KAPREALIAN ENGINEERING
INCORPORATED

KEI-P90-0606.QR5
April 27, 1992

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

Attention: Ms. Penny Silzer

RE: Quarterly Report
Unocal Service Station #5901
11976 Dublin Boulevard
Dublin, California

Dear Ms. Silzer:

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-P90-0606.P2 dated December 17, 1990. The wells are currently monitored and sampled on a quarterly basis. This report covers the work performed by KEI from February through April 1992.

SITE DESCRIPTION AND BACKGROUND

The subject site is presently used as a service station. The site is situated on relatively gently sloping, eastward trending topography, and is located approximately 700 feet northwest of a channelized portion of Dublin Creek. The site is also located near the southwest end of the San Ramon Valley (near Amador Valley). A Location Map and Site Plans are attached to this report.

KEI's initial field work was conducted on June 13, 1990, when two underground gasoline storage tanks and one waste oil tank were removed from the site. The tanks consisted of one 10,000 gallon super unleaded gasoline storage tank, one 10,000 gallon regular unleaded gasoline storage tank, and one 280 gallon waste oil tank. The tanks were made of steel, and at least one hole (of up to 1/4-inch diameter) was observed in each of the fuel tanks. Numerous holes (up to 1/2-inch in diameter) were observed in the waste oil tank. Mr. Ravi Arulanantham of the Alameda County Health Agency (ACHA) was present during tank removal and subsequent soil sampling.

Water was encountered in the fuel tank pit at a depth of approximately 7 feet below grade, thus prohibiting the collection of any soil samples from immediately beneath the tanks. Six soil samples, labeled SW1 through SW6, were collected from the sidewalls of the fuel tank pit (each sample was collected at approximately 6 to 12

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel 510 602 5100 Fax 510 687 0602

inches above the observed water table). One soil sample, labeled WO1, was collected from beneath the waste oil tank at a depth of approximately 6.5 feet below grade. An additional soil sample, labeled SWA, was collected from the waste oil tank pit sidewall at a depth of approximately 6.5 feet below grade. Sample point locations are as shown on the attached Site Plan, Figure 2.

KEI returned to the site on June 15, 1990, in order to collect soil samples from the product pipe trenches. Four samples, labeled P1 through P4, were collected from the trenches at depths of 6 feet below grade. After the soil sampling was completed, the pipe trenches were excavated to ground water at the areas indicated on the attached Site Plan, Figure 3. Pipe trench sample point locations are also shown on the attached Site Plan, Figure 2.

On June 15, 1990, after reviewing the analytical results of the soil samples SW1 through SW6, additional excavation was performed. Four additional soil samples, labeled SW1(3), SW2(3), SW5(2.5), and SW6(3), were collected from the sidewalls of the fuel tank pit (each sample was collected approximately 6 to 12 inches above ground water), in the vicinity of sample point locations SW1, SW2, SW5, and SW6, respectively.

After soil sampling was completed, approximately 25,000 gallons of ground water were pumped from the fuel tank pit. On June 20, 1990, one water sample, labeled W1, was collected from the fuel tank pit.

Also on June 20, 1990, based on analytical results of soil samples SW1(3) and SW2(3), additional excavation was again performed. Two additional soil samples, labeled SW1(6.5) and SW2(6.5), were collected from the northerly sidewall of the fuel tank pit (each sample was collected approximately 6 to 12 inches above ground water), in the vicinity of sample point locations SW1(3) and SW2(3). The sample point locations and the area excavated are as indicated on the attached Site Plan, Figure 2.

On June 26, 1990, KEI again returned to the site, in order to collect soil samples from the sidewalls of the new underground fuel storage tank pit located to the west of the pump islands. Four soil samples, labeled SW11, SW12, SW13, and SW14, were collected from the sidewalls of the excavation (each sample was collected at 6 to 12 inches above ground water). Sample point locations are as shown on the attached Site Plan, Figure 4.

On July 3, 1990, after approximately 10,000 gallons of ground water were pumped from the new fuel tank pit, KEI collected a water sample (labeled W2) from the pit.

All samples were analyzed by Sequoia Analytical Laboratory in Redwood City, California. All soil samples, except the waste oil tank pit sidewall sample SWA, were analyzed for total petroleum hydrocarbons (TPH) as gasoline, and benzene, toluene, xylenes, and ethylbenzene (BTX&E). In addition to TPH as gasoline and BTX&E, soil sample WO1 (collected from the waste oil tank pit) was analyzed for TPH as diesel, total oil and grease (TOG), and EPA method 8010 constituents. The waste oil tank pit sidewall sample (SWA) was analyzed for TOG only. In addition to TPH as gasoline and BTX&E, the soil sample (SW11) collected from the new fuel tank pit was also analyzed for TOG.

Both water samples were analyzed for TPH as gasoline and BTX&E. In addition, water sample W2, collected from the new fuel tank pit, was analyzed for TOG.

Analytical results of the soil samples (SW1, SW2, SW5, and SW6) collected from the sidewalls of the former fuel tank pit indicated levels of TPH as gasoline ranging from 120 ppm to 5,700 ppm. Samples SW3 and SW4 indicated levels of TPH as gasoline at non-detectable and 8.0 ppm, respectively. However, after additional excavation, analytical results of the final sidewall soil samples, SW1(6.5), SW2(6.5), SW5(2.5), and SW6(3), collected laterally beyond the samples SW1, SW2, SW5, and SW6 and at a depth of approximately 6 feet below grade, indicated levels of TPH as gasoline ranging from 1.2 ppm to 32 ppm.

Analytical results of the soil samples collected from the pipe trenches indicated levels of TPH as gasoline ranging from 2.5 ppm to 37 ppm. Benzene was detected in all pipe trench samples at concentrations ranging from 0.28 ppm to 0.78 ppm.

Analytical results of the soil sample (WO1) collected from beneath the waste oil tank pit indicated levels of TPH as gasoline at 36 ppm, TPH as diesel at 120 ppm, and TOG at 1,500 ppm, with non-detectable concentrations of all EPA method 8010 constituents, except for 1,2-dichlorobenzene at 210 ppb. Analytical results of the soil sample (SWA) collected from the sidewall of the waste oil tank pit indicated levels of TOG at 3,500 ppm.

Analytical results of the soil samples (SW11, SW12, SW13, and SW14) collected from the new fuel tank pit indicated non-detectable levels of TPH as gasoline and benzene for all samples. Analytical results of sample SW11 for TOG indicated 78 ppm. The results of all soil analyses are summarized in Table 4.

Analytical results of the water sample (W1) collected from the former fuel tank pit indicated a level of TPH as gasoline at 2,300

ppb and a level of benzene at 3.1 ppb. Analytical results of the water sample (W2) collected from the new fuel tank pit indicated non-detectable levels of TPH as gasoline, TOG, and benzene. The results of the water analyses are summarized in Table 5.

KEI returned to the site on July 16, 1990, when three trenches were excavated laterally from the easterly, northerly, and westerly waste oil tank pit sidewalls. Water was encountered at a depth of approximately 7 feet below grade. Three soil samples, labeled SWB(13), SWC(10), and SWD(14), were collected from the sidewalls of the trenches, each approximately 6 to 12 inches above the observed water table. Sample point locations are as shown on the attached Site Plan, Figure 4. After sampling, the sidewalls of the waste oil tank pit were excavated laterally to the sample point locations and to depths of approximately 1 foot below the water table (or about 8 feet below grade).

On July 19, 1990, after having pumped approximately 5,000 gallons of ground water from the waste oil excavation, a water sample, labeled W3, was collected from the pit.

On July 20, 1990, KEI returned to the site to collect the additional soil samples required by the ACHA. Four soil samples, labeled SWE, SWF, SWG, and SWH, were collected (each approximately 6 to 12 inches above the ground water level) from the four corners of the waste oil tank excavation. Sample point locations are also shown on the attached Site Plan, Figure 5.

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. The water sample was analyzed for TPH as gasoline, BTX&E, TPH as diesel, TOG, and EPA method 8010 constituents.

Analytical results of the soil samples indicated non-detectable levels of TPH as diesel, TOG, and all EPA method 8010 constituents for all samples. Analytical results also indicated non-detectable levels of TPH as gasoline for all samples except SWC(10), which showed a level of TPH as gasoline at 1.1 ppm. The analytical results of the water sample indicated non-detectable levels of all constituents analyzed. The results of the soil analyses are summarized in Table 6, and the results of the water analyses are summarized in Table 7.

To comply with the requirements of the regulatory agencies and based on the analytical results, KEI proposed the installation of four monitoring wells. Documentation of the tank removal procedures, sample collection techniques, and the analytical results of

the soil samples from the fuel and waste oil tank excavations are summarized in KEI's reports (KEI-J90-0606.R1 and KEI-J90-0606.R4) dated July 16, 1990, and July 30, 1990, respectively.

On November 6 and 7, 1990, four two-inch diameter monitoring wells (designated as MW1, MW2, MW3, and MW4 on the attached Site Plan, Figure 1) were installed at the site. The monitoring wells were drilled and completed to total depths ranging from 20 to 24 feet below grade. Ground water was encountered at depths ranging from about 5.4 to 9.5 feet beneath the surface during drilling in all wells, except MW3, in which ground water was not encountered until a depth of about 15.2 feet below grade. All four wells were surveyed by a licensed land surveyor (Kier & Wright of Pleasanton, California) to Mean Sea Level (MSL) and to a vertical accuracy of 0.01 feet. The wells were developed on November 12, 1990, and were initially sampled on November 16, 1990.

Water and selected soil samples were analyzed at Sequoia Analytical Laboratory in Concord, California. Samples were analyzed for TPH as gasoline and BTX&E. In addition, samples collected from MW1 (adjacent to the waste oil tank pit) were analyzed for TPH as diesel, TOG, and for EPA method 8010 compounds.

Analytical results of the soil samples collected from the borings for monitoring wells MW1 through MW4 indicated non-detectable levels of TPH as gasoline and BTX&E in all soil samples. Analytical results of the soil sample MW1(5) indicated non-detectable levels of TPH as diesel, TOG, and EPA method 8010 compounds.

Analytical results of the ground water samples collected from monitoring wells MW1 through MW4 indicated non-detectable levels of TPH as gasoline and BTX&E. Analytical results of the water sample collected from MW1 indicated non-detectable levels of TPH as diesel, TOG, and EPA method 8010 constituents. The results of the soil analyses are summarized in Table 3, and the results of the water analyses are summarized in Table 2. Based on the analytical results, KEI recommended the implementation of a monthly monitoring and quarterly sampling program. Documentation of the well installation procedures, sample collection techniques, and the analytical results are presented in KEI's report (KEI-P90-0606.R6) dated December 17, 1990. The monitoring and sampling program was initiated in February, 1991. The results of the first quarter of monitoring and sampling are documented in KEI's report (KEI-P90-0606.QR1) dated April 23, 1991.

RECENT FIELD ACTIVITIES

The four wells (MW1 through MW4) were monitored and sampled once during the quarter. During sampling, the wells were checked for depth to water and the presence of free product and sheen. No free product or sheen was noted in any of the wells during the quarter. Monitoring data are summarized in Table 1.

Water samples were collected from the wells on April 3, 1992. Prior to sampling, the wells were each purged of between 3.5 and 13 gallons by the use of a surface pump. Samples were then collected by the use of a clean Teflon bailer. Samples were decanted into clean VOA vials and/or one-liter amber bottles, as appropriate, which were then sealed with Teflon-lined screw caps 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 April 3, 1992, the ground water flow direction appeared to be approximately north-northeast over the majority of the site (the area west of the inferred trace of the Calaveras Fault), which is relatively unchanged from the flow directions previously determined. The average hydraulic gradient over the majority of the site is approximately 0.004. The ground water elevation for monitoring well MW3 is approximately 10 to 11 feet lower than in the other three monitoring wells. As indicated below, KEI infers that a splay of the Calaveras Fault crosses the site somewhere between wells MW2 and MW3 (as shown on the attached Site Plan, Figure 1), which accounts for the approximate 10 to 11 foot differential in the water table elevation of MW3 in comparison to all other wells. The above reported ground water flow direction and gradient excluded data from well MW3.

Water levels have increased during the quarter, showing a net increase of 0.14 to 0.36 feet in all wells since January 2, 1992. The measured depth to ground water at the site on April 3, 1992, ranged between 5.24 and 15.53 feet below grade.

The subject site is situated within the Dublin Subbasin of the larger Livermore Valley Ground Water Basin, as defined by the Alameda County Flood Control and Water Conservation District. The regional ground water flow direction (as of the spring of 1990) is toward the southeast.

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 Quaternary-age alluvium. The surficial alluvium has been mapped as Holocene coarse-grained alluvium (Qhac) that typically consists of unconsolidated, permeable sand and silt (with locally coarse sand and gravel materials) and that ranges in thickness from less than 10 feet to as much as 50 feet. This coarse-grained alluvium zone appears to have been deposited from sediments generated from erosion within Dublin Canyon (which is situated immediately west of the site). The site is situated at the northern perimeter of the coarse-grained alluvium near a mapped geologic contact with Late-Pleistocene alluvium (Qpa). The Late Pleistocene alluvium is described as typically consisting of weakly consolidated, irregular interbedded clay, silt, sand, and gravel materials. The overall thickness of the alluvium underlying the site is presently unknown to KEI.

In addition, the site is situated at or is closely adjacent to the mapped trace of the active Calaveras Fault. The Calaveras Fault is a major structural break within the Coast Ranges near San Francisco Bay and most likely forms a significant barrier to the migration of ground water in the alluvial materials from the hillside areas immediately west of the site.

The results of our subsurface study indicate that the site is underlain by fill materials that extend to depths below grade of about 5 feet at MW1 and MW2 and that extend to a depth of about 1 foot below grade at MW3 and MW4. The fill materials are in turn underlain predominantly by silty clay and clayey silt materials that extend to a depth of at least 23.5 feet below grade. However, at MW3, an approximately 1 foot thick silty gravel lens was encountered at depths of about 15 to 16 feet below grade, and at MW2, a silty sand/sandy silt lens was encountered at a depth of 23.5 to 24 feet below grade (the maximum depth explored). These two relatively coarse-grained lenses discussed above were the only coarse-grained soils encountered during our subsurface study.

The significant decrease (about 10 to 11 feet) in the observed ground water table elevation at MW3 in comparison to the other wells is difficult to explain and may be related to a fault contact (of the adjacent Calaveras Fault zone), which may cross the subject site somewhere between well MW3 and well MW2. KEI conducted a review of geologic fault study reports available for inspection at the California Division of Mines and Geology (CDMG) in Pleasant Hill, California, on November 13, 1990. Studies conducted at the adjacent parcel immediately north of the subject site encountered what is described as the western side of the Calaveras Fault zone. This fault was determined to be located between approximately 130 to 136 feet west of the curb along San Ramon Road, and roughly parallel to San Ramon Road. The fault trends approximately N4°W,

and significant changes in the color of the soil materials and depth to ground water on either side of the fault were noted. Depth to ground water on the western side of the fault was noted to be significantly higher than on the eastern side of the fault. Geologic maps produced for this study project the trace of the Calaveras Fault onto the subject Unocal site.

Based on the results of our file review at the CDMG and our monitoring activities in the four wells at the subject site, it is KEI's opinion that the trace of the active Calaveras Fault crosses the eastern portion of the site in such a manner that well MW3 is east of the fault, while wells MW1, MW2, and MW4 are west of the fault, as shown on the attached Site Plan, Figure 1. Therefore, all future ground water gradient determinations at the site should represent two distinct ground water tables, with data from wells MW1, MW2, and MW4 representing one distinct ground water table, data from well MW3 representing a separate ground water table, and with the fault representing a significant ground water barrier.

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, the ground water sample collected from MW1 was analyzed for TPH as diesel by EPA method 3510 in conjunction with modified 8015, TOG by Standard Method 5520B&F, and halogenated volatile organics by EPA method 8010.

Analytical results of the ground water samples collected from monitoring wells MW1 through MW4 indicated non-detectable levels of TPH as gasoline and BTX&E. In MW1, TPH as diesel, TOG, and all EPA method 8010 constituents were 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 previously discussed and as shown in the attached tables, the analytical results of soil and ground water samples collected at the site during various phases of KEI's subsurface investigation have shown the following:

- After overexcavation of the former underground fuel tank pit, all final soil samples indicated concentrations of less than 32 ppm of TPH as gasoline, with benzene levels less than 0.027 ppm.

- After overexcavation of the waste oil tank pit, all samples showed non-detectable levels of TOG and all EPA method 8010 constituents, TPH as diesel, TPH as gasoline (except one sample at 1.1 ppm), and benzene (except two samples, at 0.0061 ppm and 0.0052 ppm).

- Pipe trench soil samples showed all TPH as gasoline levels at or less than 37 ppm, with benzene levels at or less than 0.078 ppm. Following sampling, the pipe trenches were excavated to ground water.

- All soil samples collected during installation of the four wells (MW1, MW2, MW3, and MW4) indicated non-detectable levels of TPH as gasoline and BTX&E. Additionally, the soil samples collected during the installation of well MW1 indicated non-detectable levels of TPH as diesel, TOG, and all EPA method 8010 constituents.

- All soil samples collected during excavation of the new underground fuel tank pit indicated non-detectable levels of TPH as gasoline and benzene.

- Water samples collected from the four wells during six consecutive quarters of sampling have consistently shown non-detectable concentrations of TPH as gasoline and BTX&E since the initial sampling on November 16, 1990 (except for 38 ppb and 32 ppb of TPH as gasoline detected in MW3 on January 2, 1992, and October 3, 1991, respectively). Water samples collected from MW1 have also consistently shown non-detectable levels of TPH as diesel, TOG, and EPA method 8010 constituents. It should be noted that the two detectable levels of TPH as gasoline encountered in MW3 were just slightly above the laboratory detection limit (30 ppb).

- Ground water flow direction has been consistent, generally to the north-northeast and with a relatively flat gradient.

Based on the analytical results of the soil and ground water samples collected and evaluated to date, and because the majority of the contaminated soil appears to have been excavated and removed from the site, KEI recommends that no further sampling is warranted at the site at this time, unless required by the regulatory agencies. After site closure is granted by the regulatory

No! contam under bld has not been remediated

agencies, KEI will submit a work plan to destroy the existing wells at the site.

DISTRIBUTION

A copy of this report should be sent to ACHA, 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.

Should you have any questions regarding this report, please do not hesitate to call me at (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.

Thomas J. Berkins
Senior Environmental Engineer

Joel G. Greger, C.E.G.
Senior Engineering Geologist

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

Timothy R. Ross
Project Manager

\bp

Attachments: Tables 1 through 7
Location Map
Site Plans - Figures 1 through 5
Laboratory Analyses
Chain of Custody documentation

KEI-P90-0606.QR5
April 27, 1992

TABLE 1

SUMMARY OF MONITORING DATA

Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness	Sheen	Water Purged (gallons)
(Monitored and Sampled on April 3, 1992)					
MW1	362.03	5.42	0	No	11
MW2	362.07	5.24	0	No	13
MW3	351.76	15.53	0	No	3.5
MW4	362.46	5.75	0	No	10

Well #	Surface Elevation* (feet)
MW1	367.45
MW2	367.31
MW3	367.29
MW4	368.21

-- Sheen determination was not performed.

* The elevations of the tops of the well covers have been surveyed relative to MSL.

KEI-P90-0606.QR5
April 27, 1992

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
4/03/92	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
1/02/92	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3**	--	38	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
10/03/91	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	32	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
7/02/91	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
4/01/91	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
11/16/90	MW1*	ND	ND	ND	ND	ND	ND
	MW2	--	ND	ND	ND	ND	ND
	MW3	--	ND	ND	ND	ND	ND
	MW4	--	ND	ND	ND	ND	ND
Detection Limits		50	30	0.30	0.30	0.30	0.30

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

** All EPA method 8010 constituents were non-detectable.

ND = Non-detectable.

-- Indicates analysis not performed.

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

KEI-P90-0606.QR5
April 27, 1992

TABLE 3

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on November 6 & 7, 1990)

Sample Number	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
MW1(5)*	5.0	ND	ND	ND	ND	ND	ND
MW1(8)	8.0	--	ND	ND	ND	ND	ND
MW2(5)	5.0	--	ND	ND	ND	ND	ND
MW2(7.5)	7.5	--	ND	ND	ND	ND	ND
MW2(9)	9.0	--	ND	ND	ND	ND	ND
MW3(5)	5.0	--	ND	ND	ND	ND	ND
MW3(10)	10.0	--	ND	ND	ND	ND	ND
MW3(15)	15.0	--	ND	ND	ND	ND	ND
MW4(5)	5.0	--	ND	ND	ND	ND	ND
Detection Limits		1.0	1.0	0.0050	0.0050	0.0050	0.0050

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

ND = Non-detectable.

-- Indicates analysis not performed.

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

KEI-P90-0606.QR5
April 27, 1992

TABLE 4

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on June 13, 15, 20 & 26, 1990)

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
SW1	6.0	--	5,700	2.1	41	640	110
SW1(3)	6.0	--	2,200	1.8	6.3	76	30
SW1(6.5)	6.0	--	32	0.020	0.14	0.17	0.13
SW2	6.0	--	1,500	0.35	0.57	56	8.0
SW2(3)	6.0	--	360	ND	1.0	2.0	3.0
SW2(6.5)	6.5	--	6.8	0.020	0.052	0.063	0.029
SW3	6.0	--	ND	ND	ND	ND	ND
SW4	6.0	--	8.0	0.019	0.088	0.16	0.0071
SW5	6.5	--	340	0.80	0.26	3.6	2.5
SW5(2.5)	6.0	--	11	0.027	0.054	0.12	0.070
SW6	6.5	--	120	ND	0.21	0.14	0.19
SW6(3)	6.0	--	1.2	0.0084	0.012	0.021	0.012
P1	6.0	--	2.5	0.099	0.079	0.034	ND
P2	6.0	--	37	0.78	0.14	3.8	0.43
P3	6.0	--	8.5	0.028	0.016	0.080	0.35
P4	6.0	--	16	0.091	ND	1.3	0.52
SW11*	6.0	--	ND	ND	ND	0.0079	ND
SW12	6.0	--	ND	ND	ND	ND	ND
SW13	6.0	--	ND	ND	0.022	ND	ND
SW14	6.0	--	ND	ND	ND	0.020	ND
WO1**	6.5	120	36	0.091	0.17	1.8	0.38
SWA***	6.0	--	--	--	--	--	--
Detection Limits		1.0	1.0	0.0050	0.0050	0.0050	0.0050

-- Indicates analysis not performed.

ND = Non-detectable.

* TOG was 78 ppm.

** TOG was 1,500 ppm, and all EPA method 8010 constituents were non-detectable, except 1,2-dichlorobenzene at 210 ppb.

*** TOG was 3,500 ppm.

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

KEI-P90-0606.QR5
April 27, 1992

TABLE 5

SUMMARY OF LABORATORY ANALYSES
WATER

(Collected on June 20 & July 3, 1990)

Sample #	TOG	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethylbenzene
W1*	--	2,300	3.1	0.88	250	0.39
W2**	ND	ND	ND	0.96	ND	ND
Detection Limits	5.0	30	0.30	0.30	0.30	0.30

* Collected from the former fuel storage tank pit.

** Collected from the new fuel storage tank pit.

-- Indicates analysis not performed.

ND = Non-detectable.

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

KEI-P90-0606.QR5
April 27, 1992

TABLE 6

SUMMARY OF LABORATORY ANALYSES
SOIL

(Collected on July 16 & 20, 1990)

Sample	Depth (feet)	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
SWB(13)*	6.0	ND	ND	ND	0.0095	ND	ND
SWC(10)*	6.0	ND	1.1	0.0061	0.0330	0.044	0.024
SWD(14)*	6.0	ND	ND	0.0052	0.015	ND	ND
SWE*	6.3	ND	ND	ND	0.031	ND	ND
SWF*	6.3	ND	ND	ND	0.029	0.013	0.0059
SWG*	6.3	ND	ND	ND	0.028	ND	ND
SWH*	6.3	ND	ND	ND	0.015	ND	ND
Detection Limits		1.0	1.0	0.005	0.005	0.005	0.005

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

ND = Non-detectable.

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

KEI-P90-0606.QR5
April 27, 1992

TABLE 7

SUMMARY OF LABORATORY ANALYSES
WATER

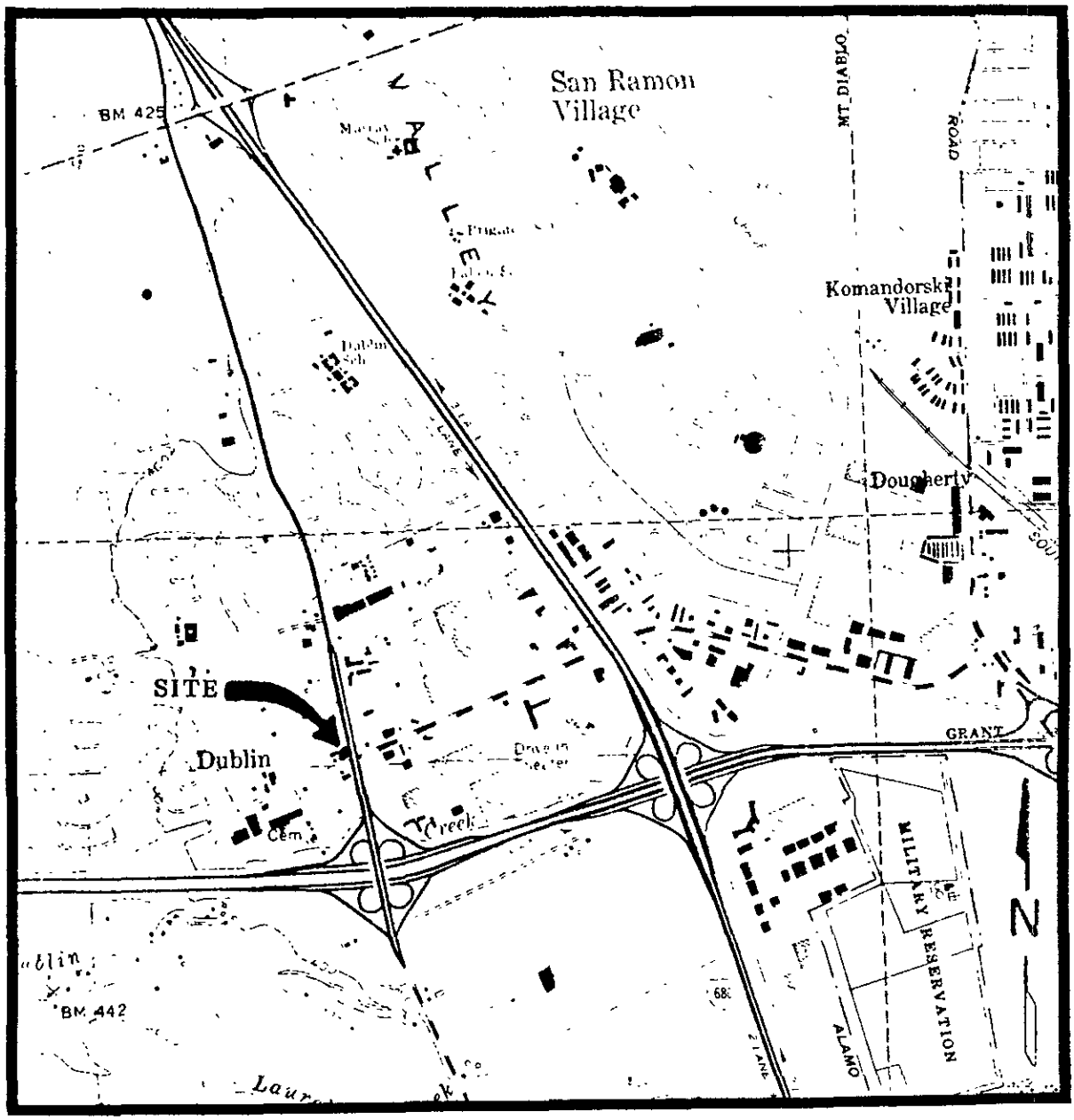
(Collected on July 19, 1990)

Sample #	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Xylenes	Ethyl-benzene
W3*	ND	ND	ND	ND	ND	ND
Detection Limits	50	30	0.30	0.30	0.30	0.30

ND = Non-detectable.

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

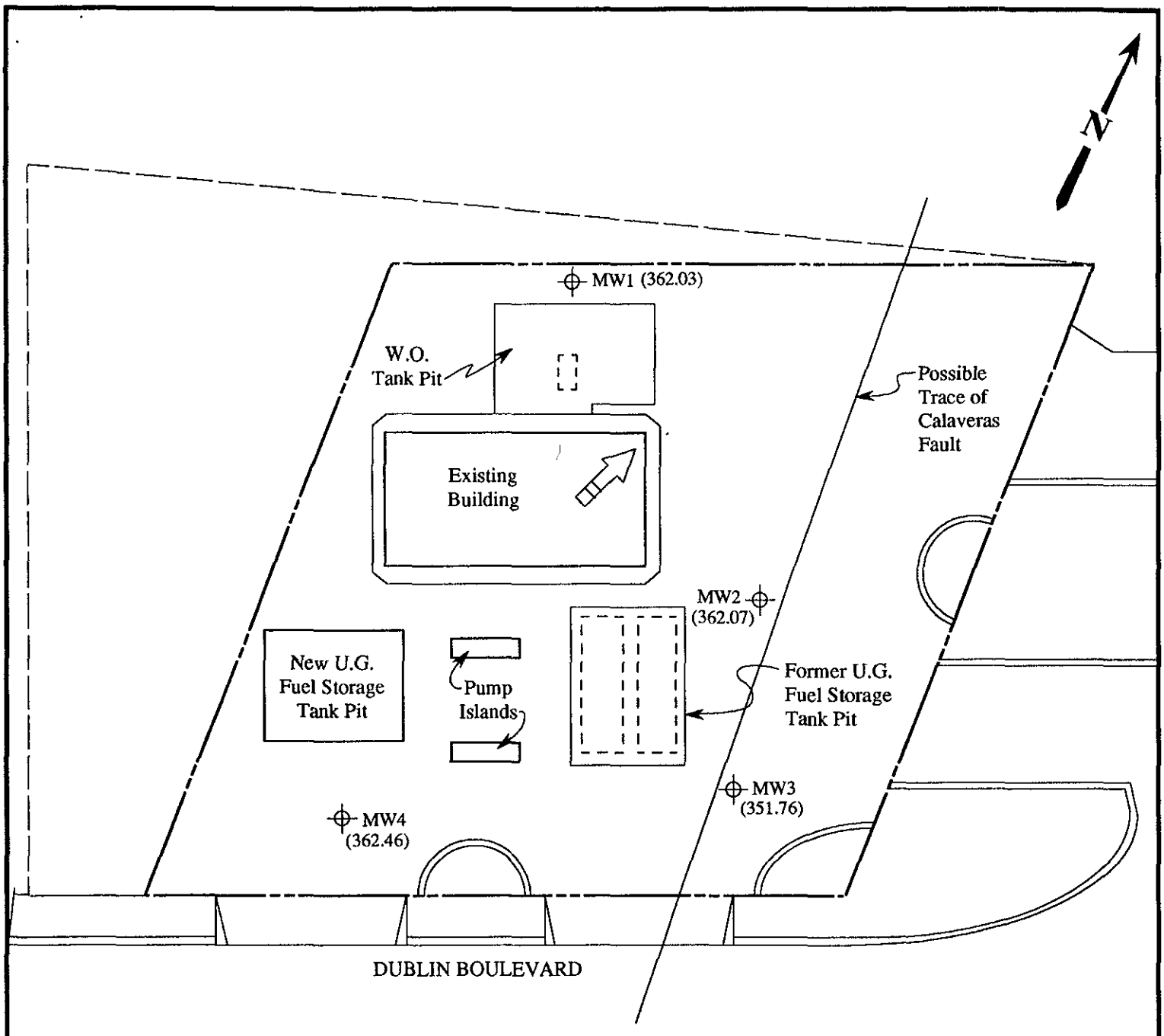
Results in parts per billion (ppb), unless otherwise indicated.



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

0 2000 4000
Approx. scale feet

KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #5901 11976 DUBLIN BOULEVARD DUBLIN, CA	LOCATION MAP



SITE PLAN

LEGEND

- Monitoring well
- ( ) Ground water elevation in feet above Mean Sea Level on 4/3/92
- Direction of ground water flow

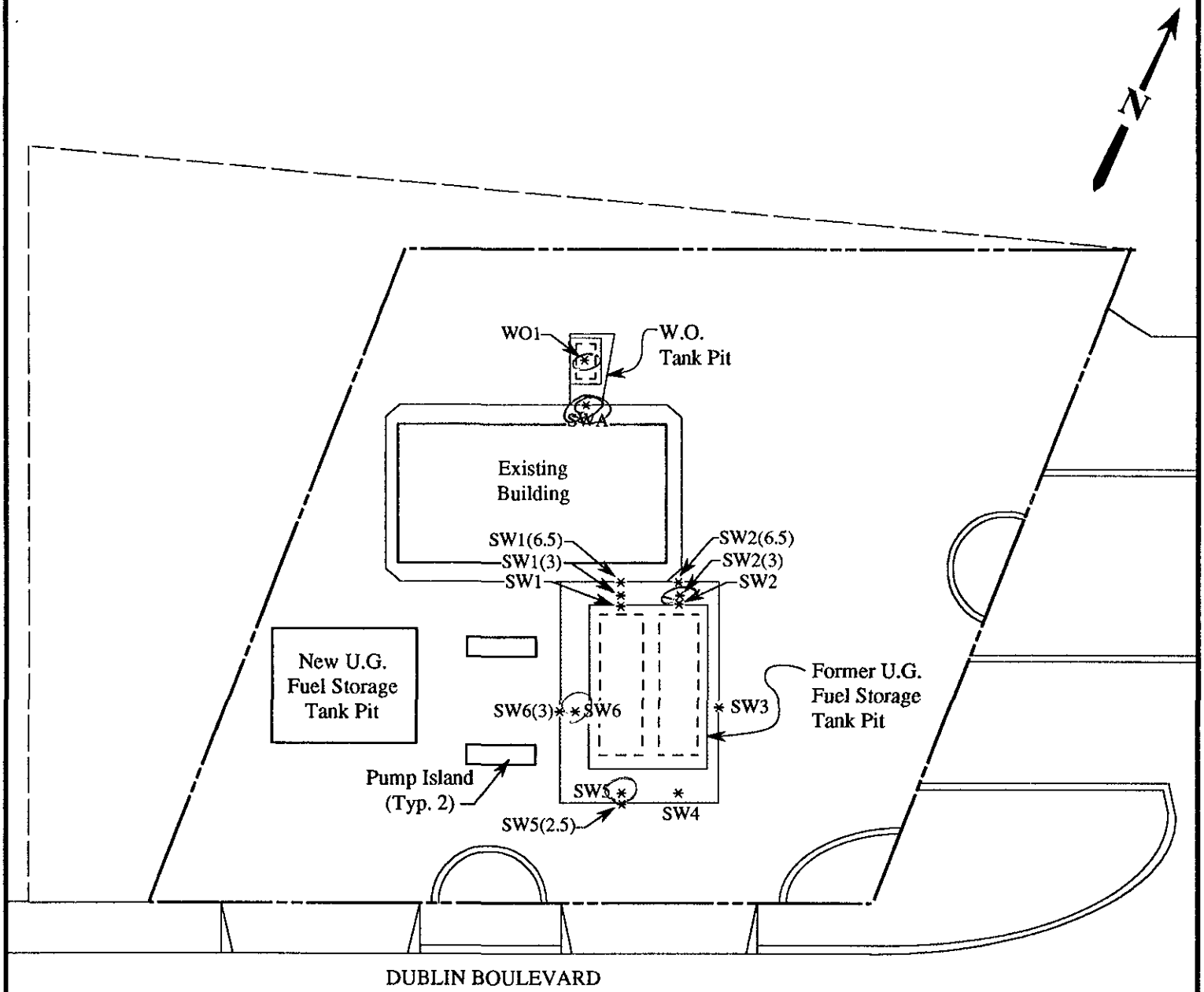
0 30 60

Approx. scale feet

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5901
11976 DUBLIN BOULEVARD
DUBLIN, CA

FIGURE
1



SITE PLAN

> 1000ppm TPH-G

○ > 100 ppm TPHG

○ 120 ppm TPH-D
1,500ppm TOG

◎ 3,500 ppm TOG

GW at 5 - 15

LEGEND

* Sample point location

☐ Additional area of excavation

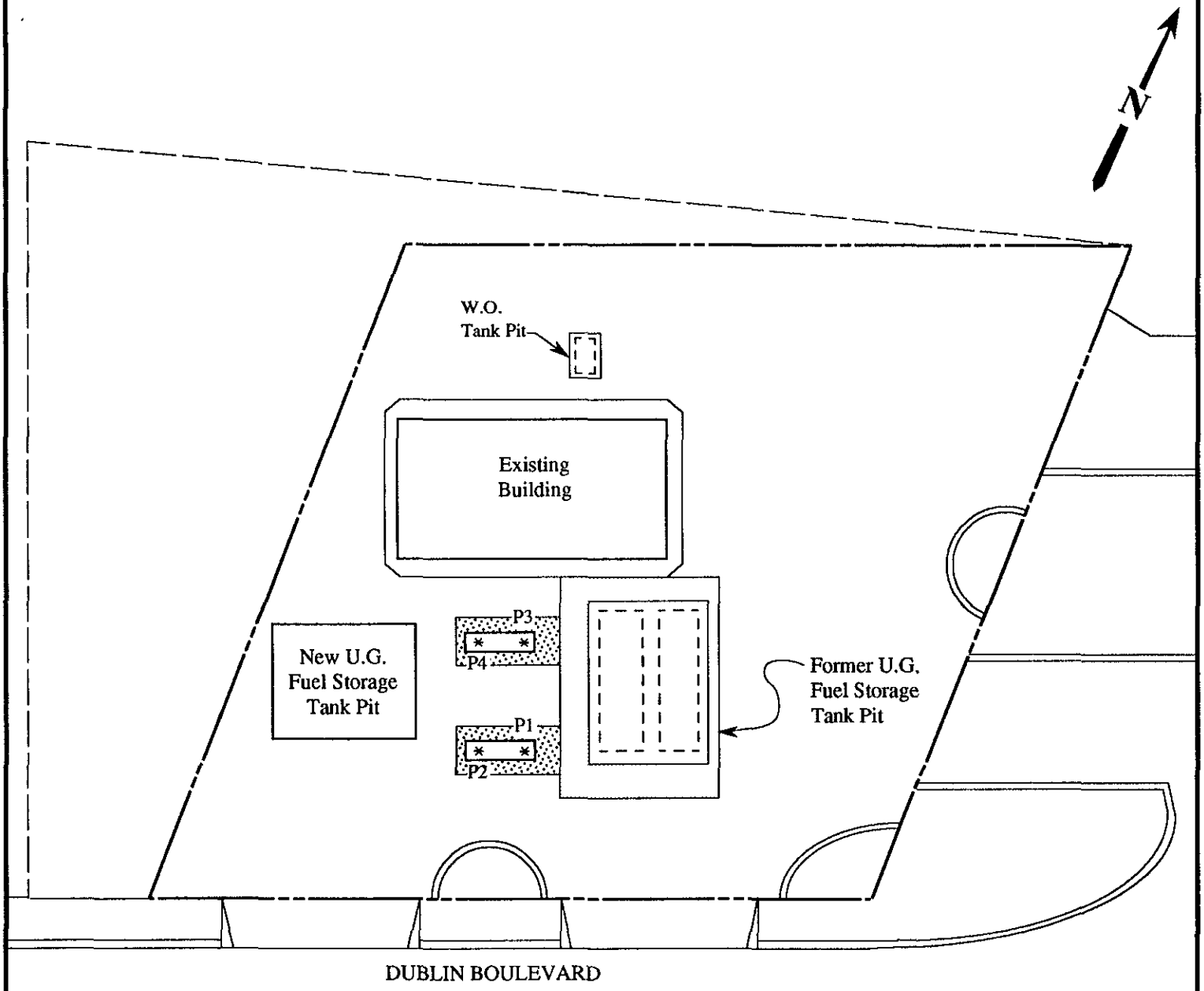
0 30 60

Approx. scale feet

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5901
11976 DUBLIN BOULEVARD
DUBLIN, CA

FIGURE
2



SITE PLAN

LEGEND

* Sample point location

Area of additional Tank Pit excavation

Area of additional Pipe Trench excavation

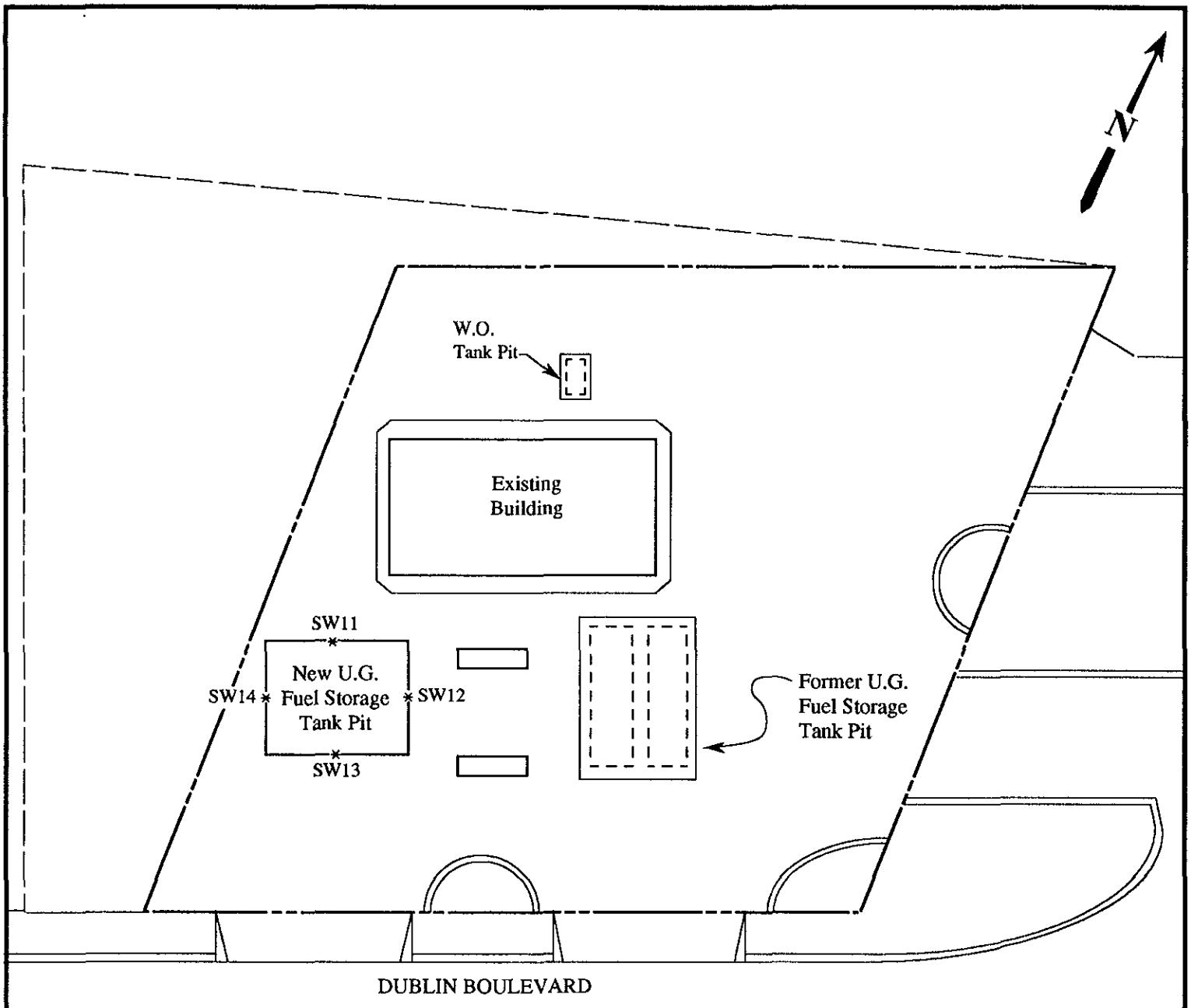
0 30 60

Approx. scale feet

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5901
11976 DUBLIN BOULEVARD
DUBLIN, CA

FIGURE
3



SITE PLAN

LEGEND

* Sample point location

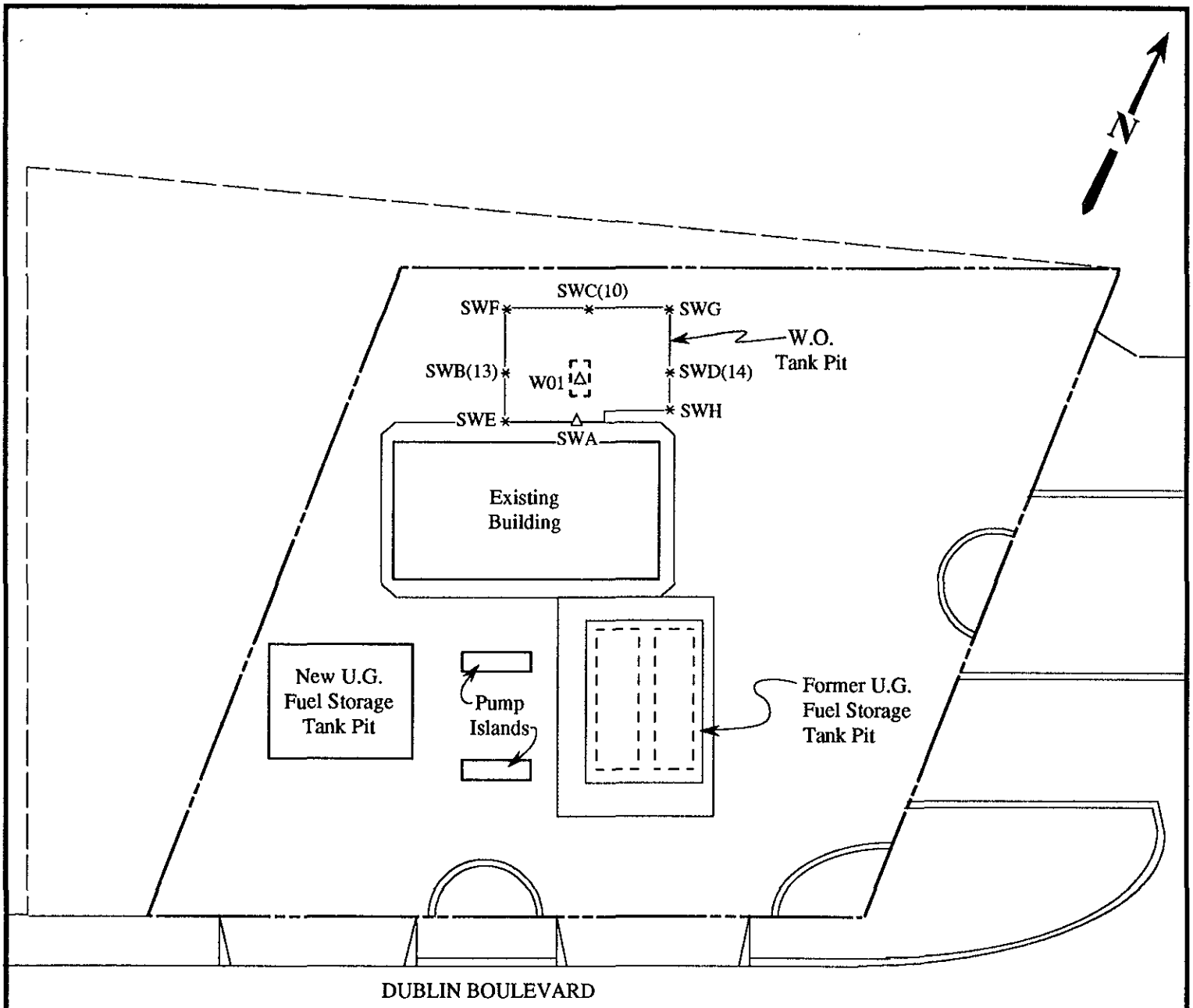
0 30 60

Approx. scale feet

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5901
11976 DUBLIN BOULEVARD
DUBLIN, CA

FIGURE
4



SITE PLAN

LEGEND

* Sample point location

△ Previous sample point location

Area of additional Tank Pit excavation

0 30 60

Approx. scale feet

KAPREALIAN ENGINEERING
INCORPORATED

UNOCAL SERVICE STATION #5901
11976 DUBLIN BOULEVARD
DUBLIN, CA

FIGURE
5

SEQUOIA ANALYTICAL

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

Kapreallan Engineering, Inc.	Client Project ID:	Unocal, 11976 Dublin Blvd., Dublin	Sampled:	Apr 3, 1992
P.O. Box 996	Matrix Descript:	Water	Received:	Apr 3, 1992
Benicia, CA 94510	Analysis Method:	EPA 5030/8015/8020	Analyzed:	4/10-4/15/92
Attention: Mardo Kapreallan, P.E.	First Sample #:	204-0169	Reported:	Apr 20, 1992

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

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
204-0169	MW-1	N.D.	N.D.	N.D.	N.D.	N.D.
204-0170	MW-2	N.D.	N.D.	N.D.	N.D.	N.D.
204-0171	MW-3	N.D.	N.D.	N.D.	N.D.	N.D.
204-0172	MW-4	N.D.	N.D.	N.D.	N.D.	N.D.

Method Detection Limits:	**50**	**0.50**	**0.50**	**0.50**	**0.50**

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 11976 Dublin Blvd., Dublin	Sampled:	Apr 3, 1992
P.O. Box 996	Matrix Descript:	Water	Received:	Apr 3, 1992
Benicia, CA 94510	Analysis Method:	EPA 3510/8015	Extracted:	Apr 10, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	204-0169	Analyzed:	Apr 17, 1992
			Reported:	Apr 20, 1992

TOTAL PETROLEUM FUEL HYDROCARBONS (EPA 8015)

Sample Number	Sample Description	High B.P. Hydrocarbons µg/L (ppb)
204-0169	MW-1	N.D.

Method Detection Limits:	**50**

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 11976 Dublin Blvd., Dublin	Sampled:	Apr 3, 1992
P.O. Box 996	Matrix Descript:	Water	Received:	Apr 3, 1992
Benicia, CA 94510	Analysis Method:	SM 5520 B&F (Gravimetric)	Extracted:	Apr 15, 1992
Attention: Mardo Kaprealian, P.E.	First Sample #:	204-0169	Analyzed:	Apr 16, 1992
			Reported:	Apr 20, 1992

TOTAL RECOVERABLE PETROLEUM OIL

Sample Number	Sample Description	Oil & Grease mg/L (ppm)
204-0169	MW-1	N.D.

Detection Limits:	5.0

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.	Client Project ID:	Unocal, 11976 Dublin Blvd., Dublin	Sampled:	Apr 3, 1992
P.O. Box 996	Sample Descript:	Water, MW-1	Received:	Apr 3, 1992
Benicia, CA 94510	Analysis Method:	EPA 5030/8010	Analyzed:	Apr 10, 1992
Attention: Mardo Kaprealian, P.E.	Lab Number:	204-0169	Reported:	Apr 20, 1992

HALOGENATED VOLATILE ORGANICS (EPA 8010)

Analyte	Detection Limit µg/L	Sample Results µg/L
Bromodichloromethane	0.50	N.D.
Bromoform	0.50	N.D.
Bromomethane	0.50	N.D.
Carbon tetrachloride	0.50	N.D.
Chlorobenzene	0.50	N.D.
Chloroethane	0.50	N.D.
2-Chloroethylvinyl ether	0.50	N.D.
Chloroform	0.50	N.D.
Chloromethane	0.50	N.D.
Dibromochloromethane	0.50	N.D.
1,3-Dichlorobenzene	0.50	N.D.
1,4-Dichlorobenzene	0.50	N.D.
1,2-Dichlorobenzene	0.50	N.D.
1,1-Dichloroethane	0.50	N.D.
1,2-Dichloroethane	0.50	N.D.
1,1-Dichloroethene	0.50	N.D.
cis-1,2-Dichloroethene	0.50	N.D.
trans-1,2-Dichloroethene	0.50	N.D.
1,2-Dichloropropane	0.50	N.D.
cis-1,3-Dichloropropene	0.50	N.D.
trans-1,3-Dichloropropene	0.50	N.D.
Methylene chloride	5.0	N.D.
1,1,2,2-Tetrachloroethane	0.50	N.D.
Tetrachloroethene	0.50	N.D.
1,1,1-Trichloroethane	0.50	N.D.
1,1,2-Trichloroethane	0.50	N.D.
Trichloroethene	0.50	N.D.
Trichlorofluoromethane	0.50	N.D.
Vinyl chloride	0.50	N.D.

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

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc. Client Project ID: Unocal, 11976 Dublin Blvd., Dublin
P.O. Box 996
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E. QC Sample Group: 2040169-172 Reported: Apr 20, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes	Diesel	Oil and Grease
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015	SM5520
Analyst:	K.E.	K.E.	K.E.	K.E.	A. Tuzon	D. Newcomb
Reporting Units:	ug/L	ug/L	ug/L	ug/L	ug/L	mg/L
Date Analyzed:	Apr 10, 1992	Apr 10, 1992	Apr 10, 1992	Apr 10, 1992	Apr 16, 1992	Apr 15, 1992
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	20	20	20	60	300	100
Conc. Matrix Spike:	23	22	22	64	222	81
Matrix Spike % Recovery:	115	110	110	107	74	81
Conc. Matrix Spike Dup.:	23	23	22	65	258	80
Matrix Spike Duplicate % Recovery:	115	115	110	108	86	80
Relative % Difference:	0.0	4.4	0.0	1.6	15	1.0

Laboratory blank contained the following analytes: None Detected

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

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

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc. Client Project ID: Unocal, 11976 Dublin Blvd., Dublin
P.O. Box 996
Benicia, CA 94510
Attention: Mardo Kaprealian, P.E. QC Sample Group: 2040169-172 Reported: Apr 20, 1992

QUALITY CONTROL DATA REPORT

ANALYTE	1,1-Dichloroethene	Trichloro-ethene	Chloro-benzene
Method:	EPA 8010	EPA 8010	EPA 8010
Analyst:	M. Nguyen	M. Nguyen	M. Nguyen
Reporting Units:	ug/L	ug/L	ug/L
Date Analyzed:	Apr 10, 1992	Apr 10, 1992	Apr 10, 1992
QC Sample #:	Matrix Blank	Matrix Blank	Matrix Blank
Sample Conc.:	N.D.	N.D.	N.D.
Spike Conc. Added:	10	10	10
Conc. Matrix Spike:	10	8.4	8.2
Matrix Spike % Recovery:	100	84	82
Conc. Matrix Spike Dup.:	9.3	9.9	9.5
Matrix Spike Duplicate % Recovery:	93	99	95
Relative % Difference:	7.3	16	16

Laboratory blank contained the following analytes: None Detected
Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

$$\text{\% Recovery:} \quad \frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$$

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

SEQUOIA ANALYTICAL

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

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

Client Project ID: Unocal, 11976 Dublin Blvd., Dublin
QC Sample Group: 2040169-172
Reported: Apr 20, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA8015	EPA8015
Analyst:	K.E.	K.E.	K.E.	K.E.	K.E.	A. Tuzon	A. Tuzon
Reporting Units:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Date Analyzed:	4/10-4/15/92	4/10-4/15/92	4/10-4/15/92	4/10-4/15/92	Apr 10, 1992	Apr 16, 1992	Apr 16, 1992
Sample #:	204-0169	204-0170	204-0171	204-0172	Blank	204-0169	Blank
Surrogate % Recovery:	100	100	100	84	97	107	86

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

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

SEQUOIA ANALYTICAL

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

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

Client Project ID: Unocal, 11976 Dublin Blvd., Dublin
QC Sample Group: 2040169-172
Reported: Apr 20, 1992

QUALITY CONTROL DATA REPORT

SURROGATE

Method:	EPA 8010	EPA 8010
Analyst:	M.N.	M.N.
Reporting Units:	ug/L	ug/L
Date Analyzed:	Apr 10, 1992	Apr 10, 1992
Sample #:	204-0169	Blank
Surrogate #1 % Recovery:	93	98
Surrogate #2 % Recovery:	120	118

SEQUOIA ANALYTICAL

Belinda C. Vega
Laboratory Director

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

KAPREALIAN ENGINEERING, INC.

CHAIN OF CUSTODY

SAMPLER: Vartkes

WITNESSING AGENCY:

SITE NAME & ADDRESS: Unocal / Dublin
11976 Dublin Blvd.

TURN AROUND TIME: Regular.

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHG & BTXE	TPH D	TOG (5520 B&F)	8010	REMARKS
MW-1	4/3/92	11:45 A.M.		✓	✓		6	Monitoring Well	✓	✓	✓	✓	204069AF
MW-2	"	12:25 P.M.		✓	✓		2	" "	✓				170AB
MW-3	"	2:05 P.M.		✓	✓		2	" "	✓				171AB
MW-4	"	1:00 P.M.		✓	✓		2	" "	✓				172AB

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
W. Vartkes	4/3/92 3:15	
MW	4/6 3:05 pm	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)

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

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

Signature: MW Title: Analyst Date: 4/3