RESNA

Working To Restore Nature

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
Fax: (408) 264-2345

TRANSMITTAL

TO: Ms. Susan Hugo
ACHCSA
Dept. of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

DATE: November 30, 1992
PROJECT NUMBER: 60000.13
SUBJECT: ARCO Station 771, 899 Rincon Avenue, Livermore, California

FROM: Barbara Sieminski
TITLE: Asst. Project Geologist

WE ARE SENDING YOU:

COPIES	DATED	NO.	DESCRIPTION
1	11/30/92	60000.13	Letter Report Quarterly Groundwater Monitoring Third Quarter 1992 at ARCO Station 771, 899 Rincon Avenue, Livermore, California.

THESE ARE TRANSMITTED as checked below:

[ ] For review and comment [ ] Approved as submitted [ ] Resubmit ___ copies for approval

[X] As requested [ ] Approved as noted [ ] Submit___ copies for distribution

[ ] For approval [ ] Return for corrections [ ] Return ___ corrected prints

[ ] For your files

REMARKS:
Per ARCO's request (Mr. Michael Whelan), this report has been forwarded to you for your review.

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) 264-2345

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

60000.13 NOV 1992

RESNA
Working To Restore Nature

3315 Almaden Expressway, Suite 34
San Jose, CA 95118
Phone: (408) 264-7723
Fax: (408) 264-2345

November 30, 1992
1102MWHE
60000.13

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

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

Mr. Whelan:

As requested by ARCO Products Company (ARCO), this letter report summarizes the results of third 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 Industries Inc.'s (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.

Prior to this quarterly monitoring period, RESNA (formerly Applied GeoSystems [AGS]) and others performed environmental assessments and investigations related to the removal of a waste-oil underground storage tank (UST), and removal and replacement of four gasoline USTs at the site. In August 1987, a 240-gallon waste-oil UST was removed from the site by Crosby and Overton Environmental Management, Inc., of Oakland, California, and soil samples were collected from the bottom of the waste-oil tank pit excavation by Brown and Caldwell of Sacramento, California (Brown and Caldwell, September, 1987). In February 1990, RESNA performed an environmental site assessment (AGS, June 1990), which included the drilling of three borings (B-1 through B-3). In December 1990, RESNA performed a supplemental subsurface investigation which included the drilling of three soil borings (B-4 through B-6) and installation of three monitoring wells, MW-1, MW-2, and MW-3 (AGS, April 1991). In January 1991, RESNA began quarterly monitoring of the onsite monitoring wells. In July 1991, RESNA performed an additional subsurface investigation which included the drilling of five soil borings (B-7 through B-11) and installation of four monitoring wells MW-4 through MW-7 (RESNA, October 1991). Gasoline UST and associated product line removal and replacement was performed in December 1991 through March 1992 by Golden West Environmental Services of Brentwood, California. Roux Associates of Concord, California, observed removal of the USTs and product lines and collected soil samples from the tank pit excavation and product line trenches (Roux, July 1992). The results of these environmental assessments and investigations are presented in the reports listed in the References section located at the end of this letter report. In April 1992, RESNA installed groundwater recovery well RW-1, vapor extraction well VW-1, and one offsite groundwater monitoring well MW-11, as a part of an additional onsite and initial offsite subsurface investigation. Additional offsite groundwater monitoring wells (MW-8 through MW-10) will be installed upon gaining offsite access. Results of this investigation will be discussed in a forthcoming report. RESNA is proceeding with design and permitting of a remediation system to be installed at the site. 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 July 28, August 24, and September 15, 1992. Quarterly sampling was performed by EMCON field personnel on September 15 and 16, 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 Report sheets. 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. Groundwater elevations in monitoring wells MW-1 through MW-5 and MW-7 increased between 0.02 and 0.25 feet between July 28, and September 15, 1992. Groundwater elevations in monitoring wells MW-6 and MW-11 decreased 0.06 feet and 0.59 feet, respectively, and the groundwater elevation in recovery well RW-1 did not change in the same time period. The groundwater gradients interpreted from the July, August and September 1992 monitorings were approximately 0.05 with flow directions to the northeast. The groundwater gradients and flow directions are shown on Plates 3 through 5, Groundwater Gradient Maps. Floating product was observed and its thickness was estimated in groundwater monitoring well MW-1 during September monitoring event. The presence of floating product sheen was also noted in the purge water from monitoring well MW-2, although no floating product was observed in the sample collected from this well for the subjective analysis during September 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 through MW-7, MW-11 and RW-1 were purged and sampled by EMCON field personnel on September 15 and 16, 1992; wells MW-1 and MW-2 were not sampled because they contained floating product. 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 through 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/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 and 418.1, 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.

Analytical results of groundwater samples from MW-3 through MW-7, MW-11 and RW-1 for this quarter's monitoring indicate:

- TPHg was detected in wells MW-4 through MW-7 and RW-1 at concentrations ranging from 2,300 parts per billion (ppb) to 65,000 ppb, and was nondetectable (less that 50 ppb) in well MW-3 and offsite well MW-11;

- Benzene was detected in wells MW-4 through MW-7 and RW-1 at concentrations ranging from 220 ppb to 2,300 ppb; and was nondetectable (<0.5 ppb) in MW-3 and offsite well MW-11. Concentrations of benzene in the wells (except MW-3 and MW-11) exceeded the State Maximum Contaminant Level (MCL) of 1.0 ppb benzene for drinking water.

- Toluene was detected in wells MW-4, MW-5, MW-7 and RW-1 at concentrations ranging from 240 ppb to 2,600 ppb; and was nondetectable in MW-6 (<5 ppb), and MW-3 and offsite well MW-11 (<0.5 ppb). Concentrations of toluene in wells MW-4, MW-5, MW-7 and RW-1 exceeded the Department of Health Services Drinking Water Action Level (DWAL) of 100 ppb toluene.

- Ethylbenzene was detected in wells MW-4 through MW-7, and RW-1 at concentrations ranging from 92 ppb to 1,700 ppb; and was nondetectable (<0.5 ppb) in MW-3 and offsite well MW-11. Concentrations of ethylbenzene in wells MW-5 and RW-1 exceeded the MCL of 680 ppb ethylbenzene in drinking water.

- Total xylenes were detected in wells MW-4 through MW-7, and RW-1 at concentrations ranging from 43 ppb to 9,900 ppb; and were nondetectable (<0.5 ppb) in MW-3 and offsite well MW-11. Concentrations of total xylenes in wells MW-5, MW-7, and RW-1 exceeded the MCL of 1,750 ppb total xylenes in drinking water.

- A lower boiling point fuel mixture quantified as TPHd was detected in the groundwater sample from MW-6 at a concentration of 810 ppb. These results appear to be within the weathered gasoline range. According to ARCO, diesel has never been stored at this site.

- TOG was detected in the groundwater sample from MW-6 at a concentration of 1.5 parts per million (ppm).

The following is a general summary of changes in the concentrations of hydrocarbon constituents in the groundwater from wells MW-3 through MW-7, MW-11 and RW-1 since the last quarterly monitoring. Concentrations of TPHg and BTEX decreased in well MW-3 to nondetectable level for the first time; decreased in wells MW-4 through MW-6 and RW-1; increased in well MW-7; and remained nondetectable in well MW-11 since the last quarterly monitoring. 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 the Horner EZY Floating Product Skimmers in wells MW-1, MW-2 and MW-5 on July 27, August 28, and September 28, 1992. No measurable amount of floating product (but 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 and onsite well MW-3 (nondetectable levels of TPHg and BTEX) indicate that these constituents have been delineated to the north. The extent of the petroleum hydrocarbons has not yet been defined to the south, east or west. Attempts to gain access to install wells to delineate the lateral extent of hydrocarbon-impacted groundwater in these directions are on-going.

Construction Plans and Specifications for an Interim Vapor Extraction System were issued for Bid on September 11, 1992. Construction for installation of this system is scheduled for November 1992. In addition we understand that the next quarterly monitoring of this site will include analyses of the groundwater from well MW-6 for TOG using EPA Method 5520 C&F.

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

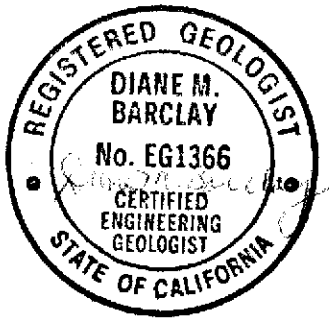
Mr. Eddy So
Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

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
Assistant Project Geologist



Diane M. Barclay
Certified Engineering
Geologist No. 1366

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, July 28, 1992
Plate 4, Groundwater Gradient Map, August 24, 1992
Plate 5, Groundwater Gradient Map, September 15, 1992
Plate 6, TPHg Concentrations in Groundwater, September 15-16, 1992
Plate 7, Benzene Concentrations in Groundwater, September 15-16, 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

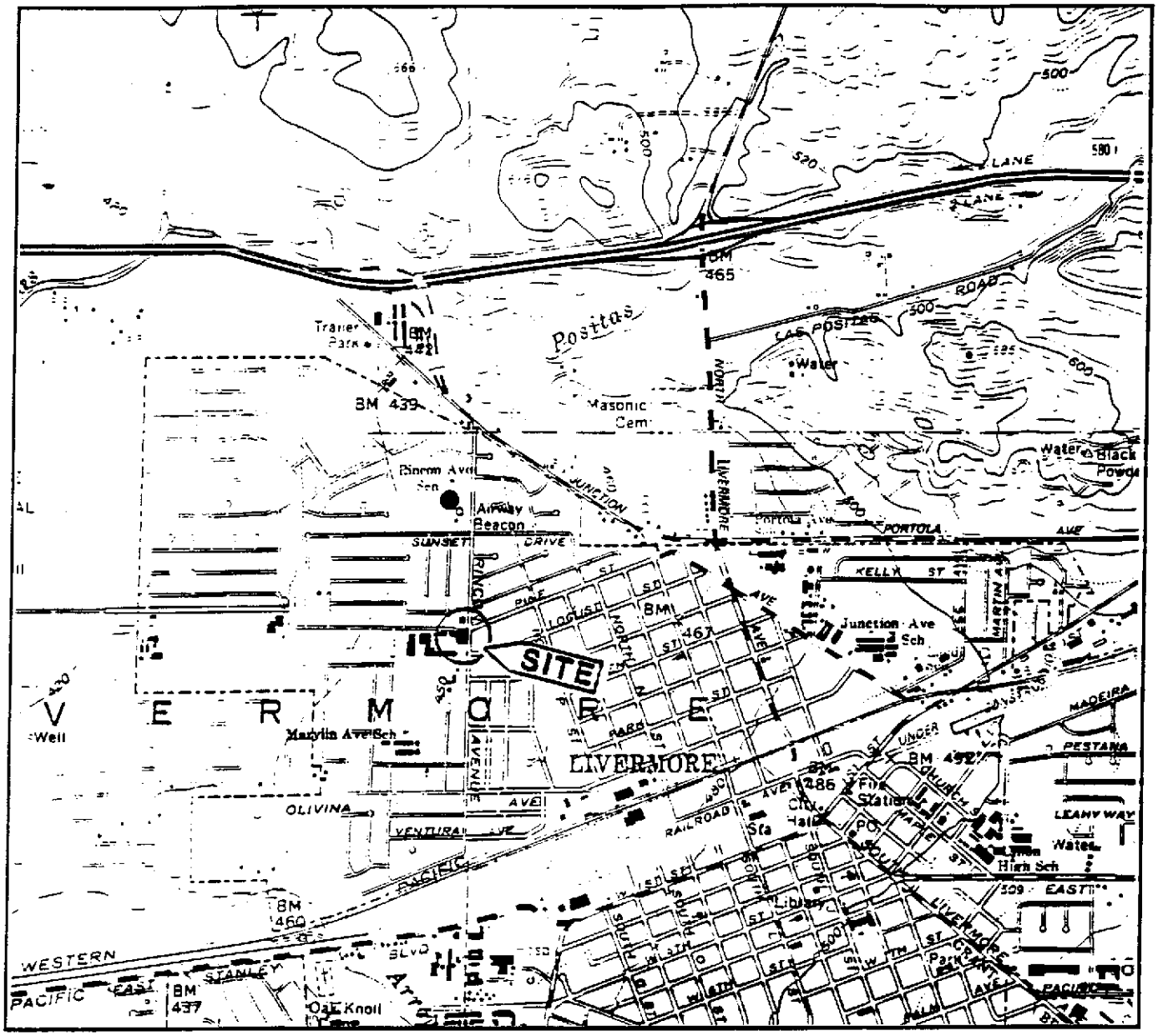
RESNA, November 21, 1991. Letter Report Quarterly Ground-Water Monitoring Third Quarter 1991 at ARCO Station 771, 899 Rincon Avenue, Livermore, California. 60000.05

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

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

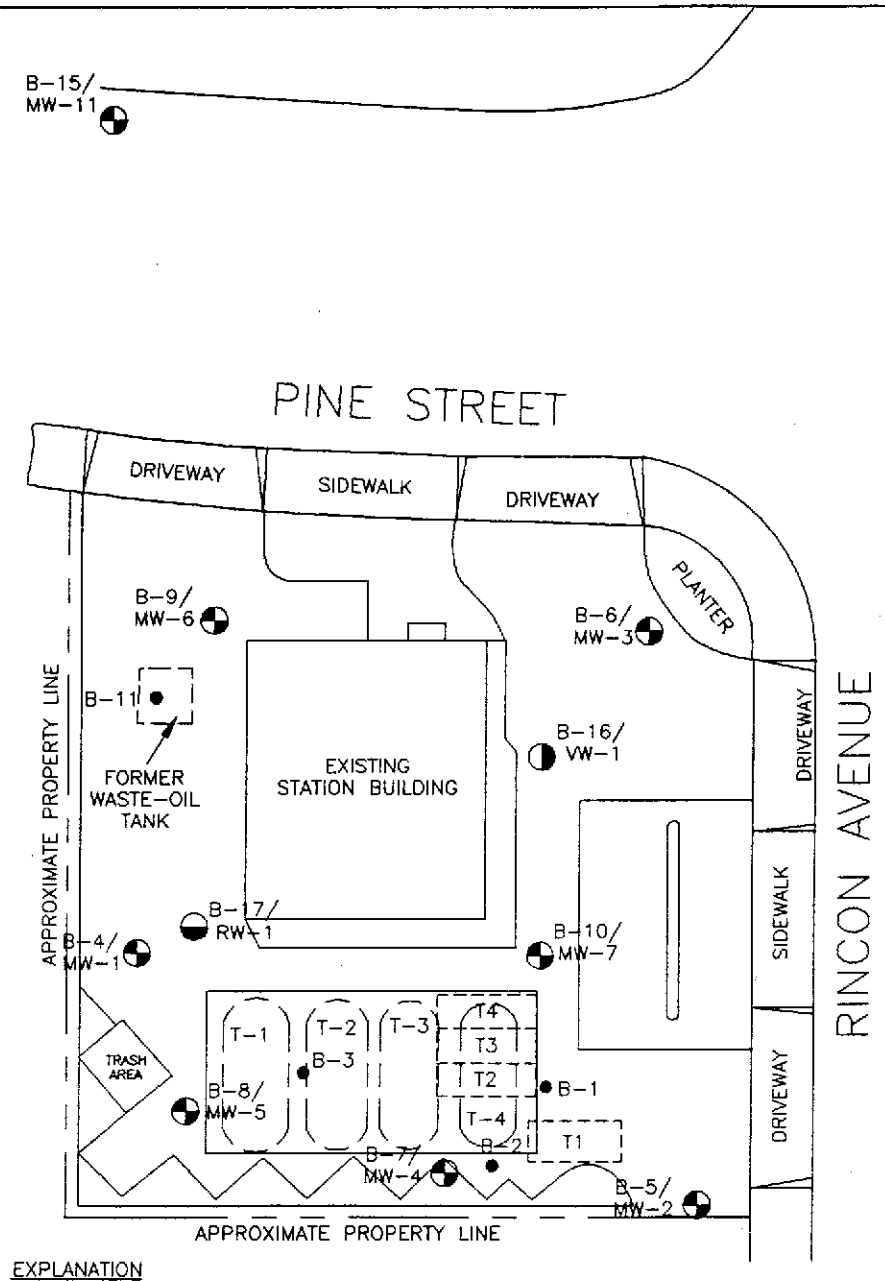
feet

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

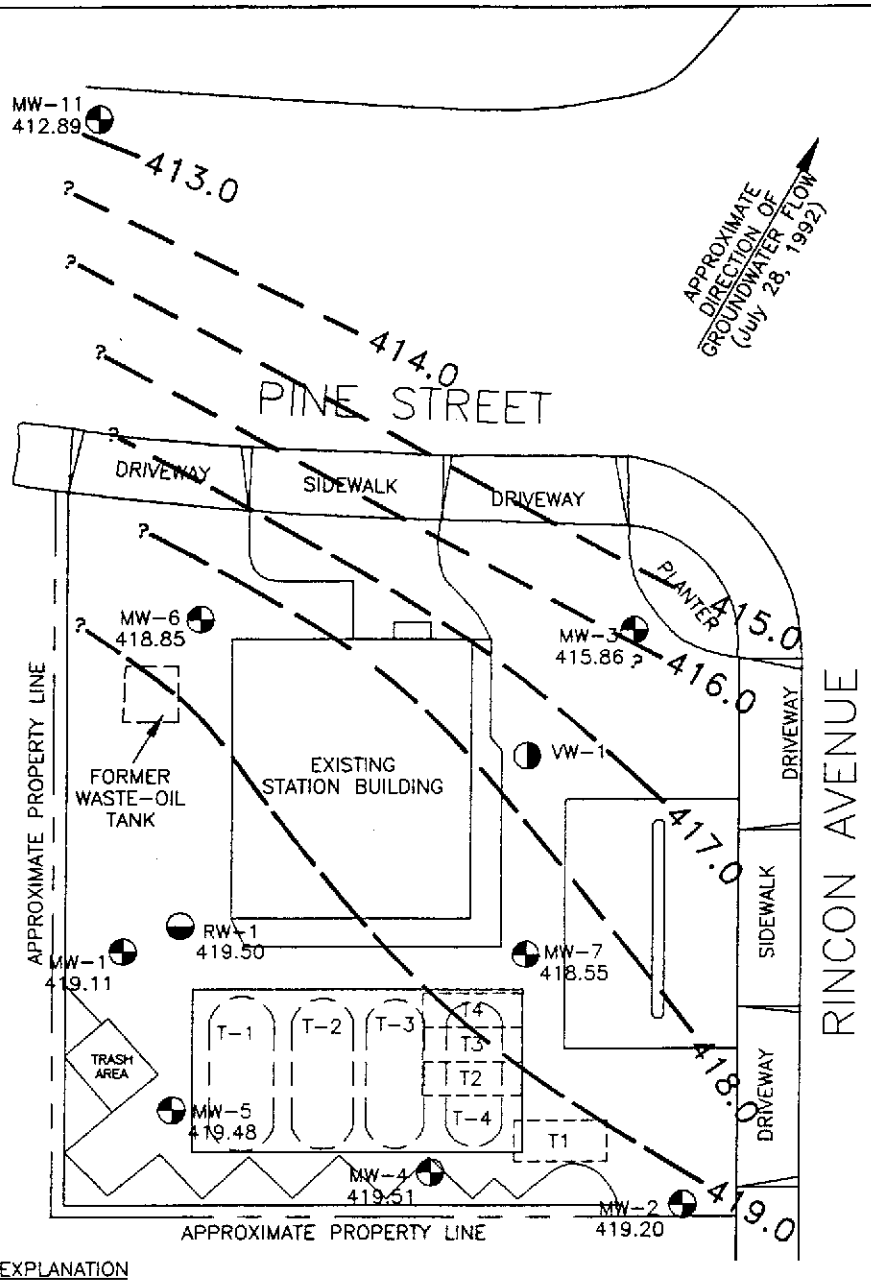
Source: Surveyed by John Koch, Licensed Land Surveyor.

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)

419.51 = Elevation of groundwater in feet above MSL, July 28, 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

Approximate Scale

30 15 0 30 60

feet

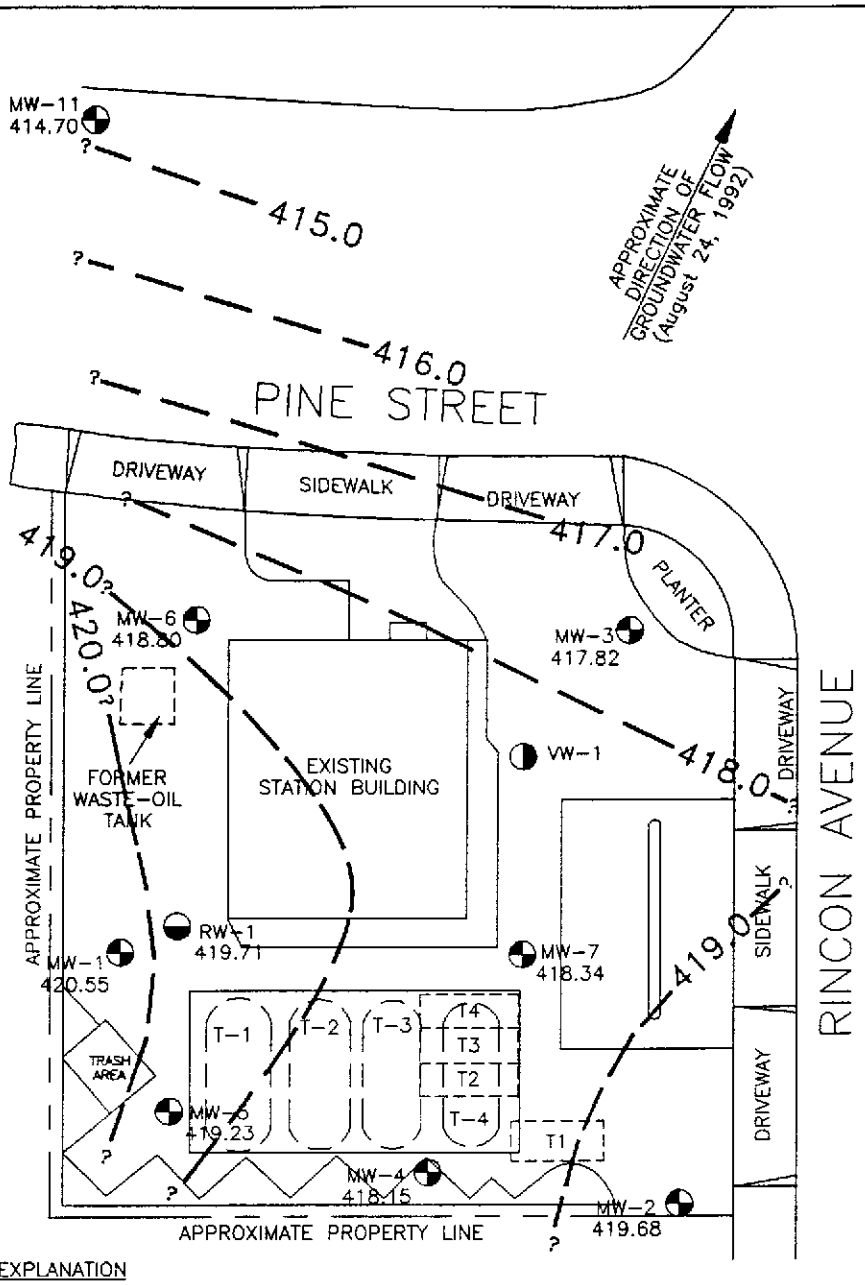
Source: Surveyed by John Koch, Licensed Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60000.13

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

PLATE 3



EXPLANATION

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

420.55 = Elevation of groundwater in feet above MSL, August 24, 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

Approximate Scale

30 15 0 30 60

feet

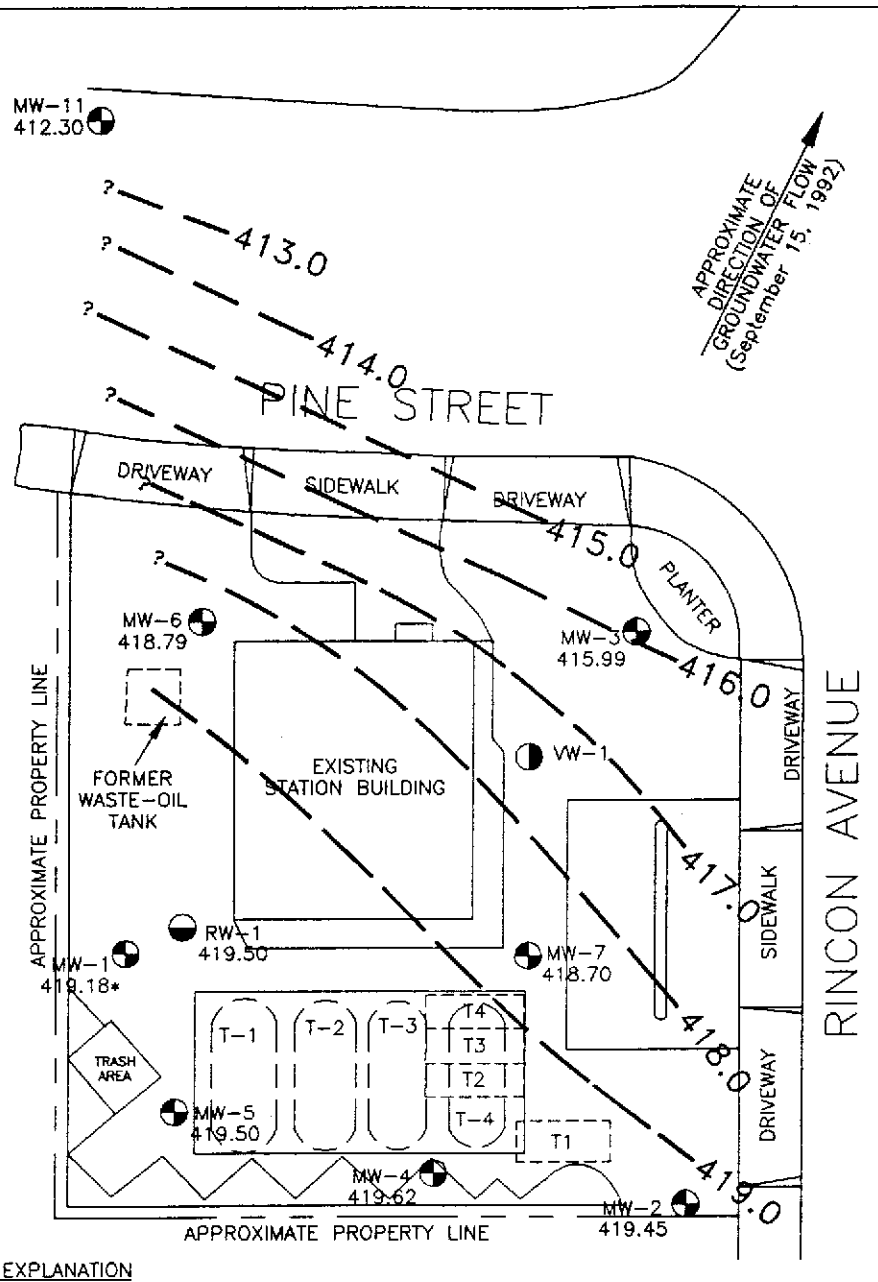
Source: Surveyed by John Koch, Licensed Land Surveyor.

RESNA
Working to Restore Nature

PROJECT 60000.13

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

PLATE 4



EXPLANATION

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

419.62 = Elevation of groundwater in feet above MSL, September 15, 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

* = Floating product

T-4 = Existing underground gasoline-storage tank

N

Approximate Scale

30 15 0 30 60

feet

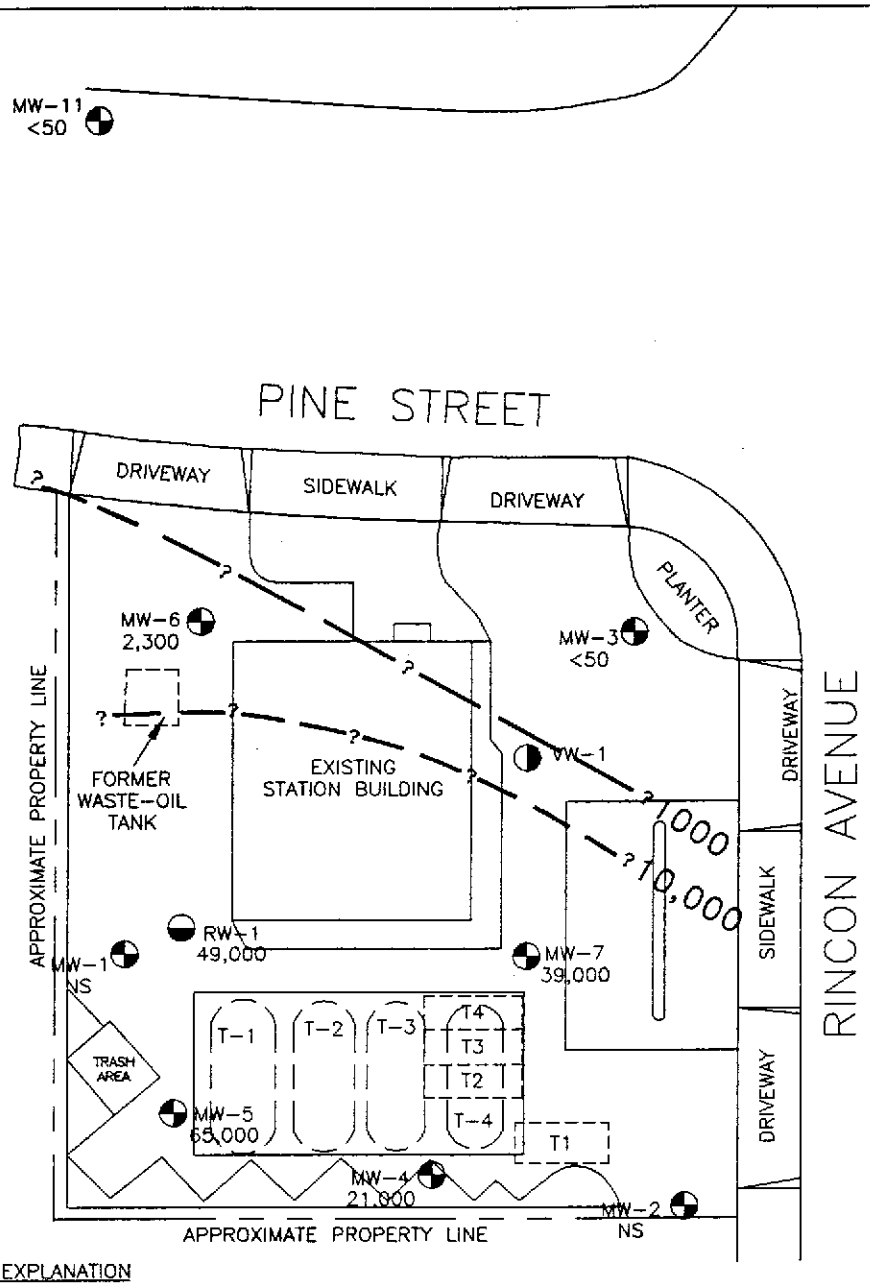
Source: Surveyed by John Koch, Licensed Land Surveyor.

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)

65,000 = Concentration of TPHg in groundwater in ppb, September 15 and 16, 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

T-4 = Existing underground gasoline-storage tank

N

Approximate Scale

30 15 0 30 60

feet

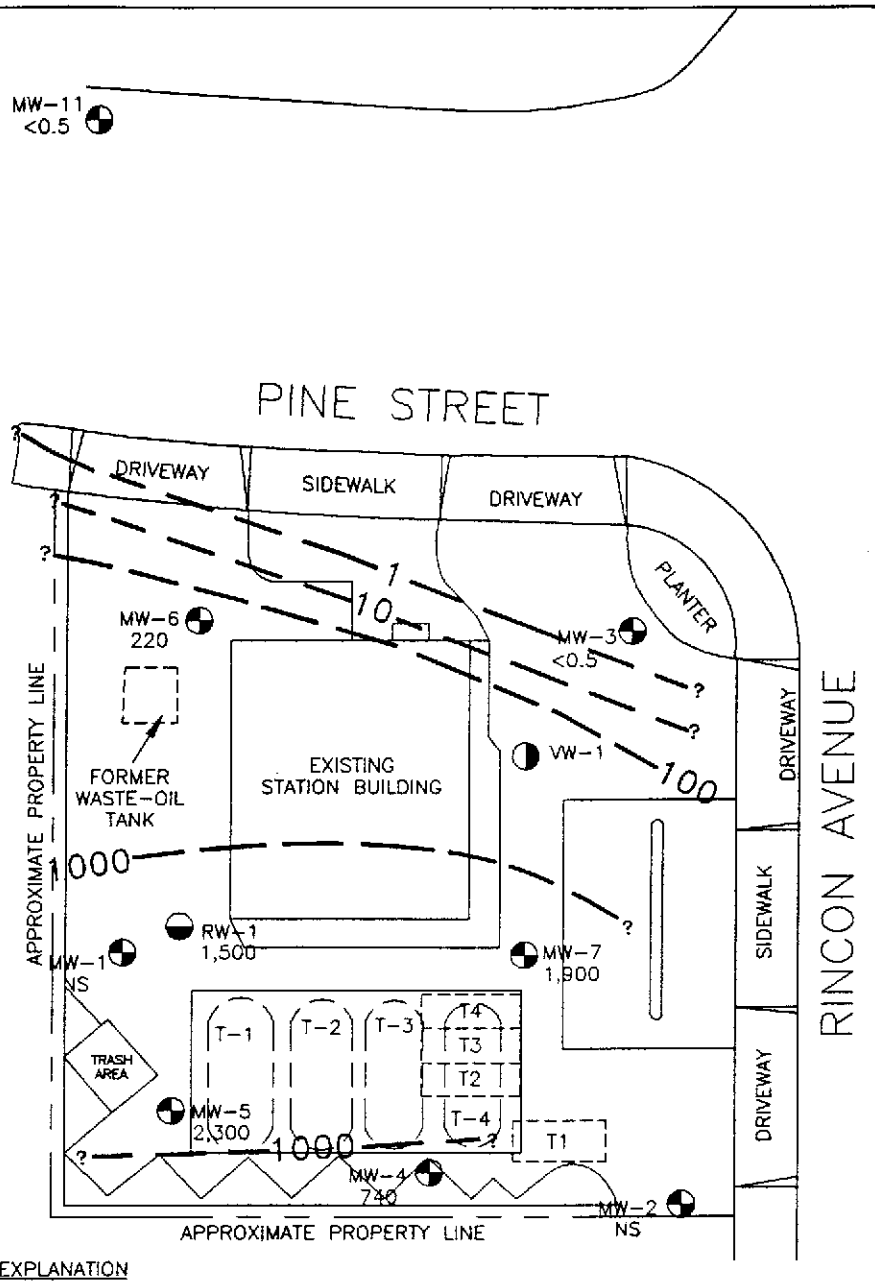
Source: Surveyed by John Koch, Licensed Land Surveyor.

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)

2,300 = Concentration of benzene in groundwater in ppb, September 15 and 16, 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

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

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**	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***	NM	NM	Sheen
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****	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
MW-2				
01-15-91	449.52**	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***	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***	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
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***	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****	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
MW-4				
07-25-91	451.56***	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
12-26-91		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

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')				
04-24-92	450.99****	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
MW-5				
07-25-91	451.41***	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****	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
MW-6				
07-25-91	451.38***	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		35.21	NC	None
03-31-92		32.26	NC	None
04-24-92	451.37****	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

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-7				
07-25-91	450.65***	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****	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
MW-11				
04-24-92	448.02****	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
RW-1				
04-24-92	451.44****	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

See notes on Page 5 of 5.

RESNA
Working To Restore Nature

Quarterly Groundwater Monitoring
ARCO Station 771, Livermore, California

November 30, 1992
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

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.

** = Surveyed by Ron Archer, Civil Engineer, in January 1991.
*** = Surveyed by John Koch, Licensed Land Surveyor, in July 1991.
**** = Surveyed by John Koch, Licensed Land Surveyor, in May 1992.
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.

NM = Not measured (instrument failure–interface probe).
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						
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						
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
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
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.

RESNA
Working To Restore Nature

Quarterly Groundwater Monitoring
ARCO Station 771, Livermore, California

November 30, 1992
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-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]
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
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
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
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 quantified as diesel. The chromatogram does not match the typical diesel fingerprint, but appears to be weathered gasoline.
**: 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
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
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
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

RECEIVED
OCT 14 1992
RESNA
SAN JOSE

Date October 7, 1992
Project 0G70-012.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Almaden Expressway, Suite 34
San Jose, California 95050

We are enclosing:

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

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the second 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.

Reviewed by:

Jim Butera JB

Robert Porter

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 : 9-15-92

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

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	good	yes	good	—	good	32.72	32.72	ND	ND	38.6	NO LOCK
2	MW-3	good	yes	good	3259	good	31.29	31.29	ND	ND	39.6	—
3	MW-6	good	yes	good	3259	good	32.58	32.58	ND	ND	43.2	—
4	MW-7	good	yes	good	3259	good	31.93	31.93	ND	ND	40.0	—
5	MW-4	good	yes	good	3259	good	31.32	31.32	ND	ND	41.0	Unable to thread nut & bolts back into plate due to obstruction in threads
6	RW-1	good	yes	good	3259	cracked	31.94	31.94	ND	ND	39.5	6" LWC is cracked
7	MW-5	good	yes	good	3259	good	31.90	31.90	ND	ND	40.5	Skimmer in well
8	MW-2	good	yes	good	3259	good	30.06	30.06	ND	ND	37.9	Skimmer in well
9	MW-1	good	yes	good	3259	good	32.25	32.25	~~ND~~ 32.26	~~ND~~ 0.01	40.2	Skimmer in well

SURVEY POINTS ARE TOP OF WELL CASINGS

Summary of Groundwater Monitoring Data
Third 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 (mg/l
MW-1	09/15/92	32.25	0.01	FP[2].	FP.	FP.	FP.	FP.	FP.	FP.
MW-2	09/15/92	30.06	0.01*	FP	FP.	FP.	FP.	FP.	NR.[4]	NR.
MW-3(38)	09/15/92	34.29	ND.[3]	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.
MW-4(40)	09/15/92	31.37	ND.	21,000.	740.	240.	350.	1,300.	NR.	NR.
MW-5(39)	09/15/92	31.90	ND.	65,000.	2,300.	2,600.	1,700.	9,900.	NR.	NR.
MW-6(42)	09/15/92	32.58	ND.	2,300.	220.	<5.	92.	43.	810.	1.5
MW-7(39)	09/15/92	31.93	ND.	39,000.	1,900.	410.	470.	5,000.	NR.	NR.
MW-11(37)	09/15/92	35.72	ND.	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.
RW-1(38)	09/15/92	31.94	ND.	49,000.	1,500.	2,200.	870.	6,900.	NR.	NR.
FB-1.[5]	09/15/92	NA.[6]	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. ND. = Not detected
4. NR. = Not reported; sample was not scheduled for analysis of the selected parameter
5. FB. = Field blank
6. NA. = Not applicable

* = Product came into well during purge

Columbia Analytical Services INC.

September 30, 1992

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:

Enclosed are the results of the water samples submitted to our lab on September 17, 1992. For your reference, our service request number for this work is SJ92-1160.

All analyses were performed in accordance with the laboratory's quality assurance program.

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/ajb

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:**	09/17/92
Project:	EMCON Project No. 0G70-012.01	**Work Order #:**	SJ92-1160
	Arco Facility No. 771	**Sample Matrix:**	Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name:	MW-6 (42)	Method Blank
Date Sampled:	09/16/92	

Analyte	Method	MRL		
TRPH	418.1	0.5	1.5	ND

TRPH Total Recoverable Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
[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 Keenit Murphy Date September 30, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/17/92
Project:	EMCON Project No. 0G70-012.01	**Date Extracted:**	09/21/92
	Arco Facility No. 771	**Date Analyzed:**	09/21/92
Sample Matrix:	Water	**Work Order #:**	SJ92-1160

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

Sample Name	MRL	TPH as Diesel
MW-6 (42)	50.	810. *
Method Blank	50.	ND

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

Approved by Kevin Murphy Date September 30, 1992

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/17/92
Project:	EMCON Project No. 0G70-012.01	**Work Order #:**	SJ92-1160
	Arco Facility No. 771	**Sample Matrix:**	Water

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

Sample Name:		MW-3 (38)	MW-4 (40)	MW-5 (39)
Date Analyzed:		09/21/92	09/21/92	09/21/92
Analyte	**MRL**			
Benzene	0.5	ND	740.	2,300.
Toluene	0.5	ND	240.	2,600.
Ethylbenzene	0.5	ND	350.	1,700.
Total Xylenes	0.5	ND	1,300.	9,900.
TPH as Gasoline	50	ND	21,000.	65,000.

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

Approved by Kevin Murphy Date September 30, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

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

Date Received: 09/17/92
Work Order #: SJ92-1160
Sample Matrix: Water

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

Sample Name:		MW-6 (42)	MW-7 (39)	MW-11 (37)
Date Analyzed:		09/21/92 *	09/21/92 *	09/21/92 *
Analyte	**MRL**			
Benzene	0.5	220.	1,900.	ND
Toluene	0.5	<5. **	410.	ND
Ethylbenzene	0.5	92.	470.	ND
Total Xylenes	0.5	43.	5,000.	ND
TPH as Gasoline	50	2,300.	39,000.	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* This sample was part of the analytical batch started on September 21, 1992. However, it was analyzed after midnight so the actual date analyzed is September 22, 1992.
** Raised MRL due to high analyte concentration requiring sample dilution.

Approved by Kevin Murphy Date September 30, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	09/17/92
Project:	EMCON Project No. 0G70-012.01	**Work Order #:**	SJ92-1160
	Arco Facility No. 771	**Sample Matrix:**	Water

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

Sample Name:		RW-1 (38)	FB-1	Method Blank
Date Analyzed:		09/21/92 *	09/21/92 *	09/21/92
Analyte	**MRL**			
Benzene	0.5	1,500.	ND	ND
Toluene	0.5	2,200.	ND	ND
Ethylbenzene	0.5	870.	ND	ND
Total Xylenes	0.5	6,900.	ND	ND
TPH as Gasoline	50	49,000.	ND	ND

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* This sample was part of the analytical batch started on September 21, 1992. However, it was analyzed after midnight so the actual date analyzed is September 22, 1992.

Approved by Kevin Murphy Date September 30, 1992

Client:	EMCON Associates	**Date Received:**	09/17/92
Project:	EMCON Project No. 0G70-012.01	**Work Order #:**	SJ92-1160
	Arco Facility No. 771	**Sample Matrix:**	Water

QA/QC Report
Continuing Calibration Summary
Inorganics
EPA Method 418.1
mg/L

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TRPH	100.	110.	110.	80-120

TRPH Total Recoverable Petroleum Hydrocarbons

Approved by Kevin Murphy Date September 30, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

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

Date Received: 09/17/92
Work Order #: SJ92-1160
Sample Matrix: Water

QA/QC Report
Matrix Spike Summary
Inorganic Parameters
mg/L (ppm)

Parameter	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Recovery Acceptance Criteria
TRPH	6.1	0.9	4.5	4.5	59.	59.	53-149

TRPH Total Recoverable Petroleum Hydrocarbons

Approved by Kenneth Murphy Date September 30, 1992

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

Date Received: 09/17/92
Work Order #: SJ92-1160
Sample Matrix: Water

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

Date Analyzed: 09\21\92

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
TPH as Diesel	1,000.	1,091.	109.	90-110

TPH Total Petroleum Hydrocarbons

Approved by Kenneth Murphy Date September 30, 1992

1994 Rigaud Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-0256

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

Date Received: 09/17/92
Work Order #: SJ92-1160
Sample Matrix: Water

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

Sample Name	Date Analyzed	Percent Recovery P-Terphenyl
MW-6 (42)	09/21/92	109.
MW-6 (42) MS	09/21/92	121.
MW-6 (42) DMS	09/21/92	122.
Method Blank	09/21/92	92.
	CAS Acceptance Criteria	55-145

TPH Total Petroleum Hydrocarbons

Approved by Kevin Murphy Date September 30, 1992

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

Date Received: 09/17/92
Work Order #: SJ92-1160
Sample Matrix: Water

QA/QC Report
Matrix Spike/Duplicate Matrix Spike Summary
Total Petroleum Hydrocarbons as Diesel
DHS LUFT Method
µg/L (ppb)

Sample Name: MW-6 (42)
Date Analyzed: 09/21/92

Parameter	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Acceptance Criteria
Diesel	4,000.	810.	5,420.	5,280.	115.	112.	55-145

Approved by Kevin Murphy Date September 30, 1992

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

Date Received: 09/17/92
Work Order #: SJ92-1160

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

Date Analyzed: 09/21/92

Analyte	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Criteria
Benzene	250.	247.	99.	85-115
Toluene	250.	255.	102.	85-115
Ethylbenzene	250.	245.	98.	85-115
Total Xylenes	750.	698.	93.	85-115
TPH as Gasoline	2,500.	2,702.	108.	90-110

TPH Total Petroleum Hydrocarbons

Approved by Kenneth Murphy Date September 30, 1992

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

Date Received: 09/17/92
Work Order #: SJ92-1160
Sample Matrix: Water

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

Sample Name	Date Analyzed	Percent Recovery *a,a,a*-Trifluorotoluene
MW-3 (38)	09/21/92	100.
MW-4 (40)	09/21/92	94.
MW-5 (39)	09/21/92	98.
MW-6 (42)	09/21/92	104.
MW-7 (39)	09/21/92	94.
MW-11 (37)	09/21/92	93.
RW-1 (38)	09/21/92	96.
FB-1	09/21/92	96.
MW-6 (42) MS	09/21/92	117.
MW-6 (42) DMS	09/21/92	117.
Method Blank	09/21/92	86.
	CAS Acceptance Criteria	70-130

TPH Total Petroleum Hydrocarbons

Approved by Kevin Murphy Date September 30, 1992

1924 Ringwood Avenue • San Jose, California 95131 • Telephone 408/437-2400 • Fax 408/437-9256

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

Date Received: 09/17/92
Work Order #: SJ92-1160
Sample Matrix: Water

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

Sample Name: MW-6 (42)
Date Analyzed: 09/21/92

Analytes	Spike Level	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	Acceptance Criteria
TPH as Gasoline	2,500.	2,300.	4,900.	4,900.	104.	104.	70-130

TPH Total Petroleum Hydrocarbons

Approved by Keom A Murphy Date September 30, 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 BUTERA	Laboratory name CAS
ARCO engineer Kyle Christie	Telephone no. (ARCO) (415) 571-2434	Telephone no. (Consultant) (408) 453-0719	Fax no. (Consultant) (408) 453-0452
Consultant name EMCON ASSOCIATES	Address (Consultant) 1938 Junction Ave San Jose		Contract number 07077

Method of shipment: Sampler will deliver

Sample I.D.	Lab no.	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH GAS 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 ☐ VOA ☐ Semi VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐
MW-7(37)		2		X		X	HCl	9-14-92	No Sample		X	0.01' of product in well								
MW-2( )		2		X		X	HCl	No	Sample		X	product came into well								
MW-3(38)	1-2	2		X		X	HCl	9-15-92	1455		X									
MW-4(40)	3-4	2		X		X	HCl	9-16-92	1430		X									
MW-5(39)	5-6	2		X		X	HCl		1213		X									
MW-6(42)	7-10	4		X		X	HCl		1154		X		X							
MW-7(39)	11-12	2		X		X	HCl		1311		X									
MW-11(37)	13-14	2		X		X	HCl	9-15-92	1405		X									
RW-1(38)	15-16	2		X		X	HCl		1545		X									
FB-1	17-18	2		X		X	HCl	9-16-92	1657		X									
MW-6(42)	19-20	2		X		X	NP	9-16-92	1154			X								

Special detection Limit/reporting: Lowest possible

Special QA/QC: QS Normal

Remarks: 2 - 40ml HCl VOA's
Add 2 - Liter Glass NP
2 Liter Glass HCl
DG-70-012.01

Lab number: SJ92-1160

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	
Relinquished by/sampler	Date 9-17-92 Time 09:30	Received by	
Relinquished by	Date Time	Received by	
Relinquished by	Date Time	Received by laboratory	Date 9-17-92 Time 9:35

Distribution: White copy — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant
APPC-3292 (2-91)

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-1 (39)

PURGED BY: B. Stafford CLIENT NAME: Arco 771

SAMPLED BY: B. Stafford 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.): 5.22

DEPTH TO WATER (feet): 32.21 CALCULATED PURGE (gal.): 26.1

7.99 DEPTH OF WELL (feet): 40.2 ACTUAL PURGE VOL. (gal.): NR

DATE PURGED: 9-16-92 Start (2400 Hr) NA End (2400 Hr) NA

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

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
0.01' of product in bailer No Sample						

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

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

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

WELL INTEGRITY: OK LOCK #: 3259

REMARKS: 0.01' of product was in Teflon bailer No Sample

Meter Calibration: Date: 9-16-92 Time: 1125 Meter Serial #: 8912 Temperature °F: ___

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

Location of previous calibration: MW-6

Signature: [signature] Reviewed By: JB Page 1 of 9

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-2(36)

PURGED BY: B. Stafford CLIENT NAME: Arco 771

SAMPLED BY: B. Stafford 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.): 4.89

DEPTH TO WATER (feet): 30.40 CALCULATED PURGE (gal.): 24.46

7.5 DEPTH OF WELL (feet): 37.9 ACTUAL PURGE VOL. (gal.): 5.0

DATE PURGED: 9-16-92 Start (2400 Hr) 1638 End (2400 Hr) 1645

DATE SAMPLED: 9-16-92 Start (2400 Hr) NA End (2400 Hr) NA

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1644	5.0	6.95	1226.	69.4	Gray	High
Product came into well during purging. No Sample						

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

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

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: Sheen on purge H2O. Product came into sample >0.01 Bailer during purging. No Sample.

Meter Calibration: Date: 9-16-92 Time: 1125 Meter Serial #: 8912 Temperature °F: ___

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

Location of previous calibration: MW-6

Signature: [signature] Reviewed By: JB Page 2 of 9

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: 0670-012-01 | SAMPLE ID: MW-3(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.): ~~3.06~~ 3.45

DEPTH TO WATER (feet): 34.33 | CALCULATED PURGE (gal.): ~~15.31~~ 17.28

DEPTH OF WELL (feet): 39.6 ~~5.27 467~~ | ACTUAL PURGE VOL. (gal.): 8.5

DATE PURGED: 9-15-92 | Start (2400 Hr) 1420 | End (2400 Hr) 1438

DATE SAMPLED: 9-15-92 | Start (2400 Hr) 1455 | End (2400 Hr) ____

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1425	3.5	6.65	896	68.9	GRAY	Heavy
1435	7.0	6.90	909	69.2	GRAY	Heavy
1435	well Dried at 8.5 gal			~~69.2~~		
1455	Recharge	6.95	914	69.0	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: good | LOCK #: 3235

REMARKS: well Dried at 8.5 gal at 1438 1425

Meter Calibration: Date: 9-15-92 Time: 1300 Meter Serial #: 5576 Temperature °F: ____

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

Location of previous calibration: MW-11

Signature: [signature] | Reviewed By: JB | Page 3 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: OG70-012.01 | SAMPLE ID: MW-4 (40)
PURGED BY: B. Stafford | CLIENT NAME: Arco 771
SAMPLED BY: B. Stafford | 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.): 6.19
DEPTH TO WATER (feet): 31.61 | CALCULATED PURGE (gal.): 30.95
4.49 DEPTH OF WELL (feet): 41.10 | ACTUAL PURGE VOL. (gal.): 18.5

DATE PURGED: 9-16-92 | Start (2400 Hr) 1348 | End (2400 Hr) 1419
DATE SAMPLED: " | Start (2400 Hr) 1430 | End (2400 Hr) 1436

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1356	6.0	7.00	1278.	69.6	Brown	High
1405	12.5	6.98	1234.	68.4	↓	↓
1419	18.5	7.03	1241.	69.0	↓	↓
—	Well dried at	18.5 gallons		at 1419	—	—
1434	Recharge	7.08	1249.	69.2	Brown	High
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): NA

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: Well dried. at 1419 WL. is @ 39.63 feet. at 1428 WL. is @ 38.40 feet. Sampling.

Meter Calibration: Date: 9-16-92 Time: 1125 Meter Serial #: 8912 Temperature °F: ___

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

Location of previous calibration: MW-6

Signature: B. Stafford | Reviewed By: JB | Page 4 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 0670-012.01 SAMPLE ID: MW-5(39)

PURGED BY: B. Stafford CLIENT NAME: Arco 771

SAMPLED BY: B. Stafford 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.): ~~8~~ 5.63 ~~38~~

DEPTH TO WATER (feet): 31.87 CALCULATED PURGE (gal.): 28.2

8.63 DEPTH OF WELL (feet): 40.5 ACTUAL PURGE VOL. (gal.): 16.5

DATE PURGED: 9-16-92 Start (2400 Hr) 1520 End (2400 Hr) 1600

DATE SAMPLED: ↓ Start (2400 Hr) 1613 End (2400 Hr) 1615

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1544	5.50	7.01	1324.	70.3	Brown	High
1551	11.0	6.92	1252.	68.9	↓	↓
16:00	16.5	7.05	1271.	68.2	↓	↓
Well dried at 16.5 gallons at 16:01						
1616	Recharge	7.15	1297.	69.2	Brown	High
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): ___

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: at 16:01 W.L. @ 39.47 feet. at 16:11 W.L. @ 38.16 feet Sampling.

Meter Calibration: Date: 9-16-92 Time: 1125 Meter Serial #: 8912 Temperature °F: ___

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

Location of previous calibration: MW-6

Signature: [signature] Reviewed By: JB Page 5 of 9

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: OG70-012.01 | SAMPLE ID: MW-6 (42)

PURGED BY: B. Stafford | CLIENT NAME: Arco 771

SAMPLED BY: B. Stafford | 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.): 6.87

DEPTH TO WATER (feet): 32.77 | CALCULATED PURGE (gal.): 34.34

0.53 DEPTH OF WELL (feet): 43.3 | ACTUAL PURGE VOL. (gal.): 16.0

DATE PURGED: 9-16-92 SS | Start (2400 Hr) 1128 | End (2400 Hr) 1149

DATE SAMPLED: 9-16-92 | Start (2400 Hr) 1154 | End (2400 Hr) 1200

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1134	7.0	6.05	1157.	66.5	Brown	High
1144	14.0	6.94	1152.	63.9	"	"
Well dried at 16.0 gallons			at 11:49			
1211	Recharge	7.14	1172.	66.8	Brown	High

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): N/A

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: at 11:49 W.L. is at 41.89 feet. at 11:57 WL. is @ 40.22 feet Sampling

Meter Calibration: Date: 9-16-92 Time: 1125 Meter Serial #: 8912 Temperature °F: 74.6

(EC 1000 969 / 1002.) (DI 3.05) (pH 7 6.97 / 7.00) (pH 10 9.87 / 10.00) (pH 4 3.96 / ___)

Location of previous calibration: N/A

Signature: [signature] | Reviewed By: JB | Page 6 of 9

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: OG70-012.01 SAMPLE ID: MW-7 (39')

PURGED BY: B. Stafford CLIENT NAME: Arco 771

SAMPLED BY: B. Stafford 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.): 5.28

DEPTH TO WATER (feet): 31.90 CALCULATED PURGE (gal.): 26.42

8.10 DEPTH OF WELL (feet): 40.0 ACTUAL PURGE VOL. (gal.): 11.0

DATE PURGED: 9-16-92 Start (2400 Hr) 1241 End (2400 Hr) 1259

DATE SAMPLED: " Start (2400 Hr) 1311 End (2400 Hr) 1315

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1246	5.5D	6.96	1138.	68.7	Brown	High
1259	11.0	6.96	1183.	68.8	↓	↓
Well dried at 11 gallons at 13:00.						
1315	Recharge	6.99	1187.	69.7	Brown	High

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): NA

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: Pebbles & rocks in well difficult to pull out water. Well dried at 11.0 gallons at 13:00. WL is @ 37.83 feet at 13:10 WL is at 37.61 Sampling.

Meter Calibration: Date: 9-16-92 Time: 1125 Meter Serial #: 8912 Temperature °F: ___

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

Location of previous calibration: MW-6

Signature: [signature] Reviewed By: JB Page 7 of 9

Rev. 2, 5/91

WATER SAMPLE FIELD DATA SHEET

EMCON ASSOCIATES

PROJECT NO: SG70-012.01 | SAMPLE ID: MW-11 (37)

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

SAMPLED BY: L. RATLIFF | LOCATION: 899 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.): .97

DEPTH TO WATER (feet): 35.73 | CALCULATED PURGE (gal.): 2.35

DEPTH OF WELL (feet): 35.6 2.37 | ACTUAL PURGE VOL. (gal.): 2.25

DATE PURGED: 9-15-92 | Start (2400 Hr) 1330 | End (2400 Hr) 1352

DATE SAMPLED: 9-15-92 | Start (2400 Hr) 1405 | End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1333	.5	6.58	973	73.2	Brown	Heavy
1340	1.0	6.82	949	71.9	Brown	Heavy
1345	1.5	6.83	930	69.3	Brown	Heavy
1350	2.0	6.95	925	69.5	Brown	Heavy
1405	Recharge	6.79	910	69.2	Brown	Heavy

Dried →

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

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

PURGING EQUIPMENT		SAMPLING EQUIPMENT	
___ 2" Bladder Pump	___ Bailer (Teflon®)	___ 2" Bladder Pump	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: Installed New 2357 | LOCK #: 2357

REMARKS: well dried at 2.25 gal at 1352 HRS

Meter Calibration: Date: 9-15-92 Time: 1300 Meter Serial #: 3516 Temperature °F: 53

(EC 1000 121 / 1000) (DI 5.0) (pH 7 6.94 / 700) (pH 10 ___ / 1009) (pH 4 3.96 / ___)

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: 6970-012.01 SAMPLE ID: RW-1 (38)

PURGED BY: L RATH CLIENT NAME: ARCO 771

SAMPLED BY: L. RATH LOCATION: 899 Rincon Av 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.): 11.09

DEPTH TO WATER (feet): 31.94 CALCULATED PURGE (gal.): 55.49

DEPTH OF WELL (feet): 39.50 756 ACTUAL PURGE VOL. (gal.): 29.0

DATE PURGED: 9-15-92 Start (2400 Hr) 1500 End (2400 Hr) 1530

DATE SAMPLED: 9-15-92 Start (2400 Hr) 1545 End (2400 Hr) —

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
1516	11.50	6.66	1223	69.8	Cloudy	Mod
1525	23.00	6.69	1201	69.8	Cloudy	Mod
1530	well Dried at 29 gal					
1545	Recharge	6.63	1201	69.5	Cloudy	Mod

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	___ 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: ___ LOCK #: 3257

REMARKS: 2" Lwi is cracked

Meter Calibration: Date: 9-15-92 Time: 1300 Meter Serial #: 55716 Temperature °F: ___

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

Location of previous calibration: MW-11

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

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

Date Sept 01, 1992
Project G70-12.01

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
	August 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.

Jim Butera JB

Reviewed by: 6/30/92

Robert C Porter
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 # : G70-12.01 STATION ADDRESS : 899 Rincon Avenue, Livermore, CA DATE : 8-24-92

ARCO STATION # : 771 FIELD TECHNICIAN : Rich Schaeffer DAY : Mon

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	Fine	Yes	Fine	Yes	Yes	33.32	33.32	N.D	N.D	55.6	[illegible]
2	RW-1	Fine	Yes	Fine	Yes	Yes	31.73	31.73	N.D	N.D	39.5	—
3	MW-3	Fine	Yes	Fine	3259	Yes	32.46	32.46	N.D	N.D	39.6	—
4	MW-6	Fine	Yes	Fine	3259	Yes	32.51	32.51	N.D	N.D	43.2	—
5	MW-4	Fine	Yes	None	3259	Yes	32.84	32.84	N.D	N.D	41.0	—
6	MW-7	Fine	Yes	None	3259	Yes	32.29	32.29	N.D	N.D	39.8	—
7	MW-5	Fine	Yes	None	3259	Yes	32.17	32.17	N.D	N.D	40.5	EMPTY SAMPLER
8	MW-2	Fine	Yes	None	3259	Yes	29.83	29.83	N.D	N.D	37.9	EMPTY SAMPLER
9	MW-1	Fine	Yes	None	3259	Yes	30.57	30.57	N.D	N.D	40.2	EMPTY SAMPLER

SURVEY POINTS ARE TOP OF WELL CASINGS

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

Date July 30, 1992
Project G70-12.01

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
	July 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 # : G70-12.01 STATION ADDRESS : 899 Rincon Avenue, Livermore, CA DATE : 7-28-92

ARCO STATION # : 771 FIELD TECHNICIAN : Rich Schaeffer DAY : TUESDAY

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	Yes	Yes	Fine	3259	Broken	35.13	35.13	N.D	N.D	38.6	couldn't get key to turn had to break cap
2	RW-1	Yes	Yes	Fine	3259	Fine	31.94	31.94	N.D	N.D	39.5	—
3	MW-3	Yes	Yes	Fine	3259	Fine	34.42	34.42	N.D	N.D	39.6	—
4	MW-6	Yes	Yes	Fine	3259	Fine	32.52	32.52	N.D	N.D	43.2	—
5	MW-4	Yes	Yes	Fine	3259	Fine	31.48	31.48	N.D	N.D	41.0	—
6	MW-7	Yes	Yes	Fine	3259	Fine	32.08	32.08	N.D	N.D	39.8	—
7	MW-5	Yes	Yes	Fine	3259	Fine	31.92	31.92	N.D	N.D	40.5	NO product IN SKIMMER
8	MW-2	Yes	Yes	Fine	3259	Fine	30.31	30.31	N.D	N.D	37.9	NO product in SKIMMER
9	MW-1	Yes	Yes	Fine	3259	Fine	32.31	32.31	N.D	N.D	40.2	No product IN SKIMMER

SURVEY POINTS ARE TOP OF WELL CASINGS

{1F1072-1} Barbara

IT NUMBER: 1072-1

MONITORING WELL PURGE WATER TRANSPORT FORM

RECEIVED
OCT 3 2 1992
RESNA
SAN JOSE

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 Stephen R. Majcher 9-24-92
(Typed or printed full name & signature) (Date)

SITE INFORMATION

	STA #	JOB #	ADDRESS	GALS
1	A-2092	21073-DW	5498 MONTEREY HWY., SAN JOSE, CA	401
2	A-6113	21053-PW	785 E. STANLEY, LIVERMORE, CA	30
3	A-771	21088-PW	899 RINCON AVE., LIVERMORE, CA	98
4	A-6201	20916-PW	40077 MISSION BLVD., FREMONT, CA	8
5	A-2152	21045-PW	22141 CENTER ST., CASTRO VALLEY, CA	123
6	A-6041	21050-PW	7249 VILLAGE PKWY., DUBLIN, CA	27
7	A-4495	21038	1950 S. DELAWARE, SAN MATEO, CA	46
8	A-4430	21010-PW	2995 MIDDLEFIELD RD., PALO ALTO, CA	173
9	A-2010	21090-PW	2110 OLD MIDDLEFIELD RD., MOUNTAIN VIEW, CA	415
10	A-1319	21054-PW	365 JACKSON ST., HAYWARD, CA	346
11	A-5387	21087-PW	20200 HESPERIAN BLVD., HAYWARD, CA	328
			TOTAL GALLONS:	1,995

TRANSPORTER INFORMATION

NAME: BALCH PETROLEUM

ADDRESS: 930 AMES AVE.

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

TRUCK ID #: PETERBILT HURSCHEL WARD Hurschel Ward 9-24-92
(Typed or printed full name & signature) (Date)

TSD FACILITY INFORMATION

NAME: GIBSON ENVIRONMENTAL GEN 1464

ADDRESS: 475 SEAPORT BLVD

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

RELEASE #: 11320 Shawn Rahn Shawn Rahn
(Typed or printed full name & signature) (Date)
9-2

PO G.R 92-074