GeoStrategies Inc.

93 AUG 30 PM 1:15

August 27, 1993

Alameda County
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Jennifer

Attention: Mr. ~~Barney Chan~~

Reference: **UNOCAL Service Station No. 1871**
96 MacArthur Boulevard
Oakland, California

Mr. Chan:

As requested by Mr. Robert A. Boust of UNOCAL Corporation, we are forwarding a copy of the Quarterly Monitoring Report dated August 27, 1993 prepared for the above referenced location. This report presents the results of third quarter 1993 groundwater monitoring and sampling.

If you have questions or comments, please call.

GeoStrategies Inc. by,

Cliff M. Garratt
Project Manager

CMG/rmt

Enclosure

cc: Mr. Robert A. Boust, UNOCAL Corporation
Mr. Paul Supple, ROUX Associates
Mr. Lester Feldman, Regional Water Quality Control Board

:ellenu\868final.wp

GeoStrategies Inc.

QUARTERLY MONITORING REPORT

UNOCAL Service Station No. 1871
96 MacArthur Boulevard
Oakland, California

786880-4

August 27, 1993

GeoStrategies Inc.

August 27, 1993

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

Attn: Mr. Robert A. Boust

Re: **QUARTERLY MONITORING REPORT**
UNOCAL Service Station No. 1871
96 MacArthur Boulevard
Oakland, California

Mr. Boust:

This Quarterly Monitoring Report has been prepared by GeoStrategies Inc. (GSI) and presents the results of the 1993 third quarter sampling for the above referenced site (Plate 1).

There are currently three monitoring wells at the site, Wells MW-1, MW-2 and MW-3 (Plate 2). These wells were installed in 1992 by ROUX Associates.

CURRENT QUARTER SAMPLING RESULTS

Depth-to-water measurements were obtained in each monitoring well on July 16, 1993. Static groundwater levels were measured from the surveyed top of each well casing and recorded to the nearest $\pm$0.01 foot. Water-level elevations were referenced to Mean Sea Level (MSL) and are presented in Table 1. Water-level data were used to construct a quarterly potentiometric map (Plate 3). Shallow groundwater flow direction was to the southwest with an approximate hydraulic gradient of 0.02.

Each well was checked for the presence of floating product. Floating product was not observed in the wells this quarter. Floating product has never been observed in these wells. The field data sheets are included in Appendix A.

786880-4

Groundwater samples were collected on July 16, 1993. 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 groundwater samples were analyzed by Anametrix Inc., a California State-certified laboratory located in San Jose, California. The laboratory analytical report and Chain-of-Custody form are included in Appendix B. These data are summarized and included with the historical groundwater quality database presented in Table 2. A chemical concentration map for benzene is presented on Plate 4. Groundwater sampling field methods and procedures are included in the initial GSI report for the site, dated January 28, 1993.

If you have questions or comments, please call.

GeoStrategies Inc. by,

Ellen C. Fostersmith
Geologist

Stephen J. Carter
Project Manager
R.G. 5577

REGISTERED GEOLOGIST
STEPHEN J. CARTER
No. 5577
STATE OF CALIFORNIA

ECF/SJC:rt

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: CMG

786880-4

TABLE 2

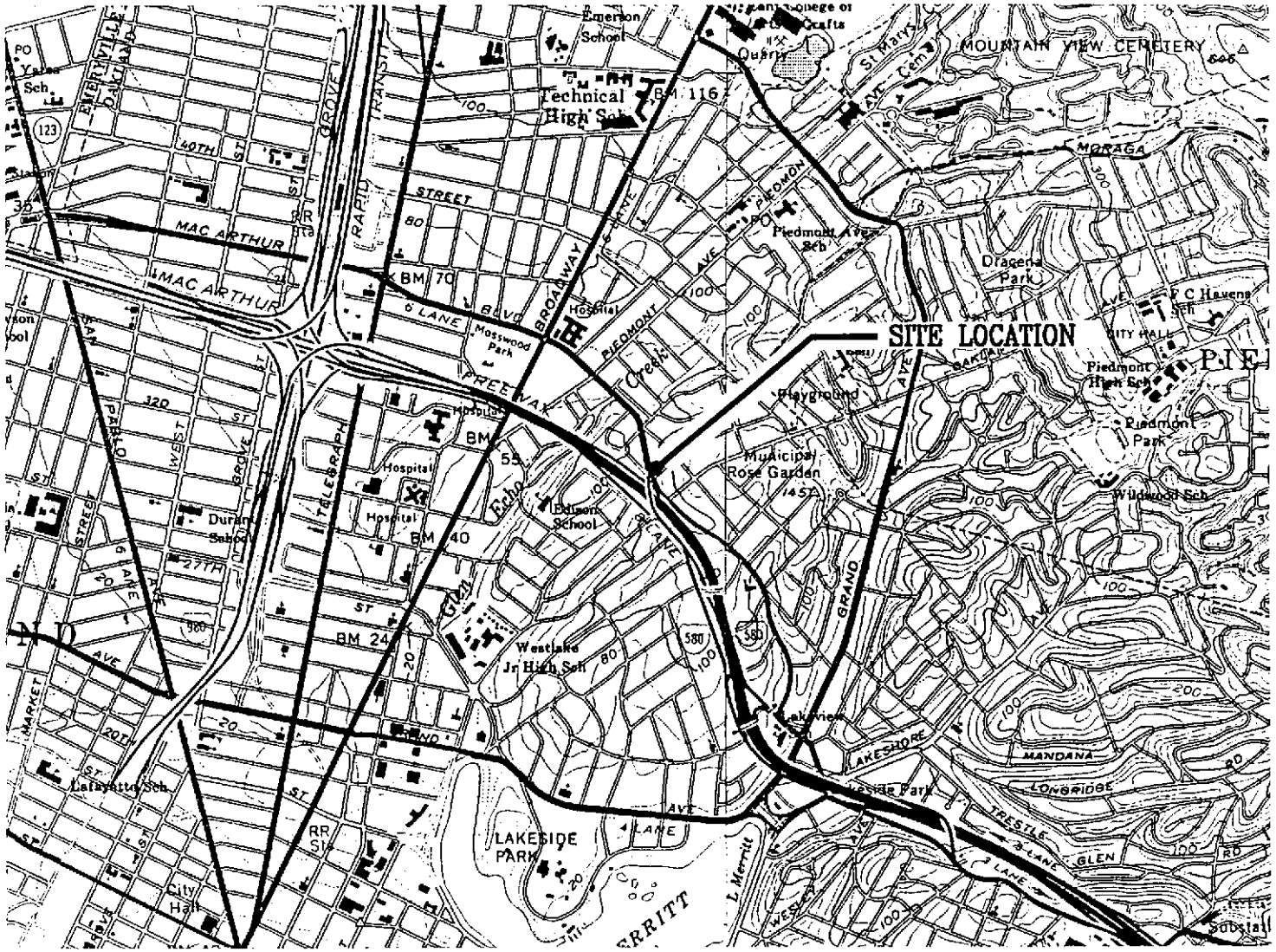
HISTORICAL GROUNDWATER QUALITY DATABASE

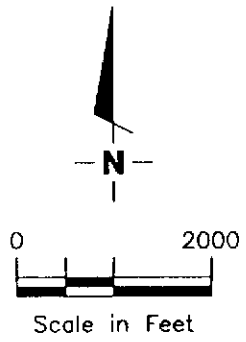
SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
03-Nov-92	MW-1	260000	2300	4600	3700	17000
25-Jan-93	MW-1	120000	2100	4600	4900	22000
29-Apr-93	MW-1	100000	850	2000	4300	19000
16-Jul-93	MW-1	29000	590	560	980	4200
03-Nov-92	MW-2	140	2.2	<0.5	<0.5	2
25-Jan-93	MW-2	2100	56	1.1	90	140
29-Apr-93	MW-2	1500	290	<5	33	11
16-Jul-93	MW-2	510*	17	0.6	3.2	2.5
03-Nov-92	MW-3	2100	120	15	38	200
25-Jan-93	MW-3	2300	80	1.0	55	52
29-Apr-93	MW-3	4500	1700	<25	200	140
16-Jul-93	MW-3	4000*	1100	28	52	70

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline.
PPB = Parts Per Billion.

Notes: 1. All data shown as <x are reported as ND (none detected).
2. Laboratory values are reported in units of µg/l, which for practical purposes are synonymous with parts per billion (ppb).

* **Concentrations reported as gasoline are primarily due to the presence of discrete peaks not indicative of gasoline.**





Base Map: USGS Topographic Map

GeoStrategies Inc.

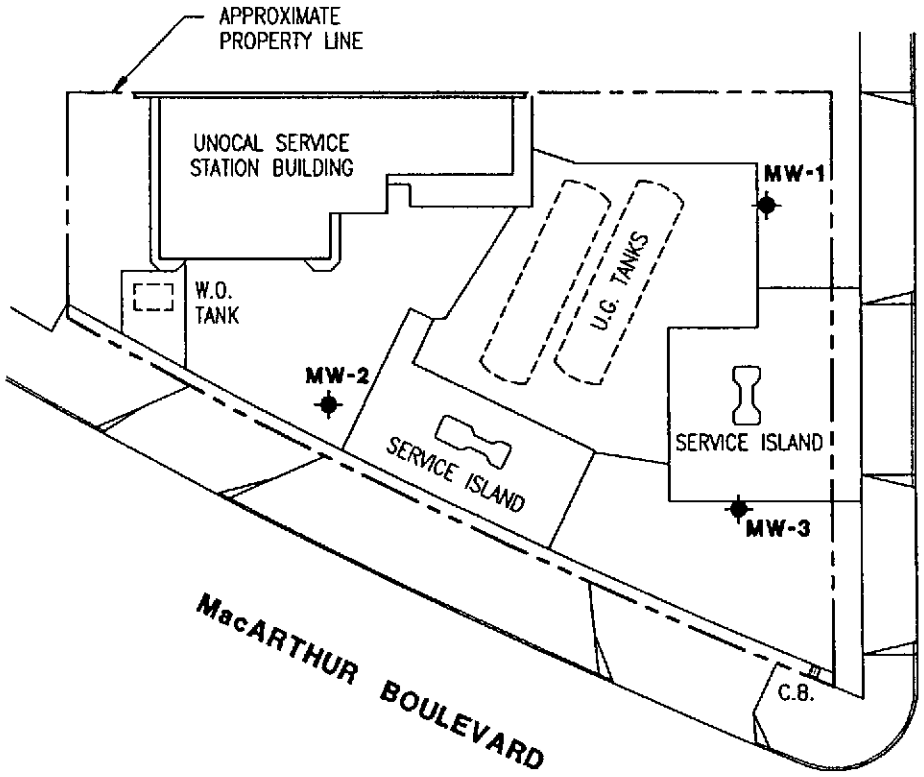
VICINITY MAP
UNOCAL Service Station #1871
96 MacArthur Boulevard
Oakland, California

PLATE
1

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7868		12/92	

EXPLANATION

✦ Groundwater monitoring well



N

0 30

Scale in Feet

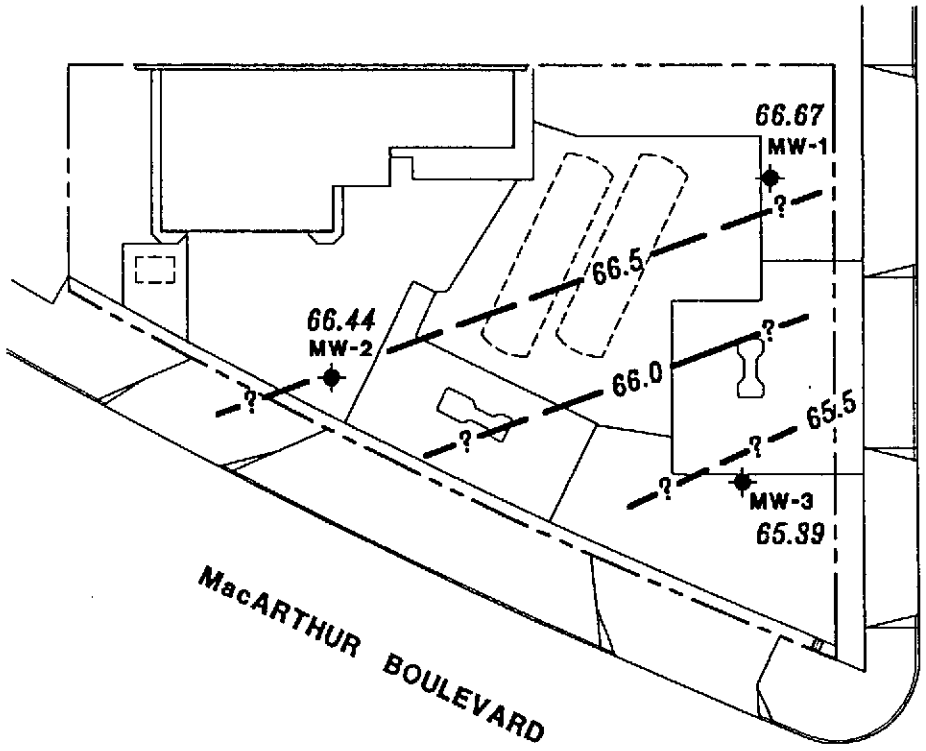
Base Map: UNOCAL Waste Oil Tank Replacement plan dated 04-14-92 and ROUX Assoc Well Location Fig. 4 dated 05/92

GeoStrategies Inc.

SITE PLAN
UNOCAL Service Station #1871
96 MacArthur Boulevard
Oakland, California

PLATE 2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
7868		8/93	



HARRISON STREET

EXPLANATION

- Groundwater monitoring well
- **99.99** Groundwater elevation in feet referenced to Mean Sea Level (MSL) measured on July 16, 1993
- 99.99 Groundwater elevation contour. Approximate Gradient = 0.02

NOTES: 1. Contours may be influenced by irrigation practices and/or site construction activities.

Approximate Groundwater Flow Direction

0 30

Scale in Feet

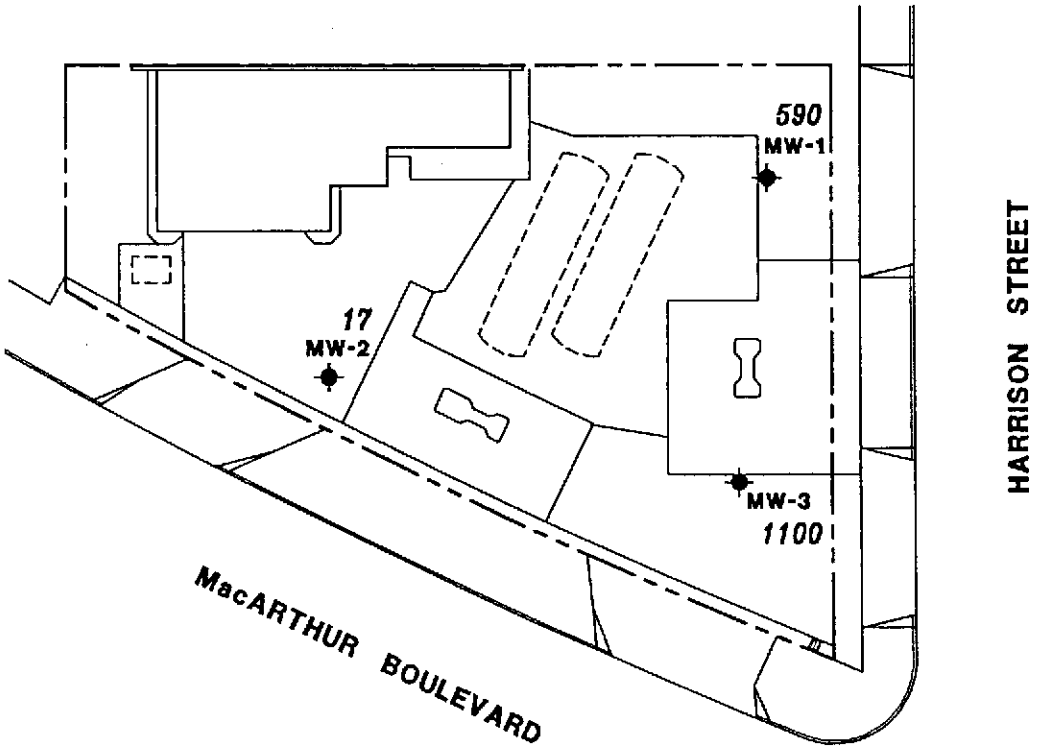
Base Map: UNOCAL Waste Oil Tank Replacement plan dated 04-14-92 and ROUX Assoc Well Location Fig. 4 dated 05/92

GeoStrategies Inc.

POTENTIOMETRIC MAP
UNOCAL Service Station #1871
96 MacArthur Boulevard
Oakland, California

PLATE **3**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
786880-4		8/93	



EXPLANATION

- Groundwater monitoring well
- ***5.00*** Benzene concentration in ppb sampled on July 16, 1993
- ***ND*** Not Detected (See laboratory reports for detection limits)

N

0 30

Scale in Feet

Base Map: UNOCAL Waste Oil Tank Replacement plan dated 04-14-92 and ROUX Assoc Well Location Fig. 4 dated 05/92

GeoStrategies Inc.

BENZENE CONCENTRATION MAP
UNOCAL Service Station #1871
96 MacArthur Boulevard
Oakland, California

PLATE **4**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE
786880-4		8/93	

APPENDIX A
FIELD DATA SHEETS

GETTLER-RYAN INC.

General and Environmental Contractors

OBSERVATION WELL DAILY MONITOR RECORD

COMPANY Unocal #1871 JOB # 9868.8C

LOCATION 96 Mac Arthur DATE 7-16-93

CITY Oakland CA TIME

WELL	DEPTH TO LIQUID (DTH) OR (DTW)	HYDROCARBON THICKNESS (HT) BEFORE	HYDROCARBON THICKNESS (HT) AFTER	AMOUNT PUMPED	COMMENTS
MW-1	14.51		24'		
MW-2	10.17		25'		
MW-3	12.09		24.1		
	Measuring point Top of casing @				
	Mark.				

PRODUCT TANK: TOTAL FLOWMETER

WATER OTHER

COMMENTS

FOREMAN FIC/mc ASSISTANT

GETTLER–RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Unocal #1871 JOB # 9808

LOCATION 96 Mac Arthur DATE 7-16-93

CITY Oakland CA TIME

Well ID. MW-1 Well Condition okay

Well Diameter 4" in. Hydrocarbon Thickness — ft.

Total Depth 24' ft.

Depth to Liquid- 14.51 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) ____ x 9.49 x(VF) 0.66 = (Estimated Purge Volume) 6.3 31 gal.

Purging Equipment Suction

Sampling Equipment Bailer

Starting Time 12:30 Purging Flow Rate 1.2 gpm.

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

Time	pH	Conductivity	Temperature	Volume
12:35	6.65	999	23.3	6
12:40	6.59	980	22.4	12
12:45	6.47	997	21.7	18
12:50	6.60	1001	21.8	24
12:56	6.57	1000	21.8	31.2

Did well dewater? NO If yes, time ____ Volume ____

Sampling Time 13:00 Weather Conditions ____

Analysis Gas BTXE Bottles Used ____

Chain of Custody Number ____

COMMENTS ____

FOREMAN F. Chin ASSISTANT ____

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Unocal #1871 JOB # 9868

LOCATION 96 MacArthur DATE 7-16-93

CITY Oakland CA TIME

Well ID. MW-2 Well Condition

Well Diameter 4" in. Hydrocarbon Thickness ft.

Total Depth 25' ft.

Depth to Liquid- 10.17 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 14.83 x(VF) 0.66 = (Estimated Purge Volume) 98.49 gal.

Purging Equipment Suction

Sampling Equipment Bailer

Starting Time 11:20 Purging Flow Rate 5 gpm.

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

Time	pH	Conductivity	Temperature	Volume
11:22	7.95	810	21.9	10
11:24	7.43	765	22.0	20
11:26	7.39	733	21.7	30
11:28	7.33	742	20.6	40
11:30	7.34	741	20.8	50

Did well dewater? No If yes, time Volume

Sampling Time 11:35 Weather Conditions

Analysis Gas BTXE Bottles Used

Chain of Custody Number

COMMENTS

FOREMAN ASSISTANT

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Unocal #1871 JOB # 9868

LOCATION 96 MacArthur DATE 7-16-93

CITY Oakland CA TIME

Well ID. MW-3 Well Condition Okay

Well Diameter 4" in. Hydrocarbon Thickness — ft.

Total Depth 24' ft.

Depth to Liquid- 12.09 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 11.91 x(VF) 0.66 = (Estimated Purge Volume) 7.37 gal.

Purging Equipment Suction

Sampling Equipment Bailer

Starting Time 11:38 40 22 6 Purging Flow Rate 1 gpm.

(Estimated Purge Volume) 40 gal. / (Purging Flow Rate) 6 gpm. = (Anticipated Purging Time) 22 min.

Time	pH	Conductivity	Temperature	Volume
11:42	7.05	968	2 23.1	4gal
11:54	6.96	~~695~~ 705	23.2	16
12:02	6.76	977	~~23.2~~	24
12:10	6.75	971	23.0	32
12:18	6.76	973	23.0	~~40~~ 30

Did well dewater? No If yes, time Volume

Sampling Time 12:22 Weather Conditions

Analysis Gas BTXE Bottles Used

Chain of Custody Number

COMMENTS

FOREMAN F. Cline ASSISTANT

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

Inchcape Testing Services
Anametrix Laboratories

1961 Concourse Drive
Suite E
San Jose, CA 95131
Tel: 408-432-8192
Fax: 408-432-8198

MR. TOM PAULSON
GETTLER RYAN/GEOSTRATEGIES
2150 W. WINTON AVENUE
HAYWARD, CA 94545

Workorder # : 9307160
Date Received : 07/16/93
Project ID : 9868.80
Purchase Order: 9868.80

The following samples were received at Anametrix, Inc. for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9307160- 1	MW-1
9307160- 2	MW-2
9307160- 3	MW-3
9307160- 4	TB

This report consists of 6 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group or section which performed the analysis(es) and generated the data. The Report Summary that precedes each section will help you determine which Anametrix group is responsible for those test results, and will bear the signatures of the department supervisor and the chemist who have reviewed the analytical data. Please refer all questions to the department supervisor who signed the form.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234. A detailed list of the approved fields of testing can be obtained by calling our office, or the DHS Environmental Laboratory Accreditation Program at (415)540-2800.

If you have any further questions or comments on this report, please give us a call as soon as possible. Thank you for using Anametrix.

Larry Kent for

Sarah Schoen, Ph.D.
Laboratory Director

7-26-93
Date

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. TOM PAULSON
GETTLER RYAN/GEOSTRATEGIES
2150 W. WINTON AVENUE
HAYWARD, CA 94545

Workorder # : 9307160
Date Received : 07/16/93
Project ID : 9868.80
Purchase Order: 9868.80
Department : GC
Sub-Department: TPH

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9307160- 1	MW-1	WATER	07/16/93	TPHgBTEX
9307160- 2	MW-2	WATER	07/16/93	TPHgBTEX
9307160- 3	MW-3	WATER	07/16/93	TPHgBTEX
9307160- 4	TB	WATER	07/12/93	TPHgBTEX

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. TOM PAULSON
GETTLER RYAN/GEOSTRATEGIES
2150 W. WINTON AVENUE
HAYWARD, CA 94545

Workorder # : 9307160
Date Received : 07/16/93
Project ID : 9868.80
Purchase Order: 9868.80
Department : GC
Sub-Department: TPH

QA/QC SUMMARY :

- The concentrations reported as gasoline for samples MW-2 and MW-3 are primarily due to the presence of discrete peaks not indicative of gasoline.

Cheryl Baenen 7/26/93
Department Supervisor Date

Charlotte Bunch 7.26.93
Chemist Date

ANALYSIS DATA SHEET - TOTAL PETROLEUM HYDROCARBONS
(GASOLINE WITH BTEX)
ANAMETRIX, INC. - (408) 432-8192

Anametrix W.O.: 9307160
Matrix : WATER
Date Sampled : 07/12 & 16/93

Project Number : 9868.80
Date Released : 07/26/93

COMPOUNDS	Reporting Limit (ug/L)	Sample I.D.# MW-1 -01	Sample I.D.# MW-2 -02	Sample I.D.# MW-3 -03	Sample I.D.# TB -04	Sample I.D.# BL2101E2 BLANK
Benzene	0.5	590	17	1100	ND	ND
Toluene	0.5	560	0.6	28	ND	ND
Ethylbenzene	0.5	980	3.2	52	ND	ND
Total Xylenes	0.5	4200	2.5	70	ND	ND
TPH as Gasoline	50	29000	510	4000	ND	ND
% Surrogate Recovery		88%	101%	111%	90%	88%
Instrument I.D.		HP4	HP4	HP4	HP4	HP4
Date Analyzed		07/21/93	07/21/93	07/22/93	07/21/93	07/21/93
RLMF		250	1	25	1	1

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using modified EPA Method 8015 following sample purge and trap by EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA Method 8020 following sample purge and trap by EPA Method 5030.
RLMF - Reporting Limit Multiplication Factor.

Anametrix control limits for surrogate p-Bromofluorobenzene recovery are 61-139%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Charleston Bunch 7.26.93
Analyst Date

Cheryl Barlman 7/26/93
Supervisor Date

ANALYSIS DATA SHEET - TOTAL PETROLEUM HYDROCARBONS
(GASOLINE WITH BTEX)
ANAMETRIX, INC. - (408) 432-8192

Anametrix W.O.: 9307160
Matrix : WATER
Date Sampled : N/A

Project Number : 9868.80
Date Released : 07/26/93

COMPOUNDS	Reporting Limit (ug/L)	Sample I.D.# BL2201E2 BLANK
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
TPH as Gasoline	50	ND
% Surrogate Recovery		90%
Instrument I.D.		HP4
Date Analyzed		07/22/93
RLMF		1

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using modified EPA Method 8015 following sample purge and trap by EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA Method 8020 following sample purge and trap by EPA Method 5030.
RLMF - Reporting Limit Multiplication Factor.

Anametrix control limits for surrogate p-Bromofluorobenzene recovery are 61-139%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Charles M Burch 7.26.93
Analyst Date

Cheryl Baeman 7/26/93
Supervisor Date

TOTAL VOLATILE HYDROCARBON MATRIX SPIKE REPORT
EPA METHOD 5030 WITH GC/FID
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 9868.80 MW-2
Matrix : WATER
Date Sampled : 07/16/93
Date Analyzed : 07/21/93

Anametrix I.D. : 07160-02
Analyst : CMB
Supervisor : [illegible]
Date Released : 07/26/93
Instrument I.D.: HP4

COMPOUND	SPIKE AMT (ug/L)	SAMPLE CONC (ug/L)	REC MS (ug/L)	%REC MS	REC MD (ug/L)	%REC MD	RPD	%REC LIMITS
BENZENE	20.0	17.0	31.7	74%	32.3	76%	2%	45-139
TOLUENE	20.0	0.6	18.9	91%	19.4	94%	3%	51-138
ETHYLBENZENE	20.0	3.2	22.1	95%	22.9	98%	4%	48-146
TOTAL XYLENES	20.0	2.5	20.4	89%	21.4	95%	5%	50-139
p-BFB				100%		105%		61-139

* Quality control established by Anametrix, Inc.

TOTAL VOLATILE HYDROCARBON LABORATORY CONTROL SAMPLE REPORT
EPA METHOD 5030 WITH GC/PID
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : LAB CONTROL SAMPLE
Matrix : WATER
Date Sampled : N/A
Date Analyzed : 07/21/93

Anametrix I.D. : ML2101E3
Analyst : CMB
Supervisor : [illegible]
Date Released : 07/26/93
Instrument I.D.: HP4

COMPOUND	SPIKE AMT. (ug/L)	LCS (ug/L)	REC LCS	%REC LIMITS
Benzene	20.0	18.3	92%	52-133
Toluene	20.0	19.1	96%	57-136
Ethylbenzene	20.0	19.6	98%	56-139
TOTAL Xylenes	20.0	19.0	95%	61-139
P-BFB			109%	61-139

* Limits established by Anametrix, Inc.

9307160 (18) 17:45 MA

Gettler - Ryan Inc. ENVIRONMENTAL DIVISION — 5237 **Chain of Custody**

COMPANY Unocal #1871 JOB NO.

JOB LOCATION 96 Mac Arthur Street

CITY Oakland CA PHONE NO.

AUTHORIZED Tom Paulsen DATE 7-16-93 P.O. NO. 9868.80

SAMPLE ID	NO. OF CONTAINERS	SAMPLE MATRIX	DATE/TIME SAMPLED	ANALYSIS REQUIRED	SAMPLE CONDITION LAB ID
MW-1	3	Liquid	7-16-93 / 13:00	TPH (Gas) BTXE	(1)
MW-2	3		11:35		(2)
MW-3	3		12:22		(3)
TB	2		—		(4)

RELINQUISHED BY: 7-16-93 1715 RECEIVED BY:

RELINQUISHED BY: RECEIVED BY:

RELINQUISHED BY: RECEIVED BY LAB: 7/16/93 17:15

DESIGNATED LABORATORY: Anametrix DHS #:

REMARKS: Normal TAT

DATE COMPLETED 7-16-93 FOREMAN 7-16-93

ORIGINAL