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KEI-P88-1203.P4
April 22, 1991

Unocal Corporation
2000 Crow Canyon Place, Suite 400
San Ramon, CA 94583

Attention: Mr. Rick Sisk

RE: Work Plan/Proposal
Unocal Service Station #3135
845 - 66th Avenue
Oakland, California

INTRODUCTION

1. 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 work plan/proposal.

Kaprealian Engineering, Inc.'s (KEI) 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. 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 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 fuel storage tanks, and one 280 gallon waste oil tank were removed from the site. The gasoline tanks and the waste oil tank were made of steel and no apparent holes or cracks were observed in any of the tanks.

Water was initially encountered in the fuel tank pit at a depth of approximately 10.5 feet, 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 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. 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 approximately 12-inches above the water table. Sample point locations are as shown on the attached Site Plan, Figure 2.

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 method 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 method 8010 constituents, and less than 5.0 ppm of TPH as gasoline for all three samples. Metals concentrations were as indicated in Table 6.

KEI collected 11 pipe trench samples, labeled D1 through D6 and P1 through P5, at depths ranging from 3.5 to 6 feet on November 29, and December 5 and 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, one sample, labeled P2(12), was collected at a depth of 12 feet, and two samples, labeled SWP2E and SWP2W, were collected at a depth of 11 feet 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, 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 6.

After fuel tank pit soil sampling was completed, approximately 5,000 gallons of ground water was 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 method 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 method 8010 constituents. Analytical results of the water sample are summarized in Table 7. The details 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, 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 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 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. The exploratory borings were drilled and/or sampled to depths of 8.5 and 10.5 feet. 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 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 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 MW3 showed non-detectable levels of all constituents analyzed. Results of the soil analyses are summarized in Table 5, and the water analyses in Table 3.

Based on the analytical results, KEI recommended 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 additional soil excavation be conducted in the vicinity of borings EB1 and EB2 because of the level of the soil contamination detected. Details of the subsurface exploration and monitoring well installation activities are summarized 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 except for well MW4, which was completed at a depth of 25 feet. 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 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 MW2 and MW6 at levels of 3,100 ppb and 1,000 ppb, respectively. Results of the soil analyses are summarized in Table 4, and the water analyses in Table 3. 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. Also, KEI proposed that the possible influence of tidal action on the ground water table gradient be evaluated. For further details, refer to KEI's report (KEI-P88-1203.R8) dated September 24, 1990.

On January 19 and 20, 1991, CEC of Sunnyvale, California, conducted a ground water sampling study under the direction of KEI. 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.

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 show 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 indicates a level of TPH as gasoline at 92 ppb, a level of benzene at 0.8 ppb, and TPH as diesel was non-detectable. Analytical results of the ground water samples are summarized in Table 1.

2. Hydrology and Regional Geology:

Based on the water level data gathered during the second quarter of monitoring, ground water flow direction appeared to be generally toward the north-northeast on February 21, 1991. The measured depth to ground water at the site on February 21, 1991 ranged between 8.47 and 11.76 feet. The monitoring data collected during the second quarter is presented in Table 2.

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 which might be related to tidal effects. All six monitoring wells were monitored 13 times for depth to water. All monitoring data is presented as Table 2a. 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 and 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 adobe topsoil 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. Locally, the fill materials extend to depths of at least 8.5 and 10.5 feet in the vicinity of borings EB1 and EB2 (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).

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 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), 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 extending to the total depth drilled (26 feet).

PROPOSED FIELD WORK

PHASE II - DEFINING THE EXTENT OF SUBSURFACE CONTAMINATION

1. KEI proposes to install four two-inch diameter monitoring wells, designated as MW7, MW8, MW9 and MW10 on the attached Site Vicinity Map, using hollow stem auger equipment. Permits will be obtained from the Alameda County Flood Control District and the City of Oakland as necessary prior to beginning work.

   The wells will be drilled about 10 feet into the saturated zone of the first encountered ground water unless a 5 foot thick clay aquitard is encountered first, at which time drilling will be terminated. Based on our present knowledge

of the site, the proposed wells are anticipated to be drilled to depths of about 22 to 26 feet.

2. Soil samples will be collected at a maximum spacing of 5 foot intervals, significant changes in lithology, at obvious areas of contamination, and at/or within the soil/ground water interface beginning at a depth of about 4 to 5 feet below grade. Sampling for laboratory analyses and lithologic logging purposes will continue until the first water table is encountered. Sampling for lithologic logging purposes only will continue below the water table to the total depth drilled. Classification of soil will be done using the Unified Soils Classification System (USCS) by KEI's field engineer or geologist. Samples will be collected in a California modified split-spoon sampler with two-inch diameter brass liners. The sampler will be advanced ahead of the drilling augers at designated depths by dropping a 140 pound hammer 30 inches. Blow counts will be recorded. Samples will be removed from the sampler and retained in brass liners. The liners will be sealed with aluminum foil, plastic caps and tape. They will be labeled and stored on ice for delivery to a state certified laboratory.

3. Finalized Boring Logs will be prepared from field logs and submitted to the Alameda County Health Care Services and to the RWQCB, San Francisco Bay Region.

4. Ground water is anticipated to be initially encountered at approximately 13 to 16 feet below grade based on our previous drilling experience at the site and to stabilize at depths of about 8 to 12 feet below grade based on the ground water level found in the existing monitoring wells.

5. Well Construction:

   Casing Type: Schedule 40 PVC, flush threaded joints, 0.010 inch factory slot, two-inch diameter. Screen to run from total depth of the well to approximately 5 feet above the depth of the first encountered ground water. Monterey sand (#2/16) will fill the annular space from total depth to 2 feet above the perforated casing interval. A two foot thick bentonite seal will be placed in the annular space on top of the sand pack. Neat cement grout will be placed on top of the bentonite seal to the surface.

   Well casings will be secured with a waterproof cap and a padlock. A round, watertight, flush-mounted well cover will be concreted in place over the top of each casing.

6. Water levels will be measured with an electronic sounder. The wells will be developed using a surface pump approximately one week after well completion. Wells will be pumped until expelled water is clear and free of turbidity. Effluent generated during well development will be contained in DOT-approved drums and hauled from the site by a licensed hazardous materials hauler.

   Casing elevations will be surveyed by a licensed land surveyor to Mean Sea Level and to a vertical accuracy of 0.01 feet.

7. Ground Water Sampling:

   The wells will be purged with a surface bailer a minimum of four casing volumes prior to sampling and at least 72 hours after development. After recovery, samples will be collected using a clean Teflon bailer and promptly decanted into 40 ml VOA vials and/or one liter amber bottles, as appropriate. Vials and/or bottles will be sealed with Teflon-lined screw caps, labeled and stored on ice for delivery to a state certified laboratory. The sampling bailer will be cleaned with soap and a clean water rinse between uses.

   Wells will be checked for free product and sheen (using an interface probe and/or paste tape) prior to development and sampling.

   Properly executed Chain of Custody documentation will accompany all samples.

8. Laboratory Analyses:

   Water and selected soil samples will be analyzed by Sequoia Analytical Laboratory in either Concord or Redwood City, California, both state certified laboratories, for TPH as gasoline using EPA method 5030 in conjunction with modified 8015, TPH as diesel using EPA methods 3550 (soil) and 3510 (water) and BTX&E using EPA method 8020, as recommended by the RWQCB, and as specified in the Tri-regional guidelines.

   Analytical results will be presented in tabular form, showing sample depths, results and detection limits.

   The analytical results will be used to delineate the vertical and lateral extent of the contaminants in soil and ground water.

9. Hydrology:

Ground water flow direction will be determined from the survey data and water table depths from both the new and existing wells. The flow direction will be shown on the Site Plan.

10. Ongoing Pumping, Monitoring and Sampling:

10.1 Monitor all monitoring wells on-site on a monthly basis. Record the elevation of the water table and any abnormal conditions noted during inspection, including presence of product and sheen.

10.2 Purge and sample ground water from all monitoring wells, and analyze for TPH as gasoline, TPH as diesel, and BTX&E on a quarterly basis. In addition, ground water from MW2 and MW6 will be analyzed for TOG. Prior to sampling, water table elevation will be recorded as well as the presence of any free product.

10.3 Preparation and submission of quarterly technical reports summarizing the field activity water sampling and analyses with discussion and recommendations.

11. Conclusions:

Conclusions and results of Phase II will be described in a technical report.

The technical report will be submitted to the Alameda County Health Care Services, and to the RWQCB.

PHASE III

Once the zero line is established through the completion of Phase II, a final remedial plan will be developed.

Interpretations of the subsurface stratigraphy will be used in consideration of various remedial options such as soil venting and/or air stripping.

PHASE IV

Implementation of the remediation plan.

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 work plan/proposal, please do not hesitate to call me at (707) 746-6915.

Approved by:

Don R. Braun
Certified Engineering Geologist

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

Timothy R. Ross
Project Manager

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Attachments: Tables 1 through 7
Location Map
Site Plans - Figures 1, 2 & 3
Typical Well Completion Diagram
Site Vicinity Map

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TABLE 1

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	92.0	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	0.5	0.5	0.5	0.5

ND = Non-detectable.

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

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TABLE 2

SUMMARY OF MONITORING DATA

Date	Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness	Sheen	Water Bailed (gallons)
2/21/91	MW1	-6.40	11.58	0	None	55
	MW2	-6.23	10.06	0	None	55
	MW3	-5.17	8.47	0	None	15
	MW4	-6.49	11.76	0	None	55
	MW5	-6.35	10.96	0	None	15
	MW6	-6.24	10.55	0	None	55
1/21/91	MW1	-7.33	12.51	0	None	0
	MW2	-7.26	11.09	0	None	55
	MW3	-6.09	9.39	0	None	0
	MW4	-7.38	12.65	0	None	55
	MW5	-7.33	11.94	0	None	0
	MW6	-7.32	11.63	0	None	55
12/21/90	MW1	-7.48	12.66	0	None	55
	MW2	-7.27	11.10	0	None	55
	MW3	-6.59	9.89	0	None	0
	MW4	-7.59	12.86	0	None	55
	MW5	-7.43	12.04	0	None	0
	MW6	-7.29	11.60	0	None	55

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.

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TABLE 2a

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

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TABLE 2a (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

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TABLE 3

SUMMARY OF LABORATORY ANALYSES
WATER

Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene	TOG
			(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	--
			(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

KEI-P88-1203.P4
April 22, 1991

TABLE 3 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

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.P4
April 22, 1991

TABLE 4

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	--	ND	ND	0.010	ND	ND	--
MW6(5)	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)	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.P4
April 22, 1991

TABLE 5

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.P4
April 22, 1991

TABLE 6

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 6 (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.P4
April 22, 1991

TABLE 7

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.

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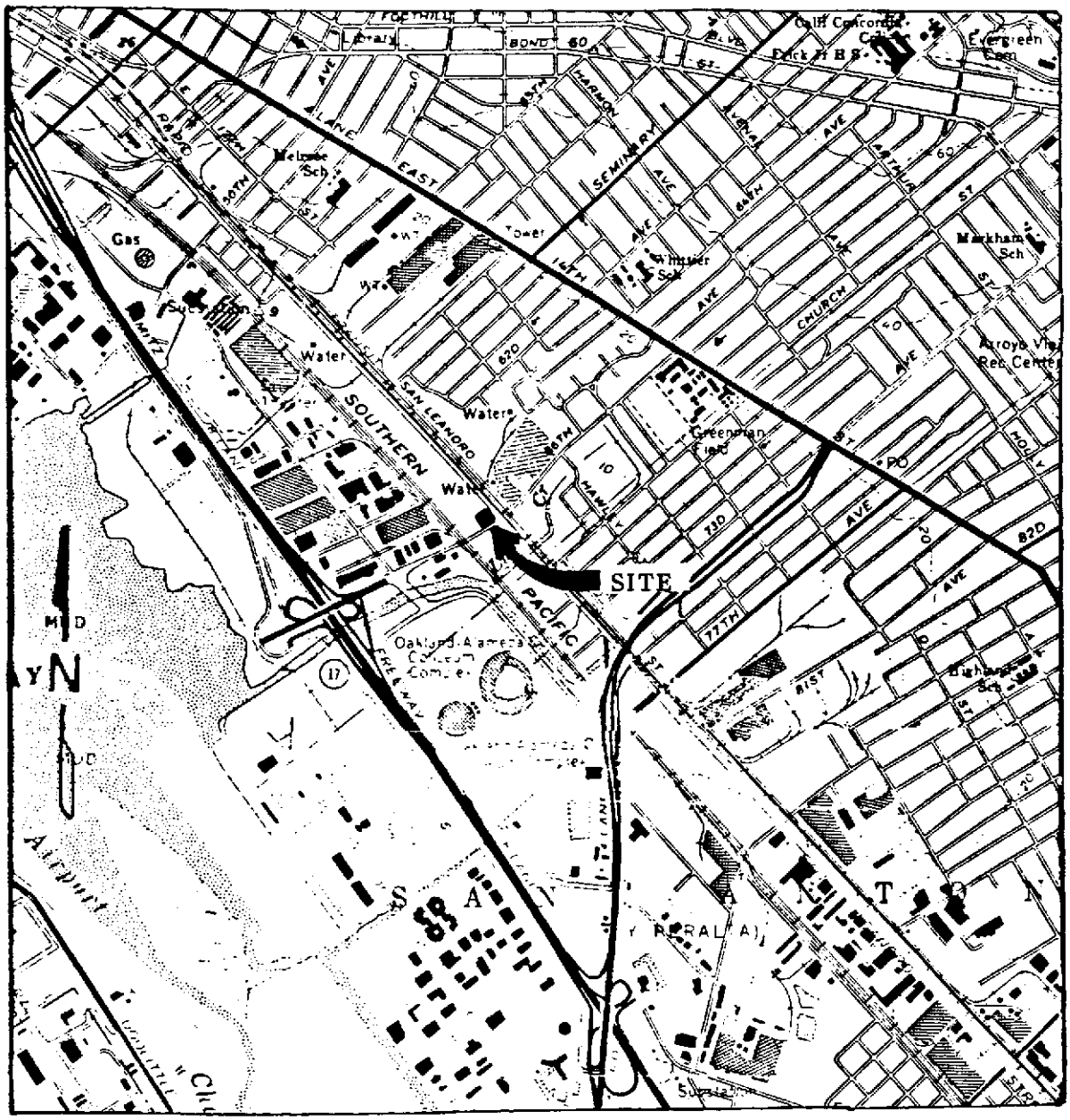

LOCATION MAP

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

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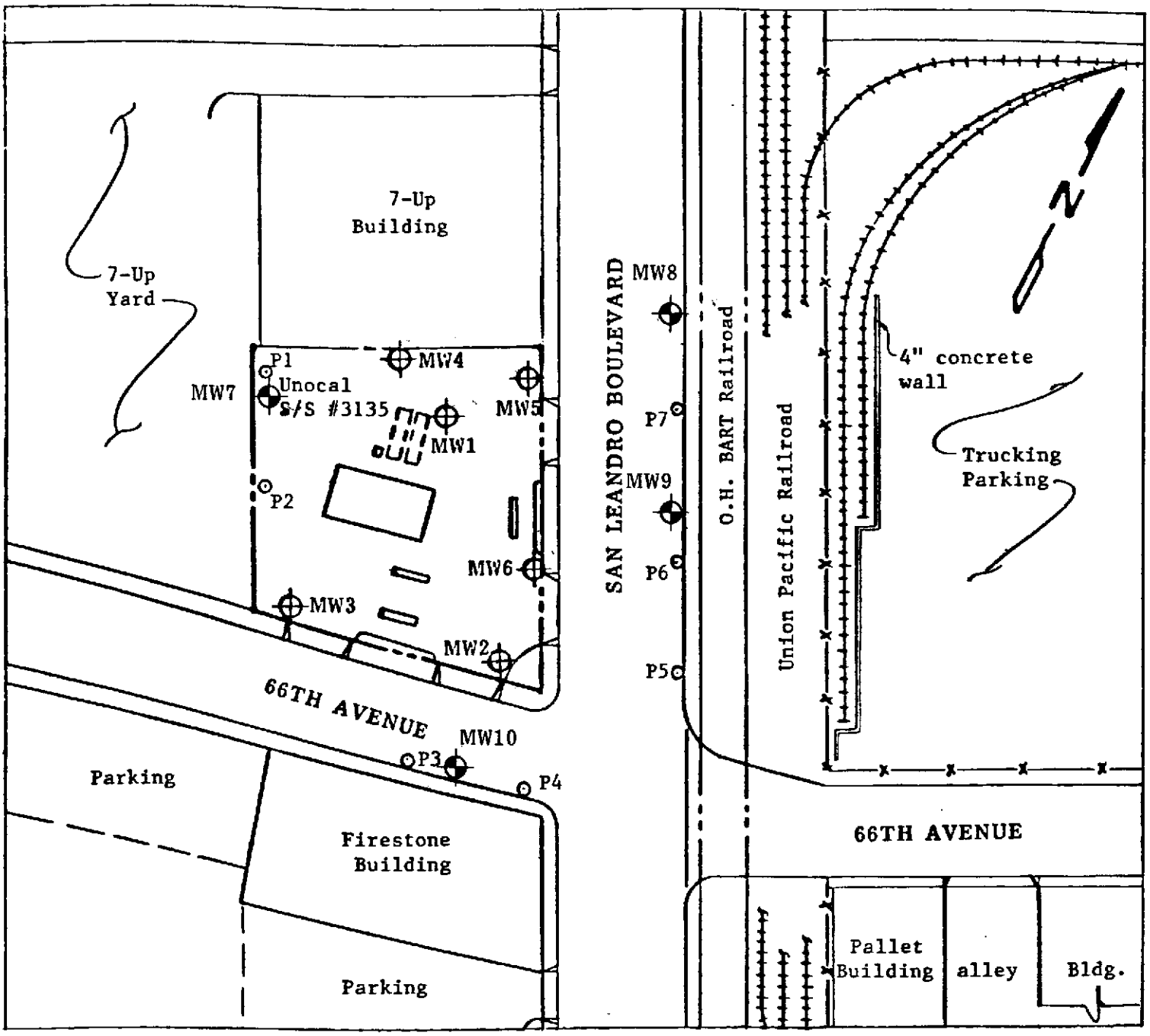

SITE VICINITY MAP

0 80 160
Approx. scale feet

LEGEND

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

Unocal S/S #3135
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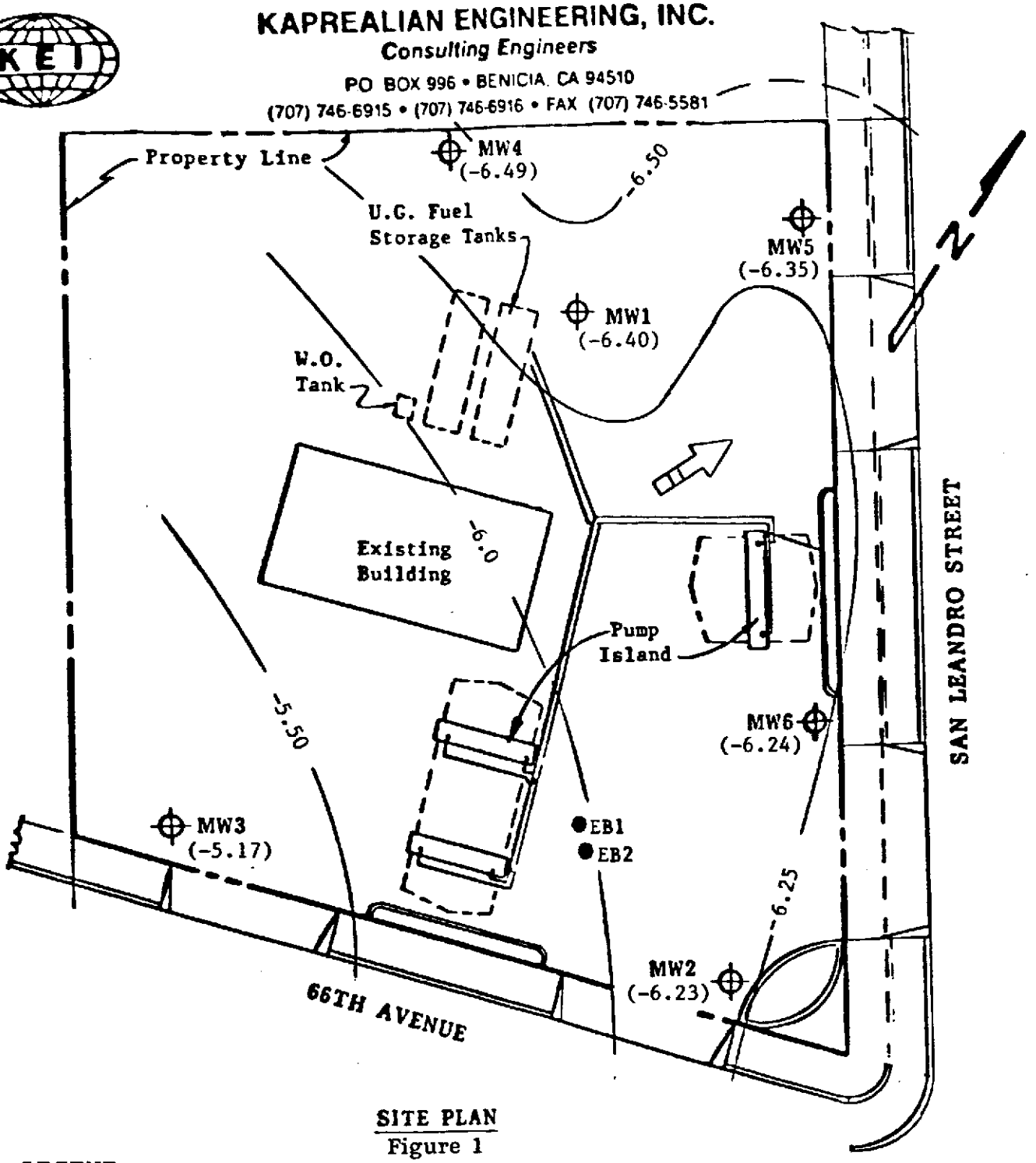

SITE PLAN
Figure 1

LEGEND

- Monitoring Well
- Exploratory Boring
- ( ) Ground Water Elevation in feet above Mean Sea Level on 2/21/91
- Direction of ground water flow
- ——— Contours of ground water surface in feet above Mean Sea Level

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

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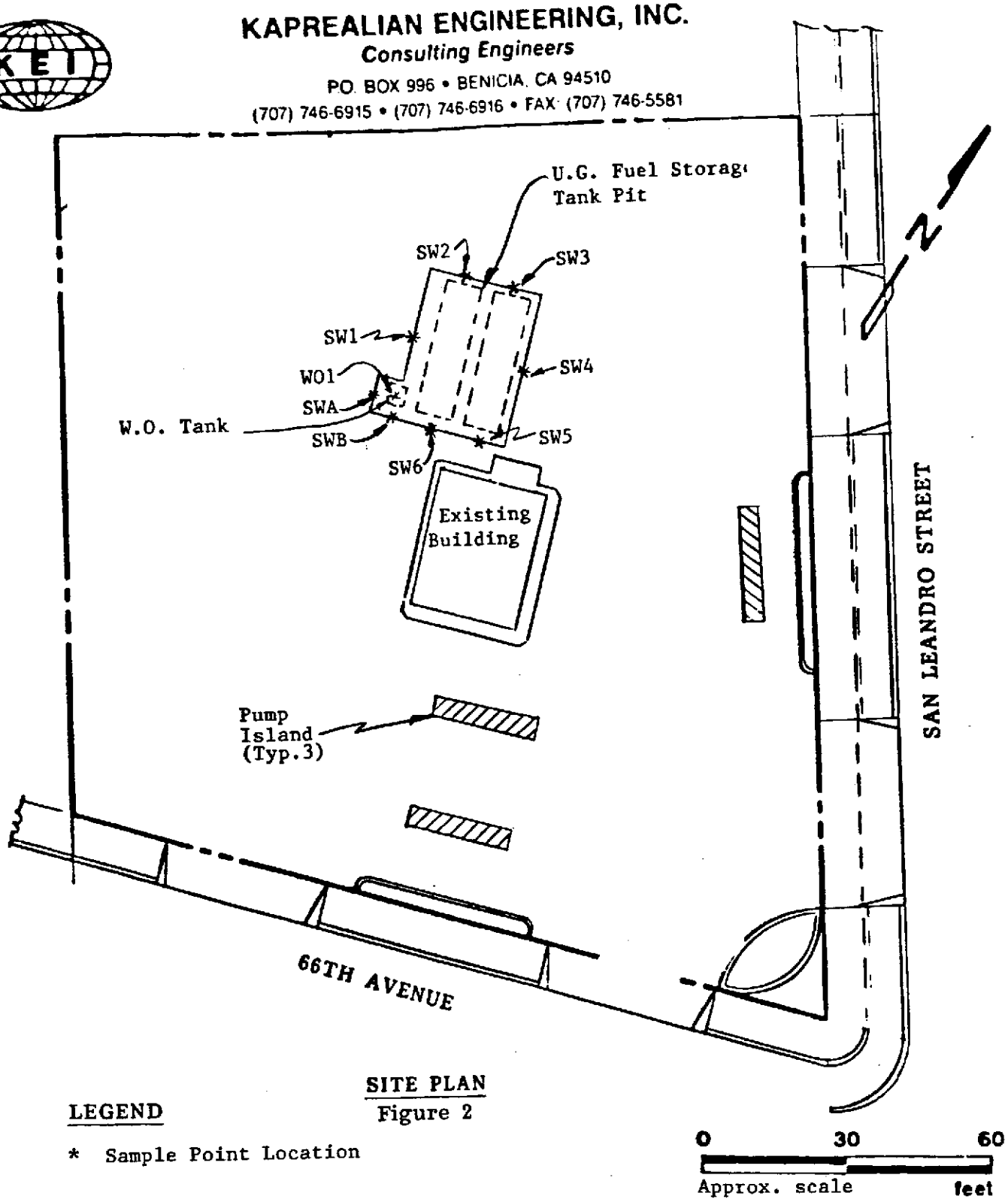

SITE PLAN
Figure 2

LEGEND

* Sample Point Location

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

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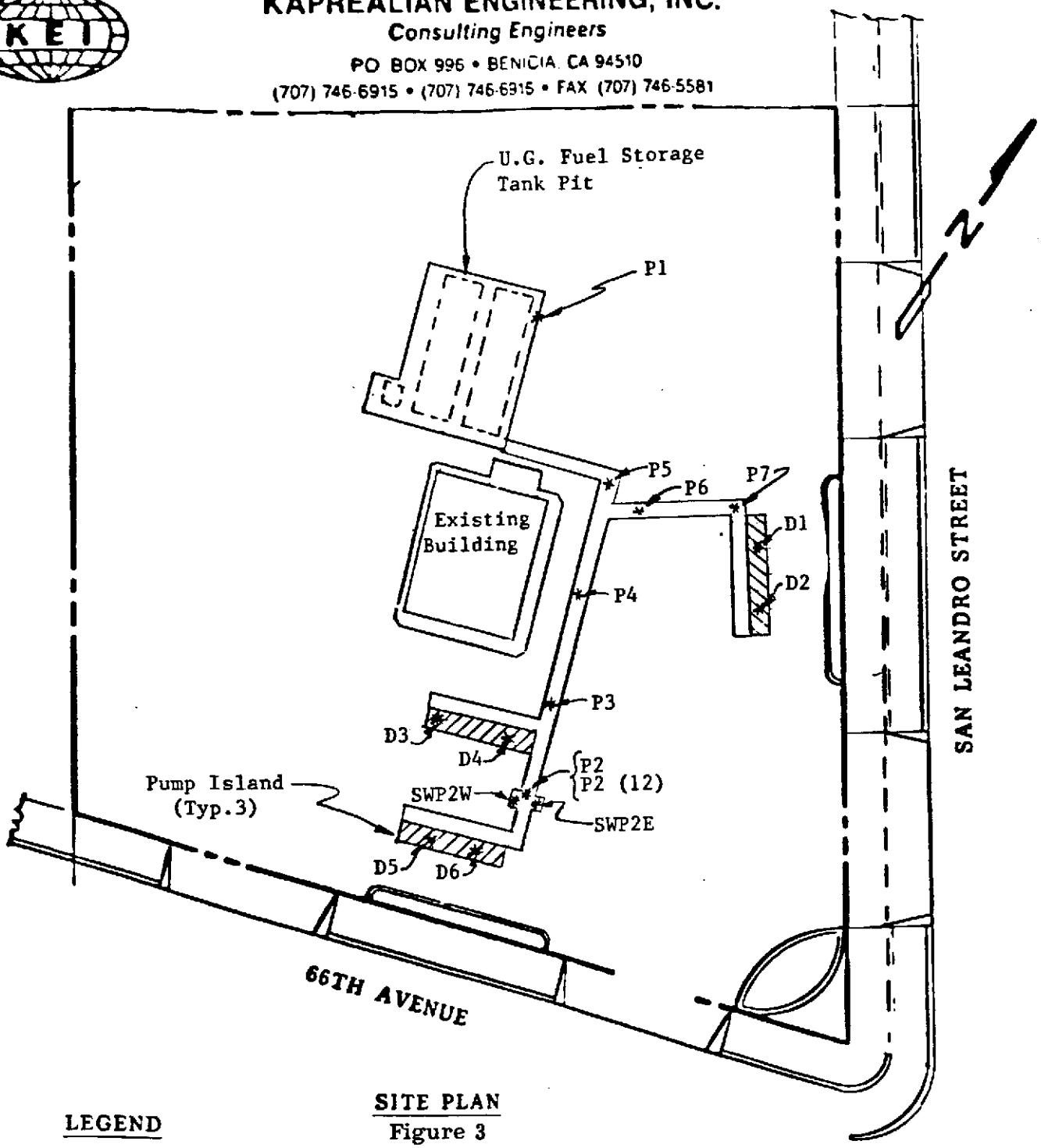


SITE PLAN
Figure 3

LEGEND

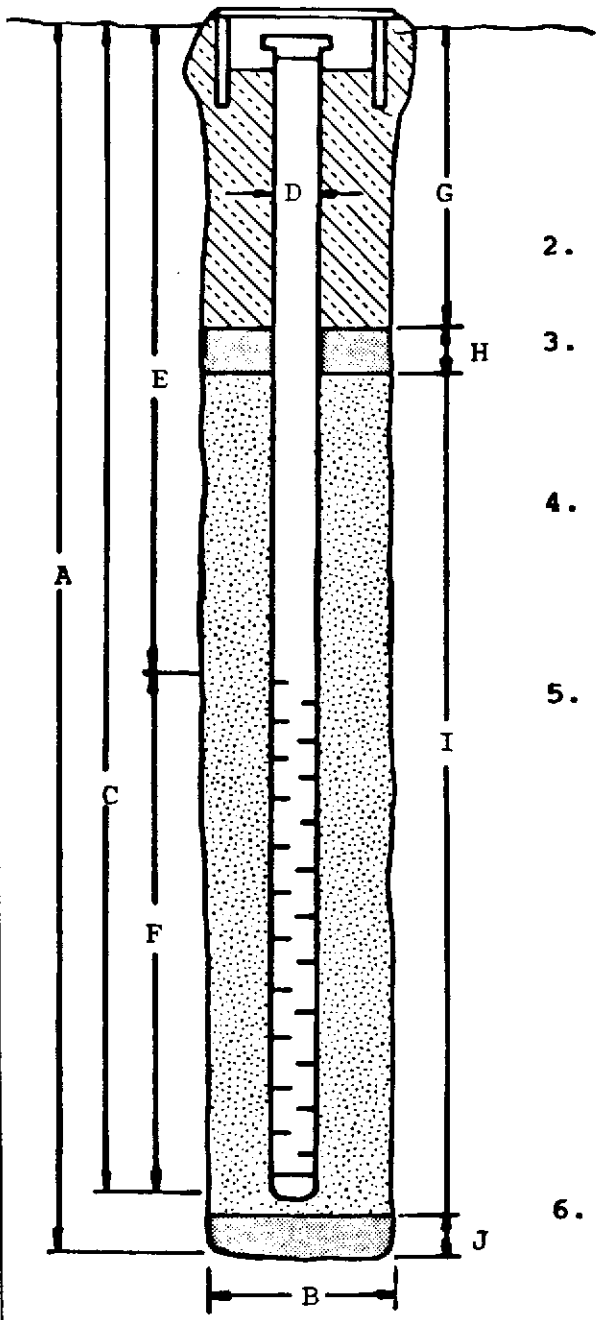
* Sample Point Location

0 30 60
Approx. scale feet

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

WELL COMPLETION DIAGRAM
(SCHEMATIC)

Flush-mounted Well Cover



WELL DETAILS*

1. Well will be terminated 10 to 15 feet into first ground water unless a five foot thick aquitard is encountered below the water table, in which case the aquitard will be backfilled with bentonite pellets and the well terminated at the top of this aquitard [A].
2. Boring diameter [B] is 9 inches for 2 inch wells and 12 inches for 4 inch wells.
3. Perforated interval [F] will extend from bottom of casing to five feet above first ground water table (unless water <5 feet deep).
4. Schedule 40, PVC casing, 2 inch in diameter [D], will be used [C]. Screen is 0.020 or 0.010 inch factory machined slots, depending on filter pack grain size.
5. Filter pack will be placed from bottom of casing to two feet above perforated interval [I]. (Bottom seal [J] is not installed unless required.) One foot of bentonite [H] will be placed above the filter pack. Concrete grout [G] will be placed from top of bentonite seal to the surface (unless modified due to shallow water). Blank casing [E] will extend from the top of the perforated casing to the top of the hole.
6. The well will be installed with a waterproof cap, padlock and a flush-mounted well cover.

* See text for additional information.