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93 JUL 26 PM 12:48

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING AND REMEDIATION PERFORMANCE EVALUATION
Second Quarter 1993
at
ARCO Station 2152
22141 Center Street
Castro Valley, California

69013.17

7/19/93

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July 19, 1993
0309MWHE
69013.17

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

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

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) prepared this letter report which summarizes the results of the second quarter 1993 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, at the above-referenced site. The scope of work for quarterly monitoring at this site was reduced from monthly depth-to-water measurements and quarterly sampling, to quarterly sampling only. The reduced monitoring is in response to a relatively stable gradient, laboratory analytical results of nondetectable total petroleum hydrocarbons as gasoline (TPHg) and the gasoline constituents benzene, toluene, ethylbenzene and total xylenes (BTEX) for the four wells associated with the site since October 1991, and installation of an interim soil remediation system. Included in this report is a description of the interim vapor extraction system (VES) that operated at the subject site from January 25, to February 25, 1993. The VES is currently not operating because of extremely low soil permeability restricting air flow. The decreased soil permeability may be the result of native soils becoming wet during the recent heavy rains and thus less permeable to air flow; and rising water levels in the vapor extraction wells which has resulted in 1 to 2 feet loss of screened interval in the wells, thus restricting air flow.

The objectives of this quarterly groundwater monitoring event are to evaluate changes in the groundwater flow direction and gradient, and evaluate changes in concentrations of petroleum hydrocarbons in the local groundwater associated with former gasoline

underground storage tanks (USTs) at the site. Field work and laboratory analyses of groundwater samples during this quarter were performed under the direction of EMCON, and included measuring depths to groundwater, subjectively analyzing groundwater for the presence of petroleum product, collecting groundwater samples from the wells for laboratory analyses, and directing a State-certified laboratory to analyze the groundwater samples. Field procedures and acquisition of field data were performed under the direction of EMCON; warrant of their field data and evaluation of their field protocols are beyond RESNA's scope of work. RESNA's scope of work was limited to interpretation of field and laboratory analyses data, which included evaluating trends in reported hydrocarbon concentrations in the local groundwater, the groundwater gradient, and direction of groundwater flow beneath the site. The operating Arco Station 2152 is located on the southwestern corner of the intersection of Grove Way and Center Street in Castro Valley, California. The site location is shown on the Site Vicinity Map, Plate 1.

The results of previous environmental investigations at the site are presented in reports listed in the references section of this letter report. The locations of the groundwater monitoring and vapor extraction wells and pertinent site features are shown on the Generalized Site Plan, Plate 2.

Groundwater Sampling and Gradient Evaluation

Depth-to-water levels (DTW) were measured by EMCON field personnel in monitoring wells MW-1 through MW-4, and vapor extraction wells VW-2 and VW-4 on April 9, 1993. Quarterly sampling of monitoring wells MW-1 through MW-4 was also performed by EMCON field personnel on April 9, 1993. The results of EMCON's field work on the site, including DTW measurements and subjective analysis for the presence of product in the groundwater in MW-1 through MW-4, VW-2 and VW-4, are presented on EMCON's Field Reports and Water Sample Field Data Sheets. These data are included in Appendix A.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations for product in the groundwater from MW-1 through MW-4 for this quarter and previous quarterly groundwater monitoring at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. EMCON's DTW measurements were used to evaluate groundwater elevations. Evidence of petroleum product or sheen was not reported on EMCON's Field Report during this quarter (see Appendix A). The groundwater gradient interpreted from the April 1993 groundwater monitoring episode is shown on the Groundwater Gradient Map, Plate 3. For this quarter, the interpreted groundwater gradient was approximately 0.005 ft/ft with a flow direction to the southwest. The groundwater

elevations and gradient for this quarter are generally consistent with previously interpreted data.

Groundwater monitoring wells MW-1 through MW-4 were purged and sampled by EMCON field personnel on April 9, 1993. EMCON's Water Sample Field Data Sheets, Field Reports, and Summary of Groundwater Monitoring Data are included in Appendix A. The purge water was removed from the site by a licensed hazardous waste hauler.

REMEDIATION SYSTEM

Vapor Extraction System Description

Construction of the vapor extraction system (VES) was completed on January 18, 1993. System operation began on January 25, 1993 and terminated on February 25, 1993. The onsite VES uses a 7.5 horsepower (hp) positive displacement blower (MD-Pneumatics 4006-81) to extract petroleum hydrocarbon vapor from subsurface soils associated with the former USTs at the site. Plate 2, shows the location of the four onsite vapor extraction wells (VW-2 through VW-5) that are used to extract vapor from hydrocarbon-impacted subsurface soils using the 7.5 hp blower (S-1). The blower (S-1) can deliver a maximum air flow rate of 250 standard cubic feet per minute (scfm).

Extracted vapor from the blower (S-1) is directed to three 2,000 pound, series flow, granular vapor-phase activated carbon canisters (A-1, A-2 and A-3) for abatement prior to discharge to the atmosphere. System operation is regulated under the Bay Area Air Quality Management District (BAAQMD) Permit to Operate Number 8270. Sample ports are located on each individual vapor pipe from vapor extraction wells VW-2 through VW-5, prior to the pipes being manifolded and plumbed to the blower in the remediation compound. Sample ports are also located influent (prior to fresh air dilution) and effluent to the blower (S-1), and influent and effluent to each carbon canister (A-1, A-2 and A-3).

System Monitoring

When in operation, the onsite VES is monitored weekly to evaluate system performance in accordance with BAAQMD permit requirements. The following measurements are recorded at every site visit: (1) applied vacuum on each of the vapor extraction wells; (2) average extracted air flow rates from the vapor-extraction wells (influent to the blower), prior to fresh air dilution; (3) average extracted air flow rate effluent to the blower (S-1); (4) temperature of the extracted vapor influent and effluent to the blower and each carbon canister; (5) pressure of extracted vapor effluent to the blower; (6) and, extracted

hydrocarbon vapor concentrations from the well field, influent and effluent to the blower and each carbon canister as measured by a photo-ionization detector (PID). In addition to these measurements, several other parameters such as the oil-level in the blower, temperature of extracted vapor from the wells, and water levels in the vapor extraction wells are also recorded every site visit for maintenance purposes.

LABORATORY METHODS AND ANALYSES

Groundwater Samples

Under the direction of EMCON, water samples collected from the wells were analyzed by Sequoia Analytical located in Redwood City, California (Hazardous Waste Testing Laboratory Certification No. 1210). The water samples from MW-1 through MW-4 were analyzed for TPHg and BTEX using modified Environmental Protection Agency (EPA) Methods 5030/8015/8020. Concentrations of TPHg and benzene in the groundwater are shown on Plate 4, TPHg/Benzene Concentrations in Groundwater. The Chain of Custody Records and Laboratory Analysis Reports are attached in Appendix A. Results of these and previous water analyses are summarized in Table 2, Cumulative Results of Laboratory Analyses of Groundwater.

TPHg and BTEX in wells MW-1 through MW-4 are nondetectable this quarter, as they have been since the October 15, 1991 sampling event.

Air Samples

When the VES is in operation, air samples are collected from the well field prior to fresh air dilution once a month and every time a new well is opened. An air sample effluent to the blower and first carbon canister (A-1) are also collected monthly to evaluate carbon breakthrough rates. Air samples collected are analyzed for BTEX and TPHg using modified EPA Methods 8020/8015 by GTEL Environmental Laboratories, located in Concord, California (Hazardous Waste Testing Laboratory Certification No. 058).

No air samples were collected from the well field during this quarter as the VES was inoperable due to decreased soil permeability.

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

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

Sincerely,
RESNA Industries Inc.

Erin McLucas
Staff Geologist

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

James L. Nelson
Certified Engineering Geologist No. 1463

Valli Voruganti
Project Engineer

Enclosures: References
Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, April 9, 1993
Plate 4, TPHg/Benzene Concentrations in Groundwater, April 9, 1993

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

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TRANSMITTAL

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

DATE: July 19, 1993
PROJECT NUMBER: 69013.17
SUBJECT: ARCO Station No. 2152

FROM: John Young

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	7/19/93	Final Letter Report on Second Quarter 1993 Groundwater Monitoring and Remediation Performance Evaluation for ARCO Station No. 2152, 22141 Center Street, Castro Valley, California.

THESE ARE TRANSMITTED as checked below:

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

John C. Young, Program Manager

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.

REFERENCES

Applied GeoSystems. May 26, 1989. Limited Environmental Site Assessment, 22141 Center Street, Castro Valley, California, AGS Report 69013-1.

Applied GeoSystems. January 18, 1990. Limited Subsurface Environmental Investigation Related to Underground Tank Removal, 22141 Center Street, Castro Valley, California, AGS Report 69013-2.

Applied GeoSystems. November 13, 1990. Environmental Subsurface Investigation at ARCO Station 2152, 22141 Center Street, Castro Valley, California, AGS Report 69013-4.

Applied GeoSystems. March 24, 1991. Letter Report, Quarterly Ground-Water Monitoring, First Quarter 1991, 22141 Center Street, Castro Valley, California, AGS Report 69013-5.

Applied GeoSystems. May 20, 1991. Letter Report, Quarterly Ground-Water Monitoring, Second Quarter 1991, 22141 Center Street, Castro Valley, California, AGS Report 69013-5.

RESNA. July 2, 1991. Supplemental Subsurface and Remedial Investigation at ARCO Station 2152, 22141 Center Street, Castro Valley, California, AGS 69013-6.

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

RESNA. October 18, 1991. Letter Report, Quarterly Ground-Water Monitoring, Third Quarter 1991, 22141 Center Street, Castro Valley, California, AGS Report 69013-5.

RESNA. October 22, 1991. Work Plan for Additional Subsurface Investigation and Design and Permitting of Vapor Extraction System at ARCO Station 2152, 22141 Center Street, Castro Valley, California, 69013.08

RESNA. March 2, 1992. Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1991, 22141 Center Street, Castro Valley, California, 69013.09.

RESNA. May 1, 1992. Letter Report, Quarterly Groundwater Monitoring, First Quarter 1992, 22141 Center Street, Castro Valley, California, 69013.09.

REFERENCES
(Continued)

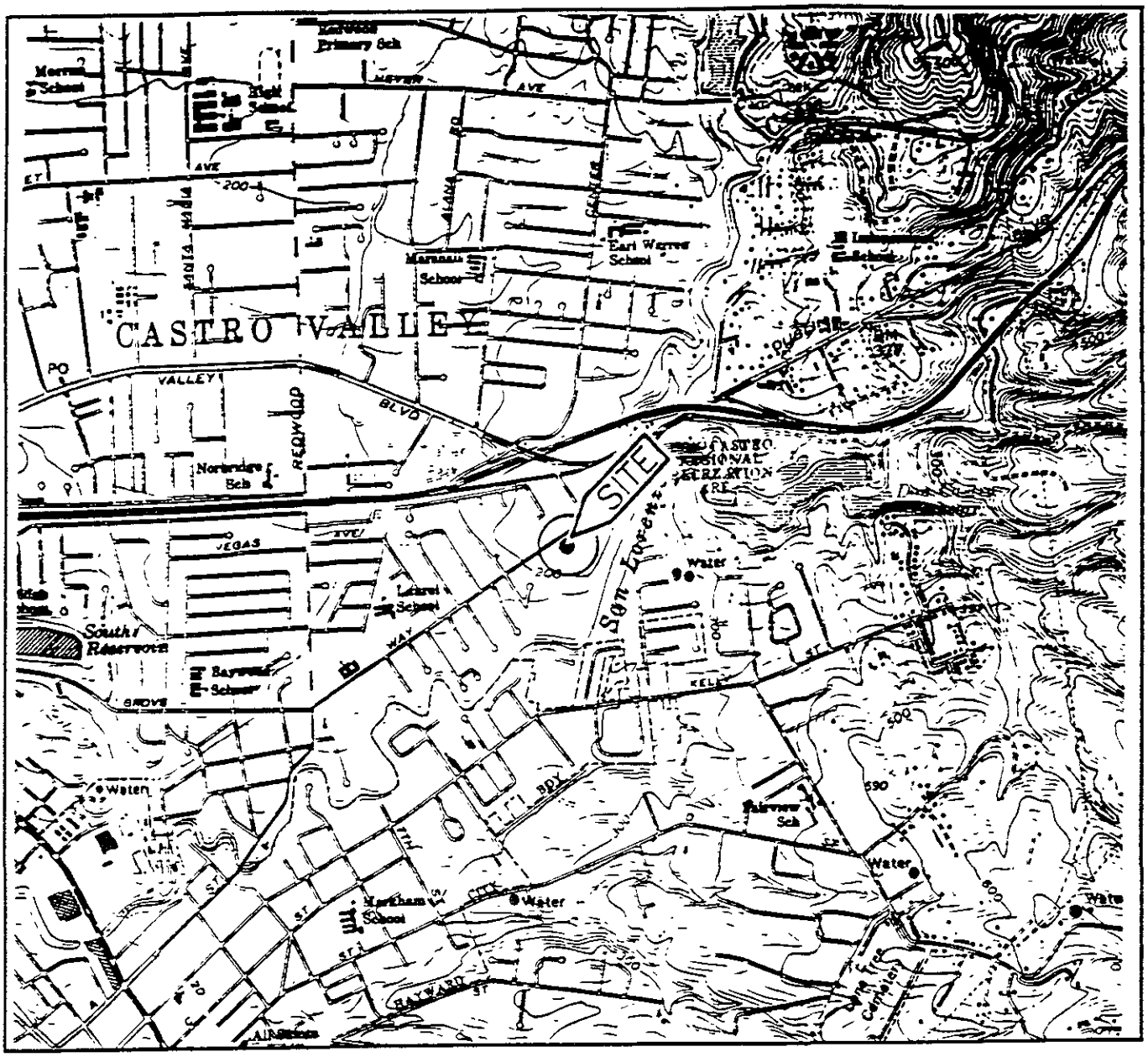
RESNA. July 17, 1992. Letter Report, Limited Subsurface Environmental Investigation, ARCO Station 2152, 22141 Center Street, Castro Valley, California, 69013.08

RESNA. September 22, 1992. Letter Report, Quarterly Groundwater Monitoring, Second Quarter 1992, 22141 Center Street, Castro Valley, California, 69013.09.

RESNA. December 30, 1992. Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1992, 22141 Center Street, Castro Valley, California, 69013.09.

RESNA. March 9, 1993. Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1992, 22141 Center Street, Castro Valley, California, 69013.13.

RESNA. June 29, 1993. Letter Report, Quarterly Groundwater Monitoring, First Quarter 1993, 22141 Center Street, Castro Valley, California, 69013.17.



Base: U.S. Geological Survey
7 5-Minute Quadrangle
Hayward, California.
Photorevised 1980

N

LEGEND

⊙ = Site Location

Approximate Scale

2000 1000 0 2000 4000

feet

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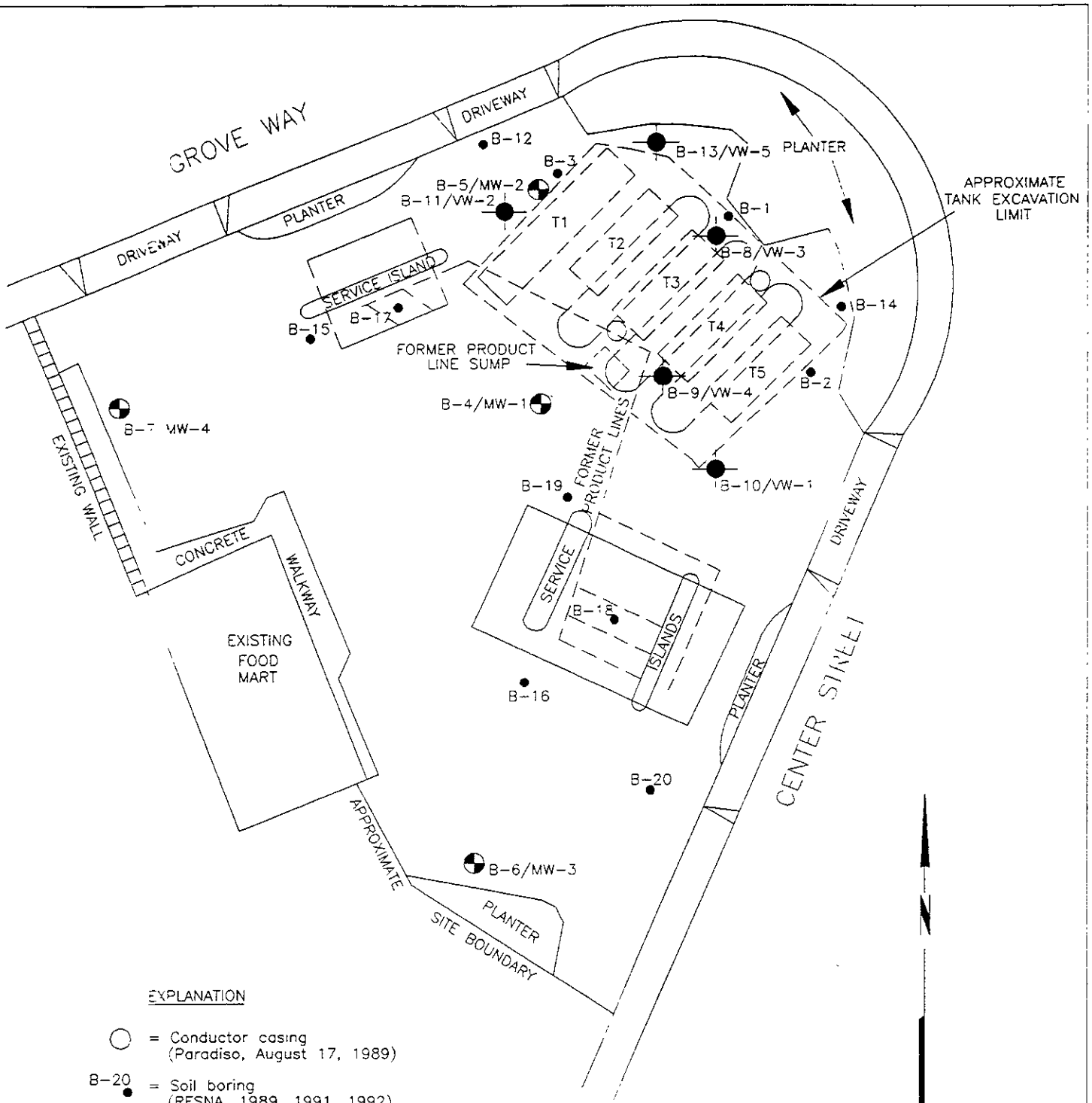
SITE VICINITY MAP
ARCO Station 2152
22141 Center Street
Castro Valley, California

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 Arcner Civil Engineer, Inc.

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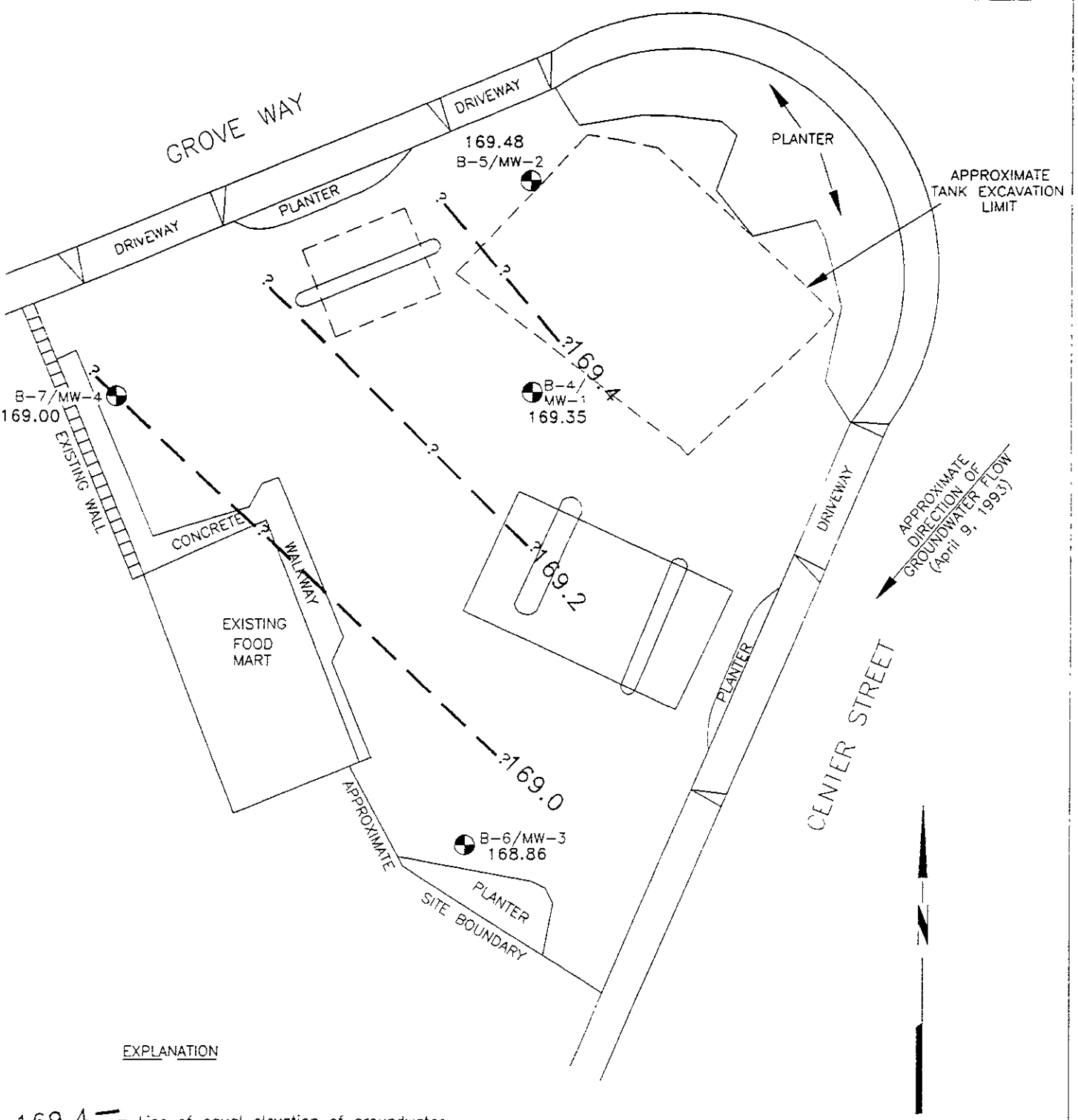
GENERALIZED SITE PLAN
ARCO Station 2152
22141 Center Street
Castro Valley, California

PLATE 2



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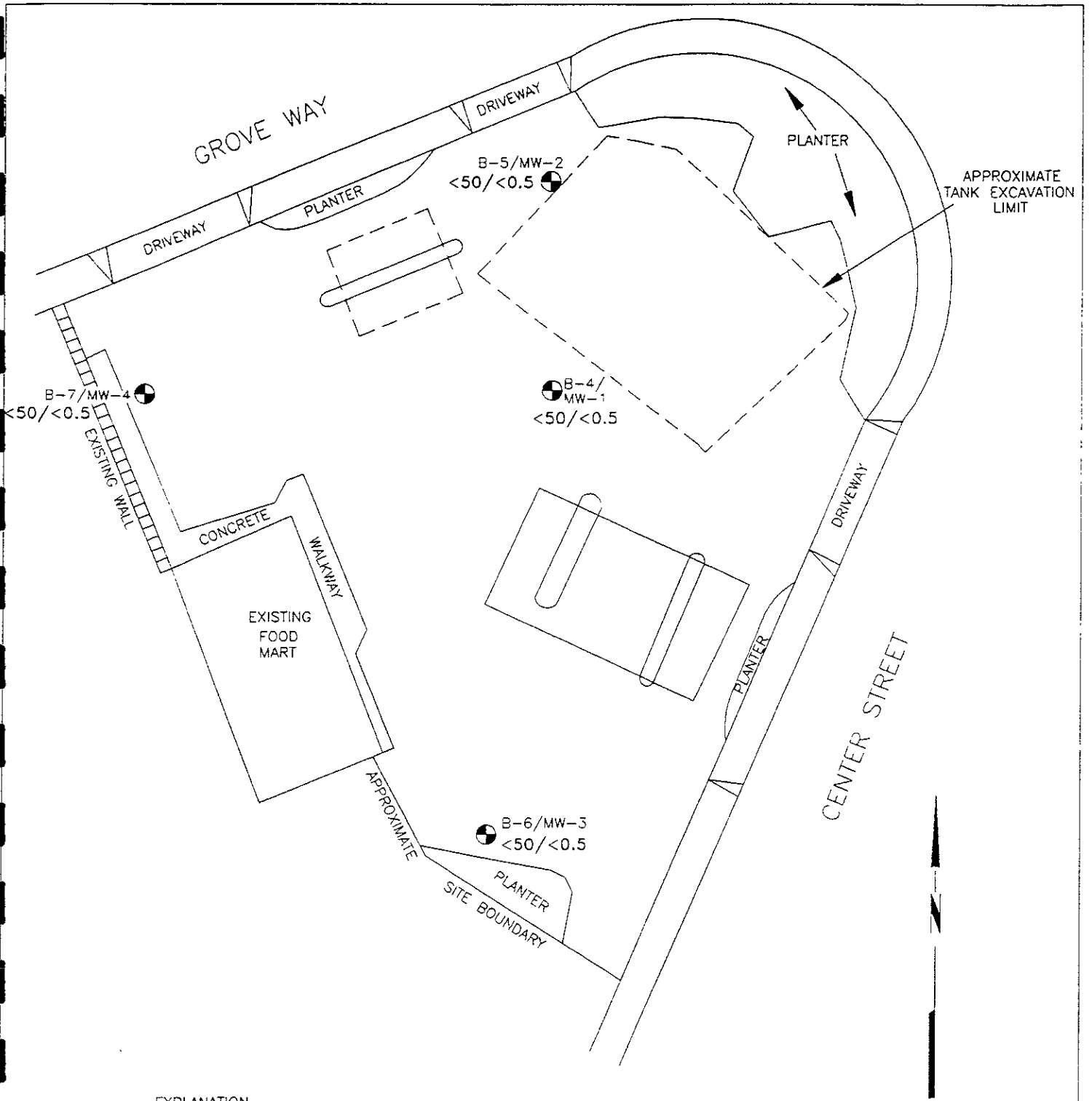
GROUNDWATER GRADIENT MAP
ARCO Station 2152
22141 Center Street
Castro Valley, California

PLATE
3



EXPLANATION

<50/<0.5 = Concentrations of TPHg/Benzene in groundwater in parts per billion (ppb) April 9, 1993

B-6/MW-3 = 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

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

Date Well Measured	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
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.

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

Date Well Measured	Depth of Well	Well Elevation	Static Water Depth	Water Elevation
MW-2cont.				
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
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.

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

Date Well Measured	Depth of Well	Well Elevation	Static Water Depth	Water Elevation
MW-3cont.				
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
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.

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

Date Well Measured	Depth of Well	Well Elevation	Static Water Depth	Water Elevation
MW-4cont.				
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
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
VW-3				
02/24/93	NR	not surveyed	NR	NR
03/30/93	38.3		38.27	residual water
04/09/93			not accessible	

See notes on Page 5 of 5.

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

Date Well Measured	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	
VW-5				
02/24/93	37.5	not surveyed	35.22	-
03/30/93			Dry	Dry
04/09/93			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

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
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
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
	01/14/93	NS	NS	NS	NS	NS
	04/09/93	<50	<0.5	<0.5	<0.5	<0.5

See notes on Page 2 of 2.

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-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

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

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

EMCON Associates

938 Junction Avenue • San Jose, California 95131-2302 • (408) 453-0719 • Fax (408) 453-0452

Date April 28, 1993
Project 0G70-026.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
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 second 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) 453-2266.

Jim Butera JB

Reviewed by:

REGISTERED ... No: 4091 Exp. 6/30/94 ... STATE OF ...

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 : 4/1/13

ARCO STATION # : 2152 FIELD TECHNICIAN : S. Horton/M. Gallegos DAY : Friday

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	good	yes	no	3259	yes	47.61	47.61	ND	ND	59.6	
2	MW-2	good	yes	no	3259	yes	47.02	47.02	ND	ND	58.0	
3	MW-3	good	yes	no	3259	yes	48.71	48.71	ND	ND	59.7	
4	MW-4	good	yes	no	3259	yes	46.18	46.18	ND	ND	60.2	
5	VW-2	good	yes	no	3259	yes	38.33	38.33	ND	ND	38.5	
6	VW-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	unable to open lid. dry concrete around lid
7	VW-4	used	yes	no	3259	yes	dry	dry	--	--	26.8	
8	VW-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	car parked on well owner unavailable

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
Second 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(58)	04/09/93	47 81	ND [2]	<50	<0 5	<0 5	<0 5	<0 5
MW-2(58)	04/09/93	47 02	ND.	<50.	<0 5	<0 5	<0 5	<0 5
MW-3(59)	04/09/93	48.71	ND.	<50.	<0.5	<0 5	<0 5	<0 5
MW-4(60)	04/09/93	46 18	ND.	<50.	<0.5	<0 5	<0 5	<0 5
FB-1[3]	04/09/93	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
1938 Junction Avenue
San Jose, CA 95131
Attention: Jim Butera

Project: EMCGC-92-1/Arco 2152, Castro Valley

Enclosed are the results from 5 water samples received at Sequoia Analytical on April 13,1993. The requested analyses are listed below:

3D53601	Water, MW-1 (58)	4/9/93	EPA 5030/8015/8020
3D53602	Water, MW-2 (58)	4/9/93	EPA 5030/8015/8020
3D53603	Water, MW-3 (59)	4/9/93	EPA 5030/8015/8020
3D53604	Water, MW-4 (60)	4/9/93	EPA 5030/8015/8020
3D53605	Water, FB-1	4/9/93	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
1938 Junction Avenue
San Jose, CA 95131
Attention: Jim Butera

Client Project ID: EMCGC-92-1/Arco 2152, Castro Valley
Sample Matrix: Water
Analysis Method: EPA 5030/8015/8020
First Sample #: 3D53601

Sampled: Apr 9, 1993
Received: Apr 13, 1993
Reported: Apr 21, 1993

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 3D53601 MW-1 (58)	Sample I.D. 3D53602 MW-2 (58)	Sample I.D. 3D53603 MW-3 (59)	Sample I.D. 3D53604 MW-4 (60)	Sample I.D. 3D53605 FB-1
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:	4/19/93	4/19/93	4/19/93	4/19/93	4/19/93
Instrument Identification:	GCHP-2	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Surrogate Recovery, %: (QC Limits = 70-130%)	105	103	108	104	105

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

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

Emcon Associates
1938 Junction Avenue
San Jose, CA 95131
Attention: Jim Butera

Client Project ID: EMCGC-92-1/Arco 2152, Castro Valley
Matrix: Water

QC Sample Group: 3D53601-05

Reported: Apr 21, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Fontecha	J. Fontecha	J. Fontecha	J. Fontecha
Conc. Spiked:	20	20	20	20
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	LCS041993	LCS041993	LCS041993	LCS041993
Date Prepared:	4/19/93	4/19/93	4/19/93	4/19/93
Date Analyzed:	4/19/93	4/19/93	4/19/93	4/19/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
LCS % Recovery:	115	108	108	110
Control Limits:	70-130	70-130	70-130	70-130
MS/MSD Batch #:	3040790	3040790	3040790	3040790
Date Prepared:	4/19/93	4/19/93	4/19/93	4/19/93
Date Analyzed:	4/19/93	4/19/93	4/19/93	4/19/93
Instrument I.D.#:	GCHP-2	GCHP-2	GCHP-2	GCHP-2
Matrix Spike % Recovery:	115	110	105	112
Matrix Spike Duplicate % Recovery:	115	110	105	112
Relative % Difference:	0.0	0.0	0.0	0.0

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

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 LCS % recovery data is used for validation of sample batch results. Due to matrix effects, the QC limits for MS/MSD's are advisory only and are not used to accept or reject batch results.

Eileen A. Manning
Project Manager

ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. EMCGC-92-1

ARCO Facility no 2152	City (Facility) Castro Valley	Project manager (Consultant) JIM BUTERA	Laboratory name SEQUOIA
ARCO engineer Kyle Christie	Telephone no (ARCO) 571-2434	Telephone no (Consultant) 453-0719	Fax no (Consultant) 453-0452
Consultant name EMCON ASSOCIATES	Address (Consultant) 1938 Junction Avenue San Jose		Contract number

Method of shipment: Courier will pick up

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 ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-1(58)		2		X		X	HCl	4/9/93	13:08		X			9304586			01			
MW-2(58)		2		X		X	HCl	4/9/93	13:41		X						02			
MW-3(59)		2		X		X	HCl	4/9/93	14:23		X						03			
MW-4(60)		2		X		X	HCl	4/9/93	15:05		X						04			
FB-1		2		X		X	HCl	4/9/93	13:10		X						05			

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 3-40 ml HCl

Lab number

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

Condition of sample

Temperature received

Relinquished by sampler	Date 4/13/93	Time 1020	Received by R Sublette 4/13/93 1020
Relinquished by R Sublette	Date 4/13/93	Time 1050	Received by
Relinquished by	Date	Time	Received by laboratory Date 4/13/93 Time 1050

White copy - ARCO Canary copy - ARCO Environmental Engineering, Pink copy - Consultant

WATER SAMPLE FIELD DATA SHEET

Rev 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 6676-006.01 SAMPLE ID: MW-1 (58)

PURGED BY: M Gallegos CLIENT NAME: ARCO #2152

SAMPLED BY: S Horton LOCATION: ~~Castroville~~ Castro Valley, CA

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.): 6.65

DEPTH TO WATER (feet): 47.51 CALCULATED PURGE (gal.): 19.97

DEPTH OF WELL (feet): 58.6 ACTUAL PURGE VOL. (gal.): 20.0

DATE PURGED: 4/9/93 Start (2400 Hr) 12:51 End (2400 Hr) 13:05

DATE SAMPLED: 4/9/93 Start (2400 Hr) 13:07 End (2400 Hr) 13:08

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
12:57	7	6.79	1707	72.5	cloudy	slight
13:01	13.5	6.64	1886	71.6	cloudy	slight
13:05	20	6.59	2040	70.9	cloudy	slight

D. O. (ppm): NR ODOR: slight NR (COBALT 0 - 100) NR (NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB-1 (13:10)

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

WELL INTEGRITY: Good LOCK #: [illegible]

REMARKS: ___

Meter Calibration: Date: 4/9/93 Time: 12:40 Meter Serial #: 9208 Temperature °F: 71.9

(EC 1000 1023 / 1000) (DI —) (pH 7 6.74 / 7.00) (pH 10 10.12 / 10.00) (pH 4 4.00 / —)

Location of previous calibration: ___

Signature: S. Horton Reviewed By: NS Page 1 of 4

WATER SAMPLE FIELD DATA SHEET

Rev 2, 5/91

EMCON ASSOCIATES

PROJECT NO. 0670-026.01 SAMPLE ID: MW-2(58)

PURGED BY: M. Gallegos CLIENT NAME: ARCO # 2152

SAMPLED BY: S. Horton LOCATION: Castro Valley, CA

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

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

CASING ELEVATION (feet/MSL)	N/R	VOLUME IN CASING (gal.)	7.17
DEPTH TO WATER (feet)	47.02	CALCULATED PURGE (gal.)	21.52
DEPTH OF WELL (feet):	58.0	ACTUAL PURGE VOL. (gal.)	22.0

DATE PURGED: 4/9/93 Start (2400 Hr) 13:25 End (2400 Hr) 13:35

DATE SAMPLED: 4/9/93 Start (2400 Hr) 13:40 End (2400 Hr) 13:41

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
13:30	7.5	7.01	1994	71.4	clear	trace
13:34	15.0	6.73	1886	71.0	clear	trace
13:35	22.0	6.65	2130	70.5	clear	trace

D. O. (ppm): N/R ODOR: slight N/R (COBALT 0 - 100) N/R (NTU 0 - 200)

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

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

WELL INTEGRITY: Good LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 4/9/93 Time: 12:40 Meter Serial #: 9206 Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: Stan Horton Reviewed By: ___ Page 2 of 5

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-026.01 SAMPLE ID: MW-4(60)

PURGED BY: M. Gallegos CLIENT NAME: ARCO #7152

SAMPLED BY: S. Horton LOCATION: Castro Valley, CA

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.):	9.15
DEPTH TO WATER (feet):	46.18	CALCULATED PURGE (gal.):	27.47
DEPTH OF WELL (feet):	60.2	ACTUAL PURGE VOL. (gal.):	27.5

DATE PURGED: 4/9/93 Start (2400 Hr) 14:46 End (2400 Hr) 15:00

DATE SAMPLED: 4/9/93 Start (2400 Hr) 15:04 End (2400 Hr) 15:05

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
14:51	9.5	6.96	1689	68.0	clear	trace
14:56	18.5	6.71	1700	68.6	clear	trace
15:00	27.5	6.70	1696	67.4	clear	trace

D. O. (ppm): NR ODOR: slight NR (COBALT 0 - 100) NR (NTU 0 - 200)

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

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

WELL INTEGRITY: Good LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 4/9/93 Time: 12:40 Meter Serial #: 92CS Temperature °F: ___

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

Location of previous calibration: MW-1

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