Applied Geotechnology Inc.

A Report Prepared For

Burns Bros., Inc.
516 S.E. Morrison, Suite 1200
Portland, Oregon 97214

EMERGENCY REMEDIAL ACTION REPORT FOR
BINGO FUEL STOP
IN ACCORDANCE WITH
WASHINGTON STATE DEPARTMENT OF ECOLOGY
ENFORCEMENT ORDER NO. DE 92TC-C109

AGI Project No. 15,659.003

RECEIVED
JUN - 8 1992
DEPARTMENT OF ECOLOGY
CENTRAL REGION OFFICE

by:

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Hydrogeologist

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EXPIRES 8/13/92

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June 5, 1992

Applied Geotechnology Inc.

TRANSMITTAL

To: Washington Department of Ecology Date: June 5, 1992

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Yakima, Washington 98902-3387

Attention: Ms. Susan Burgdorff

Project: Bingo Fuel Stop Number: 15,659.003

Subject:

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Remarks:

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EXECUTIVE SUMMARY

The Washington State Department of Ecology (Ecology) issued Enforcement Order No. DE 92TC-C109 dated February 11, 1992 following a February 7, 1992 site visit to the Bingo Fuel Stop on Interstate Highway 90 at Exit 101 near Thorp, Washington. Ecology's Enforcement Order directed Emergency Remedial Action to reduce risks to human health and the environment at the site. In addition, Ecology sent a letter dated February 26, 1992, reiterating the requirement that an adequate Emergency Remedial Action Plan be prepared and submitted.

Applied Geotechnology Inc. (AGI) prepared and submitted a Work Plan covering emergency remedial actions on behalf of Burns Bros., Inc. The Work Plan's focus was source removal and free product removal. The Work Plan was implemented on March 9, 1992, following review and approval by Ecology.

Five of seven underground storage tanks (USTs) at the site were removed during the Emergency Remedial Action. Hydrocarbon contamination in soil and groundwater was encountered in the UST excavations. Soil samples were collected and submitted for chemical analyses in accordance with the *Guidance for Site Checks and Site Assessment for Underground Storage Tanks* (Ecology, February 1991). Remaining soil in the UST excavations and associated piping trenches contains hydrocarbon concentrations above Washington State Method A soil cleanup levels as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code 173-340.

Approximately 750 gallons of product have been recovered from four product recovery sumps, and approximately 350,000 gallons of hydrocarbon-contaminated groundwater have been recovered, treated to reduce concentrations of dissolved hydrocarbons, and reintroduced into an open UST excavation.

Water samples were collected from potentially affected surface and groundwater sources and submitted for chemical analyses. Domestic water supply wells were within federal drinking water standards, as were potentially affected surface waters.

Groundwater recovery and treatment is continuing at the site. Approximately 1,500 cubic yards of hydrocarbon contaminated soil stockpiled on site will be treated or disposed of. A remedial investigation/feasibility study will be performed to evaluate the nature and extent of contamination, and to assist in the selection of appropriate cleanup alternatives.

1.0 INTRODUCTION

1.1 BACKGROUND

This report summarizes Applied Geotechnology Inc.'s (AGI) emergency remedial actions on behalf of Burns Brothers, Inc. at the Bingo Fuel Stop near Thorp, Washington. The Washington State Department of Ecology (Ecology) issued Enforcement Order No. DE 92TC-C109, dated February 11, 1992, following a site visit to the Bingo Fuel Stop on February 7, 1992. Ecology's Enforcement Order directed that all site activities stop and required the preparation and implementation of an Emergency Remedial Action Work Plan detailing remedial activities at the site to reduce risks to human health and the environment. Ecology subsequently sent a letter dated February 26, 1992, reiterating the requirement that an adequate Emergency Remedial Action Work Plan be prepared and submitted.

1.2 PURPOSE AND SCOPE

AGI prepared and submitted a Work Plan covering emergency remedial actions on behalf of Burns Brothers, Inc. The Work Plan's focus was source removal and free product removal. The Work Plan was implemented on March 9, 1992, following review and approval by Ecology, and addressed the following actions required by the Enforcement Order:

- Submit plans for conducting an emergency remedial action that delineates and contains all hazardous substances released or posing a threatened release to the environment in accordance with:
  - removal of underground storage tank (UST) contents
  - elimination or reduction of any fire, explosion, or vapor hazards
  - visual inspection of any aboveground or exposed below ground releases and prevention of hazardous substances from spreading into the environment
  - continuation of monitoring and mitigation of any additional fire and safety hazards posed by vapors or free product
  - reduction of the threat to human health and the environment posed by contaminated soils excavated, including proper handling of contaminated soils
  - testing for hazardous substances where they are most likely to occur
  - investigation of free product in accordance with the following provisions: free product removal; proper and safe handling (to the maximum extent practicable) of recovered product and byproduct

- preparation of weekly status reports and an Emergency Action Report, as detailed in the Enforcement Order
- providing any additional information required by Ecology

▸ Submit plans for the actions outlined above.

▸ Implement plans following Ecology approval.

The Work Plan was reviewed by Ecology, and approved with the following additions:

▸ Address the removal of product distribution piping.

▸ Provide proper documentation during UST and distribution piping removal.

▸ Provide appropriate handling of excavated soil.

▸ Investigate the reported presence of abandoned USTs.

▸ Sample potentially affected groundwater and surface waters near the site.

▸ Address the installation of groundwater monitoring wells at a later date.

▸ Analyze soil samples in the vicinity of the heating oil/waste oil USTs for polychlorinated biphenyls (PCBs).

▸ Analyze soil samples in the vicinity of the diesel UST for vinyl acetate, a constituent of Burns Red diesel fuel additive.

▸ Analyze bioreactor and activated carbon filter effluent.

▸ Provide descriptive information regarding the bioreactor.

▸ Include a site conditions map and surrounding population/land use information in the Emergency Remedial Action Report.

2.0 SITE BACKGROUND

2.1 LOCATION AND SURFACE CONDITIONS

The Bingo Fuel Stop is located immediately south of Exit 101 on Interstate Highway 90 near Thorp, Washington (see Figure 1, Vicinity Map). The site has been in operation as a truck stop for over 20 years. One light industrial facility and one retail store are located within a 1/4-mile radius of the site. Other nearby land is agricultural.

Four private residences are present within a 1/4-mile radius of the site. A review of Water Well Reports on record at Ecology indicates private water supply wells in this area withdraw water from depths greater than 95 feet.

Surface water features in the vicinity include a small pond directly east of the site and a swampy area adjacent to the southern portion of the site.

Five USTs used for retail fuel sales were present on the site. The tank sizes and contents included: one 5,000-gallon unleaded gasoline, one 10,000-gallon unleaded gasoline, one 10,000-gallon regular gasoline, one 12,000-gallon regular gasoline, and one 10,000-gallon diesel. The gasoline USTs were reportedly installed in 1977 by the previous operator, Telum Incorporated, Provo, Utah. The diesel tank was reportedly installed in 1972. In addition, two heating oil or used oil USTs and four aboveground diesel tanks are present on site. Aboveground and underground tanks are constructed of steel, as is the product distribution piping. Locations of tanks and other site features are shown on Figure 2, Site Plan.

2.2 SUBSURFACE CONDITIONS

Site geology consists of alluvial deposits associated with the Yakima River.[1] Soil encountered during excavation consisted of sandy gravel, with sandy silt to a lesser extent. Any groundwater associated with the Yakima River is likely present at depths of less than 80 feet. A shallow, likely perched aquifer was encountered during excavation. This groundwater is likely associated with rainfall runoff, infiltration, and agricultural irrigation. Regional groundwater uses in the area include domestic water supply and agricultural irrigation. Two nearby farmhouses are known to have private water supply wells within a 1/2-mile radius. These wells were sampled by a previous consultant and meet drinking water standards for total petroleum hydrocarbons (TPH).

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[1] U.S. Geological Survey. 1982. *Geologic Map of the Wenatchee 1:100,000 Quadrangle, Central Washington.*

2.3 PREVIOUS WORK

Several exploratory test pits have been completed at the site within the past five months. Three product recovery sumps were installed in areas where free product was encountered.

The USTs were removed from service in February 1992 in compliance with Ecology's February 11, 1992 Enforcement Order.

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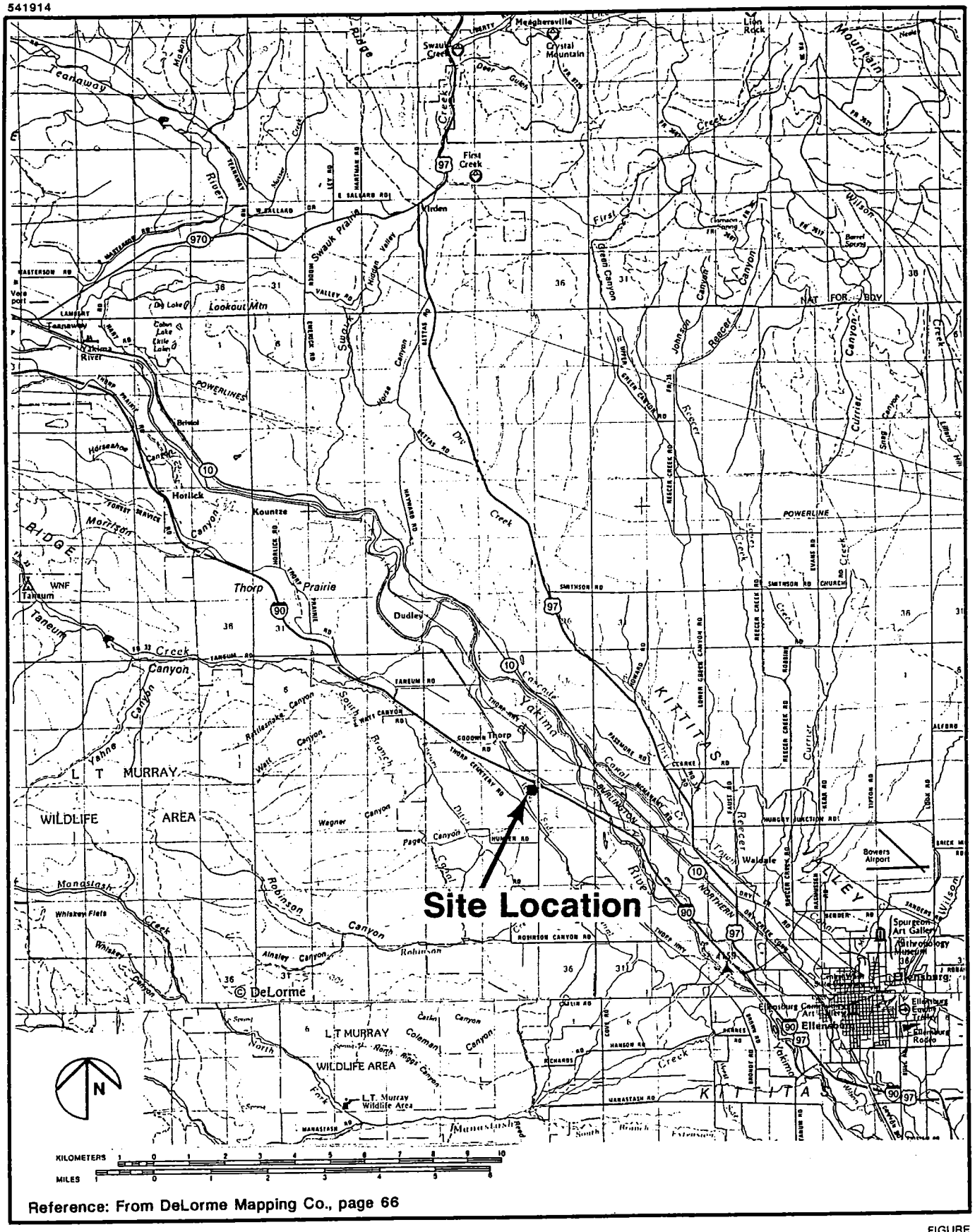

Reference: From DeLorme Mapping Co., page 66

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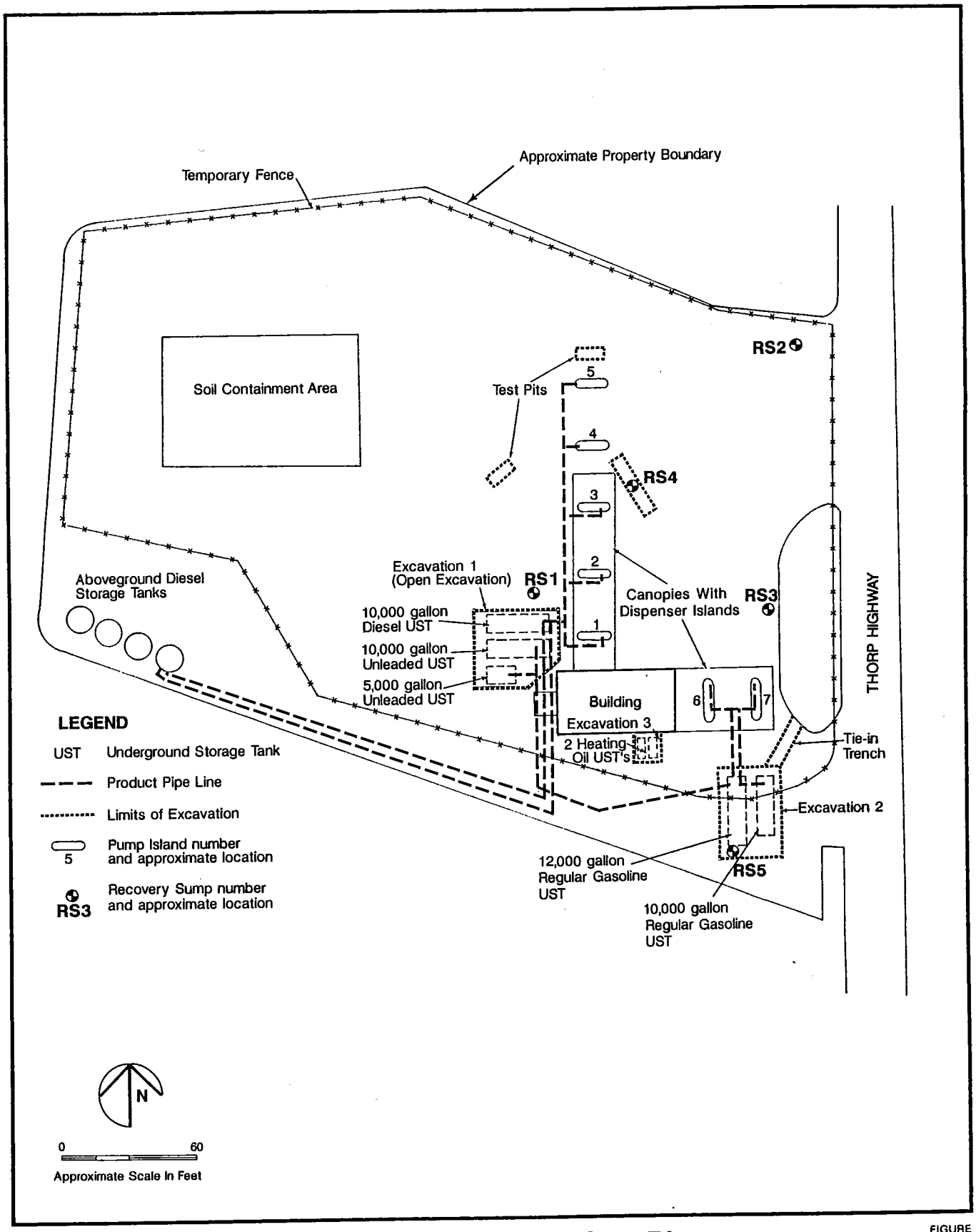
Vicinity Map

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE **1**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.003	DFF	PPK	3 Mar 92		



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Site Plan

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
2

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.003	DFF	PPB	3 Mar 92	KM	

3.0 EMERGENCY REMEDIAL ACTION

3.1 HEALTH AND SAFETY

All of AGI's site activities were conducted in accordance with the site-specific Health and Safety Plan (HASP), a copy of which is included in Appendix A. Adherence to the HASP minimized the likelihood of injury or illness to site personnel and adjacent residents.

3.2 UST AND ASSOCIATED PIPING REMOVAL

Regulatory officials were notified before any USTs were removed. Ecology requires 30 days notice before UST removal, which we understand had been waived in this case. The local fire department was notified. An aboveground tank containing a fire-retardant foam solution was kept on site during UST removal.

A total of five USTs were removed by Ken Leingang Excavation, Inc., a UST decommissioner licensed in the State of Washington. AGI performed the tank closure assessment during UST removal. Two heating oil/used oil USTs remain in the ground immediately south of the building. Adjacent soil was excavated until these two USTs were exposed. The soil showed no visible indication of a heating oil or used oil release. Soil samples were not submitted for PCB analysis due to the lack of field evidence indicating a used oil release had occurred.

All USTs were sounded and remaining product was removed for disposal or recycling by Northwest Enviroservice, Inc. UST product lines were drained and capped after disconnection from the USTs and prior to removal. Contents of the lines were contained and disposed of. Cold cutting procedures were used to make the piping disconnections. The tops of the USTs were then uncovered by excavation. Concrete and asphalt was stripped away first and stockpiled separately from soil.

Oxygen inside each UST was displaced by introduction of dry ice to inert the UST atmosphere, thereby reducing the risk of explosion during removal operations. The quantity of dry ice used was not less than 25 lb/1,000 gallons of UST capacity. Immediately prior to removal, the inside of each UST was checked with a combustible gas analyzer. The lower explosive limit (LEL) was 10 percent or less before the USTs were removed from the excavation and transported for disposal. The unleaded gasoline and diesel fuel USTs showed visible signs of corrosion, but no apparent holes. The leaded gasoline USTs were in good condition, with no apparent holes. The UST excavations were enclosed by fencing to reduce risks to the public. The excavations will be backfilled following completion of the Emergency Remedial Action.

Product distribution piping was removed following UST removal. Piping showed visible signs of corrosion, with several apparent leaks at piping fittings. Leaking fittings were observed along the diesel fuel line between the

aboveground tanks and the diesel fuel UST, and along the unleaded gasoline line between the USTs and the dispenser islands located east of the building. All UST and piping removal was done in accordance with the *Guidance for Site Checks and Site Assessment for Underground Storage Tanks* (Ecology, February 1991).

A fourth product recovery sump was installed adjacent to the northern dispenser islands during piping removal, based on field observations of diesel fuel contamination in soil beneath the dispensers.

3.3 SOIL EXCAVATION

Excavation of hydrocarbon-contaminated soil proceeded after the USTs had been removed. Initial excavation of contaminated soil began within the open UST cavity and was monitored full time by an AGI representative. Field testing included visual observation and headspace analysis using an organic vapor meter equipped with a photoionization detector (OVM-PID) to evaluate the need for excavation. Any soils with visual hydrocarbons and/or strong hydrocarbon odors likely to exceed Washington State Method A soil cleanup levels (cleanup levels), as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code (WAC) 173-340, were excavated and stockpiled for future treatment or disposal. Headspace surveys were performed by placing the soil sample into a jar or a resealable plastic bag, agitating the sample, and inserting the OVM-PID probe through a small opening to record volatile headspace vapor concentrations. Excavation continued until highly contaminated media were removed, excavation became impractical, or until no visible hydrocarbons were present and low OVM-PID readings were obtained from the headspace survey.

Free product encountered on perched groundwater during the excavation was pumped into an aboveground storage tank. Groundwater and free product recovered from the excavation was processed through an oil/water separator when the product removal system was on line. Field observations during excavation indicated little potential for preferential product migration through utility trench backfill due to the predominantly coarse-grained native soil.

Two test pits were dug in the area where abandoned USTs were thought to be present. The locations of the test pits are shown on Figure 2. Abandoned USTs were not encountered in the test pits, and the pits were backfilled.

Asphalt and concrete removed during excavation was separated from soil and transported to a construction debris landfill in Ellensburg, Washington for disposal.

Excavated soil containing petroleum hydrocarbon concentrations above cleanup levels was handled in accordance with requirements outlined in the *Guidance for Remediation of Releases from Underground Storage Tanks* (Ecology, July 1991). Excavated soil was stockpiled on and covered with a visqueen liner.

The sides of the liner covered the berms, which were constructed of hay bales. The berms and cover are intended to prevent the runon/runoff of surface water. Treatment or disposal of approximately 1,500 cubic yards of petroleum-contaminated soil in the containment area will be addressed at a later date.

Upon completion of excavation, samples for chemical analysis were obtained to verify remaining hydrocarbon levels. Sample collection and analysis are described in Section 3.4.

3.4 SOIL SAMPLING

3.4.1 Location and Rationale

AGI personnel collected 28 soil samples from the UST excavations, product piping trenches, and from beneath the dispenser islands. Samples were collected from the sides of each UST excavation on the same day the UST was removed in accordance with the *Guidance for Site Checks and Site Assessments for Underground Storage Tanks*. The samples were collected where field instruments indicated contamination existed or where contamination was most likely to occur. Figure 3 shows the locations of all soil samples. Where perched groundwater was present in the excavations, soil samples were collected from the approximate top of the water table. Soil from the base of each excavation and groundwater entering the excavations will be sampled following the completion of the Emergency Remedial Action.

3.4.2 Procedure

Discrete grab soil samples were collected by AGI personnel using a decontaminated stainless steel spoon. Soil samples were placed into precleaned glass jars with teflon-lined lids. Soil samples were collected from the bucket of the excavating machine where conditions prevented the entry of personnel into the excavation. Soil sample jars were labeled with unique identification numbers corresponding to the identification recorded on the Soil Sampling Records, including the horizontal and vertical location of the sample (i.e., east side, unleaded gasoline tank no. 1, 7.5-foot depth), the sample date, time, and project location. Sample jars were sealed using a custody seal and placed into a sample cooler. The temperature inside the cooler was maintained at 4°C or less during shipment to the analytical laboratory. Copies of the Soil Sampling Records are included in Appendix B.

3.4.3 Sample Custody

A chain-of-custody (COC) form accompanied all samples during shipment. This form lists the name of the project, project manager, and sampler; location of the site; sample identification (including the date, time, and matrix); a unique identifying number assigned to the sample; the requested analysis; sample preservation; number of containers; and laboratory shipping information. The COC form also provides for documentation of sample relinquishment and receipt, and sample disposition at all times. Samples were delivered to the analytical laboratory with 48 hours of collection.

3.4.4 Decontamination Procedures

Decontamination of personnel and sampling equipment was necessary to protect personnel, prevent the potential spread of contamination, and ensure the collection of representative samples.

Sampling equipment was thoroughly decontaminated prior to and between sampling events to prevent cross-contamination of samples. Decontamination of sampling tools was performed as follows: an initial rinse in distilled water, followed by washing in distilled water with laboratory-grade detergent, followed by a distilled water rinse. All decontamination water was stored in drums for appropriate disposal.

3.5 SAMPLE ANALYSIS

3.5.1 Analytical Methods

The selection of laboratory analyses was based on the types of substances stored in the USTs, which included leaded gasoline, unleaded gasoline, diesel fuel, heating oil, and possibly used oil. Sample analyses were in accordance with *Guidance for Remediation of Releases from Underground Storage Tanks*. A soil chemical analysis schedule is shown in Table 1.

Soil samples from the leaded gasoline UST excavation were analyzed for benzene, ethylbenzene, toluene, and total xylenes (BETX) by EPA Method 8020; total lead by EPA Method 6010; and TPH by EPA Method 8015 Modified. TPH analysis by EPA Method 8015 Modified yielded additional information on the character of petroleum hydrocarbon contamination present, aiding in the selection of remedial options. Soil samples from the unleaded gasoline and diesel fuel UST excavation were analyzed for BETX by EPA Method 8020 and for TPH by EPA Method 8015 Modified. Two soil samples from the diesel fuel UST excavation were analyzed by EPA Method 8240 for vinyl acetate, a component of the fuel additive Burns Red. Soil samples from the heating oil/used oil UST excavation were analyzed for TPH by EPA Methods 418.1 and 8015 Modified.

3.5.2 Laboratory Procedures

Samples were analyzed by Analytical Technologies, Inc. (ATI) in Renton, Washington. Detection limits for petroleum hydrocarbon compounds were at or below soil cleanup levels. All quality assurance and quality control (QA/QC) procedures were in accordance with EPA protocol. Laboratory reports were issued within 3 weeks of sample delivery.

3.5.3 Data Validation

AGI reviewed the laboratory reports to evaluate the precision and accuracy of the analytical procedures. Parameters reviewed included allowable sample holding times, matrix spike data, matrix spike duplicate percent recoveries and relative percent difference data, and surrogate spike data. This review was summarized in a QA Report, which accompanies copies of the laboratory reports included in Appendix C.

3.5.4 Results of Chemical Analyses of Soil Samples

Chemical analyses results for soil samples are shown on Table 2. Copies of the laboratory reports are included in Appendix C. The results indicate TPH concentrations in soil are above soil cleanup levels in the following locations:

- All sides of the diesel and unleaded gasoline UST excavation (Excav. 1)
- North and east sides of the regular gasoline excavation (Excav. 2)
- Piping trenches along the south side of the property (samples S10 and S11)
- Piping trench adjacent to the aboveground USTs (S14)
- Dispenser islands north of the building (S18 - S22)
- Piping trench adjacent to the dispenser islands north of the building (S23)
- Dispenser islands east of the building
- Soil stockpiled adjacent to the soil containment area (S29).

BETX constituent concentrations in soil are above soil cleanup levels in the following locations:

- North and east sides of the regular gasoline excavation (Excav. 2)
- Piping trench south of the building (S10)
- Northernmost dispenser islands north of the building (S21 and S22)
- Dispenser islands east of the building

3.6 FREE PRODUCT REMOVAL SYSTEM

3.6.1 Objectives

Free product removal was performed to reduce the immediate threat to human health and the environment. Product was recovered as rapidly as practicable. Water removed with product was treated in a bioreactor to reduce concentrations of dissolved hydrocarbons by an order of magnitude or more, and to enhance biological activity in discharge water. Treated water was reintroduced to an open excavation to provide a transport mechanism for free product recovery.

Chemical analysis data from the bioreactor effluent, in combination with biological laboratory data currently being gathered, will assist AGI in the design of a bioreactor for groundwater remediation during the site remediation phase.

3.6.2 Process

A product removal system was installed to recover free product from the three existing recovery sumps, and a fourth recovery sump installed by AGI. The system operated on a continuous basis from March 16 through June 3, 1992. Water and free product were recovered using pneumatic explosion-proof pumps and were processed in an aboveground oil/water separator. A process flow diagram of the free product removal system is shown on Figure 4.

Separated product was stored in an adjacent aboveground product storage tank. The product storage tank was monitored periodically to determine when the tank needed emptying. Recovered product will be removed from the product storage tank by an authorized transporter and taken to an appropriate facility for recycling or disposal. A high fluid shutoff switch was installed in the product storage tank to discontinue product removal operations should the tank become full.

Water discharged from the oil/water separator was treated in a bioreactor. The bioreactor remediated petroleum hydrocarbons by a combination of volatilization and bioremediation. Groundwater containing dissolved petroleum hydrocarbons and microorganisms enters the bioreactor contact tank. The contact tank provides oxygen and a slightly elevated temperature to promote biodegradation. A combination of biodegradation and volatilization occurs in the contact tank. Contact time in the bioreactor varied from 30 minutes to approximately 2 hours, depending on the influent flow rate and concentration.

Treated water was pumped from the bioreactor through an activated carbon filter to further reduce petroleum hydrocarbon compounds in discharged water to concentrations to as near state and federal drinking water standards as practicable. Discharge from the carbon filter was directed into the diesel and unleaded UST excavation to provide a continuing transport mechanism for free product recovery.

Headspace screening was utilized to monitor petroleum hydrocarbon concentrations upstream of the bioreactor, and upstream and downstream of the carbon filter. Headspace screening consists of placing process water into an airtight container to approximately 2/3 full, sealing the container, agitating the container for approximately 30 seconds, and sampling the air or headspace above the water using an OVM-PID.

3.6.3 Operation and Maintenance

The product removal system was checked weekly to ensure efficient continued operation. Depths to water and product thickness in recovery sumps were measured and are listed in Table 3. Recovered product in the product storage tank was recorded and is shown in Table 4. A graphical representation of product recovery versus time is shown on Figure 5, Product Recovery Rate. Product will be removed for disposal/recycling by an authorized transporter within the next several weeks.

3.6.4 Sampling and Analysis

Water samples were collected from the bioreactor discharge and the carbon filter discharge and analyzed for TPH in the diesel range by Washington State Method WTPH-D and for BETX by EPA Method 602. The results of chemical analyses are shown in Table 5. Copies of the laboratory reports are included in Appendix C.

3.7 SURFACE AND GROUNDWATER QUALITY

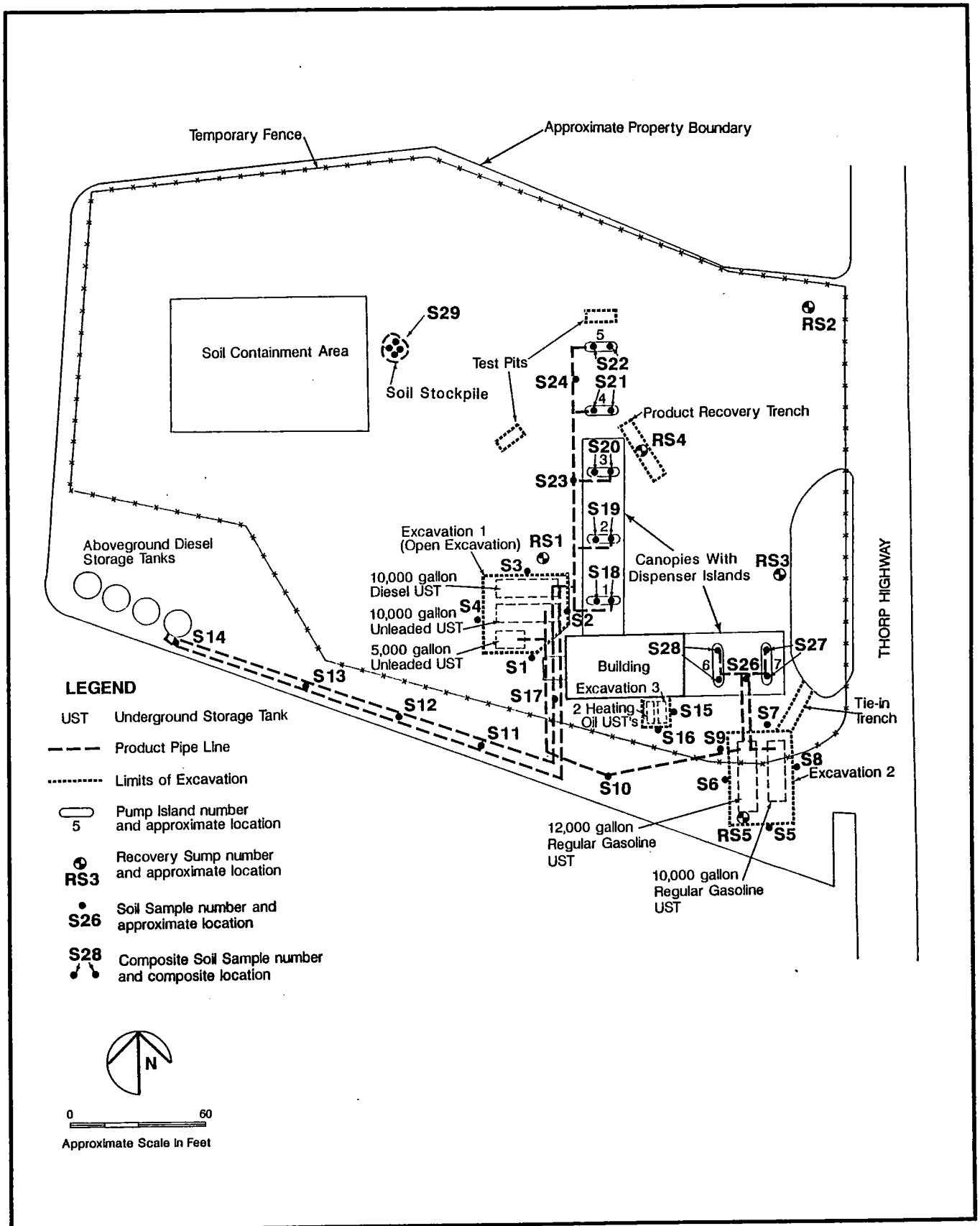
Water samples were collected from nearby surface waters and groundwater wells in accordance with the revisions to the Emergency Remedial Action Plan. Samples were collected from the surface water features within a 1/4-mile radius of the site:

- A pond adjacent to the east of the site
- A swampy area adjacent to the southern portion of the site

Water samples were collected from water supply wells within a 1/4-mile radius of the site:

- Directly to the west (Puget Power Service Center)
- Directly to the south (a private residence)
- Adjacent to the east (a private residence), and
- Across Interstate 90 to the north (Thorp Antique Mall)

The sample analyses schedule for surface water and groundwater samples collected in the vicinity of the site is shown in Table 6, and results of chemical analyses are shown in Table 7. Copies of the laboratory reports are included in Appendix C. The results indicate petroleum hydrocarbon contamination at the site has not impacted drinking water wells in the vicinity. One analyte was detected in samples from surface waters: toluene was present at 0.99 micrograms per liter (ug/L) in the sample from the swampy area adjacent to the southern portion of the site. This detection is well below Method A groundwater cleanup levels (40 ug/L), as well as federal drinking water standards (1,000 ug/L). The source of the toluene is uncertain.



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Soil Sampling Location Map

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE **3**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
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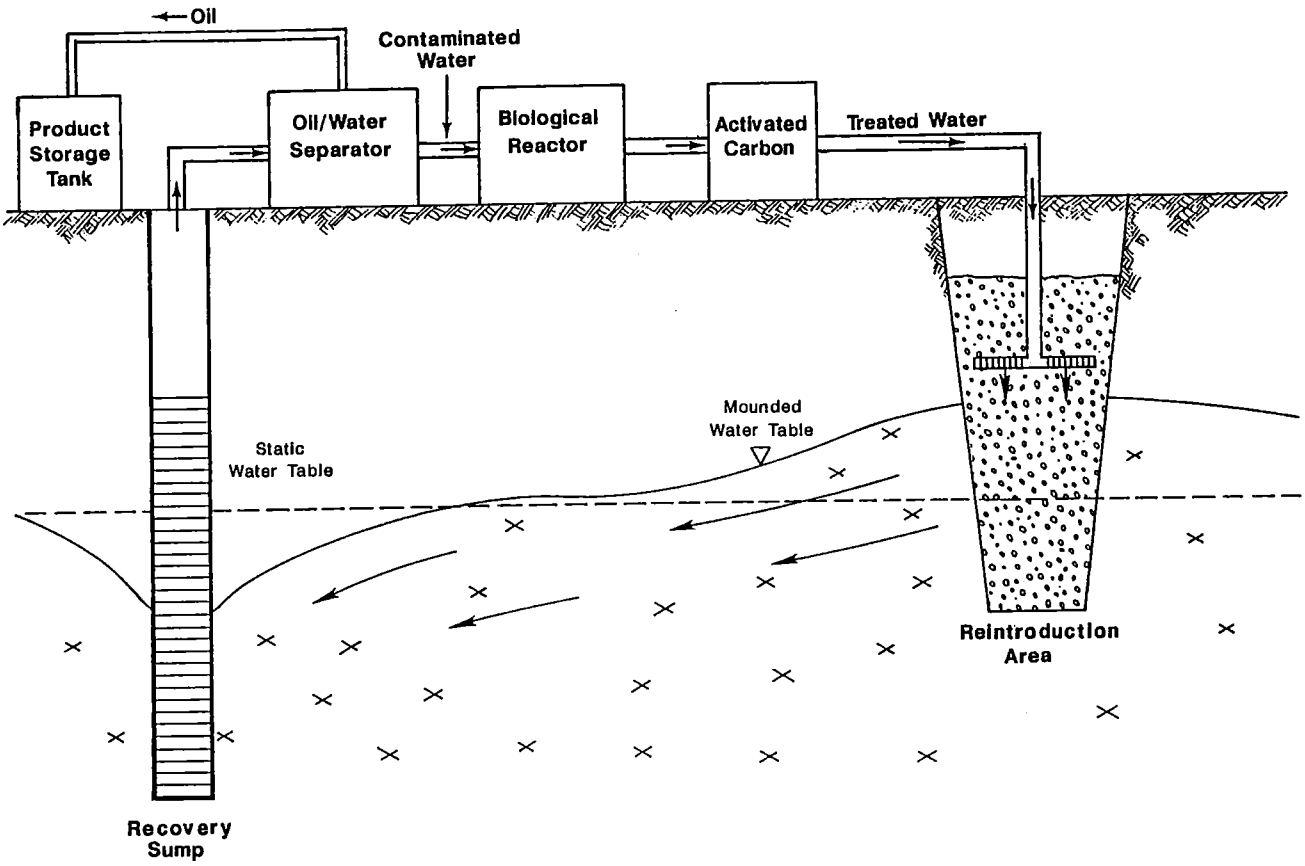

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Free Product Removal System

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE **4**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
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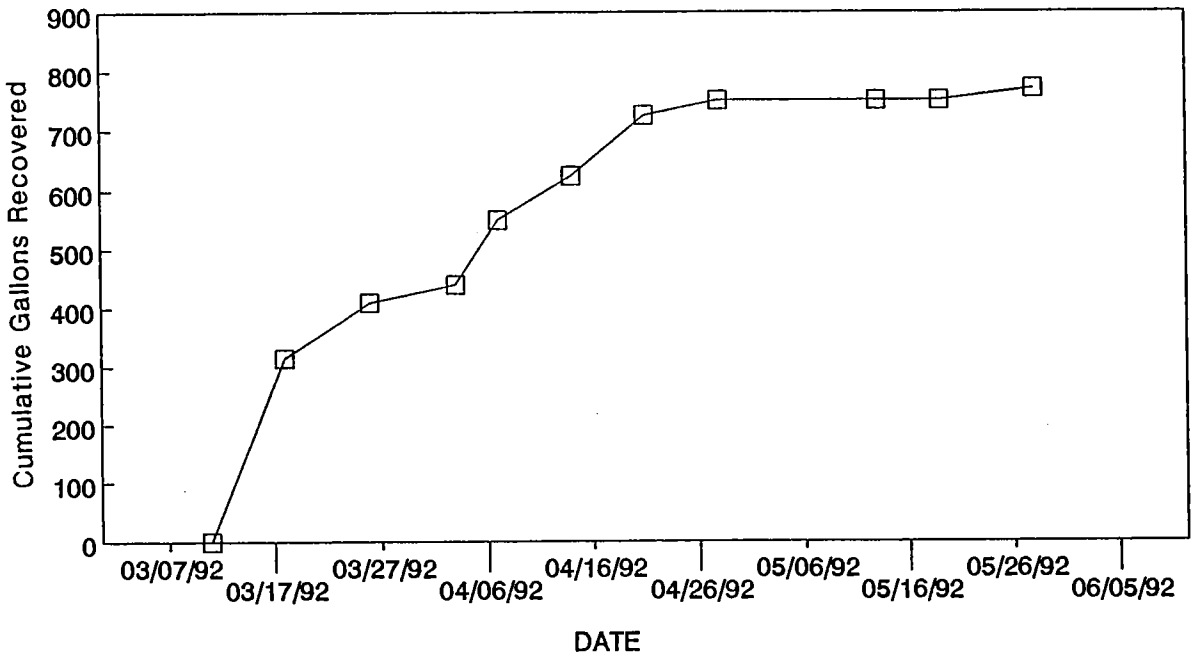

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Product Recovery Rate

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
5

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.003	SLB				

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Table 1
Soil Chemical Analyses Schedule
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	BETX	TPH	Lead	EPA Method 8240	WTPH 418.1 MOD.
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	Y	Y	N	Y	N
S2	E.WALL, EXCAV.1 @9'	03/11/92	Y	Y	N	N	N
S3	N.WALL, EXCAV.1 @8'	03/11/92	N	Y	N	Y	N
S4	W.WALL, EXCAV.1 @8'	03/11/92	Y	Y	N	N	N
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	Y	Y	Y	N	N
S6	W.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S7	N.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	Y	Y	Y	N	N
S9	EXC.2, W. PIPING @ 3'	03/12/92	Y	Y	N	N	N
S10	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S11	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S12	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S13	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S14	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	N	Y	N	N	Y
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	N	Y	N	N	Y
S17	PIPING TRENCH @ 2'	03/17/92	Y	Y	N	N	N
S18	DISPEN. ISL.1 @ 2'	03/13/92	Y	Y	N	N	N
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	Y	Y	N	N	N
S20	DISPEN. ISL.3 @ 5'	03/16/92	Y	Y	Y	N	N
S21	DISPEN. ISL.4 @ 5'	03/16/92	Y	Y	N	N	N
S22	DISPEN. ISL.5 @ 5'	03/16/92	Y	Y	N	N	N
S23	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S24	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S26	PIPING TRENCH @ 3'	03/17/92	Y	Y	Y	N	N
S27	DISPEN. ISL.7 @ 3'	03/17/92	Y	Y	Y	N	N
S28	DISPEN. ISL.6 @ 3'	03/17/92	Y	Y	Y	N	N
S29	SOIL STOCKPILE	03/18/92	Y	Y	N	N	N

Notes:

Analysis requested: Y=Yes, N=No.
BETX – Benzene, ethylbenzene, toluene, and xylenes by EPA Method 8020.
TPH – Total petroluem hydrocarbons by EPA Method 8015 Modified.
EPA Method 8240 for volatile organic compounds including vinyl acetate.
EPA Method 6010 for total lead.

Table 2
Summary of Soil Chemical Analyses
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods						WTPH 418.1M (mk/kg)	EPA 7240 Lead (mg/kg)
			BETX – 8020				TPH – 8015M			
			Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)	Gasoline (mg/kg)	Diesel (mg/kg)		
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	0.032	0.28	0.13	2.8	930	12,000	NA	
S2	E.WALL, EXCAV.1 @9'	03/11/92	0.22	1.9	2.1	10	1,200	8,700	NA	
S3	N.WALL, EXCAV.1 @8'	03/11/92	NA	NA	NA	NA	1,600	10,000	NA	
S4	W.WALL, EXCAV.1 @8'	03/11/92	<0.028	0.23	<0.028	2.2	140	540	NA	
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	<0.030	<0.030	<0.030	<0.030	<5	<25	NA	<5.8
S6	W.WALL, EXCAV.2 @8'	03/12/92	<0.029	0.10	<0.029	0.034	20	32	NA	<5.6
S7	N.WALL, EXCAV.2 @8'	03/12/92	26	61	210	470	2,500	420	NA	<5.6
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	92	300	1,000	1,800	10,000	600	NA	<5.4
S9	EXC.2, W. PIPING @ 3'	03/12/92	<0.028	<0.028	<0.028	<0.028	7	<25	NA	
S10	PIPING TRENCH @ 4'	03/13/92	21	69	200	410	1,000	100	NA	
S11	PIPING TRENCH @ 3'	03/13/92	<0.032	0.40	0.056	2.6	240	2,000	NA	
S12	PIPING TRENCH @ 3'	03/13/92	<0.031	<0.031	<0.031	<0.031	<5	<25	NA	
S13	PIPING TRENCH @ 3'	03/13/92	<0.035	<0.035	<0.035	<0.035	<5	<25	NA	
S14	PIPING TRENCH @ 4'	03/13/92	<0.030	<0.030	<0.030	<0.030	7	350	NA	
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	NA	NA	NA	NA	<5	<25	22	
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	NA	NA	NA	NA	<5	<25	<20	
S17	PIPING TRENCH @ 2'	03/17/92	0.037	<0.028	0.066	0.039	<5	<25	NA	
S18	DISPEN. ISL.1 @ 2'	03/13/92	<0.027	<0.027	0.032	0.029	<25	2,100	NA	
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	<0.030	0.070	<0.030	0.61	430	18,000	NA	
S20	DISPEN. ISL.3 @ 5'	03/16/92	0.039	1.4	0.48	7.9	280	2,200	NA	
S21	DISPEN. ISL.4 @ 5'	03/16/92	0.67	1.8	0.80	9.0	2,500	21,000	NA	
S22	DISPEN. ISL.5 @ 5'	03/16/92	0.59	1.1	0.91	6.1	740	9,100	NA	
S23	PIPING TRENCH @ 5'	03/16/92	<0.028	0.81	0.080	6.1	980	3,100	NA	
S24	PIPING TRENCH @ 5'	03/16/92	<0.028	<0.028	<0.028	<0.028	<5	87	NA	
S26	PIPING TRENCH @ 3'	03/17/92	0.44	3.6	5.6	25	300	72	NA	
S27	DISPEN. ISL.7 @ 3'	03/17/92	6.5	44	130	330	1,100	160	NA	
S28	DISPEN. ISL.6 @ 3'	03/17/92	10	19	69	170	1,600	300	NA	
S29	SOIL STOCKPILE	03/18/92	<0.028	<0.028	<0.028	<0.028	10	210	NA	
State Soil Cleanup Levels [a]			0.500	20.0	40.0	20.0	100	200	200	250

Notes:
a) Method A suggested cleanup level for residential soil promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act Cleanup Regulation.
mg/kg – Milligrams per kilogram is equivalent to parts per million (ppm).
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
Shaded values exceed Washington State Method A soil cleanup levels.

Table 3
Summary of Water and Product Level Measurements
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Location	Date Sampled	Depth to Product	Depth to Water	Product Thickness	Reference Elevation	Notes
RS–1	03/09/92	11.05	11.39	0.34	105.89	Not pumping.
	03/12/92	11.47	11.57	0.10	105.89	Not pumping.
	03/17/92	10.56	10.61	0.05	105.89	
	03/26/92	10.77	10.80	0.03	105.89	
	04/01/92	10.63	10.68	0.05	105.89	
	04/07/92	11.04	11.05	0.01	105.89	
	04/14/92	11.10	11.15	0.05	105.89	
	04/21/92	10.96	10.99	0.03	105.89	
	04/28/92		8.23	0.00	105.89	
	05/13/92	8.77	8.78	0.01	105.89	
	05/19/92		7.90	0.00	105.89	
	05/28/92		7.68	0.00	105.89	
	06/03/92		8.94	0.00	105.89	Not pumping.
RS–2	03/09/92	9.71	9.91	0.20	99.37	Not pumping.
	03/12/92	9.81	10.03	0.22	99.37	Not pumping.
	03/17/92	11.03	11.20	0.17	99.37	
	03/26/92	10.08	10.09	0.01	99.37	
	04/01/92		10.87	0.00	99.37	
	04/07/92		10.35	0.00	99.37	Not pumping.
	04/14/92		10.16	0.00	99.37	Not pumping.
	04/21/92		9.64	0.00	99.37	Not pumping.
	04/28/92		8.65	0.00	99.37	Not pumping.
	05/13/92		8.93	0.00	99.37	Not pumping.
	05/19/92		8.54	0.00	99.37	Not pumping.
	05/28/92		8.66	0.00	99.37	Not pumping.
	06/03/92		8.47	0.00	99.37	Not pumping.
RS–3	03/09/92	11.59	11.64	0.05	104.51	Not pumping.
	03/12/92	11.80	11.85	0.05	104.51	Not pumping.
	03/17/92		12.36	0.00	104.51	
	03/26/92		12.39	0.00	104.51	
	04/01/92	12.59	12.62	0.03	104.51	
	04/07/92	12.61	12.66	0.05	104.51	
	04/14/92	12.09	12.13	0.04	104.51	
	04/21/92	10.91	10.94	0.03	104.51	
	04/28/92	10.72	10.74	0.02	104.51	
	05/13/92	10.10	10.15	0.05	104.51	
	05/19/92		10.30	0.00	104.51	
	05/28/92		10.68	0.00	104.51	
	06/03/92		9.20	0.00	104.51	
RS–4	03/17/92	12.72	12.79	0.07	103.75	Not pumping.
	03/26/92	11.84	12.08	0.24	103.75	Not pumping.
	04/01/92	12.21	12.48	0.27	103.75	Not pumping.
	04/07/92	12.59	12.79	0.20	103.75	
	04/14/92	13.49	13.50	0.01	103.75	
	04/21/92	11.64	11.68	0.04	103.75	
	04/28/92	10.65	10.66	0.01	103.75	
	05/13/92	10.81	10.82	0.01	103.75	Not pumping.
	05/19/92	10.39	10.41	0.02	103.75	Not pumping.
	05/28/92	10.45	10.48	0.03	103.75	Not pumping.
	06/03/92	10.08	10.10	0.02	103.75	

Reference Elevation Datum: Assumed 100.00' at nail 1' from above base of Telephone Pole, 50' from RS–3.

Table 4
Recovered Product
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Date	Cumulative Gallons
03/11/92	0
03/18/92	315
03/26/92	410
04/03/92	440
04/07/92	550
04/14/92	625
04/21/92	725
04/28/92	750
05/13/92	750
05/19/92	750
05/28/92	770
06/03/92	770

Table 5
Summary of Water Chemical Analyses
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods BETX – 8020 Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Total Xylenes (ug/L)	WTPH Diesel (mg/L)
Degassing Tank	Bioreactor Effluent	03/16/92	1,100	140	1,900	1,100	NA
Carbon Effluent	Carbon Filter Effluent	03/16/92	0.8	ND	1.3	ND	NA
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92	100	11	180	200	19
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92	13	ND	10	56	12
Bioreactor Effluent	Bioreactor Effluent	04/01/92	91	6.2	110	100	5.4
Carbon Filter Effluent	Carbon Filter Effluent	04/01/92	1.5	ND	1.9	1.8	2.0
Degassing Tank	Bioreactor Effluent	04/07/92	190	11	220	180	18
Carbon Effluent	Carbon Filter Effluent	04/07/92	13	0.9	15	13	7.6
Degassing Tank	Bioreactor Effluent	04/14/92	41	2.4	67	130	56
Carbon Effluent	Carbon Filter Effluent	04/14/92	19	1.1	29	65	40
Degassing Tank	Bioreactor Effluent	04/21/92	ND	ND	ND	ND	10
Carbon Effluent	Carbon Filter Effluent	04/21/92	1.5	ND	1.2	5.1	3.4
Bioreactor Effluent	Bioreactor Effluent	04/28/92	120	19	150	220	5.1
Carbon Filter Effluent	Carbon Filter Effluent	04/28/92	9.5	1.5	11	30	23
Bioreactor Effluent	Bioreactor Effluent	05/13/92	13	0.7	7.5	85	14
Carbon Filter Effluent	Carbon Filter Effluent	05/13/92	1.3	ND	0.9	28	5.3
Bioreactor Effluent	Bioreactor Effluent	05/19/92	52	6.2	36	150	86
Carbon Effluent	Carbon Filter Effluent	05/19/92	9.5	1.6	6.9	53	46
Bioreactor Effluent	Bioreactor Effluent	05/28/92	1.2	0.59	1.5	0.83	11
Carbon Filter Effluent	Carbon Filter Effluent	05/28/92	ND	ND	ND	ND	6
Laboratory Detection Limit			0.5	0.5	0.5	0.5	0.5
State Groundwater Cleanup Levels [a]			5	30	40	20	1.0

Notes:

a) Method A suggested cleanup level for groundwater promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act (MTCA) Cleanup Regulation.
mg/L – Milligrams per liter is approximately equivalent to parts per million depending on density of water sample.
ug/L – Micrograms per liter is approximately equivalent to parts per million depending on density of water sample.
TPH – Total petroluem hydrocarbons.
NA – Not analyzed; ND – Not detected.
Shaded values exceed Washington State Method A groundwater cleanup levels.

Table 6
Off–Site Water Chemical Analyses Schedule
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Method 8020 BETX	WTPH–G
W–1	Puget Power Service Center	03/26/92	Y	Y
W–2	House Adjacent to South	03/26/92	Y	N
W–3	House Adjacent to East	03/26/92	Y	N
W–4	Thorp Antique Mall	03/26/92	Y	Y
W–5	Pond Adjacent to East	03/26/92	Y	N
W–6	Swampy Area Adjacent to South	03/26/92	Y	Y

Notes:

Analysis requested: Y=Yes, N=No.
BETX – Benzene, ethylbenzene, toluene, xylenes.
TPH–G – Total Petroleum Hydrocarbons, gasoline range.

Table 7
Summary of Off–Site Water Chemical Analyses
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods BETX – 8020 Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Total Xylenes (ug/L)	WTPH Gasoline (mg/L)
W–1	Puget Power Service Center	03/26/92	ND	ND	ND	ND	ND
W–2	House Adjacent to South	03/26/92	ND	ND	ND	ND	ND
W–3	House Adjacent to East	03/26/92	ND	ND	ND	ND	ND
W–4	Thorp Antique Mall	03/26/92	ND	ND	ND	ND	ND
W–5	Pond Adjacent to East	03/26/92	ND	ND	ND	ND	ND
W–6	Swampy Area Adjacent to South	03/26/92	ND	ND	0.99	ND	ND
Laboratory Detection Limit			0.5	0.5	0.5	0.5	0.1
State Groundwater Cleanup Levels [a]			5	30	40	20	1.0

Notes:

a) Method A suggested cleanup level for groundwater promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act (MTCA) Cleanup Regulation.
mg/L – Milligrams per liter is approximately equivalent to parts per million depending on density of water sample.
ug/L – Micrograms per liter is approximately equivalent to parts per million depending on density of water sample.
TPH – Total petroluem hydrocarbons.
ND – Not detected.

4.0 REPORTING

Weekly written status reports were submitted to Ecology summarizing emergency actions taken and information obtained during site activities. The weekly status reports are included in Appendix D.

5.0 SUMMARY AND CONCLUSION

The source of contamination was removed during the Emergency Remedial Action. Free product was recovered from the excavations and product recovery sumps to the extent practicable. Conditions outlined in the Enforcement Order have been satisfied.

Approximately 1,500 cubic yards of hydrocarbon contaminated soil will require treatment or disposal. Recovery and treatment of contaminated groundwater is continuing at this time.

Future work at the site will include performing a remedial investigation/feasibility study to evaluate the nature and extent of contamination, and to assist in the selection of appropriate cleanup alternatives.

DISTRIBUTION

3 Copies	Burns Bros., Inc. 516 S.E. Morrison, Suite 1200 Portland, Oregon 97214 Attention: Mr. Kirk French
2 Copies	Washington State Department of Ecology Central Regional Office 106 South 6th Avenue Yakima, Washington 98902-3387 Attention: Ms. Susan Burgdorff

Quality Assurance/Technical Review by:

Gary L. Laakso
Remediation Services Manager

PPB/JEN/jlh

APPENDIX A

Health and Safety Plan

PROJECT-SPECIFIC HEALTH AND SAFETY PLAN
BINGO FUEL STOP
THORP, WASHINGTON

AGI Project No. 15,659.003

by

Monica P. Beckman
Health and Safety Manager

Peter P. Barry
Project Manager

APPLIED GEOTECHNOLOGY INC.
300 120th Avenue N.E.
Building 4, Suite 215
Bellevue, Washington 98005
206/453-8383

March 2, 1992

1.0 GENERAL INFORMATION

1.1 INTRODUCTION

The purpose of this project-specific Health and Safety Plan (HASP) is to provide guidance and procedures to ensure the physical well being of Applied Geotechnology Inc. (AGI) personnel observing, directing, and documenting investigation, removal, and remediation activities at the Bingo Fuel Stop site in Thorp, Washington. This project-specific HASP has been written to meet Washington Industrial Safety and Health Administration (WISHA) regulations.

1.2 APPLICABLE REGULATIONS

This project-specific HASP meets current WISHA regulations included in Washington Administrative Code (WAC) 296-24, WAC 296-62, and WAC 296-155. Particular emphasis has been placed on the regulations listed below; however, additional regulations may apply to specific operations.

- General, Educational, Medical, and First-Aid Requirements (WAC 296-24, Part A-1)
- Personal Protective Equipment (WAC 296-24, Part A-2)
- Hazard Communication (WAC 296-62, Part C)
- Respiratory Protection (WAC 296-62, Part E)
- Air Contaminants (WAC 296-62, Part H)
- Air Contaminants (Specific) (WAC 296-62, Part I)
- Hearing Conservation (WAC 296-62, Part K)
- Confined Spaces (WAC 296-62, Part M)
- Hazardous Waste Operations and Emergency Response (WAC 296-62, Part P)
- Personal Protective and Life Saving Equipment (WAC 296-155, Part C)
- Excavation, Trenching, and Shoring (WAC 296-155, Part N)

1.3 SCOPE/APPLICATION

This project-specific HASP is for AGI personnel engaged in investigation, removal, and remediation activities at the Bingo Fuel Stop site. Underground storage tanks (UST), contaminated soil, and contaminated water may be present at the site. This HASP includes hazards and corrective procedures

common to sites containing petroleum hydrocarbon and solvent contamination. Information concerning the site history, location, and description is included in Section 2.0. If special or unusual hazards (e.g., confined space entries) are believed present at the site, the AGI Health and Safety Manager (HSM) Monica Beckman, or Project Manager (PM) Peter Barry, should prepare and implement an addendum to this project-specific HASP.

Prior to working at the site, a copy of this HASP will be provided to employees by the HSM or PM. AGI employees are expected to conduct site work in a safe manner and comply with the project-specific HASP and applicable federal, state, and local regulations. When no policies or regulations apply, AGI employees should act in a manner to reduce potential risk of injury or health effects.

AGI routinely hires contractors to remove storage tanks and assist in the remediation of contaminated soil and groundwater at UST sites. This project-specific HASP developed by AGI is not intended to apply to contractors working on the site. Contractors are responsible for providing and implementing their own HASP.

1.4 RESPONSIBILITIES

Each AGI project involving storage tank investigation, removal, or remediation activities is assigned a PM and Site Safety Officer (SSO). The AGI PM is responsible for preparing the project-specific portion of the HASP. If additional AGI employees enter the site, the PM should provide them with copies of the project-specific HASP and ensure they follow the procedures contained therein.

The SSO is responsible for implementing the project-specific HASP for AGI employees and notifying the HSM of additional hazards or deviations from the HASP. Since most UST sites are fairly limited in size and scope, often only one AGI representative will be on-site; in these cases, this individual will act as the SSO.

Contractors are responsible for providing and implementing their own project-specific HASP. Establishing site control procedures and decontamination activities, and informing AGI personnel of the procedures, are also the responsibility of the contractor. AGI personnel should follow project-specific procedures established by the contractor. If there is a conflict between the AGI project-specific HASP and procedures established by the contractor, AGI employees should follow the most stringent procedures.

1.5 WORK ACTIVITIES

UST investigation, removal, and remediation projects may involve the removal of various numbers and sizes of USTs, installation of a treatment system, and treatment of contaminated soil and water. The following site activities are considered common to work at UST investigation, removal, and remediation sites:

- Remove USTs and underground structures.
  - Excavate and remove underground piping, etc.
  - Excavate to top of tank
  - Rinse and clean tank
  - Inert tank
  - Remove tank
  - Ready tank for transportation (cut and clean, if necessary)
- Excavate contaminated soil using heavy equipment.
  - Move heavy equipment and excavated soil throughout the site
  - Collect soil samples for chemical analysis
- Restore the site.
  - Backfill excavation
  - Perform soil compaction and testing
  - Replace asphalt, concrete, etc.
- Extract, treat, and dispose of groundwater and vapors
  - Transport and unload equipment
  - Drill, install, and develop groundwater monitoring wells
  - Drill and install vapor extraction points
  - Construct and install treatment system
  - Start up system
  - Discharge treated water and air
  - Monitor system performance
- Soil treatment or removal
  - Screen excavated soil
  - Treat soil
  - Till soil
  - Load and haul soil
  - Collect soil samples for chemical analysis
- Pilot test
  - VES tests
  - Pump tests
  - Soil treatment tests

AGI personnel should not perform the above-referenced site activities; they should observe, direct, and document such work operations. Contractors performing site work are responsible for the health and safety of their respective employees.

2.0 SITE-SPECIFIC INFORMATION

2.1 SITE LOCATION AND DESCRIPTION

Client: Burns Bros., Inc.

AGI Project No.: 15,659.001

Site Address: Bingo Fuel Stop
Thorp, Washington

Site Description: The Bingo Fuel Stop is located in Thorp, Washington. One building, two canopies, and seven dispenser islands are located on the property. In addition, seven USTs are present. The site slopes gently toward the northeast.

2.2 CONTACT PERSONNEL

Applied Geotechnology Inc.

Project Manager	Peter Barry	(206)453-8383
Site Safety Officer	Personnel to be determined	(206)453-8383
Health and Safety Manager	Monica Beckman	(206)453-8383
Occupational Physician	Dr. Susan Berg	(206)822-3651

Contractor Ken Leingang Excavation, Inc.

Project Manager	Ken Leingang	(509)575-5507
Site Safety Officer	Personnel to be determined	(509)575-5507

2.3 SITE HISTORY

UST Information:

Total	Size (gal)	Age	Contents	Leaking (Y,N)
2	10,000	15 Years	Gasoline	Unknown
1	10,000	20 Years	Diesel Fuel	Unknown
2	Unknown	Unknown	Used Oil	Unknown
1	5,000	15 Years	Gasoline	Unknown
1	12,000	15 Years	Gasoline	Unknown

Additional Information: Petroleum hydrocarbon contamination is present at the site, possibly as a result of UST overfills in the past. Three product recovery sumps have been installed within the past two months and product has been periodically removed from the sumps.

2.4 NEAREST HOSPITAL

Appropriate action should be taken to stabilize minor emergencies (i.e., first aid injury cases.) For major emergencies, the appropriate response agency should be summoned by calling 911. If an AGI employee has been injured, the AGI PM and HSM should be contacted as soon as possible after the situation has been stabilized. The injured employee should then complete an AGI Supplementary Record of Occupational Injuries and Illnesses Form included in Attachment A. Additional emergency procedures are included in Section 7.0.

Nearest Hospital: Kittitas Valley Hospital

Address: 603 South Chestnut
Ellensberg, Washington 98926

Telephone Number: (509) 962-9841

Driving directions to the hospital are shown on the Hospital Route Map, Figure 1.

2.5 EMERGENCY TELEPHONE NUMBERS

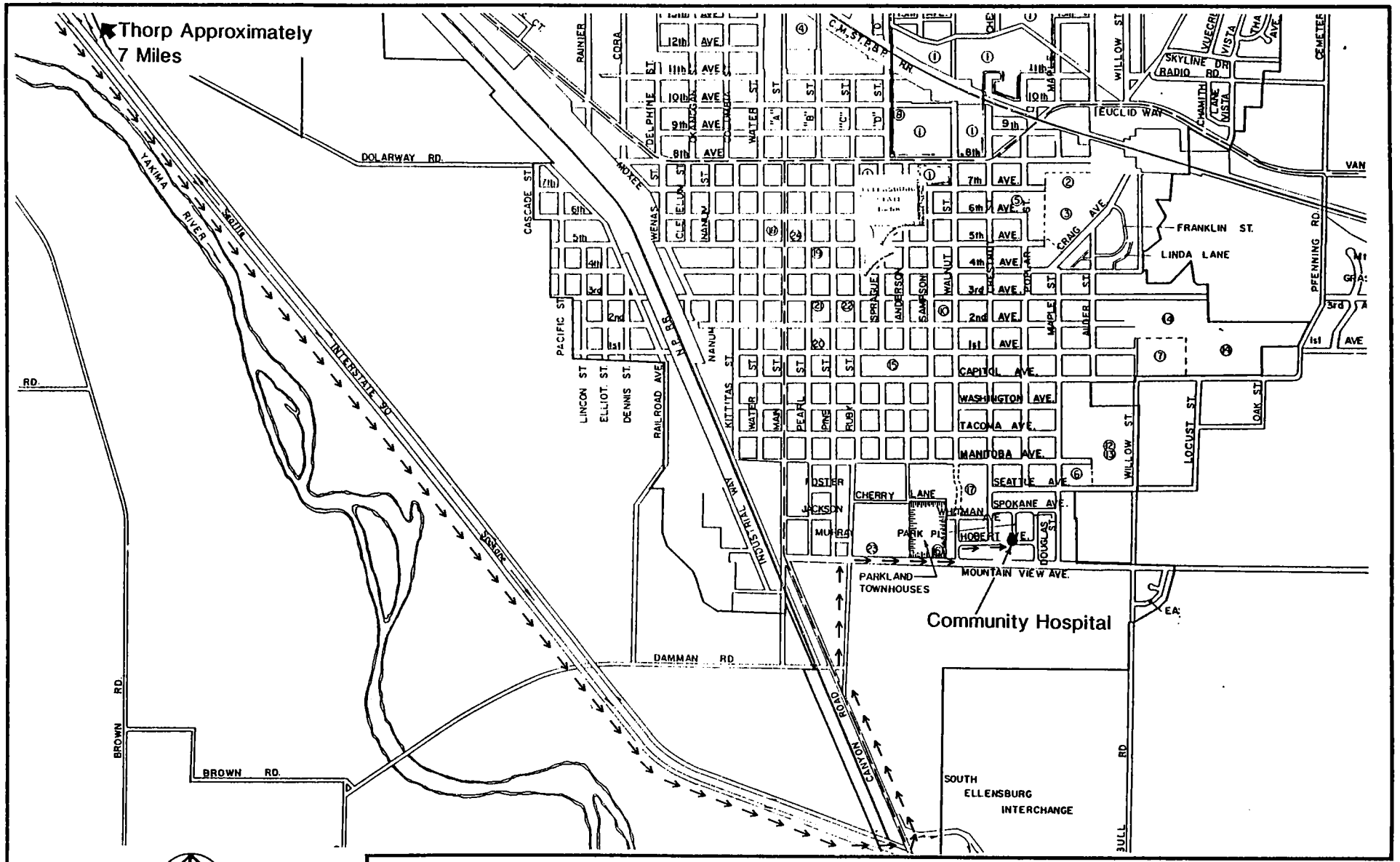
Emergency telephone numbers should be available and include the following:

Fire 911

Ambulance 911

Police 911

Poison Control Center 911



Reference: Map from Yakima Chamber of Commerce

Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Hospital Route Map

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE **1**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.003	SLB		3 Mar 92		

541914

3.0 HAZARD ASSESSMENT

3.1 CHEMICAL HAZARDS

AGI employees may be exposed to hazardous chemicals while observing, directing, and documenting investigation, removal, and remediation operations at the site. Exposure could be the result of contact with tank contents, contaminated soil, or contaminated water. The following products are considered potential contaminants at the site:

- Diesel fuels
- Gasoline (regular, unleaded, and supreme unleaded)
- Oils
- Chlorinated solvents

3.1.1 Gasoline Products

Gasoline product mixtures usually include benzene, ethylbenzene, hexane, toluene, and xylenes. Gasoline products may also contain cyclohexane, methyl tert butyl ether, and tetraethyl lead (leaded gasoline only). The most common routes of exposure for these compounds include inhalation and skin contact or absorption. Acute short-term inhalation of petroleum hydrocarbon concentrations up to 1,000 parts per million (ppm) may result in headache, dizziness, loss of appetite, weakness, loss of coordination, and upper respiratory tract irritation. Inhalation of vapor concentrations in excess of 5,000 ppm may result in loss of consciousness, coma, and death. Dermal contact may result in eye and skin irritation. Benzene is considered carcinogenic; therefore, exposure should be minimized.

3.1.2 Diesel Fuels

Constituents of diesel fuels usually include kerosene and light- to middle-weight distillates; some also contain naphthalene. The most common routes of exposure for diesel fuels include inhalation and skin contact or absorption. Prolonged inhalation may cause central nervous system effects, including headache, dizziness, loss of appetite, weakness, and loss of coordination. Prolonged skin contact may result in pain or a feeling of heat, discoloration, swelling, and blistering. Overexposure to naphthalene may result in fever, sweating, nausea, abdominal pain, diarrhea, lethargy, tremors, and convulsions. Toxicology tests reportedly indicate middle-weight distillates can cause skin cancer and mutagenic effects.

3.1.3 Oils

Oils usually contain heavy-weight distillates and additives. The most common route of exposure is skin contact, although no adverse effects are reportedly noted by dermal contact, inhalation, or ingestion. In general, no adverse chronic or acute health effects are suspected.

3.1.4 Chlorinated Solvents

The most common chlorinated solvents used as degreasers at service stations include trichloroethenes, trichloroethanes, tetrachloroethene, tetrachloroethanes, and carbon tetrachloride. Dermal contact, inhalation, and ingestion are considered the most common routes of exposure to chlorinated solvents. Prolonged dermal contact can cause dermatitis. Exposure to chlorinated solvents may cause hallucinations or distorted perceptions, motor activity changes, eye and skin irritation, irritability, nausea or vomiting, gastrointestinal disorders, and narcotic effects. Several chlorinated solvents are considered carcinogens; therefore, exposure to these compounds should be minimized.

3.1.5 General

Petroleum hydrocarbons are composed of over 200 constituents which tend to separate into four phases upon release: vapors, solubilized in water, adsorbed to soil, and floating on water. Ninety-five percent of the constituents dissolved in water are aromatic compounds and the constituents remaining in soil are usually paraffins and aromatics. Personnel will most likely be exposed to the "lighter" components (i.e., paraffins, aromatics, and olefins) as vapors in air.

Observable symptoms in site personnel are an indication that permissible exposure levels (PEL) are being exceeded. AGI personnel should leave the site and inform the AGI HSM, who should in turn reevaluate conditions at the site before allowing AGI personnel to reenter. Material Safety Data Sheets (MSDS) for common site contaminants are included in Attachment B. Product constituent and toxicology summaries are included in Tables 1 and 2, respectively.

3.2 FIRE AND EXPLOSION HAZARDS

The risk of fire or explosion exists during activities at UST sites. Certain gasoline products are considered extremely flammable. Diesel fuels are considered combustible liquids. Oils are generally considered nonflammable liquids.

A combustible gas meter should be utilized during field activities at sites where highly flammable or combustible products are suspected. If combustible gas meter readings indicate the Lower Explosive Level (LEL) has reached 20 percent in the general area, AGI personnel should inform the contractor and leave the site.

AGI personnel should not smoke or light open flames at UST sites. Electrical equipment used in hazardous areas should be of explosion-proof design. In addition, containers should be grounded and bonded while flammable liquids are transferred. If AGI personnel note these precautions are not being followed, they should notify the contractor and leave the site. In addition, AGI personnel should maintain a safe distance between themselves and excavation, drilling, and tank inerting activities.

3.3 OXYGEN DEFICIENCY HAZARDS

It is not expected that AGI employees will be exposed to oxygen deficient atmospheres during investigation, removal, or remediation activities at UST sites. Entry into a confined space is considered a last resort, requiring an addendum to the project-specific HASP. Confined spaces are considered to be any space having a limited means of exit, which is subject to the accumulation of toxic or flammable vapors, or has an oxygen deficient atmosphere. AGI personnel should not enter tanks, excavations, or trenches.

3.4 ELECTRICAL HAZARDS

AGI personnel should be aware of overhead powerlines located in the work area. If such lines are present, the contractor should be responsible for ensuring they are guarded, insulated, or turned off. In addition, the contractor should utilize a locate service to determine whether underground utilities are in the area prior to beginning excavation or drilling activities. Most state laws require a minimum 48-hour notice to utilities prior to the start of underground work. AGI personnel should be satisfied this notice has been given and utilities have been located. As a precautionary measure, AGI personnel should remain away from heavy equipment while it is in operation.

AGI personnel are responsible for ensuring AGI equipment and activities are adequately clear of utilities. Other site contractors are responsible for their own equipment and activities. AGI personnel should take particular care to never direct a contractor to act in an unsafe manner.

3.5 PHYSICAL HAZARDS

The principal site safety hazards are expected to be those associated with excavation, drilling, and heavy equipment movement. When equipment is being loaded and unloaded, AGI personnel should stand clear to prevent injuries in case the load falls. AGI personnel should be aware of moving equipment at sites and stay out of its way; particular attention should be given when backup alarms are sounding because operator visibility in the direction of travel may be decreased. AGI personnel should remain outside the swing radius and are not allowed to ride on the outside of heavy equipment. When required to approach heavy equipment, AGI personnel should first make eye contact with the operator.

Most trenches and excavations greater than 4 feet deep are considered confined spaces and should only be entered as a last resort and only after the required precautions have been taken. Work involving trenches and excavations should be performed in accordance with applicable regulations. In addition, AGI employees should stand no closer than 2 feet from the edge of an excavation or a distance equal to the depth measured horizontally from the bottom of the excavation, whichever is less.

Additional hazards during fieldwork can be a result of temperature extremes ranging from hypothermia to heat stress. Appropriate clothing and a heated rest area should be available if outside temperatures fall below 40°F for more than 2 hours. If symptoms of hypothermia (e.g., uncontrolled shivering, feeling disoriented, etc.) are noted, AGI personnel should stop working and seek warm shelter. Personnel performing physical labor while wearing protective clothing at temperatures above 70°F are subject to developing heat-related disorders. In this case, employee oral temperatures and radial pulse rates should be monitored hourly to ensure an adequate work-rest regimen is followed. If an employee's oral temperature exceeds 99.6°F or pulse rate exceeds 110 beats per minute, the next work cycle should be reduced by one third.

3.6 HAZARD ANALYSIS SUMMARY

AGI employees may be exposed to various potential hazards associated with investigation, removal, and remediation operations conducted at UST sites. The greatest likelihood of exposure to chemicals and fire hazards usually exists during initial excavation and tank inerting activities. Physical hazards, including contact with utilities, are usually the greatest during drilling and excavation activities. Hazards associated with work activities are summarized in Table 3.

Table 1
Product Constituent Summary
Project–Specific UST HASP
Bingo Fuel Stop
Thorp, Washington

Product Name	Constituent	Maximum Percentage (%)
Diesel Fuels	Distillates	Unknown
	Kerosene	Unknown
	Naphthalene	3.0
Gasoline (Regular)	Ethylbenzene	1.4
	Xylene (Total)	7.7
	Toluene	6.5
	Hexane	3.0
	Cyclohexane	2.4
	Methyl Tert Butyl Ether	15.0
	Benzene	4.9
	Tetraethyl Lead	2.0 (a)
Gasoline (Unleaded)	Ethylebenzene	1.4
	Xylene (Total)	7.7
	Toluene	6.5
	Hexane	3.0
	Cyclohexane	2.4
	Methyl Tert Butyl Ether	15.0
	Benzene	4.9
Gasoline (Supreme Unleaded)	Ethylebenzene	4.0
	Xylene (Total)	17.4
	Toluene	14.0
	Hexane	5.0
	Cyclohexane	2.4
	Methyl Tert Butyl Ether	15.0
	Benzene	4.9
Oils	Distillates	99.0
	Or	
	Lubricating Base Oil	
	Additives	1.0

Note:

(a) Measured as g/Gallon.

Table 2
Toxicology Summary
Project–Specific UST HASP
Bingo Fuel Stop
Thorp, Washington

Compound	OSHA TWA (ppm)	ACGIH TLV (ppm)	Routes of Exposure	Target Organs	Comments
Benzene	1	1(b)	INH, ING, DER, CON	Heart, CNS, Skin, Resp. SYS, EYES	Suspected Carcinogen
Cyclohexane	300	300	INH, ING, CON	Eyes, Resp. Sys., Skin, CNS	
Ethylbenzene	100	100	INH, ING, CON	Eyes, Upper Resp. Sys., Skin, CNS	
Hexane (N–Hexane)	50	50	INH, ING, CON	Skin, Eyes, Resp. Sys.	
Kerosene	NA	NA	ING, DER	CNS, GI Tract	
Methyl Tert Butyl Ether (Information Based on Ethers)	NA	NA	INH, ING, CON	CNS, Skin, Resp. Sys., Eyes	May Form Explosive Peroxides
Naphthalene	10	10	INH, ING, DER, CON	Eyes, Blood, Liver, Skin, Kidneys, RBC, CNS	
Tetraethyl Lead	0.075(skin, a)	0.1(skin, a)	INH, ING, DER, CON	CNS, CVS, Kidneys, Eyes	Skin Exposure
Toluene	100	100(c)	INH, ING, DER, CON	CNS, Liver, Kidneys, Skin	
Xylene (Total)	100	100	INH, ING, DER, CON	CNS, Eyes, GI Tract, Skin, Blood, Liver, Kidneys	

Notes:

OSHA – Occupational Safety And Health Administration
TWA – Time Weighted Average (Final Rule Limits)
ACGIH – American Council Of Governmental Industrial Hygienists
TLV – Threshold Limit Value
ppm – Parts per million
Skin – Potential significant contribution to overall exposure by the cutaneous route
(a) – measured as mg/cubic meter
(b) – notice to change TLV to 0.1 ppm
(c) – notice to change TLV to 50 ppm
INH – Inhalation
ING – Ingestion
DER – Dermal Absorption
CON – Skin and eye contact
CNS – Central nervous system
Resp. Sys. – Respiratory system
GI Tract – Gastrointestinal tract
RBC – Red blood cells

Table 3
Hazard Assessment Summary
Project–Specific UST HASP
Bingo Fuel Stop
Thorp, Washington

Phase of Work	Tasks	Hazards to Personnel	Control Measures For Personnel
Remove Underground Storage Tanks	Excavate and remove piping, etc.	Struck by moving equipment	Minimize personnel in area Maintain distance Back–up alarms functional Eye contact with operator before entering area
		Dermal contact with product	Dermal protection (gloves, etc.)
	Excavate to top of UST	Hit buried utilities/electrocution	Utilize locate service Maintain distance from overhead lines, guard, or turn off Maintain distance from equipment
		Struck by moving equipment	See above
		Fires or explosions	Maintain distance No smoking in area Prevent sparks
		Fall in excavation	Stay at least 2 feet from edge
		Breathing vapors	Stay upwind Engineering controls Wear respiratory protection
	Rinse and clean tank	Dermal contact with product	See above
		Breathing vapors	See above
		Confined space	Chevron personnel should not enter tank
	Inert tank	Breathing vapors	See above
		Explosive atmosphere in area	Maintain distance No smoking in area
	Remove tank	Falling under tank in excavation	Do not enter excavation Stay at least 2 feet from edge of open excavation
	Transport tank	Crushed by falling or rolling tank	Do not stand under or near tank Use cables for positioning
		Cables snapping	Inspect cables prior to use
Excavate Soil	Heavy equipment movement	Hit buried utilities/electrocution	See above
		Struck by moving equipment	See above
		Fires or explosions	See above
		Fall in excavation	See above
		Breathing vapors	See above

Table 3
Hazard Assessment Summary
Project–Specific UST HASP
Bingo Fuel Stop
Thorp, Washington

Phase of Work	Tasks	Hazards to Personnel	Control Measures For Personnel
Excavate Soil (continued)	Collect soil samples	Excavation cave–in	Do not enter excavation Proper sloping or shoring
		Lack of oxygen in excavation	Do not enter excavation Air monitoring/use supplied–air respiratory protection
		Dermal contact with product	See above
Restore Site	Backfill excavation	Struck by moving equipment	See above
		Electrocution	See above
	Soil compaction and testing	Struck by moving equipment	See above
	Replace asphalt, concrete, etc.	Breathing vapors	See above
		Contact with wet cement	Dermal protection
Extract, Treat, and Dispose of Groundwater and/or Vapors	Unload equipment	Crushed by falling equipment	See above
		Cables snapping	See above
		Struck by moving equipment	See above
	Drill, install, and develop wells	Block failure/rig tipping	Maintain distance
		Cable breaking	Maintain distance
		Contact with overhead utility lines	See above
		Pinches and cuts	Maintain distance Wear gloves No loose clothing, hair, etc.
		Eye injuries	Maintain distance Wear safety glasses/splash shield
		Noise	Maintain distance Hearing protection
		Fire or explosion	See above
		Breathing vapors	See above
	Drill and install vapor ext. points	See drilling wells above	See above
	Install treatment system	Crushed by falling equipment	See above
		Cables snapping	See above
		Slips, trips, cuts, etc.	Maintain distance Wear proper foot protection

Table 3
Hazard Assessment Summary
Project–Specific UST HASP
Bingo Fuel Stop
Thorp, Washington

Phase of Work	Tasks	Hazards to Personnel	Control Measures For Personnel
Extract, Treat, and Dispose of Groundwater and/or Vapors (continued)	System start–up	Breathing vapors	See above
		Chemical contact due to leaks	Maintain distance Dermal and eye protection
	Discharge treated water and air	Physical hazards from water under high pressure	Maintain distance Eye and face protection
	System performance monitoring	Breathing vapors/system failure	See above
		Slips, trips, and falls	Wear proper foot protection Utilize fall protection if working at heights
Soil Treatment or Removal	Screen excavated soil	Breathing vapors	See above
		Eye injuries	See above
		Pinches and cuts	See above
		Noise	See above
	Treat soil	Struck by moving equipment	See above
		Breathing vapors	See above
	Till soil	Struck by moving equipment	See above
		Breathing vapors	See above
		Noise	See above
	Load and haul soil	Struck by moving equipment	See above
		Electrocution	See above
		Dump trucks tipping over	Maintain distance/do not stand next to truck while unloading
	Collect soil samples	Breathing vapors	See above
		Contact with contaminants	See above
		Slips and trips	Wear proper foot protection Stay off treatment pad
Pilot Test	VES tests	Breakthrough/breathing vapors	See above
		Falling from heights	Wear fall protection Tie ladders
	Pump tests	Dermal contact	See above
		Eye injuries	See above
	Soil treatment tests	Breathing vapors	See above
		Dermal contact with product	See above
		Slips and trips	See above

4.0 SITE CONTROL

4.1 WORK ZONES

Contractors should establish exclusion zones at UST sites; therefore, AGI personnel should check with the contractor concerning the location of the exclusion zone before entering the site. If the contractor has not established work zones at the site, the AGI representative should designate such zones for use by AGI employees. Only AGI personnel meeting training and medical surveillance requirements described in Sections 8.0 and 9.0, respectively, are eligible to enter exclusion zones.

Generally, exclusion zones are established around potentially hazardous areas, including drilling operations, excavations, soil treatment areas, open groundwater monitoring wells, and treatment systems. The size of the exclusion zone depends on weather conditions and site operations.

A contamination reduction zone should be established outside and adjacent to each exclusion zone. This zone is used as a transition area and for decontamination activities. Decontamination should take place upwind from the exclusion zone.

The remaining areas of a site are referred to as the support zone. This zone is considered "clean" and is used for support facilities, including office areas, vehicle parking, employee rest areas, etc.

4.2 DECONTAMINATION PROCEDURES

Contractors should have established decontamination procedures to prevent contaminated materials from migrating from exclusion zones. If the contractor has not established decontamination procedures at a site, the AGI representative should implement such procedures for AGI employees. Generally, decontamination procedures consist of the following:

- Personnel: At the end of each work day (or before lunch breaks), AGI personnel should wash, rinse, and dispose of non-reusable equipment. Reusable equipment should be thoroughly cleaned and properly stored for the next use. Coveralls should be placed in the laundry bag at AGI for pickup by the dry cleaning service. Personnel should also wash their hands and face before eating, and should shower as soon after leaving the site as possible.

- Sampling Equipment: Sampling equipment should be decontaminated after use, before returning it to the AGI equipment storage room. Samples and sample coolers should be wiped down to prevent laboratory personnel from contacting contaminated soil or groundwater.

4.3 MINIMIZATION OF CONTACT

AGI personnel should minimize contact with contaminated soil and groundwater. This may be accomplished by remaining upwind as much as possible, walking around excavated soil, using plastic as a barrier on sampling and air monitoring equipment, etc.

4.4 GENERAL SAFE WORK PRACTICES

- A 10-unit first aid kit, eyewash kit, and at least one fire extinguisher rated for class B fires should be available to AGI personnel.
- Work should take place during daylight hours unless adequate lighting is provided in the work area.
- Eating, drinking, smoking, and chewing gum or tobacco are prohibited except in designated areas. These areas must be located outside exclusion zones and contamination reduction zones.
- AGI personnel should <u>not</u> ignite flammable liquids or start open flames at UST sites.
- Contact lenses should not be worn while working in an exclusion zone. In the rare case that glasses cannot be worn, vapor-proof goggles may be worn over contact lenses.

5.0 PERSONNEL PROTECTION

5.1 GENERAL

This section describes the personal protective equipment (PPE) that should be worn by AGI personnel at UST sites. Appropriate PPE is determined based on information in Sections 2.0 and 3.0.

5.2 EXCLUSION ZONES AND CONTAMINATION REDUCTION ZONES

The following PPE should be worn by AGI personnel working within exclusion zones and contamination reduction zones:

- Head protection: Hard hats should be worn.
- Eye and face protection: Safety glasses should be worn, except with full-face respirators. Face shields should also be worn when there is a high splash potential.
- Foot protection: Steel toe and shank work boots should be worn. Work boots should be made of rubber, or "nuke booties" may be worn over leather boots.
- Skin protection: Cotton coveralls should be worn. If direct contact with material containing petroleum hydrocarbons is expected, tyvek coveralls should also be worn. If the probability of being splashed or coming in contact with wet materials is high, personnel should wear PVC rainsuits or saranax-coated tyvek.
- Hand protection: During activities with potential contact to contaminated soil and groundwater, personnel should wear two pair of chemically protective gloves. An inner surgical-type glove should be worn to lessen the chance of cross contamination during decontamination activities. Outer gloves should be made of neoprene, nitrile, or a mixture of these (e.g., trionic). If necessary, heavy-duty work gloves may also be worn. If work gloves are worn over chemically protective gloves, they should be considered disposable. Alternatively, heavy work gloves may be worn under chemically protective gloves.
- Respiratory protection: AGI personnel should stay upwind during site operations as much as possible to limit the potential for overexposure situations. If air monitoring conducted in the breathing zone indicates organic vapor concentrations are reaching the action levels (see Section 6.2), additional engineering and administrative controls may be necessary to minimize exposure to AGI employees.

If vapor levels cannot be controlled and AGI personnel must stay in the area, they should wear NIOSH-approved, properly fitted air-purifying respirators. Respirators should be equipped with combination organic vapor and high efficiency particulate and aerosol (OV-HEPA) cartridges. Cartridges should be changed a minimum of once per day or more often if breathing becomes difficult.

5.3 SUPPORT ZONES

AGI personnel working in support zones are not required to wear chemically protective clothing or respirators. For operations in these areas, regular work clothing should provide adequate protection. However, hard hats, safety glasses, and steel-toe boots should be worn if heavy equipment operations are progressing in the area.

6.0 AIR MONITORING AND SAMPLING

6.1 GENERAL

During operations having a high potential for airborne chemical exposure, air monitoring and sampling is conducted to document exposure levels and assure precautions are taken to protect AGI personnel. Air monitoring should be conducted using either a photoionization detector (PID) or flame ionization detector (FID). Monitoring and sampling equipment should be calibrated daily in accordance with the manufacturer's requirements. Calibration data, wind direction, background readings, air monitoring readings, and air sampling information should be recorded as part of the daily field logs.

6.2 AIR SAMPLING

Air sampling is performed by AGI to document exposure of AGI personnel to benzene and total petroleum hydrocarbons (TPH). Organic vapor diffusion badges (OVD badges) or a charcoal tube and pump assembly is utilized to conduct air sampling. Upon sampling completion, the sample media is collected and sealed, exposure times recorded, and the sample media sent to an independent laboratory certified to perform industrial hygiene analysis.

For personnel sampling, the sample media is placed within 1 foot of the individuals' nose and exposed 8 to 10 hours. Sample media may be exposed shorter durations if personnel leave the exclusion zone. Personnel air samples are analyzed for benzene by National Institute for Occupational Safety and Health (NIOSH) Reference Method 1501 and for TPH by NIOSH Reference Method 1500. Additional air sampling may be performed at the discretion of the AGI PM, but should include sites near residential areas and schools or sites potentially contaminated with substances for which air sampling has not previously been conducted.

A minimum of five air samples have been collected at various project locations during different phases of site operations. Analytical results received from these samples indicate no exposures to benzene above the PEL of 1 ppm measured as an 8-hour Time Weighted Average (TWA) at any site.

6.3 AIR MONITORING

Air monitoring is conducted at UST sites during operations having a potential for generating volatile organic compounds (i.e., excavating and tank inerting). Breathing zone organic vapor concentrations are measured a minimum of five times during the work day. An employee's breathing zone is considered to encompass a 1-foot radius around his/her nose during normal operations. Breathing zone air monitoring is conducted on a random basis for each AGI employee present at a site. Additional air monitoring may be conducted at the discretion of the PM.

Personnel action levels for organic vapors were established with particular attention given to the percent benzene, ethylbenzene, toluene, and total xylene (BETX) composition of potential products because it was assumed these would be the only constituents monitored by a PID or FID. Consideration was also given to the percent benzene of the BETX mixture because benzene has the lowest PEL. Benzene reportedly accounts for up to 25 percent of the BETX mixture. It was assumed the percentage of each BETX compound would remain constant relative to the others over time and weathering (i.e., even though the overall percentage of BETX compounds in the soil may change, the percent benzene of this mixture would remain constant) and all BETX compounds would volatilize at the same rate. Based on these assumptions, the benzene PEL could be reached when total organic vapor concentrations measured reach 4 ppm in the breathing zone. The personnel organic vapor action level is a sustained (5 minutes) reading of 4 ppm greater than background, measured in the breathing zone with a PID or FID.

If the personnel organic vapor action level is reached, AGI personnel should don respiratory protection. Colorimetric tubes may be utilized to determine the presence and concentration of benzene in the breathing zone. If colorimetric tubes indicate the benzene concentration has reached 1 ppm, AGI personnel should implement engineering controls or continue to wear half-face respirators; if benzene concentrations exceed 10 ppm, additional engineering controls should be implemented or full-face respirators should be worn; and if benzene concentrations exceed 50 ppm, AGI personnel should leave the site.

If air monitoring indicates breathing zone organic vapor concentrations greater than 150 ppm (1/2 the TLV for gasoline products) but no benzene concentrations are detected, engineering controls should be implemented or AGI personnel should wear half-face respirators. At concentrations greater than 300 ppm, AGI personnel should upgrade to full-face respirators; at concentrations greater than 1,000 ppm, AGI personnel should leave the site. Additional engineering controls may be implemented to lower organic vapor concentrations below the established action levels for upgrading to full-face respirators or leaving the site.

Combustible gas monitoring should be conducted when organic vapor meter (OVM) readings exceed 2,000 ppm (i.e., approximately 15 percent of the LEL for gasoline) near work operations (outside the breathing zone) to prevent AGI personnel from working in a potentially explosive atmosphere. The combustible gas action level considered to be the industry standard is 20 percent of the LEL. If 20 percent of the LEL is measured near a work operation, AGI personnel should leave the area. AGI personnel may reenter the area when measured explosive levels fall below 10 percent of the LEL.

The action levels discussed above were determined to be sufficient based on a comparison of air sampling analytical results to air monitoring readings obtained using a PID or FID during the sampling time. Action levels may be altered as additional information is obtained. AGI employees are instructed to stay outside the exclusion zone or upwind as much as possible. Such work practices will minimize the potential for exposures above the established PEL.

7.0 EMERGENCY PROCEDURES

Emergency response procedures have been developed for extraordinary events that could occur during operations at the site. These events include accidents, chemical exposures, fires, and spills.

In general, the following actions should be implemented in the event of an emergency:

- First aid or other appropriate initial action should be administered by those closest to the accident or event. This assistance should be conducted so those rendering assistance are not placed in a situation of unacceptable risk.
- The AGI PM and HSM should be contacted.
- If an AGI employee is injured, an AGI Supplementary Record of Occupational Injuries and Illnesses Form should be completed and forwarded to the PM and HSM. Any necessary changes to the operation should be made to prevent the same accident or event from occurring in the future.

7.1 ACCIDENTS AND INJURIES

The following procedures should not be considered inflexible. Every accident presents a unique event that should be dealt with by trained personnel working in a calm, controlled manner. In the event of an accident or unusual event, the primary consideration is to provide the appropriate initial response to assist those in jeopardy without placing additional personnel at unnecessary risk.

7.1.1 Accident or Injury in an Exclusion Zone

If a person working in an exclusion zone is physically injured, Red Cross first aid procedures should be followed. Depending on the severity of the injury, emergency medical response may be sought. If the person can be moved, they should be taken to the edge of the work area where PPE may be decontaminated and removed (if necessary), emergency first aid administered, and transportation to an emergency medical facility awaited.

7.1.2 Accident or Injury Outside an Exclusion Zone

The procedures above should be followed with the exception that the injured individual should not be moved.

7.2 CHEMICAL EXPOSURES

If the injury is chemical in nature, the following first aid procedures should be followed:

7.2.1 Eye Exposure

If solid or liquid enters the eyes, they should be flushed with large amounts of clean water while lifting the upper and lower eye lids occasionally. Medical attention should be obtained.

7.2.2 Skin Exposure

If contaminated material contacts the skin, the affected area should be washed with soap and water. If the materials penetrate clothing or protective equipment, the items should be removed and the affected skin areas washed. Medical attention should be obtained if symptoms warrant.

7.2.3 Inhalation

If a person breathes a large volume of potentially toxic vapors, he/she should be moved to fresh air. If breathing has stopped, artificial respiration should be performed. Medical attention should be obtained.

7.2.4 Ingestion

If contaminated material is swallowed, medical attention should be obtained and a poison control center contacted for further instructions.

7.3 FIRES

Fire extinguishers should be available on site and in vehicle cabs. In the case of a fire at a site, the following actions should be taken:

- Evacuate personnel from the area, preferably to an upwind location.
- Notify the local fire department and emergency response agencies.
- Attempt to extinguish the fire using portable fire extinguishers or by smothering (ONLY IF SMALL).
- Notify the AGI PM and HSM.

7.4 SPILLS

The primary considerations during a hazardous materials spill are to ward off unsuspecting personnel, contain existing spillage, and prevent further spillage. In the event of a spill of stored material (except potable water) the following actions should be taken:

- Evacuate personnel from the area.
- Summon local emergency medical or fire services if the spill involves extremely toxic or flammable materials.

- Contain the spill with absorbent booms, etc. and block off the area. Drains, sewers, etc. should be blocked to prevent material from migrating from the site.
- Attempt to stop the flow of material from the container.
- Notify the AGI PM and HSM.

7.5 EMERGENCY SERVICES

The SSO should locate the nearest telephone prior to entering the site. In the case of an on-site emergency or injury requiring outside services (e.g., ambulance, fire, etc.), field personnel should telephone the emergency medical system at 911. If medical attention is needed but the situation is not an emergency, the injured employee may be transported by other field personnel to the medical facility identified in Section 2.5.

7.6 EMERGENCY NOTIFICATION SYSTEM

Generally, emergency notification is given by an air horn or car horn. The following signals are considered standard:

- One Long Blast - Warning; personnel should give necessary aid, prepare to evacuate, and await further instructions.
- Two Long Blasts - Evacuate; all personnel should evacuate the area.
- Three Long Blasts - All Clear; personnel may reenter the site.

8.0 TRAINING REQUIREMENTS

AGI employees observing, directing, and documenting work at the site should have received training in accordance with WAC 296-62, Part P regulations. This training includes the following topics:

- Names of personnel and alternates responsible for the safety and health of AGI employees and accident reporting procedures.
- Safety, health, and potential hazards at UST sites, including chemical hazards and benzene exposure.
- Use of personal protective equipment, including the use of respirators and a fit test.
- Additional work practices and engineering controls that should be followed to minimize the potential risks present at UST sites, including excavation and confined space hazards.
- Medical surveillance requirements.
- Recognition of symptoms and signs which may indicate overexposure to hazardous chemicals.
- Site control measures including work zones, decontamination procedures, emergency response procedures, and spill containment procedures.

AGI personnel should review this project-specific HASP and sign the Field Team Review Form included in Attachment C prior to commencing fieldwork at the site.

9.0 MEDICAL SURVEILLANCE REQUIREMENTS

AGI employees observing, directing, and documenting operations at the site should participate in the Medical Surveillance Program. Medical surveillance examinations are required for employees potentially exposed to chemicals at concentrations greater than the respective PEL more than 30 times per year, employees who wear respirators more than 30 times per year, and employees who are injured, become ill, or develop signs or symptoms due to potential overexposure.

Direct hire and new employees are given a baseline physical and current employees are up-to-date with respect to their annual exam. The examining physician verifies whether individuals are fit to work at hazardous waste sites and utilize protective equipment, including respirators.

Additional medical exams are given if overexposure to petroleum hydrocarbons or an injury occurs. In addition, exit physicals are required upon an employee's termination. Exit exams are performed at the discretion of the examining physician if the previous exam was conducted less than six months prior.

The AGI Medical Surveillance Program is administered by a physician board certified in Occupational Medicine. The occupational physician determines the content of medical examinations, but the physicals include, at a minimum, a detailed work history, head to toe examination, pulmonary function test, audiogram, vision acuity test, blood work, and a urinalysis. Documentation of the Medical Surveillance Program is maintained by the AGI HSM.

10.0 HASP MODIFICATIONS

This project-specific HASP should be reviewed and amended, if necessary, whenever:

- Applicable regulations are revised.
- Additional information concerning site hazards, operations, personnel, emergency services, etc. is obtained.
- Site operations are revised.

When this project-specific HASP is revised, personnel should review the changes and file a new Field Team Review Form with the AGI HSM.

ATTACHMENT A

AGI Supplementary Record of Occupational Injuries and Illnesses

Applied Geotechnology Inc.

SUPPLEMENTARY RECORD OF OCCUPATIONAL INJURIES AND ILLNESSES FORM

CASE NO: _____

THIS IS AN OFFICIAL DOCUMENT--BE THOROUGH AND ACCURATE

This section to be completed by injured employee or witness:

Employer Name: Applied Geotechnology Inc.

Employer Address: 300 120th Avenue N.E., Bellevue, WA 98005

Project Name/Location: _____

Date of Accident/Incident: _____ Time: _____

Was place of accident/incident on employer's premises? Yes( ) No( )

Employee Name: _____

Employee Home Address: _____

Social Security Number: _____ Age: _____ Sex: M( ) F( )

Occupation/Department: _____

What was being done at time of accident/incident? _____

_____

How did the accident/incident occur? _____

_____

Employee Signature: _____ Date: _____

This section to be completed by the Project Manager/Supervisor:

Time reported: _____ Did employee leave work? _____ When: _____

Date & time returned: _____

Nature of injury: _____ Exact body part affected: _____

Check one: Near Miss( ) First Aid( ) Doctor( ) Hospitalized( )

Doctor/Hospital Name: _____ Address: _____

Why did accident/incident occur? _____

What corrective action has been initiated to prevent recurrence? _____

_____

Project Manager/Supervisor Signature: _____ Date: _____

SUPPLEMENTARY RECORD OF OCCUPATIONAL INJURIES AND ILLNESSES FORM (CONTINUED)

CASE NO: _____

THIS IS AN OFFICIAL DOCUMENT--BE THOROUGH AND ACCURATE

This section to be completed by Health and Safety Manager:

Concur with action taken? Yes( ) No( ) Remarks: _____

_____

_____

_____

Health and Safety Manager Signature: _____ Date:_____

ATTACHMENT B

Material Safety Data Sheets (MSDS)

Chevron

Material Safety Data Sheet

CHEVRON Supreme Unleaded Gasoline CPS201060

APPLIED GEOTECHNOLOGY, INC
ATTN: MONICA BECKMAN
300 120TH AVE. NE
BELLEVUE, WA 98005

Print Date: January 03, 1992

This Material Safety Data Sheet contains environmental, health and toxicology information for your employees. Please make sure this information is given to them. It also contains information to help you meet community right-to-know/emergency response reporting . requirements under SARA Title III and many other laws. If you resell this product, this MSDS must be given to the buyer or the information incorporated in your MSDS. Discard any previous edition of this MSDS.

Revised for indexing purposes only. No changes have been made to this Material Safety Data Sheet.

1. PRODUCT IDENTIFICATION

CHEVRON Supreme Unleaded Gasoline

DANGER!
- HARMFUL OR FATAL IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE
- VAPOR HARMFUL
- LONG-TERM EXPOSURE TO VAPOR HAS CAUSED CANCER IN LABORATORY ANIMALS
- MAY CAUSE EYE AND SKIN IRRITATION
- EXTREMELY FLAMMABLE
- KEEP OUT OF REACH OF CHILDREN

PRODUCT NUMBER(S): CPS201060
PRODUCT INFORMATION: (800)582-3835

Prepared According to the OSHA Hazard Communication Standard (29 CFR 1910.1200) by the Chevron Environmental Health Center, Inc., P.O. Box 4054, Richmond, CA 94804.

2. FIRST AID - EMERGENCY NUMBER (800)457-2022 OR (510)233-3737

EYE CONTACT:
Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. No additional first aid should be necessary. However, if irritation persists, see a doctor.
SKIN CONTACT:
No first aid procedures are required. As a precaution, wash skin thoroughly with soap and water. Remove and wash contaminated clothing.
INHALATION:
If respiratory irritation or any signs or symptoms as described in this document occur, move the person to fresh air. If any of these effects continue, see a doctor.
INGESTION:
If swallowed, give water or milk to drink and telephone for medical advice. DO NOT make person vomit unless directed to do so by medical personnel. If medical advice cannot be obtained, then take the person and product container to the nearest medical emergency treatment center or hospital. Note to Physician: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

3. IMMEDIATE HEALTH EFFECTS - (ALSO SEE SECTIONS 11 & 12)

EYE CONTACT:
This substance is slightly irritating to the eyes and could cause prolonged (days) impairment of your vision. The degree of the injury will depend on the amount of material that gets into the eye and the speed and thoroughness of the first aid treatment. Signs and symptoms may include pain, tears, swelling, redness, and blurred vision. Eye contact with the vapors, fumes, or spray mist from this substance could also cause similar signs and symptoms.
SKIN IRRITATION:
Prolonged or frequently repeated contact may cause the skin to become cracked or dry from the defatting action of this material.
DERMAL TOXICITY:
If absorbed through the skin, this substance is considered practically non-toxic to internal organs.
RESPIRATORY/INHALATION:
This substance is slightly toxic to internal organs if inhaled. The degree of injury will depend on the airborne concentration and duration of exposure. The target organ(s) is the nervous system. Inhalation of gasoline vapor at airborne concentrations exceeding 1000 ppm may cause signs and symptoms of central nervous system effects such as headache, dizziness, loss of appetite, weakness and loss of coordination. Vapor concentrations in excess of 5000 ppm may cause loss of consciousness, coma and death. Brief exposures to high vapor concentrations may also cause pulmonary edema and bronchitis. Intentional exposures to excessively high

concentrations (e.g., when used as a drug of abuse) have been reported to result in clinical manifestations that may include convulsions, delirium, and hallucinations. These manifestations are not known to occur following accidental inhalation of gasoline vapor during normal operations.

INGESTION:

This substance is slightly toxic to internal organs if swallowed. The degree of injury will depend on the amount absorbed from the gut. The target organ(s) is the nervous system. Signs and symptoms of central nervous system effects may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. Because of the low viscosity of this substance, it can directly enter the lungs if it is swallowed (this is called aspiration). This can occur during the act of swallowing or when vomiting the substance. Once in the lungs, the substance is very difficult to remove and can cause severe injury to the lungs and death.

4. PROTECTIVE EQUIPMENT

EYE PROTECTION:

Do not get this material in your eyes. Eye contact can be avoided by wearing chemical goggles.

SKIN PROTECTION:

No special skin protection is usually necessary. Avoid prolonged or frequently repeated skin contact with this material. Skin contact can be minimized by wearing protective clothing.

RESPIRATORY PROTECTION:

No special respiratory protection is normally required. However, if operating conditions create airborne concentrations which exceed the recommended exposure standards, the use of an approved respirator is required. Refer to the OSHA Benzene Standard to determine what type of respirator is required based on exposure levels.

VENTILATION:

Use this material only in well ventilated areas.

5. FIRE PROTECTION

FLASH POINT: (P-M) < -49F (-45C)

AUTOIGNITION: NDA

FLAMMABILITY LIMITS (% by volume in air): Lower: 1.4 Upper: 7.6

EXTINGUISHING MEDIA:

Fire Fighting Foams: Alcohol Resistant Type (AR)

AFFF, CO_2, Dry Chemical.

NFPA RATINGS: Health 1; Flammability 3; Reactivity 0; Special NDA; (Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association or, if applicable, the National Paint and Coating Association, and do not necessarily reflect the hazard evaluation of the Chevron Environmental Health Center. Read the entire document and label before using this product.

FIRE FIGHTING PROCEDURES:

This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches.

For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire document.

COMBUSTION PRODUCTS:
Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

6. STORAGE, HANDLING, AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:
NDA.
STABILITY:
Stable.
HAZARDOUS POLYMERIZATION:
Polymerization will not occur.
INCOMPATIBILITY:
May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
SPECIAL PRECAUTIONS:
Never siphon gasoline by mouth. READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL. Use only as a motor fuel. Do not use for cleaning, pressure appliance fuel, or any other such use. DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed. DO NOT TRANSFER LIQUID TO AN UNLABELED CONTAINER. DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

7. PHYSICAL PROPERTIES

SOLUBILITY: Soluble in hydrocarbons; insoluble in water.
APPEARANCE: Red liquid.
BOILING POINT: 25 - 225C (Variable)
MELTING POINT: NA
EVAPORATION: NDA
SPECIFIC GRAVITY: 0.7 - 0.8
VAPOR PRESSURE: 5 - 15 PSI (max.) @ 100F (Variable)
PERCENT VOLATILE (VOLUME %): 99+%
VAPOR DENSITY (AIR=1): 3-4

8. ENVIRONMENTAL CONCERNS, SPILL RESPONSE AND DISPOSAL

CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300 (24 hour).
SPILL/LEAK PRECAUTIONS:
Eliminate all sources of ignition in vicinity of spill or released vapor.

Clean up spills immediately, observing precautions in Protective Equipment section. This material is considered to be a water pollutant and releases of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.

U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

DISPOSAL METHODS:
Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

9. EXPOSURE STANDARDS, REGULATORY LIMITS AND COMPOSITION

COMPOSITION COMMENT:
All the components of this material are on the Toxic Substances Control Act Chemical Substances Inventory.

The percent compositions are given to allow for the various ranges of the components present in the whole product and may not equal 100%.

PERCENT/CAS#	COMPONENT/REGULATORY LIMITS
100.0 %	CHEVRON Supreme Unleaded Gasoline
CONTAINING	
100.0 %	GASOLINE (GENERIC) 300ppm ACGIH TLV 500ppm ACGIH STEL 300ppm OSHA TWA 500ppm OSHA STEL
	INCLUDING
< 4.0 %	ETHYLBENZENE
CAS100414	A toxic chemical subject to the reporting requirements of

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
125ppm ACGIH STEL
100ppm OSHA TWA
125ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 4.3 % XYLENE-P
CAS106423 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
150 ppm ACGIH STEL
CERCLA 302.4 RQ=1000 POUNDS

< 8.8 % XYLENE-M
CAS106383 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 4.3 % XYLENE-O
CAS95476 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 14.0 % TOLUENE
CAS108883 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
300 ppm OSHA CEILING
CERCLA 302.4 RQ=1000 POUNDS

< 5.0 % HEXANE
CAS110543 50ppm ACGIH TLV
1000 ppm ACGIH STEL
50ppm OSHA TWA

< 2.4 % CYCLOHEXANE
CAS110827 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and

Reauthorization Act of 1986 and 40 CFR Part 372.
300ppm ACGIH TLV
300ppm OSHA TWA
CERCLA 302.4 RQ=1000 POUNDS

< 15.0 % METHYL TERT BUTYL ETHER
CAS1634044 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

< 4.9 % BENZENE
CAS71432 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
10ppm ACGIH TLV
1ppm OSHA TWA
5ppm OSHA STEL
25 ppm OSHA CEILING
CERCLA 302.4 RQ=10 POUNDS

Refer to the OSHA Benzene Standard (29 CFR 1910.1028) for detailed training, exposure monitoring, respiratory protection and medical surveillance requirements before using this product.

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	TPQ - Threshold Planning Quantity
RQ - Reportable Quantity	CPS - CUSA Product Code
CC - Chevron Chemical Company	CAS - Chemical Abstract Service Number

10. REGULATORY INFORMATION

DOT basic descriptions can vary based on package quantity and may not coincide with international description requirements. Consult the Hazardous Materials Regulations in 49CFR and the appropriate Dangerous Goods Regulations to confirm description applicability to specific shipments.

DOT SHIPPING NAME: GASOLINE
DOT HAZARD CLASS: FLAMMABLE LIQUID
DOT IDENTIFICATION NUMBER: UN1203

SARA 311 CATEGORIES:
1. Immediate (Acute) Health Effects; YES
2. Delayed (Chronic) Health Effects; YES
3. Fire Hazard; YES
4. Sudden Release of Pressure Hazard; NO
5. Reactivity Hazard; NO

The following components of this material are found on the regulatory lists indicated by the number below the component name:

ETHYLBENZENE
is found on lists: 01,02,10,11,12,13,14,15,17,18,26,28,

XYLENE-P
is found on lists: 01,02,10,11,12,15,26,28,
XYLENE-M
is found on lists: 01,02,10,11,12,14,15,17,18,26,28,
TOLUENE
is found on lists: 01,02,04,10,11,12,13,14,15,17,18,26,28,29,
HEXANE
is found on lists: 02,10,11,13,14,15,17,28,
CYCLOHEXANE
is found on lists: 01,02,10,11,12,13,14,17,26,28,
METHYL TERT BUTYL ETHER
is found on lists: 01,10,11,21,24,26,
BENZENE
is found on lists: 01,02,03,04,06,10,11,12,13,14,17,18,20,28,29,
XYLENE-O
is found on lists: 01,02,10,11,12,14,15,17,18,26,28,
GASOLINE (GENERIC)
is found on lists: 04,08,14,15,17,18,20,

REGULATORY LISTS SEARCHED:

01=SARA 313	02=MASS RTK	03=NTP Carcinogen
04=CA Prop. 65	05=MI 406	06=IARC Group 1
07=IARC Group 2A	08=IARC Group 2B	09=SARA 302/304
10=PA RTK	11=NJ RTK	12=CERCLA 302.4
13=MN RTK	14=ACGIH TLV	15=ACGIH STEL
16=ACGIH Calculated TLV	17=OSHA TWA	18=OSHA STEL
19=Chevron TLV	20=EPA Carcinogen	21=TSCA Sect 4(e)
22=TSCA Sect 5(a)(e)(f)	23=TSCA Sect 6	24=TSCA Sect 12(b)
25=TSCA Sect 8(a)	26=TSCA Sect 8(d)	28=Canadian WHMIS
29=OSHA CEILING		

11. PRODUCT TOXICOLOGY DATA

EYE IRRITATION:
The Draize Eye Irritation Score (range, 0-110) in rabbits is 0.
SKIN IRRITATION:
The Draize Skin Primary Irritation Score (range, 0-8) for a 4-hour exposure (rabbits) is 0.98. This material was not a skin sensitizer in the modified Buehler Guinea Pig Sensitization Test.
DERMAL TOXICITY:
The dermal LD50 in rabbits is > 5 ml/kg.
RESPIRATORY/INHALATION:
No product toxicology data available.
INGESTION:
The oral LD50 in rats is > 5 ml/kg.
ADDITIONAL TOXICOLOGY DATA:
Lifetime inhalation of whole gasoline vapor has caused increased liver tumors in female mice. The mechanism of this response is still being investigated but it is thought to be an epigenetic process unique to the female mouse. Inhalation exposure to whole gasoline vapor also caused kidney damage and eventually kidney cancer in male rats. No other animal

model studied has shown these adverse kidney effects and there is no physiological reason to believe that they would occur in man.

The data above is obtained from studies sponsored by the American Petroleum Institute (API).

12. ADDITIONAL HEALTH DATA

ADDITIONAL HEALTH DATA COMMENT:
This product contains benzene. The OSHA Benzene Standard (29 CFR 1910.1028) contains detailed requirements for training, exposure monitoring, respiratory protection and medical surveillance triggered by the exposure level. Refer to the OSHA Standard before using this product. Repeated or prolonged breathing of benzene vapors has been associated with the development of chromosomal damage in experimental animals and various blood diseases in humans ranging from aplastic anemia to leukemia (a form of cancer). All of these diseases can be fatal. No birth defects have been shown to occur in pregnant laboratory animals exposed to doses not toxic to the mother. However, some evidence of fetal toxicity such as delayed physical development has been seen at such levels. The available information on the effects of benzene on human pregnancies is inadequate but it has been established that benzene can cross the human placenta.

This product contains n-hexane. Prolonged or repeated skin contact or breathing of vapors may cause nerve damage characterized by progressive weakness and numbness in the arms and legs. Recovery ranges from no recovery to complete recovery depending upon the severity of the nerve damage.

This product contains toluene. Toluene has been reported to decrease immunological responses in test animals. It has also been reported that when young rats were exposed to 1000 ppm toluene for 14 hours daily, for two weeks, irreversible hearing loss was detected. The same daily exposure to 700 ppm for as long as 16 weeks was without effect. Since the level necessary to produce hearing loss is greater than 7 times the ACGIH TLV-TWA for toluene, worker exposures at or below 100 ppm is not expected to cause any adverse effects. There are also reports that chronic solvent abusers (glue sniffers, solvent huffers) who deliberately inhale high concentrations (several thousand ppm) of toluene for prolonged periods (up to ten hours/day) have suffered liver, kidney and brain damage. Toluene may also cause mental and/or growth retardation in the children of female solvent abusers who directly inhale toluene when they are pregnant. Toluene caused growth retardation in rats when administered at doses that were toxic to the mothers (1500 ppm). Concentrations of up to 5000 ppm did not cause birth defects. There were no effects in the offspring at doses that did not intoxicate the pregnant rats. The exposure level at which no effects were seen (No Observed Effect Level, NOEL) is 750 ppm. We recommend that the precautions outlined in this MSDS be followed to keep toluene concentrations below the recommended exposure standards.

This product contains xylene, a chemical that has been reported to cause developmental toxicity in rats and mice exposed by inhalation during

pregnancy. The effects noted consisted of delayed development and minor skeletal variations; additionally, when pregnant mice were exposed by ingestion to a level that killed nearly one-third of the test group, lethality (resorptions) and malformations (primarily cleft palate) occurred. Malformations have not been reported following inhalation exposure. Because of the very high levels of exposure used in these studies, we do not believe that their results imply an increased risk of reproductive toxicity to workers exposed to xylene levels at or below the exposure standard.

Xylene has given negative results in several mutagen testing assays including the Ames assay. In a cancer study sponsored by the National Toxicology Program (NTP), technical grade xylene gave no evidence of carcinogenicity in rats or mice dosed daily for two years.

This product contains methyl tert butyl ether (MTBE). Most mutagenicity data on MTBE, except for the in vitro mouse lymphoma test, indicate that it is not mutagenic. MTBE caused birth defects in mice exposed to 8,000 ppm throughout pregnancy. No birth defects were observed in mice at 1,000 ppm or in rats or rabbits at any dose of MTBE. These results suggest that the risk of birth defects in humans from MTBE is negligible at the anticipated exposure concentrations.

Whole gasoline exhaust was reviewed by the International Agency for Research on Cancer (IARC) in their Monograph Volume 46 (1989). Evidence for causing cancer was considered inadequate in animals and inadequate in humans. IARC placed whole gasoline exhaust in Category 2B, considering it possibly carcinogenic to humans.

****

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

Chevron

Material Safety Data Sheet

CHEVRON Diesel Fuel No. 1

CPS270003

APPLIED GEOTECHNOLOGY, INC
ATTN: MONICA BECKMAN
300 120TH AVE. NE
BELLEVUE, WA 98005

Print Date: January 03, 1992

This Material Safety Data Sheet contains environmental, health and toxicology information for your employees. Please make sure this information is given to them. It also contains information to help you meet community right-to-know/emergency response reporting requirements under SARA Title III and many other laws. If you resell this product, this MSDS must be given to the buyer or the information incorporated in your MSDS. Discard any previous edition of this MSDS.

Revised to update Sections 1, 5, 6, 8, 9, 11 and 12.

1. PRODUCT IDENTIFICATION

CHEVRON Diesel Fuel No. 1

DANGER!
- **HARMFUL OR FATAL IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE**
- **PROLONGED OR REPEATED SKIN CONTACT CAN BE HARMFUL**
- **MAY CAUSE SKIN IRRITATION**
- **COMBUSTIBLE**
- **KEEP OUT OF REACH OF CHILDREN**

PRODUCT NUMBER(S): CPS270003
PRODUCT INFORMATION: (800)582-3835

Prepared According to the OSHA Hazard Communication Standard (29 CFR 1910.1200) by the Chevron Environmental Health Center, Inc., P.O. Box 4054, Richmond, CA 94804.

2. FIRST AID - EMERGENCY NUMBER (800)457-2022 OR (510)233-3737

EYE CONTACT:
No first aid procedures are required. However, as a precaution flush eyes with fresh water for 15 minutes. Remove contact lenses if worn.
SKIN CONTACT:
Remove contaminated clothing. Wash skin thoroughly with soap and water. See a doctor if any signs or symptoms described in this document occur. Discard contaminated non-waterproof shoes and boots. Wash contaminated clothing.
INHALATION:
If any signs or symptoms as described in this document occur, move the person to fresh air. If any of these effects continue, see a doctor.
INGESTION:
If swallowed, give water or milk to drink and telephone for medical advice. DO NOT make person vomit unless directed to do so by medical personnel. If medical advice cannot be obtained, then take the person and product container to the nearest medical emergency treatment center or hospital. Note to Physician: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

3. IMMEDIATE HEALTH EFFECTS - (ALSO SEE SECTIONS 11 & 12)

EYE CONTACT:
This substance is not expected to cause prolonged or significant eye irritation.
SKIN IRRITATION:
This substance is a moderate skin irritant so contact with the skin could cause prolonged (days) injury to the affected area. The degree of injury will depend on the amount of material that gets on the skin and the speed and thoroughness of the first aid treatment. Signs and symptoms may include pain or a feeling of heat, discoloration, swelling, and blistering. Read the Additional Health Data section (12) of this document for more information.
DERMAL TOXICITY:
If absorbed through the skin, this substance is considered practically non-toxic to internal organs.
RESPIRATORY/INHALATION:
Prolonged breathing of vapors can cause central nervous system effects. This hazard evaluation is based on data from similar materials. Signs and symptoms of central nervous system effects may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination.
INGESTION:
If swallowed, this substance is considered practically non-toxic to internal organs. Because of the low viscosity of this substance, it can directly enter the lungs if it is swallowed (this is called aspiration). This can occur during the act of swallowing or when vomiting the

substance. Once in the lungs, the substance is very difficult to remove and can cause severe injury to the lungs and death.

4. PROTECTIVE EQUIPMENT

EYE PROTECTION:
No special eye protection is usually necessary.
SKIN PROTECTION:
Avoid contact with skin or clothing. Skin contact should be minimized by wearing protective clothing including gloves.
RESPIRATORY PROTECTION:
This material may be an inhalation hazard and, unless ventilation is adequate, the use of approved respiratory protection is recommended.
VENTILATION:
Use this material only in well ventilated areas.

5. FIRE PROTECTION

FLASH POINT: (TCC) 100F (38C) Min.
AUTOIGNITION: NDA
FLAMMABILITY: NDA
EXTINGUISHING MEDIA:
CO_2, Dry Chemical, Foam and Water Fog.
NFPA RATINGS: Health 0; Flammability 2; Reactivity 0; Special NDA;
HMIS RATINGS: Health 2; Flammability 2; Reactivity 0; Other NDA;
(Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association or, if applicable, the National Paint and Coating Association, and do not necessarily reflect the hazard evaluation of the Chevron Environmental Health Center. Read the entire document and label before using this product.
FIRE FIGHTING PROCEDURES:
Liquid evaporates and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85 F.

For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire document.
COMBUSTION PRODUCTS:
Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

6. STORAGE, HANDLING, AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:
NDA.
STABILITY:
Stable.
HAZARDOUS POLYMERIZATION:
Polymerization will not occur.
INCOMPATIBILITY:
May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
SPECIAL PRECAUTIONS:
DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed.

DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

CAUTION! Do not use pressure to empty drum or explosion may result.

WARNING! Not for use as portable heater or appliance fuel. Toxic fumes may accumulate and cause death.

7. PHYSICAL PROPERTIES

SOLUBILITY: Soluble in hydrocarbon solvents; insoluble in water.
APPEARANCE: Pale yellow liquid.
BOILING POINT: 204 - 300C (400-572F)
MELTING POINT: NA
EVAPORATION: NDA
SPECIFIC GRAVITY: 0.85 @ 15.6/15.6C (Min.)
VAPOR PRESSURE: NDA
PERCENT VOLATILE (VOLUME %): NDA
VAPOR DENSITY (AIR=1): NDA
VISCOSITY: 1.9 cSt @ 40C (Min.)

8. ENVIRONMENTAL CONCERNS, SPILL RESPONSE AND DISPOSAL

CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300 (24 hour).
SPILL/LEAK PRECAUTIONS:
This material is considered to be a water pollutant and releases of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.

Eliminate all open flame in vicinity of spill or released vapor. Stop the source of the leak or release. Clean up releases as soon as possible, observing precautions in Protective Equipment. Contain liquid to prevent

further contamination of soil, surface water or groundwater. Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases.

DISPOSAL METHODS:
Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

9. EXPOSURE STANDARDS, REGULATORY LIMITS AND COMPOSITION

COMPOSITION COMMENT:
All the components of this material are on the Toxic Substances Control Act Chemical Substances Inventory.

The percent compositions are given to allow for the various ranges of the components present in the whole product and may not equal 100%.

PERCENT/CAS#	COMPONENT/REGULATORY LIMITS
100.0 %	CHEVRON Diesel Fuel No. 1
CONTAINING	
	KEROSENE
CAS8008206	
	HYDRODESULFURIZED KEROSENE
CAS64742810	
	HYDRODESULFURIZED MIDDLE DISTILLATE
CAS64742809	
	STRAIGHT RUN MIDDLE DISTILLATES
CAS64741442	
< 3.0 %	NAPHTHALENE
CAS91203	A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. 10ppm ACGIH TLV 15ppm ACGIH STEL 10ppm OSHA PEL 15ppm OSHA STEL CERCLA 302.4 RQ=100 POUNDS

TLV - Threshold Limit Value	PEL - Permissible Exposure Limit
STEL - Short-term Exposure Limit	TPQ - Threshold Planning Quantity
RQ - Reportable Quantity	CPS - CUSA Product Code
CC - Chevron Chemical Company	CAS - Chemical Abstract Service Number

10. REGULATORY INFORMATION

DOT SHIPPING NAME: FUEL OIL, NO. 1
DOT HAZARD CLASS: COMBUSTIBLE LIQUID
DOT IDENTIFICATION NUMBER: NA1993

SARA 311 CATEGORIES:
1. Immediate (Acute) Health Effects; YES
2. Delayed (Chronic) Health Effects; YES
3. Fire Hazard; YES
4. Sudden Release of Pressure Hazard; NO
5. Reactivity Hazard; NO

WHEN A COMPONENT OF THIS MATERIAL IS SHOWN IN THIS SECTION, THE REGULATORY LIST ON WHICH IT APPEARS IS INDICATED.

KEROSENE	02,10,11,
NAPTHALENE	01,02,10,11,14,15,17,18,26,28,

REGULATORY LISTS:

01=SARA 313	02=MASS RTK	03=NTP Carcinogen
04=CA Prop. 65	05=MI 406	06=IARC Group 1
07=IARC Group 2A	08=IARC Group 2B	09=SARA 302/304
10=PA RTK	11=NJ RTK	12=CERCLA 302.4
13=MN RTK	14=ACGIH TLV	15=ACGIH STEL
16=ACGIH Calculated TLV	17=OSHA PEL	18=OSHA STEL
19=Chevron TLV	20=EPA Carcinogen	21=TSCA SECT 4
22=TSCA SECT 5 SNUR	23=TSCA SECT 6 RULE	24=TSCA SECT 12 EXPORT
25=TSCA SECT 8A CAIR	26=TSCA SECT 8D REPORT	27=TSCA SECT 8E
28=Canadian WHMIS		

11. PRODUCT TOXICOLOGY DATA

EYE IRRITATION:
NDA. The hazard evaluation was based on data from similar materials.
SKIN IRRITATION:
NDA. The hazard evaluation was based on data from similar materials.
DERMAL TOXICITY:
The dermal LD50 in rabbits is > 5 ml/kg.
RESPIRATORY/INHALATION:
NDA. The hazard evaluation was based on data from similar materials.
INGESTION:
The oral LD50 in rats is > 5 ml/kg.
ADDITIONAL TOXICOLOGY DATA:
The data above is obtained from studies sponsored by the American Petroleum Institute (API).

12. ADDITIONAL HEALTH DATA

ADDITIONAL HEALTH DATA COMMENT:
This product contains a mixture of petroleum hydrocarbons called middle distillates (which means they boil between approximately 350 and 700 F). Because of this broad description, many products are considered middle distillates yet they are produced by a variety of different petroleum refining processes. Toxicology data developed on some middle distillates found that they caused positive responses in some mutagenicity tests and caused skin cancer when repeatedly applied to mice over their lifetime. This product may contain some middle distillates found to cause those adverse effects.

This product contains naphthalene. Overexposure to naphthalene by inhalation of vapor, ingestion or skin contact may produce signs and symptoms of headache, fever, profuse sweating, nausea, abdominal pain, diarrhea, lethargy, tremors, convulsions, evidence of blood changes, including hematuria and hemoglobinuria, and optic neuritis. Laboratory animals given repeated oral doses of naphthalene have developed cataracts. MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE TO NAPHTHALENE: Individuals with congenital erythrocyte glucose-6-phosphate dehydrogenase deficiency may be particularly susceptible to the hemolytic effects of the naphthalene.

Whole diesel engine exhaust was reviewed by the International Agency for Research on Cancer (IARC) in their Monograph 46 (1989). Evidence for causing cancer was considered sufficient in animals and limited in humans. IARC placed this material in category 2A, considering it probably carcinogenic to humans.

The National Institute of Occupational Safety and Health (NIOSH) has recommended that whole diesel exhaust be regarded as potentially causing cancer. This recommendation was based on test results showing increased lung cancer in laboratory animals exposed to whole diesel exhaust. The excess risk of cancer for people exposed to diesel exhaust has not been determined as studies on exposed workers have been inconclusive. It is recommended that exposure to diesel exhaust be minimized to reduce the potential cancer risk.

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The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since the information contained herein may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular

purpose.

Emergency Number (800)457-2022 or (510)233-3737

Chevron

Material Safety Data Sheet

CHEVRON Diesel Fuel No. 2

CPS272102

APPLIED GEOTECHNOLOGY, INC
ATTN: MONICA BECKMAN
300 120TH AVE. NE
BELLEVUE, WA 98005

Print Date: January 03, 1992

This Material Safety Data Sheet contains environmental, health and toxicology information for your employees. Please make sure this information is given to them. It also contains information to help you meet community right-to-know/emergency response reporting requirements under SARA Title III and many other laws. If you resell this product, this MSDS must be given to the buyer or the information incorporated in your MSDS. Discard any previous edition of this MSDS.

Revised for indexing purposes only. No changes have been made in this MSDS.

1. PRODUCT IDENTIFICATION

CHEVRON Diesel Fuel No. 2

DANGER!
- COMBUSTIBLE
- HARMFUL OR FATAL IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE
- CAUSES SKIN IRRITATION
- CANCER HAZARD
- PROLONGED OR REPEATED SKIN CONTACT MAY INCREASE THE RISK OF SKIN CANCER
- KEEP OUT OF REACH OF CHILDREN

PRODUCT NUMBER(S): CPS272102
PRODUCT INFORMATION: (510)242-5357

Prepared According to the OSHA Hazard Communication Standard (29 CFR 1910.1200) by the Chevron Environmental Health Center, Inc., P.O. Box 4054, Richmond, CA 94804.

2. FIRST AID - EMERGENCY NUMBER (800)457-2022 OR (510)233-3737

EYE CONTACT:
No first aid procedures are required. However, as a precaution flush eyes with fresh water for 15 minutes. Remove contact lenses if worn.
SKIN CONTACT:
Remove contaminated clothing. Wash skin thoroughly with soap and water. See a doctor if any signs or symptoms described in this document occur. Discard contaminated non-waterproof shoes and boots. Wash contaminated clothing.
INHALATION:
If any signs or symptoms as described in this document occur, move the person to fresh air. If any of these effects continue, see a doctor.
INGESTION:
If swallowed, give water or milk to drink and telephone for medical advice. DO NOT make person vomit unless directed to do so by medical personnel. If medical advice cannot be obtained, then take the person and product container to the nearest medical emergency treatment center or hospital. Note to Physician: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

3. IMMEDIATE HEALTH EFFECTS - (ALSO SEE SECTIONS 11 & 12)

EYE CONTACT:
This substance is not expected to cause prolonged or significant eye irritation.
SKIN IRRITATION:
This substance is a moderate skin irritant so contact with the skin could cause prolonged (days) injury to the affected area. The degree of injury will depend on the amount of material that gets on the skin and the speed and thoroughness of the first aid treatment. Signs and symptoms may include pain or a feeling of heat, discoloration, swelling, and blistering. Read the Additional Health Data section (12) of this document for more information.
DERMAL TOXICITY:
If absorbed through the skin, this substance is considered practically non-toxic to internal organs.
RESPIRATORY/INHALATION:
Prolonged breathing of vapors can cause central nervous system effects. Signs and symptoms of central nervous system effects may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. This hazard evaluation is based on data from similar materials.
INGESTION:
If swallowed, this substance is considered practically non-toxic to internal organs. Because of the low viscosity of this substance, it can directly enter the lungs if it is swallowed (this is called aspiration). This can occur during the act of swallowing or when vomiting the

substance. Once in the lungs, the substance is very difficult to remove and can cause severe injury to the lungs and death.

4. PROTECTIVE EQUIPMENT

EYE PROTECTION:
No special eye protection is usually necessary.
SKIN PROTECTION:
Avoid contact with skin or clothing. Skin contact should be minimized by wearing protective clothing including gloves.
RESPIRATORY PROTECTION:
No special respiratory protection is normally required. However, if operating conditions create high airborne concentrations, the use of an approved respirator is recommended.
VENTILATION:
Use this material only in well ventilated areas.

5. FIRE PROTECTION

FLASH POINT: (P-M) 125F (52C) Min.
AUTOIGNITION: NDA
FLAMMABILITY LIMITS (% by volume in air): Lower: 0.6 Upper: 4.7
EXTINGUISHING MEDIA:
CO_2, Dry Chemical, Foam and Water Fog.
NFPA RATINGS: Health 0; Flammability 2; Reactivity 0; Special NDA;
(Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association or, if applicable, the National Paint and Coating Association, and do not necessarily reflect the hazard evaluation of the Chevron Environmental Health Center. Read the entire document and label before using this product.
FIRE FIGHTING PROCEDURES:
Liquid evaporates and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches. Fire hazard is greater as liquid temperature rises above 85 F.

For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire document.
COMBUSTION PRODUCTS:
Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

6. STORAGE, HANDLING, AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:
NDA.
STABILITY:
Stable.
HAZARDOUS POLYMERIZATION:
Polymerization will not occur.
INCOMPATIBILITY:
May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
SPECIAL PRECAUTIONS:
DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed.

DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

CAUTION! Do not use pressure to empty drum or drum may rupture with explosive force.

WARNING! Not for use as portable heater or appliance fuel. Toxic fumes may accumulate and cause death.

7. PHYSICAL PROPERTIES

SOLUBILITY: Soluble in hydrocarbon solvents; insoluble in water.
APPEARANCE: Pale yellow liquid.
BOILING POINT: 176 - 370C (348-698F)
MELTING POINT: NA
EVAPORATION: NDA
SPECIFIC GRAVITY: 0.84 @ 15.6/15.6C (Typical)
VAPOR PRESSURE: 0.04 PSIA @ 40C
PERCENT VOLATILE (VOLUME %): NDA
VAPOR DENSITY (AIR=1): NDA
VISCOSITY: 1.9 cSt @ 40C (Min.)

8. ENVIRONMENTAL CONCERNS, SPILL RESPONSE AND DISPOSAL

CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300 (24 hour).
SPILL/LEAK PRECAUTIONS:
Eliminate all sources of ignition in vicinity of spill or released vapor.

Clean up spills immediately, observing precautions in Protective Equipment section. This material is considered to be a water pollutant and releases of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.

U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

DISPOSAL METHODS:

Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

9. EXPOSURE STANDARDS, REGULATORY LIMITS AND COMPOSITION

COMPOSITION COMMENT:

All the components of this material are on the Toxic Substances Control Act Chemical Substances Inventory.

The percent compositions are given to allow for the various ranges of the components present in the whole product and may not equal 100%.

PERCENT/CAS#	COMPONENT/REGULATORY LIMITS
100.0 %	CHEVRON Diesel Fuel No. 2
CONTAINING	
100.0 %	FUELS, DIESEL, NO. 2
CAS68476346	
	DISTILLATES, HYDRODESULFURIZED MIDDLE
CAS64742809	
	DISTILLATES, STRAIGHT RUN MIDDLE
CAS64741442	
	KEROSINE
CAS8008206	
	KEROSINE, HYDRODESULFURIZED
CAS64742810	
	DISTILLATES, LIGHT CATALYTIC CRACKED
CAS64741599	

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	TPQ - Threshold Planning Quantity
RQ - Reportable Quantity	CPS - CUSA Product Code
CC - Chevron Chemical Company	CAS - Chemical Abstract Service Number

10. REGULATORY INFORMATION

DOT basic descriptions can vary based on package quantity and may not coincide with international description requirements. Consult the Hazardous Materials Regulations in 49CFR and the appropriate Dangerous Goods Regulations to confirm description applicability to specific shipments.

DOT SHIPPING NAME: FUEL OIL, NO. 2
DOT HAZARD CLASS: COMBUSTIBLE LIQUID
DOT IDENTIFICATION NUMBER: NA1993

SARA 311 CATEGORIES:
1. Immediate (Acute) Health Effects; YES
2. Delayed (Chronic) Health Effects; YES
3. Fire Hazard; YES
4. Sudden Release of Pressure Hazard; NO
5. Reactivity Hazard; NO

The following components of this material are found on the regulatory lists indicated by the number below the component name:

KEROSINE
is found on lists: 02,10,11,

REGULATORY LISTS SEARCHED:

01=SARA 313	02=MASS RTK	03=NTP Carcinogen
04=CA Prop. 65	05=MI 406	06=IARC Group 1
07=IARC Group 2A	08=IARC Group 2B	09=SARA 302/304
10=PA RTK	11=NJ RTK	12=CERCLA 302.4
13=MN RTK	14=ACGIH TLV	15=ACGIH STEL
16=ACGIH Calculated TLV	17=OSHA TWA	18=OSHA STEL
19=Chevron TLV	20=EPA Carcinogen	21=TSCA Sect 4(e)
22=TSCA Sect 5(a)(e)(f)	23=TSCA Sect 6	24=TSCA Sect 12(b)
25=TSCA Sect 8(a)	26=TSCA Sect 8(d)	28=Canadian WHMIS
29=OSHA CEILING		

11. PRODUCT TOXICOLOGY DATA

EYE IRRITATION:
Minimal effects clearing in less than 24 hours.
SKIN IRRITATION:
Moderate irritation at 72 hours. (Moderate erythema).
DERMAL TOXICITY:
The dermal LD50 in rabbits is > 5 ml/kg.
RESPIRATORY/INHALATION:
The 4-hour inhalation LC50 in rats is greater than 5 mg/l.
INGESTION:
The oral LD50 in rats is > 5 ml/kg.

ADDITIONAL TOXICOLOGY DATA:
The data above is obtained from studies sponsored by the American Petroleum Institute (API).

12. ADDITIONAL HEALTH DATA

ADDITIONAL HEALTH DATA COMMENT:
This product contains a mixture of petroleum hydrocarbons called middle distillates (which means they boil between approximately 350F and 700F). Because of this broad description, many products are considered middle distillates yet they are produced by a variety of different petroleum refining processes. Toxicology data developed on some middle distillates found that they caused positive responses in some mutagenicity tests and caused skin cancer when repeatedly applied to mice over their lifetime. This product may contain some middle distillates found to cause those adverse effects.

Whole diesel engine exhaust was reviewed by the International Agency for Research on Cancer (IARC) in their Monograph 46 (1989). Evidence for causing cancer was considered sufficient in animals and limited in humans. IARC placed diesel exhaust in category 2A, considering it probably carcinogenic to humans.

The National Institute of Occupational Safety and Health (NIOSH) has recommended that whole diesel exhaust be regarded as potentially causing cancer. This recommendation was based on test results showing increased lung cancer in laboratory animals exposed to whole diesel exhaust. The excess risk of cancer for people exposed to diesel exhaust has not been determined as studies on exposed workers have been inconclusive. It is recommended that exposure to diesel exhaust be minimized to reduce the potential cancer risk.

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The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

Emergency Number (800)457-2022 or (510)233-3737

Chevron

Material Safety Data Sheet

CHEVRON Regular Gasoline

CPS201305

APPLIED GEOTECHNOLOGY, INC
ATTN: MONICA BECKMAN
300 120TH AVE. NE
BELLEVUE, WA 98005

Print Date: January 03, 1992

This Material Safety Data Sheet contains environmental, health and toxicology information for your employees. Please make sure this information is given to them. It also contains information to help you meet community right-to-know/emergency response reporting requirements under SARA Title III and many other laws. If you resell this product, this MSDS must be given to the buyer or the information incorporated in your MSDS. Discard any previous edition of this MSDS.

Revised to update Section 12 (Additional Health).

1. PRODUCT IDENTIFICATION

CHEVRON Regular Gasoline

DANGER!
- **HARMFUL OR FATAL IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE**
- **VAPOR HARMFUL**
- **LONG-TERM EXPOSURE TO VAPOR HAS CAUSED CANCER IN LABORATORY ANIMALS**
- **MAY CAUSE EYE AND SKIN IRRITATION**
- **EXTREMELY FLAMMABLE**
- **CONTAINS LEAD**
- **KEEP OUT OF REACH OF CHILDREN**

PRODUCT NUMBER(S): CPS201305
PRODUCT INFORMATION: (800)582-3835

Prepared According to the OSHA Hazard Communication Standard (29 CFR 1910.1200) by the Chevron Environmental Health Center, Inc., P.O. Box 4054, Richmond, CA 94804.

2. FIRST AID - EMERGENCY NUMBER (800)457-2022 OR (510)233-3737

EYE CONTACT:
Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. No additional first aid should be necessary. However, if irritation persists, see a doctor.
SKIN CONTACT:
No first aid procedures are required. As a precaution, wash skin thoroughly with soap and water. Remove and wash contaminated clothing.
INHALATION:
If respiratory irritation or any signs or symptoms as described in this document occur, move the person to fresh air. If any of these effects continue, see a doctor.
INGESTION:
If swallowed, give water or milk to drink and telephone for medical advice. DO NOT make person vomit unless directed to do so by medical personnel. If medical advice cannot be obtained, then take the person and product container to the nearest medical emergency treatment center or hospital. Note to Physician: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

3. IMMEDIATE HEALTH EFFECTS - (ALSO SEE SECTIONS 11 & 12)

EYE CONTACT:
This substance is slightly irritating to the eyes and could cause prolonged (days) impairment of your vision. The degree of the injury will depend on the amount of material that gets into the eye and the speed and thoroughness of the first aid treatment. Signs and symptoms may include pain, tears, swelling, redness, and blurred vision. Eye contact with the vapors, fumes, or spray mist from this substance could also cause similar signs and symptoms.
SKIN IRRITATION:
Prolonged or frequently repeated contact may cause the skin to become cracked or dry from the defatting action of this material.
DERMAL TOXICITY:
If absorbed through the skin, this substance is considered practically non-toxic to internal organs.
RESPIRATORY/INHALATION:
This substance is slightly toxic to internal organs if inhaled. The degree of injury will depend on the airborne concentration and duration of exposure. The target organ(s) is the nervous system. Inhalation of gasoline vapor at airborne concentrations exceeding 1000 ppm may cause signs and symptoms of central nervous system effects such as headache, dizziness, loss of appetite, weakness and loss of coordination. Vapor concentrations in excess of 5000 ppm may cause loss of consciousness, coma and death. Brief exposures to high vapor concentrations may also cause pulmonary edema and bronchitis. Intentional exposures to excessively high

concentrations (e.g., when used as a drug of abuse) have been reported to result in clinical manifestations that may include convulsions, delirium, and hallucinations. These manifestations are not known to occur following accidental inhalation of gasoline vapor during normal operations.

INGESTION:

This substance is slightly toxic to internal organs if swallowed. The degree of injury will depend on the amount absorbed from the gut. The target organ(s) is the nervous system. Signs and symptoms of central nervous system effects may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. Because of the low viscosity of this substance, it can directly enter the lungs if it is swallowed (this is called aspiration). This can occur during the act of swallowing or when vomiting the substance. Once in the lungs, the substance is very difficult to remove and can cause severe injury to the lungs and death.

4. PROTECTIVE EQUIPMENT

EYE PROTECTION:

Do not get this material in your eyes. Eye contact can be avoided by wearing chemical goggles.

SKIN PROTECTION:

No special skin protection is usually necessary. Avoid prolonged or frequently repeated skin contact with this material. Skin contact can be minimized by wearing protective clothing.

RESPIRATORY PROTECTION:

No special respiratory protection is normally required. However, if operating conditions create airborne concentrations which exceed the recommended exposure standards, the use of an approved respirator is required. Refer to the OSHA Benzene Standard to determine what type of respirator is required based on exposure levels.

VENTILATION:

Use this material only in well ventilated areas.

5. FIRE PROTECTION

FLASH POINT: (P-M) < -49F (-45C)

AUTOIGNITION: NDA

FLAMMABILITY LIMITS (% by volume in air): Lower: 1.4 Upper: 7.6

EXTINGUISHING MEDIA:

Fire Fighting Foam: Alcohol Resistant Type (AR)

AFFF, CO_2, Dry Chemical.

NFPA RATINGS: Health 1; Flammability 3; Reactivity 0; Special NDA; (Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association or, if applicable, the National Paint and Coating Association, and do not necessarily reflect the hazard evaluation of the Chevron Environmental Health Center. Read the entire document and label before using this product.

FIRE FIGHTING PROCEDURES:

This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches.

For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire document.

COMBUSTION PRODUCTS:
Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

6. STORAGE, HANDLING, AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:
NDA.
STABILITY:
Stable.
HAZARDOUS POLYMERIZATION:
Polymerization will not occur.
INCOMPATIBILITY:
May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
SPECIAL PRECAUTIONS:
Never siphon gasoline by mouth. READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL. Use only as a motor fuel. Do not use for cleaning, pressure appliance fuel, or any other such use. DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed. DO NOT TRANSFER LIQUID TO AN UNLABELED CONTAINER. DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

7. PHYSICAL PROPERTIES

SOLUBILITY: Soluble in hydrocarbons; insoluble in water.
APPEARANCE: Orange to bronze liquid.
BOILING POINT: 25 - 225C (Variable)
MELTING POINT: NA
EVAPORATION: NDA
SPECIFIC GRAVITY: 0.7 - 0.8
VAPOR PRESSURE: 5 - 15 PSI (max.) @ 100F (Variable)
PERCENT VOLATILE (VOLUME %): 99+%
VAPOR DENSITY (AIR=1): 3-4

8. ENVIRONMENTAL CONCERNS, SPILL RESPONSE AND DISPOSAL

CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300 (24 hour).
SPILL/LEAK PRECAUTIONS:
Eliminate all sources of ignition in vicinity of spill or released vapor.

Clean up spills immediately, observing precautions in Protective Equipment section. This material is considered to be a water pollutant and releases of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.

U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

DISPOSAL METHODS:
Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

9. EXPOSURE STANDARDS, REGULATORY LIMITS AND COMPOSITION

COMPOSITION COMMENT:
All the components of this material are on the Toxic Substances Control Act Chemical Substances Inventory.

The percent compositions are given to allow for the various ranges of the components present in the whole product and may not equal 100%.

PERCENT/CAS#	COMPONENT/REGULATORY LIMITS
100.0 %	CHEVRON Regular Gasoline
CONTAINING	
100.0 %	GASOLINE (GENERIC) 300ppm ACGIH TLV 500ppm ACGIH STEL 300ppm OSHA TWA 500ppm OSHA STEL
	INCLUDING
< 1.4 %	ETHYLBENZENE
CAS100414	A toxic chemical subject to the reporting requirements of

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
125ppm ACGIH STEL
100ppm OSHA TWA
125ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 0.9 % XYLENE-P
CAS106423
A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
150 ppm ACGIH STEL
CERCLA 302.4 RQ=1000 POUNDS

< 4.6 % XYLENE-M
CAS108383
A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 2.2 % XYLENE-O
CAS95476
A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 6.5 % TOLUENE
CAS108883
A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
300 ppm OSHA CEILING
CERCLA 302.4 RQ=1000 POUNDS

< 3.0 % HEXANE
CAS110543
50ppm ACGIH TLV
1000 ppm ACGIH STEL
50ppm OSHA TWA

< 2.4 % CYCLOHEXANE
CAS110827
A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and

Reauthorization Act of 1986 and 40 CFR Part 372.
300ppm ACGIH TLV
300ppm OSHA TWA
CERCLA 302.4 RQ=1000 POUNDS

< 15.0 % METHYL TERT BUTYL ETHER
CAS1634044 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

< 4.9 % BENZENE
CAS71432 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
10ppm ACGIH TLV
1ppm OSHA TWA
5ppm OSHA STEL
25 ppm OSHA CEILING
CERCLA 302.4 RQ=10 POUNDS

Refer to the OSHA Benzene Standard (29 CFR 1910.1028) for detailed training, exposure monitoring, respiratory protection and medical surveillance requirements before using this product.

< 0.2 G/GAL TETRAETHYL LEAD
CAS78002 0.1mg/m3 ACGIH TLV
.075mg/m3 OSHA TWA
SARA 302/304 RQ=10 POUNDS TPQ=100 POUNDS
CERCLA 302.4 RQ=10 POUNDS

TLV - Threshold Limit Value
STEL - Short-term Exposure Limit
RQ - Reportable Quantity
CC - Chevron Chemical Company
TWA - Time Weighted Average
TPQ - Threshold Planning Quantity
CPS - CUSA Product Code
CAS - Chemical Abstract Service Number

10. REGULATORY INFORMATION

DOT basic descriptions can vary based on package quantity and may not coincide with international description requirements. Consult the Hazardous Materials Regulations in 49CFR and the appropriate Dangerous Goods Regulations to confirm description applicability to specific shipments.

DOT SHIPPING NAME: GASOLINE
DOT HAZARD CLASS: FLAMMABLE LIQUID
DOT IDENTIFICATION NUMBER: UN1203

SARA 311 CATEGORIES:
1. Immediate (Acute) Health Effects; YES
2. Delayed (Chronic) Health Effects; YES
3. Fire Hazard; YES
4. Sudden Release of Pressure Hazard; NO
5. Reactivity Hazard; NO

The following components of this material are found on the regulatory lists indicated by the number below the component name:

ETHYLBENZENE
is found on lists: 01,02,10,11,12,13,14,15,17,18,26,28,
XYLENE-P
is found on lists: 01,02,10,11,12,15,26,28,
XYLENE-M
is found on lists: 01,02,10,11,12,14,15,17,18,26,28,
TOLUENE
is found on lists: 01,02,04,10,11,12,13,14,15,17,18,26,28,29,
HEXANE
is found on lists: 02,10,11,13,14,15,17,28,
CYCLOHEXANE
is found on lists: 01,02,10,11,12,13,14,17,26,28,
METHYL TERT BUTYL ETHER
is found on lists: 01,10,11,21,24,26,
BENZENE
is found on lists: 01,02,03,04,06,10,11,12,13,14,17,18,20,28,29,
TETRAETHYL LEAD
is found on lists: 02,09,10,11,12,13,14,17,28,
XYLENE-O
is found on lists: 01,02,10,11,12,14,15,17,18,26,28,
GASOLINE (GENERIC)
is found on lists: 04,08,14,15,17,18,20,

REGULATORY LISTS SEARCHED:

01=SARA 313	02=MASS RTK	03=NTP Carcinogen
04=CA Prop. 65	05=MI 406	06=IARC Group 1
07=IARC Group 2A	08=IARC Group 2B	09=SARA 302/304
10=PA RTK	11=NJ RTK	12=CERCLA 302.4
13=MN RTK	14=ACGIH TLV	15=ACGIH STEL
16=ACGIH Calculated TLV	17=OSHA TWA	18=OSHA STEL
19=Chevron TLV	20=EPA Carcinogen	21=TSCA Sect 4(e)
22=TSCA Sect 5(a)(e)(f)	23=TSCA Sect 6	24=TSCA Sect 12(b)
25=TSCA Sect 8(a)	26=TSCA Sect 8(d)	28=Canadian WHMIS
29=OSHA CEILING		

11. PRODUCT TOXICOLOGY DATA

EYE IRRITATION:
No product toxicology data available. The hazard evaluation was based on data from similar materials.
SKIN IRRITATION:
No product toxicology data available. The hazard evaluation was based on data from similar materials.
DERMAL TOXICITY:
No product toxicology data available. The hazard evaluation was based on data from similar materials.
RESPIRATORY/INHALATION:

No product toxicology data available. The hazard evaluation was based on data from similar materials.
INGESTION:
No product toxicology data available. The hazard evaluation was based on data from similar materials.
ADDITIONAL TOXICOLOGY DATA:
Lifetime inhalation of whole gasoline vapor has caused increased liver tumors in female mice. The mechanism of this response is still being investigated but it is thought to be an epigenetic process unique to the female mouse. Inhalation exposure to whole gasoline vapor also caused kidney damage and eventually kidney cancer in male rats. No other animal model studied has shown these adverse kidney effects and there is no physiological reason to believe that they would occur in man.

The data above is obtained from studies sponsored by the American Petroleum Institute (API).

12. ADDITIONAL HEALTH DATA

ADDITIONAL HEALTH DATA COMMENT:
This product contains benzene. The OSHA Benzene Standard (29 CFR 1910.1028) contains detailed requirements for training, exposure monitoring, respiratory protection and medical surveillance triggered by the exposure level. Refer to the OSHA Standard before using this product. Repeated or prolonged breathing of benzene vapors has been associated with the development of chromosomal damage in experimental animals and various blood diseases in humans ranging from aplastic anemia to leukemia (a form of cancer). All of these diseases can be fatal. No birth defects have been shown to occur in pregnant laboratory animals exposed to doses not toxic to the mother. However, some evidence of fetal toxicity such as delayed physical development has been seen at such levels. The available information on the effects of benzene on human pregnancies is inadequate but it has been established that benzene can cross the human placenta.

This product contains n-hexane. Prolonged or repeated skin contact or breathing of vapors may cause nerve damage characterized by progressive weakness and numbness in the arms and legs. Recovery ranges from no recovery to complete recovery depending upon the severity of the nerve damage.

This product contains toluene. Toluene has been reported to decrease immunological responses in test animals. It has also been reported that when young rats were exposed to 1000 ppm toluene for 14 hours daily, for two weeks, irreversible hearing loss was detected. The same daily exposure to 700 ppm for as long as 16 weeks was without effect. Since the level necessary to produce hearing loss is greater than 7 times the ACGIH TLV-TWA for toluene, worker exposures at or below 100 ppm is not expected to cause any adverse effects. There are also reports that chronic solvent abusers (glue sniffers, solvent huffers) who deliberately inhale high concentrations (several thousand ppm) of toluene for prolonged periods (up to ten hours/day) have suffered liver, kidney and brain damage. Toluene may also cause mental and/or growth retardation in the children of female

solvent abusers who directly inhale toluene when they are pregnant. Toluene caused growth retardation in rats when administered at doses that were toxic to the mothers (1500 ppm). Concentrations of up to 5000 ppm did not cause birth defects. There were no effects in the offspring at doses that did not intoxicate the pregnant rats. The exposure level at which no effects were seen (No Observed Effect Level, NOEL) is 750 ppm. We recommend that the precautions outlined in this MSDS be followed to keep toluene concentrations below the recommended exposure standards.

This product contains xylene, a chemical that has been reported to cause developmental toxicity in rats and mice exposed by inhalation during pregnancy. The effects noted consisted of delayed development and minor skeletal variations; additionally, when pregnant mice were exposed by ingestion to a level that killed nearly one-third of the test group, lethality (resorptions) and malformations (primarily cleft palate) occurred. Malformations have not been reported following inhalation exposure. Because of the very high levels of exposure used in these studies, we do not believe that their results imply an increased risk of reproductive toxicity to workers exposed to xylene levels at or below the exposure standard.

Xylene has given negative results in several mutagen testing assays including the Ames assay. In a cancer study sponsored by the National Toxicology Program (NTP), technical grade xylene gave no evidence of carcinogenicity in rats or mice dosed daily for two years.

This product contains methyl tert butyl ether (MTBE). Most mutagenicity data on MTBE, except for the in vitro mouse lymphoma test, indicate that it is not mutagenic. MTBE caused birth defects in mice exposed to 8,000 ppm throughout pregnancy. No birth defects were observed in mice at 1,000 ppm or in rats or rabbits at any dose of MTBE. These results suggest that the risk of birth defects in humans from MTBE is negligible at the anticipated exposure concentrations.

Whole gasoline exhaust was reviewed by the International Agency for Research on Cancer (IARC) in their Monograph Volume 46 (1989). Evidence for causing cancer was considered inadequate in animals and inadequate in humans. IARC placed whole gasoline exhaust in Category 2B, considering it possibly carcinogenic to humans.

****

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

Chevron

Material Safety Data Sheet

CHEVRON Unleaded Gasoline

APPLIED GEOTECHNOLOGY, INC
ATTN: MONICA BECKMAN
300 120TH AVE. NE
BELLEVUE, WA 98005

Print Date: January 03, 1992

This Material Safety Data Sheet contains environmental, health and toxicology information for your employees. Please make sure this information is given to them. It also contains information to help you meet community right-to-know/emergency response reporting requirements under SARA Title III and many other laws. If you resell this product, this MSDS must be given to the buyer or the information incorporated in your MSDS. Discard any previous edition of this MSDS.

Revised to update Section 12 (Additional Health).

1. PRODUCT IDENTIFICATION

CHEVRON Unleaded Gasoline

DANGER!
- **HARMFUL OR FATAL IF SWALLOWED - CAN ENTER LUNGS AND CAUSE DAMAGE**
- **VAPOR HARMFUL**
- **LONG-TERM EXPOSURE TO VAPOR HAS CAUSED CANCER IN LABORATORY ANIMALS**
- **MAY CAUSE EYE AND SKIN IRRITATION**
- **EXTREMELY FLAMMABLE**
- **KEEP OUT OF REACH OF CHILDREN**

PRODUCT NUMBER(S): CPS201110
PRODUCT INFORMATION: (800)582-3835

Prepared According to the OSHA Hazard Communication Standard (29 CFR 1910.1200) by the Chevron Environmental Health Center, Inc., P.O. Box 4054, Richmond, CA 94804.

2. FIRST AID - EMERGENCY NUMBER (800)457-2022 OR (510)233-3737

EYE CONTACT:
Flush eyes immediately with fresh water for at least 15 minutes while holding the eyelids open. Remove contact lenses if worn. No additional first aid should be necessary. However, if irritation persists, see a doctor.
SKIN CONTACT:
No first aid procedures are required. As a precaution, wash skin thoroughly with soap and water. Remove and wash contaminated clothing.
INHALATION:
If respiratory irritation or any signs or symptoms as described in this document occur, move the person to fresh air. If any of these effects continue, see a doctor.
INGESTION:
If swallowed, give water or milk to drink and telephone for medical advice. DO NOT make person vomit unless directed to do so by medical personnel. If medical advice cannot be obtained, then take the person and product container to the nearest medical emergency treatment center or hospital. Note to Physician: Ingestion of this product or subsequent vomiting can result in aspiration of light hydrocarbon liquid which can cause pneumonitis.

3. IMMEDIATE HEALTH EFFECTS - (ALSO SEE SECTIONS 11 & 12)

EYE CONTACT:
This substance is slightly irritating to the eyes and could cause prolonged (days) impairment of your vision. The degree of the injury will depend on the amount of material that gets into the eye and the speed and thoroughness of the first aid treatment. Signs and symptoms may include pain, tears, swelling, redness, and blurred vision. Eye contact with the vapors, fumes, or spray mist from this substance could also cause similar signs and symptoms.
SKIN IRRITATION:
Prolonged or frequently repeated contact may cause the skin to become cracked or dry from the defatting action of this material.
DERMAL TOXICITY:
If absorbed through the skin, this substance is considered practically non-toxic to internal organs.
RESPIRATORY/INHALATION:
This substance is slightly toxic to internal organs if inhaled. The degree of injury will depend on the airborne concentration and duration of exposure. The target organ(s) is the nervous system. Inhalation of gasoline vapor at airborne concentrations exceeding 1000 ppm may cause signs and symptoms of central nervous system effects such as headache, dizziness, loss of appetite, weakness and loss of coordination. Vapor concentrations in excess of 5000 ppm may cause loss of consciousness, coma and death. Brief exposures to high vapor concentrations may also cause pulmonary edema and bronchitis. Intentional exposures to excessively high

concentrations (e.g., when used as a drug of abuse) have been reported to result in clinical manifestations that may include convulsions, delirium, and hallucinations. These manifestations are not known to occur following accidental inhalation of gasoline vapor during normal operations.

INGESTION:

This substance is slightly toxic to internal organs if swallowed. The degree of injury will depend on the amount absorbed from the gut. The target organ(s) is the nervous system. Signs and symptoms of central nervous system effects may include one or more of the following: headache, dizziness, loss of appetite, weakness and loss of coordination. Because of the low viscosity of this substance, it can directly enter the lungs if it is swallowed (this is called aspiration). This can occur during the act of swallowing or when vomiting the substance. Once in the lungs, the substance is very difficult to remove and can cause severe injury to the lungs and death.

4. PROTECTIVE EQUIPMENT

EYE PROTECTION:

Do not get this material in your eyes. Eye contact can be avoided by wearing chemical goggles.

SKIN PROTECTION:

No special skin protection is usually necessary. Avoid prolonged or frequently repeated skin contact with this material. Skin contact can be minimized by wearing protective clothing.

RESPIRATORY PROTECTION:

No special respiratory protection is normally required. However, if operating conditions create airborne concentrations which exceed the recommended exposure standards, the use of an approved respirator is required. Refer to the OSHA Benzene Standard to determine what type of respirator is required based on exposure levels.

VENTILATION:

Use this material only in well ventilated areas.

5. FIRE PROTECTION

FLASH POINT: (P-M) < -49F (-45C)

AUTOIGNITION: NDA

FLAMMABILITY LIMITS (% by volume in air): Lower: 1.4 Upper: 7.6

EXTINGUISHING MEDIA:

Fire Fighting Foam: Alcohol Resistant Type (AR)

AFFF, CO_2, Dry Chemical.

NFPA RATINGS: Health 1; Flammability 3; Reactivity 0; Special NDA; (Least-0, Slight-1, Moderate-2, High-3, Extreme-4). These values are obtained using the guidelines or published evaluations prepared by the National Fire Protection Association or, if applicable, the National Paint and Coating Association, and do not necessarily reflect the hazard evaluation of the Chevron Environmental Health Center. Read the entire document and label before using this product.

FIRE FIGHTING PROCEDURES:

This product presents an extreme fire hazard. Liquid very quickly evaporates, even at low temperatures, and forms vapor (fumes) which can catch fire and burn with explosive violence. Invisible vapor spreads easily and can be set on fire by many sources such as pilot lights, welding equipment, and electrical motors and switches.

For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of normal products of combustion or oxygen deficiency. Read the entire document.

COMBUSTION PRODUCTS:
Normal combustion forms carbon dioxide and water vapor; incomplete combustion can produce carbon monoxide.

6. STORAGE, HANDLING, AND REACTIVITY

HAZARDOUS DECOMPOSITION PRODUCTS:
NDA.
STABILITY:
Stable.
HAZARDOUS POLYMERIZATION:
Polymerization will not occur.
INCOMPATIBILITY:
May react with strong oxidizing agents, such as chlorates, nitrates, peroxides, etc.
SPECIAL PRECAUTIONS:
Never siphon gasoline by mouth. READ AND OBSERVE ALL PRECAUTIONS ON PRODUCT LABEL. Use only as a motor fuel. Do not use for cleaning, pressure appliance fuel, or any other such use. DO NOT USE OR STORE near flame, sparks or hot surfaces. USE ONLY IN WELL VENTILATED AREA. Keep container closed. DO NOT TRANSFER LIQUID TO AN UNLABELED CONTAINER. DO NOT weld, heat or drill container. Replace cap or bung. Emptied container still contains hazardous or explosive vapor or liquid.

7. PHYSICAL PROPERTIES

SOLUBILITY: Soluble in hydrocarbons; insoluble in water.
APPEARANCE: Orange to bronze liquid.
BOILING POINT: 25 - 225C (Variable)
MELTING POINT: NA
EVAPORATION: NDA
SPECIFIC GRAVITY: 0.7 - 0.8
VAPOR PRESSURE: 5 - 15 PSI (max.) @ 100F (Variable)
PERCENT VOLATILE (VOLUME %): 99+%
VAPOR DENSITY (AIR=1): 3-4

8. ENVIRONMENTAL CONCERNS, SPILL RESPONSE AND DISPOSAL

CHEMTREC EMERGENCY PHONE NUMBER: (800) 424-9300 (24 hour).
SPILL/LEAK PRECAUTIONS:
Eliminate all sources of ignition in vicinity of spill or released vapor.

Clean up spills immediately, observing precautions in Protective Equipment section. This material is considered to be a water pollutant and releases of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems.

U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802.

DISPOSAL METHODS:
Clean up small spills using appropriate techniques such as sorbent materials or pumping. Where feasible and appropriate, remove contaminated soil. Follow prescribed procedures for reporting and responding to larger releases. Place contaminated materials in disposable containers and dispose of in a manner consistent with applicable regulations. Contact local environmental or health authorities for approved disposal of this material.

9. EXPOSURE STANDARDS, REGULATORY LIMITS AND COMPOSITION

COMPOSITION COMMENT:
All the components of this material are on the Toxic Substances Control Act Chemical Substances Inventory.

The percent compositions are given to allow for the various ranges of the components present in the whole product and may not equal 100%.

PERCENT/CAS#	COMPONENT/REGULATORY LIMITS
100.0 %	CHEVRON Unleaded Gasoline
CONTAINING	
100.0 %	GASOLINE (GENERIC) 300ppm ACGIH TLV 500ppm ACGIH STEL 300ppm OSHA TWA 500ppm OSHA STEL
	INCLUDING
< 1.4 % CAS100414	ETHYLBENZENE A toxic chemical subject to the reporting requirements of

Section 313 of Title III of the Superfund Amendments and
Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
125ppm ACGIH STEL
100ppm OSHA TWA
125ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 0.9 % XYLENE-P
CAS106423 A toxic chemical subject to the reporting requirements of
Section 313 of Title III of the Superfund Amendments and
Reauthorization Act of 1986 and 40 CFR Part 372.
150 ppm ACGIH STEL
CERCLA 302.4 RQ=1000 POUNDS

< 4.6 % XYLENE-M
CAS108383 A toxic chemical subject to the reporting requirements of
Section 313 of Title III of the Superfund Amendments and
Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 2.2 % XYLENE-O
CAS95476 A toxic chemical subject to the reporting requirements of
Section 313 of Title III of the Superfund Amendments and
Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
CERCLA 302.4 RQ=1000 POUNDS

< 6.5 % TOLUENE
CAS108883 A toxic chemical subject to the reporting requirements of
Section 313 of Title III of the Superfund Amendments and
Reauthorization Act of 1986 and 40 CFR Part 372.
100ppm ACGIH TLV
150ppm ACGIH STEL
100ppm OSHA TWA
150ppm OSHA STEL
300 ppm OSHA CEILING
CERCLA 302.4 RQ=1000 POUNDS

< 3.0 % HEXANE
CAS110543 50ppm ACGIH TLV
1000 ppm ACGIH STEL
50ppm OSHA TWA

< 2.4 % CYCLOHEXANE
CAS110827 A toxic chemical subject to the reporting requirements of
Section 313 of Title III of the Superfund Amendments and

Reauthorization Act of 1986 and 40 CFR Part 372.
300ppm ACGIH TLV
300ppm OSHA TWA
CERCLA 302.4 RQ=1000 POUNDS

< 15.0 % METHYL TERT BUTYL ETHER
CAS1634044 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

< 4.9 % BENZENE
CAS71432 A toxic chemical subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.
10ppm ACGIH TLV
1ppm OSHA TWA
5ppm OSHA STEL
25 ppm OSHA CEILING
CERCLA 302.4 RQ=10 POUNDS

Refer to the OSHA Benzene Standard (29 CFR 1910.1028) for detailed training, exposure monitoring, respiratory protection and medical surveillance requirements before using this product.

TLV - Threshold Limit Value	TWA - Time Weighted Average
STEL - Short-term Exposure Limit	TPQ - Threshold Planning Quantity
RQ - Reportable Quantity	CPS - CUSA Product Code
CC - Chevron Chemical Company	CAS - Chemical Abstract Service Number

10. REGULATORY INFORMATION

DOT basic descriptions can vary based on package quantity and may not coincide with international description requirements. Consult the Hazardous Materials Regulations in 49CFR and the appropriate Dangerous Goods Regulations to confirm description applicability to specific shipments.

DOT SHIPPING NAME: GASOLINE
DOT HAZARD CLASS: FLAMMABLE LIQUID
DOT IDENTIFICATION NUMBER: UN1203

SARA 311 CATEGORIES:
1. Immediate (Acute) Health Effects; YES
2. Delayed (Chronic) Health Effects; YES
3. Fire Hazard; YES
4. Sudden Release of Pressure Hazard; NO
5. Reactivity Hazard; NO

The following components of this material are found on the regulatory lists indicated by the number below the component name:

ETHYLBENZENE
is found on lists: 01,02,10,11,12,13,14,15,17,18,26,28,

XYLENE-P
is found on lists: 01,02,10,11,12,15,26,28,
XYLENE-M
is found on lists: 01,02,10,11,12,14,15,17,18,26,28,
TOLUENE
is found on lists: 01,02,04,10,11,12,13,14,15,17,18,26,28,29,
HEXANE
is found on lists: 02,10,11,13,14,15,17,28,
CYCLOHEXANE
is found on lists: 01,02,10,11,12,13,14,17,26,28,
METHYL TERT BUTYL ETHER
is found on lists: 01,10,11,21,24,26,
BENZENE
is found on lists: 01,02,03,04,06,10,11,12,13,14,17,18,20,28,29,
XYLENE-O
is found on lists: 01,02,10,11,12,14,15,17,18,26,28,
GASOLINE (GENERIC)
is found on lists: 04,08,14,15,17,18,20,

REGULATORY LISTS SEARCHED:

01=SARA 313	02=MASS RTK	03=NTP Carcinogen
04=CA Prop. 65	05=MI 406	06=IARC Group 1
07=IARC Group 2A	08=IARC Group 2B	09=SARA 302/304
10=PA RTK	11=NJ RTK	12=CERCLA 302.4
13=MN RTK	14=ACGIH TLV	15=ACGIH STEL
16=ACGIH Calculated TLV	17=OSHA TWA	18=OSHA STEL
19=Chevron TLV	20=EPA Carcinogen	21=TSCA Sect 4(e)
22=TSCA Sect 5(a)(e)(f)	23=TSCA Sect 6	24=TSCA Sect 12(b)
25=TSCA Sect 8(a)	26=TSCA Sect 8(d)	28=Canadian WHMIS
29=OSHA CEILING		

11. PRODUCT TOXICOLOGY DATA

EYE IRRITATION:
The Draize Eye Irritation Score (range, 0-110) in rabbits is 0.
SKIN IRRITATION:
The Draize Skin Primary Irritation Score (range, 0-8) for a 4-hour exposure (rabbits) is 0.98. This material was not a skin sensitizer in the modified Buehler Guinea Pig Sensitization Test.
DERMAL TOXICITY:
The dermal LD50 in rabbits is > 5 ml/kg.
RESPIRATORY/INHALATION:
No product toxicology data available.
INGESTION:
The oral LD50 in rats is > 5 ml/kg.
ADDITIONAL TOXICOLOGY DATA:
Lifetime inhalation of whole gasoline vapor has caused increased liver tumors in female mice. The mechanism of this response is still being investigated but it is thought to be an epigenetic process unique to the female mouse. Inhalation exposure to whole gasoline vapor also caused kidney damage and eventually kidney cancer in male rats. No other animal

model studied has shown these adverse kidney effects and there is no physiological reason to believe that they would occur in man.

The data above is obtained from studies sponsored by the American Petroleum Institute (API).

12. ADDITIONAL HEALTH DATA

ADDITIONAL HEALTH DATA COMMENT:
This product contains benzene. The OSHA Benzene Standard (29 CFR 1910.1028) contains detailed requirements for training, exposure monitoring, respiratory protection and medical surveillance triggered by the exposure level. Refer to the OSHA Standard before using this product. Repeated or prolonged breathing of benzene vapors has been associated with the development of chromosomal damage in experimental animals and various blood diseases in humans ranging from aplastic anemia to leukemia (a form of cancer). All of these diseases can be fatal. No birth defects have been shown to occur in pregnant laboratory animals exposed to doses not toxic to the mother. However, some evidence of fetal toxicity such as delayed physical development has been seen at such levels. The available information on the effects of benzene on human pregnancies is inadequate but it has been established that benzene can cross the human placenta.

This product contains n-hexane. Prolonged or repeated skin contact or breathing of vapors may cause nerve damage characterized by progressive weakness and numbness in the arms and legs. Recovery ranges from no recovery to complete recovery depending upon the severity of the nerve damage.

This product contains toluene. Toluene has been reported to decrease immunological responses in test animals. It has also been reported that when young rats were exposed to 1000 ppm toluene for 14 hours daily, for two weeks, irreversible hearing loss was detected. The same daily exposure to 700 ppm for as long as 16 weeks was without effect. Since the level necessary to produce hearing loss is greater than 7 times the ACGIH TLV-TWA for toluene, worker exposures at or below 100 ppm is not expected to cause any adverse effects. There are also reports that chronic solvent abusers (glue sniffers, solvent huffers) who deliberately inhale high concentrations (several thousand ppm) of toluene for prolonged periods (up to ten hours/day) have suffered liver, kidney and brain damage. Toluene may also cause mental and/or growth retardation in the children of female solvent abusers who directly inhale toluene when they are pregnant. Toluene caused growth retardation in rats when administered at doses that were toxic to the mothers (1500 ppm). Concentrations of up to 5000 ppm did not cause birth defects. There were no effects in the offspring at doses that did not intoxicate the pregnant rats. The exposure level at which no effects were seen (No Observed Effect Level, NOEL) is 750 ppm. We recommend that the precautions outlined in this MSDS be followed to keep toluene concentrations below the recommended exposure standards.

This product contains xylene, a chemical that has been reported to cause developmental toxicity in rats and mice exposed by inhalation during

pregnancy. The effects noted consisted of delayed development and minor skeletal variations; additionally, when pregnant mice were exposed by ingestion to a level that killed nearly one-third of the test group, lethality (resorptions) and malformations (primarily cleft palate) occurred. Malformations have not been reported following inhalation exposure. Because of the very high levels of exposure used in these studies, we do not believe that their results imply an increased risk of reproductive toxicity to workers exposed to xylene levels at or below the exposure standard.

Xylene has given negative results in several mutagen testing assays including the Ames assay. In a cancer study sponsored by the National Toxicology Program (NTP), technical grade xylene gave no evidence of carcinogenicity in rats or mice dosed daily for two years.

This product contains methyl tert butyl ether (MTBE). Most mutagenicity data on MTBE, except for the in vitro mouse lymphoma test, indicate that it is not mutagenic. MTBE caused birth defects in mice exposed to 8,000 ppm throughout pregnancy. No birth defects were observed in mice at 1,000 ppm or in rats or rabbits at any dose of MTBE. These results suggest that the risk of birth defects in humans from MTBE is negligible at the anticipated exposure concentrations.

Whole gasoline exhaust was reviewed by the International Agency for Research on Cancer (IARC) in their Monograph Volume 46 (1989). Evidence for causing cancer was considered inadequate in animals and inadequate in humans. IARC placed whole gasoline exhaust in Category 2B, considering it possibly carcinogenic to humans.

****

The above information is based on the data of which we are aware and is believed to be correct as of the date hereof. Since this information may be applied under conditions beyond our control and with which we may be unfamiliar and since data made available subsequent to the date hereof may suggest modification of the information, we do not assume any responsibility for the results of its use. This information is furnished upon condition that the person receiving it shall make his own determination of the suitability of the material for his particular purpose.

ATTACHMENT C

Field Team Review Form

ATTACHMENT C

Field Team Review Form

I have read and reviewed the most recent revision, dated March 2, 1992, of the project-specific Health and Safety Plan (HASP) for work at the Bingo Fuel Stop site in Thorp, Washington. I have been given a chance to ask questions regarding the project-specific HASP and understand the information contained therein. I agree to comply with all aspects of the project-specific HASP.

Name: _____

Signature: _____

Date: _____

Completed copies of this form should be forwarded to the AGI Health and Safety Manager.

APPENDIX B

Soil Sampling Records

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 1 of 2

Project: Burns Bros. / Thorp
Project No.: 15,659.001
Location: Thorp WA
Date: 3-11-92
Sampled by: David Dawson
Reviewed by: PPB

NO.	Sample No.:	S1	S2	S3
	Time collected:	11:38	11:55	13:55
LOCATION	Location:	South Wall Ex/ @ 8'	East Wall Ex/ @ 9'	North Wall Ex/ @ 8'
	Depth:	8'	9'	8'
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)	No		
	Cooled by?	11:42	12:00	14:15
SAMPLE DESCRIPTION	Soil Description/ Classification:	Blue to Gray Silty Sand (SP)	Blue to Gray Gravelly Sand (SW)	Blue to Gray Sandy Gravel (GW)
	Odor:	Moderate	Moderate to Strong Heavy	Strong
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	Ø	Ø	
	Head Space Analysis: Reading	178 ppm	337 ppm	371 ppm
DISPOSITION	Split: Name:	No	No	No
	Split: Organization:	No	No	No
	Duplicate No.:			
	Archive: (Yes/No)	NO	No	No
	AGI Lab: (Yes/No)	NO	No	No
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:	3-12-92 →	→	→
	Delivery method:	Fed Ex →	→	→
	Chain of Custody No.:			
COMMENTS:		ATI 560 Naches Ave S.W. Suite 101 Renton Wa 98055 228-8335		

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 2 of 2

Project: Burns Bros. / Thorp
Date: 3-11-92
Project No.: 15,659.001
Sampled by: David Dawson
Location: Thorp WA
Reviewed by: PPB

NO.	Sample No.:	S4	~~S3~~	
	Time collected:	1410		
LOCATION	Location:	West Wall Ex / @ 8'		
	Depth:	8'		
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)	No		
	Cooled by?	14:15		
SAMPLE DESCRIPTION	Soil Description/ Classification:	Blue to Gray Sandy Gravel (GW)		
	Odor:	Moderate		
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	0 ~~205~~ ppm		
	Head Space Analysis: Reading	205 ppm		
DISPOSITION	Split: Name:	No		
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO		
	AGI Lab: (Yes/No)	NO		
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:	3-12-92		
	Delivery method:	Fed Express		
	Chain of Custody No.:			

COMMENTS:

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 1 of 2

Project: Burns Bros. / Thorp Date: 3-12-92
Project No.: 15,659.001 Sampled by: David Dawson
Location: Thorp WA Reviewed by: PPB

NO.	Sample No.:	S5	S6	S7
	Time collected:	1037	1048	1132
LOCATION	Location:	S. Wall Ex 2 @ 7½'	W. Wall Ex 2 @ 8'	N. Wall Ex 2 @ 8'
	Depth:	7½'	8'	8'
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)	No		
	Cooled by?	10:45	10:50	1140
SAMPLE DESCRIPTION	Soil Description/ Classification:	Gray to Blue. Sandy Gravel (GW) →	→	→
	Odor:	Moderate to Strong →	→	→
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	Ø	Ø	Ø
	Head Space Analysis: Reading	327	263	291
DISPOSITION	Split: Name:			
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO		
	AGI Lab: (Yes/No)	NO		
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:			
	Delivery method:			
	Chain of Custody No.:			
COMMENTS:				

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 2 of 2

Project: Burn Bros / Thorp
Project No.: 15,659.001
Location: Thorp WA
Date: 3-12-92
Sampled by: DPD
Reviewed by: PPB

NO.	Sample No.:	S8	S9	
	Time collected:	1137		
LOCATION	Location:	E. Wall Ex2 @ 8'	15'E / 30'S of SE corner of Bldg	
	Depth:	8'	3'	
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →		
	Container:	8oz Glass →		
	Composited: (Yes/No)	No		
	Cooled by?	1141		
SAMPLE DESCRIPTION	Soil Description/ Classification:	Blue to Gray Sandy Gravel (GW)	Gray to Brown Sandy Gravel (GW)	
	Odor:	Strong to Mod	Moderate	
	Head Space Analysis: Instrument	OVM #8	OVM #8 →	
	Head Space Analysis: Background	Ø	Ø	
	Head Space Analysis: Reading	199 ppm	43 ppm	
DISPOSITION	Split: Name:			
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	No	No	
	AGI Lab: (Yes/No)	No	No	
	Other: (Describe)			
	Name of analytic lab:	ATI	ATI	
	Date sent:	3-13-92	3-13-92	
	Delivery method:	Courier →		
	Chain of Custody No.:			

COMMENTS:

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 1 of 3

Project: Burns Bros. / Thorp
Project No.: 15,659.001
Location: Thorp WA
Date: 3-13-92
Sampled by: David Dawson
Reviewed by: PPB

NO.	Sample No.:	S10	S11	S12
	Time collected:	1039	1059	1353
LOCATION	Location:	U. Lead P. 25' South & 15' East of SW corner of Bldg.	U. Lead P. 38' West & 23' South of S.W corner of Bldg	Diesle P. 75' W. & 20' S. of SW corner of Bldg.
	Depth:	4'	3'	3'
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)	No	No	No
	Cooled by?	10:45	11:05	1358
SAMPLE DESCRIPTION	Soil Description/ Classification:	Blue to Gray Silt (ML)	—	Blue to Gray Sandy Silt
	Odor:	Strong →	→	Light
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	Ø	Ø	Ø
	Head Space Analysis: Reading	236 ppm	202 ppm	6 ppm
DISPOSITION	Split: Name:			
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO	No	No
	AGI Lab: (Yes/No)	NO	NO	No
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:	3-13-92 →	→	→
	Delivery method:	I delivered →	→	→
	Chain of Custody No.:			

COMMENTS:

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 2 of 3

Project: Burns Bros. / Thorp Date: 3-13-92
Project No.: 15,659.001 Sampled by: David Dawson
Location: Thorp WA Reviewed by: PPB

NO.	Sample No.:	S13	S14	S15
	Time collected:	1440	1453	1425
LOCATION	Location:	Diesle P. 115' West & 20' South of SW corner of Bld.	Diesle P. 120' West & 20' S. of SW corner of Bld	East Wall Ex. 3 (Heaton) @ 7' bgs
	Depth:	3'	4'	7'
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)	No →	→	→
	Cooled by?	1448	1456	1435
SAMPLE DESCRIPTION	Soil Description/ Classification:	Brown Silt (MH)	Brown Sandy Silt (ML)	Blue to Gray Sandy Silt (ML)
	Odor:	None	Slight	Slight
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	Ø	Ø	Ø
	Head Space Analysis: Reading	2 ppm	14 ppm	5 ppm
DISPOSITION	Split: Name:			
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO	NO	NO
	AGI Lab: (Yes/No)	NO	NO	NO
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:	3-13-92 →	→	→
	Delivery method:	I delivered →	→	→
	Chain of Custody No.:			
COMMENTS:				

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 3 of 3

Project: Burns Bros. / Thorp
Project No.: 15,659.001
Location: Thorp WA
Date: 3-13-92
Sampled by: David Dawson
Reviewed by: AMB

NO.	Sample No.:	S16	S18	S19
	Time collected:	1430	1150	0955
LOCATION	Location:	South Wall Ex. 3 (heat oil) @ 8'	Pump Island #1 Below 2 Pumps @ 2'	Pump Island #2 Below 2 Pumps @ 2½'
	Depth:	8'	2'	2½'
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)	No	Yes	Yes
	Cooled by?	1435	1155	0958
SAMPLE DESCRIPTION	Soil Description/ Classification:	Blue to Brown Gravelly Silty Sand (SP) w.	Brown Sandy Gravel (GW)	Brown to Black Gravelly Sand (SW)
	Odor:	None	Slight	Moderate
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	Ø	Ø	Ø
	Head Space Analysis: Reading	2 ppm	11 ppm	38 ppm
DISPOSITION	Split: Name:			
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO	No	No
	AGI Lab: (Yes/No)	NO	No	No
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:	3-13-92 →	→	→
	Delivery method:	I delivered →	→	→
	Chain of Custody No.:			
COMMENTS:				

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 1 of 2

Project: Burns Bros. / Thorp
Project No.: 15,659.001
Location: Thorp WA
Date: 3-16-92
Sampled by: David Dawson
Reviewed by: PAB

NO.	Sample No.:	520	521	522
	Time collected:	1359	0850	0926
LOCATION	Location:	Composite Pump Is. #4 @ 5'	Composite Pump Is #4 @ 5'	Composite Pump Is #5 @ 5'
	Depth:		5'	5'
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)		Yes	Yes
	Cooled by?		0853	0930
SAMPLE DESCRIPTION	Soil Description/ Classification:	Blue to Gray Sandy Gravel (GW)	Blue to Gray Sandy Gravel (GW) →	→
	Odor:	Strong	Strong	Strong
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	Ø	Ø	Ø
	Head Space Analysis: Reading	327 ppM	321 ppM	434 ppM
DISPOSITION	Split: Name:	NO	NO	NO
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO	No	No
	AGI Lab: (Yes/No)	NO	NO	No
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:			
	Delivery method:			
	Chain of Custody No.:			
COMMENTS:				

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 2 of 2

Project: Burns Bros. / Thorp Date: 3-16-92
Project No.: 15,659.001 Sampled by: David Dawson
Location: Thorp WA Reviewed by: PMB

NO.	Sample No.:	S 23	S24	
	Time collected:	1302	1315	
LOCATION	Location:	Diesle P. 90 west of Pump Is. 44.e5'	Diesle P. Between Pump Is 45 e5'	
	Depth:	5'	5'	
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)	No	No	
	Cooled by?	13:08	13:19	
SAMPLE DESCRIPTION	Soil Description/ Classification:	Blue to Gray Sandy Gravel →	→	
	Odor:	Strong	Slight	
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	Ø	Ø	
	Head Space Analysis: Reading	265 ppm	7 ppm	
DISPOSITION	Split: Name:	No	No	
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO	No	
	AGI Lab: (Yes/No)	NO	No	
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:			
	Delivery method:			
	Chain of Custody No.:			

COMMENTS:

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 1 of 2

Project: Burns Bros. / Thorp Date: 3-17-92
Project No.: 15,659.001 Sampled by: David Dawson
Location: Thorp WA Reviewed by: PRB

NO.	Sample No.:	S17	S26	S27
	Time collected:	1043	1346	1338
LOCATION	Location:	Diesel Pi Line S.W. corner of Bld. e	leaded & Unleaded gas line T Between Pump IS 6 & 7	Composite Below Pump IS #7
	Depth:	2'	3'	3'
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →	→	→
	Container:	8 oz glass →	→	→
	Composited: (Yes/No)	No	No	Yes
	Cooled by?	1046	1405	1405
SAMPLE DESCRIPTION	Soil Description/ Classification:	Brown Sandy Gravel (GW)	Blue to Green Silt (ML)	Composite Brown Sand (SP) Sandy Silt (ML) Blue to Green
	Odor:	Strong	Strong	Strong
	Head Space Analysis: Instrument	OVM #8 →	→	→
	Head Space Analysis: Background	Ø	Ø	
	Head Space Analysis: Reading	167 PPM	1249 PPM	4021 PPM
DISPOSITION	Split: Name:			
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO	No	No
	AGI Lab: (Yes/No)	NO	No	NO
	Other: (Describe)			
	Name of analytic lab:	ATI →	→	→
	Date sent:	3-18-92 →	→	→
	Delivery method:	I deliver →	→	→
	Chain of Custody No.:			
COMMENTS:				

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 2 of 2

Project: Burns Bros. / Thorp
Date: 3-17-92
Project No.: 15,659.001
Sampled by: David Dawson
Location: Thorp WA
Reviewed by: PPB

NO.	Sample No.:	528		
	Time collected:	1400		
LOCATION	Location:	Composite. Below Pump Is #6		
	Depth:	3'		
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →		→
	Container:	8 oz glass →		→
	Composited: (Yes/No)	Yes		
	Cooled by?	1405		
SAMPLE DESCRIPTION	Soil Description/ Classification:	Blue to Gray Silt (ML)		
	Odor:	Strong		
	Head Space Analysis: Instrument	OVM #8 →		→
	Head Space Analysis: Background	Ø		
	Head Space Analysis: Reading	1016 ppm		
DISPOSITION	Split: Name:	No		
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO		
	AGI Lab: (Yes/No)	NO		
	Other: (Describe)			
	Name of analytic lab:	ATI →		→
	Date sent:	3-18-92		
	Delivery method:	I delivered.		
	Chain of Custody No.:			
COMMENTS:				

Applied Geotechnology Inc.

SOIL SAMPLING RECORD

Sheet 1 of 1

Project: Burns Bros. / Thorp
Date: 3-18-92
Project No.: 15,659.001
Sampled by: David Dawson
Location: Thorp WA
Reviewed by: PPB

NO.	Sample No.:	529		
	Time collected:	1504		
LOCATION	Location:	Clean Soil Stockpile		
	Depth:	NA		
	Surface Elev.: (feet)			
SAMPLING	Sampling method:	Grab →		
	Container:	8 oz glass →		
	Composited: (Yes/No)	~~No~~ Yes		
	Cooled by?	1511		
SAMPLE DESCRIPTION	Soil Description/ Classification:	Brown Gravelly Sandy Silt (ML)		
	Odor:	No		
	Head Space Analysis: Instrument	OVM #8 →		
	Head Space Analysis: Background	Ø		
	Head Space Analysis: Reading	2 ppm		
DISPOSITION	Split: Name:			
	Split: Organization:			
	Duplicate No.:			
	Archive: (Yes/No)	NO		
	AGI Lab: (Yes/No)	NO		
	Other: (Describe)			
	Name of analytic lab:	ATI →		
	Date sent:	3-18-92		
	Delivery method:	I delivered		
	Chain of Custody No.:			
COMMENTS:				

APPENDIX C

Quality Assurance Report
Laboratory Analytical Reports

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–110
Sample No.: S1/S. WALL EX.1 @ 8', S2/E. WALL EX.1 @ 9', S3/N. WALL EX.1 @ 8', S4/W. WALL EX.1 8', S5/S. WALL EX.2 @ 7.5', S6/W. WALL EX.2 @ 8', S7/N. WALL EX.2 8', S8/E. WALL EX.2 @ 8', S9/U LEAD P. SE OF BLDG

Matrix: Soil

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality except for the following:

EPA Method 8240: Methylene choride is considered not detected in sample S1/S. Wall EX.1 @ 8' in accordance with USEPA guidelines.

ANALYTICAL METHODS

Parameter	Technique	Method
Volatile Organics	GCMS	EPA 8240
BETX	GC/PID	EPA 8020
Fuel Hydrocarbons	GC/FID	EPA 8015 Modified
Lead	AA/GF	EPA 7420
Moisture	GRAVIMETRIC	CLP SOW ILMO1.0

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
Volatile Organics a	03/11/92	03/17/92	03/22/92	6	11 (14)
Volatile Organics b	03/11/92	03/20/92	03/24/92	9	13 (14)
BETX c	03/11/92	03/14/92	03/16/92	3	5 (14)
BETX d	03/12/92	03/14/92	03/18/92 e	2	6 (14)
Fuel Hydrocarbons a	03/11/92	03/14/92	03/16/92 f	3	5 (14)
Fuel Hydrocarbons b	03/12/92	03/14/92	03/16/92 f	2	4 (14)
Lead a	03/11/92	03/19/92	03/23/92	8	12 (180)
Lead b	03/12/92	03/19/92	03/23/92	7	11 (180)

a – Sample S1/S. WALL EX.1 @ 8'
b – Sample S3/N. WALL EX.1 @ 8'
c – Samples S1/2. WALL EX.1 @ 8', S2/E. WALL EX.1 @ 9', S3/N. WALL EX.1 @ 8', S4/W. WALL EX.1 @ 8'
d – Samples S5/S. WALL EX.2 @ 7.5, S6/W. WALL EX.2 @ 8', S7/N. WALL EX.2 8', S8/E. WALL EX.2 @ 8', S9/U LEAD P. SE OF BLDG
e – Samples S5/S. WALL EX.2 @ 7.5 and S6/W. WALL EX.2 @ 8' were analyzed on 3/16/92.
f – Samples S4/W. WALL EX.1 @ 8', S5/S. WALL EX.2 @ 7.5', and S6/W. Wall EX.2 @ 8' analyzed on 3/15/92.
Numbers in parentheses ( ) indicate recommended holding times in days for soil.

All samples were extracted and analyzed within recommended holding times for soil.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–110
Sample No.: S1/S. WALL EX.1 @ 8', S2/E. WALL EX.1 @ 9', S3/N. WALL EX.1 @ 8', S4/W. WALL EX.1 8', S5/S. WALL EX.2 @ 7.5', S6/W. WALL EX.2 @ 8', S7/N. WALL EX.2 8', S8/E. WALL EX.2 @ 8', S9/U LEAD P. SE OF BLDG

FUEL HYDROCARBON CHEMISTRY

EPA Method 8015 Modified: The presence of petroleum hydrocarbons in the range expected for gasoline and diesel has been confirmed by chromatogram for samples S1/S. WALL EX.1 @ 8', S2/E. WALL EX.1 @ 9', S3/N. WALL EX.1 @ 8', S4/W. WALL EX.1 @ 8', S6/W. WALL EX.2 @ 8', S7/N. WALL EX.2 @ 8', and S8/E. WALL EX.2 @ 8'. The presence of petroleum hydrocarbons in the range expected for gasoline is confirmed by chromatogram for sample S9/U LEAD P. SE OF BLDG. The profiles of the first three samples listed above for which the presence of diesel and gasoline range hydrocarbons is confirmed have profiles which indicate diesel fuel as the major constituent. Samples S7/N. WALL EX.2 @ 8' and S8/E. WALL EX.2 @ 8' have chromatogram profiles which indicate gasoline as the major constituent.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
EPA 8015 Modified
EPA 7420

EPA 8240: No analytes were detected at or above their method reporting limits except for methylene chloride (0.18 mg/kg Reagent blank analyzed 3/23/92 and 0.16 mg/kg Reagent blank analyzed 3/22/92) and hexane (0.40 mg/kg 3/23/92, 0.35 mg/kg 3/23/92). Methylene chloride was detected in sample S1/S. WALL EX.1 @ 8' at 0.56 mg/kg. This level is less than 10 times the amount detected in the reagent blank associated with this sample and therefore methylene chloride is considered not detected in accordance with USEPA guidelines.

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and/or sample/sample duplicate relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8240
EPA 8020
EPA 8015 Modified
EPA 7420

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–110
Sample No.: S1/S. WALL EX.1 @ 8', S2/E. WALL EX.1 @ 9', S3/N. WALL EX.1 @ 8', S4/W. WALL EX.1 8', S5/S. WALL EX.2 @ 7.5', S6/W. WALL EX.2 @ 8', S7/N. WALL EX.2 8', S8/E. WALL EX.2 @ 8', S9/U LEAD P. SE OF BLDG

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8240

EPA 8015 Modified: All surrogate percent recoveries are within ATI's control limits except for recoveries from samples S1/S. WALL EX.1 @ 8', S2/E. WALL EX.1 @ 9', and S3/N. WALL EX.1 @ 8'. The recoveries from these samples were out of limits due to matrix interferences. All three samples had high concentrations of petroleum hydrocarbons. Data for these samples are considered acceptable.

EPA 8020: All surrogate percent recoveries are within ATI's control limits except for the recoveries from samples S2/E. WALL EX.1 @ 9' and S8/E. WALL EX.2 @ 8'. The former had matrix interference due to high concentrations of petroleum hydrocarbons. The latter sample was diluted by 500 times and the resultant surrogate concentration was below the method reporting limit. The data for all samples are considered acceptable.

SIGNATURES

Prepared by Thomas A. Murce **Date** 4/9/92
Checked by Katherine A. Hill **Date** 4/9/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9203-110

RECEIVED
APR - 3 1992
APPLIED GEOTECHNOLOGY INC.

April 1, 1992

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

:tention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros./Thorp

On March 13, 1992, Analytical Technologies, Inc., received nine soil samples for analysis. The samples were analyzed with EPA methodology r equivalent methods as specified in the attached analytical schedule. .he results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Laboratory Manager

FWG/hal/rmn

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9203-110-1	S1/S. WALL EX.1 @ 8'	03/11/92	SOIL
9203-110-2	S2/E. WALL EX.1 @ 9'	03/11/92	SOIL
9203-110-3	S3/N. WALL EX.1 @ 8'	03/11/92	SOIL
9203-110-4	S4/W. WALL EX.1 @ 8'	03/11/92	SOIL
9203-110-5	S5/S. WALL EX.2 @ 7.5'	03/12/92	SOIL
9203-110-6	S6/W. WALL EX.2 @ 8'	03/12/92	SOIL
203-110-7	S7/N. WALL EX.2 @ 8'	03/12/92	SOIL
9203-110-8	S8/E. WALL EX.2 @ 8'	03/12/92	SOIL
9203-110-9	S9/U LEAD P. SE OF BLDG	03/12/92	SOIL

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	9

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
VOLATILE ORGANIC COMPOUNDS	GCMS	EPA 8240	R
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
EAD	AA/F	EPA 7420	R
MOISTURE	GRAVIMETRIC	CLP SOW ILM01.0	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP

CASE NARRATIVE: VOLATILE ORGANICS ANALYSIS

Sample 9203-110-3 (S3/N. Wall Ex.1 @ 8') was analyzed at a ten fold dilution because of the presence of high levels of hydrocarbon contamination. No other problems or discrepancies are noted with this accession number. The data are corrected for percent moisture.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/22/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8240	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
ACETONE	<1.0
BENZENE	<0.050
BROMODICHLOROMETHANE	<0.050
BROMOFORM	<0.25
BROMOMETHANE	<0.50
-BUTANONE (MEK)	<0.50
CARBON DISULFIDE	<0.050
CARBON TETRACHLORIDE	<0.050
CHLOROBENZENE	<0.050
CHLOROETHANE	<0.050
CHLOROFORM	<0.050
CHLOROMETHANE	<0.50
DIBROMOCHLOROMETHANE	<0.050
,1-DICHLOROETHANE	<0.050
1,2-DICHLOROETHANE	<0.050
1,1-DICHLOROETHENE	<0.050
1,2-DICHLOROETHENE (TOTAL)	<0.050
1,2-DICHLOROPROPANE	<0.050
CIS-1,3-DICHLOROPROPENE	<0.050
TRANS-1,3-DICHLOROPROPENE	<0.050
ETHYLBENZENE	<0.050
-HEXANONE (MBK)	<0.50
-METHYL-2-PENTANONE (MIBK)	<0.50
METHYLENE CHLORIDE	0.16 J
STYRENE	<0.050
1,1,2,2-TETRACHLOROETHANE	<0.050
TETRACHLOROETHENE	<0.050
TOLUENE	<0.050
1,1,1-TRICHLOROETHANE	<0.050
1,1,2-TRICHLOROETHANE	<0.050
TRICHLOROETHENE	<0.050
VINYL ACETATE	<0.50
VINYL CHLORIDE	<0.050
TOTAL XYLENES	<0.050

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4	126
TOLUENE-D8	111
BROMOFLUOROBENZENE	97

J = Estimated value.

Analytical Technologies, Inc.

ATI I.D. # 9203-110

VOLATILE ORGANIC ANALYSIS
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/22/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8240	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	FLAG	SCAN	ESTIMATED CONCENTRATION
HEXANE		291	0.35

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/20/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/23/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8240	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
ACETONE	<1.0
BENZENE	<0.050
BROMODICHLOROMETHANE	<0.050
BROMOFORM	<0.25
BROMOMETHANE	<0.50
·BUTANONE (MEK)	<0.50
CARBON DISULFIDE	<0.050
CARBON TETRACHLORIDE	<0.050
CHLOROBENZENE	<0.050
CHLOROETHANE	<0.050
CHLOROFORM	<0.050
CHLOROMETHANE	<0.50
DIBROMOCHLOROMETHANE	<0.050
,1-DICHLOROETHANE	<0.050
,2-DICHLOROETHANE	<0.050
1,1-DICHLOROETHENE	<0.050
1,2-DICHLOROETHENE (TOTAL)	<0.050
1,2-DICHLOROPROPANE	<0.050
CIS-1,3-DICHLOROPROPENE	<0.050
TRANS-1,3-DICHLOROPROPENE	<0.050
ETHYLBENZENE	<0.050
-HEXANONE (MBK)	<0.50
-METHYL-2-PENTANONE (MIBK)	<0.50
METHYLENE CHLORIDE	0.18 J
STYRENE	<0.050
1,1,2,2-TETRACHLOROETHANE	<0.050
TETRACHLOROETHENE	<0.050
TOLUENE	<0.050
1,1,1-TRICHLOROETHANE	<0.050
1,1,2-TRICHLOROETHANE	<0.050
TRICHLOROETHENE	<0.050
VINYL ACETATE	<0.50
VINYL CHLORIDE	<0.050
TOTAL XYLENES	<0.050

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4	122
TOLUENE-D8	107
BROMOFLUOROBENZENE	97

J = Estimated value.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANIC ANALYSIS
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/20/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/23/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8240	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	FLAG	SCAN	ESTIMATED CONCENTRATION
HEXANE		292	0.40

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/20/92
CLIENT I.D.	: S1/S.WALL EX.1 @ 8'	DATE ANALYZED	: 03/24/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8240	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
ACETONE	<1.2
BENZENE	<0.062
BROMODICHLOROMETHANE	<0.062
BROMOFORM	<0.31
BROMOMETHANE	<0.62
-BUTANONE (MEK)	<0.62
CARBON DISULFIDE	<0.062
CARBON TETRACHLORIDE	<0.062
CHLOROBENZENE	<0.062
CHLOROETHANE	<0.062
CHLOROFORM	<0.062
CHLOROMETHANE	<0.62
DIBROMOCHLOROMETHANE	<0.062
,1-DICHLOROETHANE	<0.062
1,2-DICHLOROETHANE	<0.062
1,1-DICHLOROETHENE	<0.062
1,2-DICHLOROETHENE (TOTAL)	<0.062
1,2-DICHLOROPROPANE	<0.062
CIS-1,3-DICHLOROPROPENE	<0.062
TRANS-1,3-DICHLOROPROPENE	<0.062
ETHYLBENZENE	<0.062
-HEXANONE (MBK)	<0.62
-METHYL-2-PENTANONE (MIBK)	<0.62
METHYLENE CHLORIDE	0.56 B
STYRENE	<0.062
1,1,2,2-TETRACHLOROETHANE	<0.062
TETRACHLOROETHENE	<0.062
TOLUENE	<0.062
1,1,1-TRICHLOROETHANE	<0.062
1,1,2-TRICHLOROETHANE	<0.062
TRICHLOROETHENE	<0.062
VINYL ACETATE	<0.62
VINYL CHLORIDE	<0.062
TOTAL XYLENES	1.4

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4	108
TOLUENE-D8	94
BROMOFLUOROBENZENE	105

B = Analyte is found in the associated blank as well as the sample.

Analytical Technologies, Inc.

ATI I.D. # 9203-110-1

VOLATILE ORGANIC ANALYSIS
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/20/92
CLIENT I.D.	: S1/S.WALL EX.1 @ 8'	DATE ANALYZED	: 03/24/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8240	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	FLAG	SCAN	ESTIMATED CONCENTRATION
UNKNOWN HYDROCARBON		1166	12
UNKNOWN HYDROCARBON		1213	10
UNKNOWN HYDROCARBON		1231	9.3
APHTHALENE, DECAHYDRO-1,5-DIMETHYL-		1273	8.6
UNKNOWN HYDROCARBON		1293	7.4

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-3

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S3/N. WALL EX.1 @ 8'	DATE ANALYZED	: 03/22/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8240	DILUTION FACTOR	: 10

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
ACETONE	<12
BENZENE	<0.59
BROMODICHLOROMETHANE	<0.59
BROMOFORM	<2.9
BROMOMETHANE	<5.9
-BUTANONE (MEK)	<5.9
CARBON DISULFIDE	<0.59
CARBON TETRACHLORIDE	<0.59
CHLOROBENZENE	<0.59
CHLOROETHANE	<0.59
CHLOROFORM	<0.59
CHLOROMETHANE	<5.9
DIBROMOCHLOROMETHANE	<0.59
,1-DICHLOROETHANE	<0.59
,2-DICHLOROETHANE	<0.59
1,1-DICHLOROETHENE	<0.59
1,2-DICHLOROETHENE (TOTAL)	<0.59
1,2-DICHLOROPROPANE	<0.59
CIS-1,3-DICHLOROPROPENE	<0.59
TRANS-1,3-DICHLOROPROPENE	<0.59
ETHYLBENZENE	<0.59
-HEXANONE (MBK)	<5.9
-METHYL-2-PENTANONE (MIBK)	<5.9
METHYLENE CHLORIDE	<2.9
STYRENE	<0.59
1,1,2,2-TETRACHLOROETHANE	<0.59
TETRACHLOROETHENE	<0.59
TOLUENE	<0.59
1,1,1-TRICHLOROETHANE	<0.59
1,1,2-TRICHLOROETHANE	<0.59
TRICHLOROETHENE	<0.59
VINYL ACETATE	<5.9
VINYL CHLORIDE	<0.59
TOTAL XYLENES	9.6

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROETHANE-D4	112
OLUENE-D8	99
BROMOFLUOROBENZENE	101

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-3

VOLATILE ORGANIC ANALYSIS
TENTATIVELY IDENTIFIED COMPOUNDS

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S3/N. WALL EX.1 @ 8'	DATE ANALYZED	: 03/22/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8240	DILUTION FACTOR	: 10

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	FLAG	SCAN	ESTIMATED CONCENTRATION
DECANE		1028	20
BENZENE, 1-ETHYL-2-METHYL-		1094	16
BENZENE, 1-METHYL-2-(1-METHYLETHYL)		1164	19
UNKNOWN		1211	16
2,3-DIHYDRO-1-METHYLINDENE		1274	17

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
EPA METHOD : 8240
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-105-9
DATE EXTRACTED : 03/14/92
DATE ANALYZED : 03/19/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
1,1-DICHLOROETHENE	<0.050	2.50	2.17	87	2.14	86	1
TRICHLOROETHENE	<0.050	2.50	2.52	101	2.53	101	0
BENZENE	<0.050	2.50	2.76	110	2.76	110	0
TOLUENE	<0.050	2.50	2.90	116	2.79	112	4
CHLOROBENZENE	<0.050	2.50	2.78	111	2.67	107	4

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
EPA METHOD : 8240
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-161-1
DATE EXTRACTED : 03/19/92
DATE ANALYZED : 03/20/92
UNITS : mg/Kg

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
1,1-DICHLOROETHENE	<0.050	2.50	2.17	87	2.29	92	5
TRICHLOROETHENE	<0.050	2.50	2.21	88	2.30	92	4
BENZENE	<0.050	2.50	2.55	102	2.65	106	4
TOLUENE	0.157	2.50	2.93	111	3.10	118	6
CHLOROBENZENE	<0.050	2.50	2.31	92	2.39	96	3

$$\%\text{Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Duplicate Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
EPA METHOD : 8240
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/17/92
DATE ANALYZED : 03/22/92
UNITS : mg/Kg

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
1,1-DICHLOROETHENE	<0.050	2.50	2.28	91	N/A	N/A	N/A
TRICHLOROETHENE	<0.050	2.50	2.76	110	N/A	N/A	N/A
BENZENE	<0.050	2.50	2.86	114	N/A	N/A	N/A
TOLUENE	<0.050	2.50	2.85	114	N/A	N/A	N/A
CHLOROBENZENE	<0.050	2.50	2.80	112	N/A	N/A	N/A

$$\%\text{Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Duplicate Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
EPA METHOD : 8240
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/20/92
DATE ANALYZED : 03/23/92
UNITS : mg/Kg

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
1,1-DICHLOROETHENE	<0.050	2.50	2.17	87	N/A	N/A	N/A
TRICHLOROETHENE	<0.050	2.50	2.49	100	N/A	N/A	N/A
BENZENE	<0.050	2.50	2.53	101	N/A	N/A	N/A
TOLUENE	<0.050	2.50	2.56	102	N/A	N/A	N/A
CHLOROBENZENE	<0.050	2.50	2.58	103	N/A	N/A	N/A

$$\%Recovery = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$RPD\ (\text{Relative \% Difference}) = \frac{|(\text{Spike Result} - \text{Duplicate Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	104

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S1/S. WALL EX.1 @ 8'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	0.032
ETHYLBENZENE	0.28
TOLUENE	0.13
TOTAL XYLENES	2.8

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	109

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S2/E. WALL EX.1 @ 9'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	0.22
ETHYLBENZENE	1.9
TOLUENE	2.1
TOTAL XYLENES	10 D

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	F

D = Value from a ten fold diluted analysis.

F = Out of limits due to matrix interference.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-4

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S4/W. WALL EX.1 @ 8'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.028
ETHYLBENZENE	0.23
TOLUENE	<0.028
TOTAL XYLENES	2.2

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	103

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-5

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S5/S. WALL EX.2 @ 7.5'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.030
ETHYLBENZENE	<0.030
TOLUENE	<0.030
TOTAL XYLENES	<0.030

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	69

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-6

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S6/W. WALL EX.2 @ 8'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.029
ETHYLBENZENE	0.10
TOLUENE	<0.029
TOTAL XYLENES	0.034

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	79

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-7

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S7/N. WALL EX.2 @ 8'	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 20

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT	
BENZENE	26	
ETHYLBENZENE	61	D
TOLUENE	210	D
TOTAL XYLENES	470	D

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	96

D = Value from a 100 fold diluted analysis.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-8

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S8/E. WALL EX.2 @ 8'	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 500

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	92
ETHYLBENZENE	300
TOLUENE	1,000
TOTAL XYLENES	1,800

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	I

I = Surrogate not recovered due to sample dilution.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-9

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S9/U LEAD P. SE OF BLDG	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.028
ETHYLBENZENE	<0.028
TOLUENE	<0.028
TOTAL XYLENES	<0.028

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	65

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-110-1
DATE EXTRACTED : 03/14/92
DATE ANALYZED : 03/16/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	0.026	1.00	0.707	68	0.745	72	5
TOLUENE	0.104	1.00	0.899	80	0.918	81	2
TOTAL XYLENES	2.24	2.00	4.15	96	4.09	93	1

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/14/92
DATE ANALYZED : 03/16/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.025	1.00	0.762	76	0.777	78	2
TOLUENE	<0.025	1.00	0.844	84	0.847	85	0
TOTAL XYLENES	<0.025	2.00	1.79	90	1.80	90	1

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/15/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	103

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-1

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S1/S. WALL EX.1 @ 8'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 10

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	930
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	12,000
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	F

F = Out of limits due to matrix interference.

Analytical Technologies, Inc.

ATI I.D. # 9203-110-2

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S2/E. WALL EX.1 @ 9'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 10

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	1,200
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	8,700
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	F

F = Out of limits due to matrix interference.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-3

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S3/N. WALL EX.1 @ 8'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 10

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	1,600
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	10,000
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	F

F = Out of limits due to matrix interference.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-4

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/11/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S4/W. WALL EX.1 @ 8'	DATE ANALYZED	: 03/15/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	140
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	540
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	115

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-5

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S5/S. WALL EX.2 @ 7.5'	DATE ANALYZED	: 03/15/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	104

Analytical Technologies, Inc.

ATI I.D. # 9203-110-6

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S6/W. WALL EX.2 @ 8'	DATE ANALYZED	: 03/15/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	20
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	32
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	109

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-7

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S7/N. WALL EX.2 @ 8'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 5

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	2,500
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	420
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	111

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-8

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S8/E. WALL EX.2 @ 8'	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 50

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	10,000
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	600
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	98

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110-9

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/12/92
PROJECT #	: 15659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 03/14/92
CLIENT I.D.	: S9/U LEAD P. SE OF BLDG	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	7
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	101

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-105-9
DATE EXTRACTED : 03/14/92
DATE ANALYZED : 03/15/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	<25	500	415	83	446	89	7

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/14/92
DATE ANALYZED : 03/15/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	<25	500	471	94	435	87	8

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP

ELEMENT	DATE PREPARED	DATE ANALYZED
LEAD	03/19/92	03/23/92

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

METALS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

MATRIX : SOIL
UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	LEAD
9203-110-5	S5/S. WALL EX.2 @ 7.5'	<5.8
9203-110-6	S6/W. WALL EX.2 @ 8'	<5.6
9203-110-7	S7/N. WALL EX.2 @ 8'	<5.6
9203-110-8	S8/E. WALL EX.2 @ 8'	<5.4
REAGENT BLANK	-	<5.0

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP UNITS : mg/Kg

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	9203-110-5	<5.8	<5.5	NC	61.2	56.6	108
LEAD	BLANK SPIKE	<5.0	N/A	N/A	50.5	50.0	101

NC = Not Calculable.

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP

PARAMETER	DATE ANALYZED
MOISTURE*	03/14/92
MOISTURE	03/31/92

* Percent moisture results associated with Total Petroleum Hydrocarbon analyses.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE*	MOISTURE
9203-110-1	S1/S. WALL EX.1 @ 8'	19	-
9203-110-2	S2/E. WALL EX.1 @ 9'	19	-
9203-110-3	S3/N. WALL EX.1 @ 8'	13	15
9203-110-4	S4/W. WALL EX.1 @ 8'	12	-
9203-110-5	S5/S. WALL EX.2 @ 7.5'	18	14
9203-110-6	S6/W. WALL EX.2 @ 8'	14	-
9203-110-7	S7/N. WALL EX.2 @ 8'	15	-
9203-110-8	S8/E. WALL EX.2 @ 8'	11	9.4
9203-110-9	S9/U LEAD P. SE OF BLDG	9.7	-

* Percent moisture results associated with Total Petroleum Hydrocarbon analyses.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-110

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP UNITS : %

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE*	9203-110-9	9.7	10	3	N/A	N/A	N/A
MOISTURE	9203-116-3	8.9	9.5	7	N/A	N/A	N/A

* Percent moisture results associated with Total Petroleum Hydrocarbon analyses.

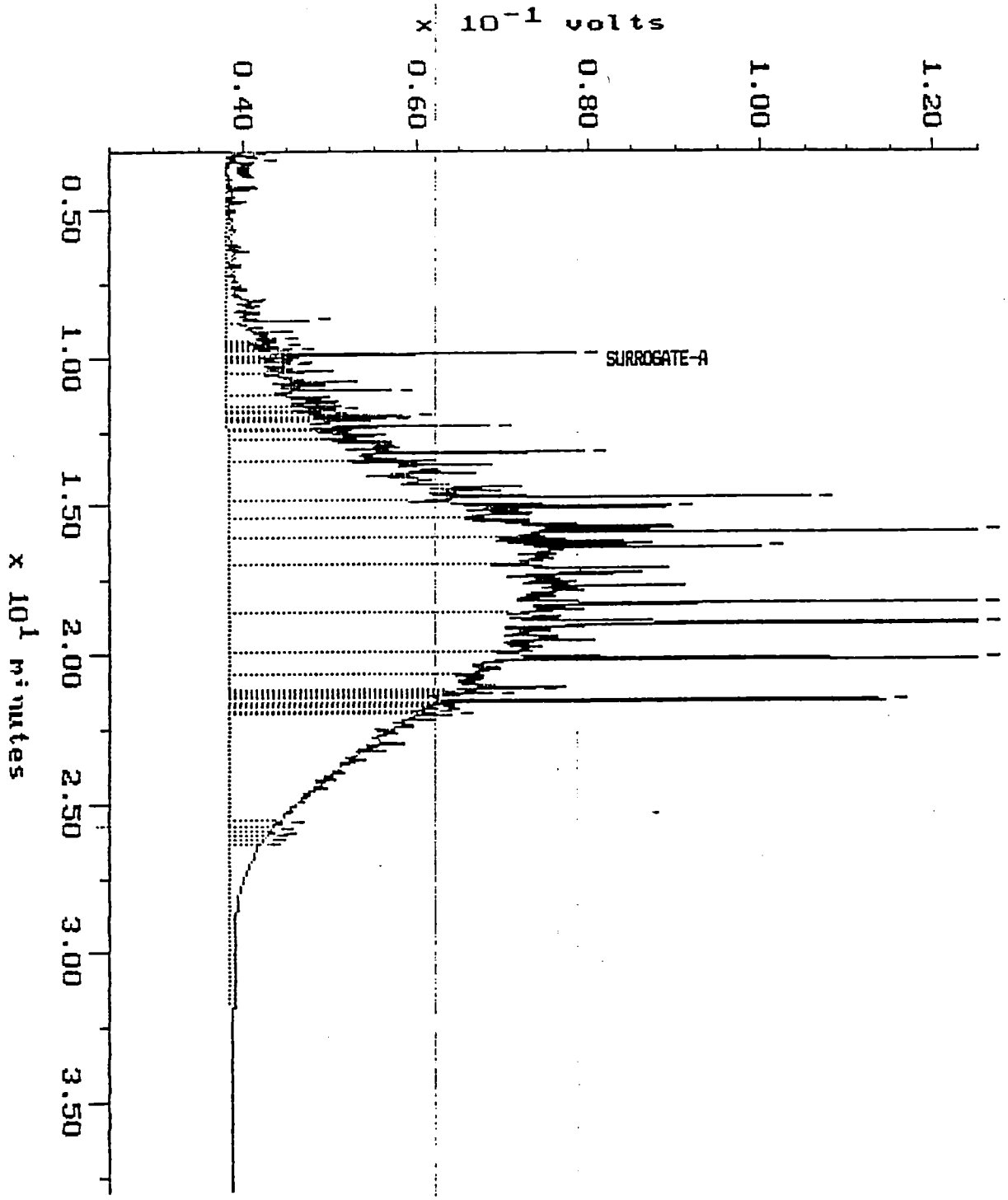
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Sample: 9203-110-1 DIL
Acquired: 16-MAR-92 11:14
Dilution: 1 : 10.000

Channel: BERT
Method: L:\BR02\MAXDATA\BERT\FUEL0315
Inj Vol: 1.00

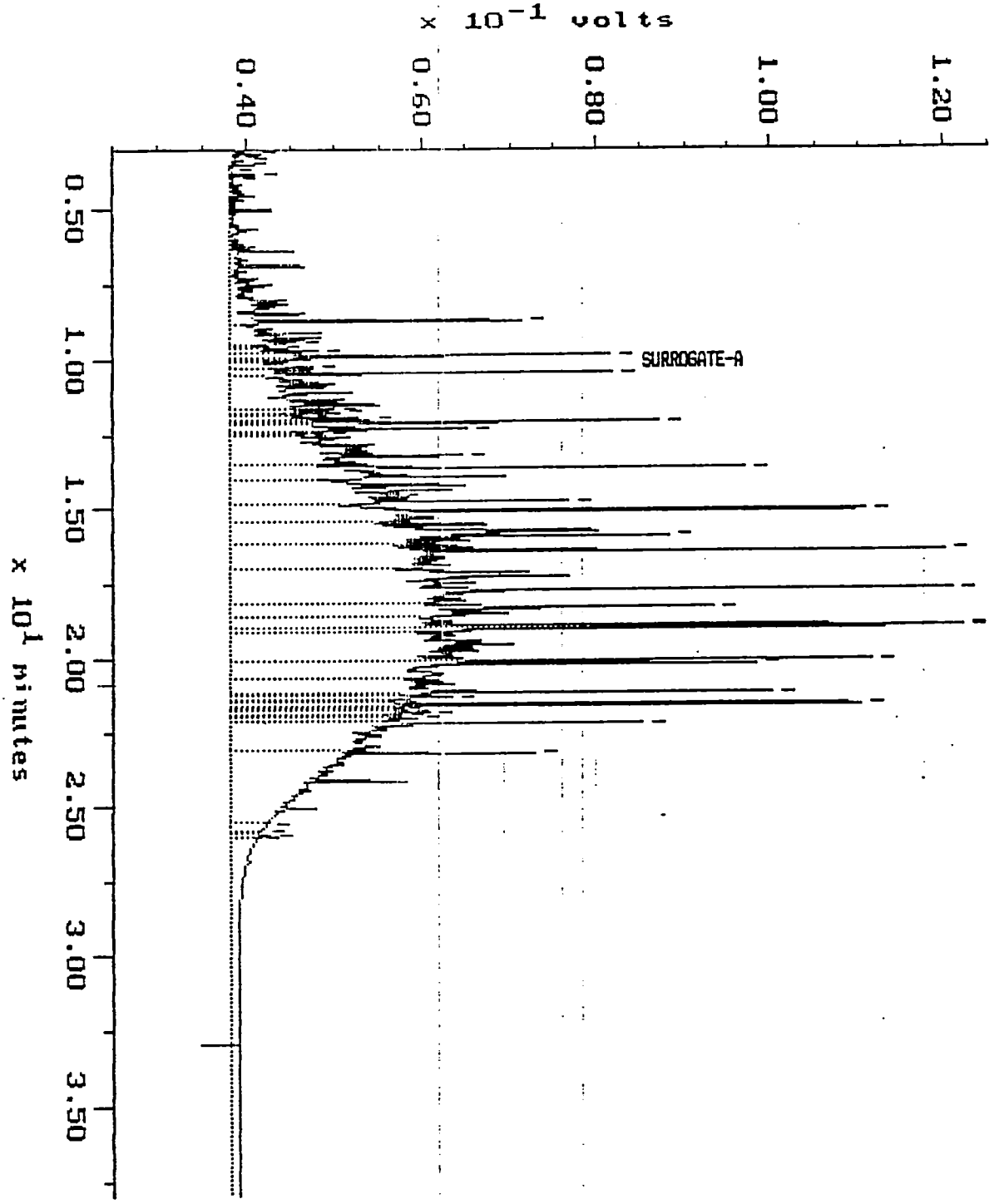
Filename: 0315BE30
Operator: PEA



Sample: 9203-110-2 DIL
Acquired: 16-MAR-92 12:02
Dilution: 1 : 10.000

Channel: BERT
Method: L:\BR02\MAXDATA\BERT\FUEL0315
Inj Vol: 1.00

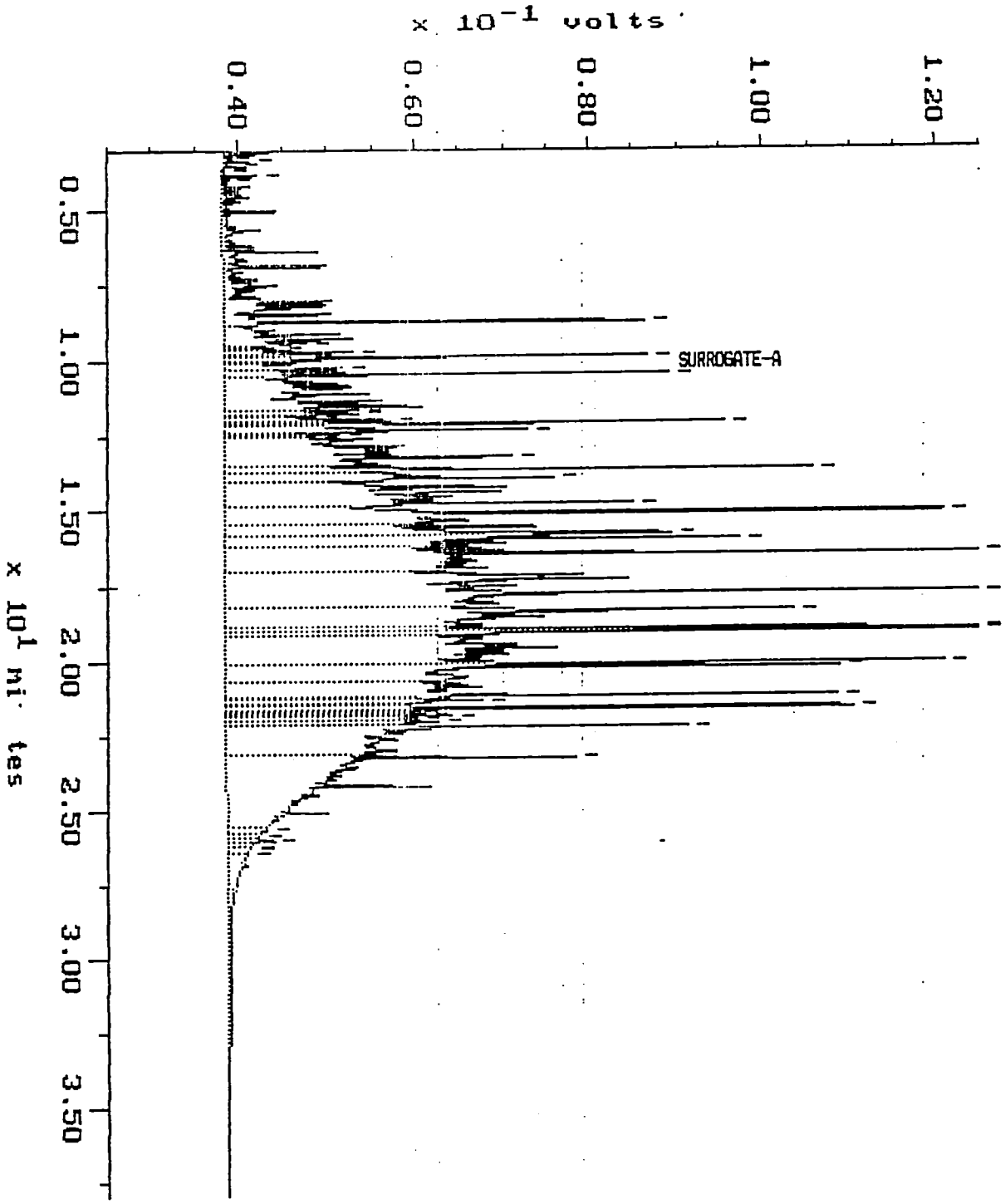
Filename: 0315BE31
Operator: PEA



Sample: 9203-110-3 DIL
Acquired: 16-MAR-92 12:50
Dilution: 1 : 10.000

Channel: BERT
Method: L:\BRO2\MAXDATA\BERT\FUEL0315
Inj Vol: 1.00

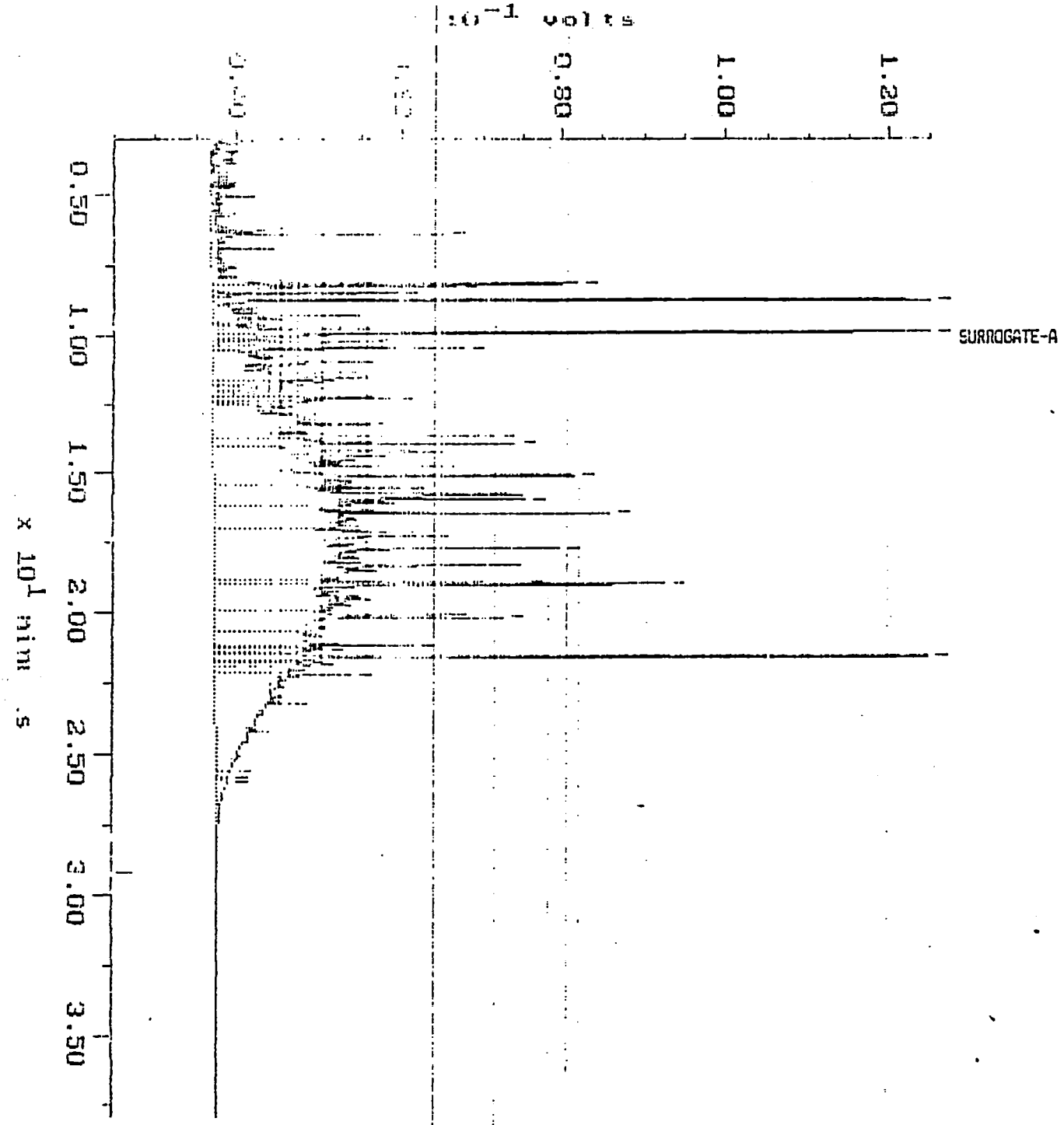
Filename: 0315BE32
Operator: PEA



Sample: 9203-118 A
Acquired: 15-[illegible] 21:35
Inj Vol: 1.00

Channel: BERT
Method: C:\3802\MAXDATA\BERT\FUEL0315

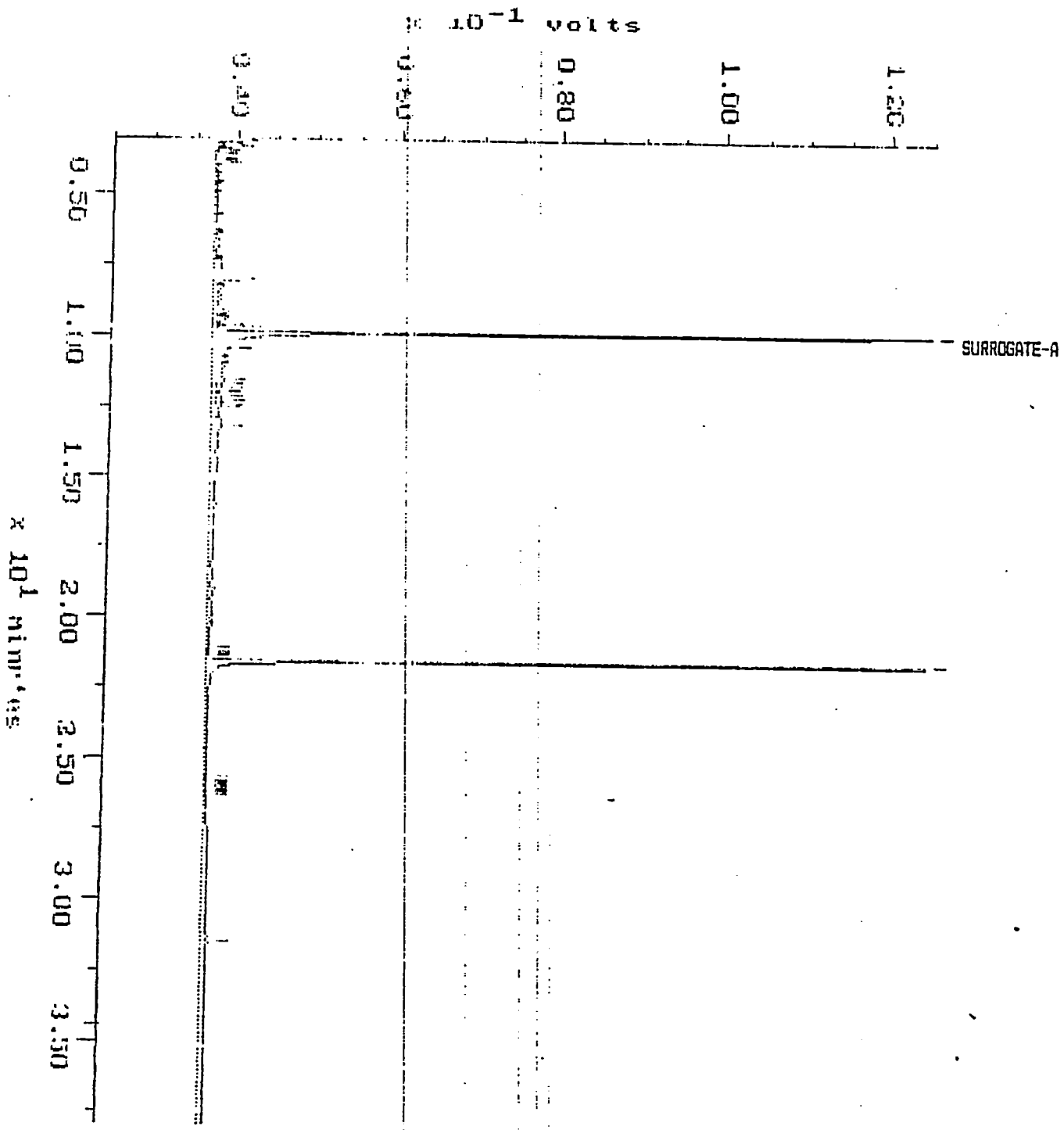
Filename: 0315BE13
Operator: PEA



Sample: 9233-110-6
Acquired: 15-MAR-92 23:11
Inj Vol: 1.00

Channel: BERT
Method: L:\BRG2\MAXDATA\BERT\FUEL0315

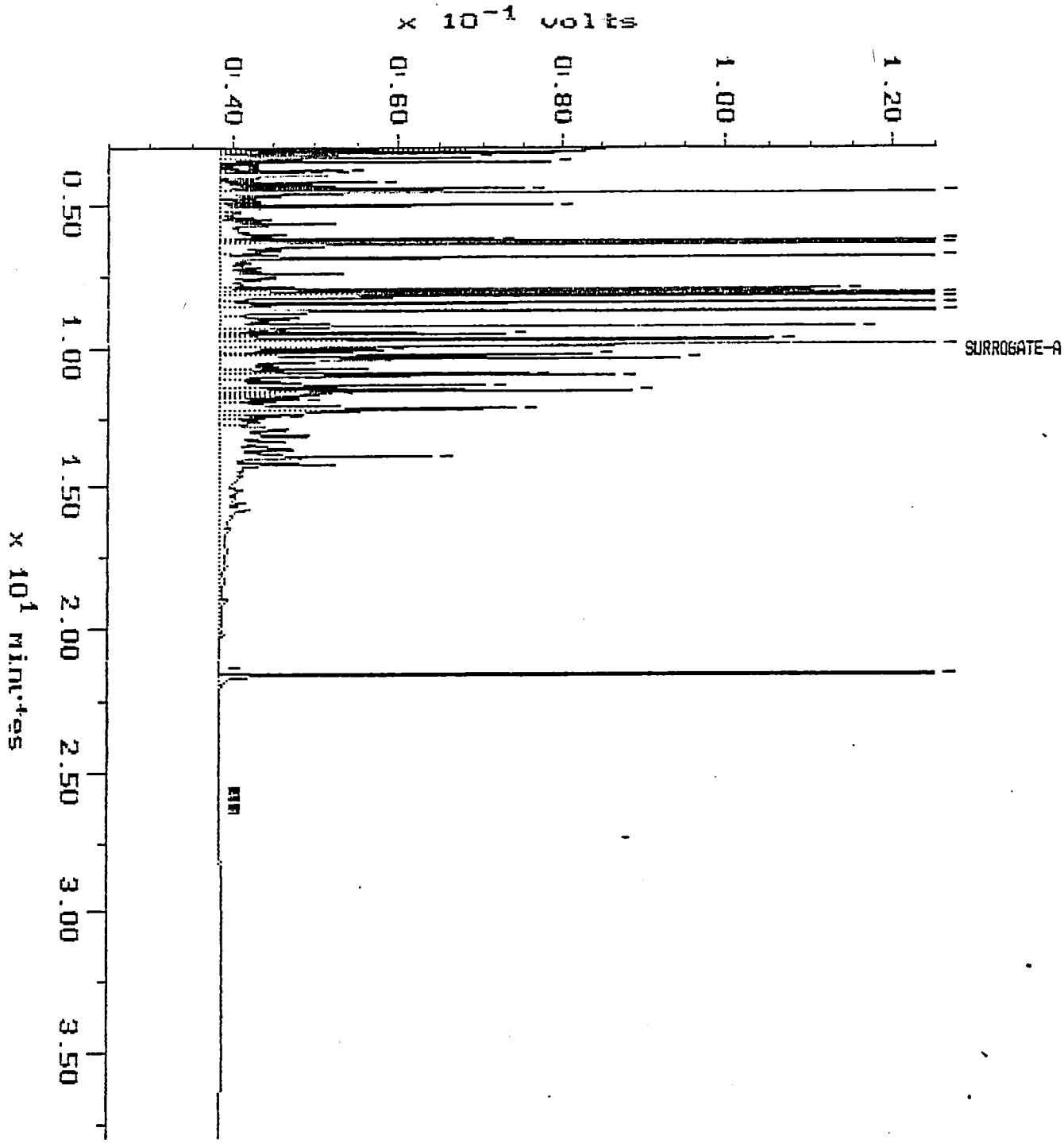
Filename: 03158E15
Operator: FCA



Sample: 9203-110-7 OIL
Acquired: 16-MAR-92 13:38
Dilution: 1 : 5.000

Channel: BERT
Method: C:\BRO2\MAXDATA\BERT\FUEL0315
Inj Vol: 1.00

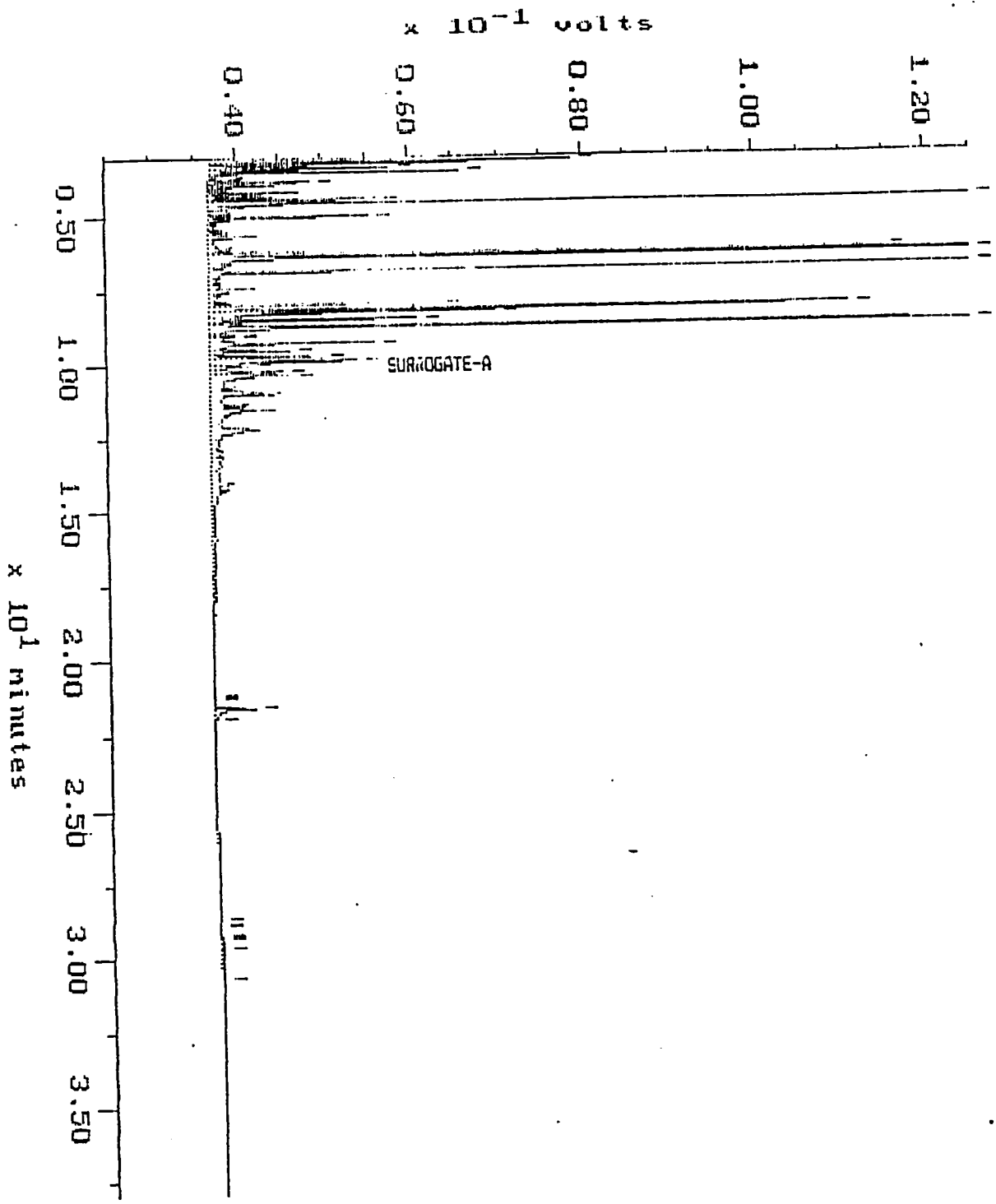
Filename: 03158E33
Operator: PEA



Sample: 9203-110-8 DiL
Acquired: 16 MAR-92 10:37
Dilution: 1 : 50.000

Channel: BERT
Method: L:\BRO2\MAXDATA\BERT\FUEL0316
Inj Vol: 1.00

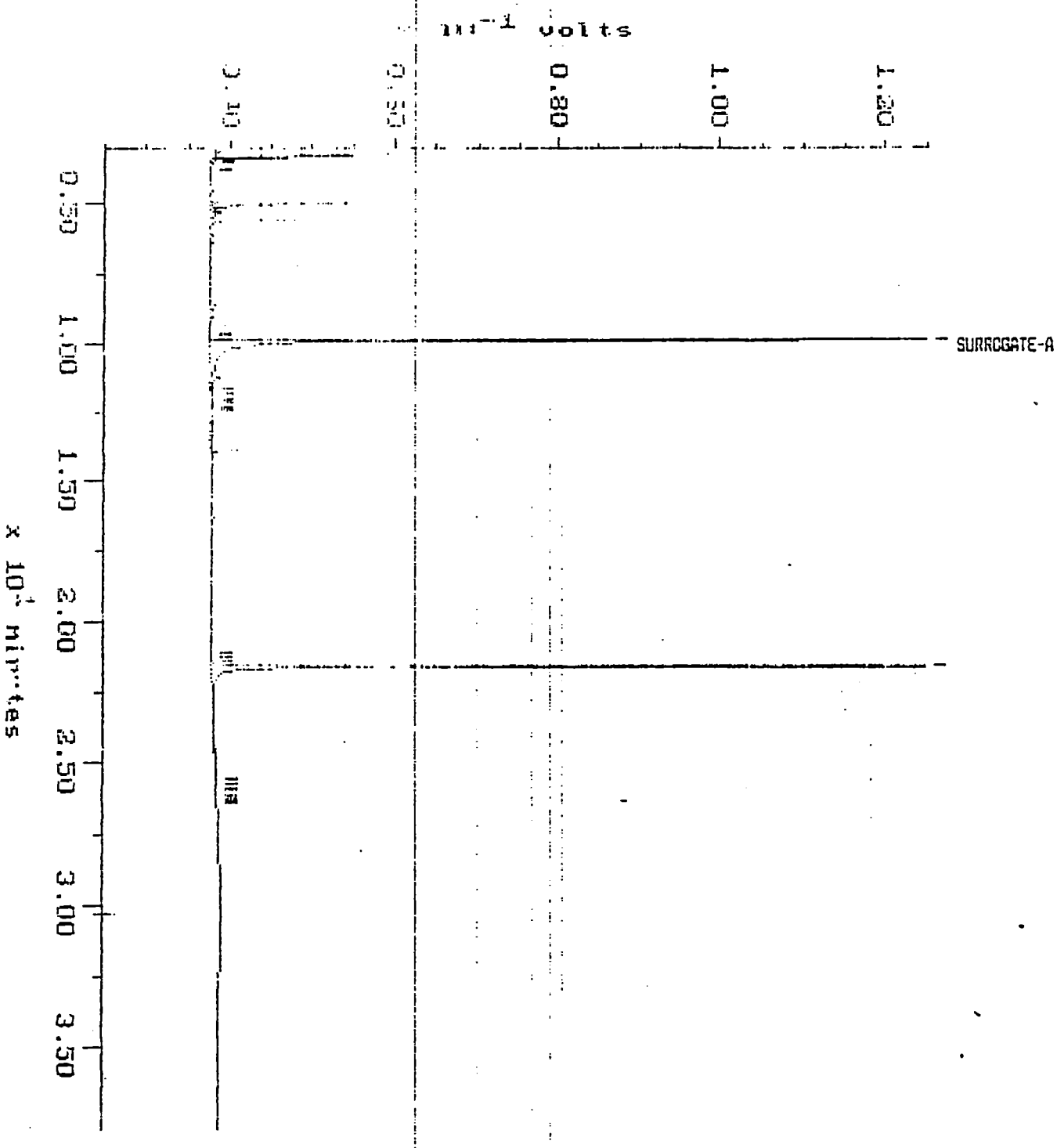
Filename: 0316BE03
Operator: PEA



Sample: 9203-110-9
Acquired: [illegible]
Inj Vol: [illegible]

Channel: BERT
Method: [illegible]\BR03\MAXDATA\BERT\FUEL0315

Filename: [illegible]
Operator: PCA



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 3-12-92 Page 1 of 2

PROJECT INFORMATION

Project Manager: Peter Barry
Project Name: Burns Bros./Thorp
Project Number: 15,659.001
Site Location: Exit 101 I-90 Sampled By: DPD

DISPOSAL INFORMATION

☐ Lab Disposal (return if not indicated)
Disposal Method:
Disposed by: Disposal Date:

QC INFORMATION (check one)

☐SW-846 ☐CLP ☐Screening ☐AGI Std. ☐Special

Laboratory Number: 9203-110.

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-ID State:	TPH-G State:	TPH-D State:	TPH Special Instructions	418.1 State:	8015M	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	Total Lead EPA # 6010				NUMBER OF CONTAINERS
S1/S. Wall Ex. 1 @ 8'	3-11-92	11:38	Soil	-1						X			X	X																									1
S2/E. Wall Ex. 1 @ 9'	↓	1155	↓	2						X			X																									1
S3/N. Wall Ex. 1 @ 8'		1355		3						X			X	X																								2
S4/W. Wall Ex 1 @ 8'		1410		4						X			X																									1
S5/S. Wall Ex 2 @ 7½'	3-12-92	1037		5						X			X																						X			1
S6/W. Wall Ex 2 @ 8'		1048		6						X			X																						X			1
S7/N. Wall Ex 2 @ 8'		1132		7						X			X																						X			1
S8/E. Wall Ex 2 @ 8'		1137		8						X			X																						X			1

LAB INFORMATION

Lab Name: ATI
Lab Address: 560 Naches Ave Suite 101
Renton Wa 98055
Via: COURIER

SAMPLE RECEIPT

Total Number of Containers:	8
Chain of Custody Seals?: Y/N/NA	Y
Intact?: Y/N/NA	Y
Received in Good Condition/Cold:	Y/Y

Turn Around Time: ☒Standard ☐24 hr. ☐48 hr. ☐72 hr. ☐1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: David P Dawson Time: 16:13	Signature: Peter P. Barry Time: 815	Signature: Time:
Printed Name: David P Dawson Date: 3-12-92	Printed Name: Peter P Barry Date: 3/13/92	Printed Name: Date:
Company: AGI	Company: AGI	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: Peter P. Barry Time: 1623	Signature: Romena Saturay Time: 1030	Signature: Time:
Printed Name: Peter P Barry Date: 3/12/92	Printed Name: ROMENA SATURAY Date: 3/13/92	Printed Name: Date:
Company: AGI	Company: ATI-WA	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev. 12/91

Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 3-12-92 Page 2 of 2

PROJECT INFORMATION

Project Manager: Peter Barry
Project Name: Burns Bros. / Thorp
Project Number: 15,659.001
Site Location: Exit 101. I-90 Sampled By:

DISPOSAL INFORMATION

☐ Lab Disposal (return if not indicated)
Disposal Method:
Disposed by: Disposal Date:

QC INFORMATION (check one)

☐SW-846 ☐CLP ☐Screening ☐AGI Std. ☐Special

Laboratory Number: 9203-110

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	PETROLEUM HYDROCARBONS					ORGANIC COMPOUNDS							PESTS/PCBs					METALS							LEACHING TESTS				OTHER				NUMBER OF CONTAINERS
					TPH-ID State:	TPH-G State:	TPH-D State:	TPH Special Instructions	418.1 State:	8015M	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals					
S9/U Lead P. SE of Bldg	3-12-92	1330	Soil	-9						X			X																								1

LAB INFORMATION

Lab Name: ATI
Lab Address: 560 Naches Ave Suite 101
Renton Wa 98055
Via:

SAMPLE RECEIPT

Total Number of Containers:	1
Chain of Custody Seals?: Y/N/NA	Y
Intact?: Y/N/NA	Y
Received in Good Condition/Cold:	Y/Y

Turn Around Time: ☐ Standard ☐24 hr. ☐48 hr. ☐72 hr. ☐1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 1622	Signature: Time: 815	Signature: Time:
Printed Name: David P. Dawson Date: 3-12-92	Printed Name: Peter P. Barry Date: 3/13/92	Printed Name: Date:
Company: AGI	Company: AGI	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: Time: 1622	Signature: Time: 1030	Signature: Time:
Printed Name: Peter P. Barry Date: 3/13/92	Printed Name: ROWENA SATURNY Date: 3/13/92	Printed Name: Date:
Company: AGI	Company: ATI-WA	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev. 12/91

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–115
Sample No.: S10 U.LEAD P @ 4', S11 DIESEL P. @ 3', S12 DIESEL P. @ 3', S13 DIESEL P. @ 3', S14 DIESEL P. 4', S15 E.WALL EX.3 @ 7', S16 S.WALL EX.3 @ 8', S18 PUMP IS. 1 @ 2', S19 PUMP IS. 2 @ 2 1/2'

Matrix: Soil

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
Fuel Hydrocarbons	GC/FID	EPA 8015 Modified
Petroleum Hydrocarbons	IR	WA DOE WTPH–418.1 Modified
Moisture	GRAVIMETRIC	CLP SOW ILMO1.0

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX a	03/13/92	03/15/92	03/19/92	2	6 (14)
BETX b	03/13/92	03/15/92	03/20/92	2	7 (14)
BETX c	03/13/92	03/17/92	03/23/92	4	10 (14)
Fuel Hydrocarbons e	03/13/92	03/15/92	03/16/92	2	3 (14)
Fuel Hydrocarbons f	03/13/92	03/15/92	03/17/92	2	4 (14)
Fuel Hydrocarbons c	03/13/92	03/18/92	03/19/92	5	6 (14)
Petroleum Hydrocarbons	03/13/92	03/16/92	03/17/92	3 (14)	4 (30)

a – Samples S11 DIESEL P. @ 3', S14 DIESEL P. @ 4', S18 PUMP IS 1 @ 2'
b – Samples S12 DIESEL P. @ 3', S13 DIESEL P. @ 3', S19 PUMP IS 2 @ 2 1/2'
c – Sample S10 U. LEAD P @ 4'
e – Sample S13 DIESEL P. @ 3'
f – Samples S11 DIESEL P. @ 3', S12 DIESEL P. @ 3', S14 DIESEL P. @ 4', S18 PUMP IS 1 @ 2', and S19 PUMP IS 2 @ 2 1/2', S15 E. WALL EX.3 @ 7', S16 S. WALL EX.3 @ 8'
Numbers in parentheses ( ) indicate recommended holding times in days for soil.

All samples were extracted and analyzed within recommended holding times for soil.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–115
Sample No.: S10 U.LEAD P @ 4', S11 DIESEL P. @ 3', S12 DIESEL P. @ 3', S13 DIESEL P. @ 3', S14 DIESEL P. 4', S15 E.WALL EX.3 @ 7', S16 S.WALL EX.3 @ 8', S18 PUMP IS. 1 @ 2', S19 PUMP IS. 2 @ 2 1/2'

FUEL HYDROCARBON CHEMISTRY

EPA Method 8015 Modified: The presence of petroleum hydrocarbons in the range expected for gasoline and diesel is confirmed by chromatogram for samples S10 U.LEAD P @ 4', S11 DIESEL P. @ 3', S14 Diesel P. @ 4', and S19 PUMP IS. 2 @ 2 1/2'. The presence of petroleum hydrocarbons in the range expected for diesel is confirmed by chromatogram for sample S18 PUMP IS. 1 @ 2'. The profile of sample S10 U. LEAD P @ 4' is similar to that of gasoline and does not resemble a diesel fuel profile. Detection of diesel in this sample is likely the result of gasoline type hydrocarbons eluting in the range expected for diesel. All other sample chromatogram profiles resemble diesel. Detections of gasoline in these samples may be the result of diesel fuel hydrocarbons eluting in the range expected for gasoline.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
EPA 8015 Modified
WA DOE WTPH–418.1 Modified

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and/or sample/sample duplicate relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8015 Modified
WA DOE WTPH–418.1 Modified

EPA 8020: All matrix spike percent recoveries and the matrix spike duplicate percent recovery of total xylenes are below ATI's control limits due to matrix interference. All RPDs are above ATI's control limits. The second matrix spike/spike duplicate analysis, performed on a sample from a different sample group, had acceptable recoveries and RPDs. The blank spikes were both acceptable. The data are considered acceptable.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–115
Sample No.: S10 U.LEAD P @ 4', S11 DIESEL P. @ 3', S12 DIESEL P. @ 3', S13 DIESEL P. @ 3', S14 DIESEL P. 4', S15 E.WALL EX.3 @ 7', S16 S.WALL EX.3 @ 8', S18 PUMP IS. 1 @ 2', S19 PUMP IS. 2 @ 2 1/2'

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8020: All surrogate percent recoveries are within ATI's control limits except for the recovery from sample S10 U.LEAD P @ 4'. Surrogate recovery was not possible due to dilution of the sample by a factor of 50. The data are considered acceptable.

EPA 8015 Modified: All surrogate percent recoveries are within ATI's control limits except for the recovery from samples S11 DIESEL P. @ 3', S18 PUMP IS. 1 @ 2', S19 PUMP IS 2 @ 2 1/2'. All of these surrogate recoveries were out of control limits due to dilution of the samples. The data are considered acceptable.

SIGNATURES

Prepared by Thomas A. Mercer **Date** 4/9/92
Checked by Katherine A. Hill **Date** 4/9/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9203-115

RECEIVED
APR - 1 1992
APPLIED GEOTECHNOLOGY INC

March 30, 1992

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

Attention : Peter Barry

Project Number : 15,659.001

Project Name : Burns Bros - Thorp

On March 13, 1992, Analytical Technologies, Inc., received nine soil samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Laboratory Manager

FWG/hal/rmn

AnalyticalTechnologies, Inc

ATI I.D. # 9203-115

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9203-115-1	S10 U.LEAD P @ 4'	03/13/92	SOIL
9203-115-2	S11 DIESEL P. @ 3'	03/13/92	SOIL
9203-115-3	S12 DIESEL P. @ 3'	03/13/92	SOIL
9203-115-4	S13 DIESEL P. @ 3'	03/13/92	SOIL
9203-115-5	S14 DIESEL P. @ 4'	03/13/92	SOIL
9203-115-6	S15 E.WALL EX.3 @ 7'	03/13/92	SOIL
9203-115-7	S16 S.WALL EX.3 @ 8'	03/13/92	SOIL
9203-115-8	S18 PUMP IS. 1 @ 2'	03/13/92	SOIL
9203-115-9	S19 PUMP IS. 2 @ 2 1/2'	03/13/92	SOIL

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	9

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc

ATI I.D. # 9203-115

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
PETROLEUM HYDROCARBONS	IR	WA DOE WTPH-418.1 MODIFIED	R
MOISTURE	GRAVIMETRIC	CLP SOW ILM01.0	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
UB = Subcontract

AnalyticalTechnologies, Inc

ATI I.D. # 9203-115

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	99

AnalyticalTechnologies,Inc

ATI I.D. # 9203-115

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	119

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S10 U.LEAD P @ 4'	DATE ANALYZED	: 03/23/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 50

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	21
ETHYLBENZENE	69
TOLUENE	200
TOTAL XYLENES	410

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	I

I = Surrogate not recovered due to sample dilution.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S11 DIESEL P. @ 3'	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.032
ETHYLBENZENE	0.40
TOLUENE	0.056
TOTAL XYLENES	2.6

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	94

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115-3

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S12 DIESEL P. @ 3'	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.031
ETHYLBENZENE	<0.031
TOLUENE	<0.031
TOTAL XYLENES	<0.031

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	71

Analytical Technologies, Inc.

ATI I.D. # 9203-115-4

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S13 DIESEL P. @ 3'	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.035
ETHYLBENZENE	<0.035
TOLUENE	<0.035
TOTAL XYLENES	<0.035

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	82

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115-5

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S14 DIESEL P. @ 4'	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.030
ETHYLBENZENE	<0.030
TOLUENE	<0.030
TOTAL XYLENES	<0.030

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	65

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115-8

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S18 PUMP IS. 1 @ 2'	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.027
ETHYLBENZENE	<0.027
TOLUENE	0.032
TOTAL XYLENES	0.029

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	88

AnalyticalTechnologies,Inc

ATI I.D. # 9203-115-9

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S19 PUMP IS. 2 @ 2 1/2	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.030
ETHYLBENZENE	0.070
TOLUENE	<0.030
TOTAL XYLENES	0.61

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	103

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9203-115-4
PROJECT #	: 15,659.001	DATE EXTRACTED	: 03/15/92
PROJECT NAME	: BURNS BROS - THORP	DATE ANALYZED	: 03/20/92
EPA METHOD	: 8020 (BETX)	UNITS	: mg/Kg
SAMPLE MATRIX	: SOIL		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.025	1.00	0.401	40F	0.517	52	25H
TOLUENE	<0.025	1.00	0.439	44F	0.562	56	25H
TOTAL XYLENES	<0.025	2.00	0.957	48F	1.18	59F	21H

F = Out of limits due to matrix interference.
H = Out of limits.

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-127-2
DATE EXTRACTED : 03/17/92
DATE ANALYZED : 03/17/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.025	1.00	0.533	53	0.519	52	3
TOLUENE	<0.025	1.00	0.566	57	0.551	55	3
TOTAL XYLENES	<0.025	2.00	1.28	64	1.25	63	2

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/15/92
DATE ANALYZED : 03/19/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.025	1.00	0.780	78	0.817	82	5
TOLUENE	<0.025	1.00	0.888	89	0.854	85	4
TOTAL XYLENES	<0.025	2.00	1.85	93	1.67	84	10

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK SPIKE
PROJECT #	: 15,659.001	DATE EXTRACTED	: 03/17/92
PROJECT NAME	: BURNS BROS - THORP	DATE ANALYZED	: 03/17/92
EPA METHOD	: 8020 (BETX)	UNITS	: mg/Kg
SAMPLE MATRIX	: SOIL		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.025	1.00	0.794	79	0.860	86	8
TOLUENE	<0.025	1.00	0.846	85	0.968	97	13
TOTAL XYLENES	<0.025	2.00	1.78	89	2.11	106	17

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies, Inc.

ATI I.D. # 9203-115

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/16/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

`-TERPHENYL	109

AnalyticalTechnologies, Inc

ATI I.D. # 9203-115

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	84

AnalyticalTechnologies,Inc

ATI I.D. # 9203-115-2

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S11 DIESEL P. @ 3'	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 5

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	240
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	2,000
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	F

F = Out of limits due to matrix interference.

Analytical Technologies, Inc.

ATI I.D. # 9203-115-3

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S12 DIESEL P. @ 3'	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

-TERPHENYL	94

AnalyticalTechnologies,Inc

ATI I.D. # 9203-115-5

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S14 DIESEL P. @ 4'	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	7
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	350
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

·TERPHENYL	119

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115-6

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S15 E.WALL EX.3 @ 7'	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

-TERPHENYL	93

AnalyticalTechnologies,Inc

ATI I.D. # 9203-115-7

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S16 S.WALL EX.3 @ 8'	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	86

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115-8

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S18 PUMP IS. 1 @ 2'	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 5

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<25
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	2,100
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

ᵀ-TERPHENYL	F

F = Out of limits due to matrix interference.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115-9

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/13/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/13/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/15/92
CLIENT I.D.	: S19 PUMP IS. 2 @ 2 1/2'	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 50

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	430
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	18,000
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

ᴵ-TERPHENYL	F

F = Out of limits due to matrix interference.

AnalyticalTechnologies,inc

ATI I.D. # 9203-115

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-115-4
DATE EXTRACTED : 03/15/92
DATE ANALYZED : 03/16/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	<25	500	500	100	475	95	5

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/15/92
DATE ANALYZED : 03/16/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	<25	500	471	94	489	98	4

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc

ATI I.D. # 9203-115

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/17/92
DATE ANALYZED : 03/17/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	<25	500	423	85	458	92	8

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
METHOD : WA DOE WTPH-418.1 MODIFIED
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE EXTRACTED : 03/16/92
DATE ANALYZED : 03/17/92
UNITS : mg/Kg
SAMPLE MATRIX : SOIL

ATI I.D. #	CLIENT I.D.	TOTAL PETROLEUM HYDROCARBONS
9203-115-6	S15 E.WALL EX.3 @ 7'	22
9203-115-7	S16 S.WALL EX.3 @ 8'	<20
REAGENT BLANK	-	<20

AnalyticalTechnologies,Inc

ATI I.D. # 9203-115

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
METHOD : WA DOE WTPH-418.1 MODIFIED
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-115-7
DATE EXTRACTED : 03/16/92
DATE ANALYZED : 03/17/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (MOTOR OIL)	<20	<20	NC	400	463	116	436	109	6

NC = Not Calculable.

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

ATI I.D. # 9203-115

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
METHOD : WA DOE WTPH-418.1 MODIFIED
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/16/92
DATE ANALYZED : 03/17/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (MOTOR OIL)	<20	N/A	N/A	400	456	114	452	113	1

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP

MATRIX : SOIL

PARAMETER	DATE ANALYZED
MOISTURE (SAMPLES -2 TO -9)	03/15/92
MOISTURE (SAMPLE -1)	03/17/92

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-115

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP

MATRIX : SOIL
UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE
9203-115-1	S10 U.LEAD P @ 4'	23
9203-115-2	S11 DIESEL P. @ 3'	22
9203-115-3	S12 DIESEL P. @ 3'	19
9203-115-4	S13 DIESEL P. @ 3'	28
9203-115-5	S14 DIESEL P. @ 4'	18
203-115-6	S15 E.WALL EX.3 @ 7'	18
9203-115-7	S16 S.WALL EX.3 @ 8'	21
9203-115-8	S18 PUMP IS. 1 @ 2'	7.5
9203-115-9	S19 PUMP IS. 2 @ 2 1/2'	18

AnalyticalTechnologies,Inc

ATI I.D. # 9203-115

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP

MATRIX : SOIL
UNITS : %

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9203-121-2	15	14	7	N/A	N/A	N/A
MOISTURE	9203-127-11	6.7	7.2	7	N/A	N/A	N/A

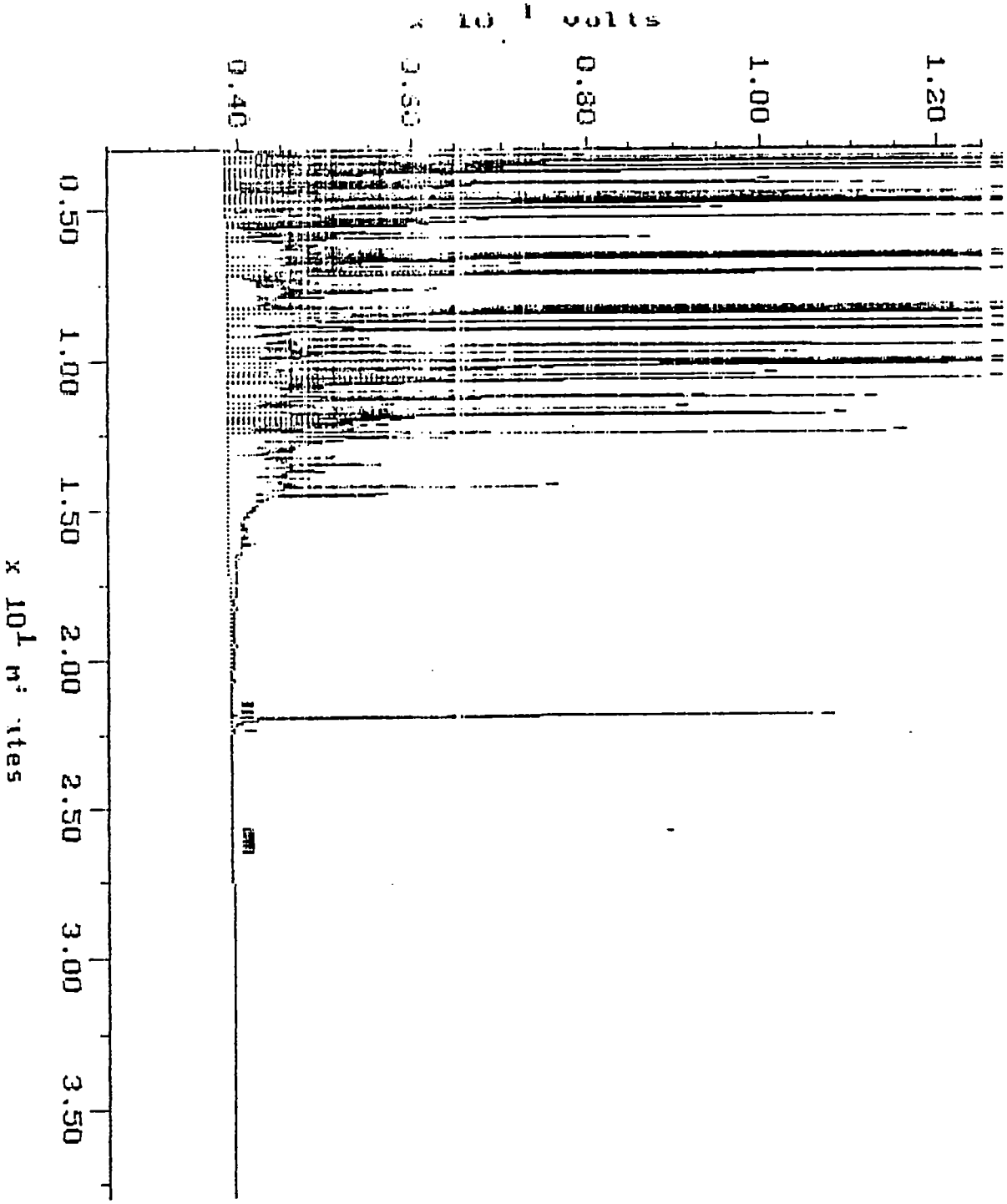
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Sample: 9203-115-1
Acquired: 19-MAR-92 23:36
Dilution: 1 : 5.000

Channel: FRED
Method: M:\BRD2\MAXDATA\FRED\FUEL0319
Inj Vol: 1.00

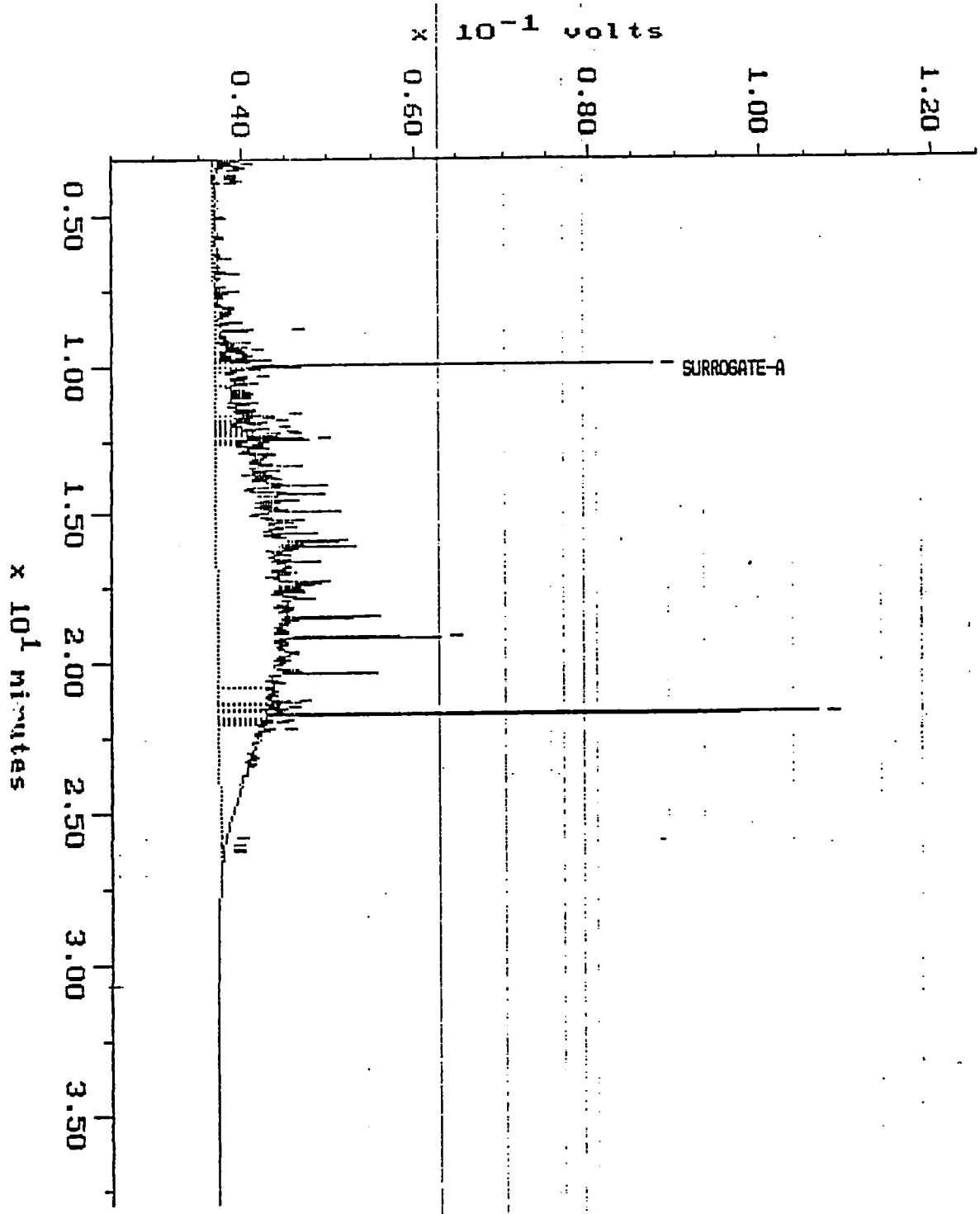
Filename: 0319FR07
Operator: ACE



Sample: 9203-115-2 DIL
Acquired: 17-MAR-92 10:49
Dilution: 1 : 5.000

Channel: ERNIE
Method: L:\BR02\MAXDATA\ERNIE\FUEL0316
Inj Vol: 1.00

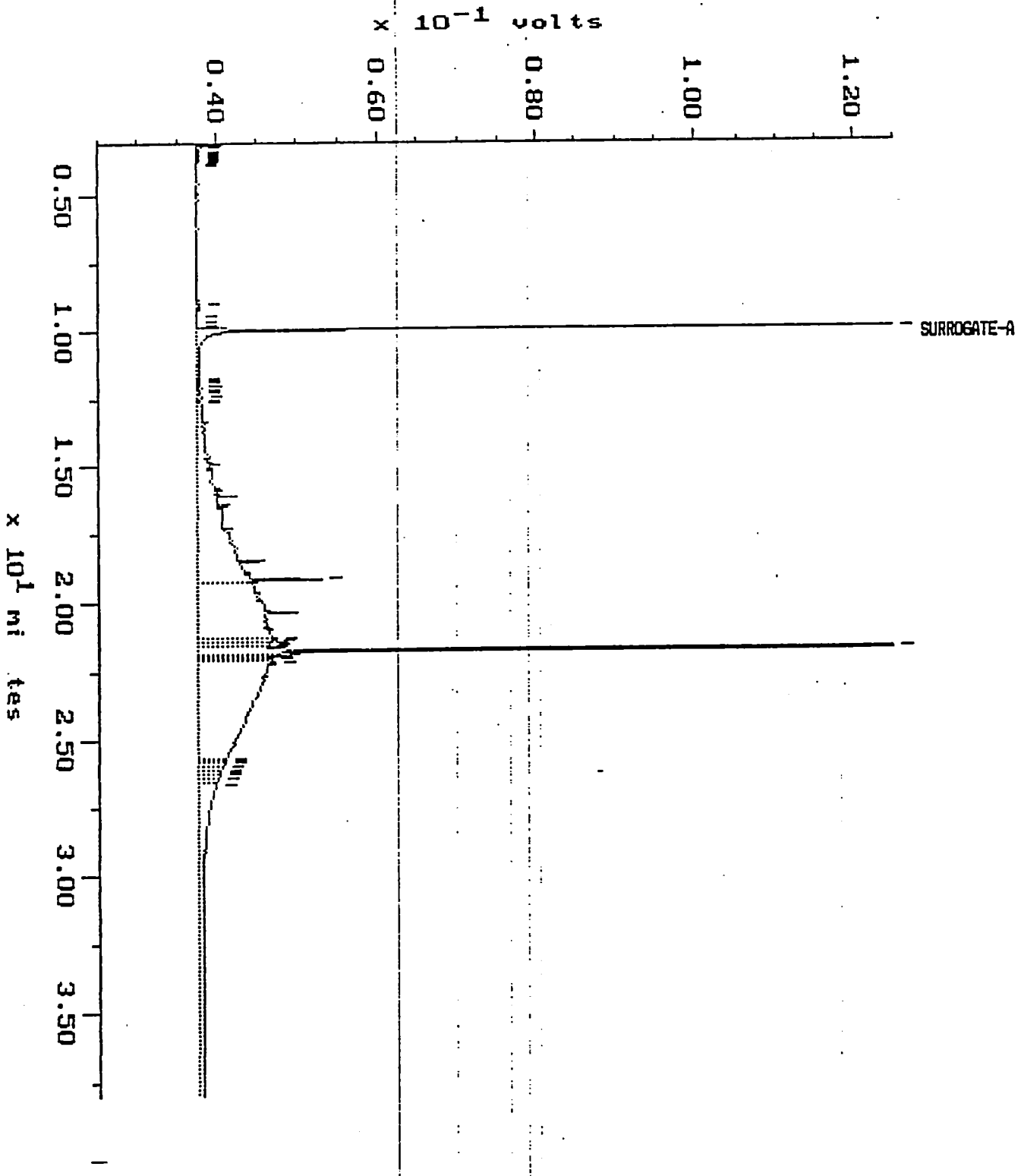
Filename: 0316ER23
Operator:



Sample: 9203-115-5
Acquired: 17-MAR-92 1:54
Inj Vol: 1.00

Channel: ERNIE
Method: L:\BRO2\MAXDATA\ERNIE\FUEL0316

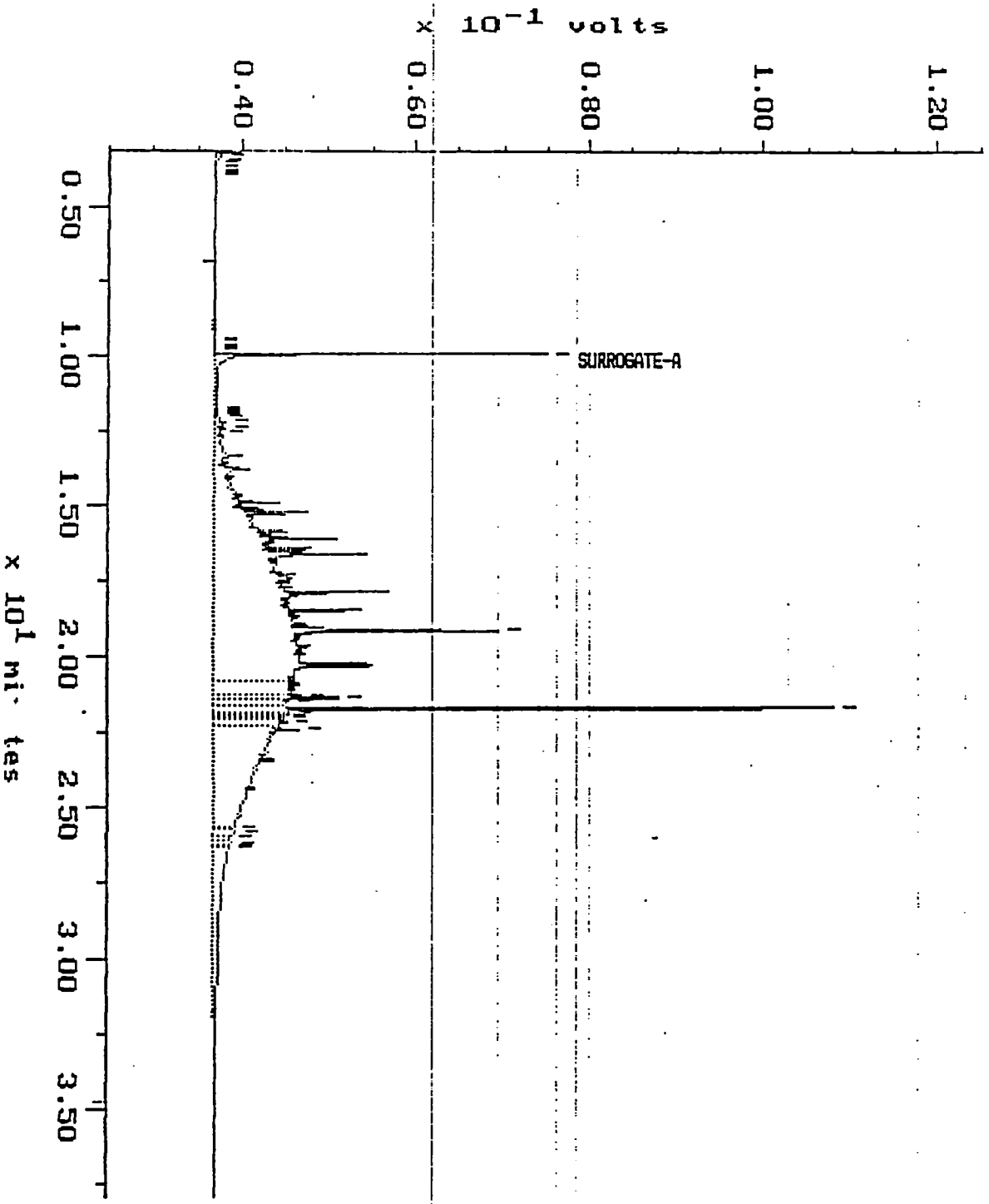
Filename: 0316ER12
Operator:



Sample: 9203-115-8 DIL
Acquired: 17-MAR-92 11:38
Dilution: 1 : 5.000

Channel: ERNIE
Method: L:\BR02\MAXDATA\ERNIE\FUEL0316
Inj Vol: 1.00

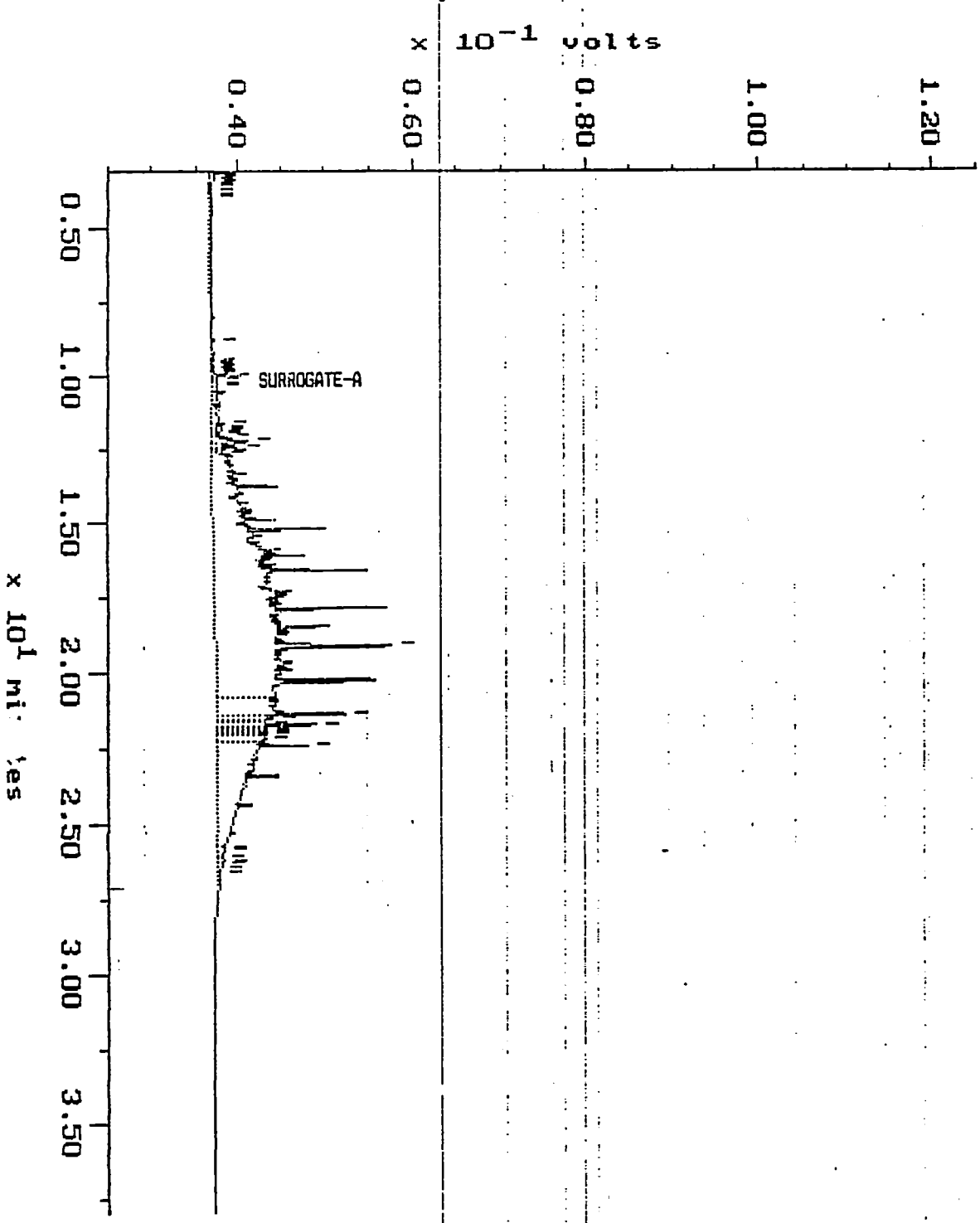
Filename: 0316ER24
Operator:



Sample: 9203-115-9 DIL
Acquired: 17-MAR-92 12:26
Dilution: 1 : 50.000

Channel: ERNIE
Method: L:\BRO2\MAXDATA\ERNIE\FUEL0316
Inj Vol: 1.00

Filename: 0316ER25
Operator:



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 3-13-92 Page 1 of 1

PROJECT INFORMATION

Project Manager: Peter Barry
Project Name: Burns Bros / Thorp
Project Number: 15,659.001
Site Location: Exit 101 I-90 WA Sampled By: DPD

DISPOSAL INFORMATION

☒ Lab Disposal (return if not indicated) Return samples 3/13/92
Disposal Method:
Disposed by: Disposal Date:

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☐ AGI Std. ☐ Special

Laboratory Number: 9203-115

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	PETROLEUM HYDROCARBONS: TPH-ID State:	TPH-G State:	TPH-D State:	TPH Special Instructions	418.1 State:	8015M	ORGANIC COMPOUNDS: 8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	PESTS/PCBs: 8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	METALS: Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	LEACHING TESTS: TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER: WTPH 418.1				NUMBER OF CONTAINERS
S10 U. Lead P @ 4'	3-13-92	1045	Soil	-1						X			X																										1
S11 Diesle P. @ 3'		1059		2						X			X																										1
S12 Diesle P. @ 3'		@1353		3						X			X																										1
S13 Diesle P. @ 3'		1440		4						X			X																										1
S14 Diesle P. @ 4'		1453		5						X			X																										1
S15 E. Wall Ex. 3 @ 7'		1425		6						X																										X			1
S16 S. Wall Ex. 3 @ 8'		1430		7						X																										X			1
S18 Dumpsts. 1 @ 2'		1150		8						X			X																										1
S19 Dumpsts 2 @ 2.5'		0955		9						X			X																										1

LAB INFORMATION

Lab Name: ATI
Lab Address: 560 Naches Ave Suit 101
Renton Wa 98055
Via:

SAMPLE RECEIPT

Total Number of Containers:	9
Chain of Custody Seals?: Y/N/NA	Y
Intact?: Y/N/NA	Y
Received in Good Condition/Cold:	Y/Y

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 1850	Signature: Time:	Signature: Time:
Printed Name: David P Dawson Date: 3-13-92	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [signature] Time: 1850	Signature: Time:	Signature: Time:
Printed Name: Roberta Stinney Date: 3-13-92	Printed Name: Date:	Printed Name: Date:
Company: ATI-WA	Company:	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev 12/91

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9203-129

April 6, 1992

RECEIVED
APR - 8 1992
APPLIED GEOTECHNOLOGY INC

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

..ctention : Peter Barry

Project Number : 15,659.001

Project Name : Burns Bros/Thorp

On March 17, 1992, Analytical Technologies, Inc., received two water ·nd five soil samples for analysis. The samples were analyzed with EPA ethodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Laboratory Manager

FWG/hal/rmn

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–129
Sample No.: S20 PUMP IS. #3 @ 5', S21 PUMP IS. #4 @ 5', S22 PUMP IS. #5 @ 5', S23 DIESEL P @ 5', S24 DIESEL P @ 5' (Soil), DEGASSING TANK, CARBON EFFLUENT (Water)

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following method:

EPA 8020 (Water)

EPA 8020 (Soil): Surrogate recovery from sample S21 PUMP IS #4 @ 5' was out of limits due to matrix interference. High concentrations of gasoline detected by EPA 8015 Modified are likely the cause of the interference. The data are considered acceptable.

EPA 8015 Modified: All surrogate percent recoveries are within ATI's control limits except for the recovery from samples S20 PUMP IS #3 @ 5', S21 PUMP IS #4 @ 5', S22 PUMP IS #5 @ 5', and S23 DIESEL P @ 5'. All of these samples contained high concentrations of diesel and gasoline range hydrocarbons indicating that matrix interference is the likely cause. The data are considered acceptable.

SIGNATURES

Prepared by Thomas A. Mercer **Date** 4/15/92
Checked by Katherine H. Hill **Date** 4/15/92

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–129
Sample No.: S20 PUMP IS. #3 @ 5', S21 PUMP IS. #4 @ 5', S22 PUMP IS. #5 @ 5', S23 DIESEL P @ 5', S24 DIESEL P @ 5' (Soil), DEGASSING TANK, CARBON EFFLUENT (Water)

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020 (Soil and Water)

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and relative percent difference (RPD) data are within ATI's control limit criteria for the following method:

EPA 8020 (Water)

EPA 8015 Modified: The matrix spike duplicate percent recovery of diesel is within ATI's control limits. The matrix spike percent recovery (28 percent) and RPD (75) are out of ATI's control limits. Low recovery of the spike from the matrix spike sample is most likely due insufficient spike added. Since the duplicate spike recovery and the blank spike/spike duplicate are within ATI's limits the data are not considered to be compromised.

EPA 8020 (Soil): The matrix spike and duplicate matrix spike percent recovery for benzene and the duplicate matrix spike recovery for toluene are below ATI's control limits. Matrix interference was observed. The blank spike was within ATI's control limits and the data are considered acceptable.

EPA 7420: The matrix spike percent recovery and sample/sample RPD are within ATI's control limits. However, it should be noted that the method requires a matrix spike duplicate which was not performed. The data are not considered to be compromised.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–129
Sample No.: S20 PUMP IS. #3 @ 5', S21 PUMP IS. #4 @ 5', S22 PUMP IS. #5 @ 5', S23 DIESEL P @ 5', S24 DIESEL P @ 5' (Soil), DEGASSING TANK, CARBON EFFLUENT (Water)

Matrix: 5 Soil, 2 Water

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality. However, the following should be noted:

EPA 7420: The required matrix spike duplicate was not performed. The sample duplicate performed is considered to be an adequate substitute and the data are not considered to be compromised.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
Fuel Hydrocarbons	GC/FID	EPA 8015 Modified
Lead	AA/F	EPA 7420
Moisture	GRAVIMETRIC	CLP SOW ILMO1.0

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX (Water CARBON EFFLUENT)	03/16/92	N/A	03/19/92	N/A	3 (14)
BETX (Water DEGASSING TANK)	03/16/92	N/A	03/24/92	N/A	8 (14)
BETX (Soil) a	03/16/92	03/17/92	03/20/92	1	4 (14)
BETX (Soil) b	03/16/92	03/17/92	03/18/92	1	2 (14)
Fuel Hydrocarbons (Soil)	03/16/92	03/17/92	03/18/92	1	2 (14)
Lead (Soil)	03/16/92	03/30/92	04/01/92	14	16 (180)

a – Samples S20 PUMP IS #3 @ 5', S21 PUMP IS #4 @5', S22 PUMP IS #5 @ 5', S23 DIESEL P @ 5'
b – Sample S24 DIESEL P @ 5'
N/A – Not applicable (No extraction required for BETX in water)
Numbers in parentheses ( ) indicate recommended holding times in days for soil and water.

All samples were extracted and analyzed within recommended holding times for soil and water.

FUEL HYDROCARBON CHEMISTRY

EPA 8015 Modified: The presence of petroleum hydrocarbons in the range expected for gasoline and diesel is confirmed by chromatogram for samples S20 PUMP IS #3 @ 5', S21 PUMP IS #4 @ 5', S22 PUMP IS #5 @ 5', and S23 DIESEL P @ 5'. The profiles of the chromatograms for these sample suggest that the gasoline range detections may be the result of diesel components in the gasoline range. The presence of petroleum hydrocarbons in the range expected for diesel is confirmed by chromatogram for sample S24 DIESEL P @ 5'.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9203-129-1	S20 PUMP IS #3 @ 5'	03/16/92	SOIL
9203-129-2	S21 PUMP IS #4 @ 5'	03/16/92	SOIL
9203-129-3	S22 PUMP IS #5 @ 5'	03/16/92	SOIL
9203-129-4	S23 DIESEL P @ 5'	03/16/92	SOIL
9203-129-5	S24 DIESEL P @ 5'	03/16/92	SOIL
9203-129-6	DEGASSING TANK	03/16/92	WATER
9203-129-7	CARBON EFFLUENT	03/16/92	WATER

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	5
WATER	2

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled isposal date.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
LEAD	AA/F	EPA 7420	R
MOISTURE	GRAVIMETRIC	CLP SOW ILM01.0	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
UB = Subcontract

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	100

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/24/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
)TAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	98

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-6

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: DEGASSING TANK	DATE ANALYZED	: 03/24/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	0.8
ETHYLBENZENE	<0.5
TOLUENE	1.3
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	99

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-7

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: CARBON EFFLUENT	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 50

COMPOUND	RESULT
BENZENE	1,100
ETHYLBENZENE	140
TOLUENE	1,900
TOTAL XYLENES	1,100

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	103

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9203-130-4
DATE EXTRACTED : N/A
DATE ANALYZED : 03/19/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	1.80	20.0	20.3	93	20.4	93	0
TOLUENE	<0.5	20.0	19.0	95	18.9	95	1
)TAL XYLENES	<0.5	40.0	39.2	98	39.3	98	0

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9203-197-6
DATE EXTRACTED : N/A
DATE ANALYZED : 03/24/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.6	93	18.8	94	1
TOLUENE	<0.5	20.0	19.0	95	19.3	97	2
TOTAL XYLENES	<0.5	40.0	38.1	95	38.8	97	2

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 03/19/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	19.4	97	18.2	91	6
TOLUENE	<0.5	20.0	20.1	101	19.3	97	4
TOTAL XYLENES	<0.5	40.0	42.1	105	40.2	101	5

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 03/24/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	19.2	96	19.4	97	1
TOLUENE	<0.5	20.0	19.3	97	19.5	98	1
TOTAL XYLENES	<0.5	40.0	40.1	100	40.1	100	0

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
)TAL XYLENES	<0.025

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	94

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S20 PUMP IS #3 @ 5'	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	0.039
ETHYLBENZENE	1.4
TOLUENE	0.48
TAL XYLENES	7.9

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	123

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S21 PUMP IS #4 @ 5'	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	0.67
ETHYLBENZENE	1.8
TOLUENE	0.80
TOTAL XYLENES	9.0

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	F

F = Out of limits due to matrix interference.

Analytical Technologies, Inc.

ATI I.D. # 9203-129-3

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S22 PUMP IS #5 @ 5'	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	0.59
ETHYLBENZENE	1.1
TOLUENE	0.91
TOTAL XYLENES	6.1

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	104

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-4

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S23 DIESEL P @ 5'	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.028
ETHYLBENZENE	0.81
TOLUENE	0.080
TOTAL XYLENES	6.1

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	107

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-5

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S24 DIESEL P @ 5'	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.028
ETHYLBENZENE	<0.028
TOLUENE	<0.028
TOTAL XYLENES	<0.028

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	82

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-129-5
DATE EXTRACTED : 03/17/92
DATE ANALYZED : 03/18/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.025	1.00	0.462	46F	0.452	45F	2
TOLUENE	<0.025	1.00	0.545	55	0.515	52F	6
TOTAL XYLENES	<0.025	2.00	1.25	63	1.20	60	4

F = Out of limits due to matrix interference.

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/17/92
DATE ANALYZED : 03/18/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.025	1.00	0.759	76	0.792	79	4
TOLUENE	<0.025	1.00	0.873	87	0.886	89	1
TOTAL XYLENES	<0.025	2.00	1.81	91	1.84	92	2

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/17/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	84

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-1

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S20 PUMP IS #3 @ 5'	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 5

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	280
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	2,200
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	F

F = Out of limits due to matrix interference.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-2

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S21 PUMP IS #4 @ 5'	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 20

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	2,500
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
JEL HYDROCARBONS	21,000
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	F

F = Out of limits due to matrix interference.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-3

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S22 PUMP IS #5 @ 5'	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 25

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	740
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	9,100
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	F

F = Out of limits due to matrix interference.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-4

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S23 DIESEL P @ 5'	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 5

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	980
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
DIESEL HYDROCARBONS	3,100
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	F

F = Out of limits due to matrix interference.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129-5

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/16/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/17/92
PROJECT NAME	: BURNS BROS/THORP	DATE EXTRACTED	: 03/17/92
CLIENT I.D.	: S24 DIESEL P @ 5'	DATE ANALYZED	: 03/18/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	87
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	96

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-105-1
DATE EXTRACTED : 03/17/92
DATE ANALYZED : 03/18/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	114	500	255	28H	560	89	75H

H = Out of limits.

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/17/92
DATE ANALYZED : 03/17/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	<25	500	423	85	458	92	8

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP

MATRIX : SOIL

ELEMENT	DATE PREPARED	DATE ANALYZED
LEAD	03/30/92	04/01/92

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

METALS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP

MATRIX : SOIL
UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	LEAD
9203-129-1	S20 PUMP IS #3 @ 5'	<5.6
REAGENT BLANK	-	<5.0

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP

MATRIX : SOIL
UNITS : mg/Kg

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	9203-166-2	<6.4	<6.7	NC	416	410	101
LEAD	BLANK SPIKE	<5.0	N/A	N/A	305	300	102

NC = Not Calculable.

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP

MATRIX : SOIL

PARAMETER	DATE ANALYZED
MOISTURE	03/17/92

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP

MATRIX : SOIL
UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE
9203-129-1	S20 PUMP IS #3 @ 5'	13
9203-129-2	S21 PUMP IS #4 @ 5'	11
9203-129-3	S22 PUMP IS #5 @ 5'	9.1
9203-129-4	S23 DIESEL P @ 5'	12
9203-129-5	S24 DIESEL P @ 5'	10

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-129

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS/THORP

MATRIX : SOIL
UNITS : %

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9203-129-4	12	15	22	N/A	N/A	N/A

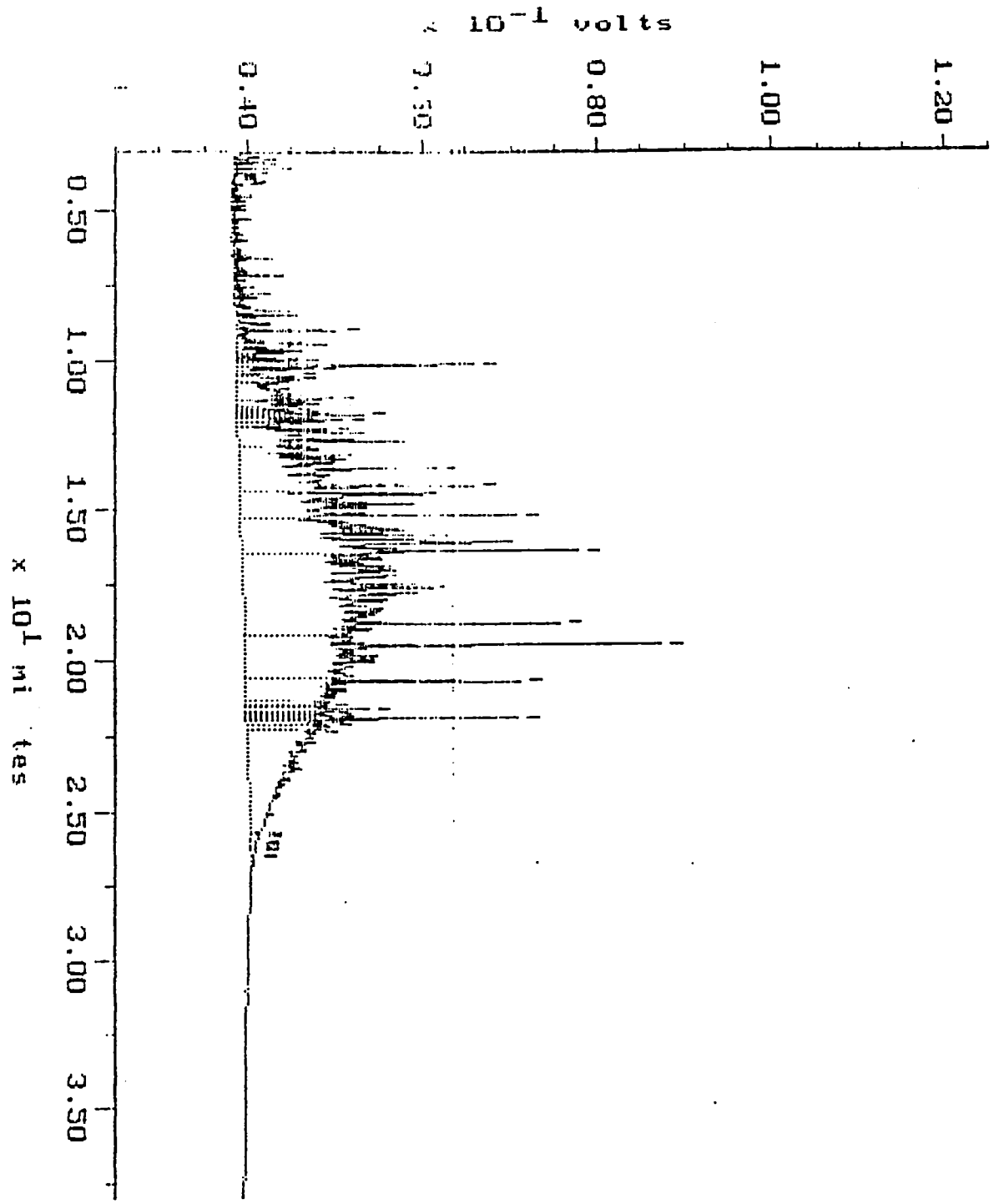
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Sample: 9203-129-1 DIL
Acquired: 18 Mar-92 17:38
Dilution: 1 : 5.000

Channel: FRED
Method: M:\BRUE\MAXDATA\FRED\FUEL0318
Inj Vol: 1.00

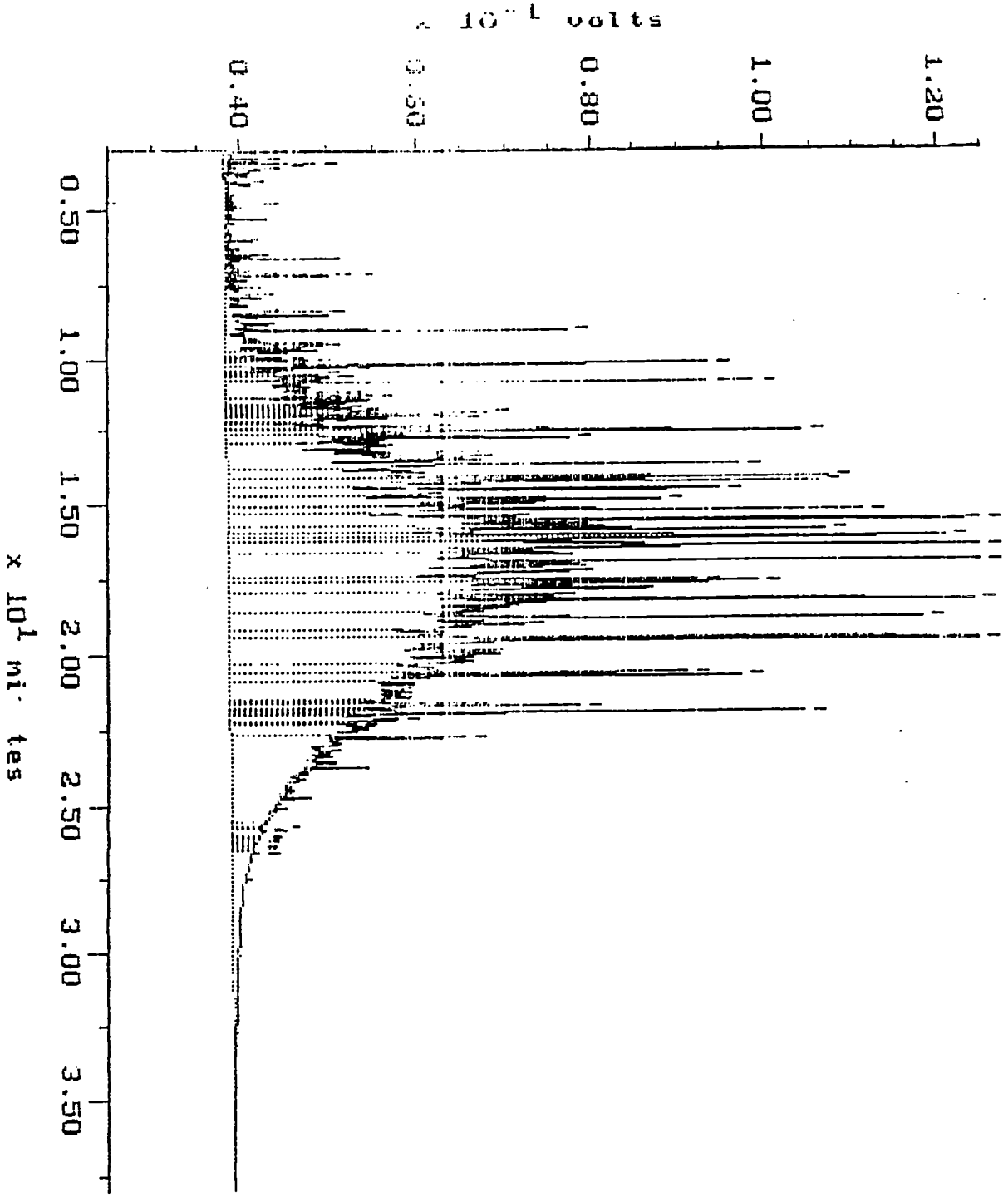
Filename: 0318-R10
Operator: ACE



Sample: 9203-123-2 DIL
Acquired: 19 Mar-92 18:27
Dilution: 1 : 20.000

Channel: FRED
Method: M:\BRU2\MAXDATA\FRED\FUEL0318
Inj Vol: 1.00

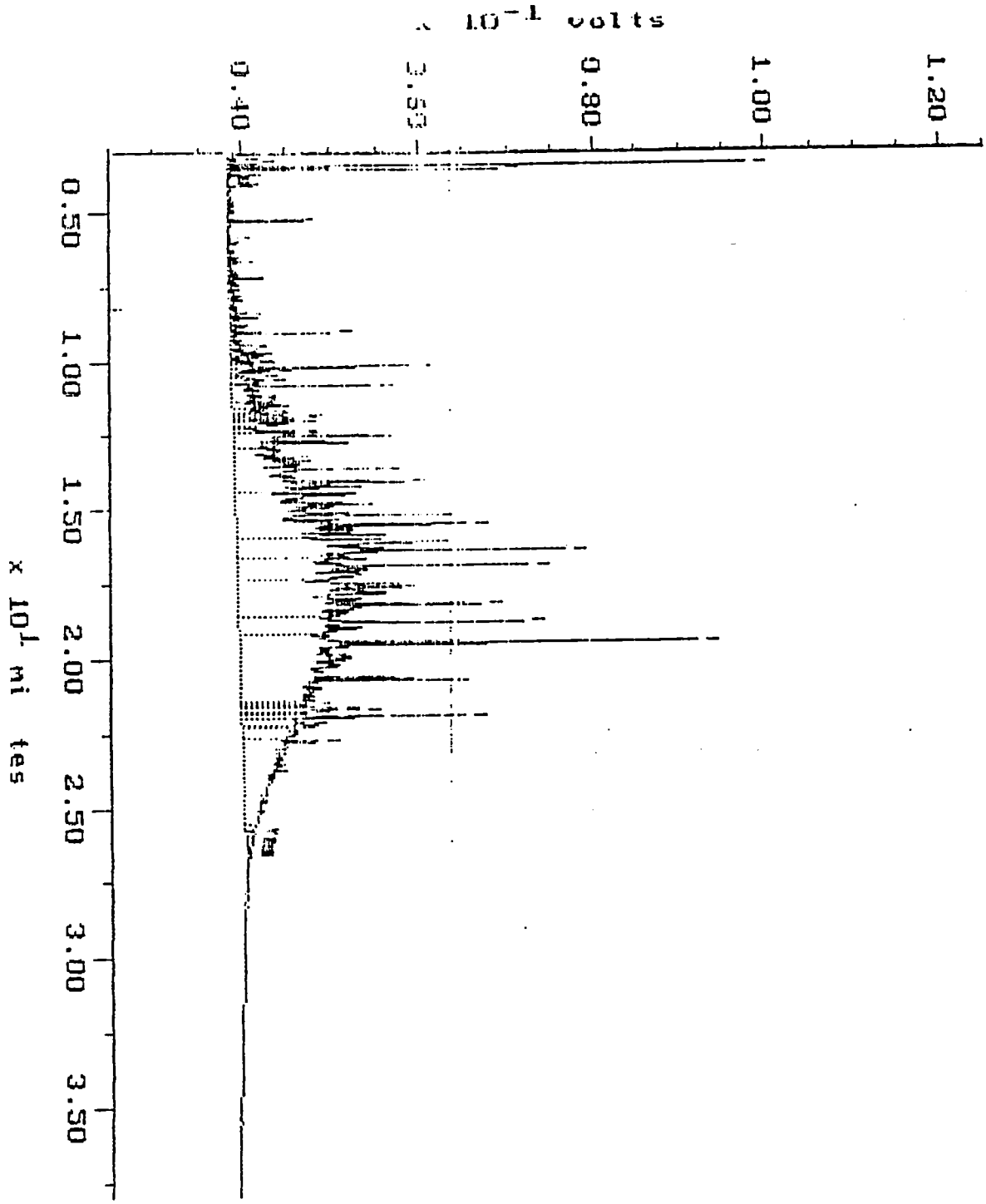
Filename: 0318FR11
Operator: ACE



Sample: 9233-129-3 DIL
Acquired: 18 MAR 92 19:15
Dilution: 1 : 25.000

Channel: FRED
Method: M:\BRU2\MAXDATA\FRLD\FUEL0318
Inj Vol: 1.00

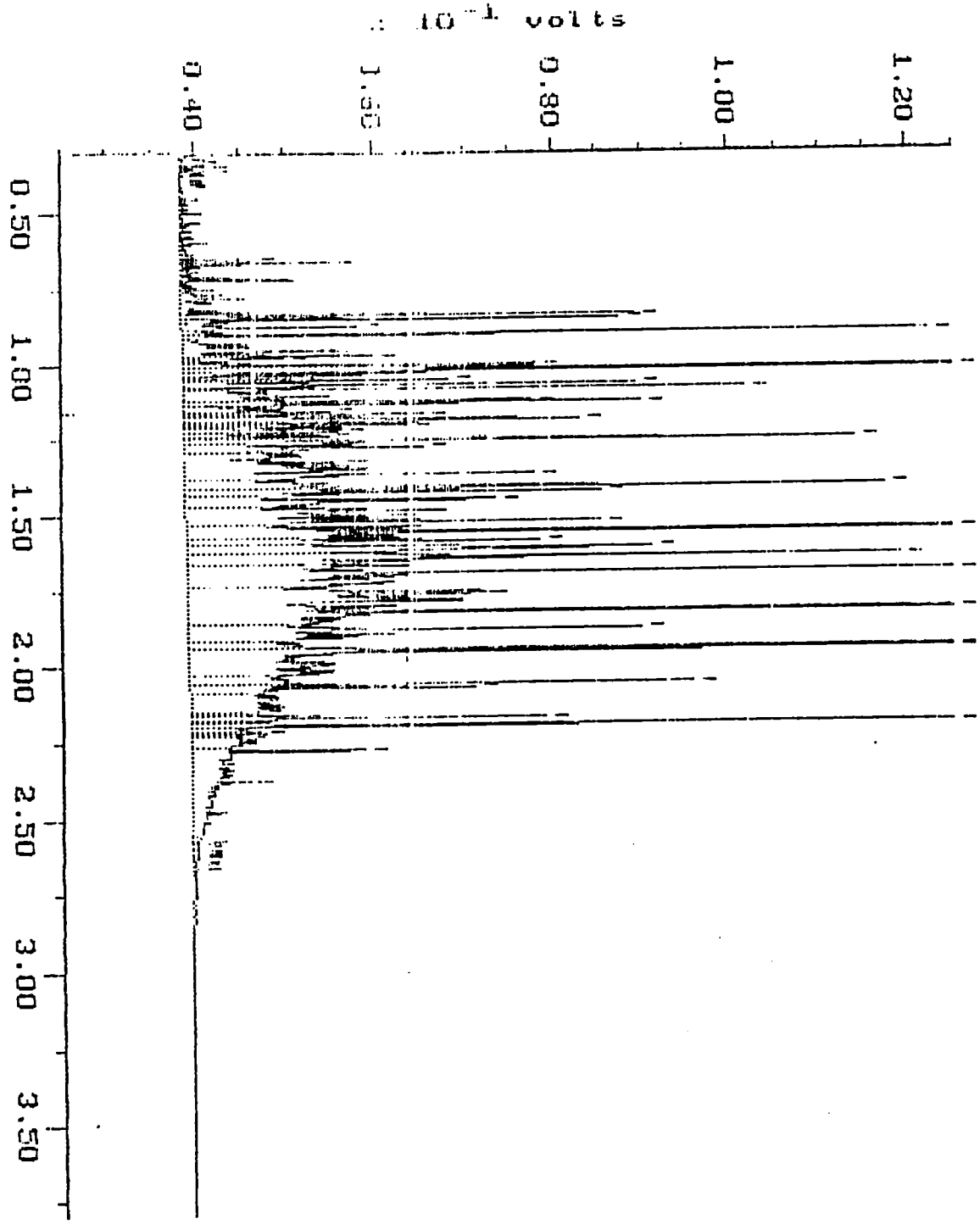
Filename: 0318FR12
Operator: ACE



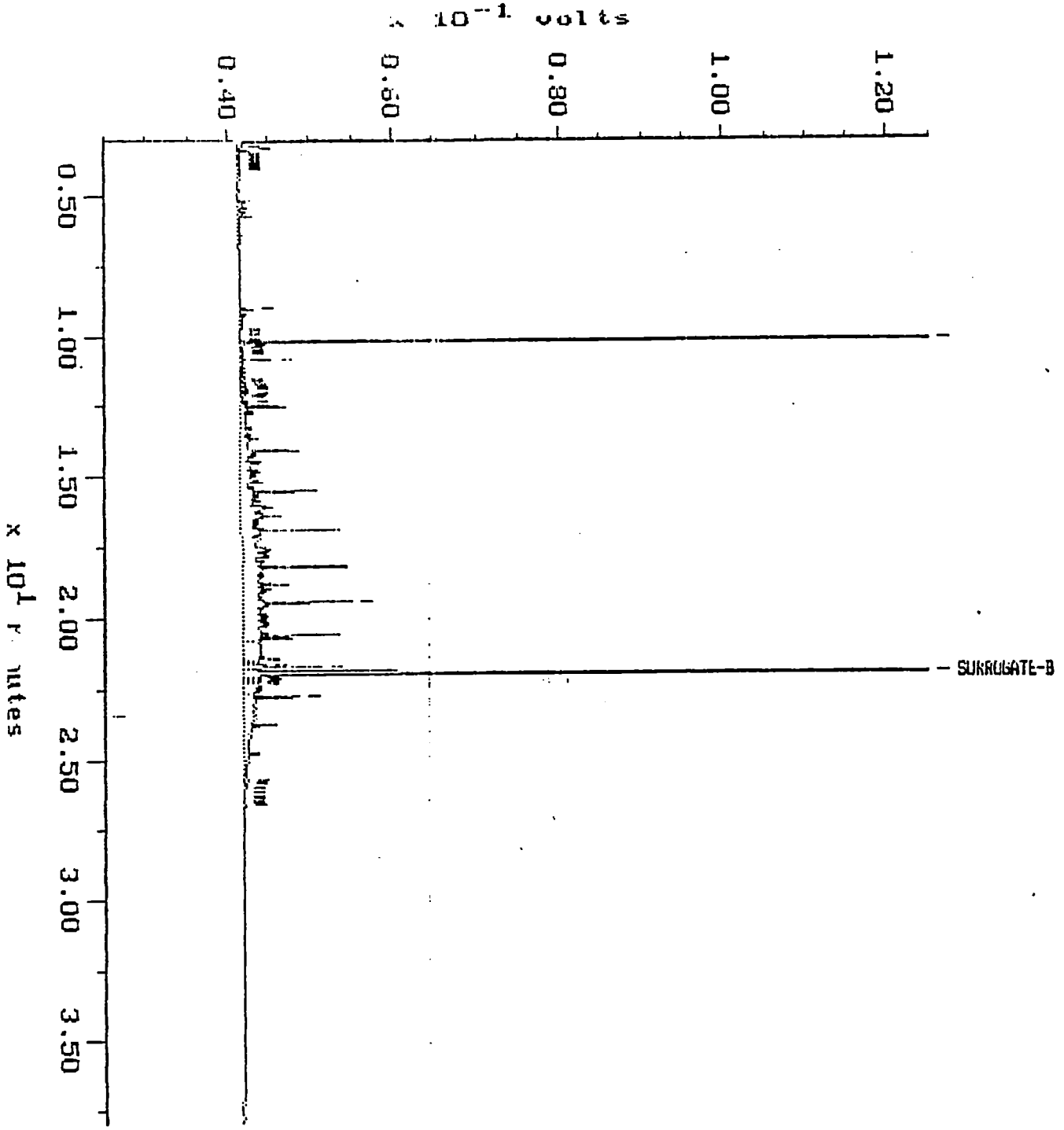
Sample: 9203-129-4 DIL
Acquired: 18 MAR-92 20:03
Dilution: 1 : 5.000

Channel: FRED
Method: M:\8R02\MAXDATA\FRED\FUEL0318
Inj Vol: 1.00

Filename: 0318FR13
Operator: ACC



Sample: 9203-129-5 Channel: FRED Filename: 0317FR22
Acquired: 18-MAR-92 7:51 Method: H:\BRU2\MAXDATA\FRED\FUEL0317 Operator: ACE
Inj Vol: 1.00



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 3-16-92 Page 1 of 1

PROJECT INFORMATION

Project Manager: Peter Barry
Project Name: Burns Bros / Thorp
Project Number: 15,659.001
Site Location: Exit 101 Hwy I-90 Sampled By: DPD

DISPOSAL INFORMATION

~~(A) Lab Disposal~~ (return if not indicated) Return Samples 3/20/92 EW
Disposal Method:
Disposed by: Disposal Date:

QC INFORMATION (check one)

☐SW-846 ☐CLP ☐Screening ☐AGI Std. ☐Special

Laboratory Number: 9203-129

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-ID State:	TPH-G State:	TPH-D State:	TPH Special Instructions	418.1 State:	8015M	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	Total / Lead				NUMBER OF CONTAINERS
S20 Pump Is. #3 @ 5'	3-16-92	1359	Soil	1						X			X																						X				1
S21 Pump Is. #4 @ 5'		0850		2						X			X																										1
S22 Pump Is. #5 @ 5'		0926		3						X			X																										1
S23 Diesel P. @ 5'		1302		4						X			X																										1
S24 Diesel P. @ 5'		1315		5						X			X																										1
DEGASSING TANK	3/16/92	1650	WATER	6			X del						X																										3
CARBON EFFL.	3/16/92	1700	WATER	7			X del 3/17/92						X																										3

LAB INFORMATION

Lab Name: ATI
Lab Address: 560 Naches Ave Suite 101
Renton WA 98055
Via: Courier

SAMPLE RECEIPT

Total Number of Containers:	11
Chain of Custody Seals?: Y/N/NA	y
Intact?: Y/N/NA	y
Received in Good Condition/Cold:	y/y

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Time: 16:37	Signature: 0815 Time:	Signature: Time:
Printed Name: David P Dawson Date: 3-16-92	Printed Name: GLENN J. COTTER Date: 3/17/92	Printed Name: Date:
Company: AGI	Company: AGI.	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: Time: 1637	Signature: Time: 1115A	Signature: Time:
Printed Name: GLENN J. COTTER Date: 3/16/92	Printed Name: V PENNICK Date: 3/17/92	Printed Name: Date:
Company: AGI	Company: ATI-WA	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev. 12/91

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–157
Sample No.: S17 DIESEL P. @ 2', S26 LEAD & UNLEAD P. @ 3', S27 PUMP IS. #7 @ 3', S28 PUMP IS. #7 @ 3', S29 C. STOCKPILE

Matrix: Soil

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality. However, the following should be noted:

EPA 7420: The required matrix spike duplicate was not performed. The sample duplicate performed is considered to be an adequate substitute and the data are not considered to be compromised.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
Fuel Hydrocarbons	GC/FID	EPA 8015 Modified
Lead	AA/F	EPA 7420
Moisture	GRAVIMETRIC	CLP SOW ILMO1.0

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX a	03/17/92	03/19/92	03/19/92	N/A	2 (14)
BETX b	03/17/92	03/19/92	03/20/92	N/A	3 (14)
BETX c	03/18/92	03/19/92	03/20/92	N/A	2 (14)
Fuel Hydrocarbons a	03/17/92	03/19/92	03/20/92	2	3 (14)
Fuel Hydrocarbons b	03/17/92	03/19/92	03/21/92	2	4 (14)
Fuel Hydrocarbons c	03/18/92	03/19/92	03/20/92	1	2 (14)
Lead	03/17/92	03/30/92	04/01/92	13	15 (180)

a – Samples S17 DIESEL P. @ 2', S26 LEAD & UNLEAD P. @ 3'
b – Samples S27 PUMP IS. #7 @ 3', S28 PUMP IS. #6 @3'
c – Sample C. STOCKPILE
Numbers in parentheses ( ) indicate recommended holding times in days for soil.

All samples were extracted and analyzed within recommended holding times for soil.

FUEL HYDROCARBON CHEMISTRY

EPA 8015 Modified: The presence of petroelum hydrocarbons in the ranges expected for gasoline and diesel are confirmed by chromatogram for samples S26 LEAD & UNLEAD P. @ 3', S27 PUMP IS. #7 @ 3', S28 PUMP IS. #6 @ 3', and S29 C. STOCKPILE. The profiles of the first three aforementioned samples indicate that gasoline is likely responsible for the detection in both the gasoline and diesel ranges. The profile of sample C. STOCKPILE indicates that the gasoline range detections are likely the result of a diesel fuel.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9203–157
Sample No.: S17 DIESEL P. @ 2', S26 LEAD & UNLEAD P. @ 3', S27 PUMP IS. #7 @ 3', S28 PUMP IS. #7 @ 3', S29 C. STOCKPILE

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
EPA 8015 Modified
EPA 7420

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8015 Modified

EPA 7420: A sample/sample duplicate was run and was within ATI's control limits. The required matrix spike duplicate was not analyzed. The data are not considered to be compromised.

EPA 8020: The matrix spike and spike duplicate percent recovery and RPD data are within ATI's control limits for benzene. The matrix spike and spike duplicate results for toluene and total xylenes were above the calibration range and therefore estimates. The RPD for the estimated values was above ATI's control limits for toluene only. The blank spike was within ATI's control limits and the data are considered acceptable.

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

SIGNATURES

Prepared by Thomas A. Mercer **Date** 4/13/92
Checked by Katherine A. Hill **Date** 4/13/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9203-157

April 8, 1992

RECEIVED
APR -9 1992
APPLIED GEOTECHNOLOGY INC.

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

Attention : Peter Barry

Project Number : 15,659.001

Project Name : Burns Bros. - Thorp

On March 18, 1992, Analytical Technologies, Inc., received five soil samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Cari Trimble for
Frederick W. Grothkopp
Laboratory Manager

FWG/hal/rmn

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9203-157-1	S17 DIESEL P. @ 2'	03/17/92	SOIL
9203-157-2	S26 LEAD & UNLEAD P. @ 3'	03/17/92	SOIL
9203-157-3	S27 PUMP IS. #7 @ 3'	03/17/92	SOIL
9203-157-4	S28 PUMP IS. #6 @ 3'	03/17/92	SOIL
9203-157-5	S29 C. STOCKPILE	03/18/92	SOIL

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	5

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled isposal date.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
LEAD	AA/F	EPA 7420	R
MOISTURE	GRAVIMETRIC	CLP SOW ILM01.0	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	102

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/17/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/18/92
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: S17 DIESEL P. @ 2'	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	0.037
ETHYLBENZENE	<0.028
TOLUENE	0.066
TOTAL XYLENES	0.039

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	59

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/17/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/18/92
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: S26 LEAD & UNLEAD P. @ 3'	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT	
BENZENE	0.44	
ETHYLBENZENE	3.6	D
TOLUENE	5.6	D
TOTAL XYLENES	25	D

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	91

D = Value from a 20 fold diluted analysis.

Analytical Technologies, Inc.

ATI I.D. # 9203-157-5

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/18/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/18/92
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: S29 C. STOCKPILE	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
BENZENE	<0.028
ETHYLBENZENE	<0.028
TOLUENE	<0.028
TOTAL XYLENES	<0.028

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	75

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-157-2
DATE EXTRACTED : 03/19/92
DATE ANALYZED : 03/19/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	0.358	1.00	1.20	84	1.38	102	14
TOLUENE	6.59C	1.00	15.8C	G	23.9C	G	41H
TOTAL XYLENES	27.4C	2.00	48.4C	G	58.8C	G	19

C = Estimated, value above linear range.

G = Out of limits due to high levels of target analytes in sample.

H = Out of limits.

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/19/92
DATE ANALYZED : 03/19/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.025	1.00	0.801	80	0.782	78	2
TOLUENE	<0.025	1.00	0.913	91	0.896	90	2
TOTAL XYLENES	<0.025	2.00	1.88	94	1.85	93	2

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/19/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
UEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	83

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157-1

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/17/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/18/92
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: S17 DIESEL P. @ 2'	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	<5
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
UEL HYDROCARBONS	<25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	83

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157-2

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/17/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/18/92
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: S26 LEAD & UNLEAD P. @ 3'	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	300
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
.UEL HYDROCARBONS	72
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	85

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157-3

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/17/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/18/92
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: S27 PUMP IS. #7 @ 3'	DATE ANALYZED	: 03/21/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 10

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	1,100
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	160
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	76

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157-4

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/17/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/18/92
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: S28 PUMP IS. #6 @ 3'	DATE ANALYZED	: 03/21/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 10

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	1,600
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	300
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	76

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157-5

FUEL HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/18/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/18/92
PROJECT NAME	: BURNS BROS. - THORP	DATE EXTRACTED	: 03/19/92
CLIENT I.D.	: S29 C. STOCKPILE	DATE ANALYZED	: 03/20/92
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE NOT CORRECTED FOR MOISTURE CONTENT

COMPOUND	RESULT
FUEL HYDROCARBONS	10
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE
FUEL HYDROCARBONS	210
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	92

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : 9203-148-8
DATE EXTRACTED : 03/19/92
DATE ANALYZED : 03/19/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	566	500	900	67	877	62	3

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

FUEL HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP
METHOD : 8015 (MODIFIED)
SAMPLE MATRIX : SOIL

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/19/92
DATE ANALYZED : 03/19/92
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
FUEL HYDROCARBONS (DIESEL)	<5	500	444	89	449	90	1

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP

MATRIX : SOIL

ELEMENT	DATE PREPARED	DATE ANALYZED
LEAD	3/30/92	04/01/92

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

METALS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

MATRIX : SOIL
UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	LEAD
9203-157-2	S26 LEAD & UNLEAD P. @ 3'	<6.0
9203-157-3	S27 PUMP IS. #7 @ 3'	5.6
9203-157-4	S28 PUMP IS. #6 @ 3'	11
REAGENT BLANK	-	<5.0

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP

MATRIX : SOIL
UNITS : mg/Kg

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	9203-118-11	34	33	3	521	493	99
LEAD	BLANK SPIKE	<5.0	N/A	N/A	305	300	102

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP

MATRIX : SOIL

PARAMETER	DATE ANALYZED
MOISTURE *	03/19/92
MOISTURE	03/27/92

* Percent moisture results associated with Total Petroleum Hydrocarbon analyses.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP

MATRIX : SOIL
UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE	MOISTURE *
9203-157-1	S17 DIESEL P. @ 2'	-	9.4
9203-157-2	S26 LEAD & UNLEAD P. @ 3'	18	18
9203-157-3	S27 PUMP IS. #7 @ 3'	16	17
9203-157-4	S28 PUMP IS. #6 @ 3'	18	20
9203-157-5	S29 C. STOCKPILE	-	10

* Percent moisture results associated with Total Petroleum Hydrocarbon analyses.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-157

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS. - THORP

MATRIX : SOIL
UNITS : %

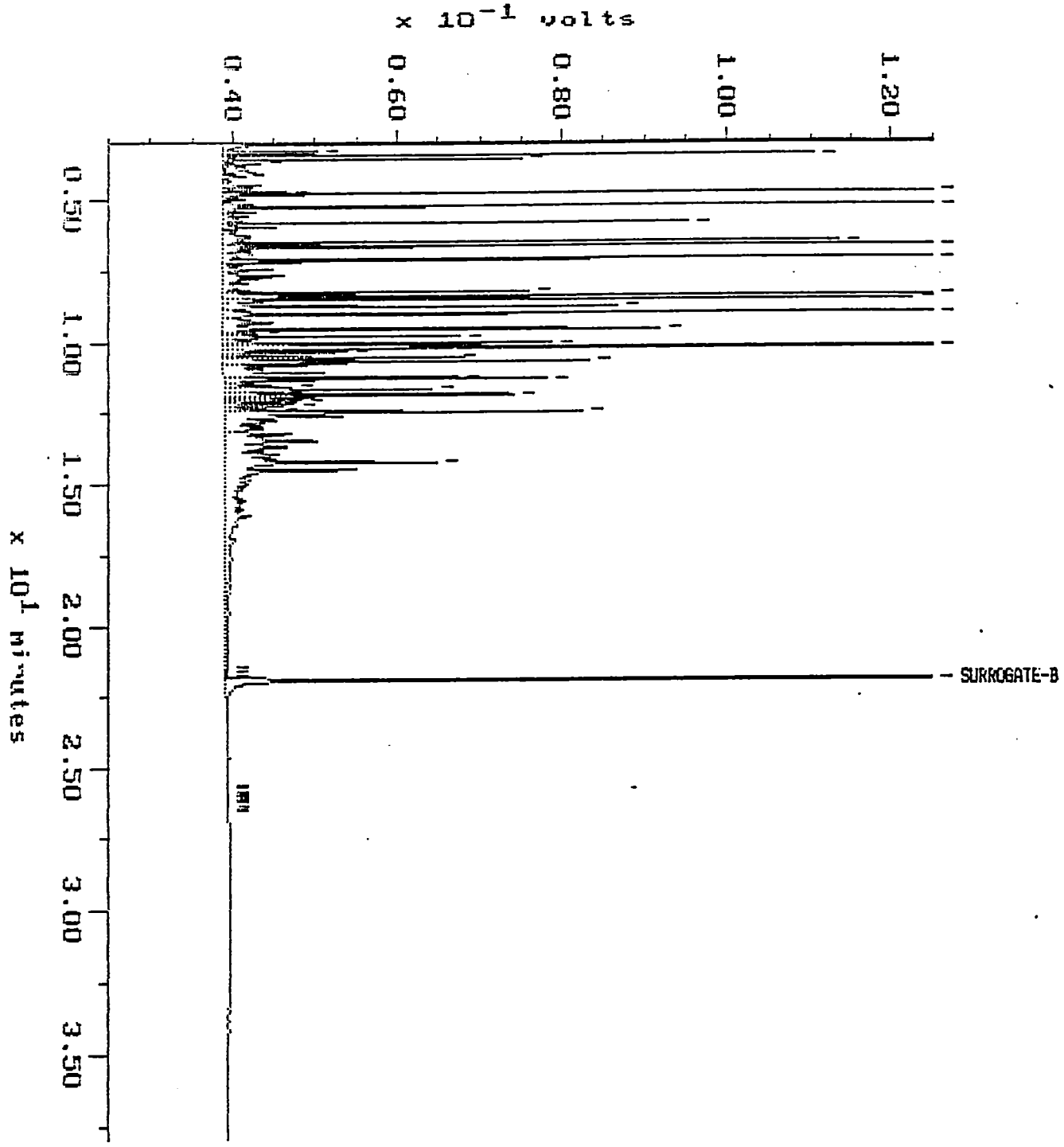
PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9203-159-4	6.3	7.1	12	N/A	N/A	N/A
MOISTURE *	9203-157-4	20	20	0	N/A	N/A	N/A

* Percent moisture results associated with Total Petroleum Hydrocarbon analyses.

$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

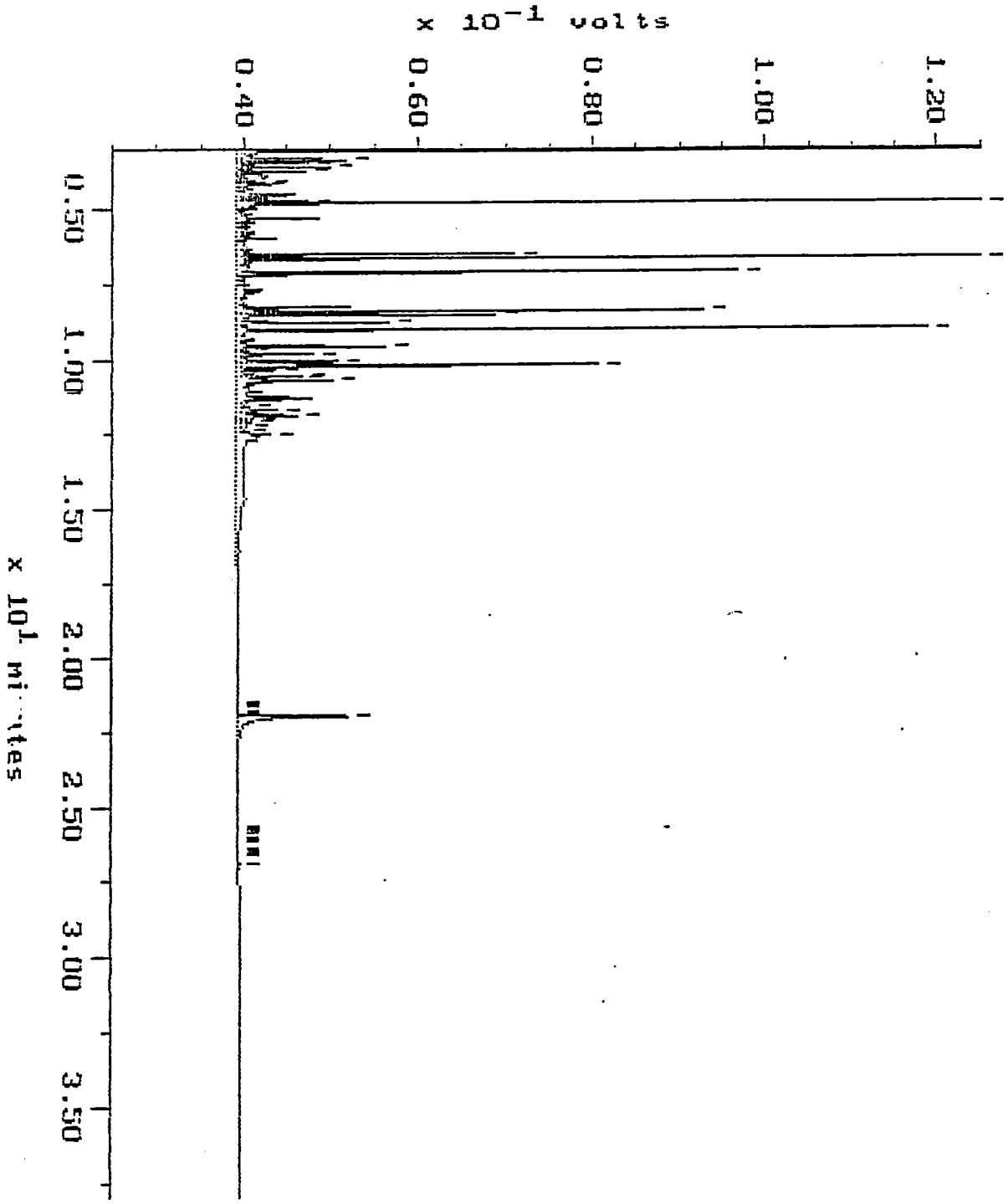
Sample: 9203-157-2 Channel: FRED Filename: 0319FR33
Acquired: 20-MAR-92 17:39 Method: M:\BRO2\MAXDATA\FRED\FUEL0319* Operator: ACE
Inj Vol: 1.00



Sample: 9203-157-3
Acquired: 21-MAR-92 21:14
Dilution: 1 : 10.000

Channel: FRED
Method: M:\BRO2\MAXDATA\FRED\FUEL0319
Inj Vol: 1.00

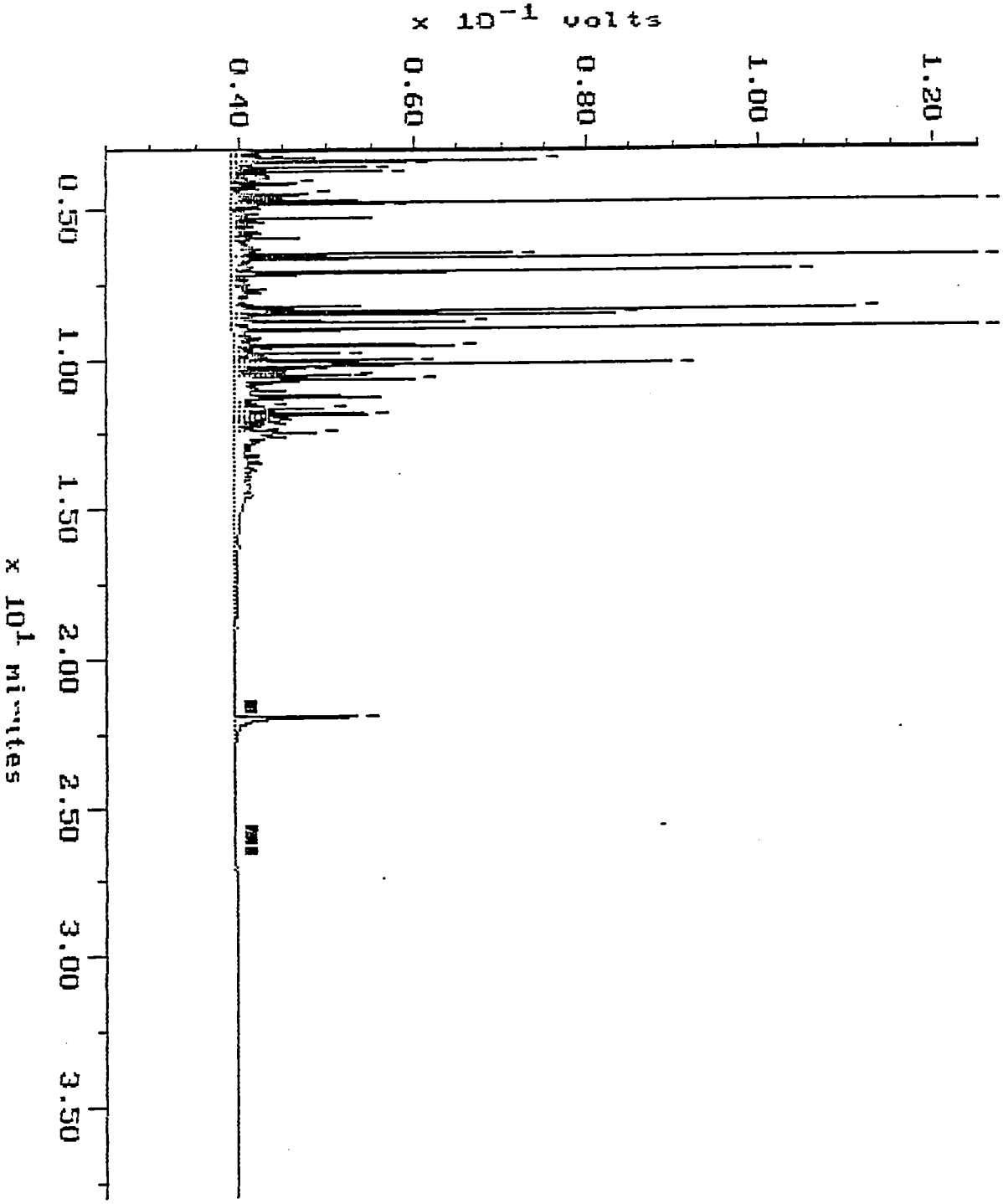
Filename: 0319FR36
Operator: ACE



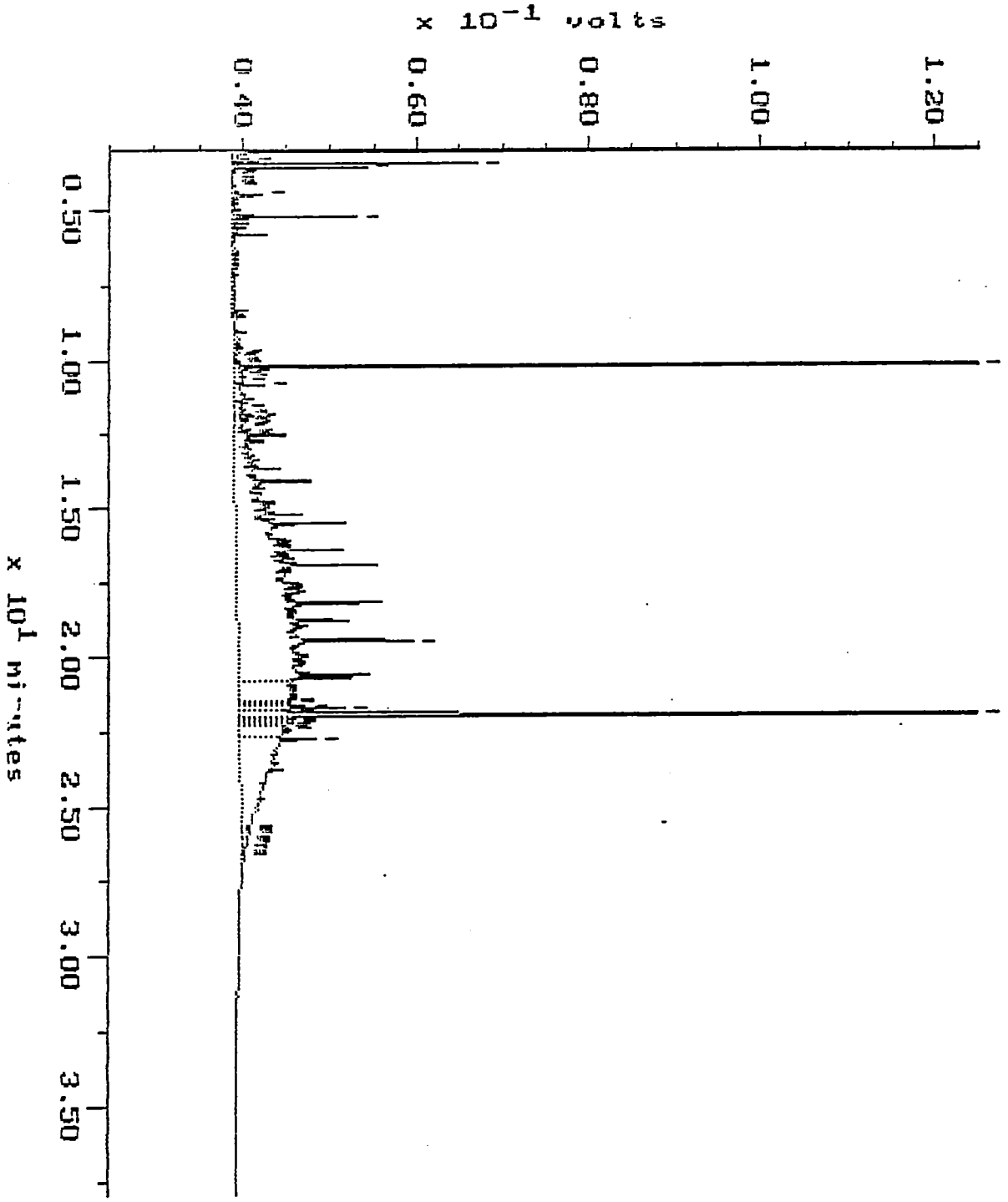
Sample: 9203-157-4
Acquired: 21-MAR-92 22:02
Dilution: 1 : 10.000

Channel: FRED
Method: M:\BRO2\MAXDATA\FRED\FUEL0319
Inj Vol: 1.00

Filename: 0319FR37
Operator: ACE



Sample: 9203-157-5 Channel: FRED Filename: 0319FR27
Acquired: 20-MAR-92 12:46 Method: M:\BRU2\MAXDATA\FRED\FUEL0319 Operator: ACE
Inj Vol: 1.00



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN OF CUSTODY

Date 3-17-92 Page 1 of 1

Project Manager: Peter Barry
Project Name: Burns Bros / Thorp
Project Number: 15,659 001
Site Location: [illegible] WA
Phone: 453 8383 Sampled By: DPD

Laboratory Number: 9203-157

SAMPLE DISPOSAL INSTRUCTIONS

☐ Lab Disposal ☒ Return (call 3/20/92) ☐ Pickup (will call)

ANALYSIS REQUEST

	SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TCL Metals (23)	Priority Pollutant Metals (13)	EPTOX Metals (8) Total	EP TOX Metals (8) EP EXT	TCLP Metals	EP TOX Pesticides (5)	TCLP - Volatiles	8010 Halogenated Volatiles	8020 Aromatic Volatiles	BETX ONLY	8240 GCMS Volatiles	8270 GCMS BNA	8310 HPLC PNA	8080 OC Pesticides & PCB's	PCB's ONLY	8140 Phosphate Pesticides	8150 Herbicides	WDOE PAH/HH (WAC 173)	418.1 (TPH)	413.2 Grease & Oil	8015M Fuel Fingerprint	TOC 9060	TOX 9020	% Moisture	Total Lead (Pb)			NUMBER OF CONTAINERS
	517 D[illegible]	3-17-92	1013	Soil	-1										X	X										X							1
*	526 [illegible]		1346		2										X	X	No 8240									X				X			1
*	527 [illegible]		1352		3										X	X										X				X			1
*	528 [illegible]		1400		4										X	X										X				X			1
	529 c. stockpile	3-18-92	1504		5										X											X							1

LAB INFORMATION

Lab Name: AGI
Lab Address: 566 Naches Ave Suite 101
Via:

SAMPLE RECEIPT

Total Number of Containers:	5
Chain of Custody Seals: Y/N/NA	Y
Intact?: Y/N/N	Y
Received in Good Cond./Cold:	Y/Y

TAT: ☐ 24hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk. ☒ 2 wks. (normal)

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions: * HOT SAMPLE

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [illegible] Time: 1800	Signature: Time:	Signature: Time:
Printed Name: David P. Dawson Date: 3/18/91	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [illegible] Time: 1800	Signature: Time:	Signature: Time:
Printed Name: [illegible] Date: 3/18/92	Printed Name: Date:	Printed Name: Date:
Company: AT-WA	Company:	Company:

AGI OFFICES: Bellevue: (206)453-8383 Tacoma: (206)383-4380 Portland: (503)222-2820

DISTRIBUTION: White, Canary = Analytical Laboratory; Pink = AGI Files

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–295
Sample No.: CARBON FILTER EFFLUENT, BIOREACTOR EFFLUENT

Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
TPH–D	GC/FID	WA ECOLOGY WTPH–D

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX	04/28/92	N/A	04/30/92	N/A	2 (14)
WTPH–D a	04/28/92	05/01/92	05/01/92	3	3 (14)
WTPH–D b	04/28/92	05/01/92	05/04/92	3	6 (14)

a – Sample BIOREACTOR EFFLUENT
b – Sample CARBON FILTER EFFLUENT
N/A – Not applicable (No extraction required for BETX in water)
Numbers in parentheses indicate recommended holding times in days for water.

All samples were extracted and analyzed within recommended holding times for water.

FUEL HYDROCARBON CHEMISTRY

WA ECOLOGY WTPH–D: The presence of petroleum hydrocarbons in the range expected for diesel is confirmed by chromatogram for samples BIOREACTOR EFFLUENT and CARBON FILTER EFFLUENT.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–295
Sample No.: CARBON FILTER EFFLUENT, BIOREACTOR EFFLUENT

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

Lab Duplicates: All lab duplicate RPD are within ATI's controol limits for the following method:

WA ECOLOGY WTPH–D: Lab duplicate RPD at 47 percent is outside of USEPA recommended guidelines for field duplicates. (Field duplicates reflect precision in the lab and in the field and generally have greater variance than lab duplicates, which measure only lab performance.) Associated blank spike data are acceptable. Sample data are considered acceptable without qualification.

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

SIGNATURES

Prepared by KAH for Thomas Mercer **Date** 5/29/92
Checked by Katherine A. Hill **Date** 5/29/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9204-295

May 14, 1992

RECEIVED
MAY 15 1992
APPLIED GEOTECHNOLOGY INC.

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros./Thorp

On April 29, 1992, Analytical Technologies, Inc., received two water samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Mary C. Silva for:
Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Frederick W. Grothkopp
Laboratory Manager

FWG/hal/elf

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9204-295-1	CARBON FILTER EFFLUENT	04/28/92	WATER
9204-295-2	BIOREACTOR EFFLUENT	04/28/92	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	2

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/29/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	96

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/28/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/29/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: CARBON FILTER EFFLUENT	DATE ANALYZED	: 04/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	9.5
ETHYLBENZENE	1.5
TOLUENE	11
TOTAL XYLENES	30

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	109

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/28/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/29/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: BIOREACTOR EFFLUENT	DATE ANALYZED	: 04/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT	
BENZENE	120	D
ETHYLBENZENE	19	
TOLUENE	150	D
TOTAL XYLENES	220	D

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	107

D = Value from a five fold diluted analysis.

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9204-293-21
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE ANALYZED	: 04/29/92
EPA METHOD	: 8020 (BETX)	UNITS	: ug/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	17.4	87	17.3	87	1
TOLUENE	<0.5	20.0	16.9	85	16.5	83	2
TOTAL XYLENES	<0.5	40.0	35.0	88	34.0	85	3

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 04/29/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.2	91	17.4	87	4
TOLUENE	<0.5	20.0	17.8	89	16.5	83	8
TOTAL XYLENES	<0.5	40.0	37.6	94	34.2	85	9

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 05/01/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 05/04/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.5
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

O-TERPHENYL	74

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295-1

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/28/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/29/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 05/01/92
CLIENT I.D.	: CARBON FILTER EFFLUENT	DATE ANALYZED	: 05/04/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 5

COMPOUND	RESULT
FUEL HYDROCARBONS	23
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	91

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295-2

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/28/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/29/92
PROJECT NAME	: BURNS BROS./THORP	DATE EXTRACTED	: 05/01/92
CLIENT I.D.	: BIOREACTOR EFFLUENT	DATE ANALYZED	: 05/01/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	5.1
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

O-TERPHENYL	99

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
METHOD : WA DOE WTPH-D
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9204-217-1
DATE EXTRACTED : 04/23/92
DATE ANALYZED : 04/24/92
UNITS : mg/L

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (DIESEL)	3.4	2.1	47	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-295

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS./THORP
METHOD : WA DOE WTPH-D
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 05/01/92
DATE ANALYZED : 05/04/92
UNITS : mg/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (DIESEL)	<0.5	5.0	4.4	88	4.5	90	2

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

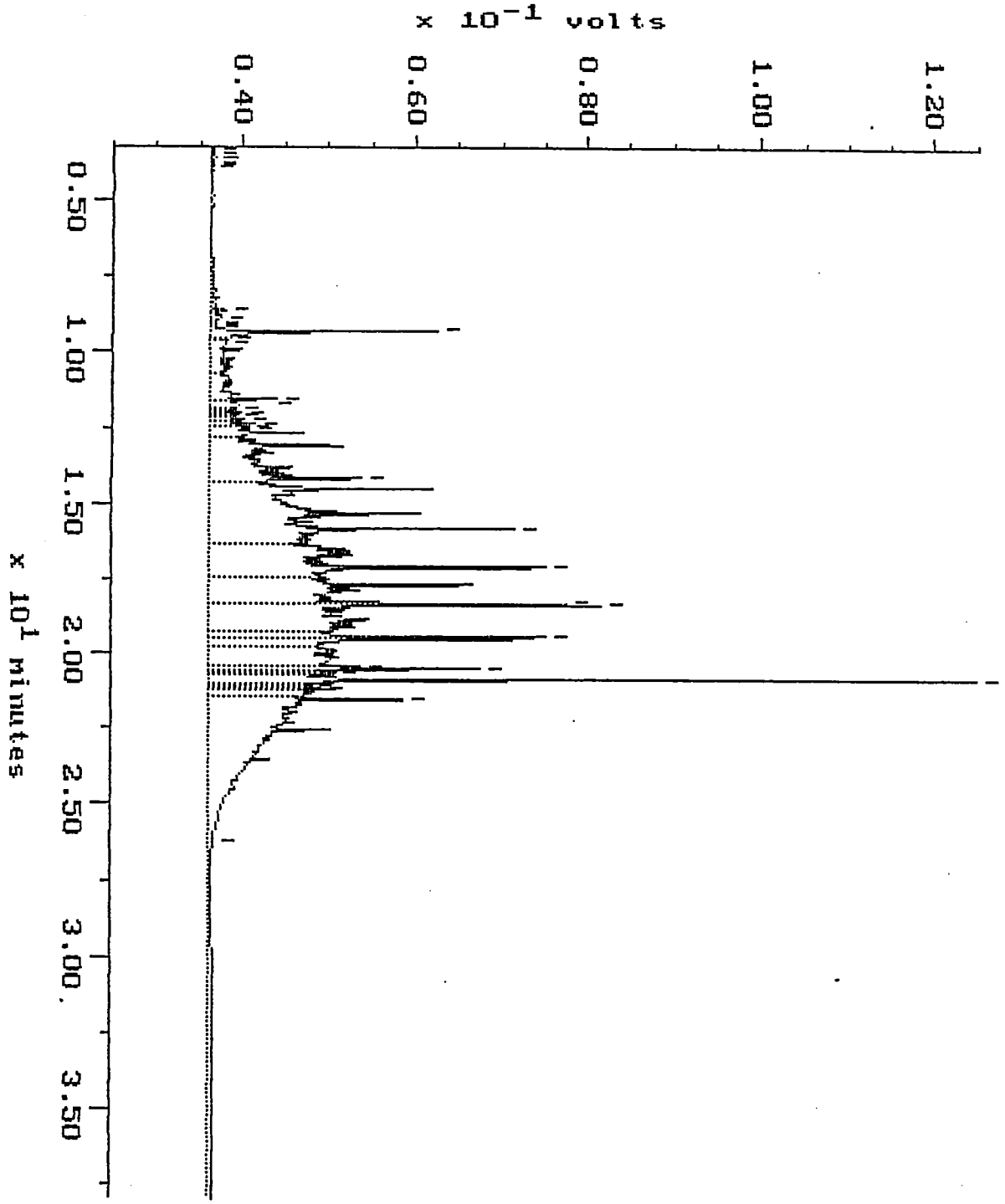
$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

WA DOE WTPH-D

Sample: 9204-295-1 DIL
Acquired: 04-MAY-92 13:15
Dilution: 1 : 5.000

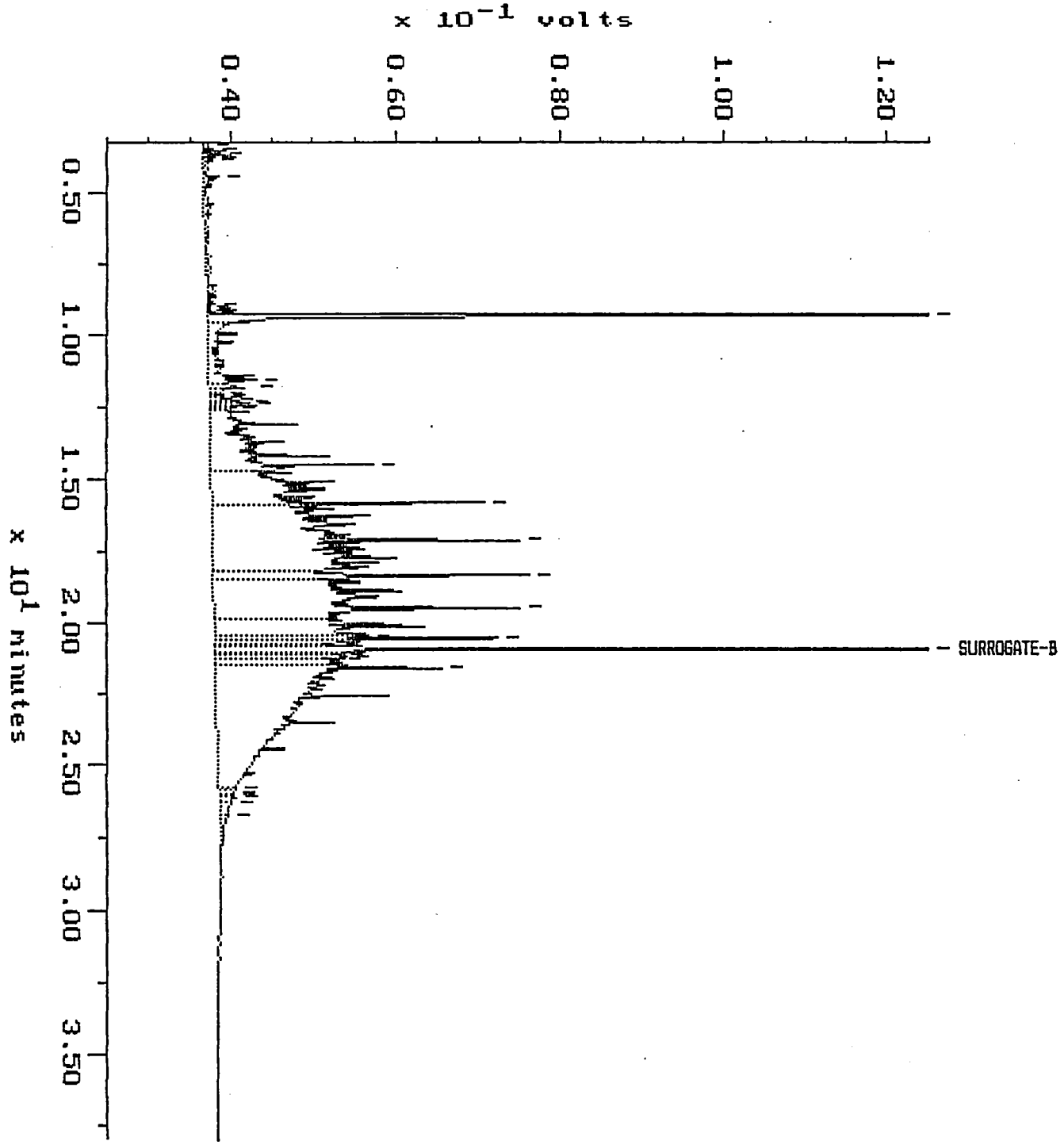
Channel: BERT
Method: L:\BRO2\MAXDATA\BERT\FUEL0504
Inj Vol: 1.00

Filename: 0504BE04
Operator: PEA



WA DOE WTPH-D

Sample: 9204-295-2 Channel: BERT Filename: 0501BE11
Acquired: 01-MAY-92 22:22 Method: L:\BRO2\MAXDATA\BERT\FUEL0501 Operator: PEA
Inj Vol: 1.00



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 4/28/92 Page 1 of 1

PROJECT INFORMATION

Project Manager: Peter Barry
Project Name: Burns Bros. / Thorp
Project Number: 15659001
Site Location: Thorp, WA Sampled By: PPB

DISPOSAL INFORMATION

☐ Lab Disposal (return if not indicated)
Disposal Method:
Disposed by: Disposal Date:

QC INFORMATION (check one)

☐SW-846 ☐CLP ☐Screening ☒AGI Std. ☐Special

Laboratory Number: 9204-295

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-ID State:	TPH-G State:	TPH-D State: Washington	TPH Special Instructions	418.1 State:	8015M:	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals					NUMBER OF CONTAINERS
Carbon Filter Effluent	4/28/92	1240	Water	1			X						X																										4
Bioreactor Effluent	4/28/92	1245	Water	2			X						X																										4

LAB INFORMATION

Lab Name: ATI - Renton
Lab Address:
Via: Courier

SAMPLE RECEIPT

Total Number of Containers:	8
Chain of Custody Seals?: Y/N/NA	Y
Intact?: Y/N/NA	Y
Received in Good Condition/Cold:	Y

Turn Around Time: ☒Standard ☐24 hr. ☐48 hr. ☐72 hr. ☐1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Peter Barry Time: 805	Signature: Time:	Signature: Time:
Printed Name: Peter Barry Date: 4/29/92	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: Thandreth Time: 1015	Signature: Time:	Signature: Time:
Printed Name: Thandreth Date: 4/29/92	Printed Name: Date:	Printed Name: Date:
Company: ATI	Company:	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev. 12/91

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–217
Sample No.: DEGASSING TANK, CARBON EFFLUENT

Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
TPH–D	GC/FID	WA ECOLOGY WTPH–D

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX	04/21/92	N/A	04/24/92	N/A	3 (14)
WTPH–D	04/21/92	04/23/92	04/24/92	2	3 (14)

N/A – Not applicable (No extraction required for BETX in water)
Numbers in parentheses indicate recommended holding times in days for water.

All samples were extracted and analyzed within recommended holding times for water.

FUEL HYDROCARBON CHEMISTRY

WA ECOLOGY WTPH–D: The presence of petroleum hydrocarbons in the range expected for diesel is confirmed by chromatogram for samples DEGASSING TANK and CARBON EFFLUENT.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–217
Sample No.: DEGASSING TANK, CARBON EFFLUENT

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

Lab Duplicates: Lab duplicate RPD is within ATI's control limits for the following method:

RPD at 47 percent is outside of USEPA recommended guidelines for field duplicate samples. (Field duplicates reflect both lab and field precision and usually have greater variance than lab duplicates, which measure only lab performance.) Blank spike quality control data are acceptable, suggesting matrix–related effects as a possible cause of poor RPD. Data are not qualified.

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

SIGNATURES

Prepared by KAH for Thomas Mercer **Date** 5/29/92
Checked by Katherine A. Hill **Date** 5/29/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9204-217

May 1, 1992

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros Bingo

On April 22, 1992, Analytical Technologies, Inc., received two water samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Laboratory Manager

FWG/hal/ff

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS BINGO

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9204-217-1	CARBON EFFLUENT	04/21/92	WATER
9204-217-2	DEGASSING TANK	04/21/92	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	2

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS BINGO

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
UB = Subcontract

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS BINGO	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/24/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	102

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/21/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/22/92
PROJECT NAME	: BURNS BROS BINGO	DATE EXTRACTED	: N/A
CLIENT I.D.	: CARBON EFFLUENT	DATE ANALYZED	: 04/24/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	1.5
ETHYLBENZENE	<0.5
TOLUENE	1.2
TOTAL XYLENES	5.1

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	97

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/21/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/22/92
PROJECT NAME	: BURNS BROS BINGO	DATE EXTRACTED	: N/A
CLIENT I.D.	: DEGASSING TANK	DATE ANALYZED	: 04/24/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	90

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9204-217-2
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS BINGO	DATE ANALYZED	: 04/24/92
EPA METHOD	: 8020 (BETX)	UNITS	: ug/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.4	92	18.4	92	0
TOLUENE	<0.5	20.0	17.7	89	18.5	93	4
TOTAL XYLENES	<0.5	40.0	36.6	92	39.1	98	7

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK SPIKE
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS BINGO	DATE ANALYZED	: 04/24/92
EPA METHOD	: 8020 (BETX)	UNITS	: ug/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	19.9	100	19.0	95	5
TOLUENE	<0.5	20.0	19.0	95	17.9	90	6
TOTAL XYLENES	<0.5	40.0	39.2	98	36.8	92	6

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS BINGO	DATE EXTRACTED	: 04/23/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/24/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.5
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	100

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217-1

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/21/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/22/92
PROJECT NAME	: BURNS BROS BINGO	DATE EXTRACTED	: 04/23/92
CLIENT I.D.	: CARBON EFFLUENT	DATE ANALYZED	: 04/24/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	3.4
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	112

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217-2

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/21/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/22/92
PROJECT NAME	: BURNS BROS BINGO	DATE EXTRACTED	: 04/23/92
CLIENT I.D.	: DEGASSING TANK	DATE ANALYZED	: 04/24/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	10
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	114

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS BINGO
METHOD : WA DOE WTPH-D
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9204-217-1
DATE EXTRACTED : 04/23/92
DATE ANALYZED : 04/24/92
UNITS : mg/L

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (DIESEL)	3.4	2.1	47	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-217

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS BINGO
METHOD : WA DOE WTPH-D
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 04/23/92
DATE ANALYZED : 04/24/92
UNITS : mg/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (DIESEL)	<0.5	5	4.6	92	4.2	84	9

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

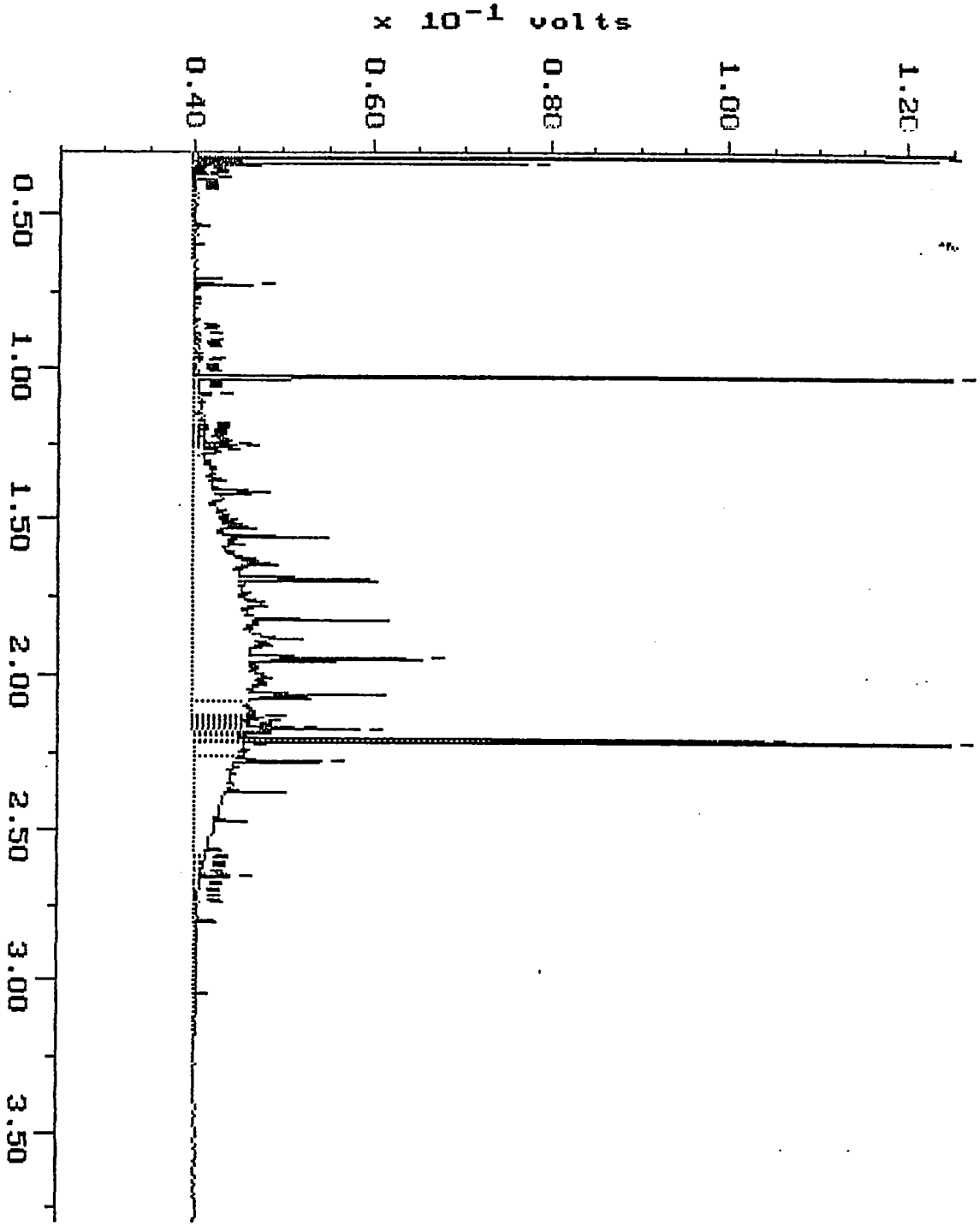
$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

WA DOE WTPH-D

Sample: 9204-217-1
Acquired: 24-APR-92 16:16
Inj Vol: 1.00

Channel: FRED
Method: M:\BRO2\MAXDATA\WILMA\FUEL0424

Filename: 0424WI06
Operator: BRO

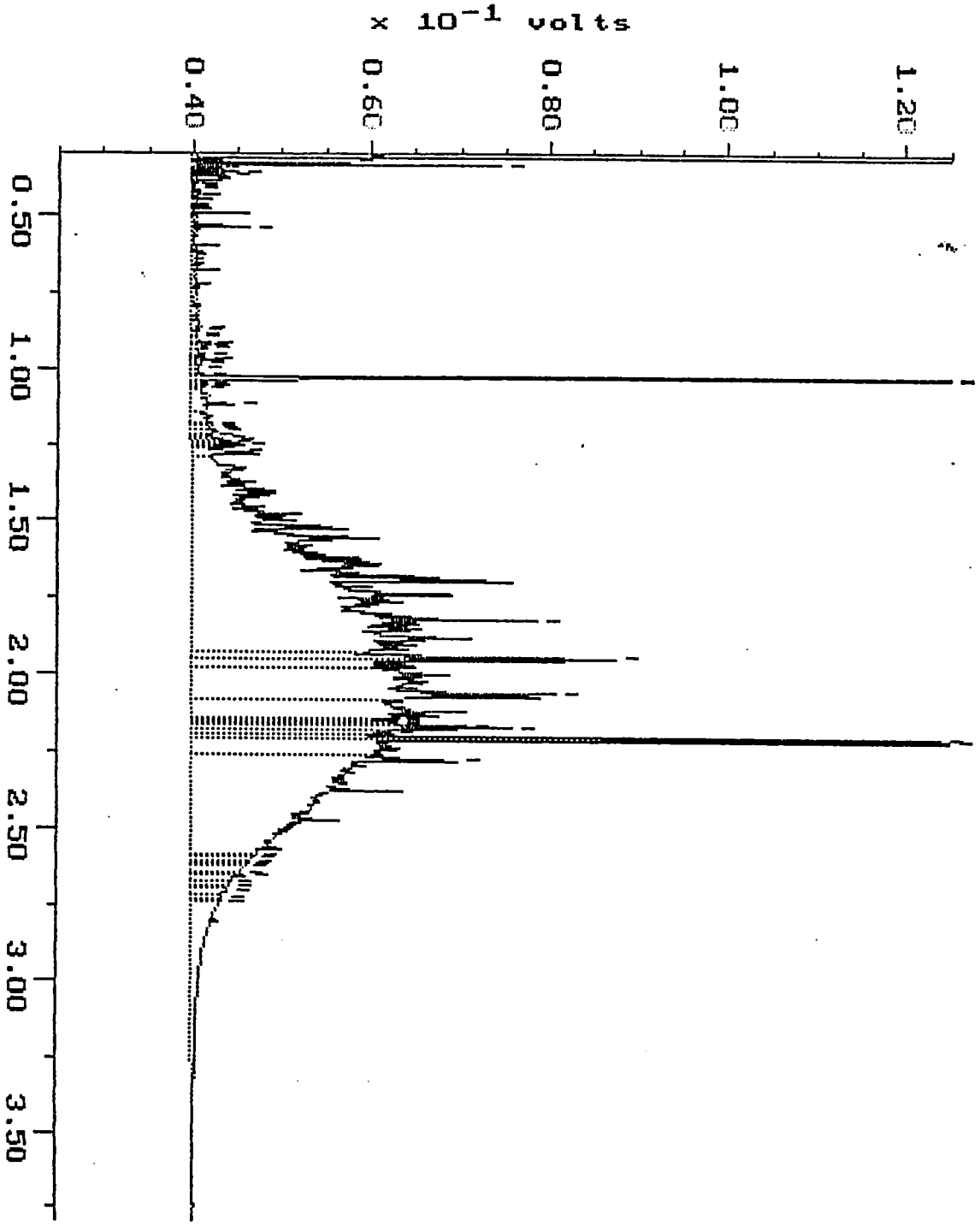


WA DOE WTPH-D

Sample: 9204-217-2
Acquired: 24-APR-92 17:49
Inj Vol: 1.00

Channel: FRED
Method: M:\BRO2\MAXDATA\WILMA\FUEL0424

Filename: 0424WI08
Operator: BRO



AnalyticalTechnologies, Inc.
San Diego ● Phoenix ● Seattle

Chain of Custody

9204-217

DATE 4/22/92 PAGE 1 OF 1

PROJ. MGR. PETER BARRY
COMPANY AGI
ADDRESS 300 120th AVE N.E.
BELLEVUE, WA 98005

SAMPLERS (SIGNATURE) (PHONE NO.) (206) 453-8383

ANALYSIS REQUEST

SAMPLE ID.	DATE	TIME	MATRIX	LAB ID.	BASE/NEU/ACID CMPDS. GC/MS/ 625/8270	VOLATILE CMPDS. GC/MS/ 624/8240	PESTICIDES/PCB 608/8080	POLYNUCLEAR AROMATIC 610/8310	PHENOLS, SUB PHENOLS 604/8040	HALOGENATED VOLATILES 601/8010	AROMATIC VOLATILES 602/8020	TOTAL ORGANIC CARBON 415/9060	TOTAL ORGANIC HALIDES 9020	PETROLEUM HYDROCARBONS 418	BETX	TPH-G	PRIORITY POLLUTANT METALS (13)	CAM METALS (18) TTLC/STLC	EP TOX METALS (8)	SWDA-INORGANICS PRIMARY/SECONDARY	HAZARDOUS WASTE PROFILE				NUMBER OF CONTAINERS
CARBON EFFLUENT	4/21/92	1110	WATER	-1											X	X									1
DECANTING TANK	4/21/92	1115	WATER	-2											X	X									1

PROJECT INFORMATION	SAMPLE RECEIPT	
PROJECT: LINGO LOPNG BROS	TOTAL NO. OF CONTAINERS	6
PO NO. 15.1677.001	CHAIN OF CUSTODY SEALS	Y
SHIPPING ID. NO.	REC'D GOOD CONDITION/COLD	Y
VIA: COURIER	CONFORMS TO RECORD	N.
	LAB NO. 9204-217	

SPECIAL INSTRUCTIONS/COMMENTS:

RELINQUISHED BY 1.	RELINQUISHED BY 2.	RELINQUISHED BY 3.
(Signature) (Time) [signature] 0810	(Signature) (Time)	(Signature) (Time)
(Printed Name) GLENN J. COTTER (Date) 4/22/92	(Printed Name) (Date)	(Printed Name) (Date)
(Company) AGI	(Company)	(Company)
RECEIVED BY 1.	**RECEIVED BY 2.**	**RECEIVED BY (LABORATORY) 3.**
(Signature) (Time) U. KENNICK 1100	(Signature) (Time)	(Signature) (Time)
(Printed Name) ATI (Date) 4/22/92	(Printed Name) (Date)	(Printed Name)
(Company)	(Company)	ANALYTICAL TECHNOLOGIES, INC.

ATI LABORATORIES: SAN DIEGO (619) 458-9141 PHOENIX (602) 438-1530

DISTRIBUTION: WHITE, CANARY - ANALYTICAL TECHNOLOGIES, INC. ● PINK - ORIGINATOR

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–140
Sample No.: DEGASSING TANK, CARBON EFFLUENT

Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
TPH–D	GC/FID	WA ECOLOGY WTPH–D

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX	04/14/92	N/A	04/17/92	N/A	3 (14)
WTPH–D a	04/14/92	04/20/92	04/21/92	6	7 (14)
WTPH–D b	04/14/92	04/20/92	04/22/92	6	8 (14)

a – Sample DEGASSING TANK
b – Sample CARBON EFFLUENT
N/A – Not applicable (No extraction required for BETX in water)
Numbers in parentheses indicate recommended holding times in days for water.

All samples were extracted and analyzed within recommended holding times for water.

FUEL HYDROCARBON CHEMISTRY

WA ECOLOGY WTPH–D: The presence of petroleum hydrocarbons in the range expected for diesel is confirmed by chromatogram for samples DEGASSING TANK and CARBON EFFLUENT.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–140
Sample No.: DEGASSING TANK, CARBON EFFLUENT

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

Lab Duplicates: All sample/sample duplicate RPDs are within ATI's control limit criteria for the following method:

WA ECOLOGY WTPH–D: RPD at 47 percent is outside of USEPA recommended guidelines for field duplicate water samples. (Field duplicates reflect both field and lab precision and generally have a greater variance than lab duplicates, which measure only lab performance.) Blank spike data are acceptable, indicating the possibility of matrix–associated effects. Data are therefore not qualified.

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8020
WA ECOLOGY WTPH–D

SIGNATURES

Prepared by KAH for Thomas Mercer **Date** 5/29/92
Checked by Katherine A. Hill **Date** 5/29/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9204-140

RECEIVED
APR 30 1992
APPLIED GEOTECHNOLOGY INC.

April 29, 1992

Applied Geotechnology, Inc.
P.O. Box 3885
:llevue, WA 98009

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo T.S.

.n April 15, 1992, Analytical Technologies, Inc., received two water samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Laboratory Manager

FWG/ff/hbb/elf

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO T.S.

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9204-140-1	DEGASSING TANK	04/14/92	WATER
9204-140-2	CARBON EFFLUENT	04/14/92	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	2

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO T.S.

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R

R = ATI - Renton
SD = ATI - San Diego
T = ATI - Tempe
PNR = ATI - Pensacola
FC = ATI - Fort Collins
JB = Subcontract

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO T.S.	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/16/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
)TAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	92

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO T.S.	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/17/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
)TAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	90

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/14/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/15/92
PROJECT NAME	: BURNS BROS/BINGO T.S.	DATE EXTRACTED	: N/A
CLIENT I.D.	: DEGASSING TANK	DATE ANALYZED	: 04/17/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	41
ETHYLBENZENE	2.4
TOLUENE	67
)TAL XYLENES	130

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	101

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/14/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/15/92
PROJECT NAME	: BURNS BROS/BINGO T.S.	DATE EXTRACTED	: N/A
CLIENT I.D.	: CARBON EFFLUENT	DATE ANALYZED	: 04/17/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	19
ETHYLBENZENE	1.1
TOLUENE	29
TOTAL XYLENES	65

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	102

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9204-140-2
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO T.S.	DATE ANALYZED	: 04/17/92
EPA METHOD	: 8020 (BETX)	UNITS	: ug/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	18.8	20.0	40.0	106	40.0	106	0
TOLUENE	28.6	20.0	49.3	104	49.1	103	0
TOTAL XYLENES	65.0	40.0	110	113	110	113	0

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO T.S.
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9204-164-2
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.9	95	18.6	93	2
TOLUENE	<0.5	20.0	18.2	91	18.4	92	1
)TAL XYLENES	<0.5	40.0	37.9	95	38.0	95	0

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO T.S.
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.6	93	19.1	96	3
TOLUENE	<0.5	20.0	18.3	92	17.4	87	5
)TAL XYLENES	<0.5	40.0	38.1	95	36.7	92	4

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO T.S.
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.4	92	19.7	99	7
TOLUENE	<0.5	20.0	17.7	89	19.4	97	9
)TAL XYLENES	<0.5	40.0	37.2	93	39.3	98	5

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO T.S.	DATE EXTRACTED	: 04/20/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/21/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.5
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

O-TERPHENYL	89

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140-1

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/14/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/15/92
PROJECT NAME	: BURNS BROS/BINGO T.S.	DATE EXTRACTED	: 04/20/92
CLIENT I.D.	: DEGASSING TAMK	DATE ANALYZED	: 04/21/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 5

COMPOUND	RESULT
FUEL HYDROCARBONS	56
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

O-TERPHENYL	146

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140-2

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/14/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/15/92
PROJECT NAME	: BURNS BROS/BINGO T.S.	DATE EXTRACTED	: 04/20/92
CLIENT I.D.	: CARBON EFFLUENT	DATE ANALYZED	: 04/22/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 10

COMPOUND	RESULT
FUEL HYDROCARBONS	40
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	140

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO T.S.
METHOD : WA DOE WTPH-D
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9204-217-1
DATE EXTRACTED : 04/23/92
DATE ANALYZED : 04/24/92
UNITS : mg/L

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (DIESEL)	3.4	2.1	47	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-140

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO T.S.
METHOD : WA DOE WTPH-D
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 04/20/92
DATE ANALYZED : 04/21/92
UNITS : mg/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (DIESEL)	<0.5	5	4.7	94	4.9	98	4

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

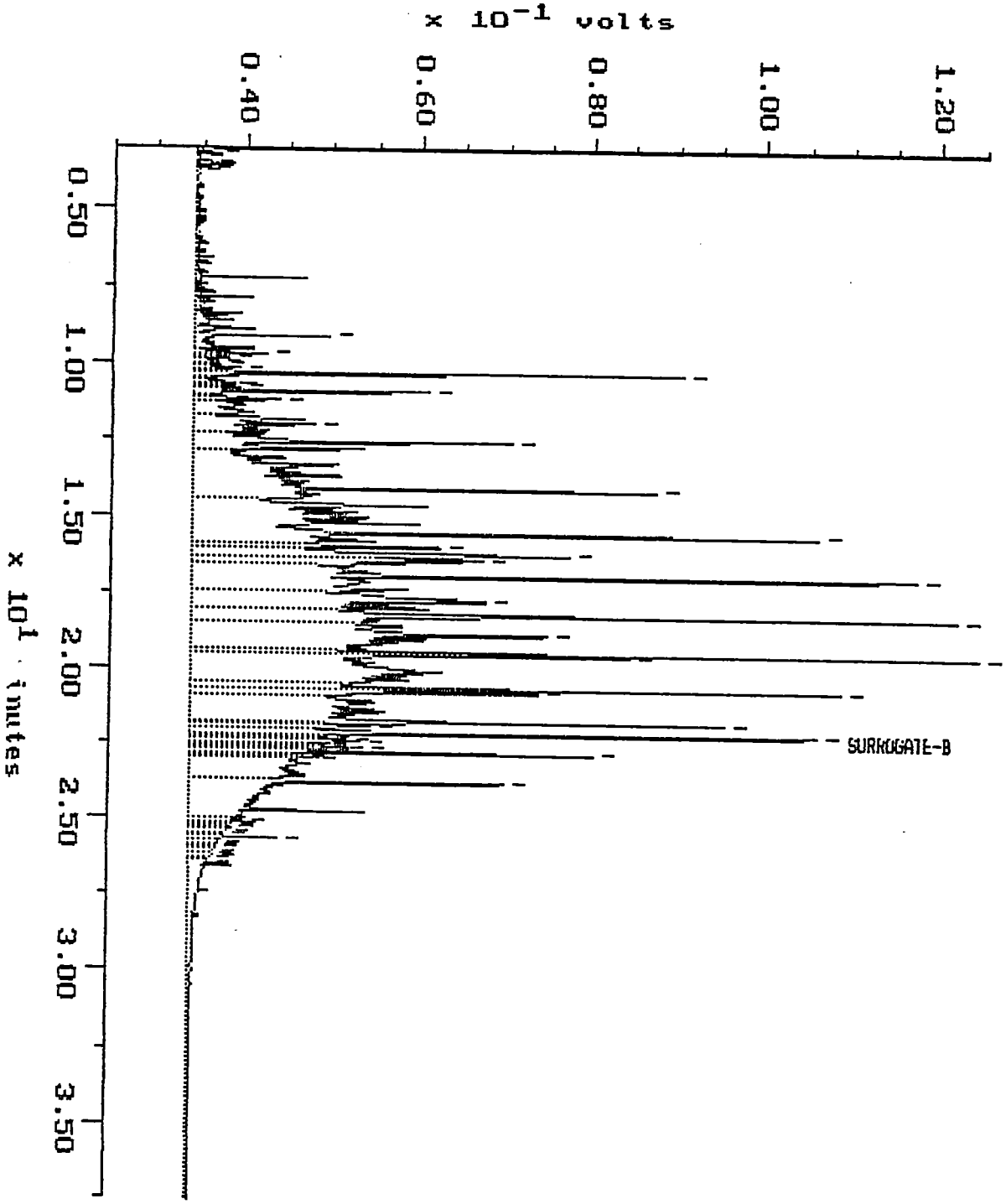
$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

WA DOE WTPH-D

Sample: 9204-140-1DIL
Acquired: 21-APR-92 17:13
Dilution: 1 : 5.000

Channel: DEMITRI
Method: M:\BR02\MAXDATA\SERGE-D\FUEL0421
Inj Vol: 1.00

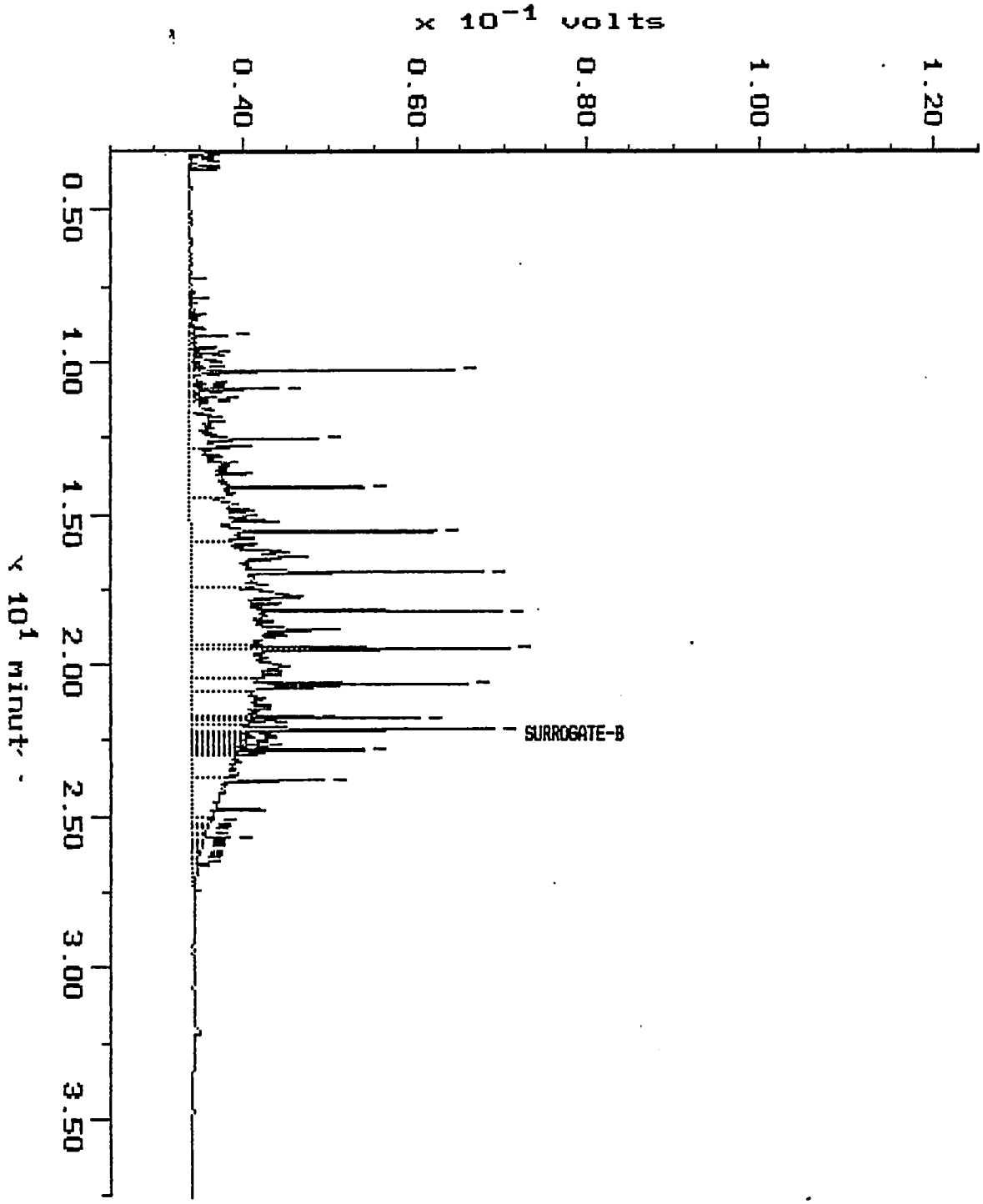
Filename: 0421S004
Operator: ACE



Sample: 9204-140-2DIL
Acquired: 22-APR-92 13:32
Dilution: 1 : 10.000

Channel: DEMITRI
Method: A:\BRO2\MAXDATA\SERGE-D\FUEL0421
Inj Vol: 1.00

Filename: 0421SD30
Operator: ACE



WA DOE WTPH-D

Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN OF CUSTODY

Date 4/14/92 Page 1 of 1

Project Manager: Dr. Barry
Project Name: Burns Bros. Bingo Truck Stop
Project Number: 15[illegible]
Site Location: I-90 Exit [illegible] Interchange, Tiger
Phone: [illegible] Sampled By: [illegible]

Laboratory Number: [illegible]

SAMPLE DISPOSAL INSTRUCTIONS

☒ Lab Disposal ☐ Return ☐ Pickup (will call)

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TCL Metals (23)	Priority Pollutant Metals (13)	EPTOX Metals (8) Total	EP TOX Metals (8) EP EXT	TCLP Metals	EP TOX Pesticides (5)	TCLP - Volatiles	8010 Halogenated Volatiles	8020 Aromatic Volatiles	BETX ONLY	8240 GCMS Volatiles	8270 GCMS BNA	8310 HPLC PNA	8080 OC Pesticides & PCB's	PCB's ONLY	8140 Phosphate Pesticides	8150 Herbicides	WDOE PAH/HH (WAC 173)	418.1 (TPH)	413.2 Grease & Oil	8015M Fuel Fingerprint	TOC 9060	TOX 9020	% Moisture	[illegible]			NUMBER OF CONTAINERS
[illegible]	4/14/92	1355	WATER	1										X															X			1
[illegible]	4/14/92	1400	WATER	[illegible]										X															X			1

LAB INFORMATION	SAMPLE RECEIPT	
Lab Name: ATL	Total Number of Containers:	[illegible]
Lab Address: [illegible]	Chain of Custody Seals: Y/N/NA	[illegible]
[illegible], WA	Intact?: Y/N/N	[illegible]
Via: Courier	Received in Good Cond./Cold:	[illegible]

TAT: ☐ 24hr. ☐ 48 hr. ☐ 72 hr. ☒ 1 wk. ☐ 2 wks. (normal)

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [illegible] Time: [illegible]	Signature: Time:	Signature: Time:
Printed Name: Glenn Lotter Date: 4/14/92	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: [illegible] Time: [illegible]	Signature: Time:	Signature: Time:
Printed Name: [illegible] Date: [illegible]	Printed Name: Date:	Printed Name: Date:
Company: ATL	Company:	Company:

AGI OFFICES: Bellevue: (206)453-8383 Tacoma: (206)383-4380 Portland: (503)222-2820

DISTRIBUTION: White, Canary = Analytical Laboratory; Pink = AGI Files

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–057
Sample No.: CARBON EFFLUENT, DEGASSING TANK, INFLUENT

Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
TPH–D	GC/FID	WA DOE WTPH–D

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX a	04/07/92	N/A	04/08/92	N/A	1 (14)
BETX b	04/07/92	N/A	04/09/92	N/A	2 (14)
TPH–D a	04/07/92	04/08/92	04/08/92	1	1 (14)
TPH–D b c	04/07/92	04/08/92	04/09/92	1	2 (14)

a – Sample CARBON EFFLUENT
b – Sample DEGASSING TANK
c – Sample INFLUENT
N/A – Not applicable (No extraction required for BETX in water)
Numbers in parentheses ( ) indicate recommended holding times in days for water.

All samples were extracted and analyzed within recommended holding times for water.

FUEL HYDROCARBON CHEMISTRY

WA DOE Method WTPH–D: The presence of petroleum hydrocarbon in the range expected for diesel is confirmed by chromatogram for samples CARBON EFFLUENT, DEGASSING TANK, and INFLUENT.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–057
Sample No.: CARBON EFFLUENT, DEGASSING TANK, INFLUENT

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
WA DOE WTPH–D

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8020
WA DOE WTPH–D

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8020
WA DOE WTPH–D

SIGNATURES

Prepared by Thomas A. Mason **Date** 4/17/92
Checked by Katherine A. Hull **Date** 4/17/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9204-057

RECEIVED
APR 16 1992
APPLIED GEOTECHNOLOGY INC

April 14, 1992

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Truck Stop

On April 8, 1992, Analytical Technologies, Inc., received three water samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Laboratory Manager

FWG/hal/elf

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO TRUCK STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9204-057-1	CARBON EFFLUENT	04/07/92	WATER
9204-057-2	DEGASSING TANK	04/07/92	WATER
9204-057-3	INFLUENT	04/07/92	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	3

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO TRUCK STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO TRUCK STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/08/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	103

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO TRUCK STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/09/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	92

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/07/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/08/92
PROJECT NAME	: BURNS BROS/BINGO TRUCK STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: CARBON EFFLUENT	DATE ANALYZED	: 04/08/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	13
ETHYLBENZENE	0.9
TOLUENE	15
TOTAL XYLENES	13

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	94

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/07/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/08/92
PROJECT NAME	: BURNS BROS/BINGO TRUCK STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: DEGASSING TANK	DATE ANALYZED	: 04/09/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 5

COMPOUND	RESULT
BENZENE	190
ETHYLBENZENE	11
TOLUENE	220
TOTAL XYLENES	180

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	103

Analytical Technologies, Inc.

ATI I.D. # 9204-057

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO TRUCK STOP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 04/08/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	19.2	96	17.8	89	8
TOLUENE	<0.5	20.0	18.4	92	17.1	86	7
TOTAL XYLENES	<0.5	40.0	37.6	94	35.1	88	7

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

ATI I.D. # 9204-057

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO TRUCK STOP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 04/09/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	19.4	97	18.5	93	5
TOLUENE	<0.5	20.0	19.1	96	17.9	90	6
TOTAL XYLENES	<0.5	40.0	38.2	96	36.3	91	5

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO TRUCK STOP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9204-057-1
DATE EXTRACTED : N/A
DATE ANALYZED : 04/08/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	13.4	20.0	33.3	100	30.1	84	10
TOLUENE	15.3	20.0	34.1	94	31.3	80	9
TOTAL XYLENES	13.0	40.0	53.6	102	47.1	85	13

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO TRUCK STOP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9204-069-1
DATE EXTRACTED : N/A
DATE ANALYZED : 04/09/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.3	92	17.9	90	2
TOLUENE	<0.5	20.0	16.8	84	17.7	89	5
TOTAL XYLENES	<0.5	40.0	34.3	86	36.5	91	6

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO TRUCK STOP	DATE EXTRACTED	: 04/08/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/08/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.5
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

O-TERPHENYL	63

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057-1

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/07/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/08/92
PROJECT NAME	: BURNS BROS/BINGO TRUCK STOP	DATE EXTRACTED	: 04/08/92
CLIENT I.D.	: CARBON EFFLUENT	DATE ANALYZED	: 04/08/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	7.6
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	96

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057-2

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/07/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/08/92
PROJECT NAME	: BURNS BROS/BINGO TRUCK STOP	DATE EXTRACTED	: 04/08/92
CLIENT I.D.	: DEGASSING TANK	DATE ANALYZED	: 04/09/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 5

COMPOUND	RESULT
FUEL HYDROCARBONS	18
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

O-TERPHENYL	125

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-057-3

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

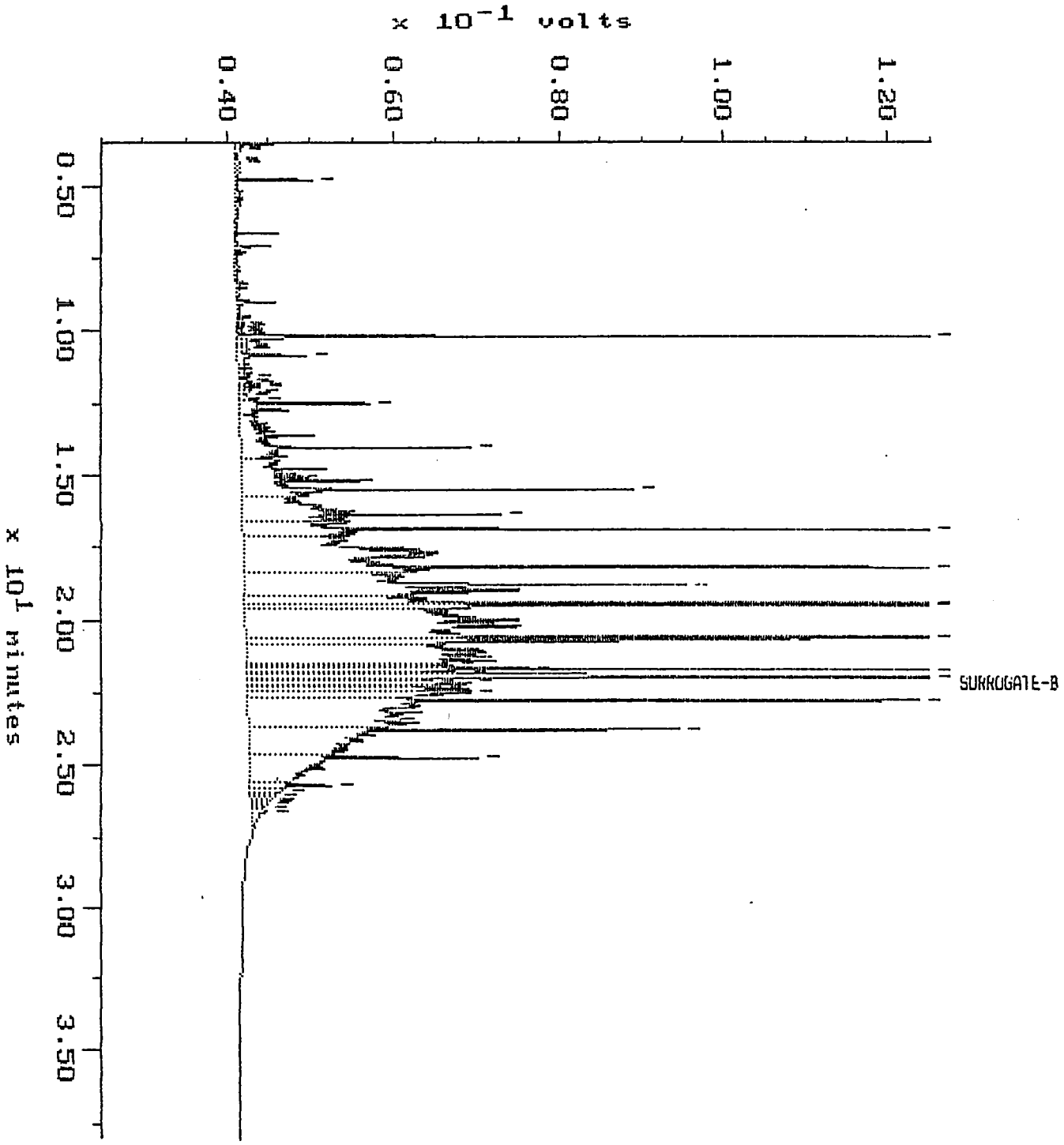
CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 04/07/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/08/92
PROJECT NAME	: BURNS BROS/BINGO TRUCK STOP	DATE EXTRACTED	: 04/08/92
CLIENT I.D.	: INFLUENT	DATE ANALYZED	: 04/09/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 5

COMPOUND	RESULT
FUEL HYDROCARBONS	24
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

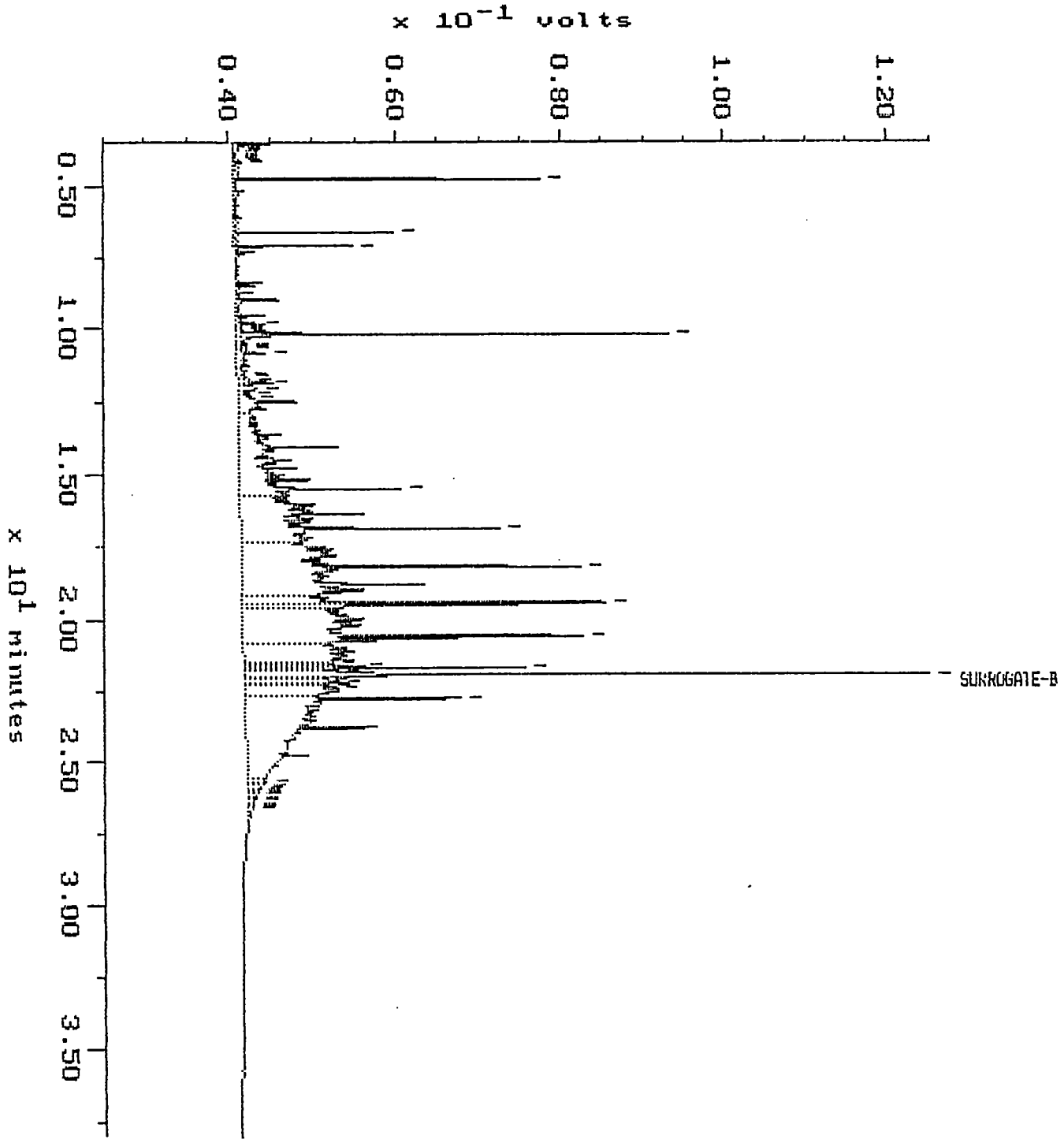
SURROGATE PERCENT RECOVERY

O-TERPHENYL	116

Sample: 9204-057-1 Channel: FRED Filename: 0408FR12
Acquired: 08-APR-92 23:46 Method: M:\BRU2\MAXDATA\FRED\FUEL0408 Operator: ACE
Inj Vol: 1.00



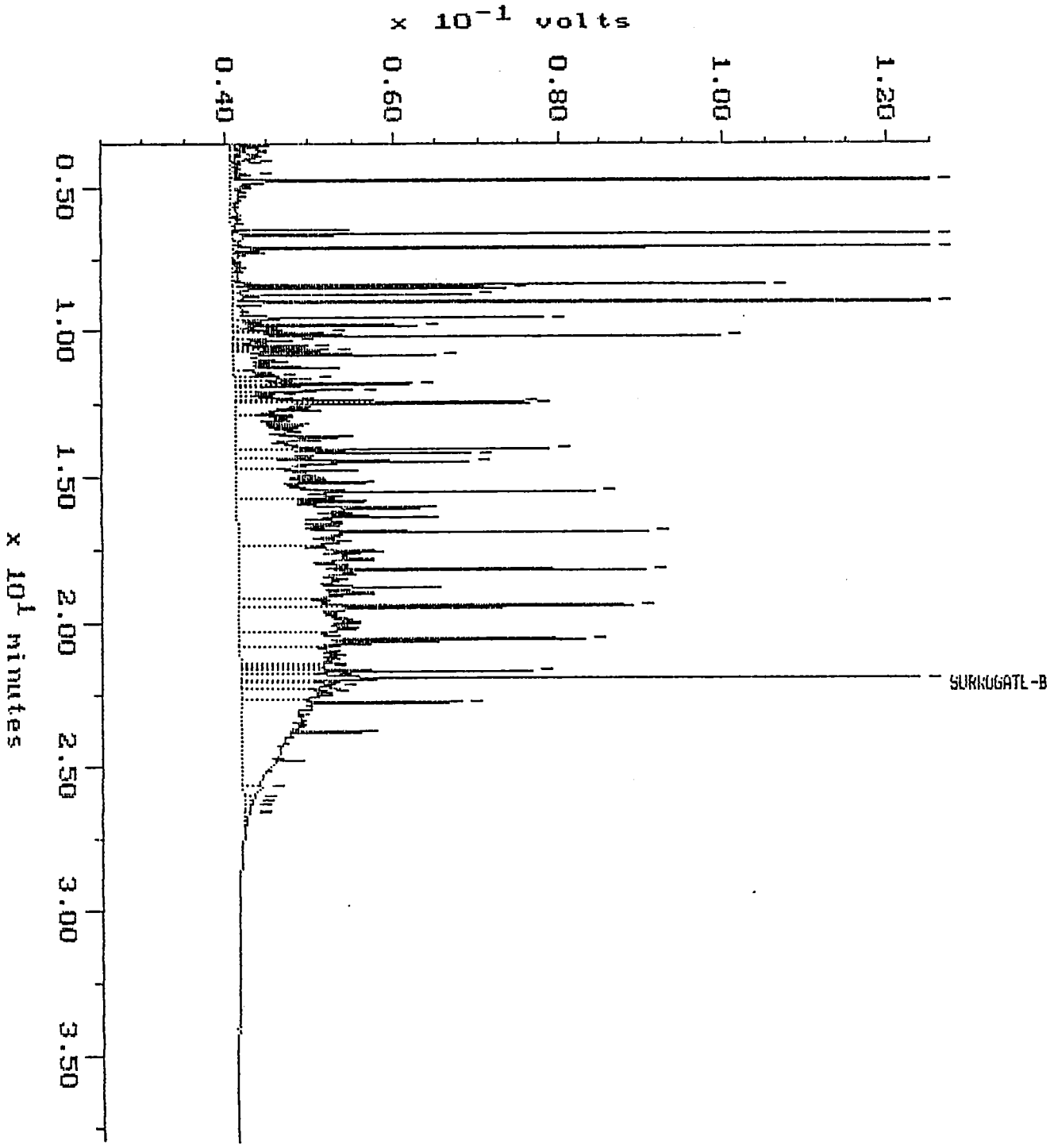
Sample: 9204-057-2 Channel: FRED Filename: 0408FR23
Acquired: 09-APR-92 8:27 Method: M:\BRU2\MAXDATA\FRED\FUEL0408 Operator: ACE
Dilution: 1 : 5.000 Inj Vol: 1.00



Sample: 9204-057-3
Acquired: 09-APR-92 9:15
Dilution: 1 : 5.000

Channel: FRED
Method: M:\BR02\MAXDATA\FRED\FUEL0408
Inj Vol: 1.00

Filename: 0408FR24
Operator: ACE



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN OF CUSTODY

Date 4/8/92 Page 1 of 1

Project Manager: P. BARRY
Project Name: BURNS BREEZE [illegible]
Project Number: [illegible]
Site Location: [illegible]
Phone: [illegible] Sampled By: [illegible]

Laboratory Number: [illegible]

SAMPLE DISPOSAL INSTRUCTIONS

☐ Lab Disposal ☐ Return ☐ Pickup (will call)

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TCL Metals (23)	Priority Pollutant Metals (13)	EPTOX Metals (8) Total	EP TOX Metals (8) EP EXT	TCLP Metals	EP TOX Pesticides (5)	TCLP - Volatiles	8010 Halogenated Volatiles	8020 Aromatic Volatiles	BETX ONLY	8240 GCMS Volatiles	8270 GCMS BNA	8310 HPLC PNA	8080 OC Pesticides & PCB's	PCB's ONLY	8140 Phosphate Pesticides	8150 Herbicides	WDOE PAH/HH (WAC 173)	418.1 (TPH)	413.2 Grease & Oil	8015M Fuel Fingerprint	TOC 9060	TOX 9020	% Moisture	4-PAH			NUMBER OF CONTAINERS
[illegible]	4/7/92	2000	WATER	1										X															X			4
[illegible] TANK	4/7/92	2000	WATER	2										X															X			4
INFLUENT	4/7/92	1950	WATER	3																									X			2

LAB INFORMATION	SAMPLE RECEIPT	
Lab Name: ATI	Total Number of Containers:	8
Lab Address: 5600 NACHES	Chain of Custody Seals: Y/N/NA	Y
RENTON, WA	Intact?: Y/N/N	Y
Via: COURIER	Received in Good Cond./Cold:	Y/Y

TAT: ☐ 24hr. ☐ 48 hr. ☐ 72 hr. ☑ 1 wk. ☐ 2 wks. (normal)

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [illegible] Time: [illegible]	Signature: Time:	Signature: Time:
Printed Name: [illegible] Date: 4/8/92	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: [illegible] Time: [illegible]	Signature: Time:	Signature: Time:
Printed Name: [illegible] Date: 4/8/92	Printed Name: Date:	Printed Name: Date:
Company: [illegible]	Company:	Company:

AGI OFFICES: Bellevue: (206)453-8383 Tacoma: (206)383-4380 Portland: (503)222-2820

DISTRIBUTION: White, Canary = Analytical Laboratory; Pink = AGI Files

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–014
Sample No.: CARBON FILTER EFFLUENT, BIOREACTOR EFFLUENT

Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
TPH–D	GC/FID	WA DOE WTPH–D

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX a	04/01/92	N/A	04/06/92	N/A	5 (14)
BETX b	04/01/92	N/A	04/07/92	N/A	6 (14)
TPH–D	04/01/92	04/03/92	04/05/92	2 (7)	4 (30)

a – Sample CARBON FILTER EFFLUENT
b – Sample BIOREACTOR EFFLUENT
N/A – Not applicable (No extraction required for BETX in water)
Numbers in parentheses ( ) indicate recommended holding times in days for water.

All samples were extracted and analyzed within recommended holding times for water.

FUEL HYDROCARBON CHEMISTRY

WA DOE METHOD WTPH–D: The presence of petroleum hydrocarbons in the range expected for diesel is confirmed by chromatogram for samples CARBON FILTER EFFLUENT and BIOREACTOR EFFLUENT.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) – Renton
Lab Number: 9204–014
Sample No.: CARBON FILTER EFFLUENT, BIOREACTOR EFFLUENT

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
WA DOE WTPH–D

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8020
WA DOE WTPH–D

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8020
WA DOE WTPH–D

SIGNATURES

Prepared by Thomas A. Mercer **Date** 4/20/92
Checked by Katherine A. Hill **Date** 4/20/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9204-014

April 13, 1992

RECEIVED
APR 13 1992
APPLIED GEOTECHNOLOGY INC

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Brothers/Thorp

On April 2, 1992, Analytical Technologies, Inc., received two water samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Laboratory Manager

FWG/hal/hbb

Analytical Technologies, Inc.

ATI I.D. # 9204-014

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROTHERS/THORP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9204-014-1	CARBON FILTER EFFLUENT	04/01/92	WATER
9204-014-2	BIOREACTOR EFFLUENT	04/01/92	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	2

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

Analytical Technologies, Inc.

ATI I.D. # 9204-014

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROTHERS/THORP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROTHERS/THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/06/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	101

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROTHERS/THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/07/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	98

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY INC.	DATE SAMPLED	: 04/01/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/02/92
PROJECT NAME	: BURNS BROTHERS/THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: CARBON FILTER EFFLUENT	DATE ANALYZED	: 04/06/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	1.5
ETHYLBENZENE	<0.5
TOLUENE	1.9
TOTAL XYLENES	1.8

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	102

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY INC.	DATE SAMPLED	: 04/01/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/02/92
PROJECT NAME	: BURNS BROTHERS/THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: BIOREACTOR EFFLUENT	DATE ANALYZED	: 04/07/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT	
BENZENE	91	
ETHYLBENZENE	6.2	
TOLUENE	110	D
TOTAL XYLENES	100	

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	101

D = Value from a ten fold diluted analysis.

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROTHERS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 04/06/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	17.7	89	16.9	85	5
TOLUENE	<0.5	20.0	18.1	91	17.0	85	6
TOTAL XYLENES	<0.5	40.0	37.9	95	35.9	90	5

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROTHERS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 04/07/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.6	93	19.6	98	5
TOLUENE	<0.5	20.0	18.0	90	19.1	96	6
TOTAL XYLENES	<0.5	40.0	36.2	91	39.2	98	8

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROTHERS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9204-014-1
DATE EXTRACTED : N/A
DATE ANALYZED : 04/06/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	1.50	20.0	20.4	95	20.3	94	0
TOLUENE	1.85	20.0	19.7	89	19.4	88	2
TOTAL XYLENES	1.75	40.0	40.8	98	39.6	95	3

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROTHERS/THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9204-042-1
DATE EXTRACTED : N/A
DATE ANALYZED : 04/07/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.5	93	17.4	87	6
TOLUENE	<0.5	20.0	17.9	90	16.7	84	7
TOTAL XYLENES	<0.5	40.0	35.9	90	33.1	83	8

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROTHERS/THORP	DATE EXTRACTED	: 04/03/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 04/05/92
SAMPLE MATRIX	: WATER	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.5
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	109

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014-1

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY INC.	DATE SAMPLED	: 04/01/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/02/92
PROJECT NAME	: BURNS BROTHERS/THORP	DATE EXTRACTED	: 04/03/92
CLIENT I.D.	: CARBON FILTER EFFLUENT	DATE ANALYZED	: 04/05/92
SAMPLE MATRIX	: WATER	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	2.0
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	97

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014-2

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY INC.	DATE SAMPLED	: 04/01/92
PROJECT #	: 15659.001	DATE RECEIVED	: 04/02/92
PROJECT NAME	: BURNS BROTHERS/THORP	DATE EXTRACTED	: 04/03/92
CLIENT I.D.	: BIOREACTOR EFFLUENT	DATE ANALYZED	: 04/05/92
SAMPLE MATRIX	: WATER	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	5.4
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
SURROGATE PERCENT RECOVERY	
O-TERPHENYL	94

AnalyticalTechnologies,Inc.

ATI I.D. # 9204-014

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY INC.	SAMPLE I.D. #	: BLANK SPIKE
PROJECT #	: 15659.001	DATE EXTRACTED	: 04/03/92
PROJECT NAME	: BURNS BROTHERS/THORP	DATE ANALYZED	: 04/05/92
METHOD	: WA DOE WTPH-D	UNITS	: mg/Kg
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (DIESEL)	<0.5	5	4.5	90	4.9	98	9

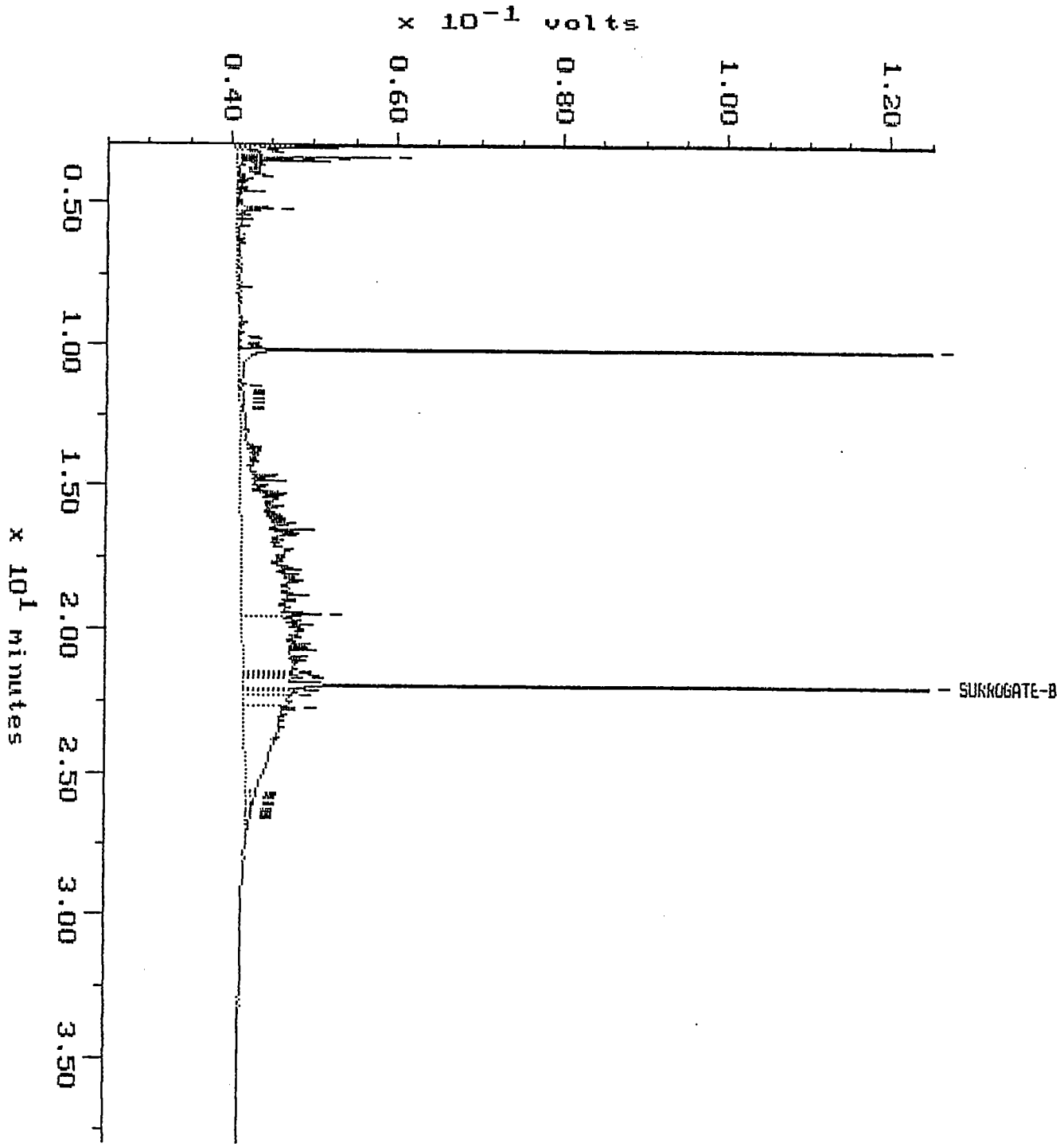
$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

Sample: 9204-014-1
Acquired: 05-APR-92 17:22
Inj Vol: 1.00

Channel: FRED
Method: M:\BR02\MAXDATA\FRED\FUEL0403

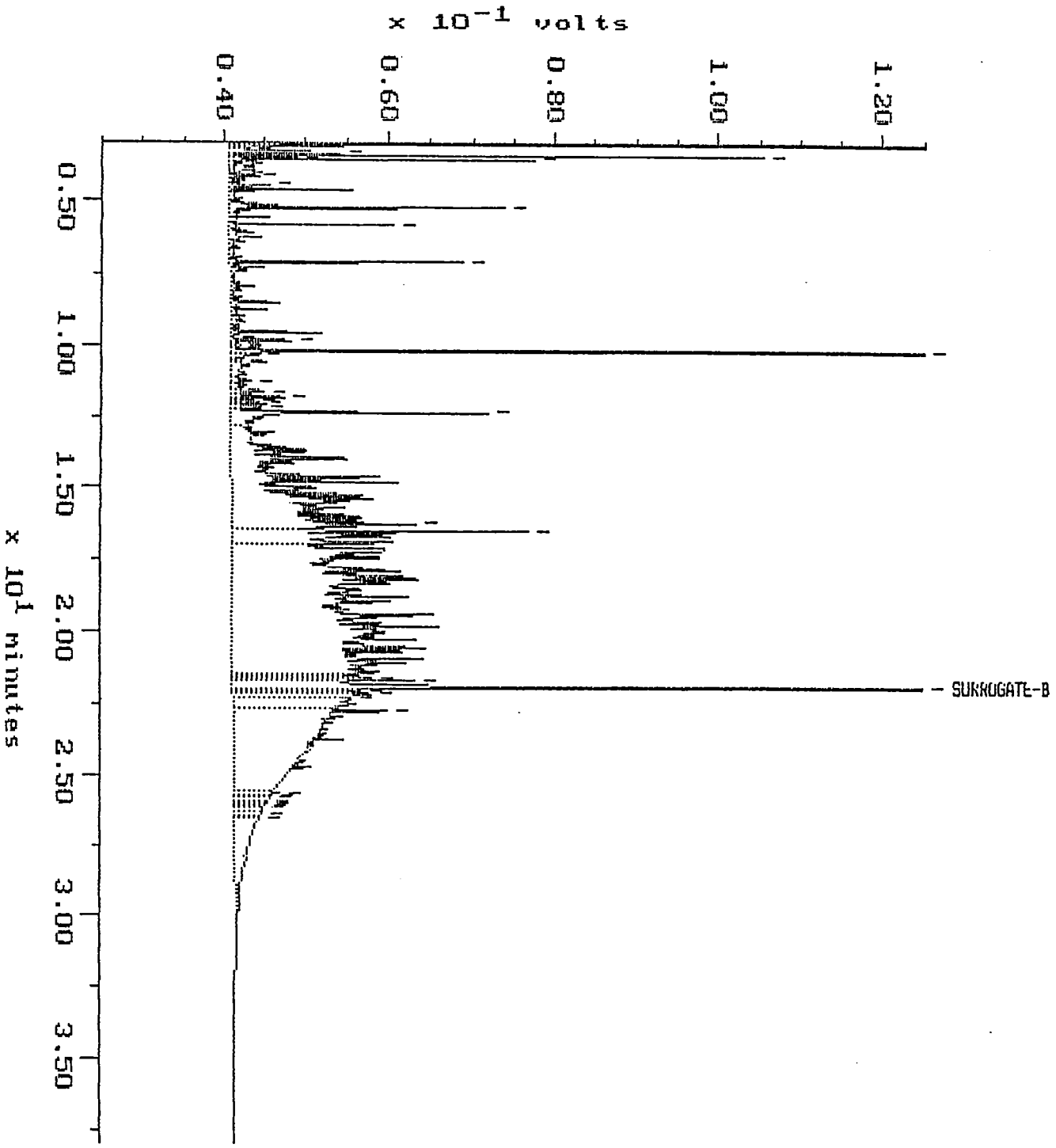
Filename: 0405FR06
Operator: ACE



Sample: 9204-014-2
Acquired: 05-APR-92 18:11
Inj Vol: 1.00

Channel: FRED
Method: M:\BR02\MAXDATA\FRED\FUEL0403

Filename: 0405FR07
Operator: ACE



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 4/1/92 Page 1 of 1

PROJECT INFORMATION

Project Manager: Peter Barry
Project Name: Burns Brothers/Thorp
Project Number: 15659001
Site Location: Thorp, WA Sampled By: PPB

DISPOSAL INFORMATION

☐ Lab Disposal (return if not indicated)
Disposal Method:
Disposed by: Disposal Date:

QC INFORMATION (check one)

☐SW-846 ☐CLP ☐Screening ☒AGI Std. ☐Special

Laboratory Number: 9204-014

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-ID State:	TPH-G State:	TPH-D State: WA	TPH Special Instructions	418.1 State:	8015M	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals					NUMBER OF CONTAINERS
Carbon Filter Effluent	4/1/92	0830	Water	1			X						X																										4
Bioreactor Effluent	4/1/92	0840	Water	2			X						X																										4

LAB INFORMATION

Lab Name: ATI / Renton
Lab Address:
Via: Courier

SAMPLE RECEIPT

Total Number of Containers:	8
Chain of Custody Seals?: Y/N/NA	Y/N
Intact?: Y/N/NA	Y/N
Received in Good Condition/Cold:	Y

Turn Around Time: ☒Standard ☐24 hr. ☒48 hr. ☐72 hr. ☐1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions: TPH-D → R2

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Peter P. Barry Time: 0800	Signature: Time:	Signature: Time:
Printed Name: Peter P. Barry Date: 4/2/92	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: Time: 1155	Signature: Time:	Signature: Time:
Printed Name: Karin R. Westlund Date: 4-2-92	Printed Name: Date:	Printed Name: Date:
Company: ATT-WA	Company:	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev. 12/91

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies Inc. (ATI) – Renton
Lab Number: 9203–241
Sample No.: W–1, W–2, W–3, W–4, W–5, W–6, W–7, BIOREACTOR DEGAS TANK EFFLUENT, CARBON TANK EFFLUENT

Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality. However, the following should be noted:

WA DOE WTPH–G: The recommended quality control sample duplicate was not analyzed. The matrix spike and spike duplicate are considered a more than adequate substitute and the data are considered acceptable.

WA DOE WTPH–D: The recommended quality control sample duplicate was not analyzed. The blank spike and spike duplicate are considered an adequate substitute and the data are considered acceptable.

ANALYTICAL METHODS

Parameter	Technique	Method
BETX	GC/PID	EPA 8020
TPH–G	GC/FID	WA DOE WTPH–G
TPH–D	GC/FID	WA DOE WTPH–D

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
BETX	03/26/92	N/A	03/30/92	N/A	4 (14)
TPH–G	03/26/92	N/A	03/31/92	N/A (7)	5 (14)
TPH–D	03/26/92	03/30/92	03/30/92	4 (7)	4 (30)

N/A – Not applicable (No extraction required for BETX or WTPH–G in water)
Numbers in parentheses ( ) indicate recommended holding times in days for water.

All samples were extracted and analyzed within recommended holding times for water.

FUEL HYDROCARBON CHEMISTRY

WA DOE WTPH–D: The presence of petroleum hydrocarbons in the range expected for diesel is confirmed by chromatogram for samples BIOREACTOR DEGASSING TANK EFFLUENT and CARBON TANK EFFLUENT.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Thorp
Project No.: 15,659.001
Lab Name: Analytical Technologies Inc. (ATI) – Renton
Lab Number: 9203–241
Sample No.: W–1, W–2, W–3, W–4, W–5, W–6, W–7, BIOREACTOR DEGAS TANK EFFLUENT, CARBON TANK EFFLUENT

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected

Rinsate: None collected

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above their method reporting limits for the following methods:

EPA 8020
WA DOE WTPH–G
WA DOE WTPH–D

Matrix Spikes: All matrix spike and matrix spike duplicate percent recoveries and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8020

WA DOE WTPH–G: All matrix spike/spike duplicate percent recovery and RPD data are within ATI's control limits. The draft WA DOE WTPH–G method requires a sample/sample duplicate which was not performed. Data are not considered to be compromised since precision is verified by the blank and matrix spike analyses.

WA DOE WTPH–D: All blank spike/spike duplicate percent recovery and RPD data are within ATI's control limits. The draft WA DOE WTPH–D method requires a sample/sample duplicate which was not performed. Data are not considered to be compromised since precision is verified by the blank spike/spike duplicate percent recovery and RPD.

Surrogates: All surrogate spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8020
WA DOE WTPH–G
WA DOE WTPH–D

SIGNATURES

Prepared by Thomas A. Mercer **Date** 4/9/92
Checked by Katherine A. Hill **Date** 4/9/92

AnalyticalTechnologies,Inc. 560 Naches Avenue, S.W., Suite 101, Renton, WA 98055, (206) 228-8335

ATI I.D. # 9203-241

April 2, 1992

RECEIVED
RECEIVED
~~APR - 3 1992~~
APR - 6 1992
APPLIED GEOTECHNOLOGY INC.
APPLIED GEOTECHNOLOGY INC.

Applied Geotechnology, Inc.
P.O. Box 3885
Bellevue, WA 98009

Attention : Peter Barry

Project Number : 15,659.001

Project Name : Burns Bros - Thorp

On March 27, 1992, Analytical Technologies, Inc., received nine water samples for analysis. The samples were analyzed with EPA methodology or equivalent methods as specified in the attached analytical schedule. The results, sample cross reference, and quality control data are enclosed.

Donna M. McKinney
Senior Project Manager

Frederick W. Grothkopp
Laboratory Manager

FWG/hal/rmn

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9203-241-1	W-1	03/26/92	WATER
9203-241-2	W-2	03/26/92	WATER
9203-241-3	W-3	03/26/92	WATER
9203-241-4	W-4	03/26/92	WATER
9203-241-5	W-5	03/26/92	WATER
9203-241-6	W-6	03/26/92	WATER
9203-241-7	W-7	03/26/92	WATER
9203-241-8	BIOREACTOR DEGAS TANK EFF	03/26/92	WATER
9203-241-9	CARBON TANK EFFLUENT	03/26/92	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	9

ATI STANDARD DISPOSAL PRACTICE

The samples from this project will be disposed of in thirty (30) days from the date of the report. If an extended storage period is required, please contact our sample control department before the scheduled disposal date.

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
BETX	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-G	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R

R = ATI - Renton
SD = ATI - San Diego
PHX = ATI - Phoenix
PNR = ATI - Pensacola
FC = ATI - Fort Collins
SUB = Subcontract

Analytical Technologies, Inc.

ATI I.D. # 9203-241

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	99

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-1	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	97

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-2	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
OTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	97

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-3

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-3	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	98

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-4

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-4	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	100

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-5

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-5	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	101

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-6

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-6	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	0.99
OTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	99

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-7

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-7	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	99

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-8

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: BIOREACTOR DEGAS TANK EFF	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	100 D
ETHYLBENZENE	11
TOLUENE	180 D
TOTAL XYLENES	200 D

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	103

= Value from a ten fold diluted analysis.

Analytical Technologies, Inc.

ATI I.D. # 9203-241-9

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: CARBON TANK EFFLUENT	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
BENZENE	13
ETHYLBENZENE	<0.5
TOLUENE	10
TOTAL XYLENES	56

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE	106

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : 9203-241-2
DATE EXTRACTED : N/A
DATE ANALYZED : 03/30/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.6	93	18.2	91	2
TOLUENE	<0.5	20.0	17.6	88	17.2	86	2
TOTAL XYLENES	<0.5	40.0	36.6	92	35.7	89	2

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

ATI I.D. # 9203-241

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
EPA METHOD : 8020 (BETX)
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 03/30/92
UNITS : ug/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.5	20.0	18.0	90	18.4	92	2
TOLUENE	<0.5	20.0	17.1	86	17.8	89	4
TOTAL XYLENES	<0.5	40.0	35.5	89	36.9	92	4

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/31/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-G	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.1
HYDROCARBON RANGE	TOLUENE TO DODECANE
HYDROCARBON QUANTITATION USING	GASOLINE

SURROGATE PERCENT RECOVERIES

TRIFLUOROTOLUENE	104

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-1

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-1	DATE ANALYZED	: 03/31/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-G	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.1
HYDROCARBON RANGE	TOLUENE TO DODECANE
HYDROCARBON QUANTITATION USING	GASOLINE

SURROGATE PERCENT RECOVERIES

TRIFLUOROTOLUENE	110

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-4

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-4	DATE ANALYZED	: 03/31/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-G	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.1
HYDROCARBON RANGE	TOLUENE TO DODECANE
HYDROCARBON QUANTITATION USING	GASOLINE

SURROGATE PERCENT RECOVERIES

TRIFLUOROTOLUENE	111

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-6

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-6	DATE ANALYZED	: 03/31/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-G	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.1
HYDROCARBON RANGE	TOLUENE TO DODECANE
HYDROCARBON QUANTITATION USING	GASOLINE

SURROGATE PERCENT RECOVERIES

TRIFLUOROTOLUENE	107

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-7

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: N/A
CLIENT I.D.	: W-7	DATE ANALYZED	: 03/31/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-G	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.1
HYDROCARBON RANGE	TOLUENE TO DODECANE
HYDROCARBON QUANTITATION USING	GASOLINE

SURROGATE PERCENT RECOVERIES

TRIFLUOROTOLUENE	109

Analytical Technologies, Inc.

ATI I.D. # 9203-241

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9203-241-1
PROJECT #	: 15,659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE ANALYZED	: 03/31/92
METHOD	: WA DOE WTPH-G	UNITS	: mg/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (GASOLINE)	<0.10	2.00	2.05	102	2.04	102	0

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

Analytical Technologies, Inc.

ATI I.D. # 9203-241

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK SPIKE
PROJECT #	: 15,659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE ANALYZED	: 03/31/92
METHOD	: WA DOE WTPH-G	UNITS	: mg/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (GASOLINE)	<0.10	1.00	1.05	105	0.913	91	14

$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/30/92
CLIENT I.D.	: REAGENT BLANK	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.5
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	84

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-8

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/30/92
CLIENT I.D.	: BIOREACTOR DEGAS TANK EFF	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 5

COMPOUND	RESULT
FUEL HYDROCARBONS	19
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

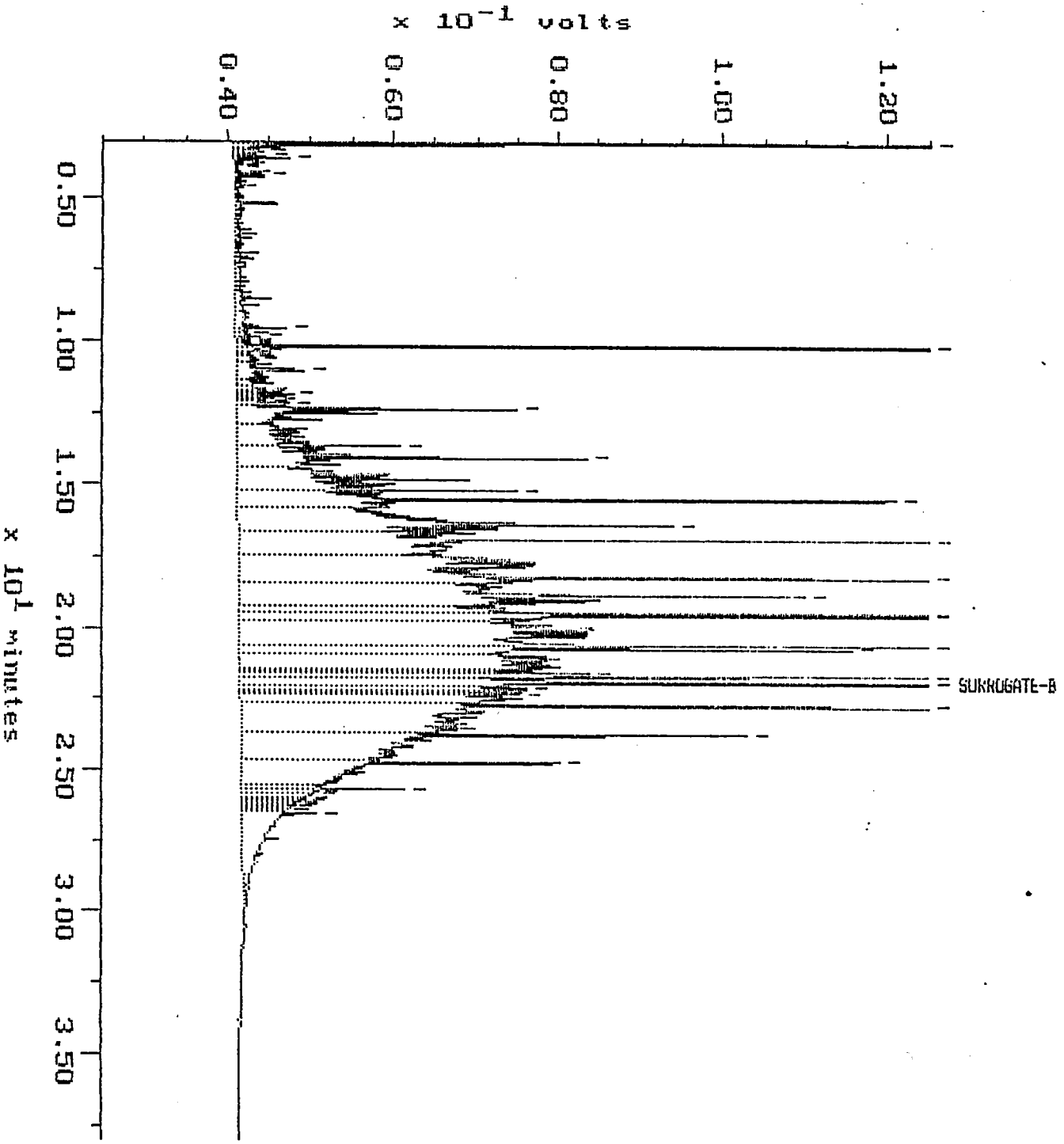
SURROGATE PERCENT RECOVERIES

O-TERPHENYL	119

Sample: 9203-241-9
Acquired: 30-MAR-92 20:35
Inj Vol: 1.00

Channel: FRED
Method: M:\BRO2\MAXDATA\FRED\FUEL0330

Filename: 0330FR03
Operator: ACE



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 3/26/92 Page 1 of 2

PROJECT INFORMATION

Project Manager: P. BARRY
Project Name: Burns Bros / Thorp
Project Number: 15659001
Site Location: Thorp, WA Sampled By: PPB/GJC

DISPOSAL INFORMATION

☐ Lab Disposal (return if not indicated)
Disposal Method: Will Return To Site
Disposed by: _____ Disposal Date: _____

QC INFORMATION (check one)

☐SW-846 ☐CLP ☐Screening ☒AGI Std. ☐Special

Laboratory Number: 9203-241

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-ID State:	TPH-G State: Washington	TPH-D State: Washington	TPH Special Instructions	418.1 State:	8015M	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals					NUMBER OF CONTAINERS
W-1	3/26/92	1158	Water	1		X							X																										4
W-2	↓	1217	↓	2									X																										2
W-3		1230		3									X																										2
W-4		1305		4		X							X																										4
W-5		1325		5									X																										4
W-6		1335		6		X							X																										4
W-7		1355		7		X							X																										4
Bioreactor Degassing Tank Effluent	↓	1645	↓	8			X						X																										3

LAB INFORMATION

Lab Name: ATI / Renton
Lab Address:
Via: Hand

SAMPLE RECEIPT

Total Number of Containers: 27
Chain of Custody Seals?: Y/N/NA 4
Intact?: Y/N/NA Y
Received in Good Condition/Cold: Y/Y

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Peter Barry Time: 847	Signature: Time:	Signature: Time:
Printed Name: Peter Barry Date: 3/27/92	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: Roger Fuller Time: 847	Signature: Time:	Signature: Time:
Printed Name: Roger Fuller Date: 3/27/92	Printed Name: Date:	Printed Name: Date:
Company: ATI-WA	Company:	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev. 12/91

Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 3/26/92 Page 2 of 2

PROJECT INFORMATION

Project Manager: P. BARRY
Project Name: Burns Bros. / Thorp
Project Number: 15659001
Site Location: Thorp, WA Sampled By: PPB/GJC

DISPOSAL INFORMATION

☐ Lab Disposal (return if not indicated)
Disposal Method: Will Return to Site
Disposed by: _____ Disposal Date: _____

QC INFORMATION (check one)

☐ SW-846 ☐ CLP ☐ Screening ☒ AGI Std. ☐ Special

Laboratory Number: 9203-241

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	TPH-ID State:	TPH-G State:	TPH-D State: WASHINGTON	TPH Special Instructions	418.1 State:	8015M	8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals					NUMBER OF CONTAINERS
Carbon Tank Effluent	3/26/92	1655	Water	9			X						X																										3

LAB INFORMATION	SAMPLE RECEIPT	
Lab Name: ATI / Renton	Total Number of Containers:	3
Lab Address:	Chain of Custody Seals?: Y/N/NA	Y
	Intact?: Y/N/NA	Y
Via: Hand	Received in Good Condition/Cold:	Y/Y

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Peter Barry Time: 848	Signature: Time:	Signature: Time:
Printed Name: Peter Barry Date: 3/27/92	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: Roger Fuller Time: 848	Signature: Time:	Signature: Time:
Printed Name: Roger Fuller Date: 3/27/92	Printed Name: Date:	Printed Name: Date:
Company: ATI-WA	Company:	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland: (503) 222-2820 Pleasanton: (415) 460-5495

DISTRIBUTION: White, Canary to Analytical Laboratory; Pink to AGI Project Files; Gold to AGI Disposal Files

Rev. 12/91

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241-9

TOTAL PETROLEUM HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/26/92
PROJECT #	: 15,659.001	DATE RECEIVED	: 03/27/92
PROJECT NAME	: BURNS BROS - THORP	DATE EXTRACTED	: 03/30/92
CLIENT I.D.	: CARBON TANK EFFLUENT	DATE ANALYZED	: 03/30/92
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	12
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERIES

O-TERPHENYL	102

AnalyticalTechnologies,Inc.

ATI I.D. # 9203-241

TOTAL PETROLEUM HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,659.001
PROJECT NAME : BURNS BROS - THORP
METHOD : WA DOE WTPH-D
SAMPLE MATRIX : WATER

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : 03/30/92
DATE ANALYZED : 03/30/92
UNITS : mg/L

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
PETROLEUM HYDROCARBONS (DIESEL)	<0.5	5	4.4	88	4.5	90	2

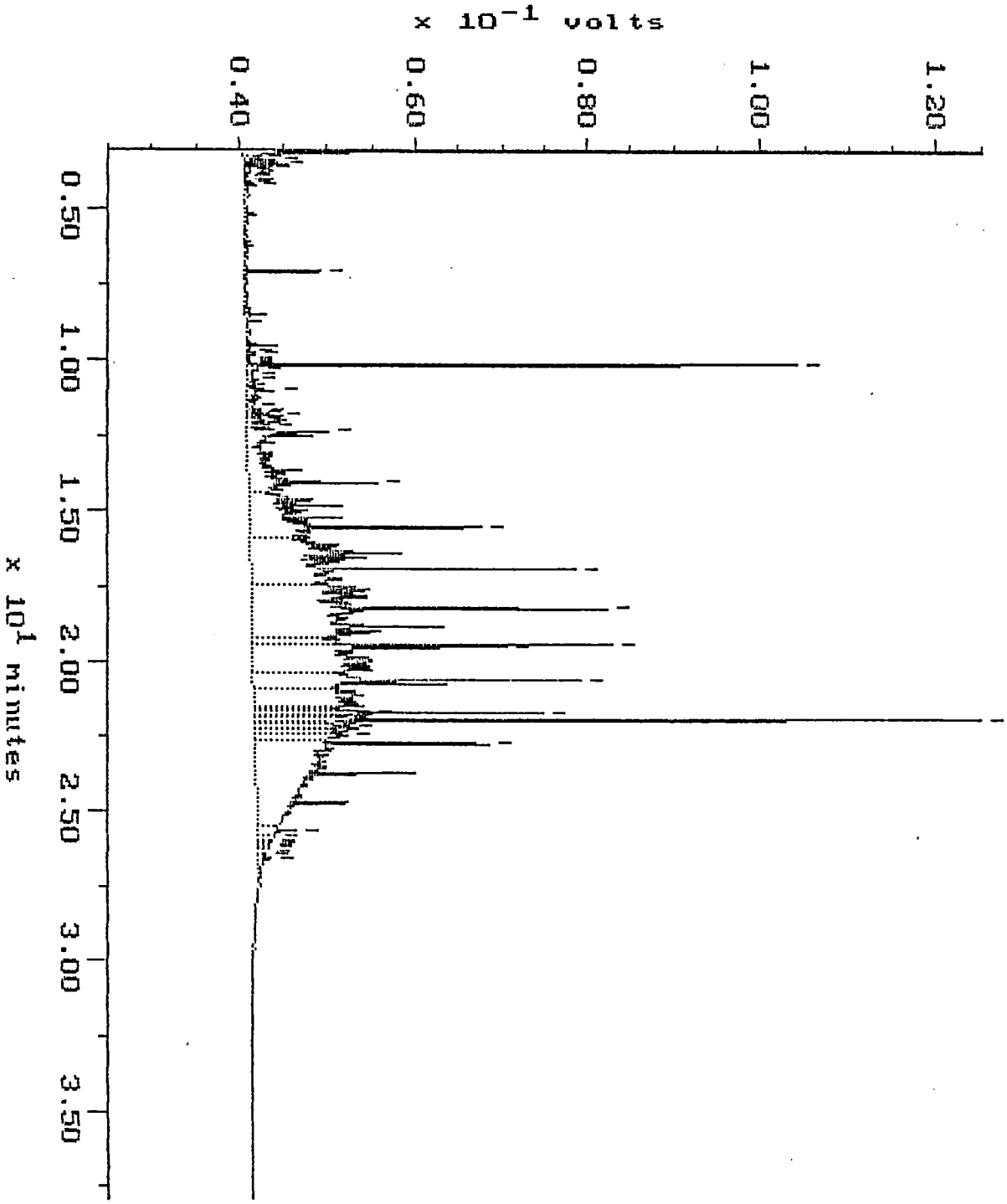
$$\% \text{ Recovery} = \frac{(\text{Spiked Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

$$\text{RPD (Relative \% Difference)} = \frac{|(\text{Spike Result} - \text{Dup. Spike Result})|}{\text{Average Result}} \times 100$$

Sample: 9203-241-8
Acquired: 31-MAR-92 16:27
Dilution: 1 : 5.000

Channel: FRED
Method: M:\BRU2\MAXDATA\FRED\FUEL0330
Inj Vol: 1.00

Filename: 0330FR32
Operator: ACE



APPENDIX D

Weekly Reports

Applied Geotechnology Inc.

March 16, 1992

15,659.001

Mr. Kirk French
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

Dear Mr. French:

Weekly Project Update
Emergency Remedial Action
Bingo Fuel Stop
Thorp, Washington

This letter presents an update on activities performed at the above-referenced site during the previous week. This work is being performed under Washington Department of Ecology Enforcement Order No. DE 92TC-C109, as described in our Emergency Remedial Action Plan dated March 5, 1992, and as revised in our March 9, 1992 letter.

UNDERGROUND STORAGE TANK REMOVAL

Five underground storage tanks (USTs) were removed by Ken Leingang Excavating, Inc., of Yakima, Washington on March 11 and 12, 1992. Tank cleaning, inerting, and rinsate disposal was performed by Northwest EnviroServices Inc. of Pasco, Washington. The 10,000-gallon diesel fuel tank, and the 5,000 and 10,000-gallon unleaded gasoline tanks (removed from Excavation 1, as shown on Figure 1, Site Plan) showed visible signs of corrosion, but had no apparent holes. The 10,000 and 12,000-gallon regular gasoline tanks (removed from Excavation 2) showed no signs of corrosion and had no apparent holes. The two heating oil/used oil tanks were exposed but not removed. The tanks appeared to be in good condition.

Product distribution piping removal began on March 12 and is continuing this week. Two apparent leaks were discovered in the piping system: an unleaded gasoline line passing near the regular gasoline tank nest appeared to have a leaky fitting; and the remote diesel fill line extending between the aboveground tanks to the underground diesel tank appeared to have a leak adjacent to the former underground diesel tank. The remainder of the piping removed to date had visible signs of corrosion but no apparent leaks.

SOIL SAMPLING

Eighteen soil samples have been collected to date and submitted to Analytical Technologies, Inc. in Renton, Washington for chemical analysis. Soil sample identification, location, and analyses requested are shown in Table 1. Locations of the soil samples are shown on Figure 1.

P.O. Box 3885 Bellevue, WA 98009 FAX 206/646-9523 Telephone 206/453-8383

PRODUCT REMOVAL SYSTEM INSTALLATION AND STARTUP

The product removal system was installed between March 10 and March 13, 1992. The system was tested on March 13 and will be placed into continuous service on March 16, 1992.

If you have any questions or comments, please give me a call.

Sincerely,

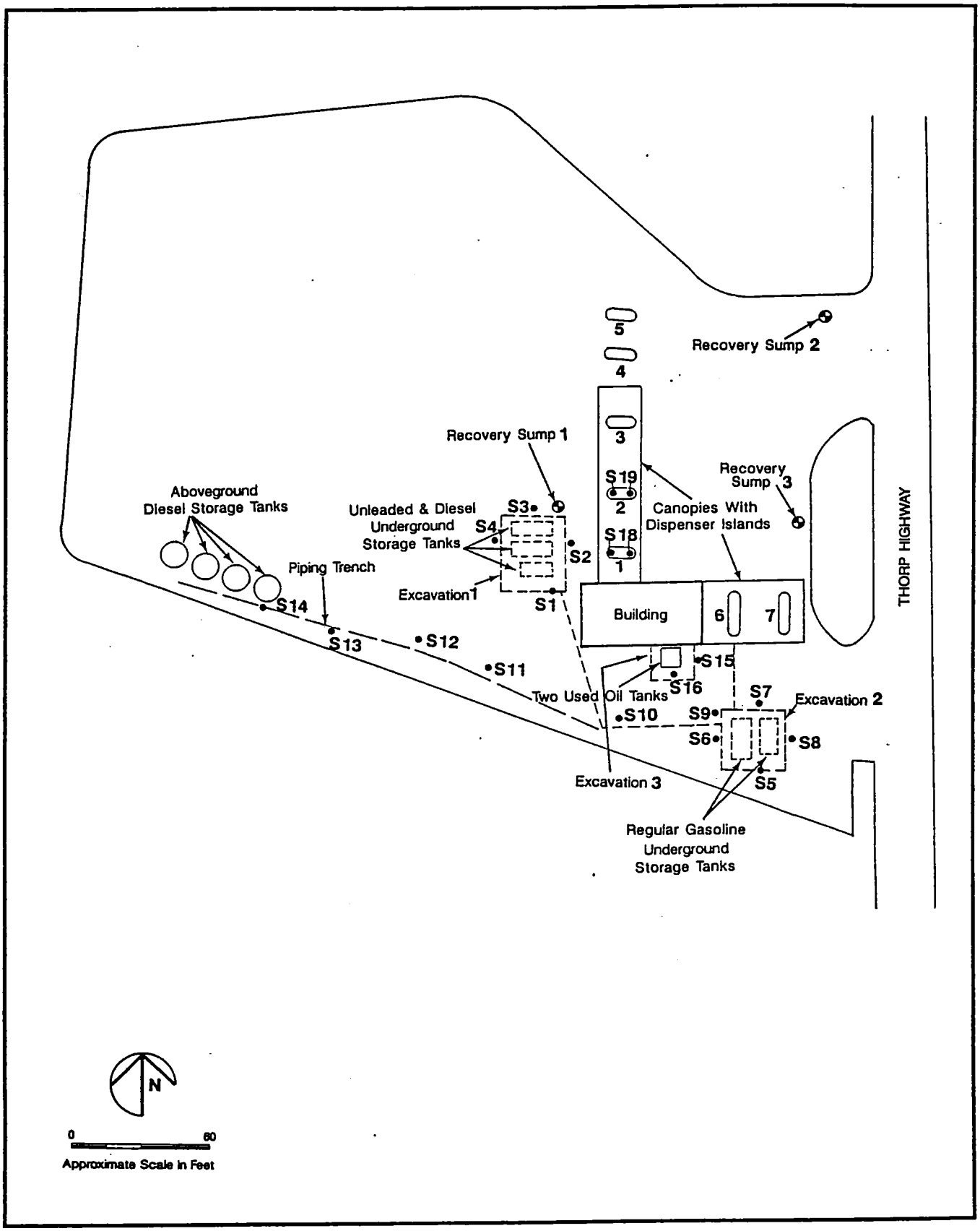
APPLIED GEOTECHNOLOGY INC.

Peter P. Barry
Hydrogeologist

Gary L. Laakso
Remediation Services Manager

PPB/GLL/jlh

attachments



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Site Plan

Burns Bros./ Bingo Fuel Stop
Thorp, Washington

FIGURE
1

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	SLB	PPB	3 Mar 92		

Table 1
Summary of Soil Chemical Analyses, PRELIMINARY
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	BETX	TPH	Lead	EPA Method 8240	WTPH 418.1 MOD.
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	Y	Y	N	N	N
S2	E.WALL, EXCAV.1 @9'	03/11/92	Y	Y	N	N	N
S3	N.WALL, EXCAV.1 @8'	03/11/92	N	Y	N	Y	N
S4	W.WALL, EXCAV.1 @8'	03/11/92	Y	Y	N	N	N
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	Y	Y	Y	N	N
S6	W.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S7	N.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	Y	Y	Y	N	N
S9	EXC.2, W. PIPING @ 3'	03/12/92	Y	Y	N	N	N
S10	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S11	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S12	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S13	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S14	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	N	Y	N	N	Y
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	N	Y	N	N	Y
S18	DISPEN. ISL.1 @ 2'	03/13/92	Y	Y	N	N	N
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	Y	Y	N	N	N

Note:
Analysis requested: Y=Yes, N=No
BETX = Benzene, ethylbenzene, toluene, and xylenes by EPA Method 8020
TPH = Total petroluem hydrocarbons by EPA Method 8015 Modified
EPA Method 8240 for Volatile organic compounds including vinyl acetate
Total Lead by EPA Method 6010

Applied Geotechnology Inc.

March 23, 1992

15,659.001

Mr. Kirk French
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

Dear Mr. French:

Weekly Project Update No. 2
Emergency Remedial Action
Bingo Fuel Stop
Thorp, Washington

This letter presents an update on activities performed at the above-referenced site during the week of March 14 through March 20, 1992. This work is being performed under Washington Department of Ecology Enforcement Order No. DE 92TC-C109, as described in our Emergency Remedial Action Plan dated March 5, 1992, and as revised in our March 9, 1992 letter.

INVESTIGATION FOR REPORTED USTS

Two test pits were dug in the area reported to possibly contain underground storage tanks (USTs). The test pits were dug to depths of 6 feet below ground surface (bgs) and 6.5 feet bgs and did not encounter any USTs. The locations of the test pits are shown on Figure 1, Site Plan.

SOIL SAMPLING: UST EXCAVATIONS AND PRODUCT PIPING

Twenty eight soil samples have been collected to date from the UST excavations and the product distribution pipelines. One sample was collected from a stockpile of approximately 20 cubic yards of excavated soil which appeared to be "clean." The samples were submitted to Analytical Technologies, Inc. in Renton, Washington for chemical analysis. Soil sample identification, location, and analyses requested are listed on Table 1. Locations of the soil samples are shown on Figure 2.

CHEMICAL ANALYSES

Preliminary data from the chemical analyses are shown on Table 2. The remainder of chemical analyses from the UST and distribution piping removal will be included in the next weekly project update if received from the analytical laboratory.

P.O. Box 3885 Bellevue, WA 98009 FAX 206/646-9523 Telephone 206/453-8383

PRODUCT REMOVAL SYSTEM OPERATION

The product removal system has been in continuous operation since March 16, 1992. Water samples were collected from the bioreactor effluent and carbon filter effluent following system startup. Headspace readings indicated petroleum hydrocarbon concentrations in the treatment system effluent were below drinking water standards. Confirmatory samples were submitted to a laboratory for chemical analysis. Water treatment system effluent is being reintroduced to the former diesel and unleaded UST excavation. Approximately 315 gallons of product have been removed as of March 18, 1992. Water samples will be collected every alternate week from the bioreactor and carbon filter effluent.

If you have any questions or comments, please call.

Sincerely,

APPLIED GEOTECHNOLOGY INC.

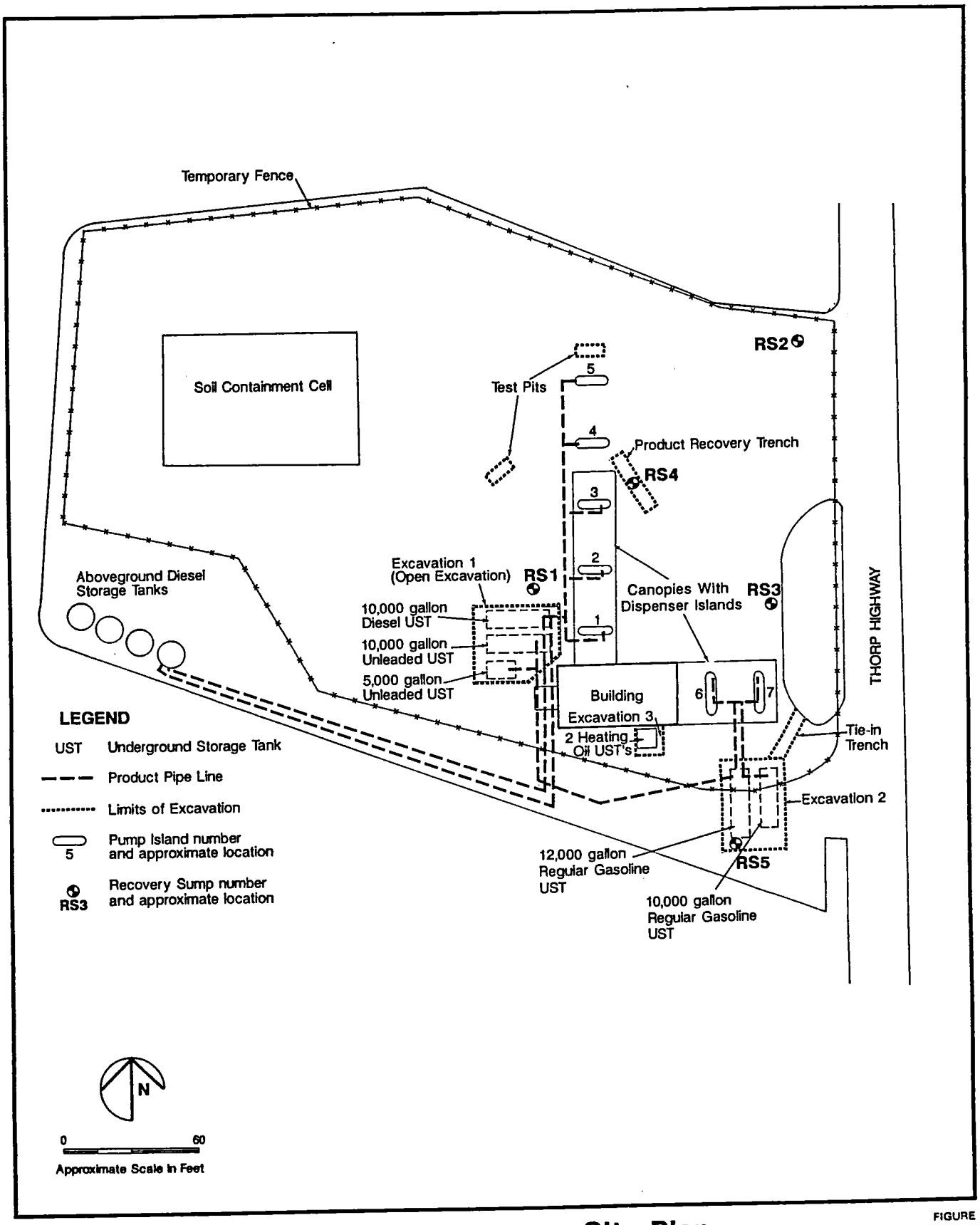
Peter P. Barry
Hydrogeologist

Gary L. Laakso
Remediation Services Manager

PPB/GLL/jlh

attachments

cc: Ms. Susan Burgdorff; Washington State Department of Ecology



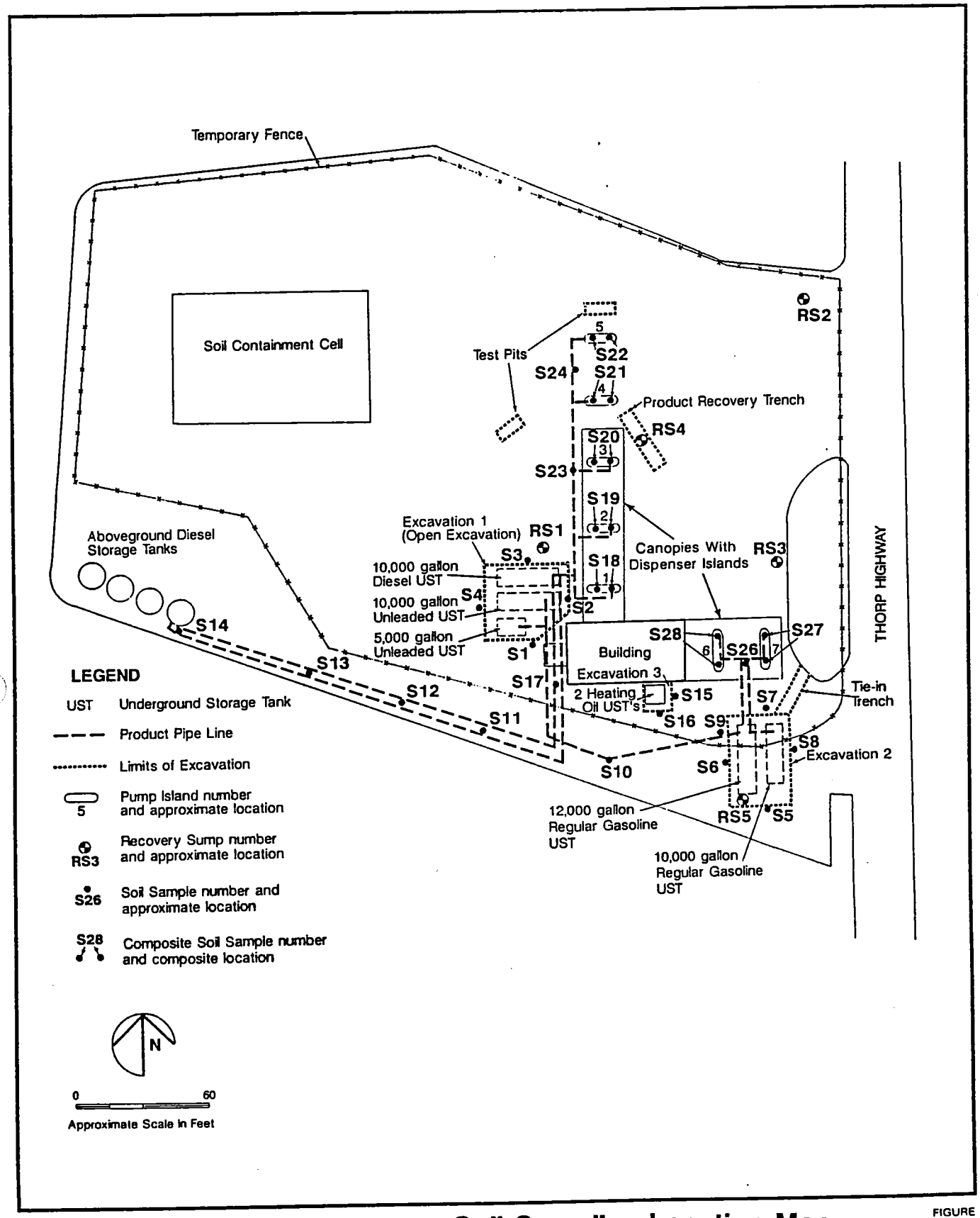
Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Site Plan

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
1

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	DFF	PPB	3 Mar 92	KM	



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Soil Sampling Location Map

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
2

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	KM	PPS	23 MAR 92		

Table 1
Summary of Soil Chemical Analyses Schedule
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods				WTPH 418.1 MOD.
			8020 BETX	8015M TPH	6010 Lead	8240 VOCs	
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	Y	Y	N	Y	N
S2	E.WALL, EXCAV.1 @9'	03/11/92	Y	Y	N	N	N
S3	N.WALL, EXCAV.1 @8'	03/11/92	N	Y	N	Y	N
S4	W.WALL, EXCAV.1 @8'	03/11/92	Y	Y	N	N	N
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	Y	Y	Y	N	N
S6	W.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S7	N.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	Y	Y	Y	N	N
S9	EXC.2, W. PIPING @ 3'	03/12/92	Y	Y	N	N	N
S10	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S11	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S12	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S13	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S14	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	N	Y	N	N	Y
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	N	Y	N	N	Y
S17	PIPING TRENCH @ 2'	03/17/92	Y	Y	N	N	N
S18	DISPEN. ISL.1 @ 2'	03/13/92	Y	Y	N	N	N
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	Y	Y	N	N	N
S20	DISPEN. ISL.3 @ 5'	03/16/92	Y	Y	Y	N	N
S21	DISPEN. ISL.4 @ 5'	03/16/92	Y	Y	N	N	N
S22	DISPEN. ISL.5 @ 5'	03/16/92	Y	Y	N	N	N
S23	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S24	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S26	PIPING TRENCH @ 3'	03/17/92	Y	Y	Y	N	N
S27	DISPEN. ISL.7 @ 3'	03/17/92	Y	Y	Y	N	N
S28	DISPEN. ISL.6 @ 3'	03/17/92	Y	Y	Y	N	N
S29	SOIL STOCKPILE	03/18/92	Y	Y	N	N	N

Notes:

Analysis requested: Y=Yes, N=No
BETX – Benzene, ethylbenzene, toluene, and xylenes.
TPH – Total petroluem hydrocarbons.
VOC – Volatile organic compounds including vinyl acetate.

Table 2
Summary of Soil Chemical Analyses, PRELIMINARY
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods: BETX – 8020 Benzene (mk/kg)	Ethylbenzene (mk/kg)	Toluene (mk/kg)	Total Xylenes (mk/kg)	TPH – 8015M Gasoline (mk/kg)	Diesel (mk/kg)	WTPH 418.1M (mk/kg)
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	0.032	0.28	0.13	2.8	930	12,000	NA
S2	E.WALL, EXCAV.1 @9'	03/11/92	0.22	1.9	2.1	10	1,200	8,700	NA
S3	N.WALL, EXCAV.1 @8'	03/11/92	NA	NA	NA	NA	1,600	10,000	NA
S4	W.WALL, EXCAV.1 @8'	03/11/92	<0.028	0.23	<0.028	2.2	140	540	NA
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	<0.030	<0.030	<0.030	<0.030	ND	ND	NA
S6	W.WALL, EXCAV.2 @8'	03/12/92	<0.029	0.10	<0.029	0.034	20	32	NA
S7	N.WALL, EXCAV.2 @8'	03/12/92	26	61	210	470	2,500		NA
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	92	300	1,000	1,800	10,000	420	NA
S9	EXC.2, W. PIPING @ 3'	03/12/92	<0.028	<0.028	<0.028	<0.028	7	ND	NA
S10	PIPING TRENCH @ 4'	03/13/92							NA
S11	PIPING TRENCH @ 3'	03/13/92					240	2,000	NA
S12	PIPING TRENCH @ 3'	03/13/92					ND	ND	NA
S13	PIPING TRENCH @ 3'	03/13/92					ND	ND	NA
S14	PIPING TRENCH @ 4'	03/13/92					7	350	NA
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	NA	NA	NA	NA	ND	ND	22
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	NA	NA	NA	NA	ND	ND	ND
S17	PIPING TRENCH @ 2'	03/17/92	0.037	<0.028	0.066	0.039			NA
S18	DISPEN. ISL.1 @ 2'	03/13/92					<25	2,100	NA
S19	DISPEN. ISL.2 @ 2.5'	03/13/92					430	18,000	NA
S20	DISPEN. ISL.3 @ 5'	03/16/92							NA
S21	DISPEN. ISL.4 @ 5'	03/16/92							NA
S22	DISPEN. ISL.5 @ 5'	03/16/92							NA
S23	PIPING TRENCH @ 5'	03/16/92							NA
S24	PIPING TRENCH @ 5'	03/16/92							NA
S26	PIPING TRENCH @ 3'	03/17/92	0.44	3.6	5.6	25			NA
S27	DISPEN. ISL.7 @ 3'	03/17/92	6.5	44	130	330			NA
S28	DISPEN. ISL.6 @ 3'	03/17/92	10	19	69	170			NA
S29	SOIL STOCKPILE	03/18/92	<0.028	<0.028	<0.028	<0.028			NA
Laboratory Detection Limit			0.025	0.025	0.025	0.025	5	25	20
State Soil Cleanup Levels [a]			0.500	20.0	40.0	20.0	100	200	200

Notes:
a) Method A suggested cleanup level for residential soil promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act Cleanup Regulation.
mg/kg – Milligrams per kilogram is equivalent to parts per million (ppm).
TPH – Total petroluem hydrocarbons.
NA – Not analyzed; ND – Not detected.
Shaded values exceed Washington State Method A soil cleanup levels.

Applied Geotechnology Inc.

March 30, 1992

15,659.001

Mr. Kirk French
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

Dear Mr. French:

Weekly Project Update No. 3
Emergency Remedial Action
Bingo Fuel Stop
Thorp, Washington

This letter presents an update on activities performed at the above-referenced site during the week of March 21 through March 27, 1992. This work is being performed under Washington Department of Ecology Enforcement Order No. DE 92TC-C109, as described in our Emergency Remedial Action Plan dated March 5, 1992, and as revised in our March 9, 1992 letter.

OFF SITE WATER SAMPLING

Water samples were collected from water supply wells within a 1/4 mile radius of the site. The locations of the wells sampled were:

- Directly to the west (Puget Power Service Center),
- Directly to the south (a private residence),
- Adjacent to the east (a private residence), and
- Across Interstate 90 to the north (Thorp Antique Mall).

Two surface water samples were collected within a 1/4 mile radius. The locations of the surface water sources were:

- A pond adjacent to the east of the site, and
- The swampy area adjacent to the south of the site.

The water samples were submitted to Analytical Technologies, Inc. in Renton, Washington for chemical analyses. Analytical methods selected for analyses are shown on Table 1.

P.O. Box 3885 Bellevue, WA 98009 FAX 206/646-9523 Telephone 206/453-8383

PRODUCT REMOVAL SYSTEM OPERATION

The product removal system has been in continuous operation since March 16, 1992. Approximately 410 gallons of product have been removed as of March 26, 1992. Approximately 60,000 gallons of groundwater recovered with the product have been treated and reintroduced into the diesel and unleaded tank excavation. Water samples collected from the carbon filter effluent indicate the reintroduced water meets Washington State Method A (routine site) groundwater cleanup levels, as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code (WAC) 173-340.

CHEMICAL ANALYSES

Preliminary data from the soil chemical analyses are shown on Table 2. The remainder of results of chemical analyses from the UST removal (EPA Method 8240 and 6010) will be included when the results are received.

Results of the water sample analyses will be included when received.

If you have any questions or comments, please give us a call.

Sincerely,

APPLIED GEOTECHNOLOGY INC.

Peter P. Barry
Hydrogeologist

Gary L. Laaksc
Remediation Services Manager

PPB/GLL/jlh

attachments

cc: Ms. Susan Burgdorff; Washington State Department of Ecology

Table 1
Summary of Soil and Water Chemical Analyses Schedule
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods				WTPH 418.1 MOD.
			8020 BETX	8015M TPH	6010 Lead	8240 VOCs	
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	Y	Y	N	Y	N
S2	E.WALL, EXCAV.1 @9'	03/11/92	Y	Y	N	N	N
S3	N.WALL, EXCAV.1 @8'	03/11/92	N	Y	N	Y	N
S4	W.WALL, EXCAV.1 @8'	03/11/92	Y	Y	N	N	N
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	Y	Y	Y	N	N
S6	W.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S7	N.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	Y	Y	Y	N	N
S9	EXC.2, W. PIPING @ 3'	03/12/92	Y	Y	N	N	N
S10	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S11	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S12	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S13	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S14	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	N	Y	N	N	Y
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	N	Y	N	N	Y
S17	PIPING TRENCH @ 2'	03/17/92	Y	Y	N	N	N
S18	DISPEN. ISL.1 @ 2'	03/13/92	Y	Y	N	N	N
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	Y	Y	N	N	N
S20	DISPEN. ISL.3 @ 5'	03/16/92	Y	Y	Y	N	N
S21	DISPEN. ISL.4 @ 5'	03/16/92	Y	Y	N	N	N
S22	DISPEN. ISL.5 @ 5'	03/16/92	Y	Y	N	N	N
S23	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S24	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S26	PIPING TRENCH @ 3'	03/17/92	Y	Y	Y	N	N
S27	DISPEN. ISL.7 @ 3'	03/17/92	Y	Y	Y	N	N
S28	DISPEN. ISL.6 @ 3'	03/17/92	Y	Y	Y	N	N
S29	SOIL STOCKPILE	03/18/92	Y	Y	N	N	N

Notes:

Analysis requested: Y=Yes, N=No
BETX – Benzene, ethylbenzene, toluene, and xylenes.
TPH – Total petroluem hydrocarbons.
VOC – Volatile organic compounds including vinyl acetate.

Table 1
Summary of Soil and Water Chemical Analyses Schedule
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Method 8020 BETX	WTPH-G
W-1	Puget Power Service Center	03/26/92	Y	Y
W-2	House Adjacent to South	03/26/92	Y	N
W-3	House Adjacent to East	03/26/92	Y	N
W-4	Thorp Antique Mall	03/26/92	Y	Y
W-5	Pond Adjacent to East	03/26/92	Y	N
W-6	Swampy Area Adjacent to South	03/26/92	Y	Y
Sample ID	**Sample Location**	**Sample Date**	**EPA Method 8020 BETX**	**WTPH-D**
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92	Y	Y
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92	Y	Y
Degassing Tank	Bioreactor Effluent	03/16/92	Y	N
Carbon Effluent	Carbon Filter Effluent	03/16/92	Y	N

Notes:

Analysis requested: Y=Yes, N=No
BETX – Benzene, ethylbenzene, toluene, and xylenes.
TPH – Total petroleum hydrocarbons.

Table 2
Summary of Soil and Water Chemical Analyses, PRELIMINARY
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods						WTPH 418.1M (mk/kg)
			BETX – 8020				TPH – 8015M		
			Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)	Gasoline (mg/kg)	Diesel (mg/kg)	
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	0.032	0.28	0.13	2.8	930	12,000	NA
S2	E.WALL, EXCAV.1 @9'	03/11/92	0.22	1.9	2.1	10	1,200	8,700	NA
S3	N.WALL, EXCAV.1 @8'	03/11/92	NA	NA	NA	NA	1,600	10,000	NA
S4	W.WALL, EXCAV.1 @8'	03/11/92	<0.028	0.23	<0.028	2.2	140	540	NA
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	<0.030	<0.030	<0.030	<0.030	<5	<25	NA
S6	W.WALL, EXCAV.2 @8'	03/12/92	<0.029	0.10	<0.029	0.034	20	32	NA
S7	N.WALL, EXCAV.2 @8'	03/12/92	26	61	210	470	2,500	420	NA
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	92	300	1,000	1,800	10,000	600	NA
S9	EXC.2, W. PIPING @ 3'	03/12/92	<0.028	<0.028	<0.028	<0.028	7	<25	NA
S10	PIPING TRENCH @ 4'	03/13/92	21	69	200	410	1,000	100	NA
S11	PIPING TRENCH @ 3'	03/13/92	<0.032	0.40	0.056	2.6	240	2,000	NA
S12	PIPING TRENCH @ 3'	03/13/92	<0.031	<0.031	<0.031	<0.031	<5	<25	NA
S13	PIPING TRENCH @ 3'	03/13/92	<0.035	<0.035	<0.035	<0.035	<5	<25	NA
S14	PIPING TRENCH @ 4'	03/13/92	<0.030	<0.030	<0.030	<0.030	7	350	NA
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	NA	NA	NA	NA	<5	<25	22
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	NA	NA	NA	NA	<5	<25	<20
S17	PIPING TRENCH @ 2'	03/17/92	0.037	<0.028	0.066	0.039	<5	<25	NA
S18	DISPEN. ISL.1 @ 2'	03/13/92	<0.027	<0.027	0.032	0.029	<25	2,100	NA
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	<0.030	0.070	<0.030	0.61	430	18,000	NA
S20	DISPEN. ISL.3 @ 5'	03/16/92	0.039	1.4	0.48	7.9	280	2,200	NA
S21	DISPEN. ISL.4 @ 5'	03/16/92	0.67	1.8	0.80	9.0	2,500	21,000	NA
S22	DISPEN. ISL.5 @ 5'	03/16/92	0.59	1.1	0.91	6.1	740	9,100	NA
S23	PIPING TRENCH @ 5'	03/16/92	<0.028	0.81	0.080	6.1	980	3,100	NA
S24	PIPING TRENCH @ 5'	03/16/92	<0.028	<0.028	<0.028	<0.028	<5	87	NA
S26	PIPING TRENCH @ 3'	03/17/92	0.44	3.6	5.6	25	297	72	NA
S27	DISPEN. ISL.7 @ 3'	03/17/92	6.5	44	130	330	1,100	160	NA
S28	DISPEN. ISL.6 @ 3'	03/17/92	10	19	69	170	1,600	300	NA
S29	SOIL STOCKPILE	03/18/92	<0.028	<0.028	<0.028	<0.028	10	210	NA
State Soil Cleanup Levels [a]			0.500	20.0	40.0	20.0	100	200	200

Notes:
a) Method A suggested cleanup level for residential soil promulgated under Chapter 173-340 WAC, State of Washington Model Toxics Control Act Cleanup Regulation.
mg/kg – Milligrams per kilogram is equivalent to parts per million (ppm).
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
Shaded values exceed Washington State Method A soil cleanup levels.

Table 2
Summary of Soil and Water Chemical Analyses, PRELIMINARY
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods BETX – 8020 Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Total Xylenes (ug/L)	WTPH Gasoline (ug/L)	Diesel (ug/L)
W–1	Puget Power Service Center	03/26/92						NA
W–2	House Adjacent to South	03/26/92						NA
W–3	House Adjacent to East	03/26/92						NA
W–4	Thorp Antique Mall	03/26/92						NA
W–5	Pond Adjacent to East	03/26/92						NA
W–6	Swampy Area Adjacent to South	03/26/92						NA
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92					NA	
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92					NA	
Degassing Tank	Bioreactor Effluent	03/16/92	1,100	140	1,900	1,100	NA	NA
Carbon Effluent	Carbon Filter Effluent	03/16/92	0.8	<0.5	1.3	<0.5	NA	NA
State Groundwater Cleanup Levels[a]			5	30	40	20	1,000	1,000

Notes:
a) Method A suggested cleanup level for groundwater promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act Cleanup Regulation.
ug/L – Micrograms per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
Shaded values exceed Washington State Method A groundwater cleanup levels.

Applied Geotechnology Inc.

April 6, 1992

15,659.001

Mr. Kirk French
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

Dear Mr. French:

Weekly Project Update No. 4
Emergency Remedial Action
Bingo Fuel Stop
Thorp, Washington

This letter presents an update on activities performed at the above-referenced site during the week of March 28 through April 3, 1992. This work is being performed under Washington Department of Ecology Enforcement Order No. DE 92TC-C109, and as described in our Emergency Remedial Action Plan dated March 5, 1992, and as revised in our March 9, 1992 letter.

OFF SITE WATER SAMPLING

Off site water samples were collected in accordance with the revisions to the Emergency Remedial Action Plan. The sample analyses schedule for groundwater and surface water samples collected in the vicinity of the site is shown in Table 1, and preliminary results of chemical analyses are shown in Table 2. The results indicate petroleum hydrocarbon contamination at the site has not impacted drinking water wells in the vicinity. One analyte was detected in samples from surface waters: toluene was present at 0.99 micrograms per liter (ug/L) in the sample from the swampy area adjacent to the south. This detection is well below Method A groundwater cleanup levels (40 ug/L), as well as federal drinking water standards (1,000 ug/L). The source of the toluene is uncertain, however, we feel it is not a threat to human health or the environment.

ADDITIONAL SOIL CHEMICAL ANALYSES RESULTS

Preliminary data from the soil chemical analyses are shown in Tables 2 and 3. Two soil samples from the diesel tank excavation showing the highest concentrations of total petroleum hydrocarbons as diesel, 12,000 milligrams per kilogram (mg/kg) and 10,000 mg/kg, were analyzed by EPA Method 8240 for vinyl acetate, a component of Burns Red fuel additive. Laboratory results of soil sample analyses for vinyl acetate indicated no detectable concentrations at the 0.62 mg/kg and 5.9 mg/kg laboratory detection limits, respectively.

P.O. Box 3885 Bellevue, WA 98009 FAX 206/646-9523 Telephone 206/453-8383

PRODUCT REMOVAL SYSTEM OPERATION

The product removal system has been in continuous operation since March 16, 1992. Approximately 440 gallons of product have been removed as of April 3, 1992. Product thickness measurements were collected from the recovery sumps currently in use and RS-4. The measurements are shown in Table 4. The recovery pump in RS-2 was moved to RS-4, as product was not present in RS-2 at the time of the most recent measurement.

Approximately 91,000 gallons of groundwater recovered with product have been treated and reintroduced into the diesel and unleaded tank excavation. Field screening of water samples collected from the carbon filter effluent indicated the reintroduced water meets Washington State Method A (routine site) groundwater cleanup levels, as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code (WAC) 173-340. Laboratory results of effluent samples, however, indicate the presence of 12 milligrams per liter of total petroleum hydrocarbons as diesel, 13 ug/L of benzene, and 56 ug/L of total xylenes.

The flow rate through the bioreactor has been decreased from approximately 4.2 gallons per minute (gpm) to approximately 2.4 gpm, to increase the residence time of hydrocarbon contaminated groundwater in the contact tank. Increased residence time will allow microorganisms to further degrade petroleum hydrocarbon compounds in recovered water. Creating additional capacity for the contact tank may be necessary if petroleum hydrocarbon compounds persist in effluent at the decreased flow rate.

If you have any questions or comments, please give me a call.

Sincerely,

APPLIED GEOTECHNOLOGY INC.

Peter P. Barry
Hydrogeologist

Gary L. Laakso
Remediation Services Manager

PPB/GLL/jlh

attachments

cc: Ms. Susan Burgdorff; Washington State Department of Ecology

Table 1
Summary of Soil and Water Chemical Analyses Schedule
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods				WTPH 418.1 MOD.
			8020 BETX	8015M TPH	6010 Lead	8240 VOCs	
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	Y	Y	N	Y	N
S2	E.WALL, EXCAV.1 @9'	03/11/92	Y	Y	N	N	N
S3	N.WALL, EXCAV.1 @8'	03/11/92	N	Y	N	Y	N
S4	W.WALL, EXCAV.1 @8'	03/11/92	Y	Y	N	N	N
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	Y	Y	Y	N	N
S6	W.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S7	N.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	Y	Y	Y	N	N
S9	EXC.2, W. PIPING @ 3'	03/12/92	Y	Y	N	N	N
S10	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S11	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S12	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S13	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S14	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	N	Y	N	N	Y
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	N	Y	N	N	Y
S17	PIPING TRENCH @ 2'	03/17/92	Y	Y	N	N	N
S18	DISPEN. ISL.1 @ 2'	03/13/92	Y	Y	N	N	N
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	Y	Y	N	N	N
S20	DISPEN. ISL.3 @ 5'	03/16/92	Y	Y	Y	N	N
S21	DISPEN. ISL.4 @ 5'	03/16/92	Y	Y	N	N	N
S22	DISPEN. ISL.5 @ 5'	03/16/92	Y	Y	N	N	N
S23	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S24	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S26	PIPING TRENCH @ 3'	03/17/92	Y	Y	Y	N	N
S27	DISPEN. ISL.7 @ 3'	03/17/92	Y	Y	Y	N	N
S28	DISPEN. ISL.6 @ 3'	03/17/92	Y	Y	Y	N	N
S29	SOIL STOCKPILE	03/18/92	Y	Y	N	N	N

Notes:

Analysis requested: Y=Yes, N=No
BETX – Benzene, ethylbenzene, toluene, and xylenes.
TPH – Total petroluem hydrocarbons.
VOC – Volatile organic compounds including vinyl acetate.

Table 1
Summary of Soil and Water Chemical Analyses Schedule
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Method 8020 BETX	WTPH-G
W-1	Puget Power Service Center	03/26/92	Y	Y
W-2	House Adjacent to South	03/26/92	Y	N
W-3	House Adjacent to East	03/26/92	Y	N
W-4	Thorp Antique Mall	03/26/92	Y	Y
W-5	Pond Adjacent to East	03/26/92	Y	N
W-6	Swampy Area Adjacent to South	03/26/92	Y	Y

Sample ID	Sample Location	Sample Date	EPA Method 8020 BETX	WTPH-D
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92	Y	Y
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92	Y	Y
Degassing Tank	Bioreactor Effluent	03/16/92	Y	N
Carbon Effluent	Carbon Filter Effluent	03/16/92	Y	N

Notes:

Analysis requested: Y=Yes, N=No
BETX – Benzene, ethylbenzene, toluene, and xylenes.
TPH – Total petroleum hydrocarbons.

Table 2
Summary of Soil and Water Chemical Analyses, PRELIMINARY
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods: BETX – 8020 Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)	TPH – 8015M Gasoline (mg/kg)	Diesel (mg/kg)	WTPH 418.1M (mk/kg)	EPA 6010 Lead (mg/kg)
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	0.032	0.28	0.13	2.8	930	12,000	NA	
S2	E.WALL, EXCAV.1 @9'	03/11/92	0.22	1.9	2.1	10	1,200	8,700	NA	
S3	N.WALL, EXCAV.1 @8'	03/11/92	NA	NA	NA	NA	1,600	10,000	NA	
S4	W.WALL, EXCAV.1 @8'	03/11/92	<0.028	0.23	<0.028	2.2	140	540	NA	
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	<0.030	<0.030	<0.030	<0.030	<5	<25	NA	<5.8
S6	W.WALL, EXCAV.2 @8'	03/12/92	<0.029	0.10	<0.029	0.034	20	32	NA	<5.6
S7	N.WALL, EXCAV.2 @8'	03/12/92	26	61	210	470	2,500	420	NA	<5.6
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	92	300	1,000	1,800	10,000	600	NA	<5.4
S9	EXC.2, W. PIPING @ 3'	03/12/92	<0.028	<0.028	<0.028	<0.028	7	<25	NA	
S10	PIPING TRENCH @ 4'	03/13/92	21	69	200	410	1,000	100	NA	
S11	PIPING TRENCH @ 3'	03/13/92	<0.032	0.40	0.056	2.6	240	2,000	NA	
S12	PIPING TRENCH @ 3'	03/13/92	<0.031	<0.031	<0.031	<0.031	<5	<25	NA	
S13	PIPING TRENCH @ 3'	03/13/92	<0.035	<0.035	<0.035	<0.035	<5	<25	NA	
S14	PIPING TRENCH @ 4'	03/13/92	<0.030	<0.030	<0.030	<0.030	7	350	NA	
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	NA	NA	NA	NA	<5	<25	22	
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	NA	NA	NA	NA	<5	<25	<20	
S17	PIPING TRENCH @ 2'	03/17/92	0.037	<0.028	0.066	0.039	<5	<25	NA	
S18	DISPEN. ISL.1 @ 2'	03/13/92	<0.027	<0.027	0.032	0.029	<25	2,100	NA	
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	<0.030	0.070	<0.030	0.61	430	18,000	NA	
S20	DISPEN. ISL.3 @ 5'	03/16/92	0.039	1.4	0.48	7.9	280	2,200	NA	
S21	DISPEN. ISL.4 @ 5'	03/16/92	0.67	1.8	0.80	9.0	2,500	21,000	NA	
S22	DISPEN. ISL.5 @ 5'	03/16/92	0.59	1.1	0.91	6.1	740	9,100	NA	
S23	PIPING TRENCH @ 5'	03/16/92	<0.028	0.81	0.080	6.1	980	3,100	NA	
S24	PIPING TRENCH @ 5'	03/16/92	<0.028	<0.028	<0.028	<0.028	<5	87	NA	
S26	PIPING TRENCH @ 3'	03/17/92	0.44	3.6	5.6	25	297	72	NA	
S27	DISPEN. ISL.7 @ 3'	03/17/92	6.5	44	130	330	1,100	160	NA	
S28	DISPEN. ISL.6 @ 3'	03/17/92	10	19	69	170	1,600	300	NA	
S29	SOIL STOCKPILE	03/18/92	<0.028	<0.028	<0.028	<0.028	10	210	NA	
State Soil Cleanup Levels[a]			0.500	20.0	40.0	20.0	100	200	200	250

Notes:
a) Method A suggested cleanup level for residential soil promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act Cleanup Regulation.
mg/kg – Milligrams per kilogram is equivalent to parts per million (ppm).
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
Shaded values exceed Washington State Method A soil cleanup levels.

Table 2
Summary of Soil and Water Chemical Analyses, PRELIMINARY
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods BETX – 8020 Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Total Xylenes (ug/L)	WTPH Gasoline (mg/L)	Diesel (mg/L)
W–1	Puget Power Service Center	03/26/92	ND	ND	ND	ND	ND	NA
W–2	House Adjacent to South	03/26/92	ND	ND	ND	ND	ND	NA
W–3	House Adjacent to East	03/26/92	ND	ND	ND	ND	ND	NA
W–4	Thorp Antique Mall	03/26/92	ND	ND	ND	ND	ND	NA
W–5	Pond Adjacent to East	03/26/92	ND	ND	ND	ND	ND	NA
W–6	Swampy Area Adjacent to South	03/26/92	ND	ND	0.99	ND	ND	NA
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92	100	11	180	200	NA	19
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92	19	ND	10	56	NA	12
Degassing Tank	Bioreactor Effluent	03/16/92	1,100	140	1,900	1,100	NA	NA
Carbon Effluent	Carbon Filter Effluent	03/16/92	0.8	ND	1.3	ND	NA	NA
Laboratory Detection Limit			0.5	0.5	0.5	0.5	0.1	0.5
State Groundwater Cleanup Levels [a]			5	30	40	20	1.0	1.0

Notes:
a) Method A suggested cleanup level for groundwater promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act Cleanup Regulation.
mg/L – Milligrams per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
ug/L – Micrograms per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
ND – Not detected.
Shaded values exceed Washington State Method A groundwater cleanup levels.

Table 3
Volatile Organic Compounds – Soil
Quantified by EPA Method 8240
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Compounds	S1 S. Wall Ex. 1 @ 8' (mg/kg)	S3 S. Wall Ex. 1 @ 8' (mg/kg)
Benzene	<0.062	<0.59
Chlorobenzene	<0.062	<0.59
Ethylbenzene	<0.062	<0.59
Styrene	<0.062	<0.59
Toluene	<0.062	<0.59
Total Xylenes	1.4	9.8
Acetone	<1.2	<12
Bromodichloromethane	<0.062	<0.59
Bromoform	<0.31	<2.9
Bromomethane	<0.62	<5.9
2–Butanone (MEK)	<0.62	<5.9
Carbon Disulfide	<0.062	<0.59
Carbon Tetrachloride	<0.062	<0.59
Chloroethane	<0.062	<0.59
Chloroform	<0.062	<0.59
Chloromethane	<0.62	<5.9
Dibromochloromethane	<0.062	<0.59
1,1–Dichloroethane	<0.062	<0.59
1,2–Dichloroethane	<0.062	<0.59
1,1–Dichloroethene	<0.062	<0.59
trans–1,2–Dichloroethene	<0.062	<0.59
1,2–Dichloropropane	<0.062	<0.59
trans–1,3–Dichloropropene	<0.062	<0.59
cis–1,3–Dichloropropene	<0.062	<0.59
2–Hexanone (MBK)	<0.62	<5.9
Methylene Chloride	0.56 B	<2.9
4–Methyl–2–Pentanone (MIBK)	<0.62	<5.9
1,1,2,2–Tetrachloroethane	<0.62	<0.59
Tetrachloroethene	<0.62	<0.59
1,1,1–Trichloroethane	<0.62	<0.59
1,1,2–Trichloroethane	<0.62	<0.59
Trichloroethene	<0.62	<0.59
Vinyl Acetate	<0.62	<5.9
Vinyl Chloride	<0.62	<0.59

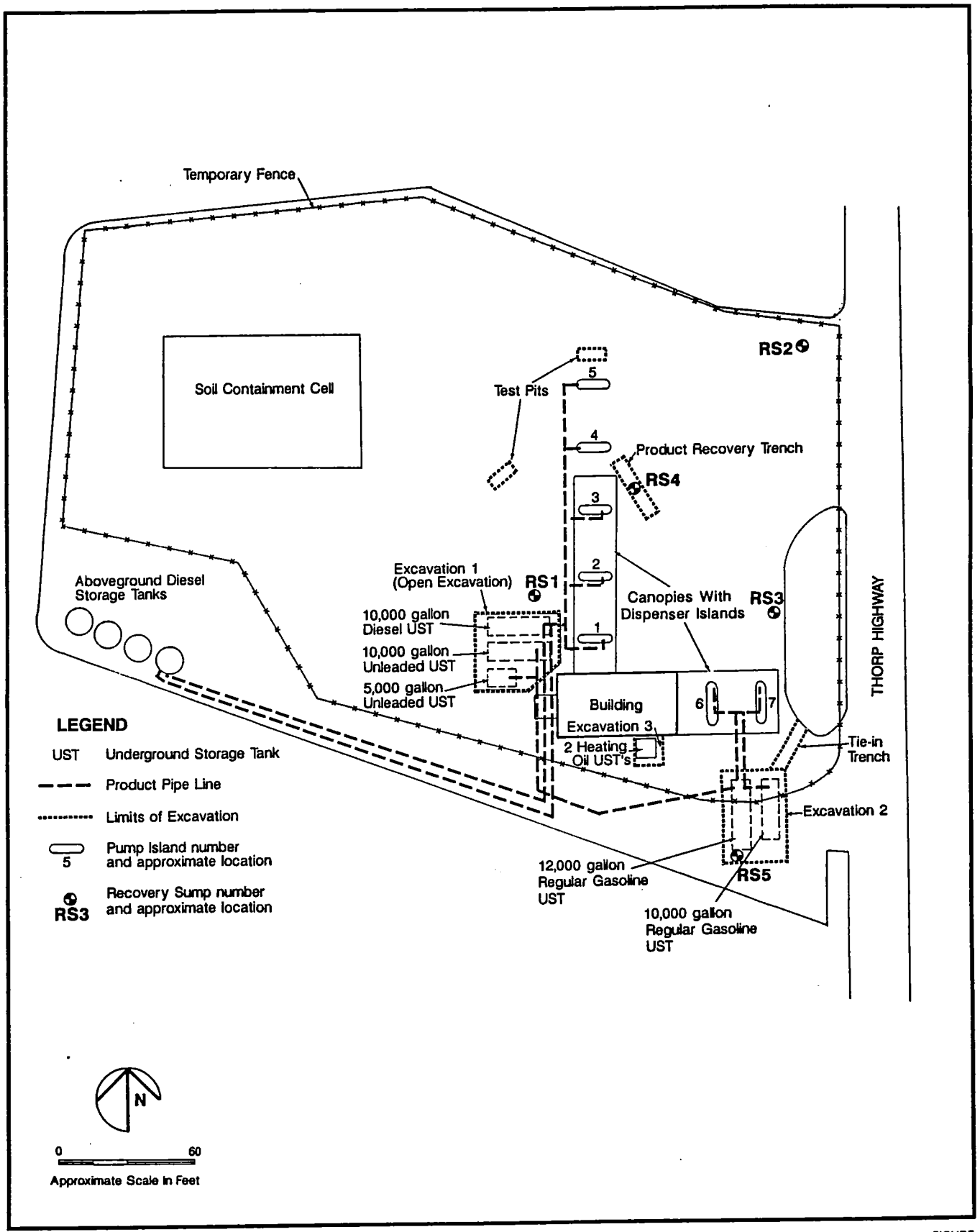
Notes:

B – Compound also detected in Reagent Blank.
mg/kg – Milligrams per kilogram is equivalent to parts per million (ppm).

Table 4
Summary of Water and Product Level Measurements
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Location	Date Sampled	Depth to Product	Depth to Water	Product Thickness	Reference Elevation	Notes
RS–1	03/09/92	11.05	11.39	0.34	105.89	Not pumping.
	03/12/92	11.47	11.57	0.10	105.89	Not pumping.
	03/17/92	10.56	10.61	0.05	105.89	
	03/26/92	10.77	10.80	0.03	105.89	
	04/01/92	10.63	10.68	0.05	105.89	
RS–2	03/09/92	9.71	9.91	0.20	99.37	Not pumping.
	03/12/92	9.81	10.03	0.22	99.37	Not pumping.
	03/17/92	11.03	11.20	0.17	99.37	
	03/26/92	10.08	10.09	0.01	99.37	
	04/01/92		10.87	0.00	99.37	
RS–3	03/09/92	11.59	11.64	0.05	104.51	Not pumping.
	03/12/92	11.80	11.85	0.05	104.51	Not pumping.
	03/17/92		12.36	0.00	104.51	
	03/26/92		12.39	0.00	104.51	
	04/01/92	12.59	12.62	0.03	104.51	
RS–4	03/17/92	12.72	12.79	0.07	103.75	Not pumping.
	03/26/92	11.84	12.08	0.24	103.75	Not pumping.
	04/01/92	12.21	12.48	0.27	103.75	Not pumping.

Reference Elevation Datum: Assumed 100.00' at nail 1' from above base of Telephone Pole, 50' from RS–3.



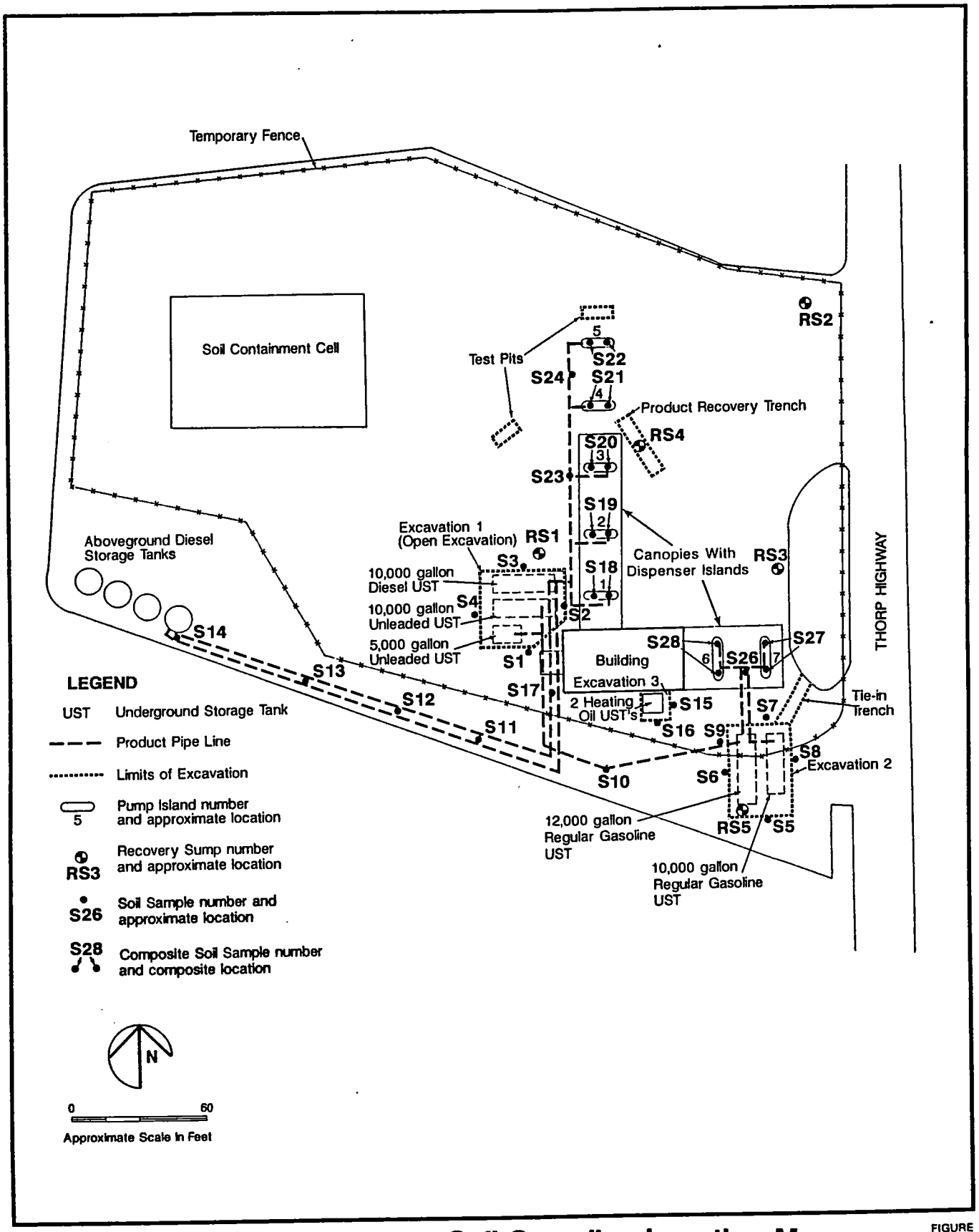
Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Site Plan

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
1

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	DFF	PPB	3 Mar 92	KM	



Applied Geotechnology Inc.
Geotechnical Engineering
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Soil Sampling Location Map

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
2

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	KM	PCB	23 MAR 92		

Applied Geotechnology Inc.

April 14, 1992

15,659.001

Mr. Kirk French
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

Dear Mr. French:

Weekly Project Update No. 5
Emergency Remedial Action
Bingo Fuel Stop
Thorp, Washington

This letter presents an update on activities performed at the above-referenced site during the week of April 4 through April 10, 1992. This work is being performed under Washington Department of Ecology Enforcement Order No. DE 92TC-C109, and as described in our Emergency Remedial Action Plan dated March 5, 1992, and as revised in our March 9, 1992 letter.

SOIL CHEMICAL ANALYSES RESULTS

Soil sample schedule is shown in Table 1, and the results of chemical analyses are shown in Tables 2 and 3. Copies of laboratory reports for soil chemical analyses are attached and include Applied Geotechnology Inc.'s (AGI) quality assurance reports.

PRODUCT REMOVAL SYSTEM OPERATION

The product removal system has been in continuous operation since March 16, 1992. Approximately 550 gallons of product have been removed as of April 7, 1992. Product thickness measurements collected from the recovery sumps currently in use and from RS-2, are shown on Table 4.

Approximately 102,000 gallons of groundwater recovered with product have been treated and reintroduced into the diesel and unleaded tank excavation. Laboratory results of bioreactor effluent and carbon filter effluent samples are shown on Table 2.

The flow rate into the bioreactor is approximately 2.5 gallons per minute. The increased residence time of hydrocarbon contaminated groundwater in the contact tank has decreased concentrations of dissolved hydrocarbons in bioreactor effluent. Concentrations of benzene, ethylbenzene, toluene, and xylenes in carbon filter effluent were below Washington State Method A

P.O. Box 3885 Bellevue, WA 98009 FAX 206/646-9523 Telephone 206/453-8383

(routine site) groundwater cleanup levels, as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code (WAC) 173-340. Total petroleum hydrocarbon (TPH) concentrations were present at 2.0 milligrams per liter (mg/L), slightly above the cleanup level of 1 mg/L. A new carbon filter has been installed to reduce concentrations of dissolved petroleum hydrocarbons in effluent.

If you have any questions or comments, please give me a call.

Sincerely,

APPLIED GEOTECHNOLOGY INC.

Peter P. Barry
Hydrogeologist

Gary L. Laakso
Remediation Services Manager

PPB/GLL/jlh

attachments

cc: Ms. Susan Burgdorff; Washington State Department of Ecology

Table 1
Summary of Soil and Water Chemical Analyses Schedule
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods				WTPH 418.1 MOD.
			8020 BETX	8015M TPH	7240 Lead	8240 VOCs	
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	Y	Y	N	Y	N
S2	E.WALL, EXCAV.1 @9'	03/11/92	Y	Y	N	N	N
S3	N.WALL, EXCAV.1 @8'	03/11/92	N	Y	N	Y	N
S4	W.WALL, EXCAV.1 @8'	03/11/92	Y	Y	N	N	N
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	Y	Y	Y	N	N
S6	W.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S7	N.WALL, EXCAV.2 @8'	03/12/92	Y	Y	Y	N	N
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	Y	Y	Y	N	N
S9	EXC.2, W. PIPING @ 3'	03/12/92	Y	Y	N	N	N
S10	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S11	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S12	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S13	PIPING TRENCH @ 3'	03/13/92	Y	Y	N	N	N
S14	PIPING TRENCH @ 4'	03/13/92	Y	Y	N	N	N
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	N	Y	N	N	Y
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	N	Y	N	N	Y
S17	PIPING TRENCH @ 2'	03/17/92	Y	Y	N	N	N
S18	DISPEN. ISL.1 @ 2'	03/13/92	Y	Y	N	N	N
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	Y	Y	N	N	N
S20	DISPEN. ISL.3 @ 5'	03/16/92	Y	Y	Y	N	N
S21	DISPEN. ISL.4 @ 5'	03/16/92	Y	Y	N	N	N
S22	DISPEN. ISL.5 @ 5'	03/16/92	Y	Y	N	N	N
S23	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S24	PIPING TRENCH @ 5'	03/16/92	Y	Y	N	N	N
S26	PIPING TRENCH @ 3'	03/17/92	Y	Y	Y	N	N
S27	DISPEN. ISL.7 @ 3'	03/17/92	Y	Y	Y	N	N
S28	DISPEN. ISL.6 @ 3'	03/17/92	Y	Y	Y	N	N
S29	SOIL STOCKPILE	03/18/92	Y	Y	N	N	N

Notes:

Analysis requested: Y=Yes, N=No
BETX – Benzene, ethylbenzene, toluene, and xylenes.
TPH – Total petroluem hydrocarbons.
VOC – Volatile organic compounds including vinyl acetate.

Table 1
Summary of Soil and Water Chemical Analyses Schedule
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Method 8020 BETX	WTPH–G
W–1	Puget Power Service Center	03/26/92	Y	Y
W–2	House Adjacent to South	03/26/92	Y	N
W–3	House Adjacent to East	03/26/92	Y	N
W–4	Thorp Antique Mall	03/26/92	Y	Y
W–5	Pond Adjacent to East	03/26/92	Y	N
W–6	Swampy Area Adjacent to South	03/26/92	Y	Y
Sample ID	**Sample Location**	**Sample Date**	**EPA Method 8020 BETX**	**WTPH–D**
Degassing Tank	Bioreactor Effluent	04/07/92	Y	Y
Carbon Effluent	Carbon Filter Effluent	04/07/92	Y	Y
Bioreactor Effluent	Bioreactor Effluent	04/01/92	Y	Y
Carbon Filter Effluent	Carbon Filter Effluent	04/01/92	Y	Y
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92	Y	Y
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92	Y	Y
Degassing Tank	Bioreactor Effluent	03/16/92	Y	N
Carbon Effluent	Carbon Filter Effluent	03/16/92	Y	N

Notes:

Analysis requested: Y=Yes, N=No
BETX – Benzene, ethylbenzene, toluene, and xylenes.
TPH – Total petroleum hydrocarbons.

Table 2
Summary of Soil and Water Chemical Analyses
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods: BETX – 8020 Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)	TPH – 8015M Gasoline (mg/kg)	Diesel (mg/kg)	WTPH 418.1M (mk/kg)	EPA 7240 Lead (mg/kg)
S1	S.WALL, EXCAV.1 @ 8'	03/11/92	0.032	0.28	0.13	2.8	930	12,000	NA	
S2	E.WALL, EXCAV.1 @9'	03/11/92	0.22	1.9	2.1	10	1,200	8,700	NA	
S3	N.WALL, EXCAV.1 @8'	03/11/92	NA	NA	NA	NA	1,600	10,000	NA	
S4	W.WALL, EXCAV.1 @8'	03/11/92	<0.028	0.23	<0.028	2.2	140	540	NA	
S5	S.WALL, EXCAV.2 @7.5'	03/12/92	<0.030	<0.030	<0.030	<0.030	<5	<25	NA	<5.8
S6	W.WALL, EXCAV.2 @8'	03/12/92	<0.029	0.10	<0.029	0.034	20	32	NA	<5.6
S7	N.WALL, EXCAV.2 @8'	03/12/92	26	61	210	470	2,500	420	NA	<5.6
S8	E.WALL, EXCAV.2 @ 8'	03/12/92	92	300	1,000	1,800	10,000	600	NA	<5.4
S9	EXC.2, W. PIPING @ 3'	03/12/92	<0.028	<0.028	<0.028	<0.028	7	<25	NA	
S10	PIPING TRENCH @ 4'	03/13/92	21	69	200	410	1,000	100	NA	
S11	PIPING TRENCH @ 3'	03/13/92	<0.032	0.40	0.056	2.6	240	2,000	NA	
S12	PIPING TRENCH @ 3'	03/13/92	<0.031	<0.031	<0.031	<0.031	<5	<25	NA	
S13	PIPING TRENCH @ 3'	03/13/92	<0.035	<0.035	<0.035	<0.035	<5	<25	NA	
S14	PIPING TRENCH @ 4'	03/13/92	<0.030	<0.030	<0.030	<0.030	7	350	NA	
S15	E.WALL, EXCAV.3 @ 7'	03/13/92	NA	NA	NA	NA	<5	<25	22	
S16	S.WALL, EXCAV.3 @ 8'	03/13/92	NA	NA	NA	NA	<5	<25	<20	
S17	PIPING TRENCH @ 2'	03/17/92	0.037	<0.028	0.066	0.039	<5	<25	NA	
S18	DISPEN. ISL.1 @ 2'	03/13/92	<0.027	<0.027	0.032	0.029	<25	2,100	NA	
S19	DISPEN. ISL.2 @ 2.5'	03/13/92	<0.030	0.070	<0.030	0.61	430	18,000	NA	
S20	DISPEN. ISL.3 @ 5'	03/16/92	0.039	1.4	0.48	7.9	280	2,200	NA	
S21	DISPEN. ISL.4 @ 5'	03/16/92	0.67	1.8	0.80	9.0	2,500	21,000	NA	
S22	DISPEN. ISL.5 @ 5'	03/16/92	0.59	1.1	0.91	6.1	740	9,100	NA	
S23	PIPING TRENCH @ 5'	03/16/92	<0.028	0.81	0.080	6.1	980	3,100	NA	
S24	PIPING TRENCH @ 5'	03/16/92	<0.028	<0.028	<0.028	<0.028	<5	87	NA	
S26	PIPING TRENCH @ 3'	03/17/92	0.44	3.6	5.6	25	300	72	NA	
S27	DISPEN. ISL.7 @ 3'	03/17/92	6.5	44	130	330	1,100	160	NA	
S28	DISPEN. ISL.6 @ 3'	03/17/92	10	19	69	170	1,600	300	NA	
S29	SOIL STOCKPILE	03/18/92	<0.028	<0.028	<0.028	<0.028	10	210	NA	
State Soil Cleanup Levels[a]			0.500	20.0	40.0	20.0	100	200	200	250

Notes:
a) Method A suggested cleanup level for residential soil promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act Cleanup Regulation.
mg/kg – Milligrams per kilogram is equivalent to parts per million (ppm).
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
Shaded values exceed Washington State Method A soil cleanup levels.

Table 2
Summary of Soil and Water Chemical Analyses
Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods BETX – 8020 Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Total Xylenes (ug/L)	WTPH Gasoline (mg/L)	Diesel (mg/L)
W–1	Puget Power Service Center	03/26/92	ND	ND	ND	ND	ND	NA
W–2	House Adjacent to South	03/26/92	ND	ND	ND	ND	ND	NA
W–3	House Adjacent to East	03/26/92	ND	ND	ND	ND	ND	NA
W–4	Thorp Antique Mall	03/26/92	ND	ND	ND	ND	ND	NA
W–5	Pond Adjacent to East	03/26/92	ND	ND	ND	ND	ND	NA
W–6	Swampy Area Adjacent to South	03/26/92	ND	ND	0.99	ND	ND	NA
Degassing Tank	Bioreactor Effluent	04/07/92					NA	
Carbon Effluent	Carbon Filter Effluent	04/07/92					NA	
Bioreactor Effluent	Bioreactor Effluent	04/01/92	91	6.2	110	100	NA	5.4
Carbon Filter Effluent	Carbon Filter Effluent	04/01/92	1.5	ND	1.9	1.8	NA	2.0
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92	100	11	180	200	NA	19
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92	13	ND	10	56	NA	12
Degassing Tank	Bioreactor Effluent	03/16/92	1,100	140	1,900	1,100	NA	NA
Carbon Effluent	Carbon Filter Effluent	03/16/92	0.8	ND	1.3	ND	NA	NA
Laboratory Detection Limit			0.5	0.5	0.5	0.5	0.1	0.5
State Groundwater Cleanup Levels [a]			5	30	40	20	1.0	1.0

Notes:
a) Method A suggested cleanup level for groundwater promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act Cleanup Regulation.
mg/L – Milligrams per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
ug/L – Micrograms per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
ND – Not detected.
Shaded values exceed Washington State Method A groundwater cleanup levels.

Table 3
Volatile Organic Compounds – Soil
Quantified by EPA Method 8240
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Compounds	S1 S. Wall Ex. 1 @ 8' (mg/kg)	S3 S. Wall Ex. 1 @ 8' (mg/kg)
Benzene	<0.062	<0.59
Chlorobenzene	<0.062	<0.59
Ethylbenzene	<0.062	<0.59
Styrene	<0.062	<0.59
Toluene	<0.062	<0.59
Total Xylenes	1.4	9.6
Acetone	<1.2	<12
Bromodichloromethane	<0.062	<0.59
Bromoform	<0.31	<2.9
Bromomethane	<0.62	<5.9
2–Butanone (MEK)	<0.62	<5.9
Carbon Disulfide	<0.062	<0.59
Carbon Tetrachloride	<0.062	<0.59
Chloroethane	<0.062	<0.59
Chloroform	<0.062	<0.59
Chloromethane	<0.62	<5.9
Dibromochloromethane	<0.062	<0.59
1,1–Dichloroethane	<0.062	<0.59
1,2–Dichloroethane	<0.062	<0.59
1,1–Dichloroethene	<0.062	<0.59
trans–1,2–Dichloroethene	<0.062	<0.59
1,2–Dichloropropane	<0.062	<0.59
trans–1,3–Dichloropropene	<0.062	<0.59
cis–1,3–Dichloropropene	<0.062	<0.59
2–Hexanone (MBK)	<0.62	<5.9
Methylene Chloride	0.56 B	<2.9
4–Methyl–2–Pentanone (MIBK)	<0.62	<5.9
1,1,2,2–Tetrachloroethane	<0.62	<0.59
Tetrachloroethene	<0.62	<0.59
1,1,1–Trichloroethane	<0.62	<0.59
1,1,2–Trichloroethane	<0.62	<0.59
Trichloroethene	<0.62	<0.59
Vinyl Acetate	<0.62	<5.9
Vinyl Chloride	<0.62	<0.59

Notes:

B – Compound also detected in Reagent Blank.
mg/kg – Milligrams per kilogram is equivalent to parts per million (ppm).

Table 4
Summary of Water and Product Level Measurements
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Location	Date Sampled	Depth to Product	Depth to Water	Product Thickness	Reference Elevation	Notes
RS–1	03/09/92	11.05	11.39	0.34	105.89	Not pumping.
	03/12/92	11.47	11.57	0.10	105.89	Not pumping.
	03/17/92	10.56	10.61	0.05	105.89	
	03/26/92	10.77	10.80	0.03	105.89	
	04/01/92	10.63	10.68	0.05	105.89	
RS–2	03/09/92	9.71	9.91	0.20	99.37	Not pumping.
	03/12/92	9.81	10.03	0.22	99.37	Not pumping.
	03/17/92	11.03	11.20	0.17	99.37	
	03/26/92	10.08	10.09	0.01	99.37	
	04/01/92		10.87	0.00	99.37	
RS–3	03/09/92	11.59	11.64	0.05	104.51	Not pumping.
	03/12/92	11.80	11.85	0.05	104.51	Not pumping.
	03/17/92		12.36	0.00	104.51	
	03/26/92		12.39	0.00	104.51	
	04/01/92	12.59	12.62	0.03	104.51	
RS–4	03/17/92	12.72	12.79	0.07	103.75	Not pumping.
	03/26/92	11.84	12.08	0.24	103.75	Not pumping.
	04/01/92	12.21	12.48	0.27	103.75	Not pumping.

Reference Elevation Datum: Assumed 100.00' at nail 1' from above base of Telephone Pole, 50' from RS–3.

Applied Geotechnology Inc.

April 20, 1992

15,659.001

Mr. Kirk French
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

Dear Mr. French:

Weekly Project Update No. 6
Emergency Remedial Action
Bingo Fuel Stop
Thorp, Washington

This letter presents an update on activities performed at the above-referenced site during the week of April 11 through April 17, 1992. This work is being performed under Washington Department of Ecology Enforcement Order No. DE 92TC-C109; as described in our Emergency Remedial Action Plan dated March 5, 1992; and as revised in our March 9, 1992 letter.

PRODUCT REMOVAL SYSTEM OPERATION

The product removal system has been in continuous operation since March 16, 1992. Approximately 625 gallons of product were removed as of April 14, 1992. Water and product level measurements collected from the recovery sumps are shown on Table 1, and locations of sumps are shown on the Site Plan, Figure 1.

Approximately 117,000 gallons of groundwater recovered with product have been treated and reintroduced into the diesel and unleaded tank excavation. Laboratory results of bioreactor effluent and carbon filter effluent samples are shown on Table 2.

Currently the flow rate into the bioreactor is approximately 2.5 gallons per minute (gpm). The flow rate has been decreased from approximately 4 gpm to increase the residence time of petroleum hydrocarbon-contaminated groundwater in the bioreactor. The increased residence time has decreased concentrations of dissolved hydrocarbons in bioreactor effluent. Concentrations of ethylbenzene, toluene, and xylenes in carbon filter effluent were below Washington State Method A (routine site) groundwater cleanup levels, as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code (WAC) 173-340. Total petroleum hydrocarbon (TPH) concentrations were detected at a concentration of 7.6 milligrams per liter (mg/L) and benzene was detected at 13 ug/L.

P.O. Box 3885 Bellevue, WA 98009 FAX 206/646-9523 Telephone 206/453-8383

Concentrations of dissolved hydrocarbons in the carbon filter effluent are likely elevated as a result of less than maximum adsorption efficiency during filter startup and several hours of bioreactor down time during carbon filter replacement. The combination of extended residence time and a replacement carbon filter will likely reduce petroleum hydrocarbon concentrations in effluent to groundwater cleanup levels, as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code 173-340.

A thin layer of product remains on water in the diesel and unleaded UST excavation. The product layer will be removed next week using a containment boom to constrict the surface area of the product and recovery pumps to transfer product to the oil/water separator.

If you have any questions or comments, please give me a call.

Sincerely,

APPLIED GEOTECHNOLOGY INC.

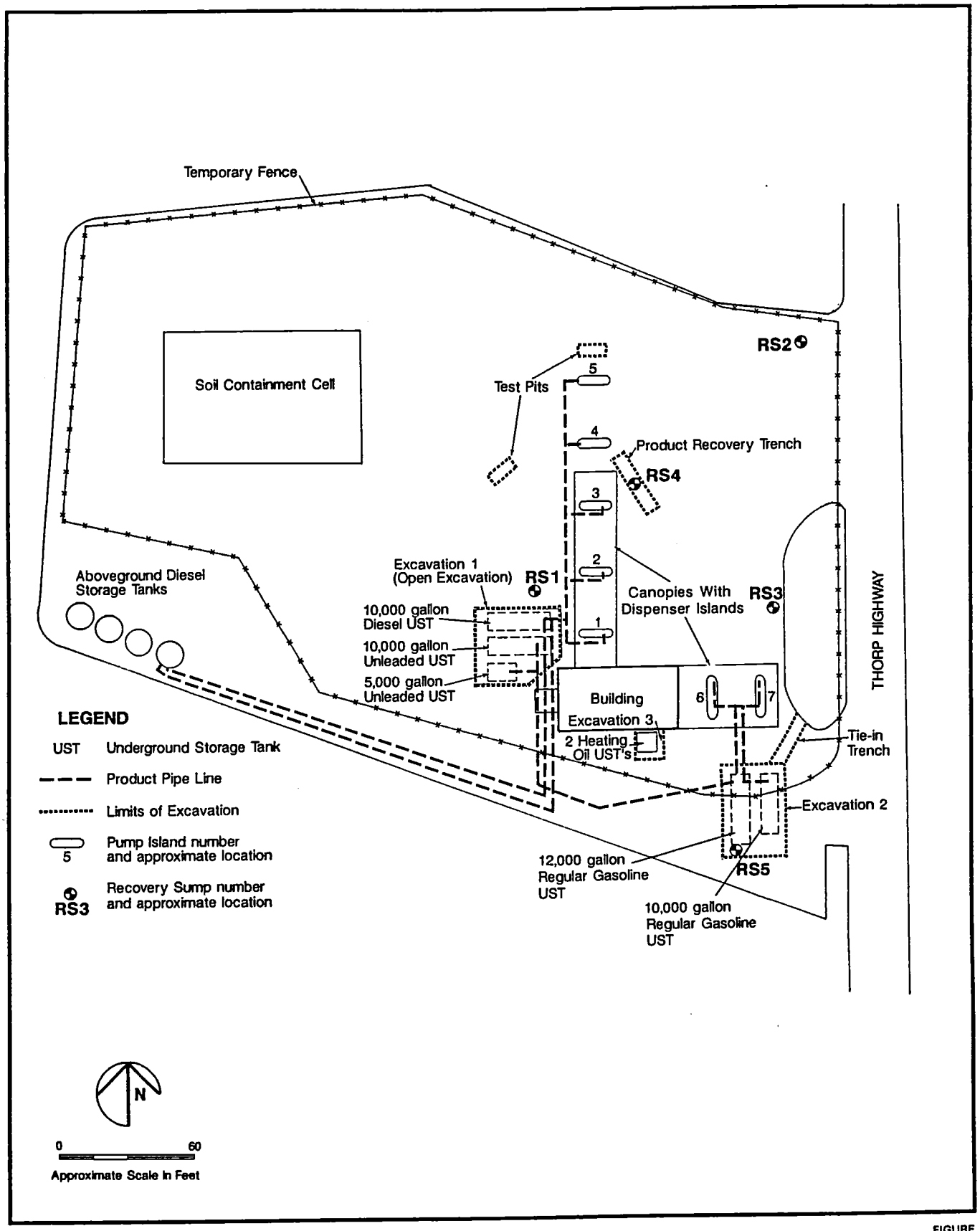
Peter P. Barry
Hydrogeologist

Gary Laakso
Remediation Services Manager

PPB/GLL/tag

attachments

cc: Ms. Susan Burgdorff; Washington State Department of Ecology



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Site Plan

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
1

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	DFF	PPB	3 Mar 92	KM	

Table 1
Summary of Water and Product Level Measurements
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Location	Date Sampled	Depth to Product	Depth to Water	Product Thickness	Reference Elevation	Notes
RS-1	03/09/92	11.05	11.39	0.34	105.89	Not pumping.
	03/12/92	11.47	11.57	0.10	105.89	Not pumping.
	03/17/92	10.56	10.61	0.05	105.89	
	03/26/92	10.77	10.80	0.03	105.89	
	04/01/92	10.63	10.68	0.05	105.89	
	04/07/92	11.04	11.05	0.01	105.89	
	04/14/92	11.10	11.15	0.05	105.89	
RS-2	03/09/92	9.71	9.91	0.20	99.37	Not pumping.
	03/12/92	9.81	10.03	0.22	99.37	Not pumping.
	03/17/92	11.03	11.20	0.17	99.37	
	03/26/92	10.08	10.09	0.01	99.37	
	04/01/92		10.87	0.00	99.37	
	04/07/92		10.35	0.00	99.37	Not pumping.
	04/14/92		10.16	0.00	99.37	Not pumping.
RS-3	03/09/92	11.59	11.64	0.05	104.51	Not pumping.
	03/12/92	11.80	11.85	0.05	104.51	Not pumping.
	03/17/92		12.36	0.00	104.51	
	03/26/92		12.39	0.00	104.51	
	04/01/92	12.59	12.62	0.03	104.51	
	04/07/92	12.61	12.66	0.05	104.51	
	04/14/92	12.09	12.13	0.04	104.51	
RS-4	03/17/92	12.72	12.79	0.07	103.75	Not pumping.
	03/26/92	11.84	12.08	0.24	103.75	Not pumping.
	04/01/92	12.21	12.48	0.27	103.75	Not pumping.
	04/07/92	12.59	12.79	0.20	103.75	
	04/14/92	13.49	13.50	0.01	103.75	

Reference Elevation Datum: Assumed 100.00' at nail 1' from above base of Telephone Pole, 50' from RS-3.

Table 2
Summary of Water Chemical Analyses
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods BETX – 8020 Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Total Xylenes (ug/L)	WTPH Gasoline (mg/L)	Diesel (mg/L)
Degassing Tank	Bioreactor Effluent	03/16/92	1,100	140	1,900	1,100	NA	NA
Carbon Effluent	Carbon Filter Effluent	03/16/92	0.8	ND	1.3	ND	NA	NA
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92	100	11	180	200	NA	19
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92	13	ND	10	56	NA	12
Bioreactor Effluent	Bioreactor Effluent	04/01/92	91	6.2	110	100	NA	5.4
Carbon Filter Effluent	Carbon Filter Effluent	04/01/92	1.5	ND	1.9	1.8	NA	2.0
Degassing Tank	Bioreactor Effluent	04/07/92	190	11	220	180	NA	18
Carbon Effluent	Carbon Filter Effluent	04/07/92	13	0.9	15	13	NA	7.6
Degassing Tank	Bioreactor Effluent	04/14/92						
Carbon Effluent	Carbon Filter Effluent	04/14/92						
Laboratory Detection Limit			0.5	0.5	0.5	0.5	0.1	0.5
State Groundwater Cleanup Levels [a]			5	30	40	20	1.0	1.0

Notes:
a) Method A suggested cleanup level for groundwater promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act (MTCA) Cleanup Regulation.
mg/L – Milligrams per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
ug/L – Micrograms per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
ND – Not detected.
Shaded values exceed Washington State Method A groundwater cleanup levels.

Applied Geotechnology Inc.

April 27, 1992

15,659.001

Mr. Kirk French
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

Dear Mr. French:

Weekly Project Update No. 7
Emergency Remedial Action
Bingo Fuel Stop
Thorp, Washington

This letter presents an update on activities performed at the above-referenced site during the week of April 18 through April 24, 1992. This work is being performed under Washington Department of Ecology Enforcement Order No. DE 92TC-C109, and as described in our Emergency Remedial Action Plan dated March 5, 1992, as revised in our March 9, 1992 letter.

PRODUCT REMOVAL SYSTEM OPERATION

The product removal system has been in continuous operation since March 16, 1992. Approximately 725 gallons of product had been removed as of April 21, 1992. Water and product level measurements collected from the recovery sumps are shown on Table 1, and locations of sumps are shown on the Site Plan, Figure 1.

Approximately 132,000 gallons of groundwater recovered with product have been treated and reintroduced into the diesel and unleaded tank excavation. Laboratory results of bioreactor effluent and carbon filter effluent samples are shown on Table 2.

Currently the flow rate into the bioreactor is approximately 2.5 gallons per minute (gpm). The flow rate has been decreased from approximately 4 gpm to increase the residence time of petroleum hydrocarbon contaminated groundwater in the bioreactor. Concentrations of ethylbenzene and toluene in carbon filter effluent sampled on April 14, 1992 were below Washington State Method A (routine site) groundwater cleanup levels, as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code (WAC) 173-340. Concentrations of benzene, ethylbenzene, toluene and xylenes in carbon filter effluent sampled on April 21, 1992 were below groundwater cleanup levels. Total petroleum hydrocarbon (TPH) concentrations were detected at a concentration of 40 milligrams per liter (mg/L), benzene at 13 micrograms per liter (ug/L), and total xylenes at 65 ug/L in the sample collected on April 14, 1992; and TPH concentrations of 3.4 mg/L were detected in the sample collected on April 21, 1992. Concentrations of dissolved hydrocarbons in the carbon filter effluent are likely elevated as a result of adjustments made to

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the oil water separator immediately prior to sampling. The combination of extended residence time and a replacement carbon filter will likely reduce petroleum hydrocarbon concentrations in effluent to groundwater cleanup levels. Additional residence capacity in the bioreactor may be necessary if petroleum hydrocarbon concentrations in effluent remain above cleanup levels.

A thin layer of product remains on water in the diesel and unleaded UST excavation. The product layer will be removed this week using a containment boom to constrict the surface area of the product, and recovery pumps to transfer product to the oil/water separator.

If you have any questions or comments, please give me a call.

Sincerely,

APPLIED GEOTECHNOLOGY INC

Peter P. Barry
Hydrogeologist

Gary Laakso
Remediation Services Manager

PPB/GLL/tag

attachments

cc: Ms. Susan Burgdorff; Washington State Department of Ecology

Table 1
Summary of Water and Product Level Measurements
Burns Bros./Bingo Fuel Stop
Thorp, Washington

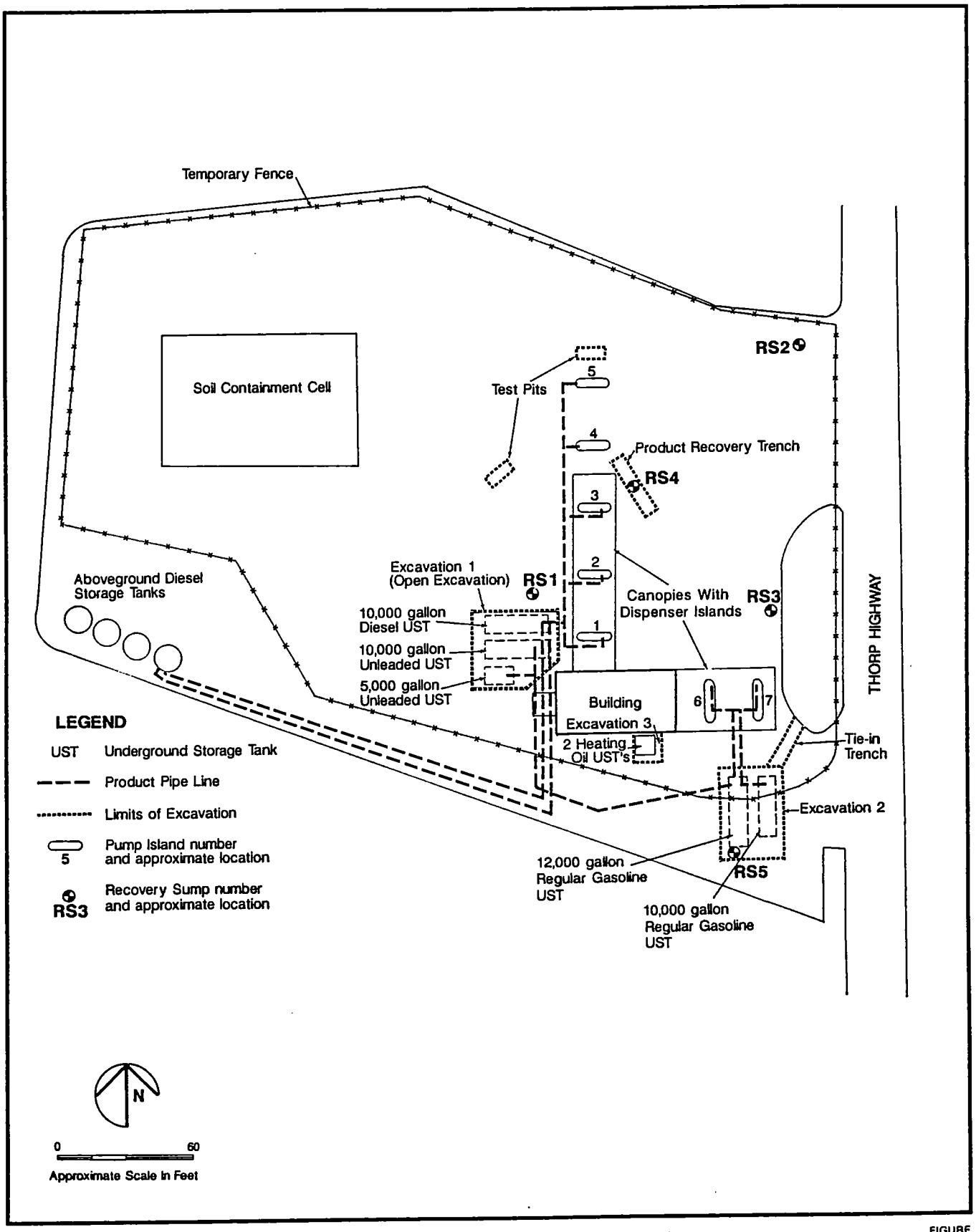
Location	Date Sampled	Depth to Product	Depth to Water	Product Thickness	Reference Elevation	Notes
RS–1	03/09/92	11.05	11.39	0.34	105.89	Not pumping.
	03/12/92	11.47	11.57	0.10	105.89	Not pumping.
	03/17/92	10.56	10.61	0.05	105.89	
	03/26/92	10.77	10.80	0.03	105.89	
	04/01/92	10.63	10.68	0.05	105.89	
	04/07/92	11.04	11.05	0.01	105.89	
	04/14/92	11.10	11.15	0.05	105.89	
	04/21/92	10.96	10.99	0.03	105.89	
RS–2	03/09/92	9.71	9.91	0.20	99.37	Not pumping.
	03/12/92	9.81	10.03	0.22	99.37	Not pumping.
	03/17/92	11.03	11.20	0.17	99.37	
	03/26/92	10.08	10.09	0.01	99.37	
	04/01/92		10.87	0.00	99.37	
	04/07/92		10.35	0.00	99.37	Not pumping.
	04/14/92		10.16	0.00	99.37	Not pumping.
	04/21/92		9.64	0.00	99.37	Not pumping.
RS–3	03/09/92	11.59	11.64	0.05	104.51	Not pumping.
	03/12/92	11.80	11.85	0.05	104.51	Not pumping.
	03/17/92		12.36	0.00	104.51	
	03/26/92		12.39	0.00	104.51	
	04/01/92	12.59	12.62	0.03	104.51	
	04/07/92	12.61	12.66	0.05	104.51	
	04/14/92	12.09	12.13	0.04	104.51	
	04/21/92	10.91	10.94	0.03	104.51	
RS–4	03/17/92	12.72	12.79	0.07	103.75	Not pumping.
	03/26/92	11.84	12.08	0.24	103.75	Not pumping.
	04/01/92	12.21	12.48	0.27	103.75	Not pumping.
	04/07/92	12.59	12.79	0.20	103.75	
	04/14/92	13.49	13.50	0.01	103.75	
	04/21/92	11.64	11.68	0.04	103.75	

Reference Elevation Datum: Assumed 100.00' at nail 1' from above base of Telephone Pole, 50' from RS–3.

Table 2
Summary of Water Chemical Analyses
Burns Bros./Bingo Fuel Stop
Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods BETX – 8020 Benzene (ug/L)	Ethylbenzene (ug/L)	Toluene (ug/L)	Total Xylenes (ug/L)	WTPH Diesel (mg/L)
Degassing Tank	Bioreactor Effluent	03/16/92	1,100	140	1,900	1,100	NA
Carbon Effluent	Carbon Filter Effluent	03/16/92	0.8	ND	1.3	ND	NA
Bioreactor Tank Effluent	Bioreactor Effluent	03/26/92	100	11	180	200	19
Carbon Tank Effluent	Carbon Filter Effluent	03/26/92	13	ND	10	56	12
Bioreactor Effluent	Bioreactor Effluent	04/01/92	91	6.2	110	100	5.4
Carbon Filter Effluent	Carbon Filter Effluent	04/01/92	1.5	ND	1.9	1.8	2.0
Degassing Tank	Bioreactor Effluent	04/07/92	190	11	220	180	18
Carbon Effluent	Carbon Filter Effluent	04/07/92	13	0.9	15	13	7.6
Degassing Tank	Bioreactor Effluent	04/14/92	41	2.4	67	130	56
Carbon Effluent	Carbon Filter Effluent	04/14/92	19	1.1	29	65	40
Degassing Tank	Bioreactor Effluent	04/21/92	ND	ND	ND	ND	10
Carbon Effluent	Carbon Filter Effluent	04/21/92	1.5	ND	1.2	5.1	3.4
Laboratory Detection Limit			0.5	0.5	0.5	0.5	0.5
State Groundwater Cleanup Levels [a]			5	30	40	20	1.0

Notes:
a) Method A suggested cleanup level for groundwater promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act (MTCA) Cleanup Regulation.
mg/L – Milligrams per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
ug/L – Micrograms per liter is equivalent to parts per million (ppm) at Standard Temperature and Pressure.
TPH – Total petroluem hydrocarbons.
NA – Not analyzed.
ND – Not detected.
Shaded values exceed Washington State Method A groundwater cleanup levels.



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Site Plan

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
1

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	DFF	PPB	3 Mar 92	KM	

Applied Geotechnology Inc.

May 5, 1992

15,659.001

Mr. Kirk French
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

Dear Mr. French:

Weekly Project Update No. 8
Emergency Remedial Action
Bingo Fuel Stop
Thorp, Washington

This letter presents an update on activities performed at the above-referenced site during the week of April 24 through May 1, 1992. This work is being performed under Washington Department of Ecology Enforcement Order No. DE 92TC-C109, and as described in our Emergency Remedial Action Plan dated March 5, 1992, as revised in our March 9, 1992 letter. A review of Project Updates 1 through 7 will give a complete description of activities performed during the Emergency Remedial Action.

PRODUCT REMOVAL SYSTEM OPERATION

The product removal system has been in continuous operation since March 16, 1992. Approximately 750 gallons of product had been removed as of April 21, 1992. Water and product level measurements collected from the recovery sumps are shown on Table 1, and locations of sumps are shown on the Site Plan, Figure 1.

Approximately 150,000 gallons of groundwater recovered with product have been treated and reintroduced into the diesel and unleaded tank excavation. Laboratory results of bioreactor effluent and carbon filter effluent samples are shown on Table 2.

Concentrations of ethylbenzene and toluene in carbon filter effluent sampled on April 28, 1992 were below Washington State Method A (routine site) groundwater cleanup levels, as defined by the Model Toxics Control Act, promulgated by Washington Administrative Code (WAC) 173-340. Total petroleum hydrocarbon (TPH) concentrations were detected at a concentration of 23 milligrams per liter (mg/L), benzene at 9.5 micrograms per liter (ug/L), and total xylenes at 30 ug/L.

Fixed media will be installed in the bioreactor this week to provide a substrate for microbiological growth. The media will retain a larger microbial population, enabling more thorough biodegradation of petroleum hydrocarbon compounds.

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CONCLUSION OF EMERGENCY REMEDIAL ACTION

Free product recovery operations are complete to the extent practicable using the existing recovery sumps. Product has not been present in RS-2 since April 1, 1992. Product has not been present in RS-1 since April 28, 1992, and remaining product thicknesses in RS-3 and RS-4 are 0.01 and 0.02 foot, respectively. Product recovery operations are expected to continue to remove residual product entering the recovery sumps.

Emergency action items listed in the Enforcement Order have been completed, with the exception of the Emergency Action Report. We anticipate the report will be prepared within three weeks, completing all requirements of the Enforcement Order. This is the final Project Update issued during the Emergency Remedial Action. Additional information and results of laboratory analyses will be conveyed to you verbally, and will be included in the Emergency Remedial Action Report.

If you have any questions or comments, please give me a call.

Sincerely,

APPLIED GEOTECHNOLOGY INC.

Peter P. Barry
Hydrogeologist

Gary L. Laakso
Remediation Services Manager

PPB/GLL/jlh

attachments

cc: Ms. Susan Burgdorff; Washington State Department of Ecology

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	04/21/92	10.96	10.99	0.03	105.89	
	04/28/92		8.23	0.00	105.89	
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Thorp, Washington

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Degassing Tank	Bioreactor Effluent	04/21/92	ND	ND	ND	ND	10
Carbon Effluent	Carbon Filter Effluent	04/21/92	1.5	ND	1.2	5.1	3.4
Bioreactor Effluent	Bioreactor Effluent	04/28/92	120	19	150	220	5.1
Carbon Filter Effluent	Carbon Filter Effluent	04/28/92	9.5	1.5	11	30	23
Laboratory Detection Limit			0.5	0.5	0.5	0.5	0.5
State Groundwater Cleanup Levels [a]			5	30	40	20	1.0

Notes:
a) Method A suggested cleanup level for groundwater promulgated under Chapter 173–340 WAC, State of Washington Model Toxics Control Act (MTCA) Cleanup Regulation.
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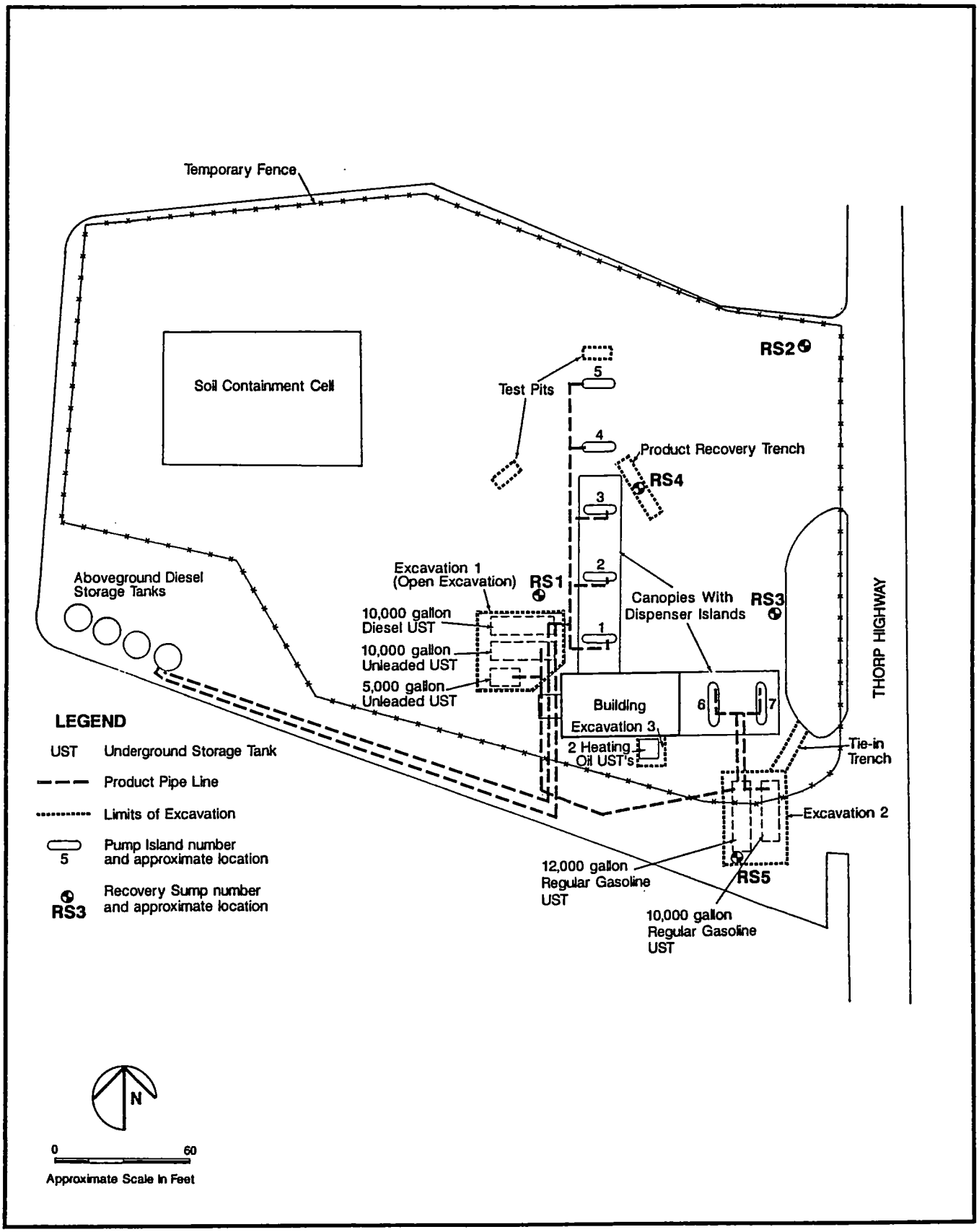

Applied Geotechnology Inc.
Geotechnical Engineering
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Site Plan

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE
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