Applied GeoSystems

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HAZARDOUS MATERIALS DIVISION
80 SWAN WAY
ROOM 200
OAKLAND, CA 94621

FROM: STEVE STRAUSZ
TITLE: STAFF GEOLOGIST

DATE: [redacted]
PROJECT NUMBER: 69034-2
SUBJECT: REPORT

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SUBSURFACE ENVIRONMENTAL ASSESSMENT

at

ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

[redacted]

AGS Report No. 69034-2

Report prepared for

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

by

Applied GeoSystems

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STATE OF CALIFORNIA

December 14, [redacted]

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(CONTINUED)

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

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

SUBSURFACE ENVIRONMENTAL ASSESSMENT
at
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

For ARCO Products Company

INTRODUCTION

ARCO Products Company (ARCO) contracted with Applied GeoSystems to perform a subsurface environmental assessment at ARCO Station 601 located at 712 Lewelling Boulevard in San Leandro, California. This assessment was initiated after gasoline and other hydrocarbons were detected in the soil and ground-water during investigations performed by Applied GeoSystems and others. The purpose of this assessment was to evaluate the extent of hydrocarbons and other constituents related to the former gasoline- and waste-oil-storage tanks in the subsurface soil and ground water.

The work performed for this investigation included drilling three soil borings, collecting and describing soil samples from the borings, installing and developing a 4-inch-diameter ground-water monitoring well in each of the borings, sampling ground water from the monitoring wells, laboratory analyzing selected soil and ground-water samples, measuring ground-water levels, and surveying wellhead elevations. This report includes a summary of previous work performed at the site, summaries of field procedures used during this investigation, interpretation of the data, and conclusions.

SITE DESCRIPTION AND BACKGROUND

The subject site is on the southwestern corner of the intersection of Lewelling Boulevard and Washington Avenue in San Leandro, California, as shown on the Site Vicinity Map (Plate 1). The site is an operating ARCO service station. The elevation of the site is approximately 22 feet above mean sea level (msl). The site is bounded by residential and professional buildings to the west-southwest and south, commercial buildings across Washington avenue to the east and northeast, and an operating service station across Lewelling Boulevard to the north-northwest.

During January 1990, two 6,000-gallon underground gasoline-storage tanks (T2 and T4), two 4,000-gallon underground gasoline-storage tanks (T1 and T3), and one underground 550-gallon waste-oil storage tank were excavated and removed from the site by Gettler-Ryan Inc. of Hayward, California. According to the report related to tank excavation and removal at the site by GeoStrategies, Inc., of Hayward, California (GeoStrategies, June 29, 1990), the tanks were installed in 1974. The approximate locations of the underground storage tanks and other features at the site are shown on the Generalized Site Plan (Plate 2).

REGIONAL AND LOCAL HYDROGEOLOGY

The ARCO station is within the East Bay Plain, located in the west-central portion of the San Leandro Cone (Hickenbottom and Muir, 1988). Helley et. al. (1979) mapped the earth materials underlying the site area as Quaternary bay mud deposits composed primarily of dark plastic clay and silty clay rich in organic material. The site is located approximately 700 feet north of the San Lorenzo Creek (which has been channelized in a concrete aqueduct in this area), approximately 1,400 feet east of the Estudillo Canal, and

approximately 1-3/4 miles northeast of Roberts Landing on the eastern shoreline of the San Francisco Bay. The active Hayward Fault is approximately 2-1/2 miles east of the site.

The inferred direction of ground-water flow in the vicinity of the site is to the west-northwest based on regional and local topography and drainage patterns. Ground water was encountered during our previous drilling activities in August 1989 at a depth of approximately 14-1/2 feet, which stabilized in the borings at a depth of approximately 10 to 11 feet.

PREVIOUS WORK

Prior to the present investigation, Applied GeoSystems and others performed environmental investigations related to the removal of underground gasoline- and waste-oil-storage tanks. The results of these investigations are presented in reports listed in the references of this report. A brief summary of previous work performed at the site is included in Appendix A of this report.

FIELD WORK

Drilling

Well construction permits were acquired from the Alameda County Flood Control and Water Conservation District (ACFCWCD) prior to drilling at the site. Copies of the permits are included in Appendix B. On June 28 and 29, 1990, three soil borings (B-6, B-7, and B-8) were drilled and a ground-water monitoring well was constructed in each of the borings (MW-1, MW-2, and MW-3, respectively). A summary of the field procedures

employed by Applied GeoSystems is included in Appendix C. Work for this assessment was performed in accordance with the Site Safety Plan (AGS 69034-1S), also included in Appendix C.

Boring B-6 was drilled at the location of the former underground waste-oil-storage tank and a ground-water monitoring well (MW-1) was installed in the boring to investigate the presence and extent of hydrocarbons and metals related to the underground waste-oil tank in the soil and ground water in the vicinity of this tank. Boring B-7 was drilled in native soil near the former underground gasoline-storage tanks in the originally inferred downgradient direction of these tanks, and a ground-water monitoring well (MW-2) installed in the boring to evaluate the presence and extent of petroleum hydrocarbons in the soil and ground water in the vicinity of the former gasoline-storage tanks. Boring B-8 was drilled in the previously inferred downgradient direction of the former waste-oil-tank, and a ground-water monitoring well (MW-3) installed in the boring to evaluate the extent of hydrocarbons in the soil and in the ground water in this vicinity.

Soil Sampling and Description

A total of 23 soil samples were collected from the soil borings and described as indicated on the Logs of Borings, Plates 4 through 6. Soil samples from boring B-6 were collected continuously from a depth of 3-1/2 feet below the ground surface to the total depth of 17 feet. Soil samples from boring B-7 were collected at intervals of less than 5 feet from the ground surface to the total depth of 16-1/2 feet. Soil samples from boring B-8 were collected at a depth of 2-1/2 feet below the ground surface and continuously from 6 feet to the total depth of 16 feet. Sampling procedures are described in Appendix C.

The earth materials encountered at the site during this and previous investigations consisted primarily of silty to sandy clay to clayey silt with thin (less than 1-1/2 foot thick) layers of clayey sand mainly between the approximate depths of 8 and 12 feet (see Logs of Borings, Plates 4 through 6, and Geologic Cross Sections A-A' and B-B', Plates 7 and 8, respectively). Ground-water was first encountered in borings B-6, B-7, and B-8 at depths of approximately 9 to 11-1/2 feet below the ground surface, within clayey sand [redacted] feet of [redacted] clay, which may be a perching or confining layer, was encountered at approximately 12 feet below the ground surface in each of the borings B-6, B-7, and B-8.

Monitoring Well Construction and Development

Three ground-water monitoring wells (MW-1, MW-2, and MW-3) were constructed in borings B-6, B-7, and B-8, respectively. The soil borings were reamed to a diameter of 10 inches by hollow stem augers prior to construction of the ground-water monitoring wells. The wells were completed with 4-inch-diameter, Schedule 40, polyvinyl chloride (PVC) casing. Well casings were set in the wells to depths of approximately 12 feet below ground surface. The screened casings for the monitoring wells consist of 4-inch-diameter, 0.020 inch machine-slotted PVC set from the total depth of the well to approximately 8 feet below the ground surface. Blank PVC casing was set from the top of the screened casing to within a few inches below the ground surface. The monitoring wells were developed on July 11, 1990 to remove fine-grained sediments and to allow better communication between the water-bearing zone and the ground-water monitoring well. Details regarding well construction and development are described in Appendix C.

Ground-Water Sampling

Depths-to-water were measured in ground-water monitoring wells MW-1, MW-2, and MW-3 and water samples were collected and visually inspected for floating product on [redacted] 1990. Initial water samples collected from monitoring well MW-2 showed no visual evidence of hydrocarbon product. [redacted] samples collected from monitoring well MW-1 exhibited an [redacted] and bead-like product emulsio[redacted] geologist noted an obvious product [redacted] associated with the water samples obtained from MW-1. Initial water samples obtained from ground-water monitoring well MW-3 showed no evidence of floating or suspended product, but after purging 2.7 gallons of water from the well, a water sample from the well exhibited a floating product sheen. Ground-water monitoring wells MW-1, MW-2, and MW-3 were then purged and sampled on July 17, 1990. Laboratory analysis were not requested for water samples obtained from wells MW-1 and MW-3 because of the presence of floating or suspended product in these two wells; however, one water sample obtained from well MW-3 was analyzed inadvertently by the laboratory for total oil and grease (TOG) without Applied GeoSystems' authorization. Subjective analysis results for product in ground water is included in Table 1. Appendix C contains a description of subjective analysis and ground-water sampling procedures.

Evaluation of Ground-Water Gradient

On July 17, 1990 the wellheads for the new and existing ground-water monitoring wells were surveyed to a local National Geodetic Vertical Datum benchmark by Ron Archer Civil Engineer, Inc. of Pleasanton, California, a licensed surveyor. The results of this wellhead survey are included in Appendix D, Wellhead Survey. Ground-water elevations for each well were calculated by subtracting the measured depth-to-water from the elevation of the

wellhead. Depths-to-water in the wells were also measured on August 7, 1990. The measured depth-to-water, wellhead elevations, and ground-water elevations are presented in Table 1, Ground-Water Elevation Data.

The ground-water gradient evaluated for the first encountered water zone at this site from the ground-water elevations obtained from wells MW-1, MW-2 and MW-3 on July 17, 1990 and August 7, 1990 is 0.003 (0.3-foot vertical drop in 100 feet horizontal distance) to the southwest. Plates 9 and 10, Ground-Water Gradient Maps for July 17 and August 7, 1990, respectively, are graphic interpretations of the ground-water elevations measured on these dates. This interpreted gradient may be affected by the presence of product emulsion and sheen in wells MW-1 and MW-3.

LABORATORY ANALYSIS

Soil samples collected from borings B-6, B-7, and B-8 were analyzed in accordance with Alameda County Health requirements for the gasoline constituents benzene, toluene, ethylbenzene, total xylenes (BTEX) and total petroleum hydrocarbons as gasoline (TPHg) using modified Environmental Protection Agency (EPA) Methods 5030/8015/8020. One soil sample obtained from just above the first encountered ground water in each soil boring was submitted for laboratory analysis for organic lead by the California State Department of Health Services (DHS) L.U.F.T. Manual method. In addition, soil samples collected from boring B-6 were analyzed for total petroleum hydrocarbons as diesel (TPHd) using EPA Methods 3550/8015; total petroleum hydrocarbons as oil and grease (TOG) using Standard Method 503 D/E; the total metals cadmium, chromium, lead and zinc using EPA Method 3050/6010; volatile organic compounds (VOCs) using EPA Method 8240; and base

neutral and acid extractables including poly neutral aromatics (BNAs), using EPA Method 8270. These soil samples were selected for laboratory analysis based on:

- Location above first-encountered ground-water;
- Location in a potential confining or perching layer below first-encountered groundwater;
- Areas where the presence of gasoline or waste oil hydrocarbons was suspected; and
- 5-foot intervals and or change in stratigraphic units, as recommended by DHS guidelines.

The results of these analyses are summarized in Table 2, Laboratory Analysis of Soil Samples, July 1990. Chain of Custody forms and copies of laboratory reports for soil samples are included in Appendix E of this report. In addition, nine soil samples were selected from different stratigraphic units in each boring and submitted to Johnson Filtration Systems Inc. laboratory in St. Paul, Minnesota for particle analysis to aid in future monitoring well design. The results of analysis and design recommendations are included in Appendix F.

Water samples obtained from monitoring well MW-2 were analyzed in accordance with Alameda County Health requirements for BTEX and TPHg by modified EPA Methods 5030/8015/602, TPHd by modified EPA Methods 3510/8015, TOG according to Standard Method 503 A/E, PNAs by EPA Method 625/8270, VOCs by EPA Method 624, and for the metals cadmium, chromium, lead, and zinc by EPA Method 3020/6010. Because diesel was reported in the analysis of the water sample from well MW-2, and diesel has apparently not been used onsite, Applied GeoSystems requested the laboratory to review the chromatographs to verify the presence of diesel. After this review, the laboratory reported that the total petroleum hydrocarbons reported as diesel resembled gasoline. The results

of these analyses are summarized in Table 3, Laboratory Analyses of Ground-Water Samples. Chain of Custody records and laboratory analysis reports are included in Appendix E.

DISCUSSION AND CONCLUSIONS

The majority of gasoline and waste-oil hydrocarbons at concentrations above 100 ppm in the soil at the site outside the immediate areas of the former gasoline-storage and waste-oil-storage tanks appears to be within or just above the interbedded clayey sand to silty clay at depths between approximately 8 and 12 feet below the ground surface. [redacted]

The lateral extent of hydrocarbons in the soil associated with the former gasoline- and waste-oil-storage tanks at the site has not been delineated below 100 ppm, with the exception of gasoline hydrocarbons which have been delineated to 15 ppm TPHg northeast of the former gasoline tank excavation.

The vertical extent of TPHg in the soil has been delineated to nondetectable (<1.0 ppm) in soil samples obtained from 15-1/2 to 16-1/2 feet in soil borings B-6, B-7, and B-8, and to nondetectable (<10 ppm) in soil samples obtained by GSI approximately 14 feet deep in the excavation beneath the former gasoline tanks. [redacted] The vertical extent of hydrocarbons associated with the former waste-oil tank has not been delineated in the vicinity of this tank.

Laboratory analysis of soil samples obtained from soil boring B-6 near the former waste-oil tank for the total metals cadmium, chromium, lead, and zinc reported levels from [illegible] ppm cadmium to 287.1 ppm lead, and are below the levels of Total Threshold Limit Concentration Values in soil of Title 22 of the California State Administrative Code, recorded January 1988, for these respective metals. Laboratory analysis of the ground-water sample obtained from well MW-2 reported levels of the metals cadmium, chromium, lead, and zinc at or below the respective DHS drinking water action levels.

Exceeds the STLC 10x

The lateral and vertical extents of hydrocarbons in the ground water have not been delineated at the site. A source of gasoline hydrocarbons reported in the ground water may be the gasoline hydrocarbons reported in the soil north and northwest of the former gasoline tank excavation. An additional offsite source of gasoline hydrocarbons may be indicated by the presence of a product sheen in well MW-3, which is located relatively crossgradient from the former gasoline storage tanks. The source of detectable concentrations of naphthalene and 2-methylnaphthalene, which are minor constituents of gasoline, may be associated with the former gasoline-storage tanks, but the source of detectable concentrations of methylene chloride is uncertain. Methylene chloride is a common laboratory chemical which is used in the extraction process, and may have been introduced in the laboratory.

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 assessment was conducted solely for the purpose of evaluating environmental conditions of the soil and ground water with respect to gasoline and waste-oil related hydrocarbons at the

site. No soil engineering or geotechnical references are implied or should be inferred. Evaluation of the geologic conditions at the site for the purpose of this assessment 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 assessment. This report has been prepared solely for ARCO Products Company and any reliance on this report by third parties shall be at such party's sole risk.

REFERENCES

Applied GeoSystems, August 1, 1989, Site Safety Plan, Subsurface Environmental Investigation at ARCO Service Station 601, AGS Report 69034-1S.

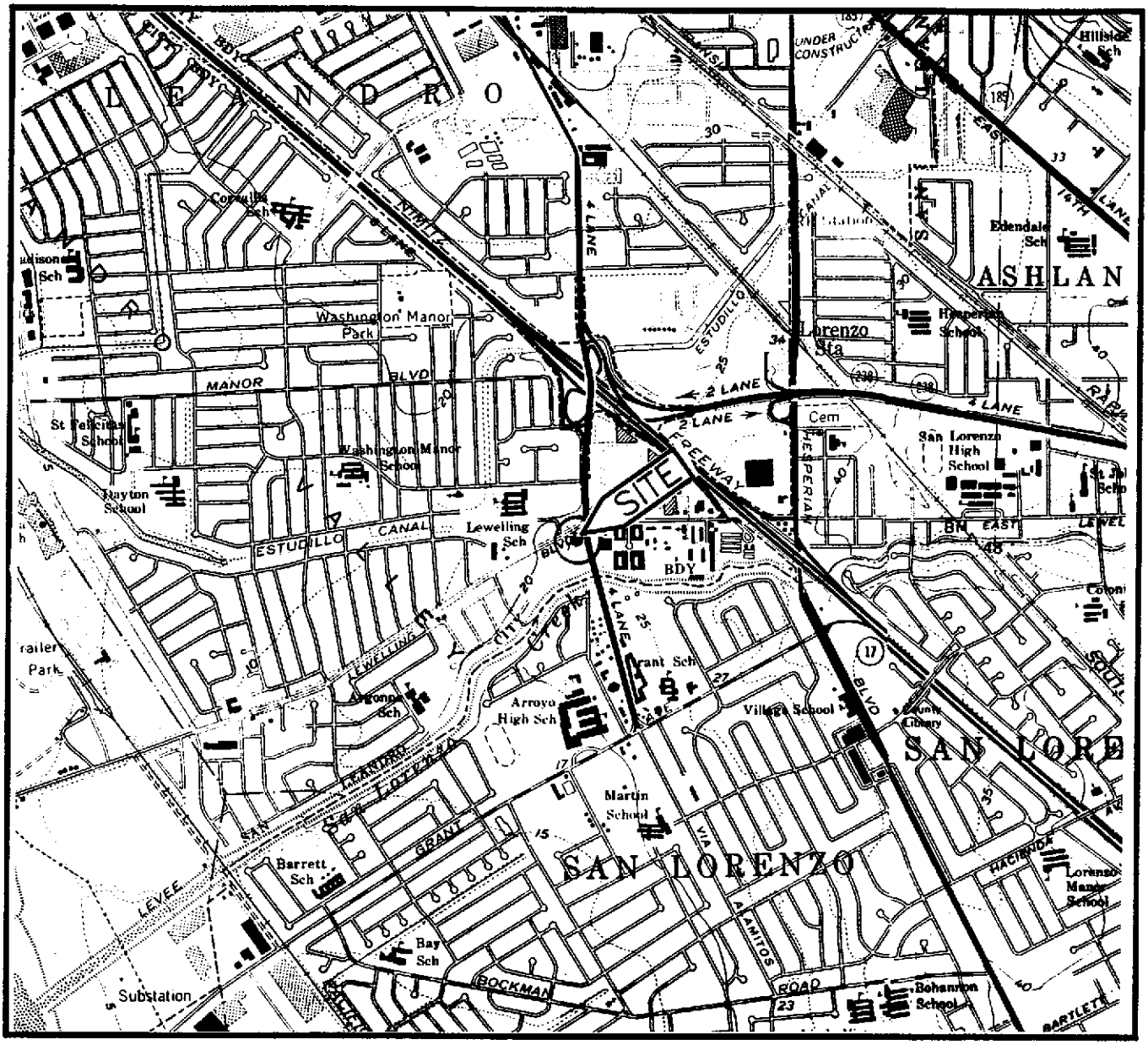
Applied GeoSystems, November 9, 1989, Limited Environmental Site Assessment at ARCO Service Station No. 601, San Leandro, California, AGS Report 69034-1.

GeoStrategies, Inc, November 14, 1989, Proposed Scope of Work, ARCO Service Station #601, San Leandro, California, GSI Report 7918-1.

GeoStrategies, Inc., June 29, 1990, Tank Replacement Report, ARCO Service Station #601, San Leandro, California, GSI Report 7918-2.

Helley, E. S., K. R. Lajoie, W. E. Spangle, and M. L. Blair, 1979, Flatland Deposits of the San Francisco Bay Region, California, U.S. Geological Survey Professional Paper 943.

Hickenbottom, Kelvin and Muir, Kenneth, June 1988, Geohydrology and Groundwater - Quality Overview of the East Bay Plain Area, Alameda County, California, Alameda County Flood Control and Water Conservation District, Report 205 (j).



Source: U.S. Geological Survey
7.5–Minute Quadrangles
Hayward/San Leandro,
California
Photorevised 1984

N

Approximate Scale

2000 1000 0 2000 4000

feet

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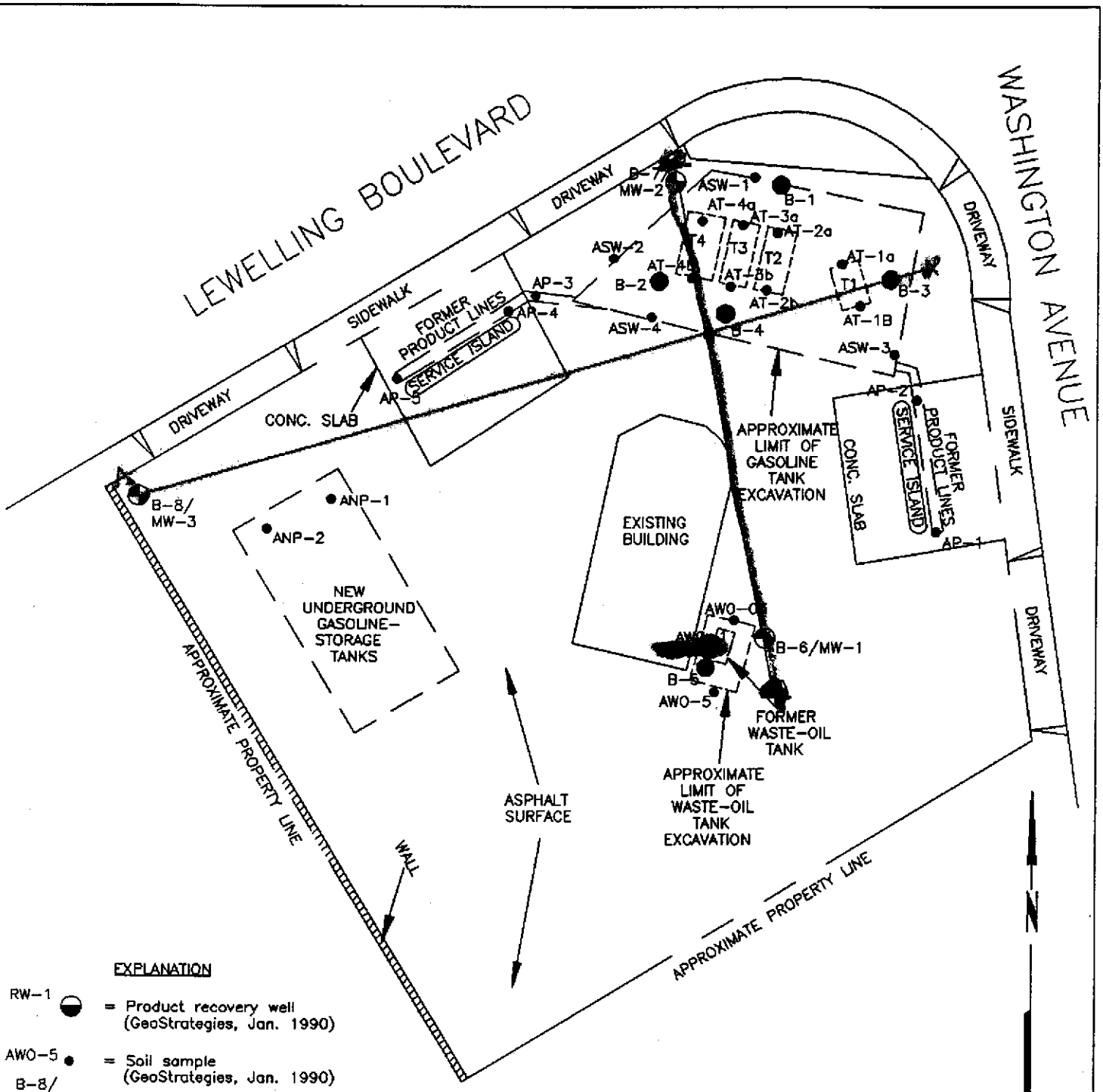
SITE VICINITY MAP
ARCO Service Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE
1



EXPLANATION

RW-1 = Product recovery well (GeoStrategies, Jan. 1990)

AWO-5 = Soil sample (GeoStrategies, Jan. 1990)

B-8/MW-3 = Ground-water monitoring well (Applied GeoSystems, June 1990)

B-5 = Soil boring (Applied GeoSystems, August 1989)

T4 = Former Underground Gasoline-storage tanks

B B' = Geologic cross sections

Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by Ron Archer, Civil Engineer Inc.

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GENERALIZED SITE PLAN
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE 2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION		LTR	DESCRIPTION	MAJOR DIVISION		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 mixtures, 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-Silt mixtures.			OL	Organic Silts and Organic Silt-Clays of low plasticity.
		GC	Clayey Gravel, 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 Sand 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, organic Silts.
		SM	Silty Sands, Sand-Silt mixtures.				
		SC	Clayey Sands, Sand-Clay mixtures.	HIGHLY ORGANIC SOILS		PT	Peat and other highly Organic Soils.


Depth through which sampler is driven


Relatively undisturbed sample


No sample recovered


Static water level observed in well/boring


Initial water level observed in boring

S-10 Sample number


Sand pack


Bentonite


Neat cement


Caved native soil


Blank PVC


Machine-slotted PVC

P.I.D. Photoionization detector

BLOWS REPRESENT THE NUMBER OF BLOWS OF A 140-POUND HAMMER FALLING 30 INCHES TO DRIVE THE SAMPLER THROUGH EACH 6 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 TIME OF DRILLING ONLY.

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UNIFIED SOIL CLASSIFICATION SYSTEM AND SYMBOL KEY
ARCO Service Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE 3

Depth of boring: 17 feet **Diameter of boring:** 10 inches **Date drilled:** 6-28-90

Well depth: 12 feet **Material type:** Sch 40 PVC **Casing diameter:** 4 inches

Screen interval: 7 to 12 feet **Slot size:** 0.020-inch

Drilling Company: Exploration Geo **Driller:** Doug Davidson

Method Used: Hollow-Stem Auger **Field Geologist:** Mike Barminski

Signature of Registered Professional: Duane M. Barclay

Registration No.: EG 1366 **State:** CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0					Asphalt over baserock.	
				CL	Gravelly clay, brown, moist, low to medium plasticity, stiff: fill.	
2		10 12 14		CL	Sandy clay, gray, moist, low plasticity, very stiff; obvious product odor.	
4	S-4.5	7 9 13	330			
6	S-6	14 18 24	201			
	S-7.5	7 10 16	337			
8				SC	[redacted], fine-grained, gray, [redacted] medium dense; [redacted] product odor.	
	S-9	12 15 30	354			
10				CL	Sandy clay, gray, [redacted] low to medium plasticity, very stiff; [redacted] odor.	
	S-10.5	8 20 30	437	SC	Clayey sand, fine-grained, brown, [redacted] medium dense; [redacted] product odor.	
12	S-12	14 20 30	878	CL	Silty clay, gray to black, [redacted], medium plasticity, hard; noticeable product odor.	
	S-13.5	6 7 16	320			
14	S-15	13 27 42	60			
16	S-16.5		143			
18					Total Depth = 17 feet.	
20						

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PROJECT: 69034-2

LOG OF BORING B-6/[redacted]

ARCO Service Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE 4

Depth of boring: 16-1/2 feet **Diameter of boring:** 10 inches **Date drilled:** 6-28-90

Well depth: 12 feet **Material type:** Sch 40 PVC **Casing diameter:** 4 inches

Screen interval: 8 to 12 feet **Slot size:** 0.020-inch

Drilling Company: Exploration Geo **Driller:** Doug Davidson

Method Used: Hollow-Stem Auger **Field Geologist:** Mike Barminski

Signature of Registered Professional: Diane M Barclay

Registration No.: EG 1366 **State:** CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0					Asphalt over baserock.	
				CL	Gravelly clay, brown, moist, low to medium plasticity, stiff: fill.	
2		6		CL	[redacted], dark gray, [redacted], low to medium plasticity, very stiff.	
		10				
	S-3	15	7.9			
4		6				
	S-4.5	10	6.8			
		16				
6						
8						
		9				
		11				
10	S-10	19	300	SC	[redacted] fine-grained, dark gray, [redacted], medium dense.	
		12		CL	[redacted], dark gray, [redacted], medium to low plasticity, hard.	
12		17				
	S-12.5	30	21.6			
		6				
14	S-14	16	12.5			
		27				
		5				
		7			With bioturbations or former root stringers now filled with silty sand and [redacted]	
16	S-16	9	47			
					Total Depth = 16-1/2 feet.	
18						
20						

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PROJECT: 69034-2

LOG OF BORING B-[redacted]

ARCO Service Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE 5

Depth of boring: 16-1/2 feet **Diameter of boring:** 10 inches **Date drilled:** 6-28-90

Well depth: 12 feet **Material type:** Sch 40 PVC **Casing diameter:** 4 inches

Screen interval: 8 to 12 feet **Slot size:** 0.020-inch

Drilling Company: Exploration Geo **Driller:** Doug Davidson

Method Used: Hollow-Stem Auger **Field Geologist:** Mike Barminski

Signature of Registered Professional: Diane M Barclay

Registration No.: EG 1366 **State:** CA

Depth	Sample No.	Blows	P.I.D.	USCS Code	Description	Well Const.
0					Asphalt over baserock.	
				CL	Gravelly clay, brown, moist, low to medium plasticity, very stiff; fill.	
2		7 7		CL	[redacted], dark gray, moist, low to medium plasticity,	
	S-3	12	95		very stiff; noticeable product odor.	
4		10				
		9 8				
6	S-6	10	106	SC	[redacted], fine-grained, dark gray, [redacted], medium dense; [redacted] product odor.	
		13				
8	S-7.5	23	634	CL	[redacted], dark gray, [redacted], low to medium plasticity, very stiff; [redacted] product odor.	
		11 13		SC	[redacted], fine-grained, dark gray, [redacted], medium	
	S-9	20	875		dense; [redacted] product odors	
10		7		CL	[redacted], dark gray, [redacted], medium plasticity, very	
	S-10	10	27		stiff; [redacted] product odors	
		36 9		SC	[redacted], fine-grained, dark gray, [redacted], medium dense;	
12		10			[redacted] product odor.	
	S-12	20	0.2	CL	[redacted], drak gray, moist, medium plasticity, very stiff;	
		6			some gravelly light brown silty layers; [redacted]	
14	S-13.5	21 22	1.0		[redacted] odor.	
		7				
16	S-16	12 18	2.0			
					Total Depth = 16-1/2 feet.	
18						
20						

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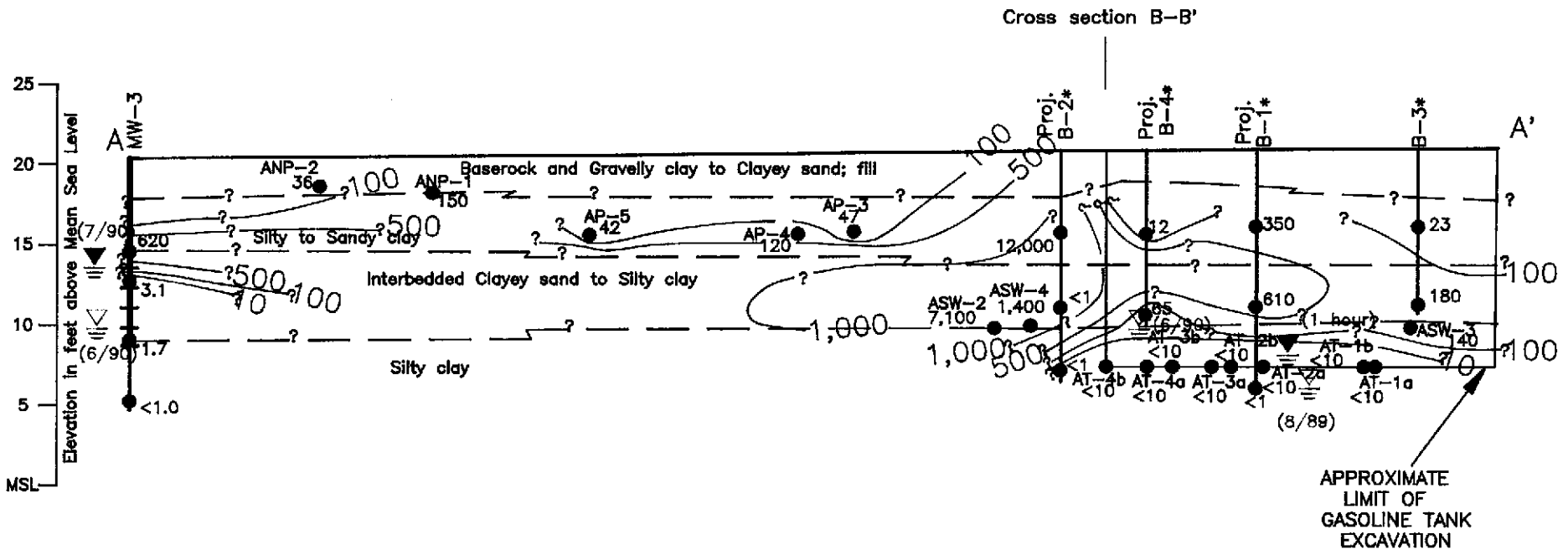
LOG OF BORING B-8[redacted]

ARCO Service Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE
6



EXPLANATION

1,000 = Line of equal concentration of TPHg in soil

12,000 = Laboratory analyzed soil sample showing concentration of TPHg in parts per million

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well

* = Boring in subsequently excavated soil

ASW–4 = Excavation sidewall soil sample

AT–4b = Excavation soil sample beneath former tank

AP–5 = Former product line trench soil sample

ANP–2 = New tank excavation soil sample

Approximate Horizontal Scale

20 10 0 20 40

feet

Approximate Vertical Scale

10 5 0 10 20

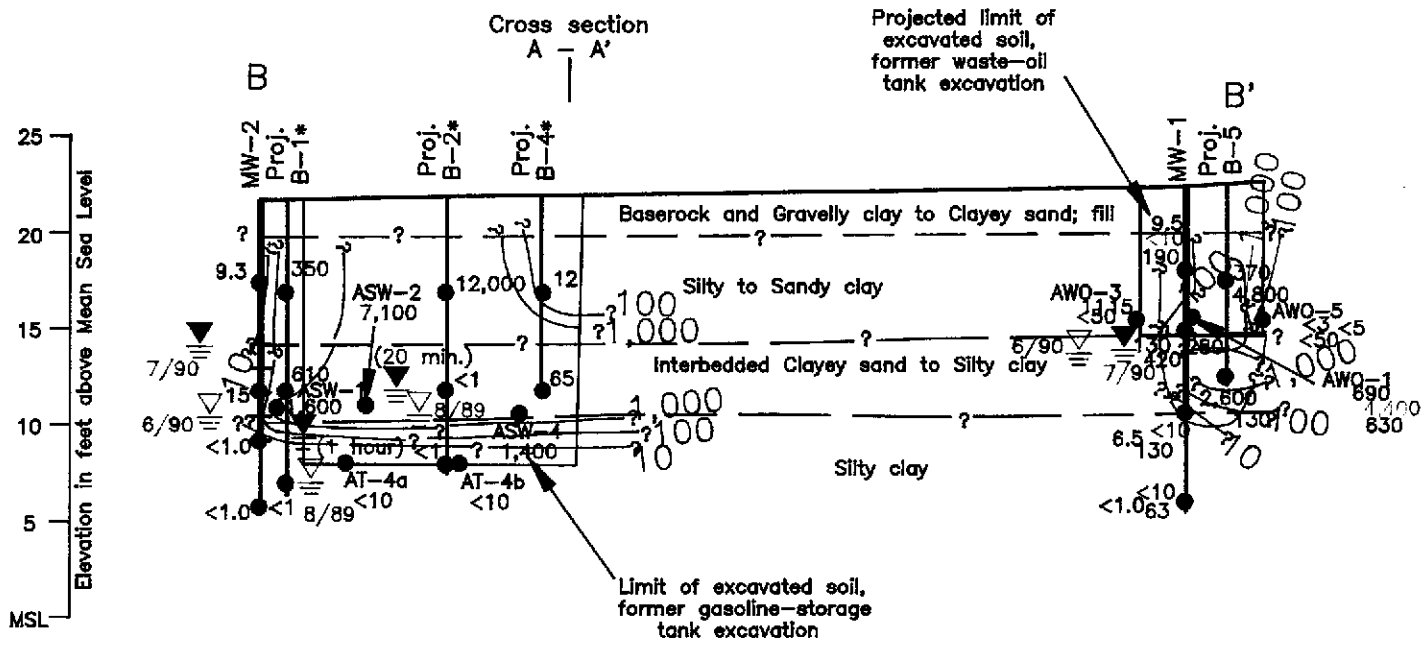
feet

PLATE 7

GEOLOGIC CROSS SECTION A - A'
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

Applied GeoSystems

PROJECT 69034-2



EXPLANATION

1,000 = Line of equal concentration of TPHg in soil

1,000 = Line of equal concentration of TOG in soil

12,000 / 630 / 4,800 / 4,400 = Laboratory analyzed soil sample showing concentration of TPHg (green), TPHd (red), TOG (orange), and TPHo (purple) in parts per million

= Well casing

= Well screen

= Boring

= Initial water level in boring

= Static water level in well

* = Boring in subsequently excavated soil

ASW–4 = Excavation sidewall soil sample

AT–4b = Excavation soil sample beneath former tank

AWO–5 = Former waste–oil tank excavation soil sample

Approximate Horizontal Scale

20 10 0 20 40

feet

Approximate Vertical Scale

10 5 0 10 20

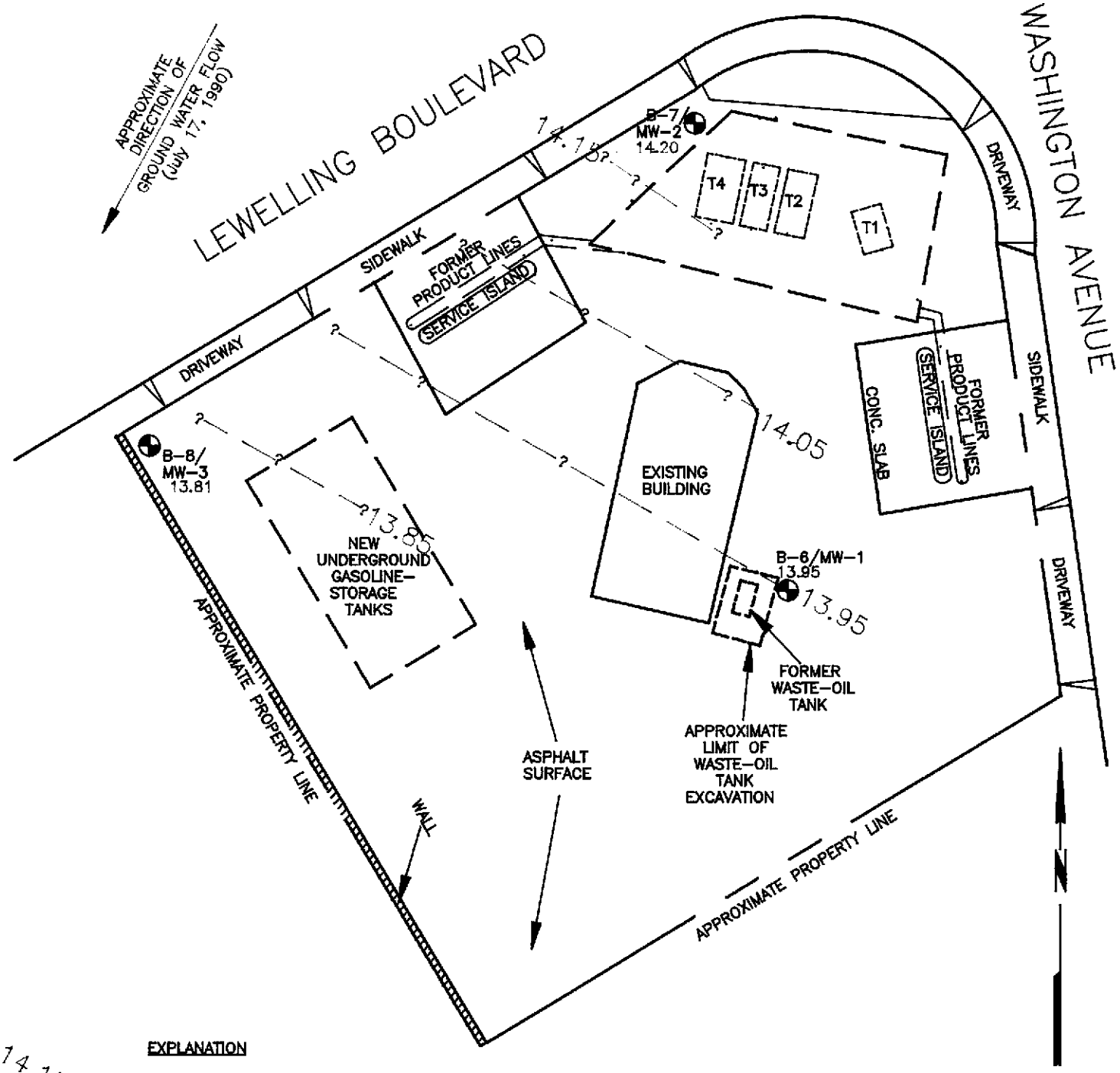
feet

Applied GeoSystems

PROJECT 69034-2

GEOLOGIC CROSS SECTION B-B'
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE 8



EXPLANATION

14.15 = Line of equal elevation of ground water

14.20 = Elevation of ground water in feet, July 17, 1990

B-8/ MW-3 = Ground-water monitoring well (Applied GeoSystems, June 1990)

Approximate Scale

30 15 0 30 60

feet

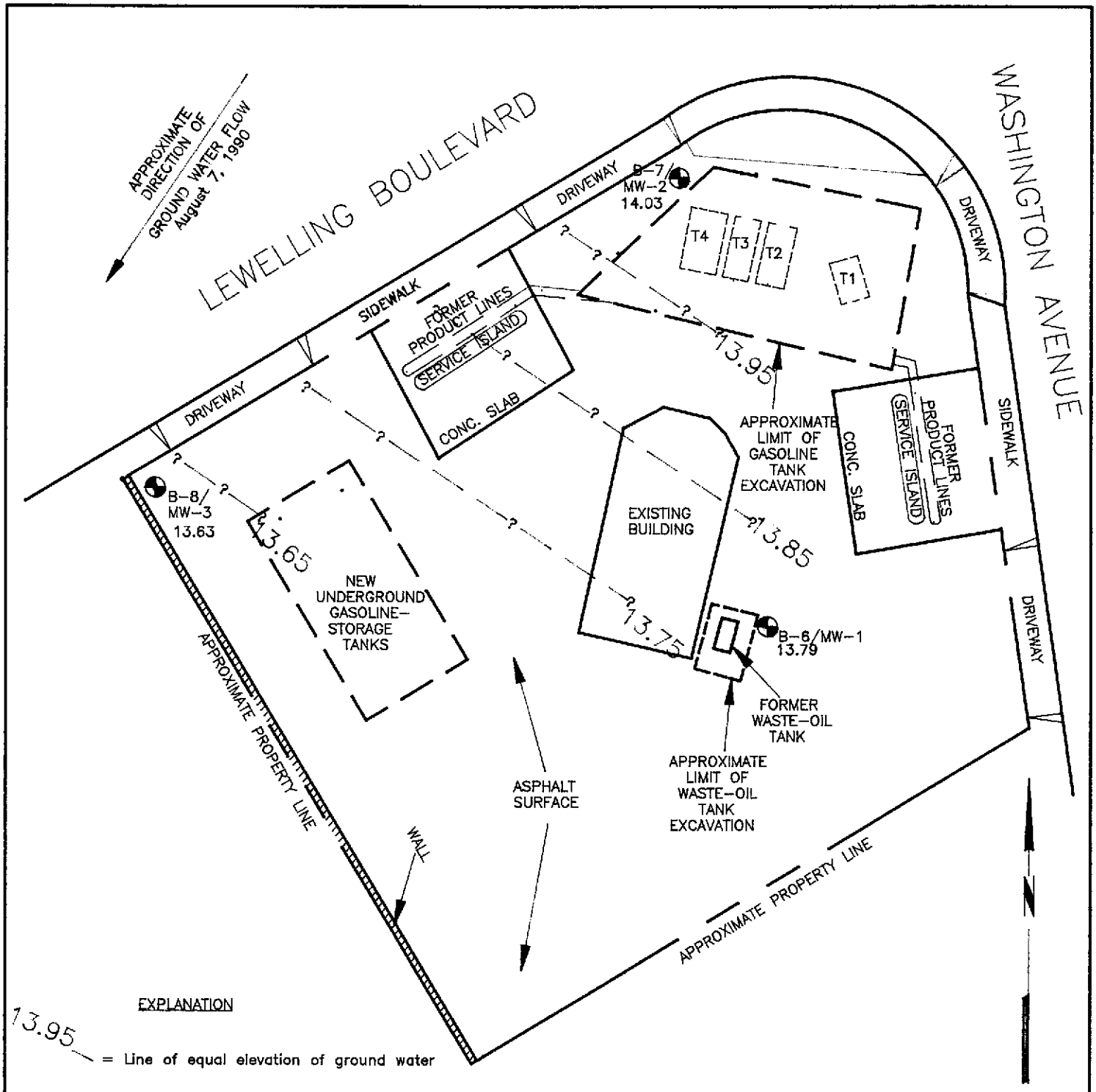
Source: Surveyed by Ron Archer, Civil Engineer Inc.

Applied GeoSystems

PROJECT 69034-2

GROUND-WATER GRADIENT MAP
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE 9



EXPLANATION

13.95 = Line of equal elevation of ground water

14.03 = Elevation of ground water in feet, August 7, 1990

B-8/ MW-3 = Ground-water monitoring well (Applied GeoSystems, June 1990)

Approximate Scale

30 15 0 30 60

feet

Source: Surveyed by Ron Archer, Civil Engineer Inc.

Applied GeoSystems

PROJECT 69034-2

GROUND-WATER GRADIENT MAP
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

PLATE 10

TABLE 1
GROUND-WATER MONITORING DATA
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

Date Well Measured	Depth of Well	Well Elevation	Depth-to-Water	Water Elevation	Product Evidence
MW-1					
07/17/90	11.20	22.98	9.03	13.95	emulsion
08/07/90	11.18	22.98	9.19	13.79	NA
MW-2					
07/17/90	12.33	22.06	7.86	14.20	odor
08/07/90	12.24	22.06	8.03	14.03	NA
MW-3					
07/17/90	11.99	20.84	7.03	13.81	sheen
08/07/90	11.98	20.84	7.21	13.63	NA

Measurements in feet.
Datum mean sea level.
Depth-to-Water measured in feet below top of casing.
NA = Not analyzed.

TABLE 2
LABORATORY ANALYSIS OF SOIL SAMPLES
June 1990
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California
(Page 1 of 2)

Sample Number	TPHg	TPHd	TOG	B	T	E	X	Organic Lead
S-4 1/2-B6	9.5	<10	190	1.4 (0.490)	0.099 (0.038)	0.25 (0.120)	1.3 (0.650)	NA
S-7 1/2-B6	420	280	130	6.0 (5.800)	27 (33.000)	8.8 (19.000)	52 (130.000)	NA
S-12-B6	[illegible]	<10	[illegible]	[illegible] (<0.010)	[illegible]	[illegible]	[illegible]	<0.01
S-16 1/2-B6	<1.0	<10	[illegible]	<0.0050 (<0.010)	[illegible]	[illegible] (<0.010)	[illegible]	NA
S-4 1/2-B7	9.3	NA	NA	0.71	0.040	0.18	0.68	NA
S-10-B7	15	NA	NA	0.99	0.71	0.50	1.3	<0.01
S-12 1/2-B7	<1.0	NA	NA	[illegible]	[illegible]	<0.0050	[illegible]	NA
S-16-B7	<1.0	NA	NA	[illegible]	[illegible]	<0.0050	[illegible]	NA
S-6-B8	620	NA	NA	11	30	16	82	NA
S-9-B8	3.1	NA	NA	[illegible]	[illegible]	[illegible]	[illegible]	<0.01
S-12-B8	1.7	NA	NA	[illegible]	[illegible]	[illegible]	[illegible]	NA
S-15 1/2-B8	<1.0	NA	NA	[illegible]	[illegible]	<0.0050	[illegible]	NA

See Notes on Page 2 of 2

TABLE 2
LABORATORY ANALYSIS OF SOIL SAMPLES
June 1990
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California
(Page 2 of 2)

Sample Number	BNAs	VOCs	Cadmium	Chromium	Lead	Zinc
S-4 1/2-B6	brl	brl	9.4	63.0	[illegible]	63.9
S-7 1/2-B6	2.9[a], 2.6[b]	brl	4.5	49.8		51.3
S-12-B6	brl	brl	13.2	61.2		55.0
S-16 1/2-B6	brl	brl	13.5	64.8		53.0
TTLC			100	2,500	1,000	5,000

Results are in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline
B = benzene
T = toluene
E = ethylbenzene
X = total xylenes
( ) = BTEX results analyzed as VOCs
PNAs = base neutral and acid extractables including polynuclear aromatics ([a] = naphthalene, [b] = 2-methylnaphthalene)
VOCs = volatile organics except for BTEX
< = Below indicated laboratory reporting limit
brl = below laboratory reporting limit for respective compounds
NA = Not Analyzed
TTLC = Total threshold limit concentration values (Title 22 of the California Administrative Code, January 1988)
Sample Number explanation:

S-12-B6
| | └── Boring number
| └──── Sample depth in feet below ground surface
└────── Soil sample

TABLE 3
LABORATORY ANALYSES OF GROUND-WATER SAMPLES
July 1990
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

Well Number	TPHg	TPHd	TOG	Benzene	Toluene	Ethyl-benzene	Total xylenes
MW-2	35,000	850*	<5,000	3,800 (3,200)	2,900 (2,400)	690 (270)	3,600 (2,900)
MW-3	N/A	N/A	<5,000	N/A	N/A	N/A	N/A

Well Number	BNAs	VOCs	Cadmium	Chromium	Lead	Zinc
MW-2	340[a],170[b]	39[c]	<20	50	50	120
DWAL	--	40[c]	10	50	50	5000

Results are in parts per billion (ppb)
TPHg = total petroleum hydrocarbons as gasoline
TPHd = total petroleum hydrocarbons as diesel (* Applied Analytical laboratories reports the chromatograph resembled gasoline and not diesel)
TOG = total oil and grease
( ) BTEX results analyzed as VOCs
PNAs = base neutral and acid extractables including polynuclear aromatics
Concentrations are below laboratory reporting limits for respective compounds except as indicated.
([a] = naphthalene, [b] = 2-methylnaphthalene)
VOCs = volatile organics except for BTEX
Concentrations are below laboratory reporting limits for respective compounds except as indicated.
([c] = methylene chloride)
< = Below indicated laboratory reporting limit
brl = below laboratory reporting limit for respective compounds
NA = Not Analyzed
DWAL = California Department of Health Services recommended drinking water action levels (July 1990)

TABLE 4
LABORATORY ANALYSIS OF SOIL SAMPLES
August 1989
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California

Sample	TPHg	TOG	B	T	E	X	VOCs
S-5-B1	350	NA	8.3	19	5.1	26	NA
S-10-B1	610	NA	10	37	6	48	NA
S-15-B1	<10	NA	0.007	0.011	<0.005	0.012	NA
S-5-B2	12,000	NA	60	450	110	660	NA
S-10-B2	<1	NA	0.015	0.016	<0.005	0.018	NA
S-14-B2	<1	NA	0.015	0.030	<0.005	0.035	NA
S-5-B3	23	NA	0.710	<0.05	0.40	0.034	NA
S-10-B3	180	NA	0.700	3.2	1.4	9.6	NA
S-5-B4	12	NA	0.33	0.37	<0.05	0.75	NA
S-10-B4	65	NA	1.9	2.0	0.7	4.6	NA
S-5-B5	370	4,800	2.1	3.8	0.8	2.8	brl
S-10-B5	2,600	130	10	90	21	130	

Results are in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline
B = benzene; T = toluene; E = ethylbenzene; X = total xylenes
VOCs = volatile organic compounds
< = Below indicated laboratory reporting limit
brl = below laboratory reporting limit for respective compounds
NA = Not Analyzed
Sample Number explanation:

S-12-B6
| | └── Boring number
| └──── Sample depth in feet below ground surface
└────── Soil sample

TABLE 5
LABORATORY ANALYSIS OF SOIL SAMPLES BY GEOSTRATEGIES
January 1990
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California
(Page 1 of 2)

Sample Number	TPHg	TPHd	TPHo	TOG	B	T	E	X
AP-1	6.8	NA	NA	NA	0.13	<0.025	<0.025	0.20
AP-2	12	NA	NA	NA	0.71	0.049	0.31	0.60
AP-3	47	NA	NA	NA	1.1	2.1	0.63	5.5
AP-4	120	NA	NA	NA	5.1	10	2.8	18
AP-5	42	NA	NA	NA	1.5	3.9	0.95	14
AT-1a	<10	NA	NA	NA	0.043	0.072	0.013	0.085
AT-1b	<10	NA	NA	NA	0.014	0.035	0.0079	0.046
AT-2a	<10	NA	NA	NA	<0.005	0.0068	<0.005	<0.005
AT-2b	<10	NA	NA	NA	0.0071	<0.005	<0.005	<0.005
AT-3a	<10	NA	NA	NA	0.023	0.041	0.013	0.036
AT-3b	<10	NA	NA	NA	0.016	<0.005	<0.005	0.0077
AT-4a	<10	NA	NA	NA	0.068	0.17	<0.005	0.014
AT-4b	<10	NA	NA	NA	<0.005	0.048	<0.005	0.08
ASW-1	1,600	NA	NA	NA	36	111	50	210
ASW-2	7,100	NA	NA	NA	175	509	220	980
ASW-3	140	NA	NA	NA	3.1	3.1	3.8	15
ASW-4	1,400	NA	NA	NA	12	46	26	129

See Notes on Page 2 of 2

TABLE 5
LABORATORY ANALYSIS OF SOIL SAMPLES BY GEOSTRATEGIES
January 1990
ARCO Station 601
712 Lewelling Boulevard
San Leandro, California
(Page 2 of 2)

Sample Number	TPHg	TPHd	TPHo	TOG	B	T	E	X
ANP-1	150	NA	NA	NA	8.1	3.9	5.8	20
ANP-2	36	NA	NA	NA	2	0.8	1.4	5.1
AWO-1	690	630	4,400	NA	<0.010	0.027	0.019	0.69
AWO-3	15	11	<50	<20	1.5	0.08	0.25	0.88
AWO-5	<3.0	<5	<50	<20	0.11	0.11	<0.03	0.10

Results are in parts per million (ppm)
TPHg = total petroleum hydrocarbons as gasoline
TPHd = Total Petroleum Hydrocarbons as diesel
TPHo = Total Petroleum Hydrocarbons as oil
TOG = Total Oil and Grease
B = benzene T = toluene E = ethylbenzene X = total xylenes
< = Below indicated laboratory reporting limit
NA = Not Analyzed

Sample Number explanation:

AP-5 = Product line soil sample
AT-4b = Former product tank number base soil sample
ASW-4 = Former product tank excavation sidewall soil sample
ANP-2 = New product tank excavation soil sample
AWO-5 = Former waste-oil tank excavation soil sample

APPENDIX A

SUMMARY OF PREVIOUS WORK

SUMMARY OF PREVIOUS WORK

August 1989

Applied GeoSystems (1989) performed a limited environmental site assessment at the request of ARCO to evaluate possible hydrocarbons in the soil in the vicinity of the underground storage tanks prior to removal of the four underground gasoline-storage tanks and one underground waste-oil-storage tank. Work performed during this limited assessment included: drilling and obtaining soil samples for laboratory analysis from five soil borings (B-1 through B-5) to depths to or just above the first-encountered ground-water; analyzing selected soil samples from each of the borings for total petroleum hydrocarbons as gasoline (TPHg) and the gasoline constituents benzene, toluene, ethylbenzene, and total xylenes (BTEX); analyzing selected soil samples from the boring located near the waste-oil tank for total oil and grease (TOG) and halogenated volatile organics (VOC); and preparation of a report including results, conclusions and recommendations for future work.

The soil borings were drilled to depths from approximately 10-1/2 to 15-1/2 feet below the ground surface. Ground water was first encountered at depths of 14-1/2 feet and 11-1/2 feet in borings B-1 and B-2, respectively, and stabilized after a period of approximately one hour at a depth of approximately 11 feet below the ground surface. Borings B-3, B-4, and B-5 were drilled to total depths of approximately 10-1/2 feet below the ground surface, and were completed prior to encountering ground water. Free hydrocarbon product was encountered in each of the five soil borings drilled. The soil encountered during this limited assessment consisted primarily of silty clay with lesser amounts of sandy clay and clayey silt.

Results of laboratory analyses of selected soil samples from borings B-1 through B-4, drilled in the area of the gasoline-storage tanks, indicated concentrations of TPHg up to 12,000 parts per million (ppm) and concentrations of BTEX up to 60 ppm, 450 ppm, 110 ppm, and 660 ppm, respectively. Results of laboratory analyses of selected soil samples from borehole B-5, drilled adjacent to the waste-oil tank, indicated TPHg at concentrations up to 2,600 ppm, total oil and grease up to 4,800 ppm, and BTEX up to 10 ppm, 90 ppm, 21 ppm, and 130 ppm, respectively. No halogenated volatile organic compounds (VOC) were detected in samples analyzed from boring B-5. The laboratory results are summarized in Table 4.

Applied GeoSystems concluded that the shallow soil in the area of the four underground gasoline-storage tanks and the underground waste-oil-storage tank had been affected by elevated levels of hydrocarbons, and that the first-encountered ground water beneath the site appeared to have been affected by hydrocarbons.

November 1989

GeoStrategies Inc. (GSI) (1989), of Hayward, California, prepared a work plan for ARCO. This Work Plan included: excavation of contaminated soils during tank and product line removal and replacement; observation of excavation and obtaining soil samples for laboratory analysis from tank excavations, product line trenches, and soil stockpiles as specified by the California Department of Health Services LUFT Manual and San Leandro Fire Department guidelines; drilling three soil borings, obtaining soil samples for laboratory analysis, installing three ground-water monitoring wells, developing the monitoring wells and sampling ground water for laboratory analysis, surveying wellhead elevations and obtaining ground-water elevations to determine the ground-water flow direction and gradient magnitude, and preparing a report to include results, conclusions and recommendations for future work at the site.

January 1990

GSI (1990) observed removal of four underground gasoline-storage tanks and one underground waste-oil-storage tank, noted contaminant distribution within the subsurface, and assisted in directing soil excavation. GSI also obtained soil samples for laboratory analysis from the tank excavations (including the new tank excavation), the product line trenches, and soil stockpiles, and prepared a report summarizing field procedures and results for ARCO.

Approximately 600 cubic yards of soil were removed from the former underground gasoline-storage tank and product line trench excavations, approximately 950 cubic yards of soil were removed from the new underground gasoline-storage tank excavation, and approximately 15 cubic yards of soil were removed from the former waste-oil tank excavation. According to GSI, the size of the former gasoline-storage tank excavation was limited by the presence of existing structures on the site. Laboratory analysis of composite soil samples obtained from the soil stockpiles reported TPHg concentrations above 1000 ppm for approximately 200 cubic yards, and above 100 ppm for approximately 350 cubic yards of soil removed from the former tank excavation. This approximately 550 cubic yards of soil was removed to disposal facilities operated by GSX (as identified by GSI, presently Laidlaw Environmental Services, Inc., Limited Class I Disposal Facility, Button Willow, California). Laboratory analysis of composite soil samples obtained from the soil stockpiles reported TPHg concentrations of less than 100 ppm for approximately 50 cubic yards of soil removed from the former gasoline tank excavation, and for approximately 950 cubic yards of soil removed from the new gasoline tank excavation. This approximately 1,000 cubic yards of soil was removed to

a Class III landfill. Approximately 15 cubic yards of soil removed from the former waste-oil tank excavation were removed to a disposal facility operated by GSX. Excavations were backfilled with clean pea gravel. **In addition, a 6-inch diameter 0.020 slot size PVC casing product recovery well (RW-1) was installed in the backfill of the former waste-oil tank excavation, at the approximate location shown on the Generalized Site Plan (Plate 2) of this report.**

The results of laboratory analysis of native soil samples obtained from the former gasoline tank excavation, former product line trenches, former waste-oil tank excavation, and new tank excavation are included in Table 5, and on cross sections A-A'and B-B', Plates 7 and 8.

APPENDIX B

WELL CONSTRUCTION PERMIT

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

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

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT ARCO STATION 601
Washington Avenue and Lewelling BLVD.
SAN LEANDRO CAL.

CLIENT
Name ARCO Products Company - Kyle CHristie
Address P.O. BOX 5811 Phone
City SAN MATEO Zip 94402

APPLICANT
Name APPLIED GeoSystems - Mike Barminski
3315 ALAMEDA EXPY Suite 34
Address Phone
City SANJOSE Zip 95118

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	X
Monitoring	X	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger X Hollowstem
Cable ___ Other ___

DRILLER'S LICENSE NO. 484288

WELL PROJECTS
Drill Hole Diameter 10 In. Maximum
Casing Diameter 4 In. Depth 25 ft.
Surface Seal Depth 5 ft. Number 4

GEOTECHNICAL PROJECTS
Number of Borings ___ Maximum
Hole Diameter ___ In. Depth ___ ft.

ESTIMATED STARTING DATE 6/28/90
ESTIMATED COMPLETION DATE 6/27/10

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

APPLICANT'S SIGNATURE Mike Barminski Date 6/21/90

FOR OFFICE USE

PERMIT NUMBER 90388
LOCATION NUMBER

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. 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 drilling logs and location sketch for geotechnical projects.
3. 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.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

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

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 22 Jun 90
Wyman Hong

121989

APPENDIX C

FIELD METHODS
STABILIZATION GRAPH

FIELD METHODS

Site Safety Plan

The Site Safety Plan (Applied GeoSystems, August 1, 1989) describes the safety requirements for the evaluation of gasoline hydrocarbons in soil and ground-water at the site. The site Safety Plan is applicable to personnel of Applied GeoSystems and its subcontractors. Applied GeoSystems personnel and subcontractors of Applied GeoSystems scheduled to perform the work at the site were briefed on the contents of the Site Safety Plan before work began. A copy of the Site Safety Plan was available for reference by appropriate parties during the work. The Staff Geologist of Applied GeoSystems was Site Safety Officer for the project.

Soil Borings

Prior to the drilling of borings and construction of monitoring wells, permits were acquired from the appropriate regulatory agency. Copies of the permits are included in Appendix B of this report. Prior to drilling, Underground Services Alert was notified of our intent to drill, and known underground utility lines and structures were marked. The borings were drilled by a truck-mounted drill rig equipped with 8- or 10-inch-diameter, hollow-stem augers. The augers were steam-cleaned prior to drilling each boring to minimize the possibility of cross-contamination. After the borings were drilled, monitoring wells were constructed in the borings, or the borings were backfilled to the ground surface with neat-cement grout and bentonite.

Borings for ground-water monitoring wells were drilled to a depth of no more than 20 feet below the depth at which a saturated zone was first encountered, or a short distance into a stratum beneath the saturated zone which was of moisture content and consistency to be judged as a perching layer by the field geologist, whichever was shallower.

Drill Cuttings

Drill cuttings subjectively evaluated for hydrocarbons at levels greater than 100 parts per million (ppm) were separated from those subjectively evaluated for hydrocarbons at levels less than 100 ppm. Evaluation was based either on subjective evidence of soil discoloration, or on measurements made using a field calibrated organic vapor meter (OVM). Readings were taken by placing a soil sample into a ziplock-type plastic bag and allowing volatilization to occur. The intake probe of the OVM was then inserted into the headspace created in

the plastic bag immediately after opening it. The drill cuttings from the borings were placed on plastic at the site, and covered with plastic. The cuttings were removed to a Class II Sanitary Landfill by ARCO.

Soil Sampling in Borings

Soil samples were collected at no greater than 5-foot intervals from the ground surface to the total depth of the borings. The 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 containing brass sleeves through the hollow center of the auger into the soil. The sampler and brass sleeves were laboratory-cleaned, steam-cleaned, or washed thoroughly with Alconox® and water, prior to each use. The sampler was driven with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each successive six inches was counted and recorded to evaluate the relative consistency of the soil.

The samples selected for laboratory analysis were removed from the sampler and quickly sealed in their brass sleeves with aluminum foil, plastic caps, and aluminized duct tape. The samples were then labeled, promptly placed in iced storage, and delivered to a laboratory certified by the State of California to perform the analyses requested.

One of the samples in brass sleeves not selected for laboratory analysis at each sampling interval was tested in the field using an OVM that was field calibrated at the beginning of each day it was used. This testing was performed by inserting the intake probe of the OVM into the headspace created in the plastic bag containing the soil sample as described in the Drill Cuttings section above. The OVM readings are presented in Logs of Borings included in the report.

Logging of Borings

A geologist was present to log the soil cuttings and samples using the Unified Soil Classification System. Samples not selected for chemical analysis, and the soil in the sampler shoe, were extruded in the field for inspection. Logs include texture, color, moisture, plasticity, consistency, blow counts, and any other characteristics noted. Logs also include subjective evidence for the presence of hydrocarbons, such as soil staining, noticeable or obvious product odor, and OVM readings.

Monitoring Well Construction

Monitoring wells were constructed in selected borings using clean 4-inch-diameter, thread-jointed, Schedule 40 polyvinyl chloride (PVC) casing. No chemical cements, glues, or solvents were used in well construction. Each casing bottom was sealed with a threaded end-plug, and each casing top with a locking plug. The screened portions of the wells were constructed of machine-slotted PVC casing with 0.020-inch-wide slots for initial site wells. Slot size for subsequent wells will be based on sieve analysis and/or well development data. The screened sections in ground-water monitoring wells were placed to allow monitoring during seasonal fluctuations of ground-water levels.

The annular space of each well was backfilled with No. 2 by 12 sand, to approximately two feet above the top of the screened casing for initial site wells. The sand pack grain size for subsequent wells will be based on sieve analysis and/or well development data. A 1- to 2-foot-thick bentonite plug was placed above the sand as a seal against cement entering the filter pack. The remaining annulus was then backfilled with a slurry of water, neat cement, and bentonite to approximately one foot below the ground surface.

An aluminum utility box with a PVC apron was placed over each wellhead and set in concrete placed flush with the surrounding ground surface. Each wellhead cover has a seal to protect the monitoring well against surface-water infiltration and requires a special wrench to open. The design discourages vandalism and reduces the possibility of accidental disturbance of the well.

Ground-Water Monitoring Well Development

The monitoring wells were developed by bailing or over-pumping and surge-block techniques. The wells were either bailed or pumped, allowed to recharge, and bailed or pumped again until the water removed from the wells was subjectively evaluated to be clear by the field geologist. The wells were allowed to equilibrate for at least 48 hours after development prior to sampling. Water generated by well development was stored in 17E Department of Transportation (DOT) 55-gallon drums on site and was removed on August 21, 1990 by ARCO's subcontractor H&H Environmental Services of San Francisco, California.

Ground-Water Sampling

The static water level in each well was measured to the nearest 0.01-foot using a Solinst® electric water-level sounder cleaned with Alconox® and water before use in each well. The

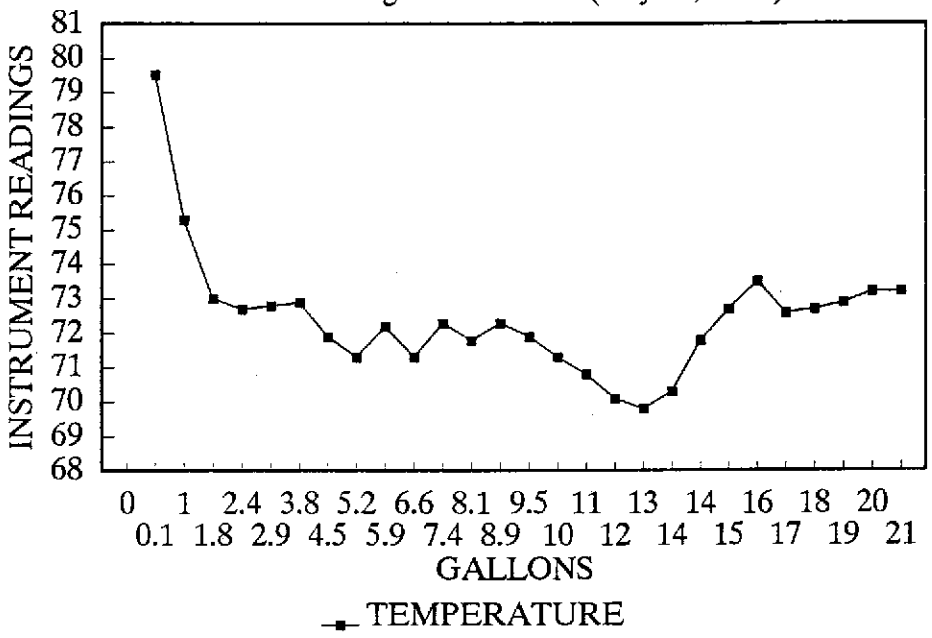
liquid in the onsite wells was examined for visual evidence of hydrocarbons by gently lowering approximately half the length of a Teflon® bailer (cleaned with Alconox® and water) past the air/water interface. The sample was then retrieved and inspected for floating product, sheen, emulsion, color, and clarity. The thickness of floating product detected was recorded to the nearest 0.1-inch.

Wells which did not contain floating product were purged using a submersible pump. The pump, cables, and hoses were cleaned with Alconox® and water prior to use in each well. The wells were purged until withdrawal was of sufficient volume to result in stabilized pH, temperature, and electrical conductivity of the water, as measured using portable meters calibrated to standard water solutions. If a purged well became de-watered, the water level was allowed to recover to at least 80 percent of the initial water level. Prior to the collection of each ground water sample, the Teflon® bailer was cleaned with Alconox® and rinsed with tap water and deionized water, and the latex gloves worn by the sampler changed. Hydrochloric acid was added to the sample vials as a preservative (as required for specific laboratory analysis). A sample-method blank was collected by pouring distilled water into the bailer and then into sample vials. A sample of the ground water was then collected from the surface of the water in each of the wells using the Teflon® bailer. The water samples were then gently poured into laboratory-cleaned, 40-milliliter (ml) glass vials, 500 ml plastic bottles, or 1-liter glass bottles (as required for specific laboratory analysis) and sealed with Teflon®-lined caps, and inspected for air bubbles to check for headspace, which would allow volatilization to occur. The samples were then labeled and promptly placed in iced storage. A field log of well purging procedures and parameter monitoring was maintained. Water generated by the purging of wells was stored in 17E DOT 55-gallon drums onsite, and was removed and disposed of by ARCO's subcontractor H & H Environmental Services of San Francisco on August 21, 1990.

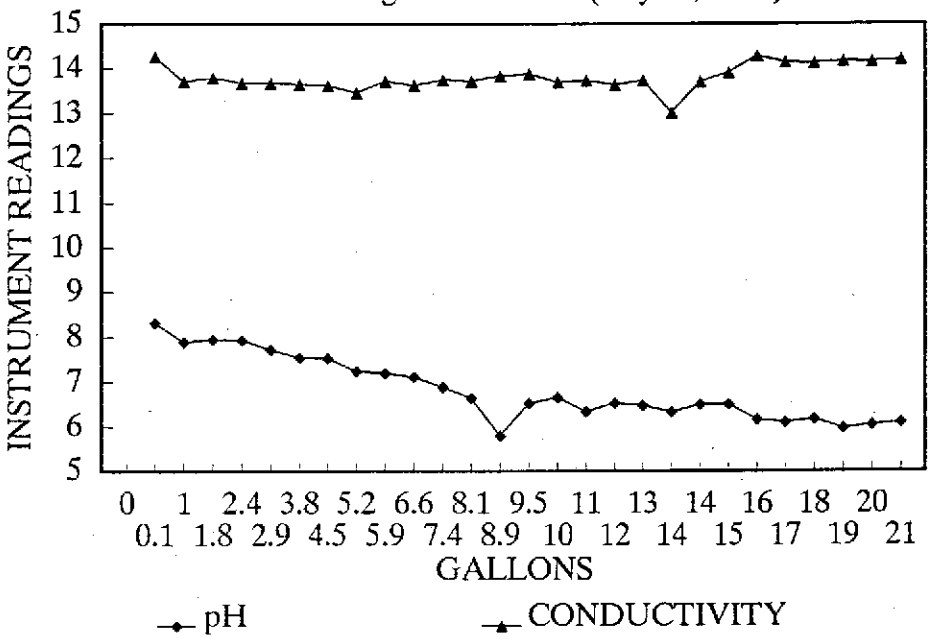
Sample Labeling and Handling

Sample containers were labeled in the field with the job number, sample location and depth, and date, and promptly placed in iced storage for transport to the laboratory. A Chain of Custody Record was initiated by the field geologist and updated throughout handling of the samples, and accompanied the samples to a laboratory certified by the State of California for the analyses requested. Copies of the Chain of Custody records are included in Appendix E. Samples will be properly disposed of after their useful life has expired.

ARCO STATION 601 STABILIZATION GRAPH
Monitoring Well MW–2 (July 17, 1990)



ARCO STATION 601 STABILIZATION GRAPH
Monitoring Well MW–2 (July 17, 1990)



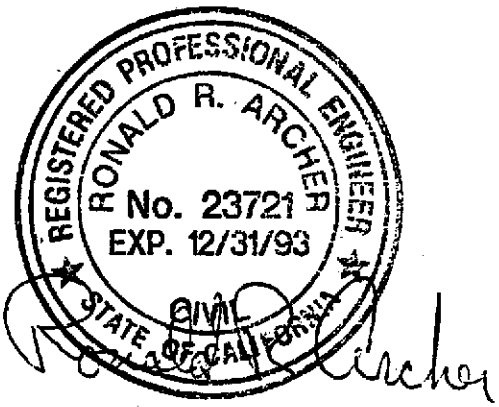
APPENDIX D

WELLHEAD SURVEY

RON ARCHER
CIVIL ENGINEER, INC.

CONSULTING • PLANNING • DESIGN • SURVEYING

4133 Mohr Ave., Suite E • Pleasanton, CA 94566
(415) 462-9372



JULY 17, 1990 JOB NO. 1701

ELEVATIONS OF EXISTING MONITOR WELLS AT ARCO SERVICE STATION NO. 601 WASHINGTON AVENUE AT LEWELLING BOULEVARD, SAN LEANDRO, CALIFORNIA.

FOR: APPLIED GEOSYSTEMS,
PROJECT NO. 69034-2

BENCHMARK:
A CINCH NAIL IN TOP OF CURB AT STORM WATER INLET AT NORTHEAST CORNER OF THE INTERSECTION OF LEWELLING BLVD. AND WASHINGTON AVENUE, ELEVATION 22.80 CITY OF SAN LEANDRO DATUM.

MONITOR WELL DATA TABLE

WELL DESIGNATION	ELEV	DESCRIPTION
MW1	22.98	TOP OF PVC CASING
	23.37	TOP OF BOX
MW2	22.06	TOP OF PVC CASING
	22.30	TOP OF BOX
MW3	20.84	TOP OF PVC CASING
	21.13	TOP OF BOX

APPENDIX E

LABORATORY ANALYSIS REPORTS
CHAIN OF CUSTODY RECORDS

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Dave Higgins
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Project: AGS 69034-2

Date Sampled: 06-28-90
Date Received: 07-03-90
BTEX Analyzed: 07-09-90
TPHg Analyzed: 07-09-90
TPHd Analyzed: 07-11-90
Matrix: Soil

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	0.050	0.050	0.050	0.050	2.0	10
SAMPLE Laboratory Identification						
S-4.5-B6 S1007012	1.4	0.099	0.25	1.3	9.5	ND

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg--Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd--Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

07-16-90
Date Reported

APPLIED ANALYTICAL LABORATORY IS CERTIFIED BY THE STATE OF CALIFORNIA DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 153)

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Dave Higgins
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Project: AGS 69034-2

Date Sampled: 06-28-90
Date Received: 07-03-90
BTEX Analyzed: 07-09-90
TPHg Analyzed: 07-09-90
TPHd Analyzed: 07-12-90
Matrix: Soil

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	0.050	0.050	0.050	0.050	2.0	10
SAMPLE Laboratory Identification						
S-7.5-B6 S1007013	6.0	27	8.8	52	420	280
S-12-B6 S1007014	0.062	0.29	0.10	0.60	6.5	ND

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

07-16-90
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

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Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Dave Higgins	Date Sampled:	06-28-90
	Applied GeoSystems	Date Received:	07-03-90
	3315 Almaden Expressway	BTEX Analyzed:	07-09-90
	San Jose, CA 95118	TPHg Analyzed:	07-09-90
Project:	AGS 69034-2	TPHd Analyzed:	07-12-90
		Matrix:	Soil

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	0.0050	0.0050	0.0050	0.0050	1.0	10
SAMPLE Laboratory Identification						
S-16.5-B6 S1007015	ND	0.040	0.011	0.069	ND	ND

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

07-16-90
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Dave Higgins	Date Sampled:	06-28-90
	Applied GeoSystems	Date Received:	07-03-90
	3315 Almaden Expressway	BTEX Analyzed:	07-12-90
	San Jose, CA 95118	TPHg Analyzed:	07-12-90
Project:	AGS 69034-2	TPHd Analyzed:	NR
		Matrix:	Soil

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	0.0050	0.0050	0.0050	0.0050	1.0	10
SAMPLE Laboratory Identification						
S-4.5-B7 S1007016	0.71	0.040	0.18	0.68	9.3	NR
S-12.5-B7 S1007019	0.056	0.015	ND	0.011	ND	NR
S-16-B7 S1007018	0.0085	0.0071	ND	0.0094	ND	NR
S-12-B8 S1007022	0.034	0.039	0.0098	0.046	1.7	NR
S-15.5-B8 S1007023	0.082	0.076	ND	0.079	ND	NR

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

07-16-90
Date Reported

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Environmental Laboratories

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Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention: Mr. Dave Higgins
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Project: AGS 69034-2

Date Sampled: 06-28-90
Date Received: 07-03-90
BTEX Analyzed: 07-07-90
TPHg Analyzed: 07-07-90
TPHd Analyzed: NR
Matrix: Soil

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	0.050	0.050	0.050	0.050	2.0	10
SAMPLE Laboratory Identification						
S-10-B7 S1007017	0.99	0.71	0.50	1.3	15	NR
S-9-B8 S1007021	0.18	0.25	0.094	0.43	3.1	NR

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

07-11-90
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. Dave Higgins	Date Sampled:	06-28-90
	Applied GeoSystems	Date Received:	07-03-90
	3315 Almaden Expressway	BTEX Analyzed:	07-12-90
	San Jose, CA 95118	TPHg Analyzed:	07-12-90
Project:	AGS 69034-2	TPHd Analyzed:	NR
		Matrix:	Soil

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit:	1.0	1.0	1.0	1.0	40	10
SAMPLE Laboratory Identification						
S-6-B8 S1007020	11	30	16	82	620	NR

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

07-16-90
Date Reported

APPLIED ANALYTICAL LABORATORY IS CERTIFIED BY THE STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 153)

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

togsoil.rpt

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Attention: Dave Higgins

Date Received:	07-02-90
Laboratory #:	S1007012
Project #:	69034-2
Sample #:	S-4.5-B6
Matrix:	Soil

Parameter	Result (mg/kg)	Detection Limit (mg/kg)	Date Analyzed
TPH as Oil and Grease	190	50	07-09-90

mg/kg = milligrams per kilogram = ppm
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

PROCEDURES

TPH as Oil and Grease: Total Petroleum Hydrocarbons as Oil and Grease are measured by extraction and gravimetric analysis according to Standard Method 503D/E.

Laboratory Representative

07-12-90
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

togsoil.rpt

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Attention: Dave Higgins

Date Received: 07-02-90
Laboratory #: S1007013
Project #: 69034-2
Sample #: S-7.5-B6
Matrix: Soil

Parameter	Result (mg/kg)	Detection Limit (mg/kg)	Date Analyzed
TPH as Oil and Grease	130	50	07-09-90

mg/kg = milligrams per kilogram = ppm
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

PROCEDURES

TPH as Oil and Grease: Total Petroleum Hydrocarbons as Oil and Grease are measured by extraction and gravimetric analysis according to Standard Method 503D/E.

Laboratory Representative

07-12-90
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

togsoil.rpt

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Attention: Dave Higgins

Date Received:	07-02-90
Laboratory #:	S1007014
Project #:	69034-2
Sample #:	S-12-B6
Matrix:	Soil

Parameter	Result (mg/kg)	Detection Limit (mg/kg)	Date Analyzed
TPH as Oil and Grease	130	50	07-09-90

mg/kg = milligrams per kilogram = ppm
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

PROCEDURES

TPH as Oil and Grease: Total Petroleum Hydrocarbons as Oil and Grease are measured by extraction and gravimetric analysis according to Standard Method 503D/E.

Laboratory Representative

07-12-90
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

togsoil.rpt

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Attention: Dave Higgins

Date Received:	07-02-90
Laboratory #:	S1007015
Project #:	69034-2
Sample #:	S-16.5-B6
Matrix:	Soil

Parameter	Result (mg/kg)	Detection Limit (mg/kg)	Date Analyzed
TPH as Oil and Grease	63	50	07-09-90

mg/kg = milligrams per kilogram = ppm
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

PROCEDURES

TPH as Oil and Grease: Total Petroleum Hydrocarbons as Oil and Grease are measured by extraction and gravimetric analysis according to Standard Method 503D/E.

Laboratory Representative

07-12-90
Date Reported

MOBILE CHEM LABS INC.

5021 Blum Road, Suite 3 • Martinez, CA 94553
Phone (415) 372-3700 • Fax (415) 372-6955

Chromalab, Inc.
2239 Omega Road, #1
San Ramon, California 94583
Attn: Eric Tam

Date Sampled: 06-28/29-90
Date Received: 07-10-90
Date Reported: 07-10-90

ORGANIC LEAD ANALYSIS

Sample Number	Sample Description	Detection Limit	SOIL RESULTS
		ppm	ppm
	Project # 790046		
B070049	SB-12-B6	0.5	<0.5
B070050	SB-10-B7	0.5	<0.5
B070051	SB-9-B8	0.5	<0.5

QA/QC: Blank is none detected
Spike Recovery is 91%
Duplicate Spike Deviation is 7.1%

Note: Analysis - California LUFT Manual, 12/87

MOBILE CHEM LABS

Ronald G. Evans
Lab Director

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ. NO.	PROJECT NAME
69034-2	ARCO-601
P.O. NO.	SAMPLERS (Signature)
270	

CHROMALAB FILE # 790046

DATE MM/DD/YY	TIME	SAMPLE I.D.	No. of Containers	TPHg	BTEX	TPHd	Organic Pb	VOC (8240)	8270			Preserved?	LABORATORY I.D. NUMBER
~~6-28-90~~													
6-28-90		S-4½-B6						X	X				
		S-7½-B6						X	X				
9		S-12-B6					X	X	X				
		S-16½-B6						X	X				
0	↓	S-10-B7					X						
7	6-29-90	S-9-B8					X						

ANALYSIS

Sent to Mobile Chem

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
	7/9/90 11:30	
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):

REMARKS:
Chromalab
48hour RUSH
Charge client
standard TAT price
and bill Applied Analytical
for the difference

SEND RESULTS TO:
Applied GeoSystems
3315 Almaden Expressway
Suite 34
San Jose, California 95118
(408) 264-7723
Proj. Mgr.: DAVE HIGGINS

SUP-21-90 FRI 12:39 415-831-8798 P.01

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

July 11, 1990

ChromaLab File #0790046A

Client: APPLIED GEOSYSTEMS
Attn: Dave Higgins
Date Sampled: June 28, 1990
Date Submitted: July 9, 1990
Date of Analysis: July 10, 1990

Project No: 690342
Project Name: ARCO 601
Sample I.D.: S-4.5-B6
Method of Analysis: EPA 8240
Detection Limit: 10 µg/Kg

COMPOUND NAME	µg/Kg	Spike Recovery	
CHLOROMETHANE	N.D	---	
VINYL CHLORIDE	N.D.	---	
BROMOMETHANE	N.D.	---	
CHLOROETHANE	N.D.	---	
TRICHLOROFLUOROMETHANE	N.D.	---	
1,1-DICHLOROETHENE	N.D.	---	
METHYLENE CHLORIDE	N.D.	---	
1,2-DICHLOROETHENE (TOTAL)	N.D.	---	
1,1-DICHLOROETHANE	N.D.	---	
CHLOROFORM	N.D.	100.1%	109.3%
1,1,1-TRICHLOROETHANE	N.D.	---	
CARBON TETRACHLORIDE	N.D.	---	
BENZENE	490	---	
1,2-DICHLOROETHANE	N.D.	---	
TRICHLOROETHENE	N.D.	96.2%	88.7%
1,2-DICHLOROPROPANE	N.D.	---	
BROMODICHLOROMETHANE	N.D.	---	
2-CHLOROETHYLVINYLETHER	N.D.	---	
TRANS-1,3-DICHLOROPROPENE	N.D.	---	
TOLUENE	38	98.5%	92.8%
CIS-1,3-DICHLOROPROPENE	N.D.	---	
1,1,2-TRICHLOROETHANE	N.D.	---	
TETRACHLOROETHENE	N.D.	---	
DIBROMOCHLOROMETHANE	N.D.	---	
CHLOROBENZENE	N.D.	---	
ETHYL BENZENE	120	---	
BROMOFORM	N.D.	---	
1,1,2,2-TETRACHLOROETHANE	N.D.	106.2%	92.0%
1,3-DICHLOROBENZENE	N.D.	---	
1,4-DICHLOROBENZENE	N.D.	---	
1,2-DICHLOROBENZENE	N.D.	---	
TOTAL XYLENES	650	---	

ChromaLab, Inc.

David Duong
Senior Chemist

Eric Tam
Lab Director

2239 Omega Road, #1 • San Ramon, California 94583
415/831-1788 • Facsimile 415/831-8798
Federal ID #68-0140157

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

July 11, 1990

ChromaLab File #0790046A

Client: APPLIED GEOSYSTEMS
Attn: Dave Higgins
Date Sampled: June 28, 1990
Date Submitted: July 9, 1990
Date Extracted: July 10, 1990
Date of Analysis: July 11,1990

Project Name: ARCO 601
Project No.: 690342
Sample I.D.: S-4.5-B6
Method of Analysis: EPA 8270
Matrix: soil

COMPOUND NAME	Sample mg/Kg	MDL mg/Kg	Spike Recovery
PHENOL	N.D.	0.5	97.9%
BIS(2-CHLOROETHYL) ETHER	N.D.	0.5	-----
2-CHLOROPHENOL	N.D.	0.5	-----
1,3-DICHLOROBENZENE	N.D.	0.5	-----
1,4-DICHLOROBENZENE	N.D.	0.5	-----
BENZYL ALCOHOL	N.D.	1.0	-----
1,2-DICHLOROBENZENE	N.D.	0.5	-----
2-METHYLPHENOL	N.D.	0.5	-----
BIS(2-CHLOROISOPROPYL)ETHER	N.D.	0.5	-----
4-METHYLPHENOL	N.D.	0.5	-----
N-NITROSO-DI-N-PROPYLAMINE	N.D.	0.5	-----
HEXACHLOROETHANE	N.D.	0.5	94.8%
NITROBENZENE	N.D.	0.5	-----
ISOPHORONE	N.D.	0.5	-----
2-NITROPHENOL	N.D.	0.5	-----
2,4-DIMETHYLPHENOL	N.D.	0.5	-----
BENZOIC ACID	N.D.	2.5	-----
BIS(2-CHLOROETHOXY)METHANE	N.D.	0.5	96.5%
2,4-DICHLOROPHENOL	N.D.	0.5	-----
1,2,4-TRICHLOROBENZENE	N.D.	0.5	-----
NAPHTHALENE	N.D.	0.5	-----
4-CHLOROANILINE	N.D.	1.0	-----
HEXACHLOROBUTADIENE	N.D.	0.5	94.6%
4-CHLORO-3-METHYLPHENOL	N.D.	1.0	-----
2-METHYLNAPHTHALENE	N.D.	0.5	-----
HEXACHLOROCYCLOPENTADIENE	N.D.	0.5	-----
2,4,6-TRICHLOROPHENOL	N.D.	0.5	-----
2,4,5-TRICHLOROPHENOL	N.D.	0.5	-----
2-CHLORONAPHTHALENE	N.D.	0.5	-----
2-NITROANILINE	N.D.	2.5	-----
DIMETHYL PHTHALATE	N.D.	0.5	-----
ACENAPHTHYLENE	N.D.	0.5	105.0%
3-NITROANILINE	N.D.	2.5	-----
ACENAPHTHENE	N.D.	0.5	111.0%
2,4-DINITROPHENOL	N.D.	2.5	-----
4-NITROPHENOL	N.D.	2.5	-----
DIBENZOFURAN	N.D.	0.5	-----

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CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

ChromaLab File #0790046A

Project Name: ARCO 601 Project No.: 690342
Sample I.D.: S-4.5-B6
Method of Analysis: EPA 8270 Matrix: soil

COMPOUND NAME	Sample mg/Kg	MDL mg/Kg	Spike Recovery
2,4-DINITROTOLUENE	N.D.	0.5	-----
2,6-DINITROTOLUENE	N.D.	0.5	107.2%
DIETHYL PHTHALATE	N.D.	0.5	-----
4-CHLORO-PHENYL PHENYL ETHER	N.D.	0.5	-----
FLUORENE	N.D.	0.5	-----
4-NITROANILINE	N.D.	2.5	-----
4,6-DINITRO-2-METHYL PHENOL	N.D.	2.5	-----
N-NITROSODIPHENYLAMINE	N.D.	0.5	-----
4-BROMOPHENYL PHENYL ETHER	N.D.	0.5	-----
HEXACHLOROBENZENE	N.D.	0.5	-----
PENTACHLOROPHENOL	N.D.	2.5	109.3%
PHENANTHRENE	N.D.	0.5	-----
ANTHRACENE	N.D.	0.5	-----
DI-N-BUTYL PHTHALATE	N.D.	0.5	-----
FLUORANTHENE	N.D.	0.5	-----
PYRENE	N.D.	0.5	-----
BUTYLBENZYLPHTHALATE	N.D.	0.5	-----
3,3'-DICHLOROBENZIDINE	N.D.	1.0	-----
BENZO(A)ANTHRACENE	N.D.	0.5	-----
BIS(2-ETHYLHEXYL)PHTHALATE	N.D.	0.5	-----
CHRYSENE	N.D.	0.5	-----
DI-N-OCTYLPHTHALATE	N.D.	0.5	-----
BENZO(B)FLUORANTHENE	N.D.	0.5	-----
BENZO(K)FLUORANTHENE	N.D.	0.5	-----
BENZO(A)PYRENE	N.D.	0.5	106.0%
INDENO(1,2,3 C,D)PYRENE	N.D.	0.5	-----
DIBENZO(A,H)ANTHRACENE	N.D.	0.5	-----
BENZO(G,H,I)PERYLENE	N.D.	0.5	-----

ChromaLab, Inc.

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Eric Tam
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- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

July 11, 1990

ChromaLab File #0790046B

Client: APPLIED GEOSYSTEMS
Attn: Dave Higgins
Date Sampled: June 28, 1990
Date Submitted: July 9, 1990
Date of Analysis: July 10, 1990

Project No: 690342
Project Name: ARCO 601
Sample I.D.: S-7.5-B6
Method of Analysis: EPA 8240
Detection Limit: 100 µg/Kg

COMPOUND NAME	µg/Kg	Spike Recovery	
CHLOROMETHANE	N.D	---	
VINYL CHLORIDE	N.D.	---	
BROMOMETHANE	N.D.	---	
CHLOROETHANE	N.D.	---	
TRICHLOROFLUOROMETHANE	N.D.	---	
1,1-DICHLOROETHENE	N.D.	---	
METHYLENE CHLORIDE	N.D.	---	
1,2-DICHLOROETHENE (TOTAL)	N.D.	---	
1,1-DICHLOROETHANE	N.D.	---	
CHLOROFORM	N.D.	100.1%	109.3%
1,1,1-TRICHLOROETHANE	N.D.	---	
CARBON TETRACHLORIDE	N.D.	---	
BENZENE	5800	---	
1,2-DICHLOROETHANE	N.D.	---	
TRICHLOROETHENE	N.D.	96.2%	88.7%
1,2-DICHLOROPROPANE	N.D.	---	
BROMODICHLOROMETHANE	N.D.	---	
2-CHLOROETHYLVINYLETHER	N.D.	---	
TRANS-1,3-DICHLOROPROPENE	N.D.	---	
TOLUENE	33000	98.5%	92.8%
CIS-1,3-DICHLOROPROPENE	N.D.	---	
1,1,2-TRICHLOROETHANE	N.D.	---	
TETRACHLOROETHENE	N.D.	---	
DIBROMOCHLOROMETHANE	N.D.	---	
CHLOROBENZENE	N.D.	---	
ETHYL BENZENE	19000	---	
BROMOFORM	N.D.	---	
1,1,2,2-TETRACHLOROETHANE	N.D.	106.2%	92.0%
1,3-DICHLOROBENZENE	N.D.	---	
1,4-DICHLOROBENZENE	N.D.	---	
1,2-DICHLOROBENZENE	N.D.	---	
TOTAL XYLENES	130000	---	

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- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
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- Consultation

July 11, 1990

ChromaLab File #0790046B

Client: APPLIED GEOSYSTEMS
Attn: Dave Higgins
Date Sampled: June 28, 1990
Date Submitted: July 9, 1990
Date Extracted: July 10, 1990
Date of Analysis: July 11,1990

Project Name: ARCO 601
Project No.: 690342
Sample I.D.: S-7.5-B6
Method of Analysis: EPA 8270
Matrix: soil

COMPOUND NAME	Sample mg/Kg	MDL mg/Kg	Spike Recovery
PHENOL	N.D.	0.5	97.9%
BIS(2-CHLOROETHYL) ETHER	N.D.	0.5	-----
2-CHLOROPHENOL	N.D.	0.5	-----
1,3-DICHLOROBENZENE	N.D.	0.5	-----
1,4-DICHLOROBENZENE	N.D.	0.5	-----
BENZYL ALCOHOL	N.D.	1.0	-----
1,2-DICHLOROBENZENE	N.D.	0.5	-----
2-METHYLPHENOL	N.D.	0.5	-----
BIS(2-CHLOROISOPROPYL)ETHER	N.D.	0.5	-----
4-METHYLPHENOL	N.D.	0.5	-----
N-NITROSO-DI-N-PROPYLAMINE	N.D.	0.5	-----
HEXACHLOROETHANE	N.D.	0.5	94.8%
NITROBENZENE	N.D.	0.5	-----
ISOPHORONE	N.D.	0.5	-----
2-NITROPHENOL	N.D.	0.5	-----
2,4-DIMETHYLPHENOL	N.D.	0.5	-----
BENZOIC ACID	N.D.	2.5	-----
BIS(2-CHLOROETHOXY)METHANE	N.D.	0.5	96.5%
2,4-DICHLOROPHENOL	N.D.	0.5	-----
1,2,4-TRICHLOROBENZENE	N.D.	0.5	-----
NAPHTHALENE	2.9	0.5	-----
4-CHLOROANILINE	N.D.	1.0	-----
HEXACHLOROBUTADIENE	N.D.	0.5	94.6%
4-CHLORO-3-METHYLPHENOL	N.D.	1.0	-----
2-METHYLNAPHTHALENE	2.6	0.5	-----
HEXACHLOROCYCLOPENTADIENE	N.D.	0.5	-----
2,4,6-TRICHLOROPHENOL	N.D.	0.5	-----
2,4,5-TRICHLOROPHENOL	N.D.	0.5	-----
2-CHLORONAPHTHALENE	N.D.	0.5	-----
2-NITROANILINE	N.D.	2.5	-----
DIMETHYL PHTHALATE	N.D.	0.5	-----
ACENAPHTHYLENE	N.D.	0.5	105.0%
3-NITROANILINE	N.D.	2.5	-----
ACENAPHTHENE	N.D.	0.5	111.0%
2,4-DINITROPHENOL	N.D.	2.5	-----
4-NITROPHENOL	N.D.	2.5	-----
DIBENZOFURAN	N.D.	0.5	-----

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- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

ChromaLab File #07900468

Project Name: ARCO 601 Project No.: 690342
Sample I.D.: S-7.5-B6
Method of Analysis: EPA 8270 Matrix: soil

COMPOUND NAME	Sample mg/Kg	MDL mg/Kg	Spike Recovery
2,4-DINITROTOLUENE	N.D.	0.5	-----
2,6-DINITROTOLUENE	N.D.	0.5	107.2%
DIETHYL PHTHALATE	N.D.	0.5	-----
4-CHLORO-PHENYL PHENYL ETHER	N.D.	0.5	-----
FLUORENE	N.D.	0.5	-----
4-NITROANILINE	N.D.	2.5	-----
4,6-DINITRO-2-METHYL PHENOL	N.D.	2.5	-----
N-NITROSODIPHENYLAMINE	N.D.	0.5	-----
4-BROMOPHENYL PHENYL ETHER	N.D.	0.5	-----
HEXACHLOROBENZENE	N.D.	0.5	-----
PENTACHLOROPHENOL	N.D.	2.5	109.3%
PHENANTHRENE	N.D.	0.5	-----
ANTHRACENE	N.D.	0.5	-----
DI-N-BUTYL PHTHALATE	N.D.	0.5	-----
FLUORANTHENE	N.D.	0.5	-----
PYRENE	N.D.	0.5	-----
BUTYLBENZYLPHTHALATE	N.D.	0.5	-----
3,3'-DICHLOROBENZIDINE	N.D.	1.0	-----
BENZO(A)ANTHRACENE	N.D.	0.5	-----
BIS(2-ETHYLHEXYL)PHTHALATE	N.D.	0.5	-----
CHRYSENE	N.D.	0.5	-----
DI-N-OCTYLPHTHALATE	N.D.	0.5	-----
BENZO(B)FLUORANTHENE	N.D.	0.5	-----
BENZO(K)FLUORANTHENE	N.D.	0.5	-----
BENZO(A)PYRENE	N.D.	0.5	106.0%
INDENO(1,2,3 C,D)PYRENE	N.D.	0.5	-----
DIBENZO(A,H)ANTHRACENE	N.D.	0.5	-----
BENZO(G,H,I)PERYLENE	N.D.	0.5	-----

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- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

July 11, 1990

ChromaLab File #0790046C

Client: APPLIED GEOSYSTEMS
Attn: Dave Higgins
Date Sampled: June 28, 1990
Date Submitted: July 9, 1990
Date of Analysis: July 10, 1990

Project No: 690342
Project Name: ARCO 601
Sample I.D.: S-12-B6
Method of Analysis: EPA 8240
Detection Limit: 10 µg/Kg

COMPOUND NAME	µg/Kg	Spike Recovery	
CHLOROMETHANE	N.D	---	
VINYL CHLORIDE	N.D.	---	
BROMOMETHANE	N.D.	---	
CHLOROETHANE	N.D.	---	
TRICHLOROFLUOROMETHANE	N.D.	---	
1,1-DICHLOROETHENE	N.D.	---	
METHYLENE CHLORIDE	N.D.	---	
1,2-DICHLOROETHENE (TOTAL)	N.D.	---	
1,1-DICHLOROETHANE	N.D.	---	
CHLOROFORM	N.D.	100.1%	109.3%
1,1,1-TRICHLOROETHANE	N.D.	---	
CARBON TETRACHLORIDE	N.D.	---	
BENZENE	N.D.	---	
1,2-DICHLOROETHANE	N.D.	---	
TRICHLOROETHENE	N.D.	96.2%	88.7%
1,2-DICHLOROPROPANE	N.D.	---	
BROMODICHLOROMETHANE	N.D.	---	
2-CHLOROETHYLVINYLETHER	N.D.	---	
TRANS-1,3-DICHLOROPROPENE	N.D.	---	
TOLUENE	37	98.5%	92.8%
CIS-1,3-DICHLOROPROPENE	N.D.	---	
1,1,2-TRICHLOROETHANE	N.D.	---	
TETRACHLOROETHENE	N.D.	---	
DIBROMOCHLOROMETHANE	N.D.	---	
CHLOROBENZENE	N.D.	---	
ETHYL BENZENE	11	---	
BROMOFORM	N.D.	---	
1,1,2,2-TETRACHLOROETHANE	N.D.	106.2%	92.0%
1,3-DICHLOROBENZENE	N.D.	---	
1,4-DICHLOROBENZENE	N.D.	---	
1,2-DICHLOROBENZENE	N.D.	---	
TOTAL XYLENES	97	---	

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- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

July 11, 1990

ChromaLab File #0790046C

Client: APPLIED GEOSYSTEMS
Attn: Dave Higgins
Date Sampled: June 28, 1990
Date Submitted: July 9, 1990
Date Extracted: July 10, 1990
Date of Analysis: July 11,1990

Project Name: ARCO 601
Project No.: 690342
Sample I.D.: S-12-B6
Method of Analysis: EPA 8270
Matrix: soil

COMPOUND NAME	Sample mg/Kg	MDL mg/Kg	Spike Recovery
PHENOL	N.D.	0.5	97.9%
BIS(2-CHLOROETHYL) ETHER	N.D.	0.5	-----
2-CHLOROPHENOL	N.D.	0.5	-----
1,3-DICHLOROBENZENE	N.D.	0.5	-----
1,4-DICHLOROBENZENE	N.D.	0.5	-----
BENZYL ALCOHOL	N.D.	1.0	-----
1,2-DICHLOROBENZENE	N.D.	0.5	-----
2-METHYLPHENOL	N.D.	0.5	-----
BIS(2-CHLOROISOPROPYL)ETHER	N.D.	0.5	-----
4-METHYLPHENOL	N.D.	0.5	-----
N-NITROSO-DI-N-PROPYLAMINE	N.D.	0.5	-----
HEXACHLOROETHANE	N.D.	0.5	94.8%
NITROBENZENE	N.D.	0.5	-----
ISOPHORONE	N.D.	0.5	-----
2-NITROPHENOL	N.D.	0.5	-----
2,4-DIMETHYLPHENOL	N.D.	0.5	-----
BENZOIC ACID	N.D.	2.5	-----
BIS(2-CHLOROETHOXY)METHANE	N.D.	0.5	96.5%
2,4-DICHLOROPHENOL	N.D.	0.5	-----
1,2,4-TRICHLOROBENZENE	N.D.	0.5	-----
NAPHTHALENE	N.D.	0.5	-----
4-CHLOROANILINE	N.D.	1.0	-----
HEXACHLOROBUTADIENE	N.D.	0.5	94.6%
4-CHLORO-3-METHYLPHENOL	N.D.	1.0	-----
2-METHYLNAPHTHALENE	N.D.	0.5	-----
HEXACHLOROCYCLOPENTADIENE	N.D.	0.5	-----
2,4,6-TRICHLOROPHENOL	N.D.	0.5	-----
2,4,5-TRICHLOROPHENOL	N.D.	0.5	-----
2-CHLORONAPHTHALENE	N.D.	0.5	-----
2-NITROANILINE	N.D.	2.5	-----
DIMETHYL PHTHALATE	N.D.	0.5	-----
ACENAPHTHYLENE	N.D.	0.5	105.0%
3-NITROANILINE	N.D.	2.5	-----
ACENAPHTHENE	N.D.	0.5	111.0%
2,4-DINITROPHENOL	N.D.	2.5	-----
4-NITROPHENOL	N.D.	2.5	-----
DIBENZOFURAN	N.D.	0.5	-----

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- Drinking Water (#955)
- Waste Water
- Consultation

ChromaLab File #0790046C

Project Name: ARCO 601 Project No.: 690342
Sample I.D.: S-12-B6
Method of Analysis: EPA 8270 Matrix: soil

COMPOUND NAME	Sample mg/Kg	MDL mg/Kg	Spike Recovery
2,4-DINITROTOLUENE	N.D.	0.5	-----
2,6-DINITROTOLUENE	N.D.	0.5	107.2%
DIETHYL PHTHALATE	N.D.	0.5	-----
4-CHLORO-PHENYL PHENYL ETHER	N.D.	0.5	-----
FLUORENE	N.D.	0.5	-----
4-NITROANILINE	N.D.	2.5	-----
4,6-DINITRO-2-METHYL PHENOL	N.D.	2.5	-----
N-NITROSODIPHENYLAMINE	N.D.	0.5	-----
4-BROMOPHENYL PHENYL ETHER	N.D.	0.5	-----
HEXACHLOROBENZENE	N.D.	0.5	-----
PENTACHLOROPHENOL	N.D.	2.5	109.3%
PHENANTHRENE	N.D.	0.5	-----
ANTHRACENE	N.D.	0.5	-----
DI-N-BUTYL PHTHALATE	N.D.	0.5	-----
FLUORANTHENE	N.D.	0.5	-----
PYRENE	N.D.	0.5	-----
BUTYLBENZYLPHTHALATE	N.D.	0.5	-----
3,3'-DICHLOROBENZIDINE	N.D.	1.0	-----
BENZO(A)ANTHRACENE	N.D.	0.5	-----
BIS(2-ETHYLHEXYL)PHTHALATE	N.D.	0.5	-----
CHRYSENE	N.D.	0.5	-----
DI-N-OCTYLPHTHALATE	N.D.	0.5	-----
BENZO(B)FLUORANTHENE	N.D.	0.5	-----
BENZO(K)FLUORANTHENE	N.D.	0.5	-----
BENZO(A)PYRENE	N.D.	0.5	106.0%
INDENO(1,2,3 C,D)PYRENE	N.D.	0.5	-----
DIBENZO(A,H)ANTHRACENE	N.D.	0.5	-----
BENZO(G,H,I)PERYLENE	N.D.	0.5	-----

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- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

July 11, 1990

ChromaLab File #0790046D

Client: APPLIED GEOSYSTEMS
Date Sampled: June 28, 1990
Date of Analysis: July 10, 1990

Attn: Dave Higgins
Date Submitted: July 9, 1990

Project No: 690342
Sample I.D.: S-16.5-B6
Method of Analysis: EPA 8240

Project Name: ARCO 601
Detection Limit: 10 µg/Kg

COMPOUND NAME	µg/Kg	Spike Recovery	
CHLOROMETHANE	N.D	---	
VINYL CHLORIDE	N.D.	---	
BROMOMETHANE	N.D.	---	
CHLOROETHANE	N.D.	---	
TRICHLOROFLUOROMETHANE	N.D.	---	
1,1-DICHLOROETHENE	N.D.	---	
METHYLENE CHLORIDE	N.D.	---	
1,2-DICHLOROETHENE (TOTAL)	N.D.	---	
1,1-DICHLOROETHANE	N.D.	---	
CHLOROFORM	N.D.	100.1%	109.3%
1,1,1-TRICHLOROETHANE	N.D.	---	
CARBON TETRACHLORIDE	N.D.	---	
BENZENE	N.D.	---	
1,2-DICHLOROETHANE	N.D.	---	
TRICHLOROETHENE	N.D.	96.2%	88.7%
1,2-DICHLOROPROPANE	N.D.	---	
BROMODICHLOROMETHANE	N.D.	---	
2-CHLOROETHYLVINYLETHER	N.D.	---	
TRANS-1,3-DICHLOROPROPENE	N.D.	---	
TOLUENE	15	98.5%	92.8%
CIS-1,3-DICHLOROPROPENE	N.D.	---	
1,1,2-TRICHLOROETHANE	N.D.	---	
TETRACHLOROETHENE	N.D.	---	
DIBROMOCHLOROMETHANE	N.D.	---	
CHLOROBENZENE	N.D.	---	
ETHYL BENZENE	N.D.	---	
BROMOFORM	N.D.	---	
1,1,2,2-TETRACHLOROETHANE	N.D.	106.2%	92.0%
1,3-DICHLOROBENZENE	N.D.	---	
1,4-DICHLOROBENZENE	N.D.	---	
1,2-DICHLOROBENZENE	N.D.	---	
TOTAL XYLENES	41	---	

ChromaLab, Inc.

David Duong
Senior Chemist

Eric Tam
Lab Director

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Federal ID #68-0140157

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

July 11, 1990 ChromaLab File #0790046D

Client: APPLIED GEOSYSTEMS Attn: Dave Higgins
Date Sampled: June 28, 1990 Date Submitted: July 9, 1990
Date Extracted: July 10, 1990 Date of Analysis: July 11,1990

Project Name: ARCO 601 Project No.: 690342
Sample I.D.: S-16.5-B6
Method of Analysis: EPA 8270 Matrix: soil

COMPOUND NAME	Sample mg/Kg	MDL mg/Kg	Spike Recovery
PHENOL	N.D.	0.5	97.9%
BIS(2-CHLOROETHYL) ETHER	N.D.	0.5	-----
2-CHLOROPHENOL	N.D.	0.5	-----
1,3-DICHLOROBENZENE	N.D.	0.5	-----
1,4-DICHLOROBENZENE	N.D.	0.5	-----
BENZYL ALCOHOL	N.D.	1.0	-----
1,2-DICHLOROBENZENE	N.D.	0.5	-----
2-METHYLPHENOL	N.D.	0.5	-----
BIS(2-CHLOROISOPROPYL)ETHER	N.D.	0.5	-----
4-METHYLPHENOL	N.D.	0.5	-----
N-NITROSO-DI-N-PROPYLAMINE	N.D.	0.5	-----
HEXACHLOROETHANE	N.D.	0.5	94.8%
NITROBENZENE	N.D.	0.5	-----
ISOPHORONE	N.D.	0.5	-----
2-NITROPHENOL	N.D.	0.5	-----
2,4-DIMETHYLPHENOL	N.D.	0.5	-----
BENZOIC ACID	N.D.	2.5	-----
BIS(2-CHLOROETHOXY)METHANE	N.D.	0.5	96.5%
2,4-DICHLOROPHENOL	N.D.	0.5	-----
1,2,4-TRICHLOROBENZENE	N.D.	0.5	-----
NAPHTHALENE	N.D.	0.5	-----
4-CHLOROANILINE	N.D.	1.0	-----
HEXACHLOROBUTADIENE	N.D.	0.5	94.6%
4-CHLORO-3-METHYLPHENOL	N.D.	1.0	-----
2-METHYLNAPHTHALENE	N.D.	0.5	-----
HEXACHLOROCYCLOPENTADIENE	N.D.	0.5	-----
2,4,6-TRICHLOROPHENOL	N.D.	0.5	-----
2,4,5-TRICHLOROPHENOL	N.D.	0.5	-----
2-CHLORONAPHTHALENE	N.D.	0.5	-----
2-NITROANILINE	N.D.	2.5	-----
DIMETHYL PHTHALATE	N.D.	0.5	-----
ACENAPHTHYLENE	N.D.	0.5	105.0%
3-NITROANILINE	N.D.	2.5	-----
ACENAPHTHENE	N.D.	0.5	111.0%
2,4-DINITROPHENOL	N.D.	2.5	-----
4-NITROPHENOL	N.D.	2.5	-----
DIBENZOFURAN	N.D.	0.5	-----

(continued on next page)

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- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

ChromaLab File #0790046D

Project Name: ARCO 601 Project No.: 690342
Sample I.D.: S-16.5-B6
Method of Analysis: EPA 8270 Matrix: soil

COMPOUND NAME	Sample mg/Kg	MDL mg/Kg	Spike Recovery
2,4-DINITROTOLUENE	N.D.	0.5	-----
2,6-DINITROTOLUENE	N.D.	0.5	107.2%
DIETHYL PHTHALATE	N.D.	0.5	-----
4-CHLORO-PHENYL PHENYL ETHER	N.D.	0.5	-----
FLUORENE	N.D.	0.5	-----
4-NITROANILINE	N.D.	2.5	-----
4,6-DINITRO-2-METHYL PHENOL	N.D.	2.5	-----
N-NITROSODIPHENYLAMINE	N.D.	0.5	-----
4-BROMOPHENYL PHENYL ETHER	N.D.	0.5	-----
HEXACHLOROBENZENE	N.D.	0.5	-----
PENTACHLOROPHENOL	N.D.	2.5	109.3%
PHENANTHRENE	N.D.	0.5	-----
ANTHRACENE	N.D.	0.5	-----
DI-N-BUTYL PHTHALATE	N.D.	0.5	-----
FLUORANTHENE	N.D.	0.5	-----
PYRENE	N.D.	0.5	-----
BUTYLBENZYLPHTHALATE	N.D.	0.5	-----
3,3'-DICHLOROBENZIDINE	N.D.	1.0	-----
BENZO(A)ANTHRACENE	N.D.	0.5	-----
BIS(2-ETHYLHEXYL)PHTHALATE	N.D.	0.5	-----
CHRYSENE	N.D.	0.5	-----
DI-N-OCTYLPHTHALATE	N.D.	0.5	-----
BENZO(B)FLUORANTHENE	N.D.	0.5	-----
BENZO(K)FLUORANTHENE	N.D.	0.5	-----
BENZO(A)PYRENE	N.D.	0.5	106.0%
INDENO(1,2,3 C,D)PYRENE	N.D.	0.5	-----
DIBENZO(A,H)ANTHRACENE	N.D.	0.5	-----
BENZO(G,H,I)PERYLENE	N.D.	0.5	-----

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Federal ID #68-0140157

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. David Higgins	Date Sampled:	06-28-90
	Applied GeoSystems	Date Received:	07-02-90
	3315 Almaden Expressway	Date Extracted:	07-12-90
	San Jose, CA 95118	Date Analyzed:	07-12-90
Project:	AGS 69034-2	Matrix:	Soil

	Cadmium	Chromium	Lead	Zinc
	ppm	ppm	ppm	ppm
Detection Limit:	0.006	0.006	0.08	0.01
SAMPLE Laboratory Identification				
S-4.5-B6 S1007012	9.4	63.0	287.1	63.9
S-7.5-B6 S1007013	4.5	49.8	242.0	51.3

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

All metals are extracted according to EPA method 3050 and analyzed according to EPA method 6010.

Laboratory Representative

07-20-90
Date Reported

APPLIED ANALYTICAL IS CERTIFIED BY THE STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 153)

APPLIED ANALYTICAL

Environmental Laboratories

42501 Albrae St., Suite 100
Fremont, CA 94538
Bus: (415) 623-0775
Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. David Higgins	Date Sampled:	06-28-90
	Applied GeoSystems	Date Received:	07-02-90
	3315 Almaden Expressway	Date Extracted:	07-13-90
	San Jose, CA 95118	Date Analyzed:	07-13-90
Project:	AGS 69034-2	Matrix:	Soil

	Cadmium	Chromium	Lead	Zinc
	ppm	ppm	ppm	ppm
Detection Limit:	0.006	0.006	0.08	0.01
SAMPLE Laboratory Identification				
S-12-B6 S1007014	13.2	61.2	105.1	55.0
S-16.5-B6 S1007015	13.5	64.8	100.5	53.0

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

All metals are extracted according to EPA method 3050 and analyzed according to EPA method 6010.

Laboratory Representative

07-20-90
Date Reported

APPLIED ANALYTICAL IS CERTIFIED BY THE STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 153)

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ANALYSIS REPORT

1020lab.frm

Attention: Mr. Dave Higgins
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Project: AGS 69034-1

Date Sampled: 07-17-90
Date Received: 07-19-90
BTEX Analyzed: 07-19-90
TPHg Analyzed: 07-19-90
TPHd Analyzed: 07-31-90
Matrix: Water

	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPHg	TPHd
	ppb	ppb	ppb	ppb	ppb	ppb
Detection Limit:	2.5	2.5	2.5	2.5	400	100
SAMPLE Laboratory Identification						
W-9-MW2 W1007668	3800	2900	690	3600	35000	850

ppb = parts per billion = µg/L = micrograms per liter.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

BTEX– Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.

TPHg–Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.

TPHd–Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Laboratory Representative

August 1, 1990
Date Reported

APPLIED ANALYTICAL LABORATORY IS CERTIFIED BY THE STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 153)

APPLIED ANALYTICAL

Environmental Laboratories

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ANALYSIS REPORT

togwater.rpt

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Attention: Dave Higgins

Date Received: 07-19-90
Laboratory #: W1007668
Project #: 69034-1
Sample #: W-9-MW2
Matrix: Water

Parameter	Result (µg/L)	Detection Limit (µg/L)	Date Analyzed
TPH as Oil and Grease	ND	5000	07-24-90

µg/L = micrograms per liter = ppb
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

PROCEDURES

TPH as Oil and Grease: Total Oil and Grease of mineral or petroleum origin are measured by extraction and gravimetric analysis according to Standard Method 503A/E.

Laura Kuck, Laboratory Manager

July 30, 1990
Date Reported

APPLIED ANALYTICAL

Environmental Laboratories

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Fax: (415) 651-8647

ANALYSIS REPORT

1020lab.frm

Attention:	Mr. David Higgins	Date Sampled:	07-17-90
	Applied GeoSystems	Date Received:	07-19-90
	3315 Almaden Expressway	Date Extracted:	07-26-90
	San Jose, CA 95118	Date Analyzed:	07-27-90
Project:	AGS 69034-1	Matrix:	WATER

	Cadmium	Chromium	Lead	Zinc
	ppm	ppm	ppm	ppm
Detection Limit:	0.02	0.01	0.02	0.01
SAMPLE Laboratory Identification				
W-9-MW2 W1007668	ND	0.05	0.05	0.12

ppm = parts per million = mg/kg = milligrams per kilogram.
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
NR = Analysis not requested.

ANALYTICAL PROCEDURES

All metals are extracted according to EPA method 3050 and analyzed according to EPA method 6010.

Laura Kuck
Laboratory Representative

07-31-90
Date Reported

APPLIED ANALYTICAL IS CERTIFIED BY THE STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY
(Certification No. 153)

APPLIED ANALYTICAL

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ANALYSIS REPORT

togwater.rpt

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway
San Jose, CA 95118
Attention: Dave Higgins

Date Received:	07-19-90
Laboratory #:	W1007669
Project #:	69034-1
Sample #:	W-8-MW3
Matrix:	Water

Parameter	Result (µg/L)	Detection Limit (µg/L)	Date Analyzed
TPH as Oil and Grease	ND	5000	07-24-90

µg/L = micrograms per liter = ppb
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

PROCEDURES

TPH as Oil and Grease: Total Oil and Grease of mineral or petroleum origin are measured by extraction and gravimetric analysis according to Standard Method 503A/E.

Laura Kuck, Laboratory Manager

July 30, 1990
Date Reported

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

August 3, 1990

ChromaLab File # 0790174

Client: Applied GeoSystems, Inc.
Attn: Dave Higgins
Date Sampled: July 17, 1990
Date Submitted: July 25, 1990
Date Extracted: July 31, 1990
Date Analyzed: Aug 02, 1990

Project No. 69034-1
Project Name: Arco 601
Sample I.D.: W-9-MW2
Method of Analysis: EPA 625/8270
Matrix: water

COMPOUND NAME	Sample mg/L	MDL mg/L	Spike Recovery
PHENOL	N.D.	0.01	103.2%, 97.5%
BIS(2-CHLOROETHYL) ETHER	N.D.	0.01	-----
2-CHLOROPHENOL	N.D.	0.01	-----
1,3-DICHLOROBENZENE	N.D.	0.01	-----
1,4-DICHLOROBENZENE	N.D.	0.01	-----
BENZYL ALCOHOL	N.D.	0.02	-----
1,2-DICHLOROBENZENE	N.D.	0.01	-----
2-METHYLPHENOL	N.D.	0.01	-----
BIS(2-CHLOROISOPROPYL)ETHER	N.D.	0.01	-----
4-METHYLPHENOL	N.D.	0.01	114.2%,105.3%
N-NITROSO-DI-N-PROPYLAMINE	N.D.	0.01	-----
HEXACHLOROETHANE	N.D.	0.01	-----
NITROBENZENE	N.D.	0.01	-----
ISOPHORONE	N.D.	0.01	-----
2-NITROPHENOL	N.D.	0.01	-----
2,4-DIMETHYLPHENOL	N.D.	0.01	-----
BENZOIC ACID	N.D.	0.05	-----
BIS(2-CHLOROETHOXY)METHANE	N.D.	0.01	94.6%, 90.3%
2,4-DICHLOROPHENOL	N.D.	0.01	-----
1,2,4-TRICHLOROBENZENE	N.D.	0.01	-----
NAPHTHALENE	0.34	0.01	-----
4-CHLOROANILINE	N.D.	0.02	-----
HEXACHLOROBUTADIENE	N.D.	0.01	-----
4-CHLORO-3-METHYLPHENOL	N.D.	0.02	-----
2-METHYLNAPHTHALENE	0.17	0.01	-----
HEXACHLOROCYCLOPENTADIENE	N.D.	0.01	-----
2,4,6-TRICHLOROPHENOL	N.D.	0.01	- - - - -
2,4,5-TRICHLOROPHENOL	N.D.	0.01	-----
2-CHLORONAPHTHALENE	N.D.	0.01	-----
2-NITROANILINE	N.D.	0.05	-----
DIMETHYL PHTHALATE	N.D.	0.01	-----
ACENAPHTHYLENE	N.D.	0.01	-----
3-NITROANILINE	N.D.	0.05	-----
ACENAPHTHENE	N.D.	0.01	113.2%,108.3%
2,4-DINITROPHENOL	N.D.	0.05	-----
4-NITROPHENOL	N.D.	0.05	-----
DIBENZOFURAN	N.D.	0.01	-----

(continued on next page)

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CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

ChromaLab File # 0790174

Project No. 69034-1 Project Name: Arco 601
Sample I.D.: W-9-MW2
Method of Analysis: EPA 625/8270 Matrix: water

COMPOUND NAME	Sample mg/L	MDL mg/L	Spike Recovery
2,4-DINITROTOLUENE	N.D.	0.01	-----
2,6-DINITROTOLUENE	N.D.	0.01	109.0%,108.5%
DIETHYL PHTHALATE	N.D.	0.01	-----
4-CHLORO-PHENYL PHENYL ETHER	N.D.	0.01	-----
FLUORENE	N.D.	0.01	-----
4-NITROANILINE	N.D.	0.05	-----
4,6-DINITRO-2-METHYL PHENOL	N.D.	0.05	-----
N-NITROSODIPHENYLAMINE	N.D.	0.01	-----
4-BROMOPHENYL PHENYL ETHER	N.D.	0.01	-----
HEXACHLOROBENZENE	N.D.	0.01	-----
PENTACHLOROPHENOL	N.D.	0.05	-----
PHENANTHRENE	N.D.	0.01	-----
ANTHRACENE	N.D.	0.01	-----
DI-N-BUTYL PHTHALATE	N.D.	0.01	-----
FLUORANTHENE	N.D.	0.01	-----
PYRENE	N.D.	0.01	103.8%, 99.7%
BUTYLBENZYLPHTHALATE	N.D.	0.01	-----
3,3'-DICHLOROBENZIDINE	N.D.	0.02	-----
BENZO(A)ANTHRACENE	N.D.	0.01	-----
BIS(2-ETHYLHEXYL)PHTHALATE	N.D.	0.01	-----
CHRYSENE	N.D.	0.01	105.3%,102.0%
DI-N-OCTYLPHTHALATE	N.D.	0.01	-----
BENZO(B)FLUORANTHENE	N.D.	0.01	-----
BENZO(K)FLUORANTHENE	N.D.	0.01	-----
BENZO(A)PYRENE	N.D.	0.01	-----
INDENO(1,2,3 C,D)PYRENE	N.D.	0.01	-----
DIBENZO(A,H)ANTHRACENE	N.D.	0.01	-----
BENZO(G,H,I)PERYLENE	N.D.	0.01	-----

ChromaLab, Inc.

David Duong
Senior Chemist

Eric Tam
Lab Director

CHROMALAB, INC.

Analytical Laboratory
Specializing in GC-GC/MS

- Environmental Analysis
- Hazardous Waste (#E694)
- Drinking Water (#955)
- Waste Water
- Consultation

August 3, 1990 ChromaLab File No.: 0790174

Client: Applied GeoSystems, Inc. Attn: Dave Higgins
Date Sampled: July 17, 1990 Date Submitted: July 25, 1990
Date of Analysis: July 31, 1990

Project No. 69034-1 Project Name: Arco 601
Sample I.D.: W-8-MW2
Method of Analysis: EPA 624 Detection Limit: 10 µg/L

COMPOUND NAME	µg/L	Spike Recovery	
CHLOROMETHANE	N.D	---	
VINYL CHLORIDE	N.D.	---	
BROMOMETHANE	N.D.	---	
CHLOROETHANE	N.D.	---	
TRICHLOROFLUOROMETHANE	N.D.	---	
1,1-DICHLOROETHENE	N.D.	---	
METHYLENE CHLORIDE	39	---	
1,2-DICHLOROETHENE (TOTAL)	N.D.	93.2%	95.8%
1,1-DICHLOROETHANE	N.D.	---	
CHLOROFORM	N.D.	---	
1,1,1-TRICHLOROETHANE	N.D.	---	
CARBON TETRACHLORIDE	N.D.	---	
BENZENE	3200	---	
1,2-DICHLOROETHANE	N.D.	---	
TRICHLOROETHENE	N.D.	---	
1,2-DICHLOROPROPANE	N.D.	---	
BROMODICHLOROMETHANE	N.D.	89.7%	91.1%
2-CHLOROETHYLVINYLETHER	N.D.	---	
TRANS-1,3-DICHLOROPROPENE	N.D.	---	
TOLUENE	2400	---	
CIS-1,3-DICHLOROPROPENE	N.D.	---	
1,1,2-TRICHLOROETHANE	N.D.	85.1%	88.5%
TETRACHLOROETHENE	N.D.	---	
DIBROMOCHLOROMETHANE	N.D.	---	
CHLOROBENZENE	N.D.	---	
ETHYL BENZENE	270	---	
BROMOFORM	N.D.	---	
1,1,2,2-TETRACHLOROETHANE	N.D.	---	
1,3-DICHLOROBENZENE	N.D.	---	
1,4-DICHLOROBENZENE	N.D.	---	
1,2-DICHLOROBENZENE	N.D.	100.4%	103.6%
TOTAL XYLENES	2900	---	

ChromaLab, Inc.

David Duong
Senior Chemist

Eric Tam
Lab Director

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APPLIED ANALYTICAL

Environmental Laboratories

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Fax: (415) 651-8647

Mr. Dave Higgins
Applied Geosystems
3315 Almaden Expressway
San Jose, CA 95118

Oct. 17, 1990

Dear Dave,

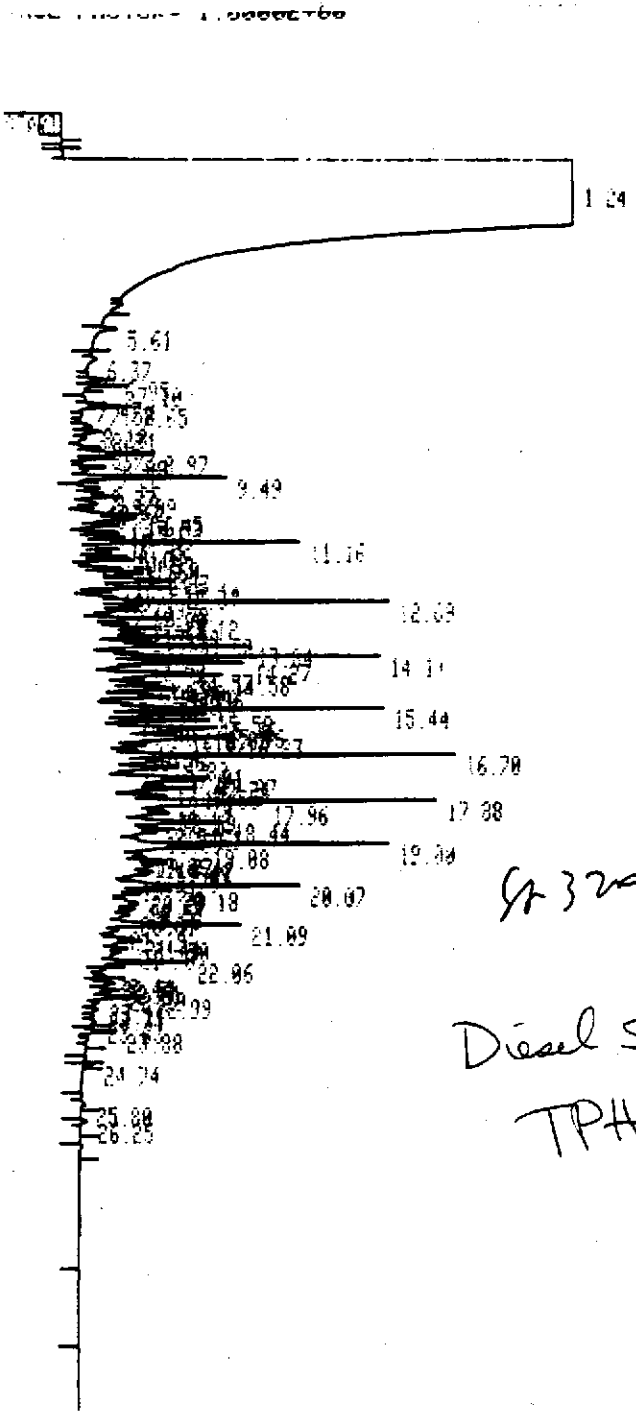
This letter is in regards to the samples which Applied Analytical received on July 17, 1990. We analyzed two water samples for Total Petroleum Hydrocarbons as Diesel using EPA method 3550/8015 and Total Petroleum Hydrocarbons as Gasoline using EPA method 5030/8015. We determined that both water samples resembled the gasoline chromatographs and not the diesel. These chromatographs are attached for your files.

Thank you for using Applied Analytical. Please feel free to call me if you have any questions regarding this matter.

Sincerely,

Laura Kuck

Laura Kuck
Laboratory Manager
Applied Analytical



Gx 320

Diesel Std

TPHd

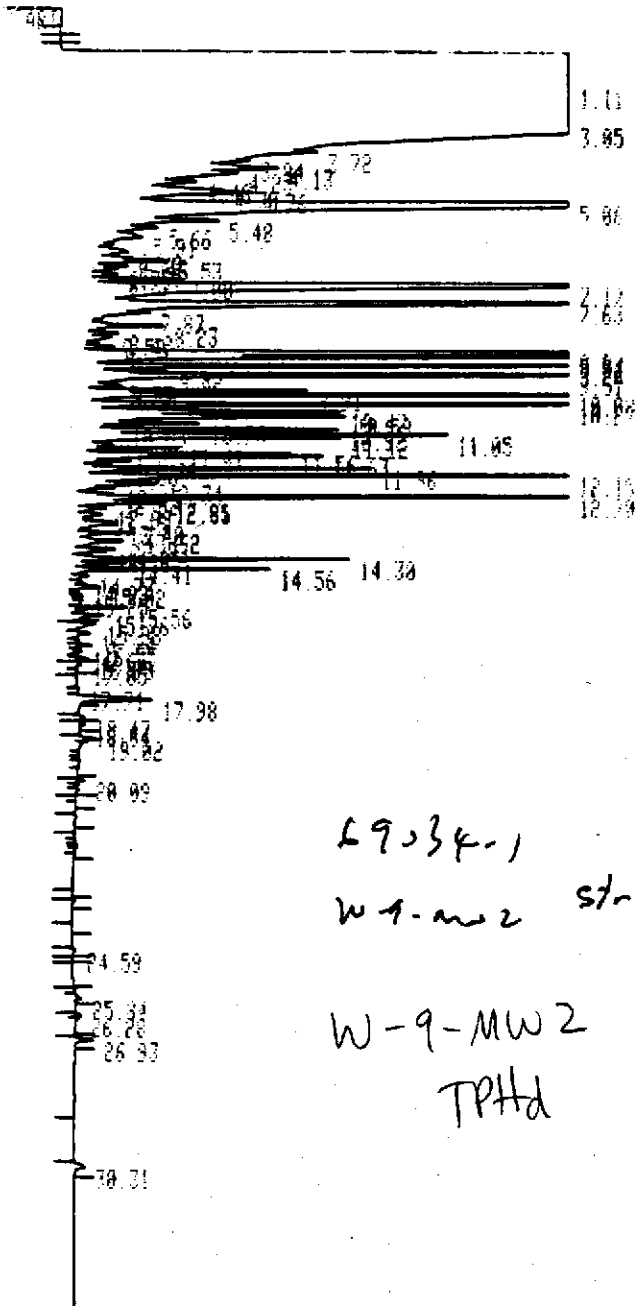
RUN # 298
WORKFILE ID: C
WORKFILE NAME:

AREA%

RT	AREA	TYPE	AR/HT	AREA%
1.24	4.6400E+08	TSHB	0.922	97.840
5.61	16294	BB	0.069	0.003
6.37	13889	VP	0.125	0.003
6.95	26916	VV	0.065	0.006
7.10	35976	VB	0.061	0.008
7.47	8545	PV	0.117	0.002
7.58	12448	VV	0.048	0.003
7.65	47298	VP	0.064	0.010

26.28	.3857	PB	0.051	6.8721E-04
26.93	19113	BB	0.082	0.003
30.30	22079	BB	0.131	0.004

TOTAL AREA= 5.6126E+08
MUL FACTOR= 1.0000E+00

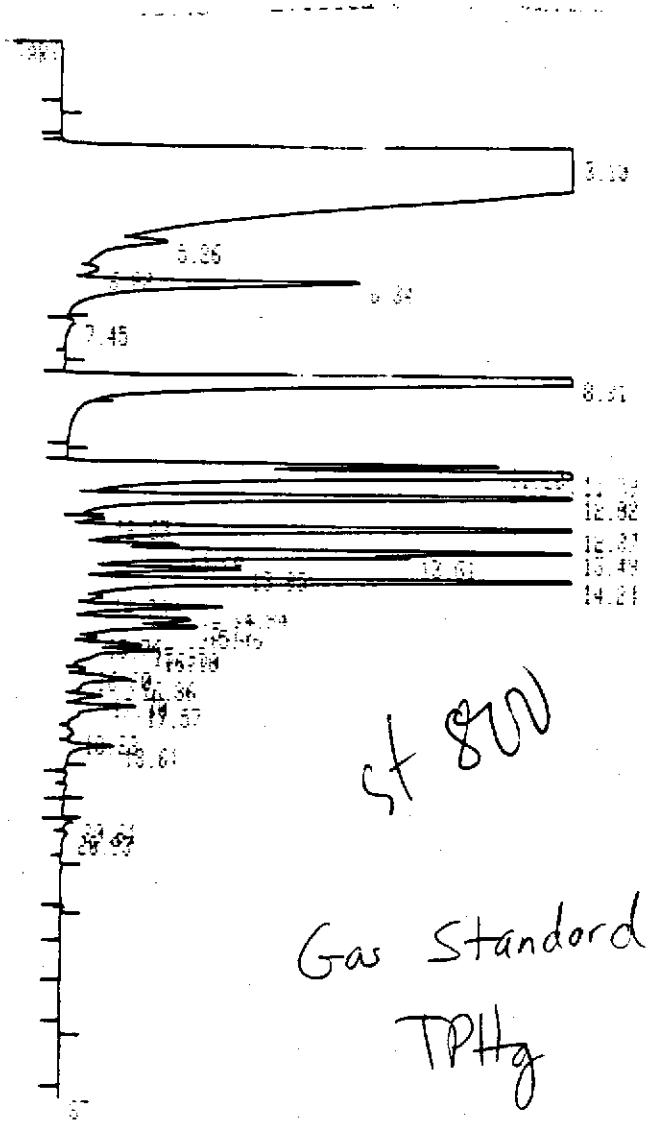


L9364-1
W-9-MW2 S/C

W-9-MW2
TPHd

RUN # 313
WORKFILE ID: C
WORKFILE NAME:

AREA%
RT AREA TYPE AREA



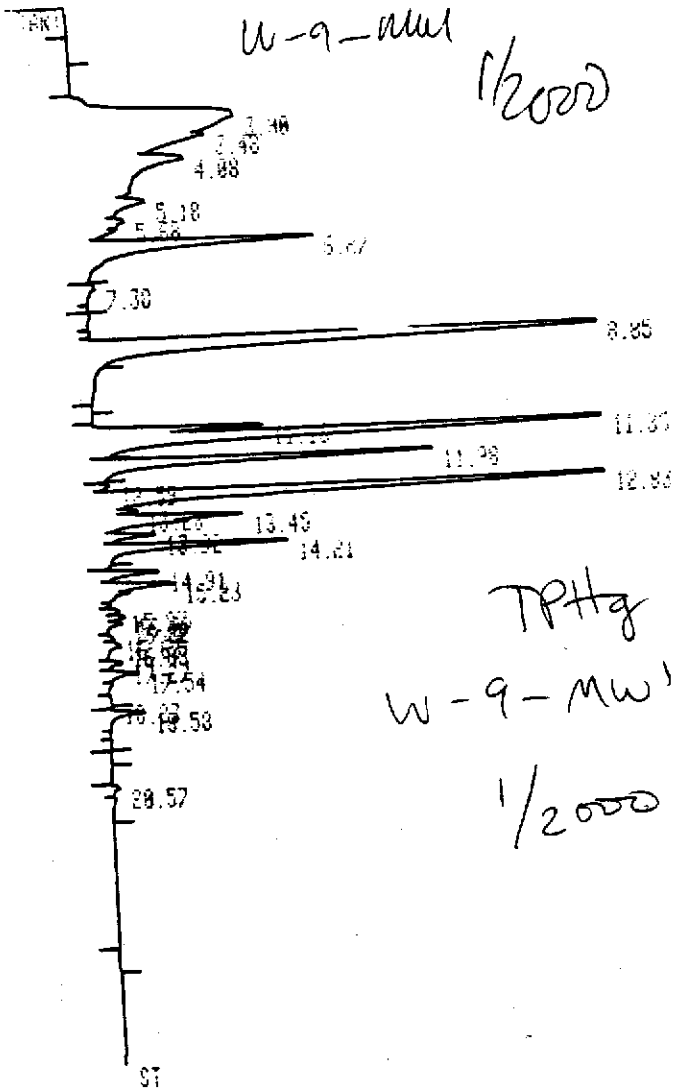
RUN # 421
WORKFILE ID: 8
WORKFILE NAME:

ESTD

RT	AREA	TYPE	CAL #	AMOUNT
3.10	5486500	BV		0.000
5.26	142970	VV		0.000
6.02	33394	VV		0.000
6.34	253500	VB	1	21.446
7.45	5264	BF		0.000
8.91	119500	PB		100.670

TOTAL AREA= 2.4865E+08
MUL FACTOR= 1.0000E+00

69034-1
W-9-MW1
1/2000

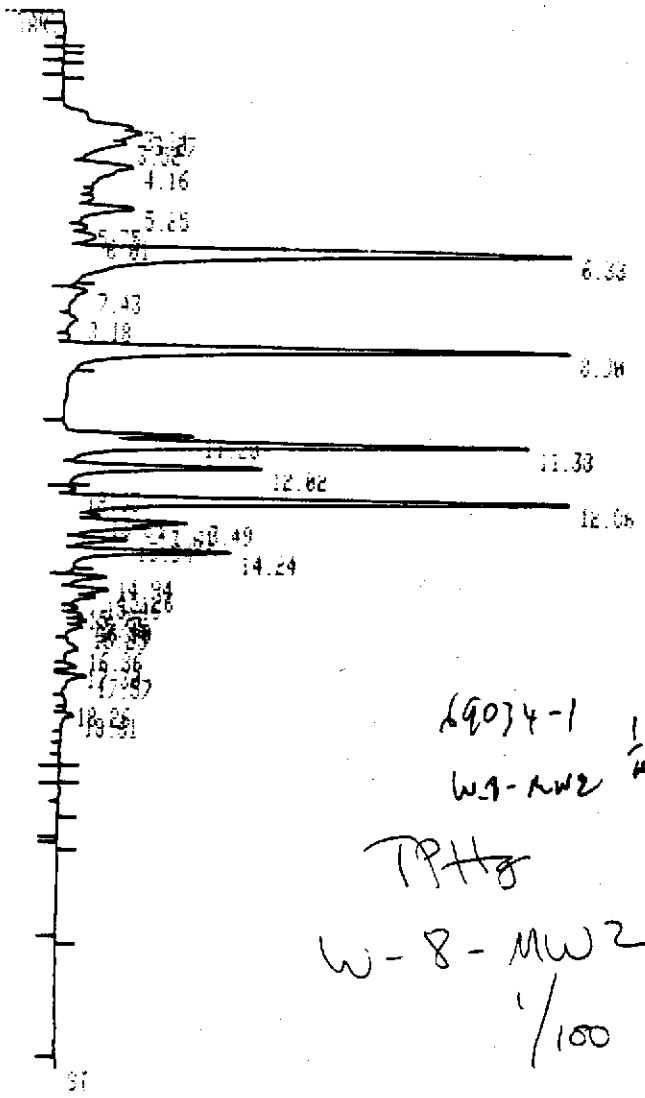


TPHg
W-9-MW1
1/2000

RUN # 455
WORKFILE ID: B
WORKFILE NAME:

ESTD RT	AREA	TYPE	CAL #	AMOUNT
3.00	371060	BV		0.000
3.48	185680	VV		0.000
4.08	c66400	VV		0.000
5.18	85066	VV		0.000
5.68	35068	VV		0.000
6.27	199360	VB	1	16.865
7.38	5372	BP		0.000
[illegible]	[illegible]	PB	P	43.341

MUL FACTOR= 1.0000E+00



LQ034-1
WS-MW2 1/100

TPHg
W-8-MW2
1/100

RUN # 464
WORKFILE ID: B
WORKFILE NAME:

ESTD

RT	AREA	TYPE	CAL #	AMOUNT
3.14	21153	BV		0.000
3.27	66955	VV		0.000
3.52	67441	VV		0.000
4.16	184780	VV		0.000
5.25	38172	VV		0.000
5.75	16210	VV		0.000
6.01	23128	VV		0.000
6.33	459450	VB	1	38.863
7.43	12484	BP		0.000
8.18	7415	PP		0.000
8.90	321130	PB	2	29.297
11.26	53838	PV	3	2.161

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ. NO. 9034-2 | PROJECT NAME: ARCO 601 | P.O. NO. | SAMPLERS (Signature): Dave Higgins

DATE (MM/DD/YY)	TIME	SAMPLE I.D.	No. of Containers	ANALYSIS: TPHg	BTEX	TPHd	TOG	ORGANIC LEAD	VOC (8240)	EPA 8270	Pb Gd, Cr, Zn	Preserved?	LABORATORY I.D. NUMBER
6/28/90		S - 4½ - B6	1	X	X	X	X		X	X	X		
		S - 7½ - B6	1	X	X	X	X		X	X	X		
		S - 12 - B6	1	X	X	X	X	X	X	X	X		
		S - 16½ - B6	1	X	X	X	X		X	X	X		
		S - 4½ - B7	1	X	X								
		S - 10 - B7	1	X	X			X					
		S - 16 - B7	1	X	X								
		S - 12½ - B7	1	X	X								
6/29/90		S - 6 - B8	1	X	X								
		S - 9 - B8	1	X	X			X					
		S - 12 - B8	1	X	X								
		S - 15½ - B8	1	X	X								

RELINQUISHED BY (Signature): Dave Higgins | DATE / TIME: 6/29/90 4:00 | RECEIVED BY (Signature): J. Guardino X662 EXPRESS IT

RELINQUISHED BY (Signature): | DATE / TIME: | RECEIVED BY (Signature):

RELINQUISHED BY (Signature): | DATE / TIME: 7-3-90 | RECEIVED FOR LABORATORY BY (Signature):

REMARKS: REPORT IN ATTACHED DETECTION LIMITS

SEND RESULTS TO:

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

Proj. Mgr.: Dave Higgins

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ. NO.	PROJECT NAME
69034-2	ARCO-601
P.O. NO.	SAMPLERS (Signature)

CHROMALAB FILE # 790046

DATE MM/DD/YY	TIME	SAMPLE I.D.	No. of Containers	TPHg	BTEX	TPHd	Organic Pb	VOC (8240)	8270			Preserved?	LABORATORY I.D. NUMBER
~~6-28-90~~													
6-28-90		S-4½-B6						X	X				
↓		S-7½-B6						X	X				
		S-12-B6					X	X	X				
		S-16½-B6						X	X				
		S-10-B7					X						
6-29-90		S-9-B8					X						

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
	7/9/90 1430	
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):

REMARKS:
Chromalab
48 hour RUSH
Charge client
standard TAT price
and bill Applied Analytical

SEND RESULTS TO:
Applied GeoSystems
3315 Almaden Expressway
Suite 34
San Jose, California 95118
(408) 264-7723

Proj. Mgr.: DAVE HIGGINS

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

RECEIVED

PROJ. NO.	PROJECT NAME
69034-1	ARCO 601 - San Leandro
P.O. NO.	SAMPLERS (Signature)

DATE MM/DD/YY	TIME		No. of Containers	TPHgasoline (8015)	BTEX (602/8020)	TPHdiesel (8015)						Preserved?	REMARKS	LABORATORY I.D. NUMBER
				ANALYSIS										
7/17/90	12:45	W-9-MW-1	1										* Hold this page of samples. THANKS MJB	
		W-9-MW-1	1											
		W-9-MW-1	1											
		W-9-MW-1	1											
		W-9-MW-1-FP	1											
													CALL Before you run any of these. We may want to run a "fingerprint" on these samples, but we have to speak with the client first. MJB	

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):	Laboratory:	SEND RESULTS TO:
Mark Pierucci	7/17/90 8:30	M Linhan 7-19-90		Applied GeoSystems 42501 Albrae Street Fremont, CA 94538 (415) 651-1906
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):	Turn Around:	Proj. Mgr.:
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):		

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ. NO.	PROJECT NAME
6903.1.1	ARCO 601 - SAN Leandro
P.O. NO.	SAMPLERS (Signature)
	M. C. Ramaroli

DATE MM/DD/YY	TIME	SAMPLE I.D.	No. of Containers	TPHg	BTEX	TPHd	TOG / 5030	8240 / 624 / 8010 / PNA / 625	VOC's / BTEX / 624	PAH / PCB / Pesticides / 8270	Iced	Preserved? HCl	LABORATORY I.D. NUMBER
7/17/90	6:45	W-9-MW2	1			✓					✓		
	6:45	W-9-MW2	1			✓					✓		
	6:40	W-9-MW2	1				✓				✓		
	6:40	W-9-MW2	1				✓				✓		
	6:55	W-9-MW2	1					✓			✓		
	6:50	W-9-MW2	1					✓			✓		
	6:50	W-9-MW2	1							✓	✓		
	6:29	W-8-MW2RB	4	✓	✓						✓		*Hold for results/call with verbals/PA
	6:30	W-8-MW2	1	✓	✓						✓	✓	
		W-8-MW2	1	✓	✓						✓	✓	
		W-8-MW2	1	✓	✓						✓	✓	
		W-8-MW2	1	✓	✓						✓	✓	
		W-8-MW2	1						✓		✓		
		W-9-MW2	1						✓		✓		

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):	REMARKS:
M. C. Ramaroli	7/17/90 8:30	[signature] 7-19-90	
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):	
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature):	

SEND RESULTS TO:

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

Proj. Mgr.: DAVE Nyland

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ NO	PROJECT NAME
69034-1	Arco 601
PO NO	SAMPLERS (Signature)

CHROMALAB FILE # 790174

DATE MM/DD/YY	TIME	SAMPLE I.D.	No. of Containers	TPHg	BTEX	TPHd	625	624 w/BTEX				Preserved?	LABORATORY I.D. NUMBER
7/17/90	6:50	W-9-MW2	2L				X						
"	6:30	W-8-MW2	2 40 ml					X					

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):
Laura Kuck	7/18/90 1500	Marc Monette
RELINQUISHED BY (Signature): Marc Monette	DATE / TIME 7/26 16:10	RECEIVED BY (Signature):
RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED FOR LABORATORY BY (Signature): Jean Wyatt 7-26 16:10

REMARKS: Normal TAT

SEND RESULTS TO:
Applied GeoSystems
3315 Almaden Expressway
Suite 34
San Jose, California 95118
(408) 264-7723

Proj. Mgr.: Dave Higgins

Applied GeoSystems

CHAIN-OF-CUSTODY RECORD

PROJ. NO.	PROJECT NAME
61031-1	ARCO 601 - San Leandro
P.O. NO.	**SAMPLERS (Signature)**
	[signature]

* Hold this PAGE of Samples. I need to discuss this with the client. I will call ASAP. THANKS MJE

DATE MM/DD/YY	TIME	SAMPLE I.D.	No. of Containers	TPHg	BTEX	TPHd	TOG/503E	BASE/ACID/PNAs/625	VOCs/BTEX/624	Pb/CAD/TOT CHROM/ZN/6010		ICED	Preserved? HCL	LABORATORY I.D. NUMBER
7/17/90	520	W-8-MW3	1				✓					✓		
	520	W-8-MW3	1				✓					✓		
	528	W-8-MW3	1			✓						✓		
	528	W-8-MW3	1			✓						✓		
	530	W-9-MW3	1							✓		✓		
	535	W-9-MW3	1					✓				✓		
	535	W-9-MW3	1					✓				✓		
	5:30	W-7-MW3 PB	1	✓	✓							✓		* Hold for volatiles, call with results [illegible]
		W-7-MW3	1	✓	✓							✓	✓	
		W-7-MW3	1	✓	✓							✓	✓	
		W-7-MW3	1	✓	✓							✓	✓	
		W-7-MW3	1	✓	✓							✓	✓	
		W-7-MW3	1						✓			✓		
		W-7-MW3	1						✓			✓		

RELINQUISHED BY (Signature):	DATE / TIME	RECEIVED BY (Signature):	REMARKS:	SEND RESULTS TO:
[signature]	7/17/90 8:30	[signature]		Applied GeoSystems 3315 Almaden Expressway Suite 34 San Jose, California 95118 (408) 264-7723
RELINQUISHED BY (Signature):	**DATE / TIME**	**RECEIVED BY (Signature):**		
RELINQUISHED BY (Signature):	**DATE / TIME**	**RECEIVED FOR LABORATORY BY (Signature):**		Proj. Mgr.: DAVE Higgins
		[signature] 7-17-90		

APPENDEIX F

SIEVE ANALYSIS REPORT

DRILLER EXPLORATION GEOSERVICES
SAN JOSE CA.

ENGINEER APPLIED GEOSYSTEMS
SAN JOSE CA.

ANALYSIS BY BILL SCHAFER
DATE 7/25/98

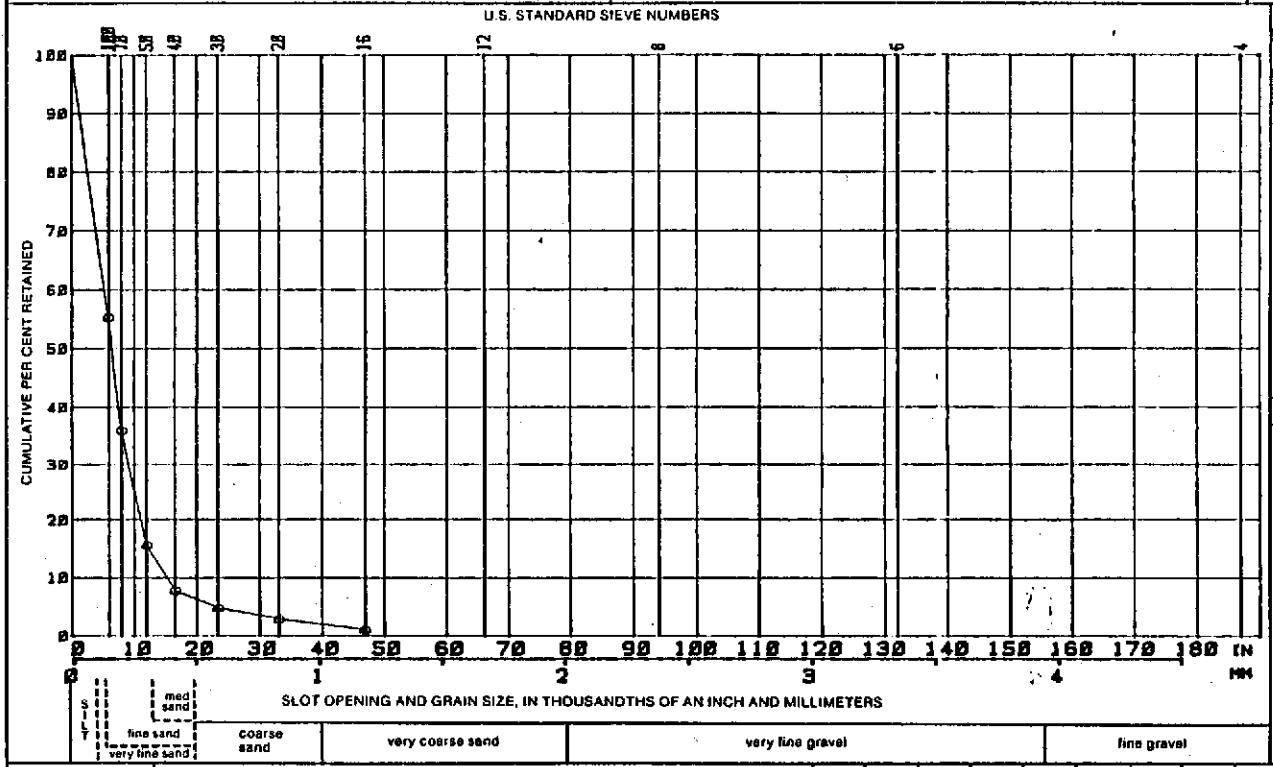
JOB NAME ARCO 681

LOCATION SAN LEANDRO CA.

JOHNSON I.D. NUMBER 98286F
SAMPLE SENT IN BY MIKE BARMINSKI

SAND ANALYSIS REPORT

Johnson Filtration Systems Inc.
P.O. Box 64118 • St. Paul, Minnesota 55164-0118 • Telephone: 612-636-3900
Telex: 29-7451 • FAX 1-612-636-0889 • Call Toll Free 1-800-VEE-WIRE



TEST HOLE DATA

DIAMETER

DEPTH

DRILLING METHOD

DRILLING FLUID

GEOPHYSICAL LOGS

STATIC WATER LEVEL

WELL DATA

CASING DIAMETER

DESIRED YIELD

WELL APPLICATION

DESIGN RECOMMENDATIONS

Johnson SS screen
20 slot (0.020 in) with
Monterey #2 or Valley
Sand 10-20 or equivalent.

COMMENTS

The other nine soil samples consisted of clays and silts and were not sieved.

SCREEN RECOMMENDATIONS

DIAMETER

SLOT	LENGTH	SETTING

COMBINED SAMPLE DEPTHS	PHYSICAL SAMPLE DESCRIPTION		mm	4.76	3.36	2.38	1.68	1.19	.840	.590	.420	.297	.210	.149	.074	.053	TOTAL WT.
			Inches	.187	.123	.094	.066	.047	.033	.023	.016	.012	.008	.006	.003	.002	
			U.S. Sieve #	4	6	8	12	16	20	30	40	50	70	100	200	270	
5986 #1	OSILT TO VERY COARSE SAND	CUMULATIVE % RETAINED						1.8	2.9	4.9	7.8	15.5	35.9	55.3			183.8