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3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING AND REMEDIATION PERFORMANCE EVALUATION

Fourth Quarter 1993
at
ARCO Station 2152
22141 Center Street
Castro Valley, California

69013.17

3-3-94

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March 3, 1994

Mr. Michael Whelan
Environmental Engineer
ARCO Products Company
P.O. Box 5811
San Mateo, California 94402

Subject: Letter Report, Quarterly Groundwater Monitoring and Remediation Performance Evaluation, Fourth Quarter 1993
ARCO Station 2152
22141 Center Street, Castro Valley, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) presents this letter report summarizing the results of Fourth Quarter 1993 Groundwater Monitoring performed by EMCON Associates (EMCON) of San Jose, California, and the operation and maintenance performed by RESNA, at the above-referenced site (Plates 1 and 2). RESNA's scope of work was to interpret field and laboratory analytical data, which included evaluating trends in hydrocarbon concentrations in the local groundwater, the groundwater gradient, and direction of groundwater flow beneath the site. Evaluation and warrant of EMCON's field procedures, field data, and field protocols, is beyond RESNA's scope of work. Previous environmental work at the site is summarized in RESNA's reports cited in the Reference section.

GROUNDWATER MONITORING

Field Work

EMCON field personnel were onsite October 29, 1993, to measure depth-to-water (DTW) levels, perform subjective analysis for the presence of product in groundwater, and perform

quarterly sampling of monitoring wells MW-1 through MW-4, and vapor extraction wells VW-2 through VW-4. Vapor well VW-5 was not monitored because a large bin was placed over the well.

Laboratory Analyses

Water samples were analyzed by Columbia Analytical Services, Inc., located in San Jose, California (Hazardous Waste Testing Laboratory Certification #1426) for benzene, toluene, ethylbenzene, and total xylenes (BTEX), and total petroleum hydrocarbons as gasoline (TPHg) using Environmental Protection Agency (EPA) Methods 5030/8020/California DHS LUFT Method. The Chain of Custody Records and Laboratory Analysis Reports are included in Appendix A.

Results of Groundwater Monitoring

Groundwater elevations fell an average of about 0.31 foot in wells MW-1 through MW-4 since the last quarter. Evidence of floating product or product sheen was not noted in any of the wells during this quarter. Based on the October 29, 1993, DTW data, groundwater is interpreted to flow toward the southwest with a gradient of approximately 0.003 ft/ft (Plate 3). Groundwater monitoring data from this and previous quarters is presented in Table 1. The results of EMCON's field work on the site are presented in Appendix A.

Concentrations of TPHg and BTEX continue to be not detected in wells MW-1 through MW-4, as they have been since the October 15, 1991, monitoring event.

REMEDIATION SYSTEM

Field Work

RESNA field personnel did not perform operations and maintenance activities during this quarter as the vapor extraction system continues to be inoperable.

Previous and Future Work

Fourth Quarter 1993

- Submitted Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1993, to ARCO and regulatory agencies.

- Performed Fourth Quarter 1993 Groundwater Monitoring.

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First Quarter 1994

- Submit Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1993, to ARCO and regulatory agencies.

- Attempt to restart the interim vapor extraction system.

- Perform First Quarter 1994 Groundwater Monitoring.

Reporting Requirements

RESNA recommends that copies of this report be forwarded to:

Mr. Scott Seery
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Mr. Richard Hiett
Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

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If you have any questions or comments, please call us at (408) 264-7723.

Sincerely,
RESNA Industries Inc.

Erin D. Krueger
Staff Geologist

James L. Nelson, C.E.G. 1463
Certified Engineering Geologist

REGISTERED GEOLOGIST
JAMES LEWIS NELSON
No. 1463
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, October 29, 1993
Plate 4, TPHg/Benzene Concentrations in Groundwater, October 29, 1993

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Groundwater Samples

Appendix A: EMCON's Field Report Depth to Water/Floating Product Survey, Summary of Groundwater Monitoring Data, Certified Analytical Report with Chain-of-Custody, and Water Sample Field Data Sheets.

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REFERENCES

RESNA. October 8, 1991. Supplemental Subsurface and Remedial Investigation at ARCO Station 2152, 22141 Center Street, Castro Valley, California, AGS 69013-5.

RESNA. November 2, 1993. Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1993, 22141 Center Street, Castro Valley, California, 69013.17.

Base: U.S. Geological Survey
7.5–Minute Quadrangles
Hayward, California.
Photorevised 1980

N

LEGEND

⊙ = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

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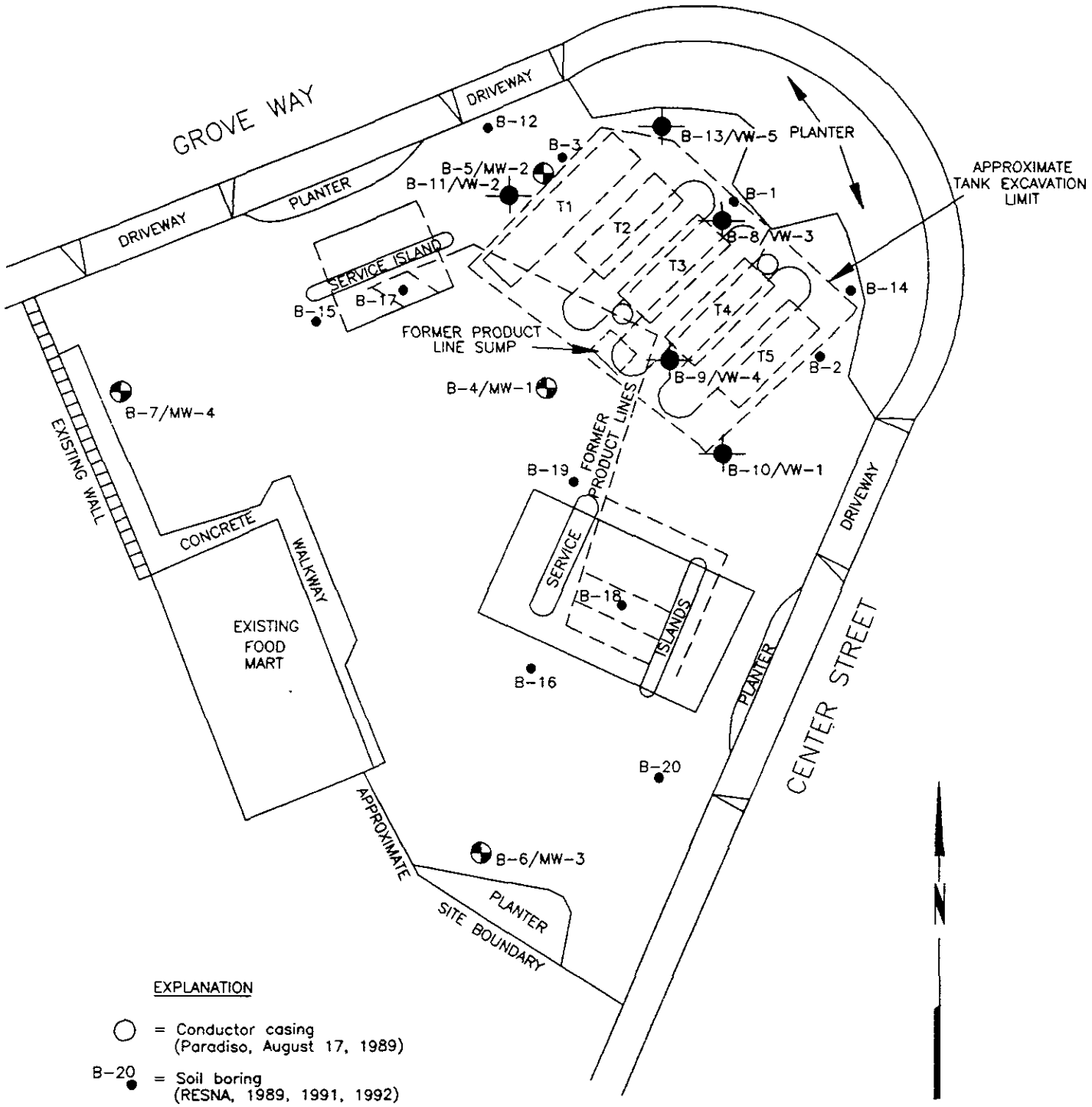
SITE VICINITY MAP
ARCO Station 2152
22141 Center Steet
Castro Valley, California

PLATE
1



EXPLANATION

- ○ = Conductor casing (Paradiso, August 17, 1989)
- B-20 ● = Soil boring (RESNA, 1989, 1991, 1992)
- B-6/MW-3 ◔ = Boring/monitoring well (RESNA, 1989, 1990)
- B-13/VW-5 —●— = Boring/vapor extraction well (RESNA, June 1990)
- T5 = Former underground gasoline-storage tanks
- ⊂⊃ = Present underground gasoline-storage tanks

30 15 0 30 60

Approximate Scale in Feet

Source: Surveyed by Ron Archer Civil Engineer, Inc.

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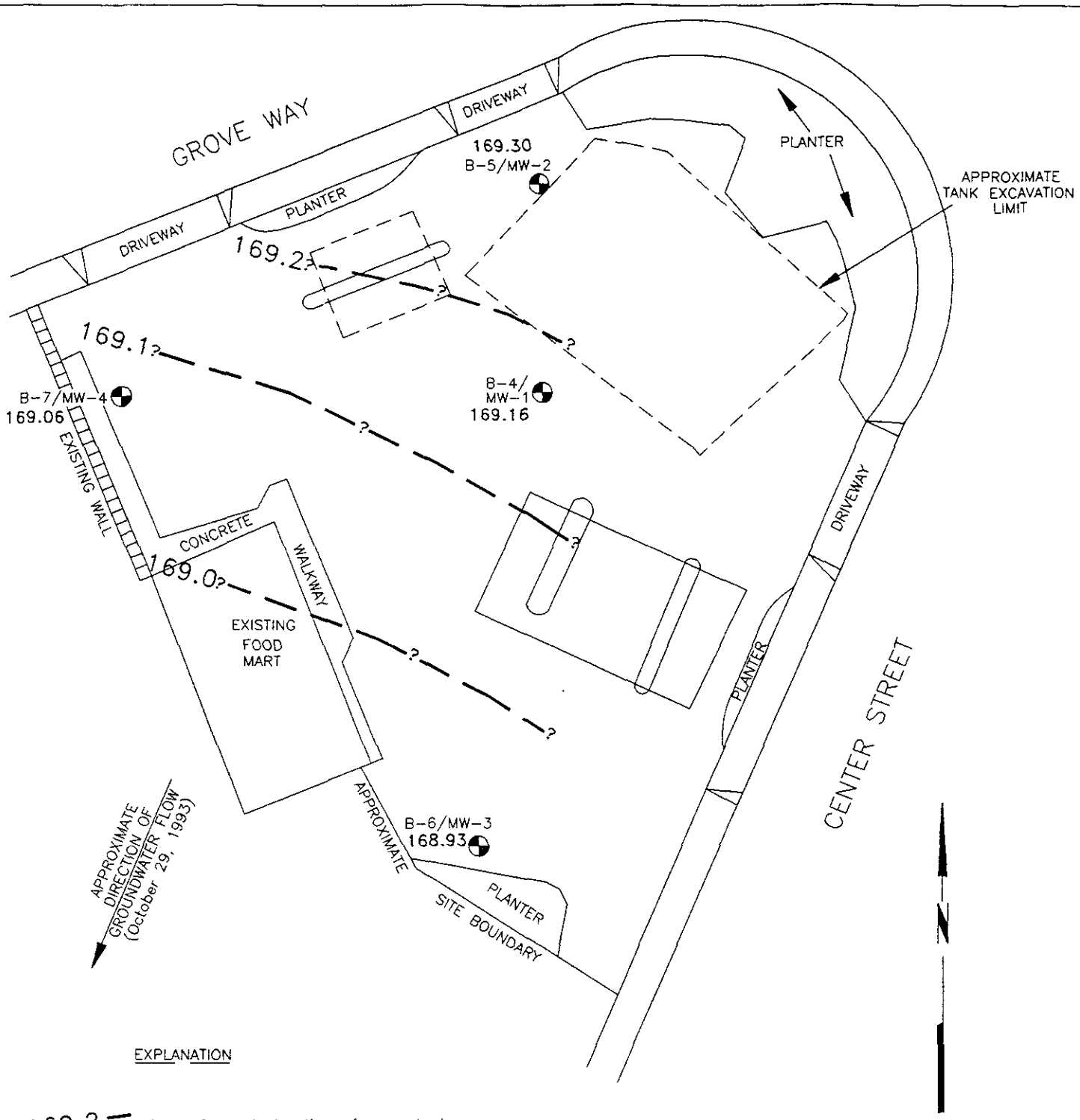
GENERALIZED SITE PLAN
ARCO Station 2152
22141 Center Street
Castro Valley, California

PLATE 2



EXPLANATION

169.2 — = Line of equal elevation of groundwater above mean sea level (MSL)

169.30 = Elevation of groundwater in feet (MSL) October 29, 1993

B-7/MW-4 = Boring/monitoring well (RESNA, 1989, 1990)

30 15 0 30 60

Approximate Scale in Feet

Source: Surveyed by Ron Archer Civil Engineer, Inc

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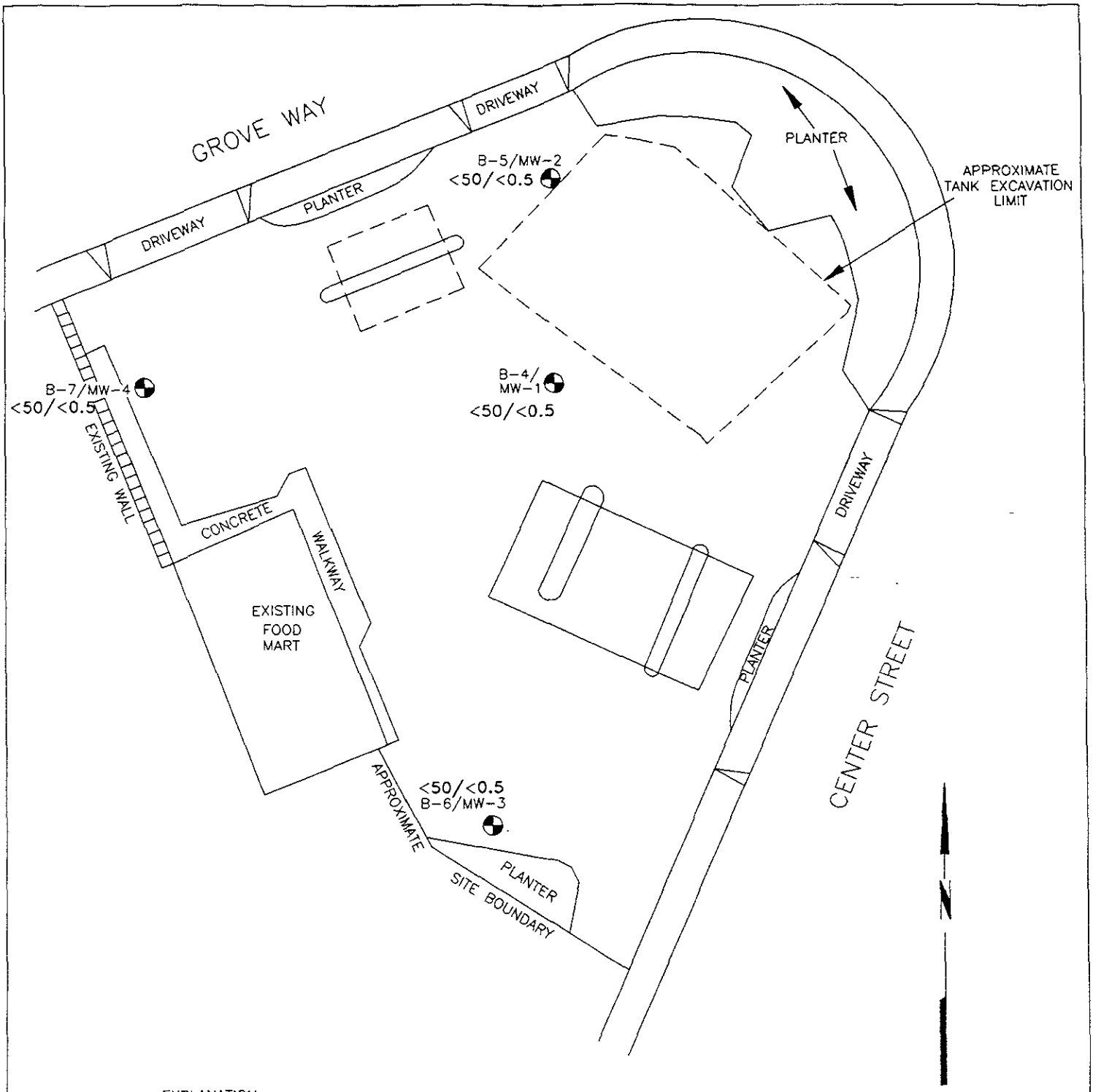
GROUNDWATER GRADIENT MAP

ARCO Station 2152
22141 Center Street
Castro Valley, California

PLATE 3



EXPLANATION

<50/<0.5 = Concentrations of TPHg/Benzene in groundwater in parts per billion, October 29, 1993

B-7/MW-4 = Boring/monitoring well (RESNA, 1989, 1990)

30 15 0 30 60

Approximate Scale in Feet

Source Surveyed by Ron Archer Civil Engineer, Inc.

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TPHg/BENZENE CONCENTRATIONS
IN GROUNDWATER
ARCO Station 2152
22141 Center Street
Castro Valley, California

PLATE
4

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2152
Castro Valley, California
(Page 1 of 5)

Well Measured Date	Depth of Well	Well Elevation	Static Water Depth	Water Elevation
MW-1				
06/25/90	58.10	217.16	49.80	167.36
09/07/90			50.00	167.16
09/26/90			50.09	167.07
12/14/90			50.44	166.72
01/08/91			50.45	166.71
02/21/91			50.51	166.65
03/19/91			50.16	167.00
04/02/91			50.14	167.02
05/02/91	57.80		49.77	167.39
06/18/91			49.75	167.41
07/08/91			49.80	167.36
08/22/91			50.08	167.08
09/18/91			50.11	167.05
10/15/91			50.30	166.86
11/13/91			50.30	166.86
12/27/91			50.28	166.88
01/18/92			50.39	166.77
02/20/92			50.16	167.00
03/13/92			49.75	167.41
04/24/92			49.18	167.98
05/15/92			49.22	167.94
06/08/92			49.3*	167.9*
07/25/92			49.42	167.74
08/23/92			49.52	167.64
09/04/92			49.71	167.45
10/19/92			49.98	167.18
11/23/92			50.10	167.06
12/18/92			50.29	166.87
01/14/93			49.81	167.35
02/24/93			48.71	168.45
03/30/93			48.02	169.14
04/09/93			47.81	169.35
07/30/93			47.61	169.55
10/29/93			48.00	169.16
MW-2				
06/25/90	59.20	216.50	49.04	167.46
09/07/90			49.22	167.28
09/26/90			49.32	167.18

See notes on Page 5 of 5.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2152
Castro Valley, California
(Page 2 of 5)

Well Measured Date	Depth of Well	Well Elevation	Static Water Depth	Water Elevation
MW-2 (cont.)				
12/14/90			49.66	166.84
01/08/91			49.72	166.78
02/21/91			49.77	166.73
03/19/91			49 44	167.06
04/02/91			49.43	167.07
05/02/91	58.90		49.03	167.47
06/18/91			48.98	167.52
07/08/91			49.03	167.47
08/22/91			49.30	167.20
09/18/91			49.34	167.16
10/15/91			49.51	166.99
11/13/91			49.53	166.97
12/27/91			49.49	167.01
01/18/92			49.60	166.90
02/20/92			49.39	167.11
03/13/92			48.97	167.53
04/24/92			48.47	168.03
05/15/92			48.47	168.03
06/08/92			48.5*	168.0*
07/25/92			48.52	167.98
08/23/92			44.95	171.55
09/04/92			48.95	167.55
10/19/92			49.20	167.30
11/23/92			49.35	167.15
12/18/92			49.57	166.93
01/14/93			49.10	167.40
02/24/93			47.86	168.64
03/30/93			47.17	169.33
04/09/93			47.02	169.48
07/30/93			46.80	169.70
10/29/93			47.20	169.30
MW-3				
06/25/90	59.70	217.57	50.55	167.02
09/07/90			50.73	166.84
09/26/90			50.81	166.76
12/14/90			51.15	166.42
01/08/91			51.16	166.41
02/21/91			51.21	166.36

See notes on Page 5 of 5.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2152
Castro Valley, California
(Page 3 of 5)

Well Measured Date	Depth of Well	Well Elevation	Static Water Depth	Water Elevation
MW-3 (cont.)				
03/19/91			50.93	166.64
04/02/91			50.92	166.65
05/02/91	59.34		50.51	167.06
06/18/91			50.47	167.10
07/08/91			50.54	167.03
08/22/91			50.80	166.77
09/18/91			50.82	166.75
10/15/91			51.02	166.55
11/13/91			51.03	166.54
12/27/91			51.01	166.56
01/18/92			51.15	166.42
02/20/92			50.84	166.73
03/13/92			50.39	167.18
04/24/92			49.82	167.75
05/15/92			49.90	167.67
07/25/92			50.14	167.43
08/23/92			50.12	167.45
09/04/92			50.38	167.19
10/19/92			50.71	166.86
11/23/92			50.81	166.76
12/18/92			50.50	167.07
01/14/93		Well inaccessible due to construction		
02/24/93		Well inaccessible due to construction		
03/30/93			48.82	168.75
04/09/93			48.71	168.86
07/30/93			48.33	169.24
10/29/93			48.64	168.93
MW-4				
06/25/90	60.30	215.18	48.06	167.12
09/07/90			48.25	166.93
09/26/90			48.35	166.83
12/14/90			48.68	166.50
01/08/91			48.70	166.48
02/21/91			48.76	166.42
03/19/91			48.44	166.74
04/02/91			48.43	166.75
05/02/91	60.00		48.04	167.14
06/18/91			48.00	167.18

See notes on Page 5 of 5.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2152
Castro Valley, California
(Page 4 of 5)

Well Measured Date	Depth of Well	Well Elevation	Static Water Depth	Water Elevation
MW-4 (cont.)				
07/08/91			48.04	167.14
08/22/91			48.34	166.84
09/18/91			48.35	166.83
10/15/91			48.54	166.64
11/13/91			48.56	166.62
12/27/91			48.52	166.66
01/18/92			48.68	166.50
02/20/92			48.37	166.81
03/13/92			47.96	167.22
04/24/92			47.41	167.77
05/15/92			47.46	167.72
06/08/92			47.52	167.66
07/25/92			47.67	167.51
08/23/92			47.78	167.40
09/04/92			47.78	167.40
10/19/92			48.22	166.96
11/23/92			48.34	166.84
12/18/92			48.50	166.68
01/14/93			48.03	167.15
02/24/93			46.95	168.23
03/30/93			46.25	168.93
04/09/93			46.18	169.00
07/30/93			45.96	169.22
10/29/93			46.12	169.06
VW-2				
02/24/93	38.5	216.38	38.28	residual water
03/30/93			38.32	residual water
04/09/93			38.33	residual water
07/30/93			38.36	residual water
10/29/93			Dry	Dry
VW-3				
02/24/93	NR	not surveyed	NR	NR
03/30/93	38.3		38.27	residual water
04/09/93			not accessible	
07/30/93			Dry	Dry
10/29/93			Dry	Dry

See notes on Page 5 of 5.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 2152
Castro Valley, California
(Page 5 of 5)

Well Measured Date	Depth of Well	Well Elevation	Static Water Depth	Water Elevation
VW-4				
02/24/93	26.9	not surveyed	Dry	Dry
03/30/93	26.8		Dry	Dry
04/09/93			Dry	Dry
07/30/93			Dry	Dry
10/29/93			residual water	
VW-5				
02/24/93	37.5	not surveyed	35.22	-
03/30/93			Dry	Dry
04/09/93			not accessible	
07/30/93			Dry	Dry
10/29/93			not accessible	

Depth measurements in feet. Water elevation is mean sea level.
Static water level measured in feet below top of casing.
* = Depth to water measurements reported to tenth of 1 foot on EMCON's field sheets.
NR = No Record

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES
OF GROUNDWATER SAMPLES
ARCO Station 2152
Castro Valley, California
(Page 1 of 2)

Well	Date	TPHg	B	T	E	X
MW-1	06/26/90	64	0.63	<0.50	<0.50	<0.50
	09/26/90	<50	<0.50	<0.50	<0.50	<0.50
	01/08/91	<50	<0.50	<0.50	<0.50	<0.50
	04/02/91	<50	<0.05	<0.05	<0.05	<0.05
	07/08/91	120	2.3	4.6	1.3	9.6
	10/15/91	<30	<0.30	<0.30	<0.30	<0.30
	03/13/92	<30	<0.30	<0.30	<0.30	<0.30
	06/08/92	<30	<0.30	<0.30	<0.30	<0.30
	09/04/92	<50	<0.5	<0.5	<0.5	<0.5
	10/19/92	<50	<0.5	<0.5	<0.5	<0.5
	01/14/93	<50	<0.50	<0.50	<0.50	<0.50
	04/09/93	<50	<0.5	<0.5	<0.5	<0.5
	07/30/93	<50	<0.50	<0.50	<0.50	<0.50
	10/29/93	<50	<0.50	<0.50	<0.50	<0.50
MW-2	06/26/90	27	<0.50	<0.50	<0.50	<0.50
	09/26/90	<50	<0.50	<0.50	<0.50	<0.50
	01/08/91	<50	<0.50	<0.50	<0.50	<0.50
	04/02/91	<50	<0.05	<0.05	<0.05	<0.05
	07/08/91	30	0.42	0.47	<0.30	0.89
	10/15/91	<30	<0.30	<0.30	<0.30	<0.30
	03/13/92	<30	<0.30	<0.30	<0.30	<0.30
	06/08/92	<30	<0.30	<0.30	<0.30	<0.30
	09/04/92	<50	<0.5	<0.5	<0.5	<0.5
	10/19/92	<50	<0.5	<0.5	<0.5	<0.5
	01/14/93	<50	<0.50	<0.50	<0.50	<0.50
	04/09/93	<50	<0.5	<0.5	<0.5	<0.5
	07/30/93	<50	<0.50	<0.50	<0.50	<0.50
	10/29/93	<50	<0.50	<0.50	<0.50	<0.50
MW-3	06/25/90	52	0.65	1.5	<0.50	2.0
	09/26/90	<50	<0.50	<0.50	<0.50	<0.50
	01/08/91	<50	<0.50	<0.50	<0.50	<0.50
	04/02/91	<50	<0.05	<0.05	<0.05	<0.05
	07/08/91	67	0.69	1.5	0.65	4.7
	10/15/91	<30	<0.30	<0.30	<0.30	<0.30
	04/13/92	<30	<0.30	<0.30	<0.30	<0.30
	06/08/92	<30	<0.30	<0.30	<0.30	<0.30
	09/04/92	<50	<0.5	<0.5	<0.5	<0.5
	10/19/92	<50	<0.5	<0.5	<0.5	<0.5

See notes on Page 2 of 2.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES
OF GROUNDWATER SAMPLES
ARCO Station 2152
Castro Valley, California
(Page 2 of 2)

Well	Date	TPHg	B	T	E	X
MW-3 cont.	01/14/93	NS	NS	NS	NS	NS
	04/09/93	<50	<0.5	<0.5	<0.5	<0.5
	07/30/93	<50	<0.50	<0.50	<0.50	<0.50
	10/29/93	<50	<0.50	<0.50	<0.50	<0.50
MW-4	06/25/90	<20	<0.50	<0.50	<0.50	<0.50
	09/26/90	<50	<0.50	<0.50	<0.50	<0.50
	01/08/91	<50	<0.50	<0.50	<0.50	<0.50
	04/02/91	<50	<0.05	<0.05	<0.05	<0.05
	07/08/91	50	1.4	2.4	0.62	4.2
	10/15/91	<30	<0.30	<0.30	<0.30	<0.30
	03/13/92	<30	<0.30	<0.30	<0.30	<0.30
	06/08/92	<30	<0.30	<0.30	<0.30	<0.30
	09/04/92	<50	<0.5	<0.5	<0.5	<0.5
	10/19/92	<50	<0.5	<0.5	<0.5	<0.5
	01/14/93	<50	<0.50	<0.50	<0.50	<0.50
	04/09/93	<50	<0.5	<0.5	<0.5	<0.5
	07/30/93	<50	<0.50	<0.50	<0.50	<0.50
	10/29/93	<50	<0.50	<0.50	<0.50	<0.50

Results in parts per billion (ppb).
TPHg: Total petroleum hydrocarbons as gasoline
B:benzene T:toluene E:ethylbenzene X:total xylene isomers
NA: Not Analyzed
<: Less than detection limit

APPENDIX A

EMCON'S FIELD REPORT
DEPTH TO WATER/FLOATING PRODUCT SURVEY,
SUMMARY OF GROUNDWATER MONITORING DATA,
CERTIFIED ANALYTICAL REPORTS WITH CHAIN-OF-CUSTODY,
AND WATER SAMPLE FIELD DATA SHEETS

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3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
FAX: (408) 264-2435

TRANSMITTAL

TO: Mr. Scott Seery
Alameda County Health Care
Services Agency
80 Swan Way, Room 200
Oakland, California 94621

DATE: March 4, 1994
PROJECT NUMBER: 69013.17
SUBJECT: ARCO Station 2152

FROM: Erin D. Krueger

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	03/03/94	Letter Report, Quarterly Groundwater Monitoring and Remediation Performance Evaluation, Fourth Quarter 1993 at ARCO Station 2152, 22141 Center Street, Castro Valley, California.

THESE ARE TRANSMITTED as checked below:

[ ] For review and comment	[ ] Approved as submitted	[ ] Resubmit ___ copies for approval
[X] As requested	[ ] Approved as noted	[ ] Submit___ copies for distribution
[ ] For approval	[ ] Return for corrections	[ ] Return ___ corrected prints
[X] For your files	[ ] Regular Mail	[X] Certified Mail

REMARKS:
Copies: 1 to RESNA project file no. 69013.17

Erin D. Krueger, Staff Geologist

cc: Mr. Michael Whelan, ARCO
Mr. Richard Hiett, CRWQCB

6013.17

EMCON Associates

1921 Ringwood Avenue • San Jose, California 95131-1721 • **(408) 453-7300** • Fax (408) 437-9526

RECEIVED

RESNA
SAN JOSE

Date November 16, 1993
Project 0G70-026.01

To:
Mr. John Young
RESNA
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	Depth To Water / Floating Product Survey Results
1	Summary of Groundwater Monitoring Data
1	Certified Analytical Reports with Chain-of-Custody
4	Water Sample Field Data Sheets

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the fourth quarter 1993 monitoring event at ARCO service station 2152, 22141 Center Street, Castro Valley, California. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions: (408) 453-7300.

Jim Butera

Reviewed by:

REG: 4021
EXP 6/30/96
INDUSTRIAL
STATE OF CALIFORNIA

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-026.01 STATION ADDRESS : 22141 Center Street, Castro Valley DATE : FRIDAY 10-29-93

ARCO STATION # : 2152 FIELD TECHNICIAN : [illegible] DAY : 10 [illegible] 93

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking 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-1	OK	YES	OK	3259	OK	45.00	48.00	ND	ND	58.0	—
2	MW-2	OK	YES	OK	3259	OK	47.20	47.20	ND	ND	59.1	—
3	MW-3	OK	YES	OK	3259	OK	48.64	48.64	ND	ND	59.6	—
4	MW-4	OK	YES	OK	3259	OK	46.12	46.12	ND	ND	60.2	NEED diversified Allen wrench water meter is locked
5	VW-2	OK	YES	OK	3259	OK	DRY	DRY	ND	ND	38.55	
6	VW-3	OK	YES	OK	3259	OK	DRY	DRY	ND	ND	38.3	
7	VW-4	OK	YES	OK	3259	OK	26.4	26.4	ND	ND	26.9	
8	VW-5	NA	—	—	3259	NA	—	—	—	—	→	large Bin on top of well unable to access

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
Fourth Quarter 1993
ARCO Service Station 2152
22141 Center Street, Castro Valley, California
micrograms per liter (µg/l) or parts per billion (ppb)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH[1] as Gasoline (ppb)	Benzene (ppb)	Toluene (ppb)	Ethyl-benzene (ppb)	Total Xylenes (ppb)
MW-1(57)	10/29/93	48.00	ND.[2]	<50.	<0.5	<0.5	<0.5	<0.5
MW-2(58)	10/29/93	47.20	ND.	<50.	<0.5	<0.5	<0.5	<0.5
MW-3(58)	10/29/93	48.64	ND.	<50.	<0.5	<0.5	<0.5	<0.5
MW-4(59)	10/29/93	46.12	ND.	<50.	<0.5	<0.5	<0.5	<0.5
FB-1[3]	10/29/93	NA.[4]	NA.	<50.	<0.5	<0.5	<0.5	<0.5

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. FB. = Field blank
4. NA. = Not applicable

SEQUOIA ANALYTICAL

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

Emcon Associates
1921 Ringwood Avenue
San Jose, CA 95131
Attention: Jim Butera

Project: EMC-93-5/Arco 2152, Castro Valley

Enclosed are the results from 5 water samples received at Sequoia Analytical on November 1,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3K30901	Water, MW-1(57)	10/29/93	EPA 5030/8015/8020
3K30902	Water, MW-2 (58)	10/29/93	EPA 5030/8015/8020
3K30903	Water, MW-3(58)	10/29/93	EPA 5030/8015/8020
3K30904	Water, MW-4 (59)	10/29/93	EPA 5030/8015/8020
3K30905	Water, FB-1	10/29/93	EPA 5030/8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

SEQUOIA ANALYTICAL

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

Emcon Associates	Client Project ID:	EMC-93-5/Arco 2152, Castro Valley	Sampled:	Oct 29, 1993
1921 Ringwood Avenue	Sample Matrix:	Water	Received:	Nov 1, 1993
San Jose, CA 95131	Analysis Method:	EPA 5030/8015/8020	Reported:	Nov 11, 1993
Attention: Jim Butera	First Sample #:	3K30901		

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 3K30901 MW-1(57)	Sample I.D. 3K30902 MW-2 (58)	Sample I.D. 3K30903 MW-3(58)	Sample I.D. 3K30904 MW-4 (59)	Sample I.D. 3K30905 FB-1	Sample I.D.
Purgeable Hydrocarbons	50	N.D.	N.D.	N.D.	N.D.	N.D.	
Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	
Toluene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	
Total Xylenes	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	
Chromatogram Pattern:		--	--	--	--	--	

Quality Control Data

Report Limit Multiplication Factor:	1.0	1.0	1.0	1.0	1.0
Date Analyzed:	11/8/93	11/8/93	11/8/93	11/8/93	11/9/93
Instrument Identification:	GCHP-2	GCHP-2	GCHP-2	GCHP-2	GCHP-3
Surrogate Recovery, %: (QC Limits = 70-130%)	86	90	89	88	95

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

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Emcon Associates
1921 Ringwood Avenue
San Jose, CA 95131
Attention: Jim Butera

Client Project ID: EMC-93-5/Arco 2152, Castro Valley
Matrix: Water

QC Sample Group: 3K30901 - 04

Reported: Nov 11, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M.Nipp	M.Nipp	M.Nipp	M.Nipp
MS/MSD Batch#:	G3JF8802	G3JF8802	G3JF8802	G3JF8802
Date Prepared:	11/8/93	11/8/93	11/8/93	11/8/93
Date Analyzed:	11/8/93	11/8/93	11/8/93	11/8/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Conc. Spiked:	20	20	20	20
Matrix Spike % Recovery:	85	86	86	83
Matrix Spike Duplicate % Recovery:	93	93	93	93
Relative % Difference:	8.9	7.8	7.8	11.4
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

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Emcon Associates
1921 Ringwood Avenue
San Jose, CA 95131
Attention: Jim Butera

Client Project ID: EMC-93-5/Arco 2152, Castro Valley
Matrix: Water

QC Sample Group: 3K30905

Reported: Nov 11, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M.Nipp	M.Nipp	M.Nipp	M.Nipp
MS/MSD Batch#:	G3K18102	G3K18102	G3K18102	G3K18102
Date Prepared:	11/9/93	11/9/93	11/9/93	11/9/93
Date Analyzed:	11/9/93	11/9/93	11/9/93	11/9/93
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10	10	10	30
Matrix Spike % Recovery:	75	76	76	73
Matrix Spike Duplicate % Recovery:	98	98	99	100
Relative % Difference:	27	25	26	31
LCS Batch#:				
Date Prepared:				
Date Analyzed:				
Instrument I.D.#:				
LCS % Recovery:				
% Recovery Control Limits:	71-133	72-128	72-130	71-120

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

SEQUOIA ANALYTICAL

Eileen A. Manning
Project Manager

Please Note:
The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMC-93-5

Chain of Custody

ARCO Facility no. 2132 | City (Facility) CASTRO VALLEY | Project manager (Consultant) JIM BUTERA

ARCO engineer Kyle Christie | Telephone no. (ARCO) 571-2434 | Telephone no. (Consultant) 453-7300 | Fax no. (Consultant) 453-0452

Consultant name EMCON Associates | Address (Consultant) 1921 Ringwood Avenue San Jose

Laboratory name: SEQUOIA

Contract number: 07-073

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH (Gas) EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-1(57)	01	2		X		X	HCl	10-29-93	1331		X											
MW-2(58)	02	2		↓		↓	↓	↓	1405		X											
MW-3(38)	03	2		↓		↓	↓	↓	1435		X											
MW-4(55)	04	2		↓		↓	↓	↓	1515		X											
FB-1	05	2		↓		↓	↓	↓	1331		X											

Method of shipment: Courier will pick up

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40ml HCl VOA's (Sequoia bottles)

Lab number: 9311309

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

Condition of sample: Good

Temperature received: Cool

Relinquished by sampler	Date	Time	Received by
[signature]	10-29-93	1620	[signature]
Relinquished by	**Date**	**Time**	**Received by**
[signature]	11/1/93	9:20	[signature]
Relinquished by	**Date**	**Time**	**Received by laboratory / Date / Time**
[signature]	11/1/93	1155	[signature] / 11/1/93 / 1155

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

ARPC-3292 (2-91)

Rev 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 06520.026.01 | SAMPLE ID: MW-1 (57)

PURGED BY: L. RATLIFF | CLIENT NAME: ARCO 2152

SAMPLED BY: L. RATLIFF | LOCATION: 22141 Center St Castro Valley

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.)	6.53
DEPTH TO WATER (feet)	45.00	CALCULATED PURGE (gal.)	19.6
DEPTH OF WELL (feet)	58.0 10.00	ACTUAL PURGE VOL. (gal.)	20.0

DATE PURGED: 10-29-93 | Start (2400 Hr) 1315 | End (2400 Hr) 1327

DATE SAMPLED: 10-29-93 | Start (2400 Hr) 13:31 | End (2400 Hr) 1331

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1318	6.5	6.69	1454	69.6	Brown	mod
1322	13.0	6.47	1741	69.5	Brown	light
1327	20.0	6.45	1748	69.41	Brown	light

D. O (ppm): NR | ODOR: NONE | NR (COBALT 0 - 100) | NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB-1

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK | LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 10-29-93 | Time 1300 | Meter Serial #: 9208 | Temperature °F: 75.5

(EC 1000 12.21 / 1000) (DI ___) (pH 7 7.04 / 7.00) (pH 10 10.08 10.00) (pH 4 4.04 / ___)

Location of previous calibration: ___

Signature: Susan Rankin | Reviewed By: JB | Page 1 of 4

Rev 2. 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0G70 026.01 SAMPLE ID: MW-2 (58)

PURGED BY: L RATIT CLIENT NAME: ARCO 2152

SAMPLED BY: L. RATIT LOCATION: 22141 Center St Castro Valley

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.)	7.70
DEPTH TO WATER (feet):	47.20	CALCULATED PURGE (gal.):	23.12
DEPTH OF WELL (feet):	59.0 11.8	ACTUAL PURGE VOL. (gal.):	24.0

DATE PURGED: 10-29-93 Start (2400 Hr) 1341 End (2400 Hr) 1356

DATE SAMPLED: 10-29-93 Start (2400 Hr) 1405 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1347	8	6.54	2190	72.0	Clear	light
1351	16	6.57	2100	71.1	clear	light
1356	24	6.59	2110	71.4	Clear	light

D. O. (ppm): NR ODOR: NONE NR (COBALT 0 - 100) NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ___ Centrifugal Pump
- X Submersible Pump
- ___ Well Wizard™
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)
- ___ Dedicated

Other ___

SAMPLING EQUIPMENT

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

Other ___

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date. 10-29-93 Time. 1300 Meter Serial #: 9208 Temperature °F: ___

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

Location of previous calibration: MW-1

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

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: CG70 C26 C1 SAMPLE ID: MW-3 (58)

PURGED BY: L RATI CLIENT NAME: ARCO 2152

SAMPLED BY: L RATI LOCATION: 22141 Center St Castro Valley

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.): 7.15

DEPTH TO WATER (feet): 48.65 CALCULATED PURGE (gal.): 21.46

DEPTH OF WELL (feet): 59.6 10.95 ACTUAL PURGE VOL. (gal.): 22.0

DATE PURGED: 10-29-93 Start (2400 Hr) 1410 End (2400 Hr) 1427

DATE SAMPLED: 10-29-93 Start (2400 Hr) 1435 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1415	7	6.48	2450	69.9	Clear	light
1420	14	6.48	2420	69.8	Clear	light
1427	22	6.50	2400	69.5	Clear	light

D. O. (ppm): NR ODOR: NONE NR (COBALT 0 - 100) NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NR

PURGING EQUIPMENT

- ___ 2" Bladder Pump
- ___ Centrifugal Pump
- X Submersible Pump
- ___ Well Wizard™
- ___ Bailer (Teflon®)
- ___ Bailer (PVC)
- ___ Bailer (Stainless Steel)
- ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

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

Other: ___

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date 10-29-93 Time: 1300 Meter Serial #: 9208 Temperature °F: ___

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

Location of previous calibration: MW-1

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

WATER SAMPLE FIELD DATA SHEET

Rev 2. 5/91

EMCON ASSOCIATES

PROJECT NO: CG70 026 C' | SAMPLE ID: MW-4 (59')

PURGED BY: L. RATH | CLIENT NAME: ARCO 7159

SAMPLED BY: L. RATH | LOCATION: 22141 Cenki St Castro Valley

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.): 9.19

DEPTH TO WATER (feet): 46.12 | CALCULATED PURGE (gal): 27.57

DEPTH OF WELL (feet): 60.2 1408 | ACTUAL PURGE VOL. (gal.): 28.0

DATE PURGED: 10-29-93 | Start (2400 Hr) 1445 | End (2400 Hr) 1512

DATE SAMPLED: 10-29-93 | Start (2400 Hr) 1515 | End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1453	10	6.67	1721	70.1	Brown	mod
~~1~~1505	20	6.69	1685	70.0	Brown	light
1512	28	6.72	1679	70.5	Clear	light

D. O (ppm): NR | ODOR: NONE | NR (COBALT 0 - 100) | NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e FB-1, XDUP-1): NR

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK | LOCK #: 3259

REMARKS: ___

Meter Calibration Date: 10-29-93 Time: 1300 Meter Serial #: 5208 Temperature °F. ___

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

Location of previous calibration: MW-1

Signature: Joe Rath | Reviewed By: JB | Page 4 of 4