gettler — ryan inc.

July 16, 1991

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

Attention: ~~Mr. Larry Seto~~ Susan

certified mail

Reference: ARCO Service Station #4931
731 W. MacArthur Boulevard
Oakland, California 94611

Mr. Seto:

As requested by ARCO Products Company, we are forwarding a copy of Quarterly Monitoring report for the above referenced location. This report presents the results of the second quarter ground-water sampling conducted at this site.

Please do not hesitate to call should you have any questions or comments.

Sincerely,

Keith E. Bullock

KEB/jpz

Enclosure

cc: Mr. Charles Carmel, ARCO Products Company
Mr. Tom Callaghan, Regional Water Quality Control Board (certified mail)
Mr. H. C. Winsor, ARCO Products Company

91 JUL 22 PM 2:52

GeoStrategies Inc.

QUARTERLY MONITORING REPORT

ARCO Service Station No. 4931
731 West Arthur Boulevard
Oakland, California

790901-12

July 12, 1991

RECEIVED
JUL 15 1991
GETTLER-RYAN INC.
GENERAL CONTRACTORS
(415) 352-4800

GeoStrategies Inc.
2140 WEST WINTON AVENUE
HAYWARD, CALIFORNIA 94545

July 12, 1991

Gettler-Ryan Inc.
2150 West Winton Avenue
Hayward, California 94545

Attn: Mr. Keith Bullock

Re: QUARTERLY MONITORING REPORT
ARCO Service Station No. 4931
731 West MacArthur Boulevard
Oakland, California

Gentlemen:

This Quarterly Monitoring Report by GeoStrategies Inc. (GSI) presents results of the 1991 second quarter ground-water sampling performed on April 12, 1991, by Gettler-Ryan Inc. (G-R) for the above referenced location (Plates 1 and 2). The scope of work presented in this document was performed at the request of ARCO Products Company. Field work and laboratory analysis methods were performed to comply with current State of California Water Resources Control Board (SWRCB) guidelines. G-R ground-water sampling procedures are presented in GSI Site Update report dated October 4, 1990.

SITE BACKGROUND

There are currently eleven monitoring wells at the site; Wells A-2 through A-12 (Plate 2). These wells were installed between 1982 and 1987 by Groundwater Technology, Inc. and Pacific Environmental Group. Wells A-2 through A-10 are onsite and Wells A-11 and A-12 are offsite. These wells were installed to evaluate the vertical and horizontal extent of petroleum hydrocarbons in the soil and groundwater beneath the site.

Quarterly monitoring and sampling of wells began in 1989. Ground-water samples have been analyzed for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) according to EPA Method 8015 (Modified) and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) according to EPA Method 8020.

CURRENT QUARTERLY SAMPLING RESULTS

Potentiometric Data

Prior to ground-water sampling, water levels were measured in each of the monitoring wells using an electronic oil-water interface probe (Table 1). Static water-levels were measured from the surveyed top of well box and recorded to the nearest $\pm$0.01 foot. Elevations corresponding to Mean Sea Level (MSL) are presented in Table 1. The potentiometric contour map presented on Plate 3 was prepared from the water-level measurement data. The local hydraulic gradient in the first water bearing zone was calculated to be 0.02 with ground-water flow approximately to the southwest.

Floating Product Measurements

Each monitoring well was checked for the presence of floating product with an electronic oil-water interface probe. A clear acrylic bailer was used to confirm interface probe results. Floating product was observed in monitoring well A-8 at a measured thickness of 0.01 feet.

Groundwater Analytical Data

Prior to collecting samples, the monitoring wells were purged until ground-water parameters stabilized. Purge volumes and physical parameter values are presented in Table 1. Ground-water samples were collected on April 12, 1991. The samples were analyzed for TPH-Gasoline according to EPA Method 8015 (Modified) and BTEX according to EPA Method 8020 by Sequoia Analytical Laboratories Inc., a State-certified laboratory located in Redwood City, California.

Detectable TPH-Gasoline was reported in monitoring wells A-2 (16,000 parts per billion (ppb)), A-4 (1800 ppb), A-6 (430 ppb) and A-9 (130 ppb). Well A-10 was ND for TPH-Gasoline. Benzene was detected in monitoring Wells A-2 (640 ppb), A-6 (24 ppb), A-9 (52 ppb) and A-10 (0.67 ppb). Wells A-3, A-5, A-7, A-11 and A-12 were reported as none detected (ND) for TPH-Gasoline and benzene. The chemical analytical data are summarized in Table 2. Historical chemical data are summarized in Table 3. TPH-Gasoline and benzene chemical analytical data have been used to prepare isoconcentration maps (Plates 4 and 5). The laboratory analytical report and Chain-of-Custody forms are presented in Appendix A and field data sheets are presented in Appendix B.

Quality Control

The Quality control (QC) sample for the second quarter's ground-water sampling was a trip blank. The trip blank was prepared in the Sequoia laboratory using organic-free water to evaluate field and laboratory handling and analytical procedures. The QC sample was broken on route to the laboratory and could not be analyzed.

If you have any questions, please call.

GeoStrategies Inc. by,

Cliff M. Garratt
Hydrogeologist

David H. Peterson
C.E.G. 1186

REGISTERED GEOLOGIST
DAVID H. PETERSON
No. 1186
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

CMG/DHP/mlg

Plate 1. Vicinity Map
Plate 2. Site Plan
Plate 3. Potentiometric Map
Plate 4. TPH-Gasoline Isoconcentration Map
Plate 5. Benzene Isoconcentration Map

Appendix A: Analytical Laboratory Report and Chain-of-Custody Forms

Appendix B: Field Data Sheets

QC Review:

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)
A-2	12-Apr-91	3	18.5	55.38	3.65	----	51.73	2	6.76	62.1	469
A-3	12-Apr-91	3	19.3	54.48	9.28	----	45.20	2	6.43	64.2	585
A-4	12-Apr-91	4	19.5	54.62	9.54	----	45.08	2	6.60	66.5	944
A-5	12-Apr-91	3	23.9	54.15	9.64	----	44.51	4	6.58	68.5	677
A-6	12-Apr-91	3	25.0	55.13	8.05	----	47.08	5	6.70	66.1	559
A-7	12-Apr-91	3	22.8	54.67	7.90	----	46.77	4	6.60	66.2	575
A-8	12-Apr-91	3	----	53.61	9.16	0.01	44.46	----	----	----	----
A-9	12-Apr-91	6	38.8	52.96	8.69	----	44.27	5	6.71	65.1	233
A-10	12-Apr-91	3	28.2	54.16	10.04	----	44.12	5	6.78	64.0	599
A-11	12-Apr-91	3	29.0	53.75	9.45	----	44.30	6	6.79	66.0	600
A-12	12-Apr-91	3	29.0	52.05	9.45	----	42.60	5	6.95	65.6	608

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.
4. Static water-levels corrected for floating product (conversion factor = 0.80).

TABLE 2

GROUND-WATER ANALYSES DATA

WELL NO	SAMPLE DATE	ANALYZED DATE	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
A-2	12-Apr-91	18-Apr-91	16000	640	290	280	2600
A-3	12-Apr-91	18-Apr-91	<30	<0.30	<0.30	<0.30	<0.30
A-4	12-Apr-91	18-Apr-91	1800	<60	90	650	1700
A-5	12-Apr-91	18-Apr-91	<30	<0.30	<0.30	<0.30	0.84
A-6	12-Apr-91	18-Apr-91	430	24	5.1	9.4	32
A-7	12-Apr-91	18-Apr-91	<30	<0.30	<0.30	<0.30	0.48
A-9	12-Apr-91	18-Apr-91	130	52	0.83	5.3	6.0
A-10	12-Apr-91	18-Apr-91	<30	0.67	0.55	<0.30	0.90
A-11	12-Apr-91	18-Apr-91	<30	<0.30	0.37	<0.30	<0.30
A-12	12-Apr-91	18-Apr-91	<30	<0.30	<0.30	<0.30	<0.30

CURRENT REGIONAL WATER QUALITY CONTROL BOARD MAXIMUM CONTAMINANT LEVELS
Benzene 1. ppb Xylenes 1,750. ppb Ethylbenzene 680. ppb

CURRENT DHS ACTION LEVELS
Toluene 100.0 ppb

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. DHS Action Levels and MCLs are subject to change pending State review.
3. The trip blank was broken en route to the laboratory and could not be analyzed.

TABLE 3

HISTORICAL GROUND WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
21-Mar-86	A-2	31000.	----	----	----	----
07-Jan-88	A-2	12000.	920.	1500.	----	4000.
20-Mar-89	A-2	22000.	1200.	1800.	1200.	7700.
24-May-89	A-2	9000.	460.	260.	250.	2400.
18-Aug-89	A-2	14000.	900.	200.	<200.	1300.
27-Oct-89	A-2	16000.	1200.	340.	90.	3100.
15-Jan-90	A-2	9900.	1100.	460.	150.	2900.
04-Apr-90	A-2	16000.	1100.	400.	380.	3900.
30-Jul-90	A-2	16000.	1400.	340.	290.	3600.
30-Jul-90	A-2	16000.	1400.	340.	290.	3600.
29-Oct-90	A-2	14000.	1100.	210.	66.	2700.
16-Jan-91	A-2	15000.	1200.	800.	190.	4600.
12-Apr-91	A-2	16000	640	290	280	2600
21-Mar-86	A-3	1000.	----	----	----	----
07-Jan-88	A-3	250.	2.3	8.	----	21.
20-Mar-89	A-3	230.	1.6	<1.	3.	3.
24-May-89	A-3	170.	0.9	2.	1.	<3.
18-Aug-89	A-3	180.	0.7	1.	<1.	<3.
27-Oct-89	A-3	120.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-3	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-3	88.	1.2	2.0	0.8	4.
30-Jul-90	A-3	120.	8.3	2.9	2.3	12.
29-Oct-90	A-3	780.	10.	27.	18.	85.
16-Jan-91	A-3	69.	2.0	3.5	<0.5	9.6
12-Apr-91	A-3	<30	<0.30	<0.30	<0.30	<0.30
20-Mar-89	A-4	360000.	1500.	3700.	6500.	35000.
24-May-89	A-4	1500000.	1000.	2000.	6000.	23000.

TABLE 3

HISTORICAL GROUND WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
04-Apr-90	A-4	40000.	680.	320.	1400.	4900.
12-Apr-91	A-4	1800	<60	90	650	1700
21-Mar-86	A-5	88.	----	----	----	----
07-Jan-88	A-5	<50.	0.5	1.	----	4.
20-Mar-89	A-5	60.	0.5	1.	2.	10.
24-May-89	A-5	<50.	0.5	<1.	<1.	<3.
18-Aug-89	A-5	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-5	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-5	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-5	<50.	<0.5	<0.5	<0.5	<1.
30-Jul-90	A-5	<50.	<0.5	<0.5	<0.5	<0.5
29-Oct-90	A-5	280.	<0.5	<0.5	<0.5	<0.5
16-Jan-91	A-5	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-5	<30	<0.30	<0.30	<0.30	0.84
21-Mar-86	A-6	<10.	----	----	----	----
21-Mar-86	A-6	<10.	----	----	----	----
07-Jan-88	A-6	390.	54.	89.	----	110.
20-Mar-89	A-6	220.	33.	21.	9.	39.
24-May-89	A-6	110.	13.	6.	3.	13.
18-Aug-89	A-6	<50.	2.1	1.	<1.	<3.
27-Oct-89	A-6	55.	3.8	1.6	1.7	6.
15-Jan-90	A-6	100.	12.	2.5	5.5	18.
04-Apr-90	A-6	100.	17.	7.1	5.5	18.
30-Jul-90	A-6	<50.	2.6	<0.5	<0.5	1.2
29-Oct-90	A-6	<50.	0.7	<0.5	<0.5	<0.5
16-Jan-91	A-6	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-6	430	24	5.1	9.4	32
07-Jan-88	A-7	<50.	<0.5	1.	----	4.

TABLE 3

HISTORICAL GROUND WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
20-Mar-89	A-7	<50.	0.9	<1.	<1.	<3.
24-May-89	A-7	<50.	<0.5	<1.	<1.	<3.
18-Aug-89	A-7	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-7	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-7	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-7	<50.	<0.5	<0.5	<0.5	<1.
30-Jul-90	A-7	<50.	<0.5	<0.5	<0.5	<0.5
29-Oct-90	A-7	<50.	2.7	7.6	1.1	3.0
16-Jan-91	A-7	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-7	<30	<0.30	<0.30	<0.30	0.48
07-Jan-88	A-9	300.	45.	14.	----	43.
21-Mar-89	A-9	50.	2.8	1.	1.	3.
24-May-89	A-9	120.	26.	12.	4.	79.
18-Aug-89	A-9	14000.	400.	800.	400.	2000.
27-Oct-89	A-9	1700.	150.	36.	30.	110.
15-Jan-90	A-9	860.	140.	58.	38.	140.
04-Apr-90	A-9	620.	36.	13.	9.4	32.
30-Jul-90	A-9	180.	77.	1.6	2.1	4.2
29-Oct-90	A-9	110.	30.	3.7	4.1	8.3
16-Jan-91	A-9	<50.	15.	<0.5	<0.5	0.6
12-Apr-91	A-9	130	52	0.83	5.3	6.0
07-Jan-88	A-10	<50.	0.6	11.	----	4.
20-Mar-89	A-10	<50.	<0.5	<1.	<1.	<3.
24-May-89	A-10	<50.	<0.5	<1.	<1.	<3.
18-Aug-89	A-10	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-10	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-10	<50.	<0.5	<0.5	<0.5	<1.
30-Jul-90	A-10	<50.	<0.5	<0.5	<0.5	<0.5
29-Oct-90	A-10	<50.	2.3	6.9	1.2	3.0

TABLE 3

HISTORICAL GROUND WATER QUALITY DATABASE

SAMPLE DATE	SAMPLE POINT	TPH-G (PPB)	BENZENE (PPB)	TOLUENE (PPB)	ETHYLBENZENE (PPB)	XYLENES (PPB)
16-Jan-91	A-10	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-10	<30	0.67	0.55	<0.30	0.90
07-Jan-88	A-11	<50.	1.1	2.	----	5.
20-Mar-89	A-11	<50.	<0.5	<1.	<1.	<3.
24-May-89	A-11	<50.	<0.5	<1.	<1.	<3.
18-Aug-89	A-11	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-11	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-11	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-11	<50.	<0.5	<0.5	<0.5	<1.
30-Jul-90	A-11	<50.	<0.5	0.6	<0.5	0.5
29-Oct-90	A-11	<50.	0.6	2.4	0.6	1.5
16-Jan-91	A-11	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-11	<30	<0.30	0.37	<0.30	<0.30
07-Jan-88	A-12	<50.	<0.5	2.	----	<4.
20-Mar-89	A-12	<50.	<0.5	<1.	<1.	<3.
24-May-89	A-12	<50.	<0.5	<1.	<1.	<3.
18-Aug-89	A-12	<50.	<0.5	<1.	<1.	<3.
27-Oct-89	A-12	<50.	<0.5	<0.5	<0.5	<1.
15-Jan-90	A-12	<50.	<0.5	<0.5	<0.5	<1.
04-Apr-90	A-12	<50.	<0.5	<0.5	<0.5	<1.
30-Jul-90	A-12	<50.	<0.5	<0.5	<0.5	<0.5
29-Oct-90	A-12	<50.	<0.5	<0.5	<0.5	<0.5
16-Jan-91	A-12	<50.	<0.5	<0.5	<0.5	<0.5
12-Apr-91	A-12	<30	<0.30	<0.30	<0.30	<0.30

TABLE 3

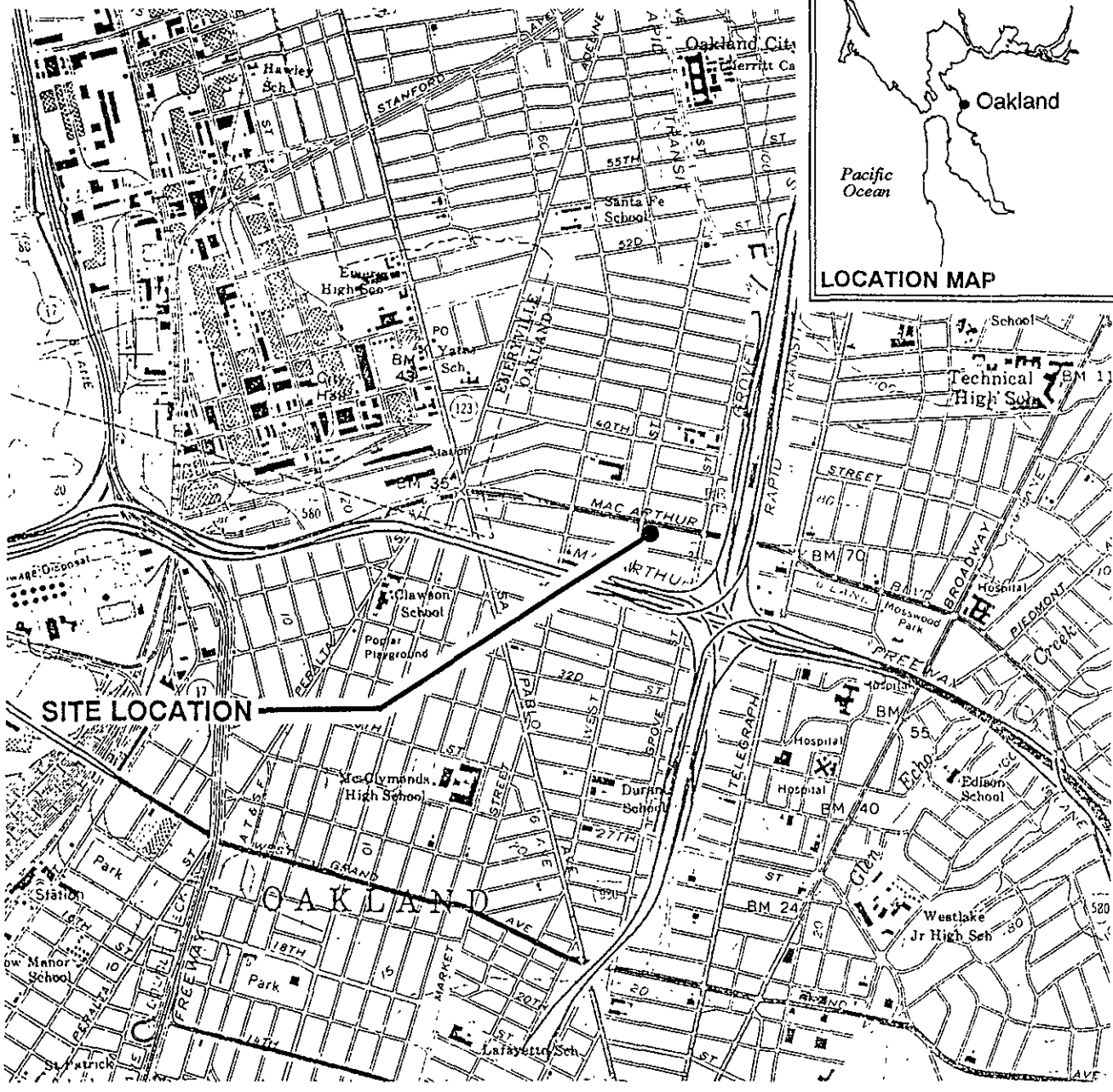
HISTORICAL GROUND WATER QUALITY DATABASE

Current Regional Water Quality Control Board Maximum Contaminant Levels
Benzene 1. ppb Xylenes 1750. ppb Ethylbenzene 680. ppb

Current DHS Action Levels Toluene 100.0 ppb

TPH-G = Total Petroleum Hydrocarbons calculated as Gasoline
PPB = Parts Per Billion
NOTE: 1. DHS Action levels and MCL's are subject to change pending State of California review.
2. All data shown as <X are reported as ND (none detected).
3. Ethylbenzene & Xylenes were combined in 1986 and 1988.

ILLUSTRATIONS



Base Map: USGS Topographic Map

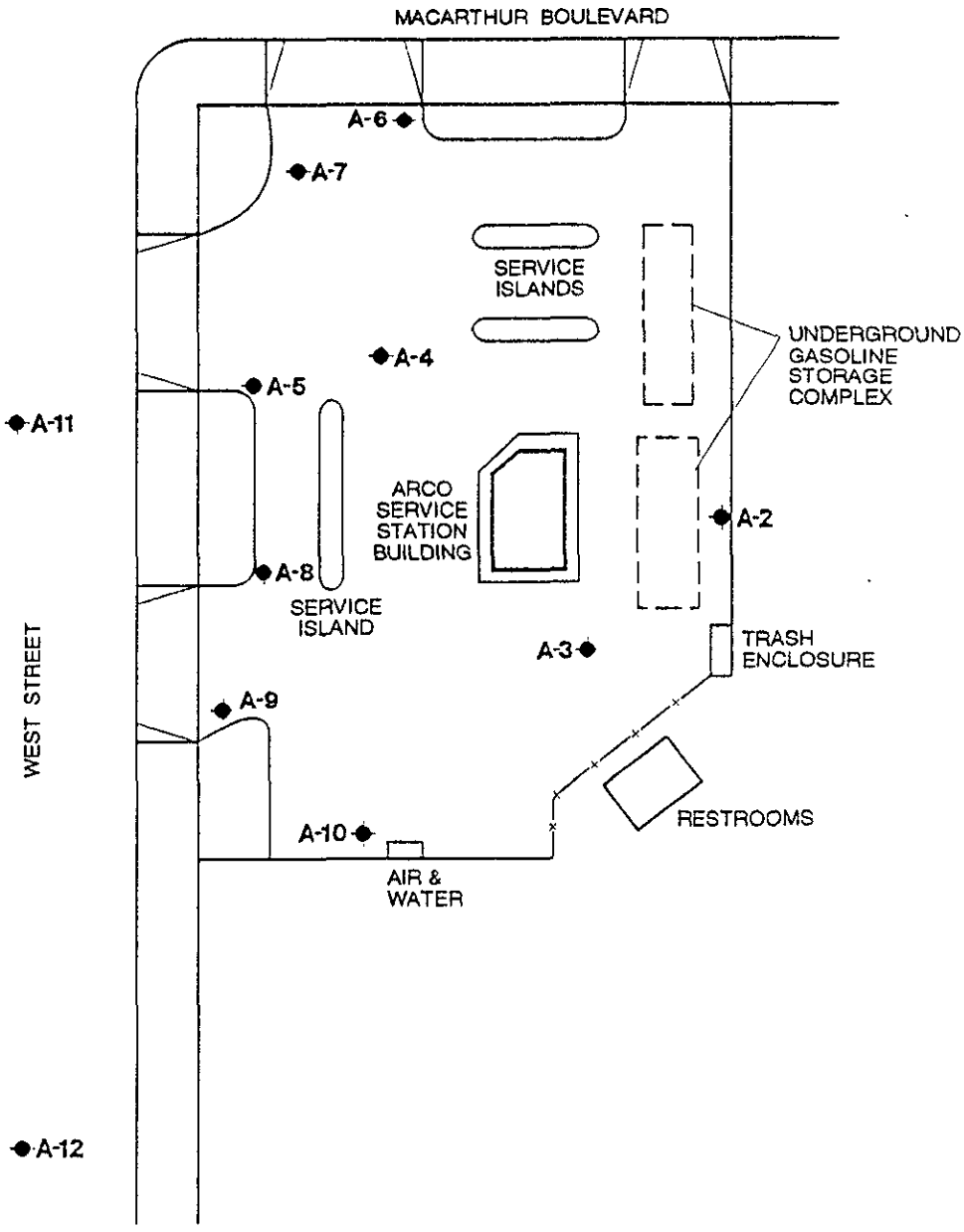
Approximate Scale : 1" = 2000'

GeoStrategies Inc.

Vicinity Map
ARCO Service Station #4931
731 W. MacArthur Boulevard
Oakland, California

PLATE
1

JOB NUMBER	REVIEWED BY RG/CEG	DATE	REVISED DATE	REVISED DATE
7909		1/90		

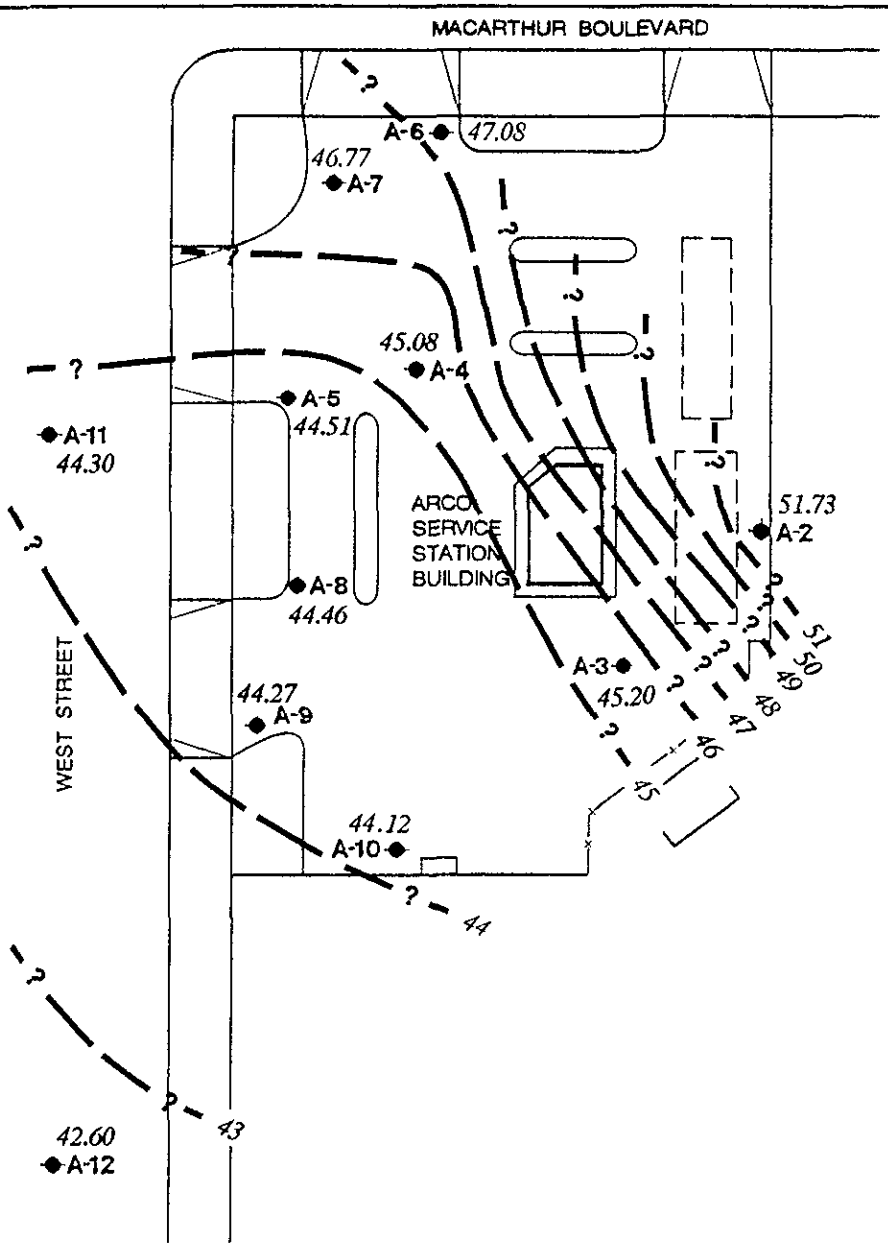


GeoStrategies Inc.

Site Plan
ARCO Service Station #4931
731 W. MacArthur Boulevard
Oakland, California

PLATE
2

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
790901-12	DMP	6/91		



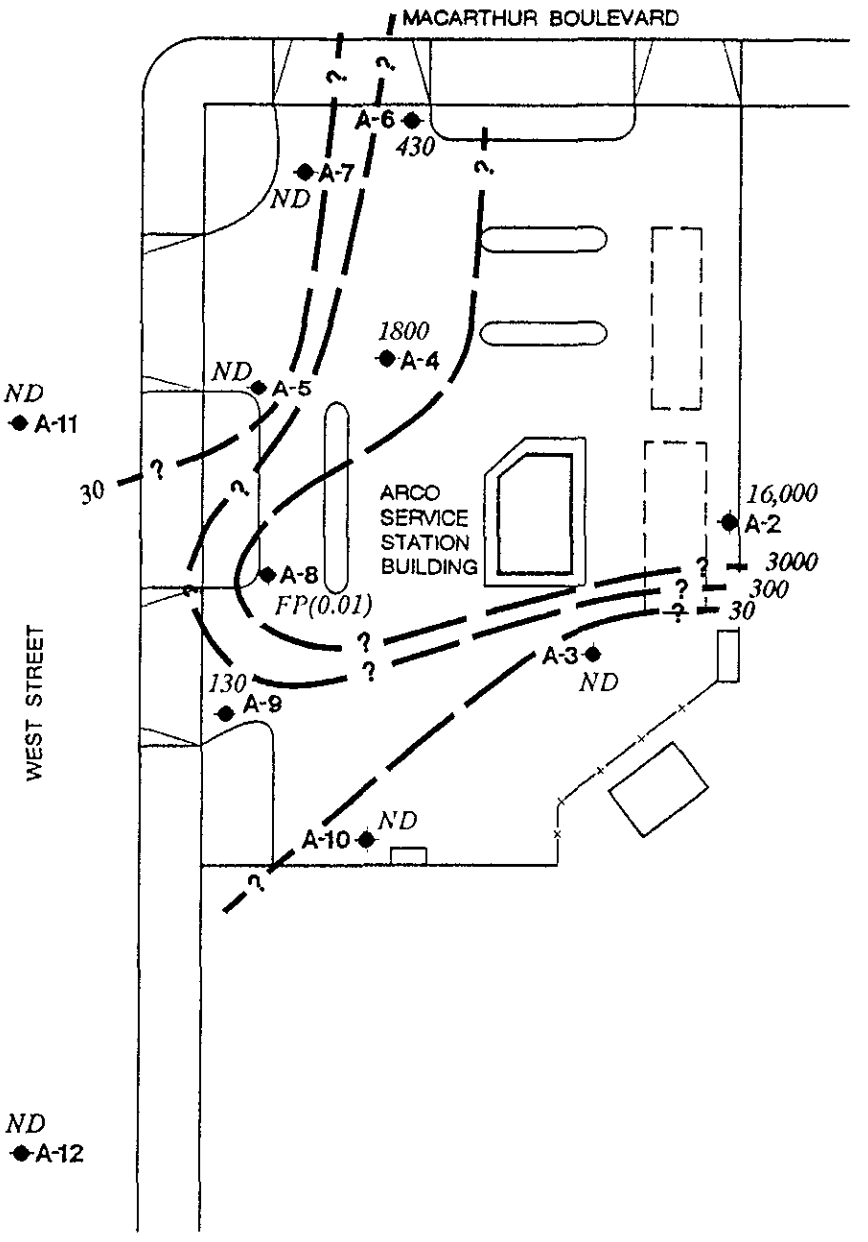
Note: Contours may be influenced by irrigation practices and/or site construction activities

GeoStrategies Inc.

Potentiometric Map
ARCO Service Station #4931
731 W. MacArthur Boulevard
Oakland, California

PLATE
3

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
790901-12	DHP	6/91		



EXPLANATION

◆ A-2	Ground-water monitoring well location
130	TPH-G (Total Petroleum Hydrocarbons calculated as Gasoline) concentration in ppb sampled on April 12, 1991
300	TPH-G isoconcentration contour
ND	Not Detected (see laboratory reports for detection limits)
FP(0.01)	Floating Product (measured thickness in feet)

N

0 40 80

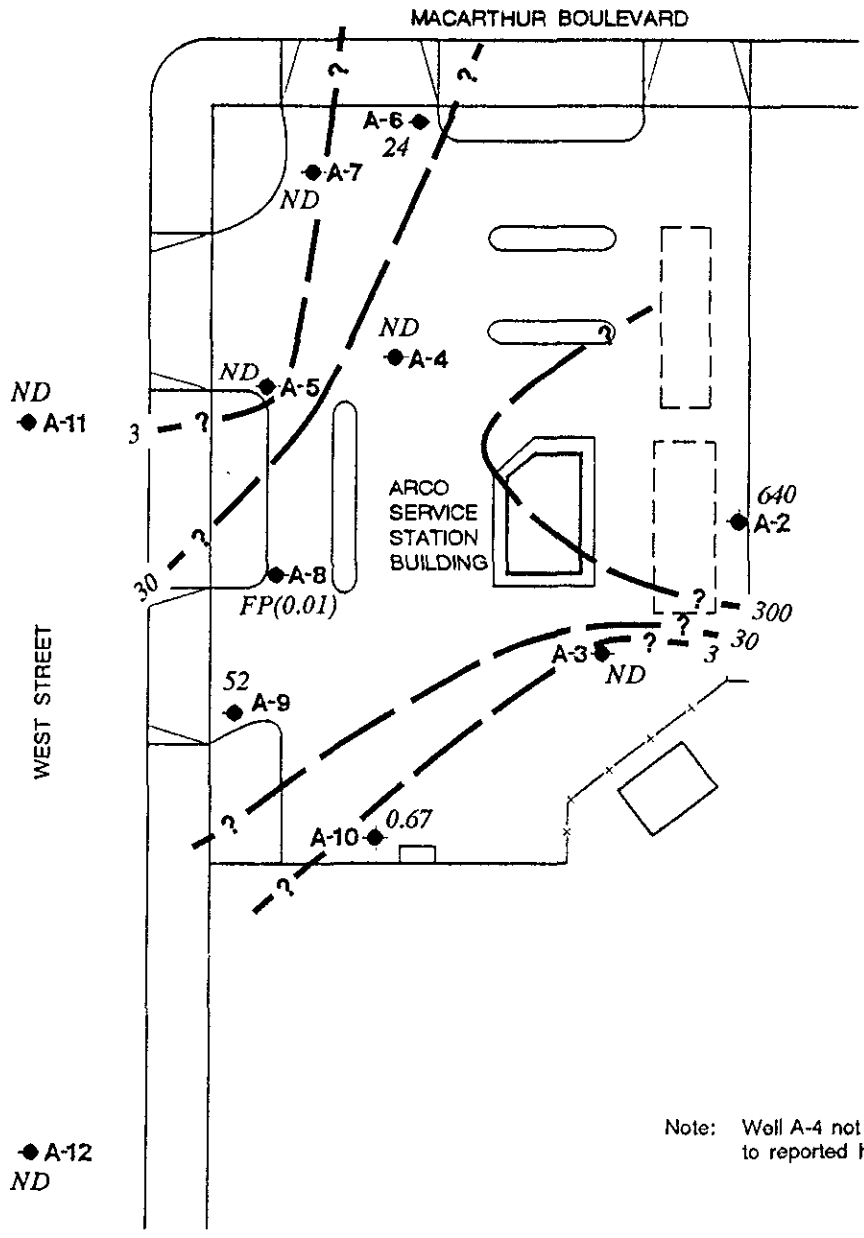
Scale in Feet

GSI GeoStrategies Inc.

TPH-G Isoconcentration Map
ARCO Service Station #4931
731 W. MacArthur Boulevard
Oakland, California

PLATE **4**

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
790901-12	DHP	6/91		



Note: Well A-4 not used in contouring due to reported high detection limit.

EXPLANATION

◆ A-2	Ground-water monitoring well location
52	Benzene concentration in ppb sampled on April 12, 1991
30	Benzene isoconcentration contour
ND	Not Detected (see laboratory reports for detection limits)
FP(0.01)	Floating Product (measured thickness in feet)

N

0 40 80

Scale in Feet

GSI GeoStrategies Inc.

Benzene Isoconcentration Map
ARCO Service Station #4931
731 W. MacArthur Boulevard
Oakland, California

PLATE 5

JOB NUMBER	REVIEWED BY	DATE	REVISED DATE	REVISED DATE
790901-12	DHS	6/91		

APPENDIX A

ANALYTICAL LABORATORY REPORT AND CHAIN-OF-CUSTODY FORM

RECEIVED
MAY 06 1991
GETTLER-RYAN INC.
GENERAL CONTRACTORS

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan	Client Project ID: #3909.01, Arco 4931, Oakland	Sampled: Apr 12, 1991
2150 W. Winton Avenue	Matrix Descript: Water	Received: Apr 15, 1991
Hayward, CA 94545	Analysis Method: EPA 5030/8015/8020	Analyzed: Apr 17, 18, 1991
Attention: Tom Paulson	First Sample #: 104-2558	Reported: Apr 26, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons µg/L (ppb)	Benzene µg/L (ppb)	Toluene µg/L (ppb)	Ethyl Benzene µg/L (ppb)	Xylenes µg/L (ppb)
104-2558	A-2	16,000	640	290	280	2,600
104-2559	A-3	N.D.	N.D.	N.D.	N.D.	N.D.
104-2561	A-5	N.D.	N.D.	N.D.	N.D.	0.84
104-2562	A-6	430	24	5.1	9.4	32
104-2563	A-7	N.D.	N.D.	N.D.	N.D.	0.48
104-2564	A-9	130	52	0.83	5.3	6.0
104-2565	A-10	N.D.	0.67	0.55	N.D.	0.90
104-2566	A-11	N.D.	N.D.	0.37	N.D.	N.D.
104-2567	A-12	N.D.	N.D.	N.D.	N.D.	N.D.
Detection Limits:		**30**	**0.30**	**0.30**	**0.30**	**0.30**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
Amended report dated: 5/3/91

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Gettler Ryan	Client Project ID:	#3909.01, Arco 4931, Oakland	Sampled: Apr 12, 1991
2150 W. Winton Avenue	Sample Descript.:	Water, A-4	Received: Apr 15, 1991
Hayward, CA 94545	Analysis Method:	EPA 5030/ 8015/8020	Analyzed: Apr 17, 1991
Attention: Tom Paulson	Lab Number:	104-2558	Reported: Apr 26, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Low to Medium Boiling Point Hydrocarbons	200	1,800
Benzene	60	N.D.
Toluene	60	90
Ethyl Benzene	60	650
Xylenes	60	1,700

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

Please Note:
Amended report dated: 5/3/91

1042558.GET <2>

Division of Atlantic Richfield Company

Task Order No. 4831-10-3 (GR# 3969.01) **Chain of Cus.**

ARCO Facility no. 4831	City (Facility) Oakland	Project manager (Consultant) Tom Paulsen	Laboratory name ~~ET (SCR)~~ STL
ARCO engineer Kyle Christie	Telephone no. (ARCO) (415) 658-5000	Telephone no (Consultant) (415) 783-7500	Fax no. (Consultant)
Consultant name Gettler Ryan Inc	Address (Consultant) 2150 W. Winton, Hayward		Contract number 07-073

Sample I.D.	Lab no.	Container no	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
A-2				✓		✓	✓	4-12-91	1220	✓							1042558			
A-3									1157	✓							2559			
A-4									1148	✓							2560			
A-5									1128	✓							2561			
A-6									1035	✓							2562			
A-7									1100	✓							2563			
A-9									1035	✓							2564			
A-10									1059	✓							2565			
A-11									0945	✓							2566			
A-12									1001	✓							2567			
Trip Bl.								—	—	✓										

Special detection Limit/reporting: Standard

Special QA/QC: Normal

Remarks

Lab number: 1042558

Turnaround time

- Priority Rush 1 Business Day ☐
- Rush 2 Business Days ☐
- Expedited 5 Business Days ☐
- Standard 10 Business Days ☒

Condition of sample: Good

Temperature received: Cold

	Date	Time		Date	Time
Relinquished by sampler	4-12-91	14:42	Received by Refrig #1		14:42
Relinquished by Refrig #1	4-15-91	08:00	Received by	4-15-91	08:00
Relinquished by	4-15-91	17:20	Received by laboratory	4/15/91	17 20

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

7992 (2-91)

APPENDIX B

FIELD DATA SHEETS

GETTLER-RYAN INC.
General and Environmental Contractors

WELL SAMPLING
FIELD DATA SHEET

COMPANY ARCO # 4931 JOB # 3909.01
LOCATION 731 W MacArthur/West DATE 4-12-91
CITY Oakland TIME

Well ID. A-12 Well Condition OK
Well Diameter 3 in. Hydrocarbon Thickness 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		

Total Depth 29.0 ft.
Depth to Liquid- 9.45 ft.
(# of casing volumes) 5 x 19.55 x(VF) .38 = (Estimated Purge Volume) 37.0 gal. (7.4)

Purging Equipment Suction
Sampling Equipment Bailer

Starting Time 9:43 Purging Flow Rate 3 gpm.
(Estimated Purge Volume) 37.0 gal. / (Purging Flow Rate) 3 gpm. = (Anticipated Purging Time) 12.3 min.

Time	pH	Conductivity	Temperature	Volume
9:44	7.52	605	66.9	3 gal
9:47	7.21	608	66.3	12 gal
9:50	7.09	607	66.7	21 gal
9:53	7.01	608	66.8	30 gal
9:55	7.01	611	66.9	36 gal
10:01	6.95	608	65.6	37 gal

Did well dewater? NO If yes, time Volume
Sampling Time 1001 Weather Conditions sun
Analysis TPH (gas) BTXE Bottles Used 3x40 ml
Chain of Custody Number

COMMENTS

FOREMAN C. Sanchez ASSISTANT

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Arco #4931 JOB # 3909.01

LOCATION 731 W MacArthur/West DATE 4-12-91

CITY Oakland TIME

Well ID. A-11 Well Condition OK

Well Diameter 3 in. Hydrocarbon Thickness — ft.

Total Depth 29.0 ft.

Depth to Liquid- 9.45 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 19.55 x(VF) .38 = (Estimated Purge Volume) 37.1 gal.

74

Purging Equipment Double Diaphram

Sampling Equipment Bailer

Starting Time 0929 Purging Flow Rate 4 gpm.

(Estimated Purge Volume) 37.1 gal. / (Purging Flow Rate) 4 gpm. = (Anticipated Purging Time) 9.3 min.

Time	pH	Conductivity	Temperature	Volume
0930	7.27	580	71.4	4 gal
0933	7.02	586	68.6	16 gal
0935	6.91	585	68.0	24 gal
0939	6.80	586	67.9	40 gal
0945	6.79	600	66.0	41 gal

Did well dewater? No If yes, time — Volume —

Sampling Time 0945 Weather Conditions

Analysis THC_go BTXE Bottles Used 2-40ml

Chain of Custody Number

COMMENTS

FOREMAN [signature] ASSISTANT

GETTLER–RYAN INC.

General and Environmental Contractors

WELL SAMPLING
FIELD DATA SHEET

COMPANY Arco 4931 JOB # 3809 a

LOCATION 731 W. MacArthur DATE 4-12-91

CITY Oakland TIME

Well ID. A-10 Well Condition OK

Well Diameter 3 in. Hydrocarbon Thickness — ft.

Total Depth 28.2 ft.

Depth to Liquid- 10.04 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 18.16 x(VF) .38 = (Estimated Purge Volume) 34.5 gal.

67

Purging Equipment Double Diaphram

Sampling Equipment Bailey

Starting Time 1045 Purging Flow Rate 4 gpm.

(Estimated Purge Volume) 34.5 gal. / (Purging Flow Rate) 4 gpm. = (Anticipated Purging Time) 8 6 min.

Time	pH	Conductivity	Temperature	Volume
1046	6.61	630	63.7	4 gal
1050	6.64	621	64.0	20 gal
1052	6.65	606	64.3	25 gal
1054	6.67	604	64.2	36 gal
1059	6.73	599	64.0	37 gal

Did well dewater? No If yes, time — Volume —

Sampling Time 1059 Weather Conditions Sunny

Analysis TH Gas BTXE Bottles Used 3-40-1

Chain of Custody Number

COMMENTS

FOREMAN [signature] ASSISTANT

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Arco #4931 JOB # 3909.01

LOCATION 731 W. MacArthur DATE 4-12-91

CITY Oakland TIME

Well ID. A-9 Well Condition OK

Well Diameter 6 in. Hydrocarbon Thickness ft.

Total Depth 38.8 ft.

Depth to Liquid- 36.9 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 3.01 x(VF) 1.5 = (Estimated Purge Volume) 226 gal. 45

Purging Equipment Double Diaphram

Sampling Equipment Bailer

Starting Time 1000 Purging Flow Rate 8 gpm.

(Estimated Purge Volume) 226 gal. / (Purging Flow Rate) 8 gpm. = (Anticipated Purging Time) 28.2 min.

Time	pH	Conductivity	Temperature	Volume
1001	6.91	573	66.1	2 gal
1006	6.83	589	66.5	48
1012	6.78	588	66.5	96
1022	67.4	588	66.4	176
1029	6.73	590	66.3	232
1035	6.71	601	67.1	233

Did well dewater? No If yes, time - Volume -

Sampling Time 1035 Weather Conditions Sunny

Analysis TH Gas BTXE Bottles Used 3-40 ml

Chain of Custody Number

COMMENTS

FOREMAN R. Miller ASSISTANT

GETTLER–RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY ARCO # 4931 JOB # 3909.01

LOCATION 731 W. MacArthur / West DATE 11.12.91

CITY Oakland TIME

Well ID. A-7 Well Condition OK

Well Diameter 3 in. Hydrocarbon Thickness ~ ft.

Total Depth 22.8 ft.

Depth to Liquid- 7.90 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 14.90 x(VF) .38 = (Estimated Purge Volume) 28.5 gal. (57)

Purging Equipment Suction

Sampling Equipment Bailer

Starting Time 1043 Purging Flow Rate 3 gpm.

(Estimated Purge Volume) 28.5 gal. / (Purging Flow Rate) 3 gpm. = (Anticipated Purging Time) 9.5 min.

Time	pH	Conductivity	Temperature	Volume
1044	6.66	556	67.6	3 gal
1047	6.63	586	67.3	12 gal
1050	6.62	586	67.2	21 gal
1100	6.60	575	66.2	22 gal

Did well dewater? Yes If yes, time 1050 Volume 21 gal

Sampling Time 1100 Weather Conditions sun

Analysis TPH (gas) BTXE Bottles Used 3 x 40 ml

Chain of Custody Number

COMMENTS

FOREMAN C. Sachs ASSISTANT

GETTLER–RYAN INC.

General and Environmental Contractors

WELL SAMPLING
FIELD DATA SHEET

COMPANY ARCO #4931 JOB # 3909.01

LOCATION 731 W. MacArthur / Wint DATE 4-12-91

CITY Oakland TIME

Well ID. A-6 Well Condition OK

Well Diameter 3 in. Hydrocarbon Thickness ft.

Total Depth 25.0 ft.

Depth to Liquid- 8.05 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 16.95 x(VF) .38 = (Estimated Purge Volume) 32.0 gal. (C.4)

Purging Equipment Suction

Sampling Equipment Bailer

Starting Time 1020 Purging Flow Rate 3 gpm.

(Estimated Purge Volume) 32.0 gal. / (Purging Flow Rate) 3 gpm. = (Anticipated Purging Time) 10.7 min.

Time	pH	Conductivity	Temperature	Volume
1021	6.81	556	68.1	3 gal
1024	6.78	555	66.1	12
1027	6.77	555	67.0	21
1030	6.70	557	67.2	30
1035	6.70	559	66.1	32

Did well dewater? NO If yes, time Volume

Sampling Time 1035 Weather Conditions SUN

Analysis TPH (gas) BTXE Bottles Used 3-40 ml

Chain of Custody Number

COMMENTS

FOREMAN C. Sanchez ASSISTANT

GETTLER–RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY ARCO # 4931 JOB # 3907.01

LOCATION 731 W. MacArthur / West DATE 9 12 91

CITY Oakland TIME

Well ID. A-5 Well Condition OK

Well Diameter 2 in. Hydrocarbon Thickness – ft.

Total Depth 23.9 ft.

Depth to Liquid- 9.64 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 14.26 x(VF) 38 = (Estimated Purge Volume) 27.0 gal. (5.4)

Purging Equipment Suction

Sampling Equipment Bailer

Starting Time 11:12 Purging Flow Rate 3 gpm.

(Estimated Purge Volume) 27.0 gal. / (Purging Flow Rate) 3 gpm. = (Anticipated Purging Time) 9 min.

Time	pH	Conductivity	Temperature	Volume
11:13	6.43	748	69.9	3 gal
11:15	6.51	763	67.8	9 gal
11:18	6.52	719	68.4	18 gal
11:19	6.56	675	68.3	21 gal
11:28	6.58	677	68.5	22 gal

Did well dewater? Yes If yes, time 11:19 Volume 21 gal

Sampling Time 11:28 Weather Conditions Sun

Analysis TPH (gas) BTX&E Bottles Used 3-40 ml

Chain of Custody Number

COMMENTS

FOREMAN G. Sanchez ASSISTANT

GETTLER-RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY: ARCO #4531 JOB #: 3909.01

LOCATION: 731 W. MacArthur / West DATE: 4-12-91

CITY: Oakland TIME:

Well ID.: A-4 Well Condition: Ok

Well Diameter: 3 4 in. Hydrocarbon Thickness: Sheen ft.

Total Depth: 19.5 ft.

Depth to Liquid-: 9.54 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 9.96 x(VF) 0.66 ~~.38~~ = (Estimated Purge Volume) 33.0 ~~19.5~~ gal. (~~.38~~)(.66)

Purging Equipment: Suction

Sampling Equipment: Bailer

Starting Time: 1136 Purging Flow Rate: 3 gpm.

(Estimated Purge Volume) 33 ∅ gal. / (Purging Flow Rate) 3 gpm. = (Anticipated Purging Time) 11 min.

Time	pH	Conductivity	Temperature	Volume
1137	6.46	1031	66.7	3 gal
1139	6.53	1027	68.4	9 gal
1148	6.60	944	66.5	10 gal

Did well dewater? Yes If yes, time 1139 Volume 9 gal

Sampling Time: 1148 Weather Conditions: Sun

Analysis: TPH (gas) BTXE Bottles Used: 3-40 ml

Chain of Custody Number:

COMMENTS:

FOREMAN: G. Sanchez ASSISTANT:

GETTLER–RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Arco #4931 JOB # 3909.01

LOCATION 731 W. MacArthur / West DATE 4-12-91

CITY Oakland TIME

Well ID. A-3 Well Condition ~~OK~~ SI sheen

Well Diameter 3 in. Hydrocarbon Thickness — ft.

Total Depth 19.3 ft.

Depth to Liquid- 9.23 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 10.02 x(VF) .38 = (Estimated Purge Volume) 19.0 gal.

Purging Equipment ~~Double Diaphram~~ ~~Suction Pump~~ Bailer

Sampling Equipment Bailer

Starting Time 1110 Purging Flow Rate 4 gpm.

(Estimated Purge Volume) — gal. / (Purging Flow Rate) 4 gpm. = (Anticipated Purging Time) — min.

Time	pH	Conductivity	Temperature	Volume
1140	6.49	556	64.7	1 gal
1146	6.48	540	64.2	5 gal
1150	6.46	552	64.4	7.5 gal
1157	6.43	585	64.2	8.5 gal

Did well dewater? Yes If yes, time 1150 Volume 7.5 gal

Sampling Time 1157 Weather Conditions Sunny

Analysis TH(8.015) BTXE Bottles Used 3-40 ml

Chain of Custody Number

COMMENTS Double Diaphram stopped working here and could not be repaired

FOREMAN [illegible] ASSISTANT

GETTLER–RYAN INC.

General and Environmental Contractors

WELL SAMPLING FIELD DATA SHEET

COMPANY Arco #4931 JOB # 394.01

LOCATION 731 W. MacArthur / west DATE 4-12-91

CITY Oakland TIME

Well ID. A-2 Well Condition OK

Well Diameter 3 in. Hydrocarbon Thickness ~ ft.

Total Depth 18.5 ft.

Depth to Liquid- 3.65 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 14.85 x(VF) .38 = (Estimated Purge Volume) 28.2 gal. 56

Purging Equipment Suction Pump

Sampling Equipment Bailer

Starting Time 1207 Purging Flow Rate 3 gpm.

(Estimated Purge Volume) 28.2 gal. / (Purging Flow Rate) 3 gpm. = (Anticipated Purging Time) 9.4 min.

Time	pH	Conductivity	Temperature	Volume
1208	6.96	445	63.7	3 gal
1210	6.82	465	62.6	7 gal
1220	6.76	469	62.1	10 gal

Did well dewater? Yes If yes, time 12.10 Volume 5 gal

Sampling Time 1220 Weather Conditions Sunny

Analysis TPH Gas BTXE Bottles Used 3-40-1

Chain of Custody Number

COMMENTS

FOREMAN [signature] ASSISTANT

GETTLER–RYAN INC.

General and Environmental Contractors

OBSERVATION WELL DAILY MONITOR RECORD

Claudia

COMPANY Arco #4931 JOB # 3909.01

LOCATION 731 w/MacArthur/west DATE 4-12-91

CITY Oakland TIME

WELL	DEPTH TO LIQUID (DTH) OR (DTW)	HYDROCARBON THICKNESS (HT) BEFORE	HYDROCARBON THICKNESS (HT) AFTER	AMOUNT PUMPED	COMMENTS
A2	3.65	Sh n.	13.5		sampled
A-3	9.28	Sh n.	19.3		
A-4	9.54	Sh n.	19.5		
A-5	9.64	ϕ	23.9		
A-6	8.05	ϕ	25.0		
A-7	7.90	ϕ	22.8		
A-8	9.15/9.16	.01	—		not sampled
A-9	8.69	ϕ	33.3		sampled
A-10	10.04	ϕ	28.2		
A-11	9.55	ϕ	28.3		
A-12	9.45	ϕ	29.0		

6"

PRODUCT TANK: TOTAL FLOWMETER

WATER OTHER

COMMENTS

FOREMAN ASSISTANT