Applied GeoSystems, Inc.
A RESNA Company

RESNA
Working To Restore Nature

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

TRANSMITTAL

TO: MS. SUSAN HUGO
ALAMEDA COUNTY DEPARTMENT OF
ENVIR. HEALTH
80 SWAN WAY, ROOM 200
OAKLAND, CALIFORNIA 94621

FROM: LOU LEET
TITLE: GEOLOGIC TECHNICIAN

DATE: 10/22/91
PROJECT NUMBER: 69028.05
SUBJECT: ARCO STATION 6113 AT
785 EAST STANLEY BOULEVARD,
LIVERMORE, CALIFORNIA

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

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

[ ] Letters [ ] Change Orders [ ] _____

COPIES	DATED	NO.	DESCRIPTION
1	10/18/91		FINAL-THIRD QUARTER 1991 GROUNDWATER MONITORING REPORT FOR THE ABOVE SUBJECT SITE.

THESE ARE TRANSMITTED as checked below:

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

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

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

[ ] For your files [ ] _____

REMARKS: THIS REPORT HAS been FORWARDED TO YOU AT THE REQUEST OF MR. CHUCK CARMEL OF ARCO PRODUCTS COMPANY.

Copies: 1 to AGS project file no. 69028.05

SAN JOSE READER'S FILE

Revision Date: 10/15/90
File Name: TRANSMIT.PRJ

ARCO Products Compa
2000 Alameda de las Pulgas
Mailing Address: Box 5811
San Mateo, California 94402
Telephone 415 571 2400

Date: October 14, 1991

Re: ARCO Station #

" I declare, that to the best of my knowledge at the present time, that the information and/or recommendations contained in the attached proposal or report are true and correct."

Submitted by:

Kyle A. Christie
Environmental Engineer

91 OCT 16 PM 2:23

October 14, 1991

Alameda County Department of Environmental Health
80 Swan Way
Oakland, California 94621

Attention: Mr. Edgar Howell

ARCO Products Company Facilities in Alameda County

Dear Mr. Howell:

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 third quarter of 1991; also included are projected site activities for the fourth quarter of 1991 and a bibliography of reports submitted for each location.

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

Please also note that ARCO Products Company has reviewed the RWQCB's February 19, 1991 printout of ARCO fuel leak sites. We 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 QSR submittal for ARCO sites on January 15, 1992. Please do not hesitate to contact me with any questions regarding this submittal.

Sincerely,

Kyle A. Christie
Environmental Engineer

Attachments:
ARCO Facility QSRs

UST LEAK SITE UPDATE

Date of Last Review/Update: April 15, 1991

Current Date: September 6, 1991

SITE IDENTIFICATION

Name: ARCO Service Station 6113

Case No.:

Address: 785 East Stanley Boulevard
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

ACHCSA - Susan Hugo

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
____	Pollution Characterization	Date
____	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

REMEDIAL ACTIONS

Waste-oil tank removed from site in January 1989.

COMMENTS

Last Quarter Activities: Performed subsurface assessment. Performed quarterly groundwater monitoring and reporting.

Current Quarter Activities: Performed quarterly groundwater monitoring and reporting; submitted Subsurface Assessment Report (April 16, 1991). Evaluate groundwater gradient.

Next Quarter Activities: Prepare a Work Plan for additional assessment.

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

REPORT	DATE	CONSULTANT
Letter Report Quarterly Ground-Water Monitoring Second Quarter 1991 69028.03	7/11/91	RESNA
Letter Report Quarterly Ground-Water Monitoring First 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

Applied GeoSystems, Inc.
A RESNA Company

RESNA
Working To Restore Nature

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

LETTER REPORT
QUARTERLY GROUNDWATER MONITORING
Third Quarter 1991
at
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

69028.05

Applied GeoSystems, Inc.
A RESNA Company

RESNA
Working To Restore Nature

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

October 18, 1991
0916ccar
69028.05

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

Subject: Third Quarter 1991 Groundwater Monitoring Report for ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California.

Mr. Carmel:

As requested by ARCO Products Company (ARCO), this letter report summarizes the methods and results of third quarter 1991 groundwater monitoring performed by RESNA/Applied GeoSystems (RESNA) at the above-referenced site. The station is on the southwestern corner of the intersection of East Stanley and Murrieta Boulevards in Livermore, California, as shown on the Site Vicinity Map, Plate 1. ARCO has contracted with RESNA to perform monthly water level measurements and quarterly groundwater sampling and analyses to monitor fluctuations in the groundwater gradient and petroleum hydrocarbon concentrations in groundwater at the site, and to evaluate trends related to fluctuations over time.

Prior to the present monitoring, Pacific Environmental Group (Pacific) and RESNA performed limited subsurface environmental investigations related to the former underground waste-oil storage tank at the site. Pacific performed soil sampling and observation during removal of the waste-oil tank in January 1989. Work by RESNA included the installation of three groundwater monitoring wells (MW-1, MW-2, and MW-3) in September 1989, the installation of one groundwater monitoring well (MW-4) in February 1991, and quarterly monitoring of these wells. Monitoring well MW-4 was installed downgradient of the former waste-oil tank (AGS, April 16, 1991). The results of these investigations are presented in the reports listed in the references attached to 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

RESNA personnel performed monthly water level measurements on June 20, July 25, and September 12, 1991, and quarterly groundwater monitoring on August 13, 1991. Field work consisted of measuring depth-to-water (DTW) levels in wells MW-1 through MW-4 and subjectively analyzing water from these wells for the presence of sheen and floating product. Purging and sampling of groundwater was not performed because the wells were dry or did not contain enough water to obtain a representative sample.

The groundwater elevations for each well were calculated by subtracting the DTW measurements from the surveyed elevations of the wellheads. The DTW measurements, wellhead elevations, and groundwater elevations are presented in Table 1, Cumulative Groundwater Monitoring Data. The June 20, 1991 data indicated a groundwater gradient of 0.03 toward the east; July 25, 1991 data indicated a groundwater gradient of 0.04 toward the east-northeast; August 13, 1991 data indicated a groundwater gradient of 0.09 toward the east-southeast; September 12, 1991 data were not analyzed because two of the four wells were dry. Groundwater gradients for June 20, July 25, and August 13, 1991 are shown on Groundwater Gradient Maps, Plates 3, 4, and 5, respectively. Groundwater elevations decreased approximately 10 to 18 feet between the May 20, 1991 monitoring episode and the August 13, 1991 monitoring episode. Directional variations in the groundwater gradient at the site and the significant decrease in groundwater elevations may be the result of the abnormally dry seasonal conditions and possibly pumping of nearby existing irrigation wells in the vicinity of the site that may produce artificial, temporary changes in the groundwater elevation and direction of flow.

No sybjective evidence of floating hydrocarbon product or noticeable hydrocarbon product None was noted in the water samples from wells MW-1 and MW-2 during this quarter; None was noted in MW-4 on July 25, 1991. Cumulative results of subjective analyses are presented in Table 1.

Conclusions and Recommendations

The decreasing groundwater elevations may be due to the abnormally dry seasonal conditions and possibly to the pumping of nearby wells for irrigation. 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 of total petroleum hydrocarbons-gasoline (TPHg) and benzene, toluene, ethylbenzene, and xylenes (BTEX) by EPA Methods 5030/8015/602 and total oil and grease (TOG) by Standard Method 5520 B/F. 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 will be submitted in the Fall of 1991.

Schedule

At ARCO's request, RESNA will continue the quarterly groundwater monitoring at this site to evaluate trends in petroleum hydrocarbon concentrations and monthly DTW monitoring to evaluate changes in the groundwater gradient with time. Routine well maintenance and quality control will be performed as necessary during these site visits. The next quarterly monitoring episode is scheduled for November 13, 1991.

Copies of this report should be forwarded to:

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

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

Mr. Randy Griffith
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

L. L. Leet

Lou Leet
Geologic Technician

Joan E. Tiernan
Registered Civil Engineer
No. 044600

Enclosures: References

Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Groundwater Gradient Map (June 20, 1991)
Plate 4, Groundwater Gradient Map (July 25, 1991)
Plate 5, Groundwater Gradient Map (August 13, 1991)

Table 1, Cumulative Groundwater Monitoring Data
Table 2, Cumulative Results of Groundwater Laboratory Analyses

Attachment I
Groundwater Sampling Protocol

cc: H.C. Winsor, ARCO Products Company

REFERENCES

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.

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. 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. 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.

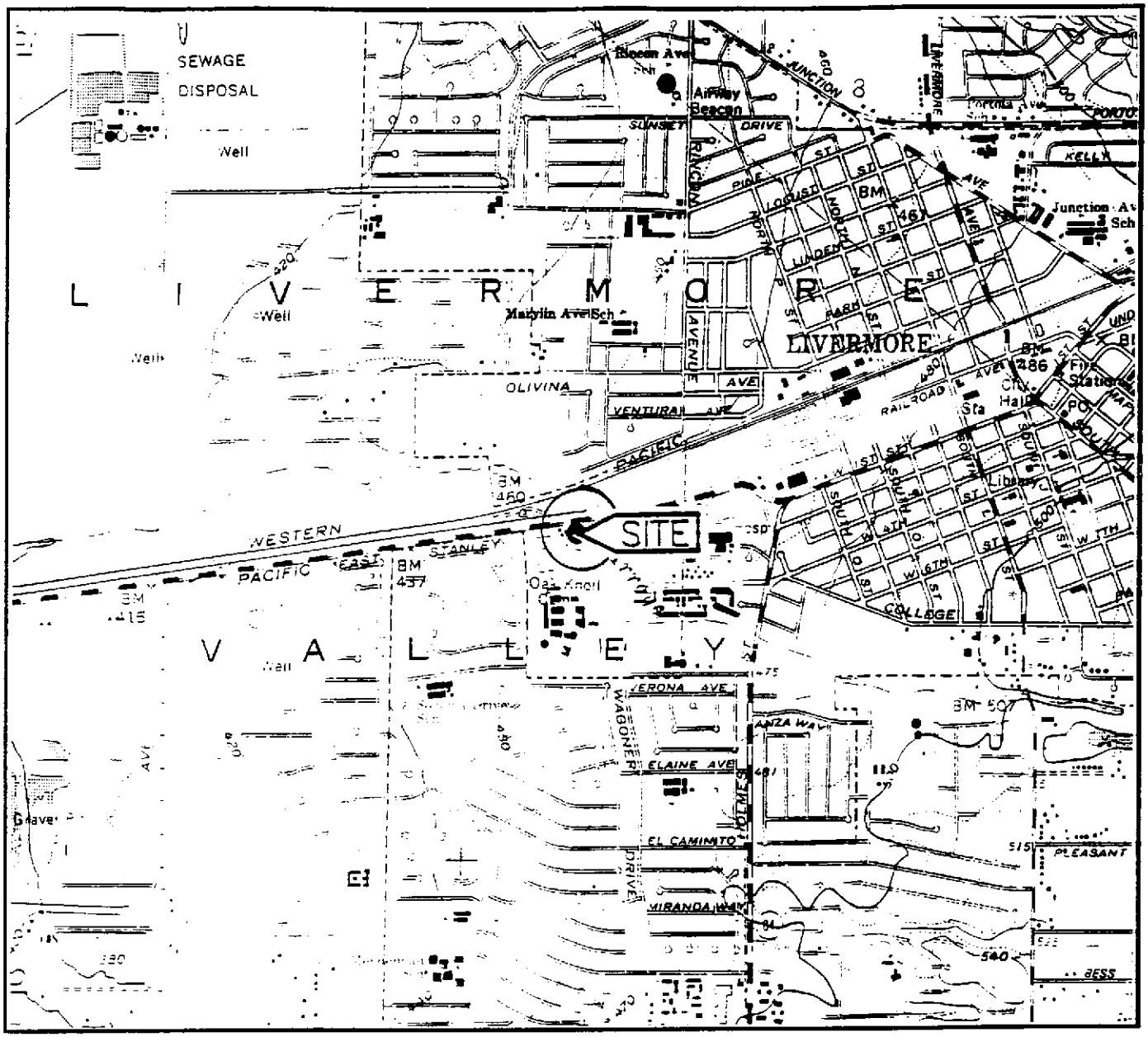
Applied GeoSystems. November 2, 1990. Letter Report, Quarterly Ground-Water Monitoring Third Quarter 1990 at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-3.

Applied GeoSystems. 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. December 6, 1989. Limited Subsurface Environmental Investigation at ARCO Station 6113, 785 East Stanley Boulevard, Livermore, California. AGS Report 69028-2.

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



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

N

LEGEND

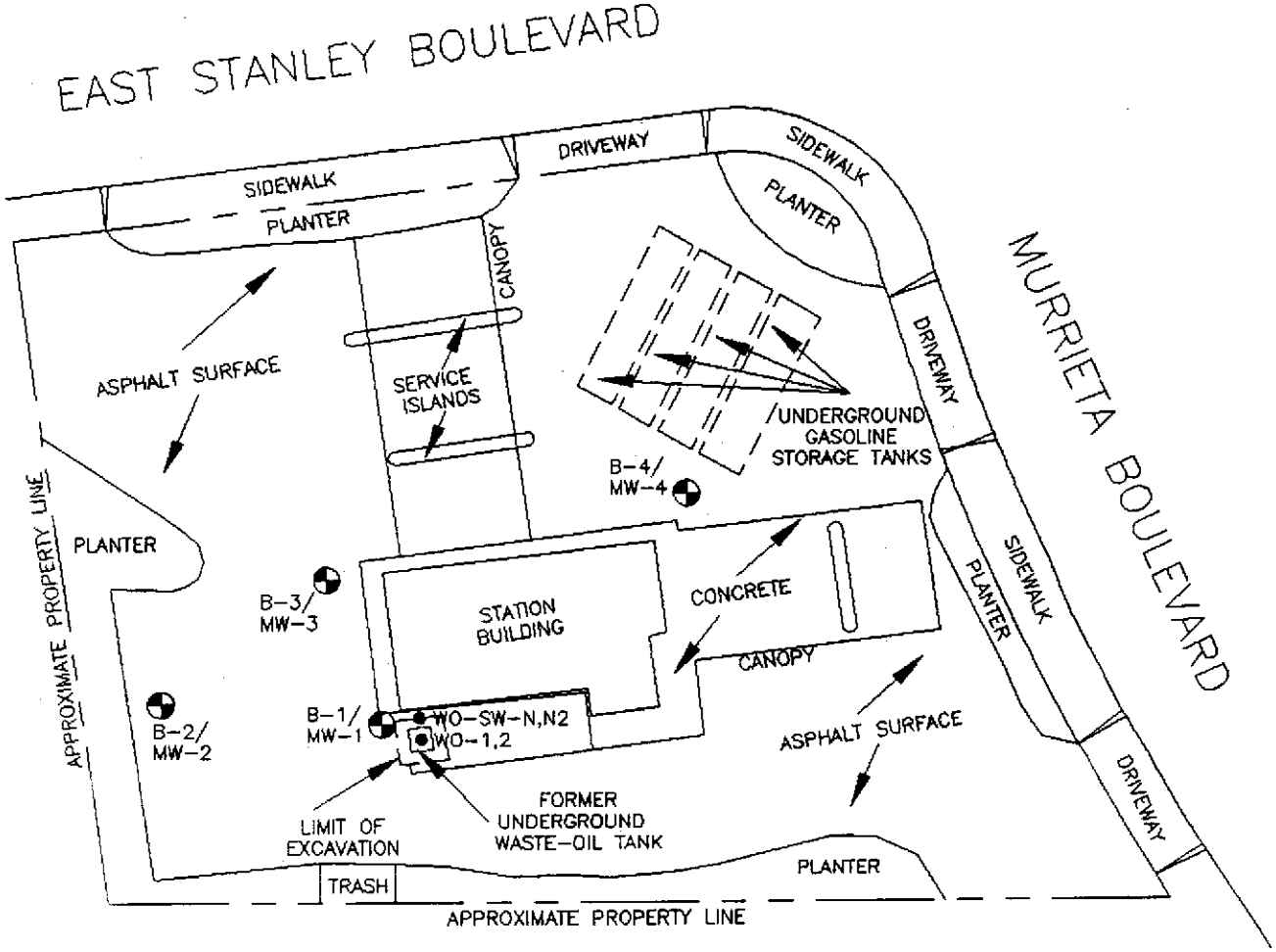
⊙ = Site Location

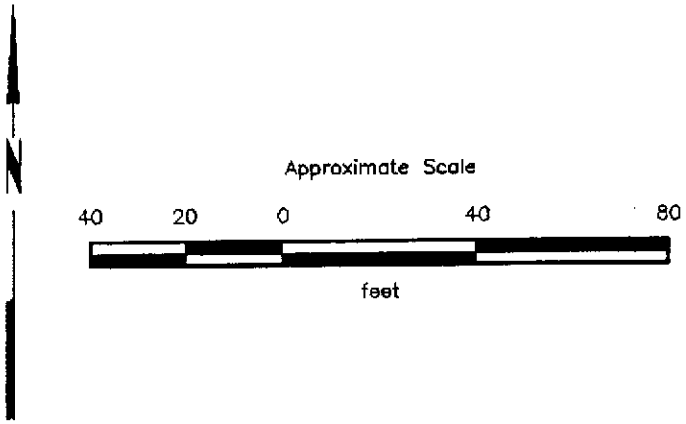
Approximate Scale

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		





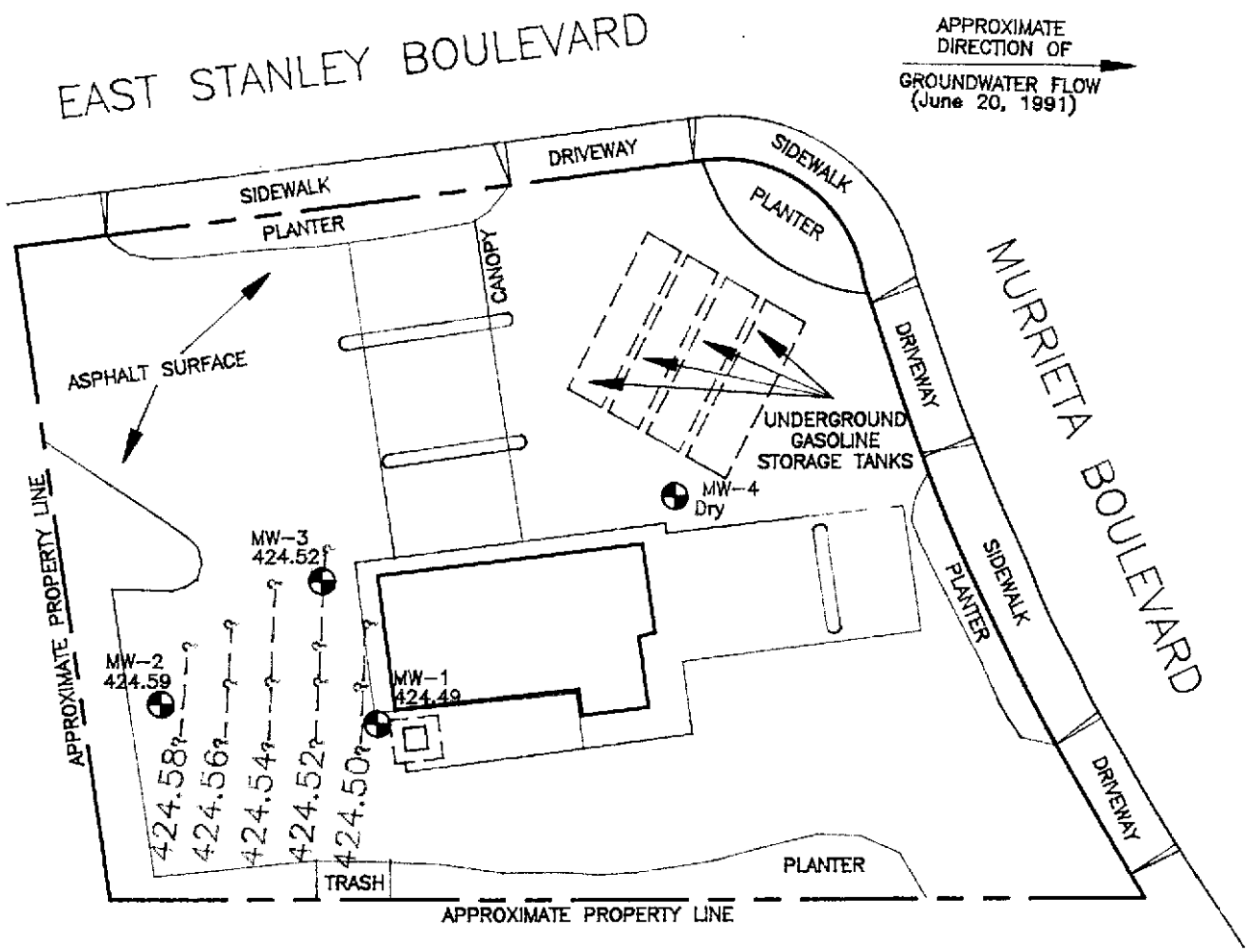
EXPLANATION

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., February 1991

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



EXPLANATION

424.58 = Line of equal elevation of groundwater above Mean Sea Level (MSL)

424.59 = Elevation of groundwater in feet (MSL) June 20, 1991

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

N

Approximate Scale

40 20 0 40 80

feet

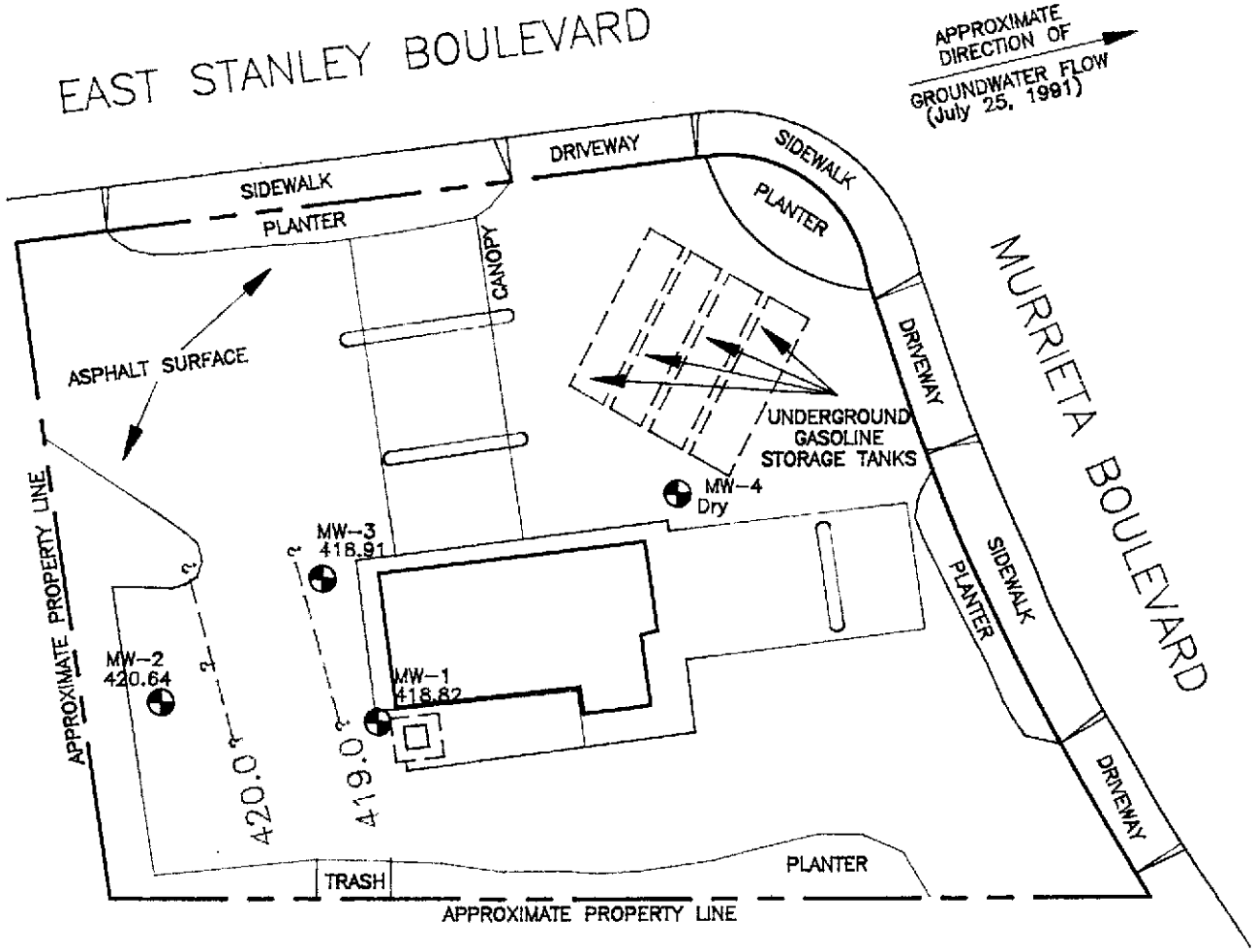
Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., February 1991

RESNA

PROJECT: 69028.05

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

PLATE 3



EXPLANATION

420.0 = Line of equal elevation of groundwater above Mean Sea Level (MSL)

420.64 = Elevation of groundwater in feet (MSL) July 25, 1991

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

N

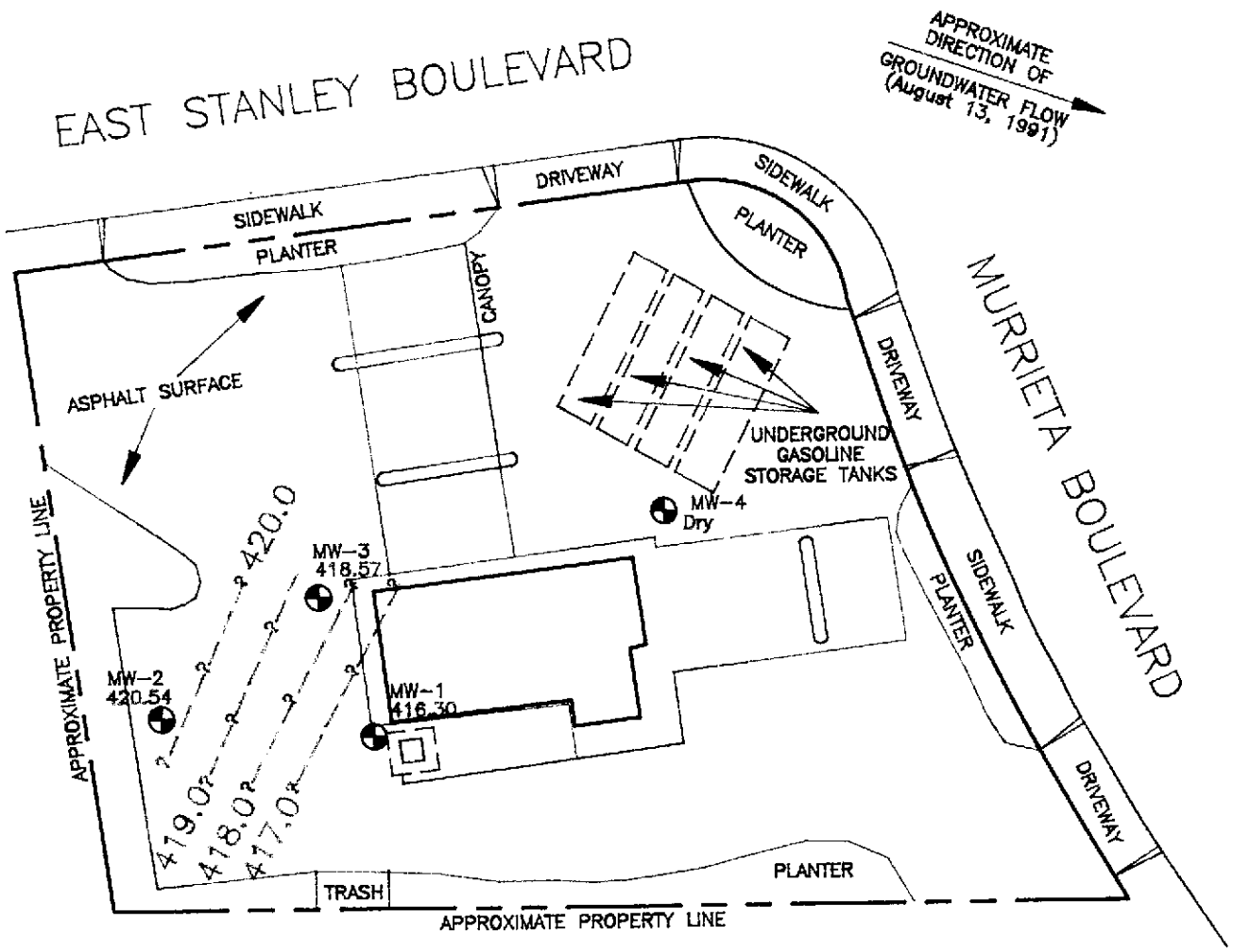
Approximate Scale

40 20 0 40 80

feet

Source: Modified from plan supplied by Ron Archer, Civil Engineer Inc., February 1991

RESNA	**GROUNDWATER GRADIENT MAP** **ARCO Service Station 6113** **785 East Stanley Boulevard** **Livermore, California**	**PLATE** **4**
PROJECT: 69028.05		



EXPLANATION

420.0 = Line of equal elevation of groundwater above Mean Sea Level (MSL)

420.54 = Elevation of groundwater in feet (MSL) August 13, 1991

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., February 1991

RESNA

PROJECT: 69028.05

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

PLATE 5

TABLE 1
CUMULATIVE GROUNDWATER MONITORING DATA
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California

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
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		38.44	420.38	None
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

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-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

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.

TABLE 2
CUMULATIVE RESULTS OF GROUNDWATER LABORATORY ANALYSES
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	NS	NS	NS	NS	NS
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	NS	NS	NS	NS	NS
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	NS	NS	NS	NS	NS
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	NS	NS	NS	NS	NS
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
ARCO Station 6113
785 East Stanley Boulevard
Livermore, California
(Page 2 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
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
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
MW-4		
02/21/91	NA	<5,000
05/20/91	NA	<75,000
08/13/91	NS	NS

Results in parts per billion (ppb).
TPHg = Total petroleum hydrocarbons as gasoline
TPHd = Total petroleum hydrocarbons as diesel
TOG = Total Oil and Grease
< = 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 Due to Lack of Water in Well

ATTACHMENT I

GROUNDWATER SAMPLING PROTOCOL

GROUNDWATER SAMPLING PROTOCOL

The static water level in each well was measured with a Solinist® water level indicator; this instrument is accurate to the nearest 0.01 foot. These groundwater depths were subtracted from wellhead elevations measured in February 1991 by Ron Archer, Civil Engineer, Inc., of Pleasanton, California, a licensed land surveyor, to calculate the differences in groundwater elevations.

Water samples collected for subjective evaluation were collected by gently lowering approximately half the length of a new, disposable bailer past the air-water interface and collecting a sample from near the surface to the water in the well. The samples were checked for measurable floating hydrocarbon product.