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

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

69013.17

11/2/93

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

November 2, 1993
3rdqtrqm
69013.17

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, Third Quarter 1993 at 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 third 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 monitoring (depth-to-water measurements and subjective analyses) and quarterly sampling, to quarterly monitoring and sampling. The reduced monitoring is in response to a relatively stable groundwater gradient and flow direction. 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 decreased soil permeability beneath the site. The decreased soil permeability may be due in part the result of native soils becoming saturated during the heavy rains of 1992-1993 and thus less permeable to air flow, and due in part to rising water levels in the vapor extraction wells, resulting in a 1 to 2 foot loss of screened interval, also 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, and to evaluate the performance of the soil remediation system. 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. RESNA's scope of work also included operation and maintenance of the soil remediation system at 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 and quarterly sampling performed by EMCON field personnel in monitoring wells MW-1 through MW-4, and vapor extraction wells VW-2 through VW-4 on July 30, 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, and VW-2 through 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 event 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 July 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 gradient and flow direction 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 July 30, 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

The vapor extraction system continues to be inoperable due to decreased permeability of soils. Attempts were made on July 8, and August 25, 1993, to restart the system, however, flows were not sufficient to keep the system operating.

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 were nondetectable this quarter, as they have been since the October 15, 1991, sampling event.

Air Samples

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 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 D. Krueger
Staff Geologist

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

James L. Nelson
Certified Engineering Geologist No. 1463

Enclosures: References
Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, July 30, 1993
Plate 4, TPHg/Benzene Concentrations in Groundwater, July 30, 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.

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.

REFERENCES
(Continued)

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

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

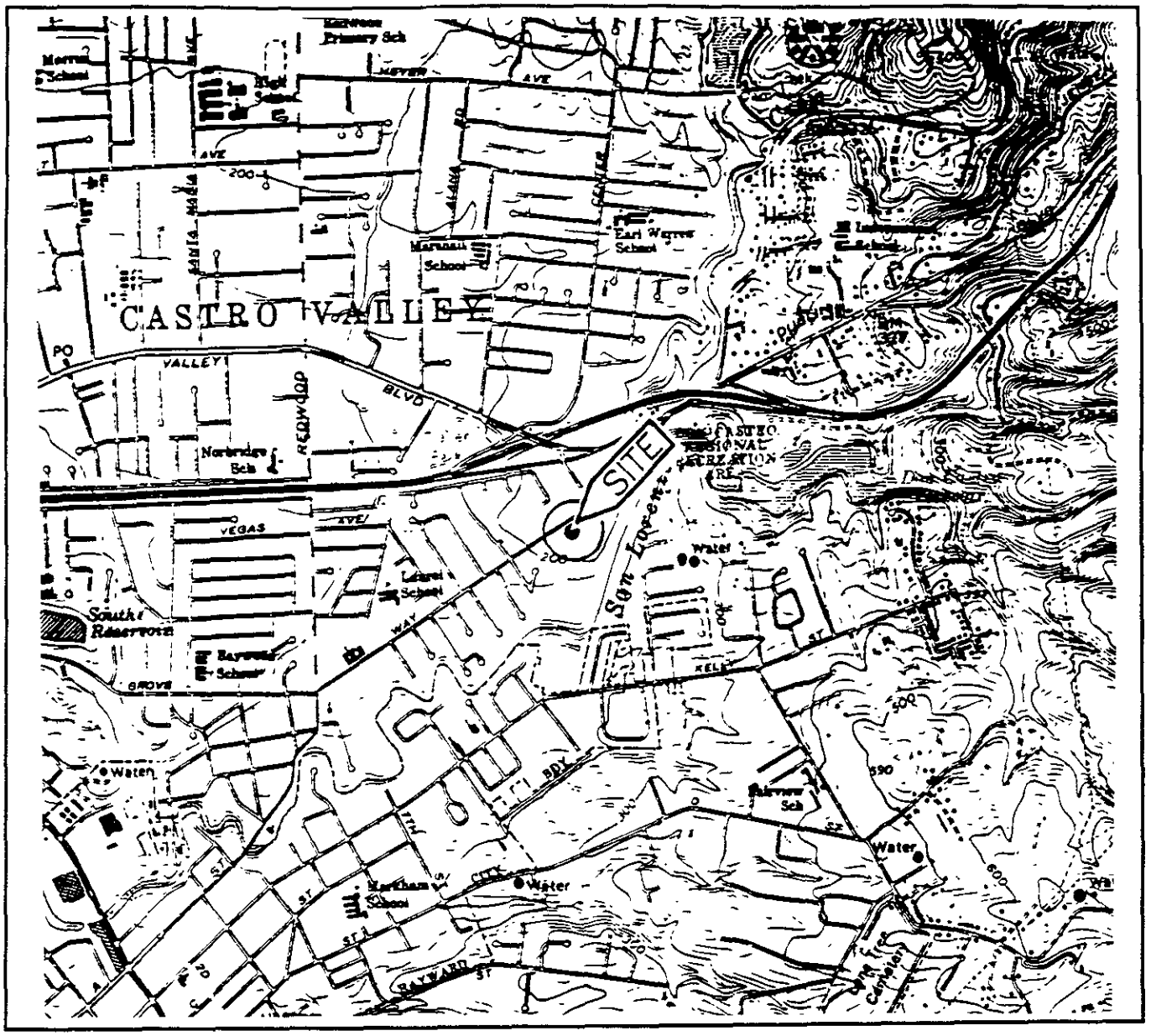
RESNA. September 22, 1992. Letter Report, Quarterly Groundwater Monitoring, Second Quarter 1992, 22141 Center Street, Castro Valley, California, 69013.09.

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.

RESNA. July 19, 1993. Letter Report, Quarterly Groundwater Monitoring, Second Quarter 1993, 22141 Center Street, Castro Valley, California, 69013.17.



Base: U.S. Geological Survey
7 5—Minute Quadrangles
Hayward, California.
Photorevised 1980

LEGEND

⊙ = Site Location

N

Approximate Scale

2000 1000 0 2000 4000

feet

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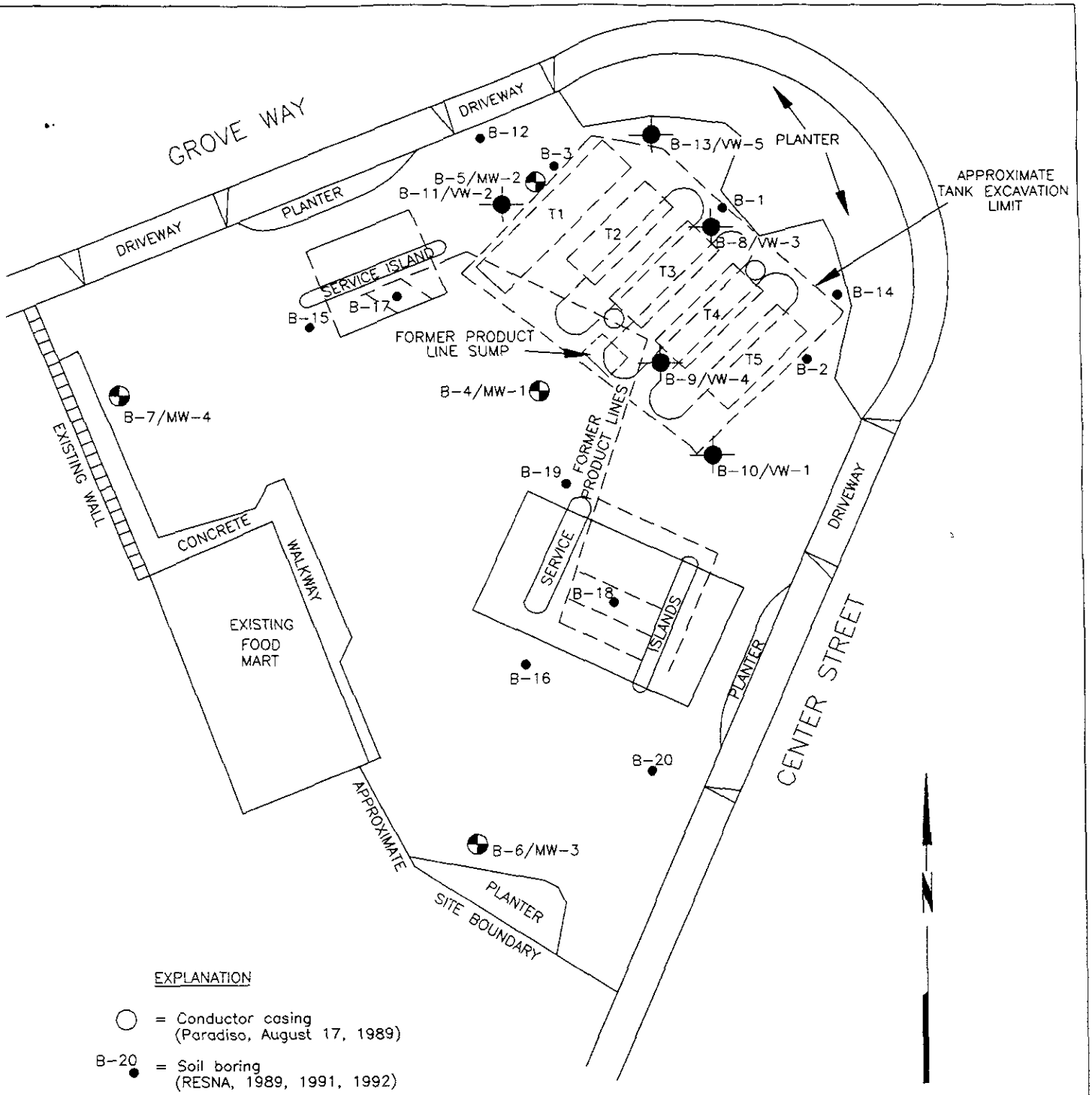
SITE VICINITY MAP
ARCO Station 2152
22141 Center Steet
Castro Valley, California

PLATE
1



Source. Surveyed by Ron Archer Civil Engineer, Inc

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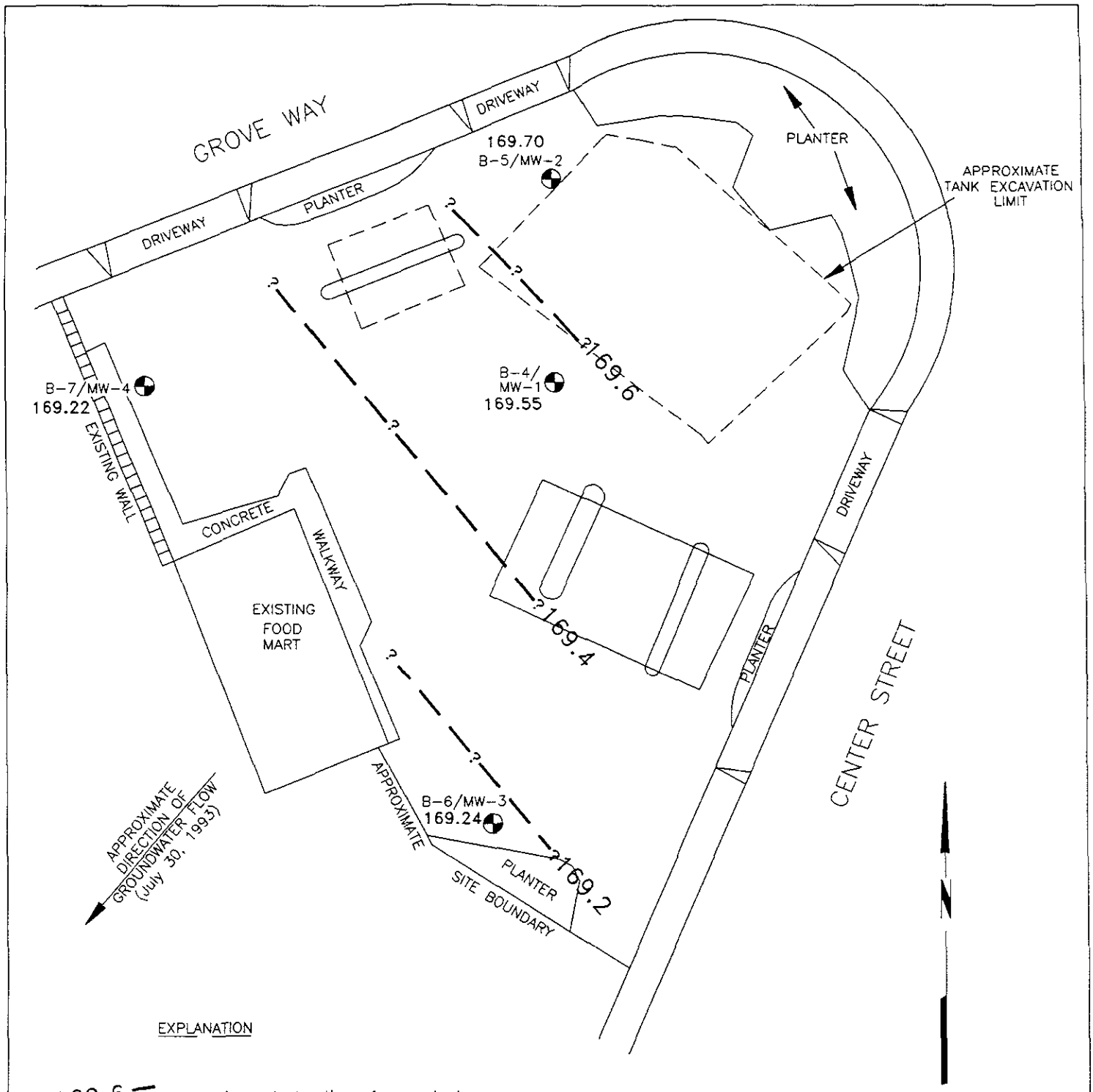
GENERALIZED SITE PLAN
ARCO Station 2152
22141 Center Street
Castro Valley, California

PLATE
2



EXPLANATION

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

169.70 = Elevation of groundwater in feet (MSL) July 30, 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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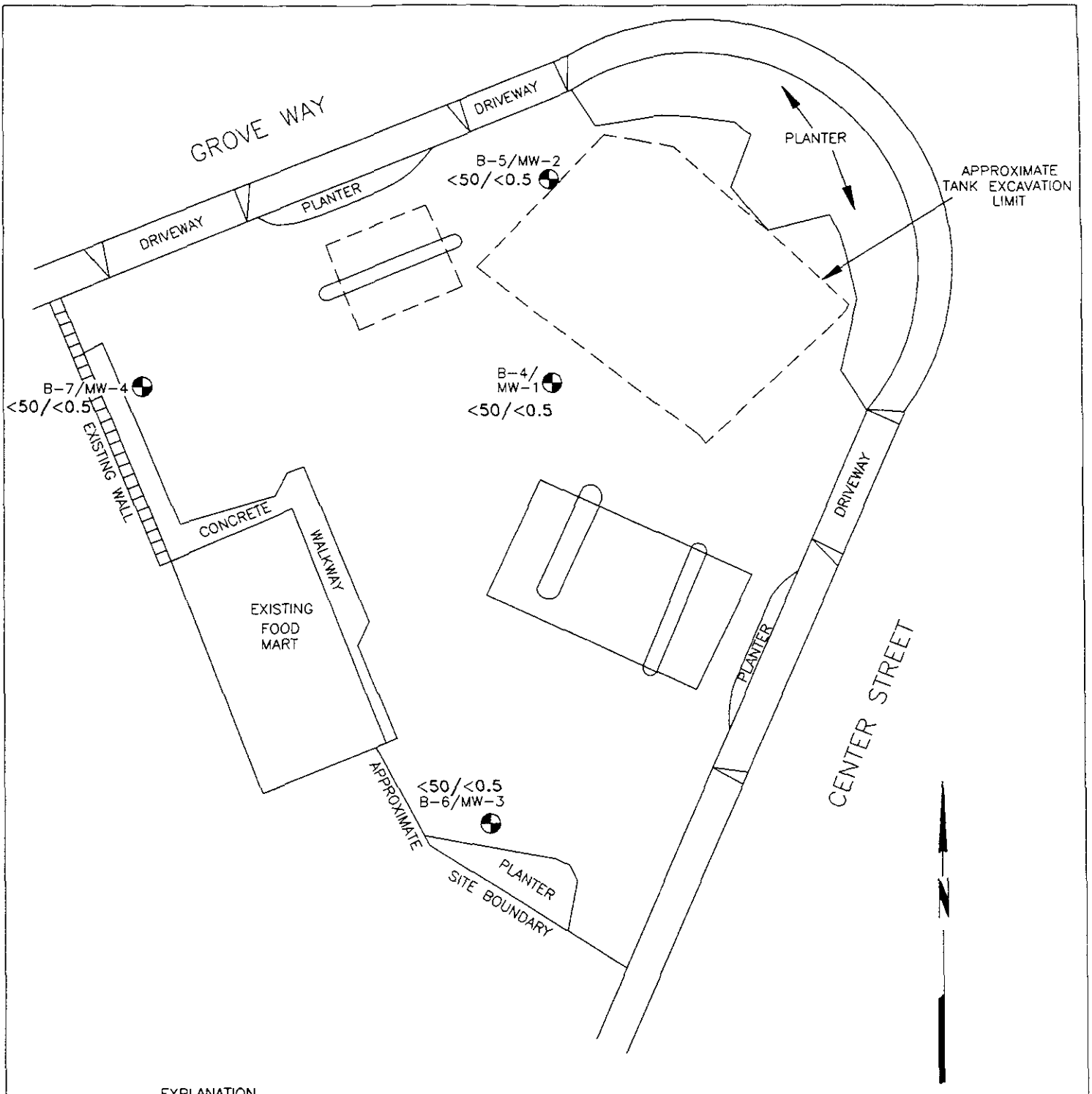
GROUNDWATER GRADIENT MAP

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, July 30, 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

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
07/30/93			47.61	169.55
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
07/30/93			46.80	169.70
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
07/30/93			48.33	169.24
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
07/30/93			45.96	169.22
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
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

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	Dry
07/30/93			Dry	Dry
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

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
	07/30/93	<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
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
	07/30/93	<50	<0.50	<0.50	<0.50	<0.50

See notes on Page 2 of 2.

RESNA
Working To Restore Nature

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
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

DATE: November 2, 1993
PROJECT NUMBER: 69013.17
SUBJECT: ARCO Station 2152

FROM: Erin D. Krueger

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	11/02/93	Letter Report Quarterly Groundwater Monitoring and Remediation Performance Evaluation, Third Quarter 1993 at ARCO Station No. 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	[ ] 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, RWQCB

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
	07/30/93	<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

RESNA
Working to Restore Nature

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 August 17, 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 third 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

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER
EXP 6/30/96
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 : 7-30-93

ARCO STATION # : 2152 FIELD TECHNICIAN : K REICHELDERFER 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**	OK	YES	OK	3259	OK	47.61	47.61	ND	NA	58.0	—
2	**MW-2**	OK	YES	OK	3259	OK	46.80	46.81	ND	NA	59.2	—
3	**MW-3**	OK	YES	OK	3259	OK	48.33	48.33	ND	NA	59.7	WELL IS OUTSIDE TRT SYST
4	**MW-4**	OK	NO HEX	OK	3259	OK	45.96	45.96	ND	NA	60.2	NO DIN-HEX BOLTS IN LID (I INSTALLED BOLTS IN LID)
5	**VW-2**	OK	YES	OK	3259	OK	38.36	38.36	ND	NA	38.5	ARCO TOOL ; 2" WELL
6	**VW-3**	OK	YES	OK	3259	OK	DRY	DRY	NA	NA	38.3	—
7	**VW-4**	OK	~~YES~~ NO	OK	3259	OK	DRY	DRY	NA	NA	36.7	NO BOLTS IN LID - I TRIED THE BOLTS YOU GAVE US → TOO BIG
8	**VW-5**	OK	YES	OK	~~3259~~ NO LOCK	OK	DRY	DRY	NA	NA	37.5	ARCO TOOL NO LOCK ON WELL I DIDN'T HAVE A 3259
												NEED 7/32" HEX BOLTS

SURVEY POINTS ARE TOP OF WELL CASINGS

FRI 36.7

Summary of Groundwater Monitoring Data
Third 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)	07/30/93	47.61	ND.[2]	<50.	<0.5	<0.5	<0.5	<0.5
MW-2(59)	07/30/93	46.80	ND.	<50.	<0.5	<0.5	<0.5	<0 5
MW-3(59)	07/30/93	48.33	ND.	<50.	<0.5	<0.5	<0.5	<0 5
MW-4(60)	07/30/93	45.96	ND.	<50.	<0.5	<0.5	<0 5	<0 5
FB-1[3]	07/30/93	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: EMC-93-5/Arco 2152, Castro Valley

Enclosed are the results from 5 water samples received at Sequoia Analytical on August 2,1993. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
3H06001	Water, MW-1 (57)	7/30/93	EPA 5030/8015/8020
3H06002	Water, MW-2 (59)	7/30/93	EPA 5030/8015/8020
3H06003	Water, MW-3 (59)	7/30/93	EPA 5030/8015/8020
3H06004	Water, MW-4 (60)	7/30/93	EPA 5030/8015/8020
3H06005	Water, FB-1	7/30/93	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: Jul 30, 1993
1938 Junction Avenue	Sample Matrix:	Water	Received: Aug 2, 1993
San Jose, CA 95131	Analysis Method:	EPA 5030/8015/8020	Reported: Aug 6, 1993
Attention: Jim Butera	First Sample #:	3H06001	

TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 3H06001 MW-1 (57)	Sample I.D. 3H06002 MW-2 (59)	Sample I.D. 3H06003 MW-3 (59)	Sample I.D. 3H06004 MW-4 (60)	Sample I.D. 3H06005 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:	8/4/93	8/4/93	8/4/93	8/4/93	8/4/93
Instrument Identification:	GCHP-6	GCHP-6	GCHP-6	GCHP-6	GCHP-6
Surrogate Recovery, %: (QC Limits = 70-130%)	89	105	106	101	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: EMC-93-5/Arco 2152, Castro Valley
Matrix: Water

QC Sample Group: 3H06001-05

Reported: Aug 6, 1993

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl-Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	C. Donohue	C. Donohue	C. Donohue	C. Donohue
Conc. Spiked:	10	10	10	30
Units:	µg/L	µg/L	µg/L	µg/L
LCS Batch#:	GBLK080493	GBLK080493	GBLK080493	GBLK080493
Date Prepared:	8/4/93	8/4/93	8/4/93	8/4/93
Date Analyzed:	8/4/93	8/4/93	8/4/93	8/4/93
Instrument I.D.#:	GCHP-6	GCHP-6	GCHP-6	GCHP-6
LCS % Recovery:	100	98	110	100
Control Limits:	80-120	80-120	80-120	80-120
MS/MSD Batch #:	3GE5101	3GE5101	3GE5101	3GE5101
Date Prepared:	8/4/93	8/4/93	8/4/93	8/4/93
Date Analyzed:	8/4/93	8/4/93	8/4/93	8/4/93
Instrument I.D.#:	GCHP-6	GCHP-6	GCHP-6	GCHP-6
Matrix Spike % Recovery:	89	88	100	87
Matrix Spike Duplicate % Recovery:	97	96	110	93
Relative % Difference:	8.6	8.7	9.5	7.4

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 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.

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMC-93-5

Chain of Custody

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:

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 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 ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐	
MW-1(57)	2			X		X	HCl	7-30-93	1437		X				930806				0-0 LAB		
MW-2(59)	2			↓		↓	↓	↓	1200		X								-02 LAB		
MW-3(59)	2								1350		X								-03 LAB		
MW-4(60)	2								1248		X								-04 LAB		
EB-1	2			↓		↓	↓	↓	1206		X								-05 LAB		

Method of shipment: ~~SO~~ courier will pick up

Special detection Limit/reporting: Lowest Possible

Special QA/QC: AS Normal

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

0670-026-01
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: 905

	Date	Time		Date	Time
Relinquished by/sampler: Ken Archuleta	7-30-93	1630	Received by: Lisa Stenstrom	8/2/93	
Relinquished by: Lisa Stenstrom	8/2/93	1145	Received by:		
Relinquished by:			Received by laboratory: Stephan Kamegai	8-2-93	9:05

...mental Engineering Pink copy ... Consultant

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-026.01 | SAMPLE ID: MW-1

PURGED BY: K REICHELDERFER | CLIENT NAME: ARCO 2152

SAMPLED BY: ↓ | LOCATION: 22141 CENTER ST. 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.):	5 78
DEPTH TO WATER (feet):	47.62	CALCULATED PURGE (gal.):	20 34
DEPTH OF WELL (feet):	58.0	ACTUAL PURGE VOL. (gal.):	20.50

DATE PURGED: 7-30-93 | Start (2400 Hr) 1411 | End (2400 Hr) 1423

DATE SAMPLED: 7-30-93 | Start (2400 Hr) 1437 | End (2400 Hr) 1440

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1416	7.00	6.77	1629	73.1	BROWN	MODERATE
1422	14.00	6.59	2180	73.3	CLOUDY	LIGHT
1429	20.50	6.56	2320	73.1	↓	↓

D. O. (ppm): NR | ODOR: NONE | COLOR: NR (COBALT 0 - 100) | TURBIDITY: 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: WELL ALMOST DRIED WHILE PURGING W/GRUNDFOS; KEEP SPEED SLOW

Meter Calibration: Date: 7-30-93 Time: 1140 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-2

Signature: Kevin Reichelderfer | Reviewed By: JB | Page 1 of 4

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-026.01 | SAMPLE ID: MW-2

PURGED BY: K REICHELDERFER | CLIENT NAME: ARCO 2152

SAMPLED BY: ↓ | LOCATION: 22141 CENTER ST. 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.):	8.11
DEPTH TO WATER (feet):	4.80	CALCULATED PURGE (gal.):	24.32
DEPTH OF WELL (feet):	59.2	ACTUAL PURGE VOL. (gal.):	24.50

DATE PURGED: 7-30-93 | Start (2400 Hr) 1135 | End (2400 Hr) 1151

DATE SAMPLED: 7-30-93 | Start (2400 Hr) 1200 | End (2400 Hr) 1203

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1141	8.50	6.65	2020	73.0	CLEAR	TRACE
1146	17.00	6.56	2000	70.8	"	"
1151	24.50	6.54	2060	70.6	"	"

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

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB-1 @ 1206

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: OK | LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 7-30-93 Time: 1142 Meter Serial #: 9203 Temperature °F: 80.7

(EC 1000 994 / 1000) (DI 10.72) (pH 7 7.02 / 7.00) (pH 10 9.96 / 10.00) (pH 4 3.91 / ___)

Location of previous calibration: ___

Signature: Kevin Reichelderfer | Reviewed By: JB | Page 1 of 4

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-026.01 | SAMPLE ID: MW-3 5-1

PURGED BY: K REICHELDERFER | CLIENT NAME: ARCO 2152

SAMPLED BY: ↓ | LOCATION: 22141 CENTER ST., 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.): 7.41

DEPTH TO WATER (feet): 48.36 | CALCULATED PURGE (gal.): 22.23

DEPTH OF WELL (feet): 59.7 | ACTUAL PURGE VOL. (gal.): 22.5

DATE PURGED: 7-30-93 | Start (2400 Hr) 1327 | End (2400 Hr) 1342

DATE SAMPLED: 7-30-93 | Start (2400 Hr) 1350 | End (2400 Hr) 1353

TIME (2400 Hr)	VOLUME (gal)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1332	7.50	6.68	2440	73.7	CLOUDY	LIGHT
1337	15.00	6.69	2420	71.1	"	"
1342	22.50	6.64	2400	70.6	↓	↓

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

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: 7-30-93 Time: 1142 | Meter Serial #: 9203 | Temperature °F: ___

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

Location of previous calibration? MW-2

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

WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-026.01 | SAMPLE ID: MW 4 (20)

PURGED BY: K REICHELDERFER | CLIENT NAME: ARCO 2152

SAMPLED BY: ↓ | LOCATION: 22141 CENTER ST., 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.):	9.31
DEPTH TO WATER (feet):	45.95	CALCULATED PURGE (gal.):	27.93
DEPTH OF WELL (feet):	60.2	ACTUAL PURGE VOL. (gal.):	28.00

DATE PURGED: 7-30-93 Start (2400 Hr) 1225 End (2400 Hr) 1240

DATE SAMPLED: 7-30-93 Start (2400 Hr) 1248 End (2400 Hr) 1251

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1230	9.50	6.71	1834	71.3	CLOUDY	LIGHT
1235	19.00	6.69	1825	70.3	"	"
1240	28.00	6.68	1824	69.7	"	"

D. O. (ppm): NR ODOR: NONE

COLOR (COBALT 0 - 100): NR

TURBIDITY (NTU 0 - 200): NR

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: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 7-30-93 Time: 1145 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-2

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