to 1.2 ppm. The waste oil tank bottom and sidewall samples were analyzed for TPH as gasoline, BTX&E, TPH as diesel, total oil and grease (TOG), EPA 8010 constituents, and the metals cadmium, chromium, lead, and zinc. Analytical results of the waste oil pit soil samples indicated less than 50 ppm of TOG, non-detectable levels of BTX&E, TPH as diesel and EPA 8010 constituents, and less than 5.0 ppm of TPH as gasoline for all three samples. Metals concentrations were as indicated in Table 5.

KEI collected 11 pipe trench samples, labeled D1 through D6 and P1 through P5, at depths ranging from 3.5 to 6 feet below grade, on

November 29, December 5, and December 29, 1989. Upon review of the analytical results for sample P2, KEI returned to the site on January 9, 1990, to collect additional soil samples. Following the trench excavation to a depth of 12 feet below grade, one sample, labeled P2(12), was collected at a depth of 12 feet below grade, and two samples, labeled SWP2E and SWP2W, were collected at depths of 11 feet below grade from the easterly and westerly sidewalls of the trench adjacent to sample point location P2(12). KEI completed the pipe trench sampling on January 10, 1990, when two samples, labeled P6 and P7, were collected at depths of 3 and 4 feet below grade, respectively. Pipe trench sample point locations are as shown on the attached Site Plan, Figure 3.

Analytical results of soil samples collected from the pipe trench indicated TPH as gasoline levels ranging from non-detectable to 15 ppm, with non-detectable to 0.13 ppm benzene for all samples, except sample P2, which showed TPH as gasoline at 3,800 ppm and benzene at 6.1 ppm. Following the additional excavation in the area of sample point P2, analytical results of samples P2(12), SWP2E and SWP2W indicated non-detectable levels of TPH as gasoline and benzene for samples P2(12) and SWP2W, while sample SWP2E showed TPH as gasoline at 20 ppm with non-detectable levels of benzene. Analytical results of the soil samples are summarized in Table 5.

After the fuel tank pit soil sampling was completed, approximately 5,000 gallons of ground water were pumped from the fuel tank pit. On December 5, 1989, one water sample, labeled W1, was collected from the fuel tank pit. The water sample was analyzed for TPH as gasoline, BTX&E, and EPA 8010 constituents. Analytical results of the water sample collected from the fuel tank pit indicated 7,900 ppb of TPH as gasoline, 850 ppb of benzene, and non-detectable levels of EPA 8010 constituents. Analytical results of the water sample are summarized in Table 6. Documentation of the tank and piping removal procedures, sample collection techniques, and analytical results of the soil and water sampling activities are presented in KEI's report (KEI-J88-1203.R2) dated January 15, 1990.

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 Site Plan, 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 Site Plan, 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 Site Plan, Figure 1. The exploratory borings were backfilled to the surface with neat cement.

The three monitoring wells were drilled and completed to total depths ranging from 22 to 23 feet below grade. The exploratory borings were 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. However, benzene was 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. Results of the soil analyses are summarized in Table 4, and results of the water analyses are summarized in Table 2.

Based on the analytical results, KEI recommended the implementation of a monthly monitoring and quarterly sampling program. 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. Documentation of the well installation procedures, sample collection techniques, and 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 Site Plan, Figure 1) were installed at the site. The three wells were each drilled and completed to a total depth 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 from all wells and selected soil samples from 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 well MW2 and MW6, were 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. Results of the soil analyses are summarized in Table 3, and results of the water analyses are summarized in Table 2.

Based on these results, KEI recommended that a Hydropunch study be performed at the site and its vicinity to aid in determining the extent of ground water contamination in the vicinity of the site. Documentation of the well installation protocol, sampling tech-

niques, and 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 Site Vicinity Map. 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 7. Documentation of the sampling methods and 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 excavation of contaminated soil in the immediate vicinity of the previously drilled exploratory borings EB1 and EB2. 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 removal of the above mentioned concrete slabs. 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 over-excavated during the fuel tank replacement during 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 Site Plan, Figure 2.

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 ground water level. 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, on March 22, 1991. Sample point locations are as shown on the attached Site Plan, Figure 2.

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. 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 Site Plan, Figure 2.

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, on April 11, 1991. Sample point locations are as shown on the attached Site Plan, Figure 2.

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 Site Plan, Figure 2) indicated levels of TPH as gasoline ranging from non-detectable to 53 ppm, except for samples SW2(30), SW8, and SW10, which indicate 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 (product pipes).

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. Results of the soil analyses are summarized in Table 9. 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

The six wells (MW1 through MW6) were monitored three times and sampled once during the quarter. During monitoring, the wells were checked for depth to water and presence of free product. During sampling, the wells were also checked for the presence of sheen. No free product or sheen was noted in any of the wells during the quarter. Monitoring data are summarized in Table 1.

Water samples were collected from the wells on November 5, 1991. Prior to sampling, the wells were each purged of between 8 and 10 gallons by the use of using a surface pump. Samples were then collected by using a clean Teflon bailer. Samples were decanted into clean VOA vials and/or one liter amber bottles, as appropriate, which were then sealed with Teflon-lined screw caps, and stored in a cooler, on ice, until delivery to the state certified laboratory.

HYDROLOGY AND GEOLOGY

Based on the water level data gathered on November 5, 1991, the ground water flow direction appeared to be generally toward the north at an average gradient of about 0.003 to 0.004, relatively unchanged from the previous quarter. Also, a ground water flow direction toward the northwest is indicated at the northwestern perimeter of the site. Water levels have fluctuated during the quarter, showing a net decrease in all wells of 0.54 to 0.72 feet, since August 5, 1991. The measured depth to ground water at the site on November 5, 1991, ranged between 9.87 and 12.40 feet below grade.

In response to a letter dated August 1, 1990, from the Alameda County Health Care Services Agency, KEI evaluated the effects of 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 feet 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.

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 described as fine-grained alluvium (Qhaf), typically consisting 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 materials, which appears to inturn be underlain by light brown sandy silt containing a trace of fine gravel and light brown very fine-grained sand.

The results of our subsurface study from the borings for MW1, MW2, and MW3 indicated the site is underlain by artificial fill materials to depths of about 7 to 8 feet below grade. Locally, the fill materials extend to depths of at least 8.5 and 10.5 feet below grade in the vicinity of borings EB1 and EB2 (the maximum depth explored). The fill materials are generally underlain by a 1.5 to 2 foot thick bed of silt, which is inturn underlain by a persistent coarse-grained sequence of clayey to sandy gravel interbedded with clayey to silty sand to the maximum depth explored (23 feet below grade).

The results of our most recent subsurface study from the borings for MW4, MW5, and MW6 indicated that the site is underlain by artificial fill materials to depths below grade of about 2.5 to 4.4 feet. The fill materials are inturn underlain by silty clay materials to depths below grade of about 8 to 12.7 feet. This silty clay zone is inturn underlain by a coarse-grained zone composed of clayey gravel and/or clayey sand materials extending to depths below grade of about 12.1 to 14.3 feet. This coarse-grained zone is inturn underlain by a clayey silt bed varying from about 1 to 3 feet in thickness and extending to depths below grade of about 14.2 to 14.8 feet in wells MW4 and MW5, and about 17.3 feet below grade in MW6. The ground water table encountered during drilling activities was detected within or immediately below the silt bed. This relatively thin clayey silt bed is underlain by a generally thick sequence of silty to clayey sand and gravel lenses extending to the maximum depth explored (26 feet below grade), except in the boring for well MW5, where a second clayey silt bed was encountered at depths below grade of about 15.6 to 19.5 feet and where a clay bed was encountered at approximately 24 feet below grade, extending to the total depth drilled (26 feet below grade).

ANALYTICAL RESULTS

Ground water samples were analyzed at Sequoia Analytical Laboratory in Concord, California, and were accompanied by properly executed Chain of Custody documentation. The samples were analyzed for TPH as gasoline using EPA method 5030 in conjunction with modified 8015, BTX&E using EPA method 8020, and TPH as diesel using EPA method 3510 in conjunction with modified 8015. The water samples collected from monitoring wells MW2 and MW6 were also analyzed for TOG using Standard Method 5520B&F.

Analytical results of the ground water samples collected from monitoring wells MW3 and MW5 indicated non-detectable levels of TPH as gasoline, TPH as diesel, and BTX&E, except for 31 ppb of TPH as gasoline and 0.65 ppb of xylenes detected in MW3. Analytical results of the ground water samples collected from monitoring wells MW1, MW2, MW4, and MW6 indicated levels of TPH as gasoline at concentrations of 4,900 ppb, 110,000 ppb, 140,000 ppb, and 7,100 ppb, respectively, with levels of benzene at concentrations of 80 ppb, 4,200 ppb, 320 ppb, and 200 ppb, respectively. In monitoring wells MW1, MW2, MW4, and MW6, TPH as diesel was detected at concentrations of 260 ppb, 3,900 ppb, 7,700 ppb, and 300 ppb, respectively. TOG was non-detectable in the ground water sample collected from well MW6 and was detected at a level of 78 ppm in well MW2. Concentrations of TPH as gasoline, benzene, and TPH as diesel detected in ground water samples collected on November 5, 1991, are shown on the attached Site Plan, Figure 1a. Results of the water analyses are summarized in Table 2. Copies of the analytical results and Chain of Custody documentation are attached to this report.

DISCUSSION AND RECOMMENDATIONS

Based on the analytical results collected and evaluated to date and no evidence of free product or sheen in any of the wells, KEI recommends the continuation of the current monitoring and sampling program of the existing wells per KEI's proposal (KEI-P88-1203.P4) dated April 22, 1991. Based on the levels of TPH as diesel detected in monitoring wells MW1, MW2, MW4, and MW6, KEI also recommends that samples collected from all monitoring wells during the next quarter continue to be analyzed for TPH as diesel by EPA method 3510 in conjunction with modified 8015.

As reported last quarter, the analytical results of previous ground water sampling studies conducted at the site indicated that the extent of the ground water contamination lies between the boundaries of the subject service station site and the contamination limits defined by probes P3 through P7 in the recent Hydropunch study, as shown on the attached Site Vicinity Map. Based on the

analytical results of ground water samples collected from monitoring wells MW1 through MW6 on February 21, 1991, KEI recommended the installation of three off-site monitoring wells to verify the non-detectable levels of hydrocarbon contamination that were found downgradient of the site in the Hydropunch study, and one on-site monitoring well in the vicinity of probe P1 to verify the low level of ground water contamination previously detected in this probe (KEI's work plan/proposal KEI-P88-1203.P4 dated April 22, 1991). The proposed well locations are shown on the attached Site Vicinity Map.

KEI has obtained the necessary well installation permits, however the required encroachment permits have not been obtained as of the date of this report. The wells will be installed as soon as all permits have been obtained. Once the extent of ground water contamination is verified (by the installation of the previously proposed monitoring wells), KEI will begin the design process for a ground water remediation system for the 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

Environmental changes, either naturally-occurring or artificially-induced, may cause changes in ground water levels and flow paths, thereby changing the extent and concentration of any contaminants.

Our studies assume that the field and laboratory data are reasonably representative of the site as a whole, and assume that subsurface conditions are reasonably conducive to interpolation and extrapolation.

The results of this study are based on the data obtained from the field and laboratory analyses obtained from a state certified laboratory. We have analyzed this data using what we believe to be currently applicable engineering techniques and principles in the Northern California region. We make no warranty, either expressed or implied, regarding the above, including laboratory analyses, except that our services have been performed in accordance with generally accepted professional principles and practices existing for such work.

Should you have any questions regarding this report, please do not hesitate to call me at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.

Thomas J. Berkins
Senior Environmental Engineer

Joel G. Greger
Certified Engineering Geologist

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

Mardo Kaprealian
President

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Attachments: Tables 1 through 9
Location Map
Site Vicinity Map
Site Plans - Figures 1, 1a, 2, 3, 4 & 5
Laboratory Analyses
Chain of Custody documentation

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December 11, 1991

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 5, 1991)					
MW1	-6.98	12.16	0	No	8
MW2	-6.82	10.65	0	Yes	9
MW3	-6.57	9.87	0	No	9
MW4	-7.13	12.40	0	No	9
MW5	-7.02	11.63	0	No	10
MW6	-6.91	11.22	0	No	10
(Monitored and Sampled on October 3, 1991)					
MW1	-6.89	12.07	0	--	0
MW2	-6.82	10.65	0	--	0
MW3	-6.43	9.73	0	--	0
MW4	-7.01	12.28	0	--	0
MW5	-6.97	11.58	0	--	0
MW6	-6.95	11.26	0	--	0
(Monitored and Sampled on September 5, 1991)					
MW1	-6.51	11.69	0	--	0
MW2	-6.43	10.26	0	--	0
MW3	-6.03	9.33	0	--	0
MW4	-6.61	11.88	0	--	0
MW5	-6.57	11.18	0	--	0
MW6	-6.58	10.89	0	--	0

Well #	Surface Elevation* (feet)
MW1	5.18
MW2	3.83
MW3	3.30
MW4	5.27
MW5	4.61
MW6	4.31

* Elevation of top of well covers surveyed to Mean Sea Level (MSL).
-- Sheen determination not performed.

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TABLE 2

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**	--	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"**	--	4,000	800	120	440	250	--

KEI-P88-1203.QR4
December 11, 1991

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	--
(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	--
Detection Limits	50	30	0.30	0.30	0.3	0.3	5.0

ND = Non-detectable.

-- Indicates analysis not performed.

* "MW7" is a duplicate sample from MW1.

** "MW7" and MWD are duplicate samples from MW6.

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

KEI-P88-1203.QR4
December 11, 1991

TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on August 14, 1990)

Sample Number	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	TOG
MW4(14.5)	14.5	--	ND	ND	ND	ND	ND	--
MW5(13)	13.0	--	ND	ND	0.010	ND	ND	--
MW6(5)	5.0	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)	12.5	93	160	3.4	12	3.6	20	200
MW6(15.5)	15.5	ND	2.5	0.43	0.41	0.12	0.50	ND
Detection Limits		1.0	1.0	0.0050	0.0050	0.0050	0.0050	30

-- Indicates analysis not performed.

ND = Non-detectable.

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

KEI-P88-1203.QR4
December 11, 1991

TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on April 26 & 27, 1990)

Sample Number	Depth (feet)	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
MW1(5)	5	ND	0.012	0.16	ND	ND
MW1(10)	10	ND	0.0094	0.024	ND	ND
MW1(14)	14	ND	0.0075	0.031	ND	ND
MW2(5)	5	2.4	0.075	0.0071	ND	ND
MW2(10)	10	2.2	ND	0.017	0.018	0.0088
MW2(12)	12	6.8	ND	0.028	0.015	0.10
MW3(5)	5	ND	0.0094	0.048	ND	ND
MW3(10)	10	ND	0.0088	0.015	ND	ND
EB2(7)	7	2,400	5.0	16	230	62
EB2(9)*	9	12,000	84	12	860	360
Detection Limits		1.0	0.0050	0.0050	0.0050	0.0050

ND = Non-detectable.

* TPH as diesel was 1,400 ppm, and TOG was 7,000 ppm.

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

KEI-P88-1203.QR4
December 11, 1991

TABLE 5

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

KEI-P88-1203.QR4
December 11, 1991

TABLE 5 (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
Detection Limits		1.0	1.0	0.05	0.1	0.1	0.1

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

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

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

-- Indicates analysis not performed.

ND = Non-detectable.

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

KEI-P88-1203.QR4
December 11, 1991

TABLE 6

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
Detection Limits	30.0	0.3	0.3	0.3	0.3

NOTE: All EPA method 8010 constituents were non-detectable.

ND = Non-detectable.

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

KEI-P88-1203.QR4
December 11, 1991

TABLE 7

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
Detection Limits		1,000	50.0	0.5	0.5	0.5	0.5

ND = Non-detectable.

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

KEI-P88-1203.QR4
December 11, 1991

TABLE 8

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 8 (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.QR4
December 11, 1991

TABLE 9

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
Detection Limits			1.0	0.0050	0.0050	0.0050	0.0050	30

-- Indicates analysis not performed.

ND = Non-detectable.

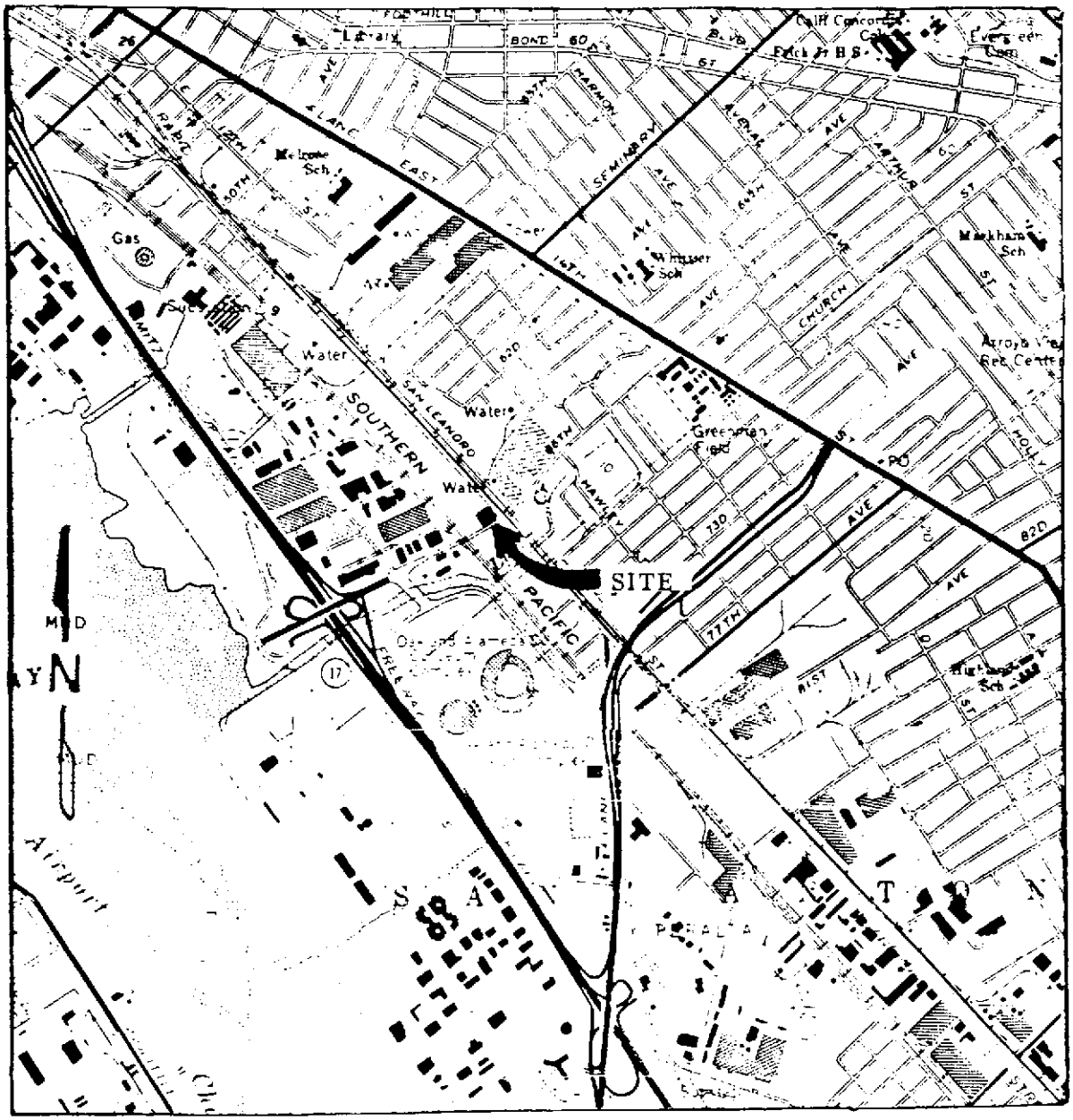
Results in parts per million (ppm), unless otherwise indicated.

KAPREALIAN ENGINEERING, INC.

Consulting Engineers

P.O. BOX 996 • BENICIA, CA 94510

(707) 746-6915 • (707) 746-6916 • FAX: (707) 746-5581



LOCATION MAP

Unocal S/S #3135
845-66th Avenue
Oakland, CA

KAPREALIAN ENGINEERING, INC.
Consulting Engineers
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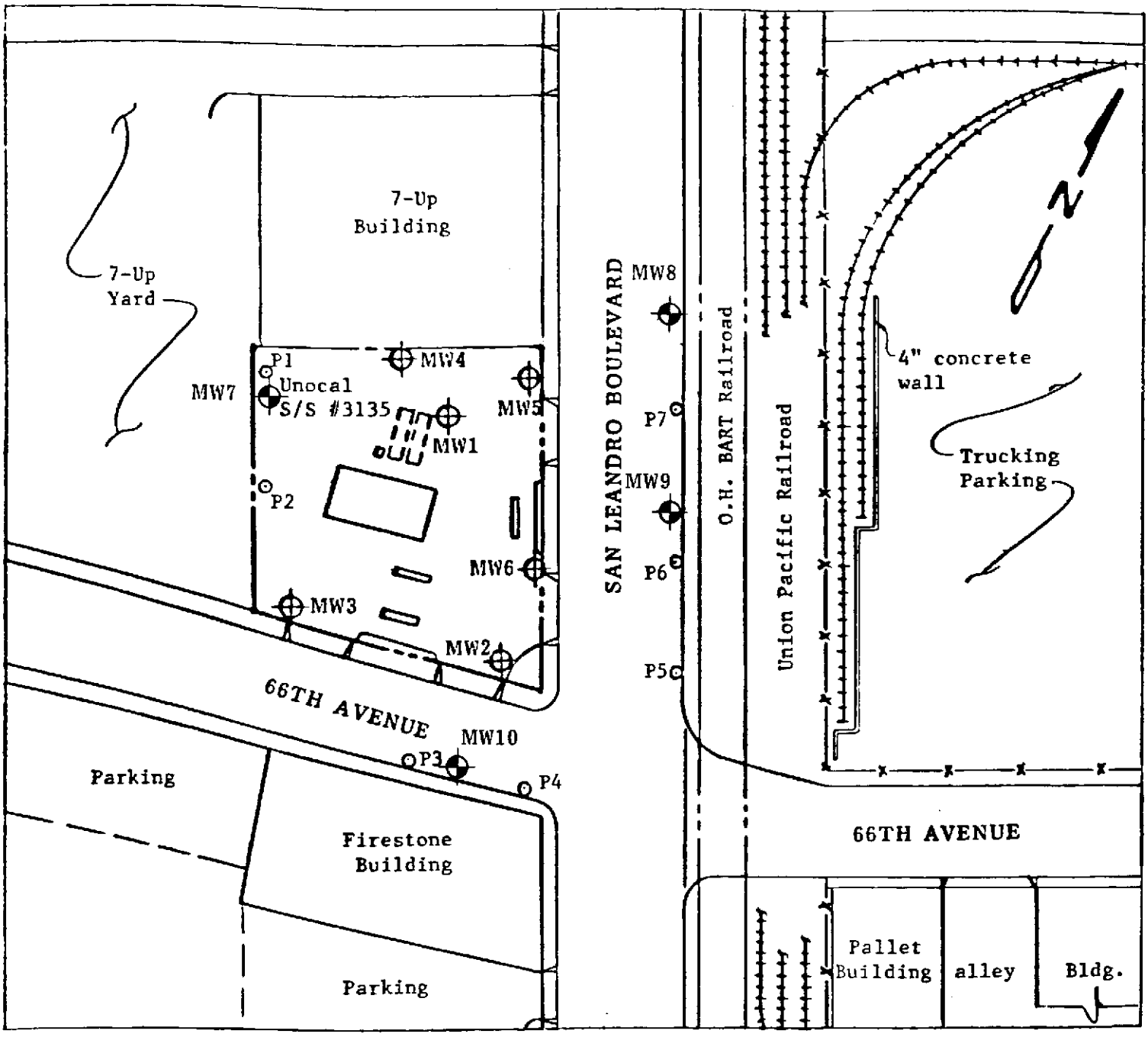

SITE VICINITY MAP

0 80 160
Approx. scale feet

LEGEND

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

Unocal S/S #3135
845 - 66th Avenue
Oakland, CA

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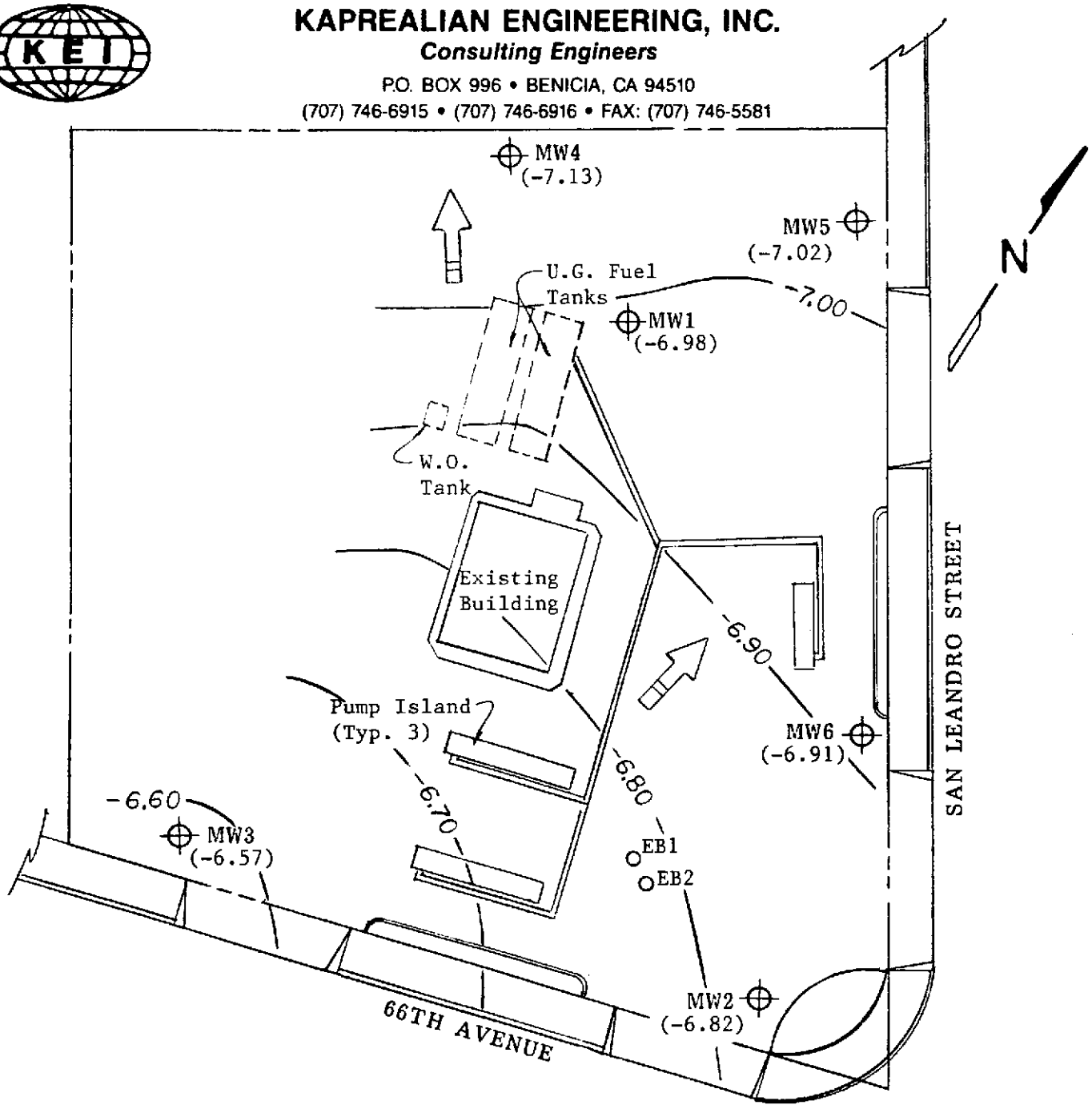

SITE PLAN
Figure 1

LEGEND

- Monitoring well
- Exploratory boring
- Direction of ground water flow
- ( ) Elevation of ground water table in feet above Mean Sea Level on 11/5/91
- Contours of ground water table elevation

0 30 60
Approx. scale feet

Unocal S/S #3135
845 - 66th Avenue
Oakland, CA

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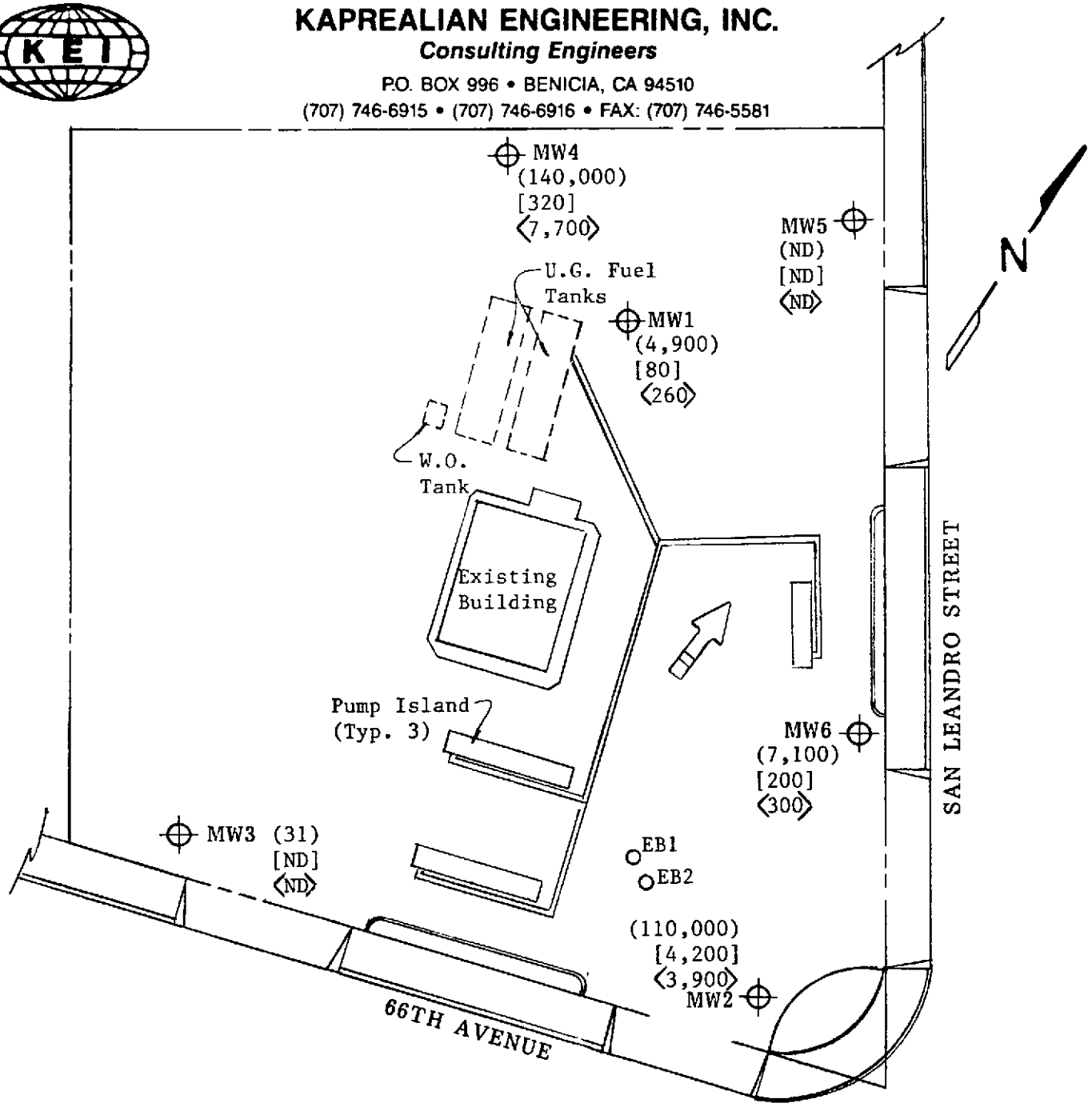

SITE PLAN
Figure 1a

LEGEND

- ⊕ Monitoring well
- ○ Exploratory boring
- ⇨ Direction of ground water flow
- ( ) Concentration of TPH as gasoline in ppb
- [ ] Concentration of benzene in ppb
- ⟨ ⟩ Concentration of TPH as diesel in ppb

ND = Non-detectable NA = Not analyzed

0 30 60
Approx. scale feet

Unocal S/S #3135
845 - 66th Avenue
Oakland, CA

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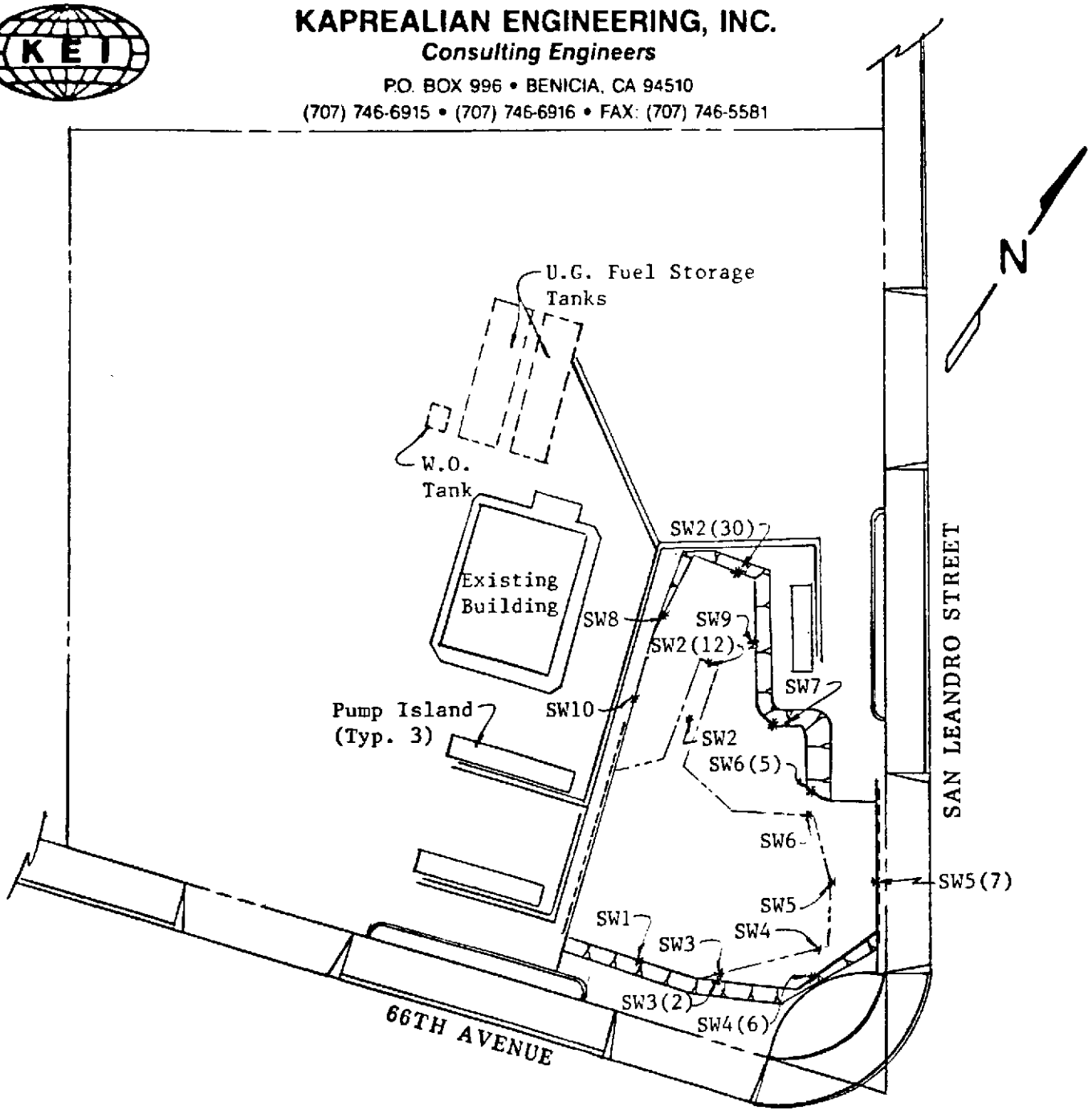

SITE PLAN
Figure 2

LEGEND

Shoring

Intermediate Excavation Boundary

* Sample Point Location

0 30 60
Approx. scale feet

Unocal S/S #3135
845 - 66th Avenue
Oakland, CA

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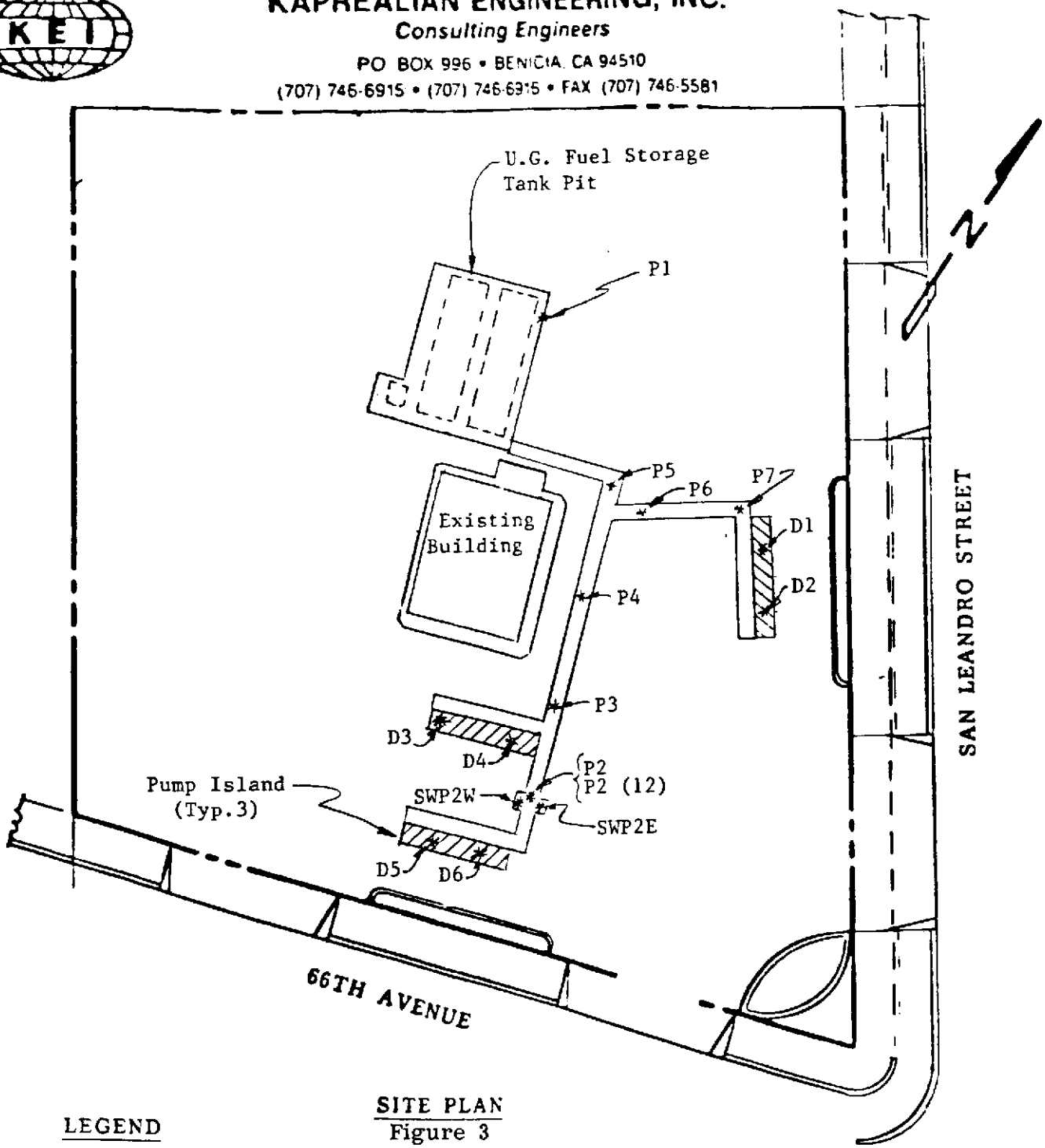

SITE PLAN
Figure 3

LEGEND

* Sample Point Location

Unocal S/S #3135
845 66th Avenue
Oakland, CA

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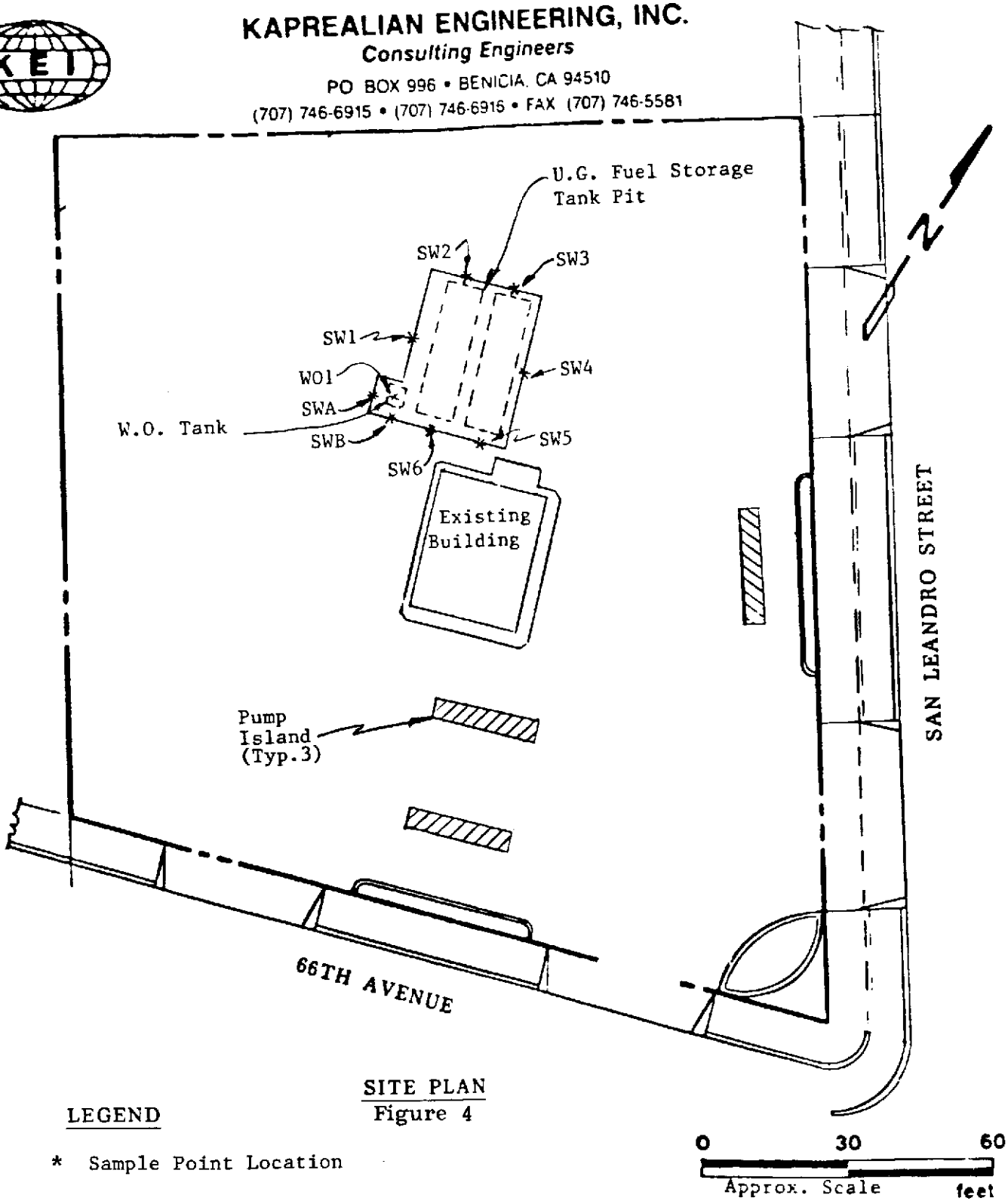

SITE PLAN
Figure 4

LEGEND

* Sample Point Location

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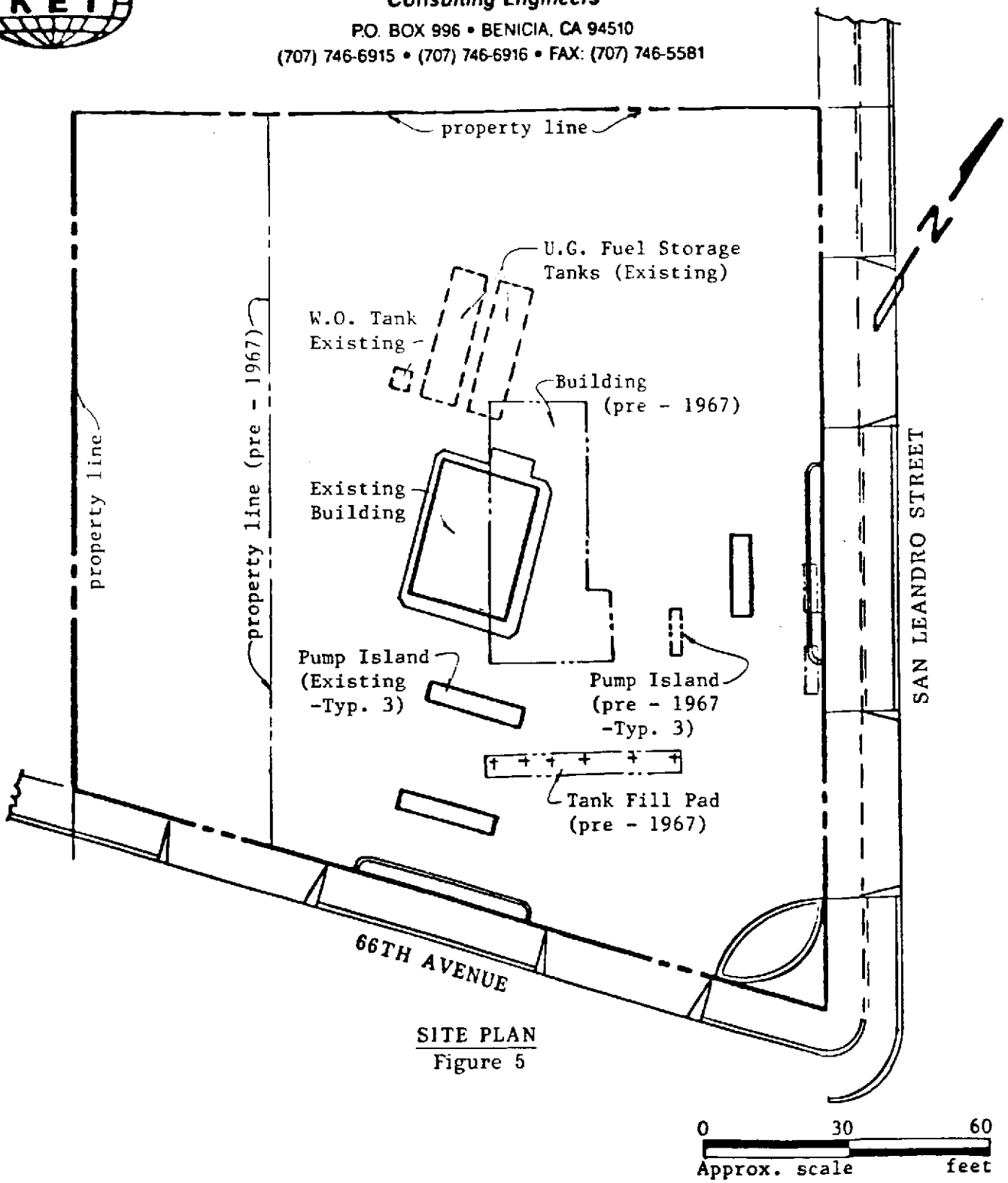

SITE PLAN
Figure 5

Unocal S/S #3135
845 - 66th Avenue
Oakland, CA

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal/845 66th Ave., Oakland	Sampled:	Nov 5, 1991
P.O. Box 996	Matrix Descript:	Water	Received:	Nov 5, 1991
Benicia, CA 94510	Analysis Method:	EPA 5030/8015/8020	Analyzed:	11/12-11/13/91
Attention: Mardo Kaprealian, P.E.	First Sample #:	111-0275	Reported:	Nov 22, 1991

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
111-0275	MW-1	4,900	80	N.D.	150	160
111-0276	MW-2	110,000	4,200	200	3,400	8,600
111-0277	MW-3	31	N.D.	N.D.	N.D.	0.65
111-0278	MW-4	140,000	320	N.D.	4,800	13,000
111-0279	MW-5	N.D.	N.D.	N.D.	N.D.	N.D.
111-0280	MW-6	7,100	200	N.D.	190	580
Method Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal/845 66th Ave., Oakland	Sampled:	Nov 5, 1991
P.O. Box 996	Matrix Descript:	Water	Received:	Nov 5, 1991
Benicia, CA 94510	Analysis Method:	EPA 3510/8015	Extracted:	Nov 11, 1991
Attention: Mardo Kaprealian, P.E.	First Sample #:	111-0275	Analyzed:	Nov 12, 1991
			Reported:	Nov 22, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons µg/L (ppb)
111-0275	MW-1	260
111-0276	MW-2	3,900
111-0277	MW-3	N.D.
111-0278	MW-4	7,700
111-0279	MW-5	N.D.
111-0280	MW-6	300

Method Detection Limits:	**50**

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

SEQUOIA ANALYTICAL

for Belinda C. Vega
Laboratory Director

1110275.KEI <2>

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal/845 66th Ave., Oakland	Sampled:	Nov 5, 1991
P.O. Box 996	Matrix Descript:	Water	Received:	Nov 5, 1991
Benicia, CA 94510	Analysis Method:	SM 5520 B&F (Gravimetric)	Extracted:	Nov 12, 1991
Attention: Mardo Kaprealian, P.E.	First Sample #:	111-0276	Analyzed:	Nov 12, 1991
			Reported:	Nov 22, 1991

TOTAL RECOVERABLE PETROLEUM OIL

Sample Number	Sample Description	Oil & Grease mg/L (ppm)
111-0276	MW-2	78
111-0277	MW-6	N.D.

Detection Limits:	5.0

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

1110275.KEI <3>

SEQUOIA ANALYTICAL

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

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

Client Project ID: Unocal/845 66th Ave., Oakland
QC Sample Group: 1110275-280
Reported: Nov 22, 1991

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020
Analyst:	C. Chapman	C. Chapman	C. Chapman	C. Chapman	C. Chapman	C. Chapman
Reporting Units:	ppb	ppb	ppb	ppb	ppb	ppb
Date Analyzed:	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991
Sample #:	111-0275	111-0276	111-0277	111-0278	111-0279	111-0280
Surrogate % Recovery:	102	108	109	96	104	94

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

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

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

Client Project ID: Unocal/845 66th Ave., Oakland
QC Sample Group: 1110275-0280
Reported: Nov 22, 1991

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015	EPA 8015
Analyst:	M. Gaines	M. Gaines	M. Gaines	M. Gaines	M. Gaines	M. Gaines
Reporting Units:	ppb	ppb	ppb	ppb	ppb	ppb
Date Analyzed:	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991
Sample #:	111-0275	111-0276	111-0277	111-0278	111-0279	111-0280
Surrogate % Recovery:	83	80	86	79	70	86

SEQUOIA ANALYTICAL

for Belinda C. Vega
Laboratory Director

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

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Reported: Nov 22, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel	Oil and Grease
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015	SM5520
Analyst:	R.H./J.F.	R.H./J.F.	R.H./J.F.	R.H./J.F.	A. Tuzon	D. Newcomb
Reporting Units:	ppb	ppb	ppb	ppb	ppb	ppm
Date Analyzed:	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991	Nov 12, 1991	Nov 2, 1991	Nov 12, 1991
QC Sample #:	1110013H	1110013H	1110013H	1110013H	Blk111191	Blk111291
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	100	100	100	200	600	130
Conc. Matrix Spike:	100	110	110	220	520	148
Matrix Spike % Recovery:	100	110	110	110	87	80
Conc. Matrix Spike Dup.:	100	100	100	220	450	176
Matrix Spike Duplicate % Recovery:	100	100	100	110	75	100
Relative % Difference:	0.0	9.5	9.5	0.0	15	22

Laboratory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

for Belinda C. Vega
Laboratory Director

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

CONCORD

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: JOE

WITNESSING AGENCY:

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

ANALYSES REQUESTED: TPH G, B T X E; TPH D; TOG (5520 B&F)

TURN AROUND TIME: Regular

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPH G,B T X E	TPH D	TOG (5520 B&F)		REMARKS
MW-1	11/5/91			✓	✓		3	MW	✓	✓		1110275 AC	VOAs preserved
MW-2	"	8:44		✓	✓		4	"	✓	✓	✓	276 AD	
MW-3	"	9:05		✓	✓		3	"	✓	✓		277 AC	
MW-4	"			✓	✓		3	"	✓	✓		278	
MW-5	"	12:50		✓	✓		3	"	✓	✓		279	
MW-6	"			✓	✓		4	"	✓	✓	✓	280 AD	

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Joe Leimon	11/5/91	K. Walker 5:00pm 11/5/91
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
[illegible]	11-6-91 1:30pm	Lin Van Lambrock
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? ✓
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? ✓

KW (Signature) — login (Title) — 11/5/91 (Date)