KAPREALIAN ENGINEERING
INCORPORATED

April 12, 1993

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

STID 1111 SH

Attention: Mr. Tom Peacock

RE: Unocal Service Station #5781
3535 Pierson Street
Oakland, California 94619

Dear Mr. Peacock:

Per the request of Mr. Edward C. Ralston of Unocal Corporation, enclosed please find our report dated March 30, 1993, for the above referenced site.

If you should have any questions, please feel free to call our office at (510) 602-5100.

Sincerely,

Kaprealian Engineering, Inc.

Judy A. Dewey

jad\82

Enclosure

cc: Ed Ralston, Unocal Corporation

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

KAPREALIAN ENGINEERING
INCORPORATED

KEI-P89-1204.QR6
March 30, 1993

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

Attention: Mr. Edward C. Ralston

RE: Semi-Annual Report
Unocal Service Station #5781
3535 Pierson Street
Oakland, California

Dear Mr. Ralston:

This report presents the results of the most recent period of monitoring and sampling of the monitoring well at the referenced site by Kaprealian Engineering, Inc. (KEI), per KEI's work plan/proposal (KEI-P89-1204.P4) dated January 21, 1991, and as modified in KEI's quarterly report (KEI-P89-1204.QR4) dated March 4, 1992. The well is currently monitored and sampled on a semi-annual basis. This report covers the work performed by KEI from September of 1992 through February of 1993.

## BACKGROUND

The subject site contains a Unocal service station facility. Two underground gasoline storage tanks and one waste oil tank were removed from the site on December 14, 1989. The waste oil tank pit was subsequently overexcavated in order to remove contaminated soil. One monitoring well and five exploratory borings have been installed at the site, as shown on the attached Figure 1.

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-P89-1204.QR4) dated March 4, 1992.

## RECENT FIELD ACTIVITIES

Monitoring well MWA was monitored and sampled once during the semi-annual period. Prior to sampling, the well was checked for depth to water and the presence of free product or a sheen. No free product or sheen was noted in the well during the semi-annual period. The monitoring data collected during this period are summarized in Table 1.

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

A water sample was collected from well MWA on February 10, 1993. Prior to sampling, the well was purged of 19 gallons of water by the use of a surface pump. The sample was collected by the use of a clean Teflon bailer. The sample was then 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 in well MWA on February 10, 1993, was 17.71 feet below grade. The water level in the well has shown a net increase of 1.24 feet since August 4, 1992.

ANALYTICAL RESULTS

The ground water sample was analyzed at Sequoia Analytical Laboratory and was accompanied by properly executed Chain of Custody documentation. The sample was analyzed for total petroleum hydrocarbons (TPH) as gasoline by EPA method 5030/modified 8015, benzene, toluene, xylenes, and ethylbenzene (BTX&E) by EPA method 8020, TPH as diesel by EPA method 3510/modified 8015, total oil and grease (TOG) by Standard Methods 5520B&F, and for EPA method 8010 constituents.

The ground water sample analytical results 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

Localized soil contamination at the subject site appears to be isolated to the immediate vicinity of the waste oil tank pit at the subject site. However, based upon the ground water samples collected to date, it does not appear that the soil contamination has significantly impacted the ground water underlying the site. Ground water samples collected from well MWA continue to show non-detectable concentrations of TPH as gasoline, TPH as diesel, BTX&E, TOG, and all EPA method 8010 constituents. Therefore, KEI recommends reducing the monitoring and sampling frequency of well MWA from a semi-annual basis to an annual basis. Recommendations for further modifications to or termination of the monitoring and sampling program will be made as warranted.

DISTRIBUTION

A copy of this report should be sent to the Alameda County Health Care Services Agency, 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 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
Well and Exploratory Boring Location Map
Laboratory Analyses
Chain of Custody documentation

KEI-P89-1204.QR6
March 30, 1993

TABLE 1

SUMMARY OF MONITORING DATA

| Well No. | Depth to Water (feet) | Product Thickness (feet) | Sheen | Water Purged (gallons) |
|---|---|---|---|---|
| **(Monitored and Sampled on February 10, 1993)** | | | | |
| MWA | 17.71 | 0 | No | 19 |

KEI-P89-1204.QR6
March 30, 1993

TABLE 2

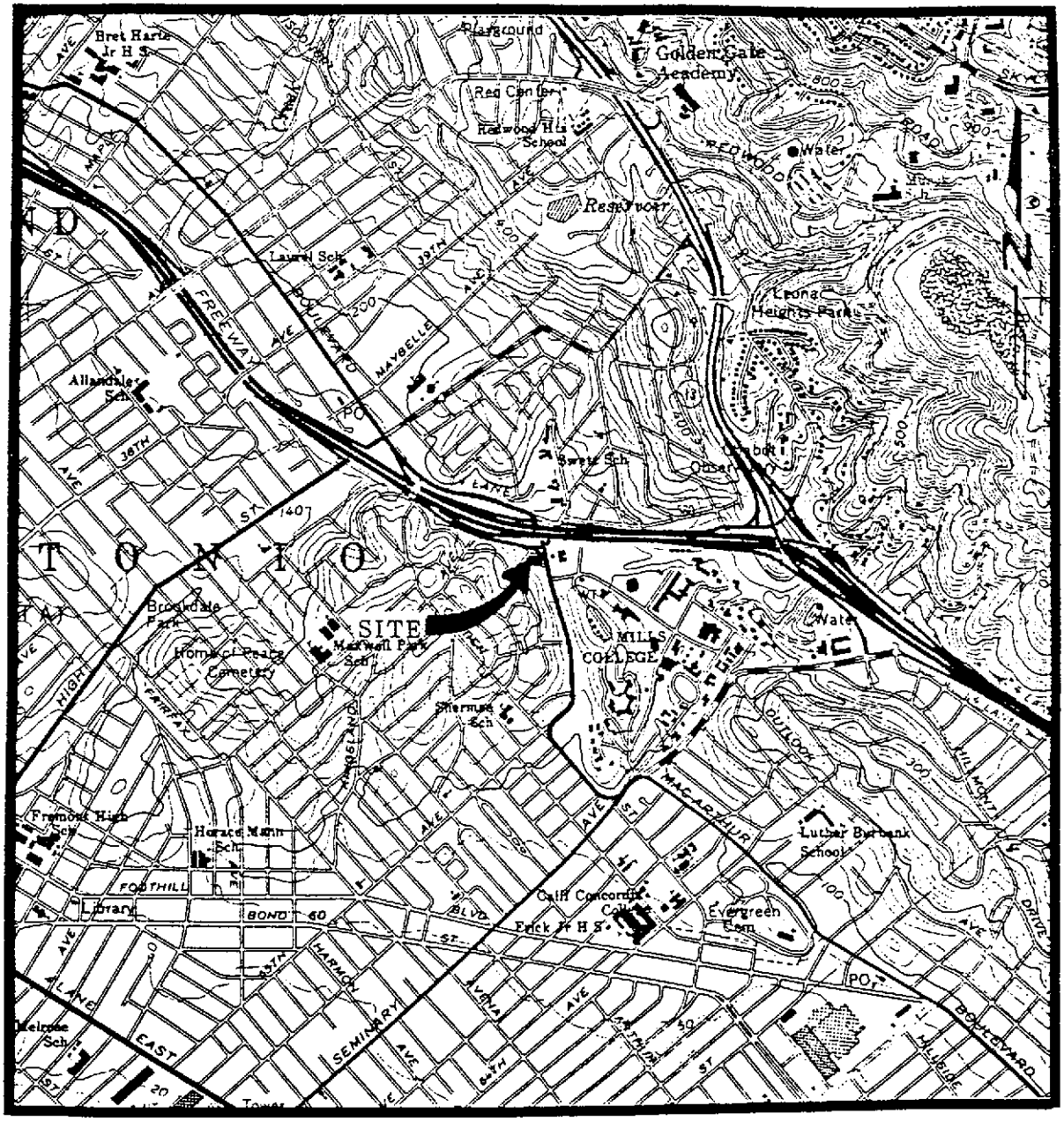
SUMMARY OF LABORATORY ANALYSES
WATER

| Date | Sample Well # | TPH as Diesel | TPH as Gasoline | Benzene | Toluene | Xylenes | Ethyl-benzene |
|---|---|---|---|---|---|---|---|
| 2/10/93 | MWA* | ND | ND | ND | ND | ND | ND |
| 8/04/92 | MWA* | ND | ND | ND | ND | 0.51 | ND |
| 2/06/92 | MWA* | ND | ND | ND | ND | ND | ND |
| 11/08/91 | MWA* | ND | ND | ND | ND | ND | ND |
| 8/07/91 | MWA* | ND | ND | ND | ND | ND | ND |
| 5/03/91 | MWA* | ND | ND | ND | ND | ND | ND |
| 12/18/90 | MWA* | 73 | ND | ND | ND | ND | ND |

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

ND = Non-detectable.

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

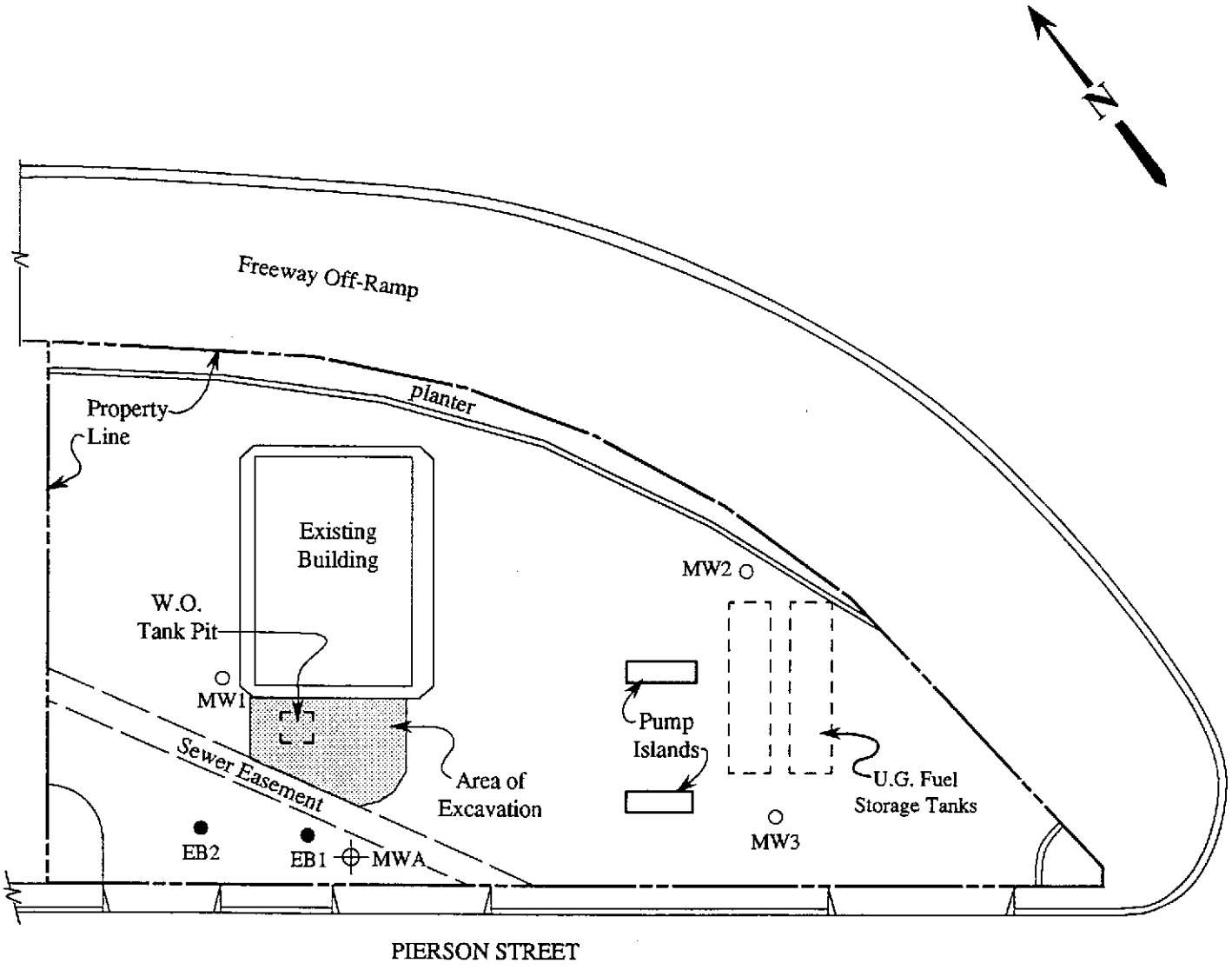



Base modified from 7.5 minute U.S.G.S. Oakland East Quadrangle
(photorevised 1980)

0 2000 4000

Approx. scale feet

| | | |
|---|---|---|
| KAPREALIAN ENGINEERING INCORPORATED | UNOCAL SERVICE STATION #5781<br>3535 PIERSON STREET<br>OAKLAND, CA | LOCATION MAP |




LEGEND

- Monitoring well
- ● Exploratory boring (drilled 7/5 & 7/6/90)
- ○ Exploratory boring (drilled 4/9 & 4/10/90)

0 30 60

Approx. scale feet

**WELL AND EXPLORATORY BORING LOCATION MAP**

KAPREALIAN ENGINEERING
INCORPORATED

**UNOCAL SERVICE STATION #5781**
**3535 PIERSON STREET**
**OAKLAND, CA**

# SEQUOIA ANALYTICAL

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


| | | | | |
|---|---|---|---|---|
| Kapreallian Engineering, Inc. | Client Project ID: | Unocal, 3535 Pierson St., Oakland | Sampled: | Feb 10, 1993 |
| 2401 Stanwell Drive, Suite 400 | Sample Matrix: | Water | Received: | Feb 10, 1993 |
| Concord, CA 94520 | Analysis Method: | EPA 5030/8015/8020 | Reported: | Feb 24, 1993 |
| Attention: Mardo Kaprealian, P.E. | First Sample #: | 302-0438 | | |

## TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

| Analyte | Reporting Limit µg/L | Sample I.D. 302-0438 MW A | 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: | 2/16/93 | 2/16/93 |
| Instrument Identification: | HP-4 | HP-4 |
| Surrogate Recovery, %: (QC Limits = 70-130%) | 97 | 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**

Scott A. Chieffo
Project Manager

# SEQUOIA ANALYTICAL

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| | | | | |
|---|---|---|---|---|
| Kaprealian Engineering, Inc. | Client Project ID: | Unocal, 3535 Pierson St., Oakland | Sampled: | Feb 10, 1993 |
| 2401 Stanwell Drive, Suite 400 | Sample Matrix: | Water | Received: | Feb 10, 1993 |
| Concord, CA 94520 | Analysis Method: | EPA 3510/3520/8015 | Reported: | Feb 24, 1993 |
| Attention: Mardo Kaprealian, P.E. | First Sample #: | 302-0438 | | |

## TOTAL EXTRACTABLE PETROLEUM HYDROCARBONS

| Analyte | Reporting Limit µg/L | Sample I.D. 302-0438 MW A | Sample I.D. Matrix Blank |
|---|---|---|---|
| Extractable Hydrocarbons | 50 | N.D. | |
| Chromatogram Pattern: | | -- | |

**Quality Control Data**

| | | |
|---|---|---|
| Report Limit Multiplication Factor: | 1.0 | 1.0 |
| Date Extracted: | 2/16/93 | 2/16/93 |
| Date Analyzed: | 2/17/93 | 2/17/93 |
| Instrument Identification: | HP-3A | HP-3B |

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

**SEQUOIA ANALYTICAL**

Scott A. Chieffo
Project Manager

# SEQUOIA ANALYTICAL

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(510) 686-9600 • FAX (510) 686-9689


| | | | | |
|---|---|---|---|---|
| Kaprealian Engineering, Inc. | Client Project ID: | Unocal, 3535 Pierson St., Oakland | Sampled: | Feb 10, 1993 |
| 2401 Stanwell Drive, Suite 400 | Matrix Descript: | Water | Received: | Feb 10, 1993 |
| Concord, CA 94520 | Analysis Method: | SM 5520 B&F (Gravimetric) | Extracted: | Feb 16, 1993 |
| Attention: Mardo Kaprealian, P.E. | First Sample #: | 302-0438 | Analyzed: | Feb 18, 1993 |
| | | | Reported: | Feb 24, 1993 |

## TOTAL RECOVERABLE PETROLEUM OIL

| Sample Number | Sample Description | Oil & Grease mg/L |
|---|---|---|
| 302-0438 | MW A | N.D. |

| | |
|---|---|
| **Detection Limits:** | **5.0** |

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

**SEQUOIA ANALYTICAL**

Scott A. Chieffo
Project Manager

3020438.KEI <3>

# SEQUOIA ANALYTICAL

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| | | | | |
|---|---|---|---|---|
| Kaprealian Engineering, Inc. | Client Project ID: | Unocal, 3535 Pierson St., Oakland | Sampled: | Feb 10, 1993 |
| 2401 Stanwell Drive, Suite 400 | Sample Descript: | Water, MW A | Received: | Feb 10, 1993 |
| Concord, CA 94520 | Analysis Method: | EPA 5030/8010 | Analyzed: | Feb 22, 1993 |
| Attention: Mardo Kaprealian, P.E. | Lab Number: | 302-0438 | Reported: | Feb 24, 1993 |

## 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 | 1.0 | N.D. |
| Carbon tetrachloride | 0.50 | N.D. |
| Chlorobenzene | 0.50 | N.D. |
| Chloroethane | 1.0 | N.D. |
| 2-Chloroethylvinyl ether | 1.0 | N.D. |
| Chloroform | 0.50 | N.D. |
| Chloromethane | 1.0 | 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 | 1.0 | N.D. |

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

**SEQUOIA ANALYTICAL**

Scott A. Chieffo
Project Manager

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

Client Project ID: Unocal, 3535 Pierson St., Oakland
QC Sample Group: 302-0438
Reported: Feb 24, 1993

## 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 | EPA 8015 | SM 5520 |
| Analyst: | A.T. | A.T. | A.T. | A.T. | K.Wimer | D. Newcomb |
| Reporting Units: | µg/L | µg/L | µg/L | µg/L | µg/L | mg/L |
| Date Analyzed: | Feb 16, 1993 | Feb 16, 1993 | Feb 16, 1993 | Feb 16, 1993 | Feb 17, 1993 | Feb 16, 1993 |
| QC Sample #: | 302-0366 | 302-0366 | 302-0366 | 302-0366 | 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 | 250 | 100 |
| **Conc. Matrix Spike:** | 26 | 24 | 23 | 67 | 208 | 92 |
| **Matrix Spike % Recovery:** | 130 | 120 | 115 | 112 | 83 | 92 |
| **Conc. Matrix Spike Dup.:** | 22 | 21 | 21 | 61 | 231 | 96 |
| **Matrix Spike Duplicate % Recovery:** | 110 | 105 | 105 | 102 | 92 | 96 |
| **Relative % Difference:** | 16 | 13 | 9.0 | 9.4 | 10.5 | 4.0 |

Laboratory blank contained the following analytes: None Detected

**SEQUOIA ANALYTICAL**

Scott A. Chieffo
Project Manager

| | | |
|---|---|---|
| % 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

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

Client Project ID: Unocal, 3535 Pierson St., Oakland
QC Sample Group: 302-0438
Reported: Feb 24, 1993

## QUALITY CONTROL DATA REPORT

| ANALYTE | 1,1-Dichloroethene | Trichloro-ethene | Chloro-benzene |
|---|---|---|---|
| Method: | EPA 8010 | EPA 8010 | EPA 8010 |
| Analyst: | K.Nill | K.Nill | K.Nill |
| Reporting Units: | µg/L | µg/L | µg/L |
| Date Analyzed: | Feb 22, 1993 | Feb 22, 1993 | Feb 22, 1993 |
| 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:** | 9.9 | 11 | 11 |
| **Matrix Spike % Recovery:** | 99 | 110 | 110 |
| **Conc. Matrix Spike Dup.:** | 8.4 | 10 | 10 |
| **Matrix Spike Duplicate % Recovery:** | 84 | 100 | 100 |
| **Relative % Difference:** | 16 | 9.5 | 9.5 |

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

**SEQUOIA ANALYTICAL**

Scott A. Chieffo
Project Manager

| | | |
|---|---|---|
| % 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

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

Client Project ID: Unocal, 3535 Pierson St., Oakland
QC Sample Group: 302-0438
Reported: Feb 24, 1993

## QUALITY CONTROL DATA REPORT

**SURROGATE**

| | | |
|---|---|---|
| Method: | EPA 8015 | EPA 8015 |
| Analyst: | K. Wimer | K. Wimer |
| Reporting Units: | µg/L | µg/L |
| Date Analyzed: | Feb 17, 1993 | Feb 17, 1993 |
| Sample #: | 302-0438 | Matrix Blank |
| **Surrogate % Recovery:** | 90 | 106 |

**SEQUOIA ANALYTICAL**

Scott A. Chieffo
Project Manager

| | | |
|---|---|---|
| % 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 |

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

Client Project ID: Unocal, 3535 Pierson St., Oakland
QC Sample Group: 302-0438
Reported: Feb 24, 1993

## QUALITY CONTROL DATA REPORT

**SURROGATE**

| | | |
|---|---|---|
| Method: | EPA 8010 | EPA 8010 |
| Analyst: | K. Nill | K. Nill |
| Reporting Units: | µg/L | µg/L |
| Date Analyzed: | Feb 22, 1993 | Feb 22, 1993 |
| Sample #: | 302-0438 | Matrix Blank |
| **Surrogate #1 % Recovery:** | 80 | 78 |
| **Surrogate #2 % Recovery:** | 112 | 110 |

**SEQUOIA ANALYTICAL**

Scott A. Chieffo
Project Manager

| | | |
|---|---|---|
| % 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 |

KAPREALIAN ENGINEERING
INCORPORATED

# CHAIN OF CUSTODY

SAMPLER: Varthes
WITNESSING AGENCY:
SITE NAME & ADDRESS: Unocal / Oakland, 3535 Pierson st.
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 A | 2/10/93 | 9:50 am. | | X | X | | 6 | Monitoring well | X | X | X | X | | | | 3020438AF |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |

| Relinquished by: (Signature) | Date/Time | Received by: (Signature) |
|---|---|---|
| W. Varthes | 2/10/93 3:55 | K. Gruver |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) |
| [illegible] | 2-11-93 | [illegible] |
| Relinquished by: (Signature) | Date/Time | Received by: (Signature) |
| [illegible] | 2-11-93 2:15 | [illegible] |
| 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? NO
4. Were samples in appropriate containers and properly packaged? Y

KG — Signature; Lab Tech — Title; 2/10/93 — Date

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