

Applied GeoSystems

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

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

REPORT
LIMITED ENVIRONMENTAL INVESTIGATION
RELATED TO UNDERGROUND TANK REMOVAL
AND SOIL AERATION

at

Beacon Station No. 546
29705 Mission Boulevard
Hayward, California

AGS Job No. 18008-1

AGS 1988

Report prepared for:

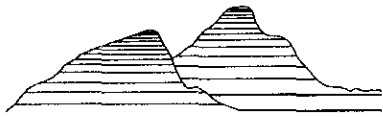
Beacon Oil Company
525 West Third Street
Hanford California 93230

by
Applied GeoSystems

Gary D. Barker
Project Geologist

Gillian S. Holmes
G.E. 2023

August 4, 1988



Applied GeoSystems

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

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

August 4, 1988
AGS No. 18008-1

Mr. Steve Epperson
Beacon Oil Company
525 West Third Street
Hanford, California 93230

Subject: Executive Summary of Report No. 18008-1, Limited
Environmental Investigation Related to Underground Tank
Removal at Beacon Station No. 546, 29705 Mission
Boulevard, Hayward, California.

Mr. Epperson:

This report summarizes the results of an environmental investigation related to the removal of four underground storage tanks at the above-referenced site. The investigation included inspecting each of the tanks after removal and collecting and analyzing samples of soil from the excavations to assess the presence of hydrocarbon product. In addition, a program for aerating gasoline-contaminated soil excavated from the gasoline tank pit was conducted at the site. Tanks number T1 and T2 were gasoline-storage tanks with capacities of 10,000 and 8,000 gallons respectively. Tank T3 was an 8,000-gallon diesel-storage tank and tank T4 was a 500-gallon waste-oil tank.

Inspection of the four steel-tanks revealed that they were all moderately rusted. Tanks T1 and T4 had visible through-going holes. The results of the soil samples collected from directly beneath the bottom of the tank in the areas corresponding to the ends of each tank showed hydrocarbon contamination ranging from low to medium for the gasoline tanks and nondetectable to high for the diesel tank (T3). The waste-oil tank sample showed nondetectable levels of hydrocarbon contamination in the soil beneath this tank. The tank pit that contained the gasoline and diesel tanks was further excavated to ground-water level (approximately 25 feet below the surface), in an attempt to remove the soil with elevated levels of hydrocarbons from the tank pit. Visual inspection of the tank pit after excavation showed no subjective evidence of hydrocarbon contamination.

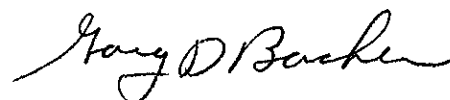
The gasoline-contaminated soil was stockpiled at the site and composite soil samples were collected to evaluate what soil needed aerating. The Bay Area Air Quality Management District

was notified of the levels of hydrocarbons in the soil to be aerated, and permission was received to spread approximately 100 cubic yards a day for aeration. The soil was evaluated with an organic vapor detector periodically. When the field evaluation showed hydrocarbon levels were probably below 100 parts per million, composite samples were collected for analysis for total petroleum hydrocarbons. These sample analyses show that, at present, the gasoline-contaminated soil contains less than 100 parts per million of hydrocarbons and can be disposed at a Class III landfill or used at the site for fill.

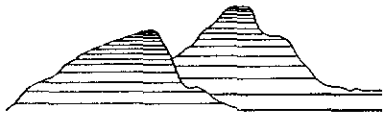
We recommend that the soil excavated from the area of tank pit which has elevated levels of TEH as diesel be sampled and analyzed for TEH as diesel to evaluate suitability for disposal. In addition, we recommend that three monitoring wells be installed at the site to evaluate if hydrocarbon contamination found in the tank pit has impacted the ground water beneath the site. Two of the wells should be located in the inferred downgradient direction from the tank pit and the third in the upgradient direction to evaluate ground water flow beneath the site. In addition, ground water samples should be collected from these wells and analyzed for gasoline and diesel hydrocarbons and the hydrocarbon constituents benzene, toluene, ethylbenzene, and total xylene isomers.

We recommend that a copy of this report be submitted to Mr. Hugh Murphy of the Hayward Fire Prevention Bureau, 22300 Foothill Blvd., Hayward, California 94541 and Ms. Lisa McCann of the California Regional Water Quality Control Board, San Francisco Bay Region, 1111 Jackson Street, Room 6040, Oakland, California 94607.

Sincerely,
Applied GeoSystems



Gary D. Barker
Project Geologist



Applied GeoSystems

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

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

**REPORT
LIMITED ENVIRONMENTAL INVESTIGATION
RELATED TO UNDERGROUND TANK REMOVAL
AND SOIL AERATION**

at
Beacon Station No. 546
525 West Third Street
Hanford, California

For: Beacon Oil Company

INTRODUCTION

This report summarizes the limited environmental investigation conducted in conjunction with the removal of four underground storage tanks at Beacon Station No. 546 located at 29705 Mission Boulevard, Hayward, California. The site is located at the intersection of Mission Boulevard and Alquire Road, now known as Industrial Parkway, in Hayward, California, as shown on the Site Vicinity Map, Plate P-1.

Beacon requested that Applied GeoSystems conduct an underground storage-tank investigation to inspect the removed tanks and to test for the presence of hydrocarbon product in the soil under and adjacent to the tanks. In addition, Beacon requested that Applied GeoSystems evaluate and sample the excavated soil during subsequent soil aeration. This report describes the work

elements associated with the tank removal and inspection and the soil sampling and laboratory analyses. The analytical results obtained are also summarized, and our recommendations for future work are also presented.

BACKGROUND

When the site was an operating Beacon service station, three underground fuel-storage tanks were located east of the station building. Two were gasoline-storage tanks (Tank T1 and Tank T2) with capacities of 10,000 and 8,000 gallons respectively. The third (Tank T3) was an 8,000-gallon diesel-storage tank. A fourth tank (Tank T4), located behind the station building, was a 500-gallon waste-oil tank. Locations of the tanks along with other selected site features is shown on the Generalized Site Plan, Plate P-2. All four of the tanks were made of steel. The date of tank installation is unknown.

TANK REMOVAL AND INSPECTION

A field geologist from Applied GeoSystems was present on site on April 6, 1988, to observe removal of tank T1, inspect outer surfaces of the tank, and inspect and collect soil samples from the tank cavity. The geologist returned to the site on April 8,

1988, to observe the removal and inspect tanks T2 through T4 and to collect soil samples from the tank pit excavations. Dry ice was placed inside each tank approximately 2 hours prior to its removal to create a non-explosive environment inside the tank, in accordance with regulations set by the Hayward Fire Department. A lower explosive limit (LEL) meter was used to check that the vapor concentration inside each tank was below the LEL before the each tank was removed.

Becker Industries of Napa, California, excavated and removed the tanks from the ground. Excavation and tank removal were accomplished with a backhoe and trackhoe. The tanks were lifted from their cavities and rolled on their sides for inspection. The outer surface of each tank was inspected by personnel from Applied GeoSystems for signs of leakage, holes, pitting, or areas of weakness. The sides and ends of each tank were scraped, and particular attention was given to seams and points directly below the fill ports. A summary of the observations made is shown in Table 1. After inspection, the tanks were transported to a disposal facility by H and H Ship Service Company of San Francisco, California.

TABLE 1
SUMMARY OF OBSERVATIONS DURING TANK INSPECTION
Beacon Station No. 546
29705 Mission Boulevard
Hayward, California

Tank T1	(gasoline): steel, 10,000-gallon-capacity, moderately rusted, small through-going hole and soil discoloration on south end, noticeable product odor.
Tank T2	(gasoline): steel, 8,000-gallon-capacity, moderately rusted, no visible holes, soil discoloration, noticeable product odor.
Tank T3	(diesel): steel, 8,000-gallon-capacity, moderately rusted, no visible holes, soil discoloration.
Tank T4	(waste-oil): steel, 500-gallon-capacity, moderately rusted, through-going hole (3/4" dia.) on side, soil discoloration.

SOIL SAMPLING

A total of seven soil samples were collected from the bottoms of the various tank pit excavations. Two soil samples were collected from the excavation at a depth of approximately 15 feet below the ground surface beneath the end of each fuel tank for laboratory analyses. Following collection of the samples the product tank pit was excavated an additional 5-feet, approximately, to remove discolored and possibly contaminated soil. One soil sample was collected for analyses at a depth of

approximately 9 feet below the surface from the bottom of the waste-oil tank excavation. Approximate sample locations with identifying numbers are shown on the Generalized Site Plan, Plate P-2.

The samples were collected by driving a hand-held sampler containing a clean brass sleeve into a bucket load of soil when the backhoe brought it to the surface. Samples were immediately sealed with aluminum foil, plastic caps, and airtight tape and then labeled and placed into iced storage for transport to a laboratory certified by the State of California for the appropriate testing. The soil samples from the gasoline and diesel tank pit were delivered to the Applied GeoSystems laboratory in Fremont, California, for analyses. In addition, the soil sample from the waste-oil tank pit excavation was delivered to the Anametrix, Inc. laboratory for required testing for total oil and grease and volatile organics. Chain-of-custody protocol was observed throughout the process of handling the samples.

LABORATORY ANALYSES

Soil samples collected from beneath tanks T1 and T2 were analyzed for total petroleum hydrocarbons (TPH) by modified Environmental

Protection Agency (EPA) Method 8015. The samples collected from beneath tanks T3 and T4 were analyzed for total extractable hydrocarbons (TEH) as diesel by modified EPA Method 8015 for hydrocarbons with high boiling points. In addition to TEH, samples from tank T4 were analyzed for volatile organics by EPA Method 8240 and for total oil and grease by EPA Method 503E.

Results of the laboratory analyses are presented on Table 2, and the laboratory analytical reports are included in the Appendix of this report.

SOIL AERATION

During the tank removal, approximately 450 cubic yards of soil was excavated from the tank pit area to a depth of approximately 18 to 20 feet. This soil was stockpiled at the site and covered with plastic to prevent unauthorized aerating. The Bay Area Air Quality Management District was called and notified of the upcoming soil aeration. Permission was obtained to uncover and spread approximately 100 yards per day. Locations of the soil piles are shown on the Plan Showing Stockpiled Soil, Plate P-3.

Applied GeoSystems returned to the site on April 18, 1988, to collect samples for compositing to evaluate the levels of

TABLE 2
 RESULTS OF LABORATORY ANALYSES
 Beacon Station No. 546
 29705 Mission Boulevard
 Hayward, California

Sample Identifier	TPH	TEH	TOG	VOC
S-15-T1N	184	NA	NA	NA
S-13-T1S	112	NA	NA	NA
S-15-T2N	46	NA	NA	NA
S-15-T2S	5	NA	NA	NA
S-15-T3E	NA	2,750	NA	NA
S-15-T3W	NA	<5	NA	NA
S-9-WT	NA	<5	<30	<*

Results reported in parts per million (ppm)
 TPH = total petroleum hydrocarbons
 TEH = total extractable hydrocarbons
 TOG = total oil and grease
 VOC = volatile organic compounds
 < = less than detection limit for method of analysis used
 NA = analysis not required
 * = less than the respective detection limits for each VOC

Sample description: S-9-T4S

Side of pit sampled
 (WT = Waste-oil tank)
 Tank number
 Depth below grade (feet)
 Soil

hydrocarbon contamination prior to spreading. The samples were collected by first removing 6 to 8 inches of covering soil from the sample location and then a sample was collected and handled in the same manner as the samples collected from the tank pits. Approximate sample locations are shown on Plate P-3. A copy of

the Chain of Custody record for transferring the samples to Applied GeoSystems laboratory is included in the Appendix of this report.

The soil samples were composited in the laboratory and analyzed for TPH by modified EPA Method 8015. Results of the composite soil sample analyses are presented on Table 3 and on the Analysis Reports in the Appendix.

We understand that Becker Industries returned to the site during April and spread a portion of the soil for aeration over a 3-day period. In addition, Becker industries excavated an additional 5 feet from the bottom of the fuel-tank pit excavation. We understand that personnel at the site observed ground water seeping into the cavity at approximately 25 feet below the ground surface. The additional excavated soil was stockpiled at the site and covered with plastic for later evaluation of hydrocarbon contamination. Locations of the soil spread for aeration and the additional stockpiled soil are shown on the Aeration Site Plan, Plate P-4.

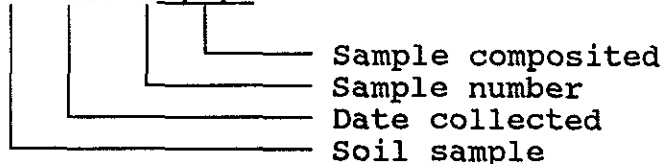
TABLE 3
 RESULTS OF COMPOSITE SOIL ANALYSES
 Beacon Station No. 546
 29705 Mission Boulevard
 Hayward, California

Sample Number	Total Petroleum Hydrocarbons
S-0418-1A, B, C	<2
S-0418-2A, B, C	114
S-0418-3A, B, C	109
S-0418-4A, B, C	100
S-0418-5A, B, C	42
S-0428-1 (ABC)	3
S-0428-2 (ABC)	32
S-0527-1 (ABCD)	51
S-0527-2 (ABCD)	48
S-0527-3 (ABCD)	5
S-0527-4 (ABCD)	2

Results presented in parts per million (ppm)
 < = Less than the detection limit for the test used

Sample designation:

S-0418-1A, B, C



The soil being aerated was intermittently tested in the field using a Photovac TIP photoionization detector to evaluate the drop in hydrocarbon contamination. Readings were obtained by placing the rubber cup that skirts the intake probe flush with the soil after clearing the overlying 6 inches of soil. The

measurements obtained with the TIP indicate the relative organic vapor concentrations in soil but cannot be used to assess the absolute concentrations of hydrocarbon contaminants in the soil. When the field TIP measurements were less than 100 ppm, composite soil samples were taken for laboratory analyses from the soil being aerated. Soil samples were collected on April 28 and again on May 27, 1988, from the soil piles that were originally excavated and had aerated sufficiently, for compositing using the same procedures and chain-of-custody protocol described earlier in this report and were delivered to Applied GeoSystems certified laboratory and analyzed for TPH. On May 27, soil samples were collected from the additional excavated and stockpiled soil. Approximate locations of the collected soil samples are shown on Plate P-4. Results of the laboratory analyses are shown on Table 3 and in the Analyses Reports in the Appendix. We understand that soil measured to have less than 100 ppm hydrocarbons will be removed from the site for proper disposal by Beacon Oil or left at the site to be used as backfill.

CONCLUSIONS AND RECOMMENDATIONS

The results of the laboratory analyses indicate low to moderate levels (100 to 500 ppm) of TPH in the soil taken from that

portion of the excavation which contained tanks T1 and T2. Levels of total extractable hydrocarbons (TEH) ranged from nondetectable to 2,750 parts per million (ppm) in soil beneath tank T3. The soil sample recovered from tank T4, did not show any detectable levels of volatile organics (EPA Method 8240) or total oil and grease.

In our opinion, the soil containing elevated levels of hydrocarbon contamination at the 15 foot level has probably been removed from the tank pit. Visual inspection of product tank pit, after excavation to the approximate depth of ground water, indicates that probably all the soil with elevated levels of hydrocarbons have been removed. In addition, the excavated soil containing gasoline contamination has aerated to levels below 100 ppm and can now be disposed of at a Class III landfill or used for backfill at the site.

We recommend that the stockpiled soil which contained the high levels of TEH should be sampled and analyzed for TEH as diesel to evaluate the suitability of this soil for disposal. In addition, we recommend the installation of three ground-water monitoring wells on the site. Two of these wells should be installed in the inferred downgradient direction of the product-tank pit and the third should be installed in the inferred upgradient direction

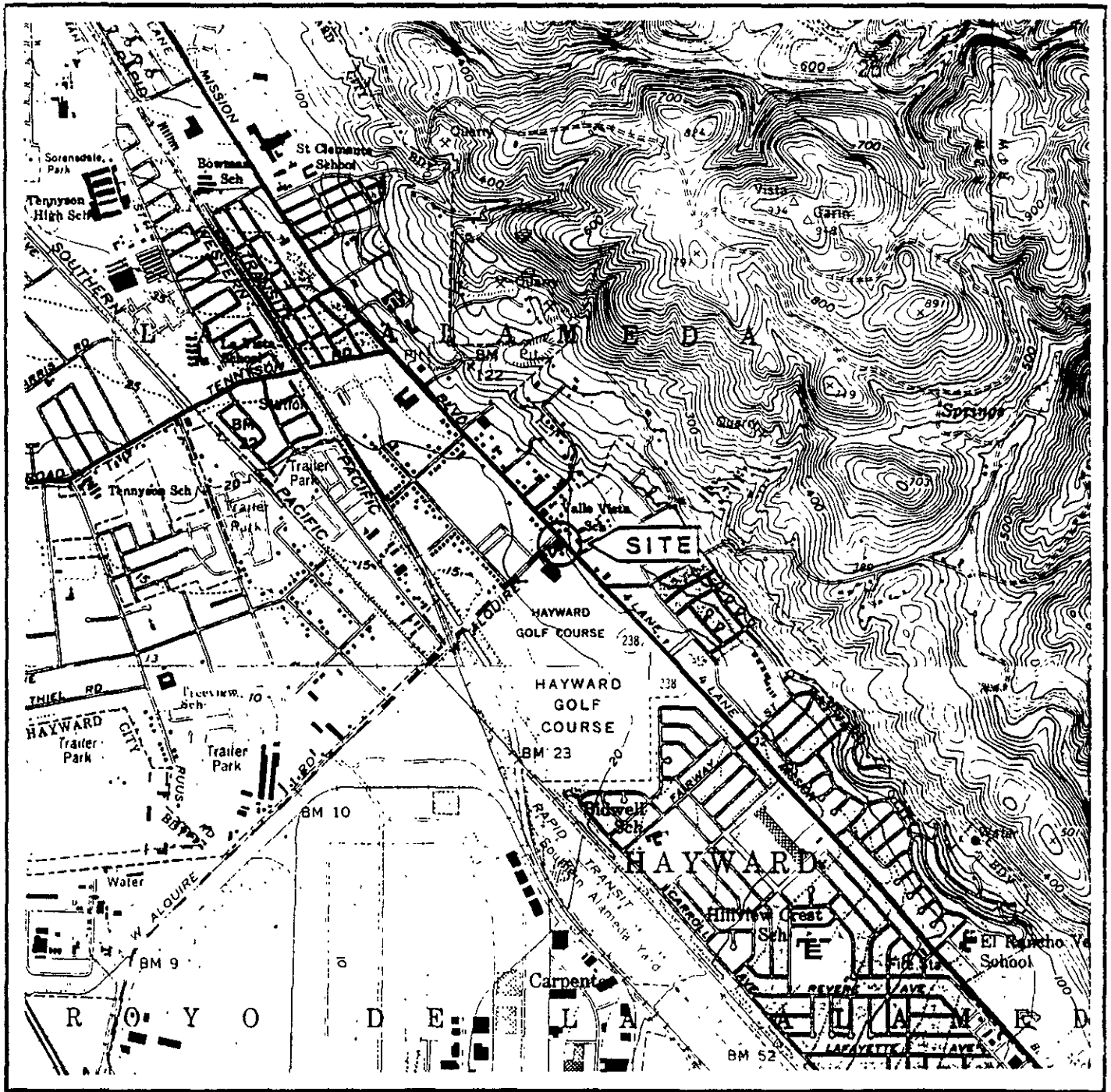
from the product-tank pit. These wells should be used to evaluate if the hydrocarbon contamination found in the soil beneath the product tanks has impacted the ground water beneath the site. In addition, these wells should be used to calculate the direction of ground-water flow beneath the site. These wells should be developed and water samples collected from each well and analyzed for the presence of hydrocarbon contamination as gasoline. The well installed in the downgradient direction from the tank pit should also be analyzed for the presence of TEH as diesel.

We recommend that a copy of this report be submitted to Mr. Hugh Murphy of the Hayward Fire Prevention Bureau, 22300 Foothill Boulevard, Hayward, California 94541 and Ms. Lisa McCann of the San Francisco Bay Regional Water Quality Control Board, 1111 Jackson Street, Room 6040, Oakland, California 94607.

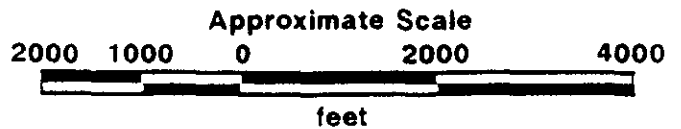
LIMITATIONS

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

contamination in the vicinity of the tank pits on the subject property. No soil engineering or geotechnical recommendations are implied or should be inferred. Evaluation of the geologic conditions at the site for the purpose of this investigation is made from a limited number of observation points. Subsurface conditions may vary away from the data points available. Additional work, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of investigation.



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

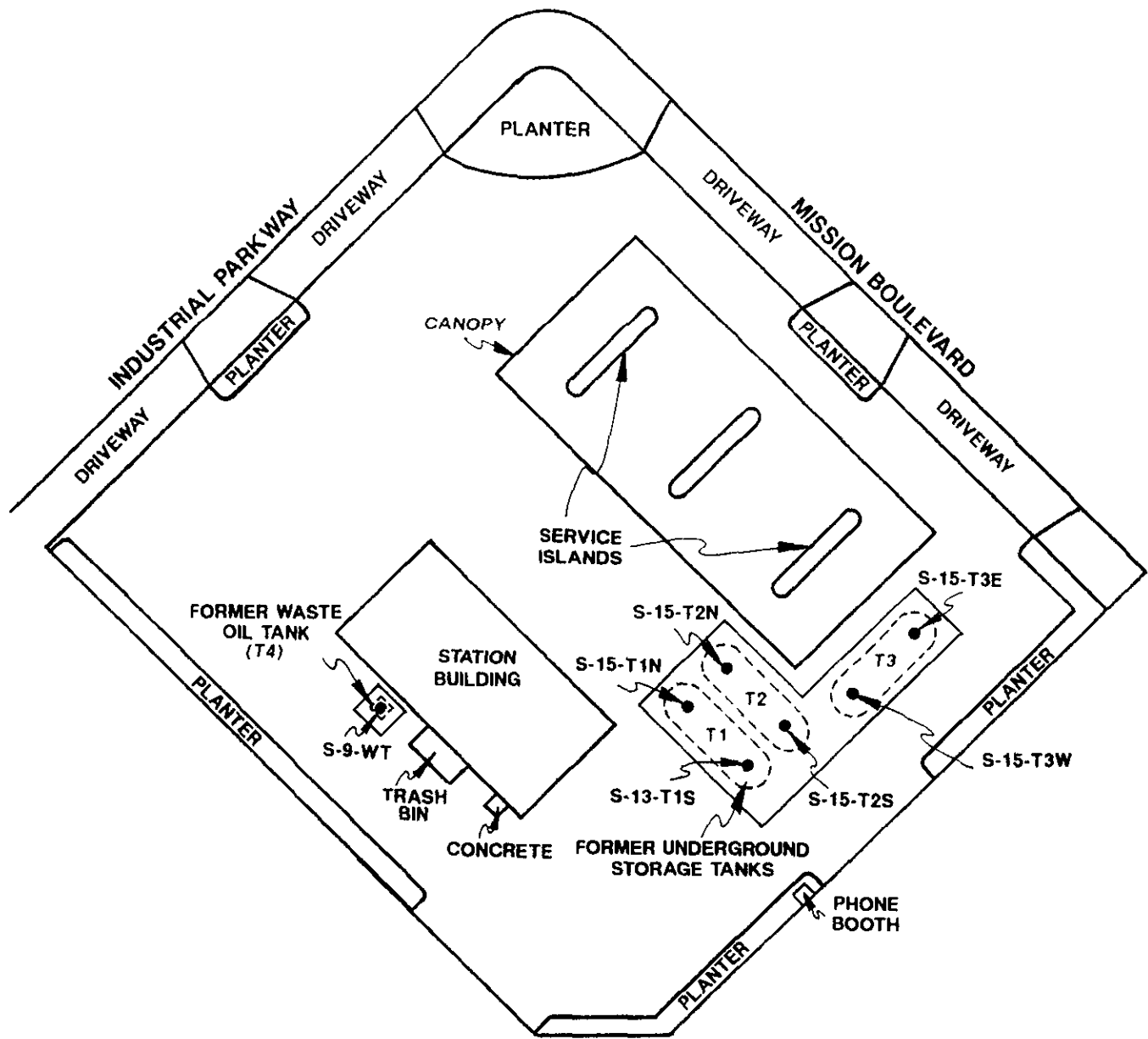


Applied GeoSystems
 412 S. Mission Blvd. Suite 817 Fremont, CA 94539-1415 415-771-1900

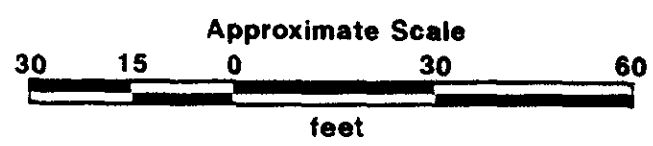
PROJECT NO. 18008-1

SITE VICINITY MAP
 Beacon Station No. 546
 29705 Mission Boulevard
 Hayward, California

PLATE
 P - 1



● = Soil sample locations



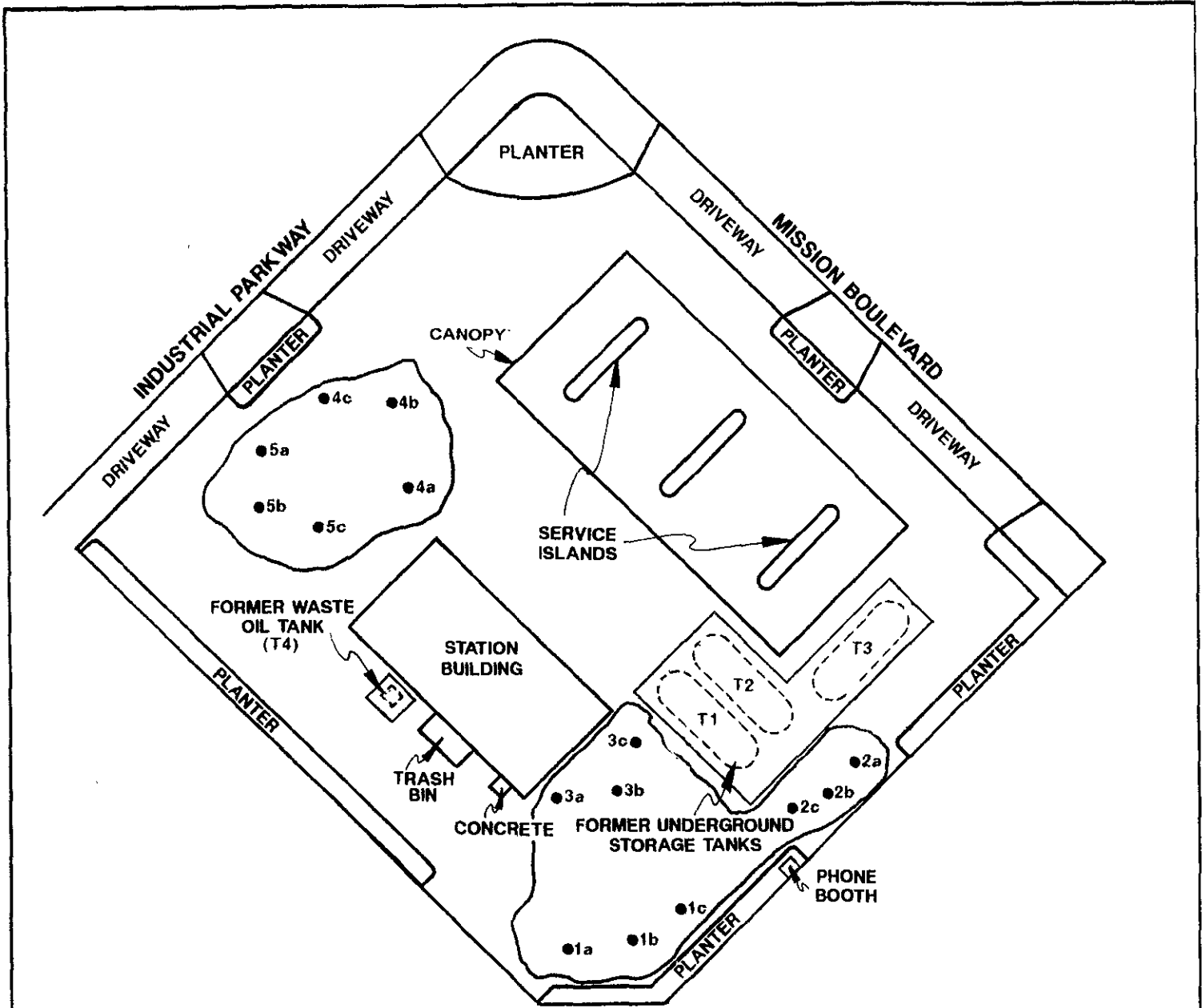
Source: Measured by tape and compass



PROJECT NO. 18008-1

GENERALIZED SITE PLAN
Beacon Station No. 546
29705 Mission Boulevard
Hayward, California

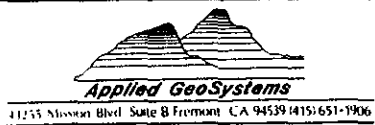
PLATE
P - 2



● = Soil sample location (April 18, 1988)



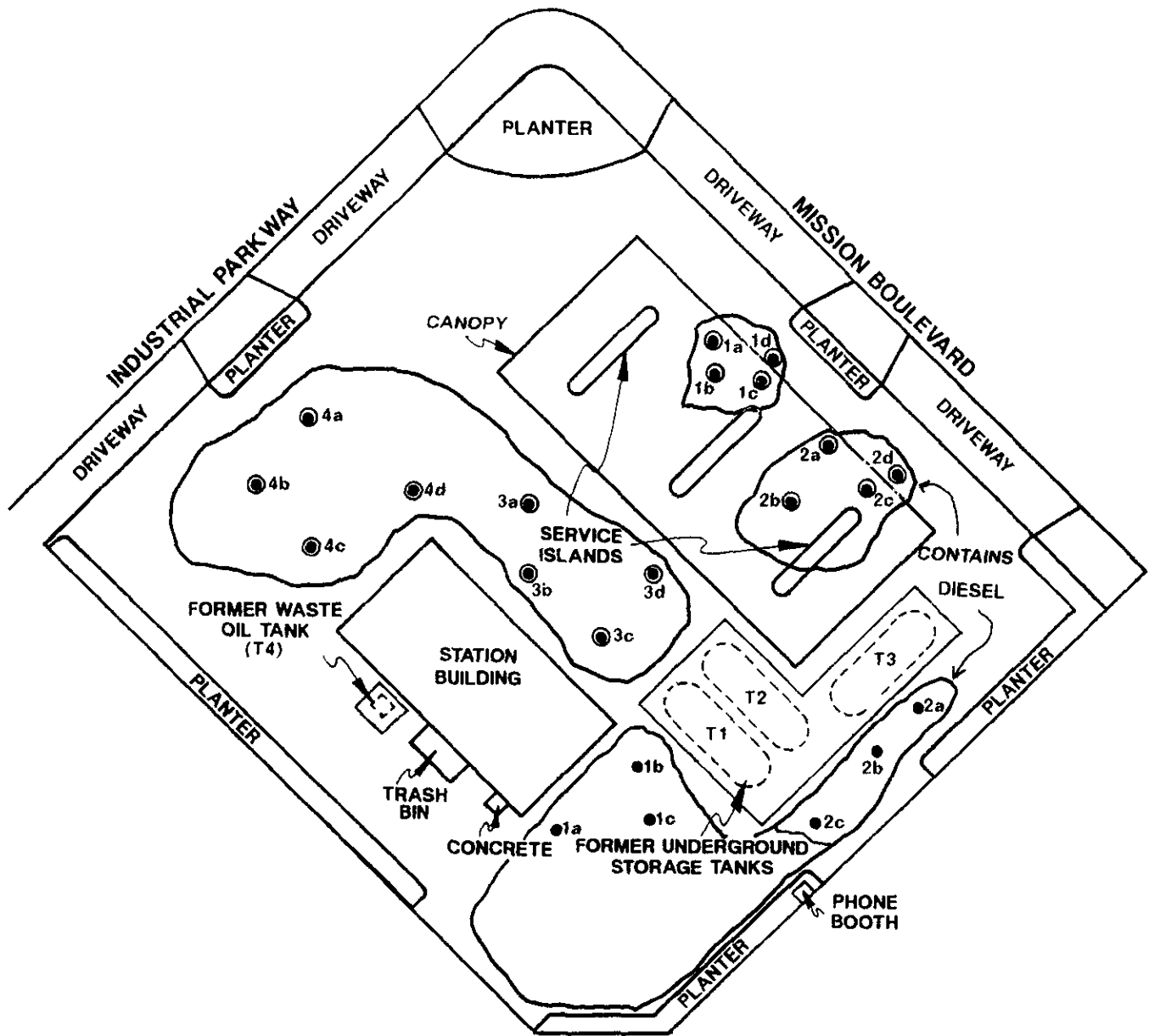
Source: Measured by tape and compass



PLAN SHOWING STOCKPILED SOIL
Beacon Station No. 546
29705 Mission Boulevard
Hayward, California

PLATE
P - 3

PROJECT NO. 18008-1



- = Soil sample location (April 28, 1988)
- ⊙ = Soil sample location (May 27, 1988)



Source: Measured by tape and compass



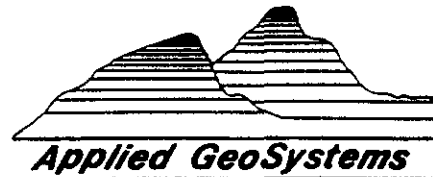
PROJECT NO. 18008-1

AERATION SITE PLAN
Beacon Station No. 546
29705 Mission Boulevard
Hayward, California

PLATE
P - 4

APPENDIX

CHAIN OF CUSTODY RECORD



SAMPLER (signature): James Orr
 Phone: (415) 651-1906

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

LABORATORY: Applied GeoSystems

SHIPPING INFORMATION:

Shipper _____

Address _____

Date Shipped _____

Service Used _____

Airbill No. _____ Cooler No. _____

TURNAROUND TIME: Two Weeks

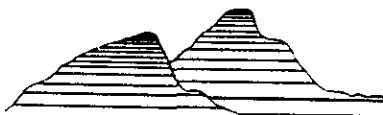
Project Leader: Gary Barker

Phone No. (415) 651-1906

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
<u>James Orr</u>	<u>Gary Barker</u>	<u>4-8-88</u>	<u>5P</u>
<u>Gary Barker</u>			
	Received for laboratory by:	<u>4-11-88</u>	<u>16:30</u>

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
<u>S-15-T2N</u>	<u>018008-1</u>	<u>4-8-88</u>	<u>TPH</u>	<u>Iced</u>
<u>S-15-T2S</u>			<u>TPH</u>	
<u>S-15-T3E</u>			<u>TEH</u>	
<u>S-15-T3W</u>			<u>TEH</u>	
<u>S-9-WT</u>			<u>TEH</u>	
<u>S-13-T1S</u>			<u>TPH</u>	
<u>S-15-T1N</u>			<u>TPH</u>	



Applied GeoSystems

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

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

Report Prepared for:
Applied GeoSystems
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-11-88
Laboratory Number: 04028S04
Project: 018008-1
Sample: S-15-T2N
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	46		2		04-13-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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

4-14-88

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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-11-88
Laboratory Number: 04028S03
Project: 018008-1
Sample: S-15-T2S
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	5		2		04-13-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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

4-14-88
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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-11-88
Laboratory Number: 04029S02
Project: 018008-1
Sample: S-15-T3E
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	2750		10		04-18-88	NR
TPH as Gasoline						NR
TEH as Diesel						
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

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

4-20-88

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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-11-88
Laboratory Number: 04029S01
Project: 018008-1
Sample: S-15-T3W
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	ND		5		04-18-88	NR
TPH as Gasoline						NR
TEH as Diesel						
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

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.

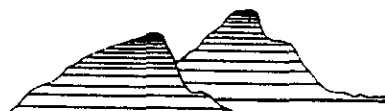
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

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

4-20-88

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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-11-88
Laboratory Number: 04029S03
Project: 018008-1
Sample: S-9-WT
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	ND		5		04-18-88	NR
TPH as Gasoline						NR
TEH as Diesel						NR
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

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.

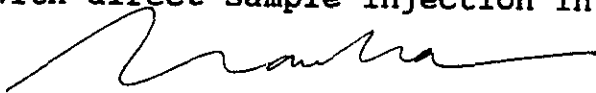
NR = Analysis not required.

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

4-20-88

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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-11-88
Laboratory Number: 04028S01
Project: 018008-1
Sample: S-13-TIS
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	112		2		04-13-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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.

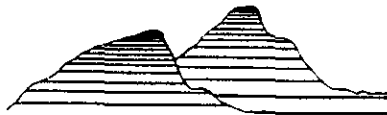
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

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

4-14-88

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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-11-88
Laboratory Number: 04028S02
Project: 018008-1
Sample: S-15-TIN
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	184		2		04-13-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes	NR					

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.

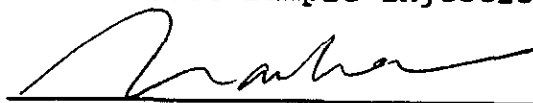
NR = Analysis not required.

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

4-14-88
Date Reported

ANAMETRIX, INC.
LABORATORY SERVICES

ENVIRONMENTAL • ANALYTICAL CHEMISTRY
2754 AIELLO DRIVE • SAN JOSE, CA 95111 • (408) 629-1132

April 14, 1988
Work Order Number 8804058
Date Received 04/12/88
Project No. 018008-1

Gary Barker
Applied GeoSystems
43255 Mission Blvd., Ste. B
Fremont, CA 94539

One soil sample was received for analysis of volatiles by GC/MS, total oil and grease by gravimetric analysis, using the following method(s):

ANAMETRIX I.D.	SAMPLE I.D.	METHOD(S)
8804058-01	018008-1 S-9-WT	8240/503E

RESULTS

See enclosed data sheets, Pages 2-3.

EXTRA COMPOUNDS

None Detected.

QUALITY ASSURANCE REPORTS

See enclosed data sheets, Pages 4-5.

If there is any more that we can do, please give us a call. Thank you for using ANAMETRIX, INC.

Sincerely,



Burt Sutherland
Laboratory Manager

BWS/lm

ORGANIC ANALYSIS DATA SHEET - EPA METHOD 624/8240

ANAMETRIX, INC. (408) 629-1132

Sample I.D. : 018008-1 S-9-WT
 Matrix : SOIL
 Date sampled : 04-08-88
 Date analyzed: 04-13-88
 Dilut. factor: NONE

Anametrix I.D. : 8804058-01
 Analyst : LM
 Supervisor : BWS
 Date released : 04-14-88
 Instrument ID : F1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
74-87-3	* Chloromethane	10	BRL
75-01-4	* Vinyl Chloride	10	BRL
74-83-9	* Bromomethane	10	BRL
75-00-3	* Chloroethane	10	BRL
75-69-4	* Trichlorofluoromethane	5	BRL
75-35-4	* 1,1-Dichloroethene	5	BRL
76-13-1	# Trichlorotrifluoroethane	5	BRL
67-64-1	**Acetone	20	BRL
75-15-0	**Carbondisulfide	5	BRL
75-09-2	* Methylene Chloride	5	BRL
156-60-5	* Trans-1,2-Dichloroethene	5	BRL
75-34-3	* 1,1-Dichloroethane	5	BRL
78-93-3	**2-Butanone	20	BRL
156-59-2	* Cis-1,2-Dichloroethene	5	BRL
67-66-3	* Chloroform	5	BRL
71-55-6	* 1,1,1-Trichloroethane	5	BRL
56-23-5	* Carbon Tetrachloride	5	BRL
71-43-2	* Benzene	5	BRL
107-06-2	* 1,2-Dichloroethane	5	BRL
79-01-6	* Trichloroethene	5	BRL
78-87-5	* 1,2-Dichloropropane	5	BRL
75-27-4	* Bromodichloromethane	5	BRL
110-75-8	* 2-Chloroethylvinylether	5	BRL
108-05-4	**Vinyl Acetate	10	BRL
10061-02-6	* Trans-1,3-Dichloropropene	5	BRL
108-10-1	**4-Methyl-2-Pentanone	10	BRL
108-88-3	* Toluene	5	BRL
10061-01-5	* cis-1,3-Dichloropropene	5	BRL
79-00-5	* 1,1,2-Trichloroethane	5	BRL
127-18-4	* Tetrachloroethene	5	BRL
591-78-6	**2-Hexanone	10	BRL
124-48-1	* Dibromochloromethane	5	BRL
108-90-7	* Chlorobenzene	5	BRL
100-41-4	* Ethylbenzene	5	BRL
1330-20-7	**Total Xylenes	5	BRL
100-42-5	**Styrene	5	BRL
75-25-2	* Bromoform	5	BRL
79-34-5	* 1,1,2,2-Tetrachloroethane	5	BRL
541-73-1	* 1,3-Dichlorobenzene	5	BRL
106-46-7	* 1,4-Dichlorobenzene	5	BRL
95-50-1	* 1,2-Dichlorobenzene	5	BRL
CAS #	Surrogate Compounds	Limits	% Recovery
17060-07-0	1,2-Dichloroethane-d4	84-132%	107%
2037-26-5	Toluene-d8	76-131%	103%
460-00-4	p-Bromofluorobenzene	74-116%	107%

* A Method 624 priority pollutant compound (Federal Register, 10/26/84)
 ** A compound on the U.S. EPA CLP Hazardous Substance List (HSL)
 # A compound added by Anametrix, Inc. BRL : Below reporting limit.

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 629-1132

Sample I.D. : 018008-1 S-9-WT
 Matrix : SOIL
 Date sampled : 04-08-88
 Date anl. TVH: NA
 Date ext. TEH: NA
 Date anl. TEH: NA

Anamatrix I.D. : 8804058-01
 Analyst : JY
 Supervisor : DDG
 Date released : 04-14-88
 Date ext. TOG : 04-13-88
 Date anl. TOG : 04-14-88

CAS #	Compound Name	Reporting Limit (ug/kg)	Amount Found (ug/kg)
	Total Oil & Grease	30000	BRL

- BRL - Below reporting limit.
- TVH - Total Volatile Hydrocarbons is determined by modified EPA 8015 with either headspace or purge and trap.
- TEH - Total Extractable Hydrocarbons is determined by modified EPA 8015 with direct injection.
- TOG - Total Oil & Grease is determined by Standard Method 503E.
- BTEX- Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

All testing procedures follow CRWQCB Region 2 guidelines.

ORGANIC ANALYSIS DATA SHEET - EPA METHOD 624/8240
ANAMETRIX, INC. (408) 629-1132

Sample I.D. : METHOD BLANK
Matrix : SOIL
Date sampled : NA
Date analyzed: 04-13-88
Dilut. factor: NONE

Anametrix I.D. : 1CB0413V000
Analyst : ARL
Supervisor : BWS
Date released : 04-14-88
Instrument ID : F1

CAS #	Compound Name	Reporting Limit (ug/Kg)	Amount Found (ug/Kg)
74-87-3	* Chloromethane	10	BRL
75-01-4	* Vinyl Chloride	10	BRL
74-83-9	* Bromomethane	10	BRL
75-00-3	* Chloroethane	10	BRL
75-69-4	* Trichlorofluoromethane	5	BRL
75-35-4	* 1,1-Dichloroethene	5	BRL
76-13-1	# Trichlorotrifluoroethane	5	BRL
67-64-1	**Acetone	20	35
75-15-0	**Carbondisulfide	5	BRL
75-09-2	* Methylene Chloride	5	16
156-60-5	* Trans-1,2-Dichloroethene	5	BRL
75-34-3	* 1,1-Dichloroethane	5	BRL
78-93-3	**2-Butanone	20	BRL
156-59-2	* Cis-1,2-Dichloroethene	5	BRL
67-66-3	* Chloroform	5	BRL
71-55-6	* 1,1,1-Trichloroethane	5	BRL
56-23-5	* Carbon Tetrachloride	5	BRL
71-43-2	* Benzene	5	BRL
107-06-2	* 1,2-Dichloroethane	5	BRL
79-01-6	* Trichloroethene	5	BRL
78-87-5	* 1,2-Dichloropropane	5	BRL
75-27-4	* Bromodichloromethane	5	BRL
110-75-8	* 2-Chloroethylvinylether	5	BRL
108-05-4	**Vinyl Acetate	10	BRL
10061-02-6	* Trans-1,3-Dichloropropene	5	BRL
108-10-1	**4-Methyl-2-Pentanone	10	BRL
108-88-3	* Toluene	5	BRL
10061-01-5	* cis-1,3-Dichloropropene	5	BRL
79-00-5	* 1,1,2-Trichloroethane	5	BRL
127-18-4	* Tetrachloroethene	5	BRL
591-78-6	**2-Hexanone	10	BRL
124-48-1	* Dibromochloromethane	5	BRL
108-90-7	* Chlorobenzene	5	BRL
100-41-4	* Ethylbenzene	5	BRL
1330-20-7	**Total Xylenes	5	BRL
100-42-5	**Styrene	5	BRL
75-25-2	* Bromoform	5	BRL
79-34-5	* 1,1,2,2-Tetrachloroethane	5	BRL
541-73-1	* 1,3-Dichlorobenzene	5	BRL
106-46-7	* 1,4-Dichlorobenzene	5	BRL
95-50-1	* 1,2-Dichlorobenzene	5	BRL
CAS #	Surrogate Compounds	Limits	% Recovery
17060-07-0	1,2-Dichloroethane-d4	84-132%	98%
2037-26-5	Toluene-d8	76-131%	96%
460-00-4	p-Bromofluorobenzene	74-116%	100

* A Method 624 priority pollutant compound (Federal Register, 10/26/84)
** A compound on the U.S. EPA CLP Hazardous Substance List (HSL)
A compound added by Anametrix, Inc. BRL : Below reporting limit.

CLP VOLATILE MATRIX SPIKE REPORT -- EPA METHOD 8240
 ANAMETRIX, INC. (408) 629-1132

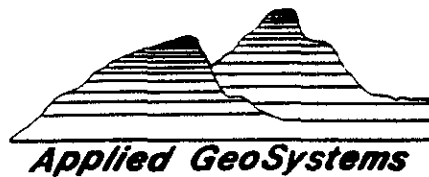
Sample I.D. : 018008-1 S-9-WT
 Matrix : SOIL
 Date sampled : 04-08-88
 Date analyzed : 04-13-88

Anamatrix I.D.: 8804058-0:
 Analyst : LM
 Supervisor : BLOS
 Date released : 04-14-88

COMPOUND	SPIKE AMT. (UG/L)	8804058 MS (UG/L)	%REC MS	8804058 MSD (UG/L)	%REC MSD	RPD	%REC LIMITS*
1,1-DICHLOROETHENE	50	52	104%	41	82%	-24%	37-155%
FREON 113	50	60	120%	48	96%	-22%	48-161%
METHYLENE CHLORIDE	50	45	90%	38	76%	-17%	46-141%
CHLOROFORM	50	52	104%	49	98%	-6%	68-126%
1,1,1-TRICHLOROETHANE	50	51	102%	49	98%	-4%	57-149%
BENZENE	50	53	106%	51	102%	-4%	64-134%
1,2-DICHLOROETHANE	50	50	100%	50	100%	0%	49-128%
TRICHLOROETHENE	50	38	76%	38	76%	0%	60-110%
4-METHYL-2-PENTANONE	50	93	186%	74	148%	-23%	35-147%
TOLUENE	50	52	104%	51	102%	-2%	67-134%
CHLOROBENZENE	50	52	104%	52	104%	0%	70-131%
1,2-DICHLOROBENZENE	50	48	96%	58	116%	19%	37-123%

* Limits established by Anamatrix, Inc.

CHAIN OF CUSTODY RECORD



SAMPLER (signature):

James R. Cline
 Phone (415) 651-1906

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

LABORATORY:

Applied GeoSystems

SHIPPING INFORMATION:

Shipper _____
 Address _____
 Date Shipped _____
 Service Used _____
 Airbill No. _____ Cooler No. _____

TURNAROUND TIME: 2 week

Project Leader: GARY BARKER
 Phone No. (415) 651-1906

Relinquished by: (signatures)

James R. Cline

Received by: (signatures)

Gary Barker

Date 4-18-88 Time 1530

Gary Barker

Received for laboratory by: Barker

Date 4-18-88 Time 1600

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					
omp { S-0418-1a S-0418-1b S-0418-1c	gpc	gpc	gpc	gpc					
					omp { S-0418-2a S-0418-2b S-0418-2c	gpc	gpc	gpc	gpc
omp { S-0418-4a S-0418-4b S-0418-4c	gpc	gpc	gpc	gpc					
					omp { S-0418-5a S-0418-5b S-0418-5c	gpc	gpc	gpc	gpc

1800B-1

4-18-88

T-PH

Iced



Applied GeoSystems

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

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

Report Prepared for:
Applied GeoSystems
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-18-88
Laboratory Number: 04047S01
Project: 18008-1
Sample: S-0418-1(ABC)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	ND		2		04-21-88	NR
TPH as Gasoline						NR
TEH as Diesel						NR
Benzene						NR
Toluene						NR
Ethylbenzene						NR
Total Xylenes						NR

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.

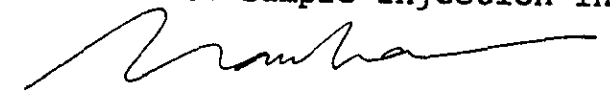
NR = Analysis not required.

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

4-25-88

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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-18-88
Laboratory Number: 04047S03
Project: 18008-1
Sample: S-0418-3(ABC)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	109		2		04-21-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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.

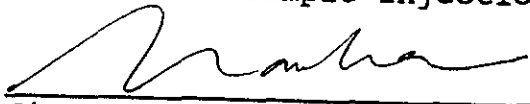
NR = Analysis not required.

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

4-25-88
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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-18-88
Laboratory Number: 04047S02
Project: 18008-1
Sample: S-0418-2(ABC)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	114		2		04-21-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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.

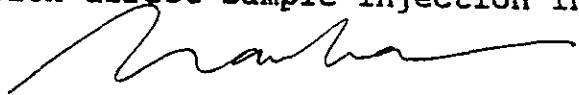
NR = Analysis not required.

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.

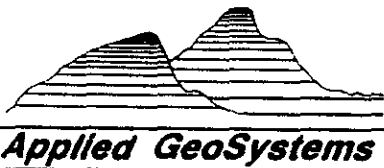
TPH--Total petroleum hydrocarbons (low-to-medium boiling points) are measured by extraction according to EPA Method 5030 followed by analysis by a modified EPA Method 8015 which uses a GC equipped with an FID. Soil extracts and water samples are subjected to purge-and-trap introduction into the GC.

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

4-25-88

Date Reported



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

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

Report Prepared for:
Applied GeoSystems
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-18-88
Laboratory Number: 04047S04
Project: 18008-1
Sample: S-0418-4(ABC)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	100		2		04-21-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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

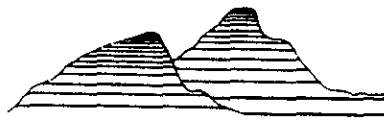
TVH/BTEX--Total volatile hydrocarbons (TVH) and benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction according to EPA Method 5030 followed by analysis by a EPA Method 8020/602 (modified for TVH) which uses a gas chromatograph (GC) equipped with a photo-ionization 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

4-25-88
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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-18-88
Laboratory Number: 04047S05
Project: 18008-1
Sample: S-0418-5(ABC)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	42		2		04-21-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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.

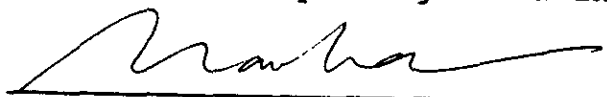
NR = Analysis not required.

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.

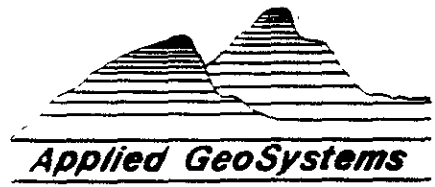
TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.


Tia Tran, Laboratory Supervisor

4-25-88

Date Reported

CHAIN OF CUSTODY RECORD



SAMPLER (signature): Don Rickman
 Phone: 651-1906

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

LABORATORY: Applied GeoSystems

SHIPPING INFORMATION:

Shipper _____
 Address _____
 Date Shipped _____
 Service Used _____
 Airbill No. _____ Cooler No. _____

TURNAROUND TIME: 2 week
 Project Leader: Gary Barker
 Phone No. 415-651-1906

Relinquished by: (signatures)	Received by: (signatures)	Date	Time
<u>Don Rickman</u>	<u>Gary Barker</u>	<u>4-28-88</u>	<u>1630</u>

<u>Gary Barker</u>	<u>Gary Barker</u>	<u>4-29-88</u>	<u>8:00</u>
--------------------	--------------------	----------------	-------------

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
<u>5-0428-1A</u>	<u>218008-2</u>	<u>4-28-88</u>	<u>TPH</u>	<u>iced</u>
<u>5-0428-1B</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>
<u>5-0428-1C</u>				
<u>5-0428-2A</u>				
<u>5-0428-2B</u>				
<u>5-0428-2C</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>	<u>OK</u>

composite
 composite



Applied GeoSystems

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

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

Report Prepared for:
Applied GeoSystems
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-29-88
Laboratory Number: 04073S01
Project: 018008-2
Sample: S-0428-1(ABC)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	3		2		05-03-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						NR

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.

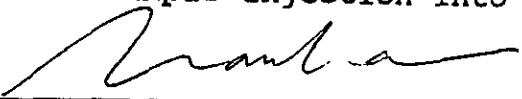
NR = Analysis not required.

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

5-06-88
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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 4-29-88
Laboratory Number: 04073S02
Project: 018008-2
Sample: S-0428-2 (ABC)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	32		2		05-03-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						NR

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.

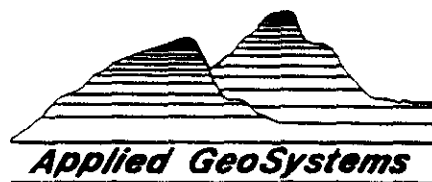
TEH--Total extractable hydrocarbons (high boiling points) are measured by extraction according to EPA Method 3550 for soils or EPA Method 3510 for water followed by a modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

Tia Tran, Laboratory Supervisor

5-06-88

Date Reported

CHAIN OF CUSTODY RECORD



SAMPLER (signature):

James R. Cline

Phone (415) 651-1906

LABORATORY:

A G S

TURNAROUND TIME: *2 weeks*

Project Leader: *GARY BARKER*

Phone No. (415) 651-1906

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

SHIPPING INFORMATION:

Shipper _____

Address _____

Date Shipped _____

Service Used _____

Airbill No. _____ Cooler No. _____

Relinquished by: (signatures)

James R. Cline

Received by: (signatures)

Gary Barker

Date

5-27-88

Time

016

Received for laboratory by:

Gary Barker

[Signature]

5-27-88

163

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	
COMPOSITE {	018008-7	5-27-88	N/A	I, I, I, I	
					S-0527-1a
					S-0527-1b
					S-0527-1c
COMPOSITE {	018008-7	5-27-88	N/A	I, I, I, I	
					S-0527-2a
					S-0527-2b
					S-0527-2c
COMPOSITE {	018008-7	5-27-88	N/A	I, I, I, I	
					S-0527-3a
					S-0527-3b
					S-0527-3c
COMPOSITE {	018008-7	5-27-88	N/A	I, I, I, I	
					S-0527-4a
					S-0527-4b
					S-0527-4c
S-0527-4d					



Applied GeoSystems

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

• FREMONT • COSTA MESA • SACRAMENTO • HOUSTON

ANALYSIS REPORT

Report Prepared for:
Applied GeoSystems
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 5-27-88
Laboratory Number: 05082S01
Project: 018008-2
Sample: S0527-1(ABCD)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	51		2		06-03-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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

6-08-88

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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 5-27-88
Laboratory Number: 05082S02
Project: 018008-2
Sample: S0527-2 (ABCD)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	48		2		06-03-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						NR

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

6-08-88
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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

Date Received: 5-27-88
Laboratory Number: 05082S03
Project: 018008-2
Sample: S0527-3(ABCD)
Matrix: Soil

0212lab.frm

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	5		2		06-03-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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.

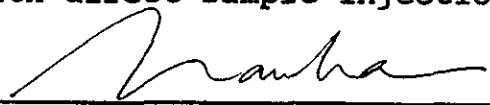
NR = Analysis not required.

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

6-08-88

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
43255 Mission Blvd.
Fremont, CA 94539
Attention: Gary D. Barker

0212lab.frm
Date Received: 5-27-88
Laboratory Number: 05082S04
Project: 018008-2
Sample: S0527-4 (ABCD)
Matrix: Soil

Parameter	Result		Detection Limit		Date Analyzed	Notes
	(mg/kg)	(mg/L)	(mg/kg)	(mg/L)		
TVH as Gasoline	2		2		06-03-88	NR
TPH as Gasoline						
TEH as Diesel						
Benzene						
Toluene						
Ethylbenzene						
Total Xylenes						

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.

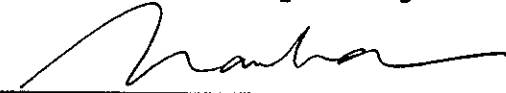
NR = Analysis not required.

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

6-08-88
Date Reported