



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

March 29, 2001

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

Subject: *Quarterly Groundwater Monitoring Report, Fourth Quarter 2000*
ARCO Service Station No. 276
10600 MacArthur Boulevard 94605
Oakland, California
Delta Project No. D000-300

Dear Mr. Supple:

Please disregard the Quarterly Groundwater Monitoring Report, Fourth Quarter 2000, dated March 21, 2001. The report was inadvertently mailed without proper signature.

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

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

A handwritten signature in black ink, appearing to read "Steven W. Meeks", written over a horizontal line.

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

SWM (Lrp001.300.doc)
Enclosures

cc: Mr. Barney Chan – Alameda County Health Care Services Agency



3164 Gold Camp Drive
Suite 200
Rancho Cordova, CA 95670-6021
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March 21, 2001

IGNORE
THIS REPORT
MAR 30 2001

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

Subject: *Quarterly Groundwater Monitoring Report, Fourth Quarter 2000*
ARCO Service Station No. 276
10600 MacArthur Boulevard
Oakland, California
Delta Project No. D000-300

Dear Mr. Supple:

Delta Environmental Consultants, Inc. is submitting the attached report that presents the results of the fourth quarter 2000 groundwater monitoring program at ARCO Products Company Service Station No. 276, located at 10600 MacArthur Boulevard, 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.

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

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March 29, 2001

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

Subject: *Quarterly Groundwater Monitoring Report, Fourth Quarter 2000*
ARCO Service Station No. 276
10600 MacArthur Boulevard
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Delta Project No. D000-300

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Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

Trevor Atkinson
Project Engineer

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



3/29/01

SWM (Lrp001.300.doc)
Enclosures

cc: Mr. Barney Chan – Alameda County Health Care Services Agency

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Station No.:	<u>276</u>	Address:	<u>1060 MacArthur Boulevard, Oakland, CA</u>
ARCO Environmental Engineer/Phone No.:			<u>Paul Supple 925-299-8891</u>
Consulting Co./Contact Person			<u>Delta Environmental Consultants, Inc.</u> <u>Steven W. Meeks, P.E.</u>
Consultant Project No.:	<u>D000-300</u>		
Primary Agency/Regulatory ID No.			<u>Alameda County Health Care Services Agency</u>

WORK PERFORMED THIS QUARTER

1. Performed annual groundwater monitoring and sampling for fourth quarter 2000

WORK PROPOSED FOR NEXT QUARTER

1. Prepare and submit annual groundwater monitoring report for fourth quarter 2000

QUARTERLY MONITORING:

Current Phase of Project	<u>Closed (PCE monitoring)</u>
Frequency of Groundwater Sampling:	<u>Annual (4th quarter) MW-1, MW-3, MW-4 & MW-5</u>
Frequency of Groundwater Monitoring:	<u>Annual</u>
Is Free Product (FP) Present On-Site:	<u>No</u>
FP Recovered this Quarter:	<u>None</u>
Cumulative FP Recovered to Date:	<u>18.54 (wells MW-2 & MW-7)</u>
Bulk Soil Removed This Quarter:	<u>None</u>
Bulk Soil Removed to Date:	<u>564 cubic yards of TPH impacted soil</u>
Current Remediation Techniques:	<u>Complete</u>
Approximate Depth to Groundwater:	<u>28.3</u>
Groundwater Gradient:	<u>0.003 south-southeast</u>

DISCUSSION:

- Per correspondence between ACHCSA, ARCO and Pinnacle, annual monitoring has been conducted at this site beginning with the fourth quarter 1999. Wells MW-1, MW-3, MW-4 and MW-5 were sampled and analyzed for tetrachloroethene (PCE) by EPA method 8010.
- The annual monitoring event is conducted at the request of the ACHCSA to monitor PCE only. According to ACHCSA, the investigation and remediation associated with the underground storage tanks has been completed and is now closed.
- Please refer to the March 1998 EMCON *Fourth Quarter 1997 Monitoring Report* for historical groundwater elevation and analytical data.

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 Field Data Sheet

TABLE 1

GROUNDWATER ANALYTICAL DATA

ARCO Service Station No. 276
10600 MacArthur Boulevard
Oakland, California

Well Number	Date Sampled	Top of Riser Elevation (ft)	Depth to Groundwater (ft)	Groundwater Elevation (ft)	PCE ($\mu\text{g/L}$)	VOCs ($\mu\text{g/L}$)
MW-1	12/17/00	55.92	29.16	26.76	<u>5.09</u>	ND
MW-2	12/17/00	55.10	15.72	39.38	NS	NS
MW-3	12/17/00	56.55	29.78	26.77	<u>158</u>	ND
MW-4	12/17/00	55.98	29.22	26.76	<u>225</u>	ND
MW-5	12/17/00	55.43	28.82	26.61	<u>1,040</u>	ND
MW-6	12/17/00	61.21	34.61	26.60	NS	NS
MW-7	12/17/00	58.22	19.94	38.28	NS	NS
MW-8	12/17/00	53.65	27.02	26.63	NS	NS
RW-1	12/17/00	56.32	29.57	26.75	NS	NS
WGR-3	12/17/00	NR	19.21	NC	NS	NS

PCE = Tetrachloroethene

$\mu\text{g/L}$ = Micrograms per liter

ND = Not determined

NS = Not sampled

NR = Not surveyed

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

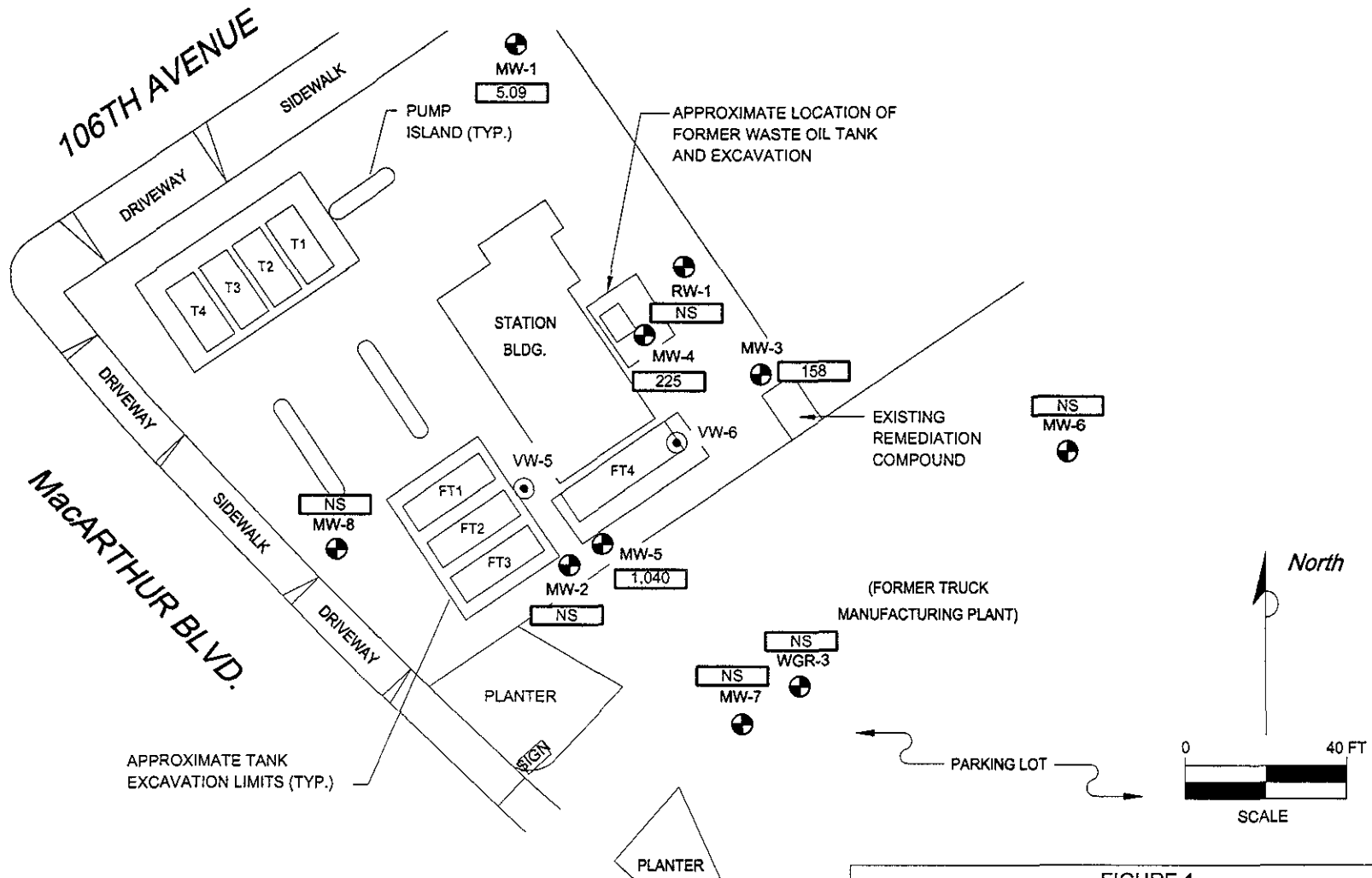
TABLE 2

GROUNDWATER FLOW DIRECTION AND GRADIENT

ARCO Service Station No. 276
10600 MacArthur Boulevard
Oakland, California

<u>Date Measured</u>	<u>Average Flow Direction</u>	<u>Average Hydraulic Gradient</u>
12/17/00	South-Southeast	0.003

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



LEGEND:

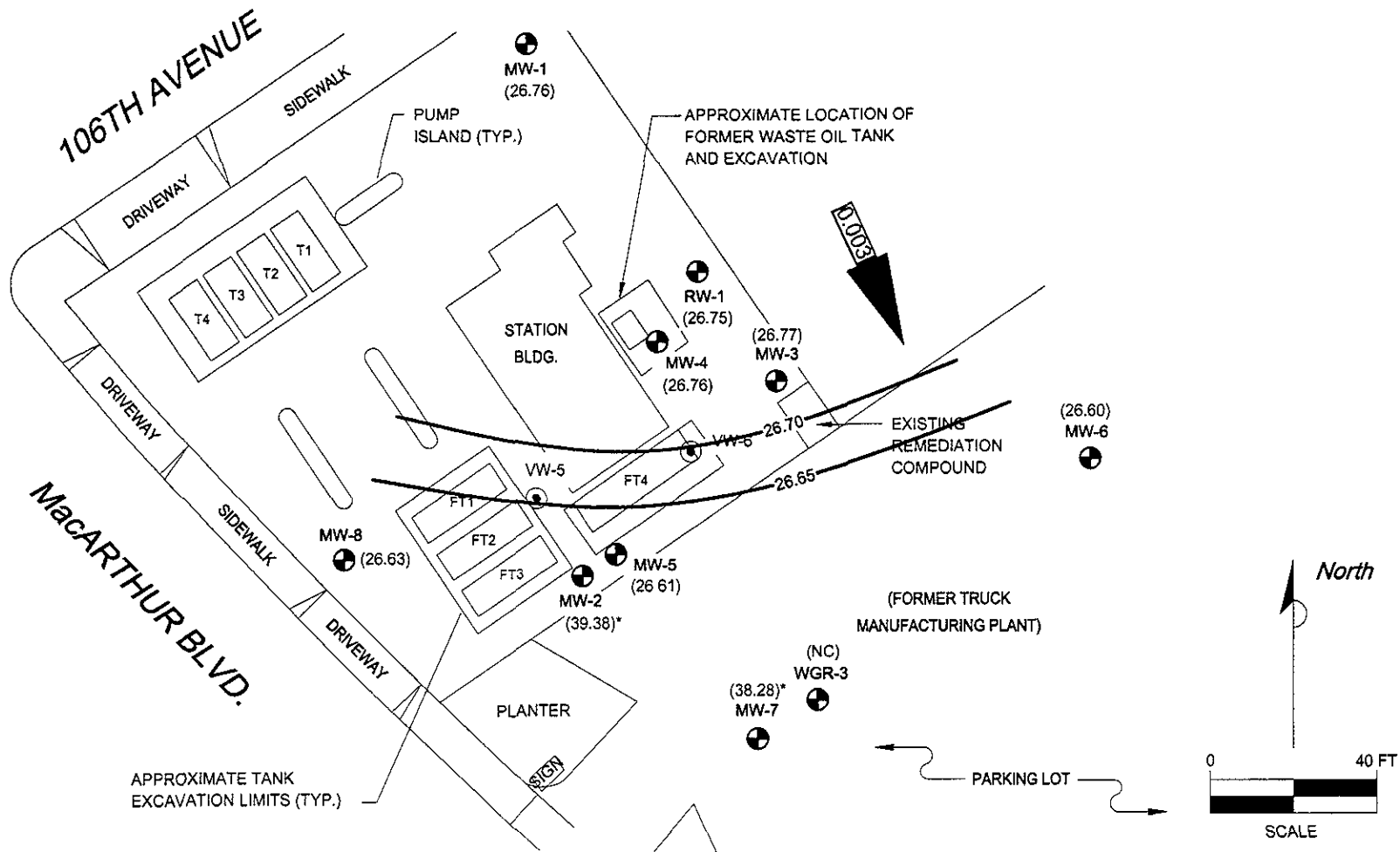
- MW-1 MONITORING WELL LOCATION
- V-5 VAPOR EXTRACTION WELL LOCATION
- 5.09 TETRACHLOROETHENE (PCE) IN MICROGRAMS PER LITER
- NS NOT SAMPLED

FIGURE 1
GROUND WATER ANALYTICAL SUMMARY
FOURTH QUARTER 2000 (12/17/00)
ARCO SERVICE STATION NO. 0276
10600 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

PROJECT NO. D000-300	DRAWN BY TLA 2/2/01
FILE NO. 0276-1	PREPARED BY TLA
REVISION NO 1	REVIEWED BY



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LEGEND:

- MW-1 MONITORING WELL LOCATION
- V-5 VAPOR EXTRACTION WELL LOCATION
- (22.71) GROUND WATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL (MSL)
- 26.70 - WATER TABLE CONTOUR IN FEET ABOVE MSL
- GROUND WATER FLOW DIRECTION
- APPROXIMATE GROUND WATER FLOW GRADIENT
- * WELL(S) ARE SCREENED ACROSS SHALLOW WATER BEARING ZONE

FIGURE 2
GROUND WATER ELEVATION CONTOUR MAP
 FOURTH QUARTER 2000 (12/17/00)
 ARCO SERVICE STATION NO. 0276
 10600 MACARTHUR BOULEVARD
 OAKLAND, CALIFORNIA

PROJECT NO D000-300	DRAWN BY TLA 3/9/01
FILE NO 0276-1	PREPARED BY TLA
REVISION NO 2	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
Historical Groundwater Elevation and Analytical Data
Halogenated Volatile Organic Compounds (EPA method 8010 or 8240)
1995-Present**

ARCO Service Station 276
10600 MacArthur Boulevard, Oakland, California

Well	Date	TOC Elevation	Depth to Water	FP Thickness	Groundwater Elevation	Date	Tetra- chloro- ethene (PCE)	Tetra- chloro- ethene (TCE)	trans- 1,2- Dichloro- ethene	cis-1,2- Dichloro- ethene	Freon 12	Dissolved Oxygen	Purged/ Not Purged
Number	Gauged	(ft-MSL)	(feet)	(ft-MSL)	(ft-MSL)	Sampled	µg/L	µg/L	µg/L	µg/L	µg/L	(mg/l)	(P/NP)
MW-1	03-10-95	55.92	26.26	ND	29.66	03-10-95	170	<1	--	<1	--		
MW-1	06-05-95	55.92	25.71	ND	30.21	06-05-95	210	<5	--	<5	--		
MW-1	08-29-95	55.92	28.44	ND	27.48	08-29-95	130	<1	--	<1	--		
MW-1	11-16-95	55.92	30.85	ND	25.07	11-16-95	45	<1	--	<1	<1		
MW-1	02-28-96	55.92	24.99	ND	30.93	02-28-96	97	<1	<1	<1	--		
MW-1	05-28-96	55.92	24.92	ND	31.00	05-28-96	160	<5	<5	<5	--		
MW-1	08-19-96	55.92	28.04	ND	27.88	08-19-96	77	<1	<1	<1	--		
MW-1	11-21-96	55.92	30.19	ND	25.73	11-21-96	30	<1	<1	<1	--		
MW-1	03-26-97	55.92	24.90	ND	31.02	03-26-97	66	<1	<1	<1	--		
MW-1	05-20-97	55.92	26.99	ND	28.93	05-20-97	36	<0.5	<0.5	<0.5	--		
MW-1	08-18-97	55.92	29.98	ND	25.94	08-18-97	11	<0.5	<0.5	<0.5	--		
MW-1	11-17-97	55.92	31.72	ND	24.20	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
MW-1	12-02-99	55.92	Not surveyed			12-02-99	Not surveyed: well was inaccessible						
MW-2	03-10-95	55.10	13.98	ND	41.12	03-11-95	<1	<1	--	<1	--		
MW-2	06-05-95	55.10	15.65	ND	39.45	06-05-95	<1	<1	--	<1	--		
MW-2	08-29-95	55.10	17.14	ND	37.96	08-29-95	<5	<5	--	<5	--		
MW-2	11-16-95	55.10	Not surveyed			11-16-95	Not surveyed: well was inaccessible						
MW-2	02-28-96	55.10	12.46	ND	42.64	02-28-96	<1	<1	<1	<1	--		
MW-2	05-28-96	55.10	15.23	ND	39.87	05-28-96	<1	<1	<1	<1	--		
MW-2	08-19-96	55.10	16.84	ND	38.26	08-21-96	<1	<1	<1	<1	--		
MW-2	11-21-96	55.10	15.44	ND	39.66	11-21-96	<1	<1	<1	<1	--		
MW-2	03-26-97	55.10	15.73	ND	39.37	03-26-97	<10^	<10^	<10^	<10^	--		
MW-2	05-20-97	55.10	16.07	ND	39.03	05-20-97	<1^	<1^	<1^	<1^	--		
MW-2	08-18-97	55.10	17.28	ND	37.82	08-18-97	<5^	<5^	<5^	<5^	--		
MW-2	11-17-97	55.10	16.75	ND	38.35	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
MW-2	12-02-99	55.10	Not surveyed			12-02-99	Not sampled: not on sampling schedule						

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1995-Present**

ARCO Service Station 276
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Well	Date	TOC Elevation	Depth to Water	FP Thickness	Groundwater Elevation	Date	Tetra- chloro- ethene (PCE)	Tetra- chloro- ethene (TCE)	trans- 1,2- Dichloro- ethene	cis-1,2- Dichloro- ethene	Freon 12	Dissolved Oxygen	Purged/ Not Purged
Number	Gauged	(ft-MSL)	(feet)	(ft-MSL)	(ft-MSL)	Sampled	µg/L	µg/L	µg/L	µg/L	µg/L	(mg/l)	(P/NP)
MW-3	03-10-95	56.55	26.74	ND	29.81	03-11-95	1700	<10	--	<10	--		
MW-3	06-05-95	56.55	26.34	ND	30.21	06-05-95	2500	<20	--	<20	--		
MW-3	08-29-95	56.55	29.15	ND	27.40	08-29-95	1600	<20	--	<20	--		
MW-3	11-16-95	56.55	31.50	ND	25.05	11-16-95	1100	<20	--	<20	<20		
MW-3	02-28-96	56.55	25.32	ND	31.23	02-28-96	1100	<10	<10	<10	--		
MW-3	05-28-96	56.55	25.46	ND	31.09	05-28-96	1700	<20	<20	<20	--		
MW-3	08-19-96	56.55	28.71	ND	27.84	08-19-96	1200	<20	<20	<20	--		
MW-3	11-21-96	56.55	30.85	ND	25.70	11-21-96	710	<20^	<20^	<20^	--		
MW-3	03-26-97	56.55	25.36	ND	31.19	03-26-97	710	<40^	<40^	<40^	--		
MW-3	05-20-97	56.55	27.61	ND	28.94	05-20-97	800	<25^	<25^	<25^	--		
MW-3	08-18-97	56.55	30.62	ND	25.93	08-18-97	420	<5^	<5^	<5^	--		
MW-3	11-17-97	56.55	32.40	ND	24.15	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
MW-3	12-02-99	56.55	30.75	ND	25.80	12-02-99	210*	<0.5*	<0.5*	<0.5*	--	0.47	NP
MW-4	03-10-95	55.98	26.22	ND	29.76	03-11-95	2600	<20	--	<20	--		
MW-4	06-05-95	55.98	25.79	ND	30.19	06-05-95	3100	<20	--	<20	--		
MW-4	08-29-95	55.98	28.56	ND	27.42	08-29-95	2900	<20	--	<20	--		
MW-4	11-16-95	55.98	31.00	ND	24.98	11-16-95	2100	<20	--	<20	<20		
MW-4	02-28-96	55.98	24.77	ND	31.21	02-28-96	2400	<20	<20	<20	--		
MW-4	05-28-96	55.98	24.91	ND	31.07	05-28-96	2700	<20	<20	<20	--		
MW-4	08-19-96	55.98	28.17	ND	27.81	08-19-96	2600	<20	<20	<20	--		
MW-4	11-21-96	55.98	30.30	ND	25.68	11-21-96	1100	<20^	<20^	<20^	--		
MW-4	03-26-97	55.98	24.80	ND	31.18	03-26-97	1900	<40^	<40^	<40^	--		
MW-4	05-20-97	55.98	27.03	ND	28.95	05-20-97	1600	<50^	<50^	<50^	--		
MW-4	08-18-97	55.98	30.10	ND	25.88	08-18-97	600	<125^	<125^	--	--		
MW-4	11-17-97	55.98	31.84	ND	24.14	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
MW-4	12-02-99	55.98	30.20	ND	25.78	12-02-99	320*	<0.5*	<0.5*	<0.5*	--	1.03	NP

Table 1
Historical Groundwater Elevation and Analytical Data
Halogenated Volatile Organic Compounds (EPA method 8010 or 8240)
1995-Present**

ARCO Service Station 276
10600 MacArthur Boulevard, Oakland, California

Well Number	Date Gauged	TOC Elevation (ft-MSL)	Depth to Water (feet)	FP Thickness (ft-MSL)	Groundwater Elevation (ft-MSL)	Date Sampled	Tetra-chloro-ethene (PCE) $\mu\text{g/L}$	Tetra-chloro-ethene (TCE) $\mu\text{g/L}$	trans-1,2-Dichloro-ethene $\mu\text{g/L}$	cis-1,2-Dichloro-ethene $\mu\text{g/L}$	Freon 12 $\mu\text{g/L}$	Dissolved Oxygen (mg/l)	Purged/Not Purged (P/NP)
MW-5	03-10-95	55.43	25.62	ND	29.81	03-10-95	270	<5	--	<5	--		
MW-5	06-05-95	55.43	25.30	ND	30.13	06-05-95	310	<5	--	<5	--		
MW-5	08-29-95	55.43	28.21	ND	27.22	08-29-95	240	<5	--	<5	--		
MW-5	11-16-95	55.43	30.63	ND	24.80	11-16-95	940	<5	--	<5	<5		
MW-5	02-28-96	55.43	24.07	ND	31.36	02-28-96	1100	<10	<10	<10	--		
MW-5	05-28-96	55.43	24.42	ND	31.01	05-28-96	360	<5	<5	<5	--		
MW-5	08-19-96	55.43	27.82	ND	27.61	08-21-96	150	<1	<1	2	--		
MW-5	11-21-96	55.43	29.92	ND	25.51	11-21-96	1900	<20^	<20^	<20^	--		
MW-5	03-26-97	55.43	24.22	ND	31.21	03-26-97	270	<10^	<10^	<10^	--		
MW-5	05-20-97	55.43	26.60	ND	28.83	05-20-97	290	<5^	<5^	<5^	--		
MW-5	08-18-97	55.43	NR	ND	NR	08-18-97	--	--	--	--	--		
MW-5	11-17-97	55.43	Not surveyed			11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
MW-5	12-02-99	55.43	29.84	ND	25.59	12-02-99	46*	<0.5*	<0.5*	<0.5*	--	0.53	P
MW-6	03-10-95	61.21	31.54	ND	29.67	03-11-95	1300	<20	--	<20	--		
MW-6	06-05-95	61.21	31.15	ND	30.06	06-05-95	2000	<20	--	<20	--		
MW-6	08-29-95	61.21	34.03	ND	27.18	08-29-95	1300	<20	--	<20	--		
MW-6	11-16-95	61.21	36.40	ND	24.81	11-16-95	1300	<20	--	<20	<20		
MW-6	02-28-96	61.21	30.18	ND	31.03	02-28-96	960	<20	<20	<20	--		
MW-6	05-28-96	61.21	30.29	ND	30.92	05-28-96	970	<20	<20	<20	--		
MW-6	08-19-96	61.21	33.54	ND	27.67	08-19-96	820	<20	<20	<20	--		
MW-6	11-21-96	61.21	35.70	ND	25.51	11-21-96	680	<20^	<20^	<20^	--		
MW-6	03-26-97	61.21	30.15	ND	31.06	03-26-97	830	<40^	<40^	<40^	--		
MW-6	05-20-97	61.21	32.40	ND	28.81	05-20-97	270	<5^	<5^	<5^	--		
MW-6	08-18-97	61.21	35.47	ND	25.74	08-18-97	420	<62.5^	<62.5^	--	--		
MW-6	11-17-97	61.21	37.25	ND	23.96	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
MW-6	12-02-99	61.21	35.55	ND	25.66	12-02-99	Not sampled: not on sampling schedule						

Table 1
Historical Groundwater Elevation and Analytical Data
Halogenated Volatile Organic Compounds (EPA method 8010 or 8240)
1995-Present**

ARCO Service Station 276
10600 MacArthur Boulevard, Oakland, California

Well	Date	TOC Elevation	Depth to Water	FP Thickness	Groundwater Elevation	Date	Tetra- chloro- ethene (PCE)	Tetra- chloro- ethene (TCE)	trans- 1,2- Dichloro- ethene	cis-1,2- Dichloro- ethene	Freon 12	Dissolved Oxygen	Purged/ Not Purged
Number	Gauged	(ft-MSL)	(feet)	(ft-MSL)	(ft-MSL)	Sampled	µg/L	µg/L	µg/L	µg/L	µg/L	(mg/l)	(P/NP)
MW-7	03-10-95	58.22	17.69	ND^^	40.53	03-11-95	Not sampled: floating product entered the well during purging						
MW-7	06-05-95	58.22	19.68	ND	38.54	06-05-95	<10	<10	--	<10	--		
MW-7	08-29-95	58.22	21.70	ND	36.52	08-29-95	<10	<10	--	<10	--		
MW-7	11-16-95	58.22	23.02	ND	35.20	11-16-95	<20	<20	--	<20	<20		
MW-7	02-28-96	58.22	16.54	ND	41.68	02-28-96	<10	<10	<10	<10	--		
MW-7	05-28-96	58.22	19.29	ND	38.93	05-28-96	<10	<10	<10	<10	--		
MW-7	08-19-96	58.22	21.84	ND	36.38	08-21-96	<1	<1	<1	<1	--		
MW-7	11-21-96	58.22	19.58	ND	38.64	11-21-96	<10^	<10^	<10^	<10^	--		
MW-7	03-26-97	58.22	19.67	ND	38.55	03-26-97	<20^	<20^	<20^	<20^	--		
MW-7	05-20-97	58.22	20.18	ND	38.04	05-20-97	<10^	<10^	<10^	<10^	--		
MW-7	08-18-97	58.22	22.21	ND	36.01	08-18-97	<10^	<10^	<10^	<10^	--		
MW-7	11-17-97	58.22	20.85	ND	37.37	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
MW-7	12-02-99	58.22	20.92	ND	37.30	12-02-99	Not sampled: not on sampling schedule						
MW-8	03-10-95	53.65	23.60	ND	30.05	03-10-95	<1	<1	--	<1	--		
MW-8	06-05-95	53.65	23.48	ND	30.17	06-05-95	<1	<1	--	<1	--		
MW-8	08-29-95	53.65	26.44	ND	27.21	08-29-95	<1	<1	--	<1	--		
MW-8	11-16-95	53.65	28.90	ND	24.75	11-16-95	<1	<1	--	<1	<1		
MW-8	02-28-96	53.65	22.16	ND	31.49	02-28-96	3	<1	<1	<1	--		
MW-8	05-28-96	53.65	22.62	ND	31.03	05-28-96	<1	<1	<1	<1	--		
MW-8	08-19-96	53.65	26.70	ND	26.95	08-21-96	<1	<1	<1	<1	--		
MW-8	11-21-96	53.65	28.16	ND	25.49	11-21-96	7	<1	<1	<1	--		
MW-8	03-26-97	53.65	22.42	ND	31.23	03-26-97	<1	<1	<1	<1	--		
MW-8	05-20-97	53.65	24.84	ND	28.81	05-20-97	<0.5	<0.5	<0.5	<0.5	--		
MW-8	08-18-97	53.65	28.03	ND	25.62	08-18-97	<5	<5	<5	--	--		
MW-8	11-17-97	53.65	29.16	ND	24.49	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
MW-8	12-02-99	53.65	28.07	ND	25.58	12-02-99	Not sampled: not on sampling schedule						

**Table 1
Historical Groundwater Elevation and Analytical Data
Halogenated Volatile Organic Compounds (EPA method 8010 or 8240)
1995-Present****

**ARCO Service Station 276
10600 MacArthur Boulevard, Oakland, California**

Well	Date	TOC Elevation	Depth to Water	FP Thickness	Groundwater Elevation	Date	Tetra-chloro-ethene (PCE)	Tetra-chloro-ethene (TCE)	trans-1,2-Dichloro-ethene	cis-1,2-Dichloro-ethene	Freon 12	Dissolved Oxygen	Purged/ Not Purged
Number	Gauged	(ft-MSL)	(feet)	(ft-MSL)	(ft-MSL)	Sampled	µg/L	µg/L	µg/L	µg/L	µg/L	(mg/l)	(P/NP)
RW-1	03-10-95	56.32	26.48	Sheen	29.84	03-10-95	260	<5	--	<5	--		
RW-1	06-05-95	56.32	26.20	ND	30.12	06-05-95	59	<1	--	<1	--		
RW-1	08-29-95	56.32	28.98	ND	27.34	08-29-95	570	<5	--	<5	--		
RW-1	11-16-95	56.32	31.34	ND	24.98	11-16-95	140	<1	--	<1	<1		
RW-1	02-28-96	56.32	25.12	ND	31.20	02-28-96	6	<1	<1	<1	--		
RW-1	05-28-96	56.32	25.26	ND	31.06	05-28-96	12	<1	<1	<1	--		
RW-1	08-19-96	56.32	28.51	ND	27.81	08-21-96	100	<1	<1	<1	--		
RW-1	11-21-96	56.32	30.65	ND	25.67	11-21-96	190	1	<1	<1	--		
RW-1	03-26-97	56.32	25.15	ND	31.17	03-26-97	6	<1	<1	<1	--		
RW-1	05-20-97	56.32	27.44	ND	28.88	05-20-97	5.3	<0.5	<0.5	<0.5	--		
RW-1	08-18-97	56.32	30.46	ND	25.86	08-18-97	46	<5	<5	--	--		
RW-1	11-17-97	56.32	32.16	ND	24.16	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
RW-1	12-02-99	56.32	30.54	ND	25.78	12-02-99	Not sampled: not on sampling schedule						
WGR-3	03-10-95	NR	15.20	ND	NR	03-11-95	<1	<1	--	<1	--		
WGR-3	06-05-95	NR	19.25	ND	NR	06-05-95	<1	<1	--	<1	--		
WGR-3	08-29-95	NR	21.41	ND	NR	08-29-95	<1	<1	--	<1	--		
WGR-3	11-16-95	NR	22.50	ND	NR	11-16-95	<1	<1	--	<1	<1		
WGR-3	02-28-96	NR	14.90	ND	NR	02-28-96	<1	<1	<1	<1	--		
WGR-3	05-28-96	NR	18.33	ND	NR	05-28-96	<1	<1	<1	<1	--		
WGR-3	08-19-96	NR	21.38	ND	NR	08-19-96	<1	<1	<1	<1	--		
WGR-3	11-21-96	NR	18.70	ND	NR	11-21-96	<1	<1	<1	<1	--		
WGR-3	03-26-97	NR	18.98	ND	NR	03-26-97	<1	<1	<1	<1	--		
WGR-3	05-20-97	NR	19.70	ND	NR	05-20-97	<0.5	<0.5	<0.5	<0.5	--		

Table 1
Historical Groundwater Elevation and Analytical Data
Halogenated Volatile Organic Compounds (EPA method 8010 or 8240)
1995-Present**

ARCO Service Station 276
10600 MacArthur Boulevard, Oakland, California

Well	Date	TOC Elevation	Depth to Water	FP Thickness	Groundwater Elevation	Date	Tetra- chloro- ethene (PCE)	Tetra- chloro- ethene (TCE)	trans- 1,2- Dichloro- ethene	cis-1,2- Dichloro- ethene	Freon 12	Dissolved Oxygen	Purged/ Not Purged
Number	Gauged	(ft-MSL)	(feet)	(ft-MSL)	(ft-MSL)	Sampled	µg/L	µg/L	µg/L	µg/L	µg/L	(mg/l)	(P/NP)
WGR-3	08-18-97	NR	21.81	ND	NR	08-18-97	<5	<5	<5	--	--		
WGR-3	11-17-97	NR	20.42	ND	NR	11-17-97	Not analyzed for Halogenated Volatile Organic Compounds						
WGR-3	12-02-99	NR	20.58	ND	NR	12-02-99	Not sampled: not on sampling schedule						

TOC: Top of Casing

ft-MSL: elevation in feet, relative to mean sea level

µg/L: micrograms per liter

ND: none detected

NR: not reported; data not available or not measurable

--: not analyzed or not applicable

*: analyzed by EPA method 8021B

^: method reporting limit was raised due to: (1) high analyte concentration requiring sample dilution, or (2) matrix interference

^^: floating product entered the well during purging

** : For previous historical groundwater elevation and analytical data please refer to *Fourth Quarter 1995 Groundwater Monitoring Results and Remediation System Performance Evaluation Report, Retail Service Station 10600 and 10700 MacArthur Boulevard, Oakland, California, (EMCON, March 22, 1996).*

**Table 2
Groundwater Flow Direction and Gradient**

**ARCO Service Station 0276
10600 MacArthur Boulevard, Oakland, California**

Date Measured	Average Flow Direction	Average Hydraulic Gradient
03-10-95	North-Northeast	0.003
06-05-95	Flat	Flat
08-29-95	Flat	Flat
11-16-95	Southwest	0.003
02-28-96	North-Northeast	0.004
05-28-96	Flat	Flat
08-19-96	Flat	Flat
11-21-96	Flat	Flat
03-26-97	Flat	Flat
05-20-97	Flat	Flat
08-18-97	Southwest	0.003
11-17-97	Northeast	0.003
12-02-99	North-Northwest	0.19

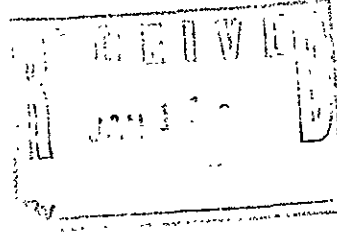
APPENDIX C

Certified Analytical Reports
And
Chain-of-Custody Documentation



January 05 , 2001

Steven Meeks
Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova, CA 95670
RE: ARCO 276, Oakland, CA / S012241



Enclosed are the results of analyses for samples received by the laboratory on 12/19/00. If you have any questions concerning his report, please feel free to contact me.

Sincerely,

Sandra R. Hanson
Client Services Representative

Lito Diaz
Laboratory Director

CA ELAP Certificate Number 1624





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1-29	S012241-01	Water	12/17/00 13:10	12/19/00 07:30
MW-3-29	S012241-02	Water	12/17/00 14:00	12/19/00 07:30
MW-4-29	S012241-03	Water	12/17/00 14:20	12/19/00 07:30
MW-5-28	S012241-04	Water	12/17/00 14:12	12/19/00 07:30
TB	S012241-05	Water	12/17/00 14:12	12/19/00 07:30





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

**Volatile Organic Compounds by EPA Method 8021B
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-1-29 (S012241-01) Water Sampled: 12/17/00 13:10 Received: 12/19/00 07:30									
Bromodichloromethane	ND	0.500	ug/l	1	0120547	12/28/00	12/28/00	EPA 8021B	
Bromoform	ND	0.500	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.500	"	"	"	"	"	"	
Chlorobenzene	ND	0.500	"	"	"	"	"	"	
Chloroethane	ND	0.500	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	5.00	"	"	"	"	"	"	
Chloroform	ND	0.500	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
Dibromochloromethane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.500	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.500	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.500	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.500	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.500	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.500	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.500	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.500	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.500	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.500	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.500	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.500	"	"	"	"	"	"	
Freon 113	ND	0.500	"	"	"	"	"	"	
Methylene chloride	ND	0.500	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.500	"	"	"	"	"	"	
Tetrachloroethene	5.09	0.500	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.500	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.500	"	"	"	"	"	"	
Trichloroethene	ND	0.500	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.500	"	"	"	"	"	"	
Vinyl chloride	ND	0.500	"	"	"	"	"	"	
Surrogate: Bromochloromethane		115 %		65-135	"	"	"	"	
Surrogate: 1,4-Dichlorobutane		112 %		65-135	"	"	"	"	





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

**Volatile Organic Compounds by EPA Method 8021B
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-3-29 (S012241-02) Water Sampled: 12/17/00 14:00 Received: 12/19/00 07:30									
Bromodichloromethane	ND	5.00	ug/l	10	0120547	12/29/00	12/29/00	EPA 8021B	
Bromoform	ND	5.00	"	"	"	"	"	"	
Bromomethane	ND	5.00	"	"	"	"	"	"	
Carbon tetrachloride	ND	5.00	"	"	"	"	"	"	
Chlorobenzene	ND	5.00	"	"	"	"	"	"	
Chloroethane	ND	5.00	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	50.0	"	"	"	"	"	"	
Chloroform	ND	5.00	"	"	"	"	"	"	
Chloromethane	ND	5.00	"	"	"	"	"	"	
Dibromochloromethane	ND	5.00	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	5.00	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	5.00	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	5.00	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	5.00	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethane	ND	5.00	"	"	"	"	"	"	
1,2-Dichloroethane	ND	5.00	"	"	"	"	"	"	
1,1-Dichloroethene	ND	5.00	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	5.00	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	5.00	"	"	"	"	"	"	
1,2-Dichloropropane	ND	5.00	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	5.00	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	5.00	"	"	"	"	"	"	
Freon 113	ND	5.00	"	"	"	"	"	"	
Methylene chloride	ND	5.00	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	5.00	"	"	"	"	"	"	
Tetrachloroethene	158	5.00	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	5.00	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	5.00	"	"	"	"	"	"	
Trichloroethene	ND	5.00	"	"	"	"	"	"	
Trichlorofluoromethane	ND	5.00	"	"	"	"	"	"	
Vinyl chloride	ND	5.00	"	"	"	"	"	"	
Surrogate: Bromochloromethane		96.0 %		65-135	"	"	"	"	
Surrogate: 1,4-Dichlorobutane		107 %		65-135	"	"	"	"	





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

Volatile Organic Compounds by EPA Method 8021B
Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-4-29 (S012241-03) Water Sampled: 12/17/00 14:20 Received: 12/19/00 07:30									
Bromodichloromethane	ND	12.5	ug/l	25	0120547	12/28/00	12/28/00	EPA 8021B	
Bromoform	ND	12.5	"	"	"	"	"	"	
Bromomethane	ND	12.5	"	"	"	"	"	"	
Carbon tetrachloride	ND	12.5	"	"	"	"	"	"	
Chlorobenzene	ND	12.5	"	"	"	"	"	"	
Chloroethane	ND	12.5	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	125	"	"	"	"	"	"	
Chloroform	ND	12.5	"	"	"	"	"	"	
Chloromethane	ND	12.5	"	"	"	"	"	"	
Dibromochloromethane	ND	12.5	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	12.5	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	12.5	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	12.5	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	12.5	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	12.5	"	"	"	"	"	"	
1,1-Dichloroethane	ND	12.5	"	"	"	"	"	"	
1,2-Dichloroethane	ND	12.5	"	"	"	"	"	"	
1,1-Dichloroethene	ND	12.5	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	12.5	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	12.5	"	"	"	"	"	"	
1,2-Dichloropropane	ND	12.5	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	12.5	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	12.5	"	"	"	"	"	"	
Freon 113	ND	12.5	"	"	"	"	"	"	
Methylene chloride	ND	12.5	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	12.5	"	"	"	"	"	"	
Tetrachloroethene	225	12.5	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	12.5	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	12.5	"	"	"	"	"	"	
Trichloroethene	ND	12.5	"	"	"	"	"	"	
Trichlorofluoromethane	ND	12.5	"	"	"	"	"	"	
Vinyl chloride	ND	12.5	"	"	"	"	"	"	
Surrogate: Bromochloromethane		103 %		65-135	"	"	"	"	
Surrogate: 1,4-Dichlorobutane		107 %		65-135	"	"	"	"	





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

Volatile Organic Compounds by EPA Method 8021B
Sequoia Analytical - Petaluma

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
MW-5-28 (S012241-04) Water Sampled: 12/17/00 14:12 Received: 12/19/00 07:30									
Bromodichloromethane	ND	50.0	ug/l	100	0120547	12/28/00	12/28/00	EPA 8021B	
Bromoform	ND	50.0	"	"	"	"	"	"	
Bromomethane	ND	50.0	"	"	"	"	"	"	
Carbon tetrachloride	ND	50.0	"	"	"	"	"	"	
Chlorobenzene	ND	50.0	"	"	"	"	"	"	
Chloroethane	ND	50.0	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	500	"	"	"	"	"	"	
Chloroform	ND	50.0	"	"	"	"	"	"	
Chloromethane	ND	50.0	"	"	"	"	"	"	
Dibromochloromethane	ND	50.0	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	50.0	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	50.0	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	50.0	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	50.0	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	50.0	"	"	"	"	"	"	
1,1-Dichloroethane	ND	50.0	"	"	"	"	"	"	
1,2-Dichloroethane	ND	50.0	"	"	"	"	"	"	
1,1-Dichloroethene	ND	50.0	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	50.0	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	50.0	"	"	"	"	"	"	
1,2-Dichloropropane	ND	50.0	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	50.0	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	50.0	"	"	"	"	"	"	
Freon 113	ND	50.0	"	"	"	"	"	"	
Methylene chloride	ND	50.0	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	50.0	"	"	"	"	"	"	
Tetrachloroethene	1040	50.0	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	50.0	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	50.0	"	"	"	"	"	"	
Trichloroethene	ND	50.0	"	"	"	"	"	"	
Trichlorofluoromethane	ND	50.0	"	"	"	"	"	"	
Vinyl chloride	ND	50.0	"	"	"	"	"	"	
Surrogate: Bromochloromethane		108 %		65-135	"	"	"	"	
Surrogate: 1,4-Dichlorobutane		110 %		65-135	"	"	"	"	





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

**Volatile Organic Compounds by EPA Method 8021B
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
TB (S012241-05) Water Sampled: 12/17/00 14:12 Received: 12/19/00 07:30									
Bromodichloromethane	ND	0.500	ug/l	1	0120547	12/28/00	12/28/00	EPA 8021B	
Bromoform	ND	0.500	"	"	"	"	"	"	
Bromomethane	ND	0.500	"	"	"	"	"	"	
Carbon tetrachloride	ND	0.500	"	"	"	"	"	"	
Chlorobenzene	ND	0.500	"	"	"	"	"	"	
Chloroethane	ND	0.500	"	"	"	"	"	"	
2-Chloroethylvinyl ether	ND	5.00	"	"	"	"	"	"	
Chloroform	ND	0.500	"	"	"	"	"	"	
Chloromethane	ND	0.500	"	"	"	"	"	"	
Dibromochloromethane	ND	0.500	"	"	"	"	"	"	
1,2-Dibromoethane (EDB)	ND	0.500	"	"	"	"	"	"	
1,2-Dichlorobenzene	ND	0.500	"	"	"	"	"	"	
1,3-Dichlorobenzene	ND	0.500	"	"	"	"	"	"	
1,4-Dichlorobenzene	ND	0.500	"	"	"	"	"	"	
Dichlorodifluoromethane	ND	0.500	"	"	"	"	"	"	
1,1-Dichloroethane	ND	0.500	"	"	"	"	"	"	
1,2-Dichloroethane	ND	0.500	"	"	"	"	"	"	
1,1-Dichloroethene	ND	0.500	"	"	"	"	"	"	
cis-1,2-Dichloroethene	ND	0.500	"	"	"	"	"	"	
trans-1,2-Dichloroethene	ND	0.500	"	"	"	"	"	"	
1,2-Dichloropropane	ND	0.500	"	"	"	"	"	"	
cis-1,3-Dichloropropene	ND	0.500	"	"	"	"	"	"	
trans-1,3-Dichloropropene	ND	0.500	"	"	"	"	"	"	
Freon 113	ND	0.500	"	"	"	"	"	"	
Methylene chloride	ND	0.500	"	"	"	"	"	"	
1,1,2,2-Tetrachloroethane	ND	0.500	"	"	"	"	"	"	
Tetrachloroethene	ND	0.500	"	"	"	"	"	"	
1,1,2-Trichloroethane	ND	0.500	"	"	"	"	"	"	
1,1,1-Trichloroethane	ND	0.500	"	"	"	"	"	"	
Trichloroethene	ND	0.500	"	"	"	"	"	"	
Trichlorofluoromethane	ND	0.500	"	"	"	"	"	"	
Vinyl chloride	ND	0.500	"	"	"	"	"	"	
Surrogate: Bromochloromethane		109 %		65-135	"	"	"	"	
Surrogate: 1,4-Dichlorobutane		109 %		65-135	"	"	"	"	





Delta Environmental Consultants(Rancho Cordova 3164 Gold Camp Drive Ste. 200 Rancho Cordova CA, 95670	Project: ARCO 276, Oakland, CA Project Number: N/A Project Manager: Steven Meeks	Reported: 01/05/01 16:32
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**Volatile Organic Compounds by EPA Method 8021B - Quality Control
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 0120547 - EPA 5030, waters

Blank (0120547-BLK1)

Prepared & Analyzed: 12/27/00

Bromodichloromethane	ND	0.500	ug/l							
Bromoform	ND	0.500	"							
Bromomethane	ND	0.500	"							
Carbon tetrachloride	ND	0.500	"							
Chlorobenzene	ND	0.500	"							
Chloroethane	ND	0.500	"							
2-Chloroethylvinyl ether	ND	5.00	"							
Chloroform	ND	0.500	"							
Chloromethane	ND	0.500	"							
Dibromochloromethane	ND	0.500	"							
1,2-Dibromoethane (EDB)	ND	0.500	"							
1,2-Dichlorobenzene	ND	0.500	"							
1,3-Dichlorobenzene	ND	0.500	"							
1,4-Dichlorobenzene	ND	0.500	"							
Dichlorodifluoromethane	ND	0.500	"							
1,1-Dichloroethane	ND	0.500	"							
1,2-Dichloroethane	ND	0.500	"							
1,1-Dichloroethene	ND	0.500	"							
cis-1,2-Dichloroethene	ND	0.500	"							
trans-1,2-Dichloroethene	ND	0.500	"							
1,2-Dichloropropane	ND	0.500	"							
cis-1,3-Dichloropropene	ND	0.500	"							
trans-1,3-Dichloropropene	ND	0.500	"							
Freon 113	ND	0.500	"							
Methylene chloride	ND	0.500	"							
1,1,2,2-Tetrachloroethane	ND	0.500	"							
Tetrachloroethene	ND	0.500	"							
1,1,2-Trichloroethane	ND	0.500	"							
1,1,1-Trichloroethane	ND	0.500	"							
Trichloroethene	ND	0.500	"							
Trichlorofluoromethane	ND	0.500	"							
Vinyl chloride	ND	0.500	"							
Surrogate: Bromochloromethane	32.6		"	30.0		109	65-135			
Surrogate: 1,4-Dichlorobutane	30.7		"	30.0		102	65-135			





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

**Volatile Organic Compounds by EPA Method 8021B - Quality Control
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
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Batch 0120547 - EPA 5030, waters

Blank (0120547-BLK2)

Prepared & Analyzed: 12/28/00

Bromodichloromethane	ND	0.500	ug/l						
Bromoform	ND	0.500	"						
Bromomethane	ND	0.500	"						
Carbon tetrachloride	ND	0.500	"						
Chlorobenzene	ND	0.500	"						
Chloroethane	ND	0.500	"						
2-Chloroethylvinyl ether	ND	5.00	"						
Chloroform	ND	0.500	"						
Chloromethane	ND	0.500	"						
Dibromochloromethane	ND	0.500	"						
1,2-Dibromoethane (EDB)	ND	0.500	"						
1,2-Dichlorobenzene	ND	0.500	"						
1,3-Dichlorobenzene	ND	0.500	"						
1,4-Dichlorobenzene	ND	0.500	"						
Dichlorodifluoromethane	ND	0.500	"						
1,1-Dichloroethane	ND	0.500	"						
1,2-Dichloroethane	ND	0.500	"						
1,1-Dichloroethene	ND	0.500	"						
cis-1,2-Dichloroethene	ND	0.500	"						
trans-1,2-Dichloroethene	ND	0.500	"						
1,2-Dichloropropane	ND	0.500	"						
cis-1,3-Dichloropropene	ND	0.500	"						
trans-1,3-Dichloropropene	ND	0.500	"						
Freon 113	ND	0.500	"						
Methylene chloride	ND	0.500	"						
1,1,2,2-Tetrachloroethane	ND	0.500	"						
Tetrachloroethene	ND	0.500	"						
1,1,2-Trichloroethane	ND	0.500	"						
1,1,1-Trichloroethane	ND	0.500	"						
Trichloroethene	ND	0.500	"						
Trichlorofluoromethane	ND	0.500	"						
Vinyl chloride	ND	0.500	"						
Surrogate: Bromochloromethane	32.4		"	30.0		108	65-135		
Surrogate: 1,4-Dichlorobutane	32.0		"	30.0		107	65-135		





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

**Volatile Organic Compounds by EPA Method 8021B - Quality Control
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 0120547 - EPA 5030, waters

Blank (0120547-BLK3)

Prepared & Analyzed: 12/29/00

Bromodichloromethane	ND	0.500	ug/l							
Bromoform	ND	0.500	"							
Bromomethane	ND	0.500	"							
Carbon tetrachloride	ND	0.500	"							
Chlorobenzene	ND	0.500	"							
Chloroethane	ND	0.500	"							
2-Chloroethylvinyl ether	ND	5.00	"							
Chloroform	ND	0.500	"							
Chloromethane	ND	0.500	"							
Dibromochloromethane	ND	0.500	"							
1,2-Dibromoethane (EDB)	ND	0.500	"							
1,2-Dichlorobenzene	ND	0.500	"							
1,3-Dichlorobenzene	ND	0.500	"							
1,4-Dichlorobenzene	ND	0.500	"							
Dichlorodifluoromethane	ND	0.500	"							
1,1-Dichloroethane	ND	0.500	"							
1,2-Dichloroethane	ND	0.500	"							
1,1-Dichloroethene	ND	0.500	"							
cis-1,2-Dichloroethene	ND	0.500	"							
trans-1,2-Dichloroethene	ND	0.500	"							
1,2-Dichloropropane	ND	0.500	"							
cis-1,3-Dichloropropene	ND	0.500	"							
trans-1,3-Dichloropropene	ND	0.500	"							
Freon 113	ND	0.500	"							
Methylene chloride	ND	0.500	"							
1,1,2,2-Tetrachloroethane	ND	0.500	"							
Tetrachloroethene	ND	0.500	"							
1,1,2-Trichloroethane	ND	0.500	"							
1,1,1-Trichloroethane	ND	0.500	"							
Trichloroethene	ND	0.500	"							
Trichlorofluoromethane	ND	0.500	"							
Vinyl chloride	ND	0.500	"							
<i>Surrogate: Bromochloromethane</i>	<i>31.0</i>		<i>"</i>	<i>30.0</i>		<i>103</i>	<i>65-135</i>			
<i>Surrogate: 1,4-Dichlorobutane</i>	<i>33.7</i>		<i>"</i>	<i>30.0</i>		<i>112</i>	<i>65-135</i>			





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

**Volatile Organic Compounds by EPA Method 8021B - Quality Control
Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 0120547 - EPA 5030, waters

LCS (0120547-BS1)

Prepared & Analyzed: 12/27/00

Chlorobenzene	9.87	0.500	ug/l	10.0		98.7	65-135			
1,1-Dichloroethene	10.9	0.500	"	10.0		109	65-135			
Trichloroethene	9.98	0.500	"	10.0		99.8	65-135			
Surrogate: Bromochloromethane	31.4		"	30.0		105	65-135			
Surrogate: 1,4-Dichlorobutane	29.5		"	30.0		98.3	65-135			

LCS (0120547-BS2)

Prepared & Analyzed: 12/28/00

Chlorobenzene	9.92	0.500	ug/l	10.0		99.2	65-135			
1,1-Dichloroethene	10.3	0.500	"	10.0		103	65-135			
Trichloroethene	9.60	0.500	"	10.0		96.0	65-135			
Surrogate: Bromochloromethane	30.4		"	30.0		101	65-135			
Surrogate: 1,4-Dichlorobutane	28.7		"	30.0		95.7	65-135			

LCS (0120547-BS3)

Prepared & Analyzed: 12/29/00

Chlorobenzene	9.74	0.500	ug/l	10.0		97.4	65-135			
1,1-Dichloroethene	9.86	0.500	"	10.0		98.6	65-135			
Trichloroethene	8.89	0.500	"	10.0		88.9	65-135			
Surrogate: Bromochloromethane	29.4		"	30.0		98.0	65-135			
Surrogate: 1,4-Dichlorobutane	30.3		"	30.0		101	65-135			

Matrix Spike (0120547-MS1)

Source: P012463-02

Prepared & Analyzed: 12/27/00

Chlorobenzene	10.0	0.500	ug/l	10.0	ND	100	65-135			
1,1-Dichloroethene	10.2	0.500	"	10.0	ND	102	65-135			
Trichloroethene	9.69	0.500	"	10.0	ND	96.9	65-135			
Surrogate: Bromochloromethane	29.5		"	30.0		98.3	65-135			
Surrogate: 1,4-Dichlorobutane	28.6		"	30.0		95.3	65-135			

Matrix Spike Dup (0120547-MSD1)

Source: P012463-02

Prepared & Analyzed: 12/27/00

Chlorobenzene	10.1	0.500	ug/l	10.0	ND	101	65-135	0.995	20	
1,1-Dichloroethene	10.5	0.500	"	10.0	ND	105	65-135	2.90	20	
Trichloroethene	9.77	0.500	"	10.0	ND	97.7	65-135	0.822	20	
Surrogate: Bromochloromethane	29.2		"	30.0		97.3	65-135			
Surrogate: 1,4-Dichlorobutane	29.8		"	30.0		99.3	65-135			





Delta Environmental Consultants(Rancho Cordova
3164 Gold Camp Drive Ste. 200
Rancho Cordova CA, 95670

Project: ARCO 276, Oakland, CA
Project Number: N/A
Project Manager: Steven Meeks

Reported:
01/05/01 16:32

Notes and Definitions

DET Analyte DETECTED
ND Analyte NOT DETECTED at or above the reporting limit
NR Not Reported
dry Sample results reported on a dry weight basis
RPD Relative Percent Difference



ARCO Facility no. 276		City (Facility) Oakland		Project manager (Consultant) Steve Meeks		Laboratory name Repurva																			
ARCO engineer Paul Supple		Telephone no. (ARCO)		Telephone no. (Consultant) 638-2585		Fax no. (Consultant) 638-8385																			
Consultant name Delta		Address (Consultant) Ronald Cordova		Contract number		Method of shipment																			
Sample I.D.	Lab no.	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 802/EPA 8020	BTEX/TPH EPA 1462/8020/8015	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 418.1/SM503E	EPA 801/8010 Checked	EPA 824/8240	EPA 825/8270	TCLP Metals <input type="checkbox"/> VOC <input type="checkbox"/> VOA <input type="checkbox"/>	Semi Metals <input type="checkbox"/> VOA <input type="checkbox"/> VOA <input type="checkbox"/>	CMI Metals EPA 8210/7000	TTLG <input type="checkbox"/> STL <input type="checkbox"/>	Lead Org. CHS <input type="checkbox"/>	Lead EPA 7420/7421 <input type="checkbox"/>	Special detection Limit/reporting	
			Soil	Water	Other	Ice	Acid																		
MW-1-29		4		X		X	X	12-17-00	1310																50/12/24/1-01
MW-2-29									1400																-02
MW-4-29									1420																-03
MW-E-28		1							1412																-04
TA		2		V		V	V		800																-05
Condition of sample:																							Temperature received: 5°C		
Relinquished by sampler Paul Supple		Date 12-19-00		Time 7:00		Received by John Yarnall		Date 12-19-00		Time 07:30		Received by John Yarnall		Date 12-19-00		Time 7:30		Priority Rush 1 Business Day <input type="checkbox"/>		Rush 2 Business Days <input type="checkbox"/>		Expedited 5 Business Days <input type="checkbox"/>		Standard 10 Business Days <input checked="" type="checkbox"/>	
Relinquished by John Yarnall		Date		Time		Received by		Date		Time		Received by laboratory		Date		Time									

APPENDIX D
Field Data Sheets



3164 Gold Camp Drive, Suite 200
 Rancho Cordova, California 95670
 Direct: (916) 638-2085
 Fax: (916) 638-8385

Arco Site Address: **10600 MacArthur Blvd**
Oakland, California

Arco Site Number: **276**
 Delta Project No.: **D000-300**
 Delta Project PM: **Steve Meeks**
 Date Sampled: **12/17/00**

Arco Project Manager: **Paul Supple**

Site Sampled By: **Doulos**

Site Contact & Phone Number: _____

Water Level Data						Purge Volume Calculations					Sampling Analytes				Sample Record			
Well ID	Time	Depth to Water (feet)	Top of Screen Interval (feet)	Total Depth of Well (feet)	Check if Purge Not Required	Casing Water Column (A)	Well Diameter (Inches)	Multiplier Value (B)	Three Casing Volumes (gallons)	Actual Water Purged (gallons)	PCE (8010) VOA	Other	Other	Other	Dissolved Oxygen (mg/L)	Sample Frequency (A, S, Q)	Sample I.D.	Sample Time
MW-1	13:10	29.16	19.0	38.8	<input checked="" type="checkbox"/>	9.64	2 inch	0.5	4.8	NP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.23	A/11	MW-1	13:10
MW-2	13:26	15.72	15.0	27.6	<input type="checkbox"/>	11.88	4 inch	2.0	23.8	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.14	A/11		
MW-3	13:14	29.78	22.0	38.6	<input checked="" type="checkbox"/>	8.82	2 inch	0.5	4.4	NP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.05	A/11	MW-3	14:00
MW-4	13:18	29.22	25.0	48.3	<input checked="" type="checkbox"/>	19.08	2 inch	0.5	9.5	NP	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2.26	A/11	MW-4	14:20
MW-5	13:22	28.82	32.2	47.0	<input type="checkbox"/>	18.18	4 inch	2.0	36.4	36.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.81	A/11	MW-5	14:12
MW-6	13:30	34.61	37.0	54.1	<input type="checkbox"/>	19.49	2 inch	0.5	9.7	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.17	A/11		
MW-7	13:34	19.94	17.5	55.0	<input type="checkbox"/>	35.06	2 inch	0.5	17.5	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1.36	A/11		
MW-8	13:38	27.02	29.0	47.7	<input type="checkbox"/>	20.68	4 inch	2.0	41.4	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.52	A/11		
RW-1	13:42	29.57	NM	48.9	<input type="checkbox"/>	19.33	6 inch	4.4	85.1	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.47	A/11		
WGR-3	13:46	19.21	22.0	27.5	<input type="checkbox"/>	8.29	4 inch	2.0	16.6	N/A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.98	A/11		
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
					<input type="checkbox"/>						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				

(A)-Casing Water Column: Depth to Bottom - Depth to Water (B)-Multiplier Values: (2" Well: 0.5) (4" Well: 2.0) (6" Well: 4.4) Sampling Sequence: Annual: MW-1, MW-3, MW-4, MW_5

Sampling Notes: List depth of Sample on C.O.C. [i.e. MW-1(30)]. Make Sure to Note on C.O.C. "Provide Lowest Reporting Limit Available." Original Copies of Field Sampling Sheets are Located in Project File
 If the water level is below the top of the screen, take a grab sample and check box for NO PURGE (NP). If the water level is above the screen, purge as normal.



3164 Gold Camp Dr, Suite 200
 Rancho Cordova, California 95670
 Direct: (916) 638-2085
 Fax: (916) 638-8385

Arco Site Address: 10600 MacArthur Blvd
Oakland, California

Arco Site Number: 276

Delta Project No.: D000-300

Arco Project Manager: Paul Supple

Delta Project PM: Steve Meeks

Site Contact & Phone Number: _____

Site Sampled By: Doulos

Date Sampled: 12/17/00

Well ID	Time	Temp °C	pH Units	Sp. Cond.	Gallons	Well ID	Time	Temp °C	pH Units	Sp. Cond.	Gallons	Well ID	Time	Temp °C	pH Units	Sp. Cond.	Gallons		
MW-1	No Purge Required					MW-8	Not Sampled												
MW-2	Not Sampled					RW-1	Not Sampled												
MW-3	No Purge Required					WGR-3	Not Sampled												
MW-4	No Purge Required																		
MW-5	13:50	69.1	6.42	.642															
	13:53	68.3	6.81	673															
	13:57	68.4	6.79	570															
MW-6	Not Sampled																		
MW-7	Not Sampled																		

Notes: _____

Original Copies of Field Sampling Sheets are Located in Project File