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R0716

September 29, 2000

Mr. Paul Supple
ARCO Products Company
P.O. Box 6549
Moraga, CA 94570

Subject: *Quarterly Groundwater Monitoring Report, Second Quarter 2000*
ARCO Service Station No. 4931
Oakland, California
Project No. D000-313

Dear Mr. Supple:

Delta Environmental Consultants, Inc. is submitting the attached report that presents the results of the second quarter 2000 groundwater monitoring program at ARCO Products Company Service Station No. 4931, located at 731 West MacArthur Boulevard, Oakland, California. The monitoring program complies with the Alameda County Health Care Services Agency requirements regarding underground tank investigations.

The interpretations contained in this report represent our professional opinions and are based, in part, on information supplied by the client. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeological and engineering practices at this time and location. Other than this, no warranty is implied or intended.

If you have any questions concerning this project, please contact Steven W. Meeks at (916) 536-2613.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Trevor L. Atkinson
Project Engineer

Steven W. Meeks, P.E.
Project Manager
California Registered Civil Engineer No. C057461

REGISTERED PROFESSIONAL ENGINEER
STEVEN WHITTEN MEEKS
C 057461
Exp. 12/31/01
CIVIL
STATE OF CALIFORNIA

TLA (Lrp001.313.doc)
Enclosures

cc: Ms. Susan Hugo – Alameda County Health Care Services Agency
Mr. John Kaiser – California Regional Water Quality Control Board, San Francisco Bay Region

Date: September 29, 2000

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.: 4931 Address:	731 West MacArthur Boulevard, Oakland, CA
ARCO Environmental Engineer/Phone No.:	Paul Supple 925-299-8891
Consulting Co./Contact Person	Delta Environmental Consultants, Inc. Steven W. Meeks, P.E.
Consultant Project No.:	D000-313
Primary Agency/Regulatory ID No.	Alameda County Health Care Services Agency

WORK PERFORMED THIS QUARTER

1. Performed quarterly groundwater monitoring for the second quarter 2000.

WORK PROPOSED FOR NEXT QUARTER

1. Prepare and submit quarterly groundwater monitoring report for second quarter 2000.
2. Perform quarterly groundwater monitoring and sampling for third quarter 2000.

QUARTERLY MONITORING:

Current Phase of Project	Monitoring/Remediation
Frequency of Groundwater Sampling:	Annual (2nd Quarter): A-7, A-13 Semi-Annual (2nd/4th Quarter): A-3, A-5, A-11, A-12 Quarterly: A-2, A-4, A-6, A-8, A-9
Frequency of Groundwater Monitoring:	Quarterly
Is Free Product (FP) Present On–Site:	No
FP Recovered this Quarter:	N/A
Cumulative FP Recovered to Date:	Unknown
Bulk Soil Removed This Quarter:	None
Bulk Soil Removed to Date:	Unknown
Current Remediation Techniques:	Intrinsic Bioremediation Enhancement using ORC
Approximate Depth to Groundwater:	9.0 feet
Groundwater Gradient:	0.031 ft toward west-southwest
Cumulative TPHg/Benzene Removed:	0.45/0.06 gallons

DISCUSSION:

- Bioremediation enhancement is ongoing using oxygen release compound (ORC) in wells A-4, A-8, A-9 and AR-1.
- MTBE was reported in A-3, A-4, A-5, A-8, A-9, A-11 and A-12 at concentrations ranging from 4 (A-11) to 2,000 (A-4 and A-5) micrograms per liter.
- TPHg was reported in A-4, A-5 and A-8 at concentrations ranging from 810 (A-8) to 2,100 (A-4) micrograms per liter.
- A-13 was not sampled since the well appears to have been paved over.

ATTACHMENTS:

- Table 1 Groundwater Elevation and Analytical Data
- Table 2 Groundwater Flow Direction and Gradient
- Figure 1 Groundwater Analytical Summary Map
- Figure 2 Groundwater Elevation Contour Map
- Appendix A Sampling and Analysis Procedures
- Appendix B Historical Groundwater Elevation Analytical Data Table
  Groundwater Flow Direction and Gradient Table
- Appendix C Certified Analytical Reports with Chain–of–Custody Documentation
- Appendix D Remedial System Performance Summary
- Appendix E Field Data Sheet

TABLE 1

GROUNDWATER ANALYTICAL DATA

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

Well Number	Date Sampled	Top of Riser Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
A-2	06/21/00	55.48	6.85	48.63	<50	<0.5	<0.5	<0.5	<1.0	<3.0
A-3	06/21/00	54.66	9.48	45.18	<50	<0.5	<0.5	<0.5	<1.0	46
A-4	06/21/00	54.73	9.49	45.24	2,100	110	2.1	11	5.9	2,000
A-5	06/21/00	54.17	9.29	44.88	980	<0.5	<0.5	<0.5	<1.0	2,000
A-6	06/21/00	55.17	8.67	46.5	<50	<0.5	<0.5	<0.5	<1.0	<3.0
A-7	06/21/00	54.71	8.58	46.13	<50	<0.5	<0.5	<0.5	<1.0	<3.0
A-8	06/21/00	53.77	9.07	44.7	810	<0.5	0.5	<0.5	810	1,500
A-9	06/21/00	53.04	8.56	44.48	<50	<0.5	<0.5	<0.5	<1.0	5.0
A-10	06/21/00	54.26	10.47	43.79	NS	NS	NS	NS	NS	NS
A-11	06/21/00	53.74	9.54	44.20	<50	<0.5	<0.5	<0.5	<1.0	4.0
A-12	06/21/00	52.05	9.28	42.77	<50	<0.5	<0.5	<0.5	<1.0	18

TABLE 1

GROUNDWATER ANALYTICAL DATA

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

Well Number	Date Sampled	Top of Riser Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	TPH as Gasoline (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
A-13	06/21/00	55.11	NM	NC	NS	NS	NS	NS	NS	NS

TPH = Total Petroleum Hydrocarbons

MTBE = Methyl tertiary butyl ether analyzed by EPA Method 8021B unless otherwise noted

µg/L = Micrograms per liter

NM = Not measured

NC = Not calculated

NS = Not sampled

Note: Please refer to Appendix B for Historical Groundwater Elevation and Analytical Data Tables developed by IT Corporation

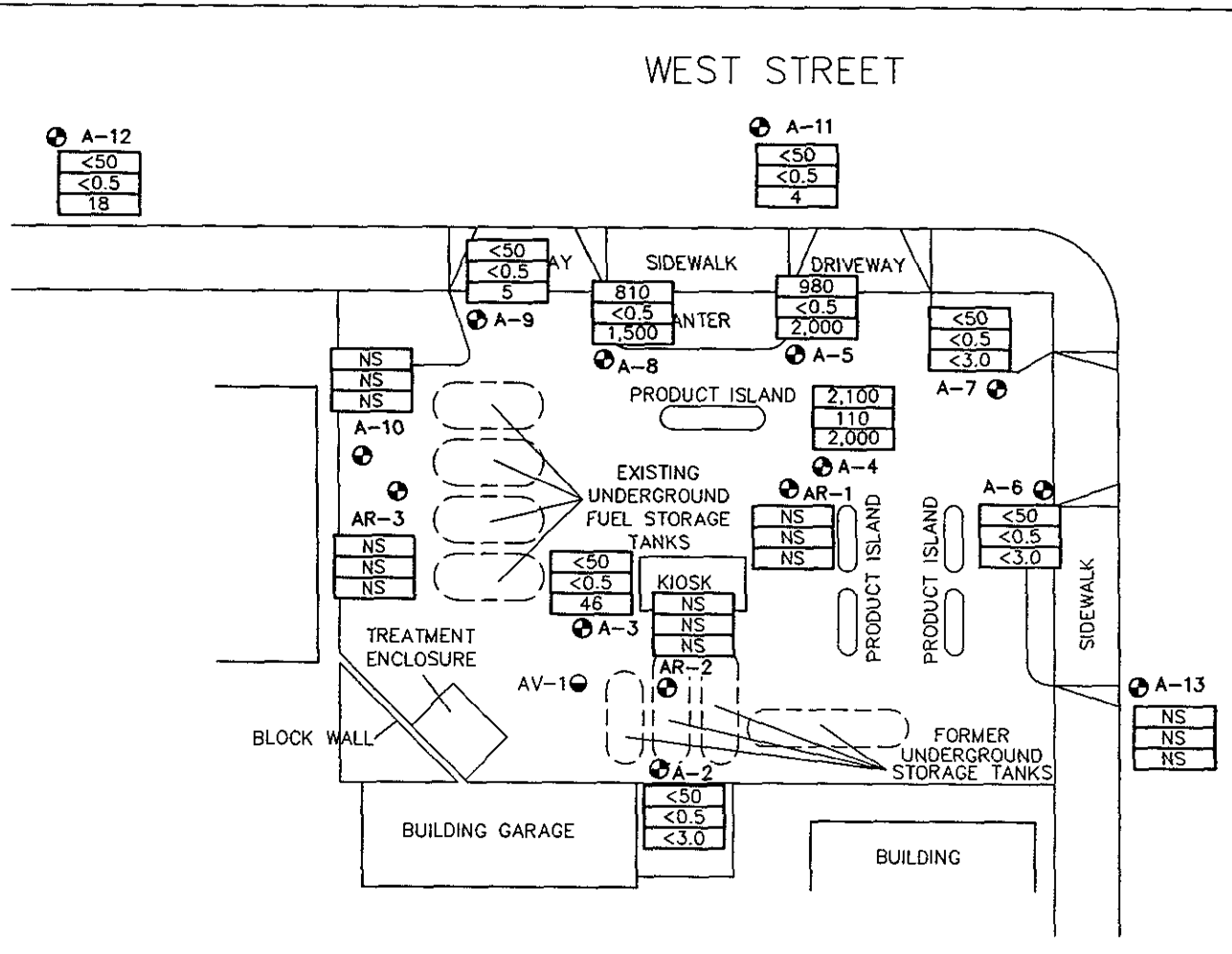
TABLE 2

FLOW DIRECTION AND GRADIENT

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

Date Measured	Average Flow Direction	Average Hydraulic Gradient
6/21/00	West-Southwest	0.031

Note: Please refer to Appendix B for Historical Groundwater Elevation and Analytical Data Tables developed by IT Corporation



LEGEND:

A-2	MONITORING WELL LOCATION
AV-1	SOIL VAPOR EXTRACTION WELL LOCATION
<50 / <0.5 / <3.0	TPH AS GASOLINE IN MICROGRAMS PER LITER BENZENE IN MICROGRAMS PER LITER MTBE IN MICROGRAMS PER LITER
NS	NOT SAMPLED

North

0 40 FT

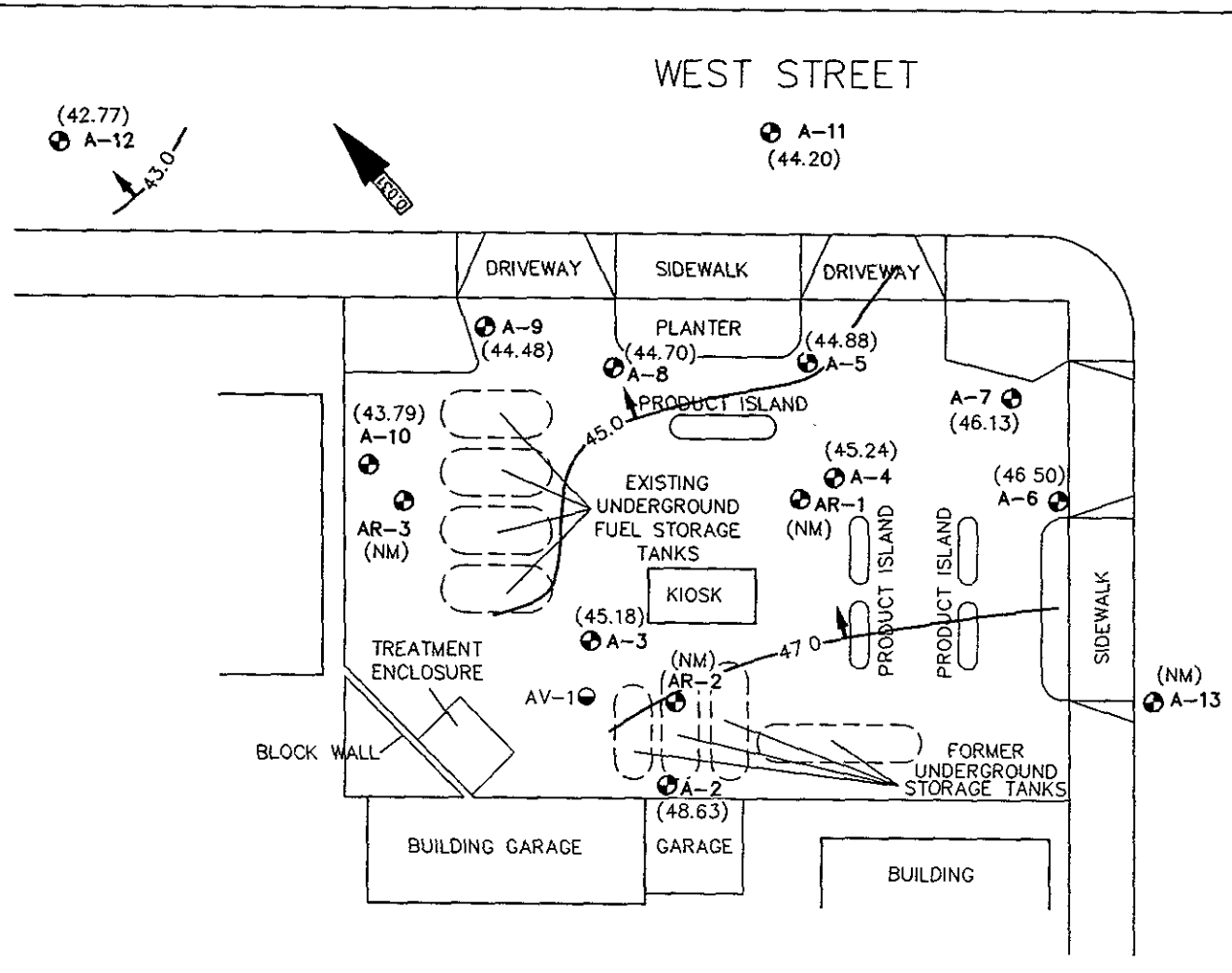
SCALE

NOTE: SITE MAP ADAPTED FROM IT CORPORATION FIGURES.
SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

FIGURE 1
GROUND WATER ANALYTICAL SUMMARY
SECOND QUARTER 2000
ARCO STATION NO. 4931
731 WEST MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

PROJECT NO. D000-313	DRAWN BY TLA 8/2/00
FILE NO. 4931-1	PREPARED BY TLA
REVISION NO. 1	REVIEWED BY

Delta Environmental Consultants, Inc.



LEGEND:

A-2	MONITORING WELL LOCATION
AV-1	SOIL VAPOR EXTRACTION WELL LOCATION
(48.63)	GROUND WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (MSL)
45.0	WATER TABLE CONTOUR IN FEET ABOVE MSL
	GROUND WATER FLOW DIRECTION
0.031	APPROXIMATE GROUND WATER FLOW GRADIENT

North

0 40 FT

SCALE

NOTE: SITE MAP ADAPTED FROM IT CORPORATION FIGURES.
SITE DIMENSIONS AND FACILITY LOCATIONS NOT VERIFIED.

FIGURE 2
GROUND WATER ELEVATION CONTOUR MAP
SECOND QUARTER 2000
ARCO STATION NO. 4931
731 WEST MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

PROJECT NO. D000-313	DRAWN BY TLA 8/2/00
FILE NO. 4931-1	PREPARED BY TLA
REVISION NO. 1	REVIEWED BY

Delta Environmental Consultants, Inc.

APPENDIX A

Sampling and Analysis Procedures

FIELD METHODS AND PROCEDURES

1.0 GROUND WATER AND LIQUID-PHASE HYDROCARBON DEPTH ASSESSMENT

A water/liquid-phase hydrocarbon (LPH) interface probe was used to assess the thickness of LPH, if present, and a water level indicator was used to measure ground water depth in monitoring wells that did not contain LPH. Depth to ground water was measured from the top of each monitoring well casing. The tip of the water level indicator was subjectively analyzed for LPH sheen. All measurements and physical observations were recorded in the field.

2.0 SUBJECTIVE ANALYSIS OF GROUND WATER

Prior to purging, a water sample was collected from the monitoring well for subjective analysis. The sample was retrieved by gently lowering a clean, disposable bailer to approximately one-half the bailer length past the air/liquid interface. The bailer was then retrieved and the sample contained within the bailer was examined for LPH and the appearance of a LPH sheen.

3.0 MONITORING WELL PURGING AND SAMPLING

Monitoring wells were purged using a centrifugal pump or disposable bailers until pH, temperature, and conductivity of the purge water had stabilized and a minimum of three to four well volumes of water had been removed. Ground water removed from the wells was stored in 55-gallon barrels at the site. The barrels were labeled with corresponding monitoring well numbers and the date of purging. After purging, ground water levels were allowed to stabilize. A ground water sample was then removed from each of the wells using a dedicated disposable bailer. If the well was purged dry, it was allowed to sufficiently recharge and a sample was collected. Samples were collected in air-tight vials, appropriately labeled, and stored on ice from the time of collection through the time of delivery to the laboratory. A chain-of-custody form was completed to document possession of the samples. Ground water samples were transported to the laboratory and analyzed within the EPA-specified holding times for the requested analyses. Purge water will be collected from the storage barrels in a vacuum truck and transported to an appropriate facility for treatment and/or disposal.

If the depth to groundwater was above the top of screens of the monitoring wells, then the wells were purged. Before sampling occurred, a polyvinyl chloride (PVC) bailer, centrifugal pump, low–flow submersible pump, or Teflon bailer was used to purge standing water in the casing and gravel pack from the monitoring well. Monitoring wells were purged according to the protocol previously stated in the first paragraph of this sub-section. In most monitoring wells, the amount of water purged before sampling was greater than or equal to three casing volumes. Some monitoring wells were expected to be evacuated to dryness after removing fewer than three casing volumes. These low–yield monitoring wells were allowed to recharge for up to 24 hours. Samples were obtained as soon as the monitoring wells recharged to a level sufficient for sample collection. If insufficient water recharged after 24 hours, the monitoring well was recorded as dry for the sampling event.

APPENDIX B

Historical Groundwater Elevation and Analytical Data Table
and
Groundwater Flow Direction and Gradient Table

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MTBE)

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-2	03/26/96	55.48	5.37	50.11	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-2	05/22/96	55.48	5.25	50.23	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-2	08/22/96	55.48	10.45	45.03	<50	1.1	1.8	<0.5	1.3	<2.5	NA	NM	
A-2	12/19/96	55.48	5.53	49.95	<50	<0.5	<0.5	<0.5	<0.5	2.7	NA	NM	
A-2	04/01/97	55.48	8.77	46.71	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-2	05/27/97	55.48	9.87	45.61	<50	<0.5	<0.5	<0.5	<0.5	4.6	NA	NM	
A-2	08/12/97	55.48	11.11	44.37	<50	<0.5	<0.5	<0.5	<0.5	5.6	NA	NM	
A-2	11/14/97	55.48	10.63	44.85	<50	0.9	2.8	<0.5	2.4	27	NA	2.6	
A-2	03/18/98	55.48	3.58	51.90	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	NM	
A-2	05/19/98	55.48	4.82	50.66	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.30	P
A-2	07/29/98	55.48	8.94	46.54	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.2	NP
A-2	10/09/98	55.48	10.82	44.66	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.5	NP
A-2	02/19/99	55.48	4.46	51.02	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	3.0	P
A-2	06/02/99	55.48	5.59	49.89	<50	<0.5	0.6	<0.5	<0.5	<3	NA	5.35	NP
A-2	08/26/99	55.48	10.67	44.81	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.79	NP
A-2	10/26/99	55.48	4.61	50.87	<50	<0.5	<0.5	<0.5	<1	<3	NA	2.14	P
A-2	02/25/00	55.48	3.10	52.38	<50	<0.5	<0.5	<0.5	<1	<3	NA	4.21	NP
A-3	03/26/96	54.66	7.20	47.46	Not Sampled: Well Sampled Semiannually								
A-3	05/22/96	54.66	7.70	46.96	<50	1.2	1.9	0.7	1.3	NA	NA	NM	
A-3	08/22/96	54.66	10.88	43.78	Not Sampled: Well Sampled Semiannually								
A-3	12/19/96	54.66	7.70	46.96	5,900	<25	<25	<25	<25	NA	5,300	NM	
A-3	04/01/97	54.66	9.78	44.88	Not Sampled: Well Sampled Semiannually								
A-3	05/27/97	54.66	10.55	44.11	2,300	<20	<20	<20	<20	3,800	NA	NM	
A-3	08/12/97	54.66	11.12	43.54	Not Sampled: Well Sampled Semiannually								
A-3	11/14/97	54.66	8.24	46.42	<1,000	<10	<10	<10	<10	1,500	NA	3.8	
A-3	03/18/98	54.66	5.05	49.61	Not Sampled: Well Sampled Semiannually								
A-3	05/19/98	54.66	9.00	45.66	<250	<2.5	<2.5	<2.5	<2.5	220	NA	4.60	P
A-3	07/29/98	54.66	9.86	44.80	Not Sampled: Well Sampled Semiannually								
A-3	10/09/98	54.66	11.36	43.30	<250	<2.5	<2.5	<2.5	<2.5	260	NA	1.0	NP
A-3	02/19/99	54.66	6.19	48.47	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.5	NP
A-3	06/02/99	54.66	10.82	43.84	120	<1	<1	<1	<1	160	NA	2.78	NP

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MTBE)

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-3	08/26/99	54.66	10.73	43.93	Not Sampled: Well Sampled Semiannually							0.95	
A-3	10/26/99	54.66	6.58	48.08	<50	<0.5	<0.5	<0.5	<1	32	NA	2.06	NP
A-3	02/25/00	54.66	5.41	49.25	Not Sampled: Well Sampled Semiannually								
A-4	03/26/96	54.73	7.95	46.78	8,900	1,200	21	200	220	NA	NA	NM	
A-4	05/22/96	54.73	8.35	46.38	5,300	700	<10	170	130	NA	NA	NM	
A-4	08/22/96	54.73	11.03	43.70	3,000	480	<5.0	75	26	150	NA	NM	
A-4	12/19/96	54.73	8.67	46.06	<2,000	<20	<20	<20	<20	NA	15,000	NM	
A-4	04/01/97	54.73	11.95	42.78	8,900	1,700	22	310	260	6,900	NA	NM	
A-4	05/27/97	54.73	10.80	43.93	7,100	960	<20	150	74	7,900	NA	NM	
A-4	08/12/97	54.73	11.38	43.35	4,300	670	12	51	27	2,800	NA	NM	
A-4	11/14/97	54.73	7.74	46.99	<20,000	300	500	<200	<200	27,000	NA	2.2	
A-4	03/18/98	54.73	6.80	47.93	4,700	600	<20	99	94	1,200	NA	1.0	
A-4	05/19/98	54.73	9.06	45.67	<2000	<20	<20	<20	720	2,000	NA	1.28	P
A-4	07/29/98	54.73	10.05	44.68	8,400	1,300	<20	290	130	1,800	NA	0.7	NP
A-4	10/09/98	54.73	11.20	43.53	3,500	400	<20	54	<20	1,700	NA	1.0	NP
A-4	02/19/99	54.73	6.85	47.88	<1,000	<10	<10	<10	12	650	NA	0.1	NP
A-4	06/02/99	54.73	11.00	43.73	6,100	760	16	260	89	2,300	NA	1.12	NP
A-4	08/26/99	54.73	10.80	43.93	1,100	68	5	8	4	1,400	NA	1.15	NP
A-4	10/26/99	54.73	10.11	44.62	1,500	39	2.3	9.0	5	1,700	NA	10.12	NP
A-4	02/25/00	54.73	5.90	48.83	870	53	1.1	4.6	20	600	NA	1.72	NP
A-5	03/26/96	54.17	7.93	46.24	Not Sampled: Well Sampled Semiannually								
A-5	05/22/96	54.17	8.20	45.97	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-5	08/22/96	54.17	10.70	43.47	Not Sampled: Well Sampled Semiannually								
A-5	12/19/96	54.17	8.39	45.78	9,900	1,100	330	230	700	NA	24	NM	
A-5	04/01/97	54.17	10.83	43.34	Not Sampled: Well Sampled Semiannually								
A-5	05/27/97	54.17	10.65	43.52	100	<0.5	<0.5	<0.5	<0.5	120	NA	NM	
A-5	08/12/97	54.17	11.05	43.12	Not Sampled: Well Sampled Semiannually								
A-5	11/14/97	54.17	10.51	43.66	<50	<0.5	<0.5	<0.5	<0.5	41	NA	4.8	
A-5	03/18/98	54.17	8.10	46.07	Not Sampled: Well Sampled Semiannually								
A-5	05/19/98	54.17	9.31	44.86	590	<5	<5	<5	<5	710	NA	2.48	P

Table 1
Groundwater Elevation and Analytical Data
Total Purgeable Petroleum Hydrocarbons
(TPPH as Gasoline, BTEX Compounds, and MTBE)

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-5	07/29/98	54.17	9.89	44.28	Not Sampled: Well Sampled Semiannually								
A-5	10/09/98	54.17	11.02	43.15	690	<5	<5	<5	<5	710	NA	1.0	NP
A-5	02/19/99	54.17	6.82	47.35	<2,000	<20	<20	<20	<20	2,300	NA	0.6	NP
A-5	06/02/99	54.17	10.82	43.35	1,500	<0.5	2.3	<0.5	<0.5	2,400	NA	2.81	NP
A-5	08/26/99	54.17	10.65	43.52	Not Sampled: Well Sampled Semiannually							0.49	
A-5	10/26/99	54.17	10.35	43.82	380	<0.5	<0.5	<0.5	<1	440	NA	1.55	NP
A-5	02/25/00	54.17	6.89	47.28	Not Sampled: Well Sampled Semiannually								
A-6	03/26/96	55.17	7.15	48.02	52	2.7	<0.5	1.1	2.0	NA	NA	NM	
A-6	05/22/96	55.17	7.35	47.82	<50	2.4	<0.5	0.88	1.7	NA	NA	NM	
A-6	08/22/96	55.17	10.12	45.05	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-6	12/19/96	55.17	7.43	47.74	<50	1.7	<0.5	0.78	1.5	<2.5	NA	NM	
A-6	04/01/97	55.17	9.97	45.20	<50	4.7	<0.5	1.9	3.2	<2.5	NA	NM	
A-6	05/27/97	55.17	9.66	45.51	<50	0.69	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-6	08/12/97	55.17	10.43	44.74	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-6	11/14/97	55.17	9.76	45.41	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	<1.0	
A-6	03/18/98	55.17	7.00	48.17	<50	6.2	0.5	2.3	2.6	<3	NA	3.0	
A-6	05/19/98	55.17	8.27	46.90	<50	<0.5	<0.5	1.3	4.7	<3	NA	2.16	P
A-6	07/29/98	55.17	8.96	46.21	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.8	NP
A-6	10/09/98	55.17	10.23	44.94	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.0	NP
A-6	02/19/99	55.17	5.79	49.38	<50	<0.5	<0.5	<0.5	<0.5	5	NA	0.4	NP
A-6	06/02/99	55.17	9.71	45.46	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.00	NP
A-6	08/26/99	55.17	9.79	45.38	<50	<0.5	<0.5	<0.5	0.7	<3	NA	0.66	NP
A-6	10/26/99	55.17	9.70	45.47	<50	<0.5	<0.5	<0.5	<1	<3	NA	1.66	NP
A-6	02/25/00	55.17	5.68	49.49	<50	<0.5	<0.5	<0.5	<1	<3	NA	1.22	NP
A-7	03/26/96	54.71	6.90	47.81	Not Sampled: Well Sampled Semiannually								
A-7	05/22/96	54.71	8.27	46.44	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-7	08/22/96	54.71	9.80	44.91	Not Sampled: Well Sampled Semiannually								
A-7	12/19/96	54.71	7.19	47.52	Not Sampled: Well Sampled Annually								
A-7	04/01/97	54.71	9.63	45.08	Not Sampled: Well Sampled Annually								
A-7	05/27/97	54.71	9.34	45.37	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	

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ARCO Service Station 4931
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Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-7	08/12/97	54.71	10.10	44.61	Not Sampled: Well Sampled Annually								
A-7	11/14/97	54.71	9.35	45.36	Not Sampled: Well Sampled Annually								
A-7	03/18/98	54.71	6.75	47.96	Not Sampled: Well Sampled Annually								
A-7	05/19/98	54.71	8.85	45.86	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.82	P
A-7	07/29/98	54.71	8.84	45.87	Not Sampled: Well Sampled Annually								
A-7	10/09/98	54.71	10.05	44.66	Not Sampled: Well Sampled Annually								
A-7	02/19/99	54.71	5.57	49.14	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	4.7	NP
A-7	06/02/99	54.71	9.56	45.15	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.17	NP
A-7	08/26/99	54.71	9.66	45.05	Not Sampled: Well Sampled Annually							0.49	
A-7	10/26/99	54.71	9.54	45.17	Not Sampled: Well Sampled Annually							1.26	
A-7	02/25/00	54.71	5.60	49.11	Not Sampled: Well Sampled Annually								
A-8	03/26/96	53.77	7.10	46.67	48,000	2,600	<100	650	1,100	NA	NA	NM	
A-8	05/22/96	53.77	7.20	46.57	14,000	2,800	160	320	190	NA	NA	NM	
A-8	08/22/96	53.77	11.57	42.20	8,000	1,000	76	150	96	4,300	NA	NM	
A-8	12/19/96	53.77	8.04	45.73	12,000	450	110	210	230	<500	NA	NM	
A-8	04/01/97	53.77	9.98	43.79	Not Sampled: Well Sampled Semiannually								
A-8	05/27/97	53.77	11.45	42.32	11,000	1,600	100	220	210	2,300	NA	NM	
A-8	08/12/97	53.77	11.59	42.18	Not Sampled: Well Sampled Semiannually								
A-8	11/14/97	53.77	9.85	43.92	26,000	2,300	<200	400	400	4,100	NA	2.2	
A-8	03/18/98	53.77	7.80	45.97	Not Sampled: Well Sampled Semiannually								
A-8	05/19/98	53.77	8.78	44.99	88,000	4,200	150	640	600	6,700	NA	1.36	P
A-8	07/29/98	53.77	9.59	44.18	46,000	4,900	160	620	580	13,000	NA	0.5	NP
A-8	10/09/98	53.77	11.23	42.54	130,000	3,700	110	500	770	7,300	NA	1.0	NP
A-8	02/19/99	53.77	6.51	47.26	<1,000	39	<10	<10	<10	840	NA	0.2	NP
A-8	06/02/99	53.77	10.68	43.09	8,500	1,300	32	180	110	6,700	NA	1.31	NP
A-8	08/26/99	53.77	10.43	43.34	6,200	870	17	64	60	3,700	NA	0.69	NP
A-8	10/26/99	53.77	10.23	43.54	15,000	2,800	140	370	360	480	NA	0.62	NP
A-8	02/25/00	53.77	5.93	47.84	2,600	330	6.6	18	26	1,100	NA	1.43	NP
A-9	03/26/96	53.04	7.05	45.99	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-9	05/22/96	53.04	7.20	45.84	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	

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Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-9	08/22/96	53.04	9.68	43.36	<50	<0.5	<0.5	<0.5	<0.5	8.5	NA	NM	
A-9	12/19/96	53.04	7.43	45.61	<50	<0.5	<0.5	<0.5	<0.5	2.6	NA	NM	
A-9	04/01/97	53.04	9.95	43.09	Not Sampled: Well Sampled Semiannually								
A-9	05/27/97	53.04	9.56	43.48	<50	2.3	<0.5	<0.5	<0.5	45	NA	NM	
A-9	08/12/97	53.04	10.15	42.89	Not Sampled: Well Sampled Semiannually								
A-9	11/14/97	53.04	8.64	44.40	<200	<2.0	<2.0	<2.0	<2.0	190	NA	9.6	
A-9	03/18/98	53.04	6.45	46.59	Not Sampled: Well Sampled Semiannually								
A-9	05/19/98	53.04	8.35	44.69	<50	<0.5	<0.5	<0.5	<0.5	7	NA	1.27	P
A-9	07/29/98	53.04	8.74	44.30	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.99	NP
A-9	10/09/98	53.04	10.05	42.99	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.0	NP
A-9	02/19/99	53.04	6.91	46.13	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.0	NP
A-9	06/02/99	53.04	9.72	43.32	<50	<0.5	<0.5	<0.5	<0.5	16	NA	2.32	NP
A-9	08/26/99	53.04	9.48	43.56	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	0.71	NP
A-9	10/26/99	53.04	9.17	43.87	1,500	6.2	0.7	78	11	91	NA	2.15	NP
A-9	02/25/00	53.04	5.84	47.20	<50	<0.5	<0.5	<0.5	<1	<3	NA	1.55	NP
A-10	03/26/96	54.26	8.28	45.98	Not Sampled: Well Removed from Sampling Program								
A-10	05/22/96	54.26	8.60	45.66	Not Sampled: Well Removed from Sampling Program								
A-10	08/22/96	54.26	10.98	43.28	Not Sampled: Well Removed from Sampling Program								
A-10	12/19/96	54.26	8.80	45.46	Not Sampled: Well Removed from Sampling Program								
A-10	04/01/97	54.26	11.15	43.11	Not Sampled: Well Removed from Sampling Program								
A-10	05/27/97	54.26	10.90	43.36	Not Sampled: Well Removed from Sampling Program								
A-10	08/12/97	54.26	11.30	42.96	Not Sampled: Well Removed from Sampling Program								
A-10	11/14/97	54.26	10.80	43.46	Not Sampled: Well Removed from Sampling Program								
A-10	03/18/98		----------		Well Removed from Survey Program								
A-11	03/26/96	53.74	8.10	45.64	Not Sampled: Well Sampled Semiannually								
A-11	05/22/96	53.74	8.25	45.49	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-11	08/22/96	53.74	10.58	43.16	Not Sampled: Well Sampled Semiannually								
A-11	12/19/96	53.74	8.37	45.37	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NA	NM	
A-11	04/01/97	53.74	10.95	42.79	Not Sampled: Well Sampled Semiannually								
A-11	05/27/97	53.74	10.60	43.14	<50	<0.5	<0.5	<0.5	<0.5	3.1	NA	NM	

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Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
A-11	08/12/97	53.74	11.07	42.67	Not Sampled: Well Sampled Semiannually								
A-11	11/14/97	53.74	10.58	43.16	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.6	
A-11	03/18/98	53.74	8.14	45.60	Not Sampled: Well Sampled Semiannually								
A-11	05/19/98	53.74	9.40	44.34	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.13	P
A-11	07/29/98	53.74	10.32	43.42	Not Sampled: Well Sampled Semiannually								
A-11	10/09/98	53.74	10.91	42.83	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	2.0	NP
A-11	02/19/99	53.74	6.77	46.97	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	1.8	NP
A-11	06/02/99	53.74	10.95	42.79	<50	<0.5	<0.5	<0.5	<0.5	6	NA	1.38	NP
A-11	08/26/99	53.74	11.05	42.69	Not Sampled: Well Sampled Semiannually							0.49	
A-11	10/26/99	53.74	10.81	42.93	<50	<0.5	<0.5	<0.5	<1	4	NA	1.27	NP
A-11	02/25/00	53.74	6.70	47.04	Not Sampled: Well Sampled Semiannually								
A-12	03/26/96	52.05	7.83	44.22	Not Sampled: Well Sampled Semiannually								
A-12	05/22/96	52.05	7.80	44.25	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
A-12	08/22/96	52.05	9.97	42.08	Not Sampled: Well Sampled Semiannually								
A-12	12/19/96	52.05	8.18	43.87	85	<0.5	<0.5	<0.5	<0.5	170	NA	NM	
A-12	04/01/97	52.05	10.30	41.75	Not Sampled: Well Sampled Semiannually								
A-12	05/27/97	52.05	10.05	42.00	50	12	<0.5	<0.5	<0.5	96	NA	NM	
A-12	08/12/97	52.05	10.46	41.59	Not Sampled: Well Sampled Semiannually								
A-12	11/14/97	52.05	9.70	42.35	<50	<0.5	<0.5	<0.5	<0.5	75	NA	7.0	
A-12	03/18/98	52.05	8.15	43.90	Not Sampled: Well Sampled Semiannually								
A-12	05/19/98	52.05	9.15	42.90	<50	<0.5	<0.5	<0.5	<0.5	29	NA	1.47	P
A-12	07/29/98	52.05	9.38	42.67	Not Sampled: Well Sampled Semiannually								
A-12	10/09/98	52.05	10.21	41.84	<50	<0.5	<0.5	<0.5	<0.5	7	NA	2.0	NP
A-12	02/19/99	52.05	6.96	45.09	<50	<0.5	<0.5	<0.5	<0.5	<3	NA	5.2	NP
A-12	06/02/99	52.05	10.25	41.80	<50	<0.5	<0.5	<0.5	<0.5	7	NA	1.38	NP
A-12	08/26/99	52.05	9.91	42.14	Not Sampled: Well Sampled Semiannually							0.51	
A-12	10/26/99	52.05	9.73	42.32	<50	<0.5	<0.5	<0.5	<1	12	NA	1.09	NP
A-12	02/25/00	52.05	6.97	45.08	Not Sampled: Well Sampled Semiannually								
A-13	03/26/96	55.11			---------- Well Inaccessible ----------								
A-13	05/22/96	55.11			---------- Well Inaccessible ----------								

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A-13	08/22/96	55.11			Well Inaccessible								
A-13	12/19/96	55.11			Well Inaccessible								
A-13	04/01/97	55.11			Well Inaccessible								
A-13	05/27/97	55.11			Well Inaccessible								
A-13	08/12/97	55.11			Well Inaccessible								
A-13	11/14/97	55.11			Well Inaccessible								
A-13	03/18/98	55.11			Well Inaccessible								
A-13	05/19/98	55.11			Well Inaccessible								
A-13	07/29/98	55.11			Well Inaccessible								
A-13	10/09/98	55.11			Well Inaccessible								
A-13	02/19/99	55.11			Well Inaccessible								
A-13	06/02/99	55.11			Well Inaccessible								
A-13	08/26/99	55.11			Well Inaccessible								
A-13	10/26/99	55.11			Well Inaccessible								
A-13	02/25/00	55.11			Well Inaccessible								
AR-1	03/26/96	54.72	8.13	46.59	6,200	110	64	38	520	NA	NA	NM	
AR-1	05/22/96	54.72	8.57	46.15	NS	NS	NS	NS	NS	NS	NS	NM	
AR-1	08/22/96	54.72	10.97	43.75	5,600	100	28	29	310	960	NA	NM	
AR-1	12/19/96	54.72	8.93	45.79	Not Sampled: Well Removed from Sampling Program								
AR-1	04/01/97	54.72	11.78	42.94	Not Sampled: Well Removed from Sampling Program								
AR-1	05/27/97	54.72	10.76	43.96	Not Sampled: Well Removed from Sampling Program								
AR-1	08/12/97	54.72	11.40	43.32	Not Sampled: Well Removed from Sampling Program								
AR-1	11/14/97	54.72	10.80	43.92	Not Sampled: Well Removed from Sampling Program								
AR-1	03/18/98	54.72	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-1	05/19/98	54.72	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-1	07/29/98	54.72	10.17	44.55	Not Sampled: Well Removed from Sampling Program								
AR-1	10/09/98	54.72	11.25	43.47	Not Sampled: Well Removed from Sampling Program								
AR-1	02/19/99	54.72	7.02	47.70	Not Sampled: Well Removed from Sampling Program								
AR-1	06/02/99	54.72	11.00	43.72	Not Sampled: Well Removed from Sampling Program								
AR-1	08/26/99	54.72	10.96	43.76	Not Sampled: Well Removed from Sampling Program							0.39	
AR-1	10/26/99	54.72	10.68	44.04	Not Sampled: Well Removed from Sampling Program							1.39	

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AR-1	02/25/00	54.72	7.15	47.57	Not Sampled: Well Removed from Sampling Program								
AR-2	03/26/96	54.77	4.93	49.84	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
AR-2	05/22/96	54.77	5.65	49.12	NS	NS	NS	NS	NS	NS	NS	NM	
AR-2	08/22/96	54.77	7.27	47.50	<50	<0.5	<0.5	<0.5	<0.5	200	NA	NM	
AR-2	12/19/96	54.77	7.78	46.99	Not Sampled: Well Removed from Sampling Program								
AR-2	04/01/97	54.77	6.80	47.97	Not Sampled: Well Removed from Sampling Program								
AR-2	05/27/97	54.77	6.32	48.45	Not Sampled: Well Removed from Sampling Program								
AR-2	08/12/97	54.77	7.43	47.34	Not Sampled: Well Removed from Sampling Program								
AR-2	11/14/97	54.77	8.95	45.82	Not Sampled: Well Removed from Sampling Program								
AR-2	03/18/98	54.77	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-2	05/19/98	54.77	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-2	07/29/98	54.77	4.47	50.30	Not Sampled: Well Removed from Sampling Program								
AR-2	10/09/98	54.77	6.90	47.87	Not Sampled: Well Removed from Sampling Program								
AR-2	02/19/99	54.77	3.80	50.97	Not Sampled: Well Removed from Sampling Program								
AR-2	06/02/99	54.77	4.61	50.16	Not Sampled: Well Removed from Sampling Program								
AR-2	08/26/99	54.77	5.22	49.55	Not Sampled: Well Removed from Sampling Program							0.44	
AR-2	10/26/99	54.77	3.20	51.57	Not Sampled: Well Removed from Sampling Program							1.79	
AR-2	02/25/00	54.77	2.33	52.44	Not Sampled: Well Removed from Sampling Program								
AR-3	03/26/96	54.19	7.95	46.24	<50	<0.5	<0.5	<0.5	<0.5	NA	NA	NM	
AR-3	05/22/96	54.19	8.30	45.89	NS	NS	NS	NS	NS	NS	NS	NM	
AR-3	08/22/96	54.19	10.84	43.35	Not Sampled: Well Removed from Sampling Program								
AR-3	12/19/96	54.19	8.56	45.63	Not Sampled: Well Removed from Sampling Program								
AR-3	04/01/97	54.19	11.24	42.95	Not Sampled: Well Removed from Sampling Program								
AR-3	05/27/97	54.19	10.67	43.52	Not Sampled: Well Removed from Sampling Program								
AR-3	08/12/97	54.19	11.10	43.09	Not Sampled: Well Removed from Sampling Program								
AR-3	11/14/97	54.19	10.60	43.59	Not Sampled: Well Removed from Sampling Program								
AR-3	03/18/98	54.19	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-3	05/19/98	54.19	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-3	07/29/98	54.19	9.95	44.24	Not Sampled: Well Removed from Sampling Program								
AR-3	10/09/98	54.19	11.20	42.99	Not Sampled: Well Removed from Sampling Program								

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Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOB)	Groundwater Elevation (feet, MSL)	TPH Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)	MTBE 8021B* (ppb)	MTBE 8260 (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
AR-3	02/19/99	54.19	6.98	47.21	Not Sampled: Well Removed from Sampling Program								
AR-3	06/02/99	54.19	10.80	43.39	Not Sampled: Well Removed from Sampling Program								
AR-3	08/26/99	54.19	10.69	43.50	Not Sampled: Well Removed from Sampling Program							0.40	
AR-3	10/26/99	54.19	NM	NM	Not Sampled: Well Removed from Sampling Program								
AR-3	02/25/00	54.19	7.21	46.98	Not Sampled: Well Removed from Sampling Program								

TPH = Total petroleum hydrocarbons by modified EPA method 8015
BTEX = Benzene, toluene, ethylbenzene, total xylenes by EPA method 8021B. (EPA method 8020 prior to 10/26/99).
MTBE = Methyl tert-butyl ether
* = EPA method 8020 prior to 10/26/99
MSL = Mean sea level
TOB = Top of box
ppb = Parts per billion
ppm = Parts per million
< = Less than laboratory detection limit stated to the right
NA = Not analyzed
NM = Not measured
NS = Not sampled

Table 2
Groundwater Flow Direction and Gradient

ARCO Service Station 4931
731 West MacArthur Boulevard, Oakland, California

Date Measured	Average Flow Direction	Average Hydraulic Gradient
03/26/96	Southwest	0.03
05/22/96	Southwest	0.04
08/22/96	Southwest	0.02
12/19/96	Southwest	0.03
04/01/97	Southwest	0.03
05/27/97	Southwest	0.04
08/12/97	Southwest	0.02
11/14/97	Southwest	0.02
03/18/98	West	0.03
05/19/98	West-Southwest	0.02
07/29/98	West-Southwest	0.02
10/09/98	Southwest	0.007
02/19/99	Southwest	0.04
06/02/99	West	0.04
08/26/99	West-Southwest	0.02
10/26/99	West-Northwest	0.13
02/25/00	**West-Southwest**	**0.05**

APPPENDIX C

Certified Analytical Reports
And
Chain-of-Custody Documentation

Columbia Analytical Services INC.
An Employee-Owned Company

July 6, 2000

Service Request No.: S2001811

Mr. Steve Meeks
Delta Environmental Consultants
3164 Gold Camp Dr. Suite 200
Rancho Cordova, CA 95670

RE: TO#2600000/RAT#8/4931 OAKLAND

Dear Mr. Meeks:

Enclosed are the results of the sample(s) submitted to our laboratory on June 21, 2000. All analyses were performed in accordance with our laboratory's quality assurance program. Results are intended to be considered in their entirety and apply to the sample(s) analyzed. Columbia Analytical Services is not responsible for use of less than the complete report. Signature of this CAS Analytical Report confirms that pages 2 through 18, following, have been thoroughly reviewed and approved for release.

Columbia Analytical Services is certified for environmental analyses by the California Department of Health Services (certificate number: 2352, expiration: January 31, 2001).

If you have any questions, please call me at (408) 748-9700.

Respectfully submitted,

Columbia Analytical Services, Inc.

Bernadette Troncales
Project Chemist

Greg Jordan
Laboratory Manager

COLUMBIA ANALYTICAL SERVICES, Inc.
Acronyms

A2LA	American Association for Laboratory Accreditation
ASTM	American Society for Testing and Materials
BOD	Biochemical Oxygen Demand
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CAM	California Assessment Metals
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
COD	Chemical Oxygen Demand
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DLCS	Duplicate Laboratory Control Sample
DMS	Duplicate Matrix Spike
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
IC	Ion Chromatography
ICB	Initial Calibration Blank sample
ICP	Inductively Coupled Plasma atomic emission spectrometry
ICV	Initial Calibration Verification sample
J	Estimated concentration. The value is less than the MRL, but greater than or equal to the MDL. If the value is equal to the MRL, the result is actually <MRL before rounding.
LCS	Laboratory Control Sample
LUFT	Leaking Underground Fuel Tank
M	Modified
MBAS	Methylene Blue Active Substances
MCL	Maximum Contaminant Level. The highest permissible concentration of a substance allowed in drinking water as established by the U. S. EPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
MS	Matrix Spike
MTBE	Methyl tert-Butyl Ether
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the paper industry for Air and Stream Improvement
ND	Not Detected at or above the method reporting/detection limit (MRL/MDL)
NIOSH	National Institute for Occupational Safety and Health
NTU	Nephelometric Turbidity Units
ppb	Parts Per Billion
ppm	Parts Per Million
PQL	Practical Quantitation Limit
QA/QC	Quality Assurance/Quality Control
RCRA	Resource Conservation and Recovery Act
RPD	Relative Percent Difference
SIM	Selected Ion Monitoring
SM	Standard Methods for the Examination of Water and Wastewater, 18th Ed., 1992
STLC	Solubility Threshold Limit Concentration
SW	Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, 3rd Ed., 1986 and as amended by Updates I, II, IIA, and IIB.
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TPH	Total Petroleum Hydrocarbons
tr	Trace level. The concentration of an analyte that is less than the PQL but greater than or equal to the MDL. If the value is equal to the PQL, the result is actually <PQL before rounding.
TRPH	Total Recoverable Petroleum Hydrocarbons
TSS	Total Suspended Solids
TTLC	Total Threshold Limit Concentration
VOA	Volatile Organic Analyte(s)

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-2(6.85)	Units:	ug/L (ppb)
Lab Code:	S2001811-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/30/00	ND	

Approved By: _____ Date: 07/06/00

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-3(9.48)	Units:	ug/L (ppb)
Lab Code:	S2001811-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/30/00	46	

Approved By: _____ Date: 07/06/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-4(9.44)	Units:	ug/L (ppb)
Lab Code:	S2001811-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	2100	
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	110	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	2.1	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	11	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	5.9	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	10	NA	6/30/00	2000	

Approved By: _____ Date: 07/06/00

1S22/020597p

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-5(9.74)	Units:	ug/L (ppb)
Lab Code:	S2001811-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	980	G2
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	10	NA	6/30/00	2000	

G2 The sample contains a single non-fuel component eluting in the gasoline range, and quantitated as gasoline. the chromatogram does not match the typical gasoline fingerprint.

Approved By: _____ Date: 07/06/00

1522/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-6(8.67)	Units:	ug/L (ppb)
Lab Code:	S2001811-005	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/30/00	ND	

Approved By: _____ Date: 07/06/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-7(8.58)	Units:	ug/L (ppb)
Lab Code:	S2001811-006	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/30/00	ND	

Approved By: _____ Date: 07/06/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-8(9.07)	Units:	ug/L (ppb)
Lab Code:	S2001811-007	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	810	
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	0.5	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	5	NA	6/30/00	1500	

Approved By: _____ Date: 07/06/00

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-9(8.56)	**Units:**	ug/L (ppb)
Lab Code:	S2001811-008	**Basis:**	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/29/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/29/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/29/00	5	

Approved By: _____ Date: 07/06/00

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-11(9.54)	Units:	ug/L (ppb)
Lab Code:	S2001811-009	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/29/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/29/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/29/00	4	

Approved By: _____ Date: 07/06/00

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	6/21/00
Sample Matrix:	Water	**Date Received:**	6/21/00

BTEX, MTBE and TPH as Gasoline

Sample Name:	A-12(9.28)	Units:	ug/L (ppb)
Lab Code:	S2001811-010	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/29/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/29/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/29/00	18	

Approved By: _____ Date: 07/06/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S200629-WB1 GC 03	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/29/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/29/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/29/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/29/00	ND	

Approved By: _____ Date: 07/06/00

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S200630-WB1 GC 06	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	ND	
Methyl *tert* -Butyl Ether	EPA 5030	8021B	3	1	NA	6/30/00	ND	

Approved By: _____ Date: 07/04/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S200630-WB1 GC 07	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	6/30/00	ND	
Benzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Toluene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Ethylbenzene	EPA 5030	8021B	0.5	1	NA	6/30/00	ND	
Xylenes, Total	EPA 5030	8021B	1	1	NA	6/30/00	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8021B	3	1	NA	6/30/00	ND	

Approved By: _____ Date: 07/06/00

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method:	EPA 5030	Units:	PERCENT
Analysis Method:	8021B CA/LUFT	Basis:	NA

Sample Name	Lab Code	Test Notes	Percent Recovery a,a,a-Trifluorotoluene	Percent Recovery a,a,a-Trifluorotoluene
A-2(6.85)	S2001811-001		107	101
A-3(9.48)	S2001811-002		106	104
A-4(9.44)	S2001811-003		82	126
A-5(9.74)	S2001811-004		83	91
A-6(8.67)	S2001811-005		104	97
A-7(8.58)	S2001811-006		107	100
A-8(9.07)	S2001811-007		85	86
A-9(8.56)	S2001811-008		92	87
A-11(9.54)	S2001811-009		92	88
A-12(9.28)	S2001811-010		91	81
Method Blank	S200629-WB1 GC 03		93	95
Method Blank	S200630-WB1 GC 06		104	101
Method Blank	S200630-WB1 GC 07		109	108
BATCH QC	S200629-001MS		101	115
Lab Control Sample	S200629-LCS GC 03		103	118
Dup Lab Control Sample	S200629-DLCS GC 03		96	118
CAS Acceptance Limits:			70-130	70-130

Approved By: _____ Date: 07/02/00

SUR2/020397p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	6/29/00

Matrix Spike Summary
BTEX and TPH as Gasoline

Sample Name:	BATCH QC	Units:	ug/L (ppb)
Lab Code:	S200629-001MS	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Spike Level	Sample Result	Spiked Sample Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Benzene	EPA 5030	8021B	0.5	25	ND	25.5	102	75-135	
Toluene	EPA 5030	8021B	0.5	25	ND	24.7	99	73-136	
Ethylbenzene	EPA 5030	8021B	0.5	25	ND	24.2	97	69-142	
Gasoline	EPA 5030	CA/LUFT	50	500	ND	513	103	75-135	

Approved By: _____ Date: 07/04/00

MS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ARCO Products Company	**Service Request:**	S2001811
Project:	TO#2600000/RAT#8/4931 OAKLAND	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	6/30/00

Laboratory Control Sample/Duplicate Laboratory Control Sample Summary
BTEX and TPH as Gasoline

Sample Name:	Dup Lab Control Sample	Units:	ug/L (ppb)
Lab Code:	S200629-LCS GC (S200629-DLCS GC 03	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	True Value LCS	True Value DLCS	Result LCS	Result DLCS	Percent Recovery LCS	Percent Recovery DLCS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Benzene	EPA 5030	8021B	25	25	25.6	25.6	102	102	75-135	<1	
Toluene	EPA 5030	8021B	25	25	24.8	24.9	99	100	73-136	<1	
Ethylbenzene	EPA 5030	8021B	25	25	24.0	24.1	96	96	69-142	<1	
Gasoline	EPA 5030	CA/LUFT	500	500	500	522	100	104	75-135	4	

Approved By: _____ Date: 07/06/00

DLCS/020597p

ARCO Products Company
Division of Atlantic-Richfield Company

Task Order No. 260 0000 5200181

Chain of Custody

ARCO Facility no. 4931	City (Facility) Oakland	Project manager (Consultant) Steve Meeks	Laboratory name Columbia
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) 916 638-2085	Fax no. (Consultant) 916 638-8385
Consultant name Delta Environmental	Address (Consultant) 3164 Gold Camp Dr. Suite 200 Rancho Cordova CA		Contract number

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(gas and BTEX) 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 Semi Metals ☐ VOA ☐ VOA ☐	CAM METALS EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
A-2 (6.85)		2	(1)	X			X	6-21-00	1010		X											
A-3 (7.48)		2	(2)	X			X	6-21-00	1035		X											
A-4 (9.44)		2	(3)	X			X	6-21-00	1340		X											
A-5 (7.74)		2	(4)	X			X	6-21-00	1123		X											
A-6 (8.67)		2	(5)	X			X	6-21-00	1305		X											
A-7 (8.58)		2	(6)	X			X	6-21-00	1252		X											
A-8 (9.07)		2	(7)	X			X	6-21-00	1110		X											
A-9 (8.54)		2	(8)	X			X	6-21-00	1205		X											
A-11 (9.54)		2	(9)	X			X	6-21-00	1404		X											
A-12 (7.28)		2	(10)	X			X	6-21-00	1415		X											

Special detection Limit/reporting: Provide lowest Limit Available

Special QA/QC

Remarks

Lab number

Turnaround time

Priority Rush
1 Business Day

Rush
2 Business Days

Expedited
5 Business Days

Standard
10 Business Days

Condition of sample:

Temperature received: Due: 7/6/00 R11/D3-B

	Date	Time	Received by	Date	Time
Relinquished by sampler	6-21-00	1700	Joseph Machado CAS	6/21/00	1705
Relinquished by			Received by		
Relinquished by			Received by		

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

APPENDIX D

Remedial System Performance Summary

REMEDIAL SYSTEM PERFORMANCE SUMMARY

GWE System

Groundwater extraction (GWE) was conducted intermittently between November 10, 1992 and July 5, 1995. The TWE system was comprised of electric GWE pumps in monitoring wells A-9, AR-1, AR-2, AR-3 and in three 1,500-pound granular activated carbon vessels arranged in series. The GWE system was permitted by East Bay Municipal Utility District Permit Account Number 502-62131. Based on Alameda County Health Care Services Agency authorization that GWE at the site was no longer required, the permit was relinquished during the second quarter 1996. Overall, 4.6 million gallons of groundwater were extracted and less than 0.06 gallon of benzene removed. Refer to the IT Corporation *Second Quarter 1997 Groundwater Monitoring Report* for historical GWE system performance and analytical data.

Intrinsic Bioremediation Evaluation

At the request of ARCO, intrinsic bioremediation indicator parameters (bioparameters) were monitored during the fourth quarter 1996 groundwater monitoring event. Groundwater samples from monitoring wells A-4, A-8 and A-12 were analyzed for biological oxygen demand (BOD), carbon dioxide (CO_2), chemical oxygen demand (DOD), methane, nitrate, sulfate, dissolved oxygen (DO) and ferrous iron. Monitoring wells A-4 and A-8 are located within the plume. Monitoring well A-12 is located outside the plume. Based on analysis of the collected data, intrinsic bioremediation was occurring at the site. Refer to the IT Corporation *First Quarter 1997 Groundwater Monitoring Report* for details.

Oxygen release compound (ORC) is currently being used in monitoring wells A-4, A-9 and AR-1 to enhance biodegradation of dissolved oxygen. ORC is currently being evaluated for replacement during the third quarter 2000 sampling event.

APPENDIX E

Field Data Sheets

MONITORING WELL GAUGING FORM

Site Name: Arco 4931 Location: 731 W. MacArthur Oakland Date: 6-21-00

Project Number: D000-313 Technician: D. Foland

Well ID	Total Well Depth (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	D.O. Reading	Time Sampled	Wellhead Locked and Secured?	Comments
A-2			6.85		2.7	1010	No	Subj & NP
A-3			9.48		4.5	1035	No	Subj & NP
A-4			9.49		4.1	1340	No	Subj & P (ORC)
A-5			9.29		3.0	1123	No	Subj & NP
A-6			8.67		2.7	1305	No	Subj & NP
A-7			8.58		2.2	1252	No	Subj & NP
A-8			9.07		3.3	1110	No	Subj & NP
A-9			8.56		3.4	1212	No	Subj & P (ORC)
A-10			10.47		3.7		No	Subj.
A-11			9.54		4.6	1404	No	Subj & NP
A-12			9.28		3.6	1415	No	Subj & NP
A-13		Unable	To locate in the street				(paved over ?)	

Traffic control performed

Note: Measure water and product levels from the notch in top of well casing.

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: D000-313	Sample Tech: D. Toland	Well ID: A-2
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION TOS 5'

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00		6.85		

Casing Diameter: 2"____ 4" X 4.5"____ 6"____ Other ____

Floating Product: Yes ___ No X Color ____ Thickness (ft) ____
Quantity of Free Product Skimmed/removed: ____

Sample Date: 6-21-00 Sample Time: 1010

Depth to Water at Sample Time: 6.85

Sample Method: Pump____ Bailer____ Disposable Bailer X Other___

PURGE WATER MONITORING

Date Purged:	Start time:	End Time:
Purge Method:		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity 00
1010		21.1	183.7	6.39	clear	2.7

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):
Hatch lock Top (No lock) (Water Vault) · ½" blk Tubing inside

Comments:

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: 0000-313	Sample Tech: D. Foland	Well ID: A-3
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00		9.48		

Casing Diameter: 2"____ 4" X 4.5"____ 6"____ **Other** ____

Floating Product: Yes ____ No X **Color** ____ **Thickness (ft)** ____
Quantity of Free Product Skimmed/removed: ____

Sample Date: 6-21-00 **Sample Time:** 1035

Depth to Water at Sample Time: 9.48

Sample Method: Pump____ **Bailer**____ **Disposable Bailer** X **Other**____

PURGE WATER MONITORING

Date Purged:	Start time:	End Time:
Purge Method:		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity DO
1035		24.5	189.5	6.74	clear	4.5

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):
No lock Non bolt Type Vault

Comments:

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: 0000-313	Sample Tech: D Foland	Well ID: A-4
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00	25	9.49	7.5	10

Casing Diameter: 2"____ 4" X 4.5"____ 6"____ Other ____

Floating Product: Yes ____ No X Color blackish Thickness (ft) ____
Quantity of Free Product Skimmed/removed: ____

Sample Date: 6-21-00 Sample Time: 1340

Depth to Water at Sample Time: 12.1

Sample Method: Pump____ Bailer____ Disposable Bailer X Other____

PURGE WATER MONITORING

Date Purged: 6-21-00	Start time: 1320	End Time: 1325
Purge Method: Centrifugal (well went dry)		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conductivity	PH	Color	Turbidity DO.
1340	10	23.7	395	7.26	Cloudy blk flakes	4.1

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):
No lock

Comments:
five absorbants on Nylon rope hanging in well
Absorbant approx 18" long gray plastic mesh with grommets on each end
(ORC)?

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: 0000-313	Sample Tech: R. Foland	Well ID: A-5
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00		9.24		

Casing Diameter: 2"_____ 4"_____ 4.5"_____ 6"_____ **Other** 3"

Floating Product: Yes ____ No X **Color** _____ **Thickness (ft)** _____
Quantity of Free Product Skimmed/removed: _____

Sample Date: 6-21-00 **Sample Time:** 1123

Depth to Water at Sample Time: 9.24

Sample Method: Pump_____ **Bailer**_____ **Disposable Bailer** X **Other**____

PURGE WATER MONITORING

Date Purged:	Start time:	End Time:
Purge Method:		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity Qa
1123		21.2	198.2	6.45	clear	3.0

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):
Vault lid broken in half, still stays in place & do not indicate safety hazard needs to be replaced. No lock

Comments:

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: 0000-313	Sample Tech: D. Foland	Well ID: A-6
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Caloulated purge volume (gal)	Actual Purge Volume (gal)
6-21-00		8.67		

Casing Diameter: 2"_____ 4"_____ 4.5"_____ 6"_____ **Other** 3

Floating Product: Yes ____ No X **Color** _____ **Thickness (ft)** _____
Quantity of Free Product Skimmed/removed: _____

Sample Date: 6-21-00 **Sample Time:** 1305

Depth to Water at Sample Time: 8.67

Sample Method: Pump_____ **Bailer**_____ **Disposable Bailer** V **Other**____

PURGE WATER MONITORING

Date Purged:	**Start time:**	**End Time:**
Purge Method:		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity 00.
1305		26.7	155.1	7.16	Clear	2.7

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):

No lock

Comments:

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: 0000-313	Sample Tech: D. Poland	Well ID: A-7
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00		8.58		

Casing Diameter: 2"____ 4"____ 4.5"____ 6"____ **Other** 3

Floating Product: Yes ____ No X **Color** ____ **Thickness (ft)** ____
Quantity of Free Product Skimmed/removed: ____

Sample Date: 6-21-00 **Sample Time:** 1252

Depth to Water at Sample Time: 8.58

Sample Method: Pump____ **Bailer**____ **Disposable Bailer** X **Other**____

PURGE WATER MONITORING

Date Purged:	Start time:	End Time:
Purge Method:		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity 00
1252		31.6	156.5	7.57	clear	2.2

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):

No lock

Comments:

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: 0000-313	Sample Tech: D. Foland	Well ID: A-8
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00		9.07		

Casing Diameter: 2"_____ 4"_____ 4.5"_____ 6"_____ **Other** 3

Floating Product: Yes____ No____ **Color**_____ **Thickness (ft)** _____
Quantity of Free Product Skimmed/removed:_____

Sample Date: 6-21-00 **Sample Time:** 1110

Depth to Water at Sample Time: 9.07

Sample Method: Pump_____ Bailer_____ **Disposable Bailer** X **Other**____

PURGE WATER MONITORING

Date Purged:	Start time:	End Time:
Purge Method:		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity 00
1110		23.2	162.5	6.82	clear	3.3

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):
No lock

Comments:

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: D000-313	Sample Tech: D. Foland	Well ID: A-9
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00	19.6	8.56	44	120

Casing Diameter: 2"_____ 4"_____ 4.5"_____ 6" X Other _____

Floating Product: Yes ____ No X **Color** _____ **Thickness (ft)** _____
Quantity of Free Product Skimmed/removed: _____

Sample Date: 6-21-00 **Sample Time:** 1212

Depth to Water at Sample Time: 9.65

Sample Method: Pump_____ Bailer_____ Disposable Bailer X Other____

PURGE WATER MONITORING

Date Purged: 6-21-00	Start time: 1150	End Time: 1205
Purge Method: Centrifugal pump		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity 00
1152	40	20.3	141.2	7.09		
1156	60	20.3	186.8	6.66		
1158	80	20.1	181.1	6.59		
1200	100	20.0	181.4	6.51		
1203	120	20.0	185.4	6.50		3.4

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):
Large extraction vault No exterior plumbing connected
Comments: 5 gal 1½" x 18" objects with gal plastic screen all connected To Nylon rope (ORC)

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: 0000-313	Sample Tech: D. Foland	Well ID: A-11
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00		9.54		

Casing Diameter: 2"____ 4"____ 4.5"____ 6"____ **Other** 3

Floating Product: Yes ____ No X **Color** ____ **Thickness (ft)** ____
Quantity of Free Product Skimmed/removed: ____

Sample Date: 6-21-00 **Sample Time:** 1404

Depth to Water at Sample Time: 9.54

Sample Method: Pump____ Bailer____ **Disposable Bailer** X **Other**____

PURGE WATER MONITORING

Date Purged:	Start time:	End Time:
Purge Method:		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity 5
1404		22.3	269	~~7.63~~	clear	4.6

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):
No lock

Comments:

GROUNDWATER MONITORING FIELD DATA SHEET

Project No.: 0000-313	Sample Tech: R. Foland	Well ID: A-12
Site Name: Arco 4931	Site Location: Oakland	DATE: 6-21-00

WELL GAUGING INFORMATION

Date Gauged	Depth of Well (ft)	Depth to Water (ft)	Calculated purge volume (gal)	Actual Purge Volume (gal)
6-21-00		9.28		

Casing Diameter: 2"_____ 4"_____ 4.5"_____ 6"_____ Other 3

Floating Product: Yes ____ No X Color _____ Thickness (ft) _____
Quantity of Free Product Skimmed/removed: _____

Sample Date: 6-21-00 Sample Time: 1415

Depth to Water at Sample Time: 9.28

Sample Method: Pump_____ Bailer_____ Disposable Bailer X Other____

PURGE WATER MONITORING

Date Purged:	Start time:	End Time:
Purge Method:		

Time	Cum. Purge Vol. (gal)	Temp (°C)	Conduct-ivity	PH	Color	Turbidity
1415		22.7	264	6.95	clear	3.6

Well Box Integrity (seals, bolts, lid, skirt, lock, etc):

No lock

Comments:

ARCO Products Company
Division of Atlantic Richfield Company

Task Order No. 260000c

Chain of Custody

ARCO Facility no. 4931	City (Facility) Oakland	Project manager (Consultant) Steve Meeks	Laboratory name Columbia
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) 916 638-2085	Fax no. (Consultant) 916 638-8385
Consultant name Delta Environmental	Address (Consultant) 3164 Gold Camp Dr. Suite 200 Rancho Cordova, CA		Contract number

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(M) 8240 EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM5030E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ VOA ☐	Semi CAM METALS EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
A-2 (6.85)		2		X			X	6-21-00	1011		X											
A-3 (7.45)		2		X			X	6-21-00	1035		X											
A-4 (7.41)		2		X			X	6-21-00	1241		X											
A-5 (7.71)		2		X			X	6-21-00	1123		X											
A-6 (8.17)		2		X			X	6-21-00	1305		X											
A-7 (8.55)		2		X			X	6-21-00	1252		X											
A-8 (9.7)		2		X			X	6-21-00	1116		X											
A-9 (8.50)		2		X			X	6-21-00	1210		X											
A-11 (8.51)		2		X			X	6-21-00	1411		X											
A-12 (7.28)		2		X			X	6-21-00	1415		X											

Special detection Limit/reporting: Provide Lowest Limit Available

Special QA/QC:

Remarks:

Lab number:

Turnaround time:

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

Condition of sample:

Temperature received:

Relinquished by sampler	Date 6-21-00	Time 1710	Received by Ralph Pacheco CAE 6/21/00 1705
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by / Date / Time

White — Laboratory Copy — ARCO Environmental Engineering Pink copy — Consultant