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

TRANSMITTAL

94 MAR -7 PM 2:19
ALCO HAZMAT

TO: Ms. Susan Hugo
Alameda County Health Care
Services Agency
80 Swan Way, Room 200
Oakland, California 94621

DATE: March 4, 1994
PROJECT NUMBER: 60000.15
SUBJECT: ARCO Station 771

FROM: Erin D. Krueger

WE ARE SENDING YOU:

COPIES	DATED	DESCRIPTION
1	03/03/94	Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1993 at ARCO Station 771, 899 Rincon Avenue, Livermore, California.

THESE ARE TRANSMITTED as checked below:

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REMARKS:
Copies: 1 to RESNA project file no. 60000.15

Erin D. Krueger, Staff Geologist

cc: Mr. Michael Whelan, ARCO
Mr. Eddy So, RWQCB
Ms. Danielle Stefani, Livermore Fire Dept.

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Fourth Quarter 1993
at
ARCO Station 771
899 Rincon Avenue
Livermore, California

60000.15

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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 771
899 Rincon Avenue, 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 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 field procedures, field data, and field protocols, performed by EMCON, is beyond RESNA's scope of work. Previous environmental work at the site is summarized in RESNA reports cited in the Reference section.

GROUNDWATER MONITORING

Field Work

EMCON field personnel were onsite November 5, 1993, to measure depth to water levels (DTW), perform subjective analysis for the presence of product in groundwater, and perform quarterly groundwater sampling of monitoring wells MW-1 through MW-11 and recovery well RW-1.

Laboratory Analyses

Water samples were analyzed by Columbia Analytical Services, Inc., located in San Jose, California (Hazardous Waste Testing Laboratory Certification No. 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. In addition, groundwater samples collected from well MW-6, the closest downgradient well to the former waste-oil tank, were also analyzed for total petroleum hydrocarbons as diesel (TPHd) using EPA Methods 3510/California DHS LUFT Method and total oil and grease (TOG) using Standard Methods 5520 C and F. The Chain of Custody Records and Laboratory Analysis Reports are included in Appendix A.

Results of Groundwater Monitoring

Groundwater elevations fell an average of about 0.62 foot in wells MW-3, MW-6 through MW-9, and MW-11 and rose an average of about 0.60 foot in wells MW-1, MW-2, MW-4, MW-5, MW-10, and RW-1 since the last quarter. Evidence of floating product or product sheen was not noted in any of the wells during this quarter. Based on November 5, 1993, DTW data, groundwater is interpreted to flow toward the north-northeast with a gradient of approximately 0.05 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 have been identified since the last quarter: concentrations of TPHg and BTEX have generally decreased in wells MW-1, MW-3, MW-5, and MW-6; have generally increased in wells MW-2, MW-4 (except TPHg) and MW-7; have remained not detected in wells MW-8 through MW-11; and, in RW-1, TPHg and ethylbenzene have increased, toluene and total xylenes have decreased, and benzene remained the same (Plate 4). Concentrations of TPHd and TOG in well MW-6 have generally decreased since the last quarter. Cumulative analytical results of water samples are presented in Table 2.

Product Recovery

No floating product was recovered during this quarter. The total product recovered at the site since 1991 is 3.06 gallons. Table 3, tabulates the total product recovered at the site.

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Previous and Future Work

Fourth Quarter 1993

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

- Performed Fourth Quarter 1993 Groundwater Monitoring.

First Quarter 1994

- Submit Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1994 to ARCO and regulatory agencies.

- Perform First Quarter 1994 Groundwater Monitoring.

- If groundwater elevations decrease to expose well screen, the appropriate regulatory agencies will be notified and the VES will be started.

Reporting Requirements

RESNA recommends that copies of this letter 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
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

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

Sincerely,
RESNA Industries Inc.

Erin D. Krueger
Staff Geologist

James L. Nelson, C.E.G. 14693
Certified Engineering Geologist

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

Enclosures: References

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

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Groundwater Samples
Table 3, Approximate Cumulative Product Recovered

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

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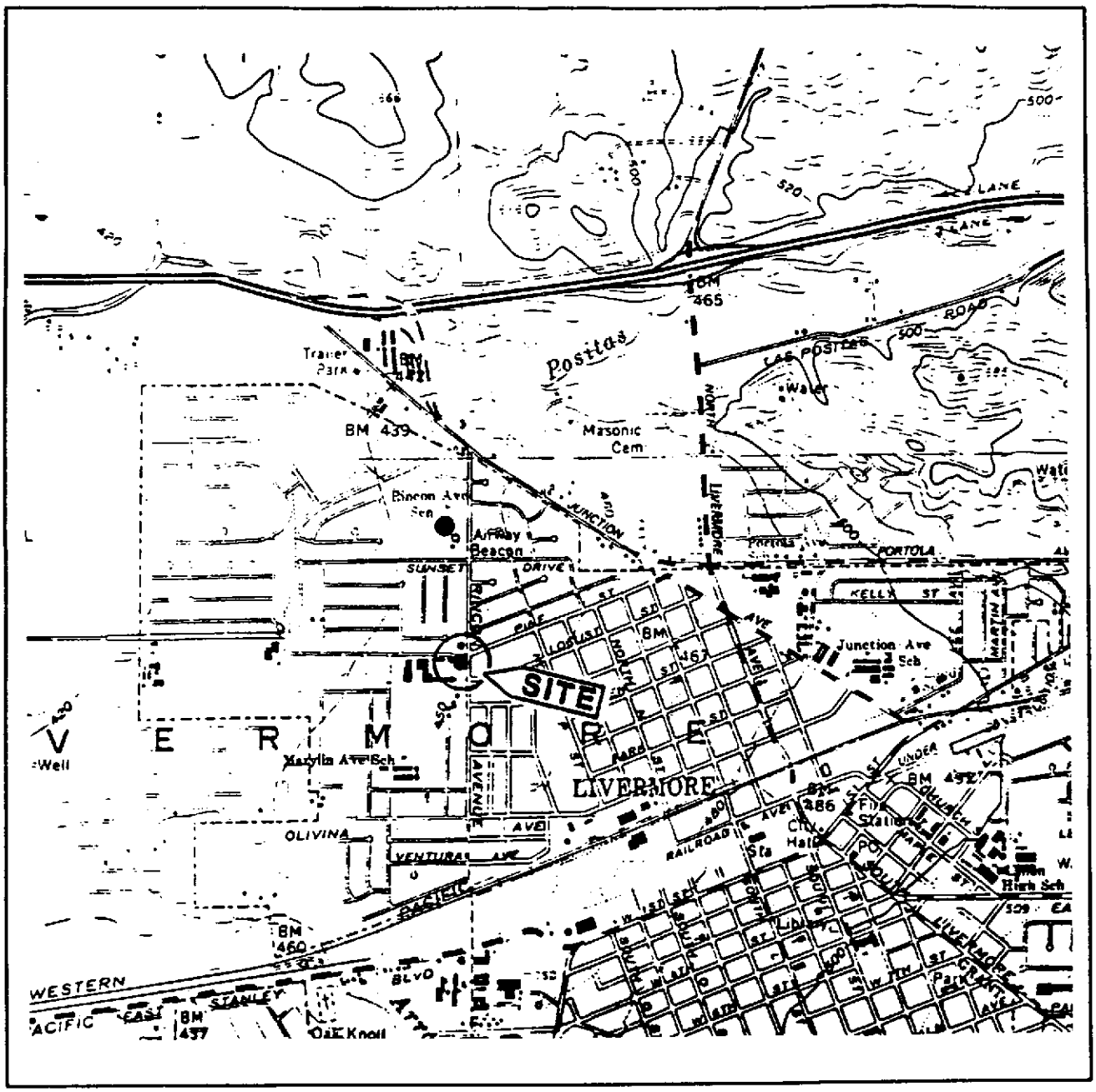
REFERENCES

RESNA, February 26, 1993. Report on Additional Onsite and Initial Offsite Subsurface Investigation at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.09

RESNA, December 29, 1993. Letter Report Quarterly Groundwater Monitoring Third Quarter 1993 at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.15



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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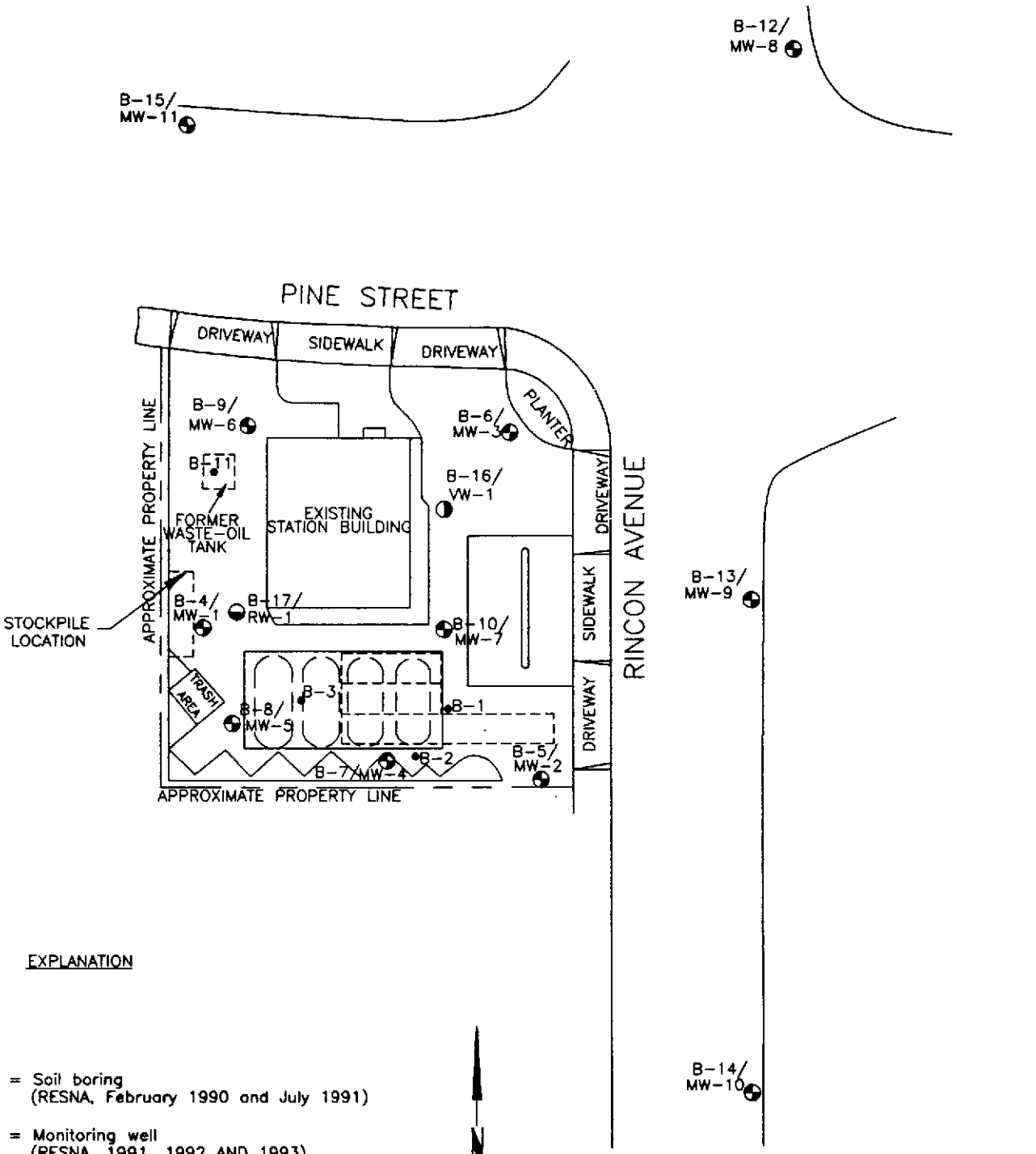
SITE VICINITY MAP
ARCO Station 771
899 Rincon Avenue
Livermore, California

PLATE
1



EXPLANATION

- B-11 ● = Soil boring (RESNA, February 1990 and July 1991)
- B-15/MW-11 = Monitoring well (RESNA, 1991, 1992 AND 1993)
- B-17/RW-1 = Recovery well (RESNA, April 1992)
- B-16/VW-1 = Vapor extraction well (RESNA, April 1992)
- = Former underground gasoline-storage tank
- = Existing underground gasoline-storage tank

N

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

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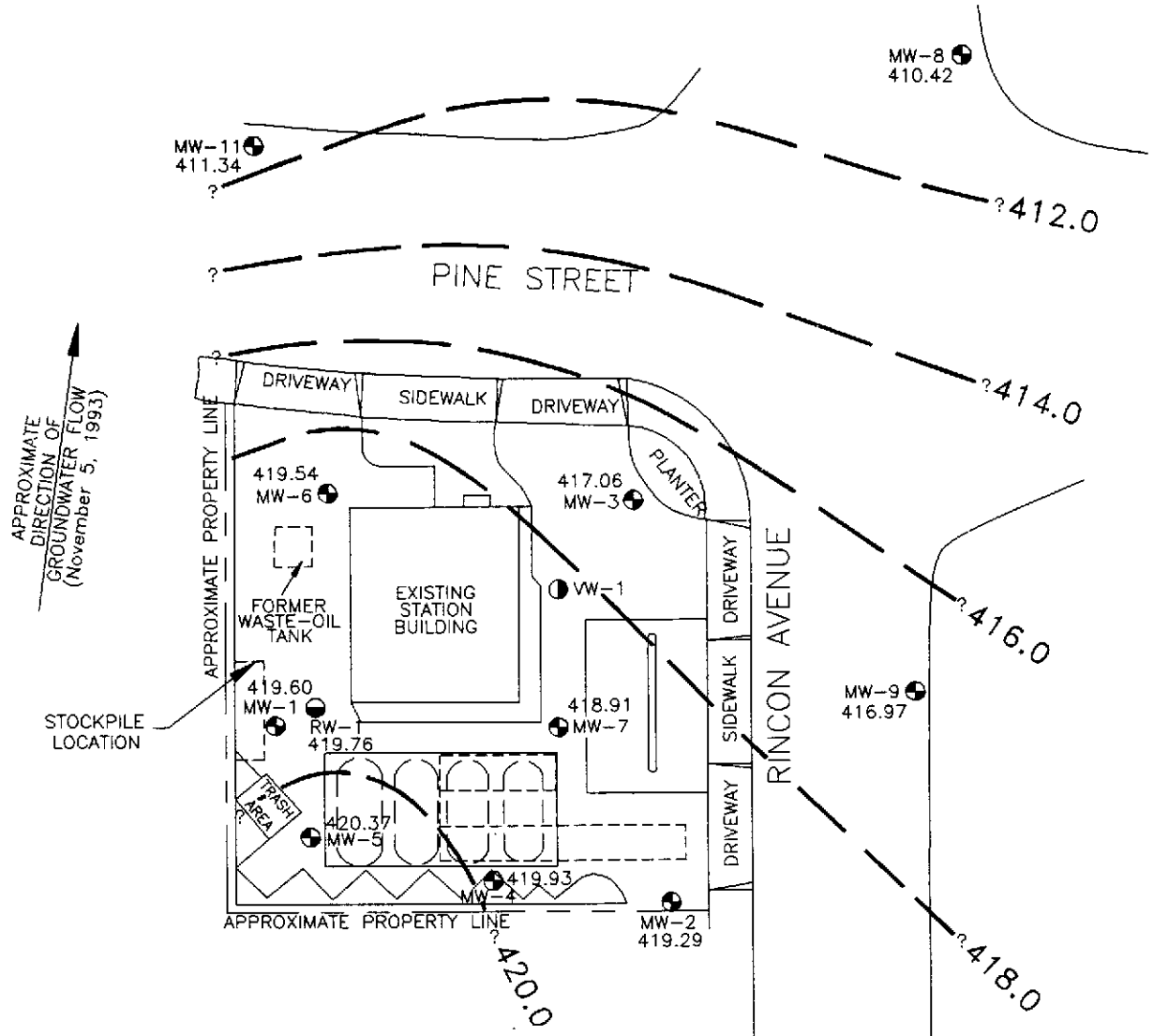
GENERALIZED SITE PLAN
ARCO Station 771
899 Rincon Avenue
Livermore, California

PLATE 2



EXPLANATION

MW-11 = Monitoring well (RESNA, 1991, 1992 AND 1993)

RW-1 = Recovery well (RESNA, April 1992)

VW-1 = Vapor extraction well (RESNA, April 1992)

= Former underground gasoline-storage tank

= Existing underground gasoline-storage tank

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

420.37 = Elevation of groundwater in feet above MSL, November 5, 1993

N

Approximate Scale

40 20 0 40 80

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

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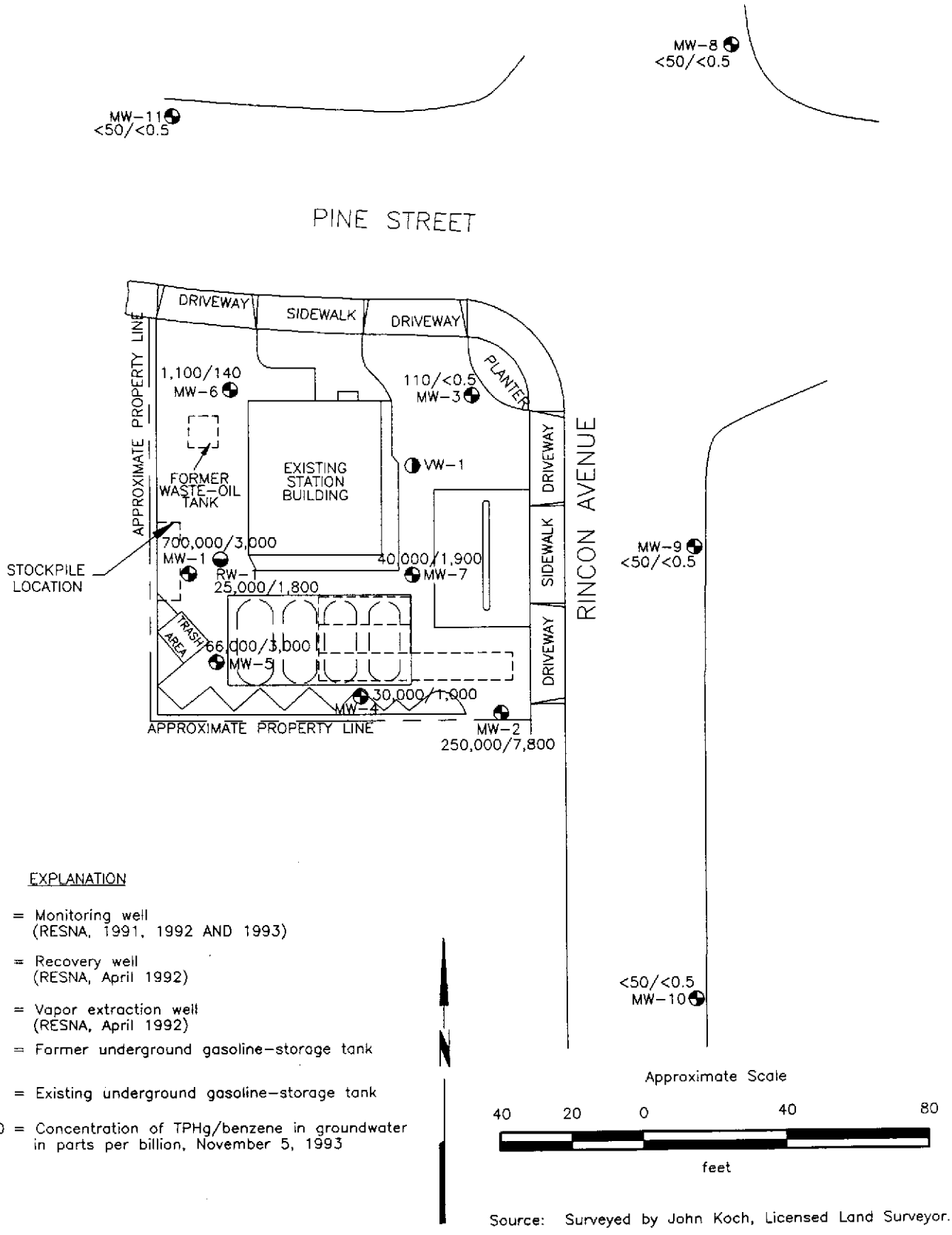
GROUNDWATER GRADIENT MAP
ARCO Station 771
899 Rincon Avenue
Livermore, California

PLATE 3



Source: Surveyed by John Koch, Licensed Land Surveyor.

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TPHg/BENZENE CONCENTRATIONS IN GROUNDWATER
ARCO Station 771
899 Rincon Avenue
Livermore, California

PLATE 4

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 1 of 8)

Well Date	Well Elevation	Depth-to- Water	Water Elevation	Floating Product
MW-1				
01-15-91	451.80[a]	32.77	419.03	Sheen
02-27-91		32.23	419.57	None
03-20-91		27.38	424.42	Sheen
04-10-91		26.49	425.31	None
05-20-91	451.80[b]	Not measured - interface probe failure		
06-20-91		33.95	417.85	Sheen
07-25-91		36.59*	415.21*	0.10
08-13-91		37.72*	414.08*	0.20
09-12-91		39.25*	412.55*	0.23
10-30-91		39.14*	412.66*	0.20
11-13-91		Dry	Dry	None
12-26-91		39.30*	412.50	0.01
01-18-92		37.81**	NC	Skimmer
02-21-92		Well inaccessible due to construction		
03-31-92		31.90**	NC	Skimmer
04-24-92	451.42[c]	Well inaccessible due to construction		
05-20-92		33.00	418.42	Skimmer
06-12-92		33.25	418.17	0.02
07-28-92		32.31	419.11	None
08-24-92		30.87	420.55	None
09-15-92		32.24*	419.18*	0.01
10-29-92		32.29	419.13	None
11-25-92	451.73[d]	32.15	419.58	Floating product**
12-14-92		30.54	421.19	None
01-29-93		23.49	428.24	None
02-26-93		25.23	426.50	None
03-29-93		25.66	426.07	None
04-27-93		28.02	423.71	None
05-10-93		30.38	421.35	None
06-17-93		30.81	420.92	None
07-27-93		Not monitored-truck parked on well		
08-26-93		31.23	420.50	None
09-14-93		32.59	419.14	None
11-05-93		32.13	419.60	None
MW-2				
01-15-91	449.52[a]	30.89*	418.63*	0.16
02-27-91		29.11*	420.41*	0.02
03-20-91		24.57*	424.95*	0.02
04-10-91		22.85*	426.67*	0.05
05-20-91	449.51[b]	NM	NM	NM

See notes on page 8 of 8

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 2 of 8)

Well Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-2 (cont.)				
06-20-91		31.42*	418.09*	0.15
07-25-91		33.69*	415.82*	0.49
08-13-91		34.80*	414.71*	0.47
09-12-91		36.39*	413.12*	0.45
10-30-91		Dry	Dry	None
11-13-91		Dry	Dry	None
12-26-91		36.45	413.06	Sheen
01-18-92		Well inaccessible due to construction		
02-21-92	449.51[b]	26.27	NC	Skimmer
03-31-92		28.85	NC	Skimmer
04-24-92		30.95	418.56	Skimmer
05-20-92		30.69	418.82	Skimmer
06-12-92		31.25	418.26	None
07-28-92		30.31	419.20	None
08-24-92		29.83	419.68	None
09-15-92		30.06	419.45	Sheen
10-29-92		30.90	418.61	None
11-25-92	449.49[d]	31.13	418.36	Floating Product**
12-14-92		29.24	420.25	None
01-29-93		20.12	429.39	None
02-26-93		22.59	426.90	None
03-29-93		22.83	426.66	None
04-27-93		25.10	424.39	None
05-10-93		27.23	422.26	None
06-17-93		28.26	421.23	None
07-27-93		29.50	419.99	None
08-26-93		29.85	419.64	None
09-14-93		30.43	419.06	None
11-05-93		30.20	419.29	None
MW-3				
01-15-91	450.29*	32.34	417.95	None
02-27-91		31.78	418.51	None
03-20-91		27.74	422.55	None
04-10-91		25.05	425.24	None
05-20-91	450.28[b]	27.06	423.22	None
06-20-91		32.35	417.93	None
07-25-91		35.02	415.26	None
08-13-91		36.50	413.78	None
09-12-91		38.47	413.81	None

See notes on page 8 of 8

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 3 of 8)

Well Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-3 (cont.)				
10-30-91		Dry	Dry	None
11-13-91		Dry	Dry	None
12-26-91		38.53	411.75	None
01-18-92		Well inaccessible due to construction		
02-21-92		Well inaccessible due to construction		
03-31-92		30.61	NC	None
04-24-92	450.28[c]	32.83	417.45	None
05-20-92		33.85	416.43	None
06-12-92		34.51	415.77	None
07-28-92		34.42	415.86	None
08-24-92		32.46	417.82	None
09-15-92		34.29	415.99	None
10-29-92		33.40	416.88	None
11-25-92		33.67	416.61	None
12-14-92		34.26	416.02	None
01-29-93		21.88	428.40	None
02-26-93		24.71	425.57	None
03-29-93	450.28[c]	24.74	425.54	None
04-27-93		25.96	424.32	None
05-10-93		27.61	422.67	None
06-17-93		28.73	421.55	None
07-27-93		30.37	419.91	None
08-26-93		30.94	419.34	None
09-14-93		31.84	418.44	None
11-05-93		33.22	417.06	None
MW-4				
07-25-91	451.56[b]	36.07	415.49	None
08-13-91		37.54	414.02	None
09-12-91		38.73	412.83	None
10-10-91	451.56[b]	39.90	411.66	None
11-13-91		40.56	411.00	None
12-26-91	450.99[c]	38.78	412.78	None
01-18-92		38.71	NC	None
02-21-92		31.91	NC	None
03-31-92		30.36	NC	None
04-24-92		32.65	418.34	None
05-20-92		32.62	418.37	None
06-12-92		32.73	418.26	None
07-28-92		31.48	419.51	None

See notes on page 8 of 8

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 4 of 8)

Well Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-4 (cont.)				
08-24-92		32.84	418.15	None
09-15-92		31.37	419.62	None
10-29-92		32.58	418.41	None
11-25-92	451.09[d]	32.37	418.72	None
12-14-92		30.99	420.10	None
01-29-93		22.30	428.79	None
02-26-93		24.47	426.62	None
03-29-93		24.67	426.42	None
04-27-93		26.68	424.41	None
05-10-93		28.64	422.45	None
06-17-93		29.28	421.81	None
07-27-93		31.14	419.95	None
08-26-93		31.38	419.71	None
09-14-93		32.00	419.01	None
11-05-93		31.16	419.93	None
MW-5				
07-25-91	451.41[b]	36.67	414.74	Sheen
08-13-91		37.98*	413.43*	0.01
09-12-91		39.01*	412.40*	0.05
10-30-91		38.28	412.13	Sheen
11-13-91		39.24	412.17	Sheen
12-26-91		39.11	412.30	Sheen
01-18-92		38.15	NC	Skimmer
02-21-92		30.59	NC	Skimmer
03-18-92		30.84	NC	Skimmer
04-24-92	451.40[c]	33.00	418.40	Skimmer
05-20-92		32.86	418.54	Skimmer
06-12-92		33.03	418.37	None
07-28-92		31.92	419.48	None
08-24-92		32.17	419.23	None
09-15-92		31.90	419.50	None
10-29-92		32.94	418.46	None
11-25-92	Not measured - new L-shape wellhead fitting prevented sounder from going down well			
12-14-92		30.90***	NC	None
01-29-93		23.25***	NC	None
02-26-93		25.02***	NC	None
03-29-93		24.72***	NC	None
04-27-93		27.11***	NC	None
05-10-93		29.04***	NC	None

See notes on page 8 of 8

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 5 of 8)

Well Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-5 (cont.)				
06-17-93		29.33***	NC	None
07-27-93		31.12	420.28	None
08-26-93		31.37	420.03	None
09-14-93		31.96	419 44	None
11-05-93		31.03	420.37	None
MW-6				
07-25-91	451.38[b]	37.68	413.70	None
08-13-91		39.17	412.21	None
09-12-91		41.14	410.24	None
10-30-91		42.10	409.28	None
11-13-91		41.45	409.93	None
12-26-91		41.23	410.15	None
01-18-92		38.23	NC	None
02-21-92	451.37[c]	35.21	NC	None
03-31-92		32.26	NC	None
04-24-92		33.24	418.13	None
05-20-92		33.14	418.23	None
06-12-92		33.43	417.94	None
07-28-92		32.52	418.85	None
08-24-92		32.57	418.80	None
09-15-92		32.58	418.79	None
10-29-92		32.33	419.04	None
11-25-92		32.43	418.94	None
12-14-92		31.52	419.85	None
01-29-93		23.70	427.67	None
02-26-93		26.22	425.15	None
03-29-93		26.13	425.24	None
04-27-93		27.27	424.10	None
05-10-93		29.74	421.63	None
06-17-93		30.92	420.45	None
07-27-93		30.90	420.47	None
08-26-93		31.18	420.19	None
09-14-93		31.70	419.67	None
11-05-93		31.83	419.54	None

See notes on page 8 of 8

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 6 of 8)

Well Date	Well Elevation	Depth-to- Water	Water Elevation	Floating Product
MW-7				
07-25-91	450.65[b]	34.88	415.77	Sheen
08-13-91		36.17	414.48	None
09-12-91		37.81	412.84	None
10-30-91		38.50	412.15	None
11-13-91		38.31	412.34	None
12-26-91		37.90	412.75	None
01-18-92		Well inaccessible due to construction		
02-21-92		31.50	NC	None
03-31-92		29.40	NC	None
04-24-92	450.63[c]	32.14	418.49	None
05-20-92		32.51	418.12	None
06-12-92		32.45	418.18	None
07-28-92		32.08	418.55	None
08-24-92		32.29	418.34	None
09-15-92		31.93	418.70	None
10-29-92		32.37	418.26	None
11-25-92	450.33[d]	31.80	418.53	None
12-14-92		30.44	419.89	None
01-29-93		21.76	428.57	None
02-26-93		24.16	426.17	None
03-29-93		24.32	426.01	None
04-27-93		25.44	424.89	None
05-10-93		27.40	422.93	None
06-17-93		28.80	421.53	None
07-27-93		29.89	420.44	None
08-26-93		30.52	419.81	None
09-14-93		31.09	419.24	None
11-05-93		31.42	418.91	None
MW-8				
01-29-93	449.43[d]	23.23	426.20	None
02-26-93		29.20	420.23	None
03-29-93		29.77	419.66	None
04-27-93		31.52	417.91	None
05-10-93		33.88	415.55	None
06-17-93		35.25	414.18	None
07-27-93		36.61	412.82	None
08-26-93		37.71	411.72	None
09-14-93		38.78	410.65	None
11-05-93		39.01	410.42	None

See notes on page 8 of 8

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 7 of 8)

Well Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-9				
01-29-93	449.21[d]	18.91	430.30	None
02-26-93		21.35	427.86	None
03-29-93		21.78	427.43	None
04-27-93		24.70	424.51	None
05-10-93		26.19	423.02	None
06-17-93		27.50	421.71	None
07-27-93		29.11	420.10	None
08-26-93		29.55	419.66	None
09-14-93		30.65	418.56	None
11-05-93		32.24	416.97	None
MW-10				
01-29-93	449.22[d]	19.27	429.95	None
02-26-93		21.34	427.88	None
03-29-93		20.89	428.33	None
04-27-93		25.40	423.82	None
05-10-93		26.77	422.45	None
06-17-93		26.80	422.42	None
07-27-93		29.87	419.35	None
08-26-93		29.67	419.55	None
09-14-93		31.07	418.15	None
11-05-93		30.42	418.80	None
MW-11				
04-24-92	448.02[e]	35.06	412.96	None
05-20-92		34.10	413.92	None
06-12-92		34.48	413.54	None
07-28-92		35.13	412.89	None
08-24-92		33.32	414.70	None
09-15-92		35.72	412.30	None
10-29-92		35.26	412.76	None
11-25-92		36.44	411.58	None
12-14-92		33.18	414.84	None
01-29-93		23.89	424.13	None
02-26-93		27.31	420.71	None
03-29-93		27.27	420.75	None
04-27-93		30.61	417.41	None
05-10-93		32.78	415.24	None
06-17-93		33.25	414.77	None
07-27-93		34.49	413.53	None

See notes on page 8 of 8

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TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California

Well Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-11 (cont.)				
08-26-93		35.44	412.58	None
09-14-93		36.62	411.40	None
11-05-93		36.68	411.34	None
RW-1				
04-24-92	451.44[c]	32.85	418.59	None
05-20-92		32.60	418.84	None
06-12-92	451.44[c]	32.72	418.72	None
07-28-92		31.94	419.50	None
08-24-92		31.73	419.71	None
09-15-92		31.94	419.50	None
10-29-92		32.15	419.29	None
11-25-92	451.67[d]	32.21	419.46	None
12-14-92		30.58	421.09	None
01-29-93		22.89	428.78	None
02-26-93		23.97	427.70	None
03-29-93		23.98	427.69	None
04-27-93		27.26	424.41	None
05-10-93		29.64	422.03	None
06-17-93		30.18	421.49	None
07-27-93		31.55	420.12	None
08-26-93		31.82	419.85	None
09-14-93		32.32	419.35	None
11-05-93		31.91	419.76	None

Measurements in feet.

* = Floating product present in well; DTW with floating product present was calculated using the following: 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 to obtain an adjusted depth to water. These adjusted groundwater depths were subtracted from wellhead elevations to correct the groundwater elevations.

** = Floating product not initially present but came into well during purging.

*** = DTW measurement may not be accurate due to L-shape wellhead fitting.

[a] = Surveyed by Ron Archer, Civil Engineer, in January 1991.

[b] = Surveyed by John Koch, Licensed Land Surveyor, in July 1991.

[c] = Surveyed by John Koch, Licensed Land Surveyor, in May 1992.

[d] = Surveyed by John Koch, Licensed Land Surveyor, in January 1993.

Wellhead elevations based on benchmark: top of pin in standard monument, west side of intersection of Rincon Avenue and Pine Street. Elevation taken as 448.741 feet. City of Livermore Datum.

NC = Elevation not calculated; wellhead elevations may no longer be correct due to construction of remediation system.

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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES
ARCO Station 771
Livermore, California
(Page 1 of 4)

Sample	TPHg	B	T	E	X	TPHd	TOG
MW-1							
01-15-91	Not sampled--sheen						
04-10-91	98,000	11,000	18,000	2,800	20,000	NA	NA
07-25-91	Not sampled--floating product						
10-30-91	Not sampled--floating product						
03-31-92	Not sampled--floating product						
06-12-92	Not sampled--floating product						
09-16-92	Not sampled--floating product						
11-25-92	Not sampled--floating product						
01-29-93	360,000	2,500	9,300	5,100	41,000	NA	NA
05-10-93	1,900,000	4,100	15,000	21,000	140,000	NA	NA
09-16-93	1,800,000	6,400	21,000	19,000	140,000	NA	NA
11-05-93	700,000	3,000	7,600	8,600	65,000	NA	NA
MW-2							
01-15-91	Not sampled--floating product						
04-10-91	Not sampled--floating product						
07-25-91	Not sampled--floating product						
10-30-91	Not sampled--sheen						
03-31-92	270,000	7,000	12,000	4,400	40,000	NA	NA
06-12-92	110,000	8,900	13,000	2,800	16,000	NA	NA
09-16-92	Not sampled--sheen						
11-25-92	Not sampled--floating product						
01-29-93	89,000	4,600	5,700	1,800	15,000	NA	NA
05-10-93	440,000	3,900	4,300	4,400	36,000	NA	NA
09-16-93	200,000	5,500	4,300	2,300	19,000	NA	NA
11-05-93	250,000	7,800	8,400	3,100	24,000	NA	NA
MW-3							
01-15-91	230	<0.5	<0.5	2.2	2.1	NA	NA
04-10-91	530	12	8.4	4.0	7.0	NA	NA
07-25-91	110	0.32	0.75	1.2	1.0	NA	NA
10-30-91	Not sampled--dry						
03-31-92	670	12	1.1	7.4	27	NA	NA
06-12-92	280	<0.5	<0.5	2.1	2.0	NA	NA
09-15-92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
11-25-92	220	1.0	<0.5	4.9	1.2	NA	NA
01-29-93	380***	0.8	0.6	2.1	2.0	NA	NA
05-10-93	170	<0.5	<0.5	2.0	0.6	NA	NA
09-15-93	120	<0.5	<0.5	<0.5	<0.5	NA	NA
11-05-93	110	<0.5	<0.5	<0.5	<0.5	NA	NA

See notes on page 4 of 4

RESNA
Working to Restore Nature

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES
ARCO Station 771
Livermore, California
(Page 2 of 4)

Sample	TPHg	B	T	E	X	TPHd	TOG
MW-4							
07-25-91	23,000	590	730	360	3,500	NA	NA
10-30-91	19,000	320	340	230	180	NA	NA
03-31-92	30,000	1,300	740	770	4,800	NA	NA
06-12-92	28,000	990	440	550	3,200	NA	NA
09-16-92	21,000	740	240	350	1,300	NA	NA
11-25-92	26,000	1,200	300	350	730	NA	NA
01-29-93	23,000	2,000	580	770	2,500	NA	NA
05-10-93	74,000	2,200	890	1,400	4,000	NA	NA
09-16-93	43,000	640	90	360	690	NA	NA
11-05-93	30,000	1,000	240	390	1,300	NA	NA
MW-5							
07-25-91	57,000	2,300	4,200	77	14,000	NA	NA
10-30-91		Not sampled--sheen					
03-31-92	80,000	7,100	9,100	2,000	16,000	NA	NA
06-12-92	69,000	4,000	5,300	2,200	12,000	NA	NA
09-16-92	65,000	2,300	2,600	1,700	9,900	NA	NA
11-25-92	Inaccessible for sampling, L-shape fitting installed at wellhead for use in interim remediation system						
01-29-93	Inaccessible for sampling, L-shape fitting installed at wellhead for use in interim remediation system						
05-10-93	220,000	3,900	3,700	3,400	15,000	NA	NA
09-16-93	180,000	3,500	3,300	2,700	10,000	NA	NA
11-05-93	66,000	3,000	2,300	1,700	6,200	NA	NA
MW-6							
07-25-91	10,000	3,000	200	340	1,000	NA	NA
10-30-91	970	150	4.4	4.9	6.6	NA	NA
03-31-92	16,000	3,600	1,500	660	1,700	2,400*	2.5[a], 4.0[b]
06-12-92	2,900	480	17	190	170	1,100*	1.2[c]
09-16-92	2,300	220	<5**	92	43	810*	1.5[d]
11-25-92	2,700	240	11	103	32	720*	1.6[a], 1.8[b]
01-29-93	20,000	1,800	1,700	490	2,600	2,300*	3.6[a], 4.0[b]
05-10-93	43,000	3,000	1,700	1,100	4,800	3,900*	16[a], 110[b]
09-15-93	3,500	300	10	100	180	1,100*	1.0[a], 1.0[b]
11-05-93	1,100	140	<5**	35	23	290	1.0[a], 1.0[b]
MW-7							
07-25-91	45,000	1,500	2,700	1,200	9,200	NA	NA
10-30-91	93,000	1,800	770	780	6,700	NA	NA
03-31-92	35,000	960	350	300	5,900	NA	NA
06-12-92	27,000	900	270	340	4,800	NA	NA
09-16-92	39,000	1,900	410	470	5,000	NA	NA

See notes on page 4 of 4

RESNA
Working to Restore Nature

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES
ARCO Station 771
Livermore, California
(Page 3 of 4)

Sample	TPHg	B	T	E	X	TPHd	TOG
MW-7 (cont.)							
11-25-92	49,000	2,900	810	750	5,300	NA	NA
01-29-93	38,000	3,200	1,100	740	4,300	NA	NA
05-10-93	54,000	1,600	160	560	3,100	NA	NA
09-16-93	37,000	1,400	170	560	2,700	NA	NA
11-05-93	40,000	1,900	210	570	2,900	NA	NA
MW-8							
01-29-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
05-10-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
09-15-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
11-05-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-9							
01-29-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
05-10-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
09-15-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
11-05-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-10							
01-29-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
05-10-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
09-15-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
11-05-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
MW-11							
06-12-92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
09-15-92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
11-25-92	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
01-29-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
05-10-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
09-15-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
11-05-93	<50	<0.5	<0.5	<0.5	<0.5	NA	NA
RW-1							
06-12-92	54,000	2,300	4,400	1,200	12,000	NA	NA
09-15-92	49,000	1,500	2,200	870	6,900	NA	NA
11-25-92	32,000	1,500	2,500	1,000	5,500	NA	NA
01-29-93	43,000	3,100	2,500	990	7,400	NA	NA
05-10-93	30,000	2,900	1,100	690	4,300	NA	NA
09-16-93	20,000	1,800	580	620	2,300	NA	NA
11-05-93	25,000	1,800	250	740	1,300	NA	NA

See notes on page 4 of 4

RESNA
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TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER SAMPLES
ARCO Station 771
Livermore, California
(Page 4 of 4)

MCLs	—	1	—	680	1,750
DWAL	—	—	100	—	—

Results in parts per billion (ppb), except TOG, which is reported in parts per million (ppm).

TPHg: Total petroleum hydrocarbons as gasoline (measured using EPA Method 5030/8015).

B: Benzene T: toluene E: ethylbenzene X: total xylene isomers

BTEX: Measured using EPA Method 5030/8020.

TPHd: Total petroleum hydrocarbons as diesel (measured using EPA Method 3510). May be weathered gasoline.

TOG: Total oil and grease: [a] using method 5520F-IR; [b] using method 5520C; [c] using method 413.2; [d] using method 418.1

NA: Not analyzed.

<: Less than the laboratory detection limit.

*: Sample contains a lower boiling point hydrocarbon mixture quantified as diesel. The chromatogram does not match the typical diesel fingerprint.

**: Method Reporting Limit raised due to high analyte concentration requiring sample dilution.

***: Sample contained components eluting in the gasoline range that were quantitated as gasoline. The chromatogram did not match the typical gasoline fingerprint.

MCL: State Maximum Contaminant Level in ppb (October 1990).

DWAL: State Recommended Drinking Water Action Level in ppb (October 1990).

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TABLE 3
APPROXIMATE CUMULATIVE PRODUCT RECOVERED
ARCO Station 771
Livermore, California
(Page 1 of 1)

Year/Date		Floating Product Recovered (gallons)
1991	TOTAL:	2.77 Gallons
1992	TOTAL:	0.29 Gallons
1993		
MW-1		
01-15-93		Sheen
02-26-93		Sheen
03-26-93		Sheen
04-22-93		Sheen
05-18-93		None
06-18-93		None
07-27-93		None
08-26-93		None
09-14-93		None
11-05-93		None
MW-2		
01-15-93		Sheen
02-26-93		Sheen
03-26-93		Sheen
04-22-93		Sheen
05-18-93		None
06-18-93		None
07-27-93		None
08-26-93		None
09-14-93		None
11-05-93		None
MW-5		
01-15-93		Sheen
02-26-93		Sheen
03-26-93		Sheen
04-22-93		Not Monitored
05-18-93		None
06-18-93		None
07-27-93		None
08-26-93		None
09-14-93		None
11-05-93		None
1993	TOTAL:	0.00 Gallons
1991-1993	**TOTAL:**	**3.06 Gallons**

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

Letter 15

RECEIVED
DEC - 7 1993
RESNA
SAN JOSE

Date November 30, 1993
Project 0G70-012.01

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 771, located at 899 Rincon Avenue, 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:

REGISTERED PROFESSIONAL ENGINEER ROBERT PORTER No. 4004 Exp. 6/31/96 STATE OF CALIFORNIA

Robert Porter

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-012.01 STATION ADDRESS : 899 Rincon Avenue, Livermore, CA DATE : 11-3 95

ARCO STATION # : 771 FIELD TECHNICIAN : L RATH DAY : FRIDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-8	ok	YES	OK	3499	ok	31.01	31.01	ND	ND	41.9	—
2	MW-9	ok	YES	ok	3499	ok	32.24	32.24	ND	ND	39.2	—
3	MW-10	ok	YES	ok	3476	ok	30.12	30.12	ND	ND	36.3	—
4	MW-11	ok	YES	OK	3476	ok	30.68	30.68	ND	ND	38.6	—
5	MW-3	O.K.	Yes	OK	3259	ok	33.22	33.27	ND	ND	39.70	—
6	MW-6	O.K	Yes	OK	3259	Slip Cap	31.03	31.03	ND	ND	43.2	Need to replace locking cap
7	RW-1	O.K.	Yes	OK	NONE	Slip	31.91	31.91	ND	ND	39.70	—
8	MW-7	O.K	Yes	OK	NONE	Slip	31.42	31.42	ND	ND	39.70	—
9	MW-4	O.K	3/4	O.K.	NONE	Slip	31.16	31.16	ND	ND	41.10	—
10	MW-5	O.K.	3/4	O.K.	NONE	Slip	31.03	31.03	ND	ND	40.2	—
11	MW-2	O.K	3/4	O.K	3259	~~Yes~~	31.20	30.20	ND	ND	37.5	~~Replace locking~~ Slip cap.
12	MW-1	OK	3/4	OK	NONE	Slip	32.13	32.13	ND	ND	40.5	NEED NEW LOCKING CAP ← skimmer in well.

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
Fourth Quarter 1993
ARCO Service Station 771
899 Rincon Avenue, 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)	TPH as Diesel (ug/l)	Total Oil and Grease, 5520C/F (mg/l)
MW-1(39)	11/05/93	32.13	ND.[2]	700,000.	3,000.	7,600.	8,600.	65,000.	NR.[3]	NR.
MW-2(37)	11/05/93	30.20	ND.	250,000.	7,800.	8,400.	3,100.	24,000.	NR.	NR.
MW-3(39)	11/05/93	33.22	ND.	110.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
MW-4(41)	11/05/93	31.16	ND.	30,000.	1,000.	240.	390.	1,300.	NR.	NR.
MW-5(40)	11/05/93	31.03	ND.	66,000.	3,000.	2,300.	1,700.	6,200.	NR.	NR.
MW-6(42)	11/05/93	31.83	ND.	1,100.	140.	<5.	35.	23.	290.	1.0/1.0
MW-7(39)	11/05/93	31.42	ND.	40,000.	1,900.	210.	570.	2,900.	NR.	NR.
MW-8(40)	11/05/93	39.01	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
MW-9(38)	11/05/93	32.24	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
MW-10(35)	11/05/93	30.42	ND.	<50.	<0.5	<0.5	<0.5	<0.5	NR.	NR.
MW-11(37)	11/05/93	36.68	ND.	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.
RW-1(38)	11/05/93	31.91	ND.	25,000.	1,800.	250.	740.	1,300.	NR.	NR.
FB-1.[4]	11/05/93	NA.[5]	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.

1. TPH. = Total petroleum hydrocarbons
2. ND. = Not detected
3. NR. = Not reported; sample was not scheduled for analysis of the selected parameter
4. FB. = Field blank
5. NA. = Not applicable

Columbia Analytical Services, Inc.

November 22, 1993 Service Request No. SJ93-1366

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

Re: **EMCON Project No. 0G70-012.01**
ARCO Facility No. 771

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 SJ93-1366.

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

Carol J. Klein
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	Depar 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

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

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	ARCO Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**Sample Matrix:**	Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name:	MW-6 (42)	Method Blank
Date Sampled:	11/05/93	

Analyte	EPA Method	MRL		
Total Oil and Grease, IR	SM 5520C	0.5	ND	ND
Hydrocarbons, IR	SM 5520F	0.5	ND	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: _____ Date: November 23, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01 ARCO Facility No. 771	**Date Extracted:**	11/16/93
		Service Request No.:	SJ93-1366
Sample Matrix:	Water		

Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/California DHS LUFT Method
µg/L (ppb)

Sample Name	Date Analyzed	TPH as Diesel
MW-6 (42)	11/18/93	290. *
Method Blank	11/18/93	ND
MRL		50

* The sample contains a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

Approved by: Edward Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**Sample Matrix:**	Water

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

Sample Name:		MW-1 (39)	MW-2 (37)	MW-3 (39)
Date Analyzed:		11/17/93 *	11/18/93	11/18/93
Analyte	**MRL**			
Benzene	0.5	3,000.	7,800.	ND
Toluene	0.5	7,600.	8,400.	ND
Ethylbenzene	0.5	8,600.	3,100.	ND
Total Xylenes	0.5	65,000.	24,000.	ND
TPH as Gasoline	50	700,000.	250,000.	110.

Sample Name:		MW-4 (41)	MW-5 (40)	MW-6 (42)
Date Analyzed:		11/18/93	11/18/93 **	11/18/93 **
Analyte	**MRL**			
Benzene	0.5	1,000.	3,000.	140.
Toluene	0.5	240.	2,300.	<5. ***
Ethylbenzene	0.5	390.	1,700.	35.
Total Xylenes	0.5	1,300.	6,200.	23.
TPH as Gasoline	50	30,000.	66,000.	1,100.

* 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.

** This sample was part of the analytical batch started on November 18, 1993. However, it was analyzed after midnight so the actual date analyzed is November 19, 1993.

*** Raised MRL due to high analyte concentration requiring sample dilution.

Approved by: Kenneth Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**Sample Matrix:**	Water

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

Sample Name:		MW-7 (39)	MW-8 (40)	MW-9 (38)
Date Analyzed:		11/18/93 *	11/18/93	11/18/93
Analyte	**MRL**			
Benzene	0.5	1,900.	ND	ND
Toluene	0.5	210.	ND	ND
Ethylbenzene	0.5	570.	ND	ND
Total Xylenes	0.5	2,900.	ND	ND
TPH as Gasoline	50	40,000.	ND	ND

Sample Name:		MW-10 (35)	MW-11 (37)	FB-1
Date Analyzed:		11/18/93	11/18/93	11/18/93
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 18, 1993. However, it was analyzed after midnight so the actual date analyzed is November 19, 1993.

Approved by: Keon A Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**Sample Matrix:**	Water

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

Sample Name:		RW-1 (38)	Method Blank	Method Blank
Date Analyzed:		11/18/93 *	11/17/93	11/18/93
Analyte	**MRL**			
Benzene	0.5	1,800.	ND	ND
Toluene	0.5	250.	ND	ND
Ethylbenzene	0.5	740.	ND	ND
Total Xylenes	0.5	1,300.	ND	ND
TPH as Gasoline	50	25,000.	ND	ND

* This sample was part of the analytical batch started on November 18, 1993. However, it was analyzed after midnight so the actual date analyzed is November 19, 1993.

Approved by: Kevin Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	Arco Facility No. 771	**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.	36.6	92.	90-110

Approved by: Keenan Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**Sample Matrix:**	Water

Matrix Spike/Duplicate Matrix Spike Summary
Petroleum Hydrocarbons, IR
EPA Method SM 5520F
mg/L (ppm)

Analyte	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
Hydrocarbon Mix	8.0	ND	7.74	8.70	97.	109.	56-151

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

Approved by: Robert A Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**Sample Matrix:**	Water

Surrogate Recovery Summary
Total Petroleum Hydrocarbons as Diesel
EPA Methods 3510/California DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery *p*-Terphenyl
MW-6 (42)	11/18/93	89.
MS	11/18/93	79.
DMS	11/18/93	91.
Method Blank	11/18/93	103.
	CAS Acceptance Criteria	46-133

Approved by: Lee M. Murphy Date: November 22 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	Date Received:	11/05/93
Project:	EMCON Project No. 0G70-012.01	Service Request No.:	SJ93-1366
	ARCO Facility No. 771	Sample Matrix:	Water

Initial Calibration Verification
Total Petroleum Hydrocarbons as Diesel
EPA Methods 3510/DHS LUFT Method
mg/L (ppm)

Date Analyzed: 11/18/93

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TPH as Diesel	500.	453.	91.	90-110

Approved by: Kenneth Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**Sample Matrix:**	Water

Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel
EPA Method 3510/DHS LUFT Method
µg/L (ppb)

Date Analyzed: 11/18/93

			Spike Result		Percent Recovery		
Analyte	**Spike Level**	**Sample Result**	**MS**	**DMS**	**MS**	**DMS**	**Acceptance Criteria**
Diesel	4,000.	ND	3,270.	3,730.	82.	93.	61-121

Approved by: Kevin Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**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 (39)	11/17/93	82.
MW-2 (37)	11/18/93	80.
MW-3 (39)	11/18/93	77.
MW-4 (41)	11/18/93	93.
MW-5 (40)	11/18/93	80.
MW-6 (42)	11/18/93	86.
MW-7 (39)	11/18/93	86.
MW-8 (40)	11/18/93	88.
MW-9 (38)	11/18/93	81.
MW-10 (35)	11/18/93	86.
MW-11 (37)	11/18/93	82.
FB-1	11/18/93	80.
RW-1 (38)	11/18/93	85.
MW-4 (41) MS	11/18/93	95.
MW-4 (41) DMS	11/18/93	92.
Method Blank	11/17/93	74.
Method Blank	11/18/93	76.
CAS Acceptance Criteria		70-130

Approved by: Kevin Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client: EMCON Associates
Project: EMCON Project No. 0G70-012.01
ARCO Facility No. 771

Date Received: 11/05/93
Service Request No.: SJ93-1366

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	Percent Result	CAS Percent Recovery Acceptance Recovery	Criteria
Benzene	25.	23.4	94.	85-115
Toluene	25.	23.4	94.	85-115
Ethylbenzene	25.	22.9	92.	85-115
Total Xylenes	75.	70.6	94.	85-115
TPH as Gasoline	250.	240.	96.	90-110

Approved by: Joann M Murphy Date: November 22, 1993

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COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/05/93
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ93-1366
	ARCO Facility No. 771	**Sample Matrix:**	Water

Matrix Spike/Duplicate Matrix Spike Summary
BTE
EPA Methods 5030/8020
µg/L (ppb)

Sample Name: MW-4 (41)
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
Benzene	2,500.	1,040.	3,480.	3,410.	98.	95.	76-122
Toluene	2,500.	240.	2,560.	2,670.	93.	97.	75-127
Ethylbenzene	2,500.	388.	2,690.	2,750.	92.	94.	70-135

Approved by: Kenneth Wyatt Date: November 22, 1993

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ARCO Products Company

Division of Atlantic Richfield Company

Chain of Custody

Task Order No. EMC-93-5

ARCO Facility no. 771	City (Facility) LIVERMORE	Project manager (Consultant) JIM BUTERA	Laboratory name CAS
ARCO engineer KYLE CHRISTIE	Telephone no. (ARCO) 571-2134	Telephone no. (Consultant) 453-7300	Fax no. (Consultant) 453-0452
Consultant name EMCON ASSOCIATES	Address (Consultant) 1921 RINGWOOD Avenue San Jose		Contract number 307077

Method of shipment: sampler will deliver

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks: 2-40 ml HCl VOAs; 2-Liter NP; 4-Liter HCl

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420 7421 ☐
MW-1(35)	1-2	2		X		X	HCl	11/5/93	1510		X									
MW-2(37)	3-4	2						11/5/93	15:32		X									
MW-3(39)	5-6	2							12:52		X									
MW-4(41)	7-8	2							14:07		X									
MW-5(40)	9-10	2							14:58		X									
MW-6(42)	11-12	6							13:10		X		X							
MW-7(38)	13-14	2							13:31		X									
MW-8(40)	15-16	2							11:17		X									
MW-9(38)	17-18	2							11:11		X									
MW-10(35)	19-20	2							12:16		X									
MW-11(37)	21-22	2							12:50		X									
FB-1	23-24	2							15:55		X									
RW-1(38)	25-26	2		↓		↓	↓	↓	14:25		X									
MW-12(42)	31-32	2		X		X	NP		13:10		X	X								

Lab number: SJ93-1366

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

	Date	Time
Relinquished by sampler: Kyle Christie	11-5-93	1615
Relinquished by		
Relinquished by		

Received by

Received by

Received by laboratory: [illegible] (CAS) — Date 11/5/93 — Time [illegible]

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

APPC 8292 (2-91)

WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 6570-012.01 | SAMPLE ID: MW-1 (39)

PURGED BY: L. RATH | CLIENT NAME: ARCO 771

SAMPLED BY: L. RATH | LOCATION: 599 Rincon Ave 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.):	5.46
DEPTH TO WATER (feet):	32.13	CALCULATED PURGE (gal.):	16.40
DEPTH OF WELL (feet):	40.5 5.37	ACTUAL PURGE VOL. (gal.):	17.0

DATE PURGED: 11-5-93 | Start (2400 Hr) 1450 | End (2400 Hr) ~~1507~~ 1507

DATE SAMPLED: 11-5-93 | Start (2400 Hr) ~~1507~~ 1510 | End (2400 Hr) 1510

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1455	5.5	6.86	1121	68.6	grn-y	Heavy
1459	11.0	6.82	1115	68.7	Grn-y	Heavy
1507	17.0	6.85	1125	68.9	Grn-y	Heavy

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): NO

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 #: NONE

REMARKS: Heavy sheen on purge water

Skimmer in well

Meter Calibration: Date: 11-5-93 | Time: 1050 | Meter Serial #: 9208 | Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: Lisa Rath | Reviewed By: [signature] | Page 1 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0610-012.01 SAMPLE ID: mw-2 (37.5)

PURGED BY: S. Williams CLIENT NAME: Arco 771

SAMPLED BY: S. Williams LOCATION: 889 Rincon Livermore

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

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

CASING ELEVATION (feet/MSL):	Wi	VOLUME IN CASING (gal.):	7.96
DEPTH TO WATER (feet):	30.2	CALCULATED PURGE (gal.):	14.89
DEPTH OF WELL (feet):	~~37.8~~ 7.6	ACTUAL PURGE VOL. (gal.):	15.00

DATE PURGED: 11/5/93 Start (2400 Hr) 1516 End (2400 Hr) 1528

DATE SAMPLED: 11/5/93 Start (2400 Hr) 1532 End (2400 Hr) 1532

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1521	5.0	6.92	1121	70.3	Grey	Heavy
1525	10.0	6.81	1090	69.1	Grey	Heavy
1528	15.0	6.90	1075	69.6	Grey	Heavy

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

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: Good LOCK #: N/A

REMARKS: Sheen on surface of water.

Meter Calibration: Date: 11-5-93 Time: 1215 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 2 of 12

1.9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012-01 | SAMPLE ID: MW-5 (39)

PURGED BY: J.W. Williams | CLIENT NAME: ~~ARCO~~ ARCO 771

SAMPLED BY: J.W. Williams | LOCATION: 899 Rincon Ave

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.):	4.24
DEPTH TO WATER (feet):	33.2	CALCULATED PURGE (gal.):	12.72
DEPTH OF WELL (feet):	39.7	ACTUAL PURGE VOL. (gal.):	13

DATE PURGED: 11-05-93 Start (2400 Hr) 1226 End (2400 Hr) 1249

DATE SAMPLED: 11-05-93 Start (2400 Hr) 1251 End (2400 Hr) 1252

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1237	4.5	6.91	958	72.2	BROWN	HEAVY
1244	9	7.12	1011	68.2	"	"
1249	13	7.14	1021	66.9	"	"

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

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	✓ 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: 11-3-93 Time: 1215 Meter Serial #: 9010 Temperature °F: 72.1

(EC 1000 918 / 1000) (DI ___) (pH 7 6.94 / 7.00) (pH 10 10.06 / 10.00) (pH 4 ___ / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: JD Page 3 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012-01 SAMPLE ID: MW-4

PURGED BY: J.W.II.ams CLIENT NAME: ARCO 771

SAMPLED BY: J.W.II.ams LOCATION: 899 Rincon Ave

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

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

CASING ELEVATION (feet/MSL): N/A VOLUME IN CASING (gal.): 5.30

DEPTH TO WATER (feet): 31.16 CALCULATED PURGE (gal.): 15.90

DEPTH OF WELL (feet): 41.1 ACTUAL PURGE VOL. (gal.): 16

DATE PURGED: 11/5/93 Start (2400 Hr) 1351 End (2400 Hr) 1404

DATE SAMPLED: 11/5/93 Start (2400 Hr) 1407 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1356	5.0	6.90	1191	70.2	Grey	Heavy
1400	11.0	6.87	1173	70.1	"	"
1404	16.0	6.89	1152	69.5	"	"

D. O. (ppm): NR ODOR: Strong 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: Good LOCK #: ___

REMARKS: ___

Meter Calibration: Date: 11-5-93 Time: 1215 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 4 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0870-012.01 SAMPLE ID: MW-5

PURGED BY: J. Williams CLIENT NAME: Arco 771

SAMPLED BY: J. Williams LOCATION: 399 Rincon Ave

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

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

CASING ELEVATION (feet/MSL): NA VOLUME IN CASING (gal.): 5.77

DEPTH TO WATER (feet): 31.03 CALCULATED PURGE (gal.): 17.97

DEPTH OF WELL (feet): 40.2 9.17 ACTUAL PURGE VOL. (gal.): 18.0

DATE PURGED: 11/5/93 Start (2400 Hr) 1437 End (2400 Hr) 1454

DATE SAMPLED: 11/5/93 Start (2400 Hr) 1458 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1446	6.00	6.90	1141	70.1	clear	light
1450	12.00	6.95	1130	69.6	Grey	moderate
1454	18.00	6.98	1122	69.6	Grey	Heavy

D. O. (ppm): <1.2 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	X 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: Good LOCK #: ___

REMARKS: Water had sheen on surface as well as a strong odor.

Meter Calibration: Date: 11-5-93 Time: 1215 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 5 of 12

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-012-01 SAMPLE ID: MW-6 (42)

PURGED BY: L. RATLIFF CLIENT NAME: ARCO 771

SAMPLED BY: L. RATLIFF LOCATION: 851 Rincon Rd Livermore

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	7.40
DEPTH TO WATER (feet):	31.96	CALCULATED PURGE (gal.):	22.22
DEPTH OF WELL (feet):	43.3 (11-3-93)	ACTUAL PURGE VOL. (gal.):	17.0

DATE PURGED: 11-5-93 Start (2400 Hr) 1309 End (2400 Hr) 1323

DATE SAMPLED: 11-5-93 Start (2400 Hr) 1340 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1315	8	7.14	1001	70.4	Gray	Heavy
1321	16	7.10	987	70.0	Gray	Heavy
~~1323~~	~~17~~	Well	Dried			
1340	Recharge	7.26	989	70.4	Gray	Heavy

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

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	X 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 Lwc Broken LOCK #: 3259

REMARKS: well Dried at 1323 Hrs at 17.0 gal
W.L at 1340 Hrs 37.9
X Trip Bottles Lwc Broken

Meter Calibration: Date: 11-5-93 Time: 1050 Meter Serial #: 92058 Temperature °F: ___

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

Location of previous calibration: MW 8

Signature: [signature] Reviewed By: [signature] Page 6 of 13

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-012-01 | SAMPLE ID: MW-7 (39)

PURGED BY: J Williams | CLIENT NAME: ARCO 771

SAMPLED BY: J Williams | LOCATION: 899 Rincon Ave

TYPE: Ground Water V | Surface Water ___ | Treatment Effluent ___ | Other ___

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

CASING ELEVATION (feet/MSL): NR | VOLUME IN CASING (gal.): 5.40

DEPTH TO WATER (feet): 31.42 | CALCULATED PURGE (gal.): 16.22

DEPTH OF WELL (feet): 39.7 | ACTUAL PURGE VOL. (gal.): 16

DATE PURGED: 11-05-93 | Start (2400 Hr) 1308 | End (2400 Hr) 1323

DATE SAMPLED: 11-05-93 | Start (2400 Hr) 1330 | End (2400 Hr) 1331

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1316	5.5	6.87	1075	70.0	GREY	HEAVY
	DRIED Time 1323					
1336	Recharge	7.02	1059	70.1	GREY	HEAVY

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

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

PURGING EQUIPMENT

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

SAMPLING EQUIPMENT

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

WELL INTEGRITY: OK | LOCK #: Slip Cap

REMARKS: Well dried at 10 gallons (323 Sample will and then took recharge reading.

Meter Calibration: Date: 11-5-93 | Time: 1215 | 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 1 of 12

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: CG70-012.01 | SAMPLE ID: MW-8 (40)

PURGED BY: L. RATH | CLIENT NAME: 899 Rincon Ave Attn 771

SAMPLED BY: L. RATH | LOCATION: Livermore Cal

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

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

CASING ELEVATION (feet/MSL):	NR	VOLUME IN CASING (gal.):	0.47
DEPTH TO WATER (feet):	39.00	CALCULATED PURGE (gal.):	1.42
DEPTH OF WELL (feet):	41.9 2.9	ACTUAL PURGE VOL. (gal.):	1.5

DATE PURGED: 11-5-93 Start (2400 Hr) 1100 End (2400 Hr) 1112

DATE SAMPLED: 11-5-93 Start (2400 Hr) 1117 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1104	.5	6.88	835	69.4	Brown	Heavy
1108	1.0	6.98	795	69.3	Brown	Heavy
1112	~~1.0~~ 1.5	7.01	792	69.1	Brown	Heavy

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

COLOR (COBALT 0 - 100): NR TURBIDITY (NTU 0 - 200): NR

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon ®)	___ 2" Bladder Pump	X Bailer (Teflon ®)
___ Centrifugal Pump	X 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 #: 3104

REMARKS: well almost Dry at 1.5 gal

3074

Meter Calibration: Date: 11-5-93 Time: 1050 Meter Serial #: 9208 Temperature °F: 68.9

(EC 1000 1480 / 1000) (DI ___) (pH 7 7.00 / 7.00) (pH 10 10.06 / 10.00) (pH 4 4.00) ___

Location of previous calibration: ___

Signature: [signature] Reviewed By: [signature] Page 3 of 12

WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012-01 SAMPLE ID: MW-9 (38)

PURGED BY: L. RATH CLIENT NAME: ARCO 771 ~~388~~

SAMPLED BY: L. RATH LOCATION: Rincon Ave Livermore Ca

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 1.13

DEPTH TO WATER (feet): 32.24 CALCULATED PURGE (gal.): 3.41

DEPTH OF WELL (feet): 39.2 6.96 ACTUAL PURGE VOL. (gal.): 3.5

DATE PURGED: 11-5-93 Start (2400 Hr) 1125 End (2400 Hr) 1136

DATE SAMPLED: 11-5-93 Start (2400 Hr) 1141 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1128	1.0	7.28	934	68.3	Brown	Heavy
1131	2.0	7.26	907	68.5	↓	↓
1136	3.5	7.19	906	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	X 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: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3499

REMARKS: ___

Meter Calibration: Date: 11-5-93 Time: 1050 Meter Serial #: 9208 Temperature °F: ___

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

Location of previous calibration: MW-8

Signature: [signature] Reviewed By: [signature] Page 9 of 17

WATER SAMPLE FIELD DATA SHEET

Rev. 2. 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-10 (35)

PURGED BY: L RATH CLIENT NAME: ARCO [redacted] 771

SAMPLED BY: L. RATH LOCATION: 6512 Inveron Ave. Livermore

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

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

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): 0.95

DEPTH TO WATER (feet): 30.41 CALCULATED PURGE (gal.): 2.87

DEPTH OF WELL (feet): 36.3 5.56 ACTUAL PURGE VOL. (gal.): 3.0

DATE PURGED: 11-5-93 Start (2400 Hr) 1200 End (2400 Hr) 1210

DATE SAMPLED: 11-5-93 Start (2400 Hr) 1216 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1204	1	7.11	1050	65.4	Brown	Heavy
1207	2	7.04	1065	64.4	Brown	Heavy
1210	3	7.10	1058	63.6	Brown	Heavy

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	X 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: ___		Other: ___	

WELL INTEGRITY: OK LOCK #: 3476

REMARKS: ___

Meter Calibration: Date: 11-5-93 Time: 1050 Meter Serial #: 9208 Temperature °F: ___

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

Location of previous calibration: MW-5

Signature: Lori Rath Reviewed By: [signature] Page 10 of 17

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0620-012-01 SAMPLE ID: MW-11 (37)

PURGED BY: L RATH CLIENT NAME: ARCO 771

SAMPLED BY: L. RATH LOCATION: 891 Rincon Ave Livermore CA

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

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

CASING ELEVATION (feet/MSL): N/A VOLUME IN CASING (gal.): 0.31

DEPTH TO WATER (feet): 36.68 CALCULATED PURGE (gal.): 0.94

DEPTH OF WELL (feet): 38.6 / 39.2 ACTUAL PURGE VOL. (gal.): 1.5

DATE PURGED: 11-5-93 Start (2400 Hr) 1234 End (2400 Hr) 1240

DATE SAMPLED: 11-5-93 Start (2400 Hr) 1250 End (2400 Hr) 1250

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1236	0.5	7.03	925	68.3	Brown	Heavy
1238	1.0	7.04	883	68.5		
1240	1.5	7.04	878	68.2		

D. O. (ppm): N/R ODOR: NONE 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/A

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
____ 2" Bladder Pump	X 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: ____		Other: ____	

WELL INTEGRITY: OK LOCK #: 3476

REMARKS: well almost Dry at 1.5 gal

Meter Calibration: Date: 11-5-93 Time: 1050 Meter Serial #: 9208 Temperature °F: ____

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

Location of previous calibration: MW-8

Signature: [signature] Reviewed By: [signature] Page 1 of 2

Rev. 2, 5/91

EMCON ASSOCIATES

WATER SAMPLE FIELD DATA SHEET

PROJECT NO: 0G70-01.01 | SAMPLE ID: RW-1 (38)
PURGED BY: L RATH | CLIENT NAME: ARCO 771
SAMPLED BY: L RATH | LOCATION: 889 Rivera Ave, Livermore CA

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

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

CASING ELEVATION (feet/MSL): NR
DEPTH TO WATER (feet): 31.77
DEPTH OF WELL (feet): 39.8 (8.03)
VOLUME IN CASING (gal.): 11.80
CALCULATED PURGE (gal.): 35.41
ACTUAL PURGE VOL. (gal.): 24.0

DATE PURGED: 11-5-93 Start (2400 Hr) 1402 End (2400 Hr) 1411
DATE SAMPLED: 11-5-93 Start (2400 Hr) 1425 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1407	12	6.64	996	69.7	Clear	light
1411	24	6.80	1041	69.5	Clear	light
1411	24	Well	Dried			
1422	Recharge	6.71	991	69.3	gray	Heavy

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

- ____ 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 #: NONE

REMARKS: Well Dried at 24.0 gal at 1411 HRS
W.L. 37.6 at 1420 HRS

Meter Calibration: Date: 11-5-93 Time: 1050 Meter Serial #: 9208 Temperature °F: ____

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

Location of previous calibration: MW-8

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