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

69028.08

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December 30, 1993
69028.08

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

Subject: Letter Report on Quarterly Groundwater Monitoring Report for Third Quarter 1993 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) has prepared this letter report summarizing the results of third quarter 1993 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, California, at the above-referenced site. The operating ARCO Station 6113 is located on the southwestern corner of the intersection of East Stanley and Murrieta Boulevards in Livermore, California, as shown on Plate 1, Site Vicinity Map. The locations of the groundwater monitoring wells, borings, and pertinent site features are shown on Plate 2, Generalized Site Plan. Previous work is discussed in the previous subsurface investigations listed in the Reference section.

The purpose of this quarterly groundwater monitoring event is to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with a former waste-oil and gasoline underground-storage tanks (USTs) at the site. Monthly monitoring (depth-to-water measurements and subjective analyses) has been reduced to quarterly monitoring and sampling. The reduced monitoring is in response to a relatively stable groundwater gradient and flow direction. The 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. RESNA's scope of work was limited to interpretation of field and laboratory analytical data, which included evaluating

trends in reported hydrocarbon concentrations in the local groundwater, the groundwater gradient, and direction of groundwater flow beneath the site.

Groundwater Sampling and Gradient Evaluation

Depth to water levels (DTW) were measured on July 27 and August 30, 1993. Quarterly sampling was performed on August 30 and September 1, 1993. Results of EMCON's field work on the site, including DTW levels and subjective analyses for the presence of product in the wells, are presented on EMCON's Field Reports, Water Sample Field Data Sheets, and Summary of Groundwater Monitoring Data (Appendix A). Cumulative Groundwater Monitoring Data is summarized in Table 1.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations of product in the groundwater for this and previous quarterly groundwater monitoring events at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. The presence of floating product was noted in well MW-6 during the August 1993 field event (see EMCON's Field Reports, Appendix A). No visual evidence of floating product or hydrocarbon sheen was observed in the other wells during this quarter. Groundwater elevations in onsite wells fell an average of approximately 1.5 feet since June 1993.

EMCON's DTW levels were used to evaluate groundwater gradient and flow direction. Graphical interpretations of the groundwater gradients and flow directions for July 27 and August 30, 1993, are shown respectively on Plates 3 and 4, Groundwater Gradient Maps. These maps show a flow direction toward the north in July and August with an average gradient of approximately 0.03 ft/ft, which is consistent with results from the previous quarter.

Groundwater monitoring wells MW-1 through MW-4 and MW-7 through MW-12 were purged and sampled by EMCON field personnel on August 30 and September 1, 1993. Groundwater monitoring well MW-5 was not sampled because the well box was inaccessible. Well MW-6 was not sampled because floating product was present. According to ARCO, the purge water was removed from the site by a licensed hazardous waste hauler.

Laboratory Methods and Results

Under the direction of EMCON, water samples collected from the wells were analyzed by Columbia Analytical Services, Inc., located in San Jose, California (California Hazardous Waste Testing Laboratory Certification No. 1426). The water samples from MW-1 through MW-4 and MW-7 through MW-12 were analyzed for total petroleum hydrocarbons as

gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 8020/5030/California DHS LUFT Method. In addition, the water samples from MW-1 were analyzed for total oil and grease (TOG) using EPA Standard Method 5520 C/F.

The following general trends were noted in reported hydrocarbon concentrations in groundwater beneath the site since last quarter. Concentrations of TPHg and BTEX remained less than the listed method detection limits in wells MW-1 MW-2, MW-8, MW-9, MW-11, and MW-12 and decreased in wells MW-3, MW-4, MW-7, and MW-10. Groundwater monitoring well MW-6 continued to contain floating product. Concentrations of TPHg and benzene in the groundwater are shown on Plate 5, TPHg Concentrations in Groundwater, and Plate 6, Benzene Concentrations in Groundwater. The highest TPHg and benzene concentrations in groundwater appear to be adjacent and immediately downgradient (to the west and north) of the existing gasoline USTs, situated in the northeastern portion of the site.

The extent of gasoline hydrocarbons in the groundwater appears to be delineated to less than 50 ppb TPHg in the central and southern portions of the site. TOG was reported in well MW-1 at a concentration of 900 and 700 ppb, respectively for the laboratory method used. The Chain of Custody Records and Laboratory Analyses 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 Samples--TPHg and BTEX, and Table 3, Cumulative Results of Laboratory Analyses of Groundwater Samples--VOCs, TPHd, TOG, and Metals.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
69028.08

Copies of this report should 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
Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

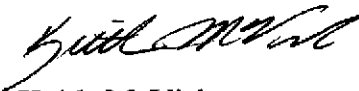
Ms. Danielle Stefani
Livermore Fire Department
4550 East Avenue
Livermore, California 94550

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA


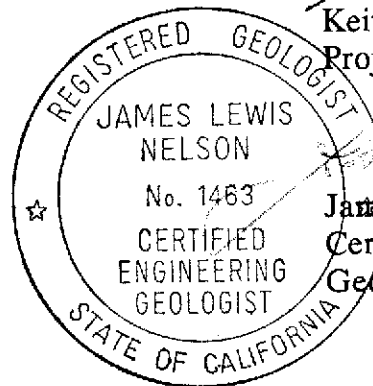
December 30, 1993
69028.08

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

Sincerely,
RESNA Industries Inc.



Keith McVicker
Project Geologist



James L. Nelson
Certified Engineering
Geologist # 1463

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, July 27, 1993
Plate 4, Groundwater Gradient Map, August 30, 1993
Plate 5, TPHg Concentrations in Groundwater
Plate 6, 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 Reports, Summary of Groundwater
Monitoring Data, Certified Analytical Reports with Chain-
of-Custody, and Water Sample Field Data Sheets.

REFERENCES

- Applied GeoSystems. December 6, 1989. Limited Subsurface Environmental Investigation at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-2.
- Applied GeoSystems. August 29, 1990. Letter Report, Quarterly Ground-Water Monitoring Second Quarter 1990 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.
- Applied GeoSystems. November 2, 1990. Letter Report, Quarterly Ground-Water Monitoring Third Quarter 1990 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.
- Applied GeoSystems. January 27, 1991. Letter Report, Quarterly Ground-Water Monitoring Fourth Quarter 1990 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.
- Applied GeoSystems. April 16, 1991. Limited Subsurface Environmental Investigation Related to the Former Waste-Oil Tank at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-4.
- Applied GeoSystems. April 24, 1991. Letter Report, Quarterly Ground-Water Monitoring First Quarter 1991 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.
- Applied GeoSystems. July 11, 1991. Letter Report, Quarterly Ground-Water Monitoring Second Quarter 1991 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-5.
- California Department of Health Services, Office of Drinking Water, October 22, 1990, "Summary of California Drinking Water Standards", Berkeley, California.
- Pacific Environmental Group. April 25, 1989. ARCO Station 6113, 785 E. Stanley Boulevard, Livermore, California. Project 330-53.01

REFERENCES
(Continued)

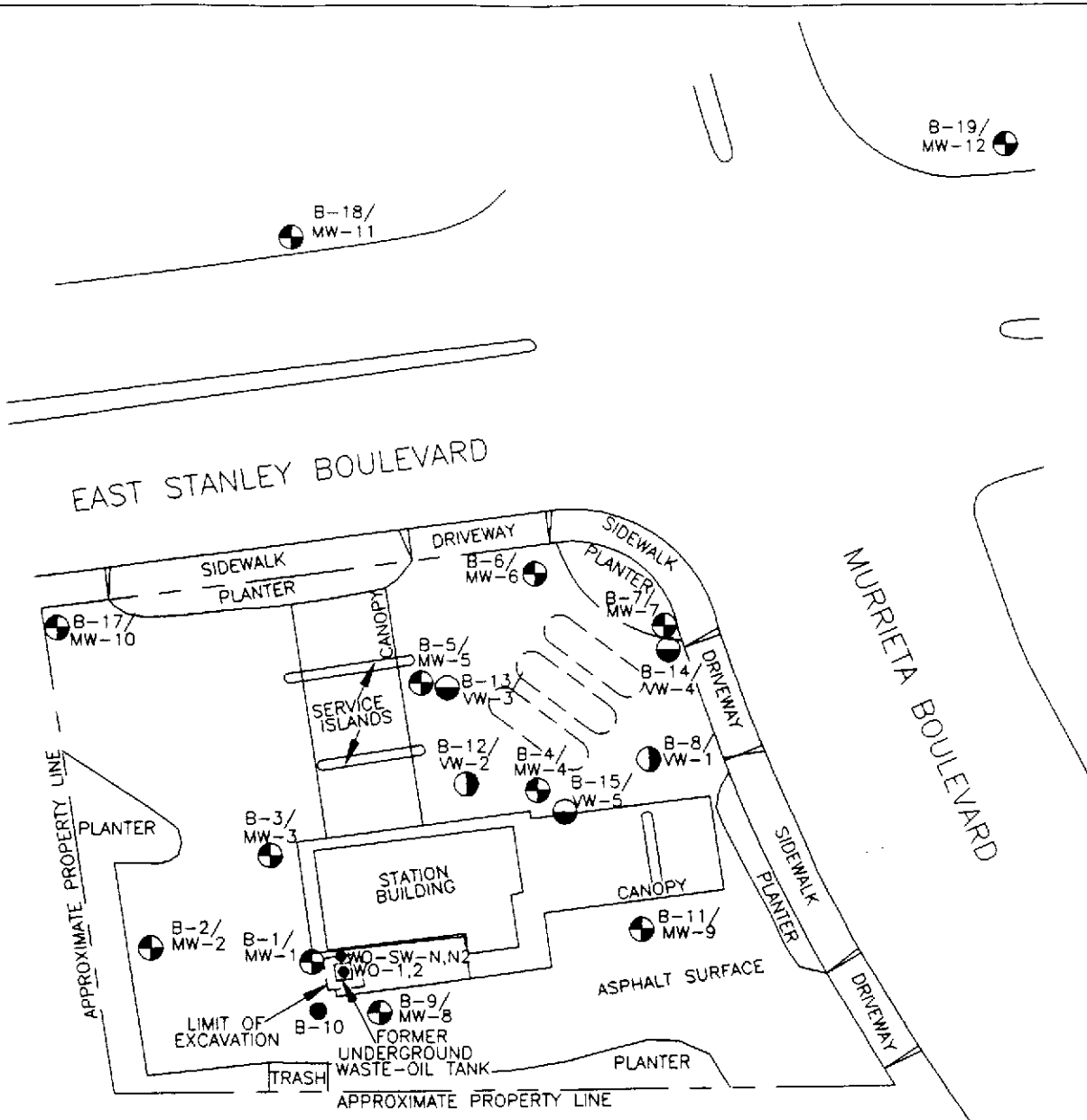
- RESNA. October 17, 1991. Work Plan for Additional Subsurface Investigation and Vapor Extraction Test at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.06
- RESNA. October 18, 1991. Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1991, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.05
- RESNA. March 3, 1991. Addendum to Work Plan for Additional Subsurface Investigation and Vapor Extraction Test at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.06
- RESNA. March 6, 1992. Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1991, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.05
- RESNA. May 4, 1992. Letter Report, Quarterly Groundwater Monitoring, First Quarter 1992, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.05
- RESNA. September 28, 1992. Letter Report, Quarterly Groundwater Monitoring, Second Quarter 1992, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.08
- RESNA. December 7, 1992. Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1992, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.08
- 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

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

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REFERENCES
(Continued)

- RESNA. March 16, 1993. Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1992, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.08
- RESNA. May 21, 1993. Letter Report, Quarterly Groundwater Monitoring, First Quarter 1993, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.08
- RESNA. September 9, 1993. Letter Report, Quarterly Groundwater Monitoring, Second Quarter 1993, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.08



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-10 = Boring
(RESNA, 06/92)
- B-15/
VW-5 = Boring/vapor extraction well
(RESNA, 07/93)
- WO-SW-N,N2 = Soil sample collected by Pacific (1989)
- = Existing underground gasoline storage tanks

Approximate Scale



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



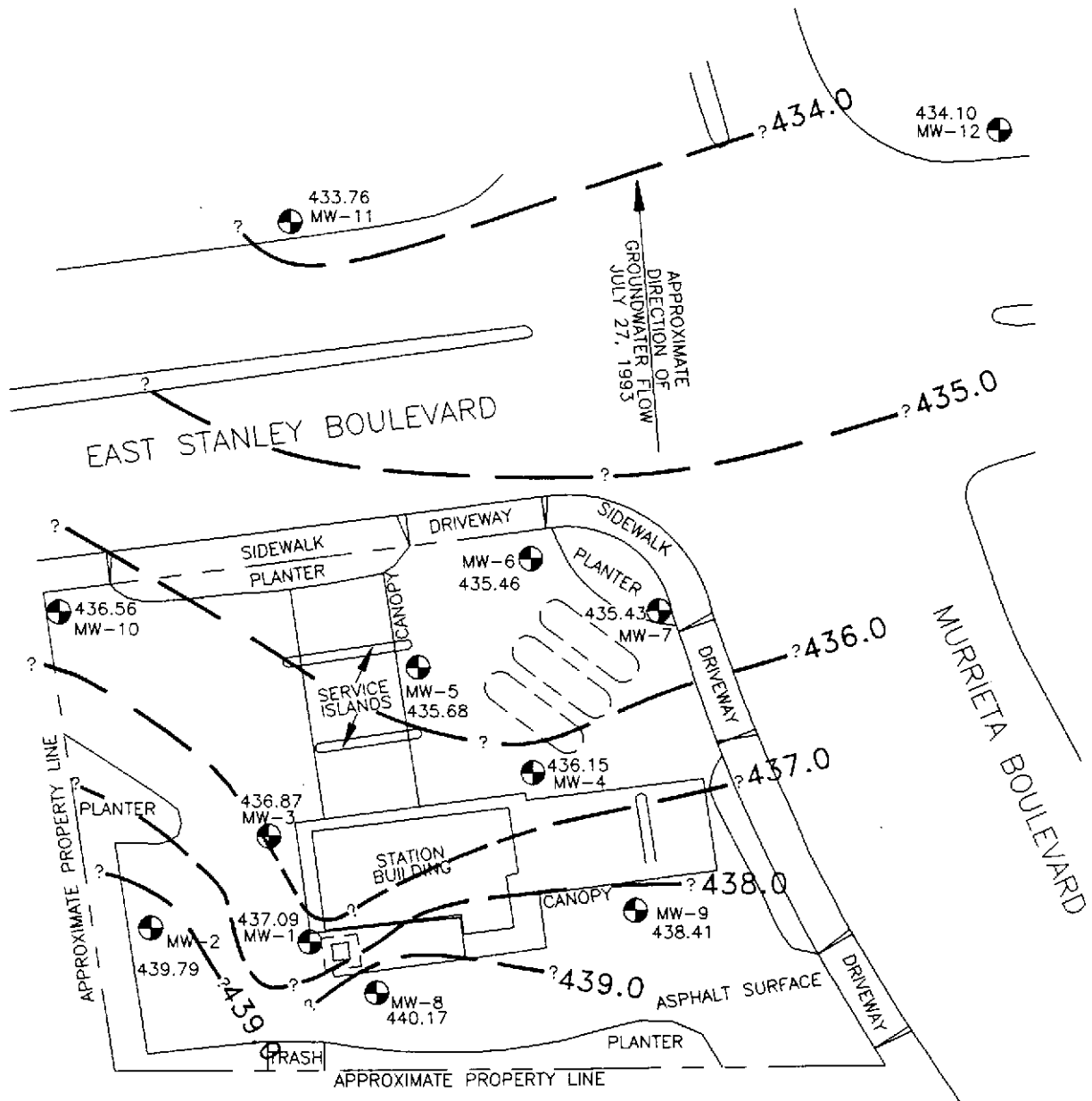
GENERALIZED SITE PLAN
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE

2

PROJECT: 69028.08

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EXPLANATION

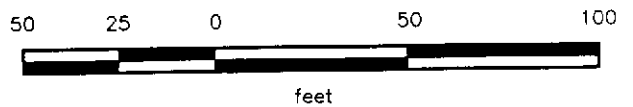
MW-12 = Monitoring well (RESNA, 09/89, 02/91, 06/92 and 03/93)

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

440.17 = Elevation of groundwater in feet above MSL, July 27, 1993

= Existing underground gasoline storage tanks

Approximate Scale



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



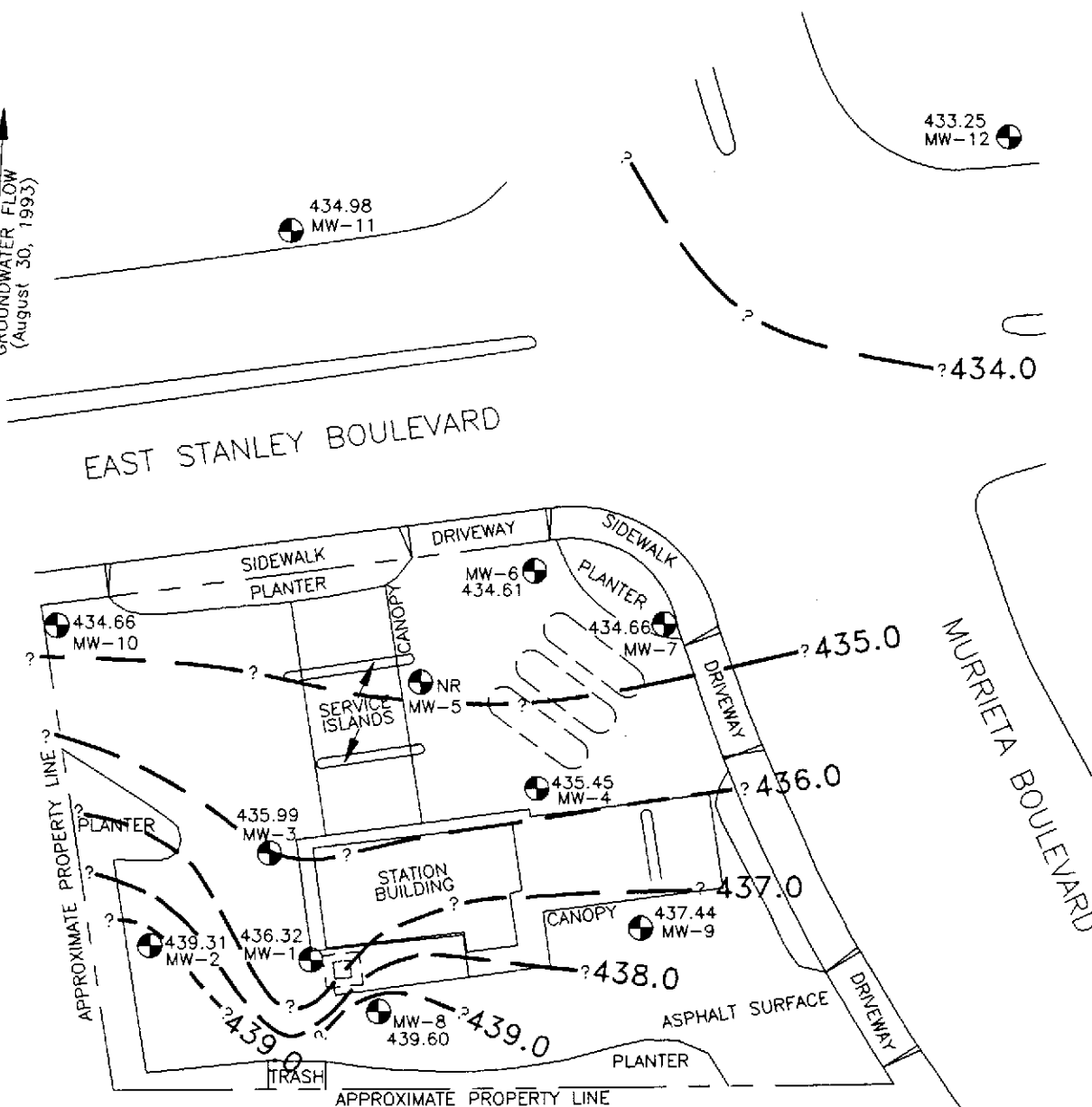
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GROUNDWATER GRADIENT MAP
 ARCO Station 6113
 785 East Stanley Boulevard
 Livermore, California

PLATE

3

APPROXIMATE
DIRECTION OF
GROUNDWATER FLOW
(August 30, 1993)



EXPLANATION

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

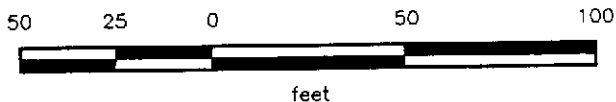
439.0 = Line of equal elevation of groundwater
in feet above mean sea level (MSL)

439.60 = Elevation of groundwater in feet above MSL,
August 30, 1993

= Existing underground gasoline storage tanks

NR = Not recorded

Approximate Scale



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

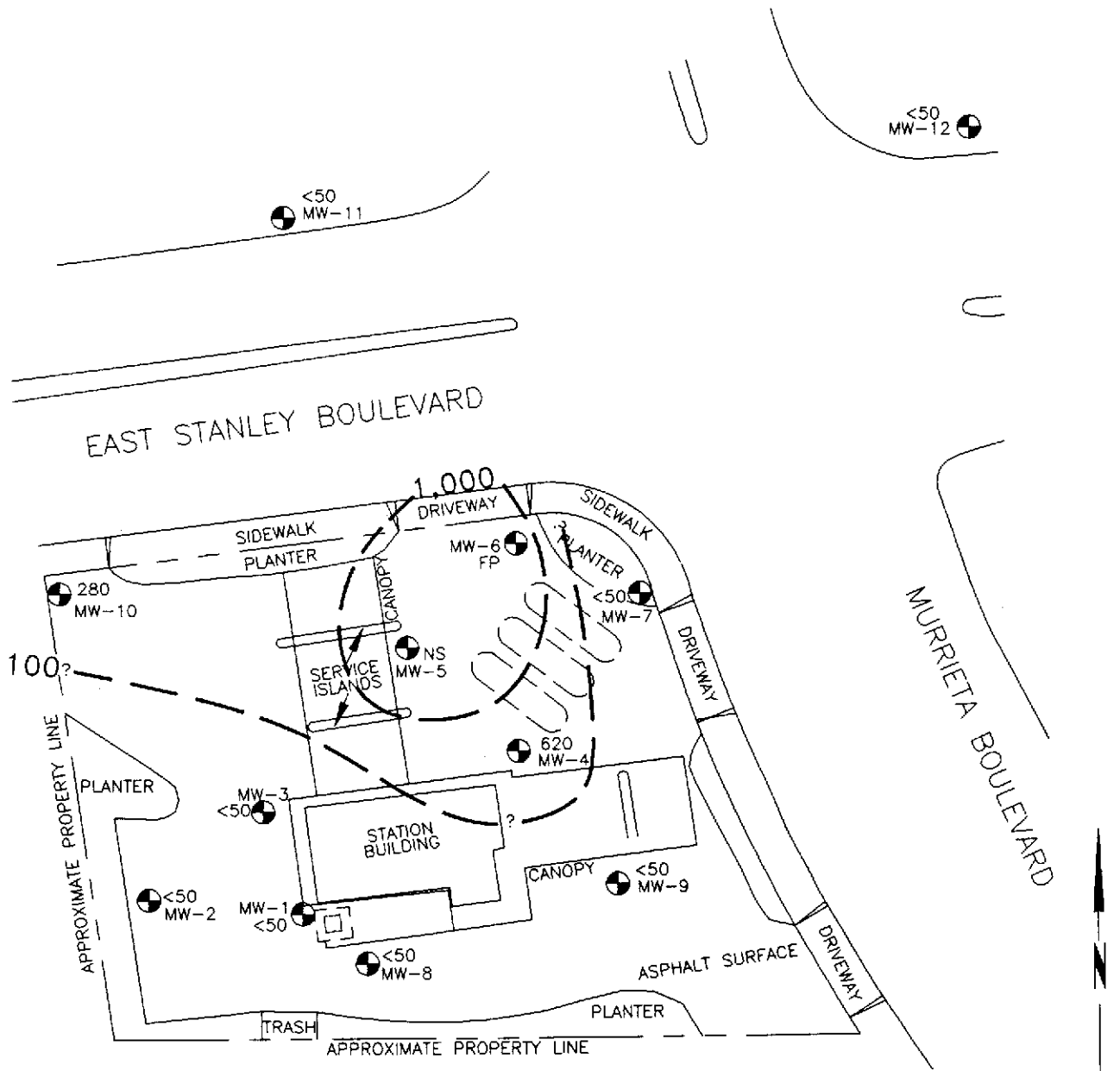


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GROUNDWATER GRADIENT MAP
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE

4



EXPLANATION

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

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

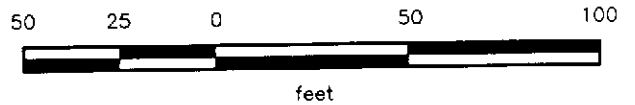
620 = Concentration of TPHg in groundwater in ppb, August 30 and September 1, 1993

FP = Floating product present (not sampled)

= Existing underground gasoline storage tanks

NS = Not sampled (inaccessible)

Approximate Scale



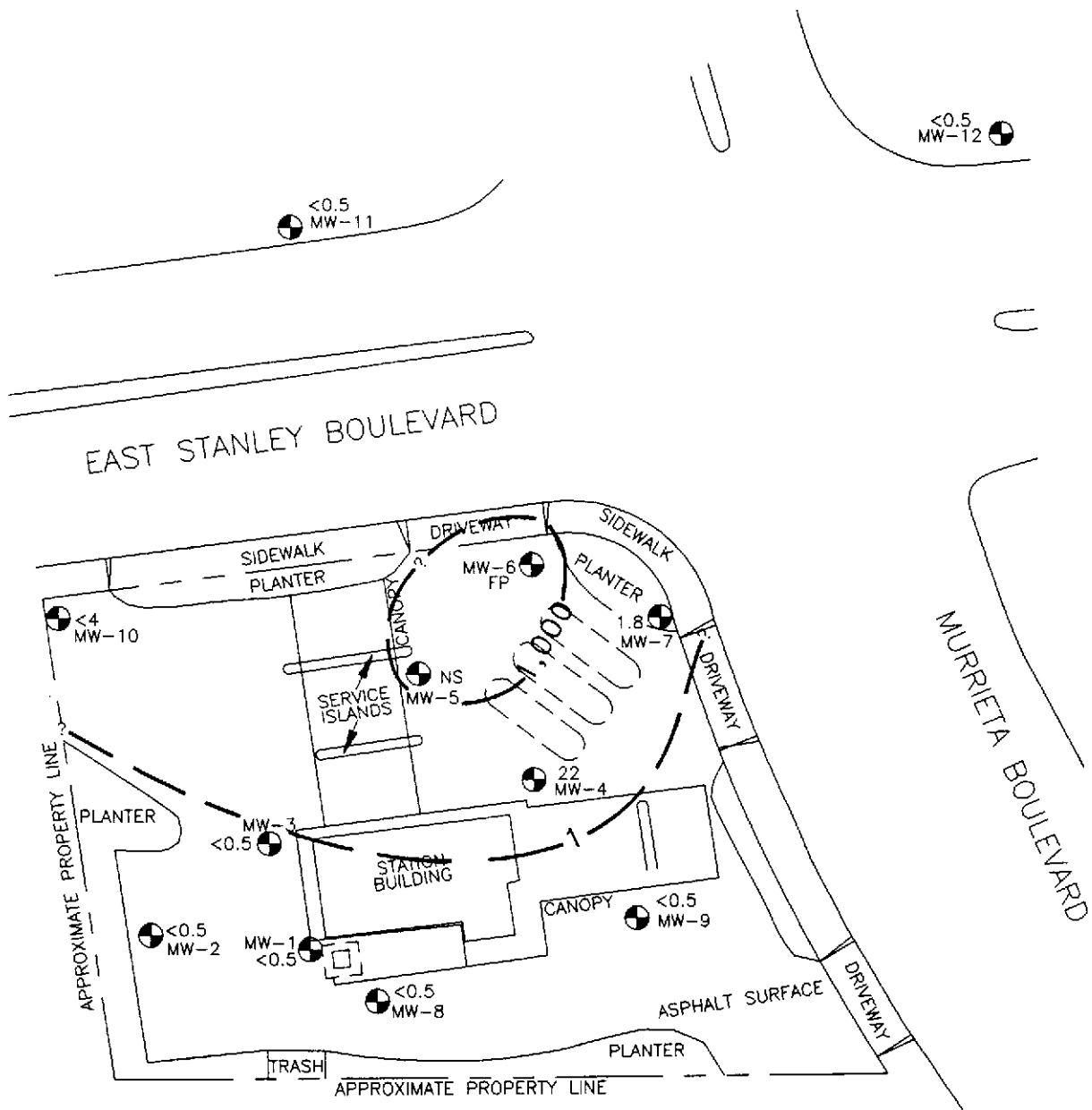
Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., Feb. 1991; and John Koch Land Surveyor, June 1992 and April 1993.



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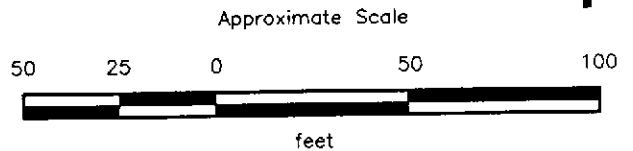
**TPHg CONCENTRATIONS
IN GROUNDWATER
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California**

**PLATE
5**



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)
- 22 = Concentration of benzene in groundwater in ppb, August 30 and September 1, 1993
- FP = Floating product present (not sampled)
- = Existing underground gasoline storage tanks
- NS = Not sampled



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
6

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

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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
<u>MW-1</u>				
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
<u>MW-2</u>				
09/20/89	457.74	20.67	437.07	None
10/12/89		18.98	438.76	None
06/21/90		21.88	435.86	None

See notes on page 7 of 7.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

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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
<u>MW-2 cont.</u>				
09/20/90		19.90	437.84	None
12/18/90		19.32	438.42	None
02/21/91	457.74	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
<u>MW-3</u>				
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
12/18/90		19.21	437.76	None
02/21/91		22.36	434.61	None

See notes on page 7 of 7.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

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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
<u>MW-3 cont.</u>				
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	456.97	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
<u>MW-4</u>				
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
08/13/91		Dry	Dry	None
09/12/91		Dry	Dry	None
10/22/91		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
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Well Date	Elevation of Wellhead	Depth to Water	Elevation of Groundwater	Floating Product
<u>MW-4 cont.</u>				
11/13/91	456.55	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
<u>MW-5</u>				
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
07/27/93		20.16	435.68	None
08/30/93		---	---	---

See notes on page 7 of 7.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
69028.08

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
<u>MW-6</u>				
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	454.93	18.76	436.17	Trace
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**	434.61**	0.01
<u>MW-7</u>				
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
<u>MW-8</u>				
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

See notes on page 7 of 7.

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

<u>Well</u> Date	Elevation of Wellhead	Depth to Water	Elevation of Groundwater	Floating Product
<u>MW-8 cont.</u>				
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
<u>MW-9</u>				
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
<u>MW-10</u>				
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
<u>MW-11</u>				
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

See notes on page 7 of 7.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

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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
<u>MW-11 cont.</u>				
07/27/93		21.31	433.76	None
08/30/93		21.09	434.98	None
<u>MW-12</u>				
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

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.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
69028.08

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
<u>MW-1</u>					
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
<u>MW-2</u>					
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
<u>MW-3</u>					
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
05/20/91	97	1.3	1.1	6.2	8.4

See notes on page 4 of 4.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER -- 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
<u>MW-3 cont.</u>					
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
<u>MW-4</u>					
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
<u>MW-5</u>					
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			
<u>MW-6</u>					
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			
08/30/93		Not sampled--floating product			

See notes on page 4 of 4.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
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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
<u>MW-7</u>					
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
<u>MW-8</u>					
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
<u>MW-9</u>					
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
<u>MW-10</u>					
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
<u>MW-11</u>					
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

See notes on page 4 of 4.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
69028.08

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
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.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
69028.08

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
<u>MW-1</u>								
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
<u>MW-2</u>								
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
<u>MW-3</u>								
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.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
69028.08

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
<u>MW-3 cont.</u>								
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
<u>MW-4</u>								
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
<u>MW-8</u>								
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.

Quarterly Groundwater Monitoring
ARCO Station 6113, 785 East Stanley Boulevard, Livermore, CA

December 30, 1993
69028.08

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 5520C&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 REPORTS,
SUMMARY OF GROUNDWATER MONITORING DATA,
CERTIFIED ANALYTICAL REPORTS WITH CHAIN-OF-CUSTODY, AND
WATER SAMPLE FIELD DATA SHEETS



EMCON Associates

1938 Junction Avenue • San Jose, California 95131-2102 • (408) 453-0719 • Fax (408) 453-0452

Date August 5, 1993
Project OG70-038.01

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

We are enclosing:

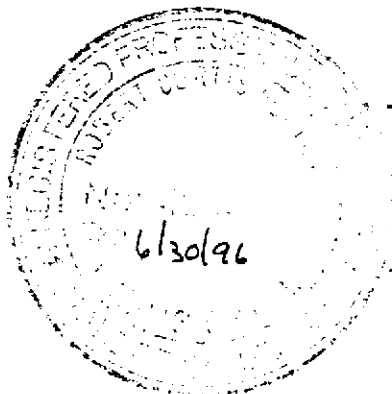
Copies	Description
<u>1</u>	<u>Depth To Water/Floating Product Survey Results</u>
<u> </u>	<u>July 1993 monthly water level survey, ARCO</u>
<u> </u>	<u>station 6113, 785 East Stanley Blvd., Livermore, CA</u>

For your: X Information Sent by: X Mail

Comments:

Monthly water level data for the above mentioned site could not be performed due to site construction. Please call if you have any questions: (408) 453-2266.

Reviewed by:



Jim Butera JB

Robert Porter
Robert Porter, Senior Project Engineer.



**FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY**

PROJECT # : OG70-038.01

STATION ADDRESS : 785 East Stanley Blvd. Livermore

DATE : 7-27-93

ARCO STATION # : 6113

FIELD TECHNICIAN : S Williams

DAY : TUES

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	17.95	17.95	ND	ND	44.8	DIVERSIFIED KEY
2	MW-2	OK	YES	OK	3259	OK	17.95	17.95	ND	ND	38.7	-
3	MW-8	OK	YES	OK	3259	OK	16.90	16.90	ND	ND	68.6	-
4	MW-9	OK	YES	OK	3259	OK	17.77	17.77	ND	ND	68.6	-
5	MW-11	OK	YES	OK	3259 Delphin	OK	21.31	21.31	ND	ND	44.5	NEW LOCK
6	MW-12	OK	YES	OK	3259 Delphin	OK	20.94	20.94	ND	ND	33.2	NEW LOCK
7	MW-7	OK	YES	OK	3259	OK	19.49	19.49	ND	ND	67.6	-
8	MW-3	OK	YES	OK	3259	OK	20.10	20.10	ND	ND	33.1	DIVERSIFIED WELL KEY
9	MW-10	OK	YES	OK	3259	OK	20.29	20.29	ND	ND	50.1	NEW LOCK
10	MW-4	OK	YES	OK	3259 Delphin	OK	20.40	20.40	ND	ND	26.7	NEW LOCK NEED REPAIR
11	MW-5	BAD	Box	OK	none	Slip	20.16	20.16	ND	ND	62.3	BAD LIP NEED REPAIR NEED NUT (DU)
12	MW-6	OK	YES	OK	3259	OK	19.47	19.47	ND	ND	60.7	TRACE

SURVEY POINTS ARE TOP OF WELL CASINGS



EMCON Associates

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

RECEIVED
SEP 23 1993
RESNA

Date September 23, 1993

Project OG70-038.01

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

We are enclosing:

Copies	Description
<u>1</u>	<u>Depth To Water / Floating Product Survey Results</u>
<u>1</u>	<u>Summary of Groundwater Monitoring Data</u>
<u>1</u>	<u>Certified Analytical Reports with Chain-of-Custody</u>
<u>12</u>	<u>Water Sample Field Data Sheets</u>

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the third 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) 453-2266.

Reviewed by:



Jim Butera *JB*

Robert Porter
Robert Porter, Senior Project Engineer.



FIELD REPORT
DEPTH TO WATER/FLOATING PRODUCT SURVEY

PROJECT #: OG70-038.01

STATION ADDRESS : 785 East Stanley Blvd. Livermore

DATE : 8-30-93

ARCO STATION #: 6113

FIELD TECHNICIAN : JW/mg

DAY : Monday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	good	good	good	3259	good	20.72	20.72	ND	NR	44.0	-
2	MW-2	good	good	good	3259	good	18.43	18.43	ND	ND	38.5	-
3	MW-8	good	good	good	3259	good	17.37	17.37	ND	ND	66.6	-
4	MW-9	good	good	good	3259	good	18.74	18.74	ND	ND	67.9	-
5	MW-11	good	good	good	3259 Dolphin	good	21.09	21.09	UP	ND	44.4	-
6	MW-12	good	good	abd	3259 Dolphin	good	21.79	21.79	WN	ND	33.3	-
7	MW-7	good	good	good	3259	good	20.26	20.26	ND	NR	67.5	-
8	MW-3	good	good	good	3259	good	20.98	20.98	ND	ND	39.2	-
9	MW-10	good	good	good	3259	good	22.19	22.19	ND	NR	49.7	-
10	MW-4	good	good	good	Dolphin	OK	21.10	21.10	ND	NR	26.7	-
11	MW-5	NR	Box	NR	none	Slip	NR	NR	NR	NR	NR	no water well failed. unable to open lid.
12	MW-6	good	good	good	3259	good	20.33	20.33	NR *	NR	66.7 *	* Product entered well during purge.

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
 Third 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)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	Total Oil & Grease 5520C/F (mg/l)
MW-1(44)	08/30/93	20.72	ND. ²	<50.	<0.5	<0.5	<0.5	<0.5	0.9/0.7
MW-2(38)	08/30/93	18.43	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR. ³
MW-3(39)	08/30/93	20.98	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-4(25)	08/30/93	21.10	ND.	620.	22.	0.9	3.6	2.1	NR.
MW-5	08/30/93	IW. ⁴	IW.	IW.	IW.	IW.	IW.	IW.	IW.
MW-6	08/30/93	20.33	0.01	FP. ⁵	FP.	FP.	FP.	FP.	NR.
MW-7(67)	08/30/93	20.26	ND.	<50.	1.8	<0.5	<0.5	0.5	NR.
MW-8(66)	08/30/93	17.37	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-9(67)	08/30/93	18.74	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-10(48)	08/30/93	22.19	ND.	280.	<4.	<0.5	<1.3	0.6	NR.
MW-11(44)	08/30/93	21.09	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
MW-12(33)	08/30/93	21.79	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.
FB-1. ⁶	08/30/93	NA ⁷ .	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. IW. = Inaccessible well, well was not sampled
5. FP. = Floating product detected in well, no samples taken
6. FB. = Field Blank
7. NA. = Not applicable

**Columbia
Analytical
Services^{INC.}**

September 16, 1993

Service Request No. SJ93-1082

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 September 1, 1993. For your reference, these analyses have been assigned our service request number SJ93-1082.

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.

Carol J. Klein for
Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Annelise J. Bazar
Regional QA Coordinator

KAM/kmh

COLUMBIA ANALYTICAL SERVICES, Inc.

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Date Received: 09/01/93
Service Request No.: SJ93-1082
Sample Matrix: Water

Inorganic Parameters¹
mg/L (ppm)

Sample Name:
Date Sampled:

MW-1 (44)
08/30/93

Method Blank

<u>Analyte</u>	<u>EPA Method</u>	<u>MRL</u>		
Total Oil and Grease	SM 5520C	0.5	0.9	ND
Hydrocarbons, IR	SM 5520F	0.5	0.7	ND

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: Carol Klein Date: 9-16-93

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
 Project: EMCON Project No. OG70-038.01
 ARCO Facility No. 6113

Date Received: 09/01/93
 Service Request No.: SJ93-1082
 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: 09/09/93 09/09/93 09/09/93

<u>Analyte</u>	<u>MRL</u>			
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 (25) MW-7 (67) MW-8 (66)
 Date Analyzed: 09/10/93 09/09/93 09/09/93

<u>Analyte</u>	<u>MRL</u>			
Benzene	0.5	22.	1.8	ND
Toluene	0.5	0.9	ND	ND
Ethylbenzene	0.5	3.6	ND	ND
Total Xylenes	0.5	2.1	ND	ND
TPH as Gasoline	50	620.	ND	ND

Approved by: Carol Klein Date: 9-16-93

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Date Received: 09/01/93
 Service Request No.: SJ93-1082
 Sample Matrix: Water

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

Sample Name: MW-9 (67) MW-10 (48) MW-11 (44)
 Date Analyzed: 09/09/93 09/09/93 09/09/93

<u>Analyte</u>	<u>MRL</u>			
Benzene	0.5	ND	<4. *	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	<1.3 *	ND
Total Xylenes	0.5	ND	0.6	ND
TPH as Gasoline	50	ND	280.	ND

Sample Name: MW-12 (53) FB-1 Method Blank
 Date Analyzed: 09/09/93 09/09/93 ** 09/09/93

<u>Analyte</u>	<u>MRL</u>			
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

* Raised MRL due to matrix interference.

** This sample was part of the analytical batch started on September 9, 1993. However, it was analyzed after midnight so the actual date analyzed is September 10, 1993.

Approved by: Carol Klein Date: 9-16-93

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Date Received: 09/01/93
Service Request No.: SJ93-1082
Sample Matrix: Water

BTEX and TPH as Gasoline
EPA Methods 5030/8020/California DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Sample Name: Method Blank
Date Analyzed: 09/10/93

<u>Analyte</u>	<u>MRL</u>	
Benzene	0.5	ND
Toluene	0.5	ND
Ethylbenzene	0.5	ND
Total Xylenes	0.5	ND
TPH as Gasoline	50	ND

Approved by: Carol Klein Date: 9-16-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. OG70-038.01
Arco Facility No. 6113

Date Received: 09/01/93
Service Request No.: SJ93-1082
Sample Matrix: Water

Continuing Calibration Summary
Oil and Grease, IR
Method 413.2/SM5520-C
mg/L (ppm)

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
Hydrocarbon Mix	40	39.1	98.	90-110

Approved by: Carol Klein Date: 9-16-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. OG70-038.01
ARCO Facility No. 6113

Date Received: 09/01/93
Service Request No.: SJ93-1082
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
Oil and Grease, IR
EPA Method 413.2/SM5520-C
mg/L (ppm)

<u>Spike Level</u>	<u>Sample Result</u>	<u>Spike Result</u>		<u>Percent Recovery</u>		<u>CAS Acceptance Criteria</u>
		<u>MS</u>	<u>DMS</u>	<u>MS</u>	<u>DMS</u>	
4.0	ND	3.7	4.1	92.	102.	56-151

Approved by: Carol Klein Date: 9-16-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
 Project: EMCON Project No. OG70-038.01
 ARCO Facility No. 6113

Date Received: 09/01/93
 Service Request No.: SJ93-1082
 Sample Matrix: Water

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

<u>Sample Name</u>	<u>Date Analyzed</u>	<u>Percent Recovery</u> <i>α,α,α-Trifluorotoluene</i>
MW-1 (44)	09/09/93	92.
MW-2 (38)	09/09/93	95.
MW-3 (39)	09/09/93	90.
MW-4 (25)	09/10/93	103.
MW-7 (67)	09/09/93	87.
MW-8 (66)	09/09/93	95.
MW-9 (67)	09/09/93	89.
MW-10 (48)	09/09/93	103.
MW-11 (44)	09/09/93	89.
MW-12 (53)	09/09/93	88.
FB-1	09/09/93	89.
MW-1 (44) MS	09/09/93	98.
MW-1 (44) DMS	09/09/93	97.
Method Blank	09/09/93	82.
Method Blank	09/10/93	84.

CAS Acceptance Criteria 70-130

Approved by: Carol Klein Date: 9-16-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. OG70-038.01
ARCO Facility No. 6113

Date Received: 09/01/93
Service Request No.: SJ93-1082

Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Date Analyzed: 09/09/93

<u>Analyte</u>	<u>True Value</u>	<u>Result</u>	<u>Percent Recovery</u>	<u>CAS Percent Recovery Acceptance Criteria</u>
Benzene	25.	27.5	110.	85-115
Toluene	25.	27.5	110.	85-115
Ethylbenzene	25.	27.4	110.	85-115
Total Xylenes	75.	82.8	110.	85-115
TPH as Gasoline	250.	249.	100.	90-110

Approved by: Carol Klein Date: 9-16-93

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Date Received: 09/01/93
Service Request No.: SJ93-1082
Sample Matrix: Water

Matrix Spike/Duplicate Matrix Spike Summary
TPH as Gasoline
EPA Methods 5030/California DHS LUFT Method
 $\mu\text{g/L}$ (ppb)

Sample Name: MW-1 (44)
Date Analyzed: 09/09/93

Percent Recovery

<u>Analyte</u>	<u>Spike Level</u>	<u>Sample Result</u>	<u>Spike Result</u>		<u>MS</u> <u>DMS</u>		<u>CAS Acceptance Criteria</u>
			<u>MS</u>	<u>DMS</u>	<u>MS</u>	<u>DMS</u>	
TPH as Gasoline	250.	ND	259.	250.	104.	100.	76-130

Approved by: Carol Klein Date: 9-16-93

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
ARCO engineer Fyle Christie	Telephone no (ARCO) 571-2434	Telephone no (Consultant) 453-0719
Consultant name EMICON ASSOCIATES	Address (Consultant) 1938 Junction Avenue San Jose	
		Fax no (Consultant) 453-0452

Laboratory name
CAS

Contract number
07077

Sample I.D.	Lab no	Container no.	Matrix			Preservation		Sampling date	Sampling time	BTEX 602 EPA 802C	BTEX/TPH EPA 1662 802D 8015	TPH Max: ec 60'S Gas: Diesel Oil and Grease 4131 4132	TPH EPA 418 1 54503E	EPA 601 BC10	EPA 624 B240	EPA 625 B27C	TCLP Metals VOA VOA	SEM Metals VOA VOA	CAM Metals EPA 50307000 TLC STC	Lead Org: DHS Lead EPA 7420-742	
			Soil	Water	Other	Ice	Acid														
MW-1(44)1-2	2	2		X		X	HC1	8-30-93	1335		X										
MW-1(38)3-4	2	2							1425		X										
MW-3(39)5-6	2	2							1703		X										
MW-4(25)7-8	2	2						9-1-93	1253		X										
MW-5	2	2									X										
MW-6(65)	2	2						9-1-93			X										
MW-7(67)9-10	2	2						8-30-93	1652		X										
MW-8(66)11-12	2	2							1350		X										
MW-9(67)13-14	2	2							1515		X										
MW-10(48)15-16	2	2						9-1-93	1202		X										
MW-11(44)17-18	2	2						8-30-93	1507		X										
MW-12(33)19-20	2	2							1608		X										
FB-1 21-22	2	2						9-1-93	1255		X										
MW-1(44)23-24	2	2					HC1	8-30-93	1335			X									

Method of shipment
Sampler will deliver

Special detection Limit/reporting
Lowest Possible

Special QA/QC
As Normal

Remarks
**2-40 ml VOA'S
4-liter HCl**

Lab number
5593-1082

Turnaround time
Priority Rush 1 Business Day ()

Rush 2 Business Days ()

Expedited 5 Business Days ()

Standard 10 Business Days (X)

Condition of sample. OKAY	Temperature received: COOL
Relinquished by sampler IAN GRAHAM	Date 9-1-93 Time 1700
Relinquished by	Date Time Received by
Relinquished by	Date Time Received by Laboratory Jefferson CAS
	Date 9-1-93 Time 1700



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 0670-038-01

SAMPLE ID: MW-1

PURGED BY: J. Williams

CLIENT NAME: ARC CO 6113

SAMPLED BY: J. Williams

LOCATION: Livermore, CA

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.): 3.90

DEPTH TO WATER (feet): 20.72 CALCULATED PURGE (gal.): 11.70

DEPTH OF WELL (feet): 44.6 ACTUAL PURGE VOL. (gal.): 12

DATE PURGED: 08-30-93 Start (2400 Hr) 1310 End (2400 Hr) 1329

DATE SAMPLED: 08-30-93 Start (2400 Hr) 1335 End (2400 Hr) 1338

TIME (2400 Hr)	VOLUME (gal.)	pH (u.its)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1317</u>	<u>4</u>	<u>7.07</u>	<u>604</u>	<u>65.3</u>	<u>BROWN</u>	<u>HENU4</u>
<u>1323</u>	<u>8</u>	<u>7.19</u>	<u>597</u>	<u>64.3</u>	<u>11</u>	<u>11</u>
<u>1329</u>	<u>12</u>	<u>7.22</u>	<u>588</u>	<u>64.1</u>	<u>11</u>	<u>11</u>

D. O. (ppm): NR ODOR: None (COBALT 0 - 100) NR (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
- Submersible Pump
- Well Wizard™
- Other: _____

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-30-93 Time: 1240 Meter Serial #: 9011 Temperature °F: 78.4
(EC 1000 9.68 / 10.00) (DI _____) (pH 7 6.54 / 7.00) (pH 10 9.90 / 10.00) (pH 4 4.02 / —)

Location of previous calibration: _____

Signature: Joe Williams Reviewed By: JWS Page 1 of 12



WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-038-01
PURGED BY: J. Williams
SAMPLED BY: J. Williams

SAMPLE ID: MW-2
CLIENT NAME: ARCO 6113
LOCATION: Livermore, Ca

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.): 327
DEPTH TO WATER (feet): 18.43 CALCULATED PURGE (gal.): 9.83
DEPTH OF WELL (feet): 38.5 ACTUAL PURGE VOL. (gal.): 10

DATE PURGED: 08-30-93 Start (2400 Hr) 1405 End (2400 Hr) 1421
DATE SAMPLED: 08-30-93 Start (2400 Hr) 1425 End (2400 Hr) 1428

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1412</u>	<u>3.5</u>	<u>6.93</u>	<u>441</u>	<u>67.6</u>	<u>BROWN</u>	<u>HEAVY</u>
<u>1416</u>	<u>7</u>	<u>6.96</u>	<u>451</u>	<u>63.9</u>	<u>11</u>	<u>11</u>
<u>1421</u>	<u>10</u>	<u>7.01</u>	<u>455</u>	<u>63.4</u>	<u>11</u>	<u>11</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|---|---|--|--|
| <input type="checkbox"/> 2' Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2' Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input checked="" type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | Other: _____ | Other: _____ | Other: _____ |

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-30-93 Time: 1240 Meter Serial #: 9010 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: MW-1

Signature: Joe [Signature] Reviewed By: [Signature] Page 2 of 12



WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: 0670-038-01

SAMPLE ID: MW-3

PURGED BY: J Williams

CLIENT NAME: ARCO 6113

SAMPLED BY: J Williams

LOCATION: Levermore CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL):	<u>NR</u>	VOLUME IN CASING (gal.):	<u>2.97</u>
DEPTH TO WATER (feet):	<u>20.95</u>	CALCULATED PURGE (gal.):	<u>8.92</u>
DEPTH OF WELL (feet):	<u>39.2</u>	ACTUAL PURGE VOL. (gal.):	<u>9.0</u>

DATE PURGED: 08-30-93 Start (2400 Hr) 1640 End (2400 Hr) ~~1703~~ 1658
 DATE SAMPLED: 08-30-93 Start (2400 Hr) 1700 End (2400 Hr) 1703

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1648</u>	<u>3</u>	<u>7.19</u>	<u>596</u>	<u>71.2</u>	<u>BROWN</u>	<u>HEAVY</u>
<u>1653</u>	<u>6</u>	<u>7.06</u>	<u>618</u>	<u>65.9</u>	<u>''</u>	<u>''</u>
<u>1658</u>	<u>9</u>	<u>7.13</u>	<u>625</u>	<u>65.7</u>	<u>''</u>	<u>''</u>

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

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
<input type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon)
<input type="checkbox"/> Centrifugal Pump	<input checked="" type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> ODL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated
Other: _____	Other: _____	Other: _____	Other: _____

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-30-93 Time: 1240 Meter Serial #: _____ Temperature °F: _____
 (EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
 Location of previous calibration: MW-1

Signature: Joe Williams Reviewed By: JB Page 3 of 12



WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: CG70-038.01

SAMPLE ID: MW-4(25)

PURGED BY: I. GRAHAM

CLIENT NAME: ARCO # 6113

SAMPLED BY: I. GRAHAM

LOCATION: LIVERMORE, CA.

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): <u>NR</u>	VOLUME IN CASING (gal.): <u>3.65</u>
DEPTH TO WATER (feet): <u>21.1</u>	CALCULATED PURGE (gal.): <u>10.97</u>
DEPTH OF WELL (feet): <u>26.7</u>	ACTUAL PURGE VOL. (gal.): <u>12.0</u>

DATE PURGED: <u>9-1-93</u>	Start (2400 Hr) <u>1220</u>	End (2400 Hr) <u>1250</u>
DATE SAMPLED: <u>9-1-93</u>	Start (2400 Hr) <u>1253</u>	End (2400 Hr) <u>1253</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1230</u>	<u>4.0</u>	<u>6.57</u>	<u>1127</u>	<u>69.4</u>	<u>GREY</u>	<u>MODERATE</u>
<u>1240</u>	<u>8.0</u>	<u>6.54</u>	<u>1147</u>	<u>67.9</u>	<u>11</u>	<u>11</u>
<u>1250</u>	<u>12.0</u>	<u>6.58</u>	<u>1151</u>	<u>67.1</u>	<u>11</u>	<u>11</u>

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): FB-1 (1255)

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
<input type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon)
<input type="checkbox"/> Centrifugal Pump	<input checked="" type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated
Other: _____	Other: _____	Other: _____	Other: _____

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: LID IS EXTREMELY STUCK

Meter Calibration: Date: 9-1-93 Time: 1100 Meter Serial #: 9105 Temperature °F: _____
 (EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
 Location of previous calibration: MW-10

Signature: [Signature] Reviewed By: [Signature] Page 4 of 12



WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: OG70-038,01
PURGED BY: I, GRAHAM
SAMPLED BY: I, GRAHAM

SAMPLE ID: MW-6 (65)
CLIENT NAME: ARCO # 6113
LOCATION: LIVERMORE, CA.

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.): 30.08
DEPTH TO WATER (feet): 20.45 CALCULATED PURGE (gal.): 90.25
DEPTH OF WELL (feet): 66.5 ACTUAL PURGE VOL. (gal.): 15.5

DATE PURGED: 9-1-93 Start (2400 Hr) 1310 End (2400 Hr) 1325
DATE SAMPLED: N/A Start (2400 Hr) N/A End (2400 Hr) N/A

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (umhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
* <u>NO SAMPLE TAKEN DUE TO PRODUCT</u> *						
<u>1W WELL PURGED @ 15.5 GAL.</u>						
D. O. (ppm):	<u>NR</u>		ODOR:	<u>STRONG</u>	<u>NR</u>	<u>NR</u>
					(COBALT 0 - 100)	(NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|---|--|--|---|
| <input type="checkbox"/> 2' Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon®) | <input type="checkbox"/> 2' Bladder Pump | <input type="checkbox"/> Bailer (Teflon®) |
| <input type="checkbox"/> Centrifugal Pump | <input checked="" type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> ODL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard™ | <input type="checkbox"/> Dedicated |
| Other: _____ | | Other: _____ | |

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: PRODUCT CAME INTO WELL DURING PULSE - CHECKED WITH A TEFLON AND MEASURED BETWEEN .01' - .02' OF PRODUCT THICKNESS (SEMIFORMY)

Meter Calibration: Date: 9-1-93 Time: 1100 Meter Serial #: 9105 Temperature °F: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
Location of previous calibration: MW-10

Signature: [Signature] Reviewed By: [Signature] Page 6 of 12



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: 2670-038-01

SAMPLE ID: MW-7

PURGED BY: M. Gallegos

CLIENT NAME: ARCWHA 6113

SAMPLED BY: M. Gallegos

LOCATION: Livermore, CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): <u>NR</u>	VOLUME IN CASING (gal.): <u>30.86</u>
DEPTH TO WATER (feet): <u>20.26</u>	CALCULATED PURGE (gal.): <u>92.59</u>
DEPTH OF WELL (feet): <u>67.5</u>	ACTUAL PURGE VOL. (gal.): <u>93.0</u>

DATE PURGED: 8-30-93 Start (2400 Hr) 1553 End (2400 Hr) 1640
 DATE SAMPLED: 8-30-93 Start (2400 Hr) 1652 End (2400 Hr) -

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1604</u>	<u>310</u>	<u>7.51</u>	<u>812</u>	<u>66.7</u>	<u>BRN</u>	<u>Heavy</u>
<u>1624</u>	<u>620</u>	<u>7.25</u>	<u>815</u>	<u>67.1</u>	<u>..</u>	<u>..</u>
<u>1640</u>	<u>930</u>	<u>7.28</u>	<u>816</u>	<u>66.9</u>	<u>..</u>	<u>..</u>

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	
<input type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon®)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon®)
<input type="checkbox"/> Centrifugal Pump	<input checked="" type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated
Other: _____		Other: _____	

WELL INTEGRITY: Good LOCK #: 3259

REMARKS: all samples taken

Meter Calibration: Date: 8-30-93 Time: _____ Meter Serial #: 4972 Temperature °F: _____
 (EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)
 Location of previous calibration: MW-8

Signature: M. Gallegos Reviewed By: JB Page 7 of 12



WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: CG70-038 01

SAMPLE ID: MW-8

PURGED BY: M. Calligos

CLIENT NAME: ARCO# 6013

SAMPLED BY: M. Calligos

LOCATION: Livermore, CA

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): <u>NR</u>	VOLUME IN CASING (gal.): <u>3216</u>
DEPTH TO WATER (feet): <u>17.37</u>	CALCULATED PURGE (gal.): <u>96.49</u>
DEPTH OF WELL (feet): <u>166.6</u>	ACTUAL PURGE VOL. (gal.): <u>96.5</u>

DATE PURGED: <u>8-30-93</u>	Start (2400 Hr) <u>1259</u>	End (2400 Hr) <u>1343</u>
DATE SAMPLED: <u>8-30-93</u>	Start (2400 Hr) <u>1350</u>	End (2400 Hr) <u>---</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1310</u>	<u>32.5</u>	<u>7.56</u>	<u>787</u>	<u>56.8</u>	<u>BRN</u>	<u>HEAVY</u>
<u>1326</u>	<u>65.0</u>	<u>7.13</u>	<u>812</u>	<u>63.7</u>	<u>BRN</u>	<u>HEAVY</u>
<u>1343</u>	<u>96.5</u>	<u>7.17</u>	<u>805</u>	<u>63.4</u>	<u>"</u>	<u>"</u>

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	
<input type="checkbox"/> 2' Bladder Pump	<input type="checkbox"/> Bailer (Teflon®)	<input type="checkbox"/> 2' Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon®)
<input type="checkbox"/> Centrifugal Pump	<input checked="" type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated
Other: <u>2.5 Bsl</u>		Other: <u> </u>	

WELL INTEGRITY: Good LOCK #: 3259

REMARKS: all samples taken

Meter Calibration: Date: 8-30-93 Time: 1245 Meter Serial #: 4972 Temperature °F: 78.9
 (EC 1000 1076/1000) (DI) (pH 7 717/700) (pH 10 1007/1000) (pH 4 400/400)

Location of previous calibration:
 Signature: M. Calligos Reviewed By: Page 8 of 12



WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: 0670-038-01

SAMPLE ID: MW-9

PURGED BY: M. Colledge

CLIENT NAME: ARCO # 6113

SAMPLED BY: M. Colledge

LOCATION: Livermore, CA

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.): 32.11

DEPTH TO WATER (feet): 18.74 CALCULATED PURGE (gal.): 96.35

DEPTH OF WELL (feet): 67.9 ACTUAL PURGE VOL. (gal.): 96.5

DATE PURGED: 8-30-93 Start (2400 Hr) 1422 End (2400 Hr) 1506

DATE SAMPLED: 8-30-93 Start (2400 Hr) 1515 End (2400 Hr) _____

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. ($\mu\text{mhos/cm @ } 25^\circ\text{C}$)	TEMPERATURE ($^\circ\text{F}$)	COLOR (visual)	TURBIDITY (visual)
<u>1436</u>	<u>32.5</u>	<u>7.21</u>	<u>781</u>	<u>65.0</u>	<u>Lt. BRN</u>	<u>HEAVY</u>
<u>1451</u>	<u>65.0</u>	<u>7.15</u>	<u>778</u>	<u>64.3</u>	<u>"</u>	<u>"</u>
<u>1506</u>	<u>96.5</u>	<u>7.15</u>	<u>776</u>	<u>64.5</u>	<u>"</u>	<u>"</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

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

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

PURGING EQUIPMENT

SAMPLING EQUIPMENT

- | | | | |
|--|--|--|---|
| <input type="checkbox"/> 2" Bladder Pump | <input type="checkbox"/> Bailer (Teflon $\text{\textcircled{B}}$) | <input type="checkbox"/> 2" Bladder Pump | <input checked="" type="checkbox"/> Bailer (Teflon $\text{\textcircled{B}}$) |
| <input type="checkbox"/> Centrifugal Pump | <input checked="" type="checkbox"/> Bailer (PVC) | <input type="checkbox"/> DDL Sampler | <input type="checkbox"/> Bailer (Stainless Steel) |
| <input type="checkbox"/> Submersible Pump | <input type="checkbox"/> Bailer (Stainless Steel) | <input type="checkbox"/> Dipper | <input type="checkbox"/> Submersible Pump |
| <input type="checkbox"/> Well Wizard TM | <input type="checkbox"/> Dedicated | <input type="checkbox"/> Well Wizard TM | <input type="checkbox"/> Dedicated |
| Other: <u>Rig Bait</u> | | Other: _____ | |

WELL INTEGRITY: Good LOCK #: 3259

REMARKS: all sample taken

Meter Calibration: Date: 8-20-93 Time: _____ Meter Serial #: 4972 Temperature $^\circ\text{F}$: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)

Location of previous calibration: MW-8
Signature: [Signature] Reviewed By: [Signature] Page 9 of 12



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

PROJECT NO: OG70-035.01

SAMPLE ID: MW-10 (48)

PURGED BY: I. GRAHAM

CLIENT NAME: ARCO # 6113

SAMPLED BY: I. GRAHAM

LOCATION: LIVERMORE, CA,

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL):	<u>NR</u>	VOLUME IN CASING (gal.):	<u>18.03</u>
DEPTH TO WATER (feet):	<u>23.3</u>	CALCULATED PURGE (gal.):	<u>54.09</u>
DEPTH OF WELL (feet):	<u>49.9</u>	ACTUAL PURGE VOL. (gal.):	<u>55.0</u>

DATE PURGED:	<u>9-1-93</u>	Start (2400 Hr)	<u>1100</u>	End (2400 Hr)	<u>1200</u>
DATE SAMPLED:	<u>9-1-93</u>	Start (2400 Hr)	<u>1202</u>	End (2400 Hr)	<u>1202</u>

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1120</u>	<u>18.03</u>	<u>7.17</u>	<u>658</u>	<u>68.8</u>	<u>BROWN</u>	<u>MOD/HEAVY</u>
<u>1140</u>	<u>37.0</u>	<u>7.08</u>	<u>671</u>	<u>65.8</u>	<u>11</u>	<u>11</u>
<u>1200</u>	<u>55.0</u>	<u>7.06</u>	<u>672</u>	<u>65.3</u>	<u>11</u>	<u>11</u>
D. O. (ppm):	<u>NR</u>	ODOR:	<u>ND</u>		<u>NR</u>	<u>NR</u>
					(COBALT 0 - 100)	(NTU 0 - 200)

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): NONE

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
<input type="checkbox"/> 2" Bladder Pump	<input type="checkbox"/> Bailer (Teflon/5)	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon/5)
<input type="checkbox"/> Centrifugal Pump	<input checked="" type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated
Other: _____		Other: _____	

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 9-1-93 Time: 1100 Meter Serial #: 9105 Temperature °F: 78.0
 (EC 1000 894 / 1000) (DI 4.50) (pH 7.82 / 7.00) (pH 10 10.08 / 10.00) (pH 4 3.93 / _____)

Location of previous calibration: _____
 Signature: [Signature] Reviewed By: [Signature] Page 10 of 12



EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

PROJECT NO: 0670-038-01

SAMPLE ID: MW-11

PURGED BY: J Williams

CLIENT NAME: ARCO 6115

SAMPLED BY: J Williams

LOCATION: Livermore, Ca

TYPE: Ground Water Surface Water Treatment Effluent Other

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

CASING ELEVATION (feet/MSL): <u>NR</u>	VOLUME IN CASING (gal.): <u>3.80</u>
DEPTH TO WATER (feet): <u>21.09</u>	CALCULATED PURGE (gal.): <u>11.42</u>
DEPTH OF WELL (feet): <u>44.4</u>	ACTUAL PURGE VOL. (gal.): <u>6</u>

DATE PURGED: 08-30-93 Start (2400 Hr) 1449 End (2400 Hr) 1459
 DATE SAMPLED: 08-30-93 Start (2400 Hr) 1505 End (2400 Hr) 1507

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
<u>1455</u>	<u>4</u>	<u>7.25</u>	<u>793</u>	<u>67.6</u>	<u>BROWN</u>	<u>HEAVY</u>
		<u>DRIED After</u>		<u>6 GALLON</u>	<u>Time 1459</u>	
<u>1510</u>	<u>Recharge</u>	<u>7.37</u>	<u>795</u>	<u>68.8</u>	<u>BROWN</u>	<u>HEAVY</u>

D. O. (ppm): NR ODOR: NONE (COBALT 0 - 100) NR (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
- Centrifugal Pump
- Submersible Pump
- Well Wizard™
- Bailer (Teflon®)
- Bailer (PVC)
- Bailer (Stainless Steel)
- Dedicated

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

Other: _____

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-30-93 Time: 1240 Meter Serial #: _____ Temperature °F: _____

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

Location of previous calibration: MW-1

Signature: J Williams Reviewed By: JTB Page 11 of 12



WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

PROJECT NO: 0670-038-01
PURGED BY: J Williams
SAMPLED BY: J Williams

SAMPLE ID: MW-12
CLIENT NAME: ARCO 6113
LOCATION: Livermore, CA

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.): 1.87
DEPTH TO WATER (feet): 21.79 CALCULATED PURGE (gal.): 5.63
DEPTH OF WELL (feet): 33.3 ACTUAL PURGE VOL. (gal.): 6

DATE PURGED: 08-30-93 Start (2400 Hr) 1541 End (2400 Hr) 1601
DATE SAMPLED: 08-30-93 Start (2400 Hr) 1604 End (2400 Hr) 1608

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. ($\mu\text{mhc}/\text{cm} @ 25^\circ\text{C}$)	TEMPERATURE ($^\circ\text{F}$)	COLOR (visual)	TURBIDITY (visual)
<u>1549</u>	<u>2</u>	<u>6.77</u>	<u>710</u>	<u>70.4</u>	<u>BROWN</u>	<u>HEAVY</u>
<u>1555</u>	<u>3</u>	<u>6.83</u>	<u>719</u>	<u>67.8</u>	<u>11</u>	<u>11</u>
<u>1601</u>	<u>6</u>	<u>6.82</u>	<u>714</u>	<u>67.2</u>	<u>11</u>	<u>11</u>
_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____

D. O. (ppm): NR ODOR: None NR (CCBALT 0 - 100) NR (NTU 0 - 200)

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon \bar{b})	<input type="checkbox"/> 2" Bladder Pump	<input checked="" type="checkbox"/> Bailer (Teflon \bar{b})
<input type="checkbox"/> Centrifugal Pump	<input type="checkbox"/> Bailer (PVC)	<input type="checkbox"/> DDL Sampler	<input type="checkbox"/> Bailer (Stainless Steel)
<input type="checkbox"/> Submersible Pump	<input type="checkbox"/> Bailer (Stainless Steel)	<input type="checkbox"/> Dipper	<input type="checkbox"/> Submersible Pump
<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated	<input type="checkbox"/> Well Wizard™	<input type="checkbox"/> Dedicated
Other: _____	_____	Other: _____	_____

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: _____

Meter Calibration: Date: 8-30-93 Time: 1240 Meter Serial: 9010 Temperature $^\circ\text{F}$: _____
(EC 1000 _____ / _____) (DI _____) (pH 7 _____ / _____) (pH 10 _____ / _____) (pH 4 _____ / _____)

Location of previous calibration: MW-1
Signature: [Signature] Reviewed By: [Signature] Page 12 of 12