GETTLER-RYAN INC.

1364 North McDowell Blvd Suite B2
Petaluma, CA 94954-1116
Phone (707) 789-3251, Fax (707) 789-3218

TRANSMITTAL

TO David De Witt
Tosco Corporation
2000 Crow Canyon Place, Suite 400
San Ramon, California 94583

DATE March 26, 2002
PROJECT NO 140107 05
SUBJECT Report
Tosco SS No 7376
4191 First Street
Pleasanton, California

WE ARE SENDING YOU

COPIES	DATED	DESCRIPTION
1	Mar 20, 2002	Off-Site Subsurface Investigation Report

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- ☒ As Requested
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- ☐ Approved as submitted
- ☐ Approved as noted
- ☐ Returned for corrections
- ☐ For your files
- ☐ For your use
- ☐ As noted below

COMMENTS
Enclosed is one copy of the revised text of the above report for your files This report was revised and signed by a civil engineer as requested Please replace the previously issued text with this text If you have any questions or comments, please call me at (707) 789-3255

Signed Clyde Galanter

COPIES TO Scott Seery, Alameda County Health Care Services Agency
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7376

REPORT
SUPPLEMENTAL SUBSURFACE ENVIRONMENTAL INVESTIGATION
at
ARCO Service Station
Armour Oil Company No.188
First and Ray Streets
Pleasanton, California

AGS Job No. 87086-1

Report prepared for

Armour Oil Company
P.O. Box 85302
San Diego, California 92138-5302

by

William R. Short
Project Geologist

Michael N. Clark
C.E.G. 1264

September 9, 1987

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

September 9, 1987
AGS 87086-1

Mr. Byron Armour
Armour Oil Company
P.O. Box 85302
San Diego, California 92138

Subject: Transmittal of Report No. 87086-1, Supplemental Subsurface Environmental Investigation at ARCO Service Station, Armour Oil Company No.188, First and Ray Streets, Pleasanton, California.

Mr. Armour:

This report presents the results of our supplemental environmental investigation at the above-referenced site. The investigation included the drilling of one soil boring and the laboratory analysis of two soil samples for potential hydrocarbon contamination.

Laboratory analyses of soil samples from the boring (B-4) show very low to relatively high concentrations of hydrocarbons. The hydrocarbon contamination appears to be derived from both gasoline and diesel. The analyses indicate that the majority of the contamination at the site has a diesel derivation. We understand, however, based on information supplied by Armour Oil Company, that no diesel product has been sold at the subject service station since it was constructed in the 1970's. This information suggests that the contamination may be derived from previous operations at the site or adjacent sites.

No ground water was encountered to a depth of 66.5 feet, the total depth of boring B-4. The absence of ground water in boring B-4 and the low to non-detectable levels of hydrocarbon contamination at the base of the boring indicate that the hydrocarbon contamination has not reached the ground water in the vicinity of the boring at the present time.

We recommend that Armour Oil Company submit a copy of this report to Mr. Rick Mueller of the Pleasanton Fire Department at 44 Railroad Street, P.O. Box 520, Pleasanton, California 94566 and to Mr. Greg Zentner at the California Regional Water Quality Control Board - San Francisco Bay Region at 1111 Jackson Street, Room 6040, Oakland, California 94607. If you have any questions regarding the content of this report, please do not hesitate to call.

Sincerely,
Applied GeoSystems

William R. Short
Project Geologist

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

REPORT
SUPPLEMENTAL SUBSURFACE ENVIRONMENTAL INVESTIGATION
at
ARCO Service Station
Armour Oil Company NO.188
First and Ray Streets
Pleasanton, California
For: Armour Oil Company

INTRODUCTION

The following report describes the work performed to drill and sample one soil boring near the site of underground storage tanks at the ARCO Service Station (Armour Oil Company No.188) located on the corner of First and Ray Streets in Pleasanton, California. UNOCAL corporation initially contracted with Applied GeoSystems to evaluate potential hydrocarbon contamination of subsurface soil prior to possible purchase of the subject service station from Armour Oil Company. Based on the findings of the initial investigation Armour Oil Company contracted with Applied Geosystems to further evaluate the vertical extent of hydrocarbon contamination at the site. This report presents data from our previous study at the site, describes the work elements conducted

during this supplemental investigation, provides our interpretations of the data collected, and presents our conclusions and recommendations.

SITE DESCRIPTION AND BACKGROUND

The ARCO Service Station site is located on the northwest corner of the intersection of First Street at Ray Street in Pleasanton, California as shown on the Site Vicinity Map, Plate P-1. We understand that four 12,000-gallon underground petroleum product storage tanks are buried at the site. The four storage tanks, which contain gasoline product for retail sale, are located adjacent to one another in the northeast portion of the property. The Generalized Site Plan, Plate P-2, shows the service station property and approximate locations of the station facilities.

Applied GeoSystems previously drilled three soil borings at the site on June 30, 1987 for UNOCAL Corporation. Two borings (B-1 and B-2) were drilled to approximately 46.5 feet in depth and one boring (B-3) was drilled to approximately 55 feet in depth. No ground water was encountered during the course of drilling, and the borings were backfilled from total depth with a slurry of

neat cement and 5 percent bentonite to a few inches below grade. The borings were then capped with asphalt to grade. Applied GeoSystems' report AGS 87065-1, dated July 14, 1987, describes the initial investigation and presents our conclusions and recommendations based on the data available at the time. Plate P-2 of this report shows the approximate locations of the three initial borings.

Laboratory analytical results of nine soil samples showed low to relatively high levels of hydrocarbon contamination in the three initial borings. The results of these analyses, initially presented in Applied GeoSystems report AGS 87065-1, are presented in Table 1 and in the Appendix of this report.

Inspection of the chromatograms (graphical results of the analyses) suggests that the hydrocarbon contamination is derived from a combination of two sources. One portion of the contamination appears to be derived from gasoline; the other portion appears to be derived from diesel. We understand, based on information supplied to us from Armour Oil Company, that no diesel product has been sold at the subject station since its construction in the 1970's.

TABLE 1
RESULTS OF CHEMICAL ANALYSES
OF SOIL SAMPLES
ARCO Service Station
First and Ray Streets
Pleasanton, California

Sample Number	TVH	Benzene	Ethyl Benzene	Toluene	Xylenes	TEH
S-20-B1	281.9	17.1	17.0	73.6	92.3	NA
S-35-B1	126.13	2.06	0.84	1.02	6.59	1325
S-45-B1	9.36	0.64	0.26	1.06	1.47	NA
S-25-B2	188.8	13.1	6.1	6.3	56.2	NA
S-35-B2	56.81	1.47	1.81	1.58	18.09	NA
S-45-B2	9.09	0.07	0.18	0.26	1.30	NA
S-10-B3	ND	ND	ND	ND	ND	NA
S-30-B3	7.72	3.95	0.13	0.51	0.85	NA
S-40-B3	180.7	12.4	9.4	47.8	45.1	NA

Results in milligrams/kilogram(mg/kg)=parts per million(ppm)
TVH: Total volatile hydrocarbons
TEH: Total extractable hydrocarbons Diesel
ND: Non Detectable
NA: Not Analyzed
Detection limits: 0.05 ppm (TVH - S-35-B1, S-45-B1, S-35-B2, S-45-B2, S-10-B3, B-30-B3)
0.5 ppm (TVH - S-20-B1, S-25-B2, S-40-B3)
5.0 ppm (TEH - S-35-B1)

Armour Oil Company supplied Applied GeoSystems with a copy of a Petro Tite system test performed at the service station in September 1986. The tank system test results indicated no leaks in the system. A copy of the Petro Tite test results are included in the Appendix of this report.

Based on the initial laboratory analytical results, Armour Oil Company contacted Applied GeoSystems to drill an additional soil boring adjacent to boring B-1 to further evaluate the vertical extent of the hydrocarbon contamination. Applied GeoSystems proposed to drill to first ground water and install a ground-water monitoring well, or to drill until two successive "clean" (based on subjective analysis) soil samples were collected from the base of the boring.

Prior to drilling, a permit was acquired from the Alameda County Flood Control and Water Conservation District. A copy of the permit is included in the Appendix of this report. Underground Service Alert (USA) was contacted to locate utility lines on public property adjacent to the site prior to on-site work.

FIELD WORK

A geologist from Applied GeoSystems observed drilling of soil boring B-4 on August 21, 1987. The boring was drilled with a CME-75 truck-mounted drill rig operated by Datum Exploration, Inc. of Pittsburg, California. Steam-cleaned, 8-inch-diameter, continuous flight hollow-stem augers were used to drill boring B-4 to a depth of approximately 66.5 feet. Because no subjective evidence of hydrocarbon contamination was detected in the lowest ten feet of the boring and because no ground water was encountered, a monitoring well was not installed and the boring was backfilled. The boring was backfilled with a slurry of neat cement and 5 percent bentonite to a few inches below grade. The boring was then capped with asphalt to grade. The location of boring B-4 with respect to the previous borings and other site features is shown on the Generalized Site Plan, Plate P-2.

The direction of ground water flow was inferred to be to the northwest prior to drilling. This flow direction was inferred from the general surface topography in the area. Based on the proximity to the tank pit, the inferred gradient, and because

boring B-1 contained the highest subjective levels of hydrocarbon contamination, boring B-4 was drilled adjacent to boring B-1.

Soil samples were collected from the borehole with a California-modified split-spoon sampler. Plate P-3 gives a summary of the Unified Soil Classification System used to identify the soils. Descriptions of earth materials encountered in the initial three borings (B-1, B-2, and B-3) are presented on the Boring Logs, Plate P-4 through Plate P-9. Descriptions of the materials encountered in boring B-4 are presented in Plates P-10 through P-12. Plate P-13 presents a geologic cross section constructed through the four borings at the site; Plate P-2 shows the location of the cross section. The earth materials encountered at the site consist primarily of interfingering units of silty clay and gravelly clay. Subjective analysis of soil cuttings excavated from boring B-4 found evidence of hydrocarbon contamination from 5 to 55 feet. Cuttings from the boreholes were spread at the site for aeration. Due to the small volume of soil no permit for aeration was required from the Bay Area Air Quality Management District.

SOIL SAMPLING PROCEDURE

Boring B-4 was hand augured to a depth of approximately 5 feet to confirm that no underground lines or structures would be encountered. Thirteen soil samples were collected and described from boring B-4 during drilling. These samples, labeled as indicated on the Boring Logs, were collected at 5-foot intervals from the ground surface to total depth. Soil samples were collected by advancing the boring to a point immediately above the sampling depth and then driving a California-modified split-spoon sampler (2.5-inch inside diameter) into the soil through the hollow center of the auger. The sampler was driven 18 inches with a standard 140 pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each 6 inches was counted and recorded to evaluate the relative consistency of the soil materials.

A subjective analysis for presence and degree or absence of hydrocarbon contamination was performed and the results recorded for each soil sample collected from the boring. The samples were removed from the sampler, immediately sealed in their brass sleeves with aluminum foil, plastic caps, and airtight tape. The

samples were labeled and placed in iced storage for transport to the analytical laboratory. A Chain of Custody Record was initiated by the field Geologist and selected samples were delivered to Applied GeoSystems' certified laboratory for analytical testing. The completed Chain of Custody Record and laboratory Record of Analysis for the tested samples are included in the Appendix of this report.

ANALYTICAL RESULTS

The sample with the highest subjective level of contamination and the sample from the base of the boring (S-35-B4, and S-65-B4) were analyzed for Total Volatile Hydrocarbons (TVH) and the hydrocarbon constituents benzene, ethylbenzene, toluene, and total xylenes (BETX) using gas chromatography with photo- and flame ionization detection (Environmental Protection Agency (EPA) Method 8020) and for Total Extractable Hydrocarbons (TEH) using gas chromatography with flame ionization detection (EPA Method 3550). The results of the chemical analyses are presented in Table 2 and in the Appendix of this report.

TABLE 2
RESULTS OF CHEMICAL ANALYSES
OF SOIL SAMPLES
ARCO Service Station
Armour Oil Company No.188
First and Ray Streets
Pleasanton, California

Sample Number	TVH	Benzene	Ethyl Benzene	Toluene	Xylenes	TEH
S-35-B4	100.5	1.4	0.5	0.6	4.4	1835
S-65-B4	0.45	ND	ND	ND	ND	ND

Results in milligrams/kilogram(mg/kg) = parts per million(ppm)
TVH: Total volatile hydrocarbons
TEH: Total extractable hydrocarbons — Diesel.
ND: Non Detectable
Detection limits: 0.2 ppm (TVH - S-35-B4)
0.05 ppm (TVH - S-65-B4)
5.0 ppm (TEH)

CONCLUSIONS AND RECOMMENDATIONS

As shown on Tables 1 and 2 the analytical results of the soil samples collected from the four borings drilled at the site indicate that low to relatively high levels of hydrocarbon

contamination are present adjacent to the tank pit and product lines. As shown in Tables 1 and 2 the level of contamination decreases with depth in borings B-1, B-2, and B-4. Subjective analyses indicate that the level of contamination decreases with depth below 40 feet in boring B-3 as well.

Inspection of the chromatograms (graphical results of the analyses) suggests that the hydrocarbon contamination is derived from a combination of two sources. One portion of the contamination appears to be derived from gasoline; the other portion appears to be derived from diesel. Gasoline constituent concentrations are measured with the Total Volatile Hydrocarbon (TVH) analysis, and the diesel constituent concentrations are measured with the Total Extractable Hydrocarbon (TEH) analysis. The analyses indicate that the majority of the contamination at the site is derived from diesel.

It is our understanding, based on information supplied by Armour Oil Company, that diesel has never been sold at the subject service station since it was constructed by Armour Oil Company in the 1970's. This information suggests that the contamination

found in the soil may be derived from previous operations at the site or adjacent sites.

Alameda County Flood Control and Water Conservation District ground-water contour maps show the ground-water surface to be approximately 55 feet below the ground surface in the vicinity of the site. Ground water was not encountered to a depth of approximately 66.5 feet in boring B-4, and no aquifer materials (such as sand and gravel) were encountered in the lower portion of the boring. For these reasons a confined aquifer system may be present below the total depth of boring B-4. The ground-water surface elevation depicted on the Alameda County Flood Control District maps may represent the potentiometric surface (surface to which water in the aquifer would rise by hydrostatic pressure) of a confined aquifer in the vicinity of the site. Or, the aquifer may be unconfined and deeper than approximately 66.5 feet. The Alameda County Flood Control maps are interpretive and the ground water levels depicted beneath the site may be approximations.

The trend of decreasing levels of hydrocarbon contamination to very low to non-detectable levels at the base of boring B-4, and

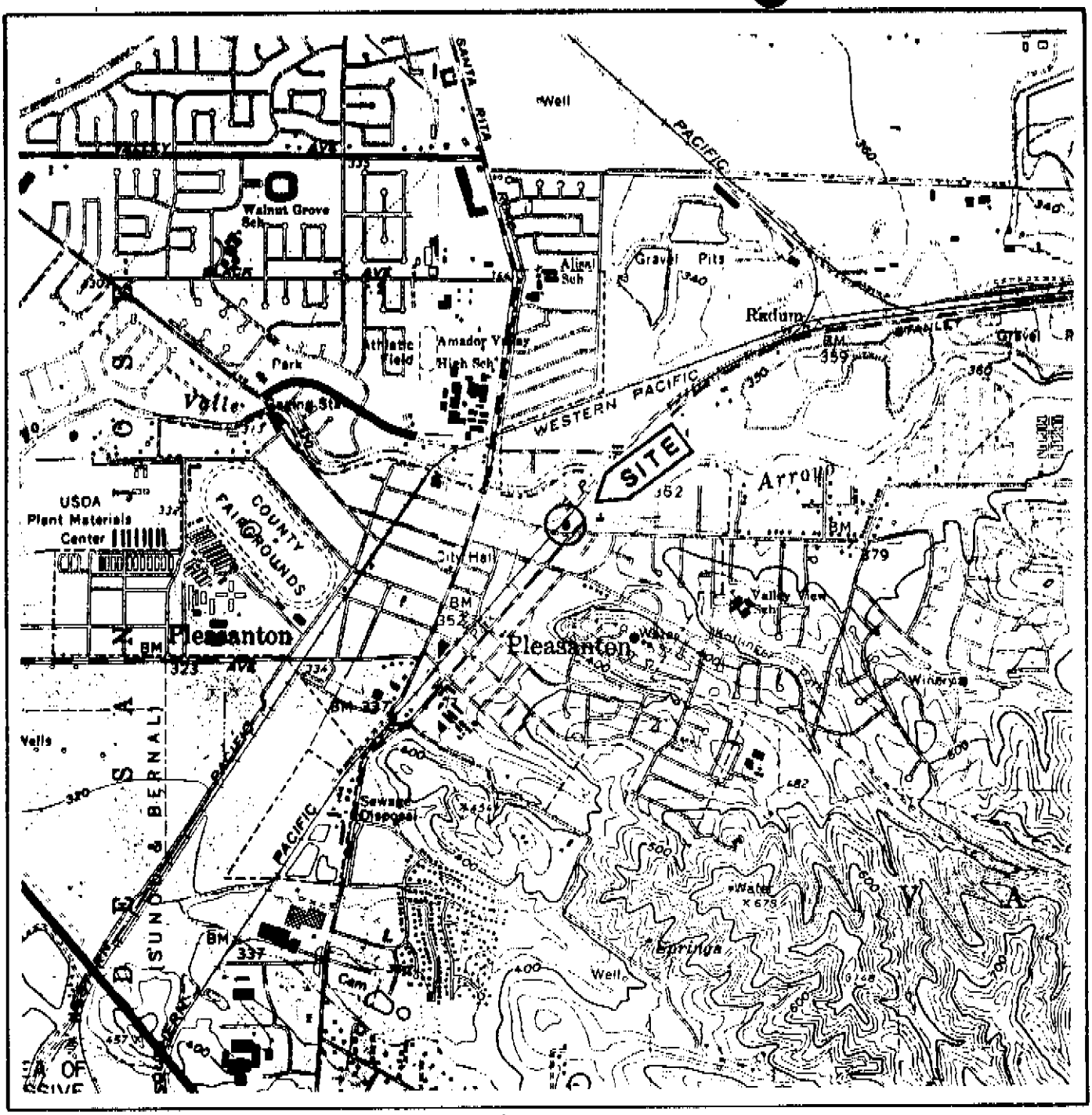
the fact that ground water is deeper than approximately 66.5 feet, indicate that the contamination has not reached the ground water in the vicinity of boring B-4 at the present time.

We recommend that Armour Oil Company submit a copy of this report to Mr. Rick Mueller of the Pleasanton Fire Department at 44 Railroad Street, P.O. Box 520, Pleasanton, California 94566, and to Mr. Greg Zentner of the California Regional Water Quality Control Board - San Francisco Bay Region at 1111 Jackson Street, Room 6040, Oakland, California 94607.

LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental geological practice in California at the time this investigation was performed. This investigation was conducted solely for the purpose of evaluating environmental conditions of the soil with respect to hydrocarbon product contamination in the vicinity of the subject property. No soil engineering or geotechnical recommendations are implied or should be inferred. Evaluation of the geologic conditions at the site for the purpose of this investigation is made from a limited

number of observation points. Subsurface conditions may vary away from the data points available. Additional work, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of investigation.



Source: State of California
Special Studies Zone
Dublin/Livermore
7.5 Minute Quadrangle

N

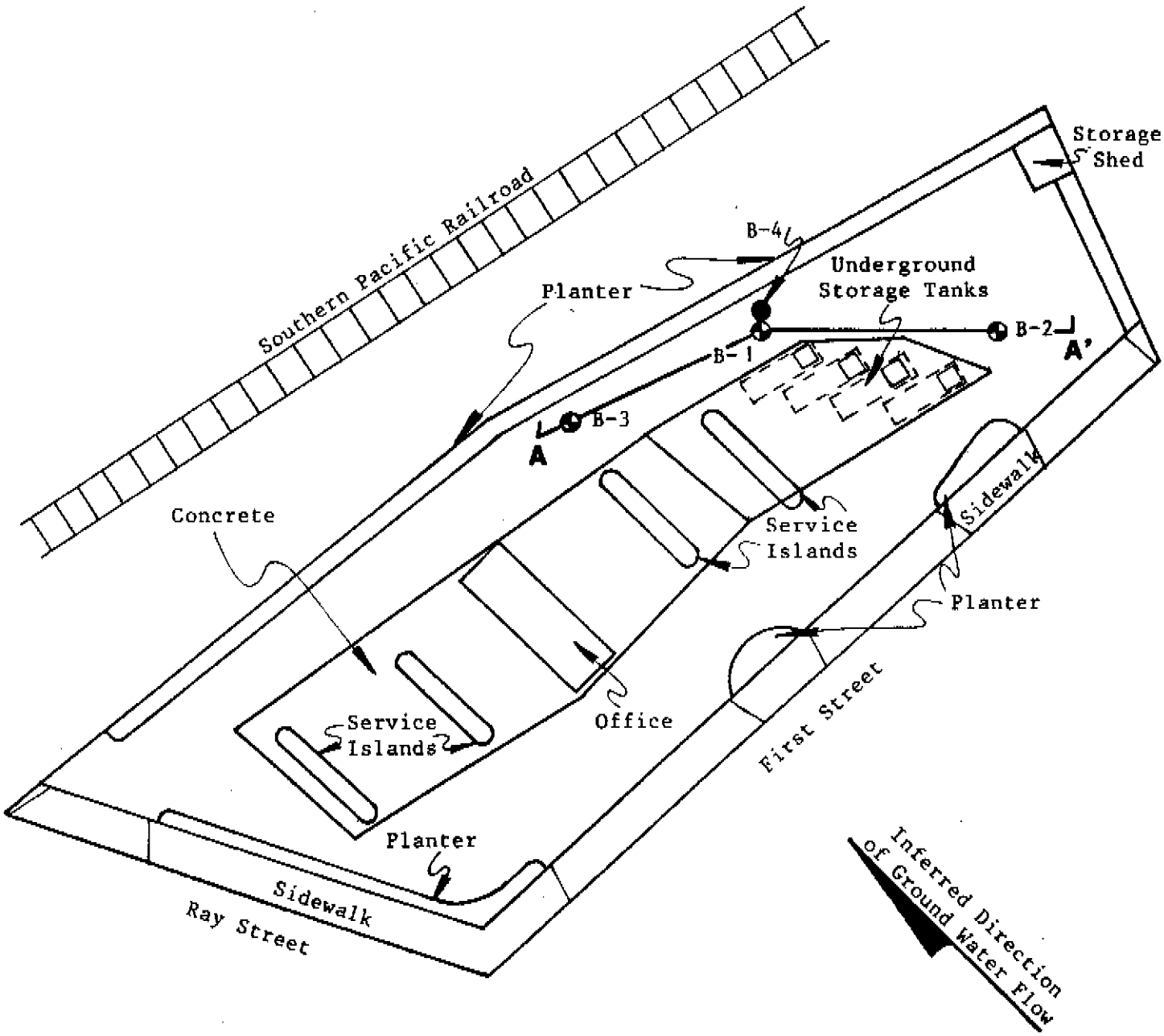
Approximate Scale
2000 1000 0 2000 4000
feet

Applied GeoSystems
41255 Mission Blvd Suite B Fremont, CA 94539 (415) 651-1906

PROJECT NO. AGS 87086-1

SITE VICINITY MAP
Arco Station
First and Ray Street
Pleasanton, California

PLATE
P-1



● Soil Boring Location

◉ Previous Soil Boring Location

A — A' Cross section

N

Approximate Scale

40 0 40 80

feet

Applied GeoSystems

PROJECT NO. AGS 87086-1

GENERALIZED SITE PLAN
Arco Station
First and Ray Street
Pleasanton, California

PLATE

P-2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		LTR	DESCRIPTION	MAJOR DIVISIONS		LTR	DESCRIPTION
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel sand mixtures, little or no fines.	FINE GRAINED SOILS	SILTS AND CLAYS LL<50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		GP	Poorly-graded gravels or gravel sand mixture, little or no fines			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		GM	Silty gravels, gravel-sand-clay mixtures.			OL	Organic silts and organic silt-clays of low plasticity.
		GC	Clayey gravels, gravel-sand-clay mixtures.		SILTS AND CLAYS LL>50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
	SAND AND SANDY SOILS	SW	Well-graded sands or gravelly sands, little or no fines.			CH	Inorganic clays of high plasticity, fat clays.
		SP	Poorly-graded sands or gravelly sands, little or no fines.			OH	Organic clays of medium to high plasticity.
		SM	Silty sands, sand-silt mixtures.	HIGHLY ORGANIC SOILS		Pt	Peat and other highly organic soils.
		SC	Clayey sands, sand-clay mixtures.				

I	Depth through which sampler is driven		Sand pack
I	Relatively undisturbed sample		Bentonite annular seal
I	Missed sample		Neat cement annular seal
▼	Ground water level observed in boring		Blank PVC
S-10	Sample number		Machine-slotted PVC

BLOW/FT. REPRESENTS THE NUMBER OF BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES TO DRIVE THE SAMPLER THROUGH THE LAST 12 INCHES OF AN 18 INCH PENETRATION.

DASHED LINES SEPARATING UNITS ON THE LOG REPRESENT APPROXIMATE BOUNDARIES ONLY. ACTUAL BOUNDARIES MAY BE GRADUAL. LOGS REPRESENT SUBSURFACE CONDITIONS AT THE BORING LOCATION AT THE TIME OF DRILLING ONLY.

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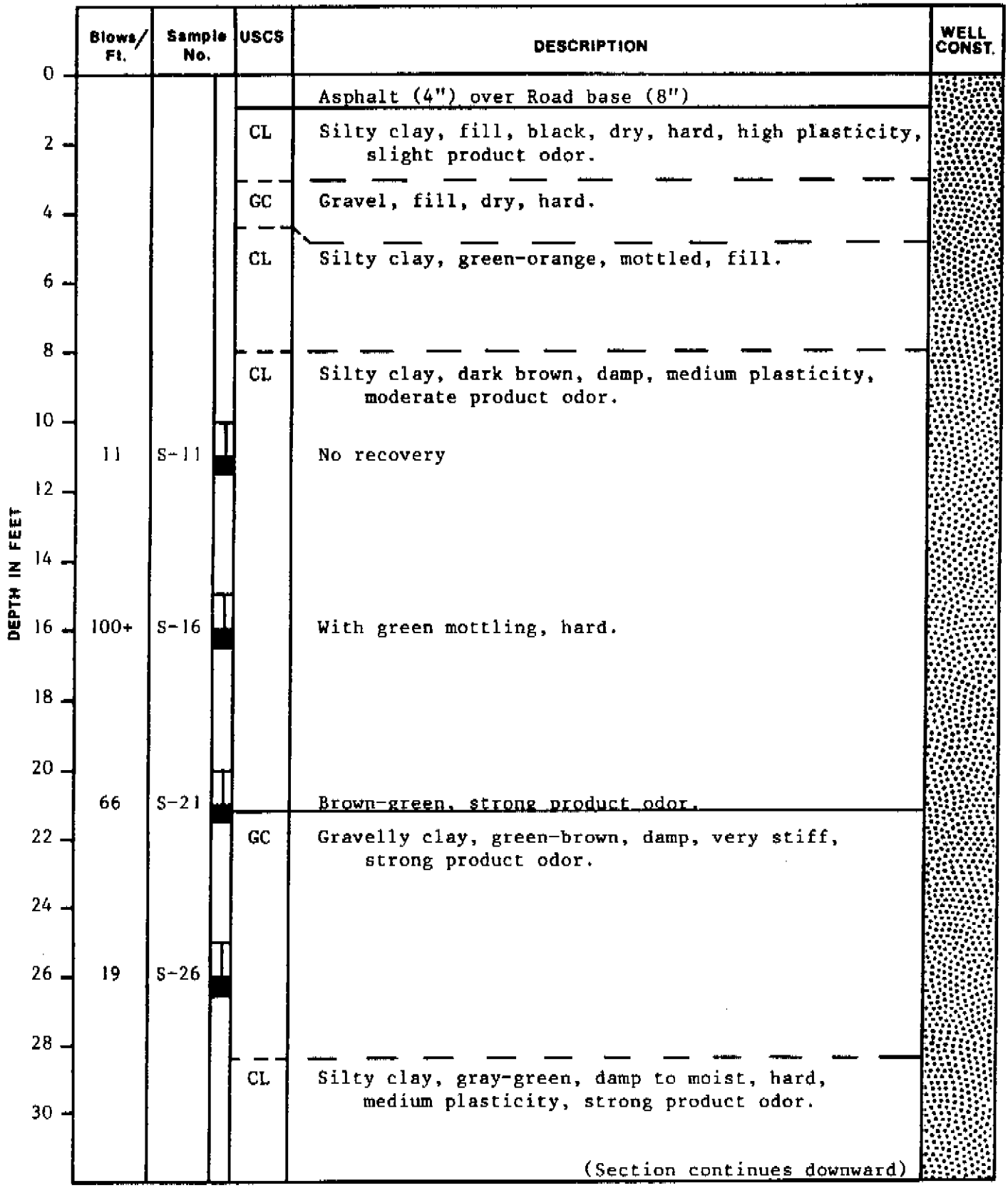
PROJECT NO. AGS 87086-1

UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOL KEY
Arco Station
First and Ray Street
Pleasanton, California

PLATE
P-3



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PROJECT NO. AGS 87086-1

LOG OF BORING B-1

Arco Station
First and Ray Street
Pleasanton, California

PLATE P-4

DEPTH IN FEET	Blows/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
30	46	S-30	CL	Silty clay, gray-green, damp to moist, hard, medium plasticity, strong product odor.	
32					
34			GC	Gravelly clay with sand, gray-green, moist, hard, strong product odor.	
36	84	S-36			
38			CL	Silty clay with some gravel, green-gray, damp, hard, medium plasticity, strong product odor.	
40	56	S-41			
42					
44					
46	64	S-46		Brown with green mottling, moderate product odor.	
				Total Depth = 46.5 feet No ground water encountered at time of drilling	
48					
50					

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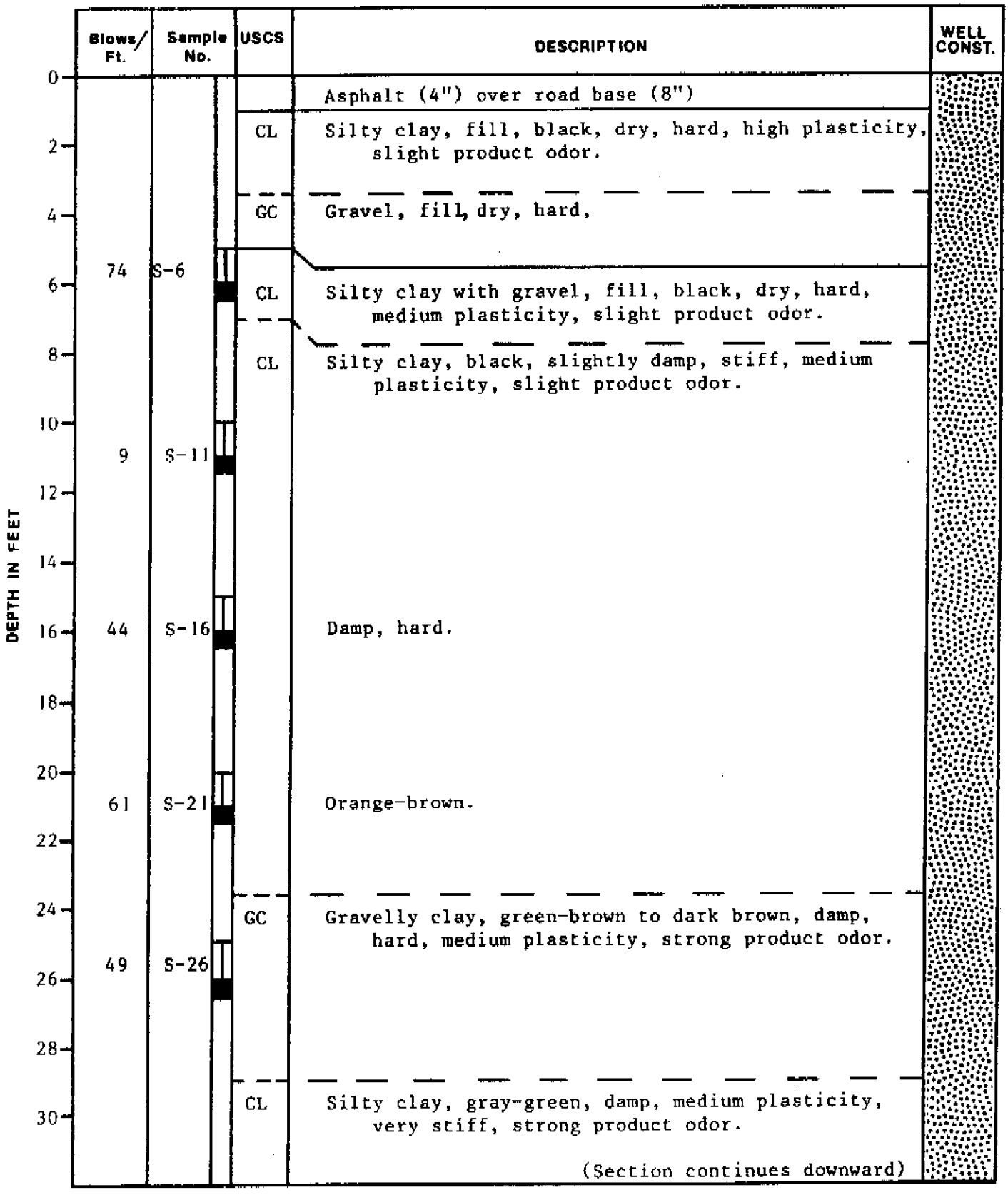
LOG OF BORING B-1

Arco Station
First and Ray Street
Pleasanton, California

PLATE

P-5



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LOG OF BORING B—2

Arco Station
First and Ray Street
Pleasanton, California

PLATE P-6

PROJECT NO. AGS 87086-1

DEPTH IN FEET	Blows/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
30	32	S-30	CL	Silty clay, gray-green, damp, medium plasticity, very stiff, strong product odor.	
32					
34			GC	Gravelly clay, gray-green, moist, hard, medium plasticity, very strong product odor.	
36	90	S-36			
38			CL	Silty clay, green-gray, very strong product odor.	
40					
42	47	S-41	CL	Silty clay, orange-brown, damp, hard, medium plasticity, strong product odor.	
44					
46	70	S-46		With green-gray mottling.	
48				Total Depth = 46.5 feet No ground water encountered at time of drilling.	
50					

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LOG OF BORING B-2

Arco Station
First and Ray Street
Pleasanton, California

PLATE P-7

PROJECT NO. AGS 87086-1

DEPTH IN FEET	Blows/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
0				Asphalt (4") over road base (8")	
2			CL	Silty clay, black, slightly damp, medium stiff, medium plasticity, slight product odor.	
4					
6	15	S-6			
8					
10					
12	33	S-11	CL	Silty clay, green-gray, damp, stiff to hard, medium plasticity, moderate to strong product odor.	
14					
16	56	S-16			
18					
20					
22	61	S-21		Orange-brown, hard.	
24					
26	38	S-26			
28					
30					

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LOG OF BORING B—3

Arco Station
First and Ray Street
Pleasanton, California

PLATE P-8

PROJECT NO. AGSS 87086-1

DEPTH IN FEET	Blows/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
30					
32	80	S-31	GC	Gravelly clay, brown, green-brown, damp, hard, medium plasticity, moderate to strong product odor.	
34					
36	67	S-36		Strong product odor.	
38					
40	43	S-41			
42					
44	63	S-45		No recovery.	
46					
48					
50					
52					
54					
56				Total Depth = 55 feet No ground water encountered at time of drilling.	
58					

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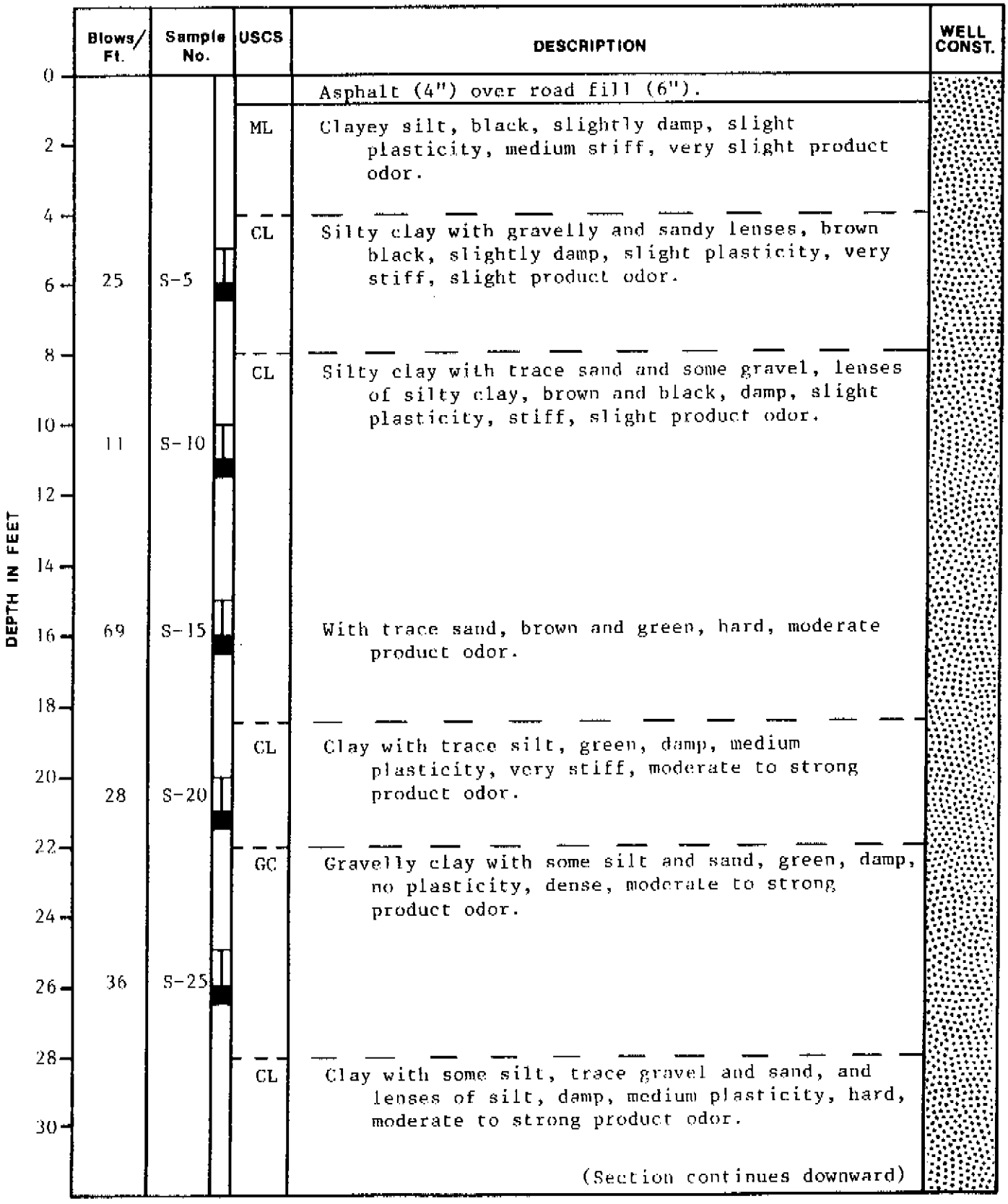
LOG OF BORING B—3

Arco Station
First and Ray Street
Pleasanton, California

PLATE

P-9

PROJECT NO. AGS 87086-1



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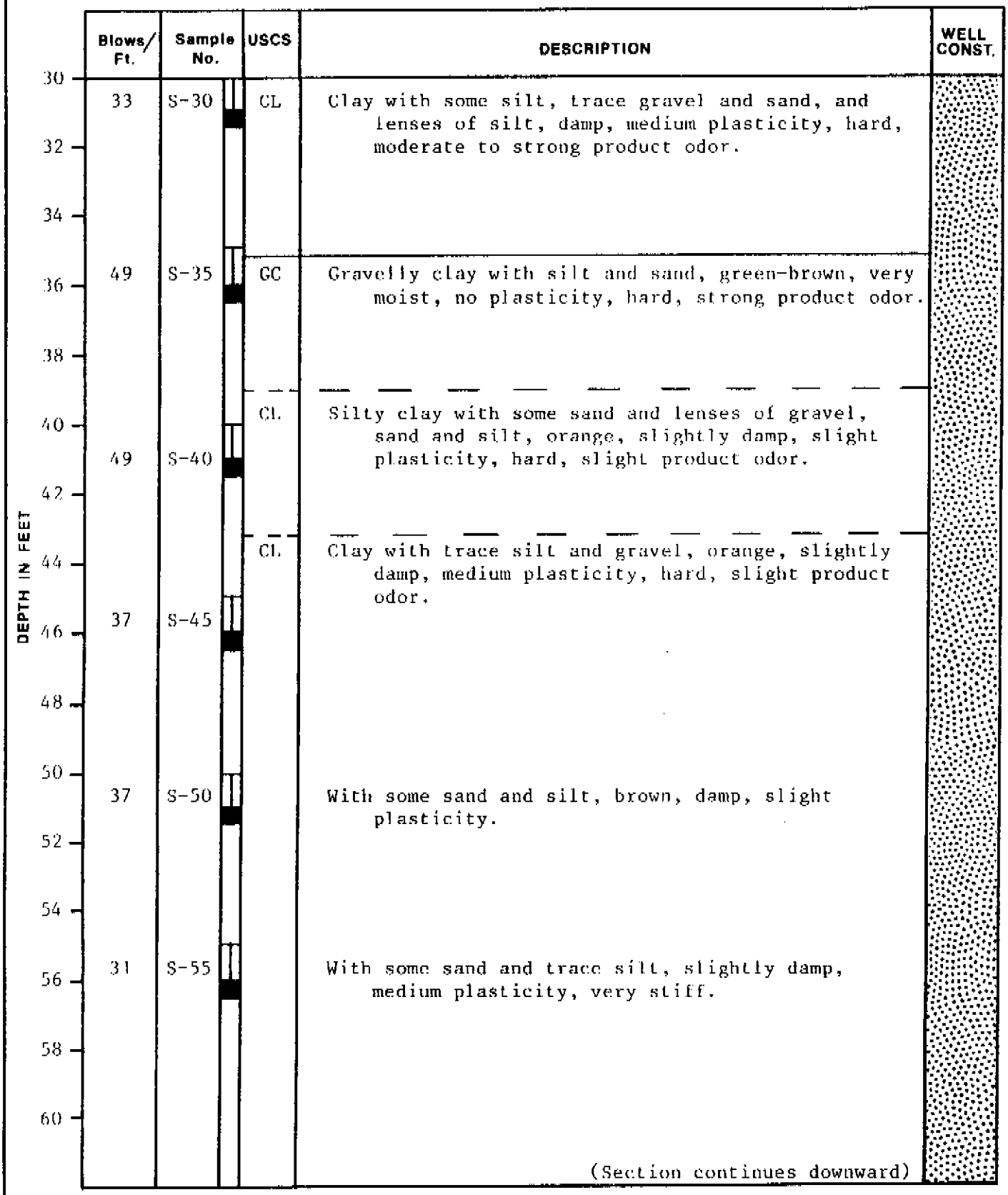
LOG OF BORING B-4

Arco Station
First and Ray Street
Pleasanton, California

PLATE
P-10

PROJECT NO. AGS 87086-1



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PROJECT NO. 87086-1

LOG OF BORING B-4

Arco Station
First and Ray Street
Pleasanton, California

PLATE P-11

Blows/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.
72	S-60	CL	Gravelly clay with some silt, orange, moist, slight plasticity, hard, no product odor.	
72	S-65		Clay with some sand and trace silt. medium plasticity.	
			Total Depth = 66.5 feet. Boring terminated after 2 consecutive clean samples after 55 feet. No ground water encountered.	

DEPTH IN FEET

60 62 64 66 68 70

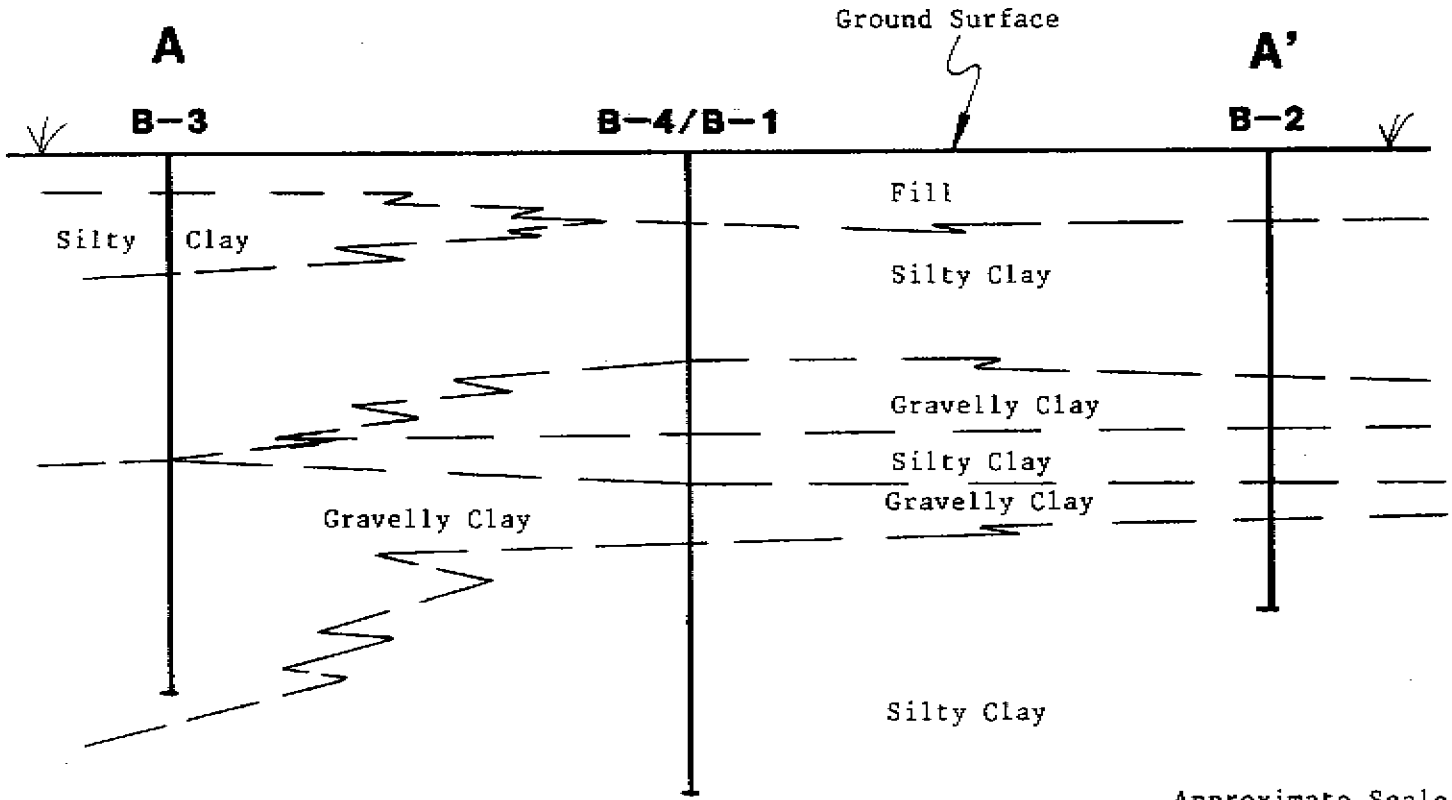
Applied GeoSystems

LOG OF BORING B-4

Arco Station
First and Ray Street
Pleasanton, California

PLATE P-12

PROJECT NO. 8708601



Approximate Scale
Horizontal and Vertical

20 0 20 40

feet

PLATE	CROSS SECTION A - A'	Applied GeoSystems
P-13	Arco Station First and Ray Street Pleasanton, California	PROJECT NO. AGS 87086-1

APPENDIX

Data Chart for Tank System Tightness Test

petro tite TANK TESTER

PLEASE PRINT

1. OWNER Property ☐ Tank(s) ☐

Armour Oil Company, P. O. Box 26243, Sacramento, CA 95826
Name / Address / Representative / Telephone

Armour Oil Company, P. O. Box 26243, Sacramento, CA 95826
Name / Address / Representative / Telephone

2. OPERATOR

Armour Oil #188, 4191 First St., Pleasanton, CA
Name / Address / Telephone

3. REASON FOR TEST (Explain Fully)

To test system for tightness

4. WHO REQUESTED TEST AND WHEN

Bob Bell — Name / Title — Armour Oil — Company or Affiliation

P. O. Box 26243 , Sacramento, CA 95826 — Address — (916)635-4343 — Date / Telephone

5. WHO IS PAYING FOR THIS TEST?

Armour Oil — Company, Agency or Individual — Bob Bell — Person Authorizing — (916)635-4343 — Title

P. O. Box 26243 — Billing Address — Sacramento, CA — City / State — 95826 — Zip

Attention of: Order No. Other Instructions

6. TANK(S) INVOLVED

Identify by Direction	Capacity	Brand/Supplier	Grade	Approx. Age	Steel/Fiberglass
#1 East	12000		u/l		steel
#3 Middle W	12000		P/u/L		
#2 East Cntr.	12000		u/L		steel
#4 West	12000		Reg		

7. INSTALLATION DATA

Location	Cover	Fills	Vents	Siphones	Pumps
North of store	concrete	4"	2"	Hal- capped & separated	Tokheim Turbine
North inside driveway, Rear of station, etc.	Concrete, Black Top, Earth, etc.	Size, Thrill docks, Drop tubes, Remote Fills	Size, Manifolded	Which tanks?	Suction, Remote, Make if known

8. UNDERGROUND WATER

Depth to the Water table 15' +

Is the water over the tank? ☐ Yes ☒ No

9. FILL-UP ARRANGEMENTS

Tanks to be filled 7 Am. 9-29-86 Arranged by Armour Oil — Name / Telephone

Extra product to "top off" and run TSTT. How and who to provide? Consider NO Lead.

Terminal or other contact for notice or inquiry ______ Company / Name / Telephone

10. CONTRACTOR, MECHANICS, any other contractor involved

John Strickland Dist Mgr came

Ray - Pleasanton Chemical specialist same

11. OTHER INFORMATION OR REMARKS

Additional information on any items above. Officials or others to be advised when testing is in progress or completed. Visitors or observers present during test etc.

TEST RESULTS

Tests were made on the above tank systems in accordance with test procedures prescribed for petro tite as detailed on attached test charts with results as follows:

Tank Identification	Tight	Leakage Indicated	Thermal	Date Tested
#1 East	yes	-.026	889	9-29-86
#2 East Cntr.	yes	-.030	951	9-29-86
#3 Mid West	yes	-.029	1219	9-23-86
#4 West	yes	+.016		9-23-86

CERTIFICATION

-29-86

This is to certify that these tank systems were tested on the date(s) shown. Those indicated as "Tight" meet the criteria established by the National Fire Protection Association Pamphlet 329. LCT

14. Armour Oil #188, 4191 First St., Pleasanton, CA

Name of Supplier, Owner or Dealer | Address No. and Street(s) | City | State | 9-29-86 Date of Test

Petro Tite LVLLT TESTER

15. TANK TO TEST

#1 East
Identify by position

4/c
Brand and Grade

16. CAPACITY

Nominal Capacity 12,000 Gallons

By most accurate capacity chart available 12,127 Gallons

From
- ☐ Station Chart
- ☐ Tank Manufacturer's Chart
- ☐ Company Engineering Data
- ☐ Charts supplied with petro tite
- ☐ Other

Is there doubt as to True Capacity? ☐
See Section "DETERMINING TANK CAPACITY"

17. FILL-UP FOR TEST

Stick Water Bottom before Fill-up 0 to ¼ in. = 0 Gallons

	Stick Readings to ¼ in.	Gallons	Total Gallons ea. Reading
Inventory			1217
Fill up. STICK BEFORE AND AFTER EACH COMPARTMENT DROP OR EACH METERED DELIVERY QUANTITY			
		Topped	13
Product in full tank (up to fill pipe)			12140

Tank Diameter 94

18. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

See manual sections applicable. Check below and record procedure in log (28).

☐ Water in tank ☐ High water table in tank excavation ☐ Line(s) being tested with LVLLT

VAPOR RECOVERY SYSTEM
☐ Stage I
☐ Stage II

19. TANK MEASUREMENTS FOR TSTT ASSEMBLY

Bottom of tank to Grade*	114 "
Add 30" for 4" L	"
Add 24" for 3" L or air seal	"
Total tubing to assemble Approximate	144 "

20. EXTENSION HOSE SETTING

Tank top to grade*	25 "
Extend hose on suction tube 6" or more below tank top	6 "

*If Fill pipe extends above grade, use top of fill.

21. TEMPERATURE/VOLUME FACTOR (a) TO TEST THIS TANK

Is Today Warmer? [ ] Colder? [ ] ___ °F Product in Tank ___ °F Fill-up Product on Truck ___ °F Expected Change [+ or -]

22. Thermal-Sensor reading after circulation 15959 digits 70/71 nearest °F

23. Digits per °F in range of expected change 325 digits

24. 12140 (total quantity in full tank (18 or 17)) × .0005 7384 (coefficient of expansion for involved product) = 6.9664176 (volume change in this tank per °F) gallons

25. 6.9664176 (volume change per °F (24)) ÷ 325 (Digits per °F in test Range (23)) = .0214351 3107 (Volume change per digit. Compute to 4 decimal places.)

This is test factor (a) .0214

OBSERVED GRAVITY 56.6

OBSERVED TEMPERATURES 78°

CORRECTED API GRAVITY 54.4

C. O. F.

LOG OF TEST PROCEDURES

27. Date / Time (24 hr.)	28. Record details of setting up and running test. (Use full length of line if needed.) #1 Eastern	29. Reading No.	30. HYDROSTATIC PRESSURE CONTROL: Standpipe Level in Inches — Beginning of Reading	Level to which Restored	31. VOLUME MEASUREMENTS (If) RECORD TO .001 GAL: Product in Gradute — Before Reading	After Reading	Product Replaced (-) / Product Recovered (+)	34. TEMPERATURE COMPENSATION USE FACTOR (a): 35. Thermal Sensor Reading	36. Change Higher + Lower - (c)	37. Compensation (c) = (a) × Expansion + Contraction -	38. NET VOLUME CHANGES EACH READING: Temperature Adjustment — Volume Minus Expansion (+) or Contraction (-) #33(V) − #37(T)	39. ACCUMULA CHANGE
0700	ARRIVED AT SITE: TOOK TANK BURIAL MEASUREMENTS: CHECKED FOR WATER:							PLEASE NOTE:		IN THE	EVENT AIR/VAPOR	
	TOOK INVENTORY OF PRODUCT ON HAND: PREPARED AREA FOR SETTING UP TESTERS.							POCKETS WERE PRESENT IN THE TANK/SYSTE				
								IT COULD HAVE AN EFFECT ON THE TEST RE				
	DELIVERY TRUCK ARRIVED: ASSISTED DRIVER IN FILLING TANK, SET UP TEST							Thermal		889		
1145	STAND AND STARTED CIRCULATING PUMP, BLED AIR.											
								Factor	A =	.0214		
1300	FIRST SENSOR READING			42.0				15959	70/71	325		
1315	START SENSOR READING	1.	44.9	"	.590	.770	+.180	967	+8	+.171	+.009	
1330	CONT'D HIGH LEVEL TEST	2.	46.8	"	.075	.375	+.300	982	+15	+.321	-.021	
1345	" " " "	3.	46.2	"	.375	.645	+.270	995	+13	+.278	-.008	
1400	" " " "	4.	46.6	"	.645	.940	+.295	009	+14	+.300	-.005	
1415	" " " "	5.	46.8	"	.075	.380	+.305	024	+15	+.321	-.016	
1430	" " " "	6.	46.5	"	.380	.665	+.285	038	+14	+.300	-.015	
1445	" " " "	7.	46.7	"	.665	.960	+.295	052	+14	+.300	-.005	
1500	" " " "	8.	46.9	"	.010	.325	+.315	067	+15	+.321	-.006	
1502	Drop to low " "			12.0								
1515	Cont'd " " "	9	17.5	"	.325	.680	+.355	081	+14	+.300	+.055	
1530	" " " "	10	17.3	"	.070	.410	+.340	097	+16	+.342	-.002	
1545	" " " "	11	16.8	"	.410	.720	+.310	113	+15	+.321	-.011	-.026
1600	" " " "	12	16.4	"	.070	.330	+.260	126	+13	+.278	-.018	
1615	" " " "	13	15.8	"	.330	.570	+.240	137	+11	+.235	+.005	

TEST CONCLUDED. [illegible] FOUND TO BE TIGHT OR [illegible] ON THIS DAY. 9-19-01

14. Armour Oil #188, 4191 First St., Pleasanton, CA

Name of Supplier, Owner or Dealer | Address No. and Street(s) | City | State | Date of Test: 9-28-86

15. TANK TO TEST

#2 East Center
Identity by position

4/U
Brand and Grade

16. CAPACITY

Nominal Capacity 12000 Gallons

By most accurate capacity chart available 12127 Gallons

From
- [x] Station Chart
- [ ] Tank Manufacturer's Chart
- [ ] Company Engineering Data
- [ ] Charts supplied with petro tite
- [ ] Other

Is there doubt as to True Capacity? [ ]
See Section "DETERMINING TANK CAPACITY"

17. FILL-UP FOR TEST

Stick Water Bottom before Fill-up 0 to ¼ in. · 0 Gallons

	Stick Readings to ¼ in.	Gallons	Total Gallons ea. Reading
Inventory			12127
		Full	13
Product in full tank (up to fill pipe)			12140

Fill up. STICK BEFORE AND AFTER EACH COMPARTMENT DROP OR EACH METERED DELIVERY QUANTITY

Tank Diameter 94

18. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

See manual sections applicable. Check below and record procedure in log (28).

- [ ] Water in tank
- [ ] High water table in tank excavation
- [ ] Line(s) being tested with LVLLT

VAPOR RECOVERY SYSTEM
- [ ] Stage I
- [ ] Stage II

19. TANK MEASUREMENTS FOR TSTT ASSEMBLY

Bottom of tank to Grade*	120 "
Add 30" for 4" L	"
Add 24" for 3" L or air seal	"
Total tubing to assemble Approximate	144 "

20. EXTENSION HOSE SETTING

Tank top to grade*	26 "
Extend hose on suction tube 8" or more below tank top	6 "

*If Fill pipe extends above grade, use top of fill.

21. TEMPERATURE/VOLUME FACTOR (a) TO TEST THIS TANK

Is Today Warmer? [ ] Colder? [ ] ___ °F Product in Tank ___ °F Fill-up Product on Truck ___ °F Expected Change (+ or -)

22. Thermal-Sensor reading after circulation 16164 digits = 71/72 Nearest °F

23. Digits per °F in range of expected change 325 digits

24. 12140 total quantity in full tank (18 or 17) × .000 56958 coefficient of expansion for involved product = 6.9147012 volume change in this tank per °F gallons

25. 6.9147012 volume change per °F (24) ÷ 325 Digits per °F in test Range (23) = .02127600369 Volume change per digit. Compute to 4 decimal places. This is test factor (a) .0213

OBSERVED GRAVITY 55.6
OBSERVED TEMPERATURES 74
CORRECTED API GRAVITY 53.8
C. O. E. .000 56 098

27. DATE / TIME (24 hr.)	28. Record details of setting up and running test. (Use full length of line if needed.) East #2 Center U/L	29. Reading No.	30. HYDROSTATIC PRESSURE CONTROL — Standpipe Level in Inches: Beginning of Reading	Level to which Restored	31. VOLUME MEASUREMENTS (V) RECORD TO .001 GAL. — 32. Product in Graduate: Before Reading	After Reading	Product Replaced (−) / Product Recovered (+)	34. TEMPERATURE COMPENSATION USE FACTOR (A) — 35. Thermal Sensor Reading	36. Change Higher + Lower − (t)	37. Computation (t) × (A) = Expansion + Contraction −	38. NET VOLUME CHANGES EACH READING — Temperature Adjustment: Volume Minus Expansion (+) or Contraction (−) #33(V) − #37(T)	39. ACCUMULATED CHANGE — At High Level total Est Deduction / At Low Level compute Change per Hour
0700	ARRIVED AT SITE: TOOK TANK BURIAL MEASUREMENTS: CHECKED FOR WATER: PLEASE NOTE: IN THE EVENT AIR/VAPOR											
	TOOK INVENTORY OF PRODUCT ON HAND: PREPARED AREA FOR SETTING UP TESTERS. POCKETS WERE PRESENT IN THE TANK/SYSTEM											
	IT COULD HAVE AN EFFECT ON THE TEST RE...											
	DELIVERY TRUCK ARRIVED: ASSISTED DRIVER IN FILLING TANK. SET UP TEST Thermal 95											
1200	STAND AND STARTED CIRCULATING PUMP, BLED AIR.											
1315	FIRST SENSOR READING			42.0				[illegible]	A =	.0213		
1330	START SENSOR READING							16164	71/72	325		
1345	CONT'D HIGH LEVEL TEST	1.	45.9	"	.065	.305	+.240	175	+11	+.234	+.006	
1400	" " " "	2.	45.2	"	.305	.520	+.215	185	+10	+.213	+.002	
1415	" " " "	3.	45.[illegible]	"	.520	.750	+.230	197	+12	+.256	−.026	
1430	" " " "	4.	45.9	"	.010	.260	+.250	210	+13	+.277	−.027	
1445	" " " "	5.	45.8	"	.260	.495	+.235	222	+12	+.256	−.021	
1500	" " " "	6.	45.9	"	.435	.740	+.245	234	+12	+.256	−.011	
1515	" " " "	7.	45.9	"	.010	.250	+.240	245	+11	+.234	+.006	
1517	drop to low " "	8.	45.8	"	.250	.480	+.230	256	+11	+.234	−.004	
1530	Cal " " "			12.0								
1545	" " " "	9	16.0	"	.030	.280	+.250	267	+11	+.234	+.016	
1600	" " " "	10	16.0	"	.280	.535	+.255	279	+12	+.256	−.001	
1615	" " " "	11	15.5	"	.030	.250	+.220	290	+11	+.234	−.014	
1630	" " " "	12	15.2	"	.250	.450	+.200	300	+10	+.213	−.013	−.030
		13	15.0	"	.450	.640	+.190	309	+9	+.192	−.002	

TEST CONCLUDED [illegible signature] FOUND TO BE TIGHT OR [redacted] ...

Petro Tite TANK TESTER

14. Armour Oil #188, 4191 First St., Pleasanton, CA — 9-23-86

Name of Supplier, Owner or Dealer | Address No. and Street(s) | City | State | Date of Test

15. TANK TO TEST

#3 Mid West

Identify by position

Prem U/L

Brand and Grade

16. CAPACITY

Nominal Capacity 12,000 Gallons

By most accurate capacity chart available 12,000 Gallons

Is there doubt as to True Capacity? ☐

See Section "DETERMINING TANK CAPACITY"

From

☐ Station Chart

☐ Tank Manufacturer's Chart

☐ Company Engineering Data

☒ Charts supplied with Petro Tite

☐ Other

17. FILL-UP FOR TEST

Stick Water Bottom before Fill-up 0 to ½ in. 0 Gallons

	Stick Readings to ½ in.	Gallons	Total Gallons as. Reading
Inventory			12,000
Fill up. STICK BEFORE AND AFTER EACH COMPARTMENT DROP OR EACH METERED DELIVERY QUANTITY			
			+50
Tank Diameter 93" — Product in full tank (up to fill pipe)			12,050

18. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

See manual sections applicable. Check below and record procedure in log (26).

☐ Water in tank ☐ High water table in tank excavation ☐ Line(s) being tested with LVLLT

VAPOR RECOVERY SYSTEM

☐ Stage I

☒ Stage II

19. TANK MEASUREMENTS FOR TSTT ASSEMBLY

Bottom of tank to Grade*	124"
Add 30" for 4" L	"
Add 24" for 3" L or air seal	"
Total tubing to assemble Approximate	144"

20. EXTENSION HOSE SETTING

Tank top to grade*	31"
Extend hose on suction tube 6" or more below tank top	6"

*If Fill pipe extends above grade, use top of fill.

21. TEMPERATURE/VOLUME FACTOR (s) TO TEST THIS TANK

Is Today Warmer? [ ] Cooler? [ ] ___° F Product in Tank ___° F Fill-up Product on Truck ___° F Expected Change [+ or -]

22. Thermal-Sensor reading after circulation 18904 digits — 80/81 Nearest °F

23. Digits per °F in range of expected change 314 digits

24. 12,050 total quantity in full tank (16 or 17) × .000578.10 coefficient of expension for involved product = 6.966105 volume change in this tank per °F gallons

25. 6.966105 volume change per °F (24) ÷ 314 Digits per °F in test Range (23) = .022185047 Volume change per digit. Compute to 4 decimal places. This is test factor (s) .0222

OBSERVED GRAVITY 52.6

OBSERVED TEMPERATURES 73°

CORRECTED API GRAVITY 55.0

C. O. E. .000578.10

26. LOG OF TEST PROCEDURES			30. HYDROSTATIC PRESSURE CONTROL		31. VOLUME MEASUREMENTS (V) RECORD TO .001 GAL.			34. TEMPERATURE COMPENSATION USE FACTOR (a)			38. NET VOLUME CHANGES EACH READING	39. ACCUMULATIVE CHANGE
27. DATE / TIME (24 hr)	28. Record details of setting up and running test. (Use full length of line if needed.) #3 Mid West Ruk	29. Reading No.	Standpipe Level in Inches: Beginning of Reading	Level to which Restored	32. Product in Graduate: Before Reading	After Reading	Product Replaced (−) / Product Recovered (+)	35. Thermal Sensor Reading	36. Change Higher + Lower − (t)	37. Computation (t) × (a) = Expansion + Contraction −	Temperature Adjustment: Volume Minus Expansion (+) or Contraction (−) #33(V) − #37(t)	In High Level record Total End Reduction / At Low Level compute Change per Hour (NFPA criteria)
0700	ARRIVED AT SITE: TOOK TANK BURIAL MEASUREMENTS: CHECKED FOR WATER: PLEASE NOTE: IN THE EVENT AIR/VAPOR											
	TOOK INVENTORY OF PRODUCT ON HAND: PREPARED AREA FOR SETTING UP TESTERS. POCKETS WERE PRESENT IN THE TANK/SYSTEM											
	IT COULD HAVE AN EFFECT ON THE TEST READ											
930	DELIVERY TRUCK ARRIVED: ASSISTED DRIVER IN FILLING TANK, SET UP TEST											
1030	STAND AND STARTED CIRCULATING PUMP, BLED AIR.											
								Freon	$t=$	.0222		
1230	FIRST SENSOR READING			42		.765		8904	60/21	.314		
1245	START SENSOR READING	1.	41.5	"	.765	.795	+.030	.912	+5	+.111	−.081	
1300	CONT'D HIGH LEVEL TEST	2.	42.5	"	.795	.830	+.035	916	+4	+.089	−.054	
1315		3.	42.8	"	.830	.890	+.060	922	+6	+.133	−.073	
1330		4.	42.9	"	.560	.620	+.060	926	+4	+.089	−.029	
1345		5.	43.0	"	.620	.685	+.065	934	+8	+.178	−.112	
1400		6.	42.9	"	.685	.740	+.055	937	+3	+.067	−.012	
1415		7.	43.0	"	.740	.810	+.070	940	+3	+.067	+.003	
1430		8.	43.0	"	.810	.875	+.065	942	+2	+.044	+.021	
1432	Drop to Low Level			42/12								
1445		9	13.8	"	.875	1.000	+.125	946	+4	+.089	+.036	
1500		10	13.5	"	.365	.470	+.105	951	+5	+.111	−.006	
1515		11	13.5	"	.470	.575	+.105	956	+5	+.111	−.006	−.029
1530		12	13.4	"	.575	.680	+.105	961	+5	+.111	−.006	
1545		13	13.3	"	.680	.780	+.100	966	+5	+.111	−.011	

TEST CONCLUDED. S... FOUND TO BE TIGHT OR NOT TIGHT ON THIS DAY ... Good

14. Armour Oil #188, 4191 First St., Pleasanton, CA — 9-23-86

Name of Supplier, Owner or Dealer | Address No. and Street(s) | City | State | Date of Test

petro tite TANK TESTER

15. TANK TO TEST: #4 west
Identify by position
Reg
Brand and Grade

16. CAPACITY
Nominal Capacity 12000 Gallons
By most accurate capacity chart available 12,000 Gallons
From: ☐ Station Chart ☐ Tank Manufacturer's Chart ☐ Company Engineering Data ☐ Charts supplied with petro tite ☐ Other Stick
Is there doubt as to True Capacity? ☐
See Section "DETERMINING TANK CAPACITY"

17. FILL-UP FOR TEST

	Stick Readings to ¼ in.	Gallons	Total Gallons ex. Reading
Stick Water Bottom before Fill-up 0 (to ¼ in.) - 0 Gallons			
Inventory			12,000
Fill up. STICK BEFORE AND AFTER EACH COMPARTMENT DROP OR EACH METERED DELIVERY QUANTITY			
			850
Tank Diameter 93" — Product in full tank (up to fill pipe)			12,850

18. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK
See manual sections applicable. Check below and record procedure in log (28).
☐ Water in tank ☐ High water table in tank excavation ☐ Line(s) being tested with LVLLT

VAPOR RECOVERY SYSTEM
☐ Stage I
☒ Stage II

19. TANK MEASUREMENTS FOR TSTT ASSEMBLY
Bottom of tank to Grade* ..... 124 "
Add 30" for 4" L ..... "
Add 24" for 3" L or air seal ..... "
Total tubing to assemble Approximate ..... 144 "

20. EXTENSION HOSE SETTING
Tank top to grade* ..... 31 "
Extend hose on suction tube 6" or more below tank top ..... 6 "

*If Fill pipe extends above grade, use top of fill.

21. TEMPERATURE/VOLUME FACTOR (a) TO TEST THIS TANK
Is Today Warmer? ( ) Colder? ( ); ___° F Product in Tank ___° F Fill-up Product on Truck ___° F Expected Change (+ or -)

22. Thermal-Sensor reading after circulation 18118 digits — 77/78 Nearest °F

23. Digits per °F in range of expected change 321 digits

24. 12,050 (Total quantity in full tank (18 or 17)) × .00055893 (coefficient of expansion for involved product) = 6.7351065 gallons (volume change in this tank per °F)

25. 6.7351065 (volume change per °F (24)) ÷ 321 (Digits per °F in test Range (23)) = .02098164 (Volume change per digit. Compute to 4 decimal places.) This is test factor (a)

.0210

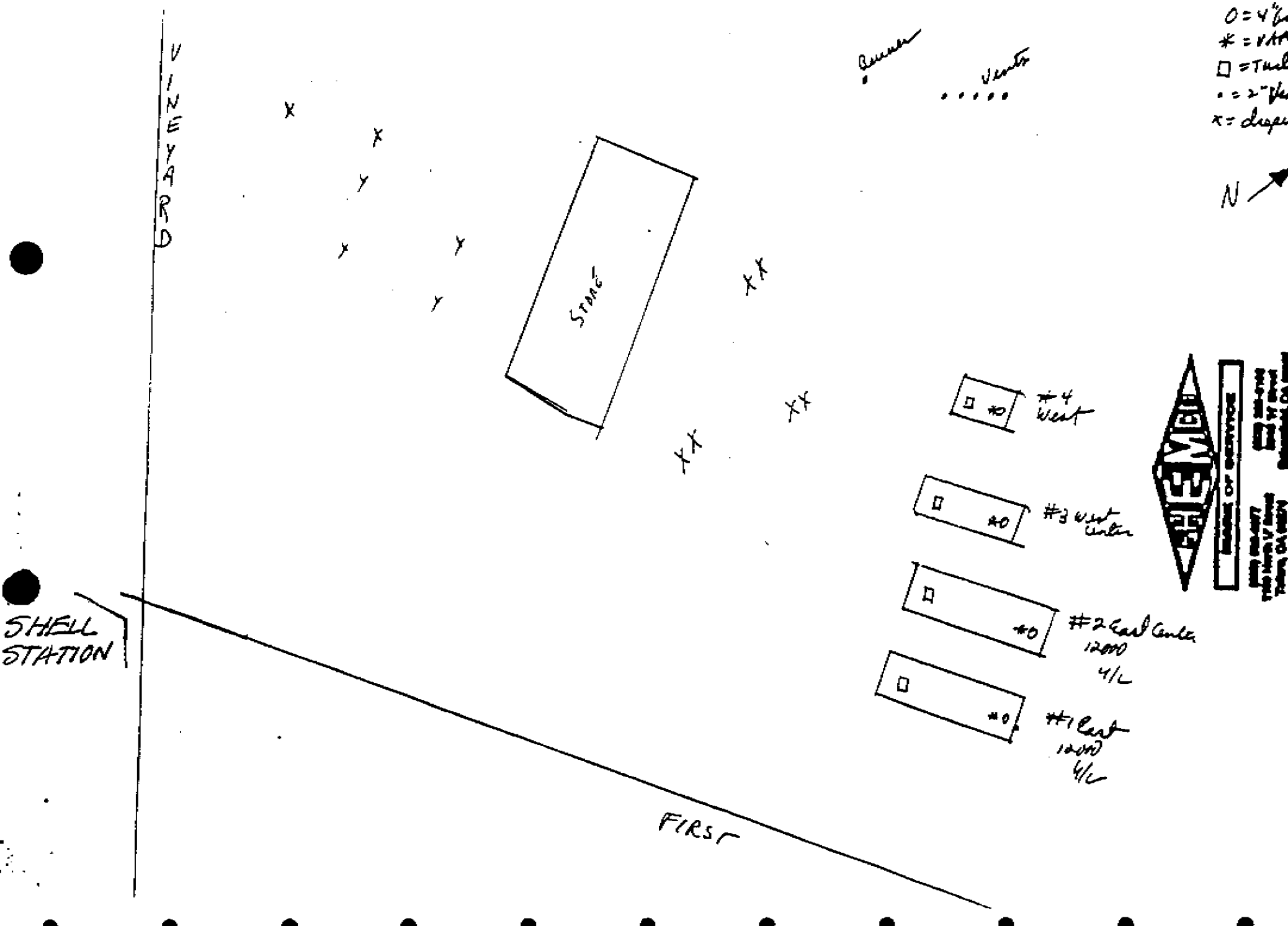
OBSERVED GRAVITY 54.4
OBSERVED TEMPERATURES 78°
CORRECTED API GRAVITY 52.3
C. O. E. .00055893

26. LOG OF TEST PROCEDURES			30. HYDROSTATIC PRESSURE CONTROL		31. VOLUME MEASUREMENTS (T) RECORD TO .001 GAL.			TEMPERATURE COMPENSATION USE FACTOR (A)			CHANGES EACH READING	ACCUMULATED CHANGE
27. TIME (24 hr.)	28. Record details of setting up and running test. (Use full length of line if needed.) #4 West Reg	29. Reading No.	Standpipe Level in Inches: Beginning of Reading	Level to which Restored	32. Product in Graduate: Before Reading	After Reading	Product Replaced (−) / Product Recovered (+)	35. Thermal Sensor Reading	36. Change Higher + Lower − (t)	37. Computation (t) × (a) = Expansion + Contraction −	Temperature Adjustment: Volume Change Expansion (+) or Contraction (−) #33(V) − #37(T)	In High Level record Total Net Deduction; In Low Level compute Change per Hour (NFPA criteria)
0700	ARRIVED AT SITE: TOOK TANK BURIAL MEASUREMENTS: CHECKED FOR WATER: PLEASE NOTE: IN THE EVENT AIR/VAPOR											
	TOOK INVENTORY OF PRODUCT ON HAND: PREPARED AREA FOR SETTING UP TESTERS. POCKETS WERE PRESENT IN THE TANK/SYSTEM											
	IT COULD HAVE AN EFFECT ON THE TEST READ											
0[illegible]30	DELIVERY TRUCK ARRIVED: ASSISTED DRIVER IN FILLING TANK, SET UP TEST											
1100	STAND AND STARTED CIRCULATING PUMP, BLED AIR.											
								Factor	A=	.0210		
1230	FIRST SENSOR READING			42		800		18118	77/78	.321		
1245	START SENSOR READING	1.	42.2	"	.800	.820	+.020	122	+4	+.084	−.064	
1300	CONT'D HIGH LEVEL TEST	2.	42.2	"	.820	.840	+.020	126	+4	+.084	−.064	
1315		3.	42.3	"	.840	.860	+.020	130	+4	+.084	−.064	
1330		4.	42.4	"	.590	.610	+.020	134	+4	+.084	−.064	
1345		5.	42.3	"	.610	.630	+.020	137	+3	+.063	−.043	
1400		6.	42.2	"	.630	.640	+.010	141	+4	+.084	−.074	
1415		7.	42.4	"	.640	.650	+.010	145	+4	+.084	−.074	
1430		8.	42.5	"	.650	.660	+.010	148	+3	+.063	−.053	
1432	Dropped to low level			42/12								
1445		9	14.0	"	.660	.820	+.160	152	+4	+.084	+.076	
1500		10	13.6	"	.365	.470	+.105	156	+4	+.084	+.021	
1515		11	13.2	"	.470	.550	+.080	160	+4	+.084	−.004	+.011
1530		12	12.8	"	.550	.610	+.060	163	+3	+.063	−.003	
1545		13	13.0	"	.610	.675	+.065	166	+3	+.063	+.002	

TEST CONCLUDED. C. [illegible] FOUND TO BE (TIGHT) OR NOT TIGHT ON THIS DAY. 9-28-81

Armour Oil Company, P. O. Box 26243, Sacramento, CA 95826
Armour Oil #188, 4191 First St., Pleasanton, CA

T-8132



FREMONT OFFICE

MAY 21 1987

RECEIVED

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION

5997 PARKSIDE DRIVE ♦ PLEASANTON, CALIFORNIA 94566 ♦ (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

(1) LOCATION OF PROJECT Arco Service Station
First & Ray Streets
Pleasanton, CA

(2) CLIENT
Name UNOCAL Corp
Address 2176 N. Calif. #650 Phone 945-7676
City Walnut Creek Zip 94596

(3) APPLICANT
Name Applied Geo Systems *
Address 3255 Mission Blvd Phone 651-1906
City Fremont Zip 94539

(4) DESCRIPTION OF PROJECT
Water Well Construction X Geotechnical ___
Cathodic Protection ___ Well Destruction ___

(5) PROPOSED WATER WELL USE
Domestic ___ Industrial ___ Irrigation ___
Municipal ___ Monitoring X Other ___

(6) PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

WELL PROJECTS
Drill Hole Diameter 8 in. Depth ~85 ft.
Casing Diameter 2 in. Number 1
Surface Seal Depth ~55 ft.
Driller's License No. 480802

GEOTECHNICAL PROJECTS
Number ___
Diameter ___ in. Maximum Depth ___ ft.

(7) ESTIMATED STARTING DATE 8-20-87
ESTIMATED COMPLETION DATE 8-20-87

(8) I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] Director Date 8-17-87

FOR OFFICE USE

PERMIT NUMBER 87197
LOCATION NUMBER ___

Approved Craig A. Mayfield Date 18 Aug 87
Craig A. Mayfield

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Notify this office (484-2600) at least one day prior to starting work on permitted work and before placing well seals.
3. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or bore hole logs and location sketch for geotechnical projects. Permitted work is completed when the last surface seal is placed or the last boring is completed.
4. Permit is void if project not begun within 90 days of approval date.

(B) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie, or equivalent.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material.

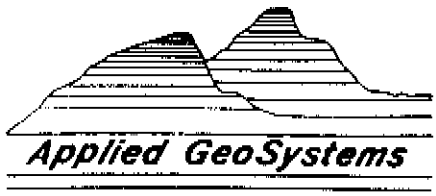
D. CATHODIC. Fill hole above anode zone with concrete placed by tremie, or equivalent.

E. WELL DESTRUCTION. See attached.

* Applied Geo Systems Representative:
Mr. Glenn Dembroff

91986

CHAIN OF CUSTODY RECORD



43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): [signature]

Phone: (415) 651-1906

LABORATORY: APPLIED GEOSYSTEMS

TURNAROUND TIME: 2 WKS.

Project Leader: BILL SHORT

Phone No. (415) 651-1906

SHIPPING INFORMATION:

Shipper _____

Address _____

Date Shipped _____

Service Used _____

Airbill No. _____ Cooler No. _____

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
[signature]		8/21/87	1700
	Received for laboratory by: [signature]	8-21-87	18:00

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
S-35-B4	AGS-87086-1	8-21-87	TVH, BTEX, TEH	ICED
S-65-B4	"	"	" " "	"

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 9-9-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: William R. Short

Date Received: 8-21-87
Date Analyzed: 9-1-87

Laboratory# 8709S001

Procedure:

The soil sample referenced on the attached Chain-of-Custody was analyzed for the presence and concentration of Benzene, Ethyl-Benzene, Toluene, and Xylenes (BETX) and for Total Volatile Hydrocarbons (TVH) by EPA method 8020. The sample was concentrated on a Tekmar LSC-2 and ALS automatic sampler prior to injection into a 5890 Hewlett Packard gas chromatograph fitted with a Photo-Ionization detector (PID) and a Flame Ionization detector (FID). The limit of detection for this sample is 0.2 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

SAMPLE	SITE	BENZENE	ETHYL BENZENE	TOLUENE	TOTAL XYLENES	TVH
S-35-B4	87086-1	1.4	0.5	0.6	4.4	100.5

Results in milligrams/kilogram (parts per million = ppm).

Tia Tran, Chemist

Applied GeoSystems is a State of California, Department of Health Services Certified Hazardous Waste Testing Laboratory (No. 153).

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 9-9-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: William R. Short

Date Received: 8-21-87
Date Analyzed: 9-1-87

Laboratory# 8709S002

Procedure:

The soil sample referenced on the attached Chain-of-Custody was analyzed for the presence and concentration of Benzene, Ethyl-Benzene, Toluene, and Xylenes (BETX) and for Total Volatile Hydrocarbons (TVH) by EPA method 8020. The sample was concentrated on a Tekmar LSC-2 and ALS automatic sampler prior to injection into a 5890 Hewlett Packard gas chromatograph fitted with a Photo-Ionization detector (PID) and a Flame Ionization detector (FID). The limit of detection for this sample is 0.05 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

SAMPLE	SITE	BENZENE	ETHYL BENZENE	TOLUENE	TOTAL XYLENES	TVH
S-65-B4	87086-1	ND	ND	ND	ND	0.45

Results in milligrams/kilogram (parts per million = ppm).
ND=Non Detectable - Less than 0.05 milligrams/kilogram (ppm).

Tia Tran, Chemist

Applied GeoSystems is a State of California, Department of Health Services Certified Hazardous Waste Testing Laboratory (No. 153).

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

RECORD OF ANALYSIS

Date 9-08-87

Applied GeoSystems
43255 Mission Blvd.
Fremont, CA. 94539

Attention: William R. Short

Date Received: 8-21-87
Date Analyzed: 9-2-87

Laboratory# 8709DS03

Procedure:

The soil samples were analyzed for high boiling point hydrocarbons by EPA method 3550 for soil extraction. The samples were injected into a 5890 Hewlett Packard gas chromatograph fitted with a Flame Ionization detector (FID). The limit of detection for these samples is 5 milligrams/kilogram (parts per million = ppm).

The results are presented in the table below:

SAMPLE	SITE	TOTAL EXTRACTABLE HYDROCARBONS
S-35-B4	87086-1	1835
S-65-B4	87086-1	ND

Results in milligrams/kilogram (parts per million = ppm).
ND=Non Detectable - Less than 5 milligrams/kilogram (ppm).

Tia Tran, Chemist

Applied GeoSystems is a State of California, Department of Health Services Certified Hazardous Waste Testing Laboratory (No. 153).

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA. 94539 (415) 651-1906

7376 ✓

FRED STANTON FIEDLER
OCT 26 1987

WORK PLAN
SUPPLEMENTAL SUBSURFACE ENVIRONMENTAL INVESTIGATION
at
ARCO Service Station
Armour Oil Company No. 188
First and Ray Streets
Pleasanton, California

AGS Job No. 87086-2P

Report prepared for

Armour Oil Company
P.O. Box 85302
San Diego, California 92138-5302

by
Applied GeoSystems

Glenn R. Dembroff
Director of Geologic Operations

Michael N. Clark
C.E.G. 1264

October 22, 1987

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

October 22, 1987
AGS 87086-2P

Mr. Byron Armour
Armour Oil Company
P.O. Box 85302
San Diego, California 92138-5302

Subject: Transmittal of Work Plan No. 87086-2P, Supplemental Subsurface Environmental Investigation at ARCO Service Station, Armour Oil Company No. 188, First and Ray Streets, Pleasanton, California.

Mr. Armour:

This work plan presents the results of previous environmental investigations performed at the above-referenced site and proposes additional work necessary to assess and, if necessary, mitigate hydrocarbon contamination of soil and ground water.

ARMOUR OIL CO

The proposed work includes removing underground storage tanks from the site, sampling and analyzing soil samples from the tank pit excavation for hydrocarbon contamination, removing product lines from the site and sampling soil from the product-line trenches, replacing the tanks with double-walled steel tanks, replacing the product lines in fiberglass-lined trenches, drilling three soil borings and constructing 2-inch-diameter ground-water monitoring wells in the borings, developing and sampling water from the wells for laboratory analysis, performing a ground-water gradient evaluation, performing a search for wells within a 1/2-mile radius of the site, and preparing a comprehensive report documenting field methodology and presenting our findings, conclusions, and recommendations.

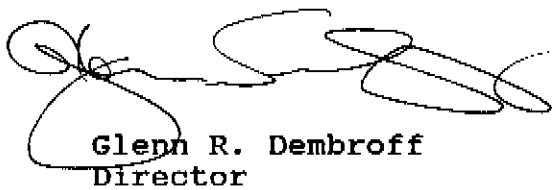
U.O.G.

??

In our opinion, this work is necessary to minimize the risk of further contamination at the site from hydrocarbon product storage and transferal, to evaluate the lateral and vertical extent of soil contamination at the site, and to assess to what extent ground-water resources beneath the site have been impacted by hydrocarbon contamination.

Please do not hesitate to call if you have any questions regarding the contents of this work plan.

Sincerely,
Applied GeoSystems



Glenn R. Dembroff
Director
Geologic Operations

Applied GeoSystems 43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

WORK PLAN
SUPPLEMENTAL SUBSURFACE ENVIRONMENTAL INVESTIGATION
at
ARCO Service Station
Armour Oil Company NO.188
First and Ray Streets
Pleasanton, California
For: Armour Oil Company

INTRODUCTION

The following work plan describes the work necessary to evaluate the extent of hydrocarbon contamination of soil and ground-water resources and to minimize the risk of further hydrocarbon releases at the above-referenced site. The work proposed includes !) replacement of current storage tanks with double-walled steel tanks, 2) replacement of product lines and double-containment of product line trenches, 3) drilling and sampling three soil borings near the underground storage tank cavity, 4) developing the monitoring wells and sampling ground water from the wells for analysis of hydrocarbon contaminants, 5) performing a ground-water gradient evaluation, 6) performing a search of

wells within a 1/2-mile radius of the site, and 7) preparing a comprehensive report documenting field methodology and presenting our findings, conclusions, and recommendations.

BACKGROUND AND PREVIOUS WORK

The ARCO Service Station site is located on the northwest corner of the intersection of First Street and Ray Street in Pleasanton, California as shown on the Site Vicinity Map, Plate P-1. We understand that four 12,000-gallon, underground petroleum product storage tanks are buried at the site. The four storage tanks, which contain gasoline product for retail sale, are located adjacent to one another in the northeast portion of the property. The Generalized Site Plan, Plate P-2, shows the service station property and approximate locations of the station facilities.

Applied GeoSystems previously drilled three soil borings at the site on June 30, 1987 for UNOCAL Corporation in order to evaluate hydrocarbon contamination at the site prior to a real estate transaction. Two borings (B-1 and B-2) were drilled to approximately 46.5 feet in depth and one boring (B-3) was drilled to approximately 55 feet in depth. No ground water was

encountered during the course of drilling, and the borings were backfilled from total depth to a few inches below grade with a slurry of neat cement and 5 percent bentonite. The borings were then capped with asphalt to grade. Applied GeoSystems' report AGS 87065-1, dated July 14, 1987, describes the initial investigation and presents our conclusions and recommendations based on the data available at the time. Plate P-2 of this report shows the approximate locations of the three initial borings.

Laboratory analytical results of nine soil samples collected from the three boreholes showed non-detectable to relatively high levels (1325 parts per million) of hydrocarbon contamination in the three initial borings. The results of these analyses, initially presented in Applied GeoSystems report AGS 87065-1, are presented in Table 1.

TABLE 1
RESULTS OF CHEMICAL ANALYSES
OF SOIL SAMPLES
ARCO Service Station
First and Ray Streets
Pleasanton, California

Sample Number	TVH	Benzene	Ethyl Benzene	Toluene	Xylenes	TEH
S-20-B1	281.9	17.1	17.0	73.6	92.3	NA
S-35-B1	126.13	2.06	0.84	1.02	6.59	1325
S-45-B1	9.36	0.64	0.26	1.06	1.47	NA
S-25-B2	188.8	13.1	6.1	6.3	56.2	NA
S-35-B2	56.81	1.47	1.81	1.58	18.09	NA
S-45-B2	9.09	0.07	0.18	0.26	1.30	NA
S-10-B3	ND	ND	ND	ND	ND	NA
S-30-B3	7.72	3.95	0.13	0.51	0.85	NA
S-40-B3	180.7	12.4	9.4	47.8	45.1	NA

Results in milligrams/kilogram(mg/kg)=parts per million(ppm)
TVH: Total volatile hydrocarbons
TEH: Total extractable hydrocarbons
ND: Non Detectable
NA: Not Analyzed
Detection limits: 0.05 ppm (TVH - S-35-B1, S-45-B1, S-35-B2, S-45-B2, S-10-B3, B-30-B3)
0.5 ppm (TVH - S-20-B1, S-25-B2, S-40-B3)
5.0 ppm (TEH - S-35-B1)

Armour Oil Company supplied Applied GeoSystems with a copy of a Petro Tite system test performed at the service station in September 1986. The tank system test results indicated no detectable leaks.

Based on the initial laboratory analytical results, Armour Oil Company contracted with Applied GeoSystems to drill an additional soil boring adjacent to boring B-1 to evaluate the vertical extent of the hydrocarbon contamination. The intent of this work was to encounter either ground water or two successive soil samples (collected at 5-foot intervals) that showed no subjective evidence of hydrocarbon contamination. The direction of ground water flow was inferred to be to the northwest prior to drilling. This flow direction was inferred from the general surface topography in the area. Boring B-4 was drilled adjacent to boring B-1 based on the proximity to the tank pit, the inferred direction of ground-water flow, and the fact that boring B-1 contained the highest subjective levels of hydrocarbon contamination.

The boring (B-4) was drilled to a depth of approximately 66.5 feet. A monitoring well was not installed because no subjective evidence of hydrocarbon contamination was detected in the lowest

10 feet of the boring and because no ground water was encountered. The boring was backfilled with a slurry of 5 percent bentonite and neat cement. The location of boring B-4, with respect to the previous borings and other site features, is shown on the Generalized Site Plan.

Soil samples were collected at 5-foot intervals from the ground surface to total depth in boring B-4. A subjective analysis for presence of hydrocarbon contamination was performed and the results recorded for each soil sample collected from the boring. The sample with the highest subjective level of contamination and the sample from the base of the boring (S-35-B4 and S-65-B4) were analyzed for total volatile hydrocarbons (TVH) and the hydrocarbon constituents benzene, ethylbenzene, toluene, and total xylene isomers (BETX) and for total extractable hydrocarbons (TEH). The results of the chemical analyses are presented in Table 2.

TABLE 2
RESULTS OF CHEMICAL ANALYSES
OF SOIL SAMPLES
ARCO Service Station
Armour Oil Company No. 188
First and Ray Streets
Pleasanton, California

Sample Number	TVH	Benzene	Ethyl Benzene	Toluene	Xylenes	TEH
S-35-B4	100.5	1.4	0.5	0.6	4.4	1835
S-65-B4	0.45	ND	ND	ND	ND	ND

Results in milligrams/kilogram(mg/kg) = parts per million(ppm)
TVH: Total volatile hydrocarbons
TEH: Total extractable hydrocarbons
ND: Non Detectable
Detection limits: 0.2 ppm (TVH - S-35-B4)
0.05 ppm (TVH - S-65-B4)
5.0 ppm (TEH)

The results of analyses on the soil samples collected from the two studies indicate that low to relatively high levels of hydrocarbon contamination are present adjacent to the tank pit and product lines. As shown in Tables 1 and 2 the level of

contamination decreases with depth in borings B-1, B-2, and B-4. Subjective analyses indicate that the level of contamination decreases with depth below 40 feet in boring B-3 as well.

Inspection of the chromatograms (graphical results of the analyses) suggests that the hydrocarbon contamination is derived from a combination of two sources. One portion of the contamination appears to be derived from gasoline; the other portion appears to be derived from diesel. Gasoline constituent concentrations are measured with the total volatile hydrocarbons (TVH) analysis, and the diesel constituent concentrations are measured with the total extractable hydrocarbons (TEH) analysis. The analyses indicate that the majority of the contamination at the site is derived from diesel.

We understand, based on information supplied by Armour Oil Company, that diesel has never been sold at the subject service station since it was constructed by Armour Oil Company in the 1970's. This information suggests that the contamination found in the soil may be derived from previous operations at the site or adjacent sites.

Alameda County Flood Control and Water Conservation District ground-water contour maps show the ground-water surface to be approximately 55 feet below the ground surface in the vicinity of the site. Ground water was not encountered to a depth of approximately 66.5 feet in boring B-4, and no aquifer materials (such as sand and gravel) were encountered in the lower portion of the boring. For these reasons a confined aquifer system may be present below the total depth of boring B-4. Conversely, the aquifer may be unconfined and deeper than approximately 66.5 feet. The ground-water surface elevation depicted on the Alameda County Flood Control District maps may represent the potentiometric surface (surface to which water in the aquifer would rise under hydrostatic pressure) of a confined aquifer in the vicinity of the site. These maps are interpretive and the ground-water levels depicted beneath the site may be approximations.

The trend of decreasing levels of hydrocarbon contamination to very low to non-detectable levels at the base of boring B-4, and the fact that ground water is deeper than approximately 66.5 feet, indicate that the contamination has not reached the ground water in the vicinity of boring B-4 at the present time.

PROPOSED WORK

The proposed work at the site is designed to both minimize the risk of future hydrocarbon contamination related to hydrocarbon product storage at the site and to evaluate the degree and lateral and vertical extent of hydrocarbon contamination on the subject property. The following work elements are proposed:

1) Excavate and remove the four single-walled underground storage tanks and associated product piping at the site. Soil sampling and laboratory analyses, as required by local and State agencies, will be performed in the tank pit and product line trenches.

2) Replace the tanks with double-walled steel tanks that are equipped with double-containment around their fill ports. Replace the product piping with fiberglass lines in a fiberglass-lined trench.

3) Excavate three soil borings at locations shown on the Generalized Site Plan. The borings will be drilled to a point approximately 20 feet below the ground-water surface and used for the installation of ground-water monitoring wells.

4) Collect and classify relatively undisturbed soil samples taken at 5-foot intervals in the soil borings.

5) Construct three ground-water monitoring wells in the boreholes with 2-inch inside-diameter polyvinyl chloride (PVC) casing.

6) Develop the wells and collect ground-water samples.

7) Analyze selected soil and ground-water samples for total hydrocarbons and gasoline-product constituents in a California State-certified laboratory.

8) Evaluate local ground-water gradient by surveying the top of each well casing, measuring static ground-water depths in the wells, and calculating the relative elevation of the ground-water surface in each well.

9) Interpret field and laboratory data to evaluate the extent of contamination.

10) Describe the subsurface conditions at the site as revealed in the borings.

11) Conduct a search for wells within a 1/2-mile radius of the site. The purpose of the search is to locate nearby wells, determine the wells' uses (e.g. domestic water supply, irrigation, etc.), and detail the wells' construction and depth of water pumping.

12) Prepare a final report summarizing our findings, conclusions, and recommendations.

The first proposed well, MW-1, will be located north of the product tanks, near the northern boundary of the property, to evaluate the subsurface soil and ground-water conditions in the inferred downgradient direction from the product storage tanks. The second well, MW-2, will be constructed west of the storage tanks in order to evaluate the subsurface soil and ground-water conditions in the inferred downgradient direction of the product piping. The third well, MW-3, will be located south of the hydrocarbon-product storage tanks to evaluate background conditions of soil and ground-water resources at the site and to

provide the third data point necessary for a ground-water gradient evaluation. Drilling will be stopped if any saturated clay layer (aquitard) that is greater than 5 feet thick is encountered below the ground-water surface. Applied GeoSystems will contact Underground Services Alert (USA) to delineate utility lines on public property adjacent to the site before we begin drilling.

Soil boring/sampling

The soil borings will be drilled using 8- to 10-inch-diameter, continuous flight, hollow stem augers and a Mobile B-61, or similar, drill rig. Auger flights will be steam-cleaned prior to use to minimize the possibility of downhole- or cross-contamination. The drilling will be performed under the guidance of a field geologist and the earth materials in the boring will be logged as drilled.

During drilling, soil samples will be collected at 5-foot intervals using a California-modified split-spoon sampler (2-1/2-inch inside-diameter) equipped with laboratory-cleaned brass sleeves. Samples will be collected by advancing the boring to a point immediately above the sampling depth, then driving the sampler into the native soil through the hollow center of the auger. The sampler will be driven 18 inches with a standard 140 pound hammer dropped 30 inches. The number of blows required to drive the sampler each successive 6 inches will be counted and recorded to give an indication of soil consistency. Copies of a Field Boring Log, as well as a Boring Log Plate used in our final report, are included with this work plan.

Soil samples collected for possible chemical analyses will be sealed with aluminum foil, plastic end caps, and airtight tape. The samples will then be labeled and immediately placed in iced storage for transport to a laboratory that is certified to perform the required chemical analyses. A Chain of Custody Record will be initiated in the field and will accompany the samples to the laboratory. A copy of the Chain of Custody Record, an example of which is included in this work plan, will be included in the final report.

Disposal of Cuttings

Soil hydrocarbon contamination in the proposed boreholes is expected to be relatively low. Relative hydrocarbon contamination of the cuttings can be characterized during drilling with an organic vapor analyzer or equivalent instrument and this characterization can later be verified in the laboratory by analyses of soil samples collected during drilling. Soil cuttings that are found to contain greater than 100 ppm hydrocarbon will be either placed in appropriately-lined Department of Transportation (DOT) type 17H 55-gallon drums or stockpiled at the site for future aeration or treatment (if necessary). Soil cuttings that are found to contain less than 100 ppm will be placed on plastic at the station site.

Drill cuttings generated during drilling will remain the responsibility of Armour Oil Company. Applied GeoSystems can arrange to have the soil aerated or treated (if necessary) and removed to an appropriate disposal facility with Armour Oil Company's authorization.

Monitoring Well Construction

The monitoring wells will be constructed of thread-jointed 2-inch inside-diameter (I.D.), schedule 40, polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents will be used in well construction. The screened portion of the well will consist of factory-perforated 0.020-inch-wide slotted casing. The well screen will extend from total depth of the well to approximately 10 feet above the upper zone of saturation to allow monitoring through expected seasonal fluctuations of ground water.

The screened section annulus will be packed with sorted sand to a minimum of 2 feet above the perforations. A 1- to 2-foot-thick bentonite plug will be placed above the sand as a seal against cement entering the sand pack. The remaining annulus will be backfilled with neat cement or a slurry of neat cement and 5 percent bentonite to a few inches below grade. The well will be developed before collecting water samples by swabbing, surge pumping, or other suitable method. The well will be pumped until the discharge is relatively clean and free of suspended sediment. Pumped water will be contained in 55-gallon drums that will be

left on site. Laboratory analyses of the water will confirm whether this water can be disposed in the sanitary sewer system or must be transported to another disposal location.

A locking well cage and padlock will be concreted over the well head and a traffic-rated cast-aluminum utility box with PVC apron will be placed over each well and set with concrete flush with the surrounding station pad. This box has a water-tight seal to protect against surface water infiltration and requires a specially-designed wrench to open. This design reduces the possibility of either vandalism or accidental disturbance of the well.

Water Sampling

Ground water will be allowed to recover to static conditions in the wells and an initial water level measurement will be made. A bailer will be then used to obtain a sample from the surface of the water in the well. Any subjective evidence of product detected in the well will be recorded. If floating product is encountered in a well, the well will not be purged or sampled. If no floating product is observed in a well, a formation water sample will be collected after the well is purged. The well will

be purged of at least three well volumes and sampled using a Teflon bailer that is cleaned with Alconox and rinsed with tap water and deionized water.

The water samples will be sealed in laboratory-cleaned 40-milliliter glass vials with Teflon-lined lids, and will be labeled, and immediately placed in iced storage. A Chain of Custody Record will be initiated by the sampler and will accompany the samples to a laboratory certified for the types of analyses requested. A copy of the Chain of Custody Record form will be included in our final report.

Laboratory Analysis

Soil samples from each borehole with the highest hydrocarbon concentration will be selected for laboratory analysis of total petroleum hydrocarbons and the aromatic hydrocarbons benzene, ethylbenzene, toluene, and total xylene isomers (BETX) by Environmental Protection Agency (EPA) Methods 8015 and 8020. The organic vapor analyzer will be used during drilling to evaluate the relative hydrocarbon concentrations of each sample collected. Water samples will be analyzed for total hydrocarbons and BETX by

EPA Methods 8015 and 602. Detection limits suitable for the soil and water tests requested and concentrations present will be stated on the laboratory report.

Measurement of Ground-Water Gradient

The gradient will be measured and the direction of local ground-water flow will be estimated. A leveling instrument will be used to measure the differences (to the nearest 0.001 foot) in elevation between the instrument and the top of the casing in each ground-water monitoring well. Elevation differences will be combined with depth to static water measurements (taken to the nearest 0.01 foot) in the respective wells to calculate the differences in water level elevations. The calculations will be used to create a ground-water potentiometric surface map for the site.

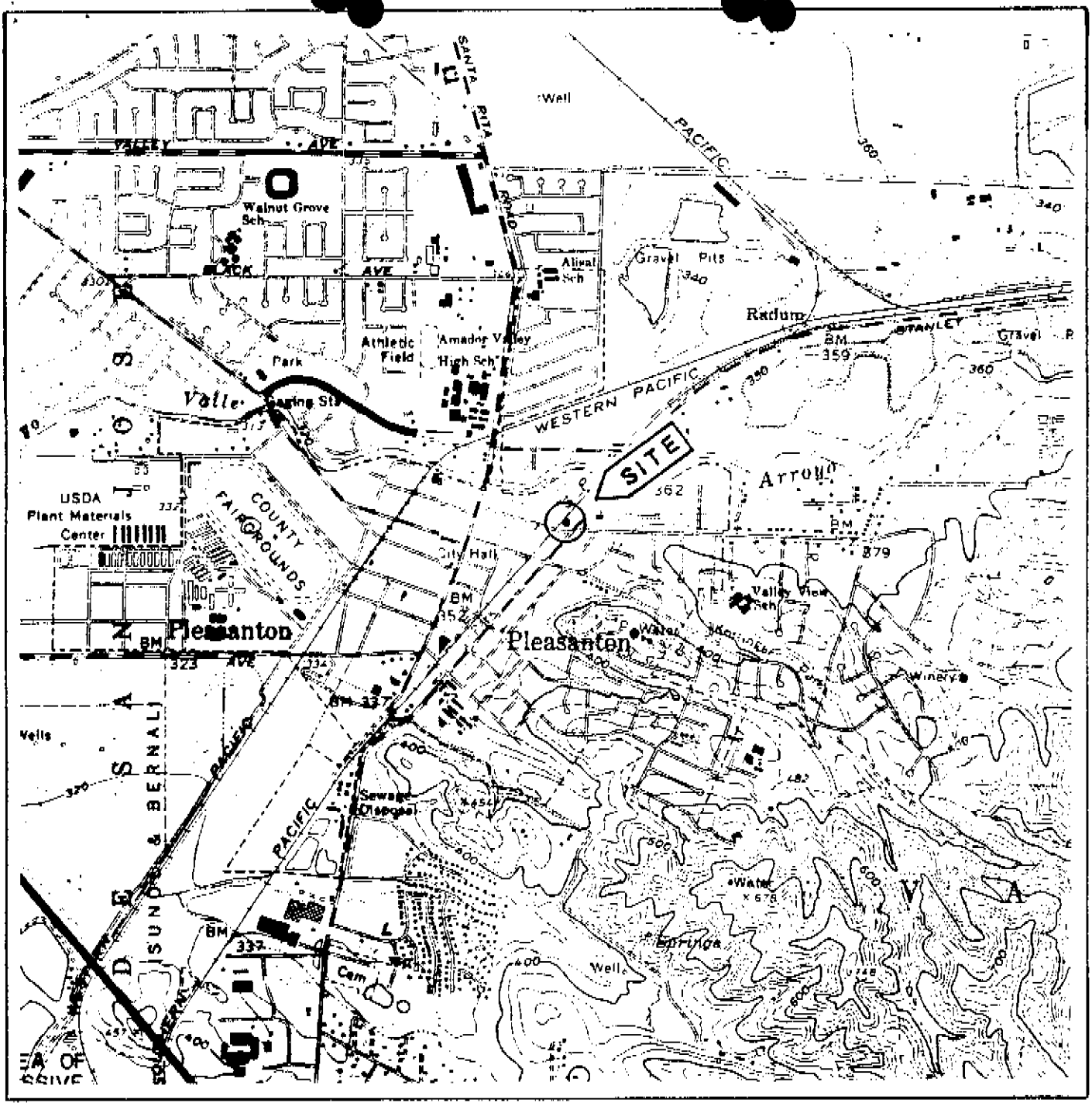
Report Preparation

A final report summarizing the soil stratigraphy, field and laboratory procedures, well construction details, laboratory results, ground-water gradient, and recommendations for further

work, if needed, will be supplied to Armour Oil Company approximately 30 days after field work is completed. All information gathered during the study will be considered confidential and released only upon authorization by Armour Oil Company.

PROJECT STAFF

Mr. Michael N. Clark, a Registered Geologist (RG 3868) and Certified Engineering Geologist (CEG 1264) in the state of California, will be in overall charge of this project. Mr. William R. Short, project geologist, will manage field and office operations of the project. Applied GeoSystems employs a staff of geologists and technicians who will additionally be used to see the project to completion.



N

Approximate Scale

2000 1000 0 2000 4000

feet

Source: State of California
Special Studies Zone
Dublin/Livermore
7.5 Minute Quadrangle

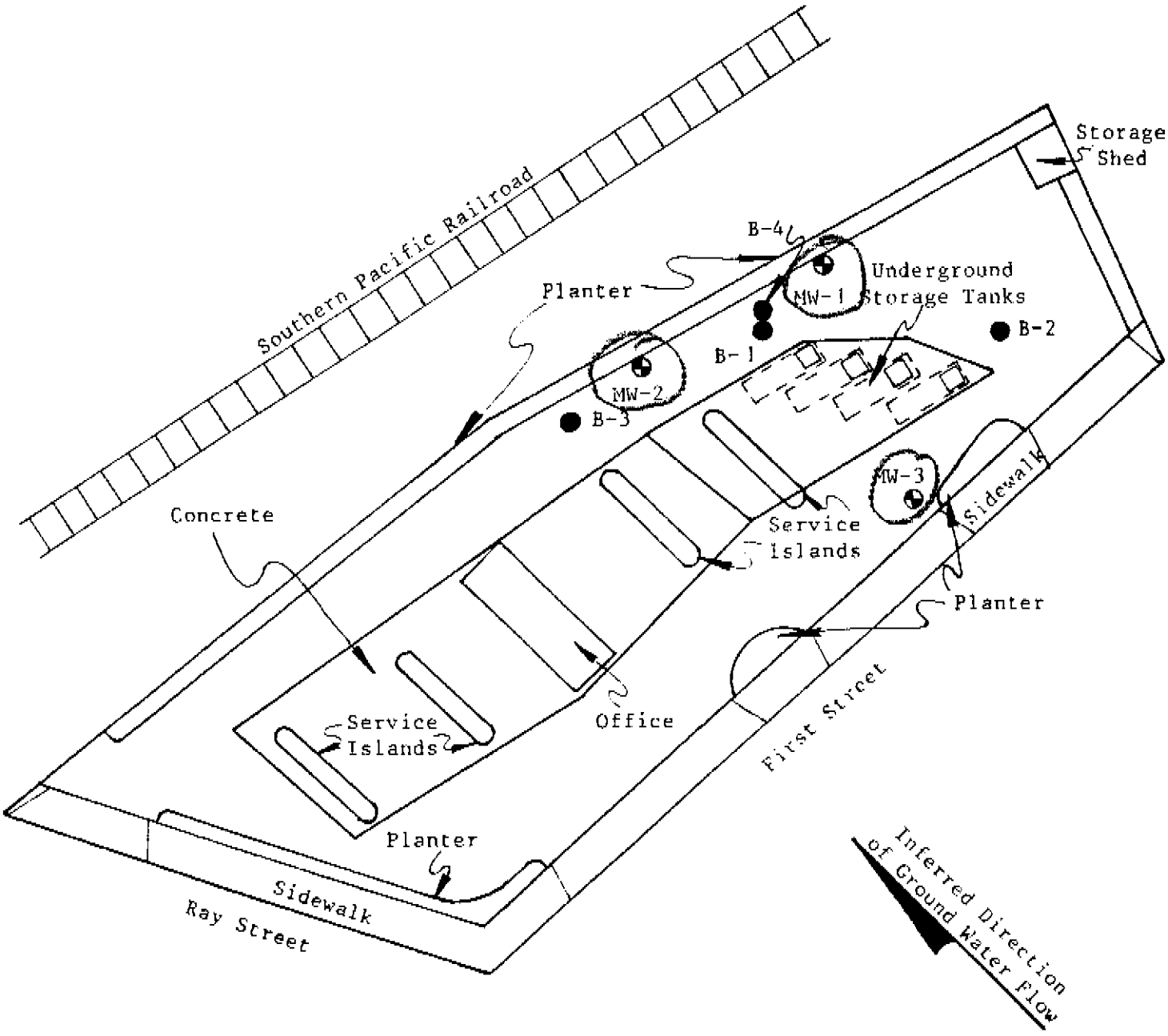
Applied GeoSystems

PROJECT NO. 87086-2P

SITE VICINITY MAP
Arco Station
First and Ray Street
Pleasanton, California

PLATE

P-1



● = Previous Soil Boring Location

◔ = Proposed Soil Boring/ Ground-water Monitoring Well

N

Approximate Scale

40 0 40 80

feet

Applied GeoSystems

PROJECT NO. 87086-2P

GENERALIZED SITE PLAN
Arco Station
First and Ray Street
Pleasanton, California

PLATE

P-2

DRILLING METHOD

BORING NO.

SHEET
P-3

SAMPLING METHOD

DRILLING

					START	FINISH
WATER LEVEL					TIME	TIME
TIME						
DATE					DATE	DATE
CASING DEPTH						

TUM _____ ELEVATION _____

RECOVERY	SAMPLE TYPE	SAMPLE DEPTH	BLOWS PER 6 in.	MOISTURE CONTENT	PRODUCT ODOR	DEPTH IN FEET	USCS CODE
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
						10	
						11	
						12	
						13	
						14	
						15	
						16	
						17	
						18	
						19	
						20	

SURFACE CONDITIONS:

FIELD BOREHOLE LOG

Blows/ Ft.	Sample No.	USCS	DESCRIPTION	WELL CONST.

DEPTH IN FEET

REPORT BOREHOLE LOG

Applied GeoSystems

LOG OF BORING

PLATE

PROJECT NO.

CHAIN OF CUSTODY RECORD

43255 Mission Blvd. Suite B Fremont, CA 94539 (415) 651-1906

SAMPLER (signature): _____

Phone: _____

LABORATORY:

_____

_____

_____

TURNAROUND TIME: _____

Attention: _____

Phone No. _____

SHIPPING INFORMATION:

Shipper _____

Address _____

Date Shipped _____

Service Used _____

Airbill No. _____ Cooler No. _____

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
	Received for laboratory by:		

LABORATORY SHOULD SIGN UPON RECEIPT AND RETURN A COPY OF THIS FORM WITH THE LABORATORY RESULTS

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt

SAMPLE