



**KAPREALIAN ENGINEERING, INC.**  
**Consulting Engineers**

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*Ashland - Unocal Corporation  
attached*

November 22, 1991

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

Attention: Mr. Larry Seto

RE: Unocal Service Station #6277  
15803 E. 14th Street  
San Leandro, California

Dear Mr. Seto:

Per the request of Mr. Ron Bock of Unocal Corporation, enclosed please find our report dated November 22, 1991, for the above referenced site.

If you have any questions, please call our office at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

jad\82

Enclosure

cc: Ron Bock, Unocal Corporation



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P.O. BOX 996 • BENICIA, CA 94510  
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KEI-P89-0301.QR8  
November 22, 1991

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

Attention: Mr. Ron Bock

RE: Quarterly Report  
Unocal Service Station #6277  
15803 E. 14th Street  
San Leandro, California

Dear Mr. Bock:

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-P89-0301.P4 dated July 23, 1991. The wells are currently monitored monthly and sampled on a quarterly basis. This report covers the work performed by KEI from July through September, 1991.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a gasoline station. The site is characterized by gently sloping, southwest trending topography, and is located approximately three miles northeast of the present shoreline of San Francisco Bay. A Location Map, Site Vicinity Map, and Site Plans are attached to this report.

KEI's work at the site began when KEI was asked to drill two exploratory borings (designated as EB1 and EB2) at the site. The borings were drilled on March 6, 1989, at the request of Alameda County. The borings were installed in order to explore for the possible presence of soil contamination in the vicinity of the pit for a proposed new underground storage tank. The borings were drilled to depths of 10.5 and 13.5 feet below grade. Water was encountered in the borings at depths of 11 to 12 feet below grade.

Samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California. Samples collected from borings EB1 and EB2 were analyzed for total petroleum hydrocarbons (TPH) as gasoline and benzene, toluene, xylenes, and ethylbenzene (BTX&E). Analytical results of the soil samples collected from a depth of 5 feet below grade in the borings had TPH as gasoline levels ranging from non-detectable to 2.1 ppm, while the samples collected from 10 feet

below grade had levels of TPH as gasoline ranging from 200 ppm to 620 ppm. Based on results of the preliminary investigation, KEI recommended that the contractor excavate the tank pit to a depth of approximately 13 feet below grade. Results of the exploratory boring investigation are presented in KEI's report (KEI-P89-0301.R1) dated March 13, 1989. Soil sample results from that report are summarized in Table 5. Exploratory boring locations are as shown on the attached Site Plan, Figure 3.

KEI returned to the site on March 13, 1989, when three underground storage tanks were removed from the site. The tanks consisted of two 10,000 gallon fuel storage tanks and one 550 gallon waste oil tank. The tanks were made of steel with a tar and wrap coating, and no apparent holes or cracks were observed in the tanks. Due to the tar coating and wrapping, very little of the actual tank walls could be observed. Water was encountered in the fuel tank pit at a depth of about 11 feet below grade, thus prohibiting the collection of any soil samples from immediately beneath the tanks. Six soil samples, labeled SW1, SW2, SW3, SW4, SW5 and SW6, were collected from the sidewalls of the fuel tank pit at a depth approximately 1 foot above the water table, and one sample, labeled WO1, was collected from beneath the waste oil tank at a depth of about 10 feet below grade.

Based on the subjective evidence observed in the field, it was decided to excavate additional soil from three of four tank pit walls. (The fourth tank pit wall adjacent to the existing building was not recommended to be excavated at that time.) On March 14, 1989, four trenches were dug to define the limits of additional soil excavation needed. Four soil samples were then collected at a depth below grade of about 10 feet, and are referred to as SW3(15), SW4/5(6), SW6(12), and SW7(14). Sample SW7(14) was collected from the sidewall of the waste oil tank pit. After the soil sampling was completed, approximately 5,000 gallons of ground water were pumped from the fuel tank pit on March 15, 1989; however, due to ongoing soil excavation, contaminated soil was falling into the water and a representative ground water sample could not be collected.

On March 17, 1989, KEI again returned to the site. Additional soil, approximately 2 feet laterally, was excavated from the fourth tank pit wall adjacent to the building. One additional sidewall soil sample, labeled SW1(2), was collected at a depth below grade of about 10 feet at the location identified on the attached Site Plan, Figure 2. Following soil sampling, an additional 1,000 gallons of ground water were pumped from the excavation and one water sample, labeled W1, was collected from the fuel tank pit.

On March 23, 1989, KEI returned to the site for pipe trench sampling. Six soil samples, labeled P1, P2, P3, P4, P5, and P6, were collected beneath the product lines at depths below grade of about 3 to 3.5 feet.

Soil samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California. Samples from the fuel tank pit were analyzed for TPH as gasoline and BTX&E. The samples from the waste oil tank pit [W01 and SW7(14)] were analyzed for TPH as gasoline, TPH as diesel, total oil and grease (TOG), and EPA method 8240 constituents.

The analytical results of the soil samples collected from the fuel tank pit indicated TPH as gasoline levels ranging from 24 ppm to 150 ppm for samples SW3(15), SW4/5(6), and SW6(12). Sample SW1, adjacent to the existing building, showed 3,500 ppm of TPH as gasoline; however, SW1(2), which was collected after excavating 2 feet of sidewall toward the building, showed 100 ppm of TPH as gasoline. Sample SW2 showed 390 ppm of TPH as gasoline. Samples SW3, SW4, SW5, and SW6 were not analyzed because their locations were excavated and new samples [SW3(15), SW4/5(6) and SW6(12)] were collected. Analytical results of the soil samples collected from the waste oil tank pit indicated 280 ppm of TOG for W01 and 41 ppm of TOG for SW7(14). Analytical results of the soil samples (P1 through P6) collected from pipe trenches indicated levels of TPH as gasoline ranging from 1.1 ppm to 6.8 ppm.

Analytical results of the water sample (W1) collected from the old fuel tank pit indicated 19,000 ppb of TPH as gasoline and 230 ppb of benzene. The results for the water sample are summarized in Table 6, and results of the soil samples are summarized in Table 5.

Based on the analytical results, KEI recommended the installation of four ground water monitoring wells. Documentation of tank and piping removal procedures, sample collection techniques, and analytical results are presented in KEI's report (KEI-P89-0301.R3) dated March 27, 1989.

On May 24, 1989, four two-inch diameter monitoring wells, designated as MW1 through MW4, were installed at the site (see attached Site Plan, Figure 1). The four wells were drilled and completed to total depths ranging from 24.5 to 25 feet below grade. Ground water was encountered at depths ranging from 11 to 12 feet beneath the surface during drilling. The wells were developed on June 5, 1989, and were initially sampled on June 6, 1989. Water and selected soil samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California. The samples were analyzed for TPH as gasoline and BTX&E. In addition, the sample collected from

monitoring well MW2 was analyzed for TPH as diesel, TOG, and EPA method 8010 constituents.

The analytical results of the soil samples collected from the borings for wells MW1, MW2, MW3, and MW4 showed levels of TPH as gasoline ranging from 2.3 ppm to 31 ppm, except in sample MW4(10), which showed a non-detectable level of TPH as gasoline, and in samples MW1(10) and MW2(5), which showed levels of 230 ppm and 290 ppm, respectively. The soil sample collected from MW2(5) also showed a TOG level of 7,700 ppm. The analytical results of water samples collected from monitoring wells MW1 through MW4 showed non-detectable levels of BTX&E in all wells, and TPH as gasoline levels ranging from 32 ppb to 590 ppb. Documentation of the well installation procedures, sample collection techniques, and sample results are presented in KEI's report (KEI-P89-0301.R6) dated June 26, 1989. Analytical results from that report are summarized in Tables 2, 2a, and 5. Based on the sample results, KEI recommended a monthly monitoring and quarterly sampling program for all of the wells and additional excavation of contaminated soil in the vicinity of MW2.

The monitoring and sampling program was initiated in July of 1989, and the wells have been monitored on a monthly basis and sampled on a quarterly basis since that time. In KEI's second quarterly report (KEI-P89-0301.QR2) dated January 16, 1990, KEI recommended the installation of one additional off-site well (MW5) to further define the extent of ground water contamination at the site.

On February 1, 1990, well MW2 was destroyed in preparation for additional excavation in the vicinity of well MW2. Documentation of the well destruction is presented in a letter report dated March 7, 1990, and addressed to Unocal Corporation.

In an attempt to remove as much of the contaminated soil as possible, KEI was present at the site on March 30, 1990, and April 3, 1990, to observe soil excavation in the vicinity of previously abandoned monitoring well MW2, as indicated on the attached Site Plans, Figures 1 and 2. Soil was excavated to a grade corresponding to approximately 6 to 12 inches below the level of the ground water, which was encountered at a depth of about 11.5 feet below grade.

After excavation, four soil samples, labeled SW8A, SW9A, SW10A, and SW11A, were collected from the sidewalls of the excavation, each approximately 6 to 12 inches above ground water. Sample locations and the area excavated are as shown on the attached Site Plan, Figure 2. Soil excavation activities were terminated due to the close proximity of the former and new underground storage tank pits

and the property line of the site. After sampling, approximately 9,400 gallons of water were pumped from the excavation.

All samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California. All soil samples were analyzed for TPH as gasoline, BTX&E, TPH as diesel, TOG, and EPA method 8010 constituents.

Analytical results of soil sample SW9A indicated non-detectable levels of TPH as gasoline and TPH as diesel. Analytical results of soil samples SW8A, SW10A, and SW11A indicated levels of TPH as gasoline ranging from 140 ppm to 1,100 ppm, while levels of TPH as diesel ranged from non-detectable to 280 ppm. Analytical results also indicated non-detectable levels of EPA method 8010 constituents and TOG for all four samples, except for sample SW11A, which showed 210 ppm of TOG. Results of the soil analyses are summarized in Table 4. Details of the soil sampling activities are presented in KEI's report (KEI-P89-0301.R7) dated May 2, 1990.

On March 12, 1991, one two-inch diameter monitoring well (designated as MW2A on the attached Site Plan, Figure 1) was installed at the site. Well MW2A was installed in the vicinity of former well MW2 and is intended to be a replacement for well MW2, which was destroyed in preparation for adjacent soil excavation activities. The well was drilled and completed to a total depth of 25.5 feet below grade. Ground water was encountered at a depth of about 14.8 feet beneath the surface during drilling. The surface of the new well cover and all previously existing well covers were surveyed by Kier & Wright of Pleasanton, California, to Mean Sea Level (MSL) and to a vertical accuracy of 0.01 feet. Well MW2A was developed on March 13, 1991, and all wells were sampled on March 15, 1991.

Water samples from all wells, and selected soil samples from the boring of MW2A, were analyzed at Sequoia Analytical Laboratory in Concord, California. The samples were analyzed for TPH as gasoline and BTX&E. In addition, the soil and water samples collected from MW2A were analyzed for TPH as diesel, TOG, and EPA method 8010 compounds.

Analytical results of the soil samples collected from boring MW2A indicated non-detectable levels of TPH as gasoline and benzene in all analyzed samples, except in sample MW2A(10), which had a TPH as gasoline level of 10 ppm, with a benzene level of 0.12 ppm. Levels of TPH as diesel ranged from non-detectable to 4.8 ppm, with TOG levels ranging from 57 ppm to 1,300 ppm, and non-detectable levels of all EPA method 8010 constituents, except for 110 ppb of 1,2-dichlorobenzene and 120 ppb of tetrachloroethene in MW2A(10). Analytical results of the water samples collected from monitoring

wells MW1 through MW4 on March 15, 1991, indicated levels of TPH as gasoline ranging from 53 ppb to 160 ppb, with benzene levels at 21 ppb and 2.5 ppb, in wells MW1 and MW2A, respectively. Benzene was non-detectable in wells MW3 and MW4. Also, TPH as diesel, TOG, and EPA method 8010 constituents were non-detectable in well MW2A, except for cis-1,2-dichloroethene at 2.6 ppb, tetrachloroethene at 67 ppb, and trichloroethene at 8.2 ppb. Results of the soil analyses are summarized in Table 3, and results of the water analyses are summarized in Tables 2 and 2a.

Documentation of well installation procedures, sample collection techniques, and analytical results are presented in KEI's report (KEI-P89-0301.R8) dated April 16, 1991. Based on the analytical results, KEI recommended the continuation of the monthly monitoring and quarterly sampling program.

KEI previously proposed that an additional monitoring well, MW5, be installed on the private property located northwest of the site in order to complete the delineation of the ground water contamination. However, it is KEI's understanding that Unocal Corporation encountered difficulty in securing access to this private property. Thus, KEI recommended that proposed well MW5 be installed at an alternate location in the sidewalk along East 14th Street, as shown on the attached Site Vicinity Map.

#### RECENT FIELD ACTIVITIES

The four wells (MW1, MW2A, MW3, and MW4) 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. The wells were checked for the presence of sheen during two monitoring events. 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 September 10, 1991. Prior to sampling, the wells were each purged of 10 gallons by the use of a surface pump. Samples were then collected 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 September 10, 1991, the ground water flow direction appeared to be toward the northwest, which is slightly changed from the north flow direction reported on June 10, 1991. The average hydraulic gradient at the site on

September 10, 1991, was approximately 0.002. Water levels have fluctuated during the quarter, showing a net decrease of 0.15 to 0.29 feet in all wells since June 10, 1991. The measured depth to ground water at the site on September 10, 1991, ranged between 10.07 and 11.72 feet below grade.

Based on review of regional geologic maps (U.S. Geological Survey Professional Paper 943 "Flatland Deposits - Their Geology and Engineering Properties and Their Importance to Comprehensive Planning" by E.J. Helley and K.R. Lajoie, 1979), the subject site is underlain by Late Pleistocene alluvium (Qpa). The Late Pleistocene alluvium is described as typically consisting of weakly consolidated, poorly sorted, irregular interbedded clay, silt, sand, and gravel, with a reported unknown maximum thickness, but is at least 150 feet thick. This alluvium is assumed to overlay bedrock and deformed older sedimentary deposits on the alluvial plain marginal to San Francisco Bay. In addition, the site is situated approximately 1,700 to 3,600 feet southwest of various mapped splays of the active Hayward Fault.

The results of our previous subsurface study indicates that the site is underlain by fill materials to a depth of about 2 to 5 feet below grade, which are in turn underlain by silty clay materials to the maximum depth explored (25 feet below grade). The results of our recent subsurface study indicate that in the vicinity of MW2A, the site is underlain by fill materials extending to a depth of about 5 feet below grade, which are in turn underlain by highly expansive clay materials to a depth of about 11.5 feet below grade, and further underlain by clay and silty clay materials to the maximum depth explored (25.5 feet below grade).

#### Water Well Survey

A detailed review of available information on producing water wells and ground water monitoring wells adjacent to the subject site was performed by KEI in August of 1991. The well survey was focused on the area within a one-half mile radius of the subject site, and is based upon data obtained from the Alameda County Flood Control and Water Conservation District. The information reviewed revealed the presence of 15 producing wells within the study area. All of the located producing wells are designated as irrigation wells and have depths ranging from 20 to 440 feet below grade. Three sites with existing monitoring wells were located within the study area; the closest one being approximately 1,000 feet from the subject site. The Alameda County Flood Control and Water Conservation District records reviewed suggest that the status of many of the irrigation wells may be unknown. No producing wells that would appear to possibly influence the previously reported northerly ground water



flow direction at the subject site were located during the survey. Wells located through the well survey are shown on the attached Well Location Map. Data for the production wells located are listed in Table 7, and data for sites with existing monitoring wells are listed in Table 8.

#### 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, and BTX&E using EPA method 8020. In addition, the ground water sample collected from monitoring well MW2A was analyzed for TPH as diesel using EPA method 3510 in conjunction with modified 8015.

Analytical results of the ground water samples collected from monitoring wells MW1, MW2A, MW3, and MW4 indicated levels of TPH as gasoline at concentrations of 280 ppb, 180 ppb, 170 ppb and 56 ppb, respectively. Benzene was detected in monitoring wells MW1 and MW2A at concentrations of 38 ppb and 8.7 ppb, respectively, and was non-detectable in wells MW3 and MW4. In monitoring well MW2A, TPH as diesel was detected at 65 ppb. Results of the analyses are summarized in Tables 2 and 2a. Concentrations of TPH as gasoline and benzene detected in ground water samples collected on September 10, 1991, are shown on the attached Site Plan, Figure 1a. 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-P89-0301.P4) dated July 23, 1991. In addition, the water samples collected from well MW2A will also be analyzed for TOG and EPA method 8010 constituents. These analyses were inadvertently omitted this quarter, but will be included in future quarter sampling events.

As previously mentioned, KEI proposed the installation of an additional monitoring well (MW5) in the sidewalk along East 14th Street, per KEI's proposal (KEI-P89-0301.P4) dated July 23, 1991. KEI has acquired the necessary permit from the Alameda County Flood Control District and is currently in the process of acquiring the necessary encroachment permit from the California Department of Transportation. Once all of the necessary permits are received, KEI will proceed with the well installation.

Lastly, based on the current northwest ground water flow direction, monitoring wells MW3 and MW4 appear to be located upgradient of potential source areas at the Unocal site; therefore, KEI recommends reviewing the files of the Regional Water Quality Control Board (RWQCB) and the Alameda County Health Care Services Agency to determine whether there are any upgradient sources which may be contributing to the contamination at the Unocal site.

#### DISTRIBUTION

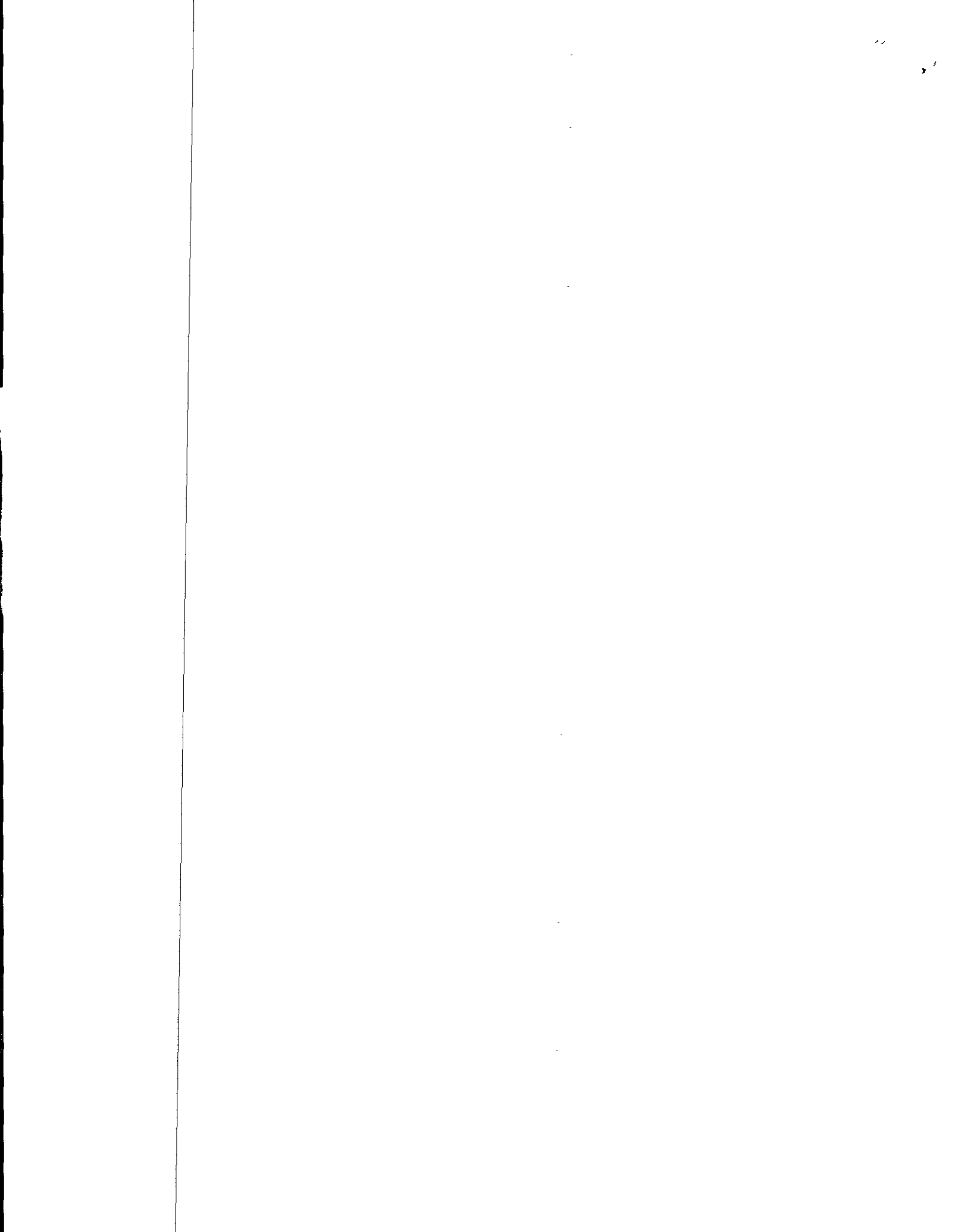
A copy of this report should be sent to Mr. Larry Seto of the Alameda County Health Care Services Agency, to the City of San Leandro, and to the RWQCB, San Francisco Bay Region.

#### 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.

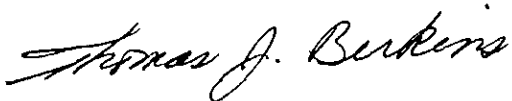


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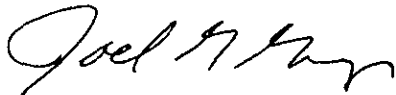
Should you have any questions regarding this report, please do not hesitate to call me at (707) 746-6915.

Sincerely,

Kaprealian Engineering, Inc.



Thomas J. Berkins  
Senior Environmental Engineer



Joel G. Greger  
Certified Engineering Geologist

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



Timothy R. Ross  
Project Manager

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Attachments: Tables 1 through 8  
Location Map  
Site Vicinity Map  
Well Location Map  
Site Plans - Figures 1, 1a, 2 & 3  
Laboratory Analyses  
Chain of Custody documentation

TABLE 1

SUMMARY OF MONITORING DATA

<u>Well No.</u>	<u>Ground Water Elevation (feet)</u>	<u>Depth to Water (feet)</u>	<u>Product Thickness (feet)</u>	<u>Sheen</u>	<u>Water Purged (gallons)</u>
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(Monitored and Sampled on September 10, 1991)

MW1	22.02	10.73	0	No	10
MW2A	22.06	11.72	0	No	10
MW3	22.28	10.28	0	No	10
MW4	22.25	10.07	0	No	10

(Monitored on August 14, 1991)

MW1	22.04	10.71	0	--	0
MW2A	22.10	11.68	0	--	0
MW3	22.29	10.27	0	--	0
MW4	22.30	10.02	0	--	0

(Monitored on July 11, 1991)

MW1	22.09	10.66	0	No	0
MW2A	22.17	11.61	0	No	0
MW3	22.38	10.18	0	No	0
MW4	22.40	9.92	0	No	0

<u>Well #</u>	<u>Surface Elevation* (feet)</u>
MW1	32.75
MW2	33.78
MW3	32.56
MW4	32.32

-- Sheen determination not performed.

\* Elevations of tops of well covers surveyed relative to MSL by Kier & Wright of Pleasanton, California.

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TABLE 2  
SUMMARY OF LABORATORY ANALYSES  
WATER

<u>Date</u>	<u>Sample Well #</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>
9/10/91	MW1	--	280	38	3.1	22	4.1
	MW2A	65	180	8.7	0.93	13	15
	MW3	--	170	ND	ND	ND	ND
	MW4	--	56	ND	ND	ND	ND
6/10/91	MW1	--	310	1.5	ND	0.31	ND
	MW2A	100	54	1.2	ND	0.69	ND
	MW3	--	160	0.65	ND	ND	ND
	MW4	--	64	ND	ND	ND	ND
3/15/91	MW1	--	110	21	ND	8.4	ND
	MW2A	ND	160	2.5	ND	51	ND
	MW3	--	150	ND	ND	0.45	ND
	MW4	--	53	ND	ND	ND	ND
12/14/90	MW1	--	450	150	6.8	49	0.28
	MW3	--	150	ND	ND	ND	ND
	MW4	--	54	ND	ND	ND	ND
9/19/90	MW1	--	140	ND	ND	3.5	ND
	MW3	--	74	0.74	ND	ND	ND
	MW4	--	61	ND	ND	ND	ND
6/25/90	MW1	--	310	10	0.89	2.1	0.37
	MW3	--	190	1.5	0.68	5.3	ND
	MW4	--	66	ND	ND	ND	ND
3/29/90	MW1	--	320	12	1.6	3.5	0.31
	MW3	--	85	ND	ND	ND	ND
	MW4	--	120	0.39	ND	ND	ND
12/12/89	MW1	--	340	100	13	44	3.4
	MW2	1,700	660	220	6.6	36	13
	MW3	--	120	6.7	0.64	1.5	0.46
	MW4	--	97	4.6	ND	ND	ND
9/13/89	MW1	--	550	32	17	52	3.4
	MW2	ND	170	2.0	0.38	9.5	ND
	MW3	--	76	ND	ND	ND	ND
	MW4	--	77	ND	ND	ND	ND

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TABLE 2 (Continued)  
SUMMARY OF LABORATORY ANALYSES  
WATER

<u>Date</u>	<u>Sample Well #</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>
6/06/89	MW1	--	590	ND	ND	ND	ND
	MW2	ND	77	ND	ND	ND	ND
	MW3	--	32	ND	ND	ND	ND
	MW4	--	37	ND	ND	ND	ND
Detection Limit		50	30	0.3	0.3	0.3	0.3

NOTE: Well MW2 was destroyed on February 1, 1990.

ND = Non-detectable.

-- Indicates analyses not performed.

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

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TABLE 2a  
SUMMARY OF LABORATORY ANALYSES  
WATER

<u>Sample Well #</u>	<u>Date</u>	<u>Tetra- chloro- ethene</u>	<u>Tri- chloro- ethene</u>	<u>1,2-Di- chloro- ethane</u>	<u>Total 1,2-dichloro- ethene</u>	<u>TOG (ppm)</u>
MW2A	6/10/91	150	10	ND	ND	ND
MW2A	3/15/91	67	8.2	ND	2.6*	ND
MW2	12/12/89	30	9.0	ND	ND	1.2
MW2	9/13/89	18	6.1	4.2	1.2	<50
MW2	6/06/89	110	4.4	2.8	ND	ND

\* Reported as cis-1,2-dichloroethene. Trans-1,2-dichloroethene was non-detectable.

ND = Non-detectable.

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



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TABLE 3  
SUMMARY OF LABORATORY ANALYSES  
SOIL

<u>Date</u>	<u>Sample Number</u>	<u>Depth (feet)</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>	<u>TOG</u>
3/12/91	MW2A(5)*	5.0	4.8	ND	ND	ND	ND	ND	1,300
	MW2A(10)*	10.0	2.4	10	0.12	0.17	1.6	0.14	260
	MW2A(14.5)*	14.5	ND	ND	ND	0.0080	0.036	ND	57
Detection Limits			1.0	1.0	0.0050	0.0050	0.0050	0.0050	30

\* All EPA method 8010 constituents were non-detectable, except for 0.110 ppm of 1,2-dichlorobenzene, and 0.120 ppm of tetrachloroethene detected in sample MW2A(10).

ND = Non-detectable.

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

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TABLE 4  
SUMMARY OF LABORATORY ANALYSES  
SOIL

<u>Date</u>	<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl- benzene</u>
4/03/90	SW8A*	10.5	62	260	1.4	8.0	40	7.0
	SW9A*	10.5	ND	ND	0.017	0.041	0.033	0.0092
	SW10A*	10.5	ND	140	0.085	0.12	5.0	1.4
	SW11A**	10.5	280	1,100	8.0	43	230	37
Detection Limits			1.0	1.0	0.0050	0.0050	0.0050	0.0050

\* TOG and all EPA method 8010 constituents were non-detectable for these samples.

\*\* TOG showed 210 ppm, while all EPA method 8010 constituents were non-detectable.

ND = Non-detectable.

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

KEI-P89-0301.QR8  
 November 22, 1991

TABLE 5  
 SUMMARY OF LABORATORY ANALYSES  
 SOIL

<u>Date</u>	<u>Sample Number</u>	<u>Depth (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl benzene</u>
3/06/89	EB1(5)	5.0	2.1	ND	0.11	ND	0.14
	EB1(10)	10.0	200	2.3	7.7	5.7	33
	EB2(5)	5.0	ND	ND	ND	ND	ND
	EB2(10)	10.0	620	2.2	20	13	78
3/13/89	SW1	10.0	3,500	22	280	600	10
3/14/89 &	SW1(2)	10.0	100	1.3	6.6	16	2.9
	SW2	10.0	390	40	4.3	71	10
3/17/89	SW3(15)	10.0	60	1.6	2.9	7.8	1.5
	SW4/5(6)	10.0	24	2.6	1.7	2.7	0.56
	SW6(12)	10.0	150	3.1	6.2	5.6	3.6
	SW7(14)*	10.0	ND	0.3	ND	ND	ND
	P1	3.0	2.3	ND	0.15	ND	ND
	P2	3.0	1.5	ND	0.31	ND	ND
	P3	3.0	1.1	ND	0.1	ND	ND
	P4	3.0	5.6	ND	0.15	0.39	ND
	P5	3.0	6.8	0.15	0.58	0.55	0.12
	P6	3.5	5.5	0.06	0.18	0.15	ND
	WO1**	10	15	ND	ND	0.21	0.88
5/24/89	MW1(5)	5.0	2.3	0.08	ND	0.62	ND
	MW1(10)	10.0	290	1.0	11	48	8.8
	MW2(5)***	5.0	230	13	1.7	3.2	1.5
	MW2(10)+	10.0	31	1.2	1.0	5.5	1.1
	MW3(5)	5.0	3.2	0.29	0.1	0.7	ND
	MW3(10)	10.0	4.6	ND	ND	0.44	0.3
	MW4(5)	5.0	3.1	ND	0.11	ND	ND
	MW4(10)	10.0	ND	ND	ND	ND	ND

KEI-P89-0301.QR8  
November 22, 1991

TABLE 5 (Continued)

SUMMARY OF LABORATORY ANALYSES  
SOIL

- \* TPH as diesel was 6.2 ppm; TOG was at 41 ppm; all 8240 constituents are non-detectable, except as noted above.
- \*\* TPH as diesel was non-detectable; TOG was at 280 ppm; all 8240 constituents are non-detectable, except as noted above.
- \*\*\* TPH as diesel was non-detectable, TOG was 7,700 ppm, and trichloroethene at 0.063 ppm.
- + TPH as diesel was non-detectable, TOG was 38 ppm, and trichloroethene at 0.065 ppm.

ND = Non-detectable.

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

KEI-P89-0301.QR8  
November 22, 1991

TABLE 6  
SUMMARY OF LABORATORY ANALYSES  
WATER

<u>Date</u>	<u>Sample Well #</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
3/17/89	W1	19,000	230	79	1,300	ND

ND = Non-detectable.

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

KEI-P89-0301.QR8  
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TABLE 7

WELLS LOCATED WITHIN STUDY AREA

<u>Survey No.</u>	<u>State No.</u>	<u>Date Drilled</u>	<u>Owner</u>	<u>Use</u>	<u>Depth (feet)</u>	<u>Location</u>
1	35,2W,6K1	8/49	Lee Dugan	Irrigation	148	Corner of E.14th and 159th Avenue
2	35,2W,6J1	1910	Manuel Rose	Irrigation	52	16053 Ashland Avenue
3	35,2W,6R2	10/47	Okada Brothers, Inc.	Irrigation	440	16109 Ashland Avenue
4	35,2W,6G2	--	Harwood	Irrigation	--	1584 Oriole
5	35,2W,6H2	1927	Magnaini	Abandoned (Not destroyed)	40	1570 Mond Avenue
6	35,2W,6H1	1924	Mary Welsh	Irrigation	32	1575 159th Avenue
7	35,2W,6K2	1957	Walsh	Irrigation	15	877 Mooney Avenue at Connolly
8	35,2W,6Q2	1952	T. D. Sexton	Irrigation	15	825 Jan Court
9	35,2W,6R1	1940	J. Fildelgo	Irrigation	70	16239 Ashland Avenue
10	35,2W,6R4	10/90	Okada Brothers Nursery	Irrigation	304	16100 Bertrero Avenue
11	35,2W,6B1	1957	Allen	Irrigation	40	1571 152nd Avenue

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November 22, 1991

TABLE 7 (continued)

WELLS LOCATED WITHIN STUDY AREA

<u>Survey No.</u>	<u>State No.</u>	<u>Date Drilled</u>	<u>Owner</u>	<u>Use</u>	<u>Depth (feet)</u>	<u>Location</u>
12	35,2W,6B4	--	Paul Fearon	Irrigation	30	1573 153rd Avenue
13	35,2W,6C2	1954	Fredin	Irrigation	25	1479 151st Avenue
14	35,2W,6P2	1958	F. Chimente	Irrigation	20	15508 Wegner Street
15	35,2W,5N3	1939	Namura Nursery	Irrigation	50	1501 163rd Avenue

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November 22, 1991

TABLE 8

SITES WITH ONE OR MORE MONITORING WELLS WITHIN STUDY AREA

<u>Survey No.</u>	<u>State No.</u>	<u>Owner</u>	<u>Location</u>	<u>Depth to Ground Water at Site (feet)</u>
1	35,2W,6J4-5	Okada Property	16109 Ashland Avenue	5
2	35,2W,5M3-4	Kaufman & Broad	1630 162nd Avenue	14-16
3	35,2W,6E7-11	Shell Oil	15120 Hesperian Boulevard	9-11
	35,2W,6E12-17	Westfield, Inc.	15120 Hesperian Boulevard	9-11





**KAPREALIAN ENGINEERING, INC.**  
Consulting Engineers

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



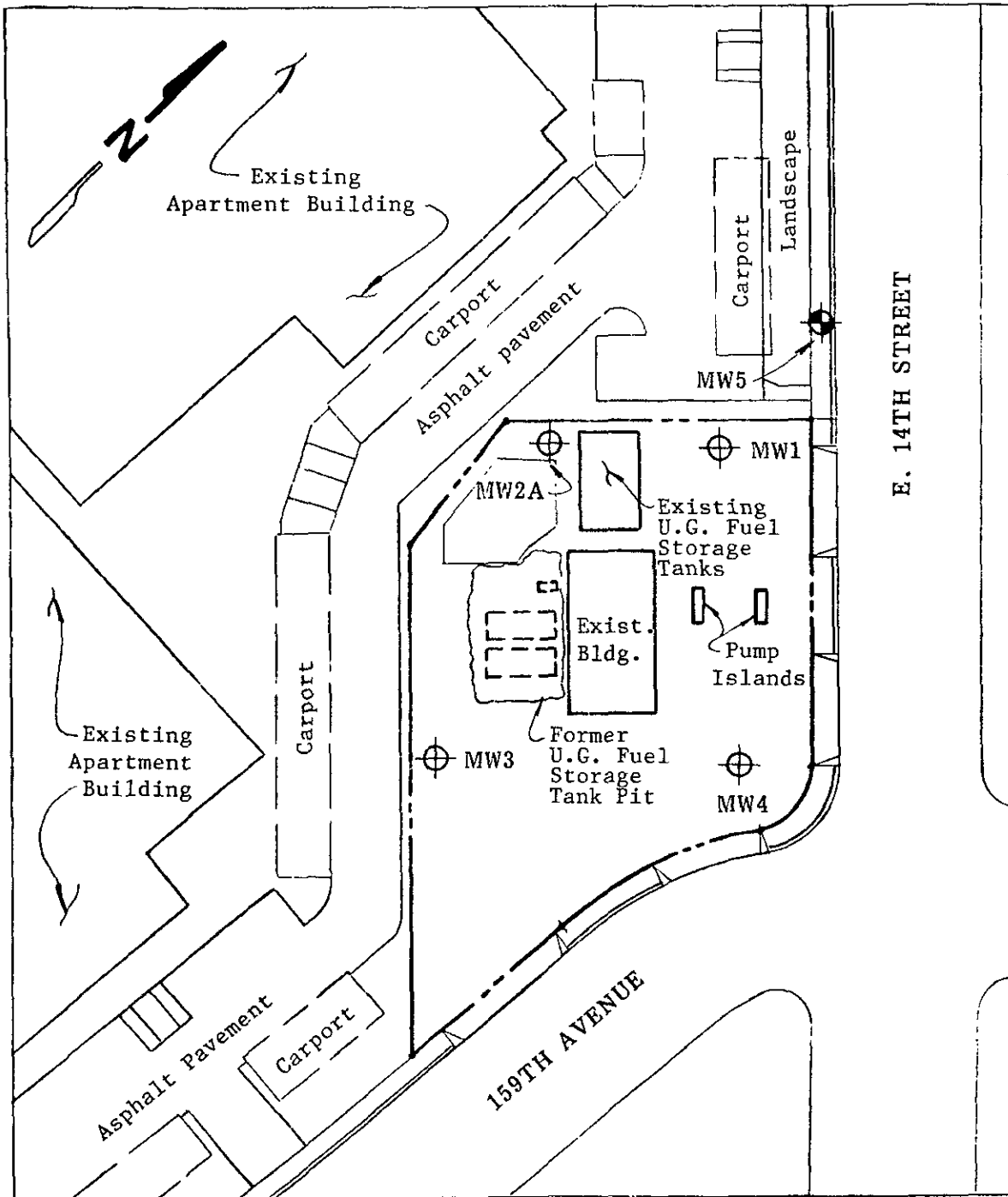
LOCATION MAP

Unocal S/S #6277  
15803 E. 14th Street  
San Leandro, CA





**KAPREALIAN ENGINEERING, INC.**  
**Consulting Engineers**

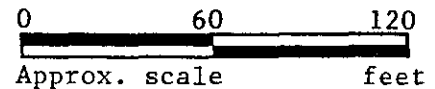
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**SITE VICINITY MAP**

**LEGEND**

-  Monitoring well (existing)
-  Monitoring well (proposed)

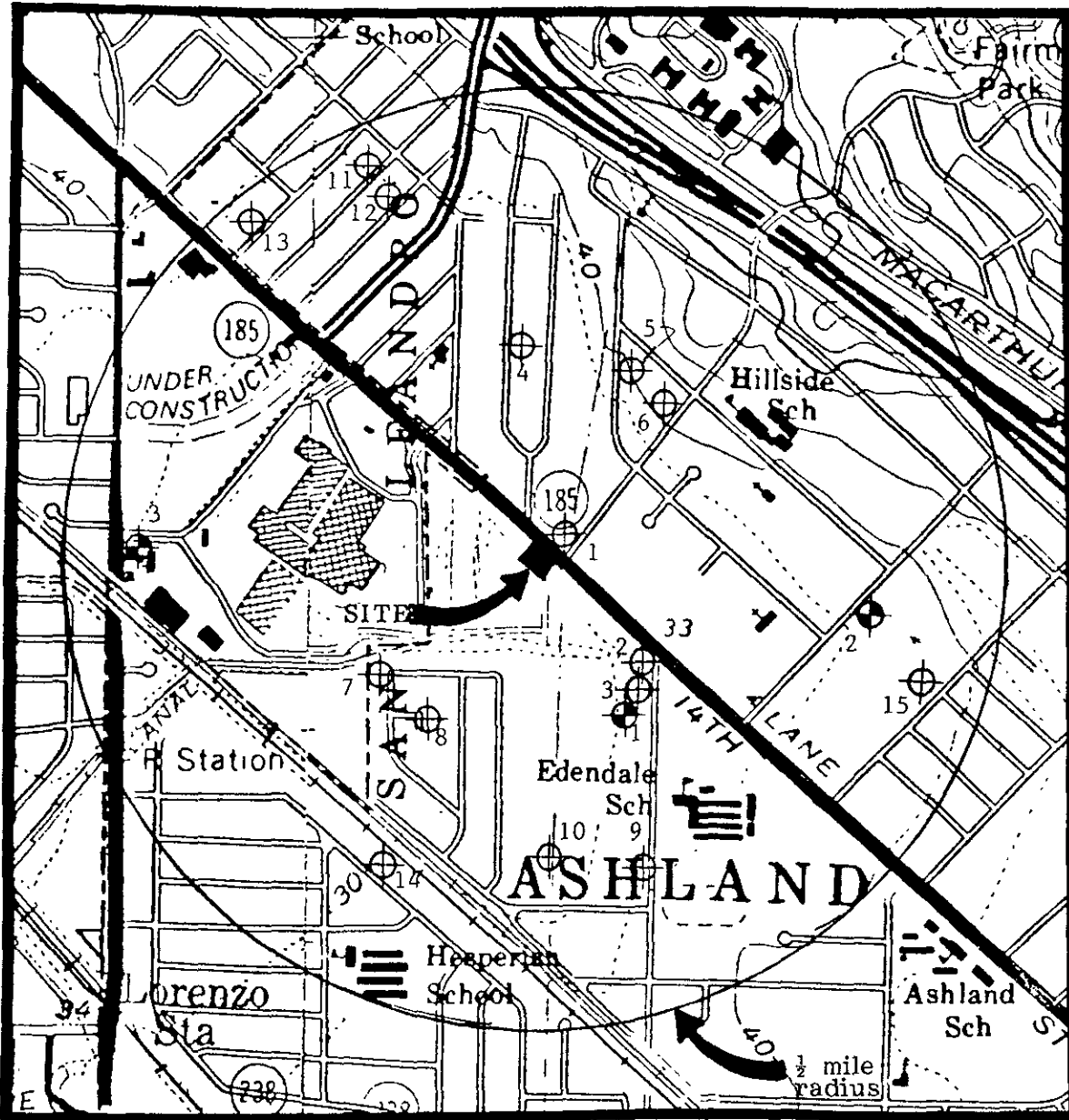


Unocal S/S #6277  
15803 E. 14th Street  
San Leandro, CA



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*Consulting Engineers*

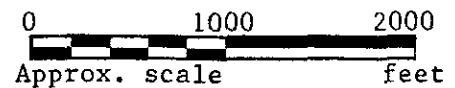
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WELL LOCATION MAP

LEGEND

- ⊕ Approximate well location (located from A.C.F.C.D. data)
- ⊕ Site with one or more monitoring well

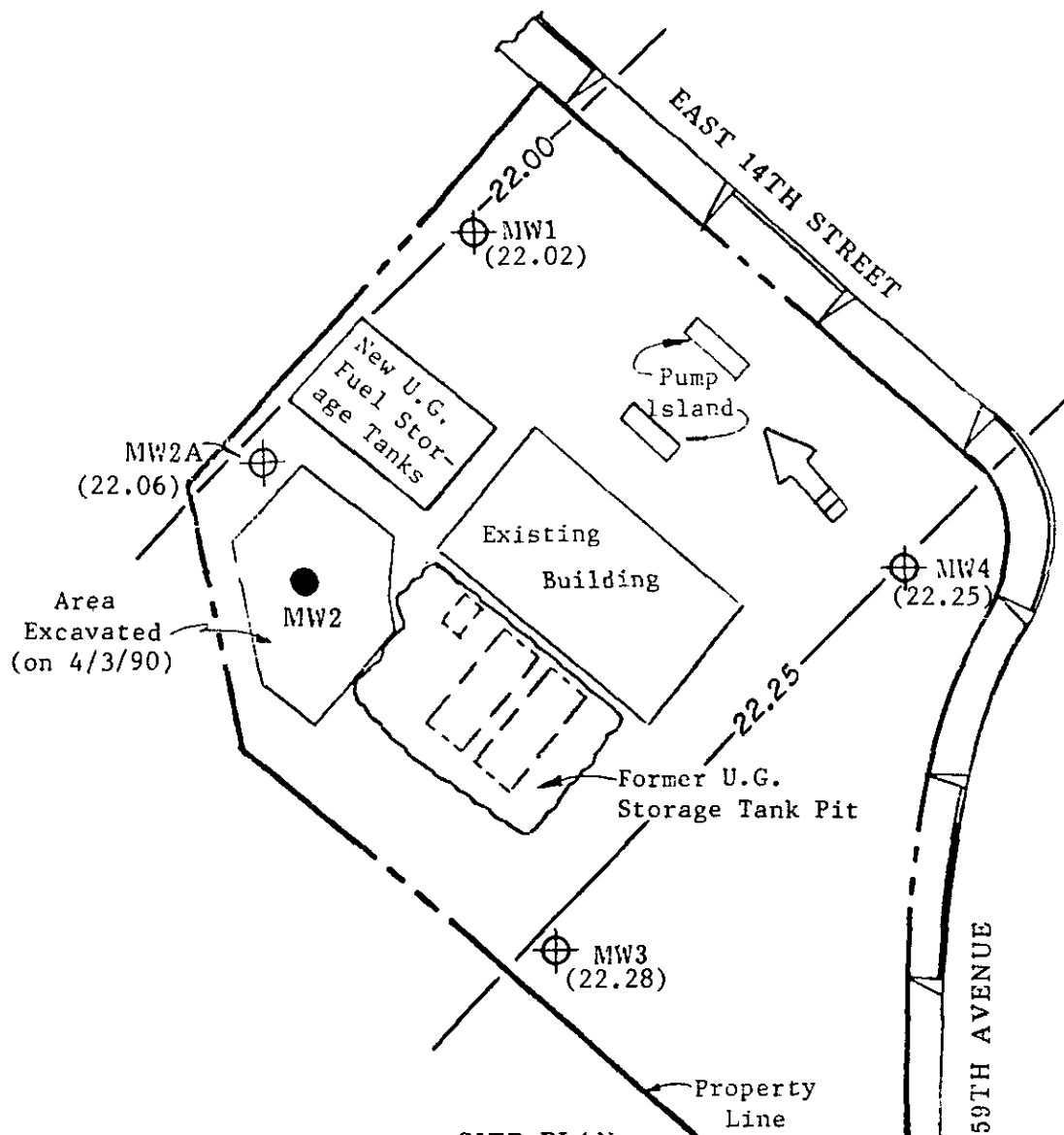


Unocal S/S #6277  
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San Leandro, CA








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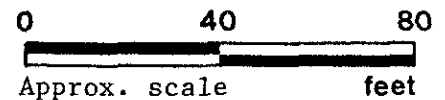
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SITE PLAN  
Figure 1

LEGEND

-  Monitoring well
-  Monitoring well (destroyed 2/1/90)
-  ( ) Water table elevation in feet above Mean Sea Level on 9/10/91
-  Contours of water table elevation
-  Ground water flow direction

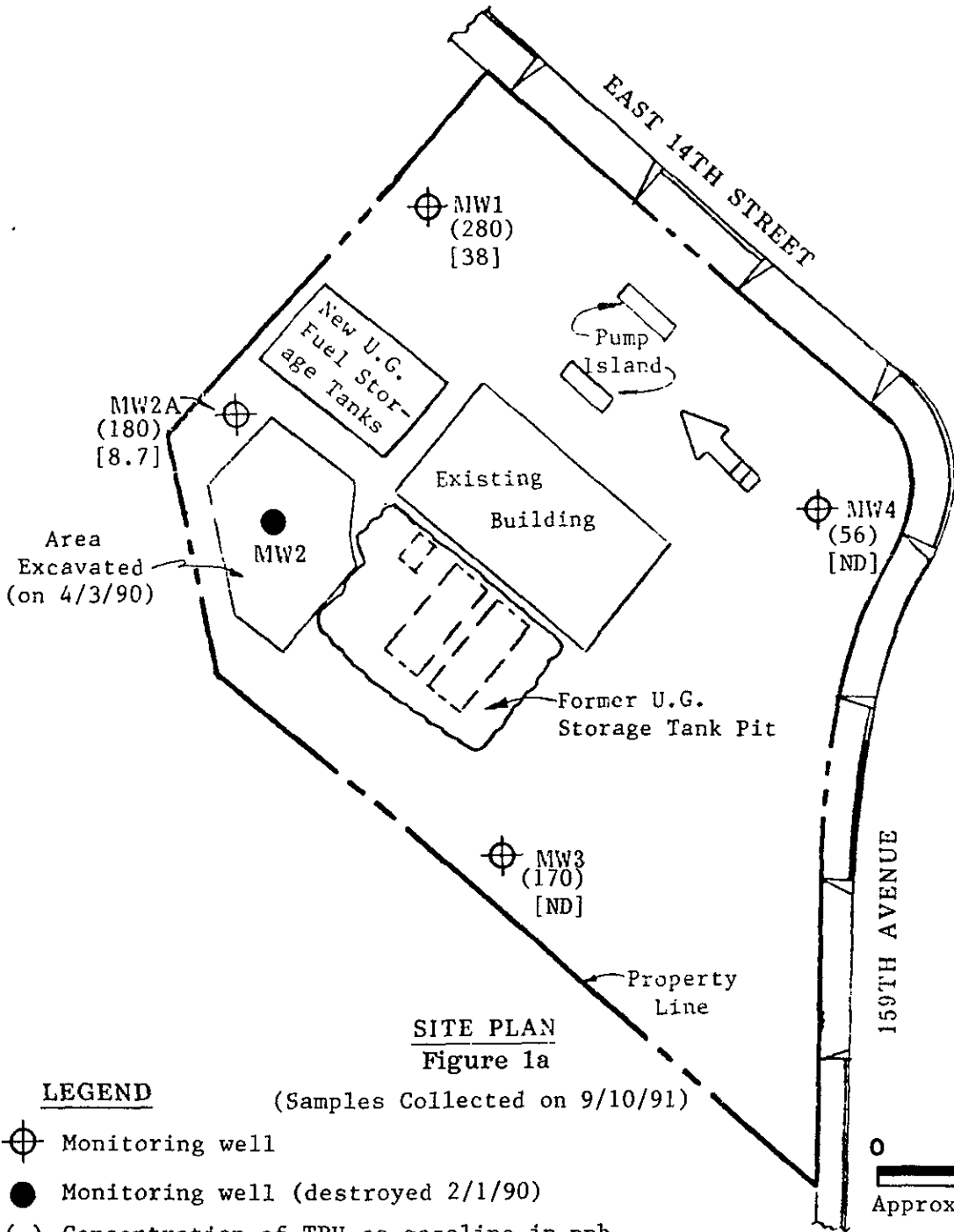


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SITE PLAN  
Figure 1a

(Samples Collected on 9/10/91)

LEGEND

- ⊕ Monitoring well
- Monitoring well (destroyed 2/1/90)
- ( ) Concentration of TPH as gasoline in ppb
- [ ] Concentration of benzene in ppb
- ➔ Direction of ground water flow

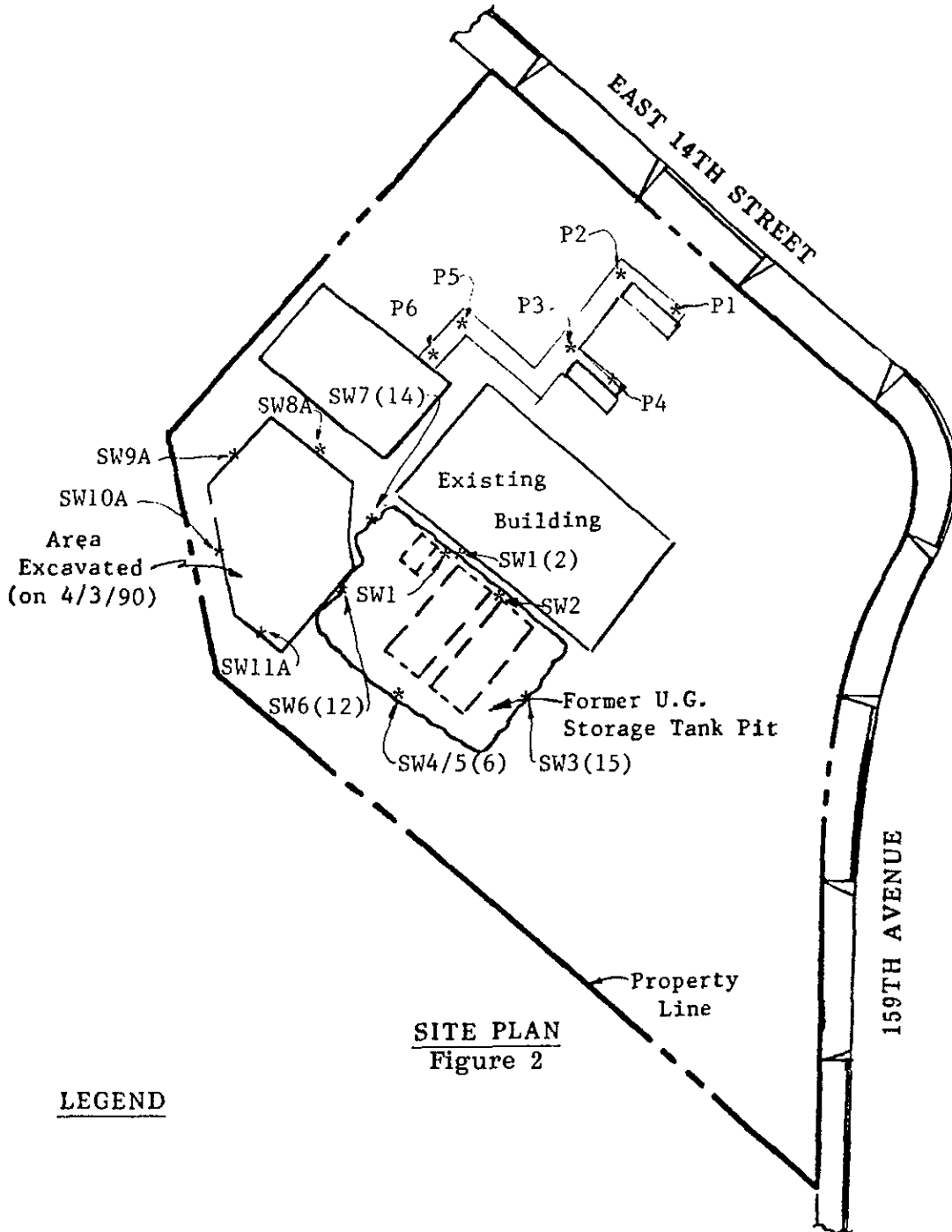
0 40 80  
Approx. scale feet

Unocal S/S #6277  
15803 E. 14th Street  
San Leandro, CA



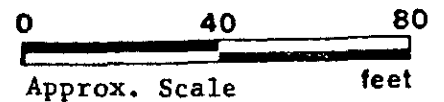
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SITE PLAN  
Figure 2

LEGEND



Unocal Service Station #6277  
15803 East 14th Street  
San Leandro, California

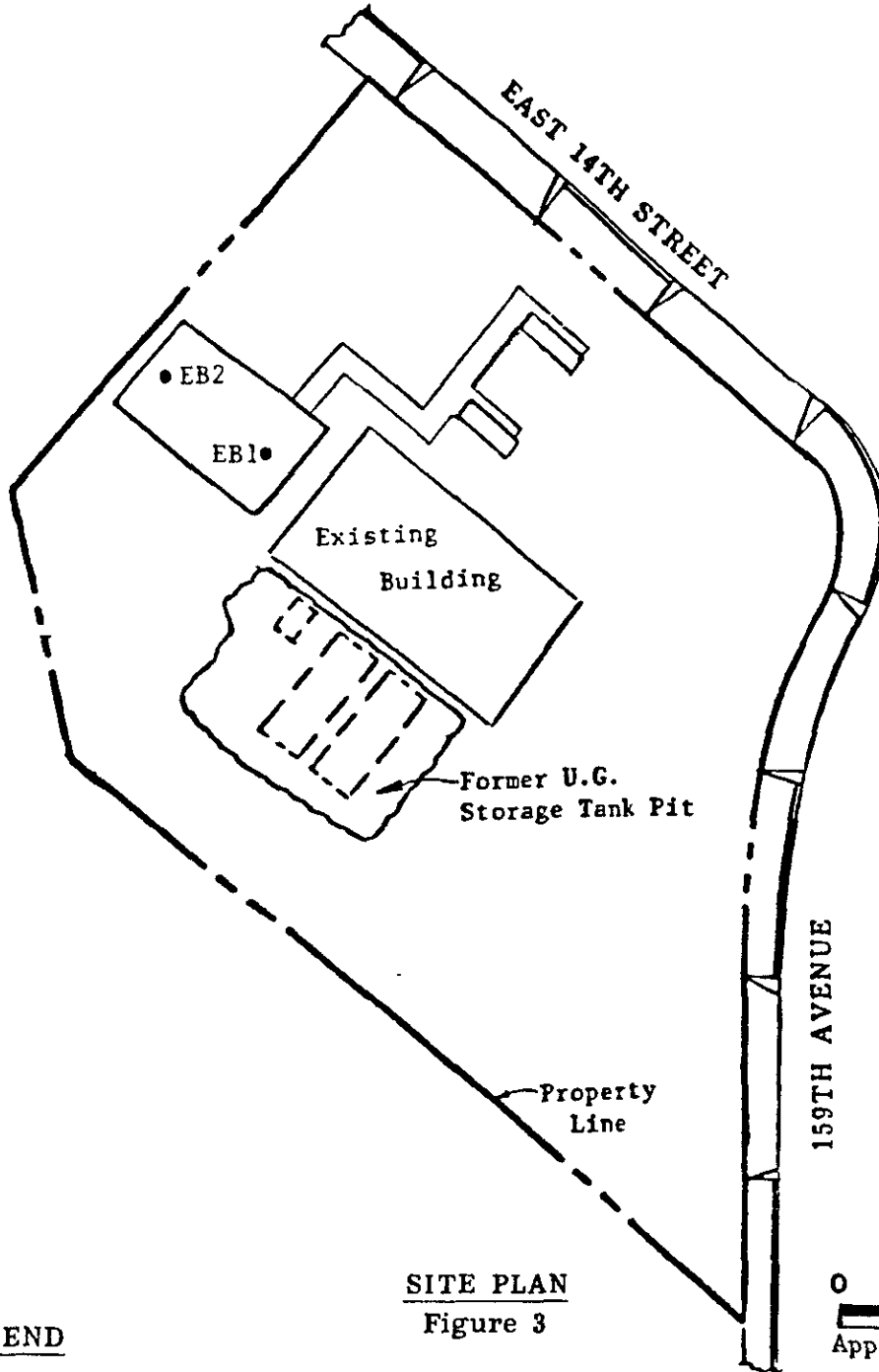


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### SITE PLAN

Figure 3

### LEGEND

- Exploratory boring

0 40 80  
Approx. scale feet

Unocal S/S #6277  
15803 East 14th Street  
San Leandro, CA



# SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520  
(510) 686-9066 • FAX (510) 686-9689

Kaprealian Engineering, Inc.	Client Project ID: Unocal/San Leandro	Sampled: Sep 10, 1991
P.O. Box 996	Matrix Descript: Water	Received: Sep 10, 1991
Benicia, CA 94510	Analysis Method: EPA 5030/8015/8020	Analyzed: Sep 13, 1991
Attention: Mardo Kaprealian, P.E.	First Sample #: 109-0872 AB	Reported: Sep 26, 1991

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

Sample Number	Sample Description	Low/Medium B.P.	Benzene	Toluene	Ethyl	Xylenes
		Hydrocarbons			Benzene	
		$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)	$\mu\text{g/L}$ (ppb)
109-0872 AB	MW-1	280	38	3.1	4.1	22
109-0873 AB	MW-2A	180	8.7	0.93	15	13
109-0874 AB	MW-3*	170	N.D.	N.D.	N.D.	N.D.
109-0875 AB	MW-4*	56	N.D.	N.D.	N.D.	N.D.

**Detection Limits:**

30

0.30

0.30

0.30

0.30

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

**SEQUOIA ANALYTICAL**

*Belinda C. Vega*  
Belinda C. Vega  
Laboratory Director

Please Note:

\*The above samples do not appear to gasoline.

Amended report : October 4, 1991

1090872.KEI &lt;1&gt;





# SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520  
(510) 686-9066 • FAX (510) 686-9689

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

Client Project ID: Unocal/San Leandro  
Matrix Descript: Water  
Analysis Method: EPA 3510/8015  
First Sample #: 1090873 C

Sampled: Sep 10, 1991  
Received: Sep 10, 1991  
Extracted: Sep 16, 1991  
Analyzed: Sep 22, 1991  
Reported: Sep 26, 1991

## TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons $\mu\text{g/L}$ (ppb)
109-0873 C	MW-2	65

Detection Limits:

50

High Boiling Point Hydrocarbons are quantitated against a diesel fuel standard.  
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

  
Belinda C. Vega  
Laboratory Director

Please Note:

The above sample does not appear to contain diesel.



# SEQUOIA ANALYTICAL

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(510) 686-9066 • FAX (510) 686-9689

Kaprealian Engineering, Inc.

Client Project ID: Unocal/San Leandro

P.O. Box 996

Benicia, CA 94510

Attention: Mardo Kaprealian, P.E. QC Sample Group: 1090872-75

Reported: Sep 26, 1991

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel
---------	---------	---------	---------------	---------	--------

Method:	EPA 8015/8020	EPA 8015/8020	PA 8015/802	PA 8015/802	EPA 8015
Analyst:	RH	RH	RH	RH	A. Tuzon
Reporting Units:	µg/L	µg/L	µg/L	µg/L	ms/L
Date Analyzed:	Sep 12, 1991	Sep 12, 1991	Sep 12, 1991	Sep 12, 1991	Sep 19, 1991
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank	BLK091691

Sample Conc.:	ND	ND	ND	ND	ND
Spike Conc. Added:	20	20	20	60	300
Conc. Matrix Spike:	22	19	22	70	310
Matrix Spike % Recovery:	110	95	110	120	100
Conc. Matrix Spike Dup.:	22	19	23	70	310
Matrix Spike Duplicate % Recovery:	110	95	110	120	100
Relative % Difference:	0	0	4.4	0	1.0

Laboratory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

  
Belinda C. Vega  
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



# SEQUOIA ANALYTICAL

1900 Bates Avenue • Suite LM • Concord, California 94520  
(510) 686-9066 • FAX (510) 686-9689

Kaprealian Engineering, Inc.

Client Project ID: Unocal/San Leandro

P.O. Box 996

Benicia, CA 94510

Attention: Mardo Kaprealian, P.E. QC Sample Group: 1090872-875

Reported: Sep 26, 1991

## QUALITY CONTROL DATA REPORT

### SURROGATE

	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015	EPA8015
Method:	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015/8020	EPA8015	EPA8015
Analyst:	M.N.	M.N.	M.N.	M.N.	M.N.	A.Tuzon	A.Tuzon
Reporting Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Date Analyzed:	Sep 13, 1991	Sep 13, 1991	Sep 13, 1991	Sep 13, 1991	Sep 13, 1991	Sep 22, 1991	Sep 22, 1991
Sample #:	BLANK	109-0872	109-0873	109-0874	109-0875	BLANK	109-0873

Surrogate % Recovery:	110	95	91	94	94	120	150
--------------------------	-----	----	----	----	----	-----	-----

SEQUOIA ANALYTICAL

Belinda C. Vega  
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$



# KAPREALIAN ENGINEERING, INC.

## CHAIN OF CUSTODY

SAMPLER		SITE NAME & ADDRESS						ANALYSES REQUESTED		TURN AROUND TIME:	
JOE		Unocal / San Leandro 15803 E. 14th Ave						TPHG, BTXE TPHD		Regular	
WITNESSING AGENCY										REMARKS	
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION			
MW-1	9/10/91			✓	✓		2	MW	✓	1090872 AB	VOA-s preserved
MW-2	"	P.M. 2:30		✓	✓		3	"	✓	873 AC	
MW-3	"			✓	✓		2	"	✓	874 AB	
MW-4	"	P.M. 12:30		✓	✓		2	"	✓	875 AB	

Relinquished by: (Signature) <i>Joe Jimenez</i>	Date/Time 9/10/91 1550	Received by: (Signature) <i>Beth Stumper</i>
Relinquished by: (Signature) <i>K. Williams</i>	Date/Time 9/10 8:15 pm	Received by: (Signature) <i>[Signature]</i>
Relinquished by: (Signature) <i>Shirley C.</i>	Date/Time 9/10 2130	Received by: (Signature) <i>[Signature]</i>
Relinquished by: (Signature)	Date/Time	Received by: (Signature)

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

- Have all samples received for analysis been stored in ice?  
Yes
- Will samples remain refrigerated until analyzed?  
Yes
- Did any samples received for analysis have head space?  
No
- Were samples in appropriate containers and properly packaged?  
Yes

BS Signature      Logan Title      9/10/91 Date