



GeoStrategies Inc.

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Alameda County
Environmental Health

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1 2 3 4 5 6

QUARTERLY MONITORING REPORT

Unocal Service Station #5325
3220 Lakeshore Avenue
Oakland, California

781401-13

December 31, 1992



GeoStrategies Inc.

December 31, 1992

Unocal Corporation
P.O. Box 5155
San Ramon, California 94583

Attn: Mr. Tim Howard

Re: QUARTERLY MONITORING REPORT
Unocal Service Station #5325
3220 Lakeshore Avenue
Oakland, California

Mr. Howard:

This Quarterly Monitoring Report has been prepared by GeoStrategies Inc. (GSI) and presents the results of the 1992 fourth quarter sampling for the above-referenced site (Plate 1).

There are currently three monitoring wells at the site; Wells U-1, U-2, and U-3 (Plate 2). These wells were installed in 1990 by GSI.

CURRENT QUARTER SAMPLING RESULTS

Depth to water measurements were obtained in each monitoring well on November 6, 1992. Static ground-water levels were measured from the surveyed top of the well box and recorded to the nearest ± 0.01 foot. Water-level elevations were referenced to Mean Sea Level (MSL) datum and are presented in Table 1. Water-level data were used to construct a quarterly potentiometric map (Plate 3). Shallow ground-water flow direction is to the southwest with an approximate hydraulic gradient of 0.005.

Each well was checked for the presence of floating product. Floating product was not observed in the wells this quarter. The field data sheets are included in Appendix A.

781401-13

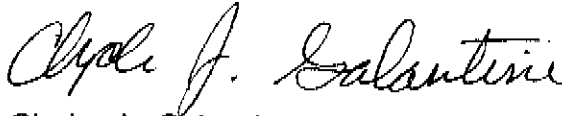
GeoStrategies Inc.

Unocal Corporation
December 31, 1992
Page 2

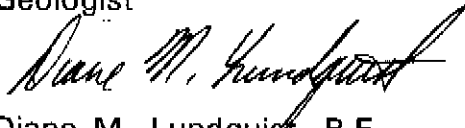
Ground-water samples were collected on November 6, 1992. Samples were analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline), according to EPA Method 8015 (Modified) and for Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) according to EPA Method 8020. The ground-water samples were analyzed by National Environmental Testing (NET) Pacific, Inc., a California State-certified laboratory located in Santa Rosa, California. The laboratory analytical report and Chain-of-Custody form are included in Appendix B. These data are summarized and included with the historical chemical analytical data presented in Table 2. A chemical concentration map for benzene is presented on Plate 4. Field methods and procedures were presented in a previous GSI report dated April 28, 1992.

If you have any questions, please call.

GeoStrategies Inc. by,



Clyde J. Galantine
Geologist



Diane M. Lundquist, P.E.
Senior Engineer
C 46725



CJG/DML/rmt

- Plate 1. Vicinity Map
- Plate 2. Site Plan
- Plate 3. Potentiometric Map
- Plate 4. Benzene Concentration Map

Appendix A: Field Data Sheets
Appendix B: Laboratory Analytical Report and Chain-of-Custody Form

QC Review: _____



781401-13

TABLE 1

FIELD MONITORING DATA

WELL NO.	MONITORING DATE	CASING DIA. (IN)	TOTAL WELL DEPTH (FT)	WELL ELEV. (FT)	DEPTH TO WATER (FT)	PRODUCT THICKNESS (FT)	STATIC WATER ELEV. (FT)	PURGED WELL VOLUMES	pH	TEMPERATURE (F)	CONDUCTIVITY (U MHOS/CM)
U-1	06-Nov-92	3	20.0	5.75	9.11	----	(-3.36)	5	6.96	70.9	1988
U-2	06-Nov-92	3	19.9	4.94	8.71	----	(-3.77)	2	6.47	72.1	4330
U-3	06-Nov-92	3	20.0	8.14	12.0	----	(-3.86)	2	7.42	70.6	863

- Notes: 1. Static water elevations referenced to Mean Sea Level (MSL).
 2. Physical parameter measurements represent stabilized values.
 3. pH values reported in pH units.

TABLE 2

HISTORICAL GROUND-WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
08-Oct-90	U-1	690.	38.	75.	8.6	130.
07-Jan-91	U-1	250.	22.	16.	4.2	17.
01-Apr-91	U-1	160.	13.	8.6	1.0	15.
03-Jul-91	U-1	140	21	4.3	0.36	17
09-Oct-91	U-1	<30	<0.30	<0.30	<0.30	<0.30
12-Feb-92	U-1	250	<0.30	<0.30	<0.30	<0.30
05-May-92	U-1	230	1.2	<0.5	<0.5	<0.5
20-Aug-92	U-1	400*	1	<0.5	<0.5	0.6
06-Nov-92	U-1	1000	80	1.4	6.7	41
08-Oct-90	U-2	780.	27.	46.	15.	130.
07-Jan-91	U-2	1900.	67.	5.8	58.	69.
01-Apr-91	U-2	1700.	250.	89.	34.	190.
03-Jul-91	U-2	2100	150	25	3.1	290
09-Oct-91	U-2	230	7.1	<0.30	<0.30	11
12-Feb-92	U-2	410	1.9	<0.30	0.36	0.40
05-May-92	U-2	1600	120	52	6.2	290
20-Aug-92	U-2	700	28	6.5	1.3	4.6
06-Nov-92	U-2	620	17	2.1	<0.5	37
08-Oct-90	U-3	<50.	<0.5	<0.5	<0.5	<0.5
07-Jan-91	U-3	<50.	<0.5	<0.5	<0.5	1.8
01-Apr-91	U-3	<50.	1.0	2.9	0.53	5.4
03-Jul-91	U-3	<30	<0.30	<0.30	<0.30	<0.30
09-Oct-91	U-3	<30	<0.30	<0.30	<0.30	<0.30
12-Feb-92	U-3	<30	<0.30	<0.30	<0.30	<0.30
05-May-92	U-3	<50	<0.5	<0.5	<0.5	<0.5
20-Aug-92	U-3	<50	<0.5	<0.5	<0.5	<0.5
06-Nov-92	U-3	<50	<0.5	<0.5	<0.5	<0.5

TABLE 2

HISTORICAL GROUND-WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
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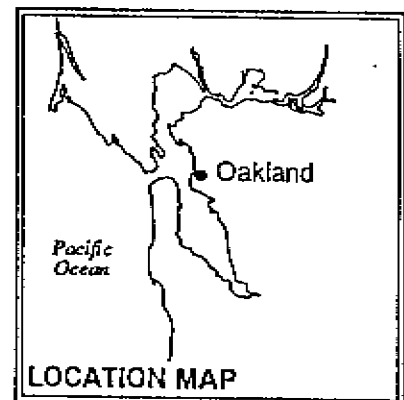
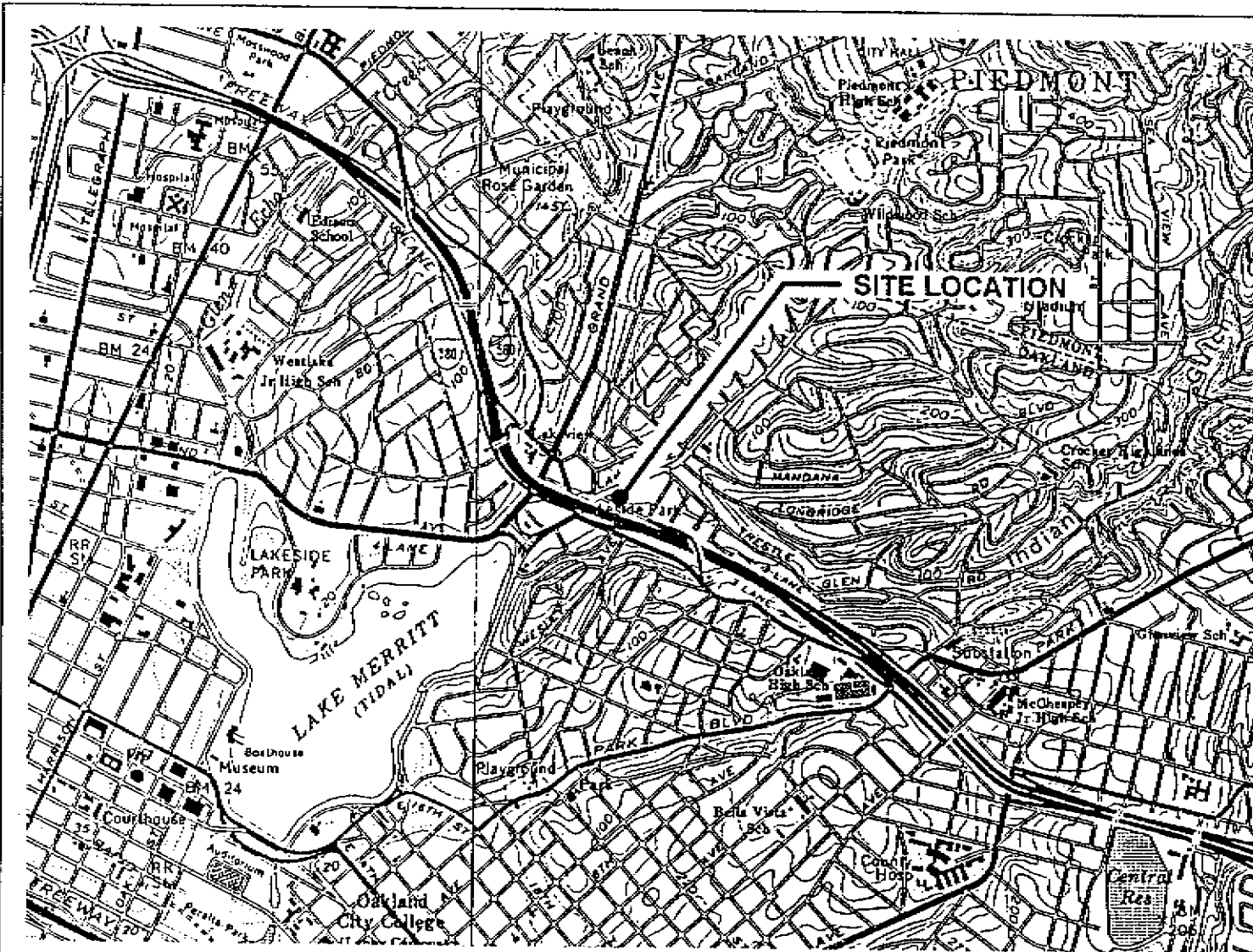
TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline

PPB = Parts Per Billion

NOTE 1. All data shown as <X are reported as ND (none detected).

* The positive result for gasoline does not appear to have a typical gasoline pattern.

ILLUSTRATIONS



Base Map: USGS Topographic Map

Approximate Scale: 1" = 2000'



GeoStrategies Inc.

Vicinity Map
 UNOCAL Service Station #5325
 3220 Lakeshore Avenue
 Oakland, California

PLATE

1

JOB NUMBER
7814

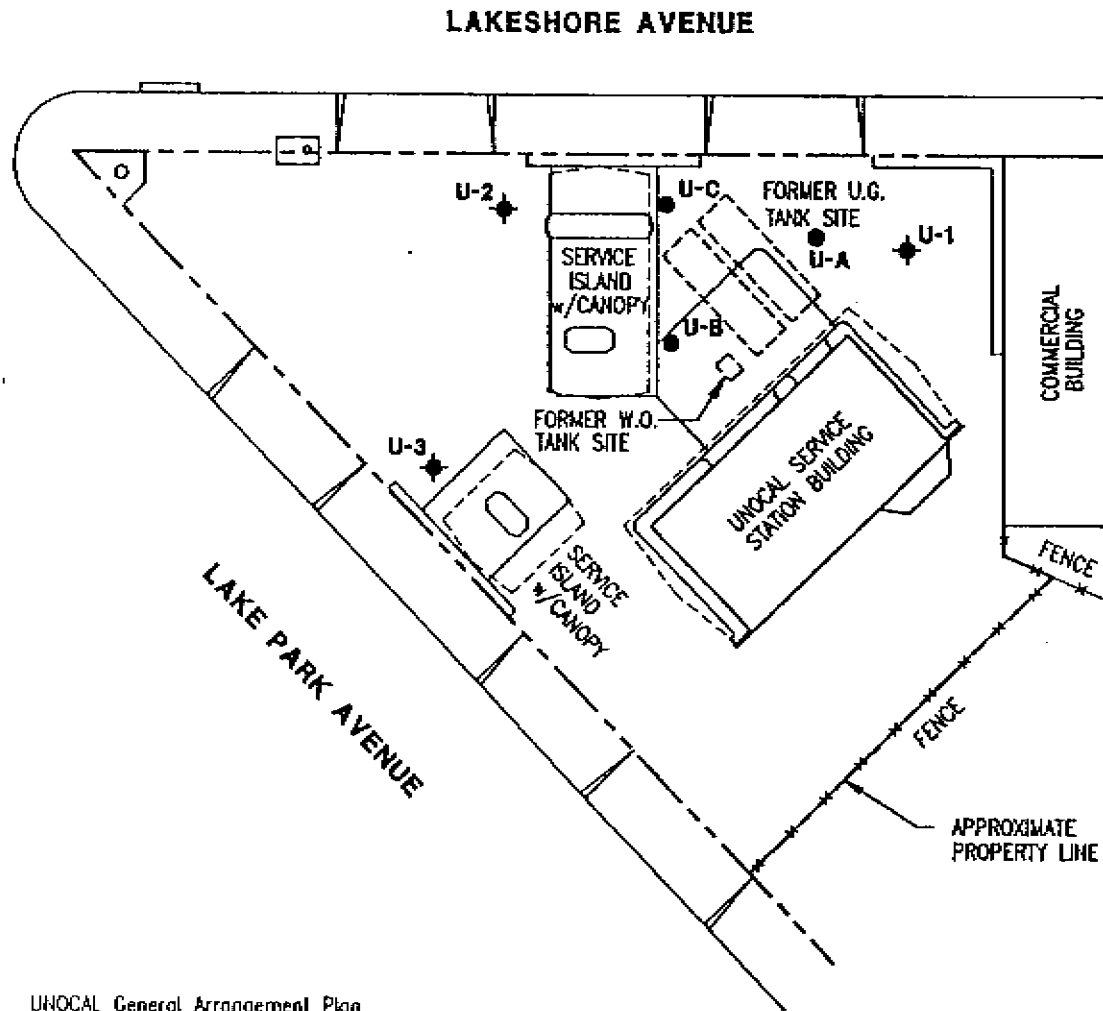
REVIEWED BY RG/CEG

DATE
6/90

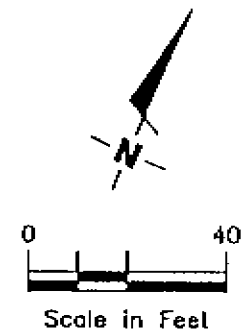
REVISED DATE

EXPLANATION

- ◆ Ground-water monitoring well
- Soil boring



Base Map: UNOCAL General Arrangement Plan dated 7-8-86 (Rev. 12-4-84) and field observations



GeoStrategies Inc.

SITE PLAN
UNOCAL Service Station #5325
3220 Lakeshore Avenue
Oakland, California

PLATE

2




JOB NUMBER
7814

REVIEWED BY

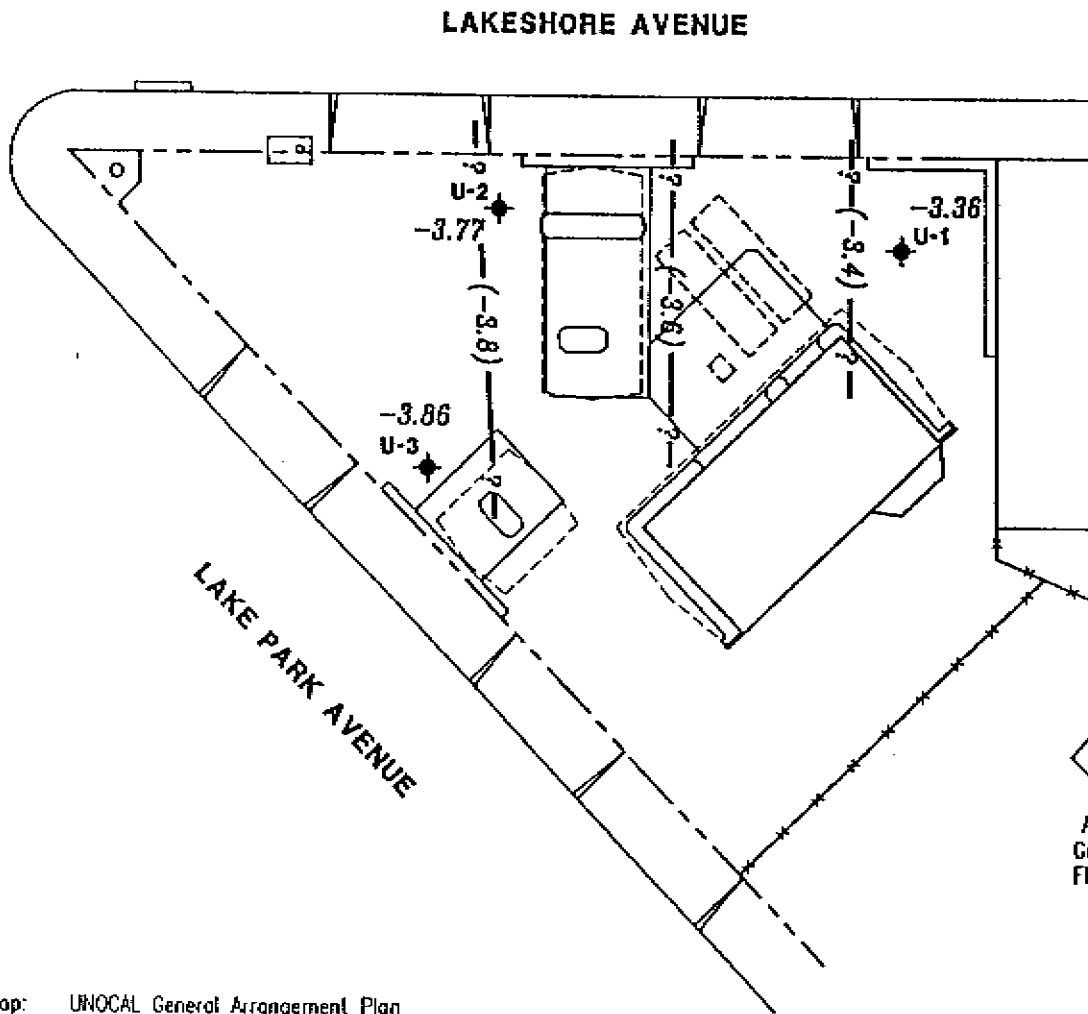
DATE
5/92

REVISED DATE

EXPLANATION

-  Ground-water monitoring well
-  Ground-water elevation contour
Approximate Gradient = 0.005
-  99.99
Ground-water elevation in feet
referenced to Mean Sea Level
(MSL) measured on November 6,
1992

Note: Contours may be influenced by irrigation practices and/or site construction activities.




Approximate
Ground-water
Flow Direction



Base Map: UNOCAL General Arrangement Plan
dated 7-8-66 (Rev. 12-4-84) and
field observations



GeoStrategies Inc.

POTENTIOMETRIC MAP
UNOCAL Service Station #5325
3220 Lakeshore Avenue
Oakland, California

PLATE
3

JOB NUMBER
781401-13

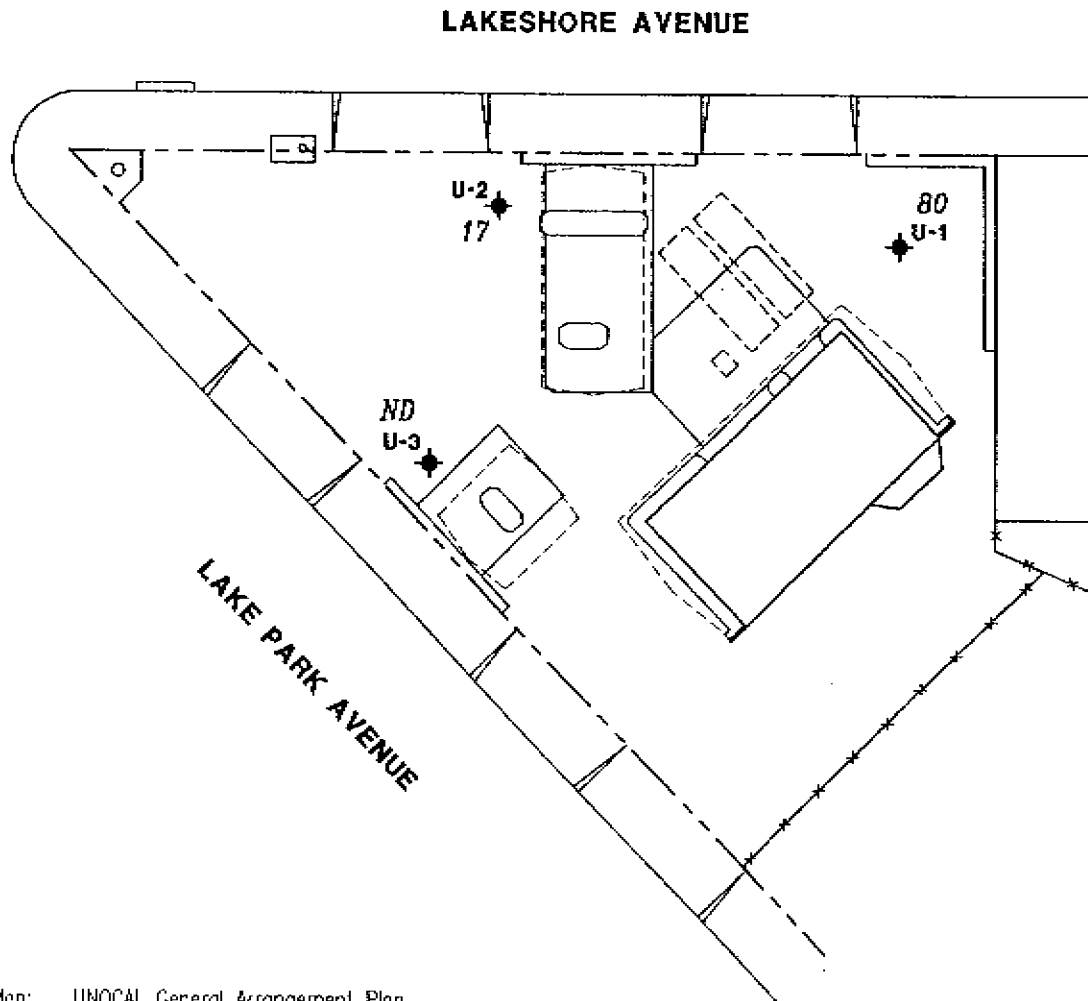
REVIEWED BY
CJG

DATE
12/92

REVISED DATE

EXPLANATION

- ◆ Ground-water monitoring well
- 0.05 Benzene concentration in ppb sampled on November 6, 1992
- ND Not Detected (See laboratory reports for detection limits)



Base Map: UNOCAL General Arrangement Plan dated 7-8-66 (Rev. 12-4-84) and field observations



GeoStrategies Inc.

BENZENE CONCENTRATION MAP
UNOCAL Service Station #5325
3220 Lakeshore Avenue
Oakland, California

PLATE

4

JOB NUMBER
781401-13

REVIEWED BY
CSG

DATE
12/92

REVISED DATE

APPENDIX A
FIELD DATA SHEETS

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Unocal JOB # 3814-01
 LOCATION 3220 Lakeshore Ave DATE 11-6-92
 CITY Oakland TIME _____

Well ID. U-1 Well Condition OK
 Well Diameter 3 in. Hydrocarbon Thickness - ft.
 Total Depth 20.0 ft.
 Depth to Liquid- 9.11 ft.

Volume Factor (VF)	2" = 0.17	6" = 1.50	12" = 5.80
	3" = 0.38	8" = 2.60	
	4" = 0.66	10" = 4.10	

 (# of casing volumes) 5 x 10.89 x (VF) .38 = (Estimated Purge Volume) 20.5 gal.
 (4.1)
 Purging Equipment DD
 Sampling Equipment Balke

Starting Time 1301 Purging Flow Rate 3 gpm.
 (Estimated Purge Volume) 20.5 gal. / (Purging Flow Rate) 3 gpm. = (Anticipated Purging Time) 6.9 min.

Time	pH	Conductivity	Temperature	Volume
<u>1302</u>	<u>6.97</u>	<u>1949</u>	<u>72.8</u>	<u>3 gal</u>
<u>1305</u>	<u>6.95</u>	<u>1970</u>	<u>71.7</u>	<u>12 gal</u>
<u>1308</u>	<u>6.97</u>	<u>1992</u>	<u>71.3</u>	<u>21 gal</u>
<u>1313</u>	<u>6.96</u>	<u>1988</u>	<u>70.9</u>	<u>22 gal</u>

Did well dewater? No If yes, time _____ Volume _____
 Sampling Time 1313 Weather Conditions sun
 Analysis for OTR Bottles Used 2x4oz
 Chain of Custody Number _____

COMMENTS _____

FOREMAN G. Jan

ASSISTANT _____

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Ozocal JOB # 3814.01
 LOCATION 3220 Lakeshore Ave DATE 11-6-92
 CITY Oakland TIME _____

Well ID. U-2 Well Condition OK
 Well Diameter 3 in. Hydrocarbon Thickness _____ ft.
 Total Depth 19.9 ft.
 Depth to Liquid- 8.71 ft.

Volume Factor (VF)	2" = 0.17	6" = 1.50	12" = 5.80
	3" = 0.38	8" = 2.60	
	4" = 0.66	10" = 4.10	

 (# of casing volumes) 5 x 11.19 x(VF) .28 = (Estimated Purge Volume) 21.0 gal.
 (4.2)
 Purging Equipment Bailer
 Sampling Equipment _____

Starting Time 1242 Purging Flow Rate _____ gpm.
 (Estimated Purge Volume) gal. / (Purging Flow Rate) _____ gpm. = (Anticipated Purging Time) _____ min.

Time	pH	Conductivity	Temperature	Volume
<u>1247</u>	<u>6.68</u>	<u>2530</u>	<u>74.2</u>	<u>1 gal</u>
<u>1251</u>	<u>6.63</u>	<u>3670</u>	<u>72.9</u>	<u>7 gal</u>
<u>1350</u>	<u>6.47</u>	<u>4330</u>	<u>72.1</u>	<u>8 gal</u>

Did well dewater? Yes If yes, time 1251 Volume 7 gal
 Sampling Time 1350 Weather Conditions SUN
 Analysis gan BIXE Bottles Used 2x40ml
 Chain of Custody Number _____

COMMENTS _____

FOREMAN R. Sant ASSISTANT _____

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Unocal JOB # 3814.01
 LOCATION 3220 Lakeshore Ave DATE 11-6-92
 CITY Oakland TIME _____

Well ID. U-3 Well Condition OK
 Well Diameter 3 in. Hydrocarbon Thickness _____ ft.
 Total Depth 20.0 ft.
 Depth to Liquid- 12.0 ft.

Volume Factor (VF)	2" = 0.17	6" = 1.50	12" = 5.80
	3" = 0.38	8" = 2.60	
	4" = 0.66	10" = 4.10	

 (# of casing volumes) 5 x 9.00 x (VF) .38 = (Estimated Purge Volume) 15.0 gal.
 (3.0)
 Purging Equipment DD
 Sampling Equipment Beiler

Starting Time 1230 Purging Flow Rate _____ gpm.
 (Estimated Purge Volume) _____ gal. / (Purging Flow Rate) _____ gpm. = (Anticipated Purging Time) _____ min.

Time	pH	Conductivity	Temperature	Volume
<u>1231</u>	<u>7.16</u>	<u>886</u>	<u>71.1</u>	<u>1 gal</u>
<u>1236</u>	<u>7.16</u>	<u>913</u>	<u>70.7</u>	<u>5 gal</u>
<u>1340</u>	<u>7.42</u>	<u>863</u>	<u>70.6</u>	<u>6 gal</u>

Did well dewater? Yes If yes, time 1236 Volume _____
 Sampling Time 1340 Weather Conditions sun
 Analysis gas SIXE Bottles Used 2 X 40
 Chain of Custody Number _____

COMMENTS _____

MAN G. Sant ASSISTANT _____

**APPENDIX B
LABORATORY ANALYTICAL REPORT
AND
CHAIN-OF-CUSTODY FORM**



NATIONAL
ENVIRONMENTAL
TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Frank Cline
Gattler-Ryan Inc.
2150 W. Winton Avenue
Hayward, CA 94545

Date: 11/22/1992
NET Client Acct No: 67900
NET Pacific Job No: 92.49229
Received: 11/09/1992

RECEIVED
NOV 10 1992
GATTLER-RYAN INC.

Client Reference Information

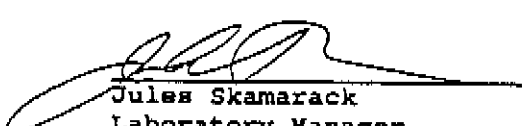
UNOCAL 3220 Lakeshore Ave, Oakland/3814.01

NOV 10 1992

GATTLER-RYAN INC.
GENERAL CONTRACTORS

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:


Jules Skamarack
Laboratory Manager

JS:rct
Enclosure(s)



Client No: 67900
Client Name: Gettler-Ryan Inc.
NET Job No: 92.49229

Date: 11/22/1992

Page: 2

Ref: UNOCAL 3220 Lakeshore Ave, Oakland/3814.01

<u>Descriptor, Lab No. and Results</u>					
Parameter	Method	Reporting Limit	U-1	U-2	Units
			11/06/1992 13:13 143332	11/06/1992 13:50 143333	
TPH (Gas/BTXE,Liquid)					
METHOD 5030 (GC,FID)			--	--	
DATE ANALYZED			11-10-92	11-10-92	
DILUTION FACTOR*			1	1	
as Gasoline	5030	50	1,000	620	ug/L
METHOD 8020 (GC,Liquid)			--	--	
DATE ANALYZED			11-10-92	11-10-92	
DILUTION FACTOR*			1	1	
Benzene	8020	0.5	80	17	ug/L
Ethylbenzene	8020	0.5	6.7	ND	ug/L
Toluene	8020	0.5	1.4	2.1	ug/L
Xylenes (Total)	8020	0.5	41	37	ug/L
SURROGATE RESULTS			--	--	
Bromofluorobenzene	5030		92	92	% Rec.



Client No: 67900
 Client Name: Gattler-Ryan Inc.
 NET Job No: 92.49229

Date: 11/22/1992

Page: 3

Ref: UNOCAL 3220 Lakeshore Ave, Oakland/3814.01

Descriptor, Lab No. and Results

Parameter	Method	Reporting Limit	U-3	Trip	Units
			11/06/1992 13:40 143334	143335	
TPH (Gas/BTEX, Liquid)					
METHOD 5030 (GC, FID)			--	--	
DATE ANALYZED			11-10-92	11-10-92	
DILUTION FACTOR*			1	1	
as Gasoline	5030	50	ND	ND	ug/L
METHOD 8020 (GC, Liquid)			--	--	
DATE ANALYZED			11-10-92	11-10-92	
DILUTION FACTOR*			1	1	
Benzene	8020	0.5	ND	ND	ug/L
Ethylbenzene	8020	0.5	ND	ND	ug/L
Toluene	8020	0.5	ND	ND	ug/L
Xylenes (Total)	8020	0.5	ND	ND	ug/L
SURROGATE RESULTS			--	--	
Bromofluorobenzene	5030		87	92	% Rec.



Client No: 67900
Client Name: Gettler-Ryan Inc.
NET Job No: 92.49229

Date: 11/22/1992

Page: 4

Ref: UNOCAL 3220 Lakeshore Ave, Oakland/3814.01

QUALITY CONTROL DATA

<u>Parameter</u>	<u>Reporting Limits</u>	<u>Units</u>	<u>Cal Verif Stand % Recovery</u>	<u>Blank Data</u>	<u>Spike % Recovery</u>	<u>Duplicate Spike % Recovery</u>	<u>RPD</u>
Gasoline	50	ug/L	103	ND	96	90	6.2
Benzene	0.5	ug/L	89	ND	99	92	7.0
Toluene	0.5	ug/L	102	ND	98	92	5.6

COMMENT: Blank Results were ND on other analytes tested.



KEY TO ABBREVIATIONS and METHOD REFERENCES

- < : Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
- * : Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated Reporting Limits by the dilution factor (but do not multiply reported values).
- ICVS : Initial Calibration Verification Standard (External Standard).
- mean : Average; sum of measurements divided by number of measurements.
- mg/Kg (ppm) : Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
- mg/L : Concentration in units of milligrams of analyte per liter of sample.
- mL/L/hr : Milliliters per liter per hour.
- MPN/100 mL : Most probable number of bacteria per one hundred milliliters of sample.
- N/A : Not applicable.
- NA : Not analyzed.
- ND : Not detected; the analyte concentration is less than applicable listed reporting limit.
- NTU : Nephelometric turbidity units.
- RPD : Relative percent difference, $100 \text{ [Value 1 - Value 2] / mean value}$.
- SNA : Standard not available.
- ug/Kg (ppb) : Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
- ug/L : Concentration in units of micrograms of analyte per liter of sample.
- umhos/cm : Micromhos per centimeter.

Method References

Methods 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

COMPANY Unocal JOB NO. 9696
 JOB LOCATION 3220 Lakeshore Ave
 CITY Oakland PHONE NO. 787-7000
 AUTHORIZED Frank Cline DATE 11-6-92 P.O. NO. 3814.01

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
U-1	2	H ₂ O	11-6-92/1313	TAC (gas) BTSE	
U-2	↓	↓	↓ 11350		
U-3	↓	↓	↓ 11340		
trip	1	↓	- / -		

RELINQUISHED BY: S. Sam 11-6-92
1535
 RELINQUISHED BY: Retrij #1 11-9-92
08:00
 RELINQUISHED BY: Alh 11-9-92
16:20

RECEIVED BY: Retrij #1 11-6-92
1535
 RECEIVED BY: Alh 11-9-92
08:00
 RECEIVED BY LAB: Alh 11/9/92
16:20

DESIGNATED LABORATORY: Sequoia DHS #:

REMARKS: Normal TAT

DATE COMPLETED 11-6-92 FOREMAN G. Sanchez

QUARTERLY SUMMARY REPORT
3RD QTR - 1992
(Jul. - Sept.)

UNOCAL SERVICE STATION #5325
3220 Lakeshore Ave.
Oakland, CA

CITY/COUNTY ID # Oakland

COUNTY: Alameda

BACKGROUND: Currently there are three (3) monitoring wells on site. The underground storage tanks were replaced in June 1990. Quarterly sampling of wells began in October 1990.

RECENT QUARTER ACTIVITIES: Collected and analyzed groundwater samples. Prepared quarterly monitoring report. Pursuing offsite access for additional wells.

NEXT QUARTER ACTIVITIES: Continue monitoring and quarterly sampling. Prepare quarterly monitoring report. Tentatively scheduled installation of the three proposed monitoring wells.

CHARACTERIZATION/REMEDIAL STATUS:

Soil contamination delineated?	<u>no</u>	
Dissolved ground water delineated?	<u>no</u>	
Free product delineated?	<u>n/a</u>	
Amount of gw contaminant recovered this quarter?	<u>n/a</u>	(gal)
Historically	<u>n/a</u>	(gal)

Soil remediation in progress? no - tanks replaced
June 1990

- anticipated start? _____
- anticipated completion? _____

Dissolved/free product remediation in progress? no

- anticipated start? _____
- anticipated completion? _____

CONSULTANT/CONTRACTOR: GeoStrategies Inc.