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KEI-P89-1106.QR6  
July 23, 1992

*revised 10/5/92*  
*SOS*

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

Attention: Ms. Penny Silzer

RE: Semi-Annual Report  
Unocal Service Station #3072  
2445 Castro Valley Boulevard  
Castro Valley, California

Dear Ms. Silzer:

This report presents the results of the most recent monitoring and sampling of the monitoring wells at the referenced site by Kaprealian Engineering, Inc. (KEI), per KEI's proposal KEI-P89-1106.P3 dated June 11, 1990, and as modified in KEI's report (KEI-P89-1106.QR5) dated January 20, 1992. The wells are currently monitored quarterly and sampled on a semi-annual basis. This report covers the work performed by KEI from January through June of 1992.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a service station and auto care facility. The subject site is situated on gently sloping, northeast trending topography, and is located near the base of the northeast flank of a series of low lying, northwest trending foothills separating Castro Valley from Hayward. The site is located at the southern corner of the intersection of Castro Valley Boulevard with Strobridge Avenue, and is situated approximately 1,200 feet southwest of an unnamed drainage. A Location Map and Site Plans are attached to this report.

KEI's initial work at the site began on November 14, 1989, when KEI collected soil samples following the removal of three fuel storage tanks (each tank had a capacity of 10,000 gallons and contained regular unleaded gasoline, super unleaded gasoline, and diesel fuel, respectively) and one 550 gallon waste oil tank at the referenced site. All of the tanks were made of steel. Two small holes were observed in the regular unleaded gasoline tank. Extensive pitting, but no holes, was observed in the super unleaded gasoline tank. The diesel tank had been treated and wrapped prior to installation, and therefore it was not possible to assess the condition of the tank at the time of removal. No apparent holes or cracks were observed in the waste oil tank. Six soil samples (designated as A1, A2, B1, B2, C1, and C2) were collected from

beneath the fuel storage tanks at depths of 13.5 feet below grade. A soil sample (W01) was collected from beneath the waste oil tank at a depth of 10.5 feet below grade.

All soil samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California. The samples collected beneath the fuel storage tanks were analyzed for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes, and ethylbenzene (BTX&E). In addition, the two samples collected from beneath the diesel tank were analyzed for TPH as diesel. The soil sample collected from beneath the waste oil tank was analyzed for TPH as gasoline, BTX&E, TPH as diesel, total oil and grease (TOG), EPA method 8010 compounds, EPA method 8270 compounds, and the metals cadmium, chromium, lead, and zinc.

The analytical results for the soil samples collected from beneath the fuel tanks showed levels of TPH as gasoline ranging from non-detectable to 11 ppm, with non-detectable BTX&E concentrations in each case. TPH as diesel concentrations were non-detectable for the two samples collected beneath the diesel tank. The analytical results of the soil sample collected from beneath the waste oil tank showed TPH as gasoline at 5.9 ppm, metals ranging from non-detectable to 45 ppm, 55 ppb of 1,1-dichloroethene, and non-detectable levels of all other constituents analyzed. The analytical results are summarized in Table 9, and the sample point locations are as shown on the attached Site Plan, Figure 2.

On November 16, 1989, KEI collected six sidewall soil samples (designated as SW1 through SW6) and a water sample (designated as W1) from the fuel tank pit. The tank pit water level was measured to be 11.5 feet below the ground surface. The sidewall soil samples were collected at approximately 6 to 12-inches above the tank pit water level. All samples were analyzed for TPH as gasoline and BTX&E. Three of the six sidewall soil samples (labeled SW2, SW3, and SW4) and the water sample (labeled W1) were also analyzed for TPH as diesel. Analytical results of the soil samples collected from the fuel tank pit showed TPH as gasoline ranging from non-detectable to 29 ppm for four of the six samples, with samples SW1 and SW4 showing 140 ppm and 160 ppm, respectively. TPH as diesel levels were non-detectable for two of the sidewall samples, with sample SW4 showing 24 ppm. Analytical results of the water sample collected from the fuel tank pit showed 11,000 ppb of TPH as diesel, 26,000 ppb of TPH as gasoline, and 670 ppb of benzene. The analytical results of the soil samples are summarized in Table 9, and the analytical results of the water sample are summarized in Table 10. Sample point locations are as shown on the attached Site Plan, Figure 2.

On November 28, 1989, KEI returned to the site to meet with a representative of the Alameda County Health Care Services Agency (ACHCS), in order to clarify the ACHCS' guidelines as applied to the subject site for fuel tank pit excavation and sampling. In response to the meeting, KEI submitted a Phase I work plan (KEI-P89-1106.P1) dated November 30, 1989, to define the extent of contamination in the vicinity of the tank pit. The work plan was approved by the ACHCS in a letter dated December 8, 1989.

On December 22, 1989, KEI returned to the site to collect additional sidewall soil samples from the fuel tank pit after further excavation. Soil was excavated from the north, east, and south sides of the pit. Sidewall soil samples, designated as SW1(17), SW2(17), SW7, SW8, SW9, SW10, SW11, and SW3(13), were collected at depths of approximately 9 or 11 feet below grade, and analyzed on-site by Mobile Chem Labs, Inc., of Lafayette, California (a State certified mobile laboratory). After excavation, TPH as gasoline was detected at concentrations of 1,500 ppm and 1,900 ppm on the northerly wall of the pit, at concentrations ranging from 3.0 ppm to 1,700 ppm on the easterly wall, and at 410 ppm on the southerly wall. The analytical results of the soil samples are summarized in Table 8, and the sample point locations are as shown on the attached Site Plan, Figure 3.

Based on the analytical results, KEI recommended the installation of nine exploratory borings to further define the extent of the soil contamination. Documentation of soil sample collection techniques and the analytical results are presented in KEI's work plan/proposal (KEI-P89-1106.P2) dated January 8, 1990.

On January 18 and 19, 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. The monitoring wells were drilled and completed to total depths ranging from 22 to 30 feet below grade. Ground water was encountered at depths ranging from 9 to 20.5 feet beneath the surface during drilling. The wells were developed on January 22 and 23, 1990, and were initially sampled on March 22, 1990.

Water and selected soil samples were analyzed for TPH as gasoline and BTX&E. Analytical results of the soil samples collected from the borings for monitoring wells MW1, MW2, and MW3 indicated non-detectable levels of TPH as gasoline and BTX&E in all soil samples, except for sample MW1(5), which showed 2.8 ppm of TPH as gasoline, 0.051 ppm of benzene, and 0.11 ppm of ethylbenzene. Analytical results of the ground water samples collected from monitoring wells MW2 and MW3 indicated non-detectable levels of TPH as gasoline and BTX&E. In well MW1, TPH as gasoline and benzene were detected at 32 ppb and 4.2 ppb, respectively. The analytical results of the soil samples are summarized in Table 7, and the results of the

water samples are summarized in Table 2. Documentation of the well installation procedures, sample collection techniques, and the analytical results are presented in KEI's report (KEI-J89-1106.R7) dated April 12, 1990.

On February 14, 1990, three soil samples, labeled P1, P2, and P3, were collected from the product pipe trenches at depths ranging from 2.5 to 4 feet below grade. The soil samples were analyzed for TPH as gasoline and BTX&E. Analytical results of samples collected from the pipe trench indicated levels of TPH as gasoline ranging from 6.0 ppm to 87 ppm, and benzene levels ranging from 0.23 ppm to 0.47 ppm. The results of the soil analyses are summarized in Table 6. Soil sample locations are shown on the attached Site Plan, Figure 4. Documentation of sample collection techniques and analytical results are presented in KEI's report (KEI-J89-1106.R5) dated March 6, 1990.

KEI returned to the site on March 9, 1990, when three sidewall soil samples, labeled SWB, SWC, and SWD, were collected from the sidewalls of the waste oil tank pit excavation at depths of 8 to 9 feet below grade. The waste oil tank pit had been excavated to a depth of 11 to 12 feet below grade. The soil samples were analyzed for TPH as gasoline, BTX&E, TPH as diesel, TOG, and EPA method 8010 compounds. Analytical results of the soil samples (SWB, SWC and SWD) collected from sidewalls of the waste oil tank pit indicated non-detectable levels of TOG and all EPA method 8010 constituents for each of the three samples. The analytical results indicated non-detectable levels of TPH as gasoline and BTX&E for samples SWC and SWD, while SWB showed 37 ppm of TPH as gasoline, with 0.10 ppm of benzene. TPH as diesel levels were non-detectable for sample SWC, and both SWB and SWD showed less than 10 ppm of TPH as diesel. The results of the soil samples are summarized in Table 5. Soil sample point locations are as shown on the attached Site Plan, Figure 5. Documentation of sample collection techniques and the analytical results are presented in KEI's report (KEI-J89-1106.R6) dated April 13, 1990.

On April 24 and 25, 1990, the previously recommended exploratory borings (designated as EB1 through EB8 on the attached Site Plan, Figure 1) were drilled at the site. The eight borings were drilled and/or sampled to depths of 10.5 to 15 feet below grade. Ground water was encountered at depths of approximately 10 to 14 feet beneath the surface in each boring, except EB4, where ground water was not encountered. Drilling was generally stopped about 1 to 2 feet after intersecting the first water table, except for EB4, which was terminated at a depth of 14.5 feet below grade when ground water was not encountered. A water sample was collected from boring EB5 only. All borings were backfilled to the surface with neat cement.

Water and selected soil samples were analyzed at Sequoia Analytical Laboratory in Redwood City, California. Soil samples from all borings, and the water sample from EB5, were analyzed for TPH as gasoline and BTX&E. The results of soil analyses are summarized in Table 4, and the results of the water analyses are summarized in Table 10.

Analytical results of the soil samples collected from the eight exploratory borings (EB1 through EB8) indicated non-detectable levels of TPH as gasoline in all samples, except EB1(9.5), EB4(14), EB6(5), EB7(5), and EB8(5), in which the levels ranged from 1.7 ppm to 5.0 ppm. Benzene was detected in all soil samples at levels ranging from 0.0053 ppm to 0.023 ppm. The analytical results of the water sample collected from boring EB5, immediately after drilling, indicated a level of TPH as gasoline at 5,900 ppb, with a level of benzene at 840 ppb.

Based on the analytical results, KEI recommended the installation of two additional monitoring wells to further define the extent of ground water contamination. In addition, KEI recommended the implementation of monthly monitoring and quarterly sampling of the existing monitoring wells. Documentation of the exploratory boring installation protocol, sample collection techniques, and the analytical results are presented in KEI's report (KEI-J89-1106.R8) dated June 11, 1990.

On August 13, 1990, two additional two-inch diameter monitoring wells (designated as MW4 and MW5 on the attached Site Plan, Figure 1) were installed at the site. The two wells were drilled and completed to total depths ranging from 23.5 to 24 feet below grade. Ground water was encountered at depths ranging from 10 to 14.5 feet beneath the surface during drilling. The new wells (MW4 and MW5) were developed on August 20, 1990, and all of the wells were sampled on August 27, 1990.

Water samples from all wells (MW1 through MW5), and selected soil samples from the borings for wells MW4 and MW5, were analyzed at Sequoia Analytical Laboratory in Redwood City, California. The samples were analyzed for TPH as gasoline and BTX&E.

Analytical results of the soil samples collected from the borings for monitoring wells MW4 and MW5 indicated non-detectable levels of TPH as gasoline and BTX&E in all analyzed samples. The analytical results of the water samples collected from all of the wells showed non-detectable levels of TPH as gasoline in all wells. Benzene was detected in wells MW1, MW3, and MW4 at levels of 3.2 ppb, 1.1 ppb and 0.34 ppb, respectively. The results of the soil analyses are summarized in Table 3, and the results of the water analyses are summarized in Table 2. Documentation of the well installation procedures, sample collection techniques, and the analytical

results are presented in KEI's report (KEI-P89-1106.R9) dated September 28, 1990. Based on the analytical results, KEI recommended the continuation of the monthly monitoring and quarterly sampling program.

#### RECENT FIELD ACTIVITIES

The five wells (MW1 through MW5) were monitored three times and were sampled once during the semi-annual period. During monitoring, the wells were checked for depth to water and the presence of free product. At the time of sampling, the wells were also checked for the presence of a sheen. No free product or sheen was noted in any of the wells during the semi-annual period. Monitoring data are summarized in Table 1.

Water samples were collected from the wells on June 18, 1992. Prior to sampling, the wells were each purged of between 10 and 12 gallons by the use of a surface pump. Water samples were then collected by the use of a clean Teflon bailer. The samples were decanted into clean VOA vials and/or one-liter amber bottles, as appropriate, which were then sealed with Teflon-lined screw caps 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 June 18, 1992, the ground water flow direction appeared to be predominantly toward the east-northeast, as shown on the attached Site Plan, Figure 1. The average hydraulic gradient at the site on June 18, 1992, was approximately 0.016. The water levels have fluctuated during the past six months, showing net increases of 0.24 and 1.46 feet in wells MW1 and MW2, respectively, and net decreases of 0.03 and 0.25 feet in wells MW3 through MW5 since December 20, 1991. The measured depth to ground water at the site on June 18, 1992, ranged between 6.35 and 9.36 feet below grade.

Based on review of regional geologic maps (U.S. Geological Survey Open-File Report 80-540 "Preliminary Geologic Map of the Hayward Quadrangle, Alameda and Contra Costa Counties, California" by T.W. Dibblee, Jr., 1980), the subject site is underlain by Quaternary-age alluvium. Mapped bedrock outcrops adjacent to the site include the marine Panoche Formation (Kpc), which is described as a conglomerate generally composed of granite, diorite, quartzite and black chert cobbles in a sandstone matrix, and the Knoxville Formation (JKK), which is described as consisting of dark micaceous shale with minor thin sandstone.

In addition, the site is situated approximately 3,000 feet northeast of the mapped trace of the active Hayward Fault; 1,900

feet southwest of the concealed mapped trace of the East Chabot Fault; and 1,800 feet northeast of the mapped trace (northern terminous?) of the West Chabot Fault.

As exposed in the underground tank pit excavation, the earth materials at the subject site consist of artificial fill materials at the surface. These fill materials are typically 1 to 2 feet thick, and locally vary up to a maximum of about 9 feet at the original east wall of the pit excavation (prior to additional excavation). These fill materials are in turn underlain by dark gray, silty clay soil materials, which are about 2.5 feet thick. These soil materials are underlain by greenish-brown to yellowish-brown, highly weathered to slightly weathered shale, which varies from soft to moderately hard with abundant fractures (both clay healed and relatively open).

The results of the drilling activities at the site indicated that bedrock materials underlying the site are composed of brown and gray shale, which is slightly to highly weathered. The depth to the bedrock materials appears to vary considerably at the site, from about 5 to 6 feet below grade in the vicinity of well MW1 and boring EB2, to about 21.5 feet below grade in the vicinity of well MW2, to greater than 22 feet below grade in the vicinity of well MW3 (the maximum depth explored). However, bedrock commonly underlies that site at a depth of about 8 to 10 feet below grade, as encountered in the majority of the borings at the site and as exposed in the old tank pit excavation.

#### 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 by EPA method 5030 in conjunction with modified 8015, and BTX&E by EPA method 8020. In addition, samples from MW4 and MW5 were analyzed for TPH as diesel by EPA method 3510 in conjunction with modified 8015.

The analytical results for the ground water samples collected from monitoring wells MW1 through MW5 indicated non-detectable levels of TPH as gasoline and BTX&E. Also, in monitoring wells MW4 and MW5, TPH as diesel was non-detectable. The results of the analyses are summarized in Table 2. Copies of the analytical results and Chain of Custody documentation are attached to this report.

#### DISCUSSION AND RECOMMENDATIONS

As shown in Table 2, the ground water samples collected from all five monitoring wells during the past five sampling events (March 1991 through June 1992) have shown benzene concentrations less than



1 ppb, which is the State of California drinking water standard for benzene. In addition, no detectable concentrations of BTX&E were detected in any well during the past three sampling events. In addition, the ground water samples collected from all five wells during the past seven sampling events (August 1990 through June 1992) have shown no detectable concentrations of TPH as gasoline, except for 44 ppb detected in well MW4 on March 11, 1991, and 34 ppb detected in well MW1 on December 12, 1990. Lastly, the ground water samples collected from wells MW4 and MW5 (located adjacent to the fuel tank pit) have shown no detectable concentrations of TPH as diesel. Therefore, based on the analytical results of all the ground water samples collected to date, KEI recommends no further monitoring and sampling of the existing wells at the subject site, unless required by the regulatory agencies. KEI will submit a work plan/proposal to destroy all of the wells once approval is granted from the regulatory agencies.

#### DISTRIBUTION

A copy of this report should be sent to the ACHCS, and to the Regional Water Quality Control Board, 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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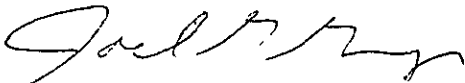
Should you have any questions regarding this report, please do not hesitate to call me at (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.



Thomas J. Berkins  
Senior Environmental Engineer



Joel G. Greger  
Certified Engineering Geologist

License No. 1633  
Exp. Date 6/30/94



Timothy R. Ross  
Project Manager

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Attachments: Tables 1 through 10  
Location Map  
Site Plans - Figures 1 through 5  
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 June 18, 1992)

MW1	172.32	8.81	0	No	11
MW2	174.05	9.36	0	No	11
MW3	172.27	6.35	0	No	10
MW4	172.53	6.84	0	No	10
MW5	172.16	6.97	0	No	12

(Monitored on March 19, 1992)

MW1	174.22	6.91	0	--	0
MW2	175.88	6.53	0	--	0
MW3	174.06	4.56	0	--	0
MW4	174.45	4.92	0	--	0
MW5	173.38	5.75	0	--	0

(Monitored on January 20, 1992)

MW1	172.36	8.77	0	--	0
MW2	174.01	8.40	0	--	0
MW3	172.52	6.10	0	--	0
MW4	172.76	6.61	0	--	0
MW5	171.98	7.15	0	--	0

<u>Well #</u>	<u>Surface Elevation* (feet)</u>
MW1	181.13
MW2	182.41
MW3	178.62
MW4	179.37
MW5	179.13

-- Sheen determination was not performed.

\* The elevations of the top of the well covers have been surveyed to Mean Sea Level, per Caltrans Monument "Stro-Nor" PK Nail.

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TABLE 2  
 SUMMARY OF LABORATORY ANALYSES  
 WATER

<u>Date</u>	<u>Sample Number</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>
6/18/92	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND
	MW5	ND	ND	ND	ND	ND	ND
12/20/91	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND
	MW5	ND	ND	ND	ND	ND	ND
9/25/91	MW1	--	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	ND	ND	ND	ND	ND	ND
	MW5	ND	ND	ND	ND	ND	ND
6/12/91	MW1	--	ND	0.66	ND	ND	ND
	MW2	--	ND	ND	0.46	0.44	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	0.48	ND
	MW5	--	ND	ND	ND	0.32	ND
3/11/91	MW1	--	ND	0.90	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	44	0.74	ND	0.15	3.2
	MW5	--	ND	ND	ND	ND	ND
12/12/90	MW1	--	34	1.6	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	0.73	ND	ND	ND
	MW5	--	ND	ND	ND	ND	ND
8/27/90	MW1	--	ND	3.2	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	1.1	0.50	0.89	0.54
	MW4	--	ND	0.34	ND	ND	ND
	MW5	--	ND	ND	ND	ND	ND

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TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES  
WATER

<u>Date</u>	<u>Sample Number</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>
3/22/90	MW1	--	32	4.2	ND	1.1	0.36
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4*	--	ND	ND	ND	ND	ND

-- Indicates analysis was not performed.

ND = Non-detectable.

\* Sample MW4 is a duplicate of sample MW2 (only on the date indicated).

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 Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>
8/13/90	MW4(5)	5.0	ND	ND	ND	ND	ND
	MW5(9.5)	9.5	ND	ND	ND	ND	ND
	MW5(13.5)	13.5	ND	ND	ND	ND	ND
Detection Limits			1.0	0.0050	0.0050	0.0050	0.0050

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 Number</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethylbenzene</u>
4/24/90	EB1(5)	ND	0.0063	0.042	0.011	ND
&	EB1(9.5)	4.9	0.0078	0.24	0.11	0.028
4/25/90	EB1(13.5)	ND	0.0087	0.048	ND	ND
	EB2(5)	ND	0.0053	0.020	0.013	0.0068
	EB2(10)	ND	0.0059	0.026	0.013	0.0050
	EB3(5)	ND	0.0069	0.031	0.017	ND
	EB3(9)	ND	0.0093	0.023	ND	ND
	EB4(5)	ND	0.0091	0.034	ND	ND
	EB4(10)	ND	0.0090	0.27	ND	ND
	EB4(14)	1.7	0.0079	0.43	ND	ND
	EB5(5)	ND	0.0095	0.015	ND	ND
	EB6(5)	5.0	0.066	0.021	0.11	0.032
	EB6(10)	ND	0.0086	0.060	0.014	0.0052
	EB6(13)	ND	0.0080	0.16	0.24	0.0092
	EB7(5)	3.0	0.040	0.056	0.073	0.034
	EB7(9.5)	ND	0.0081	0.078	0.025	0.015
	EB7(13.5)	ND	0.0054	0.085	0.012	ND
	EB8(5)	2.7	0.023	0.067	0.078	0.013
	EB8(10)	ND	0.0072	0.056	0.019	0.0050
	Detection Limits	1.0	0.0050	0.0050	0.0050	0.0050

ND = Non-detectable.

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

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TABLE 5

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>
3/09/90	SWB*	8.0	<10	37	0.10	0.10	0.74	0.25
	SWC*	9.0	ND	ND	ND	ND	ND	ND
	SWD*	9.0	<10	ND	ND	ND	ND	ND
Detection Limits			1.0	1.0	0.05	0.1	0.1	0.1

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

ND = Non-detectable.

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



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TABLE 6

SUMMARY OF LABORATORY ANALYSES  
SOIL

<u>Date</u>	<u>Sample</u>	<u>Depth (feet)</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl- benzene</u>
2/14/90	P1	4.0	87	0.33	0.17	10	2.3
	P2	2.5	6.0	0.23	ND	0.33	0.11
	P3	3.0	10	0.47	0.11	1.1	0.32
Detection Limits			1.0	0.05	0.1	0.1	0.1

ND = Non-detectable.

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

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TABLE 7  
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>Ethylbenzene</u>
1/18/90	MW1(5)	5.0	2.8	0.051	ND	ND	0.11
	MW1(6.5)	6.5	ND	ND	ND	ND	ND
	MW1(10.0)	10.0	ND	ND	ND	ND	ND
	MW2(5)	5.0	ND	ND	ND	ND	ND
	MW2(6.5)	6.5	ND	ND	ND	ND	ND
	MW2(9.0)	9.0	ND	ND	ND	ND	ND
	MW2(10)	10.0	ND	ND	ND	ND	ND
	MW2(15)	15.0	ND	ND	ND	ND	ND
	MW2(16.5)	16.5	ND	ND	ND	ND	ND
	MW2(20)	20.0	ND	ND	ND	ND	ND
	MW3(5)	5.0	ND	ND	ND	ND	ND
	MW3(6.5)	6.5	ND	ND	ND	ND	ND
	MW3(9)	9.0	ND	ND	ND	ND	ND
	Detection Limits		1.0	0.05	0.1	0.1	0.1

ND = Non-detectable.

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

KEI-P89-1106.QR6  
July 23, 1992

TABLE 8  
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>
12/22/89	SW1(17)	11	ND	1,900	14	24	120	28
	SW2(17)	11	ND	1,500	17	29	92	23
	SW7	9	ND	1,700	16	33	110	26
	SW8	9	ND	200	2.6	0.9	7.7	5.0
	SW3(13)	9	ND	690	11	11	28	11
	SW9	9	ND	3.0	0.2	0.1	0.1	ND
	SW10	9	ND	500	4.0	5.9	22	6.9
	SW4(11)	9	ND	410	2.7	3.9	19	3.8
Detection Limits			1.0	1.0	0.1	0.1	0.1	0.1

ND = Non-detectable.

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

KEI-P89-1106.QR6  
 July 23, 1992

TABLE 9

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>
11/14/89	A1	13.5	ND	2.4	ND	ND	ND	ND
&	A2	13.5	ND	ND	ND	ND	ND	ND
11/16/89	B1	13.5	--	1.9	ND	ND	ND	ND
	B2	13.5	--	11	ND	ND	ND	ND
	C1	13.5	--	1.5	ND	ND	ND	ND
	C2	13.5	--	7.5	ND	ND	ND	ND
	SW1	10.5	--	140	0.31	0.12	3.0	0.88
	SW2	10.5	ND	ND	ND	ND	ND	ND
	SW3	10.5	ND	ND	ND	ND	ND	ND
	SW4	9.5	24	160	0.33	6.4	30	9.4
	SW5	9.5	--	3.5	0.06	0.27	0.76	0.19
	SW6	10	--	29	0.12	0.21	2.0	0.58
	WO1(11)*	11	ND	5.9	ND	ND	ND	ND
Detection Limits			1.0	1.0	0.05	0.1	0.1	0.1

ND = Non-detectable.

-- Indicates analysis was not performed.

\* TOG and all EPA method 8270 constituents were non-detectable. All EPA method 8010 constituents were non-detectable, except 1,1-dichloroethene at 55 ppb. Metal concentrations were as follows: cadmium was detected at 2.5 ppm, chromium at 39 ppm, lead at 1.1 ppm, and zinc at 45 ppm.

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

KEI-P89-1106.QR6  
July 23, 1992

TABLE 10

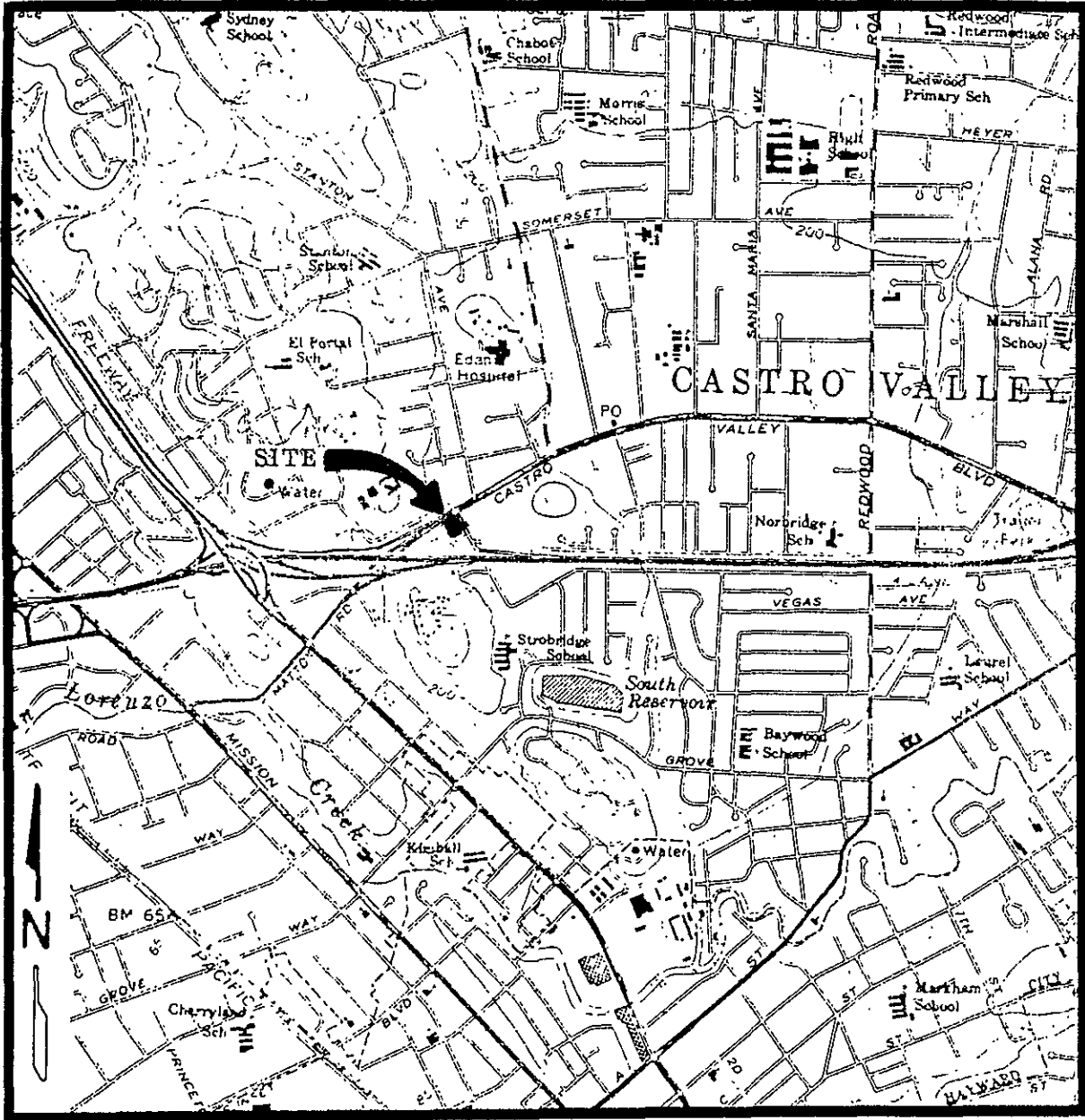
SUMMARY OF LABORATORY ANALYSES  
WATER

<u>Date</u>	<u>Sample Number</u>	<u>TPH as Diesel</u>	<u>TPH as Gasoline</u>	<u>Benzene</u>	<u>Toluene</u>	<u>Xylenes</u>	<u>Ethyl-benzene</u>
11/16/89	W1	11,000	26,000	670	1,100	9,100	120
4/25/90	EB5	--	5,900	840	34	73	100
Detection Limits		50	30	0.30	0.30	0.30	0.30

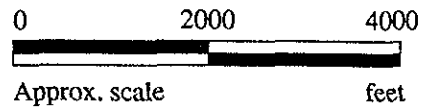
-- Indicates analysis was not performed.

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

NOTE: The water sample from EB5 was collected during drilling. The results of the analyses may not be representative of formation water; they should be used for comparative informational purposes only.



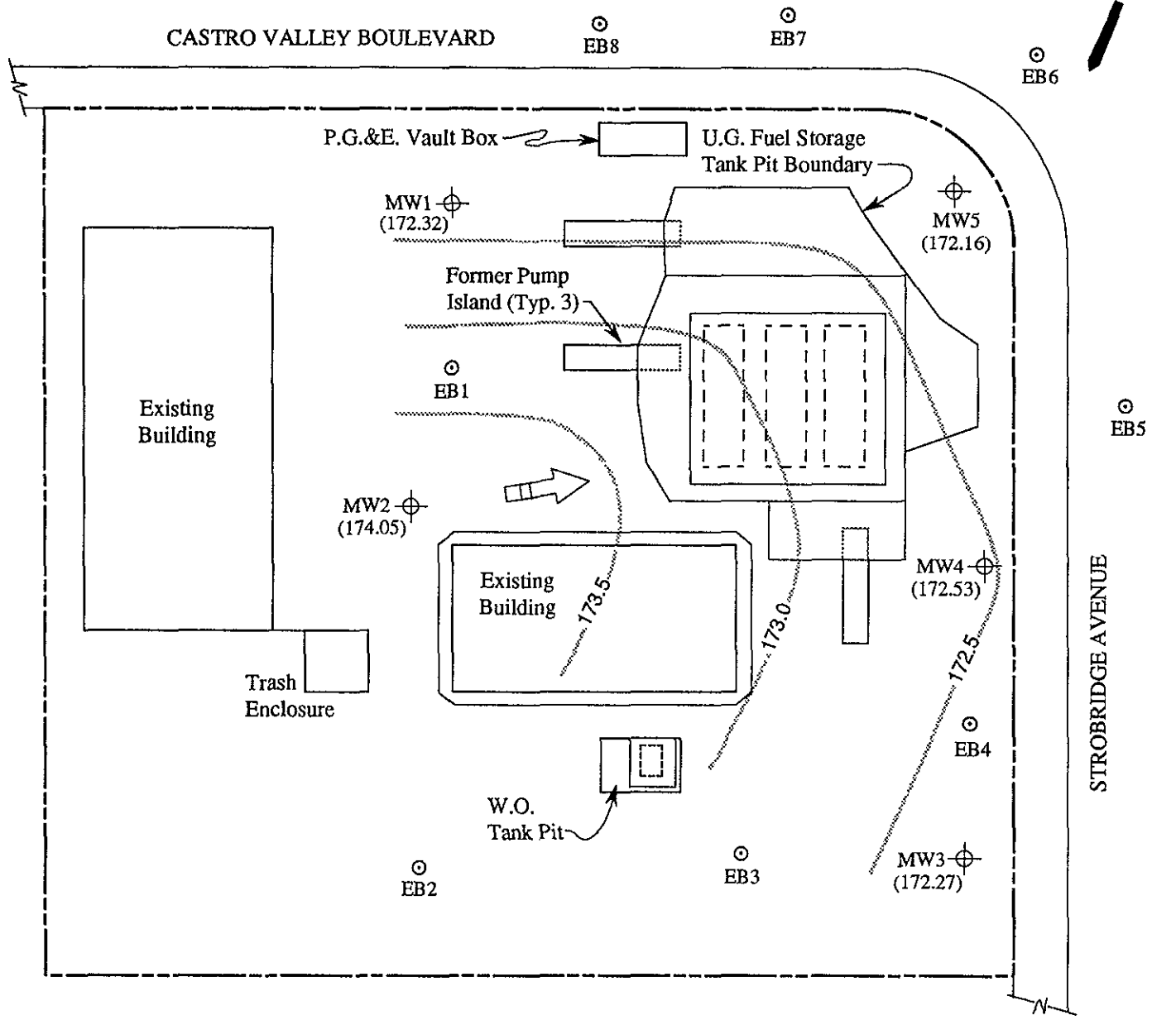
Base modified from 7.5 minute U.S.G.S. Hayward Quadrangle  
(photorevised 1980)



**KEI**  
KAPREALIAN ENGINEERING  
INCORPORATED

UNOCAL SERVICE STATION #3072  
2445 CASTRO VALLEY BLVD.  
CASTRO VALLEY, CA

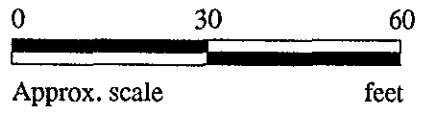
LOCATION  
MAP



**SITE PLAN**

**LEGEND**

- ⊕ Monitoring well
- ⊙ Exploratory boring
- ( ) Ground water elevation in feet above Mean Sea Level on 6/18/92
- ➔ Direction of ground water flow
- ⋯ Contours of ground water elevation

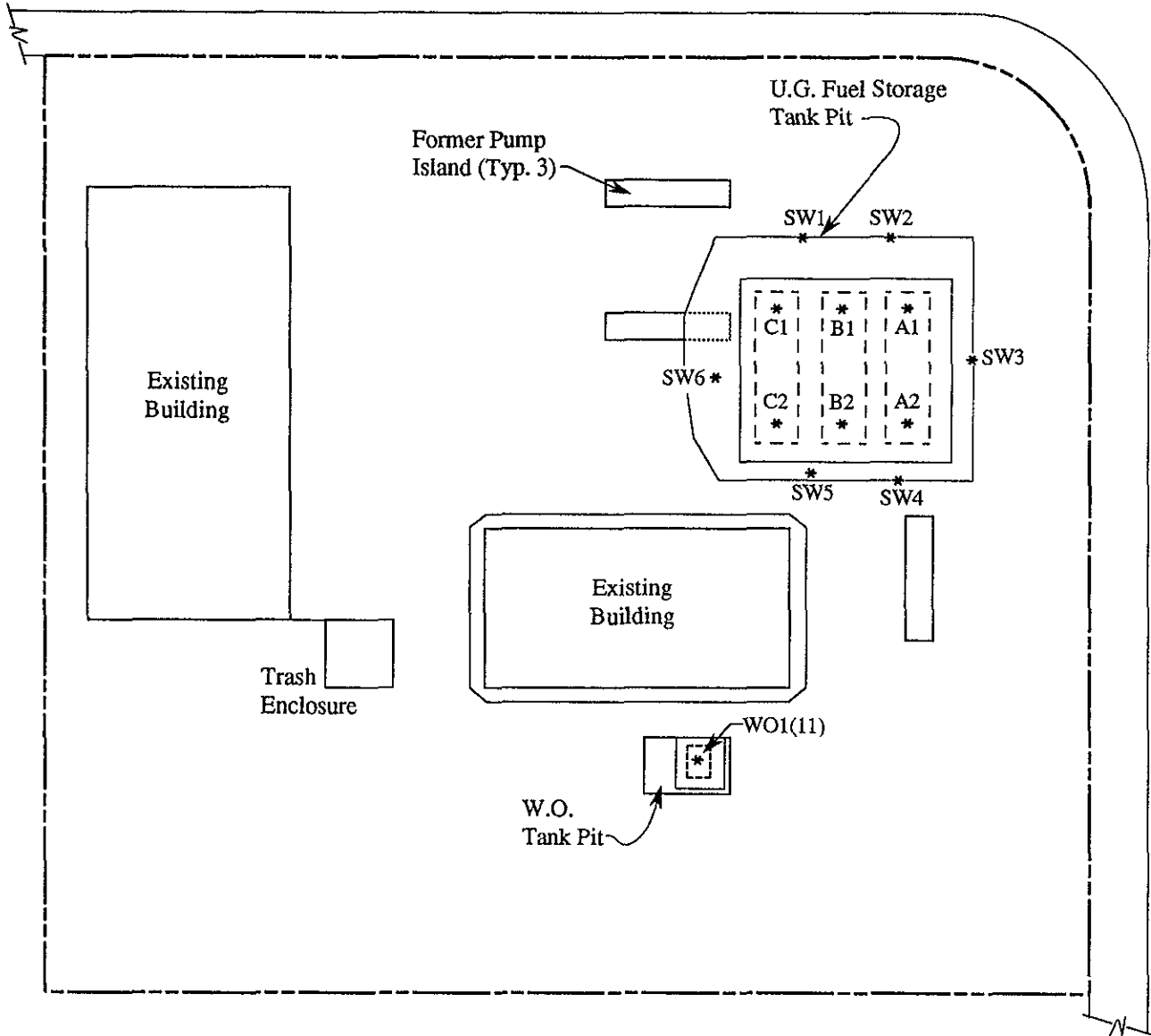


**UNOCAL SERVICE STATION #3072  
2445 CASTRO VALLEY BLVD.  
CASTRO VALLEY, CA**

**FIGURE  
1**



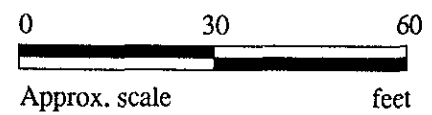
CASTRO VALLEY BOULEVARD



SITE PLAN

LEGEND

\* Sample Point Location

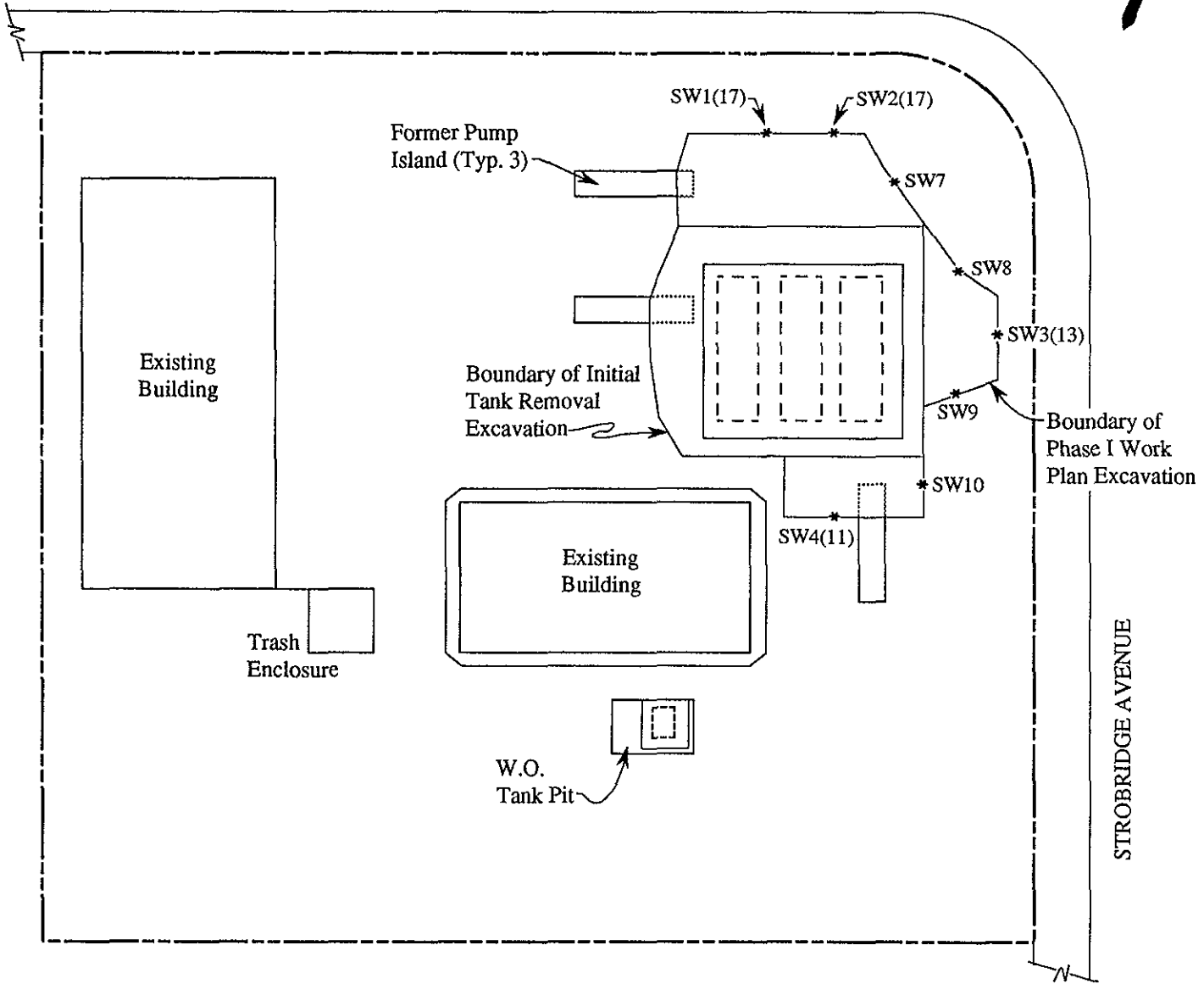


**UNOCAL SERVICE STATION #3072  
2445 CASTRO VALLEY BLVD.  
CASTRO VALLEY, CA**

**FIGURE  
2**



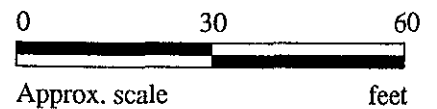
CASTRO VALLEY BOULEVARD



SITE PLAN

LEGEND

\* Sample Point Location

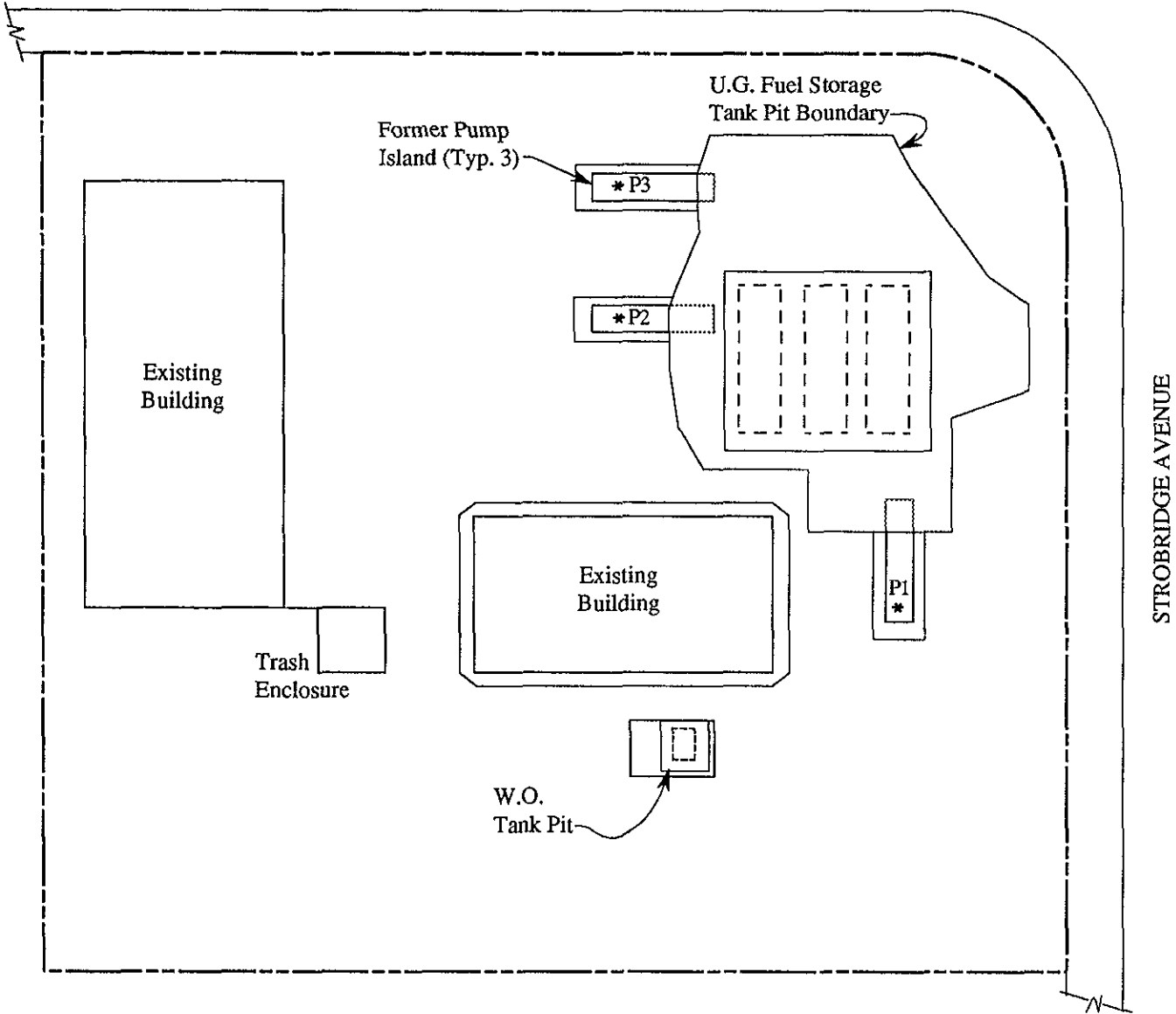


UNOCAL SERVICE STATION #3072  
 2445 CASTRO VALLEY BLVD.  
 CASTRO VALLEY, CA

FIGURE  
**3**



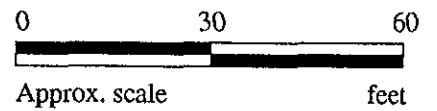
CASTRO VALLEY BOULEVARD



SITE PLAN

LEGEND

\* Sample Point Location

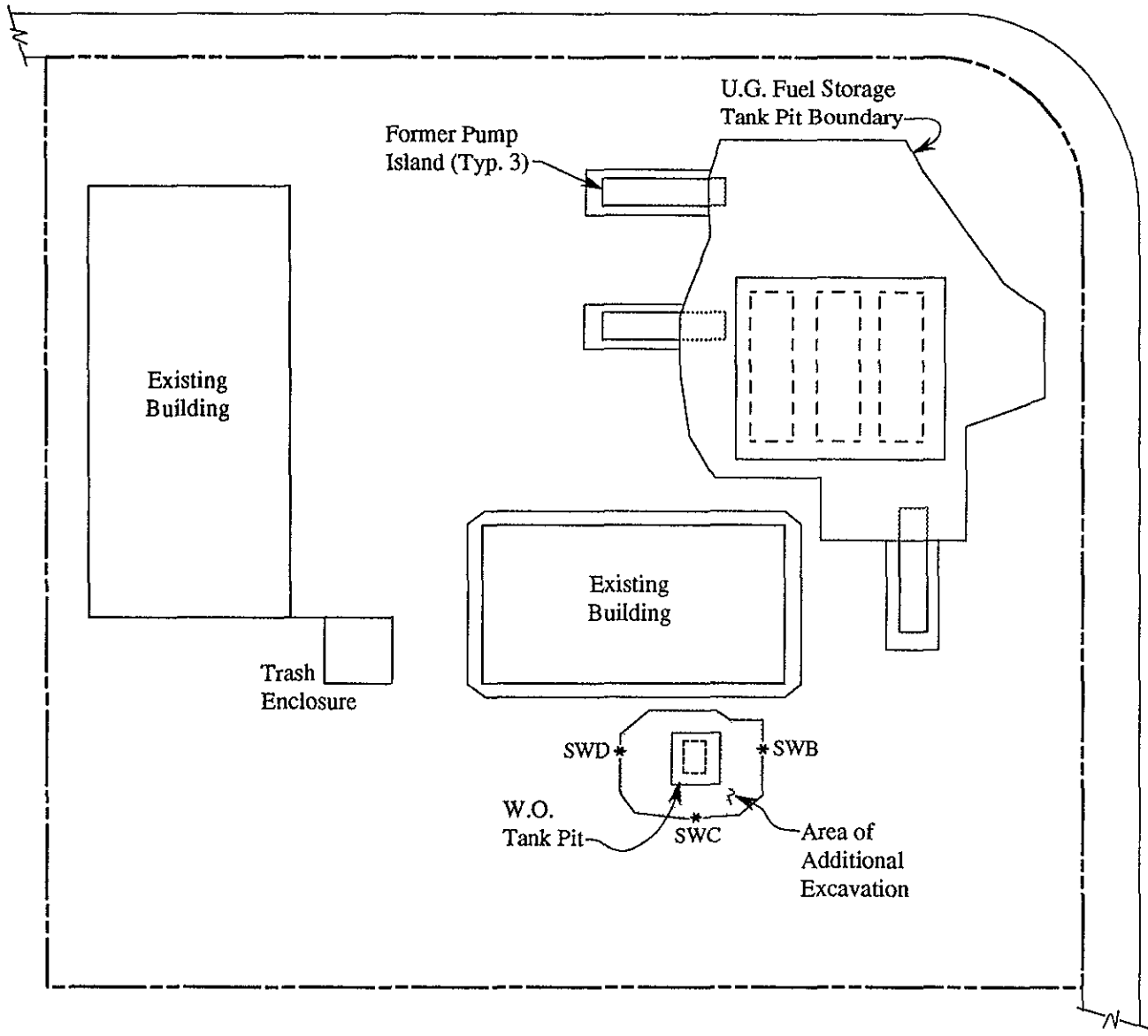


**UNOCAL SERVICE STATION #3072  
2445 CASTRO VALLEY BLVD.  
CASTRO VALLEY, CA**

**FIGURE  
4**



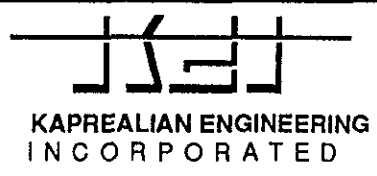
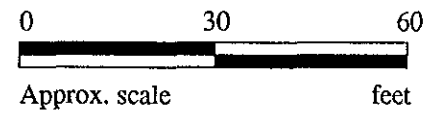
CASTRO VALLEY BOULEVARD



SITE PLAN

LEGEND

\* Sample Point Location



UNOCAL SERVICE STATION #3072  
2445 CASTRO VALLEY BLVD.  
CASTRO VALLEY, CA

FIGURE  
**5**



# SEQUOIA ANALYTICAL

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

Kapreallan Engineering, Inc. 2401 Stanwell Drive, Suite 400 Concord, CA 94520 Attention: Mardo Kapreallan, P.E.	Client Project ID: Unocal, 2445 Castro Valley Blvd. Castro Valley Matrix Descript: Water Analysis Method: EPA 5030/8015/8020 First Sample #: 206-0999	Sampled: Jun 18, 1992 Received: Jun 18, 1992 Analyzed: Jun 23, 1992 Reported: Jul 1, 1992
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## TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P.	Benzene	Toluene	Ethyl	Xylenes
		Hydrocarbons			Benzene	
		ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)	ug/L (ppb)
206-0999	MW-1	N.D.	N.D.	N.D.	N.D.	0.40
206-1000	MW-2	N.D.	N.D.	N.D.	N.D.	N.D.
206-1001	MW-3	N.D.	N.D.	N.D.	N.D.	N.D.
206-1002	MW-4	N.D.	N.D.	N.D.	N.D.	N.D.
206-1003	MW-5	N.D.	N.D.	N.D.	N.D.	N.D.

<b>Method Detection Limits:</b>	<b>50</b>	<b>0.30</b>	<b>0.30</b>	<b>0.30</b>	<b>0.30</b>
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Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.

SEQUOIA ANALYTICAL

*Scott A. Chieffo*  
 Scott A. Chieffo  
 Project Manager



# SEQUOIA ANALYTICAL

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(510) 686-9600 • FAX (510) 686-9689

Kapreallan Engineering, Inc. 2401 Stanwell Drive, Suite 400 Concord, CA 94520 Attention: Mardo Kapreallan, P.E.	Client Project ID: Unocal, 2445 Castro Valley Blvd. Castro Valley Matrix Descript: Water Analysis Method: EPA 3510/8015 First Sample #: 206-1002	Sampled: Jun 18, 1992 Received: Jun 18, 1992 Extracted: Jun 25, 1992 Analyzed: Jun 29, 1992 Reported: Jul 1, 1992
--	---	---

## TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons ug/L (ppb)
206-1002	MW-4	N.D.
206-1003	MW-5	N.D.

<b>Method Detection Limits:</b>	<b>50</b>
---------------------------------	-----------

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

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager

2060999.KEI <2>



# SEQUOIA ANALYTICAL

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Kapreallan Engineering, Inc.  
2401 Stanwell Drive, Suite 400  
Concord, CA 94520

Client Project ID: Unocal, 2445 Castro Valley Blvd., Castro Valley

Attention: Mardo Kapreallan, P.E. QC Sample Group: 2060999-1003

Reported: Jul 1, 1992

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015
Analyst:	A.T.	A.T.	A.T.	A.T.	K.Wimer
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Jun 23, 1992	Jun 23, 1992	Jun 23, 1992	Jun 23, 1992	Jun 29, 1992
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60	300
Conc. Matrix Spike:	18	19	19	63	301
Matrix Spike % Recovery:	90	95	95	105	100
Conc. Matrix Spike Dup.:	20	20	20	63	288
Matrix Spike Duplicate % Recovery:	100	100	100	105	96
Relative % Difference:	10	5.1	5.1	0.0	4.4

Laboratory Blank contained the following analytes: None detected.

SEQUOIA ANALYTICAL

  
Scott A. Chieffo  
Project Manager

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

2060999.KEI <3>



# SEQUOIA ANALYTICAL

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

Client Project ID: Unocal, 2445 Castro Valley Blvd., Castro Valley

QC Sample Group: 2060999-1003

Reported: Jul 1, 1992

## QUALITY CONTROL DATA REPORT

### SURROGATE

	EPA	EPA	EPA	EPA	EPA	EPA
Method:	8015/8020	8015/8020	8015/8020	8015/8020	8015/8020	8015/8020
Analyst:	A.T.	A.T.	A.T.	A.T.	A.T.	A.T.
Reporting Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Jun 23, 1992	Jun 23, 1992	Jun 23, 1992	Jun 23, 1992	Jun 23, 1992	Jun 23, 1992
Sample #:	Matrix Blank	206-0999	206-1000	206-1001	206-1002	206-1003

Surrogate % Recovery:	104	96	99	99	98	101
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SEQUOIA ANALYTICAL

Scott A. Chieffo  
Project Manager

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

2060999,KEI <4>



# SEQUOIA ANALYTICAL

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(510) 686-9600 • FAX (510) 686-9689

Kapreallan Engineering, Inc.  
P.O. Box 996  
Benicia, CA 94510

Client Project ID: Unocal, 2445 Castro Valley Blvd., Castro Valley

Attention: Mardo Kapreallan, P.E. QC Sample Group: 2060999-1003

Reported: Jul 1, 1992

## QUALITY CONTROL DATA REPORT

### SURROGATE

Method:	EPA8015	EPA8015	EPA8015
Analyst:	K.Wimer	K.Wimer	K.Wimer
Reporting Units:	µg/L	µg/L	µg/L
Date Analyzed:	Jun 29, 1992	Jun 29, 1992	Jun 29, 1992
Sample #:	Matrix Blank	206-1002	206-1003

<b>Surrogate</b>			
<b>% Recovery:</b>	101	88	83

SEQUOIA ANALYTICAL

*Scott A. Chieffo*  
Scott A. Chieffo  
Project Manager

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

2060999.KEL <5>





# KAPREALIAN ENGINEERING, INC.

## CHAIN OF CUSTODY

SAMPLER <i>Vartkes</i>		SITE NAME & ADDRESS <i>Unocal / Castro Valley 2445 Castro Valley Blvd.</i>					ANALYSES REQUESTED <i>TPHG:BTXE TPHD</i>				TURN AROUND TIME: <i>Regular</i>	
WITNESSING AGENCY												
SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION		TPHG:BTXE	TPHD	REMARKS
<i>MW-1</i>	<i>6/18/97</i>	<i>9:30 A.M.</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<i>2</i>	<i>Monitoring Well</i>		<input checked="" type="checkbox"/>		<i>2060999 AB ↓ 1000 AB ↓ 1001 AB ↓ 1002 AC ↓ 1003 AC</i>
<i>MW-2</i>	<i>"</i>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<i>2</i>	<i>"</i>		<input checked="" type="checkbox"/>		
<i>MW-3</i>	<i>"</i>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<i>2</i>	<i>"</i>		<input checked="" type="checkbox"/>		
<i>MW-4</i>	<i>"</i>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<i>3</i>	<i>"</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
<i>MW-5</i>	<i>"</i>	<i>12:45 P.M.</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<i>3</i>	<i>"</i>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Relinquished by: (Signature) <i>[Signature]</i>		Date/Time <i>6/18/97 6:25</i>		Received by: (Signature) <i>[Signature]</i>		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? 4. Were samples in appropriate containers and properly packaged?						
Relinquished by: (Signature) <i>[Signature]</i>		Date/Time <i>6-19</i>		Received by: (Signature) <i>[Signature]</i>								
Relinquished by: (Signature)		Date/Time		Received by: (Signature)								
Relinquished by: (Signature)		Date/Time		Received by: (Signature)								
						Signature <i>[Signature]</i>		Title <i>[Signature]</i>		Date <i>6/19</i>		