KAPREALIAN ENGINEERING
INCORPORATED

93 JUL 30 PM 2:04

KEI-P90-0606.QR6
July 13, 1993

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

Attention: Mr. Adadu Yemane

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

Dear Mr. Yemane:

This report presents the results of the most recent quarter of ground water monitoring and sampling at the referenced site by Kaprealian Engineering, Inc. (KEI). Existing wells MW1, MW3, and MW4 are currently monitored and sampled on a quarterly basis, except for well MW4, which is no longer sampled. Well MW2 was previously destroyed. This report covers the work performed by KEI in June 1993.

BACKGROUND

The subject site formerly contained a Unocal service station facility. Two underground gasoline storage tanks, one waste oil tank, and the product piping were removed from the site in June of 1990 during tank replacement activities. The fuel tank pit and the waste oil tank pit were subsequently overexcavated in order to remove contaminated soil. Four monitoring wells were installed at the site in November of 1990. The two underground gasoline storage tanks, one waste oil tank, product piping, and the hydraulic lifts were then removed from the site in May of 1992 during station demolition activities. The product pipe trench and the hydraulic lift area were subsequently overexcavated in order to remove contaminated soil. Per Unocal's procedure for potential site divestment locations, 11 exploratory borings were drilled at the site in August of 1992. Monitoring well MW2 was destroyed on August 24, 1992, because the well was damaged during the station demolition activities. Three monitoring wells currently exist at the site.

A site description, detailed background information including a summary of all of the soil and ground water subsurface investigation/remediation work conducted to date, site hydrogeologic conditions, and tables that summarize all of the soil and ground water sample analytical results are presented in KEI's report (KEI-P90-0606.R10) dated October 8, 1992.

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel. 510.602.5100 Fax 510.687.0602

RECENT FIELD ACTIVITIES

The three existing monitoring wells (MW1, MW3, and MW4) were monitored once during the quarter. Monitoring wells MW1 and MW3 were sampled once during the quarter. Monitoring well MW2 was destroyed in August of 1992, and monitoring well MW4 is no longer sampled. During monitoring, the wells were checked for depth to water and the presence of free product. Prior to sampling, monitoring wells MW1 and MW3 were also checked for the presence of a sheen. No free product or sheen was noted in any of the wells during the quarter. The monitoring data collected this quarter are summarized in Table 1.

Water samples were collected from monitoring wells MW1 and MW3 on June 18, 1993. Prior to sampling, the wells were purged of 11 and 3 gallons of water, respectively, by the use of a surface pump. The samples were 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 a state-certified laboratory.

HYDROLOGY

The measured depth to ground water at the site on June 18, 1993, ranged between 4.77 and 15.45 feet below grade. During the June 1993 monitoring event, KEI discovered that the Christy boxes for wells MW1, MW3, and MW4 were damaged. Since the wells were each previously surveyed to Mean Sea Level (MSL) at the top of the Christy box (well cover), the reference elevations previously determined for these wells are no longer accurate. Therefore, the ground water elevations for these wells, the direction of ground water flow, and the hydraulic gradient at the site for the June 18, 1993, monitoring event could not be determined.

ANALYTICAL RESULTS

The ground water samples collected this quarter were analyzed at Sequoia Analytical Laboratory and were accompanied by properly executed Chain of Custody documentation. The ground water sample collected from monitoring well MW3 was analyzed for total petroleum hydrocarbons (TPH) as gasoline by EPA method 5030/modified 8015, and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA method 8020. The ground water sample collected from monitoring well MW1 was analyzed for polynuclear aromatic hydrocarbons (PNA) by EPA method 8100.

The analytical results of all of the ground water samples collected from the monitoring wells to date are summarized in Table 2.

Copies of the laboratory analytical results and the Chain of Custody documentation are attached to this report.

DISCUSSION AND RECOMMENDATIONS

As discussed previously in this report, KEI recently discovered that the Christy boxes for monitoring wells MW1, MW3, and MW4 were damaged during the tank removal and soil excavation activities that were previously conducted at the site. Therefore, KEI will inspect the well casings for these wells in the upcoming quarter in order to determine whether the wells were damaged. KEI will repair the wells (if necessary), replace or repair the Christy boxes, and then resurvey all of the wells to MSL.

KEI has reviewed an April 28, 1993, letter addressed to Unocal from Mr. Scott Seery of the Alameda County Health Care Services (ACHCS) Agency, regarding Unocal's January 5, 1993, request for site closure. The letter requested additional documentation regarding the inferred presence of a splay of the Calaveras fault on the subject site.

Figure 4 reproduces a portion of the "State of California Special Studies Zones, Dublin Revised Official Map," which shows the surface trace of the Calaveras fault in relation to the subject site. Based on this map, the Calaveras fault crosses or is located very close to the Unocal site.

On November 30, 1990, a representative of KEI reviewed Calaveras fault study files at the California Division of Mines and Geology, at that time located in Pleasant Hill, California. A report by Applied Soil Mechanics of San Jose, titled "The Springs Proposed Apartment Project," and dated May 1979, was contained in the file. The fault splay was located in two trenches during the study, and was determined to be 130 to 136 feet west of the curb along San Ramon Road. The location of the fault splay in relation to the Unocal site, as defined in this study, is shown on the attached Figure 2. In the fault trenches, soil materials were reportedly different on opposite sides of the fault, and seepage into the trench at a depth of 5 to 7 feet below grade was observed on the west side of the fault, while no seepage was observed on the east side of the fault.

The subsurface conditions at the subject site are illustrated in Geologic Cross-Section A-A, Figure 3. The location of the cross-section is shown on Figure 2. Because of the homogenous lithology within the shallow depths drilled (to 24 feet below grade), it is difficult to draw conclusions regarding fault location based on lithologic changes. However, the gravel unit encountered at depths of 15 and 17.5 feet in well MW3 and boring EB8, respectively (on

the east side of the fault) was not encountered on the western side of the fault; this area was explored to a depth of 24 feet below grade in MW2 and 20 feet below grade in MW1 and MW4. This gravel unit was also not encountered in borings EB9 and EB10 on the east side of the fault. It is therefore possible that EB10 is actually located on the west side of the fault.

Per the ACHCS' request (in their letter dated April 28, 1993) for additional subsurface investigation at the eastern portion of the site (east side of fault), a work plan for two additional wells (see Figure 1) on the east side of the fault has been submitted (KEI-P90-0606.P6 dated June 11, 1993). It is anticipated that these proposed wells and existing well MW3 will allow a determination of the direction of ground water flow and an assessment of ground water quality in this area.

Lastly, in accordance with the ACHCS letter dated April 28, 1993, the future ground water samples collected from well MW1 will only be analyzed for PNA, and the future ground water samples collected from well MW3 will be analyzed for TPH as gasoline and BTEX.

DISTRIBUTION

A copy of this report should be sent to Mr. Scott Seery of 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 these 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.

If you have any questions regarding this report, please do not hesitate to call us 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 6/30/94

Timothy R. Ross
Project Manager

/bp

Attachments: Tables 1 & 2
Location Map
Figures 1 through 4
Laboratory Analyses
Chain of Custody documentation

KEI-P90-0606-QR6
July 13, 1993

TABLE 1

SUMMARY OF MONITORING DATA

Well No.	Ground Water Elevation (feet)	Depth to Water (feet)	Product Thickness (feet)	Sheen	Water Purged (gallons)
(Monitored and Sampled on June 18, 1993)					
MW1	**	4.77	0	No	11
MW3	**	15.45	0	No	3
MW4*	**	5.28	0	--	0

-- Sheen determination was not performed.

* Monitored only.

** The Christy boxes for wells MW1, MW3, and MW4 were damaged during the tank removal and soil excavation activities that were previously conducted at the site; therefore, the ground water elevation could not be accurately determined.

KEI-P90-0606.QR6
July 13, 1993

TABLE 2

SUMMARY OF LABORATORY ANALYSES
WATER

Date	Sample Number	TPH as Diesel	TPH as Gasoline	Benzene	Toluene	Ethylbenzene	Xylenes
6/18/93	MW1♦	---	--	--	--	--	
	MW3	--	ND	ND	ND	ND	ND
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

TABLE 2 (Continued)

SUMMARY OF LABORATORY ANALYSES
WATER

♦ All EPA method 8100 constituents (polynuclear aromatic hydrocarbons) were non-detectable.

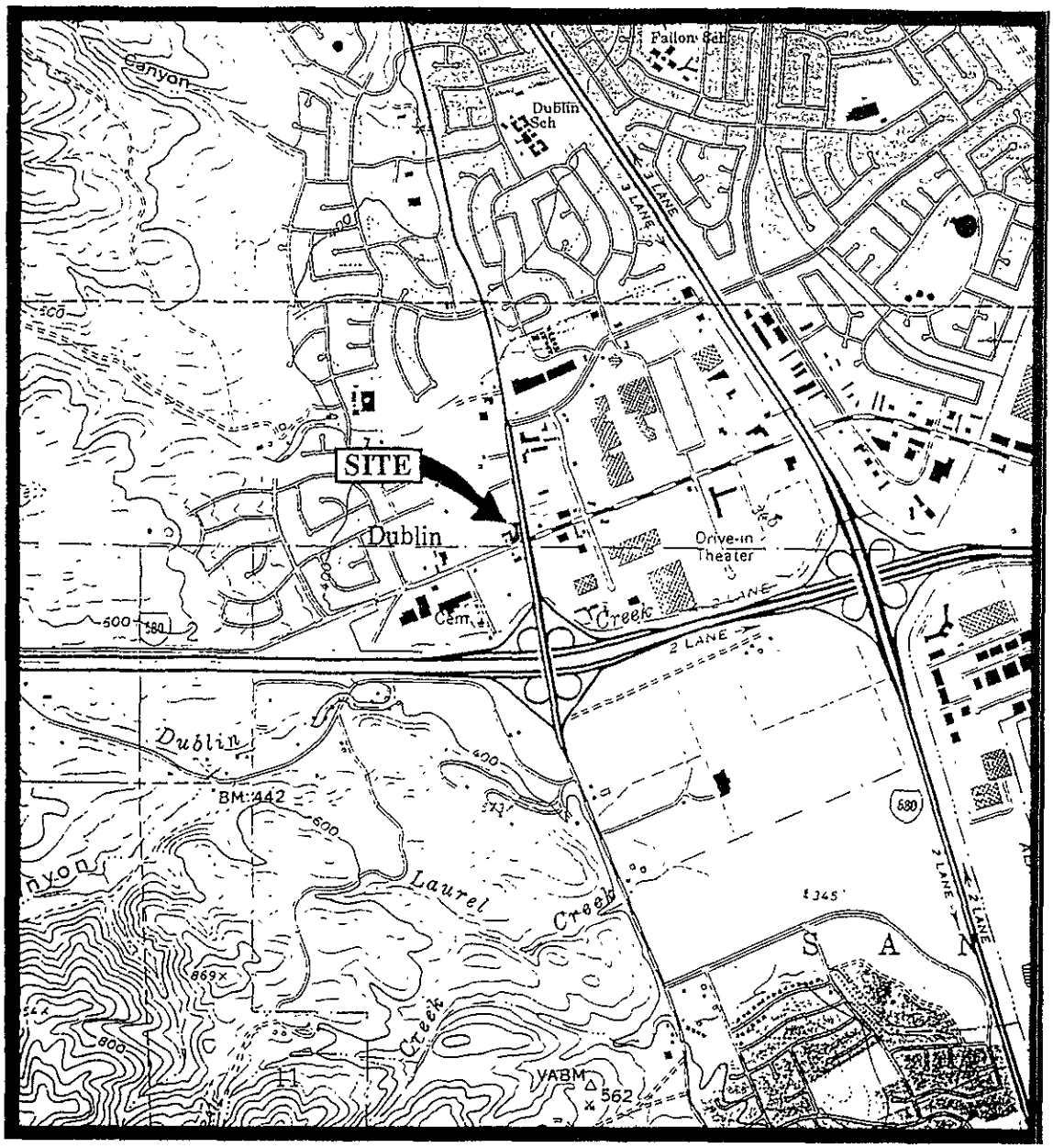
* TOG and all EPA method 8010 constituents were non-detectable.

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

ND = Non-detectable.

-- Indicates analysis was not performed.

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

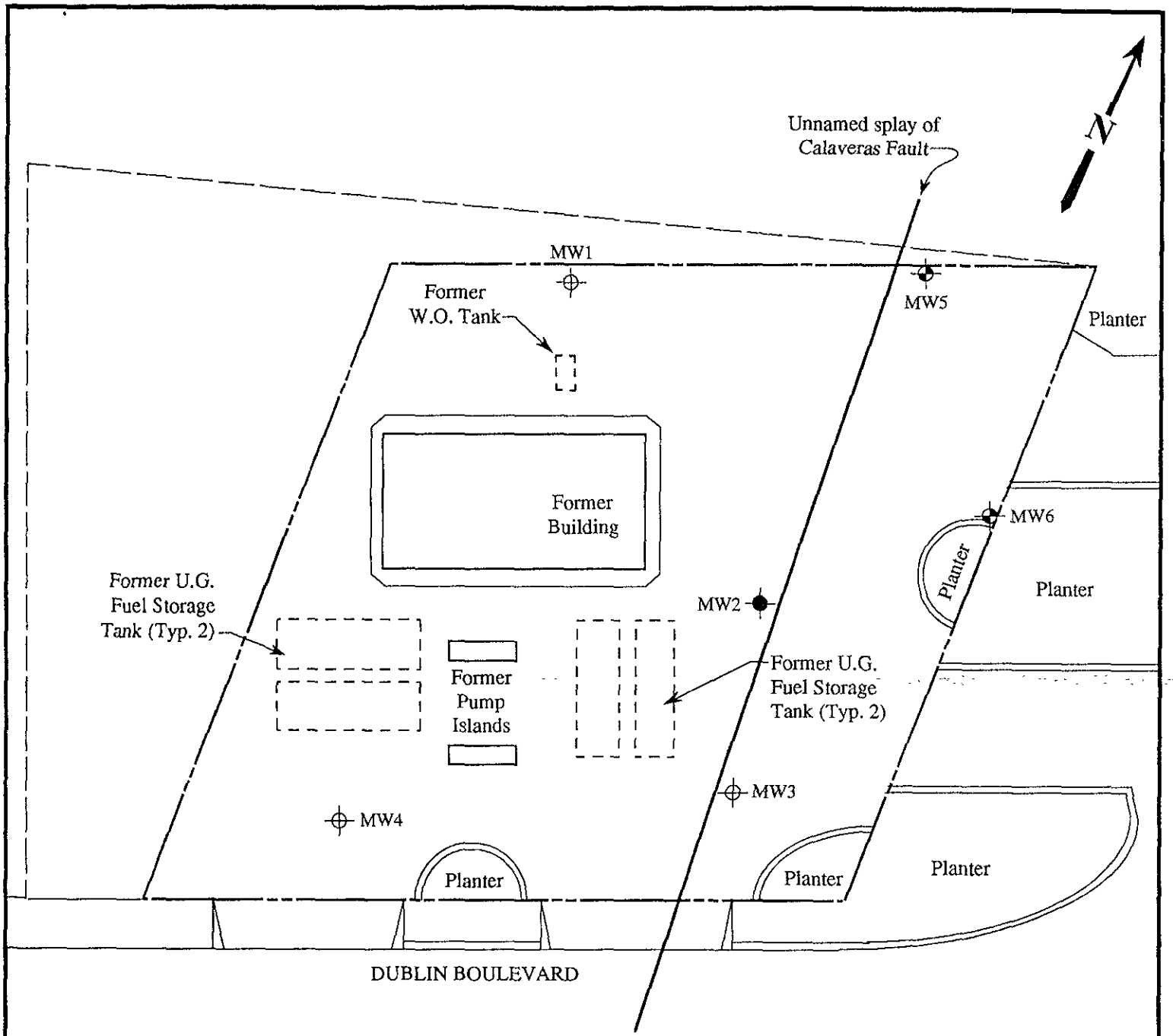


Base modified from 7.5 minute *U.S.G.S. Dublin Quadrangle* (photorevised 1980)

0 2000 4000

Approx. scale feet

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



LEGEND

- Monitoring well (existing)
- Monitoring well (proposed)
- Monitoring well (previously destroyed)

0 30 60

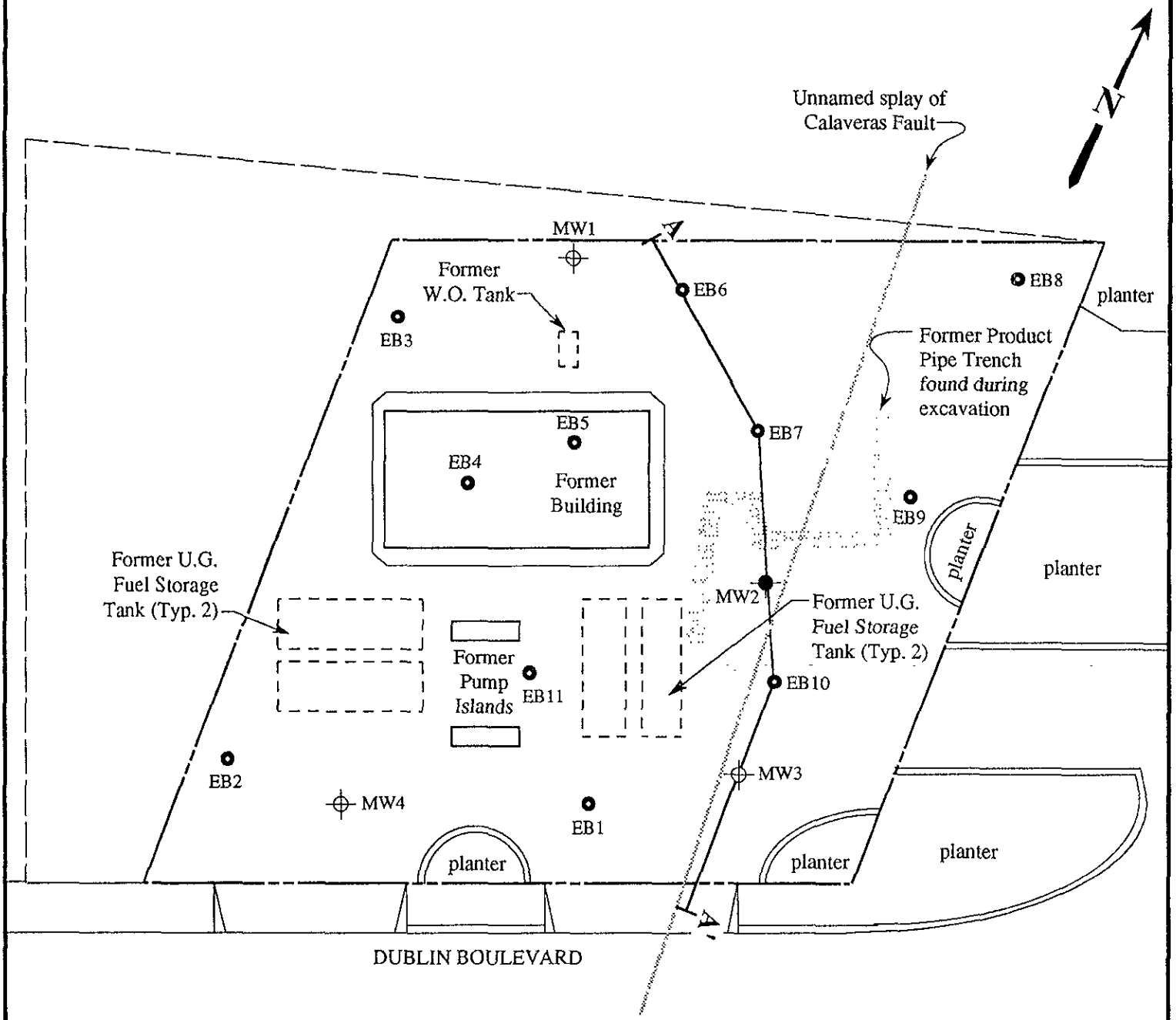
Approx. scale feet

MONITORING WELL LOCATION MAP

KAPREALIAN ENGINEERING
INCORPORATED

FORMER UNOCAL S/S #5901
11976 DUBLIN BOULEVARD
DUBLIN, CA

FIGURE
1



LEGEND

- Monitoring well (existing)
- Monitoring well (destroyed 8/24/92)
- Exploratory boring

0 30 60

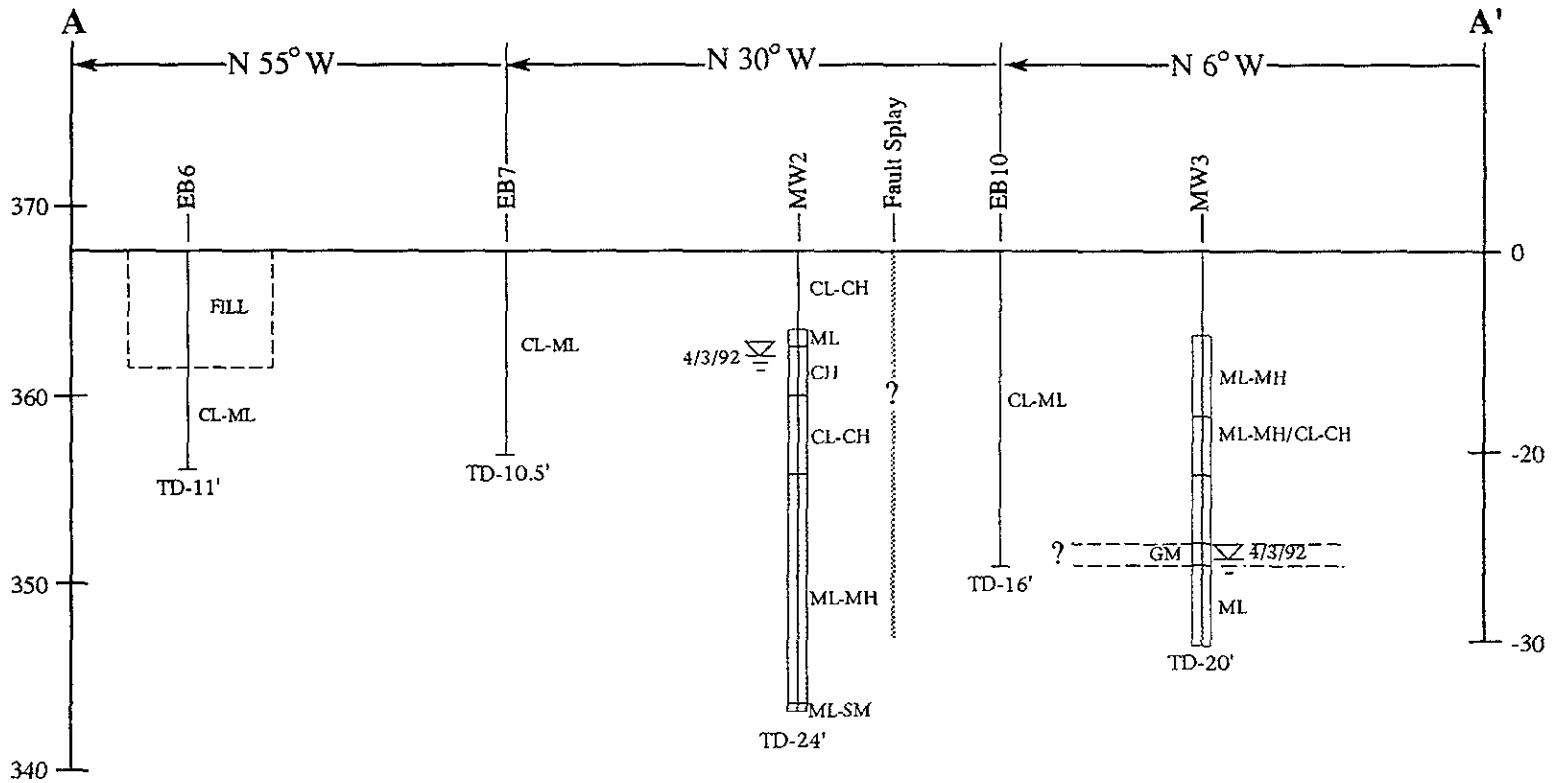
Approx. scale feet

LOCATION OF GEOLOGIC CROSS SECTION A-A'

KAPREALIAN ENGINEERING
INCORPORATED

FORMER UNOCAL S/S #5901
11976 DUBLIN BOULEVARD
DUBLIN, CALIFORNIA

FIGURE
2



0 20 40

Approx. horizontal scale feet

0 10 20

Approx. vertical scale feet

LEGEND

Soil classification symbols per USCS

Ground water level on 4/3/92

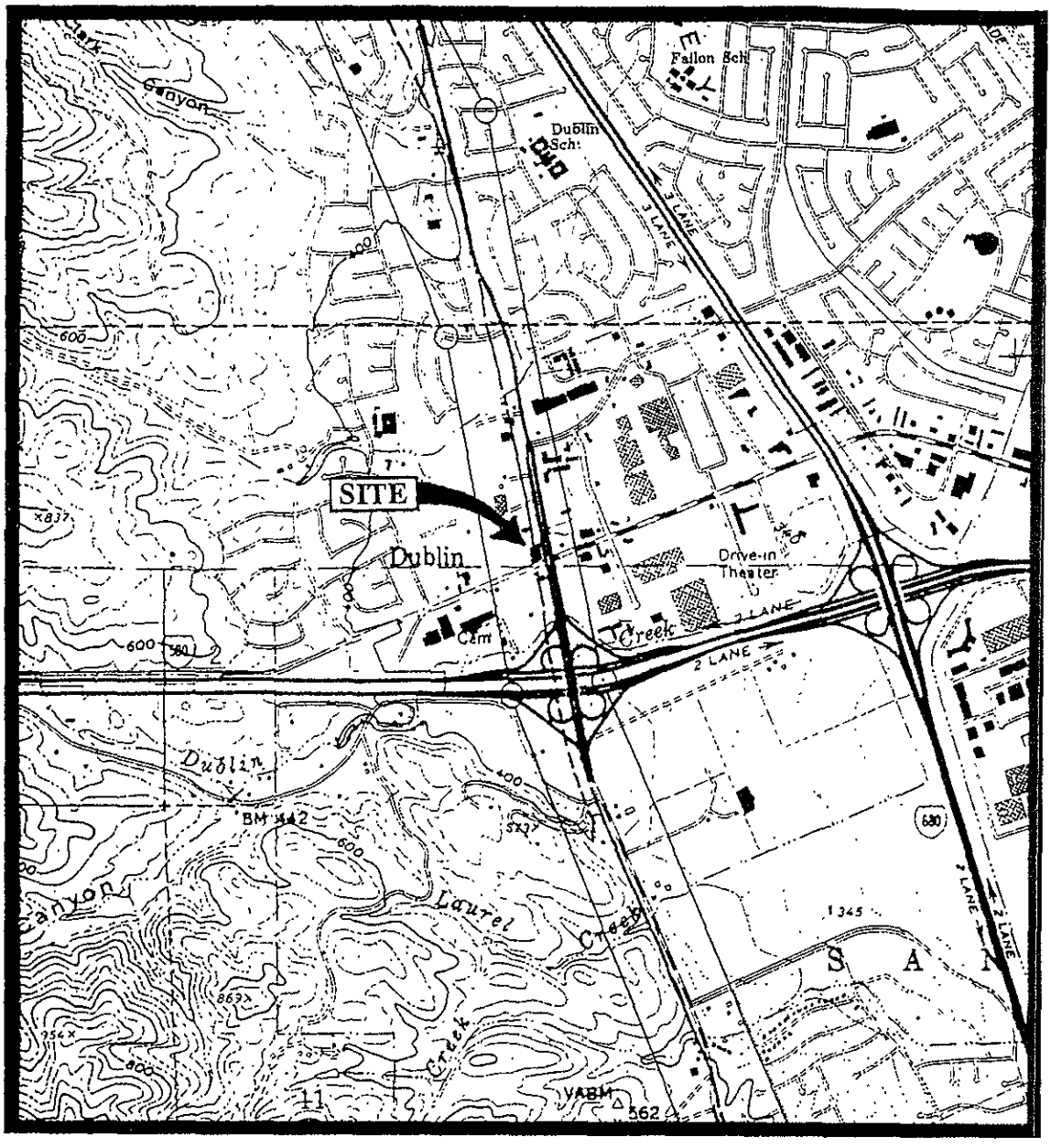
Screened interval of well

GEOLOGIC CROSS SECTION A–A'

KAPREALIAN ENGINEERING
INCORPORATED

FORMER UNOCAL S/S #5901
11976 DUBLIN BOULEVARD
DUBLIN, CA

FIGURE
3



MAP EXPLANATION

Potentially Active Faults

Faults considered to have been active during Holocene time and to have a relatively high potential for surface rupture; solid line where accurately located, long dash where approximately located, short dash where inferred.

Special Studies Zone Boundaries

These are delineated as straight-line segments that connect encircled turning points so as to define special studies zone segments.

Base modified from a portion of a State of California Special Studies Zones, Dublin, Revised Official Map. (Alquist-Priolo Special Studies Act)

0 2000 4000

Approx. scale feet

LOCATION OF CALAVERAS FAULT (ZONED POTENTIALLY ACTIVE) IN RELATION TO SUBJECT SITE		
KAPREALIAN ENGINEERING INCORPORATED	UNOCAL SERVICE STATION #5901 11976 DUBLIN BOULEVARD DUBLIN, CALIFORNIA	FIGURE 4

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:	Jun 18, 1993
2401 Stanwell Dr., Ste. 400	Sample Matrix:	Water	Received:	Jun 18, 1993
Concord, CA 94520	Analysis Method:	EPA 5030/8015/8020	Reported:	Jun 25, 1993
Attention: Mardo Kaprealian, P.E.	First Sample #:	306-0802		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 306-0802 MW 3	Sample I.D. Matrix Blank
Purgeable Hydrocarbons	50	N.D.	
Benzene	0.5	N.D.	
Toluene	0.5	N.D.	
Ethyl Benzene	0.5	N.D.	
Total Xylenes	0.5	N.D.	
Chromatogram Pattern:		--	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0
Date Analyzed:	6/22/93	6/22/93
Instrument Identification:	HP-2	HP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	100	103

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Alan B. Kemp
Project Manager

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:	Jun 18, 1993
2401 Stanwell Dr., Ste. 400	Sample Descript:	Water, MW1	Received:	Jun 18, 1993
Concord, CA 94520	Analysis Method:	EPA 8100	Extracted:	Jun 24, 1993
Attention: Mardo Kaprealian, P.E.	Lab Number:	306-0801	Analyzed:	Jun 24, 1993
			Reported:	Jun 25, 1993

POLYNUCLEAR AROMATIC HYDROCARBONS (EPA 8100)

Analyte	Detection Limit µg/L	Sample Results µg/L
Acenaphthene	2.0	N.D.
Acenaphthylene	2.0	N.D.
Anthracene	2.0	N.D.
Benzo (a) anthracene	2.0	N.D.
Benzo (a) pyrene	2.0	N.D.
Benzo (b) fluoranthene	2.0	N.D.
Benzo (ghi) perylene	2.0	N.D.
Benzo (k) fluoranthene	2.0	N.D.
Chrysene	2.0	N.D.
Dibenzo (a,h) anthracene	2.0	N.D.
Fluoranthene	2.0	N.D.
Fluorene	2.0	N.D.
Indeno (1,2,3-cd) pyrene	2.0	N.D.
Naphthalene	2.0	N.D.
Phenanthrene	2.0	N.D.
Pyrene	2.0	N.D.

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

SEQUOIA ANALYTICAL

Alan B. Kemp
Project Manager

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
2401 Stanwell Dr., Ste. 400	Matrix:	Water
Concord, CA 94520		
Attention: Mardo Kaprealian, P.E.	QC Sample Group	3060801-802

Reported: Jun 25, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J.F.	J.F.	J.F.	J.F.
Conc. Spiked:	20	20	20	60
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	1LCS062293	1LCS062293	1LCS062293	1LCS062293
Date Prepared:	6/22/93	6/22/93	6/22/93	6/22/93
Date Analyzed:	6/22/93	6/22/93	6/22/93	6/22/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
LCS % Recovery:	94	96	100	102
Control Limits:	70-130	70-130	70-130	70-130
MS/MSD Batch #:	3060771	3060771	3060771	3060771
Date Prepared:	6/22/93	6/22/93	6/22/93	6/22/93
Date Analyzed:	6/22/93	6/22/93	6/22/93	6/22/93
Instrument I.D.#:	HP-2	HP-2	HP-2	HP-2
Matrix Spike % Recovery:	95	95	100	102
Matrix Spike Duplicate % Recovery:	95	95	100	102
Relative % Difference:	0.0	0.0	0.0	0.0

SEQUOIA ANALYTICAL

Alan B. Kemp
Project Manager

Please Note:

The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

SEQUOIA ANALYTICAL

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

Kaprealian Engineering, Inc.
2401 Stanwell Dr., Ste. 400
Concord, CA 94520
Attention: Mardo Kaprealian, P.E.

Client Project ID: Unocal, 11976 Dublin Blvd., Dublin
Matrix: Water
QC Sample Group: 3060801-802

Reported: Jun 25, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Naphthalene	Acenaphthene	Pyrene
Method:	EPA 8100	EPA 8100	EPA 8100
Analyst:	D.B.	D.B.	D.B.
Conc. Spiked:	30	50	50
Units:	ng	ng	ng
LCS Batch#:	5BLK062293MS	5BLK062293MS	BLK062293MS
Date Prepared:	6/22/93	6/22/93	6/22/93
Date Analyzed:	6/24/93	6/24/93	6/24/93
Instrument I.D.#:	GC/HP-11	GC/HP-11	GC/HP-11
LCS % Recovery:	70	88	90
Control Limits:	*50-120*	*46-118*	*26-127*
MS/MSD Batch #:	S930683702	S930683702	S930683702
	MS/MSD	MS/MSD	MS/MSD
Date Prepared:	6/22/93	6/22/93	6/22/93
Date Analyzed:	6/24/93	6/24/93	6/24/93
Instrument I.D.#:	GC/HP-11	GC/HP-11	GC/HP-11
Matrix Spike % Recovery:	78	82	84
Matrix Spike Duplicate % Recovery:	86	94	80
Relative % Difference:	9.8	14	4.9

SEQUOIA ANALYTICAL

Alan B. Kemp
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation and analytical methods employed for the samples. The LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

KAPREALIAN ENGINEERING
INCORPORATED

CHAIN OF CUSTODY

SAMPLER: RAY KET
WITNESSING AGENCY:
SITE NAME & ADDRESS: UNOCAL DUBLIN, 11976 DUBLIN BLVD

ANALYSES REQUESTED: TPHG BTXE; EPA 8150

TURN AROUND TIME: 5 days

SAMPLE ID NO.	DATE	TIME	SOIL	WATER	GRAB	COMP	NO. OF CONT.	SAMPLING LOCATION	TPHG BTXE	EPA 8150	REMARKS
MW 1	6-18			X	X		2	AMB.		X	306082101AB
MW 3	"			X	X		2	VOA	X		1 8021

Relinquished by: (Signature) Ray Ket	Date/Time 1430 6-18-93	Received by: (Signature)
Relinquished by: (Signature)	Date/Time 6/18/93 1495	Received by: (Signature)
Relinquished by: (Signature)	Date/Time 6.18.93 1605	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? Y
2. Will samples remain refrigerated until analyzed? Y
3. Did any samples received for analysis have head space? N
4. Were samples in appropriate containers and properly packaged? Y

JC — Signature; Analyst — Title; 6 18 93 — Date

2401 Stanwell Drive, Suite 400
Concord, California 94520
Tel 510.602.5100 Fax 510.687.0602