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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Fourth Quarter 1993
at
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

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March 3, 1994

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

Subject: Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1993
ARCO Station 6113
785 East Stanley Boulevard, Livermore, 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 ARCO's contractor, EMCON Associates (EMCON) of San Jose, California, 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 was onsite on November 4, 1993, to measure depth-to-water (DTW) level, to perform subjective analysis for the presence of product in groundwater in wells MW-1 through MW-12, and to perform quarterly groundwater sampling.

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Laboratory Analyses

Water samples from wells MW-1 through MW-5, and MW-7 through MW-12 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 groundwater samples from monitoring well MW-1 were also analyzed for total oil and grease (TOG) using EPA Standard Methods 5520 C&F. The Certified Analytical Reports with Chain of Custody Records are included in Appendix A.

Results of Groundwater Monitoring

Since last quarter, groundwater elevations fell an average of approximately 0.6 foot in wells MW-2, MW-4, MW-7, MW-8, MW-11 and MW-12; rose an average of approximately 0.07 foot in wells MW-1, MW-3, MW-9, and MW-10; and did not change in well MW-6. Floating product 0.01 foot thick was noted in well MW-6 during this quarter. Based on November 4, 1993, DTW data, groundwater is interpreted to flow toward the north with a gradient of approximately 0.03 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.

The following trends in hydrocarbon concentrations in groundwater samples have been identified since the last quarter: TPHg and BTEX continue to be nondetectable in well: MW-1, MW-2, MW-3, and MW-8 through MW-12; TPHg was not detected in well MW-7; concentrations of TPHg and BTEX decreased in well MW-4, concentrations of benzene increased in well MW-7; and floating product continued to be present in MW-6. The highest TPHg and benzene concentrations in groundwater appear to be adjacent and immediately downgradient (west and north) of the existing gasoline underground storage tanks (USTs), situated in the northeastern portion of the site. Cumulative analytical results of water samples are presented in Table 2.

TOG was detected in well MW-1 at concentrations of 2,900 and 2,800 parts per billion (ppb), respectively, for the laboratory method used. The Certified Analytical Reports with Chain of Custody Records are included in Appendix A. Results of these and previous water analyses are summarized in Table 3.

INTERIM SOIL AND GROUNDWATER REMEDIATION SYSTEM

A vapor extraction system (VES) was installed at the site between November 1993 and January 1994. The VES will utilize vapor extraction wells VW-1 through VW-4, and groundwater monitoring well MW-5 to extract hydrocarbon-bearing vapors from the onsite soils. Once system startup is initiated, the extracted vapors will be treated by a 250 standard cubic feet per minute (scfm) thermal/catalytic oxidizer, located in remediation compound (Plate 2). Treated off-gas is to be discharged through a 2-feet by 2-feet square exhaust stack to the atmosphere as per Bay Area Air Quality Management District Permit Requirements. System startup is scheduled for first quarter of 1994.

Previous and Future Work

Fourth Quarter 1993

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

- Performed Fourth Quarter 1993 Groundwater Monitoring.

First Quarter 1994

- Perform First Quarter 1994 Groundwater Monitoring and Sampling.

- Submit Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1993.

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Reporting Requirements

RESNA recommends that copies of this report be forwarded to:

Ms. Susan Hugo
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

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

Ms. Danielle Stefani
Livermore Fire Department
4550 East Avenue
Livermore, California 94550

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

Sincerely,
RESNA Industries Inc.

Zbigniew L. Ignatowicz
Staff Geologist

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

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

Attachments: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, November 4, 1993
Plate 4, TPHg Concentrations in Groundwater
Plate 5, Benzene Concentrations in Groundwater

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Groundwater Samples--TPHg and BTEX
Table 3, Cumulative Results of Laboratory Analyses of Groundwater Samples--VOCs, TPHd, TOG, and Metals

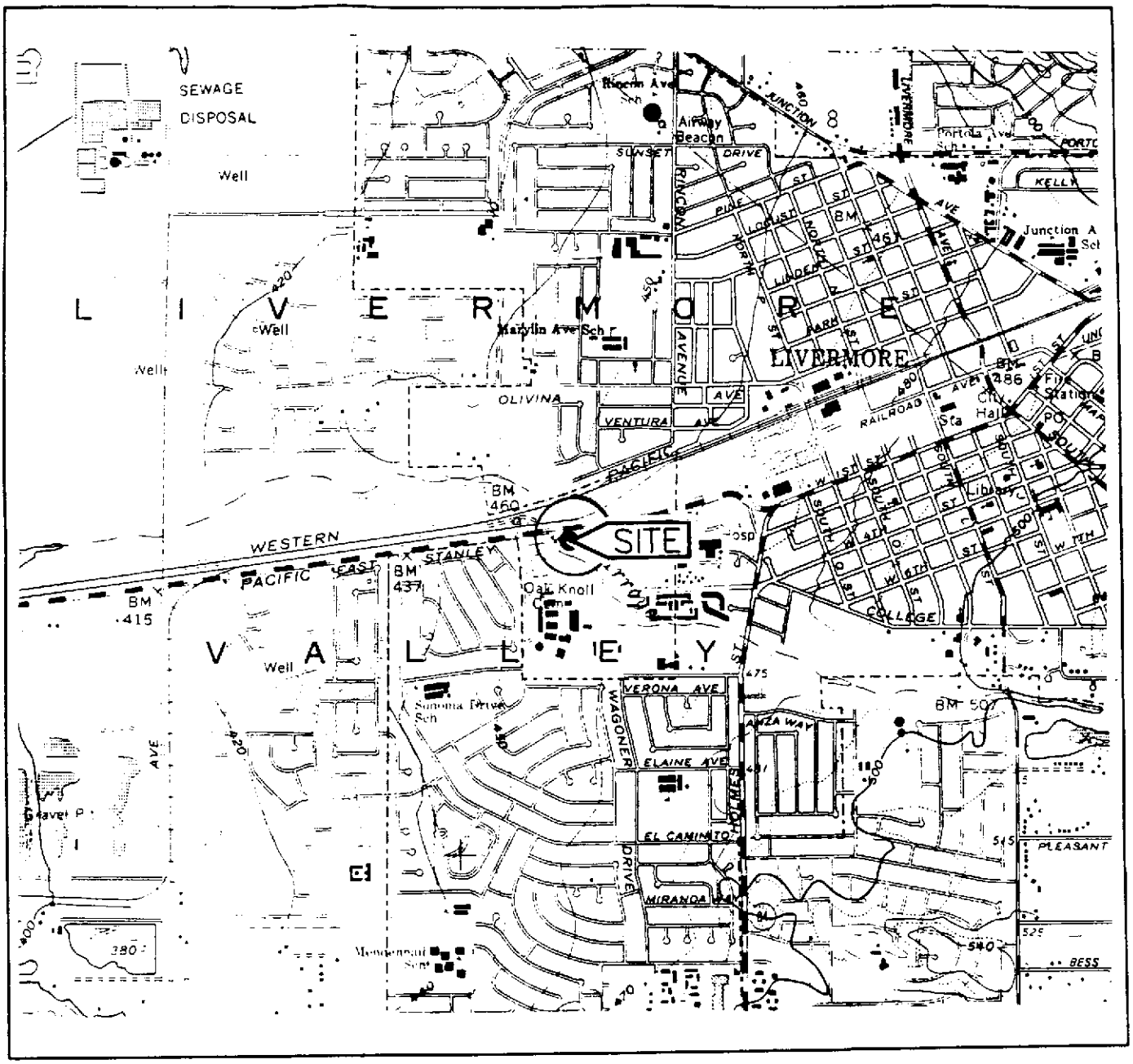
Appendix A: EMCON's Field Report, Summary of Groundwater Monitoring Data, Certified Analytical Reports with Chain-of-Custody, and Water Sample Field Data Sheets.

REFERENCES

RESNA. December 21, 1992. Additional Subsurface Investigation and Vapor Extraction Test at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.07

RESNA. December 29, 1992. Addendum to Work Plan for Initial Offsite and Additional Onsite Subsurface Investigation and Aquifer Pumping Test at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.11

RESNA. November 2, 1993. Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1993, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.08



Source: U.S. Geological Survey
7.5–Minute Quadrangle
Livermore, California
Photorevised 1980

N

Approximate Scale
2000 1000 0 2000
feet

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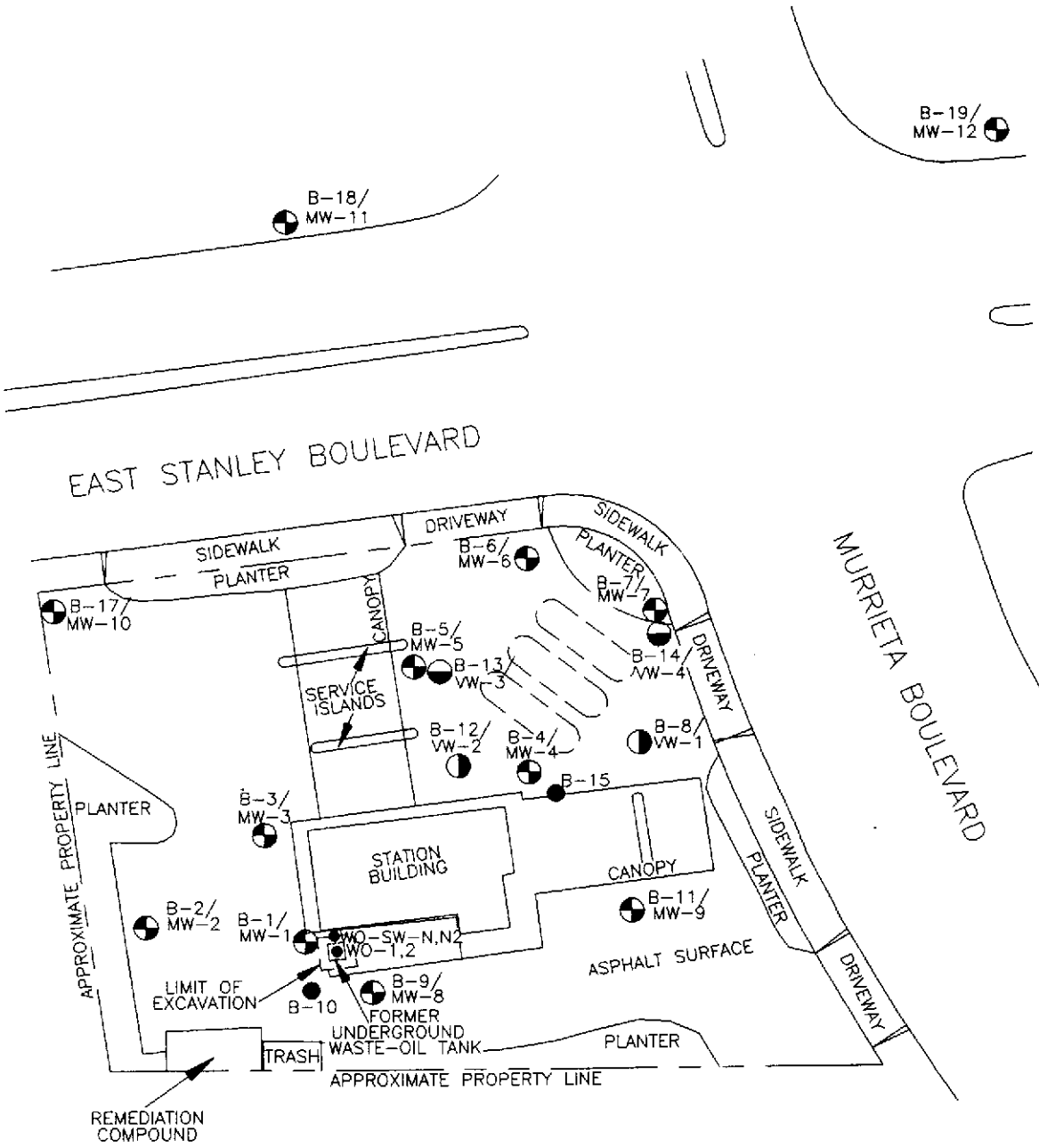
PROJECT 69028.08

SITE VICINITY MAP
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
1



EXPLANATION

B-9/MW-12 = Boring/monitoring well (RESNA, 09/89, 02/91, 06/92 and 03/93)

B-12/VW-2 = Boring/vapor extraction well (RESNA, 06/92 and 08/92)

B-15 = Boring (RESNA, 06/92, 07/93)

B-14/VW-4 = Boring/vapor extraction well (RESNA, 07/93)

WO-SW-N,N2 = Soil sample collected by Pacific (1989)

= Existing underground gasoline storage tanks

Approximate Scale

50 25 0 50 100

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., Feb. 1991; and John Koch Land Surveyor, June 1992 and April 1993.

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PROJECT: 69028.08 690288SP

GENERALIZED SITE PLAN
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE
2

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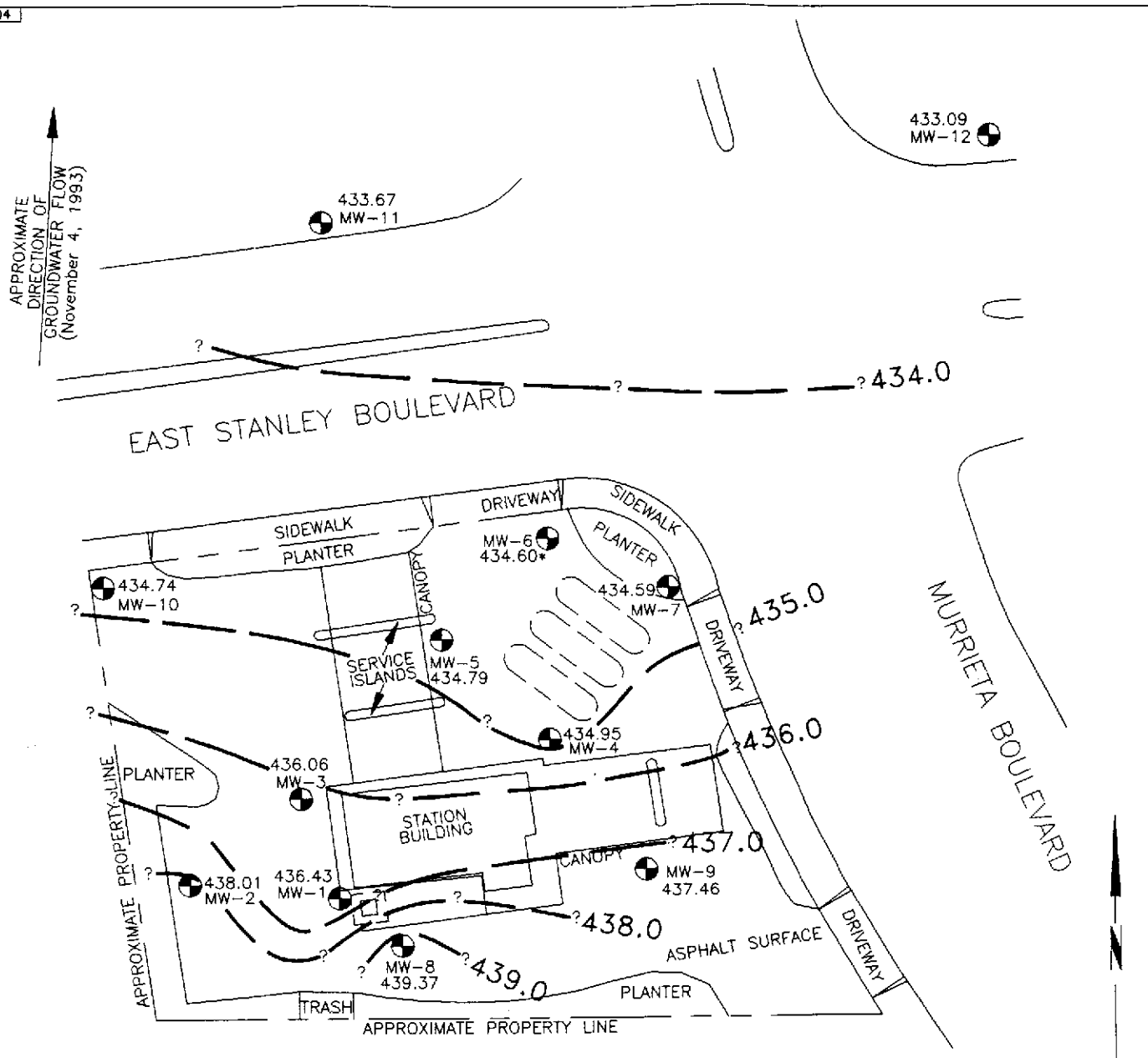

EXPLANATION

MW-12 = Monitoring well (RESNA, 09/89, 02/91, 06/92 and 03/93)

439.0 = Line of equal elevation of groundwater in feet above mean sea level (MSL)

439.37 = Elevation of groundwater in feet above MSL, November 4, 1993

= Existing underground gasoline storage tanks

* = Elevation corrected for presence of product

Approximate Scale

50 25 0 50 100

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., Feb. 1991; and John Koch Land Surveyor, June 1992 and April 1993.

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PROJECT: 69028.08

GROUNDWATER GRADIENT MAP
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 3

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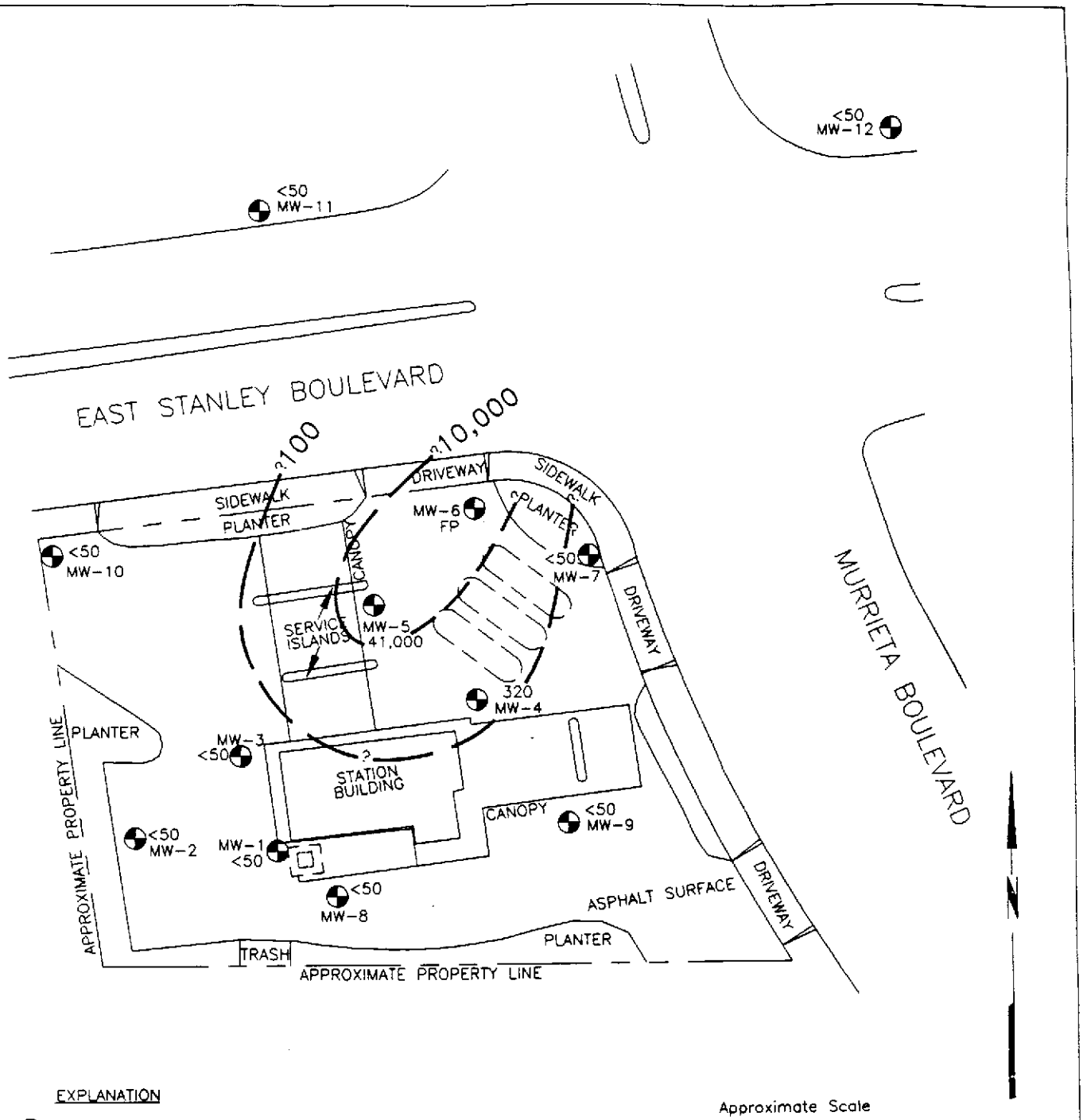

EXPLANATION

MW-12 = Monitoring well (RESNA, 09/89, 02/91, 06/92 and 03/93)

10,000 = Line of equal concentration of TPHg in groundwater in parts per billion (ppb)

41,000 = Concentration of TPHg in groundwater in ppb, November 4, 1993

FP = Floating product present (not sampled)

= Existing underground gasoline storage tanks

Approximate Scale

50 25 0 50 100

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., Feb. 1991; and John Koch Land Surveyor, June 1992 and April 1993.

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TPHg CONCENTRATIONS IN GROUNDWATER
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 4

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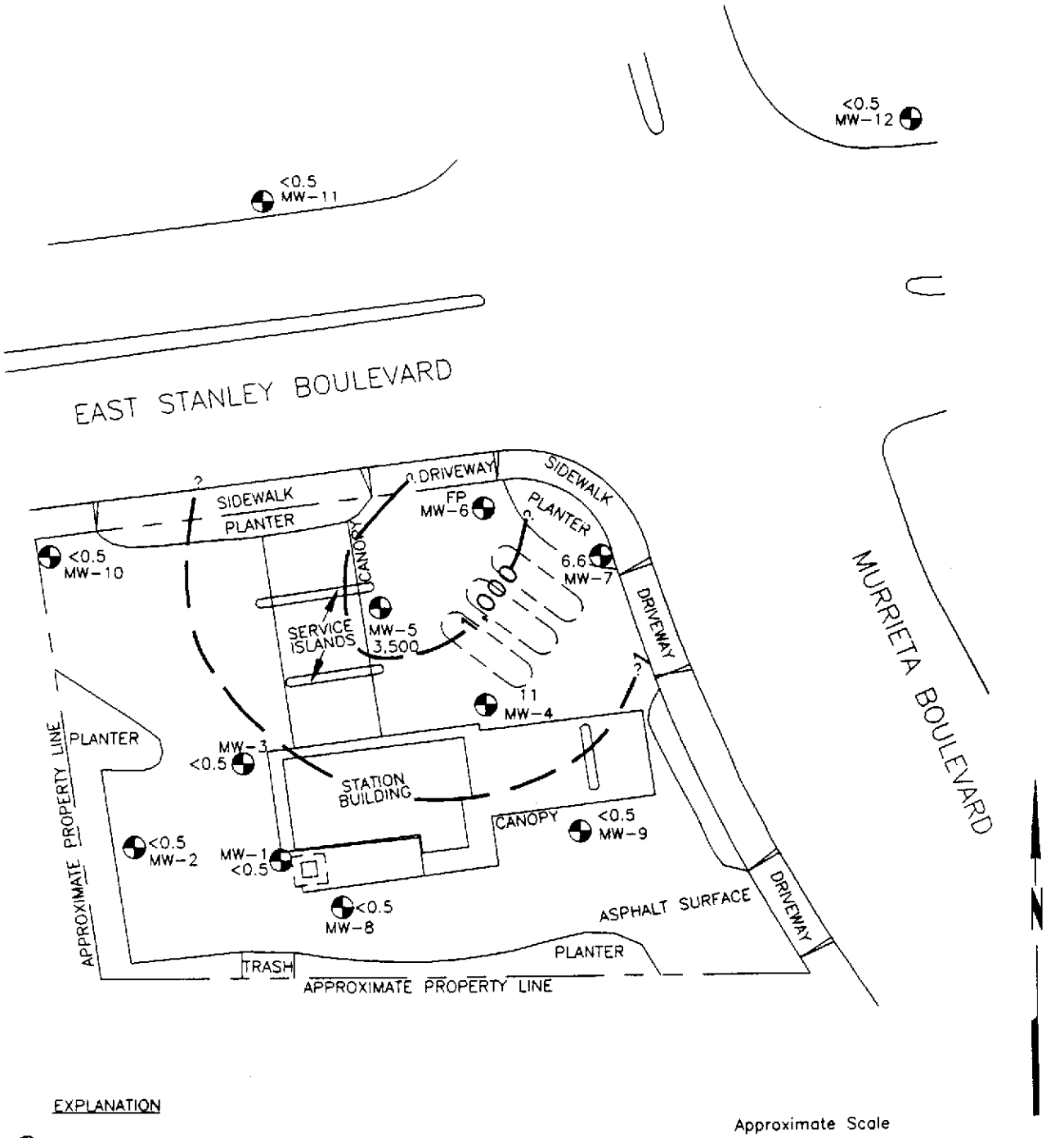

EXPLANATION

MW-12 = Monitoring well (RESNA, 09/89, 02/91, 06/92 and 03/93)

1,000 = Line of equal concentration of benzene in groundwater in parts per billion (ppb)

3,500 = Concentration of benzene in groundwater in ppb, November 4, 1993

FP = Floating product present (not sampled)

= Existing underground gasoline storage tanks

Approximate Scale

50 25 0 50 100

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., Feb. 1991; and John Koch Land Surveyor, June 1992 and April 1993.

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BENZENE CONCENTRATIONS IN GROUNDWATER
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE 5

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 1 of 7)

Well Date	Elevation of Wellhead	Depth- to-Water	Elevation of Groundwater	Floating Product
MW-1				
09/20/89	457.04	21.03	436.01	None
10/12/89		19.64	437.40	None
06/21/90		21.72	435.32	None
09/20/90		19.79	437.25	None
12/18/90		19.28	437.76	None
02/21/91		22.45	434.59	None
03/20/91		19.87	437.17	None
04/10/91		19.42	437.62	None
05/20/91		25.95	431.09	None
06/20/91		32.55	424.49	None
07/25/91		38.22	418.82	None
08/13/91		40.74	416.30	None
09/12/91		43.16	413.88	None
10/22/91		Dry	Dry	None
11/13/91		Dry	Dry	None
12/21/91		Dry	Dry	None
01/18/92		Dry	Dry	None
02/21/92		Dry	Dry	None
03/19/92		36.16	420.88	None
04/24/92		38.14	418.90	None
05/20/92		40.74	416.30	None
06/29/92		43.80*	–	None
07/28/92		Dry	Dry	None
08/26/92		Dry	Dry	None
09/11/92		Dry	Dry	None
10/29/92		Dry	Dry	None
11/11/92		Dry	Dry	None
12/14/92		Not monitored due to construction activities		
01/27/93		30.10	426.94	None
02/26/93		24.72	432.32	None
03/30/93		20.87	436.17	None
04/30/93		19.46	437.58	None
05/14/93		19.27	437.77	None
06/17/93		19.21	437.83	None
07/27/93		19.95	437.09	None
08/30/93		20.72	436.32	None
11/04/93		20.61	436.43	None
MW-2				
09/20/89	457.74	20.67	437.07	None
10/12/89		18.98	438.76	None

See notes on page 7 of 7.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 2 of 7)

Well Date	Elevation of Wellhead	Depth- to-Water	Elevation of Groundwater	Floating Product
MW-2 cont.				
06/21/90	457.74	21.88	435.86	None
09/20/90		19.90	437.84	None
12/18/90		19.32	438.42	None
02/21/91		23.02	434.72	None
03/20/91		20.01	437.73	None
04/10/91		19.81	437.93	None
05/20/91		26.62	431.12	None
06/20/91		33.15	424.59	None
07/25/91		37.10	420.64	None
08/13/91		37.20	420.54	None
09/12/91		37.44*	—	None
10/22/91		37.38*	—	None
11/13/91		37.39*	—	None
12/21/91		Dry	Dry	None
01/18/92		37.65*	—	None
02/21/92		37.75*	—	None
03/19/92		35.82	421.92	None
04/24/92		36.64	421.10	None
05/20/92		37.23	420.51	None
06/29/92		37.67*	—	None
07/28/92		38.36*	—	None
08/26/92		38.26*	—	None
09/11/92		38.37*	—	None
10/29/92		Dry	Dry	None
11/11/92		Dry	Dry	None
12/14/92		Not monitored due to construction activities		
01/27/93		32.87	424.87	None
02/26/93		Not monitored due to construction activities		
03/30/93		20.47	437.27	None
04/30/93		19.02	438.72	None
05/14/93		18.65	439.09	None
06/17/93		18.21	439.53	None
07/27/93		17.95	439.79	None
08/30/93		18.43	439.31	None
11/04/93		19.73	438.01	None
MW-3				
09/20/89	456.97	20.98	435.99	None
10/12/89		19.66	437.31	None
06/21/90		21.72	435.25	None
09/20/90		19.72	437.25	None

See notes on page 7 of 7.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 3 of 7)

Well Date	Elevation of Wellhead	Depth- to-Water	Elevation of Groundwater	Floating Product
MW-3 cont.				
12/18/90	456.97	19.21	437.76	None
02/21/91		22.36	434.61	None
03/20/91		19.79	437.18	None
04/10/91		19.35	437.62	None
05/20/91		25.86	431.11	None
06/20/91		32.45	424.52	None
07/25/91		38.06	418.91	None
08/13/91		38.40	418.57	None
09/12/91		Dry	Dry	None
10/22/91		Dry	Dry	None
11/13/91		Dry	Dry	None
12/21/92		Dry	Dry	None
01/18/92		38.90*	—	None
02/21/92		38.88*	—	None
03/19/92		36.03	420.94	None
04/24/92		37.92	419.05	None
05/20/92		38.57*	—	None
06/29/92		38.70*	—	None
07/28/92		39.05*	—	None
08/26/92		39.03*	—	None
09/11/92		39.02*	—	None
10/29/92		Dry	Dry	None
11/11/92		Dry	Dry	None
12/14/92		Not monitored due to construction activities		
01/27/93		30.36	426.61	None
02/26/93		24.96	432.01	None
03/30/93		21.45	435.52	None
04/30/93		19.43	437.54	None
05/14/93		19.37	437.60	None
06/17/93		19.38	437.59	None
07/27/93		20.10	436.87	None
08/30/93		20.98	435.99	None
11/04/93		20.91	436.06	None
MW-4				
02/21/91	456.55	22.01	434.96	None
03/20/91		20.31	436.66	None
04/10/91		19.55	437.42	None
05/20/91		25.24	431.73	None
06/20/91		Dry	Dry	None
07/25/91		Dry	Dry	None

See notes on page 7 of 7.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 4 of 7)

Well Date	Elevation of Wellhead	Depth- to-Water	Elevation of Groundwater	Floating Product
MW-4 cont.				
08/13/91	456.55	Dry	Dry	None
09/12/91		Dry	Dry	None
10/22/91		Dry	Dry	None
11/13/91		Dry	Dry	None
12/21/92		Dry	Dry	None
01/18/92		Dry	Dry	None
02/21/92		Dry	Dry	None
03/19/92		Dry	Dry	None
04/24/92		Dry	Dry	None
05/20/92		Dry	Dry	None
06/29/92		Dry	Dry	None
07/28/92		Dry	Dry	None
08/26/92		Dry	Dry	None
09/11/92		Dry	Dry	None
10/29/92		Dry	Dry	None
11/11/92		Dry	Dry	None
12/14/92		Not monitored due to construction activities		
01/27/93		Dry	Dry	None
02/26/93		23.60	432.95	None
03/30/93		20.87	435.68	None
04/30/93		19.73	436.82	None
05/14/93		19.75	436.80	None
06/17/93		19.69	436.86	None
07/27/93		20.40	436.15	None
08/30/93		21.10	435.45	None
11/04/93		21.60	434.95	None
MW-5				
06/29/92	455.84	50.53	405.31	None
07/28/92		54.92	400.92	None
08/26/92		59.58	396.26	None
09/11/92		60.88	394.96	None
10/29/92		61.86*	—	None
11/11/92		62.53*	—	None
12/14/92		Not monitored due to construction activities		
01/27/93		29.08	426.76	None
02/26/93		23.56	432.28	None
03/30/93		20.32	435.52	None
04/30/93		19.57	436.27	None
05/14/93		19.29	436.55	None
06/17/93		18.66	437.18	None

See notes on page 7 of 7.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 5 of 7)

Well Date	Elevation of Wellhead	Depth- to-Water	Elevation of Groundwater	Floating Product
MW-5 cont.				
07/27/93	455.84	20.16	435.68	None
07/27/93		20.16	435.68	None
08/30/93		—	—	—
11/04/93		21.05	434.79	None
MW-6				
06/29/92	454.93	49.72	405.21	None
07/28/92		54.63	400.30	None
08/26/92		59.45	395.48	None
09/11/92		60.73**	394.20**	0.04
10/29/92		62.14	392.79	None
11/11/92		62.42**	392.51**	0.03
12/14/92		Not monitored due to construction activities		
01/27/93		Not monitored due to construction activities		
02/26/93		22.73	432.20	None
03/30/93		19.53	435.40	None
04/30/93		18.76	436.17	None
05/14/93		19.19**	435.74**	0.01
06/17/93		18.54	436.39	None
06/17/93		18.54	436.39	None
07/27/93		19.47	435.46	None
08/30/93		20.33**	434.60**	0.01
11/04/93		20.33**	434.60**	0.01
MW-7				
06/29/92	454.92	49.57	405.35	None
07/28/92		54.60	400.32	None
08/26/92		59.60	395.32	None
09/11/92		60.74	394.18	None
10/29/92		62.23	392.69	None
11/11/92		62.69	392.23	None
12/14/92		Not monitored due to construction activities		
01/27/93		27.97	426.95	None
02/26/93		22.57	432.35	None
03/30/93		19.29	435.63	None
04/30/93		18.79	436.13	None
05/14/93		18.35	436.57	None
06/17/93		18.36	436.56	None
07/27/93		19.49	435.43	None
08/30/93		20.26	434.66	None
11/04/93		20.33	434.59	None

See notes on page 7 of 7.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 6 of 7)

Well Date	Elevation of Wellhead	Depth- to-Water	Elevation of Groundwater	Floating Product
MW-8				
06/29/92	456.97	50.40	406.57	None
07/28/92		55.79	401.18	None
08/28/92		60.79	396.18	None
09/11/92		61.97	395.00	None
10/29/92		63.51	393.46	None
11/11/92		64.21	392.76	None
12/14/92		Not monitored due to construction activities		
01/27/93		25.57	431.40	None
02/26/93		19.86	437.11	None
03/30/93		16.69	440.28	None
04/30/93		15.83	441.14	None
05/14/93		15.79	441.18	None
06/17/93		15.79	441.18	None
07/27/93		16.80	440.17	None
08/30/93		17.37	439.60	None
11/04/93		17.60	439.37	None
MW-9				
06/29/92	456.18	50.29	405.89	None
07/28/92		55.53	400.65	None
08/26/92		60.62	395.56	None
09/11/92		61.67	394.51	None
10/29/92		63.17	393.01	None
11/11/92		63.68	392.50	None
12/14/92		Not monitored due to construction activities		
01/27/93		26.48	429.70	None
02/26/93		Not monitored due to construction activities		
03/30/93		17.77	438.41	None
04/30/93		17.01	439.17	None
05/14/93		16.55	439.63	None
06/17/93		16.68	439.50	None
07/27/93		17.77	438.41	None
08/30/93		18.74	437.44	None
11/04/93		18.72	437.46	None
MW-10				
03/30/93	456.85	21.33	435.52	None
04/30/93		20.51	436.34	None
05/14/93		20.26	436.59	None
06/17/93		20.30	436.55	None
07/27/93		20.29	436.56	None

See notes on page 7 of 7.

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 7 of 7)

Well Date	Elevation of Wellhead	Depth- to-Water	Elevation of Groundwater	Floating Product
MW-10 cont.				
03/30/93	456.85	21.33	435.52	None
04/30/93		20.51	436.34	None
05/14/93		20.26	436.59	None
06/17/93		20.30	436.55	None
07/27/93		20.29	436.56	None
08/30/93		22.19	434.66	None
11/04/93		22.11	434.74	None
MW-11				
03/30/93	455.07	20.78	434.29	None
04/30/93		20.71	434.36	None
05/14/93		20.01	435.06	None
06/17/93		20.18	434.89	None
07/27/93		21.31	433.76	None
08/30/93		21.09	434.98	None
11/04/93		21.40	433.67	None
MW-12				
03/30/93	455.04	21.33	433.71	None
04/30/93		20.23	434.81	None
05/14/93		19.97	435.07	None
06/17/93		20.00	435.04	None
07/27/93		20.94	434.10	None
08/30/93		21.79	433.25	None
11/04/93		21.95	433.09	None

For MW-1 through MW-3 (surveyed by Ron Archer in October 1988) and MW-4 (surveyed by Ron Archer in February 1991) wellhead elevation based on benchmark: Top of pin set in concrete in the most westerly monument at the intersection of East Stanley Boulevard and Fenton Avenue. Elevation taken as 455.896 mean sea level. City of Livermore Datum.
For MW-4 through MW-9 (surveyed by John Koch in June 1992) and MW-10 through MW-12 (surveyed by John Koch in April 1993) wellhead elevation based on benchmark: Top of pin in standard monument, at intersection of El Rancho Drive and Albatross Ave. Elevation taken as 448.218'. City of Livermore Datum.
Measurements in feet.
* Residual water.
**Adjusted water level due to product. The recorded thickness of the floating product was multiplied by 0.80 to obtain an approximate value for the displacement of water by the floating product. This approximate displacement value was then subtracted from the measured depth to water as the corrected depth to water. These calculated groundwater depths were subtracted from surveyed wellhead elevations to obtain the differences in groundwater elevations.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES – TPHg and BTEX
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 1 of 4)

Well Date	TPHg	Benzene	Toluene	Ethyl- benzene	Total Xylenes
MW-1					
09/20/89	80	3.0	1.0	0.7	1
06/21/90	<20	<0.50	0.66	<0.50	<0.50
09/20/90	<50	<0.5	1.0	<0.5	1.8
12/18/90	<50	<0.5	1.8	<0.5	1.7
02/21/91	<50	1.2	2.3	<0.5	2.2
05/20/91	<30	<0.30	<0.30	<0.30	<0.30
08/13/91		Not sampled–dry			
11/13/91		Not sampled–dry			
03/19/92	400	<3.5*	<1.2*	<0.8*	<1.0*
06/29/92		Not sampled–residual water only			
09/11/92		Not sampled–dry			
11/12/92		Not sampled–dry			
03/30/93	<50	<0.5	<0.5	<0.5	<0.5
05/14/93	<50	<0.5	<0.5	<0.5	<0.5
08/30/93	<50	<0.5	<0.5	<0.5	<0.5
11/04/93	<50	<0.5	<0.5	<0.5	<0.5
MW-2					
09/20/89	<50	<0.5	<0.5	<0.5	<1
06/21/90	<20	<0.50	<0.50	<0.50	<0.50
09/20/90	<50	<0.5	0.7	<0.5	1.4
12/18/90	<50	0.6	1.5	<0.5	1.9
02/21/91	<50	<0.5	<0.5	<0.5	<0.5
05/20/91	<30	<0.30	<0.30	<0.30	<0.30
08/13/91		Not sampled–dry			
11/13/91		Not sampled–dry			
03/19/92	<50	<0.5	<0.5	<0.5	<0.5
06/29/92	<50	<0.5	<0.5	<0.5	<0.5
09/11/92		Not sampled–residual water only			
11/12/92		Not sampled–dry			
03/30/93	<50	<0.5	<0.5	<0.5	<0.5
05/14/93	<50	<0.5	<0.5	<0.5	<0.5
08/30/93	<50	<0.5	<0.5	<0.5	<0.5
11/04/93	<50	<0.5	<0.5	<0.5	<0.5
MW-3					
09/20/89	170	8.9	0.6	1.1	<1
06/21/90	<20	<0.50	1.0	<0.50	<0.50
09/20/90	<50	<0.5	1.0	<0.5	1.9
12/18/90	<50	<0.5	1.7	<0.5	2.0
02/21/91	<50	<0.5	<0.5	<0.5	<0.5

See notes on page 4 of 4.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES – TPHg and BTEX
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 2 of 4)

Well Date	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MW-3 cont.					
05/20/91	97	1.3	1.1	6.2	8.4
08/13/91		Not sampled--dry			
11/13/91		Not sampled--dry			
03/19/92	220	<1.1*	<1.9	<0.6*	<0.8*
06/29/92		Not sampled --residual water only			
09/11/92		Not sampled --residual water only			
11/12/92		Not sampled--dry			
03/30/93	200**	<4.0*	<0.5	<0.5	<0.5
05/14/93	72**	<3.0*	<0.5	<0.5	<0.5
08/30/93	<50	<0.5	<0.5	<0.5	<0.5
11/04/93	<50	<0.5	<0.5	<0.5	<0.5
MW-4					
02/21/91	3,500	410	7.6	30	47
05/20/91	1,400	150	6.0	4.4	3.1
08/13/91		Not sampled--dry			
11/13/91		Not sampled--dry			
03/19/92		Not sampled--dry			
06/29/92		Not sampled--dry			
09/11/92		Not sampled--dry			
11/12/92		Not sampled--dry			
03/31/93	680	110	5.2	3.0	7.4
05/14/93	1,200	200	6.2	15	9.2
08/30/93	620	22	0.9	3.6	2.1
11/04/93	320	11	<0.5	1.3	0.9
MW-5					
06/29/92	8,900	1,700	640	310	1,100
09/11/92	13,000	2,200	1,500	130	930
11/12/92		Not sampled--residual water only			
03/31/93	9,700	1,700	430	220	880
05/14/93	9,800	1,300	820	270	1,100
08/30/93		Not sampled--well inaccessible			
11/04/93	41,000	3,500	3,100	890	5,400
MW-6					
06/29/92	8,600	1,800	460	52	450
09/11/92		Not sampled--floating product			
11/12/92		Not sampled--floating product			
03/31/93		Not sampled--floating product			
05/14/93		Not sampled--floating product			

See notes on page 4 of 4.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES – TPHg and BTEX
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 3 of 4)

Well Date	TPHg	Benzene	Toluene	Ethyl- benzene	Total Xylenes
MW-6 cont.					
08/30/93		Not sampled–floating product			
11/04/93		Not sampled–floating product			
MW-7					
06/29/92	270	38	3.7	1.1	4.4
09/11/92	420	20	0.7	<0.5	<0.5
11/12/92	470	31	1.0	<0.5	0.8
03/31/93	190	20	1.0	<0.5	<0.5
05/14/93	170	17	0.6	<0.5	0.5
08/30/93	<50	1.8	<0.5	<0.5	0.5
11/04/93	<50	6.6	<0.5	<0.5	0.8
MW-8					
6/29/92	<50	<0.5	<0.5	<0.5	<0.5
09/11/92	<50	<0.5	<0.5	<0.5	<0.5
11/12/92	<50	<0.5	<0.5	<0.5	<0.5
03/30/93	<50	<0.5	<0.5	<0.5	<0.5
05/14/93	<50	<0.5	<0.5	<0.5	<0.5
08/30/93	<50	<0.5	<0.5	<0.5	<0.5
11/04/93	<50	<0.5	<0.5	<0.5	<0.5
MW-9					
06/29/92	<50	<0.5	<0.5	<0.5	<0.5
09/11/92	<50	<0.5	<0.5	<0.5	<0.5
11/12/92	<50	<0.5	<0.5	<0.5	<0.5
03/31/93	<50	<0.5	<0.5	<0.5	<0.5
05/14/93	<50	<0.5	<0.5	<0.5	<0.5
08/30/93	<50	<0.5	<0.5	<0.5	<0.5
11/04/93	<50	<0.5	<0.5	<0.5	<0.5
MW-10					
03/31/93	230**	<0.5	<0.5	<1.0*	0.6
05/14/93	440**	<10*	<0.6*	<0.9*	<0.5
08/30/93	280**	<4*	<0.5	<1.3*	0.6
11/04/93	<50	<0.5	<0.5	<0.5	<0.5
MW-11					
03/31/93	<50	<0.5	<0.5	<0.5	<0.5
05/14/93	<50	<0.5	<0.5	<0.5	<0.5
08/30/93	<50	<0.5	<0.5	<0.5	<0.5
11/04/93	<50	<0.5	<0.5	<0.5	<0.5

See notes on page 4 of 4.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES – TPHg and BTEX
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 4 of 4)

Well Date	TPHg	Benzene	Toluene	Ethyl- benzene	Total Xylenes
MW-12					
03/31/93	150	20	<0.5	<0.5	<0.5
05/14/93	<50	<0.5	<0.5	<0.5	<0.5
08/30/93	<50	<0.5	<0.5	<0.5	<0.5
11/04/93	<50	<0.5	<0.5	<0.5	<0.5
MCLs	None	1.0	None	680	1,750
DWAL	None	None	100	None	None

Results in parts per billion (ppb). Benzene, toluene, ethylbenzene and total xylenes by EPA Method 5030/8020/DHS LUFT Method.
TPHg = Total petroleum hydrocarbons as gasoline by EPA Method 5030/8020/DHS LUFT Method.
< = Less than the detection limits shown.
MCLs = Adopted Maximum Contaminant Levels in Drinking Water, DHS (October 1990)
DWAL = Recommended Drinking Water Action Level, DHS (October 1990)
* = Laboratory reportedly raised detection limit due to matrix interference.
** = The sample contains components eluting in the gasoline range that were quantitated as gasoline. The chromatogram does not match the typical gasoline fingerprint.

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TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES -- VOCs, TPHd, TOG, and Metals
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 1 of 3)

Well Date	VOCs	TPHd	TOG	Cd	Cr	Pb	Zn	Ni
MW-1								
09/20/89	NA	<50	<5,000	NA	NA	NA	NA	NA
06/21/90	NA	<100	13,000	NA	NA	NA	NA	NA
09/20/90	NA	<50	<5,000	NA	NA	NA	NA	NA
12/18/90	NA	<5,000	NA	NA	NA	NA	NA	NA
02/21/91	NA	<5,000	NA	NA	NA	NA	NA	NA
05/20/91	NA	<75,000	NA	NA	NA	NA	NA	NA
08/13/91	NS	NS	NS	NS	NS	NS	NS	NS
11/13/91	NS	NS	NS	NS	NS	NS	NS	NS
03/19/92	NA	NA	NA	NA	NA	NA	NA	NA
06/29/92	NS	NS	NS	NS	NS	NS	NS	NS
09/11/92	NS	NS	NS	NS	NS	NS	NS	NS
11/12/92	NS	NS	NS	NS	NS	NS	NS	NS
03/30/93	NA	NA	NA	NA	NA	NA	NA	NA
05/14/93	NA	NA	120,000	NA	NA	NA	NA	NA
08/30/93	NA	NA	900/700	NA	NA	NA	NA	NA
11/04/93	NA	NA	2,900/2,800	NA	NA	NA	NA	NA
MW-2								
09/20/89	NA	<50	<5,000	NA	NA	NA	NA	NA
06/21/90	NA	<100	<5,000	NA	NA	NA	NA	NA
09/20/90	NA	<50	<5,000	NA	NA	NA	NA	NA
12/18/90	NA	NA	<5,000	NA	NA	NA	NA	NA
02/21/91	NA	NA	<5,000	NA	NA	NA	NA	NA
05/20/91	NA	NA	<75,000	NA	NA	NA	NA	NA
08/13/91	NS	NS	NS	NS	NS	NS	NS	NS
11/13/91	NS	NS	NS	NS	NS	NS	NS	NS
03/19/92	NA	NA	NA	NA	NA	NA	NA	NA
06/29/92	NA	NA	NA	NA	NA	NA	NA	NA
09/11/92	NS	NS	NS	NS	NS	NS	NS	NS
11/12/92	NS	NS	NS	NS	NS	NS	NS	NS
03/30/93	NA	NA	NA	NA	NA	NA	NA	NA
05/14/93	NA	NA	NA	NA	NA	NA	NA	NA
MW-3								
09/20/89	NA	<50	<5,000	NA	NA	NA	NA	NA
06/21/90	NA	<100	10,000	NA	NA	NA	NA	NA
09/20/90	NA	<50	<5,000	NA	NA	NA	NA	NA
12/18/90	NA	NA	<5,000	NA	NA	NA	NA	NA
02/21/91	NA	NA	<5,000	NA	NA	NA	NA	NA
05/20/91	NA	NA	<75,000	NA	NA	NA	NA	NA

See notes on page 3 of 3.

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TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES -- VOCs, TPHd, TOG, and Metals
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 2 of 3)

Well Date	VOCs	TPHd	TOG	Cd	Cr	Pb	Zn	Ni
MW-3 cont.								
08/13/91	NS	NS	NS	NS	NS	NS	NS	NS
11/13/91	NS	NS	NS	NS	NS	NS	NS	NS
03/19/92	NA	<50	<5,000	NA	NA	NA	NA	NA
06/29/92	NS	NS	NS	NS	NS	NS	NS	NS
09/11/92	NS	NS	NS	NS	NS	NS	NS	NS
11/12/92	NS	NS	NS	NS	NS	NS	NS	NS
03/30/93	NA	NA	NA	NA	NA	NA	NA	NA
05/14/93	NA	NA	NA	NA	NA	NA	NA	NA
MW-4								
02/21/91	NA	NA	<5,000	NA	NA	NA	NA	NA
05/20/91	NA	NA	<75,000	NA	NA	NA	NA	NA
08/13/91	NS	NS	NS	NS	NS	NS	NS	NS
11/13/91	NS	NS	NS	NS	NS	NS	NS	NS
03/19/92	NS	NS	NS	NS	NS	NS	NS	NS
06/29/92	NS	NS	NS	NS	NS	NS	NS	NS
09/29/92	NS	NS	NS	NS	NS	NS	NS	NS
11/12/92	NS	NS	NS	NS	NS	NS	NS	NS
03/31/93	NA	NA	NA	NA	NA	NA	NA	NA
05/14/93	NA	NA	NA	NA	NA	NA	NA	NA
MW-8								
06/29/92	ND*	<50	<500	<3	1,780	143	1,310	5,100
09/11/92	NA	<50	<500	13	3,580	308	2,620	10,300
11/12/92	NA	NA	NA	28	3,440	221	2,550	9,840
03/31/93	NA	NA	NA	NA	NA	NA	NA	NA
05/14/93	NA	NA	NA	NA	NA	NA	NA	NA

See notes on page 3 of 3.

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TABLE 3
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES – VOCs, TPHd, TOG, and Metals
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 3 of 3)

Well Date	VOCs	TPHd	TOG	Cd	Cr	Pb	Zn	Ni
MW-9								
11/12/92	NA	NA	NA	10	1,080	101	859	3,070
03/31/93	NA	NA	NA	NA	NA	NA	NA	NA
05/14/93	NA	NA	NA	NA	NA	NA	NA	NA
MCL:	Varies	---	---	10	50	50	5,000	---

Results in micrograms per liter (ug/L) = parts per billion (ppb).

VOCs:	Halogenated Volatile Organic Compounds by EPA Method 5030/601.
TPHd:	Total petroleum hydrocarbons as diesel by EPA Methods 3510/California DHS LUFT Method.
TOG:	Total oil and grease measured by EPA Method 5520 C&F.
Cd:	Cadmium by EPA Method 6010.
Cr:	Chromium by EPA Method 6010.
Ni:	Nickel by EPA Method 6010.
Zn:	Zinc by EPA Method 6010.
Pb:	Lead by EPA Method 7421.
NA:	Not analyzed.
<:	Results reported as less than the detection limit.
NS:	Well not sampled.
ND:	Not detected.
*:	31 compounds tested were nondetectable.
MCL:	Adopted Maximum Contaminant Levels in Drinking Water (October 1990)

APPENDIX A

EMCON'S FIELD REPORT, SUMMARY OF GROUNDWATER MONITORING DATA, CERTIFIED ANALYTICAL REPORTS WITH CHAIN-OF-CUSTODY, AND WATER SAMPLE FIELD DATA SHEETS

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

RECEIVED
DEC - 2 1993
RESNA
SAN JOSE

Date November 30, 1993
Project 0G70-038.01

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
12	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 6113, 785 East Stanley Blvd, Livermore, CA. Groundwater monitoring is conducted consistent with applicable regulatory guidelines. Please call if you have any questions: (408) 453-7300.

Jim Butera JB

Reviewed by:

6/31/96

Robert C Porter

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-038.01 STATION ADDRESS : 785 East Stanley Blvd. Livermore DATE : 11-4-93

ARCO STATION # : 6113 FIELD TECHNICIAN : K REICHELDERFER / J WILLIAMS DAY : THURSDAY

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 HEX	OK	3259	OK	20.61	20.61	ND	NA	44.8	—
2	MW-2	OK	YES HEX	OK	3259	OK	19.73	19.73	ND	NA	38.7	—
5 →	MW-3	OK	YES HEX	OK	3259	OK	20.91	20.91	ND	NA	39.1	WELL WAS UNDER PRESSURE
3	MW-8	OK	YES 15/16	OK	3259	OK	17.60	17.60	ND	NA	66.6	—
4	MW-9	OK	YES 15/16	OK	3259	POOR	18.72	18.72	ND	NA	67.9	REPLACED LWC
5	MW-11	OK	YES 15/16	OK	3259	OK	21.40	21.40	ND	NA	44.5	—
6	MW-12	OK	YES 15/16	OK	3259	OK	21.95	21.95	ND	NA	33.1	—
7	MW-7	OK	YES 15/16	OK	3259	OK	20.33	20.33	ND	NA	67.7	—
9 →	MW-10	OK	YES 15/16	OK	3259	[illegible] OK	22.11	22.11	ND	NA	50.0	~~REPLACED LWC~~ KR
10	MW-4	OK	YES 15/16	OK	3259 Dolphin	OK	21.60	21.60	ND	NA	26.7	—
11	MW-5	OK	VAULT Box	OK	none	Slip	21.05	21.05	ND	NA	62.6	LID IS HARD TO OPEN/CLOSE
12	MW-6	OK	YES 15/16	OK	3259	OK	20.34	20.34	ND*	NA	66.7	*0.01 DETECTED W/TEFLON BAILER

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
Fourth Quarter 1993
ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California
micrograms per liter (µg/l) and milligrams per liter (mg/l)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH[1] as Gasoline (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	Total Oil & Grease 5520C/F (mg/l)
MW-1(44)	11/04/93	20.61	ND.[2]	<50.	<0.5	<0.5	<0.5	<0.5	2.9/2.8
MW-2(38)	11/04/93	19.73	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.[3]
MW-3(39)	11/04/93	20.91	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-4(26)	11/04/93	21.60	ND.	320.	11.	<0.5	1.3	0.9	NR.
MW-5(62)	11/04/93	21.05	ND.	41,000.	3,500.	3,100.	890.	5,400.	IW.
MW-6	11/04/93	20.34	0.01	FP.[4]	FP.	FP.	FP.	FP.	NR.
MW-7(67)	11/04/93	20.33	ND.	<50.	6.6	<0.5	<0.5	0.8	NR.
MW-8(66)	11/04/93	17.60	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-9(67)	11/04/93	18.72	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-10(50)	11/04/93	22.11	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-11(44)	11/04/93	21.40	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-12(33)	11/04/93	21.95	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
FB-1.[5]	11/04/93	NA[6].	NA.	<50.	<0.5	<0.5	<0.5	<0.5	NR.

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. NR. = Not required to be sampled for the above parameter.
4. FP. = Floating product detected in well, no samples taken
5. FB. = Field Blank
6. NA. = Not applicable

Columbia Analytical Services INC.

November 20, 1993 Service Request No. SJ93-1362

Jim Butera
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **EMCON Project No. 0G70-038.01**
ARCO Facility No. 6113

Dear Mr. Butera:

Attached are the results of the water samples submitted to our lab on November 5, 1993. For your reference, these analyses have been assigned our service request number SJ93-1362.

All analyses were performed consistent with our laboratory's quality assurance program. All results are intended to be considered in their entirety, and CAS is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/kmh

1921 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9356

Acronyms

ASTM	American Society for Testing and Materials
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MRL	Method Reporting Limit
NA	Not Applicable
NAN	Not Analyzed
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected at or above the MRL
NR	Not Requested
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
VPH	Volatile Petroleum Hydrocarbons

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates		**Date Received:**	11/05/93
Project:	ARCO Project No.	0G70-038.01	**Service Request No.:**	SJ93-1362
	ARCO Facility No.	6113	**Sample Matrix:**	Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name:		MW-1 (44)	Method Blank
Date Sampled:		11/04/93	
Analyte	**EPA Method**	**MRL**	
Total Oil and Grease, IR	SM 5520C	0.5	2.9	ND
Hydrocarbons, IR	SM 5520F	0.5	2.8	ND

SM Standard Methods for the Examination of Water and Wastewater, 17th Ed., 1989

[1] Unless otherwise noted, all analyses were performed within EPA recommended maximum holding times specified in *Test Methods for Evaluating Solid Waste,* (SW-846, 3rd Edition) and *Methods for Chemical Analysis of Water and Waste* (EPA-600/4-79-020, Revised March 1983).

Approved by: Keith A Murphy Date: November 20, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-038.01	**Service Request No.:**	SJ93-1362
	ARCO Facility No. 6113	**Sample Matrix:**	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

Sample Name:		MW-1 (44)	MW-2 (38)	MW-3 (39)
Date Analyzed:		11/17/93	11/17/93	11/17/93
Analyte	**MRL**			
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
TPH as Gasoline	50	ND	ND	ND

Sample Name:		MW-4 (26)	MW-5 (62)	MW-7 (67)
Date Analyzed:		11/17/93	11/18/93	11/17/93
Analyte	**MRL**			
Benzene	0.5	11.	3,500.	6.6
Toluene	0.5	ND	3,100.	ND
Ethylbenzene	0.5	1.3	890.	ND
Total Xylenes	0.5	0.9	5,400.	0.8
TPH as Gasoline	50	320.	41,000.	ND

Approved by: Keanan Murphy Date: November 20, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-038.01	**Service Request No.:**	SJ93-1362
	ARCO Facility No. 6113	**Sample Matrix:**	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

Sample Name:		MW-8 (66)	MW-9 (67)	MW-10 (50)
Date Analyzed:		11/17/93	11/17/93	11/17/93 *
Analyte	**MRL**			
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
TPH as Gasoline	50	ND	ND	ND

Sample Name:		MW-11 (44)	MW-12 (33)	FB-1
Date Analyzed:		11/17/93 *	11/17/93 *	11/17/93 *
Analyte	**MRL**			
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
TPH as Gasoline	50	ND	ND	ND

* This sample was part of the analytical batch started on November 17, 1993. However, it was analyzed after midnight so the actual date analyzed is November 18, 1993.

Approved by: Kevin A Murphy Date: November 20, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-038.01	**Service Request No.:**	SJ93-1362
	ARCO Facility No. 6113	**Sample Matrix:**	Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
µg/L (ppb)

Sample Name:		Method Blank	Method Blank
Date Analyzed:		11/17/93	11/18/93
Analyte	**MRL**		
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
TPH as Gasoline	50	ND	ND

Approved by: Kenneth Murphy Date: November 20, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-038.01	**Service Request No.:**	SJ93-1362
	Arco Facility No. 6113	**Sample Matrix:**	Water

Continuing Calibration Summary
Inorganics
SM 5520
mg/L (ppm)

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Hydrocarbons Mix	40.	37.5	94.	90-110

SM *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989

Approved by: Keenan Murphy Date: November 20, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-038.01	**Service Request No.:**	SJ93-1362
	ARCO Facility No. 6113	**Sample Matrix:**	Water

Matrix Spike/Duplicate Matrix Spike Summary
Oil and Grease, IR
EPA Method SM 5520C

Sample Name	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
Hydrocarbon Mix	8.0	10.7	17.4	16.6	84.	69.	56-151

Approved by: Keoni A Murphy Date: November 20, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-038.01	**Service Request No.:**	SJ93-1362
	ARCO Facility No. 6113	**Sample Matrix:**	Water

Surrogate Recovery Summary
BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery α,α,α-Trifluorotoluene
MW-1 (44)	11/17/93	82.
MW-2 (38)	11/17/93	79.
MW-3 (39)	11/17/93	82.
MW-4 (26)	11/17/93	89.
MW-5 (62)	11/18/93	83.
MW-7 (67)	11/17/93	81.
MW-8 (66)	11/17/93	82.
MW-9 (67)	11/17/93	81.
MW-10 (50)	11/17/93	84.
MW-11 (44)	11/17/93	80.
MW-12 (33)	11/17/93	81.
FB-1	11/17/93	79.
MW-5 (62) MS	11/18/93	86.
MW-5 (62) DMS	11/18/93	86.
Method Blank	11/17/93	74.
Method Blank	11/18/93	76.
CAS Acceptance Criteria		70-130

Approved by: Reviewed Murphy Date: November 20, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-038.01
ARCO Facility No. 6113

Date Received: 11/05/93
Service Request No.: SJ93-1362

Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
µg/L (ppb)

Date Analyzed: 11/18/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	25.	25.5	102.	85-115
Toluene	25.	24.3	97.	85-115
Ethylbenzene	25.	24.0	96.	85-115
Total Xylenes	75.	73.8	98.	85-115
TPH as Gasoline	250.	235.	94.	90-110

Approved by: Keenan Murphy Date: November 20, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-038.01	**Service Request No.:**	SJ93-1362
	ARCO Facility No. 6113	**Sample Matrix:**	Water

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline
EPA Methods 5030/California DHS LUFT Method
µg/L (ppb)

Sample Name: MW-5 (62)
Date Analyzed: 11/18/93

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
TPH as Gasoline	25,000.	40,600.	60,700.	62,200.	80.	86.	76-130

Approved by: Keo Murphy Date: November 20, 1993

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ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMC-93-5

Chain of Custody

ARCO Facility no. 6113	City (Facility) LIVERMORE	Project manager (Consultant) JIM BUTERA	Laboratory name CAS
ARCO engineer Kyle Christie	Telephone no. (ARCO) 571-2434	Telephone no. (Consultant) 453-7306	Fax no. (Consultant) 453-0452	Contract number 07077
Consultant name EMCON Associates	Address (Consultant) 1921 Ringwood Avenue San Jose		Method of shipment sampler will deliver

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 GAS	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease EPA 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(44)	1-6	6		X		X	HCl	11-4-93	1305		X		X								
MW-2(38)	7-9	2							1219		X										
MW-3(39)	9-10	2							1356		X										
MW-4(26)	11-12	2							1559		X										
MW-5(62)	13-14	2							1619		X										
MW-6( )		2									X	NO SAMPLES TAKEN, PRODUCT IN WELL									
MW-7(67)	15-16	2							1435		X										
MW-8(66)	17-18	2							1230		X										
MW-9(67)	19-20	2							1325		X										
MW-10(50)	21-22	2							1515		X										
MW-11(44)	23-24	2							1435		X										
MW-12(33)	25-26	2							1518		X										
TB-1	27-28	2						V	1234		X										

Special detection Limit/reporting: Lowest Possible

Special QA/QC: AS Normal

Remarks: 2-40ml HCl
4 Liter HCl

Lab number: 5593-1362

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

Condition of sample: ok		Temperature received: cool	
Relinquished by sampler: Kevin Richardson	Date 11-5-93	Time 0842	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: [signature] Date 11-5-93 Time 6:42

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

APPC 3292 (2-91)

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038-01 | SAMPLE ID: MW-1 (44)

PURGED BY: J Williams | CLIENT NAME: ARCO 6113

SAMPLED BY: J Williams | LOCATION: 785 E Stanley Blvd

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.):	3.95
DEPTH TO WATER (feet):	20.61	CALCULATED PURGE (gal.):	11.85
DEPTH OF WELL (feet):	44.8	ACTUAL PURGE VOL. (gal.):	12

DATE PURGED: 11-04-93 Start (2400 Hr) 1236 End (2400 Hr) 1256

DATE SAMPLED: 11-04-93 Start (2400 Hr) 1258 End (2400 Hr) 1305

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1243	4	6.91	510	63.1	BROWN	HEAVY
1250	8	6.99	504	62.8	"	"
1256	12	6.96	501	62.1	"	"

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

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 11-04-93 Time: 1138 Meter Serial #: 9010 Temperature °F: ___

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

Location of previous calibration: MW-2

Signature: [signature] Reviewed By: [signature] Page 1 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038.01 SAMPLE ID: MW-2 (38)

PURGED BY: J. Williams CLIENT NAME: ARCO 6113

SAMPLED BY: J. Williams LOCATION: 785 E Stanley Blvd

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.):	3.09
DEPTH TO WATER (feet):	19.73	CALCULATED PURGE (gal.):	9.29
DEPTH OF WELL (feet):	38.7	ACTUAL PURGE VOL. (gal.):	9.5

DATE PURGED: 11-04-93 Start (2400 Hr) 1200 End (2400 Hr) 1215

DATE SAMPLED: 11-04-93 Start (2400 Hr) 1218 End (2400 Hr) 1219

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1207	3	6.75	485	63.5	CLEAR	TRACE
1212	6	6.78	481	62.1	BROWN	MOD
1215	9	6.75	482	62.0	"	"

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 11-04-93 Time: 1138 Meter Serial #: 9010 Temperature °F: 70.8

(EC 1000 1028 / 1000) (DI ___) (pH 7 713 / 700) (pH 10 10.00 / 10.00) (pH 4 399 / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: JB Page 2 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038-01 SAMPLE ID: MW-3 (39)

PURGED BY: J. Williams CLIENT NAME: ARCO 6113

SAMPLED BY: J. Williams LOCATION: 785 E Stanley Blvd

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.): 2.97

DEPTH TO WATER (feet): 20.9' CALCULATED PURGE (gal.): 8.91

DEPTH OF WELL (feet): 39.1 ACTUAL PURGE VOL. (gal.): 9

DATE PURGED: 11-04-93 Start (2400 Hr) 1334 End (2400 Hr) 1354

DATE SAMPLED: 11-04-93 Start (2400 Hr) 1355 End (2400 Hr) 1356

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1341	3	7.02	848	65.2	BROWN	HEAVY
1346	6	7.03	503	63.1	"	"
1354	9	7.00	510	62.8	"	"

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 ___ Bailer (Teflon®)

___ Centrifugal Pump ✓ Bailer (PVC)

___ Submersible Pump ___ Bailer (Stainless Steel)

___ Well Wizard™ ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)

___ DDL Sampler ___ Bailer (Stainless Steel)

___ Dipper ___ Submersible Pump

___ Well Wizard™ ___ Dedicated

Other: ___

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 11-4-93 Time: 1138 Meter Serial #: 8010 Temperature °F: ___

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

Location of previous calibration: MW-2

Signature: Joe Williams Reviewed By: [illegible] Page 3 of 12

1.96

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038-01 SAMPLE ID: MW-4 (2C)

PURGED BY: J. Williams CLIENT NAME: ARCO 6113

SAMPLED BY: J. Williams LOCATION: 785 E Stanley Blvd

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.):	3.33
DEPTH TO WATER (feet):	21.60	CALCULATED PURGE (gal.):	9.99
DEPTH OF WELL (feet):	26.7	ACTUAL PURGE VOL. (gal.):	10

DATE PURGED: 11-04-93 Start (2400 Hr) 1548 End (2400 Hr) 1557

DATE SAMPLED: 11-04-93 Start (2400 Hr) 1558 End (2400 Hr) 1559

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1552	3.5	6.35	1106	71.6	GREY	HEAVY
1555	7	6.41	1056	67.5	"	"
1557	10	6.43	1052	66.69	"	"

D. O. (ppm): NR ODOR: STRONG

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 ___ Bailer (Teflon®)

___ Centrifugal Pump ✓ Bailer (PVC)

___ Submersible Pump ___ Bailer (Stainless Steel)

___ Well Wizard™ ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)

___ DDL Sampler ___ Bailer (Stainless Steel)

___ Dipper ___ Submersible Pump

___ Well Wizard™ ___ Dedicated

Other: ___

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 11-4-93 Time: 1138 Meter Serial #: 9010 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 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038.01 SAMPLE ID: MW-5(62)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 6113

SAMPLED BY: ↓ LOCATION: 785 E. STANLEY BLVD LIVERMORE, 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.):	27.12
DEPTH TO WATER (feet):	21.09	CALCULATED PURGE (gal.):	81.36
DEPTH OF WELL (feet):	62.6	ACTUAL PURGE VOL. (gal.):	81.50

DATE PURGED: 11-4-93 Start (2400 Hr) 1547 End (2400 Hr) 1614

DATE SAMPLED: 11-4-93 Start (2400 Hr) 1619 End (2400 Hr) 1621

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1556	27.50	6.95	868	66.2	CLEAR	TRACE
1605	55.00	6.94	873	65.2	↓	↓
1614	81.50	6.96	891	65.3	↓	↓

D. O. (ppm): NR ODOR: STRONG

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 (VAULT LID IS HARD TO OPEN/CLOSE) LOCK #: NONE (SLIP)

REMARKS: VAULT LID IS VERY HARD TO OPEN/CLOSE

Meter Calibration: Date: 11-4-93 Time: 1540 Meter Serial #: 9203 Temperature °F: 78.1

(EC 1000 1031 / 1000) (DI 14.11) (pH 7 7.04 / 7.00) (pH 10 10.02 / 10.00) (pH 4 3.91 / ___)

Location of previous calibration: ___

Signature: Kevin Reichelderfer Reviewed By: JB Page 5 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038.01 SAMPLE ID: MW-6 (NA)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 6113

SAMPLED BY: ↓ LOCATION: 785 E. STANLEY BLVD LIVERMORE, 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.):	NA
DEPTH TO WATER (feet):	20.34	CALCULATED PURGE (gal.):	NA
DEPTH OF WELL (feet):	66.7	ACTUAL PURGE VOL. (gal.):	NA

DATE PURGED: 11-4-93 Start (2400 Hr) NA End (2400 Hr) NA

DATE SAMPLED: NA Start (2400 Hr) NA End (2400 Hr) NA

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
NO SAMPLES TAKEN, PRODUCT IN WELL						

D. O. (ppm): NR ODOR: STRONG 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		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	X Bailer (Teflon®)
___ Centrifugal Pump	___ Bailer (PVC)	___ DDL Sampler	___ Bailer (Stainless Steel)
___ Submersible Pump	___ Bailer (Stainless Steel)	___ Dipper	___ Submersible Pump
___ Well Wizard™	___ Dedicated	___ Well Wizard™	___ Dedicated
Other: NA		Other: NA	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 11-4-93 Time: ___ Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: ___

Signature: Kevin Reichelderfer Reviewed By: GB Page 6 of 12

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-038.01 SAMPLE ID: MW-7(67)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 6113

SAMPLED BY: ↓ LOCATION: 785 E. STANLEY BLVD LIVERMORE, 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.):	30.99
DEPTH TO WATER (feet):	20.27	CALCULATED PURGE (gal.):	92.96
DEPTH OF WELL (feet):	67.7	ACTUAL PURGE VOL. (gal.):	93.00

DATE PURGED: 11-4-93 Start (2400 Hr) 1400 End (2400 Hr) 1429

DATE SAMPLED: 11-4-93 Start (2400 Hr) 1435 End (2400 Hr) 1437

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1410	31.00	7.17	762	68.5	CLOUDY	LIGHT
1420	62.00	7.10	751	67.7	CLEAR	TRACE
1429	93.00	7.03	750	68.1	↓	↓

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		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: • SPRINKLERS IN PLANTER AREA WERE ON AND THEY FLOODED THE LARGE PLANTER AREA WHERE MW-7 IS LOCATED. I HAD TO RUN A JACUZZI PUMP INSIDE THE WELL BOX WHILE I PURGED THE WELL WITH THE GRUNDFOS SUBMERSIBLE PUMP TO PREVENT WATER FROM THE SPRINKLERS & PLANTER AREA GETTING INTO THE WELL

Meter Calibration: Date: 11-4-93 Time: 1132 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: Kevin Reichelderfer Reviewed By: ___ Page 7 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0170-038.01 SAMPLE ID: MW-8 (66)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 6113

SAMPLED BY: ↓ LOCATION: 785 E. STANLEY BLVD LIVERMORE, 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.):	32.01
DEPTH TO WATER (feet):	17.60	CALCULATED PURGE (gal.):	96.04
DEPTH OF WELL (feet):	66.6	ACTUAL PURGE VOL. (gal.):	96.50

DATE PURGED: 11-4-93 Start (2400 Hr) 1154 End (2400 Hr) 1225

DATE SAMPLED: 11-4-93 Start (2400 Hr) 1230 End (2400 Hr) 1232

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1205	32.50	6.83	762	65.2	CLEAR	~~LIGHT~~ TRACE
1215	65.00	6.87	755	64.5	↓	TRACE
1225	96.50	6.89	756	64.4	↓	↓

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 @ 1234

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: 11-4-93 Time: 1132 Meter Serial #: 9203 Temperature °F: 70.5

(EC 1000 997 / 1000) (DI 16.83) (pH 7 6.97 / 7.00) (pH 10 9.99 / 10.00) (pH 4 3.94 / —)

Location of previous calibration: ___

Signature: Kevin Reichelderfer Reviewed By: JB Page 8 of 8

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038.01 SAMPLE ID: MW-9(67)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 6113

SAMPLED BY: ↓ LOCATION: 785 E. STANLEY BLVD LIVERMORE, 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.):	32.05
DEPTH TO WATER (feet):	18.84	CALCULATED PURGE (gal.):	96.16
DEPTH OF WELL (feet):	67.9	ACTUAL PURGE VOL. (gal.):	96.50

DATE PURGED: 11-4-93 Start (2400 Hr) 1249 End (2400 Hr) 1319

DATE SAMPLED: 11-4-93 Start (2400 Hr) 1325 End (2400 Hr) 1327

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1259	32.50	6.90	698	65.3	CLOUDY	LIGHT
1309	65.00	6.88	697	65.3	CLEAR	TRACE
1319	96.50	6.89	694	65.0	↓	↓

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: REPLACED LWC (4 INCH)

Meter Calibration: Date: 11-4-93 Time: 1132 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: Kevin Reichelderfer Reviewed By: JB Page 9 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038.01 SAMPLE ID: MW-10(50)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 6113

SAMPLED BY: ↓ LOCATION: 785 E. STANLEY BLVD LIVERMORE, 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.):	18.22
DEPTH TO WATER (feet):	22.11	CALCULATED PURGE (gal.):	54.66
DEPTH OF WELL (feet):	50.0	ACTUAL PURGE VOL. (gal.):	55.00

DATE PURGED: 11-4-93 Start (2400 Hr) 1451 End (2400 Hr) 1509

DATE SAMPLED: 11-4-93 Start (2400 Hr) 1515 End (2400 Hr) 1517

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1457	18.50	7.09	562	67.1	LT BRN	MODERATE
1503	37.00	7.05	549	65.9	CLOUDY	LIGHT
1509	55.00	7.03	552	65.8	↓	↓

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		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: 11-4-93 Time: 1132 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: Kevin Reichelderfer Reviewed By: JB Page 10 of 12

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WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-038-01 SAMPLE ID: MW-11 (44)

PURGED BY: J. Williams CLIENT NAME: ARCO 6113

SAMPLED BY: J. Williams LOCATION: 785 E Stanley Blvd

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.):	3.77
DEPTH TO WATER (feet):	21.40	CALCULATED PURGE (gal.):	11.31
DEPTH OF WELL (feet):	44.5	ACTUAL PURGE VOL. (gal.):	6.5

DATE PURGED: 11-04-93 Start (2400 Hr) 1419 End (2400 Hr) 1428

DATE SAMPLED: 11-04-93 Start (2400 Hr) 1434 End (2400 Hr) 1435

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1424	4	7.07	730	65.5	BROWN	HEAVY
	DRIED	TIME 1424 5.5 GALLONS				
1438	Recharg	7.12	726	65.5	BROWN	HEAVY

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

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 11-4-93 Time: 1138 Meter Serial #: 9010 Temperature °F: ___

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

Location of previous calibration: MW-2

Signature: [signature] Reviewed By: [signature] Page 11 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-038-01 | SAMPLE ID: MW-12 (33)

PURGED BY: J. Williams | CLIENT NAME: ARCO 6113

SAMPLED BY: J. Williams | LOCATION: 785 E Stanley Blvd

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

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

CASING ELEVATION (feet/MSL):	N/R	VOLUME IN CASING (gal.):	1.82
DEPTH TO WATER (feet):	21.95	CALCULATED PURGE (gal.):	5.46
DEPTH OF WELL (feet):	33.1	ACTUAL PURGE VOL. (gal.):	5.5

DATE PURGED: 11-04-93 Start (2400 Hr) 1453 End (2400 Hr) 1517

DATE SAMPLED: 11-04-93 Start (2400 Hr) 1517 End (2400 Hr) 1518

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1502	2	6.57	695	68.7	BROWN	HEAVY
1511	4	6.60	689	67.4	"	"
1517	5.5	6.64	687	67.0	"	"

D. O. (ppm): N/R ODOR: Slight

COLOR (COBALT 0 - 100): N/R

TURBIDITY (NTU 0 - 200): N/R

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

PURGING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)

___ Centrifugal Pump ___ Bailer (PVC)

___ Submersible Pump ___ Bailer (Stainless Steel)

___ Well Wizard™ ___ Dedicated

Other: ___

SAMPLING EQUIPMENT

___ 2" Bladder Pump ✓ Bailer (Teflon®)

___ DDL Sampler ___ Bailer (Stainless Steel)

___ Dipper ___ Submersible Pump

___ Well Wizard™ ___ Dedicated

Other: ___

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 11-4-93 Time: 1138 Meter Serial #: 9010 Temperature °F: ___

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

Location of previous calibration: MW-3

Signature: [signature] Reviewed By: [signature] Page 12 of 12