

Applied GeoSystems

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

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

REPORT
LIMITED ENVIRONMENTAL
SITE ASSESSMENT
at
ARCO Service Station No. 2152
2214 Center Street
Castro Valley, California

AGS Job 69013-1

Report prepared for

ARCO Products Company
2000 Alameda de las Pulgas
San Mateo, California 94402

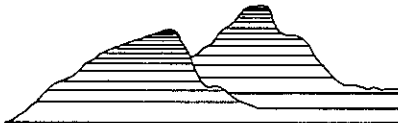
by
Applied GeoSystems

Steve Bittman
Staff Geologist

Greg Barclay
Project Branch Manager

Gillian S. Holmes
G.E. 2023

May 26, 1989



Applied GeoSystems

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

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

May 26, 1989
AGS 69013-1

Mr. Kyle Christie
ARCO Products Company
2000 Alameda de las Pulgas
San Mateo, California 94402

Subject: Executive Summary of Report No. 69013-1, Limited
Environmental Site Assessment at ARCO Station
No. 2152, 2214 Center Street, Castro Valley,
California.

Mr. Christie:

At your request this report presents the results of our limited environmental site assessment at the above-referenced site. The assessment included drilling three boreholes and analyzing selected soil samples from the borings. ARCO requested that Applied GeoSystems perform this limited environmental site assessment to evaluate the area of the underground product-storage tanks for potential hydrocarbon contamination in the subsurface soil prior to tank replacements. The following summarizes the results of the work performed:

- o On April 13, 1989 an Applied GeoSystems geologist was present on the site to drill three borings adjacent to five underground product tanks to a maximum depth of approximately 45 feet, and to collect soil samples from the boreholes.
- o Results of laboratory analyses of selected samples from three boreholes adjacent to the product tanks showed concentrations of hydrocarbons in the soil to be from nondetectable to 5.6 parts per million (ppm) total petroleum hydrocarbons (TPH), except for the soil collected at a depth of approximately 5 feet in boring B-3 adjacent to the 12,000-gallon unleaded supreme gasoline tank, which indicated 460 ppm TPH.
- o The soil encountered in the borings at the site consisted of silty clay to sandy clay with some clayey gravel.

- o No ground water was encountered to a depth of 45 feet.
- o The inferred direction of ground-water flow beneath the site is toward the southwest based on local and regional topography.

The following preliminary recommendations are provided at ARCO's request and are based on the results of this limited assessment:

- o We recommend that soil samples be collected from below the underground product-storage tanks during tank removal operations to confirm levels (if any) of hydrocarbon contamination in the soil beneath the product tanks. The soil samples should be analyzed for total petroleum hydrocarbons using modified Environmental Protection Agency (EPA) Method 8015, and for purgeable gasoline constituents benzene, ethylbenzene, toluene and total xylene isomers using EPA Method 8020.
- o If significant hydrocarbon contamination is observed in the soil during removal of the tanks, we recommend that as much of the contaminated soil as possible be excavated from the pit prior to replacing the tanks. The excavated soil should be field tested with an organic vapor meter to allow for separation of highly contaminated soil from soil with nondetectable to low levels of hydrocarbon contamination. Highly contaminated soil should be aerated onsite to levels acceptable to a Class III disposal facility. If hydrocarbon contamination appears to extend beyond the limits of the excavation, additional investigative work will be necessary to evaluate the extent of this contamination and to select appropriate remediation alternatives, as necessary.
- o We also recommend that ARCO forward copies of this report to:

Mr. Scott Hugenberger
California Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street
Room 6040
Oakland, California 94607

Mr. Bob Bowman
Castro Valley Fire Department
20336 San Miguel Boulevard
Castro Valley, California 94546

Alameda County Health Agency
Hazardous Materials Division
80 Swan Way
Room 200
Oakland, California 94621

Please call if you have any questions regarding this report.

Sincerely,
Applied GeoSystems



Steve Bittman
Staff Geologist

CONTENTS

INTRODUCTION	1
SITE DESCRIPTION AND BACKGROUND.	2
REGIONAL AND LOCAL HYDROGEOLOGY.	3
FIELD WORK	4
Site Safety Plan.	4
Soil Borings.	5
Drilling.	5
Drill Cuttings.	6
Soil Sampling	7
Soil Description.	8
Laboratory Analysis	9
DISCUSSION	11
LIMITATIONS.	11
REFERENCE CITED.	12

TABLES

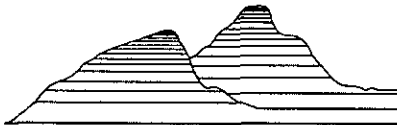
TABLE 1: RESULTS OF LABORATORY ANALYSES OF SOIL SAMPLES	10
---	----

PLATES

PLATE P-1: SITE VICINITY MAP
PLATE P-2: GENERALIZED SITE PLAN
PLATE P-3: UNIFIED SOIL CLASSIFICATION AND SYMBOL KEY
PLATE P-4 THROUGH
PLATE P-5: LOG OF BORING B-1
PLATE P-6 THROUGH
PLATE P-7: LOG OF BORING B-2
PLATE P-8 THROUGH
PLATE P-9: LOG OF BORING B-3
PLATE P-10: GEOLOGIC CROSS-SECTION A-A'

APPENDIX

APPENDIX: CHAIN OF CUSTODY RECORDS AND LABORATORY RECORDS OF ANALYSIS
--



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

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

REPORT
LIMITED ENVIRONMENTAL
SITE ASSESSMENT
at
ARCO Service Station No. 2152
2214 Center Street
Castro Valley, California
For: ARCO Products Company

INTRODUCTION

This report describes the work conducted by Applied GeoSystems at ARCO Service Station No. 2152 at 2214 Center Street in Castro Valley, California. ARCO Products Company contracted with Applied GeoSystems to evaluate the immediate area around five underground product-storage tanks for potential hydrocarbon contamination in the subsurface soil prior to tank replacements. This report summarizes the work conducted during our investigation, includes our interpretations of the data collected, and presents our conclusions.

SITE DESCRIPTION AND BACKGROUND

ARCO Service Station No. 2152 is an operating service station at the intersection of Center Street and Grove Way in Castro Valley, California, as shown on the Site Vicinity Map (Plate P-1). The Generalized Site Plan (Plate P-2) shows the approximate site boundaries and locations of selected features at the site. The site is on a relatively flat, asphalt- and concrete-covered lot. Residences are southeast and southwest of the site, and commercial developments are northwest across Grove Way, and northeast across Center Street.

We understand that five underground product-storage tanks are on the north portion of the site; including four 6,000-gallon tanks and one 12,000-gallon tank. These tanks are designated T1 through T5 on Plate P-2; tank T1 is a 12,000-gallon unleaded supreme gasoline-tank, tanks T2 through T4 are 6,000-gallon regular unleaded gasoline tanks, and tank T5 is a leaded regular gasoline tank. It is our understanding that the 12,000-gallon tank was installed in 1983, and the four 6000-gallon tanks were installed in 1976.

REGIONAL AND LOCAL HYDROGEOLOGY

Regionally, the site is in the Castro Valley Basin which lies amid the Diablo Range to the east, the Hayward Fault to the west, Lake Chabot to the north, and the city limit of Hayward to the south. The site area lies within an area of unconsolidated Pleistocene alluvium consisting of a heterogenous mixture of poorly consolidated clay, silt, sand, and gravel derived from the Diablo Range to the east. This unit underlies the entire East Bay Plain west of the Hayward Fault, extends under San Francisco Bay and is the major ground-water reservoir in the East Bay Plain Area. Wells completed in the site area where this alluvium is finer grained and thinner do not yield as much water as wells in the East Bay Plain itself (Hickenbottom, 1988). The inferred direction of ground-water flow is toward the southwest based on regional and local topography and drainage patters.

The site is at an elevation of approximately 245 feet above mean sea level. The shallow soil at the site consists of silty clay with some sandy clay underlain by clayey gravel. Ground water was not encountered in the borings to an approximate maximum depth of 45 feet. Depth to ground water in the area of the site

has been reported to be approximately 50 feet below the ground surface (Hickenbottom, 1988).

FIELD WORK

Site Safety Plan

Field work performed at the site by Applied GeoSystems on behalf of ARCO was conducted in accordance with Applied GeoSystems Site Safety Plan No. 69013-1S, dated April 12, 1989. This plan describes the safety requirements for observing the drilling of soil borings. The Site Safety Plan is applicable to personnel of Applied GeoSystems and to its subcontractors. Applied GeoSystems personnel and subcontractors of Applied GeoSystems scheduled to 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 at the site for reference by appropriate parties during work. The Staff Geologist of Applied GeoSystems was the Site Safety Officer.

Soil Borings

The number and locations of the borings drilled were based on the ARCO Retail Marketing Environmental Procedure for Preliminary Tank Replacement Assessment San Francisco Region provided us by ARCO. A total of three borings were drilled around the tank complex perimeter and were placed approximately 2-1/2 feet from the edge of the tank pad. Boring B-1 was drilled close to the fill end of tank T3. Boring B-2 was placed at the east side of the complex adjacent to tank T5, and boring B-3 was located at the west side of the complex adjacent to tank T1. The locations of the three borings are shown on the Generalized Site Plan (Plate P-2).

Drilling

A geologist from Applied GeoSystems observed the drilling of soil borings B-1 through B-3 on April 13, 1989. The borings were drilled with a CME 75 truck-mounted drill rig operated by HEW Drilling Company, Inc., of Palo Alto, California. Continuous flight, 8-inch-diameter, hollow-stem augers were used to drill the borings to total depth. Ground water was not encountered in any of the borings at the time of drilling. The borings were

backfilled to grade with a slurry of water, cement, and 5 percent bentonite.

A summary of the Unified Soil Classification System used to identify the soil excavated during drilling is presented on Plate P-3. Descriptions of earth materials encountered in borings B-1 through B-3 are presented on the Logs of Borings (Plates P-4 through P-9).

Drill Cuttings

The drill cuttings were subjectively examined as they were excavated for any discoloration and qualitatively analyzed for organic vapor using an organic vapor meter (OVM). Vapor readings were collected by placing the intake probe of the OVM against the soil cuttings. The measurements indicate the relative organic vapor concentrations in soil but cannot be used to assess concentrations of hydrocarbons in the soil with the confidence of laboratory analysis. The cuttings from the borings were stockpiled onsite and will remain the responsibility of ARCO. We understand ARCO plans to aerate and remove the cuttings along with the soil excavated during the proposed tank replacement operations.

Soil Sampling

Twenty-one soil samples were collected and described from borings B-1 through B-3 during drilling. These samples, described on the Logs of Borings, were collected at 5-foot intervals from the ground surface to the total depth of the borings. Soil samples were collected by advancing the boring to a point immediately above the sampling depth and then driving a California-modified split-spoon sampler (2-1/2-inch inside-diameter) into the soil through the hollow center of the auger. The sampler was driven 18 inches with a standard 140-pound hammer repeatedly dropped 30 inches. The number of blows to drive the sampler each successive 6 inches was counted and recorded to evaluate the relative consistency of the soil.

One of the brass sleeves from the sampler of each sampling interval was subjectively examined for discoloration and qualitatively analyzed in the field using an OVM. The OVM was used to evaluate relative concentrations of organic vapor in the soil. Vapor readings were collected by placing the OVM against the soil in one of the brass sleeves promptly after opening the sampler. The OVM readings are presented in the Logs of Borings (Plates P-4 through P-9).

The samples were removed from the sampler and quickly sealed in their brass sleeves with aluminum foil, plastic caps, and tape. The samples were then labeled and placed in iced storage. The geologist initiated Chain of Custody Records and selected samples were delivered to the Applied GeoSystems laboratory in Fremont, California (Hazardous Waste Testing Laboratory No. 153). The completed Chain of Custody Records are included in the Appendix of this report.

Soil Description

The soil encountered during this investigation consisted primarily of silty clay and clayey gravel. A layer of clayey gravel approximately 1- to 1-1/2-foot thick, interpreted as fill, was encountered in the borings from below the asphalt surface to a depth of approximately 1-1/2 to 2 feet. Silty clay was encountered at depths of approximately 1-1/2 to 2 feet and extended to depths of approximately 29-1/2 to 44 feet. Clayey sand was encountered below the silty clay and extended to the total depth of borings B-1 and B-2, approximately 45 and 30 feet, respectively. Ground water was not encountered in the borings during drilling. Graphic representation of the soil encountered is shown in Geologic Cross Section A-A' (Plate 10).

Laboratory Analysis

Sixteen soil samples collected from borings B-1 through B-3 were selected for analysis. ARCO's procedure for preliminary tank replacement assessment was used as a basis for selecting samples for analysis. The selected samples were analyzed for total petroleum hydrocarbons (TPH) using modified Environmental Protection Agency (EPA) Method 8015, and for purgeable gasoline constituents benzene, ethylbenzene, toluene and total xylene isomers (BETX) by EPA Method 8020. The results of the laboratory analyses indicate nondetectable to very low (less than 6 parts per million [ppm]) concentrations of hydrocarbons in the soil, except for one sample collected at a depth of approximately 5 feet adjacent to tank T1. This sample indicated TPH at a concentration of 460 ppm, benzene at 5.1 ppm, ethylbenzene at 9.6 ppm, toluene at 34 ppm, and total xylene isomers at 51 ppm. The results of the laboratory analyses are presented in Table 1 and in the laboratory Analysis Reports included in the Appendix.

TABLE 1
 RESULTS OF LABORATORY ANALYSIS OF SOIL SAMPLES
 ARCO Station No. 2152
 2214 Center Street
 Castro Valley, California

Sample Identifier	TPH	B	E	T	X
S-10-B1	ND	ND	ND	ND	ND
S-20-B1	ND	0.11	ND	0.15	0.19
S-25-B1	ND	0.22	0.088	0.34	0.38
S-30-B1	5.1	0.42	0.11	0.89	0.56
S-35-B1	5.1	0.40	0.094	0.72	0.42
S-40-B1	ND	0.10	ND	ND	ND
S-45-B1	ND	ND	ND	ND	ND
S-10-B2	ND	ND	ND	ND	ND
S-20-B2	ND	ND	ND	ND	ND
S-25-B2	ND	ND	ND	ND	ND
S-30-B2	ND	ND	ND	ND	ND
S-5-B3	460	5.1	9.6	34	51
S-10-B3	5.6	ND	ND	0.11	1.0
S-20-B3	ND	ND	0.055	ND	0.068
S-25-B3	ND	ND	0.17	ND	0.16
S-30-B3	ND	ND	ND	ND	ND

Results in milligrams per kilogram (mg/kg), or parts per million (ppm).

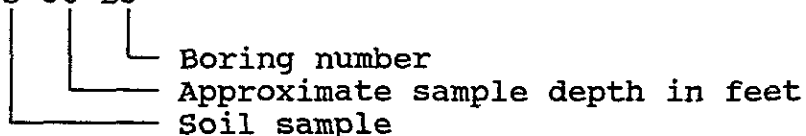
TPH: Total petroleum hydrocarbons

B:benzene E:ethylbenzene T:toluene X:total xylene isomers

ND: Less than the detection limit of the specified analysis.

Sample identification:

S-30-B3



DISCUSSION

With the exception of sample S-5-B3, analytical results of the soil samples collected from the three borings show nondetectable to very low levels (less than 6 ppm) of hydrocarbons to the depths sampled. In our opinion, these results suggest that hydrocarbon contamination from the product tanks is unlikely and does not appear to pose a significant or adverse impact on the soil in the vicinity of the borings. The elevated level of TPH discovered at an approximate depth of 5 feet in boring B-3 may be the result of overfilling of the tanks, a product line leak, or a combination of these. Because a boring was not drilled by the southwest end of the tank complex, the potential of hydrocarbon contamination in the soil cannot be evaluated for that area.

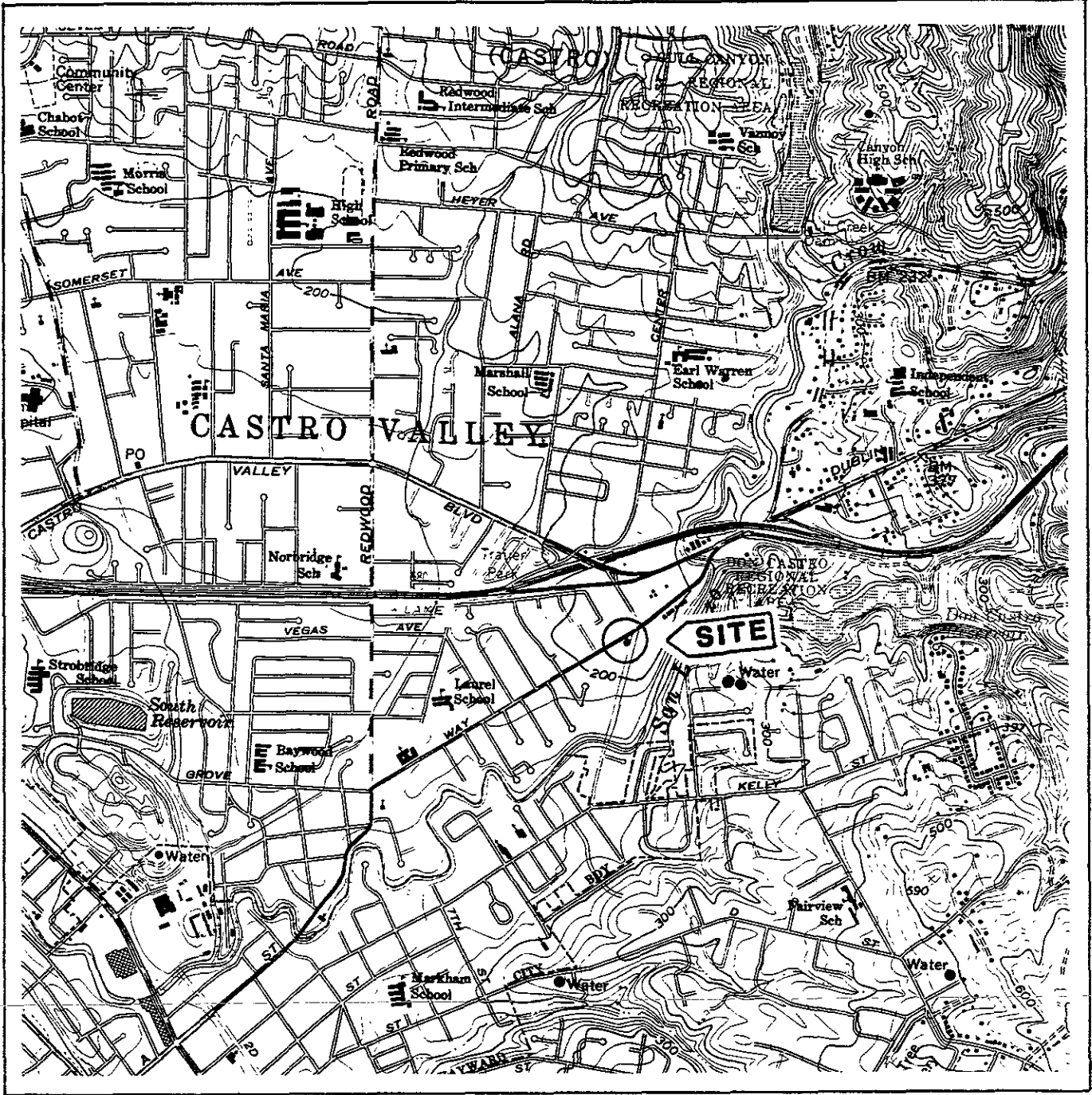
LIMITATIONS

This report was prepared in accordance with generally accepted standards of environmental geological practice in California at the time this assessment was performed. This assessment was conducted solely for the purpose of evaluating environmental conditions of the soil with respect to hydrocarbon product contamination at the subject site in the immediate area of the

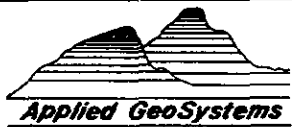
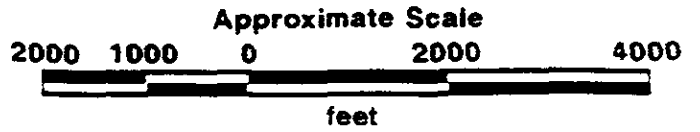
product-storage tanks. No soil engineering or geotechnical implications are stated or should be inferred. Evaluation of the geologic conditions at the site for the purpose of this assessment is made from a limited number of observation points. Subsurface conditions may vary away from the data points available. Additional work, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of assessment.

REFERENCE CITED

Hickenbottom, K. and Muir, K. 1988. Geohydrology And Groundwater-Quality Overview Of The East Bay Plain Area, Alameda County, California 205 (j) Report. Alameda County Flood Control and Water Conservation District, California.



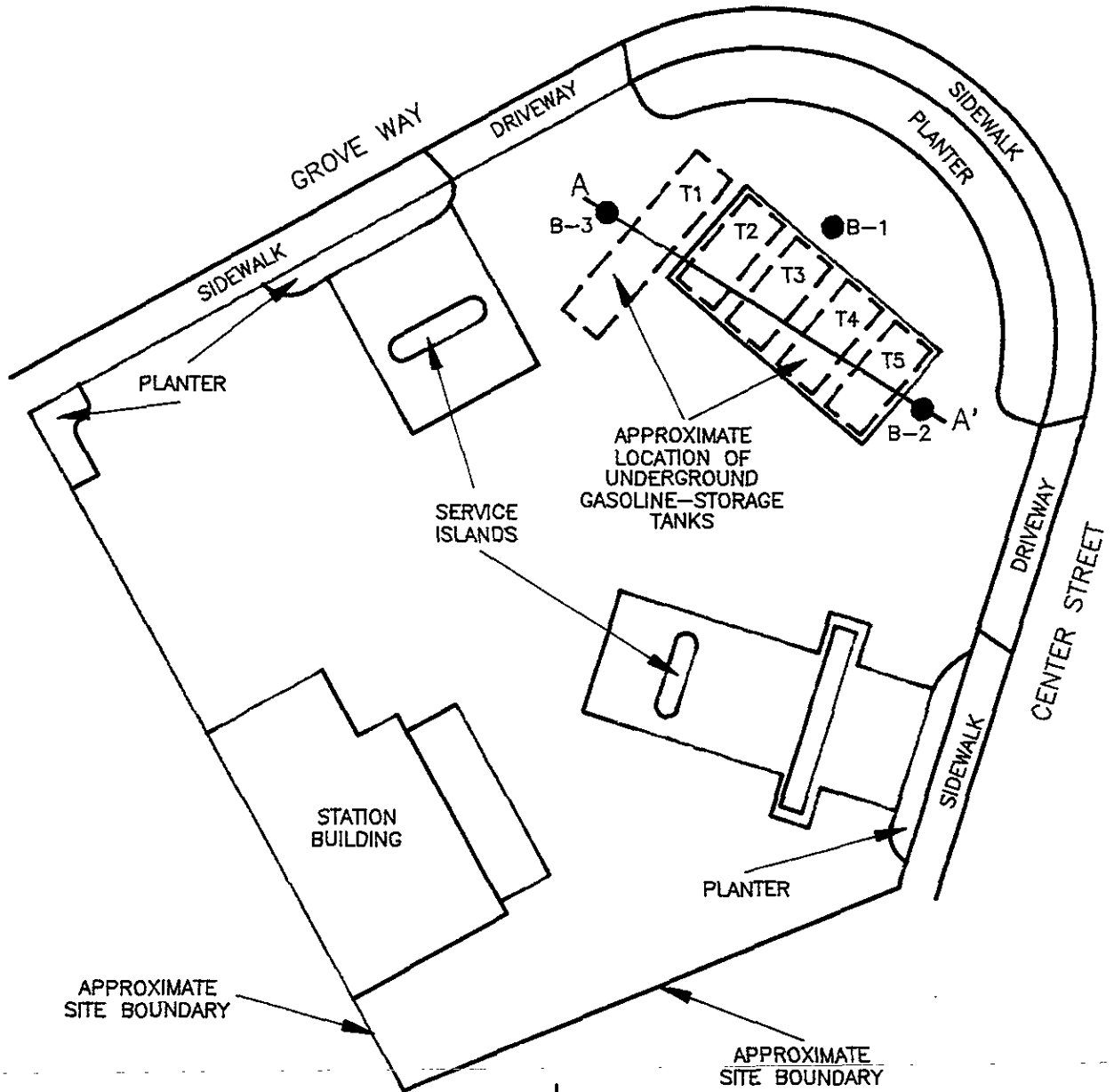
Source: U.S. Geological Survey
 7.5-Minute Quadrangle
 Hayward, California
 Photorevised 1980



PROJECT NO. 69013-1

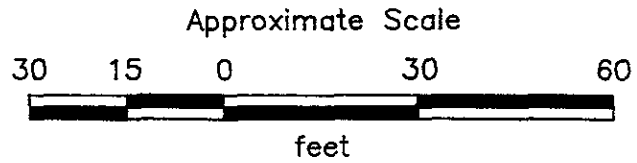
SITE VICINITY MAP
ARCO Station No. 2152
2214 Center Street
Castro Valley, California

PLATE
P-1



A — A' = Cross section location
 B-3 ● = Approximate boring location

Source: Modified from plan supplied by ARCO Corporation



PROJECT NO. 69013-1

GENERALIZED SITE PLAN
ARCO Station No. 2152
2214 Center Street
Castro Valley, California

PLATE
P - 2

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS	LTR	DESCRIPTION	MAJOR DIVISIONS	LTR	DESCRIPTION	
Coarse-grained soils	Gravel and gravelly soils	GW	Well-graded gravels of gravel-sand mixtures, little or no fines	Silt 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 gravels, gravel-sand-clay mixtures			
	Sand and sandy soils	SW	Well-graded sand of gravelly sands, little or no fines	Silt and clays LL > 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils. Elastic silts
		SP	Poorly-graded sands or gravelly sands, little or no fines		CH	Inorganic clays of high plasticity, fat clays
		SM	Silty sands, sand-silt mixtures		OH	Organic clays of medium to high plasticity, organic silts
		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



Missed sample



Static water level observed in boring



Initial water level observed in boring



Sand pack



Bentonite annular seal



Neat cement annular seal



Caved native soil



Blank PVC



Machine-slotted PVC

S-10 Sample number

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 BORING LOCATION AT THE TIME OF DRILLING ONLY.



PROJECT NO. 69013-1

**UNIFIED SOIL CLASSIFICATION
AND SYMBOL KEY**

**ARCO Station No. 2152
2214 Center Street
Castro Valley, California**

**PLATE
P - 3**

Total depth of boring: 45 feet **Diameter of boring:** 8 inches **Date drilled:** 4-13-89
Casing diameter: N/A **Length:** N/A **Slot size:** N/A
Screen diameter: N/A **Length:** N/A **Material type:** N/A
Drilling Company: HEW-Drilling Co. **Driller:** Anibal & Bobby
Method Used: Hollow-Stem Auger **Field Geologist:** Steve Bittman

Signature of Registered Professional: _____

Registration No.: _____ **State:** CA

DEPTH	SAMPLE NO.	BLOWS	P.L.D.	USCS CODE	DESCRIPTION	WELL CONST.
0					Asphalt.	▽▽▽▽
				GC	Clayey gravel, with sand, light brown, dry to damp, fill.	▽▽▽▽
2				CH	Silty clay, brown, damp, high plasticity, very stiff.	▽▽▽▽
4	S-4.5	11 7 11	0	CL	Silty clay, brown with black mottling, damp, slight plasticity, very stiff.	▽▽▽▽
10	S-9.5	8 16 17	0		Some very fine-grained sand, hard.	▽▽▽▽
12				CH	Silty clay, with intermittent pebbles to 3/8-inch, damp, high plasticity, hard.	▽▽▽▽
14	S-14.5	7 14 18	0			▽▽▽▽
18				CL	Sandy clay, brown, damp, low plasticity, hard.	▽▽▽▽
20	S-19.5	6 15 18	9.7			▽▽▽▽

(Section continues downward)



PROJECT NO. 69013-1

LOG OF BORING B - 1
ARCO Station No. 2152
2214 Center Street
Castro Valley, California

PLATE
P - 4

Depth	Sample No.	BLOWS	P.L.D.	USCS Code	Description	Well Const.
-22				CL	Sandy clay, brown, damp, low plasticity, hard.	▽▽▽▽▽
-24		5 10 15	134		Increasing sand.	
	S-24.5				Fine-grained sand, with small lenses of light gray, damp, slight plasticity, noticeable product odor.	
-26						
-28		5 11 17	31	CL	Silty clay, brown with gray mottling, damp, slight plasticity, very stiff.	
-30	S-29.5					
-32						
-34		5 10 13	182		Noticeable odor.	
-36						
-38		7 14 21	29			
-40	S-39.5					
-42						
-44		18 12 39	0	GC	Clayey gravel, brown with gray intermittent pebbles, damp, dense.	
-44	S-44.5					
-46					Total Depth = 45 feet	
-48						
-50						



LOG OF BORING B - 1

ARCO Station No. 2152
2214 Center Street
Castro Valley, California

PLATE

P - 5

PROJECT NO. 69013-1

Total depth of boring: 30 feet **Diameter of boring:** 8 inches **Date drilled:** 4-13-89
Casing diameter: N/A **Length:** N/A **Slot size:** N/A
Screen diameter: N/A **Length:** N/A **Material type:** N/A
Drilling Company: HEW-Drilling Co. **Driller:** Anibal & Bobby
Method Used: Hollow-Stem Auger **Field Geologist:** Steve Bittman

Signature of Registered Professional: _____
Registration No.: _____ **State:** CA

DEPTH	SAMPLE NO.	BLOWS	P.I.D.	USCS CODE	DESCRIPTION	WELL CONST.
0					Asphalt.	V V V V V
2				GC	Clayey gravel, dark brown, damp, fill.	▽▽▽▽▽
4	S-4.5	4 8 14	0	CH	Silty clay, brown, damp, high plasticity, very stiff.	▽▽▽▽▽
6						▽▽▽▽▽
8				CL	Silty clay, brown with black mottling, damp, low plasticity, very stiff.	▽▽▽▽▽
10	S-9.5	6 15 20	0			▽▽▽▽▽
12						▽▽▽▽▽
14	S-14.5	4 7 12	0			▽▽▽▽▽
16				CL	Silty clay, with lenses of silty sand, brown, moist, medium plasticity, stiff.	▽▽▽▽▽
18						▽▽▽▽▽
20	S-19.5	3 5 6	.9			▽▽▽▽▽

(Section continues downward)



PROJECT NO. 69013-1

LOG OF BORING B - 2
ARCO Station No. 2152
2214 Center Street
Castro Valley, California

PLATE
P - 6

Depth	Sample No.	BLOWS	P.I.D.	USCS Code	Description	Well Const.
-22-				CL	Silty clay, with lenses of silty sand, brown, moist, medium plasticity, stiff.	▽▽▽▽▽▽
-24-	S-24.5	6 12 16	3.9		Intermittent cobbles, brown with red mottling, damp, very stiff.	▽▽▽▽▽▽
-26-						▽▽▽▽▽▽
-28-		5 11				▽▽▽▽▽▽
-30-	S-29.5	12	18	GW	Clayey gravel, with sand, gray-brown, damp to moist, medium dense.	▽▽▽▽▽▽
					Total Depth = 30 feet	
-32-						
-34-						
-36-						
-38-						
-40-						
-42-						
-44-						
-46-						
-48-						
-50-						



LOG OF BORING B - 2

ARCO Station No. 2152
2214 Center Street
Castro Valley, California

PLATE

P - 7

PROJECT NO. 69013-1

Total depth of boring: 30 feet **Diameter of boring:** 8 inches **Date drilled:** 4-13-89
Casing diameter: N/A **Length:** N/A **Slot size:** N/A
Screen diameter: N/A **Length:** N/A **Material type:** N/A
Drilling Company: HEW-Drilling Co. **Driller:** Anibal & Bobby
Method Used: Hollow-Stem Auger **Field Geologist:** Steve Bittman

Signature of Registered Professional: _____

Registration No.: _____ **State:** CA

DEPTH	SAMPLE NO.	BLOWS	P.I.D.	USCS CODE	DESCRIPTION	WELL CONST.
0					Asphalt.	
				GC	Clayey gravel, dark brown, damp, fill.	▽▽▽▽
2				CH	Silty clay, black with brown mottling, damp, high plasticity, hard.	▽▽▽▽
4	S-4.5	6 19 17	16.3			▽▽▽▽
6						▽▽▽▽
8				CL	Silty clay, with some sand, brown with minor black mottling, damp, medium to low plasticity, very stiff.	▽▽▽▽
10	S-9.5	6 12 21	6.9			▽▽▽▽
12						▽▽▽▽
14	S-14.5	5 10 11	2.4	CL	Silty clay with lenses of sandy clay, brown, damp, low plasticity, very stiff.	▽▽▽▽
16						▽▽▽▽
18						▽▽▽▽
20	S-19.5	5 6 12	12			▽▽▽▽

(Section continues downward)



PROJECT NO. 69013-1

LOG OF BORING B - 3

ARCO Station No. 2152
2214 Center Street
Castro Valley, California

PLATE

P - 8

Depth	Sample No.	BLOWS	P.L.D.	USCS Code	Description	Well Const.
-22				CL	Silty clay with lenses of sandy clay, brown with gray mottling, moist, low plasticity.	▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽ ▽▽▽▽▽
-24	S-24.5	8 10 22	15	CH	Silty clay, gray-brown, damp, high plasticity, very stiff.	
-26						
-28						
-30	S-29.5	4 8 12	6.1			
Total Depth = 30 feet						
-32						
-34						
-36						
-38						
-40						
-42						
-44						
-46						
-48						
-50						



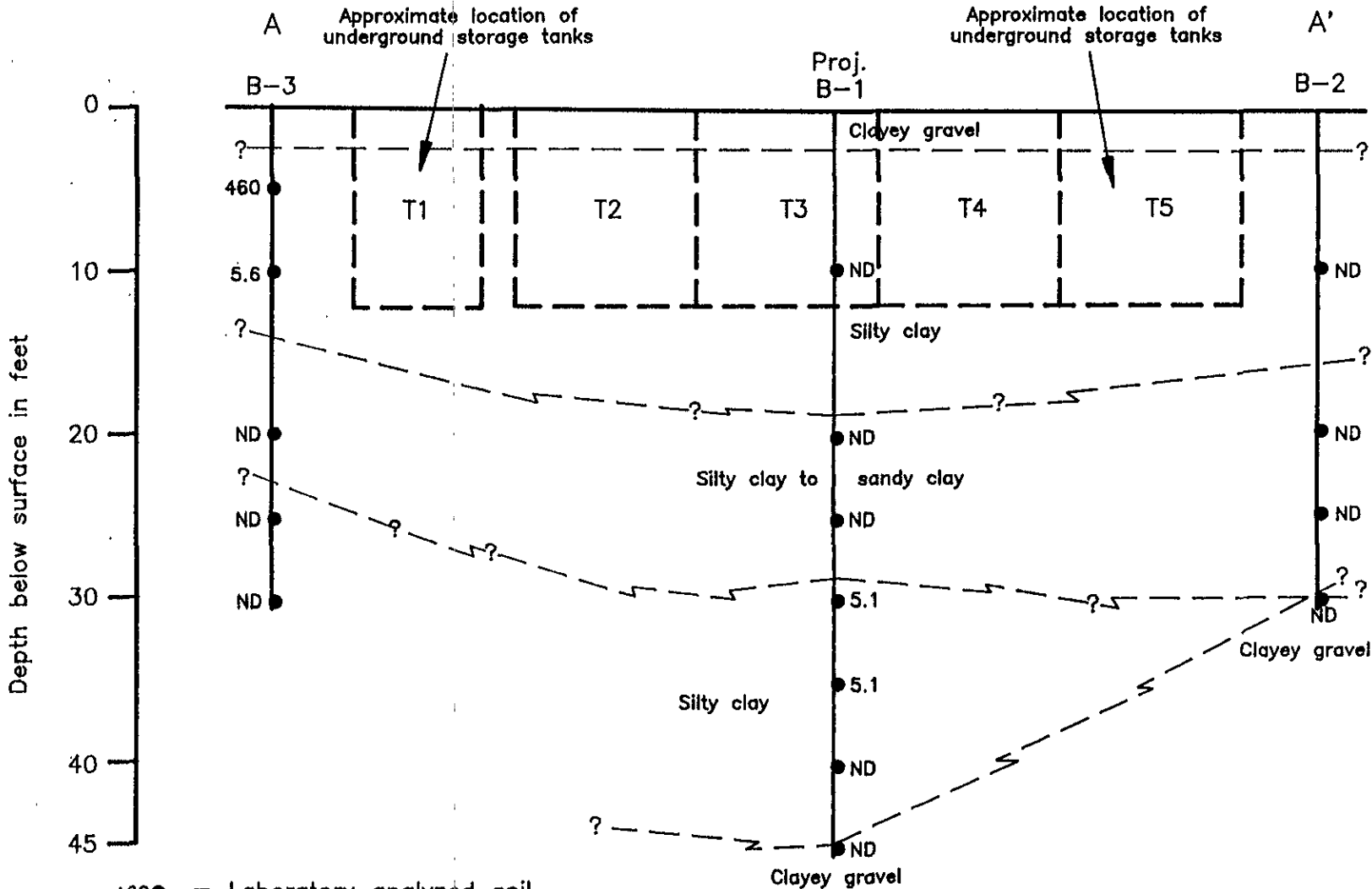
LOG OF BORING B - 3

ARCO Station No 2152
2214 Center Street
Castro Valley, California

PLATE

P - 9

PROJECT NO. 69013-1



460 ● = Laboratory analyzed soil sample showing concentration of TPH in parts per million

| = Boring

ND = Below detection limits

Approximate Horizontal and Vertical Scale

10 5 0 10 20



feet

PLATE

P - 10

GEOLOGIC CROSS SECTION A - A'

ARCO Station No. 2152

2214 Center Street

Castro Valley, California



PROJECT NO.

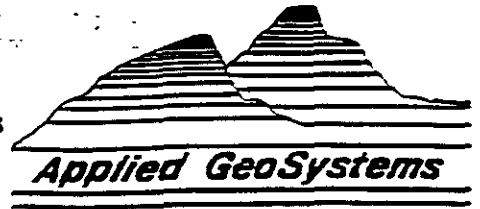
69013-1

APPENDIX

CHAIN OF CUSTODY RECORD

San Jose Branch

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



SAMPLER (signature):

Steve Bittman

Phone: (408) 264-7723

LABORATORY:

Applied GeoSystems

43255 Mission Blvd.

Fremont, CA 94539

TURNAROUND TIME: *2 weeks*

Project Leader: *Greg Barclay*

Phone No. (408) 264-7723

SHIPPING INFORMATION:

Shipper _____

Address _____

Date Shipped _____

Service Used _____

Airbill No. _____ Cooler No. _____

Relinquished by: (signatures)

Steve Bittman

Received by: (signatures)

Steve Bittman

Date

Time

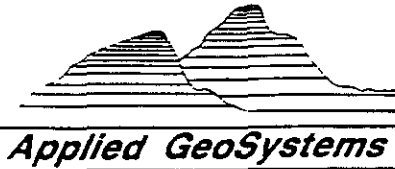
Received for laboratory by:

ng Nelson

4/14/89 17:00

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

Sample No.	Site Identification	Date Sampled	Analyses Requested	Sample Condition Upon Receipt
<i>S-10-B1</i>	<i>Arco # 2152</i>	<i>4-13-89</i>	<i>TPH (g), BTEX</i>	<i>ICED</i>
<i>S-20-B1</i>	<i>(69013-1)</i>			
<i>S-25-B1</i>				
<i>S-30-B1</i>				
<i>S-35-B1</i>				
<i>S-40-B1</i>				
<i>S-45-B1</i>				
<i>S-10-B2</i>				
<i>S-20-B2</i>				
<i>S-25-B2</i>				
<i>S-30-B2</i>				
<i>S-10-B3</i>				
<i>S-20-B3</i>				
<i>S-25-B3</i>				
<i>S-30-B3</i>				
<i>S-5-B3</i>				



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

0212lab.frm
Date Received: 04-14-89
Laboratory Number: 90421S01
Project #: 69013-1
Sample #: S-10-B1
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-20-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-20-89	
Toluene	ND		0.050		04-20-89	
Ethylbenzene	ND		0.050		04-20-89	
Total Xylenes	ND		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

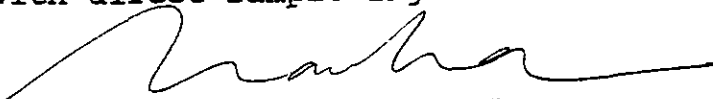
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph-(GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89
Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S02
Project #: 69013-1
Sample #: S-20-B1
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	ND		5.0		04-20-89	NR
TPH as Gasoline						NR
TEH as Diesel						NR
Benzene	0.11		0.050		04-20-89	
Toluene	0.15		0.050		04-20-89	
Ethylbenzene	ND		0.050		04-20-89	
Total Xylenes	0.19		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

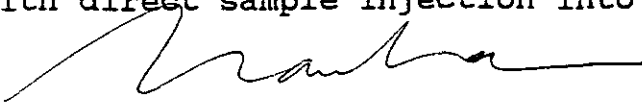
NR = Analysis not required.

PROCEDURES

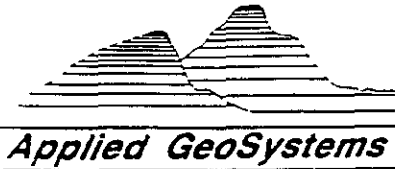
TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89
Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S03
Project #: 69013-1
Sample #: S-25-B1
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-20-89	
TEH as Diesel						NR
Benzene	0.22		0.050		04-20-89	
Toluene	0.34		0.050		04-20-89	
Ethylbenzene	0.088		0.050		04-20-89	
Total Xylenes	0.38		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

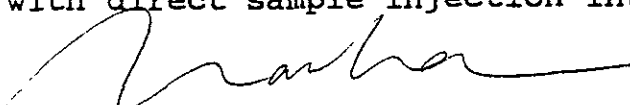
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

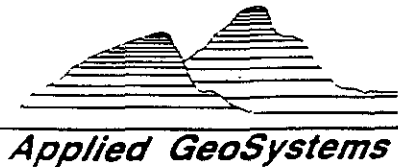
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89

Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

0212lab.frm
Date Received: 04-14-89
Laboratory Number: 90421S04
Project #: 69013-1
Sample #: S-30-B1
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	5.1		5.0		04-20-89	
TEH as Diesel						NR
Benzene	0.42		0.050		04-20-89	
Toluene	0.89		0.050		04-20-89	
Ethylbenzene	0.11		0.050		04-20-89	
Total Xylenes	0.56		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

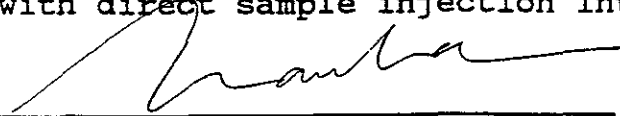
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

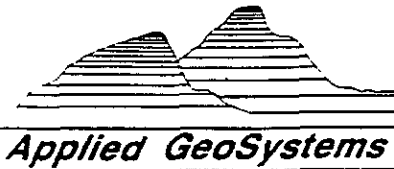
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89

Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S05
Project #: 69013-1
Sample #: S-35-B1
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	5.1		5.0		04-20-89	
TEH as Diesel						NR
Benzene	0.40		0.050		04-20-89	
Toluene	0.72		0.050		04-20-89	
Ethylbenzene	0.094		0.050		04-20-89	
Total Xylenes	0.42		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

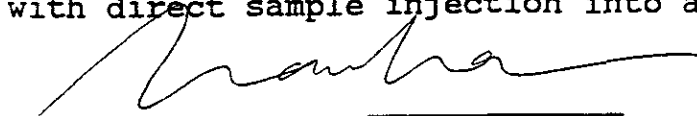
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

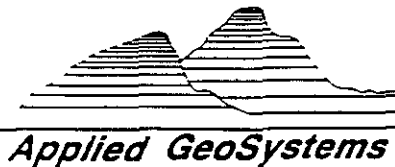
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89

Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S06
Project #: 69013-1
Sample #: S-40-B1
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-20-89	
TEH as Diesel						NR
Benzene	0.10		0.050		04-20-89	
Toluene	ND		0.050		04-20-89	
Ethylbenzene	ND		0.050		04-20-89	
Total Xylenes	ND		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

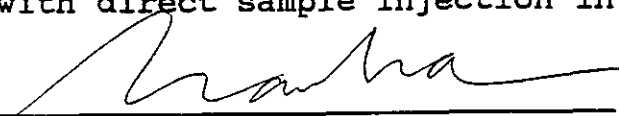
NR = Analysis not required.

PROCEDURES

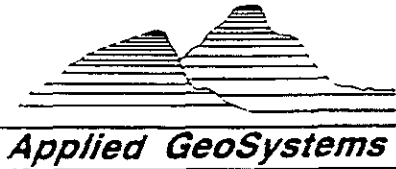
TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89
Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S07
Project #: 69013-1
Sample #: S-45-B1
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-20-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-20-89	
Toluene	ND		0.050		04-20-89	
Ethylbenzene	ND		0.050		04-20-89	
Total Xylenes	ND		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

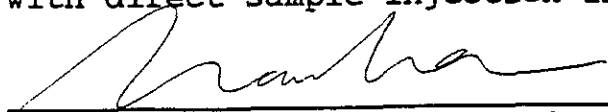
NR = Analysis not required.

PROCEDURES

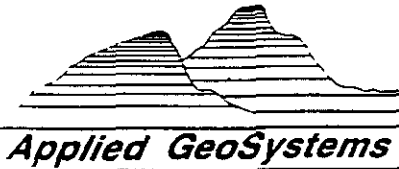
TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89
Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

02121lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S08
Project #: 69013-1
Sample #: S-10-B2
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-20-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-20-89	
Toluene	ND		0.050		04-20-89	
Ethylbenzene	ND		0.050		04-20-89	
Total Xylenes	ND		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.


NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89

Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S09
Project #: 69013-1
Sample #: S-20-B2
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-20-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-20-89	
Toluene	ND		0.050		04-20-89	
Ethylbenzene	ND		0.050		04-20-89	
Total Xylenes	ND		0.050		04-20-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

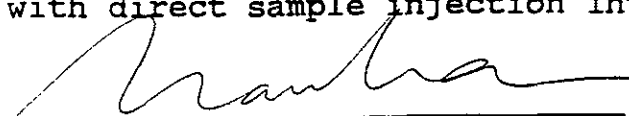
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

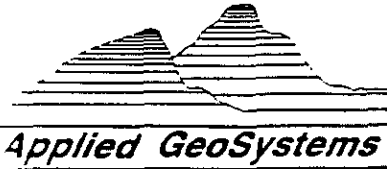
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89

Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
 Applied GeoSystems
 331 Almaden Expressway Suite 34
 San Jose, CA 95118
 Attention: Greg J. Barclay

Date Received: 04-14-89
 Laboratory Number: 90421S10
 Project #: 69013-1
 Sample #: S-25-B2
 Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-20-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-20-89	
Toluene	ND		0.050		04-20-89	
Ethylbenzene	ND		0.050		04-20-89	
Total Xylenes	ND		0.050		04-20-89	

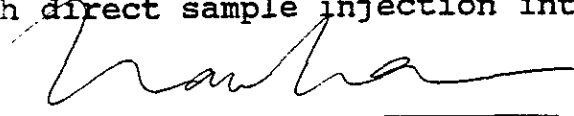
mg/kg = milligrams per kilogram = parts per million (ppm).
 mg/L = milligrams per liter = ppm.
 ND = Not detected. Compound(s) may be present at concentrations below the detection limit.
 NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

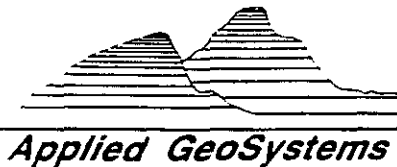
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.



Tran, Laboratory Supervisor

04-25-89
 Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S11
Project #: 69013-1
Sample #: S-30-B2
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-21-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-21-89	
Toluene	ND		0.050		04-21-89	
Ethylbenzene	ND		0.050		04-21-89	
Total Xylenes	ND		0.050		04-21-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

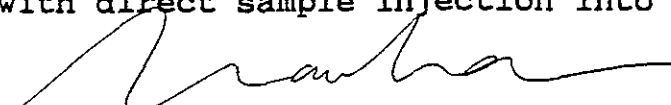
NR = Analysis not required.

PROCEDURES

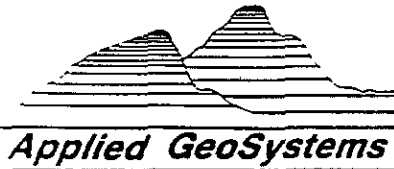
TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89
Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S13
Project #: 69013-1
Sample #: S-10-B3
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	5.6		5.0		04-21-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-21-89	
Toluene	0.11		0.050		04-21-89	
Ethylbenzene	ND		0.050		04-21-89	
Total Xylenes	1.0		0.050		04-21-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.


NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89

Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

02121lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S14
Project #: 69013-1
Sample #: S-20-B3
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-21-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-21-89	
Toluene	ND		0.050		04-21-89	
Ethylbenzene	0.055		0.050		04-21-89	
Total Xylenes	0.068		0.050		04-21-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

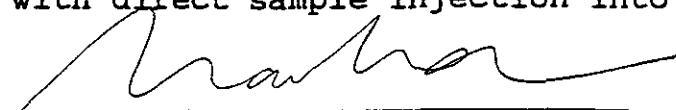
NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

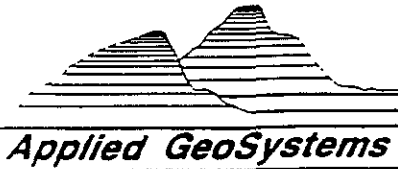
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89

Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S15
Project #: 69013-1
Sample #: S-25-B3
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-21-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-21-89	
Toluene	ND		0.050		04-21-89	
Ethylbenzene	0.17		0.050		04-21-89	
Total Xylenes	0.16		0.050		04-21-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

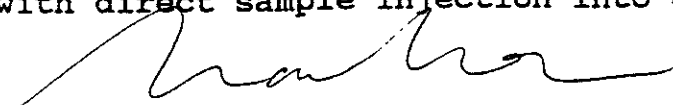
NR = Analysis not required.

PROCEDURES

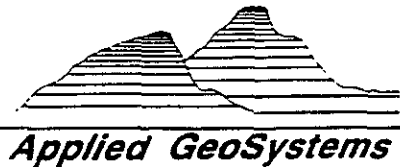
TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89
Date Reported



43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

02121lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S16
Project #: 69013-1
Sample #: S-30-B3
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline						NR
TPH as Gasoline	ND		5.0		04-21-89	
TEH as Diesel						NR
Benzene	ND		0.050		04-21-89	
Toluene	ND		0.050		04-21-89	
Ethylbenzene	ND		0.050		04-21-89	
Total Xylenes	ND		0.050		04-21-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.

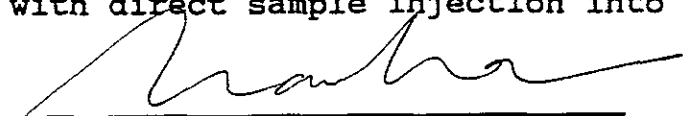
NR = Analysis not required.

PROCEDURES

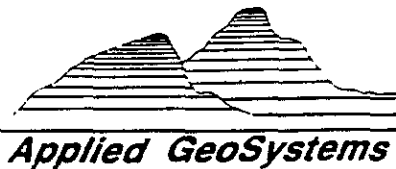
TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89
Date Reported



Applied GeoSystems

43255 Mission Boulevard, Fremont, CA 94539 (415) 651-1906

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

0212lab.frm

Report Prepared for:
Applied GeoSystems
3315 Almaden Expressway Suite 34
San Jose, CA 95118
Attention: Greg J. Barclay

Date Received: 04-14-89
Laboratory Number: 90421S12
Project #: 69013-1
Sample #: S-5-B3
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	460		25		04-21-89	NR
TPH as Gasoline						NR
TEH as Diesel						
Benzene	5.1		0.50		04-21-89	
Toluene	34		0.50		04-21-89	
Ethylbenzene	9.6		0.50		04-21-89	
Total Xylenes	51		0.50		04-21-89	

mg/kg = milligrams per kilogram = parts per million (ppm).

mg/L = milligrams per liter = ppm.

ND = Not detected. Compound(s) may be present at concentrations below the detection limit.


NR = Analysis not required.

PROCEDURES

TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization detector (PID) and a flame-ionization detector (FID) in series. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

04-25-89
Date Reported