GeoStrategies Inc.

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 $\pm$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.

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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.

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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

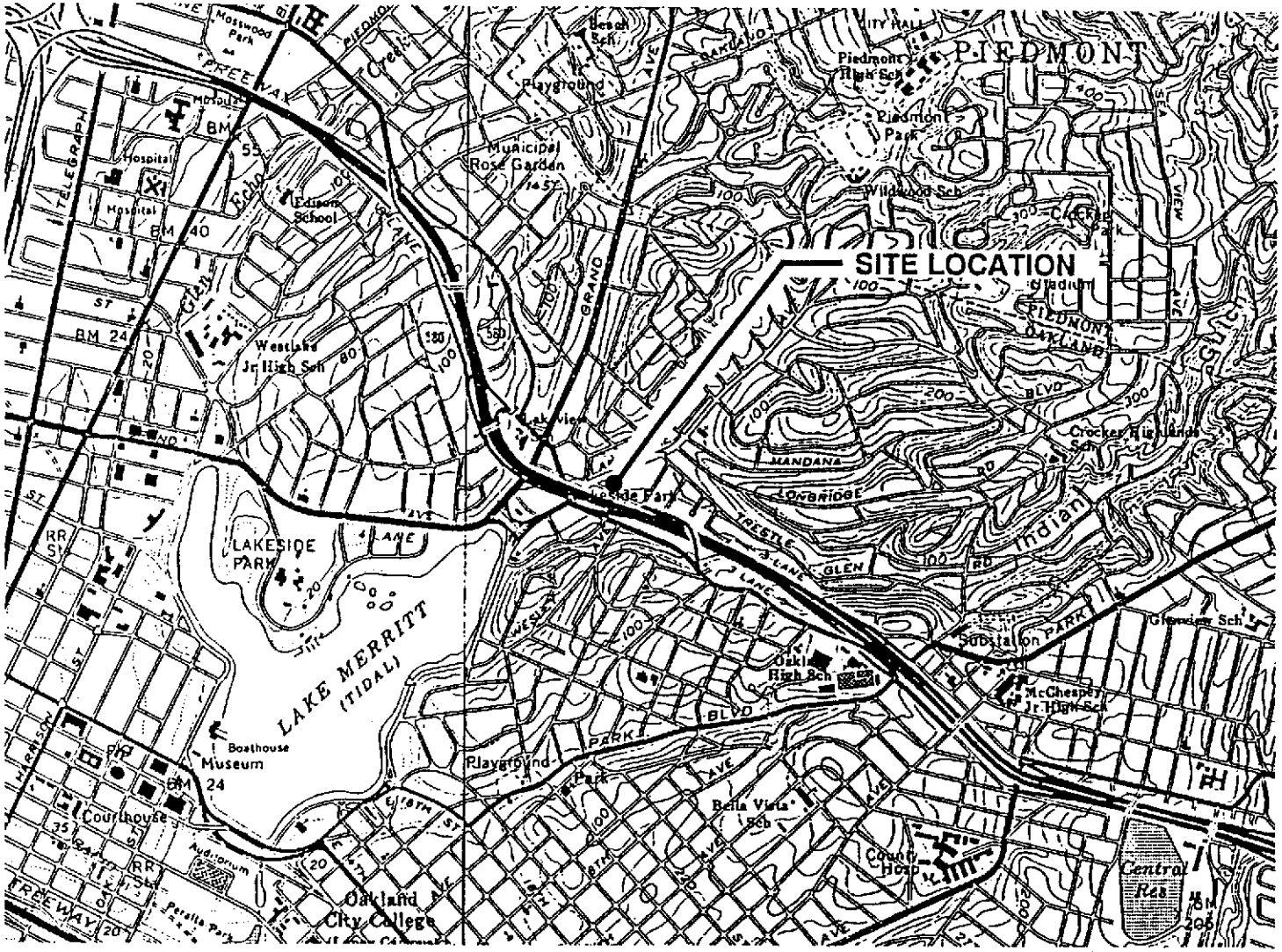
SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)

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.



Base Map: USGS Topographic Map

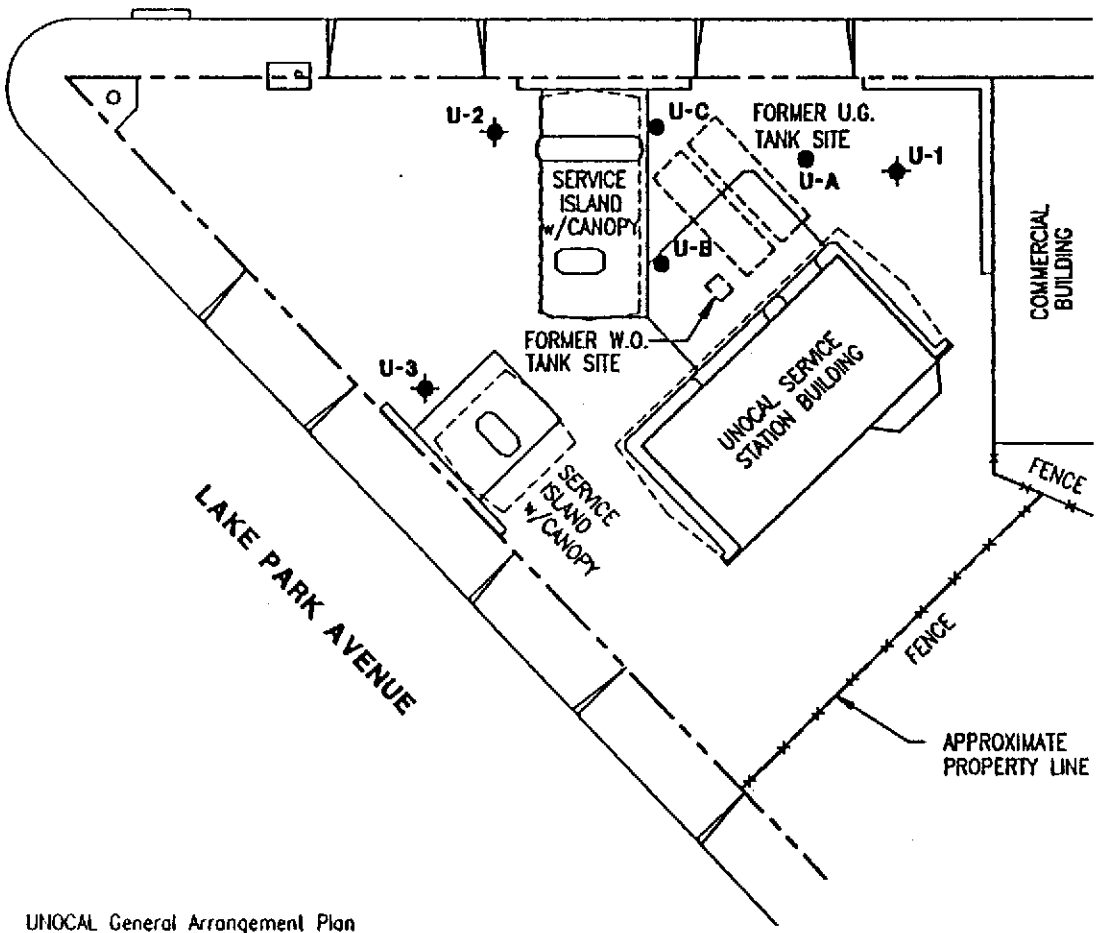
Approximate Scale: 1" = 2000'

GeoStrategies Inc.

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

PLATE 1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE
7814		6/90	



EXPLANATION

- Ground-water monitoring well
- Soil boring

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

N

0 40

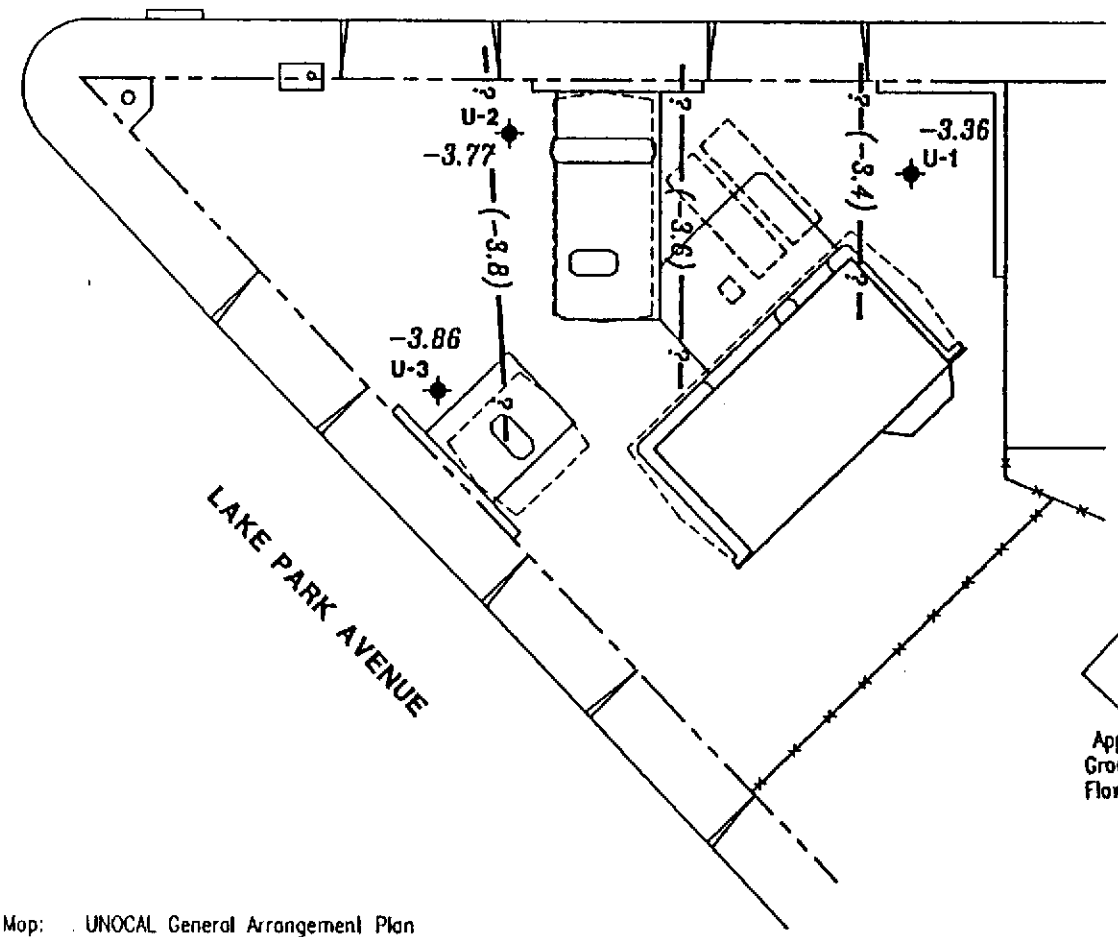
Scale in Feet

GeoStrategies Inc.

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

PLATE 2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7814		5/92	



EXPLANATION

Ground-water monitoring well

99.99 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.

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

N

0 40

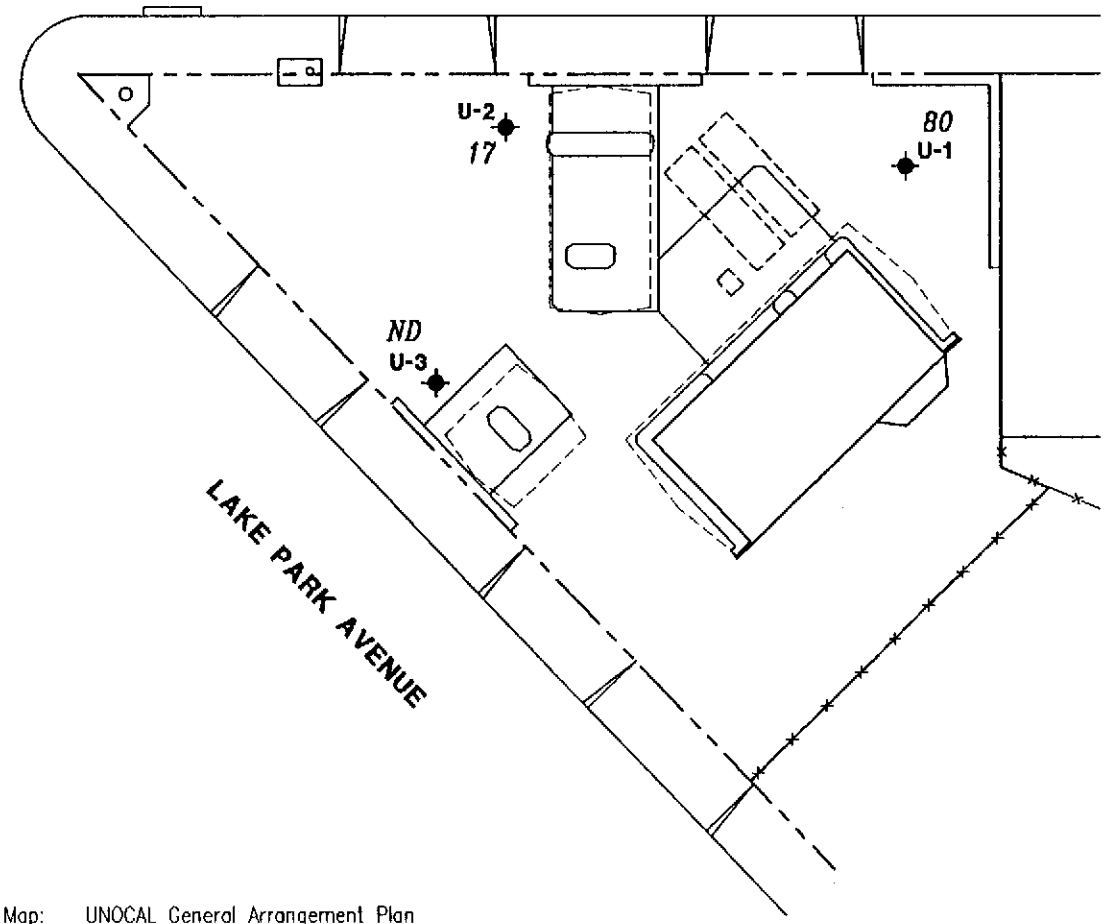
Scale in Feet

GeoStrategies Inc.

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

PLATE 3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
781401-13	CJG	12/92	



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

N

0 40

Scale in Feet

GeoStrategies Inc.

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

PLATE
4

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
781401–13	CJG	12/92	

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 Bailer

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
1302	6.97	1949	72.8	3 gal
1305	6.95	1970	71.7	12 gal
1308	6.98	1992	71.3	21 gal
1313	6.96	1988	70.9	22 gal

Did well dewater? No If yes, time Volume

Sampling Time 1313 Weather Conditions Sun

Analysis 5 on BTXE Bottles Used 2x40ml

Chain of Custody Number

COMMENTS

FOREMAN G. Jan 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-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	3" = 0.38	4" = 0.66	6" = 1.50	8" = 2.60	10" = 4.10	12" = 5.80

(# of casing volumes) 5 x 11.19 x(VF) .37 = (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
1247	6.68	2530	74.2	1 gal
1251	6.63	3670	72.9	7 gal
1350	6.47	4330	72.1	8 gal

Did well dewater? Yes If yes, time 1251 Volume 7 gal

Sampling Time 1350 Weather Conditions Sun

Analysis gas BTXE Bottles Used 3x40 ml

Chain of Custody Number

COMMENTS

FOREMAN G. 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 8.00 x(VF) .38 = (Estimated Purge Volume) 15.0 gal. (3.0)

Purging Equipment DI

Sampling Equipment Bailer

Starting Time 1230 Purging Flow Rate — gpm.

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

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

Did well dewater? Yes If yes, time 1236 Volume

Sampling Time 1340 Weather Conditions Sun

Analysis 5 am BTXE Bottles Used 3 x 40 ml

Chain of Custody Number

COMMENTS

MAN G. Sail ASSISTANT

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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

Frank Cline
Gettler-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

Client Reference Information

UNOCAL 3220 Lakeshore Ave, Oakland/3814.01

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)

Ref: UNOCAL 3220 Lakeshore Ave, Oakland/3814.01

			Descriptor, Lab No. and Results		
			U-1	U-2	
Parameter	Method	Reporting Limit	11/06/1992 13:13 143332	11/06/1992 13:50 143333	Units
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.

Ref: UNOCAL 3220 Lakeshore Ave, Oakland/3814.01

			Descriptor, Lab No. and Results		
			U-3	Trip	
			11/06/1992		
		Reporting	13:40		
Parameter	Method	Limit	143334	143335	Units
TPH (Gas/BTXE,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

Ref: UNOCAL 3220 Lakeshore Ave, Oakland/3814.01

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
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.

NET®

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 [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.

Gettler - Ryan Inc. ENVIRONMENTAL DIVISION — **1577 Chain of Custod**

COMPANY Unocal — JOB NO. 9696

JOB LOCATION 3220 Lakeshore Ave

CITY Oakland — PHONE NO. 783-7500

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_2O	11-6-92/1313	TPH (gas) BTXE	
U-2	↓	↓	1350	↓	
U-3	↓	↓	1340	↓	
trip	1	↓	-/-	↓	

RELINQUISHED BY: S. Sanchez 11-6-92 1535 — RECEIVED BY: Refrig #1 11-6-92 1535

RELINQUISHED BY: Refrig #1 11-9-92 08:00 — RECEIVED BY: 11-9-92 08:00

RELINQUISHED BY: 11-9-92 16:20 — RECEIVED BY LAB: 11/9/92 16:20

DESIGNATED LABORATORY: Sequoia — DHS #:

REMARKS: Normal TAT

DATE COMPLETED 11-6-92 — FOREMAN G. Sanchez