



2078

3164 Gold Camp Drive
Suite 200
Rancho Cordova, CA 95670-6021
U.S.A.
916/638-2085
FAX: 916/638-8385

September 20, 2000

ENVIRONMENTAL
PROTECTION
00 SEP 28 PM 2:51

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. 374
6407 Telegraph Avenue
Oakland, California
Delta Project No. D000-302

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. 374, located at 6407 Telegraph Avenue, Oakland, California. The monitoring program complies with the California Regional Water Quality Control Board 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



TLA (LRP001.302.doc)
Enclosures

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

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.:	374	Address:	6407 Telegraph Avenue, 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.:	D000-302		
Primary Agency/Regulatory ID No.			California Regional Water Quality Control Board San Francisco Bay Region

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 the third quarter 2000.
2. Perform quarterly groundwater monitoring and sampling for the third quarter 2000.

QUARTERLY MONITORING:

Current Phase of Project	Monitoring/Remediation
Frequency of Groundwater Sampling:	Annual (2 nd Quarter): MW-1, MW-2, MW-6 Semi-annual (2 nd /4 th Quarter): MW-3, MW-4 Quarterly: MW-5
Frequency of Groundwater Monitoring:	Quarterly
Is Free Product (FP) Present On-Site:	No
FP Recovered this Quarter:	None
Cumulative FP Recovered to Date:	None
Bulk Soil Removed This Quarter:	None
Bulk Soil Removed to Date:	None
Current Remediation Techniques:	Intrinsic Bioremediation
Approximate Depth to Groundwater:	6.8 feet
Groundwater Gradient:	0.035 ft/ft toward southwest

DISCUSSION:

- MTBE concentrations for MW-3, MW-4 and MW-5 were reported below the laboratory detection limits. TPHg and benzene were only reported in MW-4 at concentrations of 20,000 and 5,100 micrograms per liter, respectively.
- ORC replacement currently being evaluated to continue intrinsic bioremediation in MW-3 and MW-4.

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
Intrinsic Bioremediation Evaluation and Enhancement Data
- Appendix C Certified Analytical Reports with Chain-of-Custody Documentation
- Appendix D Field Data Sheet

TABLE 1

GROUNDWATER ANALYTICAL DATA

ARCO Service Station 374
6407 Telegraph Avenue
Oakland, California

Well Number	Date Sampled	Top of Riser Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	TPH as Gasoline (µg/L)	MTBE (µg/L)
MW-1	6/20/00	158.91	6.86	152.05	NS	NS	NS	NS	NS	NS
MW-2	6/20/00	157.92	7.67	150.25	NS	NS	NS	NS	NS	NS
MW-3	6/20/00	153.64	6.42	147.22	<0.5	<0.5	<0.5	<1.0	<50	<10
MW-4	6/20/00	156.53	7.50	149.03	5,100	440	1,000	1,700	20,000	<250
MW-5	6/20/00	151.33	7.84	143.49	<0.5	<0.5	<0.5	<1.0	<50	<10
MW-6	6/20/00	153.84	4.79	149.05	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

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

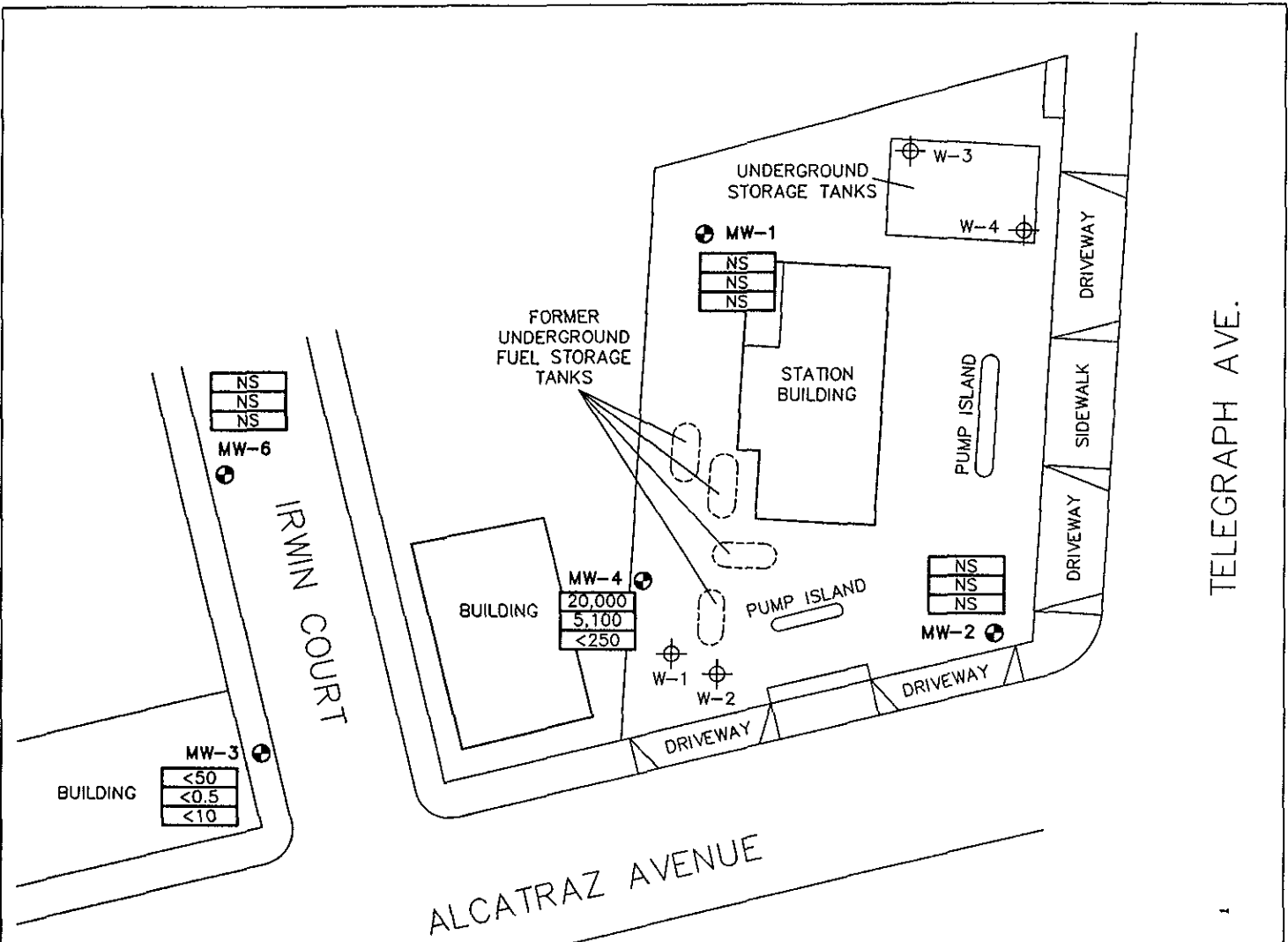
TABLE 2

GROUNDWATER FLOW DIRECTION AND GRADIENT

ARCO Service Station No. 374
6407 Telegraph Avenue
Oakland, California

<u>Date Measured</u>	<u>Average Flow Direction</u>	<u>Average Hydraulic Gradient</u>
6/20/00	Southwest	0.035

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



<50
<0.5
<10

MW-5

NS
NS
NS

MW-6

<50
<0.5
<10

MW-3

20,000
5,100
<250

MW-4

NS
NS
NS

MW-1

NS
NS
NS

MW-2

LEGEND:

- MW-1 MONITORING WELL LOCATION
- ⊕ W-1 TANK PIT MONITORING WELL LOCATION
- | |
|------|
| <50 |
| <0.5 |
| <10 |

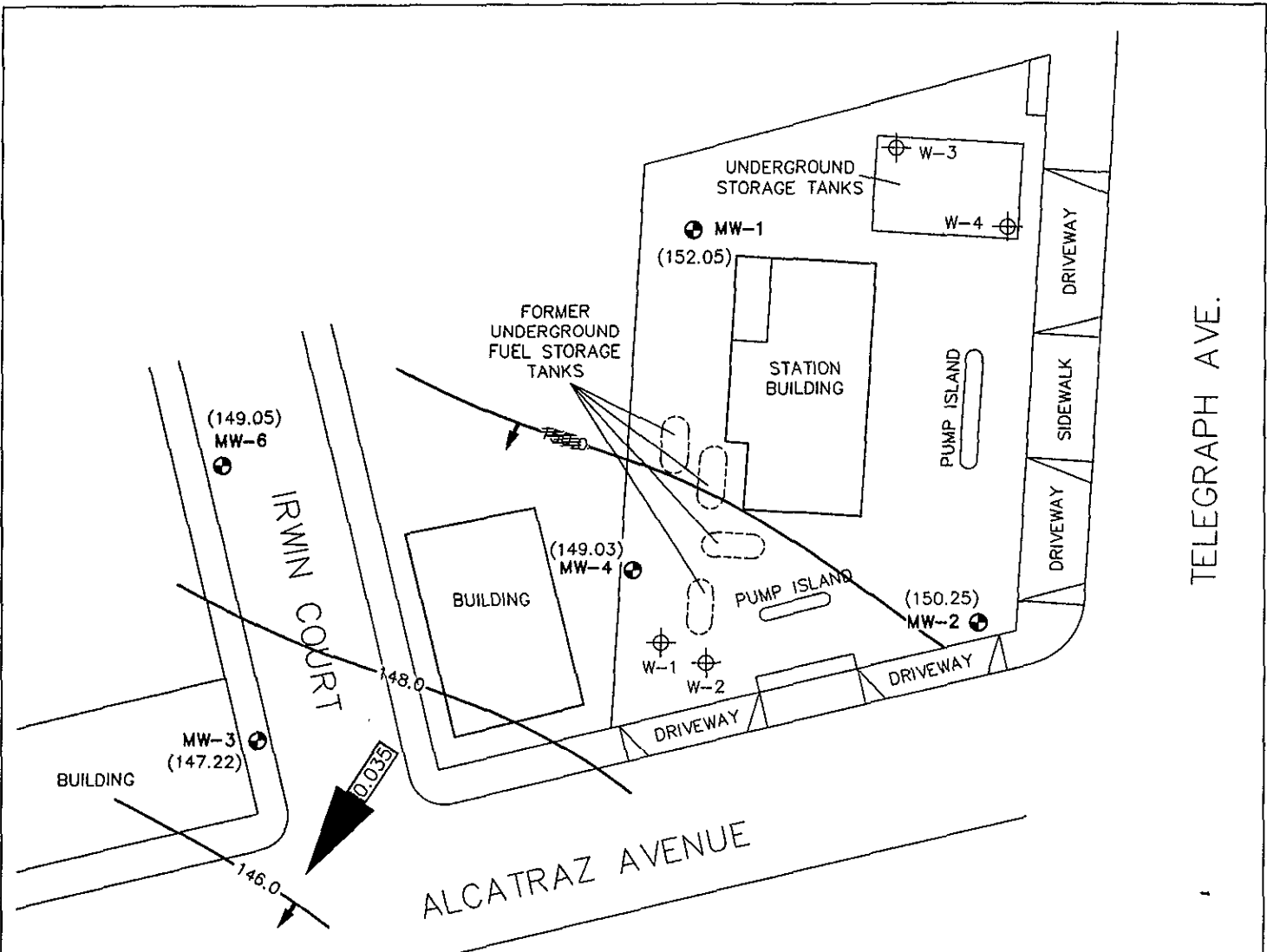
 TPH AS GASOLINE IN MICROGRAMS PER LITER
 BENZENE IN MICROGRAMS PER LITER
 MTBE IN MICROGRAMS PER LITER
- NS NOT SAMPLED

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. 374
6407 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. D000-302	DRAWN BY TLA 8/1/00
FILE NO. 374-1	PREPARED BY TLA
REVISION NO. 1	REVIEWED BY



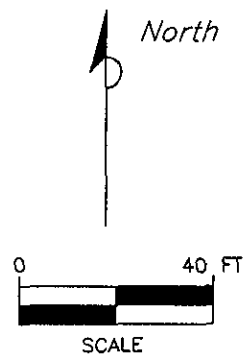


- LEGEND:**
- MW-1 MONITORING WELL LOCATION
 - W-1 TANK PIT MONITORING WELL LOCATION
 - (152.05) GROUND WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (MSL)
 - 150.0- WATER TABLE CONTOUR IN FEET ABOVE MSL
 - GROUND WATER FLOW DIRECTION
 - APPROXIMATE GROUND WATER FLOW GRADIENT

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. 374
6407 TELEGRAPH AVENUE
OAKLAND, CALIFORNIA

PROJECT NO. D000-302	DRAWN BY TLA 8/1/00
FILE NO. 374-1	PREPARED BY TLA
REVISION NO. 1	REVIEWED BY



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

IT Corporation

Historical Groundwater Elevation and Analytical Data Table

Groundwater Flow Direction and Gradient Table

Intrinsic Bioremediation Evaluation and Enhancement Data

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

ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Total Xylenes (ppb)	MTBE (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
MW-1	01/31/96	158.91	6.34	152.57	Not Sampled: Well Sampled Annually							
MW-1	04/10/96	158.91	5.82	153.09	Not Sampled: Well Sampled Annually							
MW-1	07/16/96	158.91	7.23	151.68	<50	<0.5	<0.5	<0.5	<0.5	340	NM	
MW-1	10/14/96	158.91	8.34	150.57	Not Sampled: Well Sampled Annually							
MW-1	03/27/97	158.91	6.37	152.54	Not Sampled: Well Sampled Annually							
MW-1	05/27/97	158.91	7.30	151.61	Not Sampled: Well Sampled Annually							
MW-1	08/12/97	158.91	8.22	150.69	<50	<0.5	<0.5	<0.5	<0.5	620	NM	
MW-1	11/17/97	158.91	7.98	150.93	Not Sampled: Well Sampled Annually							
MW-1	03/16/98	158.91	4.94	153.97	Not Sampled: Well Sampled Annually							
MW-1	05/12/98	158.91	5.28	153.63	Not Sampled: Well Sampled Annually							
MW-1	07/27/98	158.91	6.84	152.07	<500	<5	<5	<5	<5	580	0.6	P
MW-1	10/15/98	158.91	7.32	151.59	Not Sampled: Well Sampled Annually							
MW-1	02/18/99	158.91	6.28	152.63	Not Sampled: Well Sampled Annually							
MW-1	05/24/99	158.91	6.45	152.46	<50	<0.5	<0.5	<0.5	<0.5	1,300	2.0	NP
MW-1	08/27/99	158.91	7.86	151.05	<50	<0.5	<0.5	<0.5	<0.5	1,500	1.65	NP
MW-1	10/26/99	158.91	8.43	150.48	Not Sampled: Well Sampled Annually							
MW-1	02/03/00	158.91	7.28	151.63	<50	<0.5	<0.5	<0.5	<1	4,000	2.16 1.0	NP
MW-2	01/31/96	157.92	6.51	151.41	Not Sampled: Well Sampled Annually							
MW-2	04/10/96	157.92	6.94	150.98	Not Sampled: Well Sampled Annually							
MW-2	07/16/96	157.92	7.73	150.19	<50	1.2	<0.5	<0.5	<0.5	33	NM	
MW-2	10/14/96	157.92	8.35	149.57	Not Sampled: Well Sampled Annually							
MW-2	03/27/97	157.92	7.40	150.52	Not Sampled: Well Sampled Annually							
MW-2	05/27/97	157.92	7.82	150.10	Not Sampled: Well Sampled Annually							
MW-2	08/12/97	157.92	8.29	149.63	<50	<0.5	<0.5	<0.5	<0.5	23	NM	
MW-2	11/17/97	157.92	8.05	149.87	Not Sampled: Well Sampled Annually							
MW-2	03/16/98	157.92	6.45	151.47	Not Sampled: Well Sampled Annually							

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

ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Total Xylenes (ppb)	MTBE (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
MW-2	05/12/98	157.92	6.93	150.99	Not Sampled: Well Sampled Annually							
MW-2	07/27/98	157.92	7.39	150.53	<50	<0.5	<0.5	<0.5	<0.5	<3	0.85	NP
MW-2	10/15/98	157.92	7.67	150.25	Not Sampled: Well Sampled Annually							
MW-2	02/18/99	157.92	6.63	151.29	Not Sampled: Well Sampled Annually							
MW-2	05/24/99	157.92	7.43	150.49	<50	6.3	<0.5	0.7	<0.5	29	3.0	P
MW-2	08/27/99	157.92	8.22	149.70	<50	<0.5	<0.5	<0.5	<0.5	<3	0.95	NP
MW-2	10/26/99	157.92	8.46	149.46	Not Sampled: Well Sampled Annually							
MW-2	02/03/00	157.92	7.75	150.17	<50	<0.5	<0.5	<0.5	<1	<3	1.0	NP
MW-3 *	01/31/96	153.64	7.02	146.62	140	20	0.87	11	14	NA	NM	
MW-3 *	04/10/96	153.64	7.82	145.82	84	2.4	<0.5	1.9	1.1	NA	NM	
MW-3 *	07/16/96	153.64	6.80	146.84	<50	2.2	<0.5	<0.5	<0.5	<2.5	NM	
MW-3 *	10/14/96	153.64	7.67	145.97	<50	1.2	<0.5	<0.5	0.81	2.9	NM	
MW-3 *	03/27/97	153.64	7.62	146.02	<50	0.94	<0.5	0.9	0.63	<2.5	NM	
MW-3 *	05/27/97	153.64	6.72	146.92	Not Sampled: Well Sampled Semiannually							
MW-3 *	08/12/97	153.64	8.20	145.44	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NM	
MW-3 *	11/17/97	153.64	7.64	146.00	Not Sampled: Well Sampled Semiannually							
MW-3 *	03/18/98	153.64	5.14	148.50	<50	<0.5	<0.5	<0.5	<0.5	<3	4.0	P
MW-3 *	05/12/98	153.64	5.53	148.11	Not Sampled: Well Sampled Semiannually							
MW-3 *	07/27/98	153.64	7.63	146.01	74	<0.5	<0.5	<0.5	<0.5	<3	1.7	NP
MW-3 *	10/15/98	153.64	7.46	146.18	Not Sampled: Well Sampled Semiannually							
MW-3 *	02/18/99	153.64	5.85	147.79	Not Sampled							
MW-3 *	05/24/99	153.64	7.00	146.64	<50	<0.5	<0.5	<0.5	<0.5	4	6.0	NP
MW-3 *	08/27/99	153.64	7.16	146.48	<50	<0.5	<0.5	<0.5	<0.5	<3	16.57	NP
MW-3 *	10/26/99	153.64	7.79	145.85	<50	<0.5	<0.5	<0.5	<1	<3	14.86	NP
MW-3 *	02/03/00	153.64	7.11	146.53	<50	<0.5	<0.5	<0.5	<1	<3	1.0	NP

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

ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Total Xylenes (ppb)	MTBE (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
MW-4	01/31/96	156.53	5.64	150.89	230	23	2.2	3.7	32	NA	NM	
MW-4	04/10/96	156.53	6.66	149.87	7,300	1,600	350	350	830	NA	NM	
MW-4	07/16/96	156.53	7.73	148.80	5,600	1,100	160	240	520	150	NM	
MW-4	10/14/96	156.53	8.55	147.98	4,500	860	72	160	340	<62	NM	
MW-4	03/27/97	156.53	7.15	149.38	25,000	5,200	760	850	2,600	<250	NM	
MW-4	05/27/97	156.53	7.75	148.78	Not Sampled: Well Sampled Semiannually							
MW-4	08/12/97	156.53	8.46	148.07	4,800	950	40	140	210	170	NM	
MW-4	11/17/97	156.53	8.24	148.29	Not Sampled: Well Sampled Semiannually							
MW-4	03/16/98	156.53	5.32	151.21	<50	<0.5	<0.5	<0.5	<0.5	<3	1.5	P
MW-4	05/12/98	156.53	6.38	150.15	Not Sampled: Well Sampled Semiannually							
MW-4	07/27/98	156.53	7.36	149.17	21,000	6,100	390	810	1,600	<300	0.5	NP
MW-4 *	10/15/98	156.53	8.30	148.23	Not Sampled: Well Sampled Semiannually							
MW-4 *	02/18/99	156.53	4.39	152.14	Not Sampled							
MW-4 *	05/24/99	156.53	7.45	149.08	18,000	5,600	350	410	1,300	<300	1.0	NP
MW-4 *	08/27/99	156.53	8.07	148.46	12,000	3,200	170	490	810	65	1.32	NP
MW-4 *	10/26/99	156.53	8.72	147.81	12,000	3,100	130	450	680	12	1.39	NP
MW-4 *	02/03/00	156.53	7.41	149.12	9,300	2,800	96	330	400	73	1.0	NP
MW-5	01/31/96	151.33	8.64	142.69	<50	<0.5	<0.5	<0.5	<0.5	NA	NM	
MW-5	04/10/96	151.33	N/A	--	<50	<0.5	<0.5	<0.5	<0.5	NA	NM	
MW-5	07/16/96	151.33	8.15	143.18	<50	0.79	1.3	<0.5	<0.5	<2.5	NM	
MW-5	10/14/96	151.33	7.92	143.41	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NM	
MW-5	03/27/97	151.33	7.75	143.58	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NM	
MW-5	05/27/97	151.33	8.16	143.17	<50	<0.5	<0.5	<0.5	<0.5	<2.5	NM	
MW-5	08/12/97	151.33	----- Well Inaccessible -----									
MW-5	11/17/97	151.33	8.75	142.58	<50	<0.5	<0.5	<0.5	<0.5	<2.5	4.0	NP
MW-5	03/16/98	151.33	6.90	144.43	<50	<0.5	<0.5	<0.5	<0.5	<3	1.5	P

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

ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Total Xylenes (ppb)	MTBE (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
MW-5	05/12/98	151.33	7.24	144.09	<50	<0.5	<0.5	<0.5	<0.5	<3	2.2	P
MW-5	07/27/98	151.33	7.91	143.42	<50	<0.5	<0.5	<0.5	<0.5	<3	1.3	P
MW-5	10/15/98	151.33	8.31	143.02	<50	<0.5	<0.5	<0.5	0.6	<3	3.0	P
MW-5	02/18/99	151.33	7.25	144.08	<50	<0.5	<0.5	<0.5	<0.5	<3	2.0	P
MW-5	05/24/99	151.33	7.52	143.81	<50	<0.5	<0.5	<0.5	<0.5	<3	2.0	NP
MW-5	08/27/99	151.33	8.31	143.02	<50	<0.5	<0.5	<0.5	<0.5	<3	2.28	P
MW-5	10/26/99	151.33	8.61	142.72	<50	<0.5	<0.5	<0.5	<1	<3	1.99	P
MW-5	02/03/00	151.33	10.09	141.24	<50	<0.5	<0.5	<0.5	<1	<3	1.0	NP
MW-6	01/31/96	153.84	5.15	148.69	Not Sampled: Well Sampled Annually							
MW-6	04/10/96	153.84	4.58	149.26	Not Sampled: Well Sampled Annually							
MW-6	07/16/96	153.84	4.96	148.88	<50	<0.5	<0.5	<0.5	<0.5	150	NM	
MW-6	10/14/96	153.84	6.15	147.69	Not Sampled: Well Sampled Annually							
MW-6	03/27/97	153.84	4.40	149.44	Not Sampled: Well Sampled Annually							
MW-6	05/27/97	153.84	4.90	148.94	Not Sampled: Well Sampled Annually							
MW-6	08/12/97	153.84	5.43	148.41	<50	<0.5	<0.5	<0.5	<0.5	39	NM	
MW-6	11/17/97	153.84	5.87	147.97	Not Sampled: Well Sampled Annually							
MW-6	03/16/98	153.84	4.52	149.32	Not Sampled: Well Sampled Annually							
MW-6	05/12/98	153.84	4.42	149.42	Not Sampled: Well Sampled Annually							
MW-6	07/27/98	153.84	4.75	149.09	<50	<0.5	<0.5	<0.5	<0.5	18	0.9	P
MW-6	10/15/98	153.84	5.75	148.09	Not Sampled: Well Sampled Annually							
MW-6	02/18/99	153.84	3.93	149.91	Not Sampled: Well Sampled Annually							
MW-6	05/24/99	153.84	4.32	149.52	<50	<0.5	<0.5	<0.5	<0.5	6	2.0	NP
MW-6	08/27/99	153.84	5.72	148.12	<50	<0.5	<0.5	<0.5	<0.5	8	1.02	NP
MW-6	10/26/99	153.84	5.94	147.90	Not Sampled: Well Sampled Annually							
MW-6	02/03/00	153.84	5.44	148.40	<50	<0.5	<0.5	<0.5	<1	<3	1.0	NP

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

ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California

Well Number	Date Gauged/ Sampled	Well Elevation (feet, MSL)	Depth to Water (feet, TOC)	Groundwater Elevation (feet, MSL)	TPPH as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl- benzene (ppb)	Total Xylenes (ppb)	MTBE (ppb)	Dissolved Oxygen (ppm)	Purged/ Not Purged (P/NP)
MSL	= Mean sea level.											
TOC	= Top of casing.											
TPPH	= Total purgeable 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 by EPA method 8021B. (EPA method 8020 prior to 10/26/99).											
ppb	= Parts per billion.											
ppm	= Parts per million.											
<	= Less than laboratory detection limit stated to the right.											
NA	= Not analyzed.											
NM	= Not measured.											
N/A	= Not available.											
*	= ORCs installed in well MW-3 beginning 11/14/95 and in well MW-4 beginning 09/29/98. Please refer to Appendix D for details.											

**Table 2
Groundwater Flow Direction and Gradient**

**ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California**

Date Measured	Average Flow Direction	Average Hydraulic Gradient
01-31-96	Southwest	0.04
04-10-96	Southwest	0.04
07-16-96	Southwest	0.03
10-14-96	Southwest	0.03
03-27-97	Southwest	0.04
05-27-97	Southwest	0.03
08-12-97	Southwest	0.04
11-17-97	Southwest	0.03
03-16-98	Southwest	0.03
05-12-98	Southwest	0.04
07-27-98	Southwest	0.04
10-15-98	Southwest	0.02
02-18-99	Southwest	0.05
05-24-99	Southwest	0.03
08-27-99	Southwest	0.03
10-26-99	Southwest	0.03
02-03-00	Southwest	0.047

Table D-1
Intrinsic Bioremediation Evaluation and Enhancement Data

ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California

Well	Date Sampled	Field Analyses					Laboratory Analyses										
		Groundwater Temperature (deg F)	pH (units)	Conductivity (µmhos)	D.O. (mg/L)	Ferrous Iron (mg/L)	Total Alkalinity (mg CaCO ₃ /L)	B.O.D. (mg/L)	Carbon Dioxide (mg/L)	C.O.D. (mg/L)	Methane (%)	Nitrate as Nitrate (mg/L)	Nitrite as Nitrite (mg/L)	Sulfate (mg/L)	TPH as Gasoline (µg/L)	Total BTEX (µg/L)	
MW-3	11/14/95	**	65.5*	6.76*	508*	7.17	N/A	NS	NS	NS	NS	NS	6.6	<1.0	NS	140	46
MW-3	06/06/96	**	66.2	7.38	700	12.28	N/A	NS	NS	NS	NS	NS	NS	NS	NS	84†	5.4†
MW-3	07/16/96		67.8	7.08	1,010	8.73	0.0	280	1.8	270	44	<0.020	<1.0	NS	78	<50	2.2
MW-3	01/21/97	**	59	N/A	N/A	11.15	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-3	08/12/97	**	74.4	6.65	600	6.7	1.6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-3	11/17/97		N/A	N/A	N/A	12.0	0.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
MW-3	03/16/98		68.5	7.75	806	4.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-3	05/12/98		NM	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-3	07/27/98		68.1	6.81	904	1.7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	74	ND
MW-3	09/29/98	**	ORC installed														
MW-3	10/15/98		NM	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-3	02/18/99		NM	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-3	05/24/99		66.2	7.24	799	6.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-3	07/26/99	**	ORC installed														
MW-3	08/27/99		69.0	7.97	782	16.57	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-3	10/26/99		66.5	5.93	794	14.86	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-3	02/03/00		62.0	7.42	7,877	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-4	07/16/96		69.5	6.72	1,370	3.20	4.20	420	NS	470	NS	0.11	<1.0	NS	18	5,600	2,020
MW-4	03/16/98		66.2	6.89	1,411	1.50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-4	05/12/98		NM	NM	NM	NM	N/A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	07/27/98		70.5	6.34	1,434	0.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21,000	8,900
MW-4	09/29/98	**	ORC installed														
MW-4	10/15/98		NM	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	02/18/99		NM	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-4	05/24/99		67.6	6.72	1,509	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18,000	7,660
MW-4	07/26/99	**	ORC installed														

Table D-1
Intrinsic Bioremediation Evaluation and Enhancement Data

ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California

Well	Date Sampled	Field Analyses					Laboratory Analyses									
		Groundwater Temperature (deg F)	pH (units)	Conductivity (µmhos)	D.O. (mg/L)	Ferrous Iron (mg/L)	Total Alkalinity (mg CaCO ₃ /L)	B.O.D. (mg/L)	Carbon Dioxide (mg/L)	C.O.D. (mg/L)	Methane (%)	Nitrate as Nitrate (mg/L)	Nitrite as Nitrite (mg/L)	Sulfate (mg/L)	TPH as Gasoline (µg/L)	Total BTEX (µg/L)
MW-4	08/27/99	70.5	7.09	1,469	1.32	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12,000	4,670
MW-4	10/26/99	66.8	7.05	1,565	1.39	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12,000	4,360
MW-4	02/03/00	64.1	7.27	1,506	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9,300	3,626
MW-5	07/16/96	70.4	6.85	690	6.80	0.0	170	NS	180	NS	<0.020	<1.0	NS	35	<50	1.1
MW-5	03/16/98	69.5	7.19	584	1.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-5	05/12/98	65.9	7.04	619	2.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-5	07/27/98	73.6	7.39	569	1.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-5	10/15/98	65.8	6.88	626	3.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	0.6
MW-5	02/18/99	63.4	6.98	616	2.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-5	05/24/99	66.7	6.70	591	2.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-5	08/27/99	72.6	7.10	624	2.28	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-5	10/26/99	70.4	5.95	601	1.99	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-5	02/03/00	62.1	7.31	6,072	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-6	06/06/96	N/A	N/A	N/A	3.47	N/A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	03/16/98	N/A	N/A	N/A	N/A	N/A	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	05/12/98	NM	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	07/27/98	70.3	6.67	638	0.9	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-6	10/15/98	NM	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	02/18/99	NM	NM	NM	NM	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	05/24/99	65.5	6.62	713	2.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-6	08/27/99	73.0	7.12	589	1.02	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND
MW-6	10/26/99	NM	NM	NM	2.51	NM	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
MW-6	02/03/00	61.7	7.32	5,091	1.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND

**Table D-1
Intrinsic Bioremediation Evaluation and Enhancement Data**

**ARCO Service Station 0374
6407 Telegraph Avenue, Oakland, California**

Well	Date Sampled	<u>Field Analyses</u>					<u>Laboratory Analyses</u>									
		Groundwater Temperature (deg F)	pH (units)	Conductivity (µmhos)	D.O. (mg/L)	Ferrous Iron (mg/L)	Total Alkalinity (mg CaCO3/L)	B.O.D. (mg/L)	Carbon Dioxide (mg/L)	C.O.D. (mg/L)	Methane (%)	Nitrate as Nitrate (mg/L)	Nitrite as Nitrite (mg/L)	Sulfate (mg/L)	TPH as Gasoline (µg/L)	Total BTEX (µg/L)
D.O. = Dissolved oxygen							µg/L	= Micrograms per liter								
B.O.D. = Biochemical oxygen demand							NM	= not measured								
C.O.D. = Chemical oxygen demand							NS	= Not sampled								
TPPH = Total purgeable petroleum hydrocarbons							ND	= Not detected								
BTEX = Benzene, toluene, ethylbenzene, and xylenes							N/A	= Not available								
deg F = Degrees Fahrenheit							*	Field measurements collected on November 2, 1995.								
µmhos = Micromhos							**	ORC installed								
mg/L = Milligrams per liter							†	From April 10, 1996 groundwater monitoring event.								

APPENDIX C

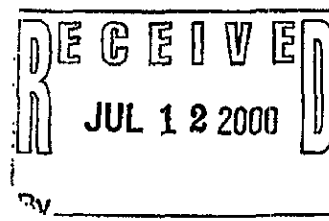
Certified Analytical Reports
And
Chain-of-Custody Documentation



July 10, 2000

Service Request No.: S2001821

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



RE: TO#25989.00/RAT#8/374 OAKLAND

Dear Mr. Meeks:

Enclosed are the results of the sample(s) submitted to our laboratory on June 22, 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 10, 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 Director

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
Project: TO#25989.00/RAT#8/374 OAKLAND
Sample Matrix: Water

Service Request: L2002171
Date Collected: 6/20/00
Date Received: 6/22/00

MTBE, BTEX and TPH as Gasoline

Sample Name: MW-3-6
Lab Code: L2002171-001
Test Notes: †

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
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	1.0	1	NA	6/30/00	ND	
TPH as Gasoline	EPA 5030	8015M	50	1	NA	6/30/00	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8021B	10	1	NA	6/30/00	ND	

† TPH as Gasoline does not include MTBE.

Approved By: _____

PT

Date: _____

07/10/00

1S22020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: TO#25989.00/RAT#8/374 OAKLAND
Sample Matrix: Water

Service Request: L2002171
Date Collected: 6/20/00
Date Received: 6/22/00

MTBE, BTEX and TPH as Gasoline

Sample Name: MW-4-7
Lab Code: L2002171-002
Test Notes: † / C2A

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
Benzene	EPA 5030	8021B	0.5	25	NA	6/30/00	5100	
Toluene	EPA 5030	8021B	0.5	25	NA	6/30/00	440	
Ethylbenzene	EPA 5030	8021B	0.5	25	NA	6/30/00	1000	
Xylenes, Total	EPA 5030	8021B	1.0	25	NA	6/30/00	1700	
TPH as Gasoline	EPA 5030	8015M	50	25	NA	6/30/00	20000	
Methyl tert-Butyl Ether	EPA 5030	8021B	10	25	NA	6/30/00	<250	

†
C2A

TPH as Gasoline does not include MTBE.
MRL is elevated because of matrix interferences and because the sample required diluting.

Approved By: _____



Date: _____

07/10/00

IS22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
Project: TO#25989.00/RAT#8/374 OAKLAND
Sample Matrix: Water

Service Request: L2002171
Date Collected: 6/20/00
Date Received: 6/22/00

MTBE, BTEX and TPH as Gasoline

Sample Name: MW-5-7
Lab Code: L2002171-003
Test Notes: †

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
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	1.0	1	NA	6/30/00	ND	
TPH as Gasoline	EPA 5030	8015M	50	1	NA	6/30/00	ND	
Methyl <i>tert</i> -Butyl Ether	EPA 5030	8021B	10	1	NA	6/30/00	ND	

† TPH as Gasoline does not include MTBE.

Approved By: _____



Date: _____

07/10/00

1522/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: ARCO Products Company
 Project: TO#25989.00/RAT#8/374 OAKLAND
 Sample Matrix: Water

Service Request: L2002171
 Date Collected: NA
 Date Received: NA

MTBE, BTEX and TPH as Gasoline

Sample Name: Method Blank
 Lab Code: L200630-MB
 Test Notes: †

Units: ug/L (ppb)
 Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
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	1.0	1	NA	6/30/00	ND	
TPH as Gasoline	EPA 5030	8015M	50	1	NA	6/30/00	ND	
Methyl tert-Butyl Ether	EPA 5030	8021B	10	1	NA	6/30/00	ND	

† TPH as Gasoline does not include MTBE.

Approved By: _____

Handwritten signature

Date: _____

07/10/00

1522/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
 Project: TO#25989.00/RAT#8/374 OAKLAND
 Sample Matrix: Water

Service Request: L2002171
 Date Collected: NA
 Date Received: NA
 Date Extracted: NA
 Date Analyzed: 6/30/00

Matrix Spike/Duplicate Matrix Spike Summary
 MTBE, BTEX and TPH as Gasoline

Sample Name: Batch QC
 Lab Code: L2002170-002MS, L2002170-002DMS
 Test Notes:

Units: ug/L (ppb)
 Basis: NA

Percent Recovery

Analyte	Prep Method	Analysis Method	MRL	Spike Level		Sample Result	Spike Result		Percent Recovery		CAS Acceptance Limits	Relative Percent Difference	Result Notes
				MS	DMS		MS	DMS	MS	DMS			
Benzene	EPA 5030	8021B	0.5	12.7	12.7	ND	17.7	17.3	139	136	39-150	2	
Toluene	EPA 5030	8021B	0.5	140	140	ND	130	130	93	93	46-148	<1	
Ethylbenzene	EPA 5030	8021B	0.5	35.2	35.2	ND	32.7	32.4	93	92	32-160	<1	
TPH as Gasoline	EPA 5030	8015M	50	2000	2000	ND	1810	1850	90	92	70-140	2	

Approved By: _____

Date: _____

07/10/00

DMS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#25989.00/RAT#8/374 OAKLAND
LCS Matrix: Water

Service Request: L2002171
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 6/30/00

Laboratory Control Sample Summary
MTBE, BTEX and TPH as Gasoline

Sample Name: Lab Control Sample
Lab Code: L200630-LCS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Benzene	EPA 5030	8021B	50.0	48.7	97	39-150	
Toluene	EPA 5030	8021B	50.0	49.2	98	46-148	
Ethylbenzene	EPA 5030	8021B	50.0	51.5	103	32-160	
TPH as Gasoline	EPA 5030	8015M	2000	1850	92	70-140	

Approved By: _____



Date: _____

07/10/00

LCS/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: TO#25989.00/RAT#8/374 OAKLAND
Sample Matrix: Water

Service Request: L2002171
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
MTBE, BTEX and TPH as Gasoline

Prep Method: EPA 5030
Analysis Method: 8021B/8015M

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery	
			4-Bromofluorobenzene	4-Bromofluorobenzene
MW-3-6	L2002171-001		80	80
MW-4-7	L2002171-002		94	90
MW-5-7	L2002171-003		88	86
TB	L2002171-004		89	88
Method Blank	L200630-MB		77	72
Batch QC	L2002170-002MS		95	91
Batch QC	L2002170-002DMS		96	96
Lab Control Sample	L200630-LCS		99	92

CAS Acceptance Limits: 60-130 60-140

Approved By: _____



Date: _____

07/10/00

5022/061197p

ARCO Products Company

Division of AtlanticRichfield Company

Task Order No. **2598900**

Chain of Custody

ARCO Facility no. 374	City (Facility) Oakland	Project manager (Consultant) Steve Meeks	Laboratory name Columbia
ARCO engineer Paul Buppale	Telephone no. (ARCO)	Telephone no. (Consultant) 688 2065	Contract number
Consultant name Delta	Address (Consultant) Rancho Cordova		
		Fax no. (Consultant) 688 8265	

Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 802/EPA 8020	BTEX/TPH EPA 8020/8020/8016	TPH Modified 8015 Gas <input type="checkbox"/> Diesel <input type="checkbox"/>	Oil and Grease 413.1 <input type="checkbox"/> 413.2 <input type="checkbox"/>	TPH EPA 416.1/SN1503E	EPA 8018010	EPA 8248240	EPA 8258270	TCLP Metals <input type="checkbox"/> VOC <input type="checkbox"/> VOA <input type="checkbox"/>	CMM Metals EPA 8010/7000 TTL <input type="checkbox"/> STLC <input type="checkbox"/>	Lead Org./DHS <input type="checkbox"/> Lead EPA 7420/7421 <input type="checkbox"/>				
			Soil	Water	Other	Ice	Acid																	
MW-3-6	①	4		X		X	X	6-20-00	1848		X													
MW-4-7	②	1		✓		✓	✓		1815															
MW-5-7	③	1		✓		✓	✓		1938															
TB	④	2		✓		✓	✓	6-19-00	800		✓													

Method of shipment

Special detection Limit/reporting

Special QA/QC

Remarks

Lab number **5200182**

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 <i>Paul Buppale</i>	Date	Time	Received by <i>Joseph Machado</i>	Date CAS 6/22/00	Time	1000	
Relinquished by	Date	Time	Received by	Date	Time		
Relinquished by	Date	Time	Received by laboratory	Date	Time		

7/7/00 RUC/03R

APPENDIX D

Field Data Sheets

DOULOS ENVIRONMENTAL COMPANY
 GROUNDWATER/LIQUID LEVEL DATA
 (measurements in feet)

Project Address: Area 374, 6407 Telegraph Ave Date: 6-20-00

Oakland CA Project No.: _____

Recorded by: Hal Haase

Well No	Time	Well Elev. TOC	Depth to Gr. Water	Measured Total Depth	Gr. Water Elevation	Depth to Product	Product Thickness	Comments
MW-1	1745		6.86	26.31				
MW-2	1748		7.67	25.88				
MW-3	1753		6.42	26.45				DO 1.80
MW-4	1809		7.50	26.56				DO 1.31
MW-5	1809		7.84	22.69				DO 1.41
MW-6	1758		4.79	14.50				

RECEIVED
 JUL 10 2000
 By _____

Notes:

Client: Arco

Sampling Date: 6-20-00

Site: Arco # 374

Project No.: _____

6407 Telegraph Ave

Well Designation: MW-3

OAKLAND CA.

Is setup of traffic control devices required? NO YES time: _____ hours
 Is there standing water in well box? NO YES Above TOC Below TOC
 Is top of casing cut level? NO YES If no, see remarks
 Is well cap sealed and locked? NO YES If no, see remarks
 Height of well casing riser (in inches): 9
 Well cover type: 8" UV _____ 12" UV _____ 12" EMCO _____ 8" BK _____
 12" BK _____ 12" DWP 12" CNI _____ 36" CNI _____ Other _____
 General condition of wellhead assembly: Excellent Good Fair Poor

Purging Equipment: _____ 2" disposable bailer _____ Submersible pump
 _____ 2" PVC bailer _____ Dedicated bailer
 _____ 4" PVC bailer Centrifugal pump

Sampled with: Disposable bailer: Teflon bailer: _____

Well Diameter: 2" _____ 4" 6" _____ 8" _____

Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement

Recharge Measurement

Time: 1753

Time: 1848

Calculated purge: 40 gal

Depth of well: 2645

Depth to water: 1804

Actual purge: 40 gal

Depth to water: 642

Start purge: 1825

Sampling time: 1848

Time	Temp.	E.C.	pH	Turbidity	Volume
<u>1830</u>	<u>21.0</u>	<u>782</u>	<u>6.93</u>	—	<u>1</u>
<u>1835</u>	<u>20.4</u>	<u>741</u>	<u>6.85</u>	—	<u>2</u>
<u>1840</u>	<u>20.5</u>	<u>739</u>	<u>6.87</u>	—	<u>3</u>

Sample appearance: clear

Lock: mark

Equipment replaced: (Check all that apply) Note condition of replaced item

2" Locking Cap: _____ Lock #3753: _____ 7/32 Allenhead: _____

4" Locking Cap: _____ Lock-Dolphin: _____ 9/16 Bolt: _____

6" Locking Cap: _____ Pinned Allenhead (DWP): _____

Remarks: _____

MA

Client: Arco

Sampling Date: 6-20-00

Site: Arco # 374

Project No.: _____

6407 Telegraph Ave

Well Designation: MW-4

OAKLAND CA.

Is setup of traffic control devices required? NO YES time: _____ hours
 Is there standing water in well box? NO YES Above TOC Below TOC
 Is top of casing cut level? NO YES If no, see remarks
 Is well cap sealed and locked? NO YES If no, see remarks
 Height of well casing riser (in inches): 10
 Well cover type: 8" UV _____ 12" UV _____ 12" EMCO _____ 8" BK _____
 12" BK _____ 12" DWP _____ 12" CNI _____ 36" CNI _____ Other: 30 BK
 General condition of wellhead assembly: Excellent Good Fair Poor

Purging Equipment: _____ 2" disposable bailer _____ Submersible pump
 _____ 2" PVC bailer _____ Dedicated bailer
 _____ 4" PVC bailer NA Centrifugal pump

Sampled with: Disposable bailer: Teflon bailer: _____

Well Diameter: 2" _____ 4" 6" _____ 8" _____

Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.
Initial Measurement Recharge Measurement
 Time: 1809 Time: NA Calculated purge: NA
 Depth of well: 26.56 Depth to water: NA Actual purge: NA
 Depth to water: 7.50

Start purge: NA Sampling time: 1815

Time	Temp.	E.C.	pH	Turbidity	Volume

Sample appearance: clear Lock: none

Equipment replaced: (Check all that apply) Note condition of replaced item
 2" Locking Cap: _____ Lock #3753: _____ 7/32 Allenhead: _____
 4" Locking Cap: _____ Lock-Dolphin: _____ 9/16 Bolt: _____
 6" Locking Cap: _____ Pinned Allenhead (DWP): _____

Remarks: _____

Signature: Kal Mahse

Client: Arco

Sampling Date: 6-20-00

Site: Arco # 374

Project No.: _____

6407 Telegraph Ave

Well Designation: MW-5

OAKLAND CA.

Is setup of traffic control devices required? NO YES time: _____ hours
 Is there standing water in well box? NO YES Above TOC Below TOC
 Is top of casing cut level? NO YES If no, see remarks
 Is well cap sealed and locked? NO YES If no, see remarks
 Height of well casing riser (in inches): 4
 Well cover type: 8" UV _____ 12" UV _____ 12" EMCO 8" BK _____
 12" BK _____ 12" DWP _____ 12" CNI _____ 36" CNI _____ Other _____
 General condition of wellhead assembly: Excellent Good Fair Poor

Purging Equipment: _____ 2" disposable bailer _____ Submersible pump
 _____ 2" PVC bailer _____ Dedicated bailer
 _____ 4" PVC bailer _____ Centrifugal pump

Sampled with: Disposable bailer: Teflon bailer: _____

Well Diameter: 2" _____ 4" 6" _____ 8" _____

Purge Vol. Multiplier: 0.16 0.65 1.47 2.61 gal/ft.

Initial Measurement Recharge Measurement
 Time: 1803 Time: 1937 Calculated purge: 29 gal
 Depth of well: 22.68 Depth to water: 10.02 Actual purge: 29.4
 Depth to water: 7.84

Start purge: 1858 Sampling time: 1938

Time	Temp.	E.C.	pH	Turbidity	Volume
<u>1804</u>	<u>20.8</u>	<u>504</u>	<u>6.94</u>	_____	<u>1</u>
<u>1909</u>	<u>20.8</u>	<u>570</u>	<u>6.89</u>	_____	<u>2</u>
<u>1915</u>	<u>20.5</u>	<u>566</u>	<u>6.87</u>	_____	<u>3</u>

Sample appearance: clear Lock: master

Equipment replaced: (Check all that apply) Note condition of replaced item
 2" Locking Cap: _____ Lock #3753: _____ 7/32 Allenhead: _____
 4" Locking Cap: _____ Lock-Dolphin: _____ 9/16 Bolt: _____
 6" Locking Cap: _____ Pinned Allenhead (DWP): _____

Remarks: _____

Signature: Hal Han