Pinnacle
ENVIRONMENTAL SOLUTIONS

a division of EMCON

August 5, 1998
Project 20805-214.001

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

Re: Quarterly Groundwater Monitoring Report, First Quarter 1998, for ARCO Service Station No. 2162, located at 15135 Hesperian Boulevard, San Leandro, California

Dear Mr. Supple:

Pinnacle Environmental Solutions, a division of EMCON (Pinnacle), is submitting the attached report which presents the results of the first quarter 1998 groundwater monitoring program at ARCO Products Company (ARCO) Service Station No. 2162, located at 15135 Hesperian Boulevard, San Leandro, California (see Figure 1). Pertinent site features, including existing monitoring and groundwater extraction wells, are shown in Figure 2.

LIMITATIONS

No monitoring event is thorough enough to describe all geologic and hydrogeologic conditions of interest at a given site. If conditions have not been identified during the monitoring event, results should not be construed as a guarantee of the absence of such conditions at the site, but rather as the product of the scope and limitations of work performed during the monitoring event.

Please call if you have questions.

Sincerely,

Pinnacle

Glen VanderVeen
Project Manager

Jay R. Johnson, R.G.
Senior Project Supervisor

Attachment: Quarterly Groundwater Monitoring Report, First Quarter 1998

cc: Mr. John Jang, Regional Water Quality Control Board - S.F. Bay Region
Mr. Mike Bakaldin, City of San Leandro Fire Department, Hazardous Materials Division
Mr. Scott Seery, Alameda County Health Care Services Agency

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144-A Mayhew Way Walnut Creek, California 94596 (510) 977-9020 (510) 977-9030 Fax

Date: August 5, 1998

ARCO QUARTERLY GROUNDWATER MONITORING REPORT

Facility No.: 2162 Address:	15135 Hesperian Boulevard, San Leandro
ARCO Environmental Engineer:	Paul Supple
Consulting Co./Contact Person:	Pinnacle Environmental Solutions/Glen VanderVeen
Consultant Project No.:	20805-214.001
Primary Agency/Regulatory ID No.:	Alameda County Health Care Services

WORK PERFORMED THIS QUARTER (First - 1998):

1. Prepared and submitted quarterly groundwater monitoring report for fourth quarter 1997.
2. Performed quarterly groundwater monitoring and sampling for first quarter 1998.

WORK PROPOSED FOR NEXT QUARTER (Second - 1998):

1. Prepare and submit quarterly groundwater monitoring report for first quarter 1998.
2. Perform quarterly groundwater monitoring and sampling for second quarter 1998.

QUARTERLY MONITORING:

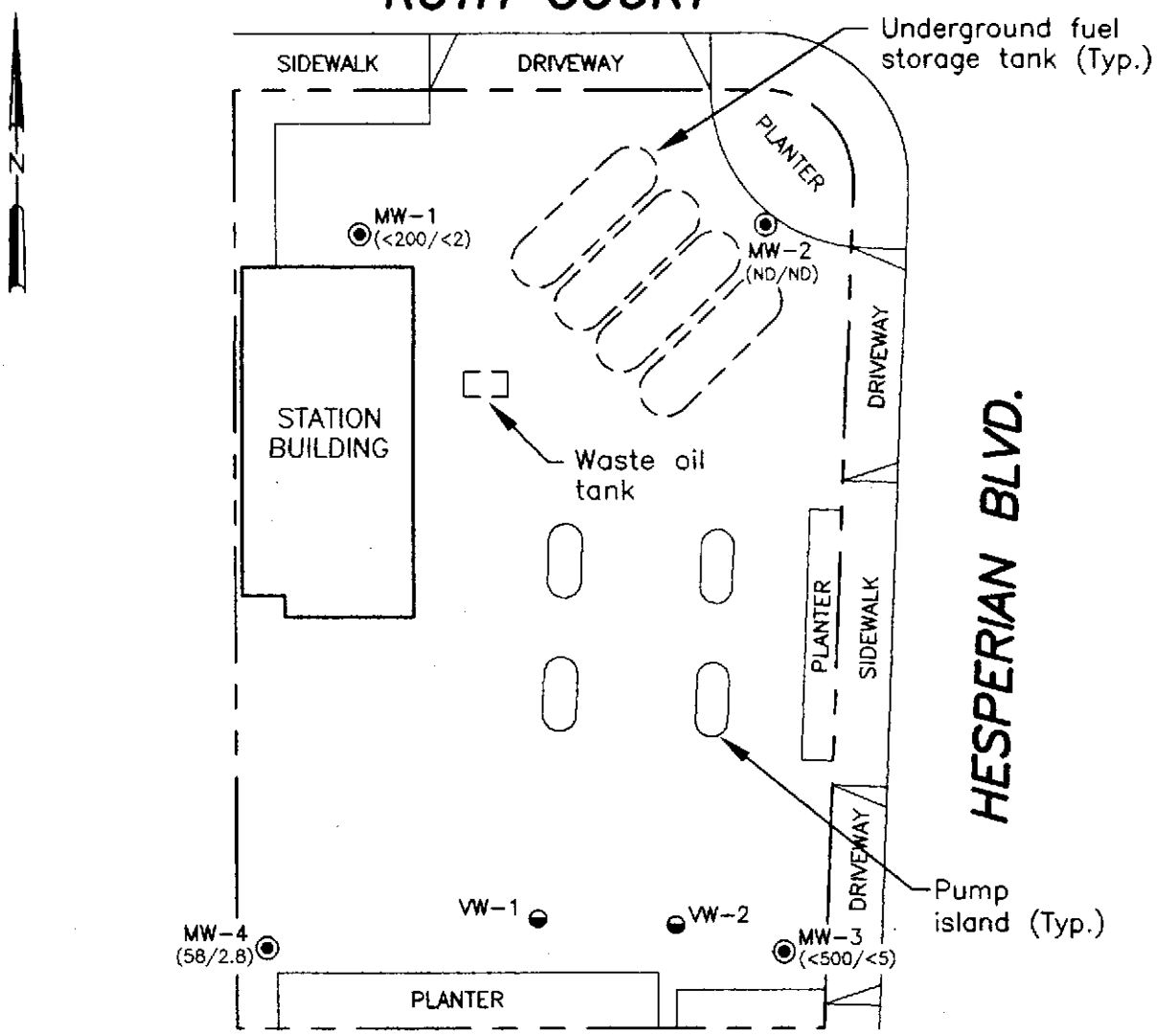
Current Phase of Project:	Monitoring
Frequency of Groundwater Sampling:	Quarterly: MW-1 through MW-4
Frequency of Groundwater Monitoring:	Quarterly
Is Free Product (FP) Present On-Site:	No
FP Recovered this Quarter:	None
Cumulative FP Recovered to Date:	None
Bulk Soil Removed This Quarter:	None
Bulk Soil Removed to Date:	None
Current Remediation Techniques:	Natural Attenuation
Approximate Depth to Groundwater:	**6.8 feet**
Groundwater Gradient (Average):	0.008 toward south-southwest

DISCUSSION:

- TPPH-g and benzene concentrations are consistent with historic levels in all wells sampled.
- Please refer to the Fourth Quarter 1996 Groundwater Monitoring Report for historical groundwater elevation and analytical data.

ATTACHMENTS:

- Figure 1 - Groundwater Analytical Summary Map
- Figure 2 - Groundwater Elevation Contour Map
- Table 1 - Groundwater Elevation and Analytical Data
- Attachment A - Field and Laboratory Procedures
- Attachment B - Certified Analytical Reports, Chain-of-Custody Documentation, and Field Data Sheets



EXPLANATION

- ◉ Groundwater monitoring well
- ◒ Vadose zone monitoring well
- (58/2.8) Concentration of total petroleum hydrocarbons, as gasoline (TPHG) and benzene in groundwater (ug/L); samples were collected on 3/25/98
- ND Not detected at or above the method reporting limit for TPHG (50 ug/L) or benzene (0.5 ug/L)
- < Method reporting limit raised to indicated concentration (ug/L) due to high analyte concentration requiring sample dilution or matrix interference

0 30 60

SCALE IN FEET

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DATE JUNE 1998
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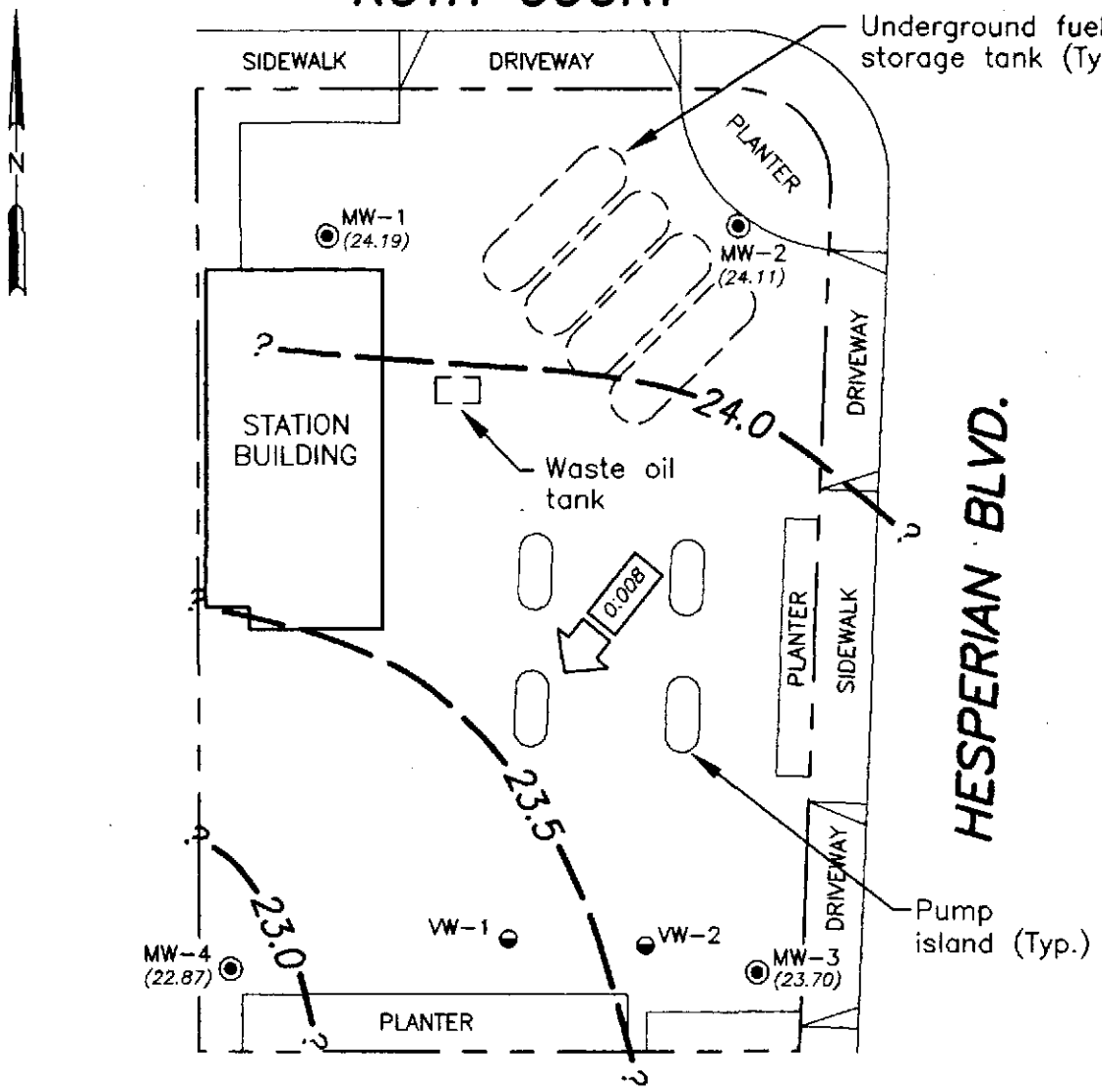
APP
REV 0
PROJECT NO.
805-214.001

FIGURE 1
ARCO PRODUCTS COMPANY
SERVICE STATION 2162, 15135 HESPERIAN BLVD.
SAN LEANDRO, CALIFORNIA
GROUNDWATER ANALYTICAL SUMMARY
1ST QUARTER 1998

EA-SANJOSE-CAD/DRAWINGS: J:\PINACL\2162CHEM.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 7/1/98 Time: 9:33 AM Operator: KJOHNSON



EXPLANATION

- Groundwater monitoring well
- Vadose zone monitoring well
- (23.70) Groundwater elevation (Ft.–MSL); measured 3/25/98
- Groundwater elevation contour (Ft.–MSL)
- Approximate direction of groundwater flow showing gradient

0 30 60

SCALE IN FEET

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DATE JUNE 1998
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APP
REV 0
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805-214.001

FIGURE 2
ARCO PRODUCTS COMPANY
SERVICE STATION 2162, 15135 HESPERIAN BLVD.
SAN LEANDRO, CALIFORNIA
GROUNDWATER ELEVATION CONTOURS
1ST QUARTER 1998

EA-SANJOSE-CAD/DRAWINGS: J:\!\PINACL\2162GWC.dwg Xrefs: <NONE>
Scale: 1 = 30.00 DimScale: 1 = 30.00 Date: 7/1/98 Time: 9:36 AM Operator: KJOHNSON

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

ARCO Service Station 2162
15135 Hesperian Boulevard at Ruth Court
San Leandro, 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)	Xylenes (ppb)	MtBE (ppb)	Dissolved Oxygen (ppm)
MW-1	02/26/96	31.19	7.14	24.05	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	05/23/96		7.70	23.49	<50	<0.50	<0.50	<0.50	<0.50	NA	NA
	08/21/96		8.75	22.44	210	<0.50	<0.50	<0.50	<0.50	<2.5	NA
	11/20/96		8.62	22.57	91	<0.50	<0.50	<0.50	<0.50	2.6	NA
	04/01/97 †		8.70	22.49	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA
	06/10/97 †		8.45	22.74	94	<0.50	<0.50	0.68	0.56	6.4	NA
	09/17/97 †		9.20	21.99	<50	<0.50	<0.50	<0.50	<0.50	10	1.0
	12/12/97 †		8.00	23.19	<200	<2.0	<2.0	<2.0	<2.0	180	2.0
	03/25/98		7.00	24.19	<200^	<2^	<2^	3	<2^	180	2.0
MW-2	02/26/96	30.38	6.41	23.97	770	<0.50	<0.50	45	28	NA	NA
	05/23/96		6.80	23.58	590	0.50	<0.50	35	18	NA	NA
	08/21/96		7.80	22.58	170	<0.50	<0.50	21	6.3	<2.5	NA
	11/20/96		7.73	22.65	88	<0.50	<0.50	7.9	1.1	<2.5	NA
	04/01/97		7.83	22.55	66	<0.50	<0.50	3.6	0.56	33	NA
	06/10/97 †		7.52	22.86	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA
	09/17/97 †		8.24	22.14	<50	<0.50	<0.50	<0.50	<0.50	<3.0	0.6
	12/12/97 †		7.10	23.28	<50	<0.50	<0.50	<0.50	<0.50	<3.0	1.2
	03/25/98		6.27	24.11	<50	<0.50	<0.50	0.7	0.5	55	1.0
MW-3	02/26/96	30.30	6.72	23.58	120	5.0	<0.50	<0.50	<0.50	NA	NA
	05/23/96		7.18	23.12	140	12	<0.50	<0.50	<0.50	NA	NA
	08/21/96		8.17	22.13	<50	1.1	<0.50	<0.50	<0.50	130	NA
	11/20/96		8.03	22.27	55	<0.50	<0.50	<0.50	<0.50	59	NA
	04/01/97 †		8.09	22.21	<50	<0.50	<0.50	<0.50	<0.50	180	NA
	06/10/97 †		7.97	22.33	<50	<0.50	<0.50	<0.50	<0.50	1,900	NA
	09/17/97 †		8.54	21.76	<5,000	<50	<50	<50	<50	1,100	2.2
	09/17/97 *		--	--	--	--	--	--	--	860	--
	12/12/97 †		7.50	22.80	560	<5.0	<5.0	<5.0	5.0	370	1.4
	03/25/98		6.60	23.70	<500^	<5^	<5^	<5^	<5^	470	1.0
MW-4	02/26/96	30.39	7.59	22.80	110	9.9	<0.50	<0.50	<0.50	NA	NA
	05/23/96		8.22	22.17	69	8.0	<0.50	<0.50	<0.50	NA	NA
	08/21/96		9.28	21.11	<50	6.8	<0.50	<0.50	<0.50	<2.5	NA
	11/20/96		9.12	21.27	95	10	0.59	<0.50	0.52	3.8	NA
	04/01/97		8.45	21.94	73	5.7	<0.50	<0.50	<0.50	<2.5	NA
	06/10/97 †		9.00	21.39	<50	<0.50	<0.50	<0.50	<0.50	<2.5	NA
	09/17/97 †		9.76	20.63	<50	3.2	<0.50	<0.50	<0.50	8.0	0.2
	12/12/97 †		8.45	21.94	<50	2.9	<0.50	<0.50	<0.50	14	1.0
	03/25/98		7.52	22.87	58	2.8	<0.5	<0.5	<0.5	<3	3.0

MtBE = Methyl tert-butyl ether
MSL = Mean sea level
TOC = Top of casing
ppb = Parts per billion
ppm = Parts per million
NA = Not analyzed
† = Well subject to the no purge protocol. Please refer to Field and Laboratory Procedures (Attachment A) for details.
* = MtBE confirmed by EPA Method 8240.
< = Less than the laboratory detection limit stated to the right.
^ = The MRL was elevated due to high analyte concentration requiring sample dilution.

ATTACHMENT A
FIELD AND LABORATORY PROCEDURES

Sampling Procedures

The sampling procedure for each well consists first of measuring the water level and checking for the presence of separate-phase hydrocarbons (SPH), using either an electronic indicator and a clear Teflon® bailer or an oil-water interface probe. Wells not containing SPH are then purged of approximately three casing volumes of water (or to dryness) using a centrifugal pump, gas displacement pump, or bailer. Equipment used for the current sampling event is noted on the attached field data sheets. During purging, temperature, pH, and electrical conductivity are monitored in order to document that these parameters are stable prior to collecting samples. After purging, water levels are allowed to partially recover. Groundwater samples are collected using a Teflon® bailer, placed into appropriate EPA-approved containers, labeled, logged onto chain-of-custody documents, and transported on ice to a California State-certified laboratory.

Laboratory Procedures

The groundwater samples were analyzed for the presence of total purgeable petroleum hydrocarbons calculated as gasoline, benzene, toluene, ethylbenzene, xylenes, and methyl tert-butyl ether. The analyses were performed according to EPA Methods 8015 (modified) and 8020 utilizing a purge-and-trap extraction technique. Final detection was by gas chromatography using flame- and photo-ionization detectors. The methods of analysis for the groundwater samples are documented in the certified analytical report. The certified analytical report, chain-of-custody documentation, and field data sheets are presented as Attachment B.

Columbia Analytical Services, Inc.

April 9, 1998 Service Request No.: S9800705

Glen Vanderveen
EMCON
1921 Ringwood Avenue
San Jose, CA 95131

RE: 21775-293.003/TO#22312.00/2162 SAN LEANDRO

Dear Mr. Vanderveen:

The following pages contain analytical results for sample(s) received by the laboratory on March 26, 1998. Results of sample analyses are followed by Appendix A which contains sample custody documentation and quality assurance deliverables requested for this project. The work requested has been assigned the Service Request No. listed above. To help expedite our service, please refer to this number when contacting the laboratory.

Analytical results were produced by procedures consistent with Columbia Analytical Services' (CAS) Quality Assurance Manual (with any deviations noted). Signature of this CAS Analytical Report below confirms that pages 2 through 14, following, have been thoroughly reviewed and approved for release in accord with CAS Standard Operating Procedure ADM-DatRev3.

Please feel welcome to contact me should you have questions or further needs.

Sincerely,

Steven L. Green
Project Chemist

Bernadette T. Cox for
Greg Anderson
Regional QA Coordinator

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)

ACRONLST.DOC 7/14/95

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800705
Project:	21775-293.003/TO#22312.00/2162 SAN LEANDRO	**Date Collected:**	3/25/98
Sample Matrix:	Water	**Date Received:**	3/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-3(8)	Units:	ug/L (ppb)
Lab Code:	S9800705-001	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	10	NA	3/30/98	<500	C1
Benzene	EPA 5030	8020	0.5	10	NA	3/30/98	<5	C1
Toluene	EPA 5030	8020	0.5	10	NA	3/30/98	<5	C1
Ethylbenzene	EPA 5030	8020	0.5	10	NA	3/30/98	<5	C1
Xylenes, Total	EPA 5030	8020	0.5	10	NA	3/30/98	<5	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	10	NA	3/30/98	470	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

1S22/020597p

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800705
Project:	21775-293.003/TO#22312.00/2162 SAN LEANDRO	**Date Collected:**	3/25/98
Sample Matrix:	Water	**Date Received:**	3/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-4(7)	Units:	ug/L (ppb)
Lab Code:	S9800705-002	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/26/98	58	
Benzene	EPA 5030	8020	0.5	1	NA	3/26/98	2.8	
Toluene	EPA 5030	8020	0.5	1	NA	3/26/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/26/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/26/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/26/98	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800705
Project:	21775-293.003/TO#22312.00/2162 SAN LEANDRO	**Date Collected:**	3/25/98
Sample Matrix:	Water	**Date Received:**	3/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-1(7)	Units:	ug/L (ppb)
Lab Code:	S9800705-003	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	4	NA	4/4/98	<200	C1
Benzene	EPA 5030	8020	0.5	4	NA	4/4/98	<2	C1
Toluene	EPA 5030	8020	0.5	4	NA	4/4/98	<2	C1
Ethylbenzene	EPA 5030	8020	0.5	4	NA	4/4/98	3	
Xylenes, Total	EPA 5030	8020	0.5	4	NA	4/4/98	<2	C1
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	4	NA	4/4/98	180	

C1 The MRL was elevated due to high analyte concentration requiring sample dilution.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800705
Project:	21775-293.003/TO#22312.00/2162 SAN LEANDRO	**Date Collected:**	3/25/98
Sample Matrix:	Water	**Date Received:**	3/26/98

BTEX, MTBE and TPH as Gasoline

Sample Name:	MW-2(7)	Units:	ug/L (ppb)
Lab Code:	S9800705-004	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	4/3/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	4/3/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	4/3/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	4/3/98	0.7	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	4/3/98	0.5	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	4/3/98	55	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800705
Project:	21775-293.003/TO#22312.00/2162 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980326-WB2	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/26/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/26/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/26/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/26/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/26/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/26/98	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800705
Project:	21775-293.003/TO#22312.00/2162 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980329-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	3/29/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	3/29/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	3/29/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	3/29/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	3/29/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	3/29/98	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800705
Project:	21775-293.003/TO#22312.00/2162 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980402-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	4/2/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	4/2/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	4/2/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	4/2/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	4/2/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	4/2/98	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ARCO Products Company	**Service Request:**	S9800705
Project:	21775-293.003/TO#22312.00/2162 SAN LEANDRO	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA

BTEX, MTBE and TPH as Gasoline

Sample Name:	Method Blank	Units:	ug/L (ppb)
Lab Code:	S980404-WB1	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	50	1	NA	4/4/98	ND	
Benzene	EPA 5030	8020	0.5	1	NA	4/4/98	ND	
Toluene	EPA 5030	8020	0.5	1	NA	4/4/98	ND	
Ethylbenzene	EPA 5030	8020	0.5	1	NA	4/4/98	ND	
Xylenes, Total	EPA 5030	8020	0.5	1	NA	4/4/98	ND	
Methyl *tert*-Butyl Ether	EPA 5030	8020	3	1	NA	4/4/98	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 21775-293.003/TO#22312.00/2162 SAN LEANDRO
Sample Matrix: Water

Service Request: S9800705
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: NA

Surrogate Recovery Summary
BTEX, MTBE and TPH as Gasoline

Prep Method: EPA 5030
Analysis Method: 8020 *CA/LUFT*

Units: PERCENT
Basis: NA

Sample Name	Lab Code	Test Notes	Percent Recovery 4-Bromofluorobenzene	Percent Recovery a,a,a-Trifluorotoluene
MW-3(8)	S9800705-001		101	88
MW-4(7)	S9800705-002		93	109
MW-1(7)	S9800705-003		101	85
MW-2(7)	S9800705-004		96	82
BATCH QC	S9800701-001MS		93	104
BATCH QC	S9800701-001DMS		92	104
Method Blank	S980326-WB2		92	104
Method Blank	S980329-WB1		96	91
Method Blank	S980402-WB1		103	91
Method Blank	S980404-WB1		98	90

CAS Acceptance Limits: 69-116 69-116

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 21775-293.003/TO#22312.00/2162 SAN LEANDRO
Sample Matrix Water

Service Request: S9800705
Date Collected: NA
Date Received: NA
Date Extracted: NA
Date Analyzed: 3/29/98

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline

Sample Name: BATCH QC
Lab Code: S9800701-001MS, S9800701-001DMS
Test Notes:

Units: ug/L (ppb)
Basis: NA

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Gasoline	EPA 5030	CA/LUFT	50	250	250	ND	240	250	96	100	75-135	4	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: ARCO Products Company
Project: 21775-293.003/TO#22312.00/2162 SAN LEANDRO

Service Request: 89800705
Date Analyzed: 3/26/98

Initial Calibration Verification (ICV) Summary
BTEX, MTBE and TPH as Gasoline

Sample Name: ICV
Lab Code: ICV1
Test Notes:

Units: ug/L (ppb)
Basis: NA

ICV Source:

Analyte	Prep Method	Analysis Method	True Value	Result	CAS Percent Recovery Acceptance Limits	Percent Recovery	Result Notes
TPH as Gasoline	EPA 5030	CA/LUFT	250	250	90-110	100	
Benzene	EPA 5030	8020	25	24	85-115	96	
Toluene	EPA 5030	8020	25	24	85-115	96	
Ethylbenzene	EPA 5030	8020	25	23	85-115	92	
Xylenes, Total	EPA 5030	8020	75	68	85-115	91	
Methyl *tert*-Butyl Ether	EPA 5030	8020	25	24	85-115	96	

ICV032196

TPHVOA PD F

ARCO Products Company

Division of Atlantic/Richfield Company

Task Order No. 22312.00

Chain of Custody

ARCO Facility no. 2162	City (Facility) San Leandro	Project manager (Consultant) Glen Vanderveen	Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300	Fax no. (Consultant) (408) 437-9526
Consultant name EMCON	Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131		Contract Number

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH mod. 8015 EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Semi Metals ☐ VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐			
MW-3 (B)	1	2		X		X	HCl	3/25/98	09:51		X												
MW-4 (A)	2	2		X		X	HCl	3/25/98	09:53		X												
MW-1 (C)	3	2		X		X	HCl	3/25/98	10:36		X												
MW-2 (D)	4	2		X		X	HCl	3/25/98	10:20		X												

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT 8

2-40ml HCl VOAs

21775-293.003

Lab Number: 59800705

Method of shipment: Sampler will deliver

Turnaround Time:

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

Due 4/8/98

Condition of sample:		Temperature received:	
Relinquished by sampler	Date 3/25/98 Time 16:00	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory Ray Courtney CAS	Date 3/26/98 Time 870

Distribution: White Copy – Laboratory: Canary Copy – ARCO Environmental Engineering: Pink Copy – Consultant

R11/03

EMCON - Groundwater Sampling and Analysis Request Form

PROJECT NAME : **ARCO STATION 2162**
15135 Hesperian Blvd., San Leandro

Sampling Project #: **21775-293.003**
Reporting Project #: **?**
OWT Project #: **71044**

DATE REQUESTED : **25-Mar-98**

Project Manager: **Glen Vanderveen**

Groundwater Monitoring Instructions	Treatment System Instructions
Quarterly Monitoring - Third Month of the Quarter Perform a water level survey prior to sampling (see ARCO SOP) **Well survey points are top of well casings.** **Purge three (3) casing volumes.** **You will have to bring 2 drums for purge water transport.** **Please sample well MW-4, even if sheen is present.** Sample each well with a Teflon bailer. Sample ID's on the C-O-C and the sample bottles must include the depth at which the sample was collected [i.e. MW-1 (30)]	**Lisle Rath Pager # (408) 798-2928**

Site Contact: **?** Site Phone: **?** Well Locks: **?**

Well ID or Source	Casing Diameter (inches)	Casing Length (feet)	Top Of Screen (feet)
MW-3	**4.0**	**15.0**	
MW-4	**4.0**	**17.2**	
MW-1	**4.0**	**16.0**	
MW-2	**4.0**	**16.0**	

Above wells in indicated order

Analyses Requested

Depth to Water

Depth to Floating Product

Floating Product Thickness

Total Depth

Well Integrity

Dissolved Oxygen
(Field Measurement)

TPHG/ BTEX/ MTBE by (EPA 8020)
(Fill 2- 40ml HCL VOAs)

If depth to water is below the top of the screen take a grab sample. If the water level is above the top of the screen purge as normal.

Laboratory Instructions:
Provide lowest detection limits possible.
Please use the EMCON Reporting Project Number (**?**) on the CAR.

ND = None Detected IP = Intermitent Product

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : **21775-293.003** STATION ADDRESS : **15135 Hesperian Blvd., San Leandro** DATE : **3/25/98**

ARCO STATION # : **2162** FIELD TECHNICIAN : **Chris Chaco/ Keith Matthews** DAY : **Wednesday**

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket Present	Lock Number	Type Of Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-3	OK	15/16"	Y	ARCO	LWC	6.60	6.60	ND	ND	15.0	
2	MW-4	OK	15/16"	Y	ARCO	LWC	7.52	7.52	ND	ND	17.8	
3	MW-1	OK	15/16"	Y	ARCO	LWC	7.00	7.00	ND	ND	16.0	
4	MW-2	OK	15/16"	Y	ARCO	LWC	6.27	6.27	ND	ND	16.1	

SURVEY POINTS ARE TOP OF WELL CASINGS

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-293.003 SAMPLE ID: MW-1(7)

PURGED BY: Chaco / Mathews CLIENT NAME: ARCO 2162

SAMPLED BY: ↓ LOCATION: San Leandro

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ~ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	5-88
DEPTH TO WATER (feet):	7.00	CALCULATED PURGE (gal.):	17.64
DEPTH OF WELL (feet):	16.00	ACTUAL PURGE VOL. (gal.):	18.0

DATE PURGED: 3-25-98 Start (2400 Hr) 10:12 End (2400 Hr) 10:16

DATE SAMPLED: 3-25-98 Start (2400 Hr) — End (2400 Hr) 10:20

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
10:12	6	7.26	857	65.2	Brown	Hvy
10:14	12	7.21	853	68.4	"	"
10:16	18	7.22	847	68.4	"	"

D. O. (ppm): 2.0 ODOR: Strong — —

(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: —

Parameters field filtered at this well: —

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	~ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 1 of 4

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-293.003 SAMPLE ID: MW-2 (7)

PURGED BY: Chaco / Mathews CLIENT NAME: ARCO 2162

SAMPLED BY: " LOCATION: San Leandro

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	6.42
DEPTH TO WATER (feet):	6.27	CALCULATED PURGE (gal.):	19.26
DEPTH OF WELL (feet):	14.1	ACTUAL PURGE VOL. (gal.):	20

DATE PURGED: 3-25-98 Start (2400 Hr) 10:25 End (2400 Hr) 10:33

DATE SAMPLED: ↓ Start (2400 Hr) — End (2400 Hr) 10:36

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
10:29	6	7.22	860	65.4	Cloudy	Light
10:31	7	7.20	868	6.50	"	"
10:33	7	7.21	852	6.49	"	"

D. O. (ppm): 1 ODOR: None

(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: —

Parameters field filtered at this well: —

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	✓ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: good LOCK #: ARCO

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 2 of 4

Rev. 3, 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-293.003 SAMPLE ID: MW-3 (8)

PURGED BY: Chace/Mathews CLIENT NAME: ARCO ~~Mobil~~ -2162

SAMPLED BY: Chace/Mathews LOCATION: San Leandro

TYPE: Ground Water ✓ Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 ✓ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 5.48

DEPTH TO WATER (feet): 6.60 CALCULATED PURGE (gal.): 16.46

DEPTH OF WELL (feet): 15.0 ACTUAL PURGE VOL. (gal.): 17.0

DATE PURGED: 3-25-98 Start (2400 Hr) 0925 End (2400 Hr) 09:30

DATE SAMPLED: ✓ Start (2400 Hr) 09:31 End (2400 Hr) ~~0945~~

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0925	5.0	6.76	846	68.2	Cloudy	Hvy
0927	11.0	6.93	842	68.3	"	mod
0930	17.0	6.96	850	68.5	"	mod

D. O. (ppm): 0-1 ODOR: None

(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: —

Parameters field filtered at this well: —

PURGING EQUIPMENT

___ 2" Bladder Pump ___ Bailer (Teflon®)
___ Centrifugal Pump ✓ Bailer (PVC)
___ Submersible Pump ___ Bailer (Stainless Steel)
___ Well Wizard™ ___ Dedicated
Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)
___ DDL Sampler ___ Bailer (Stainless Steel)
___ Dipper ___ Submersible Pump
___ Well Wizard™ ___ Dedicated
Other: ___

WELL INTEGRITY: Good LOCK #: Arco

REMARKS: Good

Meter Calibration: Date: 3-25-98 Time: 09:00 Meter Serial #: 272 Temperature °F: 63.4

(EC 1000 996 / 1000) (DI ___) (pH 7 688 / 700) (pH 10 1002 / 1000) (pH 4 407 / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 3 of 4

Rev. 3. 2/94

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 21775-293.003 SAMPLE ID: MW-4 (7)

PURGED BY: Chaco/Mathews CLIENT NAME: ARCO 2162

SAMPLED BY: ↓ LOCATION: San Leandro

TYPE: Ground Water X Surface Water ___ Treatment Effluent ___ Other ___

CASING DIAMETER (inches): 2 ___ 3 ___ 4 X 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): ~~5.046~~ 4.71

DEPTH TO WATER (feet): 7.52 CALCULATED PURGE (gal.): 20.14

DEPTH OF WELL (feet): 17.8 ACTUAL PURGE VOL. (gal.): ~~20.02~~

DATE PURGED: 3-25-98 Start (2400 Hr) 09:45 End (2400 Hr) 0952

DATE SAMPLED: ↓ Start (2400 Hr) — End (2400 Hr) 0955

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0947	7	6.96	744	65.9	Brown	Hvy
0950	14	7.02	826	65.1	Cloudy	Mod
0952	21	7.08	840	65.1	Cloudy	Light

D. O. (ppm): 3 ODOR: None — —

(COBALT 0 - 500) (NTU 0 - 200 or 0 - 1000)

Field QC samples collected at this well: —

Parameters field filtered at this well: —

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	✓ Bailer (Teflon®)
___ Centrifugal Pump	✓ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: ___		Other: ___	

WELL INTEGRITY: Good LOCK #: ARCO

REMARKS: Noticable Sheen

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

(EC 1000 ___ / ___) (DI ___) (pH 7 ___ / ___) (pH 10 ___ / ___) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: Kent Matthews Reviewed By: [illegible] Page 1 of 1

EMCON Associates - Field Services | Historical Monitoring Well Data

1921 Ringwood Avenue | 1998 | ARCO 2162

San Jose, California | 21775-293.003

Well ID	Quarter	Date	Purge Volume (gallons)	Did well dry	Well Contained Product	
						Gallons
						First 56.00
						Second 0.00
						Third 0.00
						Fourth 0.00
MW-1	First Second Third Fourth	03/25/98	7.00	NO	NO	
MW-2	First Second Third Fourth	03/25/98	20.00	NO	NO	
MW-3	First Second Third Fourth	03/25/98	8.00	NO	NO	
MW-4	First Second Third Fourth	03/25/98	21.00	NO	NO	
	First Second Third Fourth					
	First Second Third Fourth					
	First Second Third Fourth					
	First Second Third Fourth					
	First Second Third Fourth					
	First Second Third Fourth					Steam water (gal) _____

ARCO Products Company
Division of Atlantic/Richfield Company

Task Order No. 22312.00

Chain of Custody

ARCO Facility no. 2162	City (Facility) San Leandro	Project manager (Consultant) Glen Vanderveen	Laboratory Name CAS
ARCO engineer Paul Supple	Telephone no. (ARCO)	Telephone no. (Consultant) (408) 453-7300 / Fax no. (Consultant) (408) 437-9526	Contract Number
Consultant name EMCON		Address (Consultant) 1921 Ringwood Ave. San Jose, CA 95131	

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH Gas EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM 503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org/DHS ☐ Lead EPA 7420/7421 ☐			
MW-3 (8)		2		X		X	HCL	3/25/98	09:31		X												
MW-4 (?)		2		X		X	HCL	3/25/98	09:55		X												
MW-1 (?)		2		X		X	HCL	3/25/98	10:35		X												
MW-2 (?)		2		X		X	HCL	3/25/98	10:30		X												

Method of shipment: Sampler will deliver

Special Detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: RAT-? 2-40ml HCL VOAs

21775-293.003

Lab Number

Turnaround Time:

Priority Rush 1 Business Day ☐

Rush 2 Business Days ☐

Expedited 5 Business Days ☐

Standard 10 Business Days ☒

Condition of sample:		Temperature received:	
Relinquished by sampler [signature]	Date 3/25/98 Time 16:00	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory [signature] CAS	Date 3/26/98 Time 810

Distribution: White Copy – Laboratory: Canary Copy – ARCO Environmental Engineering: Pink Copy – Consultant