Applied GeoSystems

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

91 JUL 15 PM 1:37

TRANSMITTAL

TO: Mr. Gil Wistar
Alameda County Department of
Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

FROM: Lou Leet
TITLE: Geological Technician

DATE: July 12, 1991
PROJECT NUMBER: AGS 60000.05
SUBJECT: Letter Report

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	July 11, 1991	AGS 60000.05	Letter Report Quarterly Ground-Water Monitoring Second Quarter 1991 at ARCO Station 771, Livermore, California

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

[XX] For your files [ ] _____

REMARKS: _____

Copies: 1 to AGS project file no. 60000.05

SAN JOSE READER'S FILE

*Revision Date: 10/15/90
*File Name: TRANSMT.PRJ

July 15, 1991

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

Attention: Mr. Rafat Shahid

ARCO Products Company Facilities in Alameda County - RWQCB Fuel Leaks List

Dear Mr. Shahid

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

The QSRs are classified by address within the County. We are submitting this document and attached QSRs as agreed in our recent meeting with the RWQCB. Please note that we are forwarding copies of the QSRs to the RWQCB as well.

ARCO Products Company has reviewed the Regional Water Quality Control Board's (RWQCB) February 19, 1991 printout of ARCO fuel leak sites in the San Francisco Bay Area. We have evaluated each site with respect to ARCO's responsibility for investigation, monitoring, and/or remediation. It is ARCO's belief that several of the sites originally attributed to ARCO are actually the responsibility of other parties. We have therefore prepared QSRs and a brief discussion regarding those sites which we believe should either be removed from ARCO responsibility or be considered for closure.

ARCO is planning a subsequent comprehensive QSR submittal for ARCO sites on October 15, 1991. Please do not hesitate to contact us with any questions regarding this submittal.

Sincerely,

for Kyle A. Christie
Environmental Engineer

Attachments:
Non-ARCO Facility/Site Closure Discussion and QSRs
ARCO Facility QSRs

NON-ARCO FACILITY/SITE CLOSURE DISCUSSION AND QSRS

Alameda County

Alameda County Sites

Two ARCO facilities including Station Numbers 4977 and 6002 (located at 2770 Castro Valley Road, Castro Valley and 6235 Seminary Avenue, Oakland) experienced vapor/vent line failure during UST system precision testing. In accordance with State Water Resources Control Board (SWRCB) letter LG-43, ARCO requests that these facilities be removed from the RWQCB fuel leaks list.

A small volume of hydrocarbons were released from ARCO Station Number 498 located at 286 South Livermore Avenue, Livermore. The product was released to an on-site secondary containment trench and was subsequently removed; no product was released to the soil or groundwater. Alameda County issued a letter to ARCO on May 24, 1991 stating that no further action is necessary at this site.

A total of seven Alameda County ARCO facilities listed by the RWQCB were not ARCO-owned at the time of the release discovery and/or report. These sites include Station Numbers 188, 329, and 623 (respectively located at 4191 First Street, Pleasanton, 2032 12th Street, Oakland, and 2110 Mountain, Oakland) and facilities located at 2951 High Street, 4401 Market Street, 2844 Mountain Boulevard, and 2740 98th Street, Oakland.

ARCO has prepared QSRs for each of these facilities; however, we request that the cases be omitted from the leaks list or be referred to the actual responsible party, as appropriate. The ownership information for the individual sites is included on the attached QSRs.

Finally, the RWQCB February 19, 1991 printout lists two sites which are actually the same. The facility listed as 71 MacArthur Boulevard is actually ARCO Service Station Number 4931 located at 731 West MacArthur Boulevard in Oakland.

Attachment:
Non-ARCO Facility QSRs

UST LEAK SITE UPDATE

Date of Last Review/Update: April 15, 1991

Current Date: July 15, 1991

SITE IDENTIFICATION

Name: ARCO Service Station 771 Case No. _____

Address: 899 Rincon Avenue/Pine Street
Street Number Street

City: Livermore ZIP Code: 94550

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 - Gil Wistar

CASE TYPE

_____ Undetermined _____ Soil Only _____ Ground Water _____ Drinking Water

STATUS (Date indicates when case moved into status)

_____	No Action Taken	
_____	Leak Being Confirmed	Date _____
_____	Preliminary Site Assessment Workplan Submitted	Date _____
_____	Preliminary Site Assessment Underway	Date _____
_____	Pollution Characterization	Date _____
_____	Remediation Plan	Date _____
_____	Remedial Action Underway	Date _____
_____	Post Remedial Action Monitoring	Date _____
_____	Case Referred to Regional Board	Date _____
_____	Case Referred to Dept. of Health Services	Date _____
_____	Case Closed	Date _____

REMEDIAL ACTIONS

COMMENTS

In the previous quarter ARCO performed onsite investigation for assessment of possible soil and/or ground-water contamination. Soil and ground water have been impacted by gasoline hydrocarbons. Assessment report issued April 12, 1991. ARCO is currently monitoring water levels monthly and water quality quarterly.

Work Plan for subsurface investigation submitted to regulators May 15, 1991.

Please refer to attached page for listing of previously submitted reports which document site history.

RESPONSIBLE PARTY IDENTIFICATION (Only if newly discovered or changed)

Name _____

Contact _____ Phone ( ) _____

Address _____
Street Number Street

_____
City State ZIP Code

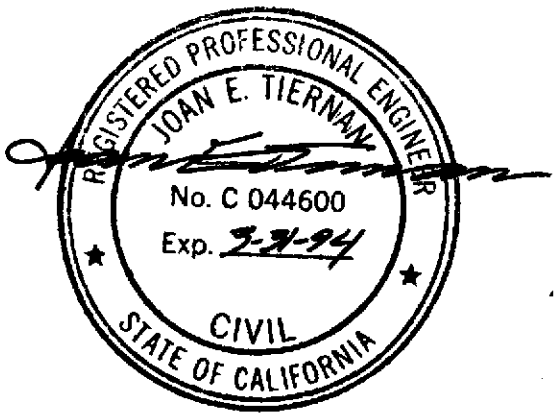
REPORT	DATE	CONSULTANT
Work Plan and Addendum One to Work Plan for Subsurface Investigation and Remediation AGS 60000.06	5/15/91	RESNA/Applied GeoSystems
Report on Supplemental Subsurface Investigation AGS 60000.04	4/12/91	RESNA/Applied GeoSystems
Work Plan Supplemental Subsurface Investigation AGS 60000-3	8/31/90	Applied GeoSystems
Report on Limited Subsurface Environmental Assessment AGS 60000-1	6/22/90	Applied GeoSystems

Applied GeoSystems 3315 Almaden Expressway, Suite 34, San Jose, CA 95118 (408) 264-7723

• FREMONT • IRVINE • HOUSTON • BOSTON • SACRAMENTO • CULVER CITY • SAN JOSE

LETTER REPORT
QUARTERLY GROUND-WATER MONITORING
Second Quarter 1991
at
ARCO Station 771
899 Rincon Avenue
Livermore, California

AGS 60000.05



Applied GeoSystems 3315 Almaden Expressway, Suite 34, San Jose, CA 95118 (408) 264-7723

• FREMONT • IRVINE • HOUSTON • BOSTON • SACRAMENTO • CULVER CITY • SAN JOSE

July 11, 1991
0621ccar
AGS 60000.05

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

Subject: Second Quarter 1991 Ground-Water Monitoring Report for ARCO Station 771, 899 Rincon Avenue, Livermore, California.

Mr. Carmel:

As requested by ARCO Products Company (ARCO), this letter report summarizes the methods and results of second quarter 1991 ground-water monitoring performed by RESNA/Applied GeoSystems (AGS) at the above-referenced site. The station is located on the southwestern corner of the intersection of Rincon Avenue and Pine Street on Rincon Avenue, Livermore, California, as shown on the Site Vicinity Map, Plate 1. ARCO has requested that AGS perform quarterly ground-water sampling and analyses to monitor gasoline hydrocarbon concentrations associated with the gasoline-storage tanks at the site, and to evaluate trends related to fluctuations of these hydrocarbon concentrations. ARCO has also requested that AGS perform monthly monitoring of ground-water levels in the wells at the site and evaluate fluctuations in the ground-water gradient over time.

Prior to this quarterly monitoring period AGS performed a limited environmental site assessment in February, 1990 (AGS, June 1990), which included the drilling of three borings (B-1 through B-3). In December, 1990, AGS performed a supplemental subsurface investigation which included installation of monitoring wells MW-1, MW-2, and MW-3 (AGS, April 1991). The results of these investigations are presented in the reports listed in the references attached to this letter report. The locations of the soil borings, ground-water monitoring wells, and pertinent site features are shown on the Generalized Site Plan, Plate 2.

Ground-Water Sampling and Gradient Evaluation

AGS personnel performed monthly monitoring of ground-water elevations and subjective analyses on March 20, 1991, and quarterly ground-water monitoring and sampling on April 10, 1991. Field work consisted of measuring depth-to-water (DTW) levels in wells MW-1, MW-2, and MW-3; subjectively analyzing water from these wells for the presence of petroleum hydrocarbon sheen and floating product; purging wells containing sheen or product; and purging and sampling ground water from monitoring wells MW-1 and MW-3 on April 10, 1991, for laboratory analysis. The ground-water sampling protocol is presented in Appendix A.

Subjective analyses on March 20 indicated a sheen in well MW-1 and 0.05 feet of floating product in MW-2. Subjective analyses on April 10, 1991, indicated an obvious odor, in well MW-1 and 0.02 feet of floating product in well MW-2. There was no evidence of floating product in well MW-3 during this quarter. Cumulative results of subjective analyses are presented in Table 1, Cumulative Ground-Water Monitoring Data.

The DTW levels, wellhead elevations, and ground-water elevations for this and previous monitoring episodes at the site are summarized in Table 1. Ground-water elevations in well MW-2, which contained floating product, were calculated as stated in Appendix A.

The interpreted ground-water gradients of 0.03 to the north-northeast from the March 20, 1991 and 0.015 to the northwest from the April 10, 1991 monitoring episodes are shown on the Ground-Water Gradient Maps (Plates 3 and 4, respectively). Due to floating product in well MW-2, these gradients are considered approximations. Ground-water monitoring data collected from the wells at the site between January 15 to April 10, 1991 indicate a northwest to northeast fluctuating ground-water gradient.

Monitoring wells MW-1 and MW-3 were purged and sampled in accordance with the attached protocol. MW-2 was not sampled due to the presence of free product, which was bailed from the well. Well purge data sheets are also attached in Appendix A.

Laboratory Analysis

Water samples collected from wells MW-1 and MW-3 were sent to Sequoia Analytical in Redwood City, California (Hazardous Waste Testing Laboratory Certification No. 145). The samples were analyzed for total petroleum hydrocarbons as gasoline (TPHg), benzene, toluene, ethylbenzene, and total xylenes (BTEX) using modified Environmental Protection Agency (EPA) Methods 5030/8015/8020. 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 Analysis of Ground-Water Samples.

Results of this quarter's ground-water monitoring indicate:

- the presence of floating product in well MW-2 during March and April 1991, which is consistent with January and February monitoring data;
- concentrations of TPHg ranged from 530 parts per billion (ppb) in MW-3 to 98,000 ppb in MW-1; and
- concentrations of BTEX ranged from 4.0 ppb ethylbenzene in MW-3 to 20,000 ppb xylenes in MW-1. Benzene exceeded the State Maximum Contaminant levels (MCL) in both wells. Toluene exceeded the State Recommended Action Level (AL) in MW-1. Ethylbenzene and total xylenes exceeded the MCL in MW-1.

Conclusions and Recommendations

The ground water on the site has been impacted by gasoline hydrocarbons. The extent of gasoline hydrocarbons at the site has not been delineated. AGS recommends continued ground-water monitoring at the site, including analyses for TPHg and BTEX. Recommendations for further assessment at the site will be included under separate cover in subsequent investigation reports and work plans.

Schedule

AGS will continue monthly water level and quarterly ground-water monitoring at the site to evaluate trends in gasoline hydrocarbons and changes in ground-water 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 July 10, 1991.

It is also recommended that copies of this letter report be forwarded to:

Mr. Gil Wistar
Alameda County Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Mr. Lester Feldman
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, please call us at (408) 264-7723.

Sincerely,
RESNA/Applied GeoSystems

L. J. Leet

Lou Leet
Geological Technician

Joan E. Tiernan
Registered Civil
Engineer 044600

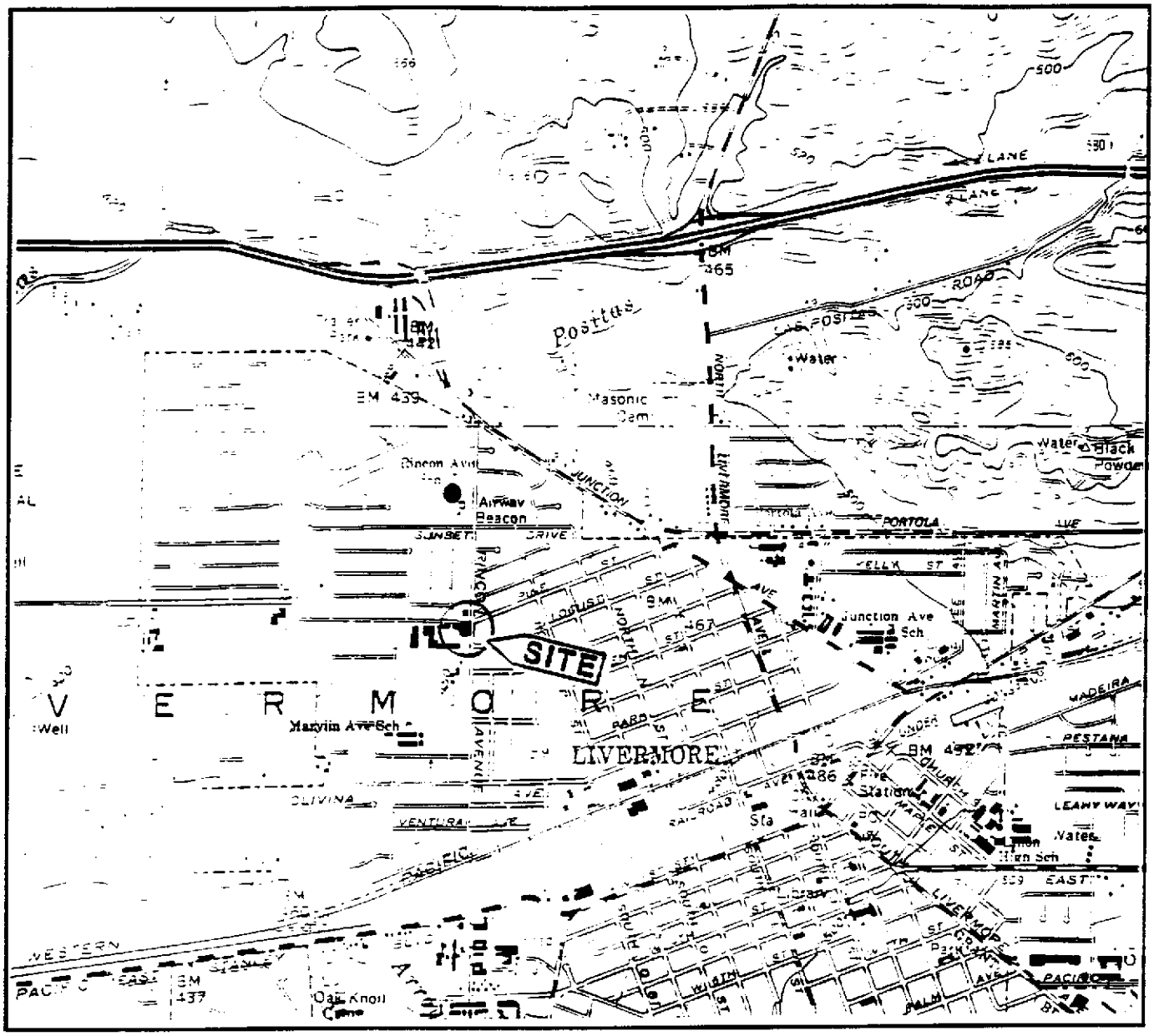
Enclosures: References
Plate 1, Site Vicinity Map
Plate 2, Generalized Site Plan
Plate 3, Ground-Water Gradient Map, March 20, 1991
Plate 4, Ground-Water Gradient Map, April 10, 1991
Table 1, Cumulative Ground-Water Monitoring Data
Table 2, Cumulative Results of Laboratory Analyses of Ground-Water Samples
Appendix A: Ground-Water Sampling Protocol
Well Purge Data Sheets
Chain of Custody Records
Laboratory Analysis Reports

cc: H.C. Winsor, ARCO

REFERENCES

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

RESNA/Applied Geosystems, April 12, 1991. Supplemental Subsurface Investigation at ARCO Station No. 771, Livermore, California. AGS 60000.04.



Source: U.S. Geological Survey
7.5-Minute Quadrangle
Livermore, California
Photorevised 1980

Approximate Scale

2000 1000 0 2000 4000

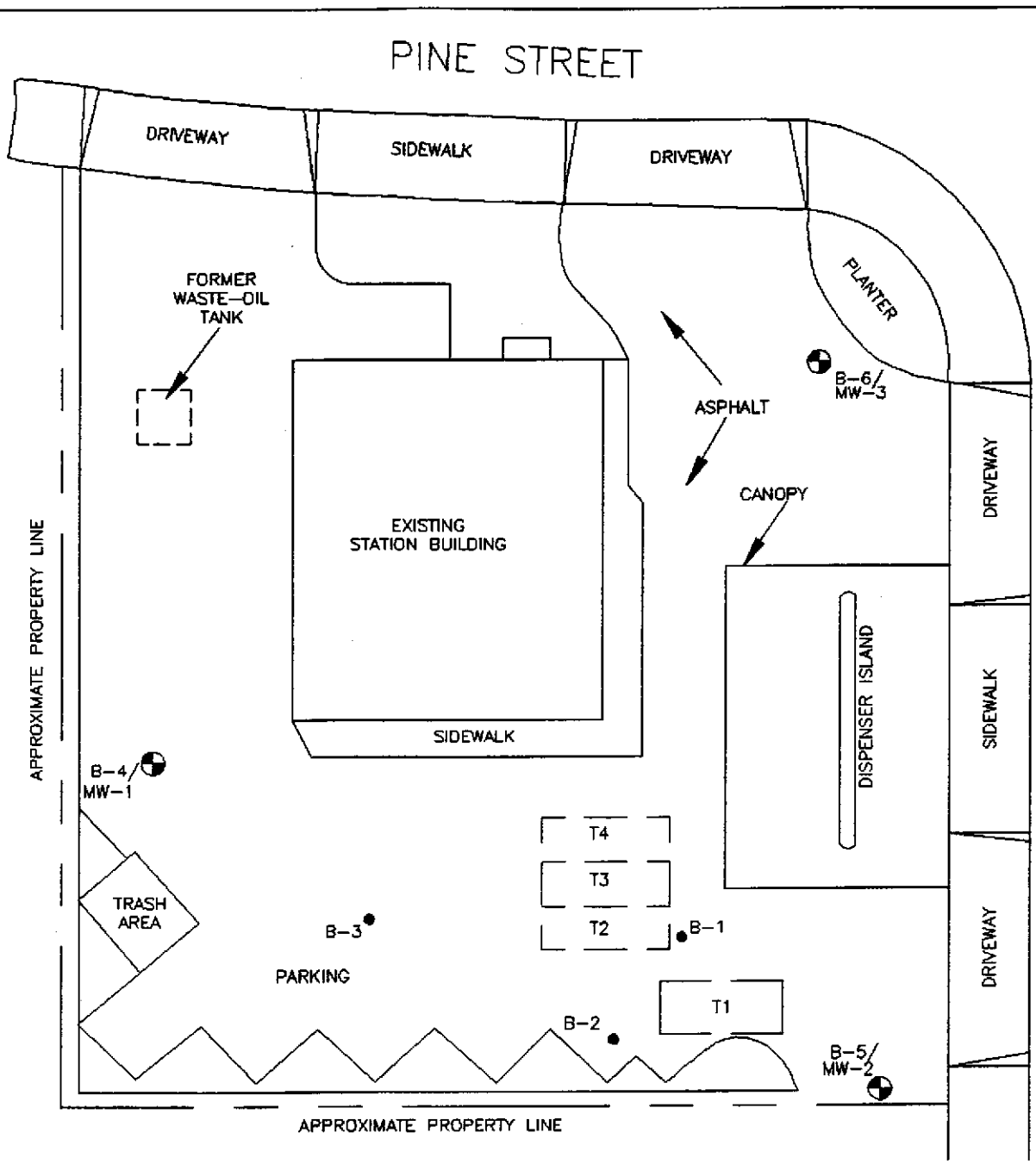
feet

Applied GeoSystems

PROJECT 60000-5

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

PLATE 1



EXPLANATION

B-6/ MW-3 = Monitoring well (Applied GeoSystems, December 1990)

B-3 = Soil boring (Applied GeoSystems, February 1990)

T4 = Underground gasoline-storage tank

N

Approximate Scale

20 10 0 20 40

feet

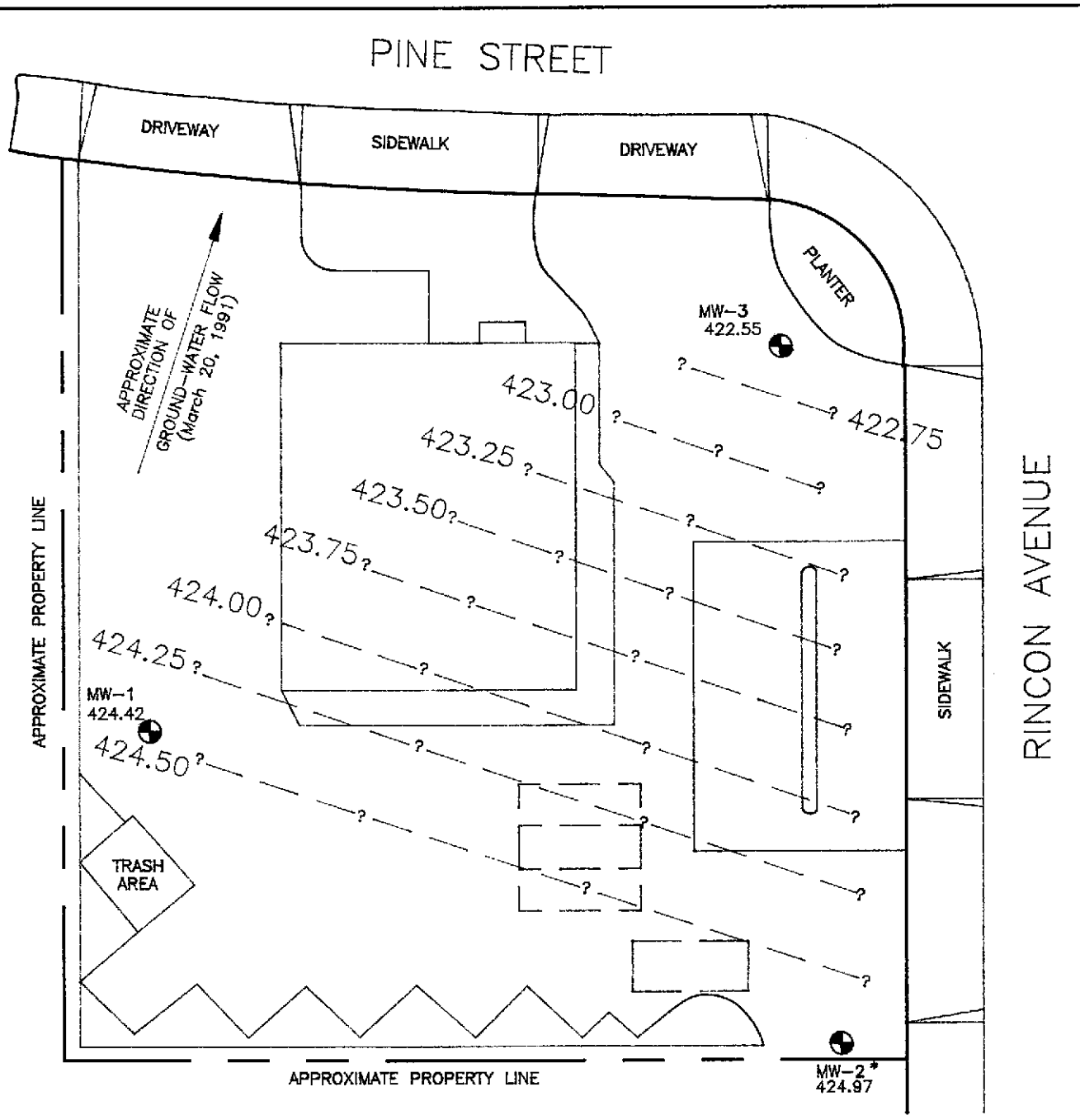
Source: Surveyed by Ron Archer Civil Engineer, Inc.

Applied GeoSystems

PROJECT 60000-5

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

PLATE
2



EXPLANATION

424.50 — = Line of equal elevation of ground water above mean sea level (MSL)

* = Floating product or product sheen present in well

424.97 = Elevation of ground water in feet (MSL), March 20, 1991

MW-3 = Monitoring well (Applied GeoSystems, December 1990)

Approximate Scale

20 10 0 20 40

feet

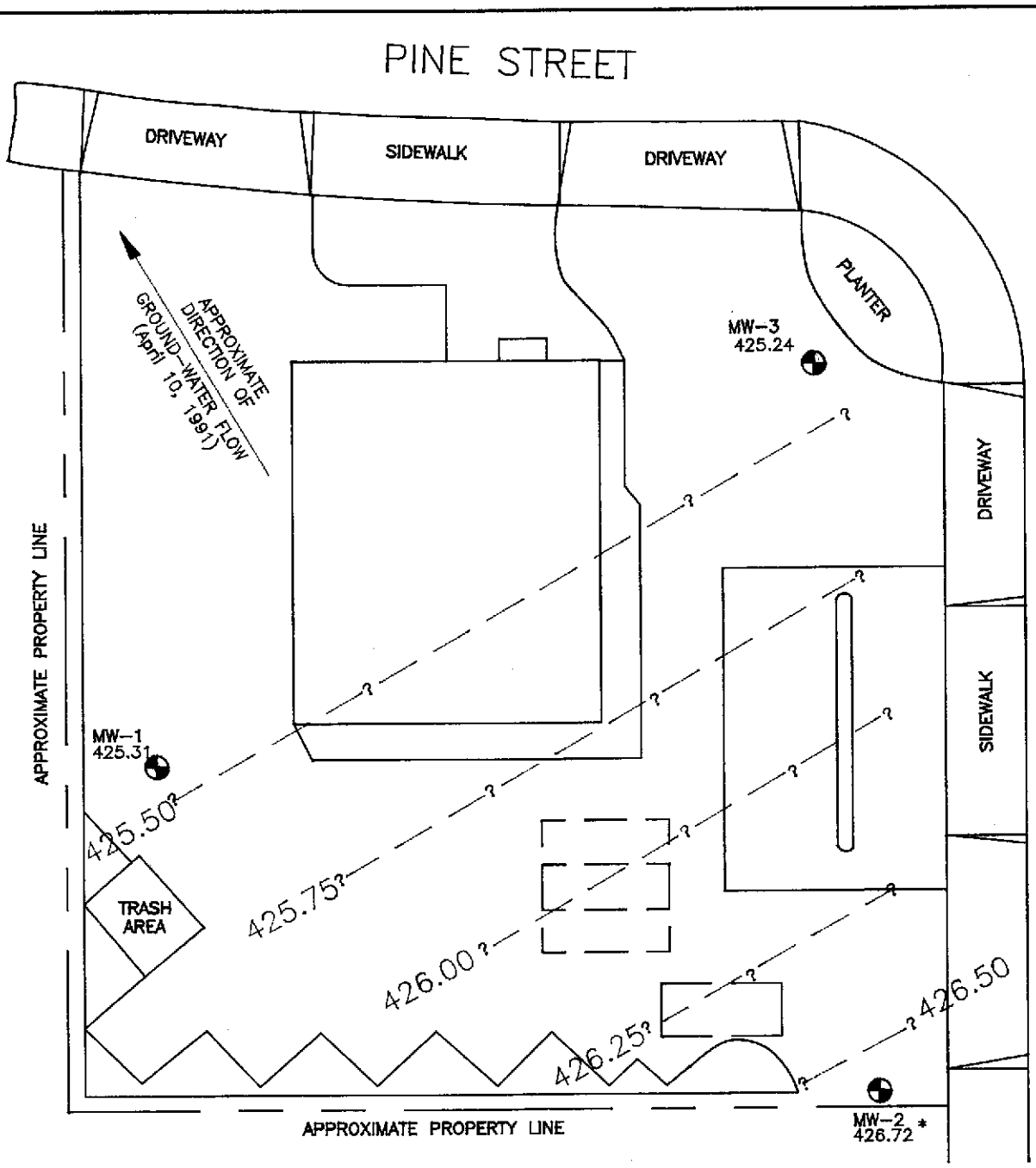
Source: Surveyed by Ron Archer Civil Engineer, Inc.

Applied GeoSystems

PROJECT 60000-5

GROUND-WATER GRADIENT MAP
ARCO Station 771
899 Rincon Avenue
Livermore, California

PLATE 3



EXPLANATION

426.50 — = Line of equal elevation of ground water above mean sea level (MSL)

* = Floating product or product sheen present in well

426.72 = Elevation of ground water in feet (MSL), April 10, 1991

MW-3 = Monitoring well (Applied GeoSystems, December 1990)

N

Approximate Scale

20 10 0 20 40

feet

Source: Surveyed by Ron Archer Civil Engineer, Inc.

Applied GeoSystems

PROJECT 60000-5

GROUND-WATER GRADIENT MAP
ARCO Station 771
899 Rincon Avenue
Livermore, California

PLATE
4

TABLE 1
CUMULATIVE GROUND-WATER MONITORING DATA
ARCO Station 771
Livermore, California

Date Measured	Well Elevation	Depth-to-Water	Water Elevation	Floating Product	Adjusted Water Elevation
MW-1					
01-15-91	451.80	32.77	419.03	Sheen	NA
02-27-91		32.23	419.57	None	NA
03-20-91		27.38	424.42	Sheen	NA
04-10-91		26.49	425.31	Odor	NA
MW-2					
01-15-91	449.52	30.89*	418.63*	0.16	418.76
02-27-91		29.11*	420.41*	0.02	420.43
03-20-91		24.57*	424.95*	0.02	424.97
04-10-91		22.85*	426.67*	0.05	426.72
MW-3					
01-15-91	450.29	32.34	417.95	None	NA
02-27-91		31.78	418.51	None	NA
03-20-91		27.74	422.55	None	NA
04-10-91		25.05	425.24	None	NA

Measurements in feet.
Calculated DTW when floating product is present is calculated using the attached protocol (Appendix A).
* = Floating product present in well.
NA = Not applicable.

TABLE 2
CUMULATIVE RESULTS OF LABORATORY ANALYSIS OF GROUND-WATER SAMPLES
ARCO Station 771
Livermore, California

Sample	TPHg	B	T	E	X
MW-1					
01-15-91	NS	NS	NS	NS	NS
04-10-91	98,000	11,000	18,000	2,800	20,000
MW-2					
01-15-91	NS	NS	NS	NS	NS
04-10-91	NS	NS	NS	NS	NS
MW-3					
01-15-91	230	<0.5	<0.5	2.2	2.1
04-10-91	530	12	8.4	4.0	7.0
MCLs	---	1	NA	680	1,750
ALs	---	---	100	---	---

Results in parts per billion (ppb).
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 8020/602.
NS: Not sampled.
<: Less than the laboratory detection limit.
MCL: Maximum contaminant level in ppb.
AL: Action level in ppb.
NA: Not applicable

GROUND-WATER SAMPLING PROTOCOL

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

The static water level in each well that was suspected to contain floating product was measured with an ORS® interface probe; this instrument is accurate to the nearest 0.01 foot. The probe contains two different sensor units, one for detecting the liquid/air interface, and one for distinguishing between water and hydrocarbon. The thickness of the floating product and the ground-water depths were recorded. The recorded thickness of the floating product was then multiplied by 0.80 to obtain an approximate value for the displacement of water by the floating product. This approximate displacement value is then subtracted from the measured depth to water to obtain a calculated depth to water. These calculated ground-water depths were subtracted from wellhead elevations measured by Ron Archer, Civil Engineer, Inc., of Pleasanton, California, a licensed land surveyor, to calculate the differences in ground-water elevations.

Water samples collected for subjective evaluation were collected by gently lowering approximately half the length of a clean Teflon® bailer past the air-water interface (if possible) and collecting a sample from near the surface of the water in the well. The samples were checked for evidence of free hydrocarbon product.

Before water samples were collected from the ground-water monitoring wells, the wells were purged until stabilization of the temperature, pH, and conductivity was obtained. Approximately 3 well casing volumes of water were purged before these characteristics stabilized. The quantity of water purged from the wells was calculated as follows:

1 well casing volume = $\pi r^2 h(7.48)$ where:

r = radius of the well casing in feet.

h = column of water in the well in feet (well depth - depth to water).

7.48 = conversion constant from cubic feet to gallons.

Gallons of water purged/gallons in 1 well casing volume = well casing volume removed.

After purging, each well was allowed to recharge to within 80% of the initial water level. Water samples were then collected with an Environmental Protection Agency (EPA) approved Teflon® bailer which had been cleaned with Alconox® and deionized water. The water samples were carefully poured into 40-milliliter glass vials, which were filled so as to produce a positive meniscus. Each sample container was preserved with hydrochloric acid, sealed with a cap containing a Teflon® septum, and subsequently examined for air bubbles to avoid headspace which would allow volatilization to occur. The samples were promptly transported in iced storage in a thermally-insulated ice chest, accompanied by a Chain of Custody Record, to a California-certified laboratory.

WELL PURGE DATA SHEET

Project Name: ARCO 771 **Job No.** 60000-5

Date: 04/16/91 **Page** 1 **of** 1

Well No. MW-1 **Time Started** 13:18

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)
13:18	Start pumping.			
13:25	5	61.7	6.98	11.18
13:30	10	61.7	6.77	10.97
13:38	15	59.9	7.59	10.85
13:45	20	60.0	6.84	10.08
13:55	25	59.8	7.18	9.42
14:00	30	62.5	7.03	9.54
14:10	35	62.8	6.98	9.36
14:20	40	63.5	6.77	9.73
14:22	Stopped pumping.			

Notes:

Depth to Bottom (feet)	:	40.31
Depth to Water - initial (feet)	:	26.49
Gallons per Well Casing Volume	:	35.37
Gallons Purged	:	40
Well Casing Volumes Purged	:	1.13
Approximate Pumping Rate (gpm)	:	26.30

WELL PURGE DATA SHEET

Project Name: ARCO 771 Job No. 60000-5

Date: 04/16/91 Page 1 of 1

Well No. MW-3 Time Started 12:10

Time (hr)	Gallons (cum.)	Temp. (F)	pH	Conduct. (micromoh)
12:10	Start pumping			
12:20	5	69.5	6.84	9.25
12:26	10	65.6	7.11	9.11
12:35	15	62.6	6.85	9.20
12:40	20	60.3	6.78	8.72
12:46	25	61.3	6.74	8.84
12:52	30	60.7	6.74	8.62
13:00	35	62.9	7.08	8.73
13:01	40	66.6	7.15	8.89
13:02	Stop pumping			

Notes:

Depth to Bottom (feet)	:	39.35
Depth to Water - initial (feet)	:	25.05
Time Sampled	:	3:00
Gallons per Well Casing Volume	:	32.30
Gallons Purged	:	40
Well Casing Volumes Purged	:	1.24
Approximate Pumping Rate (gpm)	:	26.30

ARCO Products Company
Division of AtlanticRichfieldCompany

Chain of Custody

Task Order No. 771-91-5

ARCO Facility no. 771	City (Facility) LIVERMORE	Project manager (Consultant) MIKE BARMINSKI	Laboratory name SEQUOIA
ARCO engineer CHUCK CARMEL	Telephone no. (ARCO)	Telephone no. (Consultant) 4082647723	Fax no. (Consultant) 4082642435
Consultant name APPLIED GEOSYSTEMS	Address (Consultant) 3315 ALMADEN EXPY S-34 S.J. 95118		Contract number 07-073

Sample I.D.	Lab no	Container no.	Matrix: Soil	Matrix: Water	Matrix: Other	Preservation: Ice	Preservation: Acid	Sampling date	Sampling time	BTEX 602/EPA 8020	BTEX/TPH EPA M602/8020/8015	TPH Modified 8015 Gas / Diesel	Oil and Grease 413.1 / 413.2	TPH EPA 418.1/SM503E	EPA 601/8010	EPA 624/8240	EPA 625/8270	TCLP Metals / Semi VOA / VOA	CAM Metals EPA 6010/7000 TTLC / STLC	Lead Org./DHS / Lead EPA 7420/7421		
W-27-MW3		4		X		X	HCl	4/10/91	3:00		X											
W-28-MW1		4		X		X	HCl	4/10/91	3:30		X											

Method of shipment: Sequoia pick-up

Special detection Limit/reporting

Special QA/QC

Remarks: AGS Project No. 60000-4

Lab number

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

Condition of sample: good

Temperature received: COOL

	Date	Time		Date	Time
Relinquished by sampler: L. L. Lee	4/11/91	2:40 PM	Received by: Mary C. Lee		
Relinquished by:	4/11/91	3:45	Received by:		
Relinquished by:			Received by laboratory: K. Oakland	4/11/91	1530

...y — Laboratory; Canary copy — ARCO Environmental Engineering; Pink copy — Consultant

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems
3315 Almaden Expressway, Ste 34
San Jose, CA 95118
Attention: Mike Barminski

Project: #60000-4, Arco 771, Livermore

Enclosed are the results from 2 water samples received at Sequoia Analytical on April 11,1991. The requested analyses are listed below:

1042075 A - D	Water, W-27-MW3	4/10/91	EPA 5030/ 8015/8020
1042076 A - D	Water, W-28-MW1	4/10/91	EPA 5030/ 8015/8020

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Bjorn A. Bjorkman
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems	Client Project ID:	#60000-4, Arco 771, Livermore	Sampled:	Apr 10, 1991
3315 Almaden Expressway, Ste 34	Sample Descript.:	Water, W-28-MW1	Received:	Apr 11, 1991
San Jose, CA 95118	Analysis Method:	EPA 5030/ 8015/8020	Analyzed:	Apr 12, 1991
Attention: Mike Barminski	Lab Number:	104-2076 A - D	Reported:	Apr 19, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Low to Medium Boiling Point Hydrocarbons	6,000	98,000
Benzene	60	11,000
Toluene	60	18,000
Ethyl Benzene	60	2,800
Xylenes	60	20,000

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection. Because matrix effects and/or other factors required additional sample dilution, detection limits for this sample have been raised.

SEQUOIA ANALYTICAL

Bjorn A. Bjorkman
Project Manager

SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Applied GeoSystems	Client Project ID:	#60000-4, Arco 771, Livermore	Sampled:	Apr 10, 1991
3315 Almaden Expressway, Ste 34	Sample Descript.:	Water, W-27-MW3	Received:	Apr 11, 1991
San Jose, CA 95118	Analysis Method:	EPA 5030/ 8015/8020	Analyzed:	Apr 12, 1991
Attention: Mike Barminski	Lab Number:	104-2075 A - D	Reported:	Apr 19, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS WITH BTEX DISTINCTION (EPA 8015/8020)

Analyte	Detection Limit µg/L (ppb)	Sample Results µg/L (ppb)
Low to Medium Boiling Point Hydrocarbons	30	530
Benzene	0.30	12
Toluene	0.30	8.4
Ethyl Benzene	0.30	4.0
Xylenes	0.30	7.0

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

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Applied GeoSystems
3315 Almaden Expressway, Ste 34
San Jose, CA 95118
Attention: Mike Barminski

Client Project ID: #60000-4, Arco 771, Livermore

QC Sample Group: 1042075 - 1042076

Reported: Apr 19, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020	EPA 8015/8020
Analyst:	S.Hoffman	S.Hoffman	S.Hoffman	S.Hoffman
Reporting Units:	ng	ng	ng	ng
Date Analyzed:	Apr 12, 1991	Apr 12, 1991	Apr 12, 1991	Apr 12, 1991
QC Sample #:	GBLK041291	GBLK041291	GBLK041291	GBLK041291
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	100	100	100	300
Conc. Matrix Spike:	99	100	100	300
Matrix Spike % Recovery:	99	100	100	100
Conc. Matrix Spike Dup.:	100	100	100	300
Matrix Spike Duplicate % Recovery:	100	100	100	100
Relative % Difference:	1.0	0.0	0.0	0.0

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

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Bjorn A. Bjorkman
Project Manager

% Recovery: $\frac{\text{Conc. of M.S. - Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$

Relative % Difference: $\frac{\text{Conc. of M.S. - Conc. of M.S.D.}}{\text{(Conc. of M.S. + Conc. of M.S.D.) / 2}} \times 100$