Applied GeoSystems, Inc.
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RESNA
Working To Restore Nature

TRANSMITTAL

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

TO: MS. SUSAN HUGO
ACHCSA-DEH
80 SWAN WAY, ROOM 200
OAKLAND, CA 94621

DATE: 5/4/92
PROJECT NUMBER: 69028.05
SUBJECT: ARCO STATION 6113, 785 EAST STANLEY BOULEVARD, LIVERMORE, CALIFORNIA.

FROM: LOU LEET
TITLE: STAFF GEOLOGIST

WE ARE SENDING YOU [ ] Attached [ ] Under separate cover via _____ the following items:

[ ] Shop drawings [ ] Prints [XX] Reports [ ] Specifications

[ ] Letters [ ] Change Orders [ ] _____

COPIES	DATED	NO.	DESCRIPTION
1	5/4/92		FINAL-LETTER REPORT QUARTERLY GROUNDWATER MONITORING FIRST QUARTER 1992 AT THE ABOVE SUBJECT SITE.

THESE ARE TRANSMITTED as checked below:

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

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

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

[ ] For your files [ ] _____

REMARKS: A COPY OF THIS REPORT HAS BEEN FORWARDED TO YOU AT THE REQUEST OF MR. MICHAEL WHELAN, ARCO PRODUCTS COMPANY.

Copies: 1 to project file no. 69028.05

*Revision Date: 11/21/91
*File Name: TRANSMT.PRJ

4/23/92
Called Don Moore (Seaco)
received QR updates of Arco

April 13, 1992

92 APR 1? PM 3:00

Ms. Susan Hugo
Alameda County Department of Environmental Health
80 Swan Way
Oakland, California 94621

ARCO Products Company Facilities in Alameda County

Dear Ms. Hugo:

Please find attached, Quarterly Summary Reports (QSRs) for ARCO Products Company Service Stations in Alameda County. The QSRs summarize activities conducted by ARCO at the respective sites during the first quarter of 1992; also included are projected site activities for the second quarter of 1992 and a bibliography of reports submitted for each location.

The QSRs are classified by city and address within Alameda County. We are submitting this document and attached QSRs as agreed. Please note that we are forwarding copies of the QSRs to the Regional Water Quality Control Board (RWQCB).

Please note that ARCO Products Company has reviewed the RWQCB's February 19, 1991 printout of ARCO fuel leak sites. We have evaluated each site with respect to ARCO's responsibility for investigation, monitoring, and/or remediation. Those locations for which ARCO is not responsible were listed and described in the QSR package delivered to you on July 15, 1991. The attached QSRs therefore represent only those locations for which ARCO is responsible.

ARCO is planning a subsequent comprehensive QSR submittal for ARCO sites on July 15, 1992. Please do not hesitate to contact us with any questions regarding this submittal.

Sincerely yours,

Daniel W. Moore for

Kyle A. Christie
Environmental Engineer

Attachments: ARCO Facility QSRs

A:\arcoqsrs\consmrg.ltr
50013-004-06

UST LEAK SITE UPDATE

Date of Last Review/Update: January 6, 1992

Current Date: April 6, 1992

SITE IDENTIFICATION

Name: ARCO Service Station 6113

Case No.:

Address: [redacted]
Street Number / Street

Livermore
City

ZIP Code

County: Alameda

Substance: Gasoline

Local Agency: Alameda County Health Care Services Agency

Regional Board: Regional Water Quality Control Board - San Francisco Bay Area

LEAD STAFF PERSON [redacted]

CASE TYPE

____	Undetermined	____	Soil Only	X	Ground Water	____	Drinking Water

STATUS (Date indicates when case moved into status)

____	No Action Taken		
X	Leak Being Confirmed	Date	1/89
X	Preliminary Site Assessment Workplan Submitted	Date	7/10/89
X	Preliminary Site Assessment Underway	Date	8/89
X	Pollution Characterization	Date	2/92
____	Remediation Plan	Date	
____	Remedial Action Underway	Date	
____	Post Remedial Action Monitoring	Date	
____	Case Referred to Regional Board (ACHCSA)	Date	
____	Case Referred to Dept. of Health Services	Date	
____	Case Closed	Date	

COMMENTS/MILESTONES:

Waste-oil tank removed from site in January 1989. Submitted Work Plan for Additional Subsurface Investigation and Vapor Extraction Test.

RECENT ACTIVITIES/FINDINGS:

Last Quarter Activities: Prepared a Work Plan for additional assessment. Attempted to perform quarterly monitoring on 11/13/91 - all wells were dry.

Current Quarter Activities: Performed quarterly groundwater monitoring.

ANTICIPATED ACTIVITIES:

Next Quarter Activities: Waiting for regulatory approval to implement Work Plan.

Reports Documenting the site's history are listed on page 2.

REPORT	DATE	CONSULTANT
Fourth Quarter 1991 Groundwater Monitoring Report 69028.05	3/6/92	RESNA
Third Quarter 1991 Groundwater Monitoring Report 69028.05	10/18/91	RESNA/Applied GeoSystems
Work Plan for Additional Subsurface Investigation and Vapor Extraction Test 69028.06	10/17/91	RESNA
Letter Report Quarterly Ground-Water Monitoring Second Quarter 1991 69028.03	7/11/91	RESNA
Letter Report Quarterly Ground-Water Monitoring First Quarter 1991 69028.05	4/23/91	RESNA
Site Safety Plan for ARCO Station 6113 AGS 69028-4S	2/14/91	Applied GeoSystems
Letter Report, Quarterly Ground-Water Monitoring Fourth Quarter 1990 AGS Report 69028-3	1/27/91	Applied GeoSystems
Addendum to Work Plan for ARCO Station 6113 AGS 69028-4	12/16/90	Applied GeoSystems
Letter Report, Quarterly Ground-Water Monitoring Third Quarter 1990 AGS Report 69028-3	11/2/90	Applied GeoSystems
Letter Report, Quarterly Ground-Water Monitoring Second Quarter 1990 AGS Report 69028-3	8/29/90	Applied GeoSystems
Limited Subsurface Environmental Investigation AGS Report 69028-2	12/6/89	Applied GeoSystems
Work Plan - Limited Subsurface Environmental Investigation AGS Report 69028-1W	7/18/89	Applied GeoSystems
ARCO Station 6113, 785 E. Stanley Boulevard, Livermore, California Project 330-53.01	4/25/89	Pacific Environmental Group

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LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
First Quarter 1992
at
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

69028.05

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San Jose, CA 95118
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Fax: (408) 264-2435

May 4, 1992
0504MWHE
69028.05

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

Subject: First Quarter 1992 Groundwater Monitoring Report for ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California.

Mr. Whelan:

As requested by ARCO Products Company (ARCO), this letter report summarizes the results of first 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 a former waste-oil and underground gasoline-storage tanks at the site. The field work and laboratory analyses of groundwater samples during this quarter was performed under the direction of EMCON and included measuring depths to groundwater, subjectively analyzing groundwater for the presence of petroleum product, collecting groundwater samples from the wells for laboratory analyses, and directing a State-certified laboratory to analyze the groundwater samples. Field procedures and acquisition of field data were performed under the direction of EMCON; evaluation and warrant of their field data and field protocols is beyond RESNA Industries' (RESNA's) scope of work. RESNA's scope of work was limited to interpretation of field and laboratory analyses 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 6113 is located on the southwestern corner of the intersection of East Stanley and Murrieta Boulevards in Livermore, California, shown on the Site Vicinity Map, Plate 1.

Prior to the present monitoring, Pacific Environmental Group (PEG) and RESNA performed limited subsurface environmental investigations related to the former underground waste-oil storage tank at the site. PEG performed soil sampling and observation during removal of the waste-oil tank in January 1989 (PEG, April 1989). Work by RESNA included installation of three groundwater monitoring wells (MW-1, MW-2, and MW-3) in September 1989 (AGS, December 1989) and installation of one groundwater monitoring well (MW-4) in the approximate downgradient direction of the former waste-oil tank in February 1991 (AGS, April 16, 1991). Quarterly groundwater sampling of wells MW-1 through MW-3 was initiated in June 1990; quarterly groundwater sampling of well MW-4 was initiated in February 1991. The results of these investigations are presented in the reports listed in the references section included in this letter report. The locations of the groundwater monitoring wells and 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 January 18, February 21, and March 19, 1992. Quarterly sampling was performed by EMCON field personnel on March 19, 1992. The results of EMCON's field work on the site, including DTW measurements and subjective analysis for the presence of product in the groundwater in MW-1 through MW-4, are presented on EMCON's field report sheets and EMCON's Summary of Groundwater Monitoring Data. 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-4 for this quarter and previous quarterly groundwater monitoring at the site are summarized in Table 1, Cumulative Groundwater Monitoring Data. EMCON's DTW measurements were used to evaluate groundwater elevations. Evidence of product or sheen was not observed by EMCON's field personnel during this quarterly monitoring (see EMCON's field report sheets, Appendix A). During the March 1992 monitoring, groundwater was present in all monitoring wells except [redacted]. The groundwater gradients interpreted from the March 1992 groundwater monitorings are shown on the Groundwater Gradient Map, Plate 3. Because monitoring wells MW-1 and MW-4 were dry and MW-3 contained residual water trapped at the tip of the well casing, DTW measurements could not be taken. As a result, gradients for January and February could not be evaluated. The groundwater gradient interpreted from EMCON's March 19, 1992, DTW measurements was 0.02 toward the northeast.

Groundwater monitoring wells MW-1 through MW-3 were purged and sampled by EMCON field personnel on March 19, 1992. Because well MW-4 was dry, groundwater could not be

sampled. EMCON's water sample field data sheets are included in Appendix A. Reportedly, wells MW-1 through MW-3 were dewatered after less than two well volumes were purged. The purge water was removed from the site by a licensed hazardous waste hauler; the Monitoring Well Purge Water Disposal Form is also included in Appendix A.

Laboratory Methods and Analyses

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-1 through MW-4 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. Well MW-3 was also analyzed for total petroleum hydrocarbon as diesel (TPHd) using EPA Method 5520B, and total oil and grease (TOG) using EPA method 5520F (gravimetric). Concentrations of TPHg and benzene in the groundwater are shown on Plate 4, TPHg Concentrations in Groundwater, and Plate 5, Benzene Concentrations in Groundwater. The Chain of Custody Records and Laboratory Analysis 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 and BTEX and Table 3, Cumulative Results of Laboratory Analyses of Groundwater--TPHd and TOG.

Results of this quarter's groundwater monitoring indicate:

- TPHg was detected in groundwater samples from MW-1 at concentrations of 400 parts per billion (ppb), and from MW-3 at 220 ppb. TPHg was nondetectable (<50 ppb) in the groundwater sample from well MW-2.

- Benzene was nondetectable in groundwater samples from wells MW-2, MW-3, and MW-1; with detection limits of <0.5, <1.1 ppb, and <3.5 ppb, respectively. Detection limits were reportedly raised for the samples from MW-2 and MW-3 because of matrix interference.

- Toluene was nondetectable in groundwater samples from wells MW-2, MW-1, and MW-3; with detection limits of <0.5 ppb, <1.2 ppb, and <1.9 ppb, respectively. Detection limits were reportedly raised for the samples from MW-1 and MW-3 because of matrix interference.

- Ethylbenzene was nondetectable in groundwater samples from wells MW-2, MW-3, and MW-1; with detection limits of <0.5 ppb, <0.6 ppb, and <0.8 ppb, respectively. Detection limits were reportedly raised for the samples from MW-3 and MW-1 because of matrix interference.

- Total xylenes were nondetectable in groundwater samples from wells MW-2, MW-3, and MW-1; with detection limits of <0.5 ppb, <0.8 ppb, and <1.0 ppb, respectively. Detection limits were reportedly raised for the samples from MW-3 and MW-1 because of matrix interference.

- TPHd was nondetectable (<0.5 ppb) in the groundwater sample from well MW-3.

- TOG was nondetectable (<5,000 ppb) in the groundwater sample from well MW-3.

The following general trends were noted in reported hydrocarbon concentrations in groundwater from monitoring wells MW-1, MW-2, and MW-3 since the last quarterly monitoring. Concentrations of TPHg increased in wells MW-1 and MW-3; and were generally consistent in well MW-2.

Conclusions and Recommendations

Groundwater at this site has been impacted by petroleum hydrocarbons. Reported concentrations of TPHg in groundwater samples from wells MW-1 and MW-3 were higher than those from the previous quarterly monitoring. Concentrations of TPHg and BTEX in well MW-2 have generally not been detected since September 1989, with the exception of low concentrations of benzene, toluene, and total xylenes (ranging from 0.7 ppb to 1.9 ppb). RESNA recommends continued monthly groundwater monitoring and quarterly groundwater sampling of all wells at the site, including well MW-4 (if sufficiently recharged), and analyzing groundwater samples for TPHg and BTEX. In addition, RESNA recommends analyzing the groundwater sample from well MW-1 located near the former waste-oil tank, for TOG and TPHd.

Schedule

Monthly groundwater monitoring and quarterly groundwater sampling will continue to be performed by ARCO's contracted sampler. At ARCO's request, RESNA will continue to

analyze and report monthly and quarterly groundwater monitoring data from this site to evaluate trends in petroleum hydrocarbons, and changes in groundwater gradient with time.

Groundwater levels have continued to decrease, possibly due to the abnormally dry seasonal conditions and/or localized pumping. RESNA recommends monthly monitoring of groundwater elevations and quarterly sampling of the groundwater when feasible. When groundwater elevations rise to sufficient levels to sample the wells, water samples will be collected once each quarter and submitted to a laboratory for analyses. Routine well maintenance and quality control will be performed as necessary during these visits. Reports of monitoring will be submitted each quarter. A work plan for an additional subsurface investigation and vapor extraction test (VET) was submitted to Alameda County Health Care Services Agency (ACHCSA) and the California Regional Water Quality Control Board (RWQCB) on October 17, 1991. An Addendum to the work plan for an additional subsurface investigation was submitted to Ms. Susan Hugo of the ACHCSA on March 3, 1992, and the work will be scheduled upon receiving approval of the addendum to work plan.

Copies of this report should be forwarded to:

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

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

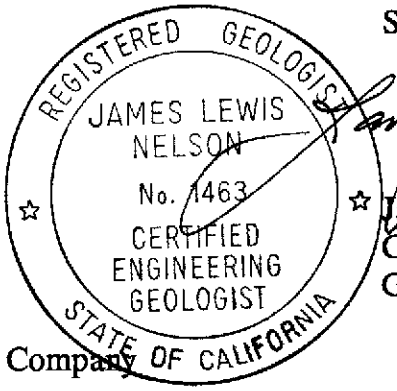
Ms. Danielle Stefani
Livermore Fire Department
4550 East Avenue
Livermore, California 94550

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

Sincerely,
RESNA Industries

L. J. Leet

Lou Leet
Staff Geologist



James L. Nelson
Certified Engineering
Geologist No. 1463

cc: H.C. Winsor, ARCO Products Company

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map, March 19, 1992
Plate 4, TPHg Concentrations in Groundwater, March 19, 1992
Plate 5, Benzene Concentrations in Groundwater, March 19, 1992

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

Appendix A: EMCON's Depth to Water/Floating Product Survey Results, 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. December 6, 1989. Limited Subsurface Environmental Investigation at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-2.

Applied GeoSystems. August 29, 1990. Letter Report, Quarterly Ground-Water Monitoring Second Quarter 1990 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.

Applied GeoSystems. November 2, 1990. Letter Report, Quarterly Ground-Water Monitoring Third Quarter 1990 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.

Applied GeoSystems. January 27, 1991. Letter Report, Quarterly Ground-Water Monitoring Fourth Quarter 1990 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.

Applied GeoSystems. April 16, 1991. Limited Subsurface Environmental Investigation Related to the Former Waste-Oil Tank at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-4.

Applied GeoSystems. April 24, 1991. Letter Report, Quarterly Ground-Water Monitoring First Quarter 1991 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.

Applied GeoSystems. July 11, 1991. Letter Report, Quarterly Ground-Water Monitoring Second Quarter 1991 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-5.

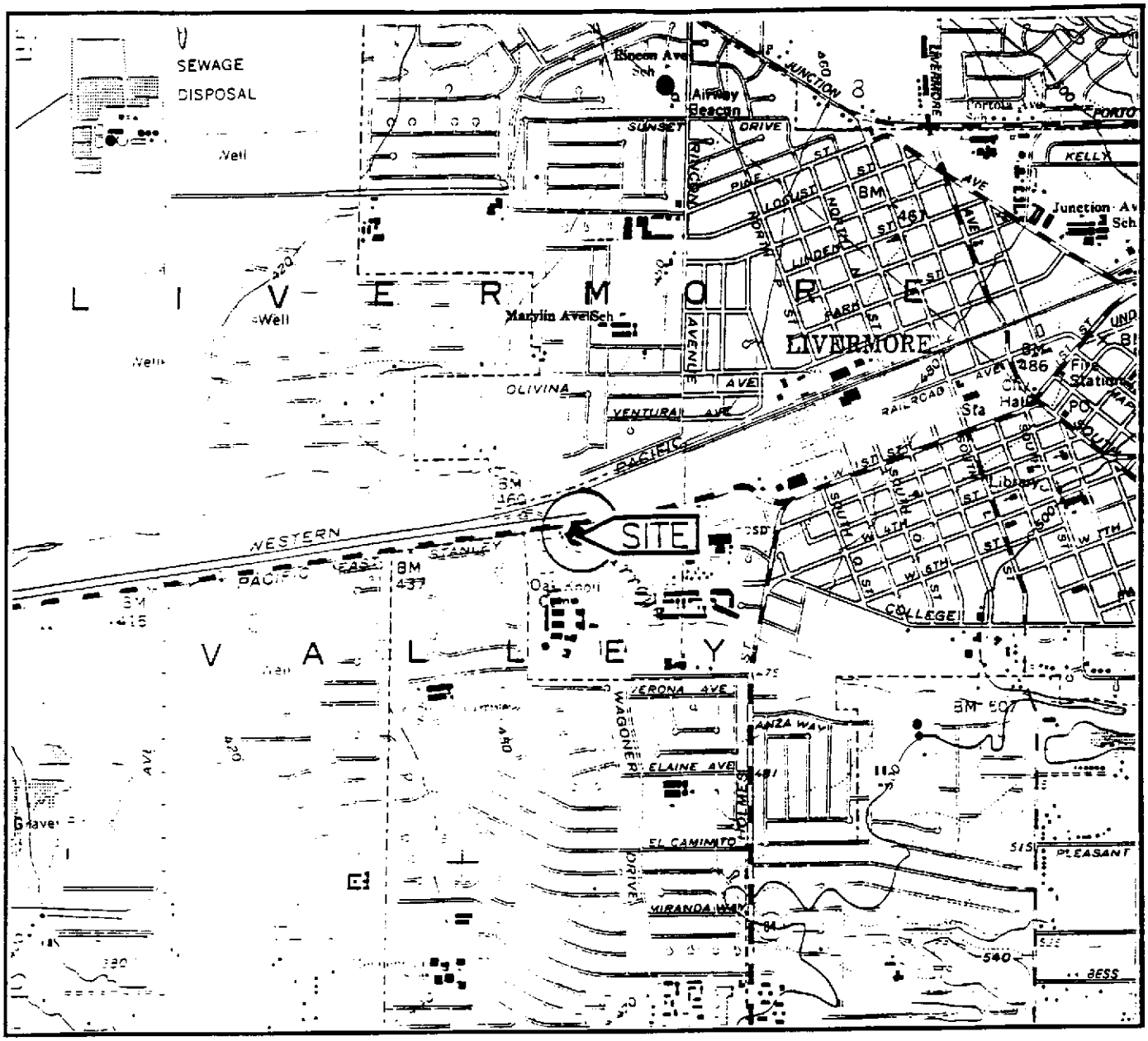
California Department of Health Services, Office of Drinking Water, October 22, 1990, "Summary of California Drinking Water Standards", Berkeley, California.

Pacific Environmental Group. April 25, 1989. ARCO Station 6113, 785 E. Stanley Boulevard, Livermore, California. Project 330-53.01

REFERENCES
(Continued)

RESNA. October 18, 1991. Letter Report, Quarterly Groundwater Monitoring, Third Quarter 1991, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.05

RESNA. March 6, 1992. Letter Report, Quarterly Groundwater Monitoring, Fourth Quarter 1991, at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. 69028.05



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

LEGEND

⊙ = Site Location

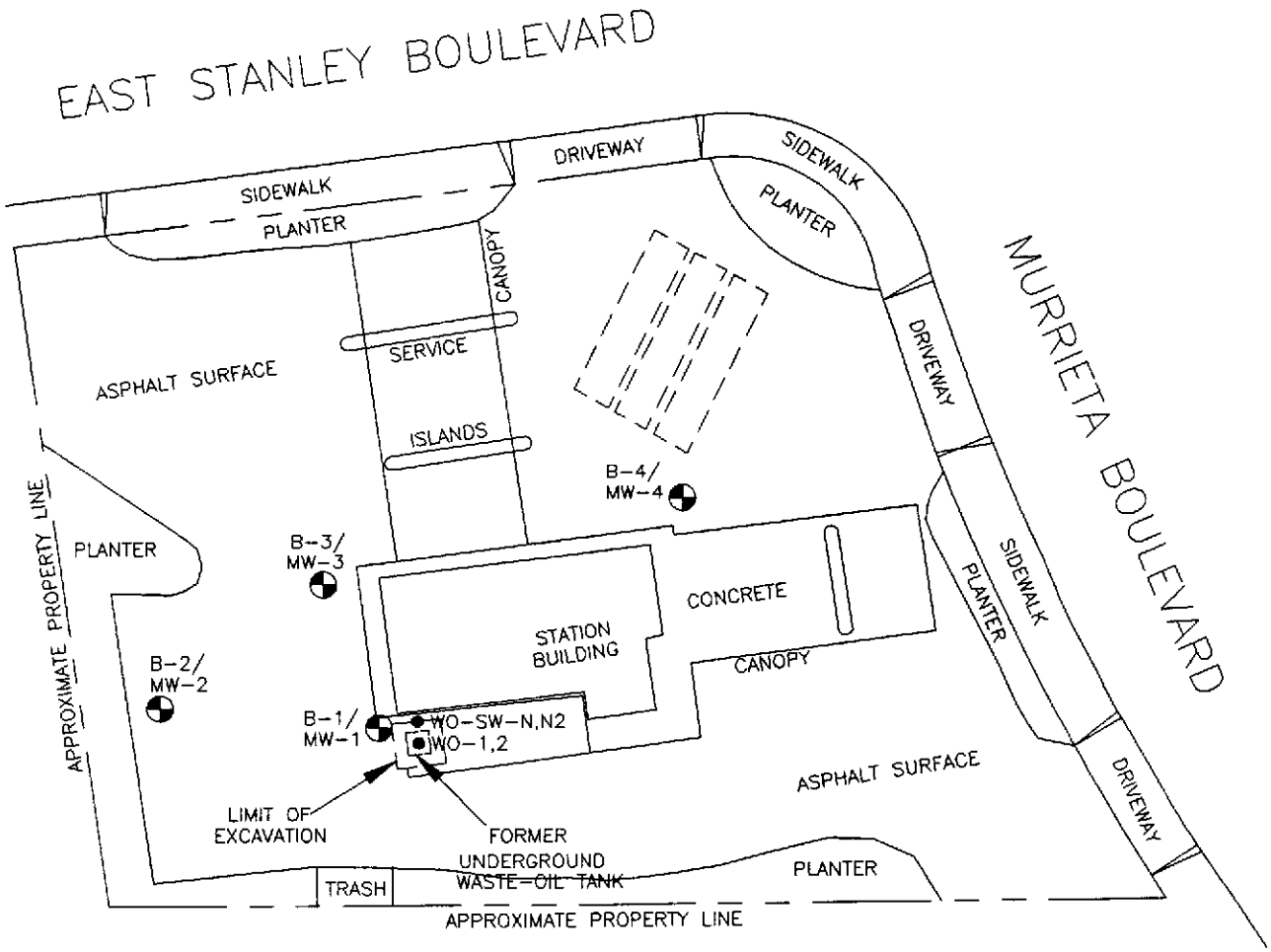
N

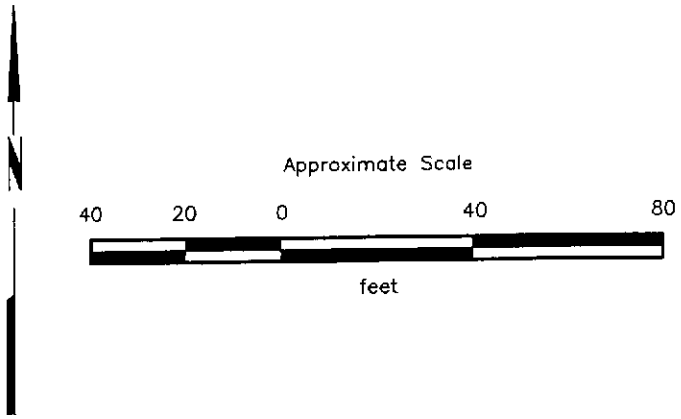
Approximate Scale

2000 1000 0 2000 4000

feet

RESNA	**SITE VICINITY MAP** **ARCO Service Station 6113** **785 East Stanley Boulevard** **Livermore, California**	**PLATE** **1**
PROJECT 69028.05		





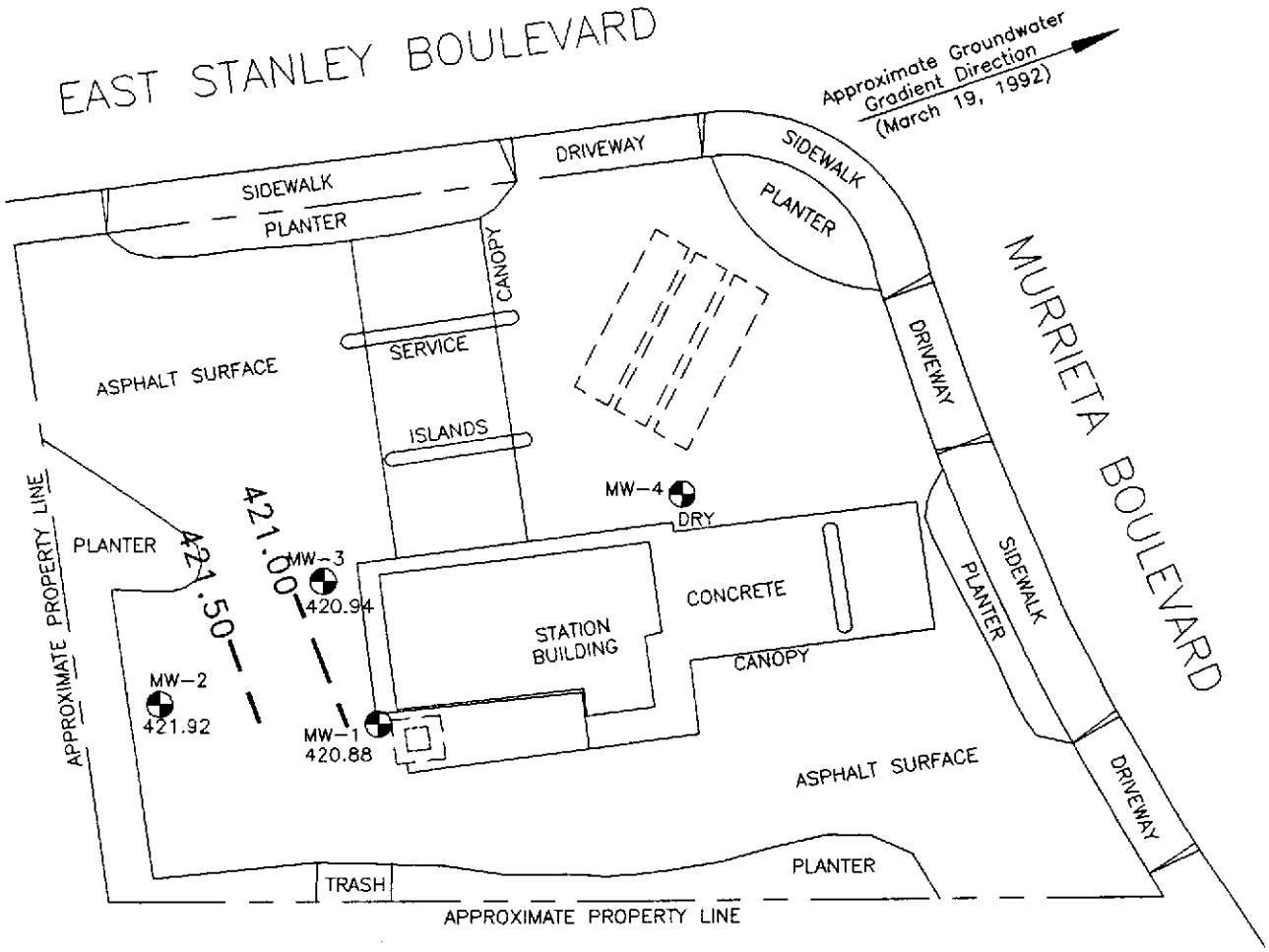
EXPLANATION

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

B-4/MW-4 ◔ = Boring/monitoring well (Applied GeoSystems, September 1989 and February 1991)

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., October 1988.

RESNA	**GENERALIZED SITE PLAN**	**PLATE**
	ARCO Service Station 6113	**2**
PROJECT: 69028.05	**785 East Stanley Boulevard**	
	Livermore, California	



EXPLANATION

421.50 —— = Line of equal elevation of groundwater in feet above mean sea level (MSL) (March 19, 1992)

421.92 = Elevation of groundwater in feet (March 19, 1992)

MW-4 ⊕ = Boring/monitoring well (Applied GeoSystems, September 1989 and February 1991)

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., October 1988.

RESNA

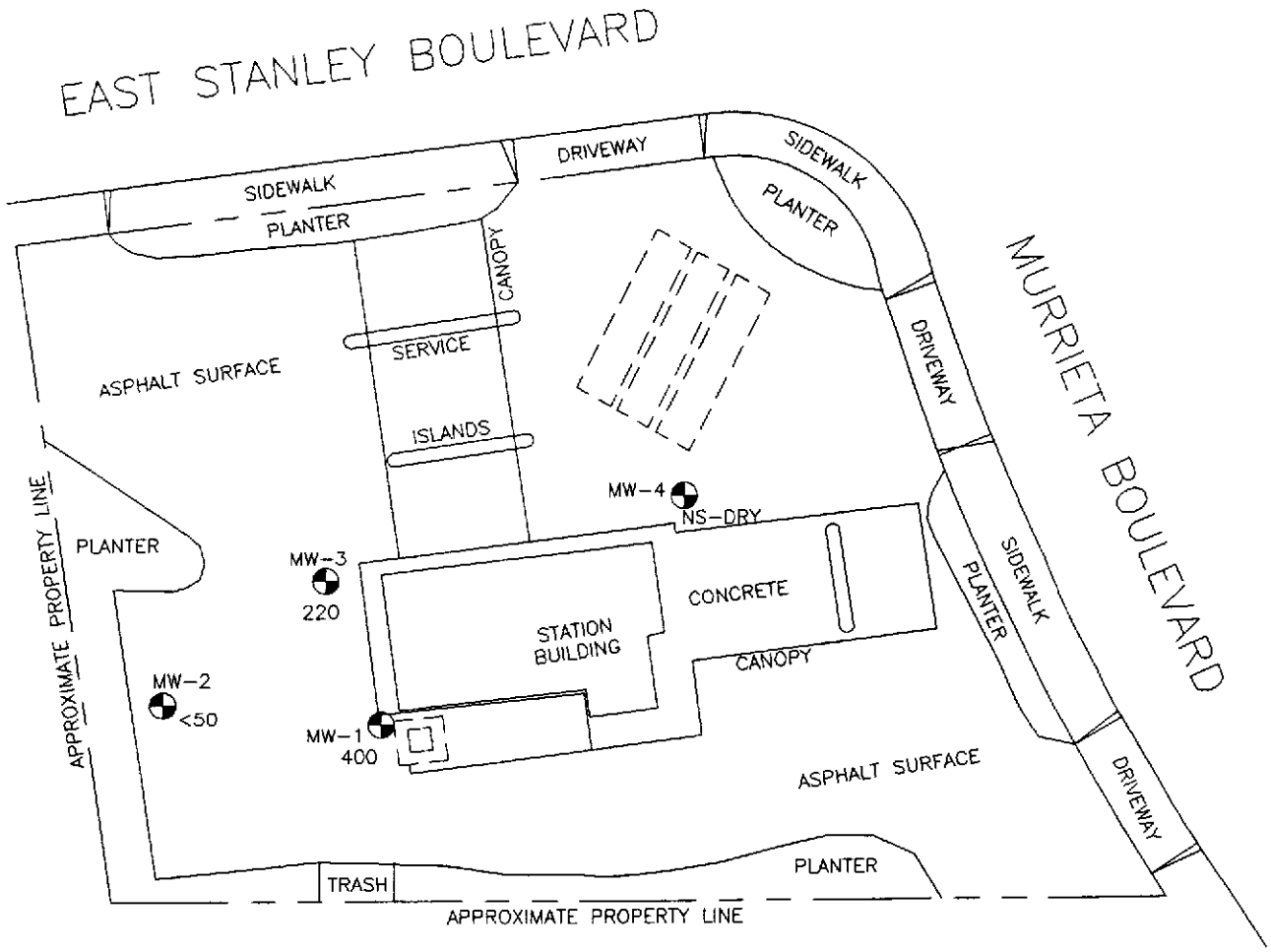
PROJECT: 69028.05

GROUNDWATER GRADIENT MAP

ARCO Service Station 6113
785 East Stanley Boulevard
Livermore, California

PLATE

3



EXPLANATION

400 = Concentration of TPHg in groundwater in ppb (March 19, 1992)

NS = Not sampled

MW-4 = Boring/monitoring well (Applied GeoSystems, September 1989 and February 1991)

N

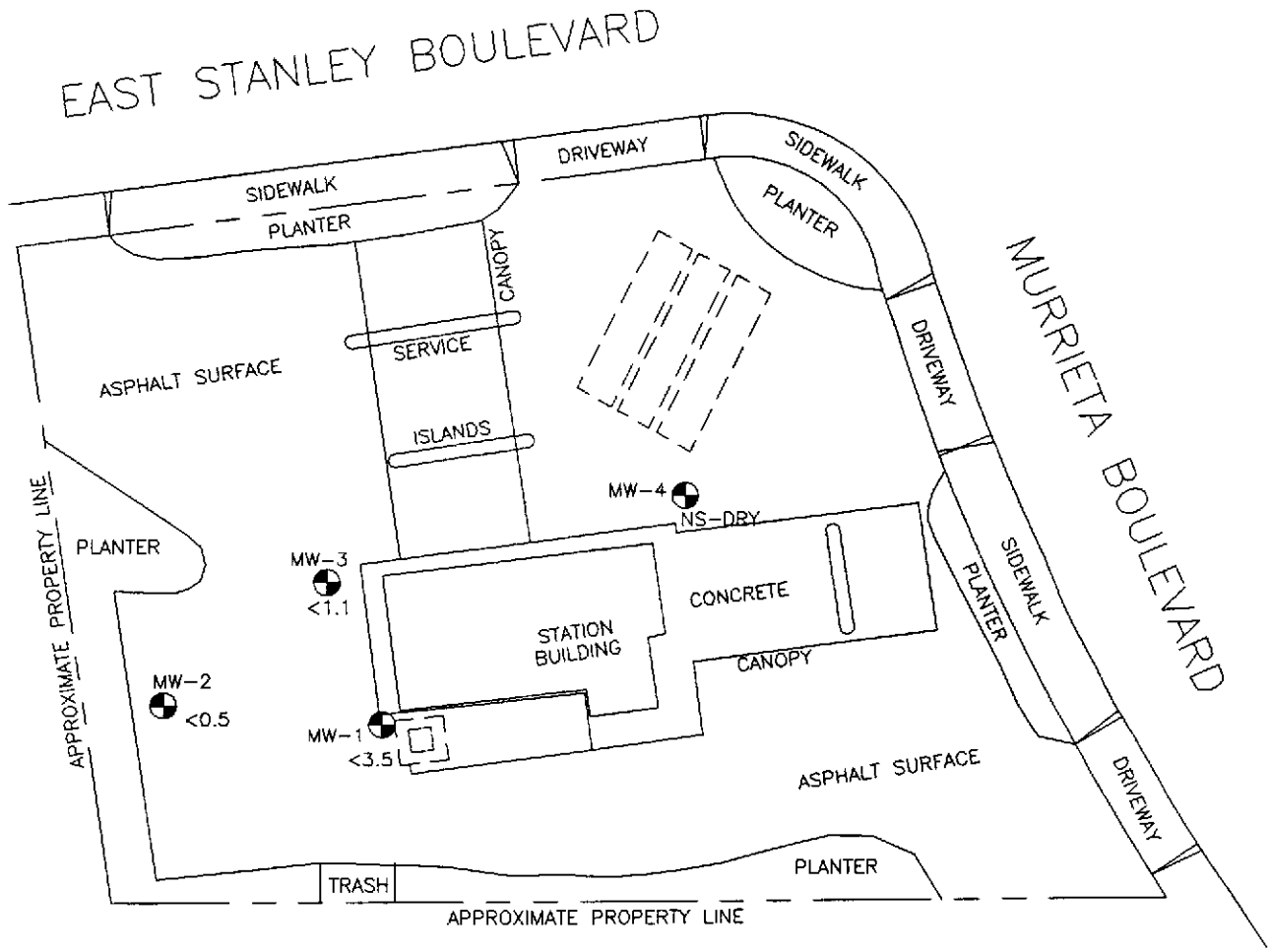
Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., October 1988.

RESNA	**TPHg CONCENTRATIONS IN GROUNDWATER ARCO Service Station 6113 785 East Stanley Boulevard Livermore, California**	**PLATE 4**
PROJECT: 69028.05		



EXPLANATION

<3.5 = Concentration of benzene in groundwater in ppb (March 19, 1992)

NS = Not sampled

MW-4 = Boring/monitoring well (Applied GeoSystems, September 1989 and February 1991)

N

Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., October 1988.

RESNA	**BENZENE CONCENTRATIONS IN GROUNDWATER ARCO Service Station 6113 785 East Stanley Boulevard Livermore, California**	**PLATE 5**
PROJECT: 69028.05		

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

Well Date	Elevation of Wellhead	Depth to Water	Elevation of Groundwater	Floating Product
MW-1				
09/20/89	457.04	21.03	436.01	None
10/12/89		19.64	437.40	None
06/21/90		21.72	435.32	None
09/20/90		19.79	437.25	None
12/18/90		19.28	437.76	None
02/21/91		22.45	434.59	None
03/20/91		19.87	437.17	None
04/10/91		19.42	437.62	None
05/20/91		25.95	431.09	None
06/20/91		32.55	424.49	None
07/25/91		38.22	418.82	None
08/13/91		40.74	416.30	None
09/12/91		43.16	413.88	None
10/22/91		Dry	Dry	None
11/13/91		Dry	Dry	None
12/21/91		Dry	Dry	None
01/18/92		Dry	Dry	None
02/21/92		Dry	Dry	None
03/19/92		36.16	420.88	None
MW-2				
09/20/89	457.74	20.67	437.07	None
10/12/89		18.98	438.76	None
06/21/90		21.88	435.86	None
09/20/90		19.90	437.84	None
12/18/90		19.32	438.42	None
02/21/91		23.02	434.72	None
03/20/91		20.01	437.73	None
04/10/91		19.81	437.93	None
05/20/91		26.62	431.12	None
06/20/91		33.15	424.59	None
07/25/91		37.10	420.64	None
08/13/91		37.20	420.54	None
09/12/91		37.44*	–	None
10/22/91		37.38*	–	None
11/13/91		37.39*	–	None
12/21/91		Dry	Dry	None
01/18/92		37.65	420.09	None
02/21/92		37.75	419.99	None
03/19/92		35.82	421.92	None

See notes on Page 2 of 2.

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

Well / Date	Elevation of Wellhead	Depth to Water	Elevation of Groundwater	Floating Product
MW-3				
09/20/89	456.97	20.98	435.99	None
10/12/89		19.66	437.31	None
06/21/90		21.72	435.25	None
09/20/90		19.72	437.25	None
12/18/90		19.21	437.76	None
02/21/91		22.36	434.61	None
03/20/91		19.79	437.18	None
04/10/91		19.35	437.62	None
05/20/91		25.86	431.11	None
06/20/91		32.45	424.52	None
07/25/91		38.06	418.91	None
08/13/91		38.40	418.57	None
09/12/91		Dry	Dry	None
10/22/91		Dry	Dry	None
11/13/91		Dry	Dry	None
12/21/92		Dry	Dry	None
01/18/92		38.90*	—	None
02/21/92		38.88*	—	None
03/19/92		36.03	420.94	None
MW-4				
02/21/91	456.97	22.01	434.96	None
03/20/91		20.31	436.66	None
04/10/91		19.55	437.42	None
05/20/91		25.24	431.73	None
06/20/91		Dry	Dry	None
07/25/91		37.93	419.04	None
08/13/91		Dry	Dry	None
09/12/91		Dry	Dry	None
10/22/91		Dry	Dry	None
11/13/91		Dry	Dry	None
12/21/92		Dry	Dry	None
01/18/92		Dry	Dry	None
02/21/92		Dry	Dry	None
03/19/92		Dry	Dry	None

Wellhead Elevation based on benchmark: Top of pin set in concrete in the most westerly monument at the intersection of East Stanley Boulevard and Fenton Avenue. Elevation taken as 455.896 mean sea level, City of Livermore datum.
Depth-to-water measurements in feet below the top of the well casing.
* Residual water.

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

Well Date	TPHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes
MW-1					
09/20/89	80	3.0	1.0	0.7	1
06/21/90	<20	<0.50	0.66	<0.50	<0.50
09/20/90	<50	<0.5	1.0	<0.5	1.8
12/18/90	<50	<0.5	1.8	<0.5	1.7
02/21/91	<50	1.2	2.3	<0.5	2.2
05/20/91	<30	<0.30	<0.30	<0.30	<0.30
08/13/91		Not sampled--dry			
11/13/91		Not sampled--dry			
03/19/92	400	<3.5*	<1.2*	<0.8*	<1.0*
MW-2					
09/20/89	<50	<0.5	<0.5	<0.5	<1
06/21/90	<20	<0.50	<0.50	<0.50	<0.50
09/20/90	<50	<0.5	0.7	<0.5	1.4
12/18/90	<50	0.6	1.5	<0.5	1.9
02/21/91	<50	<0.5	<0.5	<0.5	<0.5
05/20/91	<30	<0.30	<0.30	<0.30	<0.30
08/13/91		Not sampled--dry			
11/13/91		Not sampled--dry			
03/19/92	<50	<0.5	<0.5	<0.5	<0.5
MW-3					
09/20/89	170	8.9	0.6	1.1	<1
06/21/90	<20	<0.50	1.0	<0.50	<0.50
09/20/90	<50	<0.5	1.0	<0.5	1.9
12/18/90	<50	<0.5	1.7	<0.5	2.0
02/21/91	<50	<0.5	<0.5	<0.5	<0.5
05/20/91	97	1.3	1.1	6.2	8.4
08/13/91		Not sampled--dry			
11/13/91		Not sampled--dry			
03/19/92	220	<1.1*	<1.9	<0.6*	<0.8*
MW-4					
02/21/91	3,500	410	7.6	30	47
05/20/91	1,400	150	6.0	4.4	3.1
08/13/91		Not sampled--dry			
11/13/91		Not sampled--dry			
03/19/92		Not sampled--dry			
Jan. 1990					
MCLs	None	1.0	None	680	1,750
Als	None	-.-	100	None	None

See notes on Page 2 of 2.

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

Results in parts per billion (ppb).
TPHg = Total petroleum hydrocarbons as gasoline
< = Less than the detection limits shown.
MCLs = Adopted Maximum Contaminant Levels in Drinking Water, DHS (October 1990)
AIs = Recommended Drinking Water Action Levels, DHS (October 1990)
NA = Not Analyzed
NS = Not Sampled
* = Laboratory reportedly raised detection limit due to matrix interference.

TABLE 3
CUMULATIVE RESULTS OF GROUNDWATER LABORATORY ANALYSES – TPHd and TOG
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 1 of 2)

Well Date	TPHd	TOG
MW-1		
09/20/89	<50	<5,000
06/21/90	<100	13,000
09/20/90	<50	<5,000
12/18/90	NA	<5,000
02/21/91	NA	<5,000
05/20/91	NA	<75,000
08/13/91	NS	NS
11/13/91	NS	NS
03/19/92	NA	NA
MW-2		
09/20/89	<50	<5,000
06/21/90	<100	<5,000
09/20/90	<50	<5,000
12/18/90	NA	<5,000
02/21/91	NA	<5,000
05/20/91	NA	<75,000
08/13/91	NS	NS
11/13/91	NS	NS
03/19/92	NA	NA
MW-3		
09/20/89	<50	<5,000
06/21/90	<100	10,000
09/20/90	<50	<5,000
12/18/90	NA	<5,000
02/21/91	NA	<5,000
05/20/91	NA	<75,000
08/13/91	NS	NS
11/13/91	NS	NS
03/19/92	<5,000	<5,000
MW-4		
02/21/91	NA	<5,000
05/20/91	NA	<75,000
08/13/91	NS	NS
11/13/91	NS	NS
03/19/92	NS	NS

See notes on Page 2 of 2.

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

Results in parts per billion (ppb).
TPHg = Total petroleum hydrocarbons as gasoline.
TPHd = Total petroleum hydrocarbons as diesel.
TOG = Total Oil and Grease.
* = Laboratory reportedly raised detection limit due to matrix interference.
< = Less than the detection limits shown.
NA = Not Analyzed.
NS = Not Sampled.

APPENDIX A

EMCON'S DEPTH TO WATER/FLOATING PRODUCT SURVEY, SUMMARY OF GROUNDWATER MONITORING DATA, CERTIFIED ANALYTICAL REPORTS WITH CHAIN-OF-CUSTODY, AND WATER SAMPLE FIELD DATA SHEETS

MONITORING WELL PURGE WATER DISPOSAL FORM

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

Date January 29, 1992
Project G70-38.01

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

We are enclosing:

Copies	Description
1	DTW/FP Survey Form, January 1992 monthly water level survey, ARCO station 6113, 785 East Stanley Boulevard, 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:

Mark Knuttel MK

Robert Porter, Senior P.E. #4094

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-38.01 STATION ADDRESS : 785 East Stanley Blvd. Livermore DATE : 1-18-92

ARCO STATION # : 6113 FIELD TECHNICIAN : M. Kmetko / J. Vatcha DAY : Saturday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	~~ok~~ yes	yes	ok	yes	yes	Dry	Dry	ND	ND	44.85	—
2	MW-2	ok	~~yes~~ Ok	ok	yes	yes	37.65	37.65	ND	ND	38.60	—
3	MW-3	ok	yes	ok	yes	yes	~~Dry~~ 39.90	~~Dry~~ 38.90	ND	ND	39.05	—
4	MW-4	ok	yes	ok	yes	yes	Dry	Dry	ND	ND	26.70	under from well

EMCON ASSOCIATES
Consultants in Wastes Management and Environmental Control

RECEIVED
MAR 2 - 1992
RESNA
SAN JOSE

Date February 25, 1992
Project G70-38.01

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 Form, February 1992 monthly water level survey, ARCO station 6113, 785 East Stanley Blvd., 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:

REGISTERED PROFESSIONAL ENGINEER ROBERT CURTIS PORTER No: 4084 Exp. 6/30/92 INDUSTRIAL STATE OF CALIFORNIA

Mark Knuttel MK

Robert Porter, Senior Project Engineer.

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-38.01 STATION ADDRESS : 785 East Stanley Blvd. Livermore DATE : 02/21/92

ARCO STATION # : 6113 FIELD TECHNICIAN : Vince Barlock DAY : FRIDAY

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	Yes/OK	Yes	OK	Yes	Yes	DRY	DRY	ND	ND	44.81	—
2	MW-2	Yes/OK	Yes	OK	Yes	Yes	37.74	37.75	ND	ND	38.55	- SLT, H2O (PRT turbid)
3	MW-3	Yes/OK	Yes	OK	Yes	Yes	38.88	38.88	ND	ND	39.07	- SLT, H2O (PRT, turbid)
4	MW-4	Yes/OK	Yes	OK	YES	YES	DRY	DRY	ND	ND	46.69	- SLIGHT hydrocarbon
												ODOR; SOME H2O
												IN sheath, bag
												w/ product

EMCON
ASSOCIATES
Consultants in Wastes
Management and
Environmental Control

Date April 1, 1992
Project G70-38.01

To:
Mr. Joel Coffman
RESNA/ Applied Geosystems
3315 Alamden 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
1	Certified Analytical Reports with Chain-of-Custody
4	Water Sample Field Data Sheets

For your: X Information Sent by: X Mail

Comments:

Enclosed are the data from the first quarter 1992 monitoring event at ARCO service station 6113, 785 East Stanley Boulevard, Livermore, California. Please call if you have any questions: (408) 453-2266.

Mark Knuttel MK

Reviewed by:

Robert Porter, Senior Project Engineer.

1938 Junction Avenue, San Jose, California 95131-2102, (408) 453-0710, Fax (408) 453-0452

FIELD REPORT
DEPTH TO WATER / FLOATING PRODUCT SURVEY

PROJECT # : G70-38.01 STATION ADDRESS : 785 East Stanley Blvd. Livermore DATE : 3/19/92

ARCO STATION # : 6113 FIELD TECHNICIAN : S. Horton DAY : Thursday

DTW Order	WELL ID	Well Box Seal	Well Lid Secure	Gasket	Lock	Locking Well Cap	FIRST DEPTH TO WATER (feet)	SECOND DEPTH TO WATER (feet)	DEPTH TO FLOATING PRODUCT (feet)	FLOATING PRODUCT THICKNESS (feet)	WELL TOTAL DEPTH (feet)	COMMENTS
1	MW-1	yes	yes	✓	3259	yes	36.16	36.16	ND	ND	44.80	—
2	MW-2	yes	yes	✓	3259	yes	35.82	35.82	ND	ND	38.62	—
3	MW-3	yes	yes	✓	3259	yes	36.03	36.03	ND	ND	34.06	—
4	MW-4	yes	yes	✓	3259	yes	Dry Well		ND	ND	26.70	Dry Well

Summary of Groundwater Monitoring Data
First Quarter 1992
ARCO Service Station 6113
785 East Stanley Boulevard, Livermore, California
micrograms per liter (µg/l) and milligrams per liter (mg/l)

Well ID and Sample Depth	Sampling Date	Depth To Water (feet)	Floating Product Thickness (feet)	TPH[1] as Gasoline (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	Total Oil and Grease, 5520B (mg/l	Hydrocarbons 5520F Gravimetric (mg/l)
MW-1(43)	03/19/92	36.16	ND.[2]	400.	<3.5*	<1.2*	<0.8*	<1.0*	NR.[3]	NR.
MW-2(38)	03/19/92	35.82	ND.	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.
MW-3(39)	03/19/92	36.03	ND.	220.	<1.1*	<1.9*	<0.6*	<0.8*	<0.5	<0.5
MW-4	NS.[4]	Dry.	NA.[5]	NS.	NS.	NS.	NS.	NS.	NS.	NS.
FB-1.[6]	03/19/92	NA.	NA.	<50	<0.5	<0.5	<0.5	<0.5	NR.	NR.

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

*. = Raised method reporting limit due to matrix interference

Columbia Analytical Services INC.

March 31, 1992

Mr. Mark Knuttel
EMCON Associates
1921 Ringwood Avenue
San Jose, CA 95131

Re: **EMCON Project No. G70-38.01**
Arco Facility No. 6113

Dear Mr. Knuttel:

Enclosed are the results of the water samples submitted to our lab on March 19, 1992. For your reference, our service request number for this work is SJ92-0283.

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

Please call if you have any questions.

Respectfully submitted:

Keoni A. Murphy
COLUMBIA ANALYTICAL SERVICES, INC.

le/KAM

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. G70-38.01
Arco Facility No. 6113

Date Received: 03/19/92
Work Order #: SJ92-0283
Sample Matrix: Water

Inorganic Parameters[1]
mg/L (ppm)

Sample Name	Date Sampled	Total Oil & Grease, 5520B	Hydrocarbons, 5520F-Gravimetric
MW-3 (39)	03/19/92	ND	ND
Method Blank		ND	ND
Method Reporting Limit		0.5	0.5

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 Kevin Murphy Date March 31, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client: EMCON Associates
Project: EMCON Project No. G70-38.01
Arco Facility No. 6113

Date Received: 03/19/92
Work Order #: SJ92-0283
Sample Matrix: Water

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

Sample Name:		MW-1 (43)	MW-2 (38)	MW-3 (39)
Date Analyzed:		03/24/92	03/24/92	03/24/92
Analyte	**MRL**			
Benzene	0.5	<3.5*	ND	<1.1*
Toluene	0.5	<1.2	ND	<1.9*
Ethylbenzene	0.5	<0.8*	ND	<0.6*
Total Xylenes	0.5	<1.0*	ND	<0.8*
TPH as Gasoline	50	400.	ND	220.

TPH Total Petroleum Hydrocarbons
MRL Method Reporting Limit
ND None Detected at or above the method reporting limit
* Raised MRL due to matrix interference.

Approved by Kevin Murphy Date March 31, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	EMCON Associates	**Date Received:**	03/19/92
Project:	EMCON Project No. G70-38.01	**Work Order #:**	SJ92-0283
	Arco Facility No. 6113	**Sample Matrix:**	Water

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

Sample Name:		FB-1	Method Blank	Method Blank
Date Analyzed:		03/25/92	03/24/92	03/25/92
Analyte	**MRL**			
Benzene	0.5	ND	ND	ND
Toluene	0.5	ND	ND	ND
Ethylbenzene	0.5	ND	ND	ND
Total Xylenes	0.5	ND	ND	ND
TPH as Gasoline	50	ND	ND	ND

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

Approved by Kevin Murphy Date March 31, 1992

COLUMBIA ANALYTICAL SERVICES, INC.

Client: EMCON Associates
Project: EMCON Project No. G70-38.01
Arco Facility No. 6113

Date Received: 03/19/92
Work Order #: SJ92-0283
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 α,α,α-Trifluorotoluene
MW-1 (43)	03/24/92	119.
MW-2 (38)	03/24/92	91.
MW-3 (39)	03/24/92	104.
FB-1	03/25/92	89.
Method Blank	03/24/92	85.
Method Blank	03/25/92	88.
	CAS Acceptance Criteria	70-130

TPH Total Petroleum Hydrocarbons

Approved by Kenneth Murphy Date March 31, 1992

ARCO Products Company
Division of AtlanticRichfieldCompany

Task Order No. EMCGC-92-1

Chain of Custody

ARCO Facility no. 6113	City (Facility) Livermore	Project manager (Consultant) Mark Knuttel	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, CA		Contract number 07077

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 9q5 EPA M602/8020/8015	TPH Modified 8015 Gas ☐ Diesel ☐	Oil and Grease 413.1 ☐ 413.2 ☐ 5520 B&F Sgrav	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals ☐ Semi VOA ☐ VOA ☐	CAM Metals EPA 6010/7000 TTLC ☐ STLC ☐	Lead Org./DHS ☐ Lead EPA 7420/7421 ☐		
MW-1(43)	1-2	2		X		X	HCl	3/19/92	12:20		X											
MW-2(38)	3-4	2		X		X	HCl	3/19/92	12:25		X											
MW-3(39)	5-6	2		X		X	HCl	3/19/92	12:50		X											
MW-4( )	—	2		X		X	HCl	NO SAMPLE			X											
FB-1	7-8	2		X		X	HCl	3/19/92	12:45		X											
MW-3(39)	9-10	2		X		X	HCl	3/19/92	12:50				X									
MW-1 (43)		1		X		X	HNO_3	3/19/92	12:20											X		

Laboratory name: CAS

Contract number: 07077

Method of shipment: Sampler will deliver

Special detection Limit/reporting: Not Lowest possible

Special QA/QC: Normal
TOG - 5520 B&F Sgrav per P. Lacey 3-19-92

Remarks: G70-38.01
TPH-g/BTXE
2-40 ml VOA HCl
TOG
2-liter glass HCl
Total LEAD
1-500 ml LPE HNO_3
- NOT FILTERED -

Lab number: SJ92-0283

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		Date	Time
Relinquished by sampler	3/19/92	2:55 pm	Received by		
Relinquished by			Received by	3-19-92	2:55
Relinquished by			Received by laboratory		

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

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 770-38.01 SAMPLE ID: MW-1

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

SAMPLED BY: J. Williams LOCATION: 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): - VOLUME IN CASING (gal.): 1.41

DEPTH TO WATER (feet): 36.16 CALCULATED PURGE (gal.): 7.05

DEPTH OF WELL (feet): 46.46 ACTUAL PURGE VOL. (gal.): 7 CC

DATE PURGED: 3/19/92 Start (2400 Hr) 12:04 End (2400 Hr) 12:13

DATE SAMPLED: 3/19/92 Start (2400 Hr) 12:17 End (2400 Hr) 12:20

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
12:10	1.5	6.99	924	63.3	BROWN	HEAVY
12:13	1	Well Dried At 3 Gallons				
12:25	Recharge	7.22	915	63.4	BROWN	HEAVY

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

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

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

WELL INTEGRITY: Good LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: 3/19/92 Time: 12:00 Meter Serial #: 9011 Temperature °F: 65.1

(EC 1000 1405 / 1000) (DI ___) (pH 7 7.00 / 7.00) (pH 10 9.95 / 1000) (pH 4 4.00 / ___)

Location of previous calibration: ___

Signature: [signature] Reviewed By: MK Page 1 of 4

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: G70-35 01 | SAMPLE ID: MW-2

PURGED BY: S Horton | CLIENT NAME: ARCC #6113

SAMPLED BY: S. Horton | LOCATION: 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): ___ | VOLUME IN CASING (gal.): .45

DEPTH TO WATER (feet): 35.42 | CALCULATED PURGE (gal.): 2.28

DEPTH OF WELL (feet): 38.62 | ACTUAL PURGE VOL. (gal.): .75

DATE PURGED: 3/19/92 | Start (2400 Hr) 12:05 | End (2400 Hr) 12:12

DATE SAMPLED: 3/19/92 | Start (2400 Hr) 12:22 | End (2400 Hr) 12:25

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
12:07	.5	6.41	1497	63.5	brown	heavy
12:12	Well Dried at .75 Gallons					
12:25	recharge	6.52	1493	64.0	brown	heavy

D. O. (ppm): NR | ODOR: slight | 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: Good | LOCK #: 3259

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: [signature] | Reviewed By: MK | Page 2 of 4

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 670-35.01 SAMPLE ID: MW-3

PURGED BY: J Williams CLIENT NAME: ARCO #6113

SAMPLED BY: J Williams LOCATION: 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): - VOLUME IN CASING (gal.): .48

DEPTH TO WATER (feet): 36.03 CALCULATED PURGE (gal.): 2.42

DEPTH OF WELL (feet): 39.06 ACTUAL PURGE VOL. (gal.): .75

DATE PURGED: 3/19/97 Start (2400 Hr) 12:16 End (2400 Hr) 12:19

DATE SAMPLED: 3/19/97 Start (2400 Hr) 12:45 End (2400 Hr) 12:50

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
12:19	.5	6.84	15.67	63.3	brown	heavy
12:19	___	Well Dried At 75 Gallons				
[illegible]	recharge	___	[illegible]	[illegible]	[illegible]	[illegible]
12:50	recharge	6.88	1.15	63.9	"	"
___	___	___	___	___	___	___

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): EB-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 #: 3259

REMARKS: ___

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: MW-1

Signature: [signature] Reviewed By: MK Page 3 of 4

WATER SAMPLE FIELD DATA SHEET

Rev. 2, 5/91

EMCON ASSOCIATES

PROJECT NO: 670-38.01 | SAMPLE ID: MW-4

PURGED BY: NE | CLIENT NAME: ARCO #6113

SAMPLED BY: I | LOCATION: 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): NE | VOLUME IN CASING (gal.): NE

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

DEPTH OF WELL (feet): ↓ | ACTUAL PURGE VOL. (gal.): ___

DATE PURGED: NE | Start (2400 Hr) NE | End (2400 Hr) NE

DATE SAMPLED: I | Start (2400 Hr) I | End (2400 Hr) I

TIME (2400 Hr)	VOLUME (gal.)	pH (units)	E.C. (µmhos/cm @ 25° C)	TEMPERATURE (°F)	COLOR (visual)	TURBIDITY (visual)
			↓			
			↓			
			DRY WELL	—		
			↓			
			↓			

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

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

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: NE		Other: NE	

WELL INTEGRITY: Good | LOCK #: 3259

REMARKS: 3-19-92

Meter Calibration: Date: ___ Time: ___ Meter Serial #: ___ Temperature °F: ___

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

Location of previous calibration: ___

Signature: Mark Knuttel for Steve Horton | Reviewed By: MK | Page 4 of 4

1016-2

GIB-92-023

MONITORING WELL PURGE WATER DISPOSAL FORM

TO BE COMPLETED BY GENERATOR

NAME ARCO PRODUCTS

ADDRESS P.O. BOX 5811

CITY, STATE, ZIP SAN MATEO, CA 94402 PHONE NO (415)571-2434

Description of Water: Purge water generated during sampling or development of monitoring wells located at various ARCO sites. Auger rinsate generated during the installation of monitoring wells at various ARCO sites. The water may contain dissolved hydrocarbons.

	STA #	ADDRESS	GAL
1.	#2134	401 S. SARATOGA AVE., SAN JOSE, CALIFORNIA	32
2.	743	1799 EL CAMINO REAL, SAN BRUNO, CALIFORNIA	48
3.	6113	785 E. STANLEY BLVD., LIVERMORE, CALIFORNIA	5
4.	6072	1575 LANDESS AVE., MILPITAS, CALIFORNIA	81
5.	6041	7249 VILLAGE PARKWAY, DUBLIN, CALIFORNIA	34
6.	6196	2519 COFFEE ROAD, MODESTO, CALIFORNIA	13
7.	6019	2933 65TH ST., SACRAMENTO, CALIFORNIA	13
8.	662	1949 ARDEN WAY, SACRAMENTO, CALIFORNIA	133
9.	6188	4421 FLORIN RD., SACRAMENTO, CALIFORNIA	157
10.	6168	222 JIBBOOM ST., SACRAMENTO, CALIFORNIA	66

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

KYLE CHRISTIE Kyle Christie by Jon Dalton 3/24/92

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TRANSPORTER

NAME ALLIED OIL & PUMPING/BALCH PETROLEUM

ADDRESS P.O. BOX 32123

CITY, STATE, ZIP SAN JOSE, CA

PHONE NO (408)432-0333

TRUCK UNIT I.D. NO

JERRY DRAKE 3/24/92

TYPED OR PRINTED FULL NAME & SIGNATURE DATE

TSD FACILITY

NAME GIBSON OIL & REFINING

ADDRESS 475 SEAPORT BLVD ☒ RECYCLE ☐ OTHER

CITY, STATE, ZIP REDWOOD CITY, CA 94063

PHONE NO (415)368-5511 RELEASE#11320

GAL

BILL REED Bill Reed - 3-24-92

TYPED OR PRINTED FULL NAME & SIGNATURE DATE