RESNA
Working To Restore Nature

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

TRANSMITTAL

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

DATE: March 18, 1993
PROJECT NUMBER: 60000.13
SUBJECT: ARCO Station 771, 899 Rincon Avenue, Livermore, California.

FROM: Barbara Sieminski
TITLE: Assistant Project Geologist

WE ARE SENDING YOU:

COPIES	DATED	NO.	DESCRIPTION
1	3/18/93	60000.13	Final - Letter Report - Quarterly Groundwater Monitoring, Fourth Quarter 1992 at the above subject site.

THESE ARE TRANSMITTED as checked below:

[ ] For review and comment
[ ] Approved as submitted
[ ] Resubmit ___ copies for approval
[X] As requested
[ ] Approved as noted
[ ] Submit___ copies for distribution
[ ] For approval
[ ] Return for corrections
[ ] Return ___ corrected prints
[ ] For your files

REMARKS: Mr. Michael Whelan, ARCO Products Company
Mr. Eddy So, RWQCB, San Francisco Bay Region
Ms. Danielle Stefani, Livermore Fire Department
Mr. Joel Coffman, RESNA Industries Inc.

Copies: 1 to RESNA project file no. 60000.13

RESNA
Working To Restore Nature

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

LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Fourth Quarter 1992
at
ARCO Station 771
899 Rincon Avenue
Livermore, California

MAR 1993

60000.13

RESNA
Working To Restore Nature

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

March 18, 1993
0129MWHE
60000.13

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

Subject: Fourth Quarter 1992 Groundwater Monitoring Report for ARCO Station 771, 899 Rincon Avenue, Livermore, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), RESNA Industries Inc. (RESNA) prepared this letter report which summarizes the results of fourth quarter 1992 groundwater monitoring performed by ARCO's contractor, EMCON Associates (EMCON) of San Jose, California, at the above-referenced site. The objectives of this quarterly groundwater monitoring are to evaluate changes in the groundwater flow direction and gradient, and changes in concentrations of petroleum hydrocarbons in the local groundwater associated with the former gasoline-storage tanks and former waste-oil tank at the site. The field work and laboratory analyses of groundwater samples during this quarter performed under the direction of EMCON included measuring depths to groundwater, subjectively analyzing groundwater for the presence of petroleum product, collecting groundwater samples from the wells for laboratory analyses, and directing a State-certified laboratory to analyze the groundwater samples. Field procedures and acquisition of field data were performed under the direction of EMCON; warrant of their field data and evaluation of their field protocols is beyond RESNA's scope of work. 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.

The operating ARCO Station 771 is located on the southwestern corner of the intersection of Rincon Avenue and Pine Street in Livermore, California. The site location is shown on the Site Vicinity Map, Plate 1.

Results of previous environmental investigations at the site are summarized in the reports listed in the References section. The locations of soil borings, groundwater monitoring wells, and other pertinent site features are shown on the Generalized Site Plan, Plate 2.

Groundwater Sampling and Gradient Evaluation

Depth to water measurements (DTW) were performed by EMCON field personnel on October 29, November 25, and December 14, 1992. Quarterly sampling was performed by EMCON field personnel on November 25, 1992. The results of EMCON's field work on the site, including DTW measurements and subjective analyses for the presence of product in the groundwater in MW-1 through MW-7, MW-11 and RW-1, are presented on EMCON's Field Reports. These data are included in Appendix A.

The DTW levels, wellhead elevations, groundwater elevations, and subjective observations of product in the groundwater from MW-1 through MW-7, MW-11 and RW-1 for this quarter and previous quarterly groundwater monitorings at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. DTW level was not measured in MW-5 during November monitoring, because new L-shape wellhead fitting installed to connect this well to the vapor extraction system prevented the sounder from going down the well. It appears that DTW level measured in MW-5 in December may not be accurate (measured through the L-shape casing), therefore it was not used for gradient evaluation. Groundwater elevations increased an average of 1 foot since the last quarter. The groundwater gradients interpreted from the October, November and December 1992 monitorings were approximately 0.1 ft/ft with flow directions to the northeast. The groundwater gradients and flow directions are shown on Plates 3 through 5, Groundwater Gradient Maps. The presence of floating product was noted in the purge water from monitoring wells MW-1 and MW-2, although no floating product was observed in the sample collected from these wells for the subjective analyses during November monitoring event. No evidence of floating product or sheen was observed in the other wells by EMCON's field personnel during this quarter (EMCON Field Report Sheets, Appendix A).

Groundwater monitoring wells MW-3, MW-4, MW-6, MW-7, MW-11 and RW-1 were purged and sampled by EMCON field personnel on November 25, 1992. Wells MW-1 and MW-2 were not sampled because they contained floating product. Well MW-5 was not sampled due to the new L-shape wellhead fitting which made it impossible to lower a pump or bailer in the well for purging or collecting samples. The purge water was removed from the site by a licensed hazardous waste hauler; the Monitoring Well Purge Water Transport Form is included in Appendix A.

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 (Hazardous Waste Testing Laboratory Certification No. 1426). The water samples from MW-3, MW-4, MW-6, MW-7, MW-11 and RW-1 were analyzed for total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 5030/8020/California DHS LUFT Method. Concentrations of TPHg and benzene in the groundwater are shown on Plate 6, TPHg Concentrations in Groundwater, and Plate 7, Benzene Concentrations in Groundwater. Well MW-6, the nearest downgradient well to the former waste-oil tank, was also analyzed for total petroleum hydrocarbons as diesel (TPHd) and total oil and grease (TOG) using EPA Methods 3510/California DHS LUFT Method and SM 5520C&F, respectively. 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--TPHg, TPHd, BTEX, and TOG.

The following is a general summary of changes in the concentrations of hydrocarbon constituents in the groundwater from wells MW-3, MW-4, MW-6, MW-7, MW-11 and RW-1 since the last quarterly monitoring. Concentrations of TPHg and BTEX generally increased slightly in onsite wells, and remained nondetectable in offsite well MW-11. The concentration of TPHd decreased, and the concentration of TOG slightly increased, in MW-6.

Product Recovery

Floating product was measured and removed on a monthly basis, as summarized in Table 3, Approximate Cumulative Product Recovered. In January 1992, Horner EZY Skimmers were installed in wells MW-1, MW-2, and MW-5, as a method of interim remediation at the site. RESNA inspected wells MW-1, MW-2 and MW-5 for the presence of floating product on October 26, November 30, and December 30, 1992. No measurable amount of floating product (except for product sheen) was detected in wells MW-1, MW-2 and MW-5 during these inspections. The total 1992 year-to-date product recovered is 0.29 gallons, of which 93 percent was removed from well MW-1 and the remaining 7 percent from wells MW-2 and MW-5. The total product recovered at the site is 3.06 gallons for 1991 and 1992 combined.

Conclusions

Groundwater at the site has been impacted by petroleum hydrocarbons. The groundwater sample results from offsite well MW-11 (nondetectable levels of TPHg and BTEX) indicate that these constituents have been delineated to the northwest. The extent of the petroleum hydrocarbons has not yet been defined to the south, east or west. Attempts to gain access to install offsite wells for further delineation of hydrocarbon-impacted groundwater in the vicinity of the site are ongoing.

Currently groundwater monitoring well MW-5 cannot be monitored and sampled due to the new L-shape wellhead fitting installed for use of the well in the interim remediation system being installed at the site.

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

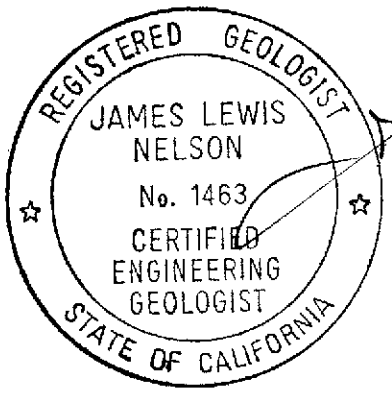
Ms. Danielle Stefani
Livermore Fire Department
4550 East Avenue
Livermore, California 94550

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

Sincerely,
RESNA Industries Inc.

Barbara Sieminski

Barbara Sieminski
Assistant Project Geologist



James L. Nelson
Certified Engineering
Geologist No. 1463

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, October 29, 1992
Plate 4, Groundwater Gradient Map, November 25, 1992
Plate 5, Groundwater Gradient Map, December 14, 1992
Plate 6, TPHg Concentrations in Groundwater, November 25, 1992
Plate 7, Benzene Concentrations in Groundwater, November 25, 1992

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Groundwater - TPHg, TPHd, BTEX, and TOG
Table 3, Approximate Cumulative Product Recovered

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

Monitoring Well Purge Water Disposal Form

REFERENCES

Applied GeoSystems, June 22, 1990. Limited Subsurface Environmental Assessment, ARCO Station No. 771, Livermore, California. AGS 60000-1.

Brown and Caldwell, September 16, 1987. Soil Sample Results for Waste-Oil tank Removal, ARCO Station 771, 899 Rincon Avenue, Livermore, California. 17/3456-02/3.

California Department of Health Services, Office of Drinking Water, October 24, 1990, Summary of Drinking Water Standards.

RESNA/Applied Geosystems, April 12, 1991. Supplemental Subsurface Investigation at ARCO Station No. 771, Livermore, California. AGS 60000.

RESNA/Applied GeoSystems, July 12, 1991. Letter Report Quarterly Ground-Water Monitoring Second Quarter 1991 at ARCO Station 771, 899 Rincon Avenue, Livermore, California. AGS 60000.05

RESNA, October 17, 1991. Report on Additional Subsurface Investigation at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.06

RESNA, November 21, 1991. Letter Report Quarterly Ground-Water Monitoring Third Quarter 1991 at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.05

RESNA, April 7, 1992. Letter Report Quarterly Groundwater Monitoring Fourth Quarter 1991 at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.05

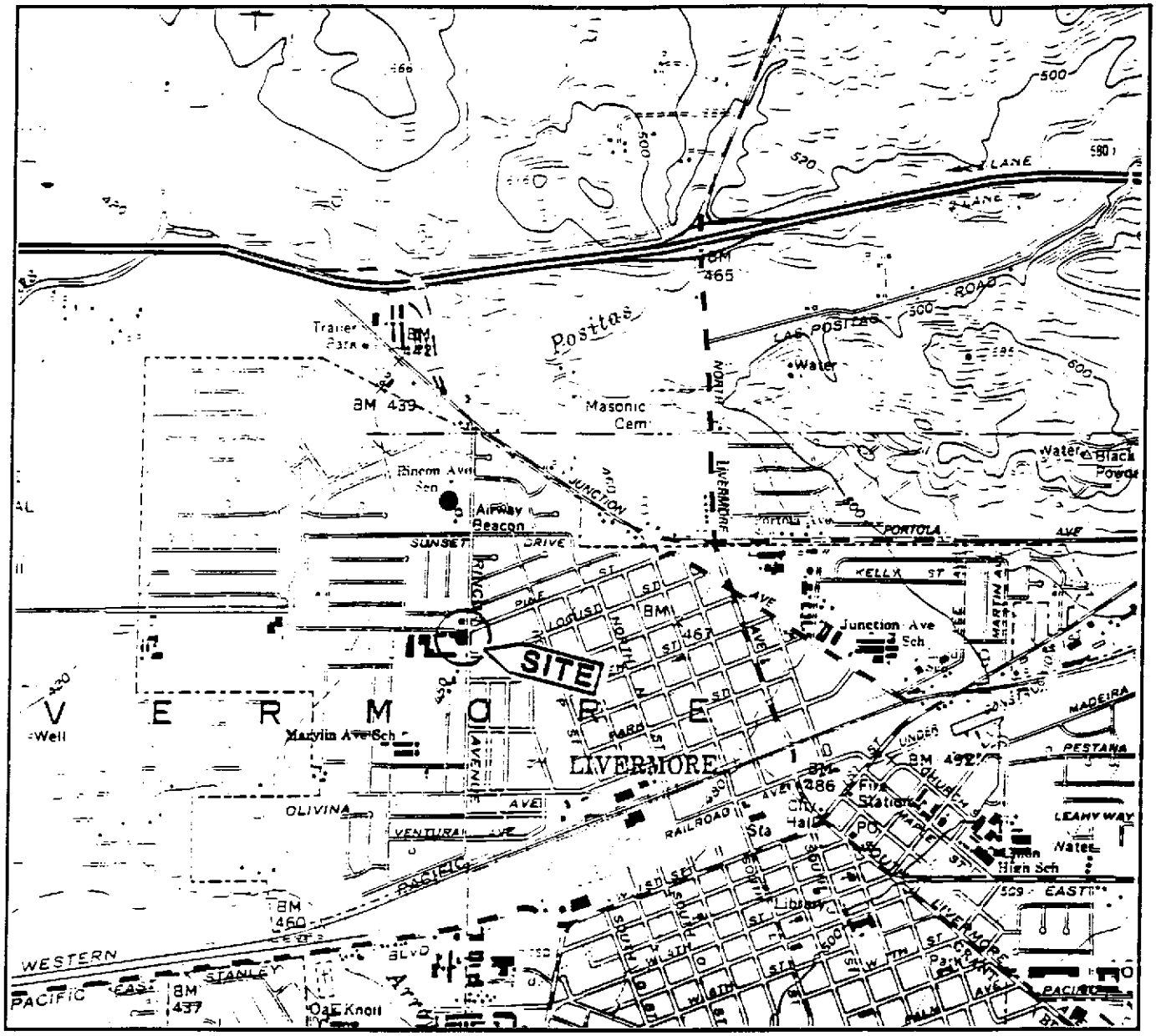
RESNA, May 1, 1992. Letter Report Quarterly Groundwater Monitoring First Quarter 1992 at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.05

RESNA, September 28, 1992. Letter Report Quarterly Groundwater Monitoring Second Quarter 1992 at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.13

RESNA, December 4, 1992. Letter Report Quarterly Groundwater Monitoring Third Quarter 1992 at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.13

REFERENCES

Roux, July 10, 1992. Underground Storage Tank Removal and Soil Sampling, ARCO Facility No. 771, 899 Rincon Avenue, Livermore, California. A135W01



Base: U.S. Geological Survey
7.5-Minute Quadrangles
Livermore, California.
Photorevised 1980

LEGEND

⊙ = Site Location

N

Approximate Scale

2000 1000 0 2000 4000

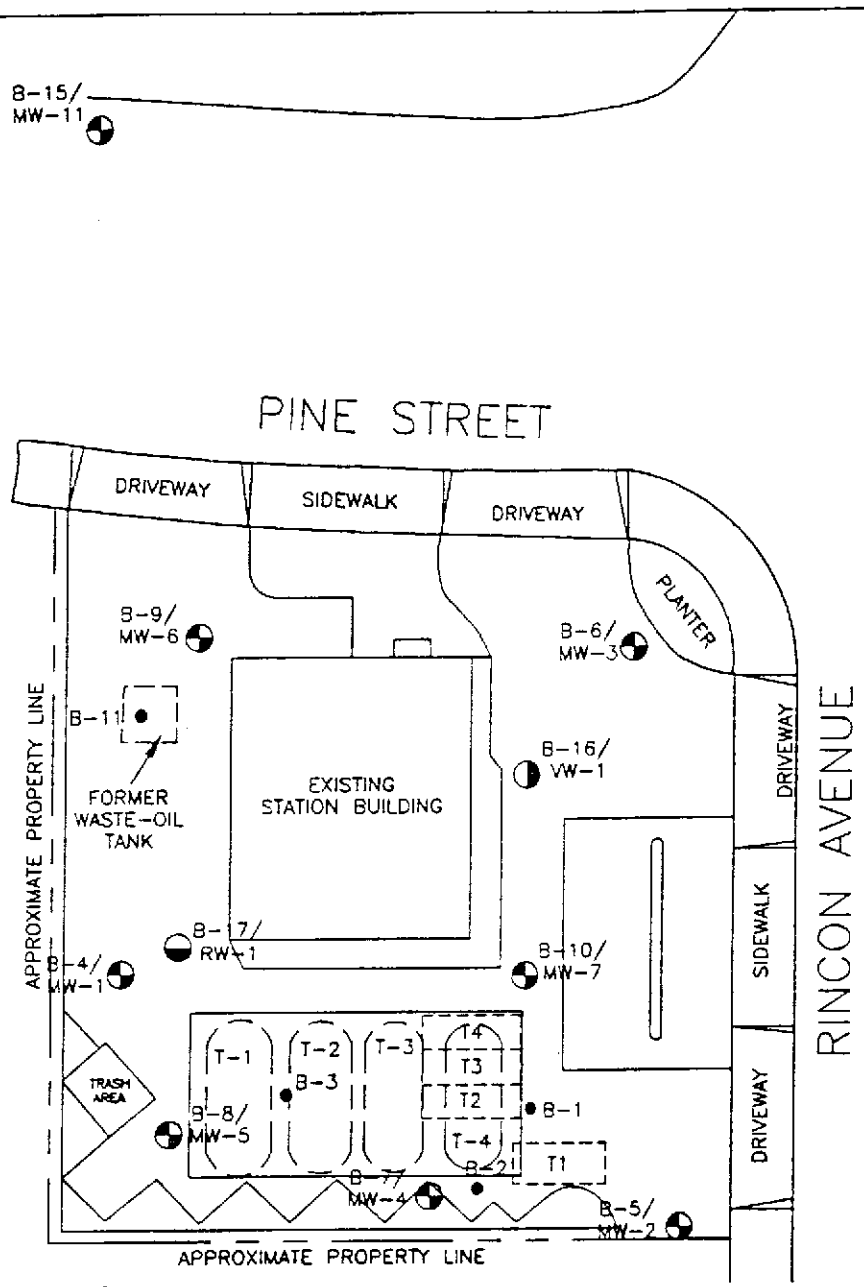
feet

RESNA
Working to Restore Nature

PROJECT 60000.13

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 and 1992)

B-17/ RW-1 = Recovery well (RESNA, April 1992)

B-16/ VW-1 = Vapor extraction well (RESNA, April 1992)

T4 = Former underground gasoline-storage tank

T-4 = Existing underground gasoline-storage tank

Approximate Scale

30 15 0 30 60

feet

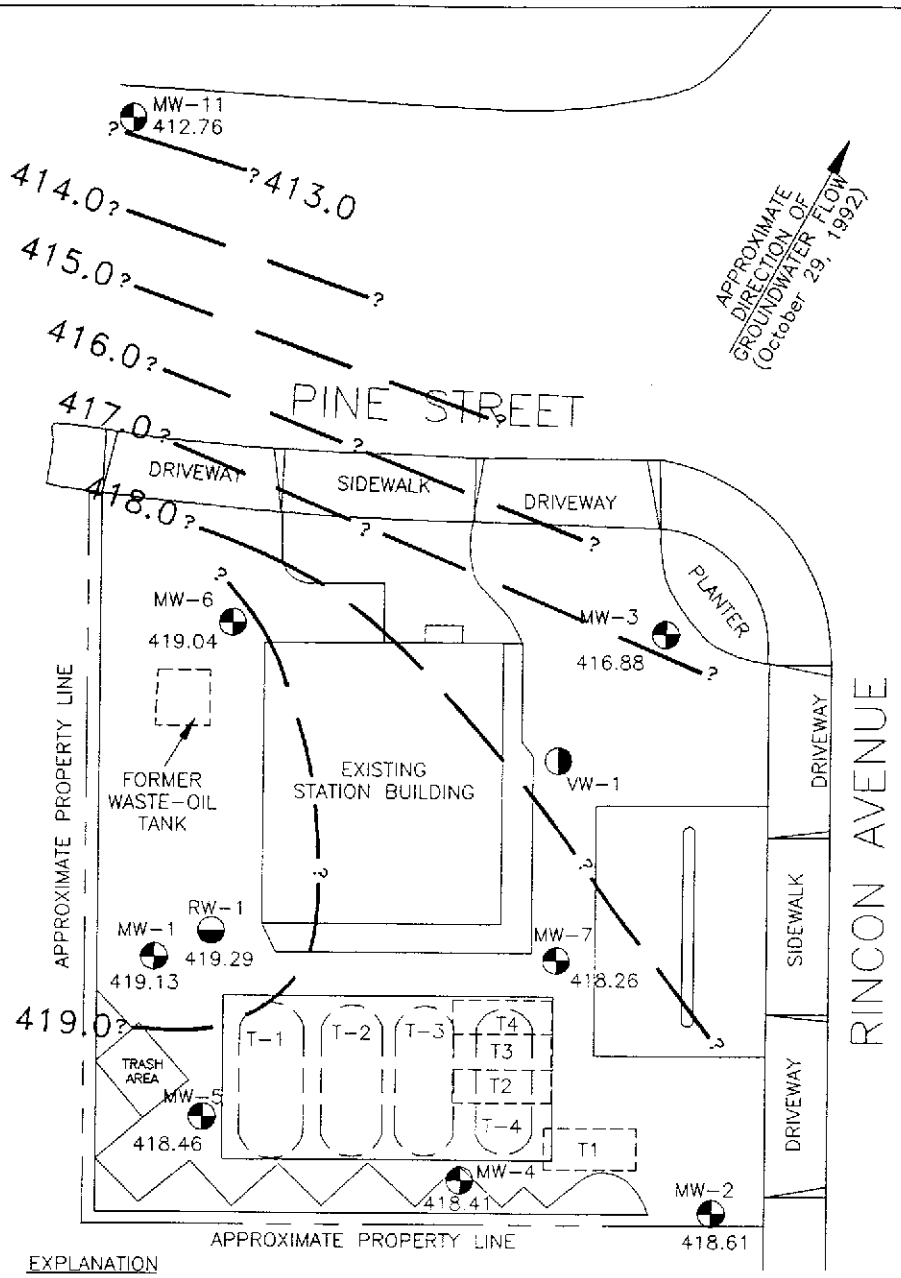
Source: Surveyed by John Koch, Licensed Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60000.13

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

PLATE
2



EXPLANATION

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

419.29 = Elevation of groundwater in feet above MSL, October 29, 1992

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

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

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

T4 = Former underground gasoline-storage tank

T-4 = Existing underground gasoline-storage tank

N

Approximate Scale

30 15 0 30 60

feet

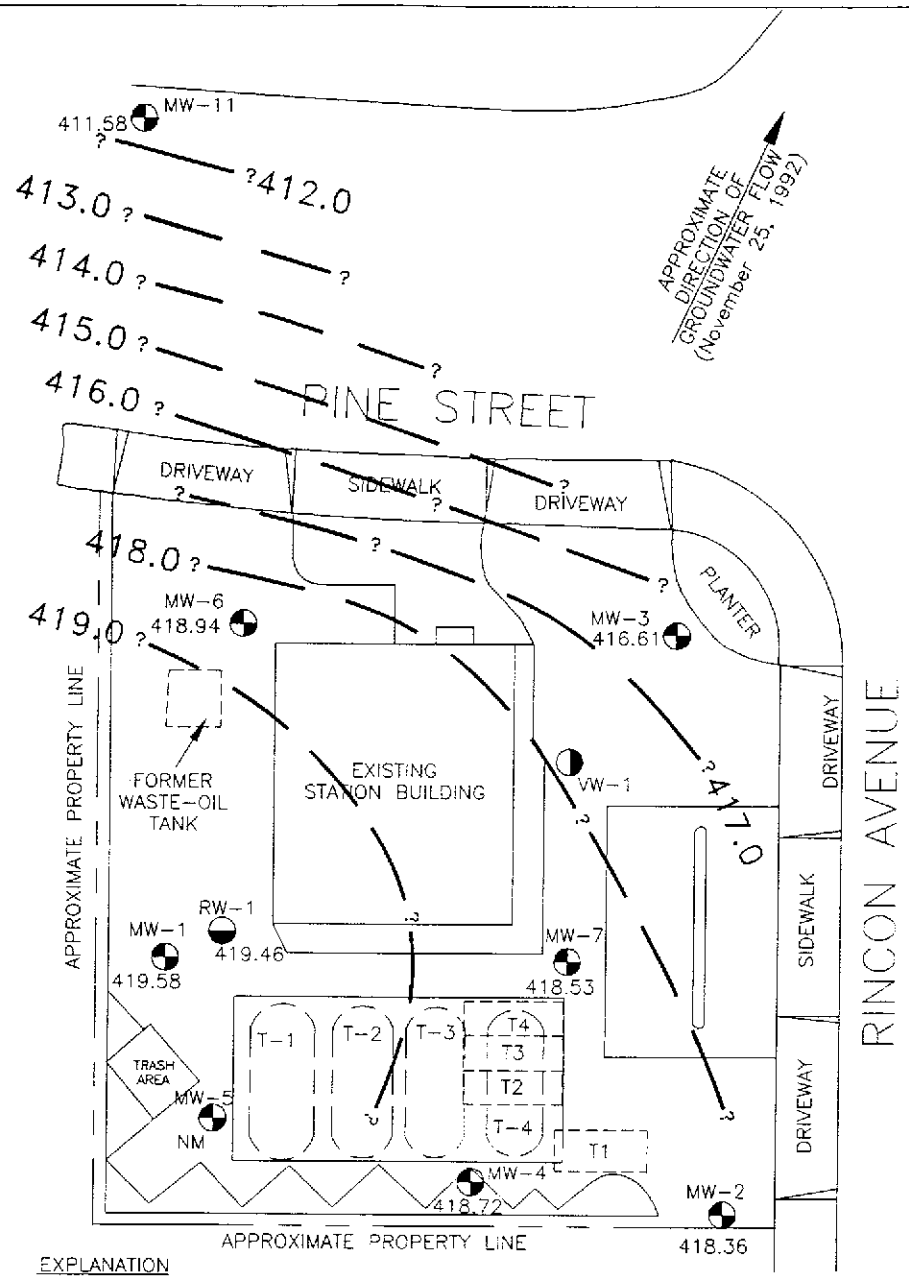
Source: Surveyed by John Koch, Licensed Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60000.13

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

PLATE 3



EXPLANATION

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

419.58 = Elevation of groundwater in feet above MSL, November 25, 1992

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

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

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

T4 = Former underground gasoline-storage tank

NM = DTW not measured, new L-shape wellhead fitting prevented sounder from going down well

T-4 = Existing underground gasoline-storage tank

Approximate Scale

30 15 0 30 60

feet

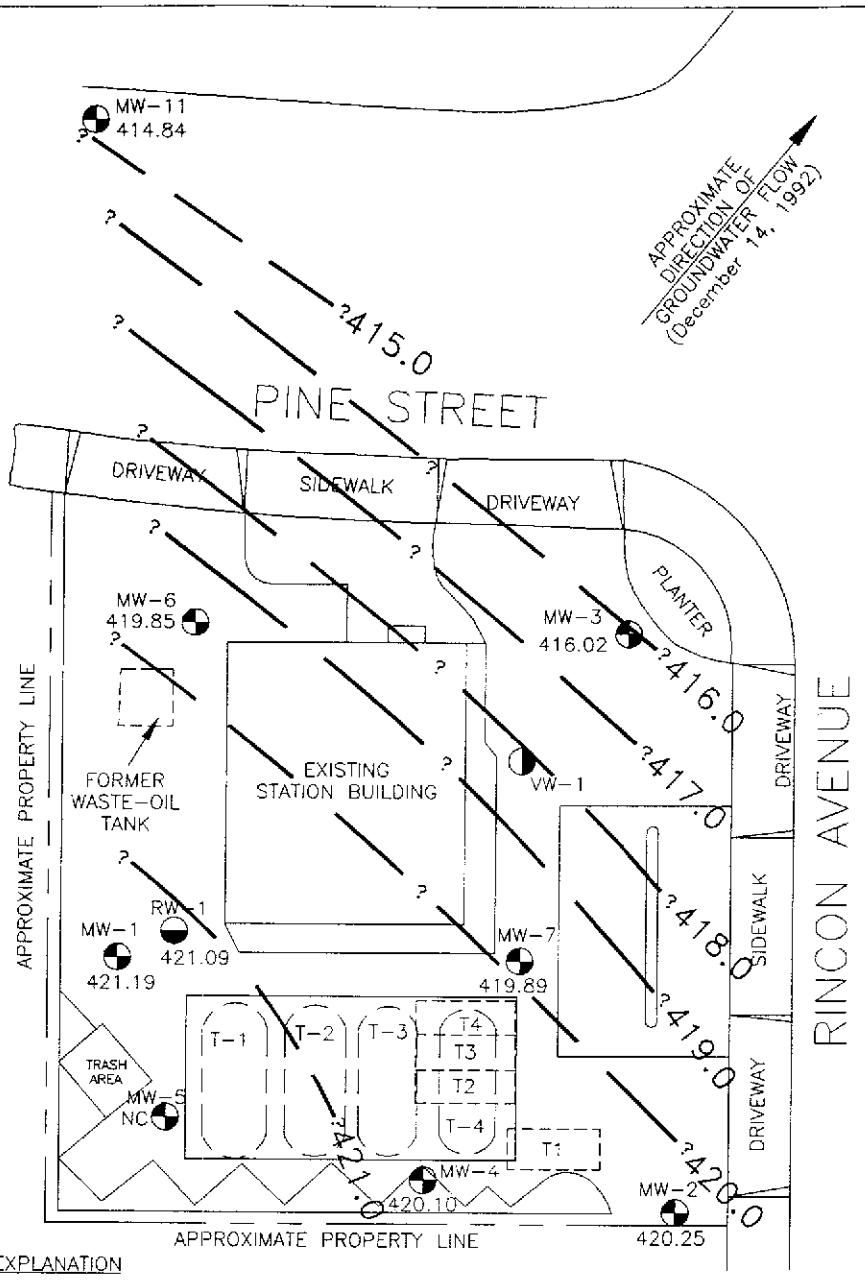
Source: Surveyed by John Koch, Licensed Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60000.13

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

PLATE 4



EXPLANATION

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

421.19 = Elevation of groundwater in feet above MSL, December 14, 1992

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

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

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

T4 = Former underground gasoline-storage tank

NC = Not calculated; DTW measurement may not be accurate due to L-shape wellhead fitting

T-4 = Existing underground gasoline-storage tank

N

Approximate Scale

30 15 0 30 60

feet

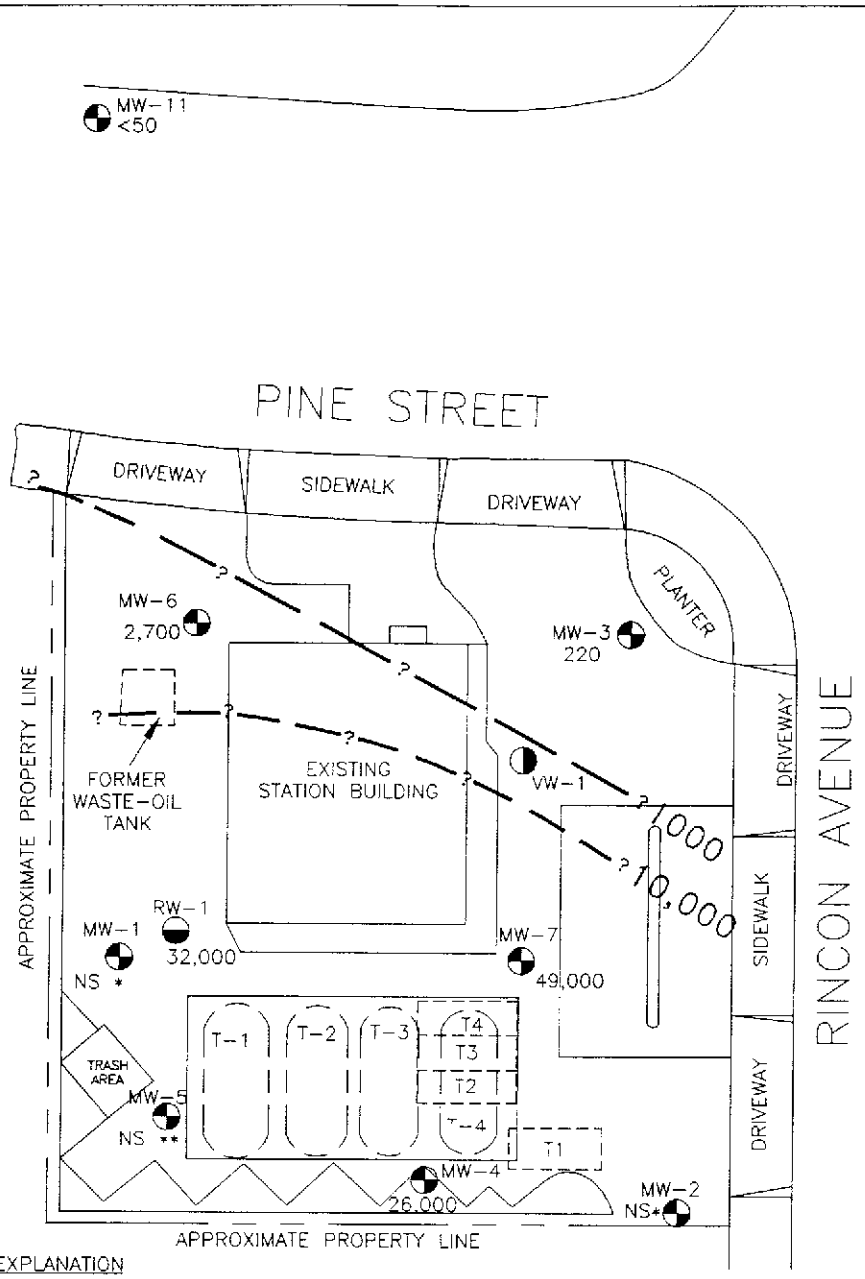
Source: Surveyed by John Koch, Licensed Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60000.13

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

PLATE 5



EXPLANATION

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

49,000 = Concentration of TPHg in groundwater in ppb, November 25, 1992

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

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

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

T4 = Former underground gasoline-storage tank

NS = Not sampled

* = Floating product

** = Inaccessible for sampling; new L-shape wellhead fitting prevented sampler from going down well

T-4 = Existing underground gasoline-storage tank

N

Approximate Scale

30 15 0 30 60

feet

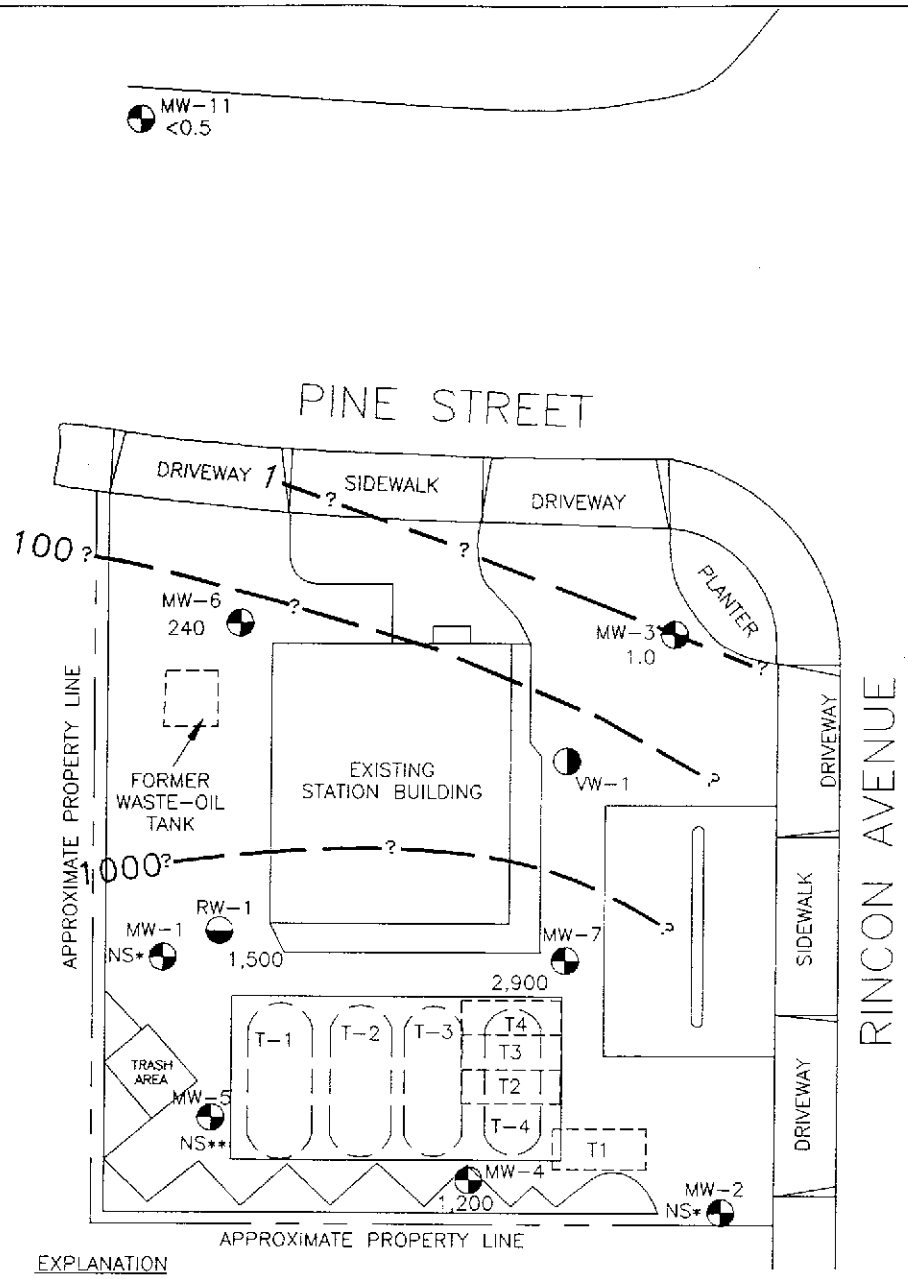
Source: Surveyed by John Koch, Licensed Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60000.13

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

PLATE 6



EXPLANATION

1000 = Line of equal concentration of benzene in groundwater in parts per billion (ppb)

2,900 = Concentration of benzene in groundwater in ppb, November 25, 1992

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

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

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

T4 = Former underground gasoline-storage tank

NS = Not sampled

* = Floating product

** = Inexcessible for sampling due to elbow fitting at wellhead

T-4 = Existing underground gasoline-storage tank

N

Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by John Koch, Licensed Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60000.13

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

PLATE 7

RESNA
Working To Restore Nature

Quarterly Groundwater Monitoring
ARCO Station 771, Livermore, California

March 18, 1993
60000.13

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

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
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
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		26.27	NC	Skimmer
03-31-92		28.85	NC	Skimmer

See notes on Page 5 of 5.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 2 of 5)

Well / Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-2 (cont')				
04-24-92	449.51[b]	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
MW-3				
01-15-91	450.29[a]	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
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
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		39.90	411.66	None
11-13-91		40.56	411.00	None

See notes on Page 5 of 5.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 3 of 5)

Well / Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-4 (cont')				
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
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
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
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

See notes on Page 5 of 5.

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 771
Livermore, California
(Page 4 of 5)

Well / Date	Well Elevation	Depth-to-Water	Water Elevation	Floating Product
MW-6(cont)				
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
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
MW-11				
04-24-92	448.02[c]	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

See notes on Page 5 of 5.

Quarterly Groundwater Monitoring
ARCO Station 771, Livermore, California

March 18, 1993
60000.13

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

Well Date	Well Elevation	Depth-to- Water	Water Elevation	Floating Product
RW-1				
04-24-92	451.44[c]	32.85	418.59	None
05-20-92		32.60	418.84	None
06-12-92		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

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 calculate the differences in 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 = Not calculated; wellhead elevations may no longer be correct due to construction activities related to the removal and replacement of underground storage tanks.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER - TPHg, TPHd, BTEX, and TOG
ARCO Station 771
Livermore, California
(Page 1 of 2)

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						
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						
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
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
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

See notes on Page 2 of 2.

Quarterly Groundwater Monitoring
ARCO Station 771, Livermore, California

March 18, 1993
60000.13

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSES OF GROUNDWATER - TPHg, TPHd, BTEX, and TOG
ARCO Station 771
Livermore, California
(Page 2 of 2)

Sample	TPHg	B	T	E	X	TPHd	TOG
MW-5(cont)							
11-25-92	Inaccessible for sampling due to L-shape fitting at wellhead						
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]
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
11-25-92	49,000	2,900	810	750	5,300	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
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
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 by EPA Method 5030/8015).
B: Benzene T: toluene E: ethylbenzene X: total xylene isomers
BTEX: Measured by EPA Method 5030/8020.
TPHd: Total petroleum hydrocarbons as diesel (measured by EPA Method 3510). May be weathered gasoline.
TOG: Total oil and grease: [a] by method 5520F-IR; [b] by method 5520C; [c] by method 413.2; [d] by method 418.1
NA: Not analyzed.
<: Less than the laboratory detection limit.
*: Sample contains a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.
**: Method Reporting Limit raised due to high analyte concentration requiring sample dilution.
MCL: State Maximum Contaminant Level in ppb (October 1990).
DWAL: State Recommended Drinking Water Action Level in ppb (October 1990).

TABLE 3
APPROXIMATE CUMULATIVE PRODUCT RECOVERED
ARCO Station 771
Livermore, California

Year	Floating Product Removed (gallons)
1991	TOTAL: 2.77 Gallons

Date	Floating Product Removed (gallons)
1992:	
MW-1	
01-15-92	Well inaccessible due to construction
02-28-92	Well inaccessible due to construction
03-26-92	0.25
04-27-92	Well inaccessible due to construction
05-14-92	None present
06-30-92	0.02
07-27-92	Sheen
08-28-92	Sheen
09-28-92	Sheen
10-26-92	Sheen
11-30-92	Sheen
12-30-92	Sheen
MW-2	
01-15-92	Well inaccessible due to construction
02-28-92	None present
03-26-92	0.01
04-27-92	None present
05-14-92	None present
06-30-92	None present
07-27-92	Sheen
08-28-92	Sheen
09-28-92	Sheen
10-26-92	Sheen
11-30-92	Sheen
12-30-92	Sheen
MW-5	
01-15-92	Well inaccessible due to construction
02-28-92	None present
03-26-92	0.01
04-27-92	None present
05-14-92	None present
06-30-92	None present
07-27-92	Sheen
08-28-92	Sheen
09-28-92	Sheen
10-26-92	Sheen
11-30-92	Sheen
12-30-92	Sheen
	TOTAL: 0.29 Gallons

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

MONITORING WELL PURGE WATER DISPOSAL FORM

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

Date December 18, 1992
Project 0G70-012.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	Depth To Water/Floating Product Survey Results
	December 1992 monthly water level survey, ARCO
	station 771, 899 Rincon Avenue, Livermore, CA

For your: X Information Sent by: X Mail

Comments:
Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by:

Jim Butera JB

Robert Porter, Senior Project Engineer.

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

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : 0G70-012.01 STATION ADDRESS : 899 Rincon Avenue, Livermore, CA DATE : 12-14-92

ARCO STATION # : 771 FIELD TECHNICIAN : MAdler 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-11**	OK	Yes	OK	2357	OK	33.18	33.18	ND	ND	38.6	—
2	**MW-3**	OK	Yes	OK	3259	OK	34.26	34.26	ND	ND	39.6	—
3	**MW-6**	OK	Yes	OK	3259	OK	31.52	31.52	ND	ND	43.2	—
4	**MW-7**	OK	Yes	OK	NO	SLIP CAP	30.44	30.44	ND	ND	39.7	No bolts in lid
5	**MW-4**	OK	Yes	OK	NO	SLIP CAP	30.99	30.99	ND	ND	41.1	—
6	**RW-1**	OK	Yes	OK	NO	SLIP CAP	30.58	30.58	ND	ND	39.7	—
7	**MW-5**	OK	Yes	OK	NO	SLIP CAP	30.90	30.90	ND	ND	40.7	Casing has 2 45° ELLS creating a bend
8	**MW-2**	OK	Yes	OK	NO	SLIP CAP	29.24	29.24	ND	ND	38.1	—
9	**MW-1**	OK	Yes	OK	NO	SLIP CAP	30.54	30.54	ND	ND	40.3	⊛
					⊛	MW-1	The casing is too high. When the box lid is on					
							it pushes the slip cap on	way too tight as cars				
							drive over it. I broke off the	small plastic				
							ball valve trying to get the cap off.					

SURVEY POINTS ARE TOP OF WELL CASINGS

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

RECEIVED
NOV 9 - 1992
RESNA
SAN JOSE

Date November 3, 1992
Project 0G70-012.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

Copies	Description
1	Depth To Water/Floating Product Survey Results
	October 1992 monthly water level survey, ARCO
	station 771, 899 Rincon Avenue, Livermore, CA

For your: X Information Sent by: X Mail

Comments:
Monthly water level data for the above mentioned site are attached. Please call if you have any questions: (408) 453-2266.

Reviewed by: Jim Butera JB

REGISTERED ... ROBERT ... NO: 4004 EXP. 6/30/16 ... INDUSTRIAL ... STATE OF CALIFORNIA

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 : 10-29-92

ARCO STATION # : 771 FIELD TECHNICIAN : B. S DAY : Thursday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-11	ok	Yes	ok	2357	Yes	35.26	35.26	ND	ND	38.6	—
2	MW-3	ok	Yes	ok	3259	Yes	33.40	33.40	ND	ND	39.7	—
3	MW-6	ok	Yes	OK	3259	Yes	32.33	32.33	ND	ND	43.2	—
4	MW-7	ok	Yes	None	3259	Yes	32.37	32.37	ND	ND	40.0	—
5	MW-4	ok	Yes	None	3259	Yes	32.58	32.58	ND	ND	41.11	—
6	RW-1	OK	YES	OK	3259	Yes	32.15	32.15	ND	ND	39.5	—
7	MW-5	ok	yes	none	3259	Yes	32.94	32.94	ND	ND	40.5	Skimmer was empty
8	MW-2	OK	Yes	None	2357	Yes	30.90	30.90	ND	ND	37.9	Skimmer was Empty
9	MW-1	OK	Yes	None	2357	Yes	32.29	32.29	ND	ND	40.2	—

SURVEY POINTS ARE TOP OF WELL CASINGS

EMCON
ASSOCIATES
Consultants in Wastes
Management and
Environmental Control

RECEIVED
DEC 18 1992
RESNA

Date December 16, 1992
Project 0G70-012.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95118

We are enclosing:

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

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the fourth quarter 1992 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) 453-2266.

Jim Butera JB

Reviewed by:

REGISTERED PROFESSIONAL ENGINEER ROBERT C. PORTER No. 4001 Exp. 6/30/96 INDUSTRIAL STATE OF CALIFORNIA

Robert C 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 : 11-25-92

ARCO STATION # : 771 FIELD TECHNICIAN : L RATH - K. Reichelber FORDAY : WEDNESDAY

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-11**	OK	YES	OK	2357	OK	36.44	36.44	ND	NA	38.6	—
2	**MW-3**	OK	YES	OK	3259	OK	33.67	33.67	ND	NA	39.6	—
3	**MW-6**	OK	YES	OK	3259	OK	32.43	32.43	ND	NA	43.3	—
4	**MW-4**	OK	YES	OK	NO	SLIP CAP	32.37	32.37	ND	NA	41.1	NEW REMEDIATION PLUMBING, NEW BENCHMARK FOR MEASURE POINT
5	**MW-7**	OK	YES	OK	NO	SLIP CAP	31.80	31.80	ND	NA	39.7	—
6	**RW-1**	OK	YES	OK	NO	SLIP CAP	32.21	32.21	ND	NA	39.7	—
7	**MW-5**	OK	YES	OK	NO	SLIP CAP	NA *	NA *	NA	NA	NA	* elbow prevents sounder from going down well.
8	**MW-2**	OK	YES	OK	NO	SLIP CAP	31.13	31.13	ND	NA	38.0	See field sheet for level, used a standard
9	**MW-1**	OK	YES	OK	NO	SLIP CAP	32.15	32.15	ND	NA	40.3	SOUNDER
												NOTE: ALL NEW PLUMBING
												HAD STRONG ODOR FROM
												PIPE "DOPE" USED
												JUST BEFORE SAMPLING/SURVEY

(PVC SHAVINGS IN WELL, MMC ALSO)

SURVEY POINTS ARE TOP OF WELL CASINGS WELLS

Summary of Groundwater Monitoring Data
Fourth Quarter 1992
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	11/25/92	32.15	0.01*	FP.[2]	FP.	FP.	FP.	FP.	FP.	FP.
MW-2	11/25/92	31.13	0.01*	FP.	FP.	FP.	FP.	FP.	NR.[3]	NR.
MW-3(39)	11/25/92	33.67	ND.[4]	220.	1.0	<0.5	4.9	1.2	NR.	NR.
MW-4(41)	11/25/92	32.37	ND.	26,000.	1,200.	300.	350.	730.	NR.	NR.
MW-5	11/25/92	32.72	ND.	IW.[5]	IW.	IW.	IW.	IW.	IW.	IW.
MW-6(42)	11/25/92	32.43	ND.	2,700.	240.	11.	103.	32.	720.	1.8 /1.6
MW-7(38)	11/25/92	31.80	ND.	49,000.	2,900.	810.	750.	5,300.	NR.	NR.
MW-11(37)	11/25/92	36.44	ND.	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.
RW-1(39)	11/25/92	32.21	ND.	32,000.	1,500.	2,500.	1,000.	5,500.	NR.	NR.
FB-1.[6]	11/25/92	NA.[7]	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.

1. TPH. = Total petroleum hydrocarbons
2. FP. = Not sampled; well was not sampled due to detection of floating product
3. NR. = Not reported; sample was not scheduled for analysis of the selected parameter
4. ND. = Not detected
5. IW. = Well inaccessable, newly installed elbow at well head prevents well from being sampled
6. FB. = Field blank
7. NA. = Not applicable

* = Product came into well during purge

Columbia Analytical Services, Inc.

December 14, 1992

Service Request No. SJ92-1503

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 30, 1992. For your reference, these analyses have been assigned our service request number SJ92-1503.

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

Please call if you have any questions.

Respectfully submitted:

COLUMBIA ANALYTICAL SERVICES, INC.

Keoni A. Murphy
Laboratory Manager

Annelise J. Bazar
Regional QA Coordinator

KAM/kt

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Work Order No.:**	SJ92-1503
	Arco Facility No. 771	**Sample Matrix:**	Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name:		MW-6 (42)	Method Blank
Date Sampled:		11/25/92	
Analyte	**Method**	**MRL**	
Total Oil and Grease	SM 5520C	0.5	1.8	ND
Hydrocarbons, IR	SM 5520F	0.5	1.6	ND

MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
SM *Standard Methods for the Examination of Water and Wastewater*, 17th Ed., 1989
[1] Unless otherwise noted, all analyses were performed within EPA recommended maximum holding times specified in *Test Methods for Evaluating Solid Waste,* (SW-846, 3rd Edition) and *Methods for Chemical Analysis of Water and Waste* (EPA-600/4-79-020, Revised March 1983).

Approved by: Keith A Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Date Extracted:**	12/07/92
	ARCO Facility No. 771	**Date Analyzed:**	12/08/92
Sample Matrix:	Water	**Work Order No.:**	SJ92-1503

TPH as Diesel
EPA Method 3510/California DHS LUFT Method
µg/L (ppb)

Sample Name	MRL	TPH as Diesel
MW-6 (42)	50	720. *
Method Blank	50	ND

MRL Method Reporting Limit
TPH Total Petroleum Hydrocarbons
ND None Detected at or above the method reporting limit
* The sample contains a lower boiling point hydrocarbon mixture quantitated as diesel. The chromatogram does not match the typical diesel fingerprint.

Approved by: Kevin A Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ92-1503
	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-3 (39)	MW-4 (41)	MW-6 (42)
Date Analyzed:		12/04/92	12/04/92	12/04/92
Analyte	**MRL**			
Benzene	0.5	1.0	1,200.	240.
Toluene	0.5	ND	300.	11.
Ethylbenzene	0.5	4.9	350.	103.
Total Xylenes	0.5	1.2	730.	32.
TPH as Gasoline	50	220.	26,000.	2,700.

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by: Kevin A. Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ92-1503
	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 (38)	MW-11 (37)	RW-1 (39)
Date Analyzed:		12/04/92	12/04/92	12/04/92
Analyte	**MRL**			
Benzene	0.5	2,900.	ND	1,500.
Toluene	0.5	810.	ND	2,500.
Ethylbenzene	0.5	750.	ND	1,000.
Total Xylenes	0.5	5,300.	ND	5,500.
TPH as Gasoline	50	49,000.	ND	32,000.

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by: Keith Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ92-1503
	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:		FB-1	Method Blank
Date Analyzed:		12/04/92	12/04/92
Analyte	**MRL**		
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
TPH as Gasoline	50	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit

Approved by: Kevin Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ92-1503
	Arco Facility No. 771	**Sample Matrix:**	Water

Continuing Calibration Summary
Inorganics
SM5520
mg/L

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Hydrocarbons	100.	102.	102.	90-100

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

Approved by: Kenneth Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ92-1503
	ARCO Facility No. 771	**Sample Matrix:**	Soil

Matrix Spike Summary *
Total Recoverable Petroleum Hydrocarbons
SM5520F
mg/Kg (ppm)

Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Criteria
200.	495.	703.	697.	104.	101.	56-106

* The matrix spike for this sample batch was performed on a soil sample.
SM Standard Methods for the Examination of Water and Wastewater, 17th Ed., 1989

Approved by: Kevin Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Date Received: 11/30/92
Service Request No.: SJ92-1503
Sample Matrix: Water

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

Date Analyzed: 12/08/92

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TPH as Diesel	1,000.	1,038.	104.	90-110

TPH Total Petroleum Hydrocarbons

Approved by: Karen A Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Date Received: 11/30/92
Service Request No.: SJ92-1503
Sample Matrix: Water

Surrogate Recovery Summary
TPH as Diesel
EPA Method 3510/DHS LUFT Method

Sample Name	Date Analyzed	Percent Recovery P-Terphenyl
MW-6 (42)	12/08/92	105.
MW-6 (42) MS	12/08/92	94.
MW-6 (42) DMS	12/08/92	104.
Method Blank	12/08/92	104.
	CAS Acceptance Criteria	46-133

TPH Total Petroleum Hydrocarbons

Approved by: Kevin Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Date Received: 11/30/92
Service Request No.: SJ92-1503
Sample Matrix: Water

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

Sample Name: MW-6 (42)
Date Analyzed: 12/08/92

Parameter	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Acceptance Criteria
Diesel	4,000.	720.	4,020.	4,070.	83.	84.	61-121

Approved by: Keam A Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

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

Date Received: 11/30/92
Service Request No.: SJ92-1503

Initial Calibration Verification
BTEX and TPH as Gasoline
EPA Methods 5030/8020/DHS LUFT Method
Nanograms

Date Analyzed: 12/04/92

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	250.	247.	99.	85-115
Toluene	250.	248.	99.	85-115
Ethylbenzene	250.	226.	91.	85-115
Total Xylenes	750.	651.	87.	85-115
TPH as Gasoline	2,500.	2,379.	95.	90-110

TPH Total Petroleum Hydrocarbons

Approved by: Kenneth Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ92-1503
	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-3 (39)	12/04/92	123.
MW-4 (41)	12/04/92	129.
MW-6 (42)	12/04/92	119.
MW-7 (38)	12/04/92	118.
MW-11 (37)	12/04/92	110.
RW-1 (39)	12/04/92	116.
FB-1	12/04/92	111.
MW-3 (39) MS	12/04/92	129.
MW-3 (39) DMS	12/04/92	130
Method Blank	12/04/92	109.
	CAS Acceptance Criteria	70-130

TPH Total Petroleum Hydrocarbons

Approved by: Leonard Murphy Date: December 14, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	EMCON Associates	**Date Received:**	11/30/92
Project:	EMCON Project No. 0G70-012.01	**Service Request No.:**	SJ92-1503
	ARCO Facility No. 771	**Sample Matrix:**	Water

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

Sample Name: MW-3 (39)
Date Analyzed: 12/04/92

			Spike Result		Percent Recovery		CAS Acceptance
Analyte	Spike Level	Sample Result	MS	DMS	MS	DMS	Criteria
TPH as Gasoline	250.	219.	436.	444.	87.	90.	70-130

TPH Total Petroleum Hydrocarbons

Approved by: Keen A Murphy Date: December 14, 1992

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMCGC-92-1

Chain of Custody

ARCO Facility no. 771	City (Facility) Livermore	Project manager (Consultant) Jim Buteva	Laboratory name CAS
ARCO engineer Kyle Christie	Telephone no. (ARCO) 571-2434	Telephone no. (Consultant) 453-0719	Fax no. (Consultant) 453-0452
Consultant name EMCON Associates	Address (Consultant) 1938 Junction Ave San Jose		Contract number 07077

Method of shipment: Sample will deliver

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015 GAS	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 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 ☐		
~~1~~		~~2~~		~~X~~		~~X~~	~~HCl~~				~~X~~		PRODUCT IN WELL - NO SAMPLE TAKEN									
~~2~~		~~2~~		~~X~~		~~X~~	~~HCl~~				~~X~~		Product in well						x10	sample taken		
3 (39)	1-2	2		X		X	HCl	11-25-92	1133		X											
4 (41)	3-4	2		X		X	HCl	11-25-92	1230		X											
~~5~~		~~2~~		~~X~~		~~X~~	~~HCl~~				~~X~~		x10 SAMPLE taken NO ACCESS									
6 (42)	5-8	4		X		X	HCl	11-25-92	1235		X		X									
7 (38)	9-10	2		X		X	HCl	11-25-92	1345		X											
11 (37)	11-12	2		X		X	HCl	11-25-92	1135		X											
1 (39)	13-14	2		X		X	HCl	11-25-92	1425		X											
-1	15-16	2		X		X	HCl	11-25-92			X											
6 (42)	17-18	2		X		X	NP	11-25-92	1235			X										

Special detection Limit/reporting: Lowest Possible

Special QA/QC: As Normal

Remarks:
2-40ml HCl VOA's
4-Liter HCl Glass
2-Liter NP Glass
OG70-012.01

Lab number: 3392-1503

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

Condition of sample: OK

Temperature received: cool

	Date	Time	Received by
Relinquished by sampler: Kevin Richards	11-30-92	0845	
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory: [signature] Date: 11-30-92 Time: 9:00

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

ARCO-3292 (2-91)

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-1 (40)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 771

SAMPLED BY: ↓ LOCATION: 899 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.):	5.35
DEPTH TO WATER (feet):	32.15	CALCULATED PURGE (gal.):	26.73
DEPTH OF WELL (feet):	40.3	ACTUAL PURGE VOL. (gal.):	NA

DATE PURGED: 11-25-92 Start (2400 Hr) NA / End (2400 Hr) NA /

DATE SAMPLED: ___ Start (2400 Hr) ___ / End (2400 Hr) ___ /

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
		Product in well				

D. O. (ppm): NR ODOR: NA 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 #: 3259

REMARKS: PRODUCT CAME IN DURING PURGING - NO SAMPLE TAKEN

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-3

Signature: Kevin Reichelderfer Reviewed By: DB Page 1 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-2 (37)

PURGED BY: L. RATLIFF CLIENT NAME: ARCO 771

SAMPLED BY: _____ LOCATION: 899 Rincon Ave Livermore Cal

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.): 4.49

DEPTH TO WATER (feet): 31.15 CALCULATED PURGE (gal.): 22.46

DEPTH OF WELL (feet): 38.0 / 6.55 ACTUAL PURGE VOL. (gal.): 0 0

DATE PURGED: 11-25-92 Start (2400 Hr) NA End (2400 Hr) NA

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

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
		Product in well				

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

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
____ 2" Bladder Pump	____ Bailer (Teflon®)	____ 2" Bladder Pump	____ 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 #: NO LOCK

REMARKS: Product came into well during purging
NO SAMPLE taken
PVC Shavings in purge water

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 54175 Temperature °F: ____

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

Location of previous calibration: MW-11

Signature: Linda Ratliff Reviewed By: AB Page 2 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 770-012.01 SAMPLE ID: MW-3(39)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 771

SAMPLED BY: ↓ LOCATION: 899 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.):	3.89
DEPTH TO WATER (feet):	33.67	CALCULATED PURGE (gal.):	19.45
DEPTH OF WELL (feet):	39.6	ACTUAL PURGE VOL. (gal.):	8.50

DATE PURGED: 11-25-92 Start (2400 Hr) 1108 End (2400 Hr) 1121

DATE SAMPLED: 11-25-92 Start (2400 Hr) 1133 End (2400 Hr) 1135

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1111	4.00	7.04	927	67.0	BROWN	MOD/HEAVY
1118	8.00	7.12	976	68.1	↓	HEAVY
1121	WELL DRIED @ 8.50 GALLONS					
1136	RECHARGE	7.08	965	67.2	BROWN	MODERATE

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

FIELD QC SAMPLES COLLECTED AT THIS WELL (i.e. FB-1, XDUP-1): FB-1 @ 1128

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 #: 3259

REMARKS: 1121 WELL DRIED @ 8.50 GALLONS

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 9203 Temperature °F: 62.9

(EC 1000 999 / 1000) (DI ___) (pH 7 6.89 / 7.00) (pH 10 10.07 / 10.00) (pH 4 3.93 / —)

Location of previous calibration: ?

Signature: Kevin Reichelderfer Reviewed By: [illegible] Page 3 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-4(41)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 771

SAMPLED BY: ↓ LOCATION: 899 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.):	5.71
DEPTH TO WATER (feet):	32.39	CALCULATED PURGE (gal.):	28.57
DEPTH OF WELL (feet):	41.1	ACTUAL PURGE VOL. (gal.):	15.00

DATE PURGED: 11-25-92 Start (2400 Hr) 1206 End (2400 Hr) 1222

DATE SAMPLED: 11-25-92 Start (2400 Hr) 1230 End (2400 Hr) 1232

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1210	6.00	7.01	1260	62.6	BROWN	HEAVY
1216	12.00	6.99	1176	67.1	↓	↓
1222	WELL DRIED @ 15.00 GALLONS					
1235	RECHARGE	6.98	1171	67.6	BROWN	MODERATE

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): N.R

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 #: 3259

REMARKS: • 1222 WELL DRIED @ 15.00 GALLONS
• NEW REMEDIATION PLUMBING IN WELL; NEW BENCHMARK FOR MEASURING POINT, PVC SHAVINGS IN PURGE WATER

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-3

Signature: Kevin Reichelderfer Reviewed By: AB Page 1 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

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

~~PURGED BY~~: L. RATLIFF CLIENT NAME: ARCO 771

~~SAMPLED BY~~: NA LOCATION: 899 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.): NA

DEPTH TO WATER (feet): 32.72 CALCULATED PURGE (gal.): /

DEPTH OF WELL (feet): 40.7 ACTUAL PURGE VOL. (gal.): /

DATE PURGED: 11-25-92 Start (2400 Hr) NA End (2400 Hr) NA

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

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
		Inaccessable		well		
		No	Sample			

D. O. (ppm): NR ODOR: ___ 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: See Below LOCK #: No Lock

REMARKS: Unable to Fit pvc bailer or 2" grunfos pump down well due to a New elbow Fitting installed By RSI; Unable to Secure bolts to well cover due to dust and dirt in threads. Fresh pipe dope applied today 11-25-92

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 5473 Temperature °F: ___

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

Location of previous calibration: MW-11

Signature: Lola Peters Reviewed By: AB Page 5 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-6 (42)

PURGED BY: L. RATH CLIENT NAME: ARCO 771

SAMPLED BY: L. RATH LOCATION: 899 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.): 7.13

DEPTH TO WATER (feet): 32.43 CALCULATED PURGE (gal.): 35.65

DEPTH OF WELL (feet): 43.3 ACTUAL PURGE VOL (gal.): 20.0

DATE PURGED: 11-25-92 Start (2400 Hr) 1155 End (2400 Hr) 1219

DATE SAMPLED: 11-25-92 Start (2400 Hr) 1235 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1202	7.0	6.95	1392	57.7	Brown	Heavy
1215	14.0	7.04	1249	62.4	Brown	Heavy
1219	well Dried at	20 gal				
1235	Recharge	7.07	1219	62.5	Brown	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): 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 #: 325-9

REMARKS: Well Dried at 20 gal at 1219 HRS

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 5475 Temperature °F: ___

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

Location of previous calibration: MW-11

Signature: Leslie Rath Reviewed By: JB Page 6 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-7(38)

PURGED BY: L. RATH CLIENT NAME: ARCO 771

SAMPLED BY: L. RATH LOCATION: 899 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.): 5.18

DEPTH TO WATER (feet): 31.80 CALCULATED PURGE (gal.): 25.91

DEPTH OF WELL (feet): 39.7 7.9 ACTUAL PURGE VOL (gal.): 11.0

DATE PURGED: 11-25-92 Start (2400 Hr) 1305 End (2400 Hr) 1325

DATE SAMPLED: 11-25-92 Start (2400 Hr) 1345 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1311	5.0	6.87	1167	63.3	Brown	Heavy
1324	10.0	6.45	1154	62.6	Brown	Heavy
1325	well Dried at 11.0 gal					
1345	Recharge	6.39	1180	63.2	Brown	Heavy

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

COLOR (COBALT 0 - 100): NR NR

TURBIDITY (NTU 0 - 200): NR

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

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 #: NO LOCK

REMARKS: RSI installed slip caps NO Locks
PVC Shavings in purge water
pipe dope was ~~applied~~ applied on PVC today 11-25-92

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 34175 Temperature °F: ___

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

Location of previous calibration: MW-11

Signature: Laura Rath Reviewed By: JB Page 7 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 3670-012.01 SAMPLE ID: MW-11 (37)

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 X 3 ___ 4 ___ 4.5 ___ 6 ___ Other ___

CASING ELEVATION (feet/MSL): NR VOLUME IN CASING (gal.): .35

DEPTH TO WATER (feet): 36.415 CALCULATED PURGE (gal.): 1.76

DEPTH OF WELL (feet): 38.6 2.15 ACTUAL PURGE VOL (gal.): 1.5

DATE PURGED: 11-25-92 Start (2400 Hr) 1104 End (2400 Hr) 1115

DATE SAMPLED: 11-25-92 Start (2400 Hr) 1135 End (2400 Hr) ___

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1107	.5	7.26	918	61.4	Brown	Heavy
1111	1.0	7.05	927	63.1	Brown	Heavy
1115	1.5	7.04	921	63.3	Brown	Heavy
1115	well	Dried at	1.5 gal			
1135	Recharge	6.97	954	62.1	Brown	Heavy

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

COLOR (COBALT 0 - 100): NR

TURBIDITY (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	I 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 #: 2357

REMARKS: Well Dried at 1.5 gal at 1115

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 54175 Temperature °F: 64.6

(EC 1000 867/1000) (DI ___) (pH 7 6.89/7.00) (pH 10 9.98/10.00) (pH 4 ___/3.99)

Location of previous calibration: ___

Signature: [signature] Reviewed By: JB Page 8 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: OG70-012.01 SAMPLE ID: RW-1 (39)

PURGED BY: K REICHELDERFER CLIENT NAME: ARCO 771

SAMPLED BY: ↓ LOCATION: 899 RINCON 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	VOLUME IN CASING (gal.):	10.86
DEPTH TO WATER (feet):	32.30	CALCULATED PURGE (gal.):	54.32
DEPTH OF WELL (feet):	39.7	ACTUAL PURGE VOL. (gal.):	25.00

DATE PURGED: 11-25-92 Start (2400 Hr) 1342 End (2400 Hr) 1357

DATE SAMPLED: 11-25-92 Start (2400 Hr) 1425 End (2400 Hr) 1427

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1347	11.00	6.77	1330	69.3	CLOUDY	LIGHT/MOD
1352	22.00	6.92	1347	69.9	LT GREY	MODERATE
1357	WELL DRIED @ 25.00 GALLONS					
1429	RECHARGE	7.13	1281	68.4	CLOUDY	LIGHT

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

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

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

WELL INTEGRITY: OK LOCK #: 3259

REMARKS:
- 1357 WELL DRIED @ 25.00 GALLONS (DTW 38.41)
- NEW REMEDIATION PLUMBING IN WELL; NEW BENCHMARK FOR MEASURING WL; PVC SHAVINGS IN WELL
- HAD TO WAIT FOR RESNA LADY (VALLI) BEFORE SAMPLING BECAUSE SHE HAD QUESTIONS ABOUT MW-5

Meter Calibration: Date: 11-25-92 Time: 1100 Meter Serial #: 9203 Temperature °F: ___

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

Location of previous calibration: MW-3

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

{TF1090-2} TF NUMBER: 1090-2 GIB-92-087

MONITORING WELL PURGE WATER TRANSPORT FORM

GENERATOR INFORMATION

NAME: ARCO PRODUCTS

ADDRESS: P.O. BOX 5811

CITY,STATE,ZIP: SAN MATEO, CA 94402 PHONE #: (415) 571-2434

DESCRIPTION OF WATER: PURGE WATER GENERATED DURING SAMPLING OR DEVELOPMENT OF MONITORING WELLS LOCATED AT VARIOUS SITES. AUGER RINSATE GENERATED DURING THE INSTALLATION OF MONITORING WELLS AT VARIOUS SITES. THE WATER MAY CONTAIN DISSOLVED HYDROCARBONS.

THE GENERATOR CERTIFIES THAT THIS WATER AS DESCRIBED IS NON-HAZARDOUS

KYLE CHRISTIE by Jon DeTar 12-15-92
(Typed or printed full name & signature) (Date)

SITE INFORMATION

	STA #	JOB #	ADDRESS	GALS
1	A-2182	21325-PW	1404 MCHENRY AVE., MODESTO, CA	30
2	A-2063	21323-PW	2924 MCHENRY AVE., MODESTO, CA	50
3	A-6043	21324-PW	2101 TULLY RD., MODESTO, CA	48
4	A-548	21464-PW	1612 HAMMER LANE, STOCKTON, CA	152
5	A-2130	21382-DW	7609 NO. EL DORADO ST., STOCKTON, CA	124
6	A-771	21346-PW	899 RINCON AVE., LIVERMORE, CA	82
7	A-414	21182-PW	3000 SHATTUCK AVE., BERKELEY, CA	127
8	A-276	21335-PW	10600 MACARTHUR BLVD., OAKLAND, CA	158
9	A-515	21484-PW	300 SO. DELAWARE ST., SAN MATEO, CA	117
10	A-313	21485-PW	3600 ALAMEDA DEL LAS PULGAS, MENLO PARK, CA	99
11				
				987

TRANSPORTER INFORMATION

NAME: BALCH PETROLEUM

ADDRESS: 930 AMES AVE.

CITY,STATE,ZIP: MILPITAS, CA 95035 PHONE #: (408) 942-8686

TRUCK ID #: 102-PTRBLT HURSCHEL WARD Hurschel C Ward 12-15-92
(Typed or printed full name & signature) (Date)

TSD FACILITY INFORMATION

NAME: GIBSON ENVIRONMENTAL Gor. 1868

ADDRESS: 475 SEAPORT BLVD

CITY,STATE,ZIP: REDWOOD CITY, CA 94063 PHONE #: (415) 368-5511

RELEASE #: 11320 SHAWN RAGLIN Shawn Raglin 12-15-92
(Typed or printed full name & signature) (Date)