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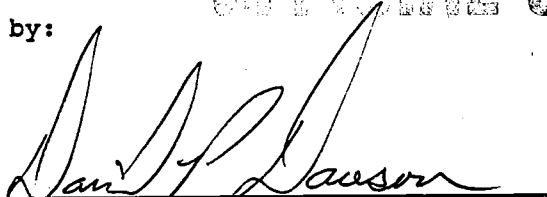
Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214

VOLUME I
REMEDIAL INVESTIGATION REPORT
BINGO FUEL STOP
THORP, WASHINGTON

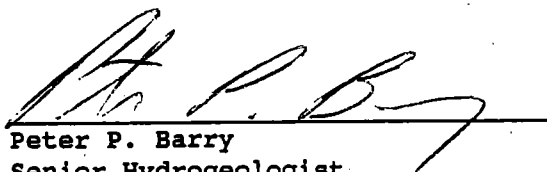
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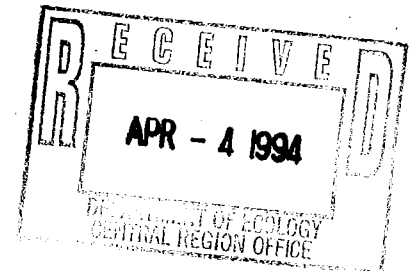
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TABLE OF CONTENTS

VOLUME I

ACRONYMS AND ABBREVIATIONS	viii
EXECUTIVE SUMMARY	x
1.0 INTRODUCTION	1
1.1 General	1
1.2 Report Organization	2
1.3 Previous Work	2
1.4 The Regulated Cleanup Process	2
1.5 Purpose, Scope, and Authorization	4
2.0 SITE FEATURES AND HISTORY	5
2.1 Site and Surrounding Area Description	5
2.2 Site Facilities and Utilities	6
2.3 Regional and Site History	6
2.4 Demography and Land Use	7
3.0 FIELD INVESTIGATION	9
3.1 General	9
3.2 Surface Water and Sediments	9
3.3 Soils	9
3.4 Groundwater	10
3.5 Aquifer Testing	11
4.0 GEOLOGY	13
4.1 Regional Topography and Geology	13
4.2 Site Geology	13
4.3 Soil Classification and Physical Properties Testing	14
5.0 HYDROLOGY	16
5.1 Nearby Surface Water Bodies	16
5.2 Regional Hydrogeology and Groundwater Use	17
5.3 Site Hydrogeology	17
5.4 Groundwater Recharge and Discharge	19

TABLE OF CONTENTS

6.0	CONTAMINANT DISTRIBUTION AND MIGRATION	20
6.1	General	20
6.2	Soil	20
6.3	Groundwater	22
6.4	Surface Water	24
6.5	Sediment	24
6.6	Contaminant Sources and Migration	24
7.0	DEVELOPMENT OF DRAFT CLEANUP LEVELS	27
7.1	Introduction	27
7.2	Cleanup Level Development	27
7.3	Cleanup Level Considerations	28
7.4	Estimating Risk-Based Concentrations	31
7.5	Summary of Draft Groundwater Cleanup Levels	32
7.6	Summary of Draft Soil Cleanup Levels	34
7.7	Draft Groundwater and Soil Cleanup Levels	36
7.8	Draft Cleanup Level Exceedances	36
8.0	USE OF THIS REPORT	38
9.0	REFERENCES	39
	DISTRIBUTION	42

TABLES

FIGURES

APPENDICES

- Appendix A: Water Well Reports
- Appendix B: Field Investigation Procedures
- Appendix C: Boring Logs and Well Construction Summaries
- Appendix D: Physical Properties Analyses

VOLUME II: Laboratory Reports and Quality Assurance Reports

LIST OF TABLES

Table 2-1	Nearby Domestic Well Information
Table 2-2	Underground Storage Tank Specifications
Table 3-1	Well Construction Summary
Table 4-1	Physical Properties - Soil
Table 5-1	Mean Monthly Climatological Data, 1988 - 1992
Table 5-2	Groundwater Elevation Data
Table 5-3	Aquifer Test Results
Table 6-1	Chemical Analysis Schedule - Soil
Table 6-2	Hydrocarbons and Lead Detected in Soil
Table 6-3	Polycyclic Aromatic Hydrocarbon Results for Soil
Table 6-4	Groundwater Sample Collection and Field Parameter Data
Table 6-5	Chemical Analysis Schedule - Groundwater
Table 6-6	Hydrocarbons, Lead, and Nitrate/Nitrite Detected in Groundwater
Table 6-7	Polycyclic Aromatic Hydrocarbon Results for Groundwater
Table 6-8	Chemical Analysis Schedule - Surface Water/Sediment
Table 6-9	Analytical Results for Surface Water and Sediment
Table 7-1	Chemicals of Concern
Table 7-2	Toxicological Parameters for Chemicals of Concern
Table 7-3	Groundwater and Surface Water ARARs for Chemicals of Concern
Table 7-4	Groundwater and Surface Water Risk-Based Concentrations
Table 7-5	Draft Groundwater Cleanup Level Summary
Table 7-6	Draft Soil Cleanup Level Summary
Table 7-7	Draft Cleanup Levels for Soil and Groundwater

LIST OF TABLES

Table 7-8	Summary of Draft Chemical Exceedances - Soil
Table 7-9	Summary of Draft Chemical Exceedances - Groundwater
Table 7-10	Summary of Method A TPH Exceedances in Soil
Table 7-11	Summary of Method A TPH Exceedances in Groundwater

LIST OF ILLUSTRATIONS

Figure 1-1	Vicinity Map
Figure 2-1	Adjacent Land Use Area Map
Figure 2-2	Nearby Well Location Map
Figure 2-3	Site Conditions Map
Figure 3-1	UST Removal Area Soil Sampling Location Map
Figure 4-1	Cross Section Location Map
Figure 4-2	Cross Section - A to A'
Figure 4-3	Cross Sections - B to B' and C to C'
Figure 5-1	Surface Water Flow Diagram
Figure 5-2	Groundwater Contour Map - July 7, 1993
Figure 5-3	Groundwater Contour Map - November 5, 1993
Figure 5-4	Groundwater Hydrographs MW3 & MW4
Figure 6-1	RI Soil Sampling Location Map
Figure 6-2	Groundwater Sampling Location Map
Figure 6-3	Surface Water & Sediment Sample Location Map
Figure 6-4	Extent of Impacted Media
Figure 7-1	Soil Cleanup Level Exceedance Locations
Figure 7-2	Groundwater Cleanup Level Exceedance Location Map
Plate B1	Water Level Drawdown Test-MW3
Plate B2	Water Level Recovery Test-MW3
Plate B3	Water Level Drawdown Test-MW4
Plate B4	Water Level Recovery Test-MW4
Plate C1	Soil Classification/Legend
Plate C2	Description of Terms

LIST OF ILLUSTRATIONS
(continued)

Plate C3	Monitoring Well Construction for MW1, MW2, MW4, MW5, MW6 and MW11
Plate C4	Monitoring Well Construction for MW7, MW8, MW9, MW10 and MW12
Plate C5	Monitoring Well Construction for MW3 and P21
Plates C6 thru C19	Logs of Monitoring Wells
Plates D1 thru D4	Particle Size Analysis
Plate D5	Plasticity Chart

LIST OF ACRONYMS

AGI	Applied Geotechnology Inc.
ARAR	Applicable or Relevant and Appropriate Requirement
AST	above ground storage tank
ASTM	American Society of Testing and Materials
ATI	Analytical Technologies, Inc.
ATSDR	Agency for Toxic Substances and Disease Registry
BCF	bioconcentration factors
BETX	benzene, ethylbenzene, toluene, and total xylenes
bgs	below ground surface
CAP	Cleanup Action Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cm/sec	centimeter per second
COC	chemicals of concern
CPF	cancer potency factors
Ecology	Washington State Department of Ecology
gpm	gallons per minute
K	hydraulic conductivity
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
µg/L	micrograms per liter
MRL	method reporting limit
MTCA	Model Toxics Control Act
MW	monitoring well
NOAA	National Oceanic and Atmospheric Administration
PAH	polycyclic aromatic hydrocarbons

OVM	organic vapor meter
PID	photoionization detector
ppm	parts per million
PZ	piezometer
QC	quality control
RA	Emergency Remedial Actions
RfD	chronic reference doses
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RME	reasonable maximum exposure
S	Sample
SG	staff gauge
SR 90	State Route 90
TPH	total petroleum hydrocarbons
UST	underground storage tank
USEPA	United States Environmental Protection Agency
VOC	volatile organic compounds
WAC	Washington Administrative Code
WS	water sample

EXECUTIVE SUMMARY

This report presents the results of Applied Geotechnology Inc.'s (AGI) Remedial Investigation (RI) of the former Bingo Fuel Stop, located 1 mile southeast of the Town of Thorp in the Yakima River Valley in central Washington. The site is leased by and the facilities are owned by Burns Bros., Inc., and were used as an auto and truck fueling facility from approximately 1968 until January 1992.

The Washington State Department of Ecology (Ecology) conducted a site visit on February 7, 1992 and issued an enforcement order based on observations of hydrocarbon contamination and potential threats to human health and the environment. The Enforcement Order directed Emergency Remedial Actions (RA) to occur. AGI prepared and submitted an Emergency RA Work Plan, which was reviewed and approved by Ecology. Five USTs were excavated during the Emergency RA, and approximately 700 gallons of floating product were recovered from four recovery sumps. Results of the Emergency RA are described in our June 5, 1992 report.

Following completion of the Emergency RA, Ecology and Burns Bros., Inc. entered into an Agreed Order to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the site. This report summarizes activities performed during the RI portion of the Order. As part of this RI, AGI gathered data regarding site conditions, the distribution of petroleum hydrocarbons, and surrounding land use in order to evaluate the impact of petroleum hydrocarbon compounds on the environment.

Twelve soil borings were drilled on or near the site during June, July, and October 1993. Boring locations were selected on the basis of targeted areas of suspected soil and groundwater contamination. Borings were completed as groundwater monitoring wells.

Surface water was investigated in the irrigation canal near the northeast boundary of the site, the swampy area south of the site, and the pond east of the site. Areas studied outside the boundary of the site are referred to as the "study area" in this text.

Sediment samples were collected from areas potentially affected by runoff from the site, including directly downstream of the east end of the culvert under Thorp Highway, from the west end of the culvert (a surface soil sample, as no sediment was evident), and from the north side of the swampy area to the south.

Aquifer testing was performed to evaluate hydraulic characteristics of the site's water-bearing strata. Testing was conducted using step-drawdown and constant rate pumping and recovery test procedures. Two hydrostratigraphic zones were identified below the site: the Upper and Lower Zones. Groundwater flow is northeasterly. Local and regional hydrogeology suggest the overall northeasterly flow direction is consistent throughout the year. Overall aquifer permeability and associated hydraulic conductivity are considered to be moderate to low due to the silty nature of much of the sediments below the site.

Soil samples were collected during the Emergency RA in March 1992 and RI in July and October 1993. During the Emergency RA, a total of 28 soil samples were collected from the UST excavations, product piping trenches, and beneath the fuel dispenser islands. During the RI, 20 soil samples were collected from the 12 soil borings. Borings were then completed as groundwater monitoring wells MW1 through MW12. Soil samples were analyzed for total petroleum hydrocarbons (TPH) quantified as gasoline, diesel, and oil; benzene, ethylbenzene, toluene, and total xylenes (BETX); total lead; polycyclic aromatic hydrocarbons (PAHs); and volatile organic compounds (VOCs).

During the Emergency RA, four groundwater samples (W-1 through W-4) were collected from four drinking water wells located within a 1/4-mile radius of the site. During the RI, 14 groundwater samples were collected from 11 of the 12 monitoring wells. Free product was present in two of the monitoring wells during RI sampling.

Groundwater samples were analyzed for TPH quantified as gasoline and diesel, BETX, total lead, PAHs, pesticides, nitrate/nitrite, gasoline, and VOCs.

During the Emergency RA, two surface water samples were collected within a 1/4-mile radius of the site. One sample was collected from a pond east of the site and the other from the swampy area south of the site. Surface water samples were analyzed for BETX and TPH quantified as gasoline. The only analyte detected in either sample was toluene at a concentration of 0.99 micrograms per liter in the sample from the swampy area.

Two sediment samples were collected during the RI. One sample was collected from the east end of the north culvert; the other one was collected from the swampy area south of the site. Samples were analyzed for BETX and TPH quantified as diesel. Toluene was detected in the sample collected from the north culvert, and TPH quantified as diesel was detected in both samples.

During the RI, site-specific characteristics and conditions were evaluated, as well as chemical-specific toxicity, that influence risk. Site-specific characteristics include land and groundwater use, as well as factors affecting chemical movement (e.g., soil type, depth to groundwater).

Groundwater cleanup levels were based on protection of groundwater quality for use as drinking water.

Soil and groundwater contamination is mainly limited to TPH-related compounds: gasoline, diesel, BETX, and occasionally PAHs. The UST and dispenser island release appear to be primary sources of contamination.

The presence of free product and elevated TPH compounds at wells downgradient of the source areas indicates TPH contamination has been transported by groundwater. The adjacent surface waters (the drainage ditch along the south boundary, the swampy area to the southeast, the pond to the east, and the irrigation canal along the east side of Thorp Highway) have not been significantly affected by TPH contamination originating from the site.

Sampling locations where soil and groundwater chemicals of concern (COC) concentrations exceeded selected site-specific draft cleanup levels are summarized below by medium.

Draft soil cleanup level exceedances include BETX in soil samples S7, S8, S10, S21, S22, S27, and S28 (collected from UST excavation sidewalls and piping trenches), and soil samples from MW6 at 17.5 feet and 22.5 feet below ground surface.

Draft groundwater cleanup level exceedances include benzene, ethylbenzene, and toluene concentrations in groundwater samples from MW5, MW6, and MW8. Lead concentrations are exceeded in samples from wells MW2 and MW3. Lead and nitrate/nitrite were exceeded in the sample from MW1.

1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of Applied Geotechnology Inc.'s (AGI) Remedial Investigation (RI) of the former Bingo Fuel Stop in Thorp, Washington, owned by Burns Bros., Inc. The location of the Bingo Fuel Stop is shown on Figure 1-1, Vicinity Map. The site was used as an auto and truck fueling facility from approximately 1968 until January 1992. The Washington State Department of Ecology (Ecology) conducted a site visit on February 7, 1992 and issued an Enforcement Order based on observations of hydrocarbon contamination and potential threats to human health and the environment.

The order required implementation of an Emergency Remedial Action (RA). AGI performed the Emergency RA as described in our Emergency Remedial Action report (AGI, 1992c). Following completion of Enforcement Order requirements, Burns Bros., Inc. and Ecology entered into an Agreed Order to conduct a Remedial Investigation/Feasibility Study (RI/FS). This RI has been conducted in accordance with Agreed Order DE 93TC-C171 (Ecology, 1993a); with Washington Administrative Code (WAC) 173-340-350; and with AGI's Work Plan dated April 22, 1993 (AGI, 1993a). As part of this RI, AGI gathered data regarding site conditions, the distribution of petroleum hydrocarbons, and surrounding land use in order to evaluate the impact of petroleum hydrocarbon compounds on the environment. The FS will be initiated following completion of the RI.

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1.2 REPORT ORGANIZATION

This report is arranged in nine sections. This introduction is followed by a description of site features and history in Section 2.0. RI field investigations are described in Section 3.0, and Sections 4.0 and 5.0 follow with discussions of geology, climate, and hydrology. Section 6.0 discusses contamination distribution and migration. Applicable regulatory requirements and draft site cleanup levels and exceedances are then presented in Section 7.0. Sections 8.0 and 9.0 provide information regarding use of this report and references. Figures and tables follow the references.

References are listed by the author, agency, or company, followed by the year of the publication, in parenthesis. Figures and tables are numbered by the section where first referenced, followed by sequential numbers. Appendices follow figures and tables, and contain Water Well Reports for wells potentially within a 1/2-mile radius of the site (Appendix A), a detailed description of the field investigation methods (Appendix B), boring logs and well construction summaries (Appendix C), physical properties analyses results (Appendix D), and laboratory reports and quality assurance reports (bound separately in Volume II).

1.3 PREVIOUS WORK

Ecology issued an Enforcement Order (Ecology, 1992a) on February 11, 1992 directing fuel dispensing activities at the site to stop and requiring preparation and implementation of an Emergency Remedial Action Work Plan. Five underground storage tanks (USTs) were temporarily taken out of service in February 1992 in compliance with the Ecology Enforcement Order. Ecology reiterated the requirement to prepare an adequate Work Plan in a February 26, 1992 letter (Ecology, 1992b).

AGI prepared and submitted an Emergency Remedial Action Work Plan on March 5, 1992 (AGI, 1992a). The Work Plan was reviewed and approved by Ecology, with several revisions, as described in our March 9, 1992 letter (AGI, 1992b). The five USTs were excavated during the Emergency RA, and approximately 700 gallons of floating product were recovered from four recovery sumps. Product was recovered to the maximum extent practicable. The results of the Emergency Remedial Action are summarized in our June 5, 1992 report (AGI, 1992c).

1.4 THE REGULATED CLEANUP PROCESS

In March 1989, a citizen-sponsored toxic waste cleanup law went into effect in Washington, changing site cleanup procedures statewide. Passed by voters as Initiative 97, this law is known as the Model Toxics Control Act (MTCA), Chapter 70.105, Revised Code of Washington. State regulations promulgated under MTCA (WAC 173-340) are known as the MTCA Cleanup Regulation. This regulation provides the framework for soil and groundwater remediation in Washington where "hazardous substances have come to be located." MTCA requires cleanup of hazardous substance releases and is thereby invoked when a hazardous substance release is discovered or suspected. The MTCA cleanup process includes:

- ▶ Discovery and Reporting. Any owner or operator who has information that a hazardous substance has been released to the environment and may be a threat to human health or the environment must report such information to Ecology's Toxics Cleanup Program within 24 hours of release confirmation. Contamination discovered at the site was reported to Ecology by Burns Bros., Inc. personnel.
- ▶ Initial Investigation. Ecology is required to perform an investigation within 90 days of discovery. Based on the initial investigation, further investigation or no further action may be required.
- ▶ Site Hazard Assessment and Ranking. Ecology conducts a hazard assessment to confirm the presence of hazardous substances and determine the relative risk the site poses to human health and the environment. The site is then ranked using the Washington Ranking Method. This method assigns a number to each site based on relative risk to human health and the environment. The Bingo Fuel Stop is ranked 2 on a scale of 1 (highest risk) to 5 (lowest risk).
- ▶ Remedial Investigation/Feasibility Study. The RI emphasizes data collection and site characterization and the FS emphasizes analysis and evaluation of cleanup actions. Specifically, the RI provides a mechanism for characterizing site conditions and the nature and extent of contaminants present, and assessing risk to human health and the environment. The FS develops, screens, and evaluates various potential remedial actions. This report presents the results of the RI conducted by AGI. The cleanup method is selected in the RI/FS phase. Methods available are termed Method A, Method B, and Method C. Method A is used when all hazardous substances detected at the site are found on the list of 25 chemicals contained in WAC 173-340-720 or -740. Method B, which uses site specific characteristics and contaminant distribution to determine cleanup levels, is applicable to all sites. Method C is only applicable to industrial sites.
- ▶ Interim Remedial Action. Interim RAs may be taken to reduce the threat to human health or the environment. Interim RAs are initiated before the RI/FS is complete, in contrast to remedial actions initiated after the FS is completed. Removal and treatment of groundwater containing dissolved petroleum hydrocarbons has been initiated as an interim RA.
- ▶ Selection of Cleanup Action. Based on information gathered during the RI/FS, the preferred cleanup alternative is identified and a Cleanup Action Plan (CAP) is developed. The CAP identifies preferred cleanup methods and specifies cleanup standards and other requirements at the site.
- ▶ Site Cleanup. Cleanup begins when the CAP is implemented. This includes design, construction, operation, and monitoring of cleanup actions.

1.5 PURPOSE, SCOPE, AND AUTHORIZATION

The purpose of this RI is to evaluate the nature, extent, concentration, and potential off-site migration of contamination in site soils and groundwater. During this investigation, chemicals of concern (COC) were identified by analysis of soil, sediment, surface water, and groundwater samples. Site-specific draft cleanup levels for each COC were then developed, based on information regarding their toxicity and contaminant pathways. Areas at the site where cleanup levels were exceeded, based on chemical analyses, were then identified for cleanup. The scope of work to accomplish this objective included:

- ▶ Collecting additional site background information.
- ▶ Drilling 12 exploratory borings and completing them as groundwater monitoring wells.
- ▶ Confirming groundwater flow directions obtained during the Emergency Remedial Action, which indicated flow toward the northeast.
- ▶ Further characterizing the nature and extent of petroleum hydrocarbon concentrations in soil and groundwater.
- ▶ Developing site-specific draft cleanup levels for soil and groundwater.
- ▶ Preparing this comprehensive RI report.

Details of these tasks are presented in our April 22, 1993 Work Plan (AGI, 1993a). The authorization to perform these tasks is contained in the Agreed Order, and in Ecology's April 28, 1993 (Ecology, 1993c) letter to Burns Bros., Inc.

2.0 SITE FEATURES AND HISTORY

2.1 SITE AND SURROUNDING AREA DESCRIPTION

The former Bingo Fuel Stop is located on Thorpe Highway at its junction with State Route 90 (SR 90). The site is located in the southeast quarter of the northeast quarter of Section 14, Township 18 North, Range 17 East, Willamette Meridian. The legal description of the site, according to the Kittitas County Records Volume 244, Page 773, segments the site into two parcels as follows:

PARCEL 1:

That portion of the Southeast 1/4 of the Northeast 1/4 of Section 14, Township 18 North, Range 17 East, W.M., Kittitas County, Washington, described as follows:

Commencing at the intersection of the West boundary line of the Right of Way of Thorpe County Road and the Southwest boundary line of the Right of Way of Primary State Highway No. 3 (SR 90); thence South 00°07'45" East for 204.73 feet; thence North 89°52'15" East for 30 feet more or less to the West boundary line of Thorpe County Road; thence South 00°07'45" East for 95.27 feet; thence North 63°33'45" West for 257.14 feet; thence North 00°07'45" West for 284.99 feet; thence South 63°33'45" East for 223.61 feet to the true point of beginning.

PARCEL 2:

That portion of the Southeast 1/4 of the Northeast 1/4 of Section 14, Township 18 North, Range 17 East, W.M., Kittitas County, Washington, described as follows:

Commencing at the intersection of West boundary line of the Right-of-Way of Thorpe County Road and the Southwest boundary line of the Right-of-Way of Primary State Highway No. 3 (SR 90); thence North 63°33'52" West 223.59 feet to the true point of beginning; thence North 63°33'52" West 5.68 feet; thence North 39°24'52" West 278.97 feet; thence South 0°07'47" East 465.40 feet; thence South 72°06'45" East 317.70 feet; thence North 63°33'45" West 134.62 feet; thence North 0°07'45" West 284.90 feet to the true point of beginning.

SUBJECT TO ALL EASEMENTS, RIGHTS OF WAY, ENCUMBRANCES AND OTHER RESTRICTIONS OF RECORD

For the purpose of this RI, the site is described as one property, not two parcels.

Land use in the surrounding area is predominantly agricultural as shown on Figure 2-1. One retail store is located within 2 miles of the site, across SR 90 to the northeast. The Puget Power Kittitas Service Center is located adjacent to the west of the site. One residence is present adjacent to the southern site boundary, and one residence is present adjacent to the eastern site boundary.

A review of Water Well Reports in Ecology's files and a door-to-door survey of houses nearby indicate nine domestic wells are located within a 1/2-mile radius of the site. Nearby water well locations are shown on Figure 2-2, and information about the wells is summarized in Table 2-1. Water Well Reports for wells potentially within a 1/2-mile radius are included in Appendix A; however, only one report is known to correspond to existing wells (Puget Power Well). Depths to water were not measured due to inaccessibility of the wells, except for Well 2 east of the site. Depth to water in Well 2 was approximately 2 feet below ground surface on March 18, 1994.

2.2 SITE FACILITIES AND UTILITIES

Site facilities and utilities are shown on Figure 2-3 and described in the following sections.

2.2.1 Aboveground Facilities and Utilities

The aboveground site facilities include one building with two canopies and a large storage trailer. The canopies formerly sheltered five of seven fuel dispensing islands served by five USTs and four aboveground storage tanks (ASTs). The ASTs have been out of service for at least 18 months. Aboveground utilities at the site include electrical power supply and telephone lines.

2.2.2 Underground Facilities and Utilities

Underground facilities include five USTs (formerly containing gasoline and diesel) and associated piping. UST characteristics are summarized in Table 2-2. The USTs and piping were removed in 1992, as described in our June 5, 1992 Emergency Remedial Action Report (AGI, 1992c). Two USTs, formerly containing heating oil and possibly used oil, are located adjacent to the south side of the building. These tanks were taken out of service in 1992. A water line connects the on-site domestic water supply well along the eastern boundary of the site with the building. A septic tank is present west of the building, and a septic drainfield is likely present in the northwest portion of the site. An underground culvert is present adjacent to the northeast boundary of the site. The culvert directs surface water runoff into the irrigation canal on the east side of Thorp Highway.

2.3 REGIONAL AND SITE HISTORY

2.3.1 General

A review of property ownership records at the Kittitas County Records office indicates agricultural activity in the region was occurring by the early 1900s. Agricultural activity in the region continues to be the primary economic activity today.

The site was part of a rural homesite prior to 1968. During the mid to late 1960s, SR 90 was constructed adjacent (north) to the property. Following completion of this portion of SR 90, the site use changed from rural/agricultural to a retail fueling facility. The site was initially leased by Standard Oil Company of California in 1968. The lease was then acquired by

True Value Oil Company, Inc. True Value Oil Company's interest on the lease was then assigned to Telum Inc. and/or Bingo Management, Inc. between 1976 and 1986. In 1986, Burns Bros., Inc. acquired the lease from Telum Inc. and Bingo Management.

2.3.2 Operational History

A review of Ecology records regarding releases from fueling operations at the site indicates several incidents have been reported within the past 3 years. No information prior to that time has been located.

Reports of suspected or confirmed releases are as follows:

- ▶ 11/27/89: Report of a 15-gallon diesel spill, dissipated by the time Thorp Fire Department arrived, reported by Bob Morgan, Thorp Fire Department.
- ▶ 04/19/90: Report of a 50-gallon release of diesel fuel, allegedly hosed into a nearby ditch/wetland area. Report of previous spill of 100 gallons cleaned up by excavating soil and placing it in nearby field; red color of diesel fuel additive visible in ditch, reported by (anonymous).
- ▶ 05/06/91: Granular substance reported to be spilled; investigation determined substance to be sand, reported by S. G. Panattoni, Kittitas County Sheriff's Department.
- ▶ 08/19/91: AST overfill reported by Kirk Mattoon, Burns Bros. Manager.
- ▶ 09/20/91: Report of contaminated surface gravel removal, improper disposal, leaking ASTs, improper storage of diesel fuel additive, no placards present on ASTs, reported by (anonymous).
- ▶ 10/01/91: Fuel barrel reported in irrigation canal; petroleum hydrocarbon contaminated soil reported to be stockpiled by site sign; discolored soil around tanks; storm drain leads into irrigation canal, reports cattle drink from canal, cattle are sick and not gaining weight, reported by (anonymous).
- ▶ 02/07/92: Explosive vapors in excavation; visible petroleum hydrocarbon contamination, reported by Jim Chulos, Ecology.
- ▶ 03/23/92: Report of three incidents, 4/15/89, 8/12/90 and 10/24/91; three surface spills cleaned up with absorbent material, reported by Keith Chandler, former Bingo Fuel Stop manager.

2.4 DEMOGRAPHY AND LAND USE

Population density in the area is sparse. It is estimated that fewer than 30 people reside within a 1/2-mile radius of the site.

The site is zoned for limited commercial use according to the Kittitas County Planning Department. Surrounding land zoning is agricultural.

Applied Geotechnology Inc.

Burns Bros., Inc. leases the Bingo Fuel Stop site from a group of landowners. An interview was conducted with the site owners' representative, Robert Dunnington, in May 1993 (AGI, 1993b). Mr. Dunnington indicated the site will likely be sold following site cleanup. Future site use is therefore unknown; however, it will likely be required to be in accordance with zoning restrictions.

3.0 FIELD INVESTIGATION

3.1 GENERAL

The purpose of AGI's field activities was to investigate soil and groundwater below the site and nearby surface water and sediments. Information obtained during the investigation was used to identify the nature and extent of contamination at the site, enabling the selection of a cleanup action alternative.

RI field activities were performed in general accordance with our April 1993 RI/FS Work Plan (AGI, 1993a). Field investigation procedures are discussed in Appendix B. Activities included collecting surface water and sediment samples, drilling and sampling 12 soil borings, completing the soil borings as groundwater monitoring wells, collecting samples from the wells, and conducting two aquifer tests.

3.2 SURFACE WATER AND SEDIMENTS

3.2.1 Surface Water Sampling and Chemical Analyses

Staff gauges were installed in the irrigation canal near the northeast boundary of the site, the swampy area south of the site, the pond east of the site, and the gasoline and diesel UST excavation to monitor fluctuations of surface water levels. Surface water level measurements were collected periodically in conjunction with groundwater level measurements.

Surface water samples were collected from the pond adjacent to the east, the swampy area adjacent to the south, the drainage ditch south and west of the site, and the irrigation ditch adjacent to MW8. A surface water sample was not collected from the collection grate on the west side of Thorp Highway as no surface water was present at that location during the RI field investigation. Surface water samples were analyzed by Washington State test method WTPH-D for total petroleum hydrocarbons (TPH) and by U.S. Environmental Protection Agency (EPA) Method 8020 for benzene, ethylbenzene, toluene, and total xylenes (BETX).

3.2.2 Sediment Sampling and Chemical Analyses

Sediment samples were collected directly downstream of the east end of the culvert under Thorp Highway, from the west end of the culvert (a surface soil sample, as no sediment was evident), and from the north side of the swampy area to the south. Sediment samples were analyzed by WTPH-D for TPH and by EPA Method 8020 for BETX.

3.3 SOILS

3.3.1 Surface

The site is predominantly covered with asphalt pavement except for the bermed area around the ASTs and the open area in the northwest portion of the site. Due to the presence of pavement in areas where fuel dispensers were located and surrounding the UST locations, no surface soil samples were collected.

3.3.2 Subsurface

Twelve soil borings were drilled on or near the site by air rotary or hollow-stem auger drilling methods during June, July, and October 1993. Figure 2-3 shows the locations of soil borings (MW5) at and near the site completed during the RI. All soil borings were completed as groundwater monitoring wells. Borings ranged in depth from 14 to 81 feet below ground surface (bgs). Subsurface soil samples were collected from each boring at 5-foot depth intervals. Additional samples were collected between the 5-foot intervals for a few of the borings. Boring locations were selected on the basis of targeted areas of suspected soil and groundwater contamination. Boring logs documenting subsurface conditions encountered during drilling are included in Appendix C.

3.3.3 Chemical Analysis

Soil samples were collected for chemical analysis from each of the borings during the RI. Soil sampling was performed to characterize the extent and concentration of hydrocarbons across the site and the lower topographic areas north, northeast, and east of the site. Soil samples were analyzed by EPA Methods 8020, 8015 Modified, 7421, and 8310 for BETX, TPH, lead, and polycyclic aromatic hydrocarbons (PAHs), respectively. At locations where hydrocarbons were detected by EPA Method 8015 Modified, the sample analyses were not intended to evaluate if concentrations were above or below cleanup levels, but to provide additional information regarding the character of the petroleum hydrocarbons. Soil sample analytical schedules and collection rationale are presented in Section 6.0. Sampling protocols are described in the Field Investigation description in Appendix B.

3.4 GROUNDWATER

The RI was designed to establish groundwater background (upgradient) conditions, and investigate the existence and areal extent of hydrocarbon, lead, and volatile organic compound (VOC) concentrations in groundwater across the site and the area downgradient of the site. Twelve groundwater monitoring wells were installed, developed, and sampled during the RI.

3.4.1 Monitoring Wells

A total of six groundwater monitoring wells (MW1 through MW5 and MW11) and one piezometer (PZ1) are currently located at the site. A total of six groundwater wells (MW6 through MW10 and MW12) are located north and east of the site. Individual well construction diagrams are presented with the boring logs in Appendix C. These diagrams are based on construction details recorded during well installation. Table 3-1 summarizes construction details for all wells and the piezometer.

Six of the borings (MW1 through MW6) were drilled at or adjacent to the site during June and July 1993 and completed as 4-inch-diameter groundwater monitoring wells. The boring for MW3 was drilled to a depth of 81 feet bgs to evaluate subsurface conditions at approximately the same elevation as the Yakima River, located 3,800 feet northeast of the site. The remaining borings were drilled 5 to 10 feet past the depth at which groundwater was encountered during drilling.

Due to the presence of petroleum hydrocarbons in MW4, MW5, and MW6, five additional borings (MW7 through MW10 and MW12) were drilled to the north and east of the site in October 1993. In addition, another well (MW11) was drilled on the site north of the AST locations at the request of Ecology. All six of these wells were drilled 5 feet past the depth at which groundwater was encountered during drilling. Monitoring well borings MW11 and MW12 were completed as 2-inch-diameter wells due to hard drilling conditions, which required a smaller diameter auger to complete the borings. All of the other wells were completed as 4-inch-diameter wells.

3.4.2 Chemical Analysis

Samples were collected from all monitoring wells except for MW4, which was not sampled because it contained free product. Groundwater samples were analyzed by EPA Methods 8020, 8015 Modified, 7421, 8310, and 8240 for BETX, TPH, lead, PAHs, and VOCs, respectively. The groundwater analytical schedule is presented in Section 6.0, and sampling protocols are described in Appendix B.

3.5 AQUIFER TESTING

Aquifer testing was performed to determine hydraulic characteristics of the site's water-bearing strata. Aquifer test data are gathered in two phases: drawdown and recovery. Water level drawdown data are gathered during pumping. Water level recovery data are gathered immediately following the cessation of pumping. Hydraulic characteristics can be determined from drawdown data, and then checked using recovery data. Aquifer test data were analyzed by conventional methods for an unconfined aquifer. The aquifer test analyses results are presented in Section 5.4.3, Aquifer Hydraulic Properties.

3.5.1 Static Water Level Monitoring

To evaluate background water level trends, depths to water in MW3 and MW4 were monitored under static, or non-pumping, conditions. This monitoring was conducted for approximately 67 hours (4,000 minutes) during September 1993. This information is used to remove background "noise" from aquifer testing data.

3.5.2 Testing Procedures

Testing was conducted at MW3 and MW4 using step-drawdown and constant rate pumping and recovery test procedures. The step-drawdown test on Well MW3 indicated a constant rate test could be performed at a pumping rate of approximately 1 gallon per minute. The test at MW3 was conducted on July 14 and 15, 1993; the MW4 test was performed on July 21 and 22, 1993. Existing groundwater extraction pumps had been inactive for at least 21 days prior to beginning the tests. Water discharged from pumping wells during the tests was plumbed to the on-site groundwater treatment facility, where it was treated according to interim cleanup procedures. Water was not reintroduced during the tests in order to avoid recharge effects on test data.

Wells MW1 through MW6, the site domestic well, and the reintroduction area were used for water level observation. Recovery tests consisted of recording water levels in the same wells as they returned to prepumping conditions after cessation of pumping. Water levels were monitored by measuring depth to water at each of the referenced wells. Depths to water were measured with electronic water level indicators. Details of each test are discussed in the Field Investigation description in Appendix B.

4.0 GEOLOGY

Published papers on regional geology were reviewed as part of the RI and used to assist in the interpretation of site geology. No direct references for geology at the site were located. However, information obtained during drilling of soil borings at the site was used to interpret site geology. Both regional and site-specific geologic conditions have been reviewed to evaluate the distribution and migration of contaminants at the site. Physical properties testing was also performed to further evaluate the subsurface materials at the site.

4.1 REGIONAL TOPOGRAPHY AND GEOLOGY

The Bingo Fuel Stop site is in the Kittitas Valley in central Washington, as shown on Figure 1-1. The topography near the site slopes to the northeast toward the Yakima River.

Regional geology was interpreted primarily by review of studies published by Waitt (1979) and Porter (1976). The topographically higher areas southwest of the site are most likely comprised of Kittitas and Lakedale Drifts. The topographically higher areas north and northeast of Thorp are comprised of Thorp Gravel Deposits. The low area between the two topographically higher areas is most likely recent alluvium deposited by the Yakima River and possible outwash alluvium from the Kittitas and Lakedale Drifts at depth.

4.2 SITE GEOLOGY

Geologic conditions at or near the site were characterized based on information obtained from the subsurface explorations (MW1 through MW12) conducted during the RI and a review of Water Well Reports from Ecology's files. Geologic cross sections were prepared using soil boring information and interpretation. Locations of cross sections are shown on Figure 4-1, and the cross sections are shown on Figures 4-2, 4-3, and 4-4.

The most predominant material encountered in every exploration was a well-graded gravel with sand and cobbles. In addition, a wide variety of material was encountered in the explorations varying from clay, silt, sandy silt, silty sand, silty gravel, and poorly graded and well-graded sands and gravels. The varying thickness and wide diversity of material encountered suggest that the material is one geologic unit, and was placed while the Yakima River meandered through the Kittitas Valley. The materials encountered during drilling are shown on the monitoring well logs in Appendix C and are described in detail below.

Gravelly Clay: Brown gravelly clay, which was encountered from 2.5 to 25 feet bgs only in the boring drilled for MW6, was most likely fill material placed to construct Thorp Highway.

Silt: Black and brown, soft to very stiff silt was encountered in all borings drilled in the lower topographic areas north to east of the site (MW7, MW8, MW10, and MW12). The silt was encountered at depths ranging from 3 to 12 feet bgs. The black coloring encountered in MW7, MW8, and MW12 is attributed to organic material within the silt.

Sandy Silt: Black, very stiff to hard sandy silt was encountered directly below the crushed rock asphalt subgrade in MW1 and MW4 borings. Brown, loose to hard sandy silt was encountered at ground surface for all borings drilled in the lower topographic areas north to east of the site. This material was also encountered at depth (58 to 60 feet bgs) in MW3 and may act as an aquitard. A clay layer approximately 3 feet thick at approximately 10 lower in elevation was noted in a boring drilled by the Bonneville Power Administration approximately 3/4 mile to the northeast.

Silty Sand: Brown to gray, dense, silty sand with gravel and cobbles was encountered near ground surface in borings MW2, MW4, and MW11 and at depth in MW3. MW6 encountered a gray, very dense silty sand below the gravel clay fill material at 25 feet bgs.

Sand: Gray, dense, poorly graded sand was encountered in only one of the shallow borings (MW9). Yellow to brown, very dense, poorly graded sand was encountered from 52 to 55 feet bgs in MW3. Gray, dense, well-graded sand was encountered in only one of the shallow borings (MW12). Brown, very dense, well graded sand with gravel was encountered from 49 to 52 feet bgs in MW3.

Gravel: Brown, very dense, poorly graded fine gravel with sand, interbedded with poorly graded sand with gravel, was encountered from 64 feet bgs to the total depth of 81 feet bgs in MW3. This material was not encountered in any of the other explorations. Brown, very dense, well-graded gravel with sand and cobbles was the most predominant lithologic unit and was encountered in all borings. In some areas, the material had a gray color, likely due to a reducing environment caused by petroleum hydrocarbons.

Silty Gravel: A 1- to 2-foot-thick layer of brown, very dense, silty gravel was encountered at 15 feet bgs in both MW3 and MW11 borings, and may be a localized aquitard in this area. This material was also encountered at 48 to 49 feet bgs in MW3.

In summary, the variety of materials encountered, and the proximity to the Yakima River, suggest site geology is alluvial in origin.

4.3 SOIL CLASSIFICATION AND PHYSICAL PROPERTIES TESTING

Five soil samples were submitted for physical properties testing to supplement field soil classification and define soil physical and/or hydraulic properties. The samples are considered to be from the same geologic unit. Laboratory physical properties tests included moisture content, dry density, specific gravity, porosity, particle size, pH, and plasticity indices. Table 4-1 summarizes test results. Appendix D contains the laboratory reports for physical properties testing.

All soil samples were visually examined by an AGI geologist or engineer at the time of sample collection. Sample classifications were based on the Unified Soil Classification System (American Society of Testing and Materials [ASTM] D-2488-909).

Moisture content and dry density were calculated for four of the samples. These tests were performed to determine *in situ* moisture content and associated bulk unit weight. Moisture content was calculated in accordance with ASTM D-2216-90; dry density was calculated on the basis of sample moisture content and volume.

Specific gravity tests were performed on four of the samples in accordance with ASTM D-854-83. The measured specific gravity test results were used in conjunction with moisture content and dry density data to calculate total porosity values using the following formula:

$$n = 1 - [\gamma_d / G_s (\gamma_w)]$$

where: n = total porosity
 γ_d = dry density (pounds per cubic foot [pcf])
 G_s = specific gravity of the soil sample
 γ_w = unit weight of water (62.4 pcf)

Particle size analyses were performed on four of the samples by sieve and hydrometer methods. Sieve analyses were performed on coarse-grained samples; combined sieve and hydrometer analyses were performed on those samples which were principally fine grained.

Particle size analyses were conducted to more accurately classify samples and supplement field classifications. Plates C-1 through C-4 show particle size analysis curves.

Plasticity index tests were performed on two of the samples in accordance with ASTM D-4318 to supplement field classification. Plate C-5 summarizes plasticity index testing results.

The results of physical properties testing are consistent with field observations of the variety of material encountered, and support the supposition that the material was deposited by the Yakima River system.

5.0 HYDROLOGY

Nearby surface water bodies, regional hydrogeology and groundwater use, site hydrogeology, and areas of groundwater recharge and discharge were evaluated during the RI. Understanding water movement through the hydrologic cycle assists in the process of identifying potential receptors and contaminant migration pathways.

Temperature and precipitation in the Thorp area is measured by the City of Ellensburg, approximately 5 miles east of the site. Seasonal temperature variations from 1988 to 1992 ranged between an average monthly temperature of 22.9°F during December and 67.8°F during July.

Annual precipitation from 1989 to 1992 ranged between 6.76 and 9.17 inches per year (National Oceanic and Atmospheric Administration [NOAA]; 1989 and 1992). Seasonal precipitation variations are minor; however, September has the least precipitation during the years measured. Mean monthly precipitation and temperatures for the Thorp area are summarized in Table 5-1.

5.1 NEARBY SURFACE WATER BODIES

The prominent surface water body in the Kittitas Valley is the Yakima River. The headwaters of the Yakima River are regulated by dams on Lake Keechelus, Lake Kachess, and Cle Elum Lake, approximately 30 miles to the northeast. The Yakima River flows through the Kittitas Valley from the northwest toward the southeast to the town of Ellensburg, passing within approximately 3/4 mile to the northeast of the site. From there, it flows southward toward the City of Yakima, then southeast into the Columbia River, and eventually to the Pacific Ocean.

Surface waters adjacent to the site include a drainage ditch along the southern boundary of the site, a swampy area adjacent to the southeast, a small pond to the east across Thorp Highway, and an irrigation canal southeast of the site, crossing under Thorp Highway and continuing northward along the east side of Thorp Highway. We understand the drainage ditch along the southern boundary of the site was installed by farmers to collect shallow groundwater from nearby agricultural fields. This was done to dewater the fields and increase agricultural productivity (Panattoni, 1994). Water in the ditch flows eastward into the irrigation canal at the southwest corner of the site, as shown on Figure 5-1. The irrigation canal routes water north (through the canal) or northeast (through subsurface piping). Some of the water flows east through subsurface piping along the south side of SR 90. The remainder of the water flows northeast through piping below SR 90 to one of two fields. Excess irrigation water from this series of canals is routed into a pond on the south side of Depot Road or into the Ellensburg Power Canal (which eventually reenters the Yakima River). The pond appears to have been excavated sometime between 1966 and 1979, based on a review of aerial photographs.

5.2 REGIONAL HYDROGEOLOGY AND GROUNDWATER USE

The site resides in the approximately 30-mile-long, southeast-trending Kittitas Valley. The valley is bordered on the south by the Manastash Ridge and to the north by the Wenatchee Mountains. Hydrologically, this area is known as the Kittitas Basin and is within the Yakima River Basin.

Groundwater resources in the Kittitas basin are plentiful due to high precipitation and runoff in the Cascade Mountains where the Yakima River watershed originates. Snowmelt and rainfall provide most of the watershed's runoff throughout the fall, winter, and spring. Meltwater from glaciers in the western area of the watershed also sustains flows throughout the spring and summer. Permeable Yakima River alluvium throughout the basin provides reliable supplies of groundwater to wells. Nearby domestic and irrigation wells withdraw water from depths of 30 to 350 feet according to the Water Well Report files at Ecology. Well logs are included in Appendix C.

Most groundwater withdrawn throughout the basin is pumped from Yakima River alluvium. These sediments are several hundred feet thick in many places in the basin. Most groundwater flow through the basin likely travels through these sediments. Groundwater in the Kittitas basin is used for irrigation associated with agriculture. Most groundwater withdrawal occurs during the growing season from April through September. Groundwater is typically encountered in low-lying areas of the Kittitas Valley at depths of less than 20 feet bgs.

5.3 SITE HYDROGEOLOGY

Site hydrogeology was studied during the RI, to evaluate the impact of petroleum hydrocarbons on groundwater. Groundwater elevation maps were prepared based on depth to water measurements in groundwater monitoring wells. Groundwater flow directions were determined based on groundwater contours. Two aquifer tests were performed to evaluate hydraulic conductivity and velocity.

5.3.1 Groundwater Occurrence

We have identified two hydrostratigraphic zones below the site, termed the Upper and Lower Zones. The uppermost groundwater zone occurs under unconfined (water table) conditions within the alluvial sediments described in Section 4.0. Eleven groundwater monitoring wells are screened in this zone. Depth to the water table generally varies approximately 22 feet across the study area. One on-site monitoring well (MW3) is screened in the Lower Zone, below silty sands, silty gravels, and a thin silt layer. The groundwater zone screened by MW3 exhibits lower hydraulic head than the overlying groundwater zone screened by the shallow PZ1 completion (consistently about 5 feet between PZ1 and MW3). This hydraulic head difference and the low permeability of overlying sediments suggest the deeper groundwater zone screened by MW3 (70 to 80 feet bgs) can be identified separately from the shallow groundwater.

5.3.2 Groundwater Elevations and Flow Directions

Water levels in monitoring wells MW1 through MW6 have been measured on a weekly basis since July, and MW7 through MW12 levels have been measured on a weekly basis since November 1993. These data indicate groundwater elevations are consistently highest in the southwest portion of the site area, and gradually decrease to the northeast. Total change in water table elevation across the study area on November 5, 1993 was approximately 22 feet between MW11 and MW12 (approximately 720 feet apart), with a resulting groundwater gradient of approximately 0.03 foot per foot of horizontal distance. Horizontal groundwater flow is thus northeasterly toward the Yakima River. Depths to the water table and groundwater elevations for July 7 and November 5, 1993 are summarized in Table 5-2. Measurements on July 7 were collected when site wells were not being pumped; on November 5, measurements were collected when recovery sumps were being pumped. The groundwater flow directions are fairly consistent, indicating that pumping the recovery sumps has no net effect on flow direction.

The northeasterly groundwater flow direction has been consistent through each of the referenced measurement rounds. Figures 5-2 and 5-3 show groundwater elevation contours and flow directions measured on July 7 and November 5, 1993, respectively. Winter or spring water level conditions have not been characterized at the site; however, local and regional hydrogeology suggest the overall northeasterly flow direction is consistent throughout the year.

At the PZ1 location, hydraulic head in the shallow zone well is higher than the head in MW3, indicating at least partial separation of the two zones, and the potential for limited downward flow from the Upper to the Lower Zone in this location. Vertical flow direction is not known elsewhere across the site.

Water level fluctuations at MW3 and MW4 under static (non-pumping) conditions are shown in the groundwater hydrographs on Figure 5-4. The maximum water level change exhibited during this monitoring period was approximately 0.05 foot at MW3 and 0.04 foot at MW4. Cyclic fluctuations evident in the data from MW3 may be attributed to pumping at a groundwater extraction well pumping large volumes of water at 6-hour intervals in the vicinity. The absence of a well-defined cycle in the data from MW4 further suggests the existence of two hydrogeologic zones.

5.3.3 Aquifer Hydraulic Properties

Aquifer testing was performed on the site on July 14, 15, 21, and 22. Testing procedures are described in the Field Procedures description in Appendix B. Data gathered during the testing were analyzed using different methods developed by Theis, Jacob, Lohman, and Thiem. Assumptions regarding the use and limitations of these analysis methods are discussed in the Field Procedures description in Appendix B.

The results of aquifer test data analysis provide values for transmissivity and hydraulic conductivity for the Upper and Lower Zones based on recovery data for the Lower Zone, and drawdown and recovery data for the Upper Zone. Aquifer test results are shown in Table 5-3. The results indicate hydraulic conductivity (K) of the Lower Zone is approximately 10^{-5} centimeters per second (cm/sec). The value of K for the Upper Zone is approximately 10^{-3} cm/sec, and

assuming a porosity of approximately 0.30, average liner flow velocity is estimated to be approximately 0.3 feet/day. The gradient flow velocity was not calculated for the Lower Zone since the water level is only known in one location.

Aquifer test results for the Upper and Lower Zone are consistent with silty sand and silty gravel conditions; the Lower Zone results indicate a significantly lower permeability than the Upper Zone. Hydraulic communication between the zones appears to be minor based on: the relatively low hydraulic conductivity of the lower zone at MW3 compared to the upper zone; the difference in static water levels between well MW3 (lower zone) and piezometer PZ1 (upper zone); and lower conductivity and higher pH measured in water sampled from MW3 compared to other wells.

5.4 GROUNDWATER RECHARGE AND DISCHARGE

Groundwater below most of the site appears to be recharged by the unlined drainage ditch west and south of the site (Figure 2-3). The ditch is partially dammed south of the site, creating the swampy area. Overflow from the swampy area flows into an irrigation canal fed by the West Side Canal. The irrigation canal crosses under Thorp Highway in a culvert. A portion of the flow is then channeled into the pond east of Thorp Highway by an adjustable distribution box. Most of the flow proceeds north along the east side of Thorp Highway (or through subsurface piping across the adjacent field), then east along the SR 90 eastbound on-ramp or northeast under SR 90.

The swampy area south of the site is likely recharging groundwater in the vicinity of MW5, based on the elevation of water in the swampy area measured at staff gauge 3 (SG3) and groundwater elevation in MW5. The elevation of water in the swampy area was 6 feet higher than groundwater elevation in MW5 on November 12, 1993.

The small pond east of Thorp Highway likely recharges groundwater in the eastern portion of the study area, based on the elevation of the pond surface measured at SG2 compared to groundwater elevation at nearby well MW7. The pond elevation was approximately 5 feet higher than groundwater elevation in MW7 on November 12, 1993. The irrigation canal east of Thorp Highway and south of the eastbound on ramp to SR 90 is likely recharging groundwater in the vicinity of MW8, based on the canal water level at SG1 compared to the elevation of groundwater at MW8. The canal water level was approximately 8 feet higher than groundwater elevation in MW8 on November 12, 1993.

One groundwater discharge (seep) area was observed along the hillslope immediately north of recovery sump RS-2 during our January 28, 1993 site visit. The seep was also observed by Ecology personnel in November 1992 and January 1993, who stated the seep had a petroleum odor and sheen. This seepage likely resulted from shallow groundwater in the Upper Zone intersecting the ground surface. Seepage has not been observed since the groundwater recovery and treatment system restarted pumping from RS-2 in late January 1993.

6.0 CONTAMINANT DISTRIBUTION AND MIGRATION

6.1 GENERAL

This section presents chemical analysis results for soil, groundwater, surface water, and sediment samples collected during the Emergency Remedial Action in March 1992 and Remedial Investigation in July, October, and November 1993. The section also discusses contaminant distribution, sources, and migration. Because the site has a history of storing and handling large volumes of fuels, fuel hydrocarbons were the focus of the investigations. Lead, pesticide, and fertilizer distribution was also investigated at the request of Ecology. Collection protocols for groundwater and surface and subsurface soil samples are outlined in the field procedures description in Appendix B.

Laboratory reports for the RI sample analyses are presented in Volume II. Analyses were performed by Analytical Technologies, Inc. in accordance with Ecology and EPA methodologies. Each laboratory data package was reviewed by AGI upon receipt for technical accuracy, precision, and completeness. Quality assurance reports summarizing results of these reviews are presented with the laboratory reports in Volume II. Specific analytes and method reporting limits (MRLs) for each method utilized during the investigations are included in the analytical summary tables introduced in the following discussions.

6.2 SOIL

Soil samples were collected during the Emergency RA in March 1992 and RI in July and October 1993. During the Emergency RA, a total of 28 soil samples were collected from the UST excavations, product piping trenches, beneath the fuel dispenser islands, and the soil stockpile.

During the RI, 20 soil samples were collected from 12 soil borings. Borings were then completed as groundwater monitoring wells MW1 through MW12. At least one sample was collected from each boring near the water table and up to two additional samples were collected from various interval(s) of the boring if evidence of contamination was noted during drilling. A field duplicate sample was collected from MW6 at 22.5 feet bgs. One soil sample was collected from near the drain box at the west end of the north culvert. Sample collection locations during the Emergency RA and soil boring locations are shown on Figures 3-1 and 6-1, respectively.

6.2.1 Analytical Schedule

Soil samples were analyzed for selected compounds, including TPH quantified as gasoline and diesel by EPA Method 8015 Modified (to characterize the hydrocarbons type and treatability, not evaluate whether concentrations were above or below cleanup levels); TPH quantified as oil by EPA Method 418.1 Modified; BETX by EPA Method 8020; total lead by EPA Method 7421; PAHs by EPA Method 8310; VOCs by EPA Method 8240; and TPH quantified as diesel by Washington State Method WTPH-D. The analytical schedule for soil samples is summarized in Table 6-1.

6.2.2 Contaminant Distribution, TPH and BETX

The following sections discuss soil sample results from the Emergency RA and the RI. Sample locations, depths, dates, and laboratory results are summarized in Tables 6-2 and 6-3. The distribution of TPH and BETX is discussed below.

TPH: All soil samples were analyzed for TPH. During the Emergency RA, elevated TPH as gasoline concentrations ranging up to 21,000 milligrams per kilogram (mg/kg) were detected in samples collected from UST removal areas, piping trenches, and dispenser islands. The extent of TPH contamination was not delineated since only surficial soil samples were collected at that time.

During the RI, soil samples were collected from subsurface on and off site, providing a more comprehensive delineation of lateral and vertical extent of TPH contamination in soil.

TPH was not detected in soil samples from borings MW1, MW2, MW4, MW7, MW8, MW9, MW10, MW11, and MW12. Gasoline and diesel concentrations were detected at 310 mg/kg and 3,100 mg/kg, respectively, in a sample collected from boring MW3 at 9 feet bgs, and diesel was detected at 34 mg/kg in a sample collected at 42.5 feet bgs. Low levels of TPH were detected in samples collected from boring MW5 at 7.5 feet bgs and MW6 at 17.5 and 22.5 feet bgs. The TPH concentrations ranged from 10 to 160 mg/kg.

A sample collected from near the drain box at the west end of the north culvert (see Figure 6-1) contained 340 mg/kg diesel-range TPH (Sample S32).

Oil: Samples collected from the east and south sidewalls of the former heating oil UST excavation (S15 and S16) during the Emergency RA were analyzed for oil-range TPH. Oil was detected in sample S15 at 22 mg/kg, but was not detected in sample S16.

BETX: All soil samples were analyzed for BETX except S3, S15, and S16, collected during the Emergency RA. In the UST removal area, elevated BETX concentrations were detected in samples collected from the north and east sidewalls of the former regular gasoline UST excavation, from the piping trenches, and beneath dispenser islands 6 and 7 (Samples S7, S8, S10, S27 and S28). The ranges of BETX concentrations in these samples are from 6.5 to 92 mg/kg (benzene), 19 to 300 mg/kg (ethylbenzene), 69 to 1,000 mg/kg (toluene), and 170 to 1,800 mg/kg (total xylenes).

During the RI, BETX was not detected in samples collected from MW1, MW2, MW7, MW8, MW10, MW11, MW12, and near the drain box at the west end of the north culvert. The highest BETX concentrations were in a sample collected from MW6 at 22.5 feet bgs. BETX concentrations in this sample were 3.5 mg/kg (benzene), 3.6 mg/kg (ethylbenzene), 17 mg/kg (toluene), and 21 mg/kg (total xylenes). BETX was detected in samples from MW3, MW4, and MW5 at lower concentrations.

6.2.3 Contaminant Distribution, PAHs, Lead, and Vinyl Acetate

PAHs: Soil samples collected during the Emergency RA were not analyzed for PAHs. All soil samples collected from borings during the RI were analyzed for PAHs. Naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, fluorene, and/or phenanthrene were detected in samples collected from MW3, MW5, and MW6. However, carcinogenic PAH compounds were not detected in any analyzed soil samples.

Lead: Surficial soil samples S5, S6, S7, S8, S20, S26, S27, and S28 and all samples collected during the RI were analyzed for total lead. Lead concentrations ranged from not detected to 21 mg/kg. No elevated lead concentrations were identified.

Vinyl Acetate: Two soil samples (S1 and S3) which contained elevated (up to 12,000 mg/kg) concentrations of diesel were analyzed for volatile organic hydrocarbons, including vinyl acetate, a component of Burns Red additive in diesel fuel. Vinyl acetate was not detected in either sample. The only volatile organic hydrocarbons detected in samples S1 and S3 were low concentrations of total xylenes.

6.3 GROUNDWATER

During the Emergency RA, a total of four water samples (W-1 through W-4) were collected from four drinking water wells located within a 1/4-mile radius of the site. During the RI, 14 groundwater samples were collected from 11 of the 12 monitoring wells (MW1 through MW12 except MW4), including field duplicate samples collected from MW2 and MW11. All well locations are shown on Figure 6-2. Free product was present in MW4 and MW6 during July 1993 sampling and, therefore, samples were not collected from these two wells at that time. However, a sample was collected from MW6 in November for selected chemical analyses.

During the RI groundwater sampling, pH, conductivity, and temperature were measured and recorded to monitor parameter stabilization while purging wells. This procedure provides a cursory field assessment of groundwater chemistry, and promotes collection of samples representative of in situ groundwater conditions. Field parameters measured during groundwater sampling are summarized in Table 6-4.

6.3.1 Analytical Schedule

Groundwater samples were analyzed for TPH quantified as gasoline and diesel by EPA Method 8015 Modified (to characterize hydrocarbon types and treatability, not to evaluate if concentrations were above or below cleanup levels), BETX by EPA Method 8020, total lead by EPA Method 7421, PAHs by EPA Method 8310, pesticides by EPA Method 8080, nitrate/nitrite by EPA Method 353.2/354.1, gasoline by Washington State Method WTPH-G, and VOCs by EPA Method 8240. The analytical schedule for groundwater samples is summarized in Table 6-5.

6.3.2 Contaminant Distribution, TPH and BETX

The following sections discuss groundwater sample results from the Emergency RA and the RI. Sample locations, dates, and laboratory results are summarized in Tables 6-6 and 6-7. The distribution of TPH and BETX is discussed below.

TPH: Samples collected from Puget Power Service Center and the Thorp Antique and Fruit Mall during the Emergency RA were analyzed by Washington State Method WTPH-G. No hydrocarbons were detected. All groundwater monitoring well samples collected during the RI were analyzed by EPA Method 8015 Modified, except for the sample from MW6. The sample collected from MW6 was used to evaluate the concentration of vinyl acetate in groundwater, as described in Section 6.3.3. Samples collected from MW1, MW2, MW3, MW7, MW9, MW10, MW11, and MW12 did not contain detectable concentrations of hydrocarbons.

TPH quantified as gasoline was detected in MW5 at 34 milligrams per liter (mg/L) and MW8 at 3 mg/L. TPH quantified as diesel was detected in MW5 at 2 mg/L.

BETX: BETX was not detected in the four drinking water wells sampled during the Emergency RA. BETX was not detected in samples collected from wells MW1, MW7, MW9, MW10, MW11, and MW12 during the RI. Elevated BETX concentrations (ranging up to 12,000 micrograms per liter [$\mu\text{g/L}$] total xylenes) were detected in samples collected from MW5, MW6, and MW8. Low levels of BETX (slightly above detection limits) were detected in samples collected from MW2 and MW3.

6.3.3 Contaminant Distribution - PAHs, Lead, Vinyl Acetate, and Agrichemical Chemicals

PAHs: Samples collected during the Emergency RA were not analyzed for PAHs, lead, or agricultural chemicals. Elevated levels of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected in samples collected from MW5 and MW8 during the RI. Trace levels of fluorene, phenanthrene, and anthracene were also detected at MW5. Samples collected from MW2 and MW3 contained lower levels of naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, fluorene, phenanthrene, and/or anthracene. Carcinogenic PAH compounds were not detected in any groundwater samples.

Lead: Total lead was detected in groundwater samples collected from MW1 (0.013 mg/L), MW2 (0.005 mg/L), and MW3 (0.004 mg/L). No other groundwater samples contained detectable levels of lead.

Vinyl Acetate: The sample collected from MW6 during the RI was analyzed for VOCs, including vinyl acetate, a Burns Red fuel additive. Vinyl acetate was not detected in the sample.

Nitrate/Nitrite: The sample collected from MW1 during the RI was analyzed for nitrate and nitrite. Nitrate was detected at a concentration of 6.25 mg/L and nitrite at 0.15 mg/L.

Pesticides: Samples collected from MW1 and MW6 during the RI were analyzed for chlorinated pesticides. Pesticides were not detected in either sample.

6.4 SURFACE WATER

During the Emergency RA, surface water samples were collected from all surface water bodies within a 1/4-mile radius of the site. One sample was collected from a pond east of the site, from the swampy area south of the site, from the drainage ditch south and west of the site, and from the irrigation ditch adjacent to MW8 (see Figure 6-3).

Surface water samples were analyzed by some or all of the following: EPA Method 8020 for BETX and Washington State Method WTPH-G and WTPH-D for TPH quantified as gasoline and diesel. Results of chemical analysis are shown in Table 6-8. The only analyte detected in either sample was toluene at 0.99 µg/L in the sample from the swampy area.

6.5 SEDIMENT

Sediment samples were collected during the RI from areas where potentially impacted sediment was expected to accumulate. One sample was collected from the east end of the north culvert; the other one was collected from the swampy area south of the site (see Figure 6-3). Samples were analyzed for BETX and TPH quantified as diesel. Results of chemical analyses are shown in Table 6-8. TPH quantified as diesel was detected at 2,100 mg/kg and toluene at 0.42 mg/kg in the sample collected from the east end of the north culvert (Sample S31). The hydrocarbon concentrations may be the result of surface run-off water or groundwater seepage from the subsurface near RS2, discharged from the culvert, since diesel-range compounds were also detected in the soil near the drain box at the west end of the culvert (Sample S32). The impacted sediment did not likely result from impacted shallow groundwater directly, based on a comparison of the lower static water level in MW8 and the elevation of the irrigation canal (approximately 8 feet of difference in November 1993).

The sample collected from the southern swampy area (Sample S30) contained 57 mg/kg TPH as diesel, but no detectable BETX. The detected diesel may be attributable to run-off water from the aboveground tank area transported via the irrigation canal, or possibly to run-off water from the east portion of the site. The laboratory chromatogram indicates the presence of diesel and longer chain hydrocarbons similar to motor oil or asphalt. The most likely source of oil or asphalt is the paved area north of the swampy area.

6.6 CONTAMINANT SOURCES AND MIGRATION

The following sections summarize the distribution and potential sources for petroleum hydrocarbons detected during the Emergency RA and the RI.

6.6.1 Contaminant Sources and Migration - Soil

The Emergency RA soil investigation was limited to surface soils adjacent to the UST excavations, associated pipelines, and dispenser islands. TPH concentrations identified in this investigation were believed to be the result of vertical leaching from surface spills and/or releases from the UST systems. For instance, elevated TPH concentrations in soil samples collected

from piping trenches may be related to piping corrosion and leaking fittings observed during the UST removal. TPH concentrations in soils beneath dispenser islands were probably caused by fuel leaks/drips from fuel pumps above and/or fuel spilled during pump maintenance.

Elevated TPH concentrations detected in the soil sample collected during the RI from MW3 at 9 feet bgs likely resulted from surface spills at or upslope of this location. However, contaminants may have originated from the UST and dispenser island areas and migrated with groundwater. Similarly, TPH found at MW5 may have originated from surface spills migrating downward and/or UST release transported by groundwater. TPH present in MW6 may have resulted from surface spills upslope or UST release transported by groundwater.

Diesel found in a soil sample collected from the drain box at the west end of the north culvert is likely a result of run-off water from the site.

6.6.2 Contaminant Sources and Migration - Groundwater

The general groundwater flow direction across the site is to the northeast, as described in Section 5.4.2. TPH and BETX were either not detected or were at trace levels at upgradient locations (MW1, MW2, MW11). In contrast, free product or high concentrations of TPH and BETX were present at downgradient wells (MW4, MW5, and MW6), indicating the USTs and service islands were probably sources of TPH concentrations in groundwater.

Farther from the source area, hydrocarbons were not detected in Wells MW7, MW9, and MW10. MW8, however, contained elevated levels of dissolved hydrocarbons. These concentrations appear to have migrated from the source area to the northeast with groundwater. Farther downgradient from MW8 to the northeast, hydrocarbons were not detected in MW12.

6.6.3 Contaminant Sources and Migration - Surface Water

Surface water has not been impacted from petroleum hydrocarbons at the site based on surface water sample analyses.

6.6.4 Contaminant Sources and Migration - Sediment

Sediment in the swampy area appears to have been impacted by hydrocarbons from the site, based on the result of Sample S30. These hydrocarbons have likely been transported by surface runoff, as the surface water body is hydraulically above shallow groundwater.

Sediment in the irrigation canal adjacent to MW8 has likely been impacted by surface runoff via the culvert near the northeast corner of the site.

6.6.5 Contaminant Sources and Migration Summary

In summary, soil and groundwater contamination is mainly limited to TPH-related compounds: gasoline, diesel, BETX, and occasionally PAHs. The UST and dispenser island releases appear to be primary sources of contamination. Another significant source may be surface fuel spills in the dispenser island areas during dispensing operations and maintenance. The extent of impacted soil, sediment, surface water, and groundwater is shown on Figure 6-4.

The presence of free product and elevated TPH concentrations at downgradient wells indicate TPH contamination has been transported with or by groundwater. The extent of this contamination off site toward the northeast has been delineated, evidenced by downgradient wells with nondetectable hydrocarbon concentrations. The adjacent surface waters (swampy area to the south and the pond to the east) have apparently not been significantly affected by TPH contamination originating from the site.

7.0 DEVELOPMENT OF DRAFT CLEANUP LEVELS

7.1 INTRODUCTION

This section presents the rationale used to develop site-specific, risk-based draft cleanup levels for Bingo Fuel Stop. Development of draft cleanup levels follows Washington State regulations as issued under the Model Toxics Control Act, WAC 173-340-700. This section is organized into the following headings:

- ▶ Cleanup Level Development provides a general overview of the development of risk-based cleanup levels under MTCA guidance.
- ▶ Cleanup Level Considerations identifies chemicals representative of site contamination, assesses their potential exposure to human and ecological receptors, and evaluates their toxicity, regulatory criteria, and other appropriate toxicological factors.
- ▶ Estimating Risk-Based Concentrations uses MTCA guidance to develop medium-specific, risk-based concentrations that protect human health and the environment.
- ▶ Selection of Draft Groundwater Cleanup Levels documents the selection of appropriate chemical-specific groundwater cleanup levels.
- ▶ Selection of Draft Soil Cleanup Levels documents the selection of appropriate chemical-specific soil cleanup levels.

7.2 CLEANUP LEVEL DEVELOPMENT

MTCA presents three options to establish specific cleanup levels for sites contaminated by hazardous substances. These options are termed Methods A, B, and C; however, their order does not reflect an order of application.

MTCA Method B was used in developing cleanup levels for the site. Method B is the standard method used to establish cleanup levels for groundwater, surface water, soil, and air and is applicable to all sites. WAC 173-340-705(1) states Method B shall be used to develop cleanup levels unless one or more of the conditions for using Method A or Method C are demonstrated to exist, and the person conducting the cleanup action elects to utilize that method. The method requires calculation of risk-based cleanup levels using the risk equations and parameters listed in the regulations. Risk-based concentrations are then compared to any applicable federal or state regulations.

Method B takes into account the combined effects of multiple toxicants and exposure pathways. The calculated risk-based cleanup levels are then compared to modifying criteria, such as analytical MRLs, background concentrations, and actual exposure pathways, to establish site-specific cleanup levels. Method B is appropriate for determining cleanup levels at Bingo Fuel Stop due to the presence of hazardous substances not listed in Method A cleanup tables.

7.3 CLEANUP LEVEL CONSIDERATIONS

7.3.1 General

Site-specific cleanup level development begins by identifying chemicals representative of site contamination, referred to as chemicals of concern (COCs). COCs are then evaluated for their potential to cause adverse human and/or ecological effects. Using this information, risk-based concentrations are calculated to protect human and/or other populations from exposure to unacceptable COC concentration levels.

To develop risk-based cleanup levels, several steps are involved:

- ▶ Identifying chemicals detected during the RI as COCs.
- ▶ Identifying potential human and ecological receptors by characterizing contaminant transport and potential receptor exposure pathways.
- ▶ Compiling all available human health toxicity information for COCs on human and other receptors. This information is used in calculating risk-based concentrations.
- ▶ Compiling all Applicable or Relevant and Appropriate Requirements (ARARs). Groundwater and surface water quality criteria are the most applicable ARARs for use at this site; rationale for their use is discussed below.

7.3.2 Identification of COCs

Site history and fueling operations were considered when developing a list of potential COCs. Soil and groundwater samples were analyzed for the presence of potential COCs. All chemicals detected in soil and groundwater samples are included on the list of COCs, Table 7-1.

7.3.3 Potential Receptors and Exposure Pathways

Potential receptors may include human and animal populations as well as groundwater and surface water bodies. Exposure pathways describe the mechanism of contaminant transport to receptors and include airborne dusts, migration in groundwater, soil and water ingestion, and direct dermal contact, among others. Evaluation of potential pathways and receptors is necessary to determine which populations and resources will be impacted by contamination.

Exposure to contamination through ingestion of groundwater is the primary exposure pathway since area groundwater is currently used as drinking water sources for some private residences within a 1/2-mile radius.

Currently, access to contaminated soil is limited by fencing. On-site workers could contact chemicals in exposed soil through dermal absorption, incidental ingestion, and inhalation of soil that has been entrained as dust.

Hydrogeologic information indicates that groundwater can potentially discharge to the Yakima River, or to irrigation canals that eventually discharge to the Yakima River. Therefore, freshwater aquatic organisms could be exposed to chemicals migrating in groundwater. The Yakima River is not a source of drinking water in the vicinity and it is unlikely that river water would be used as a future drinking water source. However, during recreational use of the river, humans could be exposed to chemicals that have migrated from groundwater to surface water or could consume aquatic organisms that have bioaccumulated contaminants. Protection of aquatic life and against human exposure during recreational use or ingestion of fish are also elements of cleanup level development. The most likely transport pathway to this surface water body is site groundwater.

7.3.4 Compilation of Toxicity Information and ARARs

Toxicity Information: Toxicity factors for chemicals detected in soil and groundwater were compiled from standard EPA reference sources. These include the EPA Integrated Risk Information System (EPA, 1993a) and the Health Effects Assessment Summary Tables (EPA, 1993b). Toxicological information is presented in Table 7-2. Where available, primary toxicological information, including cancer potency factors (CPF) and chronic reference doses (RfD), is presented. Table 7-2 also lists primary (and some secondary) adverse toxicological endpoints of COCs, and apportionment factors. Apportionment factors, used in the downward adjustment of cleanup levels to reflect multiple chemical exposures, are further discussed in Section 7.4.3.

Specific toxicity information is not available for the following chemicals detected on site:

- ▶ lead
- ▶ 1-methylnaphthalene
- ▶ 2-methylnaphthalene
- ▶ phenanthrene

Cleanup levels cannot be developed for chemicals lacking toxicity information. However, these chemicals are similar in environmental fate and mobility to chemicals detected on site that possess well-characterized toxicological parameters. Compound concentrations will be compared to developed cleanup levels for chemically similar COCs.

A standard toxicity factor has not been developed for lead because of unique issues in evaluating lead exposure and toxicity. However, risk-based criteria have been established for lead-contaminated media and are discussed.

Compilation of ARARs: Possible ARARs include federal or state standards and proposed standards for chemicals in soil or groundwater.

- ▶ Soil: No soil ARARs are available for chemicals detected. However, issues related to lead in soil are addressed by EPA. An interim cleanup level of 500 to 1,000 mg total lead per kg soil at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (Superfund) sites characterized as residential is in the process of being finalized by EPA (EPA, 1992a, 1990, and 1989).

MTCA requires that concentrations of contaminants allowed to remain in soils not degrade groundwater quality (WAC 173-340-740[3][a][ii][A]); therefore, ARARs for chemicals detected in soil are relevant to groundwater ARARs. ARARs for groundwater are discussed below.

- ▶ **Groundwater:** Federal water quality maximum contaminant levels (MCLs) are ARARs for groundwater that is used as a source of drinking water. Current residential properties within a 1-mile radius of Bingo Fuel Stop use groundwater as a source of drinking water; therefore, groundwater MCLs are applicable in developing Method B cleanup levels. Federal MCLs are listed in Table 7-3. Site hydrogeology indicates that groundwater traversing site boundaries has the potential to discharge to the Yakima River. In consideration of the potential for cross-media contamination (i.e., soil contaminants leaching into groundwater and subsequently being transported into surface water), surface water ARARs are identified (where possible) for chemicals detected in groundwater.
- ▶ **Surface Water:** Ecology is presently adopting the National Toxics Rule (EPA, 1992b) as an ARAR for surface water (McCormick, 1993). The National Toxics Rule establishes legally enforceable federal standards for select priority toxic pollutants in surface water. The Rule will bring all states into compliance with the requirements of Section 303(c)(2)(B) of the Clean Water Act.

Until the National Toxics Rule is adopted, freshwater criterion (continuous concentration) for the protection of both aquatic life and human health from the consumption of aquatic organisms are preeminent. Chronic Freshwater Quality Criteria for COCs are presented in Table 7-3.

The criterion for consumption of aquatic organisms considers human ingestion of 6.5 grams of fish per day and accounts for trophic level bioaccumulation. A separate criterion for ingestion of surface water as a drinking water source, with subsequent consumption of aquatic organisms, is not considered relevant because the Yakima River is not used as a drinking water source.

7.3.5 Petroleum Hydrocarbon Components

In accordance with WAC 173-340-740(3)(a)(ii)(B), cleanup levels were developed for individual toxic TPH constituents (i.e., BETX and PAHs) and compared to the Method A cleanup level for the mixture of constituents commonly referred to as TPH. The listed regulation section states that "the person undertaking the cleanup may elect to make this determination of appropriate cleanup goals on the basis of data on individual hazardous substances that comprise the total petroleum hydrocarbon."

TPH mixtures commonly include individual components that range in toxicity from nonhazardous chemicals to those presenting carcinogenic risks. Under Method B, separate risk-based cleanup levels may be derived for each chemical component detected so that cleanup levels more accurately reflect the degree of risk posed by each detected chemical present in a particular TPH mixture.

Primary TPH COCs detected on site are in the aromatic fraction. BETX and PAHs are typically used in characterizing potential risks and cleanup requirements for petroleum-contaminated sites; these chemicals include the most toxic known compounds likely present in TPH and exhibit a broad range of

physical and chemical properties that influence environmental toxicity and mobility (Kostecki and Calabrese, 1989). BETX and PAHs can serve as indicators of overall site risk and remediation needs. Remediation based on cleanup levels for these individual TPH COCs will also result in cleanup of other substances with similar environmental fate properties.

7.4 ESTIMATING RISK-BASED CONCENTRATIONS

7.4.1 Introduction

Risk-based concentrations estimated under Method B allow media-specific concentrations that protect public health and the environment to be established. Development of these concentrations take into account site-specific factors that influence the nature of risk posed by the site (i.e., land use) and factors that affect the movement of chemicals in the environment (i.e., soil type, depth to groundwater, rainfall). Media-specific risk-based concentrations are then compared to other applicable contaminant concentrations and cleanup levels are selected.

7.4.2 Target Risk Levels

Under MTCA Method B, the total target risk level from exposure to all carcinogenic substances occurring on site following cleanup should not exceed 1×10^{-5} (i.e., a 1 in 100,000 incremental risk of developing cancer over a lifetime from a 30-year exposure period). The total target risk level from exposure to any individual carcinogen should not exceed 1×10^{-6} . For noncarcinogenic health effects, the target hazard index is 1.0 (i.e., an estimated exposure level at the RfD) for combined exposures to all noncarcinogenic substances eliciting the same type of toxic response.

7.4.3 Apportionment of Risk-Based Concentrations

Risk-based concentrations estimated using the approach presented in MTCA must be adjusted downward to reflect consideration of potential additive risks as a result of multiple exposures. Such adjustments ensure that total risks presented by site exposures following cleanup do not exceed the target levels established in MTCA.

The toxicological endpoints of the COCs are listed in Table 7-2; these are used in setting the apportionment factor, also listed in the table (WAC 173-340-708[5]). Apportionment factors are used in the downward adjustment of cleanup levels to reflect multiple chemical exposures.

For example, two site COCs are liver toxicants; development of soil and groundwater cleanup levels for these liver toxicants are therefore adjusted (apportioned) downward by a factor of 2 to account for multiple chemical exposures. Noncarcinogenic COCs affecting only one toxicological endpoint do not have apportionment factors indicated; cleanup levels for these are based on unapportioned hazard.

Only one COC detected in soil and groundwater is listed as a carcinogen. Because unadjusted risk-based cleanup levels under Method B for individual carcinogens are calculated to protect against cancer risks at 1×10^{-6} , and because the total cancer risk is less than or equal to 1×10^{-5} , adjustment of risk-based cleanup concentrations is unnecessary.

Risk-based concentrations for contaminants in surface water, groundwater, and soil were derived assuming exposure only to a single chemical, and are listed in Table 7-4 as "Unapportioned Risk-Based Concentrations". Values listed as "Apportioned Risk-Based Concentrations" have been adjusted, as described above, to account for exposures to multiple chemicals via multiple exposure routes.

7.5 SUMMARY OF DRAFT GROUNDWATER CLEANUP LEVELS

Groundwater cleanup levels were primarily based on protection of groundwater quality for use as drinking water. MTCA guidance suggests that groundwater concentrations also meet relevant surface water cleanup levels at the point of discharge to prevent surface water contamination; cleanup levels were developed to assess potential concerns about groundwater migration and discharge to the Yakima River. Cleanup levels based on estimated risk and ARARs are discussed below and presented in Table 7-5.

7.5.1 Groundwater and Surface Water Risk-Based Concentrations

Groundwater: Groundwater risk-based concentrations are those concentrations that protect human health from chemical-specific unacceptable risks or hazards resulting from the ingestion of contaminated drinking water.

Following the standard reasonable maximum exposure (RME) approach presented in WAC 173-340-720, risk-based groundwater concentrations were developed assuming ingestion of chemicals in contaminated drinking water. This includes an inhalation correction factor for VOCs "which takes into account exposure to hazardous substances which are volatilized and inhaled during showering and other domestic activities" (WAC 173-340-720[7]).

Table 7-4 lists Method B groundwater risk-based concentrations. As discussed, these concentrations were also apportioned to reflect consideration of potential additive risks from exposures to multiple substances.

Surface Water: Surface water risk-based concentrations are those concentrations that protect human health from chemical-specific unacceptable risks or hazards resulting from the ingestion of contaminated fish.

Following the standard RME approach presented in WAC 173-340-730, risk-based surface water concentrations were developed assuming ingestion of chemicals that have bioaccumulated in edible fish or shellfish. Calculating risk-based surface water cleanup levels under MTCA guidance requires the use of chemical-specific fish bioconcentration factors (BCF). BCFs are published by Ecology (Ecology, 1993d) and are also used in deriving EPA ambient water quality criteria (i.e., the National Toxics Rule).

Risk-based cleanup levels calculated for surface water assume that an exposed individual will obtain one-half of his/her total fish intake from the vicinity of the site over a period of 30 years. This assumption will likely overestimate actual exposures because of the relatively small site size and distance to water source. Use of these conservative exposure assumptions increases the protectiveness of calculated surface water cleanup levels.

Table 7-4 lists Method B surface water risk-based concentrations. As discussed, these concentrations were also apportioned to reflect consideration of potential additive risks from exposures to multiple substances.

Table 7-4 lists the selected risk-based value by comparing both groundwater and surface water concentrations. The most stringent value is used as the selected risk-based concentration.

7.5.2 Groundwater and Surface Water ARARs

Groundwater and surface water ARARs are listed in Table 7-3. The most stringent ARARs are presented in Table 7-5 as the selected groundwater and surface water criteria.

7.5.3 Selection of Draft Groundwater Cleanup Levels

The selection of groundwater cleanup levels begins by comparing apportioned risk-based concentrations to their respective ARARs. The most stringent value is used as the selected cleanup level unless the natural background concentration or the MRL is greater, in which case that value is used. Table 7-5 presents the selected groundwater cleanup levels.

The most stringent groundwater criterion for benzene is its risk-based concentration; however, the selected groundwater cleanup level is 5 ug/L--the MCL for benzene. Ecology allows MCLs to be used as cleanup levels if they are sufficiently protective under MTCA regulations. The MCL for benzene, a carcinogen, is considered sufficiently protective since this concentration represents less than the 1×10^{-5} target risk level under MTCA (Ecology, 1993a). In addition, since only one carcinogen was detected on site, the total target risk using the MCL is also less than 1×10^{-5} .

7.5.4 Uncertainty Analysis: Groundwater Cleanup Levels

Evaluation of Groundwater Cleanup Levels for TPH Constituents: Cleanup levels for TPH constituents were developed under MTCA Method B guidelines. Currently, Ecology suggests using Method A cleanup levels for TPH because Method B cleanup levels are based on an incomplete toxicological characterization of unidentified TPH constituents and may not be protective of human health and the environment. Method A cleanup levels for TPH in groundwater are listed under WAC 173-340-720(2); these levels should be used as interim cleanup goals until Ecology finalizes additional guidance.

Qualitative Evaluation of Groundwater Contaminants Lacking Cleanup Levels: Groundwater contaminants without standardized toxicity factors or ARARs were evaluated qualitatively by comparing them to structurally similar COCs for which cleanup levels were developed. Potential cleanup levels for these chemicals can be compared to COCs that have cleanup levels and are chemically similar (listed below) to chemicals that have well characterized oral toxicity factors:

<u>No Cleanup Level</u>	<u>Structurally Similar Chemical of Concern</u>
▶ 1-methylnaphthalene	▶ naphthalene
▶ 2-methylnaphthalene	▶ naphthalene
▶ phenanthrene	▶ anthracene

Detected on-site concentrations of chemicals without developed cleanup levels were in no instance above the developed cleanup level for structurally similar COCs. Remediation of any COC, if necessary, would likely promote additional attenuation of non-COCs, assuring adequate protection of human and/or ecological receptors.

7.6 SUMMARY OF DRAFT SOIL CLEANUP LEVELS

Soil cleanup levels were calculated under the residential exposure scenario. Soil cleanup levels were estimated by assuming ingestion of soil can occur; cleanup levels also take into consideration protection of groundwater and surface water resources. Cleanup levels based on estimated risk, ARARs, and background concentrations are discussed below and presented in Table 7-6.

7.6.1 Soil Risk-Based Concentrations

Risk-based soil cleanup levels were calculated assuming incidental soil ingestion. Under Method B guidance outlined in WAC 173-340-740(3)(a), the RME scenario assumes the receptor is a young child living in a residential area. Table 7-6 lists apportioned Method B soil risk-based concentrations; these concentrations reflect consideration of potential additive risks from exposures to multiple substances.

7.6.2 Soil ARARs

No soil ARARs are available for any COC detected at the site. Issues related to lead have been discussed. Ecology established 250 mg lead/kg soil and 1,000 mg lead/kg soil as the Method A residential and industrial soil cleanup levels, respectively (WAC 173-340-740[2] and -745[2]). These are presented as the selected soil lead cleanup level as indicated in Table 7-7.

7.6.3 Soil Cleanup Levels Protective Against Cross-Media Contamination

MTCA requires that cleanup levels consider the potential for cross-media contamination. Site-specific cross-media contamination could occur if contaminants in soil reach groundwater and then potentially discharge into the irrigation ditch or Yakima River surface water. Thus, soil cleanup levels protective of both groundwater and surface water quality have been calculated. The fraction of soil contaminants able to reach groundwater is termed the chemical leaching potential.

The MTCA default leaching potential for all chemicals is 100; 1/100 (1 percent) of the chemical's concentration in soil will leach into groundwater; this value was used for all chemicals detected at the site.

Leaching potential factors were applied to the most stringent ARAR or risk-based target groundwater and surface water concentration to establish the soil cleanup level protective of groundwater quality. Soil cleanup levels protective of groundwater quality are also listed in Table 7-6.

7.6.4 Background Soil Concentrations and MRLs

Washington State background soil concentrations at the 90th percentile are listed in Table 7-6.

Soil MRLs are also listed in Table 7-6. These levels represent best available technology using current analytical methodology.

7.6.5 Selection of Draft Soil Cleanup Levels

The selection of soil cleanup levels under Method B begins by comparing apportioned risk-based concentrations to their respective ARARs (if they exist) and soil concentrations protective of groundwater quality. The most stringent value is used as the selected cleanup level unless the natural background concentration or the MRL is greater, in which case that value is used. Table 7-6 presents the selected soil cleanup levels.

7.6.6 Uncertainty Analysis: Soil Cleanup Levels

Evaluation of Soil Cleanup Levels for TPH Constituents: Cleanup levels for TPH constituents were developed under MTCA Method B guidelines. Currently, Ecology suggests using Method A cleanup levels for TPH because Method B cleanup levels are based on an incomplete toxicological characterization of unidentified TPH constituents and may not be protective of human health and the environment. Method A cleanup levels for TPH in residential soil are listed under WAC 173-340-740(2); these levels should be used as interim cleanup goals until Ecology finalizes additional guidance.

Qualitative Evaluation of Soil Contaminants Lacking Cleanup Levels: Soil contaminants without standardized toxicity factors or ARARs were evaluated qualitatively by comparing them to structurally similar COCs for which cleanup levels were developed. Soil risk-based cleanup levels were developed for anthracene, listed in Table 7-6; however, this level was not listed in the summary Table 7-7 because anthracene was never detected in soil. Soil cleanup levels for the following chemicals were not developed; potential cleanup levels for these chemicals can be compared to COCs that have cleanup levels and are chemically similar (also listed) or to chemicals that have well characterized oral toxicity factors:

<u>No Cleanup Level</u>	<u>Structurally Similar Chemical of Concern</u>
▶ 1-methylnaphthalene	▶ naphthalene
▶ 2-methylnaphthalene	▶ naphthalene
▶ phenanthrene	▶ anthracene

Detected on-site concentrations of chemicals without developed cleanup levels were in no instance above the developed cleanup level for structurally similar COCs. Remediation of any COC, if necessary, would likely promote additional attenuation of non-COCs, assuring adequate protection of human and/or ecological receptors.

7.7 DRAFT GROUNDWATER AND SOIL CLEANUP LEVELS

Groundwater and soil summary cleanup levels are presented in Sections 7.5 and 7.6, respectively. Draft cleanup levels for soil and groundwater are summarized in Table 7-7, along with the rationale for their selection.

All groundwater cleanup levels developed for organic chemicals (VOCs and semivolatile organic compounds) are primarily based on risk-based groundwater concentrations. All soil cleanup levels developed for these chemicals are based on protection of groundwater quality.

7.8 DRAFT CLEANUP LEVEL EXCEEDANCES

This section identifies sampling locations where soil and groundwater COC concentrations exceed draft Method B cleanup levels. A limited number of exceedances were identified; these are summarized below by medium and spatially illustrated in Figures 7-1 and 7-2. Draft soil and groundwater cleanup levels are listed on Table 7-7, and exceedance locations for soil and groundwater are listed on Tables 7-8 and 7-9.

Soil: Chemical concentrations in soil exceeding Method B cleanup levels are listed below by location:

- ▶ Soil samples S7, S8, S10, and S27 exceeded draft cleanup levels for benzene, ethylbenzene, and toluene; soil boring S8 also exceeded the cleanup level for total xylenes.
- ▶ Soil samples S21, S22, S28, MW6 @ 17.5', and MW6 @ 22.5' exceeded draft cleanup levels for benzene only.
- ▶ Soil sample S8 exceeded the draft cleanup level for xylenes.
- ▶ No soil sample exceeded draft cleanup levels for any PAH or lead.

Groundwater: Chemical concentrations in groundwater exceeding draft Method B cleanup levels are listed below by location:

- ▶ Monitoring wells MW5 and MW6 exceeded draft cleanup levels for benzene, ethylbenzene, and toluene.
- ▶ Monitoring well MW8 exceeded draft cleanup levels for benzene and ethylbenzene.
- ▶ Monitoring wells MW1, MW2, and MW3 exceeded draft cleanup levels for lead; monitoring well MW1 also exceeded the cleanup level for nitrate/nitrite.

Uncertainty: Lead exceeded draft groundwater cleanup levels in three monitoring wells. The highest concentration of lead detected on site occurred in the southernmost (upgradient) well, MW1. This concentration, 13 ug/L, is above the draft cleanup level of 3.2 ug/L (based on surface water criteria); however, it is below the federal MCL of 15 ug/L. Lead is the only chemical detected on site where its cleanup level is based on its surface water criteria; this may be inappropriate since natural attenuation and dilution will occur during groundwater transport from the Bingo Fuel Stop to

the Yakima River. Further investigation of background groundwater quality may be appropriate if exceedances of lead in groundwater represent unacceptable risks to human health and the environment.

Method A TPH Cleanup Levels: As discussed in Sections 7.5.4 and 7.6.6, Ecology currently suggests using Method A or the Matrix Evaluation to develop cleanup levels for a TPH mixture in contrast to using the Method B risk-based approach as outlined in WAC 173-340-705. Ecology's belief, stated in a January 28, 1994 internal memorandum (Ecology, 1994), indicates that development of Method B risk-based cleanup levels is based on an incomplete toxicological characterization of all TPH constituents and may not be protective of human health and the environment. This current internal policy may change as existing and additional toxicological information is accepted concerning the risks to human health and the environment resulting from TPH and its constituents. If the regulations governing establishment of TPH cleanup levels are revised in the future, cleanup of TPH will be modified in accordance with the new regulations.

Method A cleanup levels for TPH-contaminated soil and water are outlined under WAC 173-340-740(2) and -720(2), respectively, and listed in Tables 7-10 and 7-11.

8.0 USE OF THIS REPORT

This report has been prepared exclusively for Burns Bros., Inc. and its other consultants for this project only. The analyses, conclusions, and recommendations in this report are based on data described herein and our experience and professional judgment. The data were either made available to AGI or reasonable obtained within the practical constraints of our scope of services. AGI cannot be responsible for the interpretation by others of the data contained herein.

Our work has been performed in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the area. No other warranty, express or implied, is made.

9.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR). 1990. Toxicological Profile for Polycyclic Aromatic Hydrocarbons, Draft. U.S. Public Health Service, Atlanta, GA.

Applied Geotechnology Inc. (AGI). 1992a. Emergency Remedial Action Plan for Bingo Fuel Stop in Accordance with Washington State Department of Ecology Enforcement Order No. DE 92TC-C109, March 5, 1992.

AGI. 1992b. Letter from AGI to Burns Bros., Inc. dated March 9, 1992.

AGI. 1992c. Emergency Remedial Action Report for Bingo Fuel Stop in Accordance with Washington State Department of Ecology Enforcement Order No. DE 92TC-C109, June 5, 1992.

AGI. 1993a. Work Plan, Remedial Investigation/Feasibility Study, Bingo Fuel Stop, Thorp, Washington, April 22, 1993.

AGI. 1993b. Personal Communication, Peter Barry and Robert Dunnington, May 19, 1993.

Kostecki, P.T., and E.J. Calabrese. 1989. Petroleum contaminated soil. Volume 3. C.E. Bell (ed). University of Massachusetts, School of Public Health, Environmental Health Sciences Program, Amherst, MA. Lewis Publishers.

McCormick, C. 1993. Telephone conversation with Craig McCormick, Toxics Cleanup Program, Washington State Department of Ecology, on August 11, 1993. Ecology will follow the National Toxics Rule 40 CFR 131 for surface water quality criteria.

Panattoni, Gene, 1994. Meeting with Gene Panattoni, West Side Canal, March 18, 1994.

Porter, S.C. 1976. Pleistocene glaciation in the southern part of the North Cascade Range, Washington. Geological Society of American Bulletin V. 87: p.p. 61-75.

U.S. Environmental Protection Agency. 1993. Drinking Water Regulations and Health Advisors. Office of Water, Washington D.C.

U.S. Environmental Protection Agency. 1993a. Integrated Risk Information System, On-line. Office of Health and Environmental Assessment, Environmental Criteria and Assessment Office, Cincinnati, OH.

U.S. Environmental Protection Agency. 1993b. Health Effects Assessment Summary Tables, Annual Update. Office of Solid Waste and Emergency Response, 9200.6-303(93-1), EPA 540-R-93-058, Cincinnati, OH.

U.S. Environmental Protection Agency. 1992a. Review of Draft Directive on OSWER Soil Lead Cleanup Guidance, from D.R. Clay, Assistant Administrator, Office of Solid Waste and Emergency Response, Washington, D.C.

U.S. Environmental Protection Agency. 1992b. Water Quality Standards; Establishment of Numeric Criteria for Priority Toxic Pollutants; States' Compliance; Final Rule. Federal Register 57(246):60848-60922.

U.S. Environmental Protection Agency. 1992c. Memorandum, Oral Reference Doses and Oral Slope Factors for JP-4 (CAS No. not identified), JP-5 (CAS No. not identified; similar to kerosene, CAS No. 8008-20-6), Diesel Fuel (CAS No. 68334-30-5), and Gasoline (CAS No. 8006-61-9)(AVGAS)[McChord AFB (Wash Rack/Treatment)/Tacoma, WA]. Joan S. Dollarhide, Associate Director, Superfund Health Risk Technical Support Center, Chemical Mixtures Assessment Branch.

U.S. Environmental Protection Agency. 1990. Supplement to Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites. OSWER Directive No. 9355.4-02A.

U.S. Environmental Protection Agency. 1989. Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites, from H.L. Longest, II, Director, Office of Emergency and Remedial Response. OSWER Directive, 9355.4-02, Washington, D.C.

U.S. Geological Survey. 1993. Status Report on Washington State Hazardous Waste Project Studies Conducted by U.S.G.S. Correspondence to Washington State Department of Ecology, January 26, 1993.

Waitt, R.B., Jr. 1979. Late Cenozoic Deposits, Landforms, Stratigraphy, and Tectonism in Kittitas Valley, Washington. Geological Survey Professional Paper 1127.

Washington Department of Ecology. 1992c. Memorandum, June 30, 1992 Cleanup Standards Update. Leslie Keill, Toxics Cleanup Program.

Washington Department of Ecology. 1993a. Memorandum, Guidance on the Use of MCLs as Cleanup Levels, Carol Kraege, Toxics Cleanup Program, March 15, 1993.

Washington Department of Ecology. 1993b. Agreed Order No. DE 93TC-C171, March 17, 1993.

Washington Department of Ecology. 1993c. Ecology letter to Burns Bros., Inc. dated April 28, 1993.

Washington Department of Ecology. 1993d. Memorandum, July 1993 Update to the Model Toxics Control Act (MTCA) Cleanup Standards Database, Barb Huether, Toxics Cleanup Program, July 9, 1993.

Washington Department of Ecology. 1994. Memorandum, TPH Cleanup Levels and Method B. Carol Fleskes, Toxics Cleanup Program.

Washington Department of Ecology. 1992a. Enforcement Order No. DE 92TC-C109, February 11, 1992.

Washington Department of Ecology. 1992b. Ecology letter to Burns Bros., Inc. dated February 26, 1992.

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Quality Assurance/Technical Review by:



Gary Laakso
Remediation Services Manager

DPD/PPB/jlh

Table 2-1**Nearby Domestic Well Information**

Burns Bros./Bingo Fuel Stop

Thorp, Washington

Well Number	Location	Name	Depth of Well (Below Ground Surface)
1	Thorp Hwy. residence south of Bingo Fuel Stop	Brain Residence	Unknown
2	Thorp Hwy. residence east of Bingo Fuel Stop	Howry Residence	9
3	West of Bingo Fuel Stop	Puget Power	350
4	Depot Rd. residence east of Antique Mall	Rowley Residence	125+
5	Depot Road	Thorp Antique Mall	100+
6	Depot Rd. residence NW of Antique Mall	Unknown	Unknown
7	East side of Thorp Hwy., north of Depot Rd.	Gibson Residence	"Shallow"
8	West side of Thorp Hwy. north of Depot Rd.	George Residence	285
9	Depot Rd., 1/2 mile west of Thorp Hwy.	Unknown	Unknown

Table 2-2
Underground Storage Tank Specifications
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Storage Tank	Capacity (gal)	Contents	Installation Date
1*	10,000	Diesel	1972
2*	10,000	Unleaded Gasoline	1972
3*	5,000	Unleaded Gasoline	1972
4*	12,000	Leaded Gasoline	1977
5*	10,000	Leaded Gasoline	1977
6**	1,000 ?	Heating Oil	?
7**	550 ?	Heating Oil	?

Notes:

*Removed from site in 1992.

**Out of service, remaining on site.

Table 3-1
Well Construction Summary
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Well Designation	General Well Location	Date Completed	Drilling Method	Drilled Depth (ft. bgs)	Well Diameter (inches)	Screen Type	Screened Interval (ft. bgs)	Measuring Point Elevation ^a (ft. above MSL)
MW1	On Site	07/02/93	Air Rotary ^b	18.5	4	0.020-inch slot PVC ^c	3.0-18.5	1644.44
MW2	On Site	07/02/93	Air Rotary	18.5	4	0.020-inch slot PVC	5.5-18.5	1644.69
MW3 ^d	On Site	06/30/93	Air Rotary	80.9	4	0.020-inch slot PVC	70.5-80.5	1641.38
MW4	On Site	07/06/93	Air Rotary	17.5	4	0.020-inch slot PVC	5.5-17.5	1640.32
MW5	On Site	07/01/93	Air Rotary	18.5	4	0.020-inch slot PVC	3.0-18.5	1642.14
MW6	Off Site	07/06/93	Air Rotary	30.5	4	0.020-inch slot PVC	4.0-29.5	1639.34
MW7	Off Site	10/26/93	6.25-inch ID HSA	14.0	4	0.020-inch slot PVC	4.0-14.0	1624.25
MW8	Off Site	10/27/93	6.25-inch ID HSA	14.5	4	0.020-inch slot PVC	4.0-14.0	1626.66
MW9	Off Site	10/27/93	6.25-inch ID HSA	16.5	4	0.020-inch slot PVC	6.0-16.0	1626.16
MW10	Off Site	10/28/93	6.25-inch ID HSA	16.5	4	0.020-inch slot PVC	6.0-16.0	1628.27
MW11	On Site	10/29/93	4.25-inch ID HSA	17.5	2	0.020-inch slot PVC	4.0-17.0	1645.73
MW12	Off Site	10/28/93	4.25-inch ID HSA	14.5	2	0.020-inch slot PVC	4.0-14.0	1623.53
PZ1 ^d	On Site	06/30/93	Air Rotary	18	1	Hand slotted	6.5-18.0	1641.38

Notes:

- a) Measuring point is north side of top of PVC well casing; survey datum: standard disk number U245.1944, Elevation 1637.484.
 b) Air rotary rig using an 8.6-inch inside diameter steel drill casing.
 c) PVC - Schedule 40 polyvinyl chloride plastic pipe with milled slots.
 d) MW3 and PZ1 is a dual completion.
 ft. bgs - Feet below ground surface.
 MSL - Mean Sea Level.

Table 4-1
Physical Properties – Soil
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Boring I.D.	Sample Depth (ft. bgs)	USCS Classification	Moisture Content (%)	Dry Density (pcf)	Specific Gravity	Porosity (total)	Particle Size Analysis Summary			
							Percent > #4 Sieve	Percent < #4 Sieve	Percent > #200 Sieve	Percent > #200 Sieve
MW3	13	Gravel (GW)	7.4	133.4	2.66	0.196	74.49	15.97	9.54	
MW3	50	Sand (SW)	16.2	112.6	2.69	0.329	30.13	62.82	7.05	
MW6	12.5	Clay (CH)	14.5	107.1	2.82	0.391	24.45	21.48	54.07	
MW10	13	Sandy Silt (ML)	28.6	89.6	2.90	0.505	0.0	31.71	68.29	

Notes:

ft. bgs – Feet below ground surface.
 pcf – Pounds per cubic foot.
 USCS – Unified Soil Classification System.
 #4 Sieve – Equivalent to 5 millimeters.
 #200 Sieve – Equivalent to 0.1 millimeters.

Table 5-1
Mean Monthly Climatological Data, 1988 – 1992
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Month	Mean Monthly ^a Precipitation (inches)	Mean Monthly ^a Temperature (°F)
January	0.66	29.6
February	0.52	33.2
March	0.79	40.5
April	0.79	48.9
May	0.54	54.6
June	0.89	62.1
July	0.56	67.8
August	0.57	67.3
September	0.04	60.2
October	0.46	48.2
November	1.05	38.0
December	0.72	22.9
Annual Precipitation	7.59	

Note:

a) Mean of 1988 – 1992 data (NOAA; 1988, 1989, 1990, 1991, 1992).

Table 5-2
Groundwater Elevation Data
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Well I.D.	Reference Elevation (ft. MSL)	07/07/93		11/05/93	
		Depth to Groundwater	Groundwater Elevation	Depth to Groundwater	Groundwater Elevation
		ft. btc	ft. MSL	ft. btc	ft. MSL
MW1	1644.44	7.10	1637.34	7.00	1637.44
MW2	1644.69	8.05	1636.64	8.25	1636.44
MW3	1641.38	14.20	1627.18	15.44	1625.94
PZ1	1641.38	8.91	1632.47	10.19	1631.19
MW4	1640.32	8.21	1632.11	9.01	1631.31 *
MW5	1642.14	6.55	1635.59	7.67	1634.47
MW6	1639.34	20.85	1618.49	22.99	1616.42 *
MW7	1624.25	N/A	N/A	7.16	1617.09
MW8	1626.66	N/A	N/A	10.52	1616.14
MW9	1626.16	N/A	N/A	10.13	1616.03
MW10	1628.27	N/A	N/A	11.34	1616.93
MW11	1645.73	N/A	N/A	8.37	1637.36
MW12	1623.53	N/A	N/A	7.99	1615.54

Notes:

July 7, 1993 data obtained when groundwater was not being pumped at the site.

November 5, 1993 data obtained when groundwater was being pumped at the site.

*Corrected for the presence of free product using:

Corrected depth to water = (measured depth to water) - (product thickness) x 0.8.

ft. btc - Feet below top of casing.

ft. MSL - Feet above Mean Sea Level.

N/A - Not available.

Table 5-3
Aquifer Test Results
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Solution Method	Transmissivity (T) (ft ² /min)	Hydraulic Conductivity (K) ^a		
		(ft/min)	(cm/sec)	(gal/day-ft ²)
<u>MW3 Recovery Data</u> Theis (Recovery)	3.8×10^{-3}	1.1×10^{-4}	5.5×10^{-5}	1.2
<u>MW4 Drawdown Data</u> Jacob-Lohman (Variable Discharge)	3.5×10^{-1}	8.3×10^{-3}	4.3×10^{-3}	91.1
Thiem (Distance-Drawdown)	1.9×10^{-1}	4.5×10^{-3}	2.3×10^{-3}	48.7
<u>MW4 Recovery Data</u> Theis (Recovery)	1.7×10^{-1}	4.0×10^{-3}	2.1×10^{-3}	44.5

Notes:

a) Based on saturated thickness of 35 feet for the Lower Zone and 42 feet for the Upper Zone.

cm/sec - Centimeters per second.

ft/min - Feet per minute.

ft²/min - Square feet per minute.

gal/day-ft² - Gallons per day per square foot.

Table 6-1
Chemical Analysis Schedule – Soil
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	EPA Method					Washington State Method	
	8020 BETX	8015M TPH	7421 Lead	8310 PAHs	8240 VOCs	WTPH-D TPH-D	WTPH- 418.1 TPH
S1	X	X			X		
S2	X	X					
S3		X			X		
S4	X	X					
S5	X	X	X				
S6	X	X	X				
S7	X	X	X				
S8	X	X	X				
S9	X	X					
S10	X	X					
S11	X	X					
S12	X	X					
S13	X	X					
S14	X	X					
S15		X					X
S16		X					X
S17	X	X					
S18	X	X					
S19	X	X					
S20	X	X	X				
S21	X	X					
S22	X	X					
S23	X	X					
S24	X	X					
S26	X	X	X				
S27	X	X	X				
S28	X	X	X				
S29	X	X					
S31	X					X	
S32	X					X	
MW1 @ 7.5'	X	X	X	X			
MW2 @ 7.5'	X	X	X	X			
MW3 @ 9.0'	X	X	X	X			
MW3 @ 42.5'	X	X	X	X			
MW4 @ 7.5'	X	X	X	X			
MW4 @ 17.5'	X	X	X	X			
MW5 @ 7.5'	X	X	X	X			
MW5 @ 10.0'	X	X	X	X			
MW6 @ 17.5'	X	X	X	X			
NW6 @ 50'	X	X	X	X			
MW5 @ 22.5'	X	X	X	X			
MW6 @ 30'	X	X	X	X			
MW7 @ 4.5'	X	X	X	X			
MW8 @ 8.5'	X	X	X	X			
MW9 @ 8'	X	X	X	X			
MW10 @ 8'	X	X	X	X			
MW10 @ 50'	X	X	X	X			
MW11 @ 3.5'	X	X	X	X			
MW11 @ 7.5'	X	X	X	X			
MW12 @ 3.5'	X	X	X	X			

Notes:

TPH – Total petroleum hydrocarbons, quantified as gasoline and diesel-range fuel hydrocarbons.
 PAHs – Polycyclic aromatic hydrocarbons.
 VOCs – Volatile organic compounds.

Table 6-2
Hydrocarbons and Lead Detected in Soil
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	Sample Location	Sample Depth	Sample Date	EPA Test Methods						WTPH 418.1M (mg/kg)	EPA 7421 Lead (mg/kg)
				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'	8	03/11/92	0.032	0.28	0.13	2.8	930	12,000	NA	NA
S2	E.WALL, EXCAV.1 @ 9'	9	03/11/92	0.22	1.9	2.1	10	1,200	8,700	NA	NA
S3	N.WALL, EXCAV.1 @ 8'	8	03/11/92	NA	NA	NA	NA	1,600	10,000	NA	NA
S4	W.WALL, EXCAV.1 @ 8'	8	03/11/92	<0.028	0.23	<0.028	2.2	140	540	NA	NA
S5	S.WALL, EXCAV.2 @ 7.5'	7.5	03/12/92	<0.030	<0.030	<0.030	<0.030	<5	<25	NA	<5.8
S6	W.WALL, EXCAV.2 @ 8'	8	03/12/92	<0.029	0.10	<0.029	0.034	20	32	NA	<5.6
S7	N.WALL, EXCAV.2 @ 8'	8	03/12/92	26	61	210	470	2,500	420	NA	<5.6
S8	E.WALL, EXCAV.2 @ 8'	8	03/12/92	92	300	1,000	1,800	10,000	600	NA	<5.4
S9	EXC-2, W. PIPING @ 3'	3	03/12/92	<0.028	<0.028	<0.028	<0.028	7	<25	NA	NA
S10	PIPING TRENCH @ 4'	4	03/13/92	21	69	200	410	1,000	100	NA	NA
S11	PIPING TRENCH @ 3'	3	03/13/92	<0.032	0.40	0.056	2.6	240	2,000	NA	NA
S12	PIPING TRENCH @ 3'	3	03/13/92	<0.031	<0.031	<0.031	<0.031	<5	<25	NA	NA
S13	PIPING TRENCH @ 3'	3	03/13/92	<0.035	<0.035	<0.035	<0.035	<5	<25	NA	NA
S14	PIPING TRENCH @ 4'	4	03/13/92	<0.030	<0.030	<0.030	<0.030	7	350	NA	NA
S15	E.WALL, EXCAV.3 @ 7'	7	03/13/92	NA	NA	NA	NA	<5	<25	22	NA
S16	S.WALL, EXCAV.3 @ 8'	8	03/13/92	NA	NA	NA	NA	<5	<25	<20	NA
S17	PIPING TRENCH @ 2'	2	03/17/92	0.037	<0.028	0.066	0.039	<5	<25	NA	NA
S18	DISPEN. ISL.1 @ 2'	2	03/13/92	<0.027	<0.027	0.032	0.029	<25	2,100	NA	NA
S19	DISPEN. ISL.2 @ 2.5'	2.5	03/13/92	<0.030	0.070	<0.030	0.61	430	18,000	NA	NA
S20	DISPEN. ISL.3 @ 5'	5	03/16/92	0.039	1.4	0.48	7.9	280	2,200	NA	<5.6
S21	DISPEN. ISL.4 @ 5'	5	03/16/92	0.67	1.8	0.80	9.0	2,500	21,000	NA	NA
S22	DISPEN. ISL.5 @ 5'	5	03/16/92	0.59	1.1	0.91	6.1	740	9,100	NA	NA
S23	PIPING TRENCH @ 5'	5	03/16/92	<0.028	0.81	0.080	6.1	980	3,100	NA	NA
S24	PIPING TRENCH @ 5'	5	03/16/92	<0.028	<0.028	<0.028	<0.028	<5	87	NA	NA
S26	PIPING TRENCH @ 3'	3	03/17/92	0.44	3.6	5.6	25	300	72	NA	<6.0
S27	DISPEN. ISL.7 @ 3'	3	03/17/92	6.5	44	130	330	1,100	160	NA	<5.6
S28	DISPEN. ISL.6 @ 3'	3	03/17/92	10	19	69	170	1,600	300	NA	11
S29	SOIL STOCKPILE	—	03/18/92	<0.028	<0.028	<0.028	<0.028	10	210	NA	NA
S32	Drain Box	0.25	06/29/93	<0.029	<0.029	<0.029	<0.029	NA	340 *	NA	NA
MW1 @ 7.5'	MW1	7.5	07/02/93	<0.027	<0.027	<0.027	<0.027	<5	<27	NA	2.1
MW2 @ 7.5'	MW2	7.5	07/02/93	<0.026	<0.026	<0.026	<0.026	<5	<26	NA	1.9
MW3 @ 9.0'	MW3	9.0	06/28/93	<0.026	1.0	0.055	5.9	310	3,100	NA	2.0
MW3 @ 42.5'	MW3	42.5	06/29/93	<0.028	<0.028	<0.028	0.041	<6	31	NA	2.3
MW4 @ 7.5'	MW4	7.5	07/06/93	<0.026	0.17	0.11	1.3	<5	<26	NA	3.0
MW4 @ 17.5'	MW4	17.5	07/06/93	<0.027	<0.027	<0.027	<0.027	<5	<27	NA	2.1

Table 6-2
Hydrocarbons and Lead Detected in Soil
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	Sample Location	Sample Depth	Sample Date	EPA Test Methods						WTPH 418:1M (mk/kg)	EPA 7421 Lead (mg/kg)
				Benzene (mg/kg)	Ethylbenzene (mg/kg)	BETX - 8020 Toluene (mg/kg)	Total Xylenes (mg/kg)	TPH - 8015M Gasoline (mg/kg)	Diesel (mg/kg)		
MW5 @ 7.5'	MW5	7.5	07/01/93	<0.030	0.12	0.080	0.50	160	43	NA	2.1
MW5 @ 10.0'	MW5	10.0	07/01/93	<0.028	<0.028	<0.028	<0.028	<6	<28	NA	1.3
MW6 @ 17.5'	MW6	17.5	07/06/93	0.64	1.2	0.55	4.3	10	<31	NA	21
MW6 @ 50'	MW6, Duplicate	17.5	07/06/93	0.48	0.79	0.40	2.8	12	<30	NA	19
MW6 @ 22.5'	MW6	22.5	07/06/93	3.5	3.6	17	21	99	38	NA	6.8
MW6 @ 30'	MW6	30	07/06/93	<0.026	<0.026	<0.026	<0.026	<5	<26	NA	1.2
MW7 @ 4.5'	MW7	4.5	10/26/93	<0.036	<0.036	<0.036	<0.036	<7	<36	NA	3.4
MW8 @ 8.5	MW8	8.5	10/27/93	<0.029	<0.029	<0.029	<0.029	<6	<29	NA	2.6
MW9 @ 8'	MW9	8	10/27/93	<0.027	<0.027	<0.027	<0.027	<5	<27	NA	<1.7
MW10 @ 8'	MW10	8	10/28/93	<0.038	<0.038	<0.038	<0.038	<8	<38	NA	2.4
MW10 @ 50'	MW10, Duplicate	8	10/28/93	<0.035	<0.035	<0.035	<0.035	<7	<35	NA	2.4
MW11 @ 3.5'	MW11	3.5	10/29/93	<0.031	<0.031	<0.031	<0.031	<6	<31	NA	3.8
MW11 @ 7.5'	MW11	7.5	10/29/93	<0.032	<0.032	<0.032	<0.032	<6	<32	NA	3.6
MW12 @ 3.5'	MW12	3.5	10/28/93	<0.031	<0.031	<0.031	<0.031	<6	<31	NA	3.0

Notes:

Sample Number S25 does not exist - this identification number was bypassed during sample collection.

Samples S30 and S31 are sediment samples, included on Table 6-9.

* Analyzed by Washington State Method WTPH-D.

mg/kg - Milligrams per kilogram.

TPH - Total petroleum hydrocarbons.

NA - Not analyzed.

< - Indicates compound not detected at stated detection limit.

Table 6-3
Polycyclic Aromatic Hydrocarbon Results for Soil
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Analyte	Method Reporting Limit (mg/kg, dry wt.)	Sample I.D. and Depth (ft. bgs)											
		MW1		MW2		MW3		MW4		MW5		MW6	
		7.5	7.5	9.0	42.4	7.5	17.5	7.5	10.0	17.5	17.5*	22.5	30
mg/kg, dry wt.													
Acenaphthene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	0.21	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (a) anthracene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (b) fluoranthene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (k) fluoranthene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (g,h,i) perylene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (a) pyrene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibenzo (a,h) anthracene	0.042	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluorene	0.010	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	0.044	ND
Indeno (1,2,3-cd) pyrene	0.021	ND	ND	9.2	ND	ND	ND	ND	ND	ND	ND	ND	ND
1-Methylnaphthalene	0.21	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	0.26	ND
2-Methylnaphthalene	0.21	ND	ND	2.3	ND	ND	ND	ND	ND	ND	ND	0.59	ND
Naphthalene	0.10	ND	ND	2.8	0.023	ND	ND	ND	ND	ND	ND	0.28	ND
Phenanthrene	0.010	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Pyrene	0.021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 6-3
Polycyclic Aromatic Hydrocarbon Results for Soil
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Analyte	Method Reporting Limit (mg/kg, dry wt.)	Sample I.D. and Depth (ft. bgs)						
		MW7	MW8	MW9	MW10	MW11	MW12	
		4.5	8.5	8.0	8.0	8.0*	3.5	7.5
mg/kg, dry wt.								
Acenaphthene	0.021	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	0.21	ND	ND	ND	ND	ND	ND	ND
Anthracene	0.021	ND	ND	ND	ND	ND	ND	ND
Benzo (a) anthracene	0.021	ND	ND	ND	ND	ND	ND	ND
Benzo (b) fluoranthene	0.021	ND	ND	ND	ND	ND	ND	ND
Benzo (k) fluoranthene	0.021	ND	ND	ND	ND	ND	ND	ND
Benzo (g,h,i) perylene	0.021	ND	ND	ND	ND	ND	ND	ND
Benzo (a) pyrene	0.021	ND	ND	ND	ND	ND	ND	ND
Chrysene	0.021	ND	ND	ND	ND	ND	ND	ND
Dibenzo (a,h) anthracene	0.042	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	0.021	ND	ND	ND	ND	ND	ND	ND
Fluorene	0.010	ND	ND	ND	ND	ND	ND	ND
Indeno (1,2,3-cd) pyrene	0.021	ND	ND	ND	ND	ND	ND	ND
1-Methylnaphthalene	0.21	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	0.21	ND	ND	ND	ND	ND	ND	ND
Naphthalene	0.10	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	0.010	ND	ND	ND	ND	ND	ND	ND
Pyrene	0.021	ND	ND	ND	ND	ND	ND	ND

Notes:

*Field duplicate.

Method reporting limit may vary with sample moisture content, matrix interference, etc.

ft. bgs - Feet below ground surface.

mg/kg - Milligrams per kilogram.

ND - Not detected.

Table 6-4
Groundwater Sample Collection and Field Parameter Data
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Well I.D.	Date Collected	Well Depth (ft bmp)	Depth to Static Water Level (ft bmp)	Well Casing Volume (gallons)	Volume Purged (gallons)	Purge Method	Field Parameters			Comments (Sample Appearance, Odor, etc.)
							Temperature (°C)	Conductivity (µmhos/cm)	pH	
MW1	07/08/93	17.95	7.05	7.1	25	Bailer	13.5	475	7.06	Turbid/no odor.
MW2	07/08/93	18.25	8.01	6.7	25	Bailer	13.2	533	6.76	Slightly turbid.
MW3	07/08/93	80.35	14.34	42.9	45	Bailer	13.8	287	7.92	Clear/no odor.
MW5	07/08/93	17.75	6.57	7.3	40	Bailer	14.9	370	6.84	Clear/hydrocarbon odor.
MW7	10/29/93	15.00	6.95	5.2	49	Bailer	12.8	385	7.04	Very turbid with sediment/no odor.
MW8	10/29/93	15.99	10.26	3.7	16	Bailer	12.3	550	6.78	Very turbid with sediment/slight hydrocarbon odor.
MW9	10/29/93	17.50	9.85	4.98	38	Bailer	12.8	402	6.8	Very turbid/yellowish - brown
MW10	11/01/93	16.50 ^a	11.19	4.6	48	Bailer	12.3	396	6.39	Light milky white color/no odor.
MW11	11/01/93	17.50 ^a	8.25	1.3	40	Bailer	11.8	360	6.17	Light brown milky color/no odor.
MW12	10/29/93	15.95	7.70	5.36	43	Bailer	13.5	443	6.83	Very turbid with sediment/no odor.

Notes:

Wells MW4 and MW6 parameters were not measured due to presence of free product in the wells.

a) Depth below ground surface.

ft. bmp - Feet below measuring point; top of PVC casing used as measuring point.

Table 6-5
Chemical Analysis Schedule – Groundwater
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	EPA Method								Washington State Method
	8020 BETX	8015M ^a TPH	7421 Lead	8310 PAHs	8240 VOCs	353.2 354.1 Nitrite/Nitrate	8080 Pesticides	8010 VOCs	WTPH – G Gasoline
MW1-7/93	X	X	X	X		X	X		
MW2-7/93	X	X	X	X					
MW3-7/93	X	X	X	X					
MW4-7/93									
MW5-7/93	X	X	X	X					
MW6-11/93					X		X	X	
MW7-10/93	X	X	X	X					
MW8-10/93	X	X	X	X					
MW9-10/93	X	X	X	X					
MW10-10/93	X	X	X	X					
MW11-10/93	X	X	X	X					
MW12-10/93	X	X	X	X					
W-1	X								X
W-2	X								
W-3	X								
W-4	X								X

Notes:

- a) Quantified for both gasoline and diesel-range hydrocarbons.
 TPH – Total petroleum hydrocarbons.
 PAH – Polycyclic aromatic hydrocarbons.
 VOC – Volatile organic compounds.

Table 6-6
Hydrocarbons, Lead, and Nitrate/Nitrite Detected in Groundwater
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods									
			BETX -- 8020					TPH -- 8015 M		7421	353.2	354.1
			Benzene	Ethylbenzene	Toluene	Xylenes	TPH as	Gasoline	Diesel	Lead	Nitrate/Nitrite	Nitrite
			µg/L							mg/L		
MW1-7/93	MW1	07/08/93	ND	ND	ND	ND	ND	ND	ND	0.013	6.4	0.15
MW2-7/93	MW2	07/08/93	0.7	ND	ND	ND	ND	ND	ND	0.005	NA	NA
MW50-7/93	MW2, Duplicate	07/08/93	0.6	ND	ND	ND	ND	ND	ND	0.004	NA	NA
MW3-7/93	MW3	07/08/93	1.4	0.9	ND	5.1	ND	ND	ND	0.004	NA	NA
MW4-7/93	MW4	07/08/93	NS	NS	NS	NS	NS	NS	NS	NS	NA	NA
MW5-7/93	MW5	07/08/93	1,300	840	4,500	7,000	34	2	2	ND	NA	NA
MW6-11/93	MW6	11/22/93	6,800	3,400	21,000	20,000	NA	NA	NA	ND	NA	NA
MW7-10/93	MW7	10/29/93	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
MW8-10/93	MW8	10/29/93	2,800	410	79	950	3	3	3	ND	NA	NA
MW9-10/93	MW9	10/29/93	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
MW10-10/96	MW10	11/01/93	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
MW11-10/96	MW11	11/01/93	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
MW100-10/96	MW11, Duplicate	11/01/93	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
MW12-10/93	MW12	10/29/93	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
W-1	Puget Power Service Center	03/26/92	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
W-2	House Adjacent to South	03/26/92	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
W-3	House Adjacent to East	03/26/92	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
W-4	Thorp Antique Mall	03/26/92	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Method Reporting Limit			0.5	0.5	0.5	0.5	1	1	1	0.003	0.01	0.001

Notes:

* Analyzed by Washington State Method WTPH-G.

mg/L - Milligrams per liter.

µg/L - Micrograms per liter.

NA - Not analyzed.

ND - Not detected.

NS - Not sampled due to the presence of free product.

Table 6-7

Polycyclic Aromatic Hydrocarbon Results for Groundwater

Burns Bros./Bingo Fuel Stop
Thorp, Washington

Method Reporting Limit (µg/L)		Sample I.D.									
Analyte		MW1	MW2	Dup MW2	MW3	MW4	MW5	MW6	MW7	MW8	
		µg/L									
Acenaphthene	0.50	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Acenaphthylene	1.0	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Anthracene	0.05	ND	ND	ND	ND	NS	0.075	NS	ND	ND	
Benzo (a) anthracene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Benzo (b) fluoranthene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Benzo (k) fluoranthene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Benzo (g,h,i) perylene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Benzo (a) pyrene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Chrysene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Dibenzo (a,h) anthracene	0.20	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Fluoranthene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	
Fluorene	0.10	ND	0.29	0.36	0.35	NS	0.59	NS	ND	ND	
Indeno (1,2,3-cd) pyrene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	
1-Methylnaphthalene	0.50	ND	0.58	0.71	1.1	NS	50	NS	ND	5.8	
2-Methylnaphthalene	0.50	ND	0.96	1.2	ND	NS	97	NS	ND	4.7	
Naphthalene	0.50	ND	ND	ND	ND	NS	190	NS	ND	27	
Phenanthrene	0.05	ND	ND	ND	0.13	NS	0.45	NS	ND	ND	
Pyrene	0.10	ND	ND	ND	ND	NS	ND	NS	ND	ND	

Table 6--7

Polycyclic Aromatic Hydrocarbon Results for Groundwater

Burns Bros./Bingo Fuel Stop
Thorp, Washington

Analyte	Method Reporting Limit (µg/L)	Sample I.D.					
		MW9	MW10	MW11	Dup MW11	MW12	
							µg/L
Acenaphthene	0.50	ND	ND	ND	ND	ND	ND
Acenaphthylene	1.0	ND	ND	ND	ND	ND	ND
Anthracene	0.05	ND	ND	ND	ND	ND	ND
Benzo (a) anthracene	0.10	ND	ND	ND	ND	ND	ND
Benzo (b) fluoranthene	0.10	ND	ND	ND	ND	ND	ND
Benzo (k) fluoranthene	0.10	ND	ND	ND	ND	ND	ND
Benzo (g,h,i) perylene	0.10	ND	ND	ND	ND	ND	ND
Benzo (a) pyrene	0.10	ND	ND	ND	ND	ND	ND
Chrysene	0.10	ND	ND	ND	ND	ND	ND
Dibenzo (a,h) anthracene	0.20	ND	ND	ND	ND	ND	ND
Fluoranthene	0.10	ND	ND	ND	ND	ND	ND
Fluorene	0.10	ND	ND	ND	ND	ND	ND
Indeno (1,2,3-cd) pyrene	0.10	ND	ND	ND	ND	ND	ND
1-Methylnaphthalene	0.50	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene	0.50	ND	ND	ND	ND	ND	ND
Naphthalene	0.50	ND	ND	ND	ND	ND	ND
Phenanthrene	0.05	ND	ND	ND	ND	ND	ND
Pyrene	0.10	ND	ND	ND	ND	ND	ND

Notes:

Method reporting limit may vary due to dilution, matrix interference, etc.

Dup - Duplicate sample.

ND - Not detected.

NS - Not sampled.

µg/L - Micrograms per liter.

Table 6-8
Chemical Analysis Schedule – Surface Water/Sediment
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	EPA Method	Washington State Method	
	8020 BETX	WTPH-G Gasoline	WTPH-D Diesel
Surface Water			
W-5	X		
W-6	X	X	
Irrig. Canal, Near S31	X	X	X
Drainage Ditch, west of site	X	X	X
Sediment			
S30	X		X
S31	X		X

Table 6-9
Analytical Results for Surface Water and Sediment
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods				Washington State Test Methods	
			Benzene	Ethylbenzene	Toluene	Xylenes	Gasoline	Diesel
<u>Surface Water</u> W-5 W-6 Irrig. Canal, Near S31 Drainage Ditch, west of site	Pond Adjacent to East Swampy Area Adjacent to South Adjacent to north culvert, east of Thorp highway Adjacent to Puget Power Cattle Guard	03/26/92	<0.5	<0.5	<0.5	<0.5	mg/L	NA
		03/26/92	<0.5	<0.5	0.99	<0.5	<0.1	NA
		03/01/94	<0.5	<0.5	<0.5	<0.5	<0.1	<0.25
		03/01/94	<0.5	<0.5	<0.5	<0.5	<0.1	<0.25
<u>Sediment</u> S30 S31	Swampy Area Adjacent to South (0.25 ft. in depth) East Culvert (0.25 ft. in depth)	06/29/93	<0.10	<0.10	<0.10	<0.10	mg/kg	NA
		06/29/93	<0.086	<0.086	0.42	<0.086	NA	2,100

Notes:

mg/kg - Milligrams per kilogram.

mg/L - Milligrams per liter.

µg/L - Micrograms per liter.

NA - Not analyzed.

< - Indicates compound not detected at stated detection limit.

Table 7-1
Chemicals of Concern
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Chemical	Soil	Groundwater
<u>Volatile Organic Compounds</u>		
Benzene	X	X
Ethylbenzene	X	X
Toluene	X	X
Total Xylenes	X	X
<u>Polycyclic Aromatic Hydrocarbons</u>		
Anthracene		X
Fluorene	X	X
1-Methylnaphthalene	X	X
2-Methylnaphthalene	X	X
Naphthalene	X	X
Phenanthrene	X	X
<u>Inorganics</u>		
Lead	X	X
Nitrate/Nitrite		X

Notes:

X – Chemical was detected at least once in this medium.

Table 7-2
Toxicological Parameters for Chemicals of Concern
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Chemical	Toxicological Input Parameters		Toxicological Endpoint	Apportionment Factor
	Oral CPF*	Chronic Oral RfD**		
<u>Volatile Organic Compounds</u>				
Benzene	0.029 i	--	Carcinogen	1
Ethylbenzene	--	0.1 i	Liver, kidney	2
Toluene	--	0.2 i	Liver, kidney	2
Total Xylenes	--	2 i	Body weight	2
<u>Polycyclic Aromatic Hydrocarbons</u>				
Anthracene	--	0.3 i	None Observed	1
Fluorene	--	0.04 i	Blood	2
1-Methylnaphthalene	--	--	--	--
2-Methylnaphthalene	--	--	--	--
Naphthalene	--	0.04 h	Body Weight	2
Phenanthrene	--	--	--	--
<u>Inorganics</u>				
Lead	--	--	--	--
Nitrate/Nitrite	--	0.1 i	Blood	2

Notes:

*Cancer Potency Factor (mg/kg-day)⁻¹.

**Chronic Reference Dose (mg/kg-day).

i - EPA Integrated Risk Information System (IRIS).

h - EPA Health Effects Assessment Summary Tables (HEAST).

-- Toxicological parameters not available.

Table 7-3

Groundwater and Surface Water ARARs for Chemicals of Concern

Burns Bros./Bingo Fuel Stop

Thorp, Washington

Chemical	Federal Maximum Contaminant Level* (µg/L)	Chronic Freshwater Quality Criteria (µg/L)**	
		Surface Water	Consumption of Organisms
<u>Volatile Organic Compounds</u>			
Benzene	5	--	71
Ethylbenzene	700	--	29,000
Toluene	1,000	--	200,000
Total Xylenes	10,000	--	--
<u>Polycyclic Aromatic Hydrocarbons</u>			
Anthracene	--	--	110,000
Fluorene	--	--	14,000
1-Methylnaphthalene	--	--	--
2-Methylnaphthalene	--	--	--
Naphthalene	--	--	--
Phenanthrene	--	--	--
<u>Inorganics</u>			
Lead	15	3.2	--
Nitrate/Nitrite***	10,000	--	--

Notes:

* Maximum contaminant level (MCL) obtained from Office of Water (EPA, 1993).

** National Toxics Rule criterion; 40 CFR Part 131.

***ARAR based on nitrate + nitrite (as N).

-- ARAR not available.

 $\mu\text{g/L}$ - Micrograms per liter.

Table 7-4

Groundwater and Surface Water Risk-Based Concentrations

Burns Bros./Bingo Fuel Stop
Thorp, Washington

Chemical	BCF *	Method B Risk-Based Concentration (µg/L)				
		Unapportioned Value		Apportioned Value		Selected Value
		Groundwater	Surface Water	Groundwater	Surface Water	
<u>Volatile Organic Compounds</u>						
Benzene	5.2	1.5	43	1.5	43	1.5
Ethylbenzene	37.5	800	6,914	400	3,457	400
Toluene	10.7	1,600	48,460	800	24,230	800
Total Xylenes	22.5 **	16,000	230,453	8,000	115,226	8,000
<u>Polycyclic Aromatic Hydrocarbons</u>						
Anthracene	30	4,800	25,926	4,800	25,926	4,800
Fluorene	30	640	3,457	320	1,728	320
1-Methylnaphthalene	--	--	--	--	--	--
2-Methylnaphthalene	--	--	--	--	--	--
Naphthalene	10.5	640	9,877	320	4,938	320
Phenanthrene	--	--	--	--	--	--
<u>Inorganics</u>						
Lead	--	--	--	--	--	--
Nitrate/Nitrite***	--	1,600	--	800	--	800

Notes:

Shaded value indicates selected risk-based concentration.

*BCF - Bioconcentration factor; obtained from ambient water quality criteria documents (Ecology).

**Obtained from previously issued document (Ecology).

***Risk-based concentrations based on nitrite.

-- Not available.

 $\mu\text{g/L}$ - Micrograms per liter.

Table 7-5
Draft Groundwater Cleanup Level Summary
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Chemical	Groundwater Concentration (µg/L)				
	Method Reporting Limit	Selected Groundwater Criterion	Selected Surface Water Criterion	Selected Risk-Based Concentration	Selected Groundwater Cleanup Level
<u>Volatile Organic Compounds</u>					
Benzene	0.5	5	71	1.5	5.0 *
Ethylbenzene	0.5	700	29,000	400	400
Toluene	0.5	1,000	200,000	800	800
Total Xylenes	2	10,000	--	8,000	8,000
<u>Polycyclic Aromatic Hydrocarbons</u>					
Anthracene	0.0091	--	110,000	4,800	4,800
Fluorene	0.018	--	14,000	320	320
1-Methylnaphthalene	0.5	--	--	--	--
2-Methylnaphthalene	0.5	--	--	--	--
Naphthalene	0.045	--	--	320	320
Phenanthrene	0.05	--	--	--	--
<u>Inorganics</u>					
Lead	3	15	3.2		3.2
Nitrate/Nitrite	0.01	10,000	--	800	800 **

Notes:

Shaded value indicates selected groundwater cleanup level.

*Selected groundwater cleanup level set at federal maximum contaminant level; see text for discussion.

**Groundwater cleanup level based on nitrite.

-- Not available.

µg/L -- Micrograms per liter.

Table 7-6
Draft Soil Cleanup Level Summary
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Chemical	Soil Concentration (mg/kg)				
	Method Reporting Limit	Background	Selected* Risk-Based Concentration	Protective of Groundwater	Selected Soil Cleanup Level
<u>Volatile Organic Compounds</u>					
Benzene	0.025	--	34.5	0.5	0.5
Ethylbenzene	0.025	--	4,000	40	40
Toluene	0.025	--	8,000	80	80
Total Xylenes	0.025	--	80,000	800	800
<u>Polycyclic Aromatic Hydrocarbons</u>					
Anthracene	0.021	--	24,000	480	480
Fluorene	0.010	--	1,600	32	32
1-Methylnaphthalene	0.17	--	--	--	--
2-Methylnaphthalene	0.17	--	--	--	--
Naphthalene	0.10	--	1,600	32	32
Phenanthrene	0.0083	--	--	--	--
<u>Inorganics</u>					
Lead	0.15	18 ws	250 **	0.32	250
Nitrate/Nitrite	NA	--	4,000	80	80

Notes:

Shaded value indicates selected soil cleanup level.

*Apportioned risk-based concentration.

**Method A residential cleanup level for lead.

-- Not available.

mg/kg - Milligrams per kilogram.

NA - Chemical not analyzed in soil.

ws - Washington State background (USGS, 1993).

Table 7-7
Draft Cleanup Levels for Soil and Groundwater
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Chemical	Soil (mg/kg)	Basis for Selection	Groundwater (µg/L)	Basis for Selection
<u>Volatile Organic Compounds</u>				
Benzene	0.5	Cross media (groundwater APAR)	5.0	Groundwater APAR
Ethylbenzene	40	Cross media (groundwater risk-based)	400	Risk-based: groundwater
Toluene	80	Cross media (groundwater risk-based)	800	Risk-based: groundwater
Total Xylenes	800	Cross media (groundwater risk-based)	8,000	Risk-based: groundwater
<u>Polycyclic Aromatic Hydrocarbons</u>				
Anthracene	ND		4,800	Risk-based: groundwater
Fluorene	32	Cross media (groundwater risk-based)	320	Risk-based: groundwater
1-Methylnaphthalene	NE		NE	
2-Methylnaphthalene	NE		NE	
Naphthalene	32	Cross media (groundwater risk-based)	320	Risk-based: groundwater
Phenanthrene	NE		NE	
<u>Semivolatile Organic Compounds</u>				
Lead	250	Risk Based	3.2	Surface water APAR
Nitrate/Nitrite	NA		800	Risk-based: groundwater

Notes:

Cleanup levels have been rounded to two significant digits.

mg/kg – Milligrams per kilogram.

µg/L – Micrograms per liter.

NA – Chemical not analyzed in soil.

ND – Chemical not detected in soil.

NE – Not established.

Table 7-8
Summary of Draft Chemical Exceedances – Soil
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	Sample Location	Sample Depth	Sample Date	EPA Test Method			
				Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Total Xylenes (mg/kg)
S7	N.WALL, EXCAV.2 @ 8'	8	03/12/92	26	61	210	470
S8	E.WALL, EXCAV.2 @ 8'	8	03/12/92	92	300	1,000	1,800
S10	PIPING TRENCH @ 4'	4	03/13/92	21	69	200	410
S21	DISPEN. ISL.4 @ 5'	5	03/16/92	0.67	1.8	0.80	9.0
S22	DISPEN. ISL.5 @ 5'	5	03/16/92	0.59	1.1	0.91	6.1
S27	DISPEN. ISL.7 @ 3'	3	03/17/92	6.5	44	130	330
S28	DISPEN. ISL.6 @ 3'	3	03/17/92	10	19	69	170
MW6 @ 17.5'	MW6	17.5	07/06/93	0.64	1.2	0.55	4.3
MW6 @ 22.5'	MW6	22.5	07/06/93	3.5	3.6	17	21

Notes:

Shaded values exceed draft Method B cleanup levels.

mg/kg – Milligrams per kilogram.

TPH – Total petroleum hydrocarbons.

NA – Not analyzed.

ND – Not detected.

< – Indicates compound not detected at stated detection limit.

Table 7-9
Summary of Draft Chemical Exceedances – Groundwater
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	Sample Location	Sample Date	BETX – 8020					7421	353.2	954.1
			Benzene	Ethylbenzene	Toluene	Xylenes	Lead			
			µg/L							
MW1 – 7/93	MW1	07/08/93	ND	ND	ND	ND	13	6,400	150	
MW2 – 7/93	MW2	07/08/93	0.7	ND	ND	ND	5	NA	NA	
MW3 – 7/93	MW3	07/08/93	1.4	0.9	ND	5.1	4	NA	NA	
MW5 – 7/93	MW5	07/08/93	1,300	840	4,500	7,000	ND	NA	NA	
MW6 – 11/93	MW6	11/22/93	6,800	3,400	21,000	20,000	NA	NA	NA	
MW8 – 10/93	MW8	10/29/93	2,800	410	79	950	ND	NA	NA	
Method Reporting Limit			0.5	0.5	0.5	0.5	0.003	0.01	0.001	

Notes:

Shaded values exceed draft Method B cleanup levels.

* Analyzed by Washington State Method WTPH-G.

mg/L – Milligrams per liter.

µg/L – Micrograms per liter.

NA – Not analyzed.

ND – Not detected.

NS – Not sampled due to the presence of free product.

Table 7--10
Summary of Method A TPH Exceedances in Soil
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

EPA Test Methods											
Sample ID	Sample Location	Sample Depth	Sample Date	BETX - 8020				Total Xylenes (mg/kg)	TPH - 8015M		7421 Lead (mg/kg)
				Benzene (mg/kg)	Ethylbenzene (mg/kg)	Toluene (mg/kg)	Gasoline (mg/kg)		Diesel (mg/kg)		
S1	S.WALL, EXCAV.1 @ 8'	8	03/11/92	0.032	0.28	0.13	2.8	930	12,000	NA	
S2	E.WALL, EXCAV.1 @ 9'	9	03/11/92	0.22	1.9	2.1	10	1,200	8,700	NA	
S3	N.WALL, EXCAV.1 @ 8'	8	03/11/92	NA	NA	NA	NA	1,600	10,000	NA	
S4	W.WALL, EXCAV.1 @ 8'	8	03/11/92	<0.028	0.23	<0.028	2.2	140	540	NA	
S7	N.WALL, EXCAV.2 @ 8'	8	03/12/92	26	61	210	470	2,500	420	<5.6	
S8	E.WALL, EXCAV.2 @ 8'	8	03/12/92	92	300	1,000	1,800	10,000	600	<5.4	
S10	PIPING TRENCH @ 4'	4	03/13/92	21	69	200	410	1,000	100	NA	
S11	PIPING TRENCH @ 3'	3	03/13/92	<0.032	0.40	0.056	2.6	240	2,000	NA	
S14	PIPING TRENCH @ 4'	4	03/13/92	<0.030	<0.030	<0.030	<0.030	7	350	NA	
S18	DISPEN. ISL.1 @ 2'	2	03/13/92	<0.027	<0.027	0.032	0.029	<25	2,100	NA	
S19	DISPEN. ISL.2 @ 2.5'	2.5	03/13/92	<0.030	0.070	<0.030	0.61	430	18,000	NA	
S20	DISPEN. ISL.3 @ 5'	5	03/16/92	0.039	1.4	0.48	7.9	280	2,200	<5.6	
S21	DISPEN. ISL.4 @ 5'	5	03/16/92	0.67	1.8	0.80	9.0	2,500	21,000	NA	
S22	DISPEN. ISL.5 @ 5'	5	03/16/92	0.59	1.1	0.91	6.1	740	9,100	NA	
S23	PIPING TRENCH @ 5'	5	03/16/92	<0.028	0.81	0.080	6.1	980	3,100	NA	
S26	PIPING TRENCH @ 3'	3	03/17/92	0.44	3.6	5.6	25	300	72	<6.0	
S27	DISPEN. ISL.7 @ 3'	3	03/17/92	6.5	44	130	330	1,100	160	<5.6	
S28	DISPEN. ISL.6 @ 3'	3	03/17/92	10	19	69	170	1,600	300	11	
S29	SOIL STOCKPILE	--	03/18/92	<0.028	<0.028	<0.028	<0.028	10	210	NA	
S32	Drain Box	0.25	06/29/93	<0.029	<0.029	<0.029	<0.029	NA	340 *	NA	
MW3 @ 9.0'	MW3	9.0	06/28/93	<0.026	1.0	0.055	5.9	310	3,100	2.0	
MW5 @ 7.5'	MW5	7.5	07/01/93	<0.030	0.12	0.080	0.50	160	43	2.1	
Method A TPH Cleanup Level *								100	200		

Table 7-11
Summary of Method A TPH Exceedances in Groundwater
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

Sample ID	Sample Location	Sample Date	EPA Test Methods						
			BIETX - 8020			TPH - 8015 M		7421	Lead
			Benzene	Ethylbenzene	Toluene	Xylenes	TPH as Gasoline	Diesel	
MW5-7/93	MW5	07/08/93	1,300	840	4,500	7,000	34	2	ND
MW8-10/93	MW8	10/29/93	2,800	410	79	950	3	ND	ND
Method Reporting Limit			0.5	0.5	0.5	0.5	1	1	0.003
Method A TPH Cleanup Level ^a			1.0						

Notes:

*Analyzed by Washington State Method WTPH-G.

a) Method A suggested cleanup level for groundwater promulgated under Washington Administrative Code Chapter 173-340, Model Toxics Control Cleanup Act Regulation.

mg/L - Milligrams per liter.

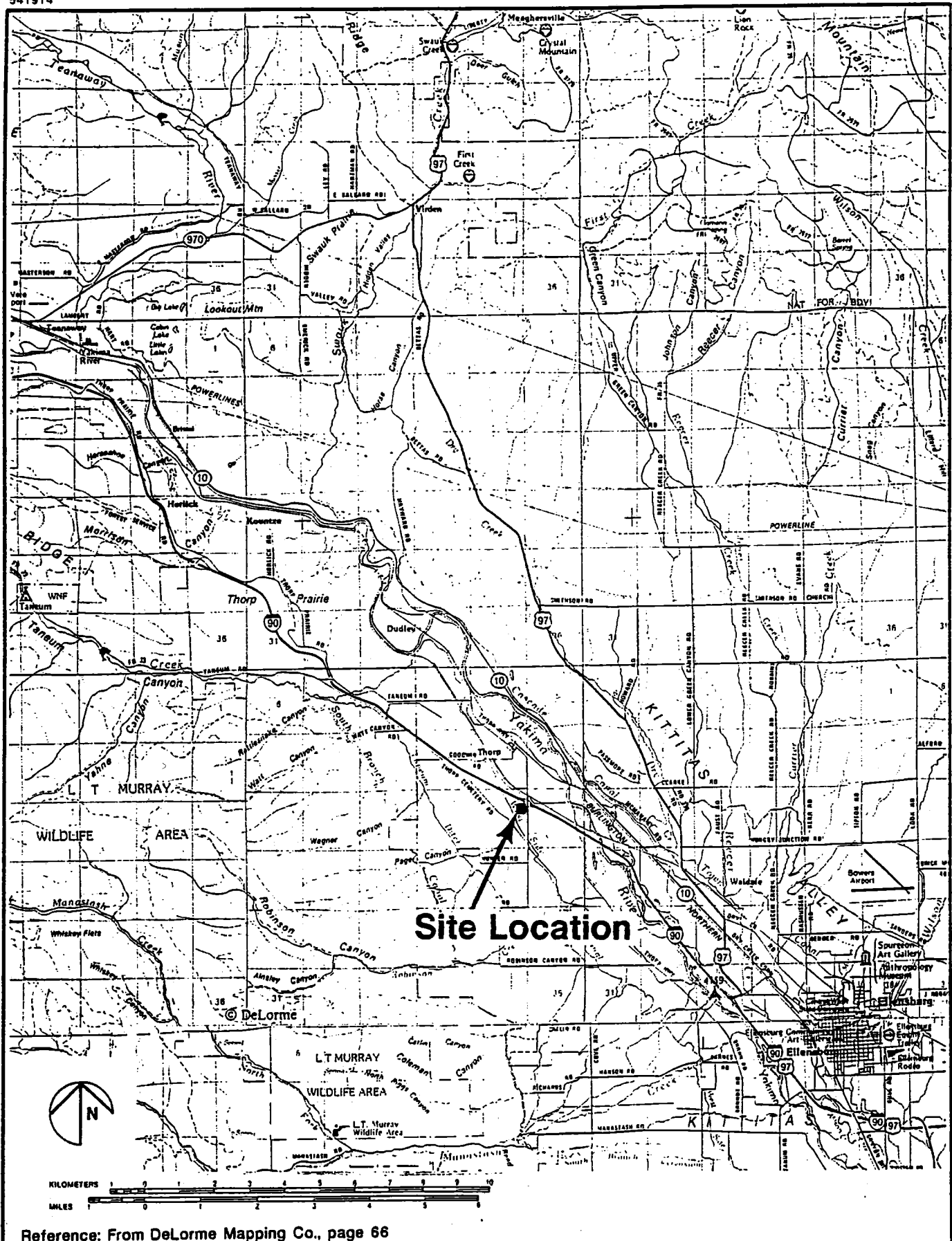
µg/L - Micrograms per liter.

NA - Not analyzed.

ND - Not detected.

NS - Not sampled due to the presence of free product.

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Vicinity Map

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE

1-1

JOB NUMBER
15,659.001

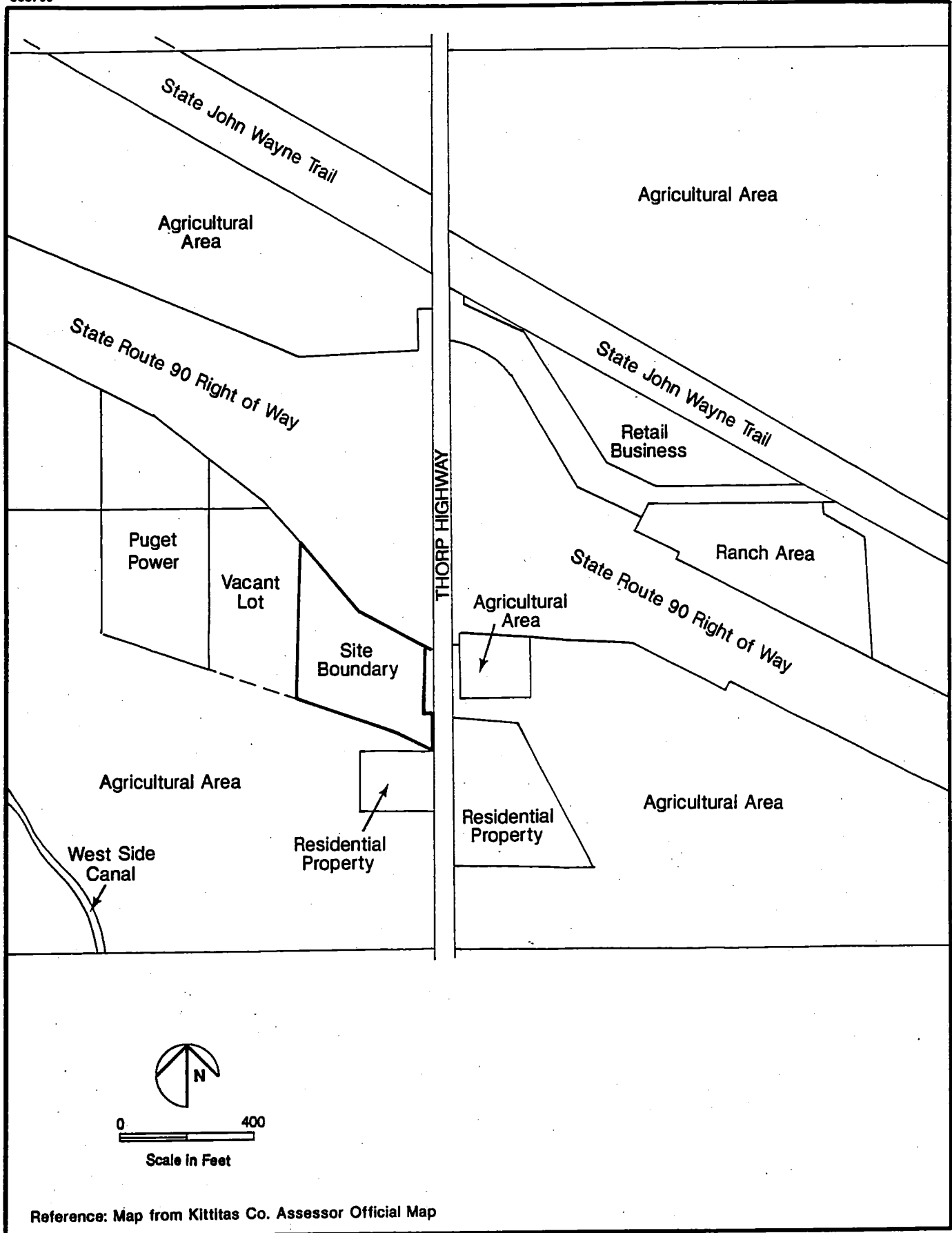
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DATE
3 Mar 92

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DATE



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Adjacent Land Use Area Map
Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE

2-1

JOB NUMBER
15,659.001

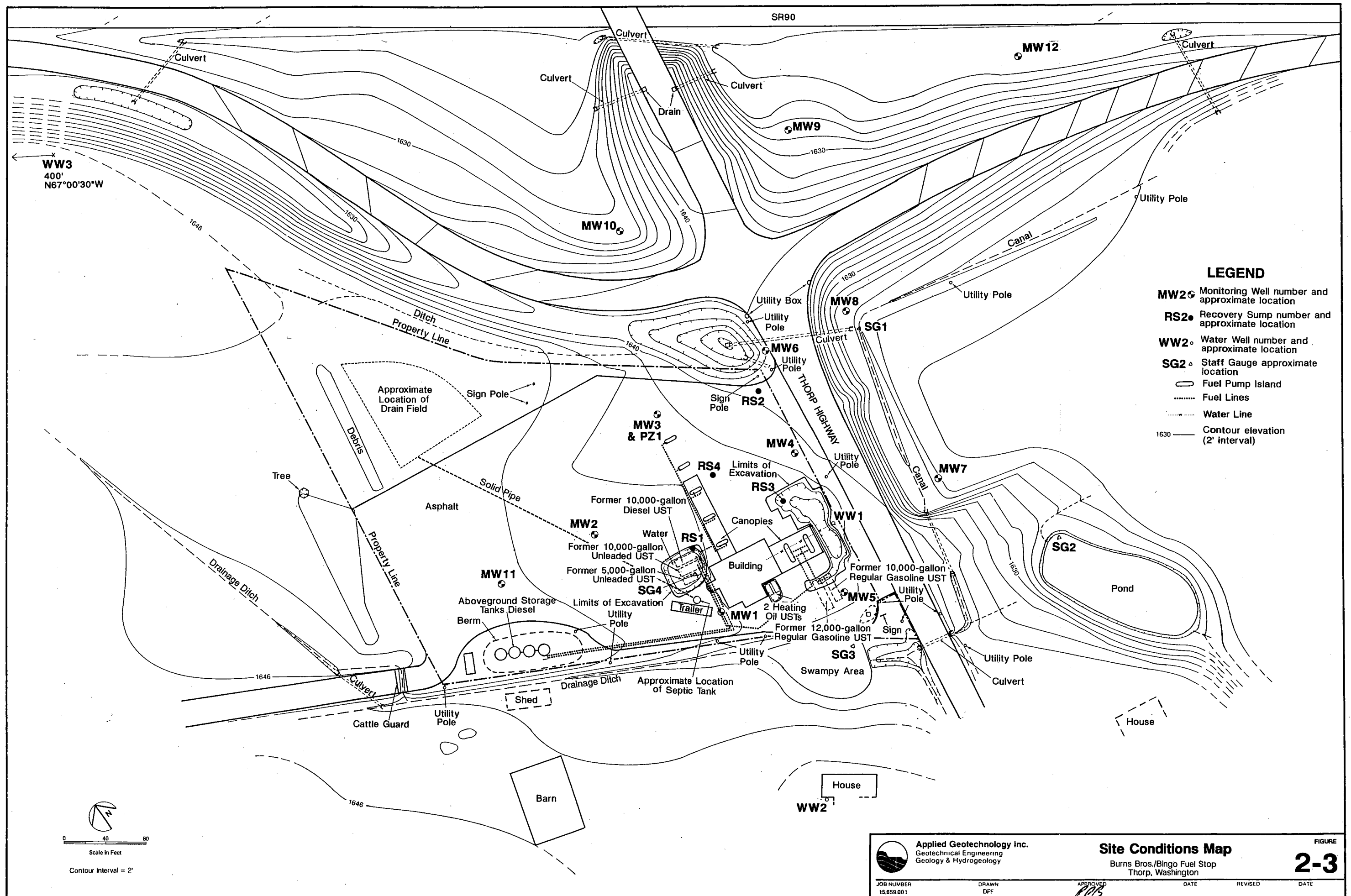
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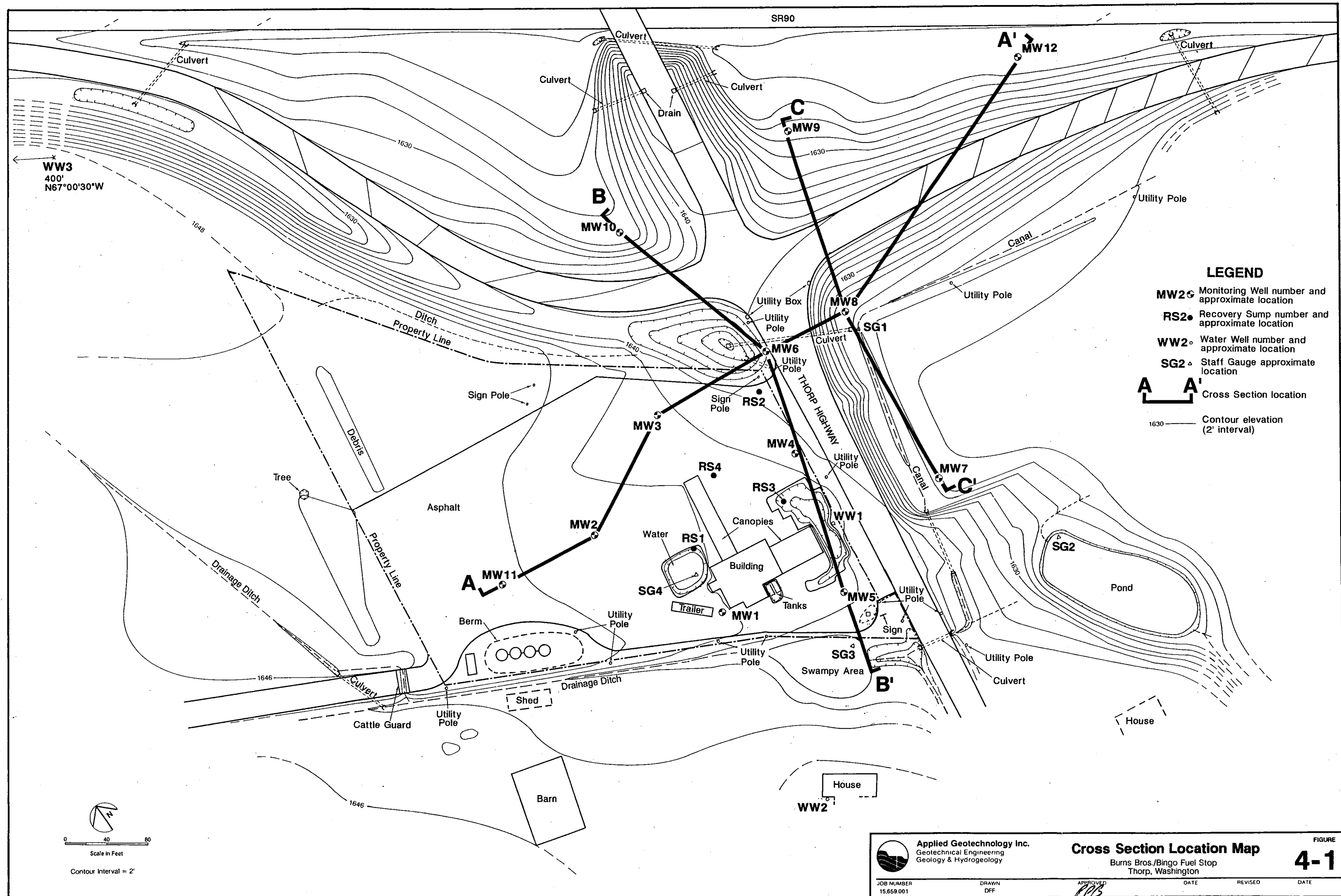
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PPB

DATE
3/31/94











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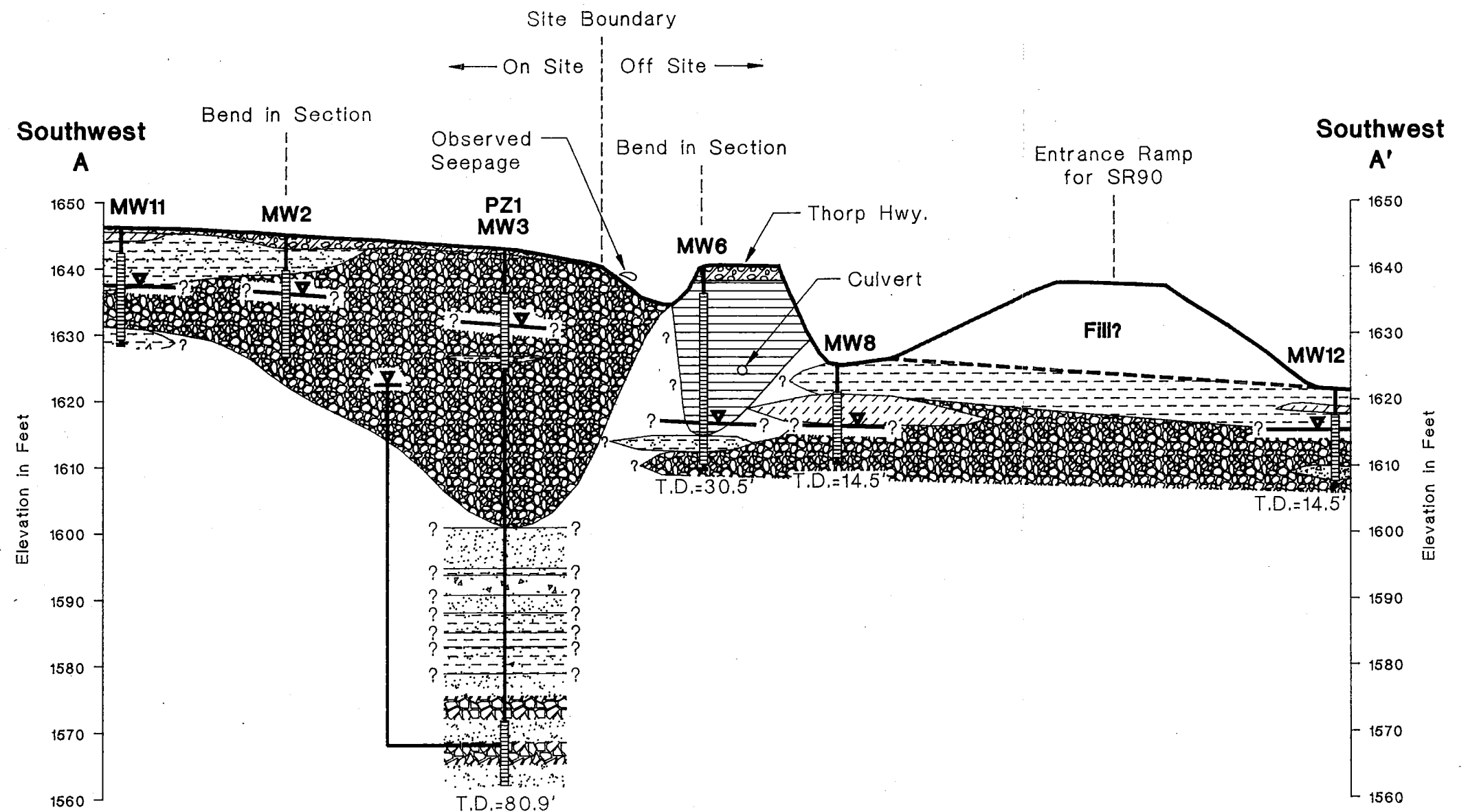
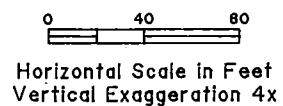
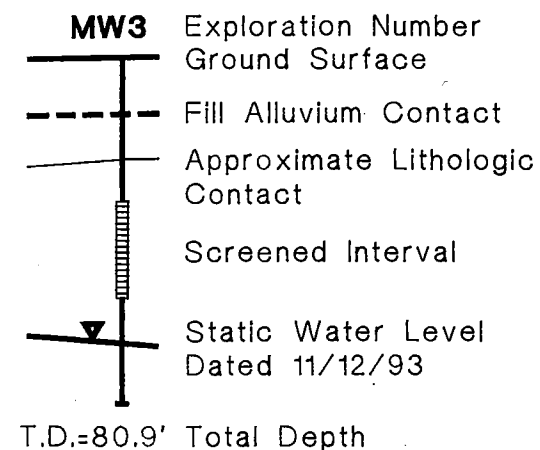
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LEGEND

		Asphalt and Crushed Rock
CL		Gravelly Clay
MH		Silt
ML		Sandy Silt
SM		Silty Sand
SP		Poorly Graded Sand and Gravelly Sand
SW		Well Graded Sand and Gravelly Sand
GP		Poorly Graded Gravels and Sandy Gravel
GW		Well Graded Gravels and Sandy Gravel
GM		Silty Gravel



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Cross Sections - A to A'
Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE

4-2

JOB NUMBER
15,659.001

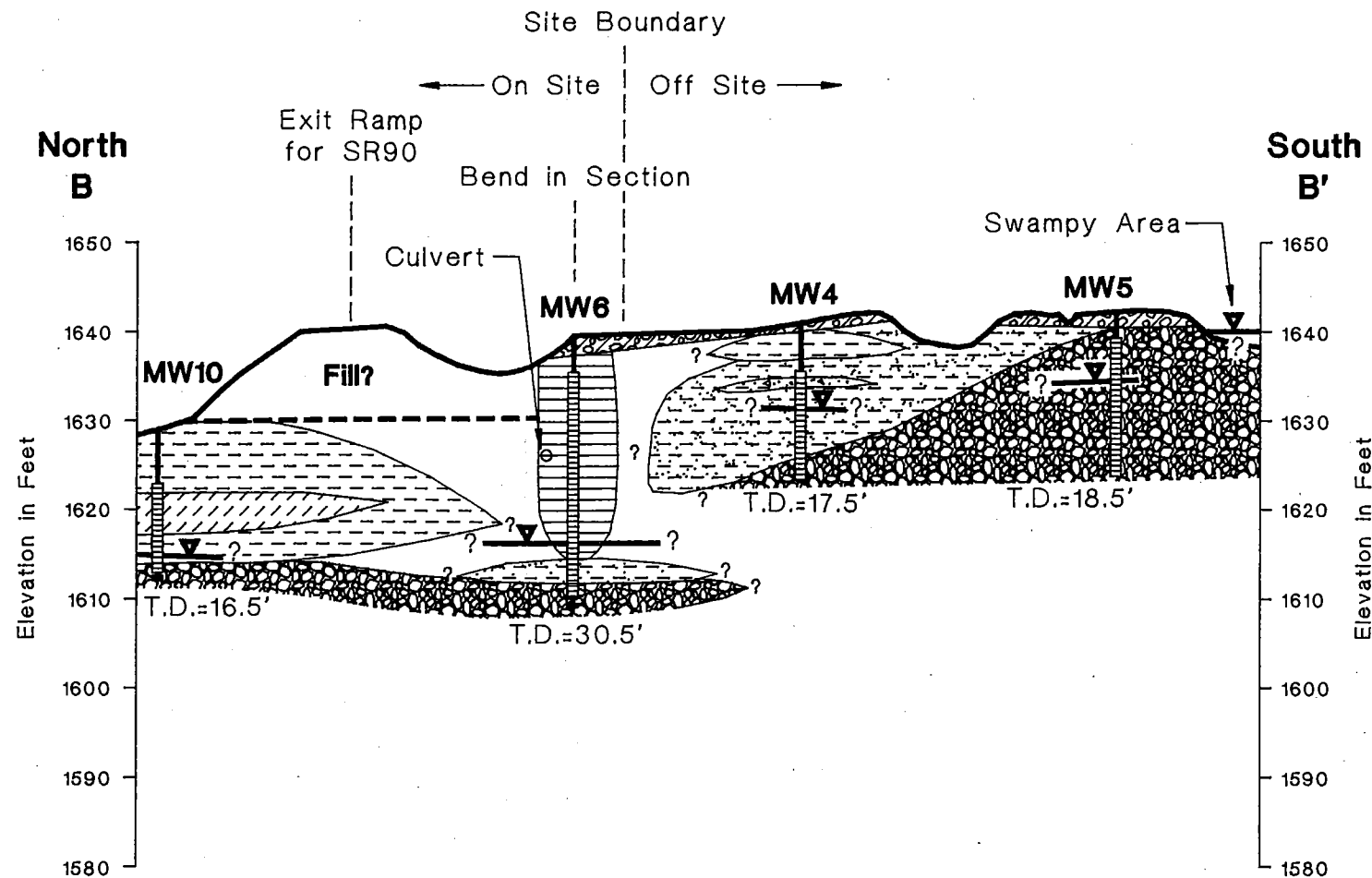
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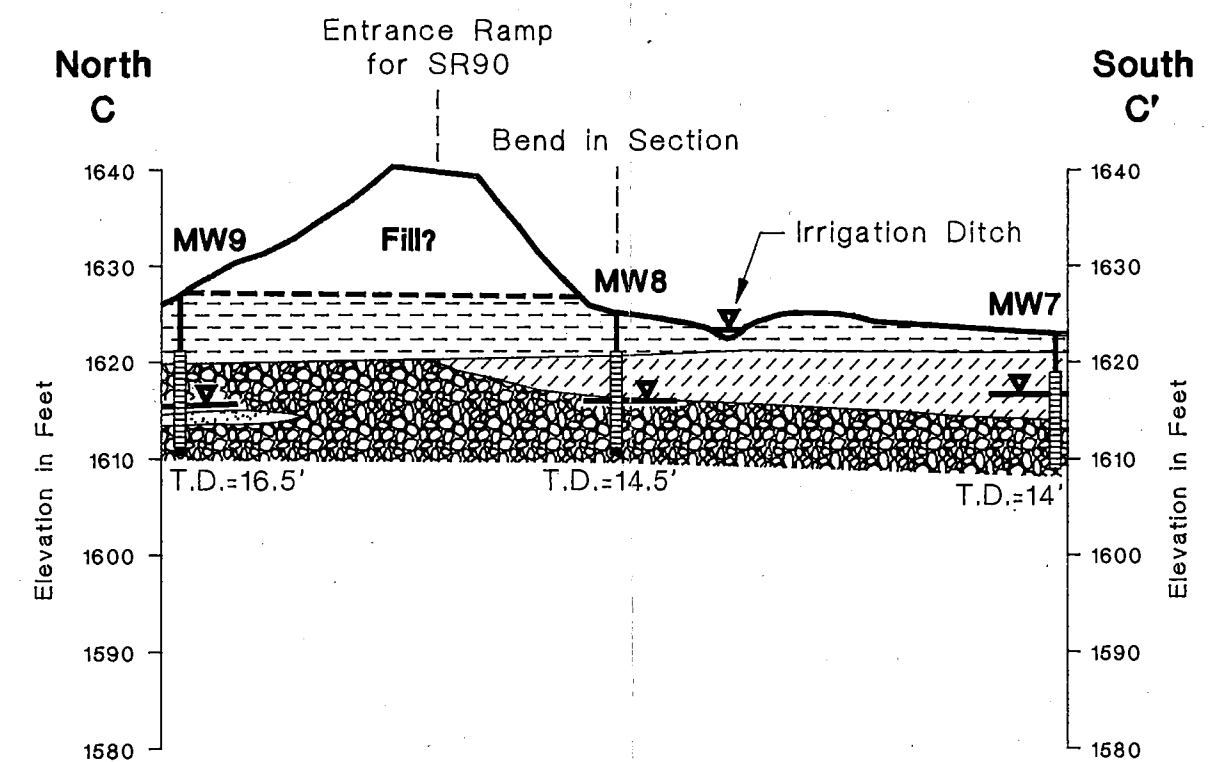
DATE
6 Dec. 93

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DATE



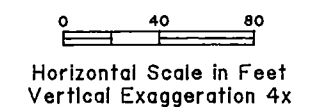
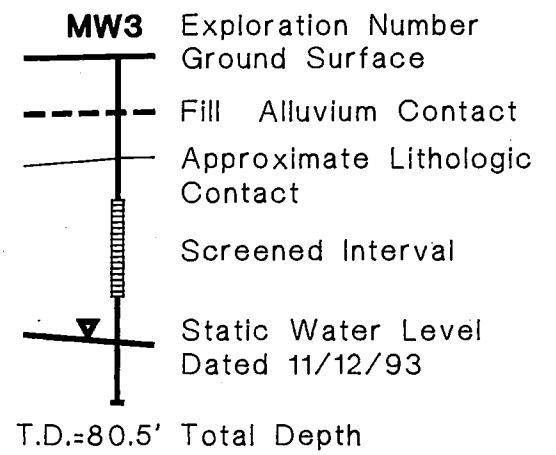
Cross Section B - B'



Cross Section C - C'

LEGEND

- Asphalt and Crushed Rock
- CL Gravelly Clay
- MH Silt
- ML Sandy Silt
- SM Silty Sand
- SP Poorly Graded Sand and Gravelly Sand
- GW Well Graded Gravels and Sandy Gravel
- GM Silty Gravel



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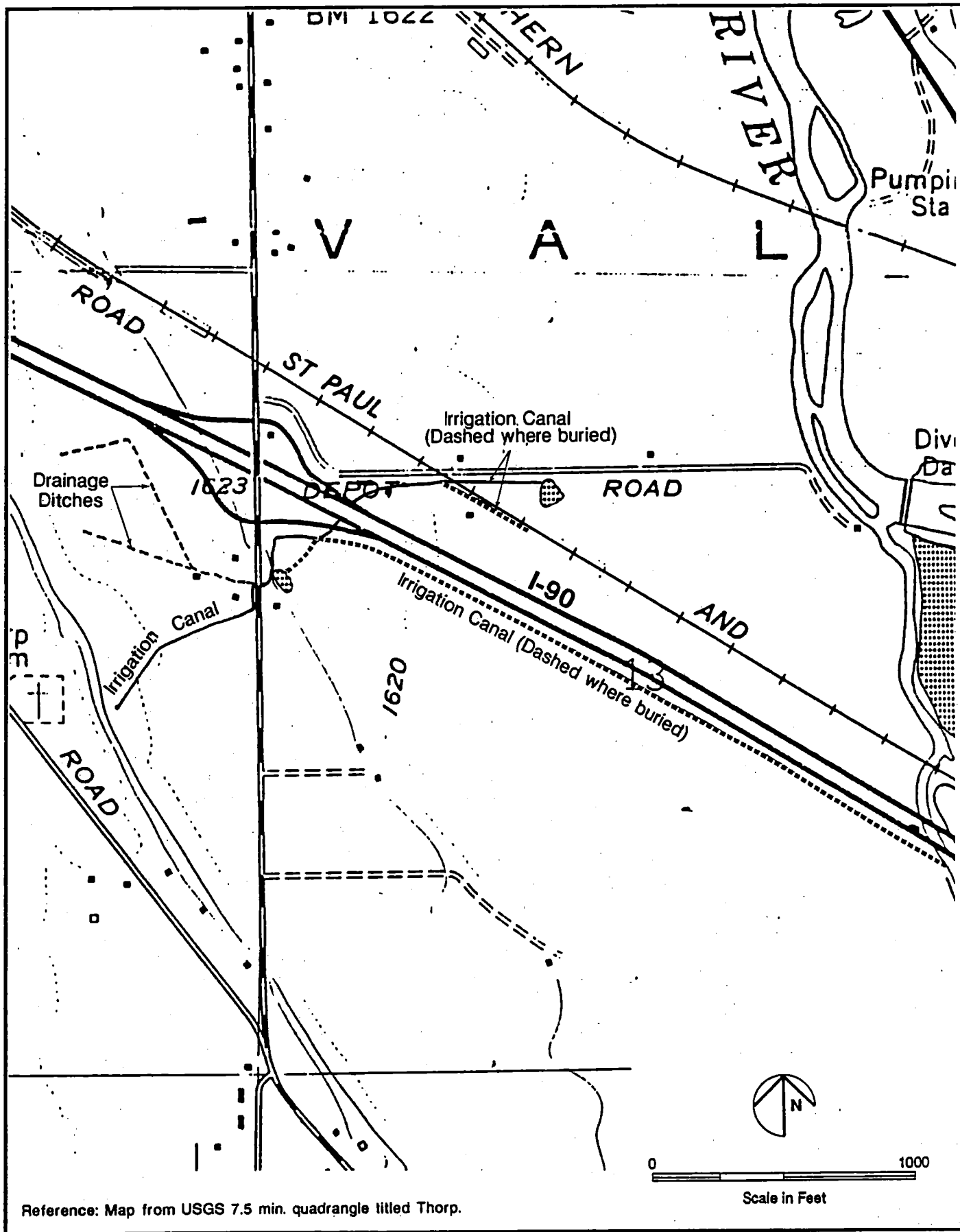
Cross Sections - B to B' and C to C'

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE

4-3

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	JFL		6 Dec. 93		



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Surface Water Flow Diagram

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE

5-1

JOB NUMBER
15.659.001

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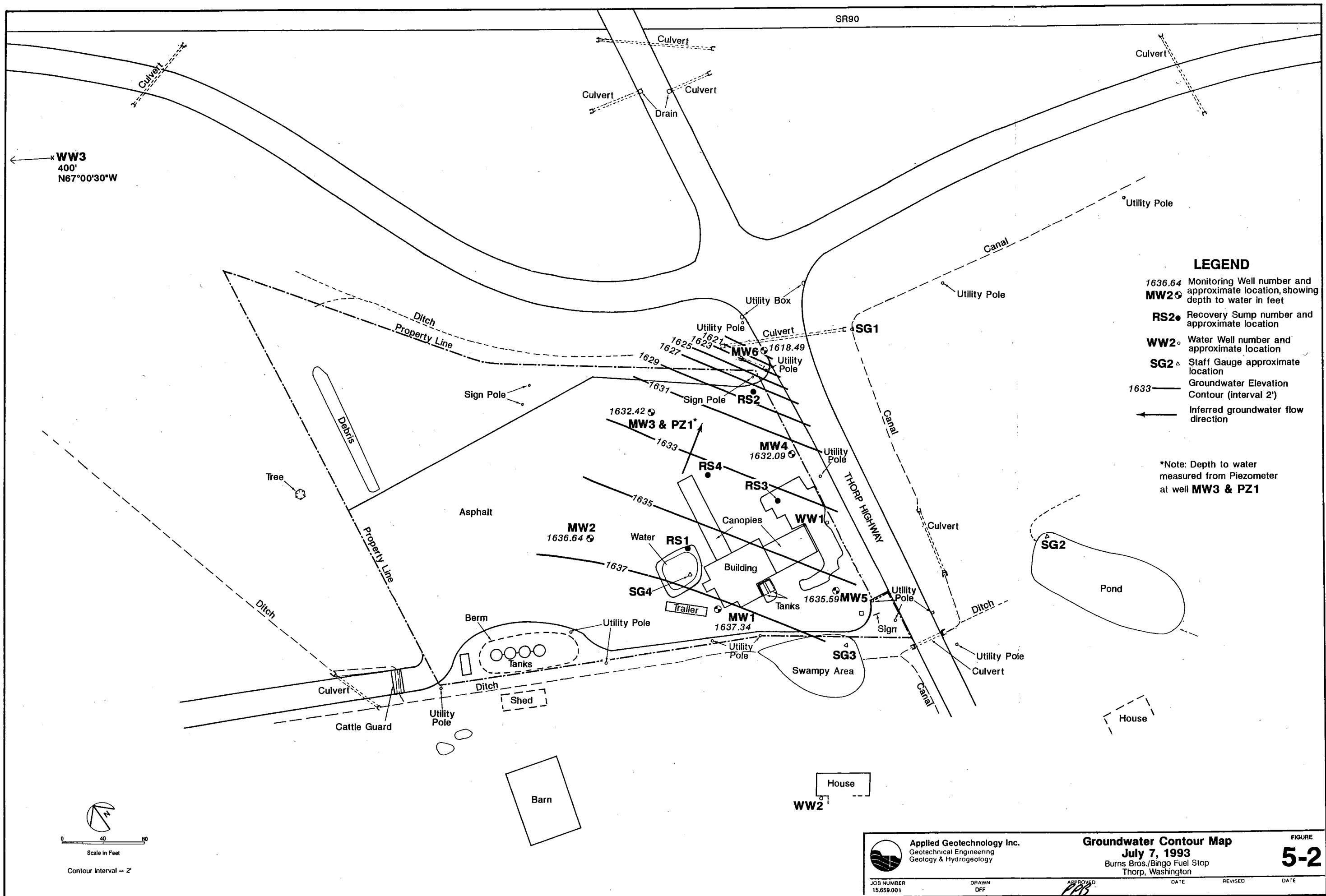
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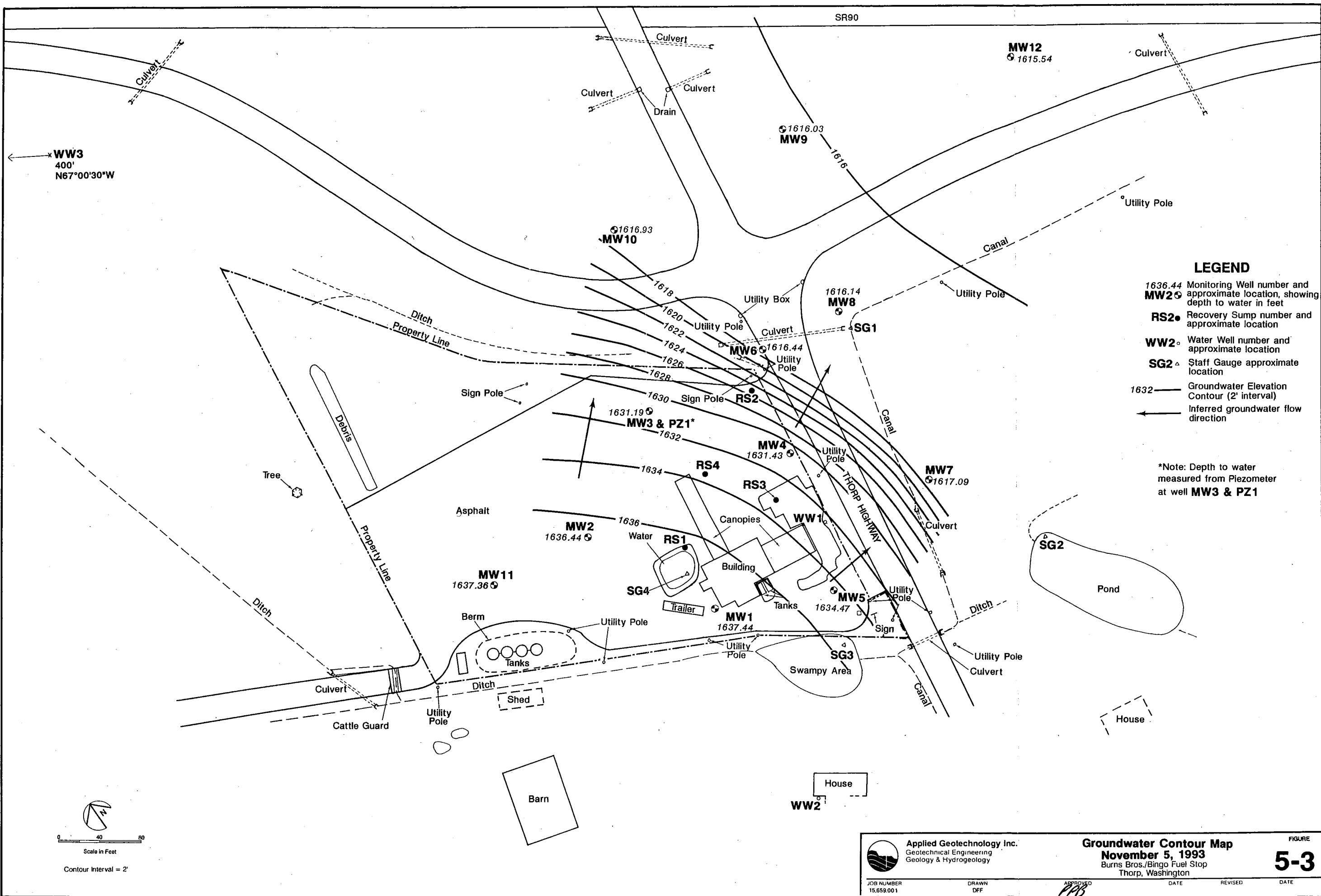
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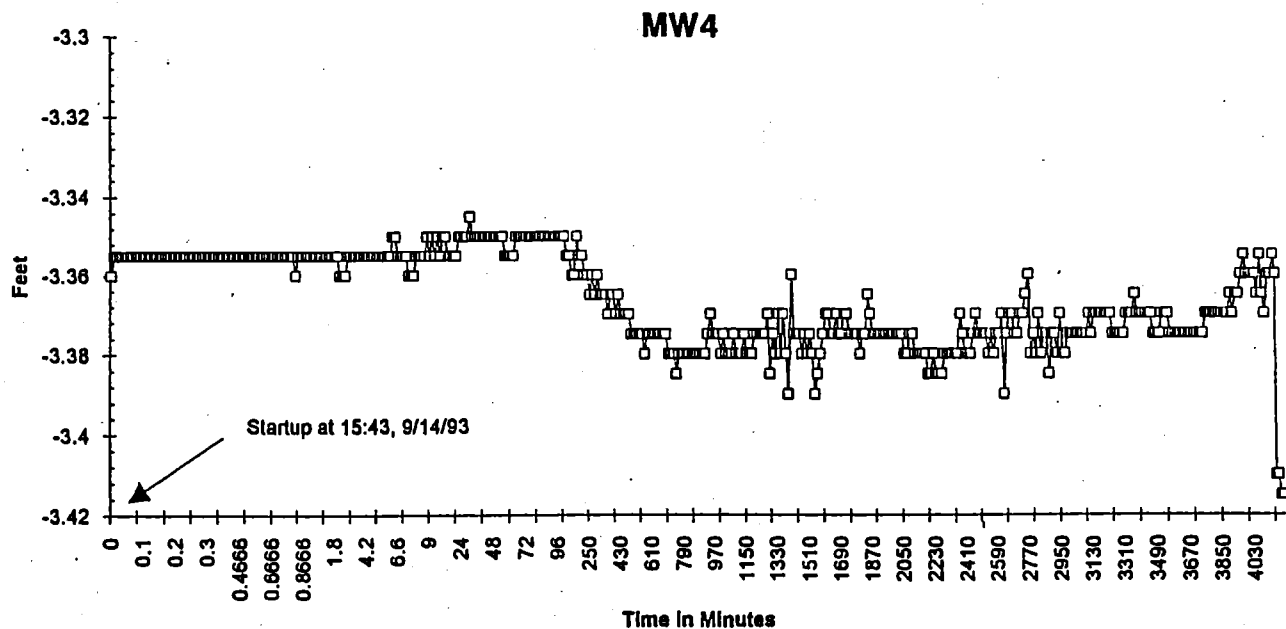
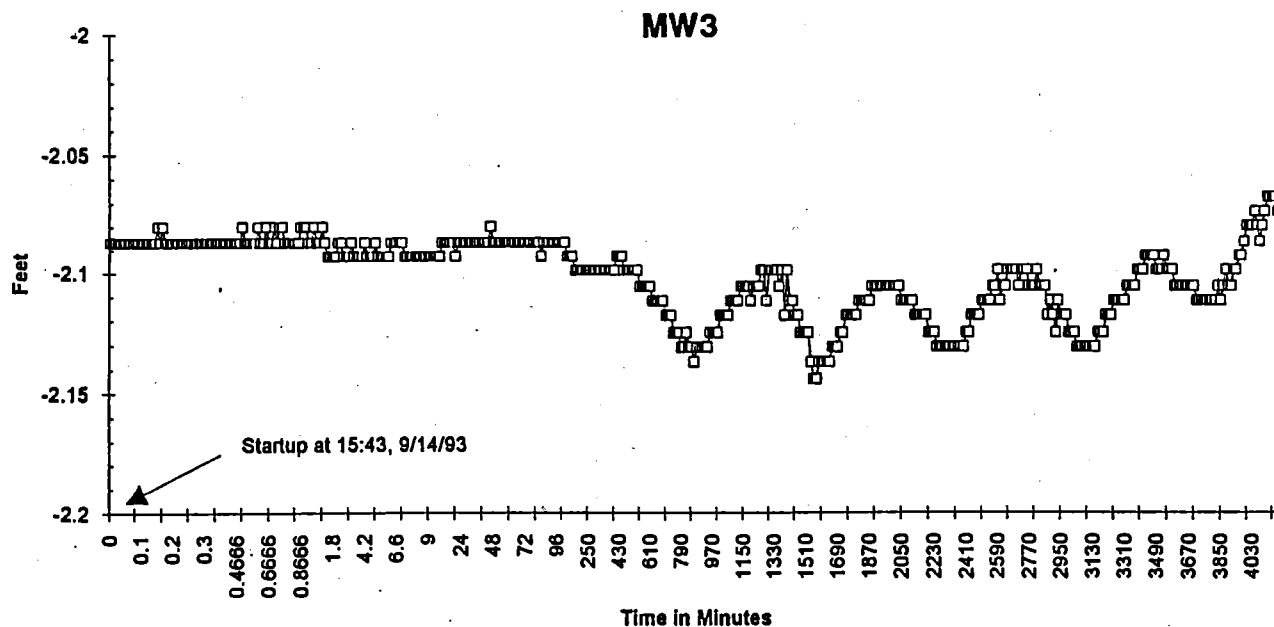
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FIGURE

5-4



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Groundwater Hydrographs MW3 & MW4
Burns Bros./Bingo Fuel Stop
Thorp, Washington

JOB NUMBER
15,659.001

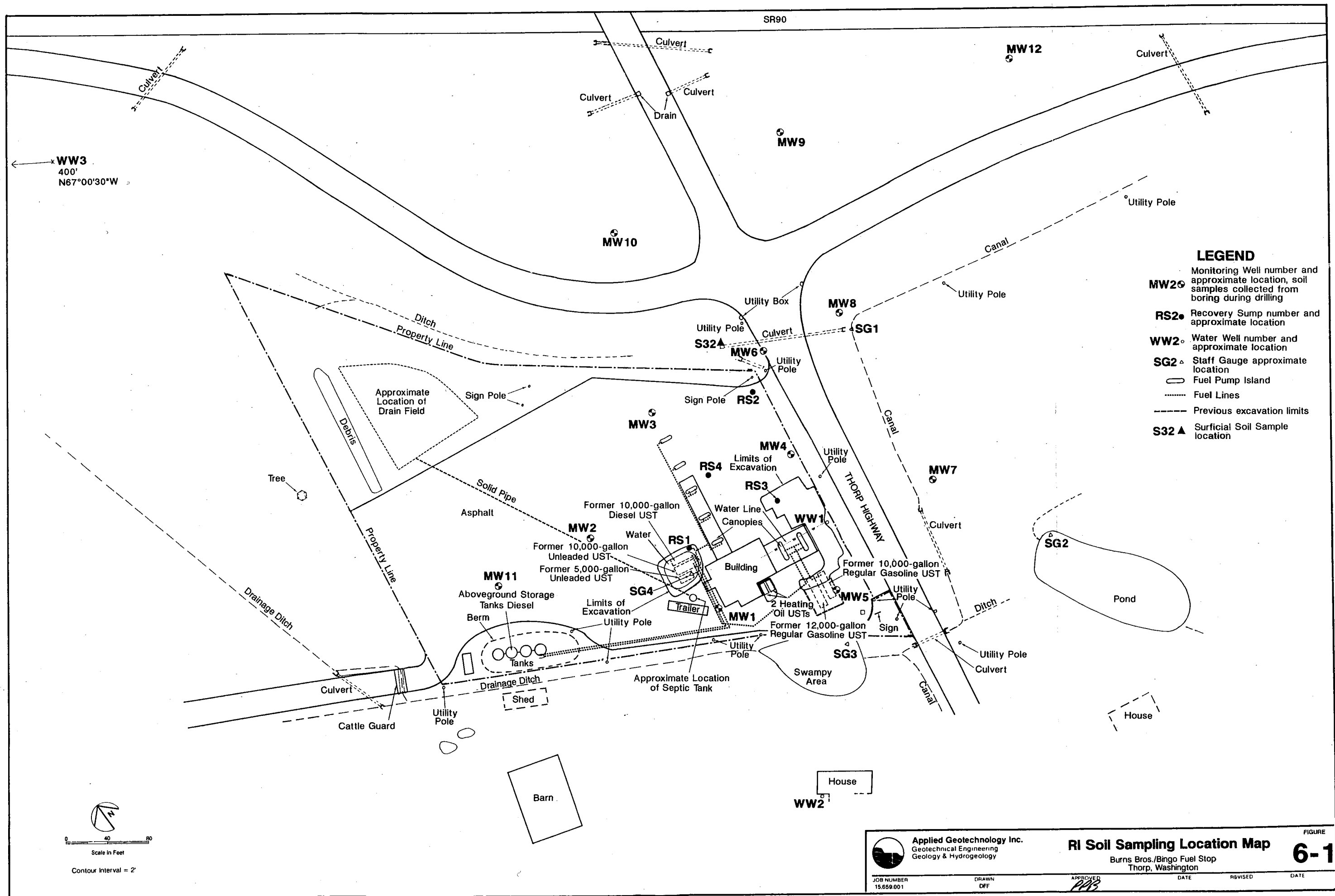
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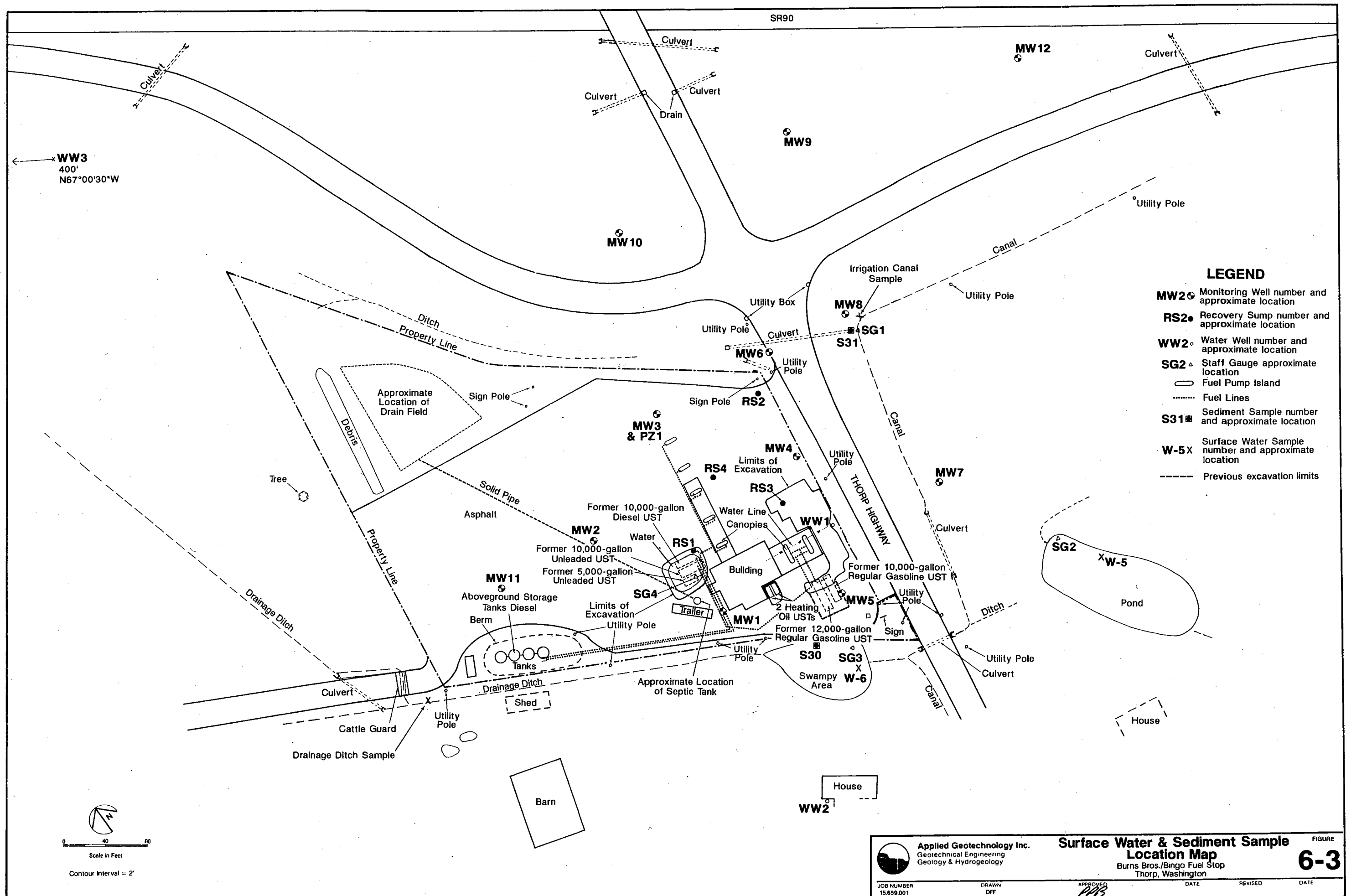
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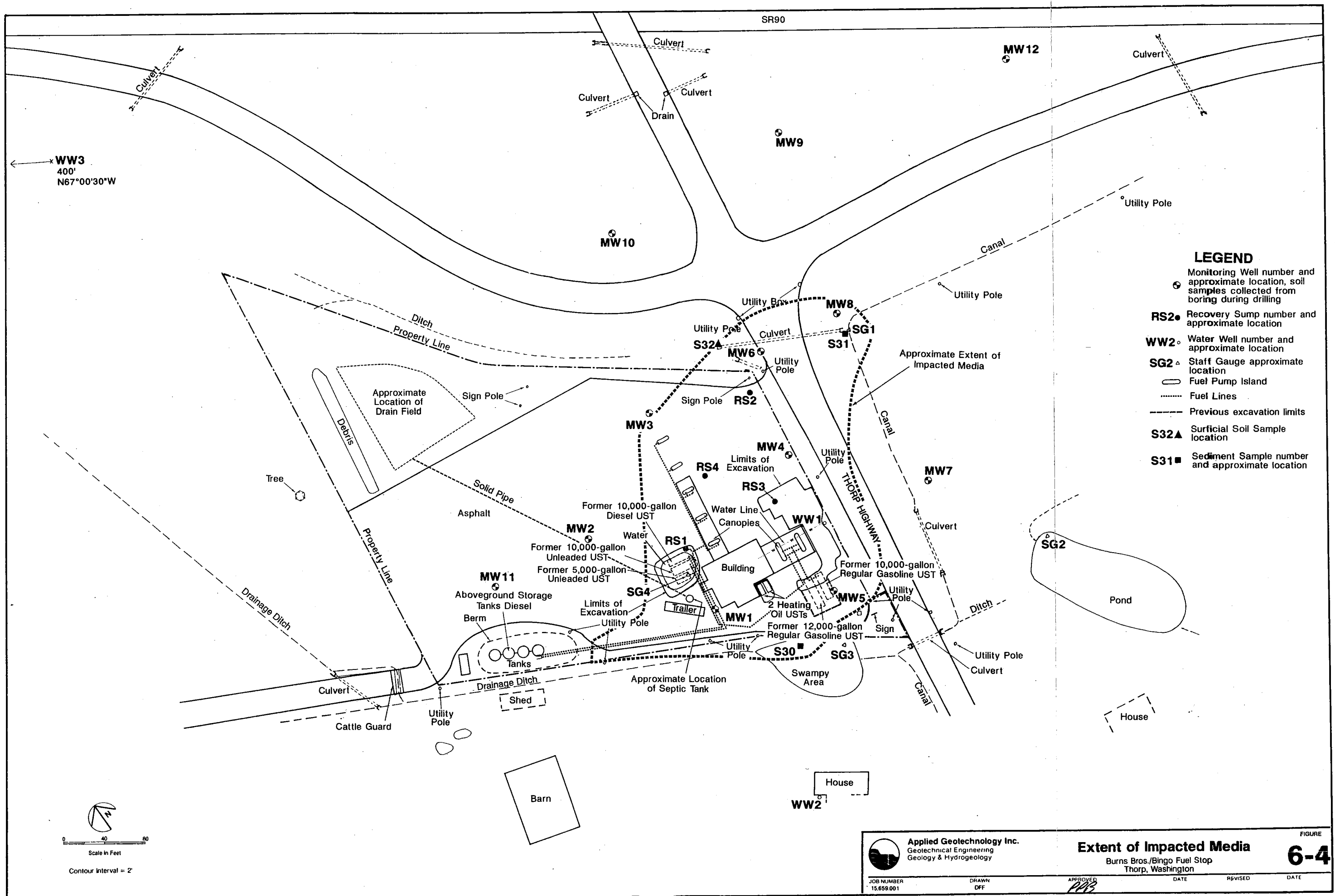
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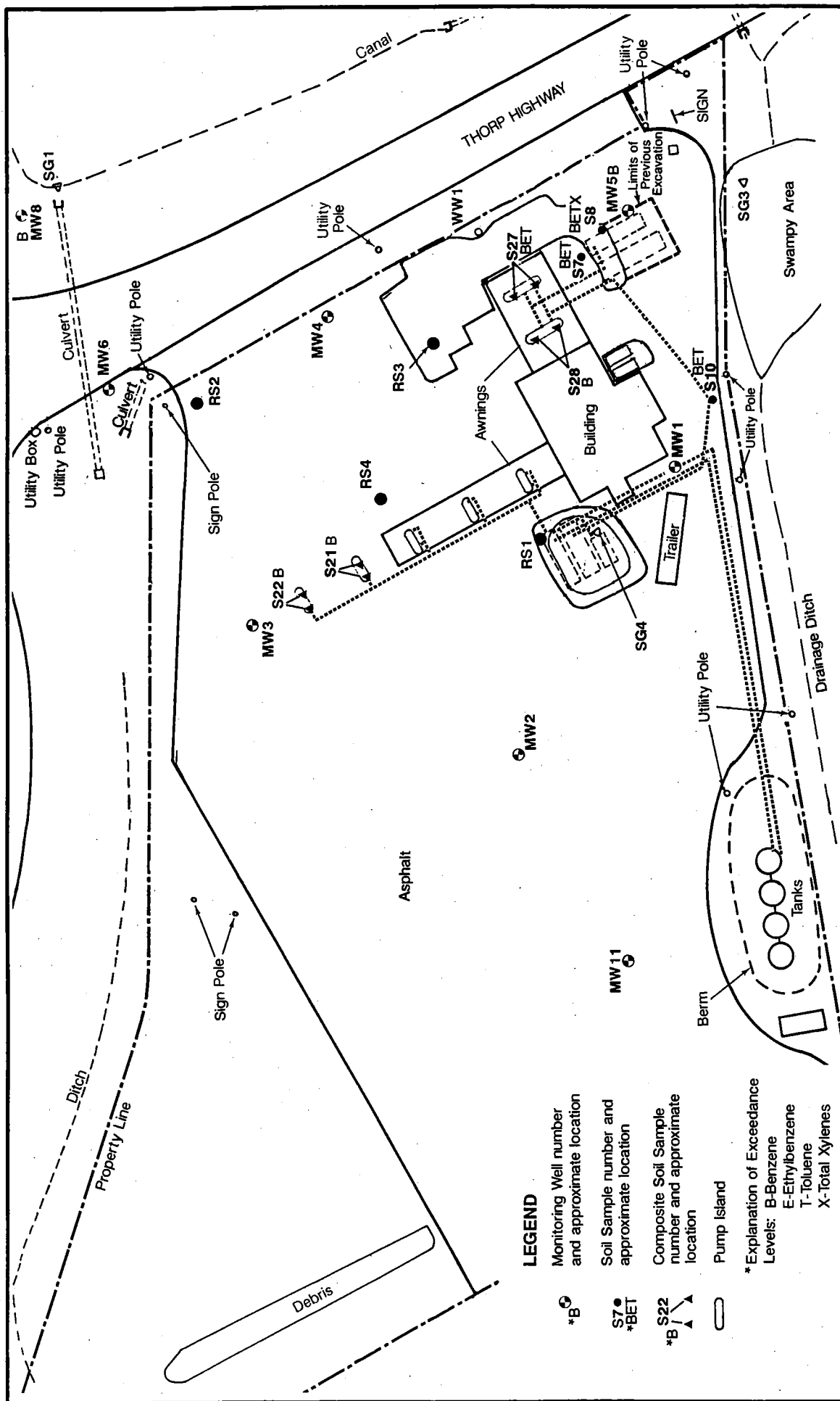
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LEGEND

- *B ● Monitoring Well number and approximate location
- S7 ● Soil Sample number and approximate location
- *BET ● Composite Soil Sample number and approximate location
- S22 ● Pump Island
- *B ● Explanation of Exceedance Levels: B-Benzene, E-Ethylbenzene, T-Toluene, X-Total Xylenes



Scale in Feet
0 40 80



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Soil Cleanup Level Exceedance Locations

Burns Bros./Bingo Fuel Stop
Thorp, Washington

JOB NUMBER
15,659,001

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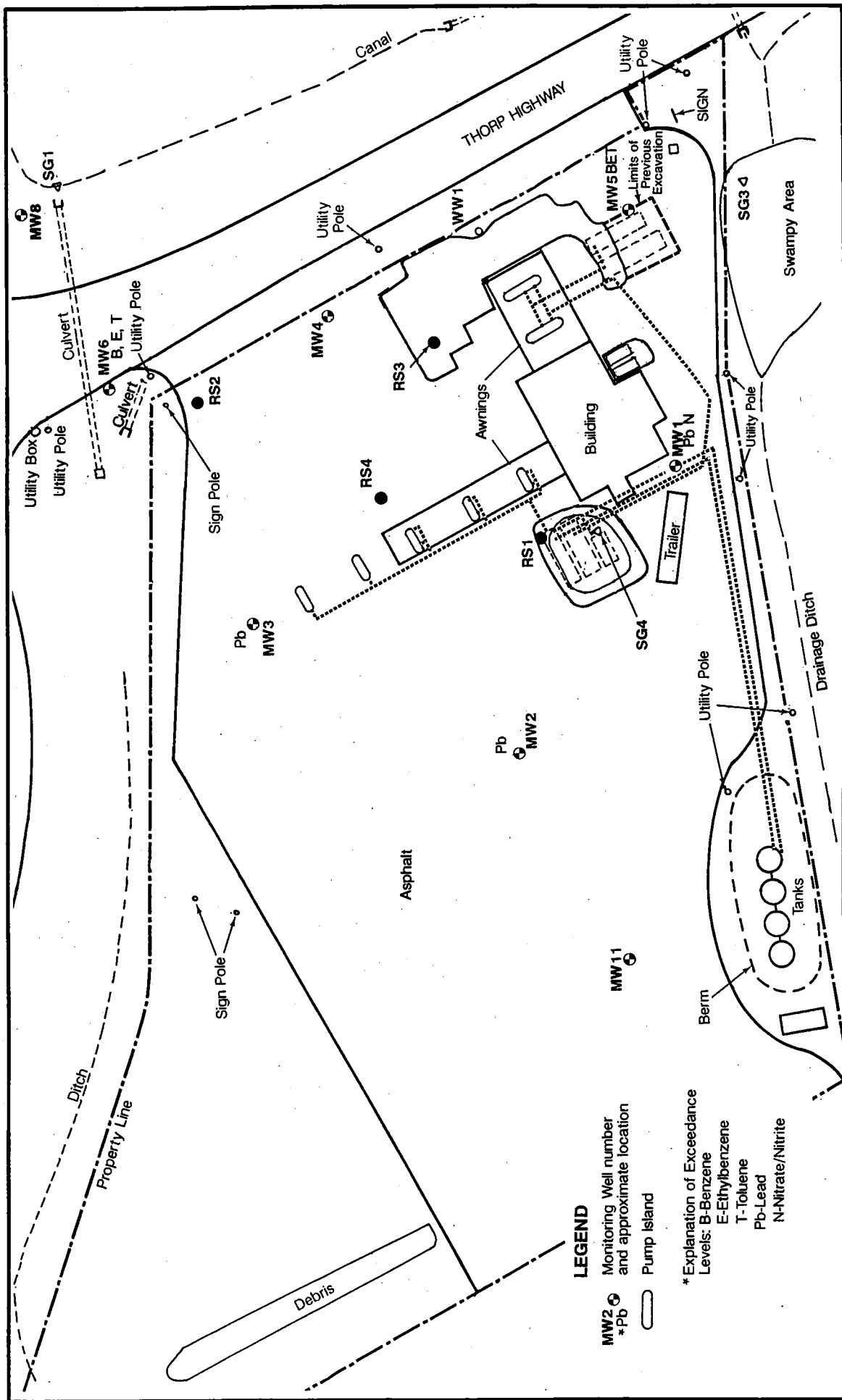
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DATE

FIGURE

7-1



LEGEND

- MW2 +Pb Monitoring Well number and approximate location
- Pump Island
- * Explanation of Exceedance Levels: B-Benzene, E-Ethylbenzene, T-Toluene, Pb-Lead, N-Nitrate/Nitrite



Scale in Feet
0 40 80

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JOB NUMBER
15.659.001

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DATE

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Groundwater Cleanup Level Exceedance Location Map

Burns Bros./Bingo Fuel Stop
Thorp, Washington

FIGURE

7-2

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APPENDIX A

Water Well Reports

(1) OWNER: Name FRANK TURNER Address THORP, WASH.
 (2) LOCATION OF WELL: County BONAS - SE 1/4 SE 1/4 Sec 11 T 18 N, R 17 E W.M.
 ng and distance from section or subdivision corner

3) PROPOSED USE: Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(4) TYPE OF WORK: Owner's number of well
(if more than one).....

New well	<input checked="" type="checkbox"/>	Method: Dug	<input type="checkbox"/>	Bored	<input type="checkbox"/>
Deepened	<input type="checkbox"/>	Cable	<input checked="" type="checkbox"/>	Driven	<input type="checkbox"/>
Reconditioned	<input type="checkbox"/>	Rotary	<input type="checkbox"/>	Jetted	<input type="checkbox"/>

5) **DIMENSIONS:** Diameter of well 6 inches.
 Drilled 111 ft. Depth of completed well 111 ft.

(6) CONSTRUCTION DETAILS:

Casing installed: 6" Diam. from 0 ft. to 111 ft.
 Threaded ☐ " Diam. from _____ ft. to _____ ft.
 Welded ☒ " Diam. from _____ ft. to _____ ft.

Perforations: Yes ☐ No ☒

Type of perforator used.....

SIZE of perforations in. by in.

..... perforations from ft. to ft.

..... perforations from ft. to ft.

..... perforations from ft. to ft.

Screens: Yes ☐ No ☒

Manufacturer's Name.....
Type..... **Model No.**.....
Diam...... **Slot size**..... **from**..... **ft. to**..... **ft.**
Diam...... **Slot size**..... **from**..... **ft. to**..... **ft.**

Gravel packed: Yes ☐ No ☒ **Size of gravel:**
Gravel placed from **ft. to** **ft.**

Surface seal: Yes ☒ No ☐ To what depth? 21 ft.
Material used in seal: BENTONITE
Did any strata contain unusable water? Yes ☒ No ☐
Type of water? SURFACE Depth of strata 13'-40'
Method of sealing strata off. CLAY STRATA

(7) PUMP: Manufacturer's Name.....
Type: HP.....

(8) **WATER LEVELS:** Land-surface elevation above mean sea level.....ft.
 Static level 10'.....ft. below top of well Date 4-10-79
 Artesian pressure.....lbs. per square inch Date.....
 Artesian water is controlled by..... (Cap. valve, etc.)

2) WELL TESTS: Drawdown is amount water level is lowered below static level

Was a pump test made? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, by whom?.....			
Yield:	gal./min. with	ft. drawdown after	hrs.
"	"	"	"
"	"	"	"

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
.....
.....

Date of test 4-10-79
Pump test 6 gal/min. with 40 ft. drawdown after..... hrs.
Artesian flow..... g.p.m. Date.....
Temperature of water..... Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
TOPSOIL - DIRT	0'	10'
GRAVEL & COBBLES	10'	23'
SAND	23'	40'
BROWN CLAY & GRAVEL	40'	95'
SAND	95'	107'
SAND & GRAVEL	107'	111'

Work started 3-20- 1979 Completed: 4-10, 1979

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME Wm. L. VIKEMAN
(Person, firm, or corporation) (Type or print)

Address: RT. 4 BOX 24, GUNSBURG, OH

[Signed] Wm. L. Stearns
(Well Driller)

License No. 0706 Date 4-11- 19 77

WATER WELL REPORT

Start Card No. 1703

STATE OF WASHINGTON

Water Right Permit No. 1

(1) OWNER: Name Burns Brothers Address _____

LOCATION OF WELL: County Kittitas NW 1/4 SE 3/4 T. 18 N., R. 17 W.M. 14

2a) STREET ADDRESS OF WELL (or nearest address) Thorp Highway

(3) PROPOSED USE: ☒ Domestic ☐ Industrial ☐ Municipal ☐
☐ Irrigation ☐ Test Well ☐ Other ☐
☐ DeWater

4) TYPE OF WORK: Owner's number of well (If more than one) _____
Abandoned ☐ New well ☒ Method: Dug ☐ Bored ☐
Deepened ☐ Cable ☐ Driven ☐
Reconditioned ☐ Rotary ☒ Jetted ☐

5) DIMENSIONS: Diameter of well 6 inches.
Drilled 290 feet. Depth of completed well 290 ft.

6) CONSTRUCTION DETAILS:
Casing installed: 6 " Diam. from 12 ft. to 280 ft.
Welded ☒ " Diam. from _____ ft. to _____ ft.
Liner installed ☐ " Diam. from _____ ft. to _____ ft.
Threaded ☐ " Diam. from _____ ft. to _____ ft.
Perforations: Yes ☐ No ☒
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
Screens: Yes ☐ No ☒
Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.
Gravel packed: Yes ☐ No ☒ Size of gravel _____
Gravel placed from _____ ft. to _____ ft.
Surface seal: Yes ☒ No ☐ To what depth? 20 ft.
Material used in seal Benomite
Did any strata contain unusable water? Yes ☐ No ☐
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level 80 ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

3) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes ☐ No ☐ If yes, by whom? _____
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
" " " " " "
" " " " " "
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level

Date of test _____
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Artest 40 gal./min. with stem set at 280 ft. for 1 hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes ☐ No ☒

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION
Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
<u>Overburden</u>	<u>0</u>	<u>3</u>
<u>Boulders</u>	<u>3</u>	<u>60</u>
<u>Gravel</u>	<u>60</u>	<u>290</u>

Work started 4/30/89 19. Completed _____, 19____

WELL CONSTRUCTOR CERTIFICATION:
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME American Drilling (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address P.O. Box 398 Chelan
(Signed) M. L. Paul License No. 941
Contractor's Registration No. AMR1210W Date 4-10, 1989

(USE ADDITIONAL SHEETS IF NECESSARY)

APPENDIX B

Field Investigation Procedures

APPENDIX B

Field Investigation Procedures

DRILLING

Groundwater monitoring well borings were drilled by Holt Drilling of Puyallup, Washington using two different drilling techniques. A Speed Star SD 300 air rotary drill rig equipped with an 8-inch inside-diameter steel casing was used to drill MW1 through MW6. A Mobil B-61 drill rig equipped with a 4- and 6-inch inside-diameter hollow-stem auger was used to drill MW7 through MW12. The drilling method used for each boring is shown on Table 3-1. All borings were continuously monitored by an AGI representative who carefully logged the exploration, examined and classified the materials and contaminants encountered, obtained representative soil samples, and directed field operations.

SOIL SAMPLING

Soil samples were obtained by driving a Dames and Moore split-barrel sampler into undisturbed soil ahead of the drill casing. Samples to be submitted for chemical analysis were placed in laboratory-approved glass jars; other grab samples were stored in plastic, resealable bags.

Organic vapor concentrations in sample headspace were measured with an organic vapor meter (OVM) Model 580A, equipped with a photoionization detector (PID). This instrument measures vapor concentrations in parts per million (ppm). Results from the odor and the organic vapor monitoring are recorded on the soil boring logs in Appendix C. The OVM calibration was checked daily using a 100 ppm isobutylene gas.

Soil samples selected for chemical analysis were stored with frozen Blue Ice during field activities and hand delivered to Analytical Technologies, Inc. (ATI) in Renton, Washington.

MONITORING WELL INSTALLATION

The monitoring wells were installed by Holt Drilling immediately after completion of drilling. The general procedure used for well construction is described below. Minor departures from prescribed construction techniques were occasionally required. As-built well construction diagrams are presented in Appendix C.

Monitoring Well Installation for Borings Drilled by Air Rotary Method (MW1 through MW6)

- The well screen and blank PVC sections were joined together at land surface and lowered through the steel casing. PVC well casing was 4-inch-diameter flush-threaded Schedule 40 PVC pipe. Screens were 10 to 25 feet in length of 0.020-inch-wide milled slots. Bottom caps were flush threaded; top caps were slip on, except for MW3 which was flush threaded; and all caps were 4-inch-diameter.

- ▶ The annulus between the steel and PVC well casing was backfilled with silica sand or equivalent, bentonite chips, and concrete surface seal, as described below. MW3 was also filled with cement grout with bentonite powder due to the length of annulus space which had to be filled. The depth to the top of backfill materials within the annulus was measured frequently with a tape to maintain control of the well construction and prevent overfilling the steel casing.
- ▶ The annulus surrounding the slotted well screen was backfilled using silica sand (No. 10-20). The sand was placed in 2 to 3-foot lifts as the steel casing was withdrawn. Sand was placed from land surface at a controlled rate to avoid bridging. This method minimized the potential for native materials collapsing into the boring and possibly plugging the well screen slots.
- ▶ After the annulus surrounding the slotted portion of the well casing was backfilled, the hole was sealed from possible surface water contamination with a bentonite chip seal at least 2 feet thick, except for MW1 and MW5 where the seal was 1.5 feet thick.
- ▶ Flush-mounted monument cases were installed over the PVC well casing. Monuments were set in fresh concrete.
- ▶ A permanent mark or notch was made on the north side of the top of the PVC well casing, which served as the point from which all water level measurements were made.
- ▶ The boring drilled to install MW3 was also used to install a shallow piezometer (PZ1). A 1-inch-diameter Schedule 40 PVC pipe with a 11.5-foot length of hand-slotted screen section was installed at 18 feet bgs in the boring for MW3.

Monitoring Well Installation for Borings Drilled by Hollow Stem Auger Method (MW7 through MW12)

- ▶ Five completed boreholes (MW8 through MW12) were backfilled to achieve the desired base depth for the PVC screen. Silica sand (No. 10-20) was used as backfill below the well casings. The backfill depth was generally 0.5 foot.
- ▶ The well screen and blank section were joined together at land surface and lowered through the hollow auger stem. Well casing was 2- or 4-inch-diameter, flush-threaded Schedule 40 PVC pipe. Screens were 10-foot lengths of 0.020-inch-wide milled slots, except for MW11 which had a 13-foot length screen. Bottom caps were flush-threaded, except for MW11 which had a bottom slip cap secured to the PVC screen by stainless steel screws. All well top caps were slip on.
- ▶ Wells were backfilled with silica sand or equivalent, bentonite chips, and concrete surface seal, as described below. The depth to the top of backfill materials within the annulus was measured frequently with a steel tape to maintain control of the well construction and prevent overfilling the hollow-stem auger casing.

- ▶ The annulus surrounding the slotted well screen was backfilled using silica sand (No. 10-20). The sand was placed in 2 to 3-foot lifts as the auger was withdrawn. Sand was placed from land surface at a controlled rate to avoid bridging. This method minimized the potential for native materials collapsing into the boring and possibly plugging the well screen slots.
- ▶ After the annulus surrounding the slotted portion of the well casing was backfilled, the hole was sealed from possible surface water contamination with a bentonite chip seal at least 2 feet thick, except for MW7 where the seal was 1 foot thick.
- ▶ A flush-mounted monument case was installed over the PVC well casing for MW11. Five-foot-long steel surface casings were installed over the PVC well casing for MW7 through MW10 and MW12. The steel surface casings and the monument were set in fresh concrete.
- ▶ A permanent mark or notch was made on the north side of the top of the well casing, which served as a point from which all water level measurements were made.

WELL DEVELOPMENT

The 4-inch monitoring wells were developed by swabbing and bailing using a 4-inch-diameter PVC swab block equipped with a rubber gasket and a 3-inch PVC bailer. The 2-inch monitoring wells were developed by bailing using a 2-inch stainless steel bailer. Equipment used in well development activities was decontaminated prior to placement in each well in accordance with the procedures outlined in this appendix. Wells were bailed until the turbidity of the discharge water stabilized and the water was relatively sediment-free. Indicator parameters including pH, conductivity, and temperature were measured and recorded to assure stabilization before completion of development. The pH meter was calibrated daily to pH of 4.00 and 7.00, before being used to check the pH parameter.

VERTICAL ELEVATION SURVEY

The top of the PVC casings for monitoring wells MW1 through MW6 were surveyed by graduate students from Portland State University when they were developing the topographic and plan view map for the site. They used a standard disk number U245.1944 as a reference benchmark which has a known elevation of 1,637.484 feet.

The top of the casings for MW7 through MW12 were surveyed in by representatives of AGI using known surveyed elevations from the top of MW1 and MW6 well casings.

GROUNDWATER SAMPLING

Prior to purging wells for sampling, depth to groundwater was measured to the nearest 0.01 foot using a SINCO electronic water level indicator. Wells were purged using decontaminated stainless steel or PVC bailers lowered by a nylon or stainless steel cord. A minimum of three well casing volumes were extracted prior to sampling at all wells except MW3. Purge water was dispensed into the bioreactor which is actively treating groundwater on the site.

Indicator parameters including pH, conductivity, and temperature were measured and recorded to assure stabilization while purging wells prior to sampling. This procedure allowed us to verify the collection of samples representative of *in situ* groundwater conditions.

Groundwater samples were collected with stainless steel bailers immediately after purging. Samples were then discharged directly from the bailer to the sample container. Sample odor and appearance were noted and recorded during sample collection.

SAMPLE CONTROL/PROJECT RECORDS

A careful record of field activities and observations was maintained by an AGI field representative. Records were maintained on the following forms:

- ▶ Daily Field Investigation Report
- ▶ Field Log of Boring
- ▶ Soil Sample Record
- ▶ Groundwater Monitor Well Development Record
- ▶ Groundwater Sample Record

Sample control was maintained by careful labeling and following chain-of-custody procedures. Each sample container was labeled identifying sample contents with the following information:

- ▶ Project name
- ▶ Sample identification
- ▶ Analysis to be performed
- ▶ Date and time of collection

Chain of Custody records accompanied shipment of all samples to the laboratory.

DECONTAMINATION PROCEDURES

All drilling equipment was decontaminated with a high-pressure steam cleaner prior to drilling the first boring, between subsequent borings, and after completing the final boring.

All equipment used for soil and water sample collection and groundwater purging was decontaminated before each sampling event in the following sequence:

- ▶ Potable water rinse
- ▶ Alconox soap and potable water wash
- ▶ Distilled water rinse
- ▶ Isopropyl alcohol rinse
- ▶ Distilled water rinse
- ▶ HNO₃ rinse
- ▶ Distilled water rinse

SOIL CUTTINGS DISPOSAL

Borehole soil cuttings were placed on the soil treatment area at the site where soil excavated during the removal of the USTs is undergoing remediation by Solid Phase techniques.

QUALITY CONTROL

Quality control (QC) for this sampling round included collection of rinsates and duplicate samples. Specifically, these samples included:

- ▶ A rinsate from soil and groundwater sampling equipment.
- ▶ Groundwater and soil sample duplicates.
- ▶ One trip blank was provided by ATI (analytical laboratory) with each ice chest containing samples to be analyzed for volatile organic compounds, benzene, ethylbenzene, toluene, and total xylenes (BETX).

AQUIFER TESTING

MW3 Testing

Testing: Two tests were performed at the deep completion (MW3) screened in the lower hydrostratigraphic unit. Results of these tests are thus assumed to reflect hydraulic conditions of the lower zone. The first test, conducted July 14, was performed to determine aquifer and well discharge capabilities. Based on results of this test, a constant rate of approximately 1 gallon per minute (gpm) was used for the second test. The latter test was performed July 14 and 15 upon near full recovery of the MW3 water level from the effects of the first test. Duration of the second, constant rate test was approximately 900 minutes (15 hours). Wells MW1 through MW6 were used for water level monitoring during the test at MW3.

Results: MW3 drawdown and recovery data are plotted on Plates A-1 and A-2. Total water level drawdown in MW3 during the constant rate test reached 46 feet (46 feet below the static, pre-pumping level). Water table drawdown in neighboring shallow zone wells during the test was minor. These fluctuations appear to be independent of the effect of pumping at MW3 because they continued to decline in most wells until nearly 24 hours after pumping stopped. These declines are therefore not definitively attributable to the groundwater withdrawal at MW3, but rather were likely the effect of external influences such as pumping at nearby off site well(s).

The water level in the pumped well (MW3) recovered to within 0.9 foot of the pre-step-drawdown test water level, and fully recovered from the second test, within 5 hours after pumping stopped. No recovery from pumping was observed in the shallow observation wells. Drawdown data from the pumped well were used to determine a hydraulic conductivity (K) of approximately 10^{-3} cm/sec for the lower zone.

MW4 Testing

Testing: One test was conducted in the upper hydrostratigraphic zone at MW4 on July 21 and 22, 1993. Duration of this test was 300 minutes (5 hours). Pumping rate for this test was ramped from approximately 1-1/2 to 5 gpm over the 300 minute period of pumping. For the test at MW4, wells MW1 through MW6 were monitored for water level change.

Results: MW4 drawdown and recovery data are plotted on Plates A-3 and A-4. During the test, fluctuations in all observation wells except PZ1, were minor, ranging from 0.03 to 0.05 foot. PZ1 exhibited a 0.3 foot decline. Despite their minor magnitudes, declines observed in the shallow observation wells during the test appear to be attributable to MW4 (upper zone) pumping because most shallow zone wells' water levels recovered to their pre-pumping levels after the test. The water level response in PZ1 is most reliably attributed to this pumping; the PZ1 data were therefore the only drawdown data used besides the pumping well for MW4 aquifer test analysis. Drawdown in the pumped well and drawdown versus distance from the pumped well to PZ1 were used to determine a K of approximately 2×10^{-3} cm/sec for the upper zone. Water level change observed in the deep zone well (MW3) during this test appeared to be independent of the shallow zone (MW4) pumping.

Water level recovery in the pumped well (MW4) occurred within approximately one hour after pumping stopped. This water level continued to rise to approximately 0.1 foot above the pre-pumped water level after 3 hours of recovery.

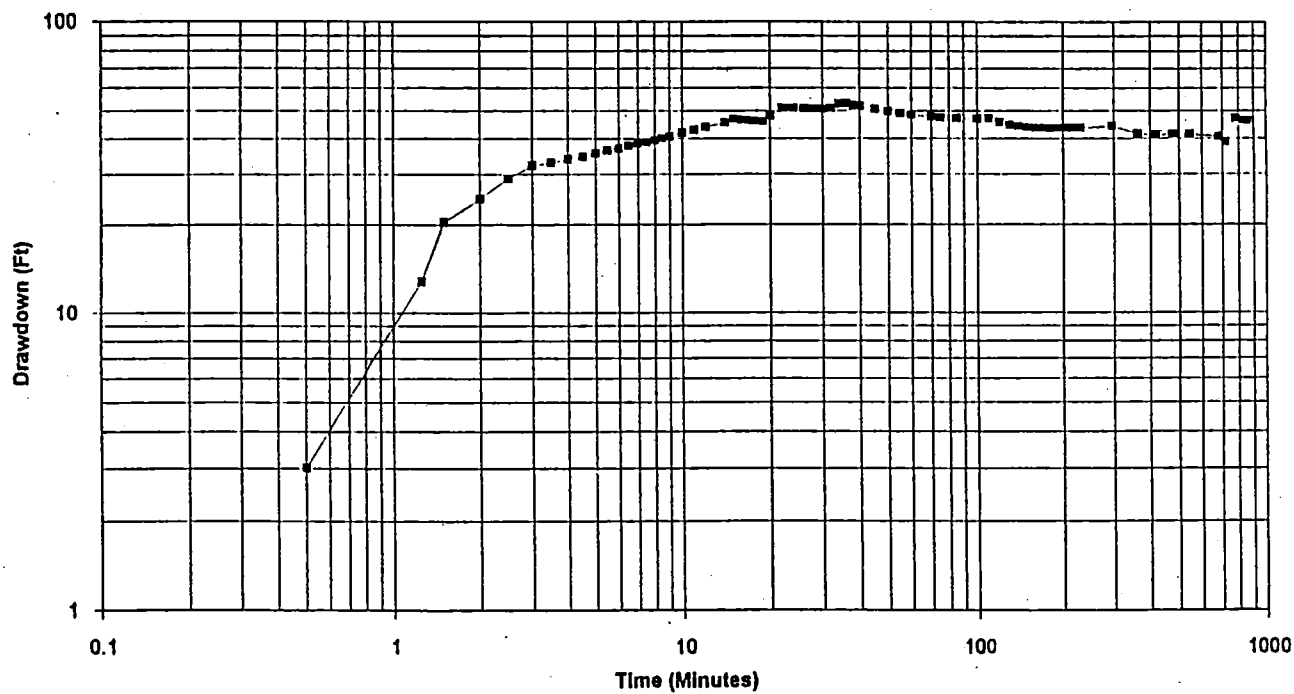
Data Analysis

Data analysis was performed using several methods commonly applied to unconfined aquifers. Results from application of methods developed by Jacob, Theis, Lohman, and Thiem-Dupuit were compared. These methods require several assumptions concerning hydraulic characteristics of the aquifer. Specifically, these are:

- ▶ The aquifer has a seemingly infinite areal extent.
- ▶ The aquifer is homogeneous, isotropic, and of uniform thickness over the area influenced by the pumping test.
- ▶ Prior to pumping, the water table is nearly horizontal over the area influenced by the pumping test.
- ▶ The aquifer is pumped at a constant discharge rate.
- ▶ The pumped well penetrates the entire aquifer and thus receives water from the entire thickness of the aquifer by horizontal flow.

For methods that assume unsteady conditions (i.e., drawdown and hydraulic gradient changes with time), additional assumptions include:

- ▶ Water removed from storage is discharged instantaneously with decline of head.
- ▶ The diameter of the pumped well is very small so that storage in the well can be neglected.



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Geotechnical Engineering
Geology & Hydrogeology

Water Level Drawdown Test-MW3

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

B1

JOB NUMBER
15,659.001

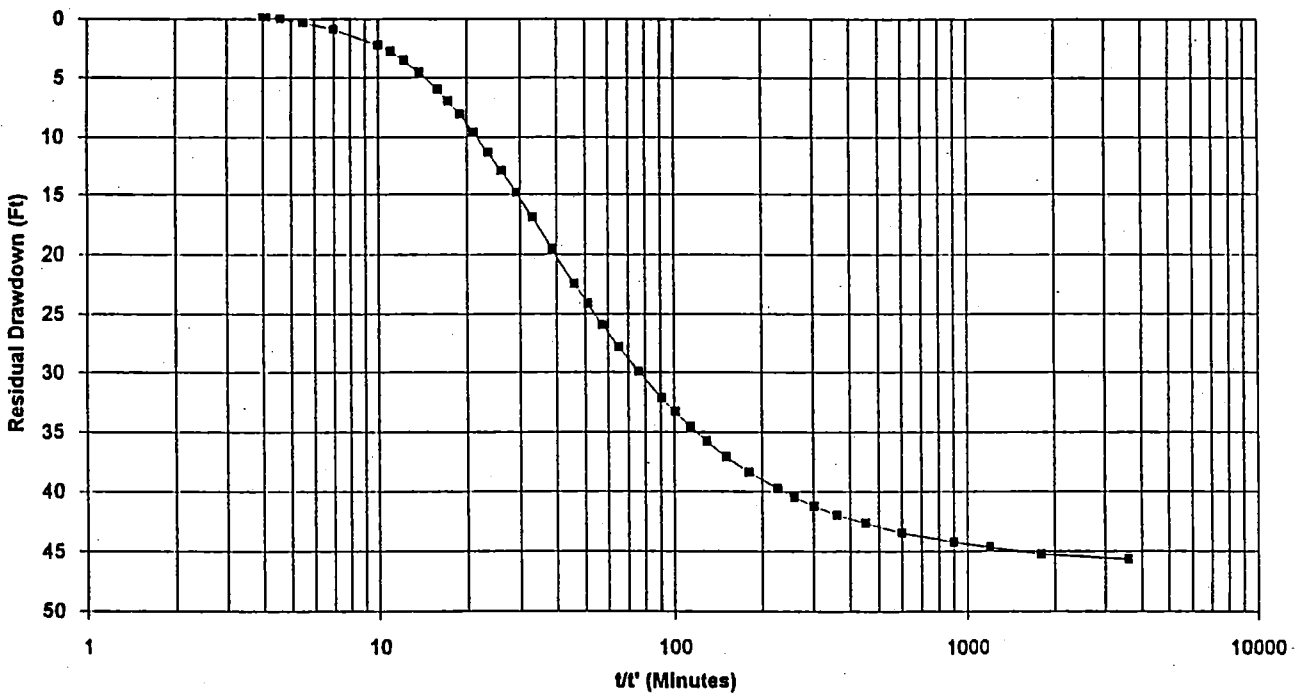
DRAWN
DFF

APPROVED
PPB

DATE
1 Apr 94

REVISED

DATE



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Geotechnical Engineering
Geology & Hydrogeology

Water Level Recovery Test-MW3

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

B2

JOB NUMBER
15,659.001

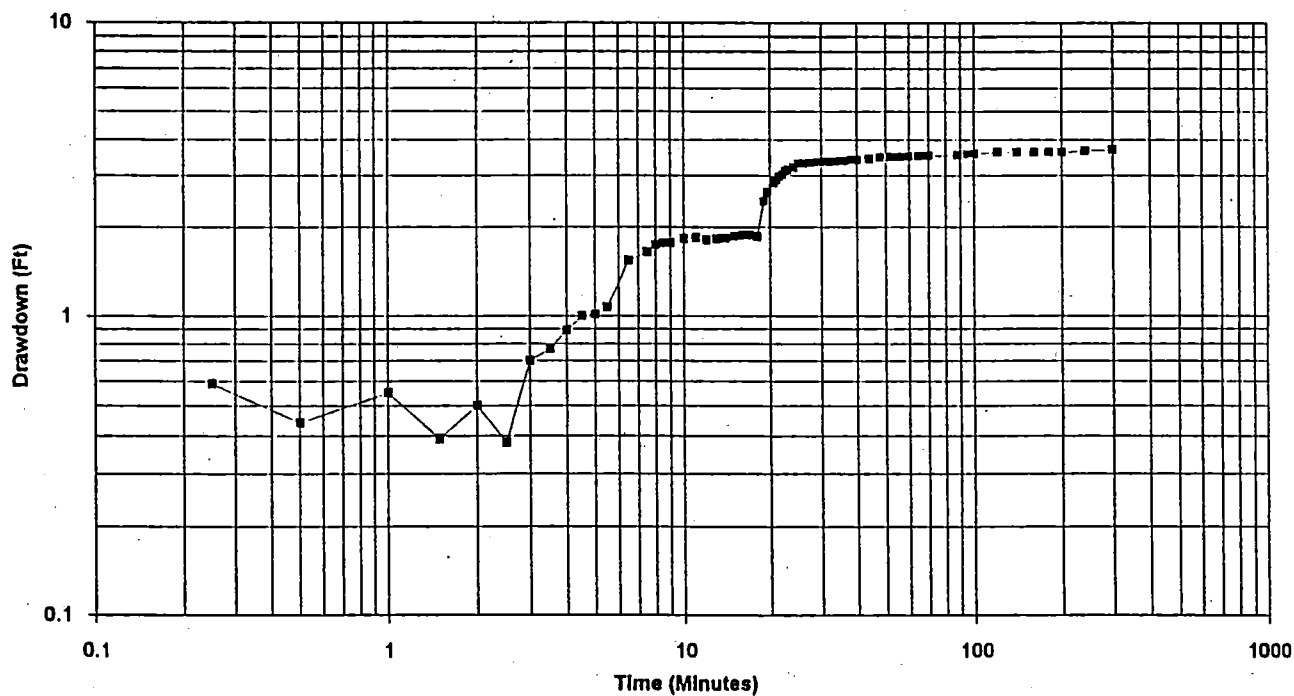
DRAWN
DFF

APPROVED
PCB

DATE
1 Apr 94

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DATE



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Geotechnical Engineering
Geology & Hydrogeology

Water Level Drawdown Test-MW4

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

B3

JOB NUMBER
15,659.001

DRAWN
DFF

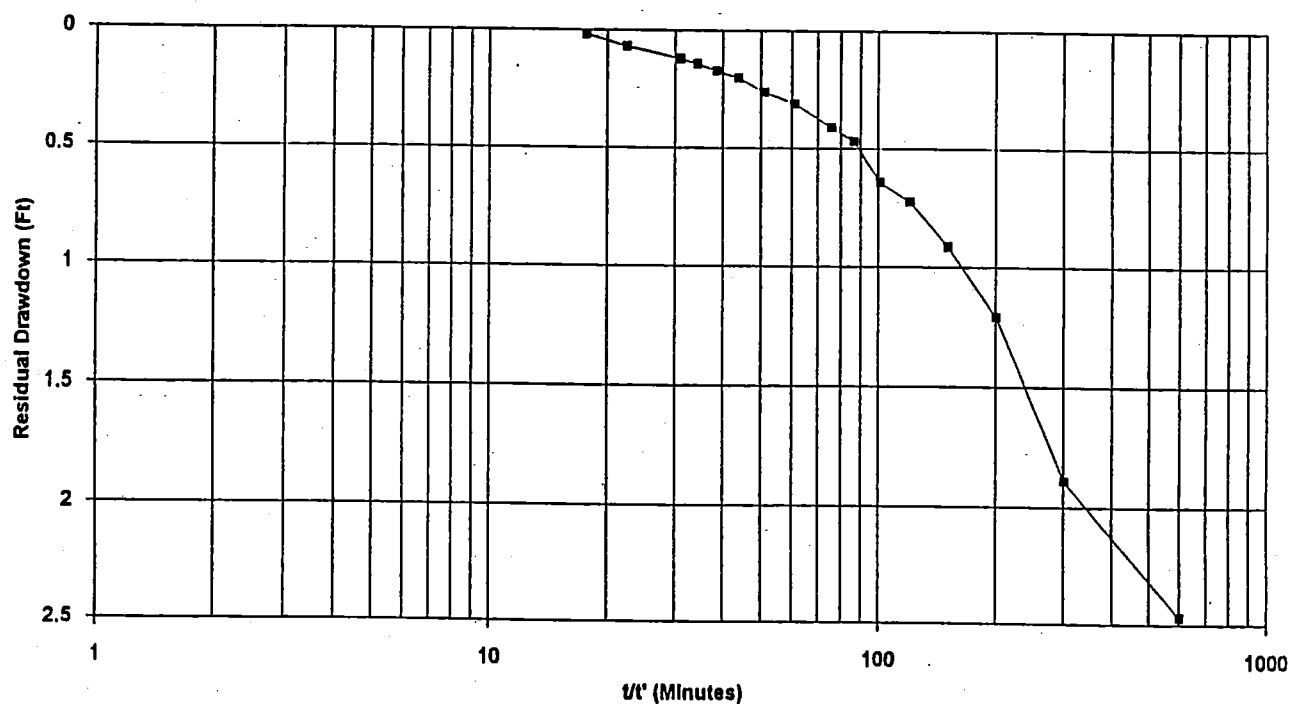
APPROVED

PPS

DATE
1 Apr 94

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DATE



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Geotechnical Engineering
Geology & Hydrogeology

Water Level Recovery Test-MW4

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

B4

JOB NUMBER
15,659.001

DRAWN
DFF

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PJB

DATE
1 Apr 94

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DATE

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APPENDIX C

Boring Logs and Well Construction Summaries

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS					TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN HALF IS LARGER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE	CLEAN GRAVELS WITH LESS THAN 5% FINES	GW		WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP		POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM		SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC		CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 5% FINES	SW		WELL GRADED SANDS, GRAVELLY SANDS
			SP		POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM		SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC		CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN HALF IS SMALLER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50		ML		INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL		ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50		MH		INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH		INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH		ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			PT		PEAT AND OTHER HIGHLY ORGANIC SOILS

LEGEND

SAMPLE	CONTACT BETWEEN UNITS	LABORATORY TESTS
<ul style="list-style-type: none"> "Undisturbed" Bulk/Grab Not Recovered Recovered, Not Retained 	<ul style="list-style-type: none"> Well Defined Change Gradational Change Obscure Change End of Exploration 	<ul style="list-style-type: none"> Consol - Consolidation LL - Liquid Limit PL - Plastic Limit Gs - Specific Gravity SA - Size Analysis TxS - Triaxial Shear TxP - Triaxial Permeability Perm - Permeability Po - Porosity MD - Moisture/Density DS - Direct Shear VS - Vane Shear Comp - Compaction UU - Unconsolidated, Undrained CU - Consolidated, Undrained CD - Consolidated, Drained
BLOWS/FOOT Hammer is 140 pounds with 30-inch drop, unless otherwise noted S - SPT Sampler (2.0-Inch O.D.) T - Thin Wall Sampler (2.8-Inch Sample) H - Split Barrel Sampler (2.4-Inch Sample)		
MOISTURE DESCRIPTION Dry - Considerably less than optimum for compaction Moist - Near optimum moisture content Wet - Over optimum moisture content Saturated - Below water table, in capillary zone, or in perched groundwater		



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Soil Classification/Legend

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C1

JOB NUMBER
15,659.001

DRAWN
SES

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6 Dec 93

DATE

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REVISED

DATE

1 Apr 94

Organic Vapor Meter

Concentrations of photoionizable organic gases (e.g., gasoline vapors) in the headspace of soil sample containers were determined in the field with an OVM Air Analyzer and recorded as parts per million (ppm) of petroleum product. The recorded concentrations are only an approximate value for organic gas concentrations in the soil pore spaces (soil gas). Actual values are within the range of ± 50 to 100%.

For unsaturated, coarse grained soils such as gravels, it is possible to detect hydrocarbons in the gas phase using an OVM and not in the whole sample using EPA Method 8015M (TPH) or 8020M (BETX). For these samples, the majority of the hydrocarbons are present in the pore space and are present at concentrations too low to detect when the whole sample is analyzed. For saturated samples and for fine grained samples such as silts and clays, a larger percentage of the hydrocarbons are present and adsorbed to the soil particle or dissolved in the pore water. For these samples, detectable OVM readings will correlate well with measured soil concentrations using EPA 8015M or 8020M.



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Description of Terms

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C2

JOB NUMBER
15,659.001

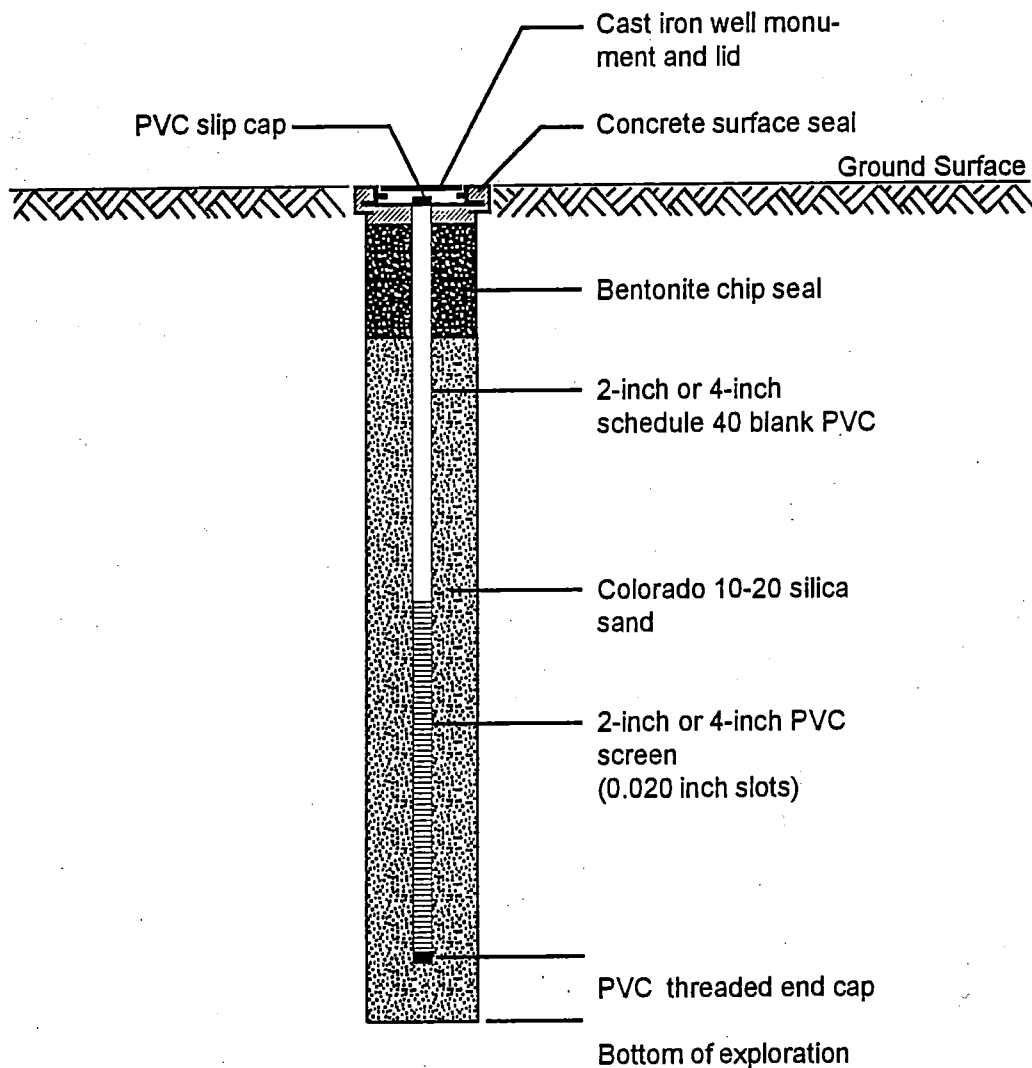
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SES

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PAB

DATE
6 Dec 93

REVISED

DATE
1 Apr 94



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**Monitoring Well Construction for
MW1, MW2, MW4, MW5, MW6 and MW11**
Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C3

JOB NUMBER
15,659.001

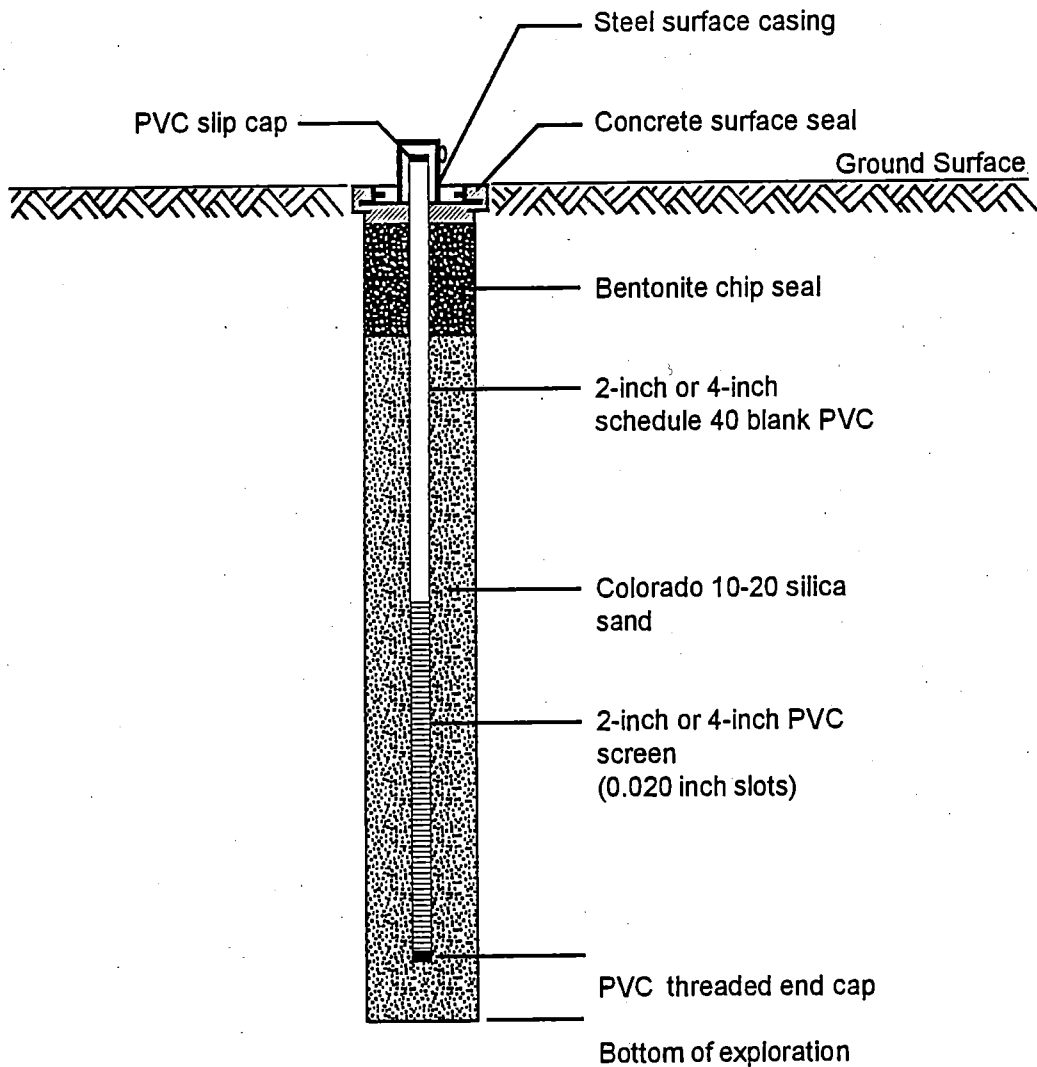
DRAWN
SES/KM

APPROVED
PPB

DATE
6 Dec 93

REVISED

DATE



Applied Geotechnology Inc.

**Monitoring Well Construction for
MW7, MW8, MW9, MW10 and MW12**
Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C4

JOB NUMBER
15,659.001

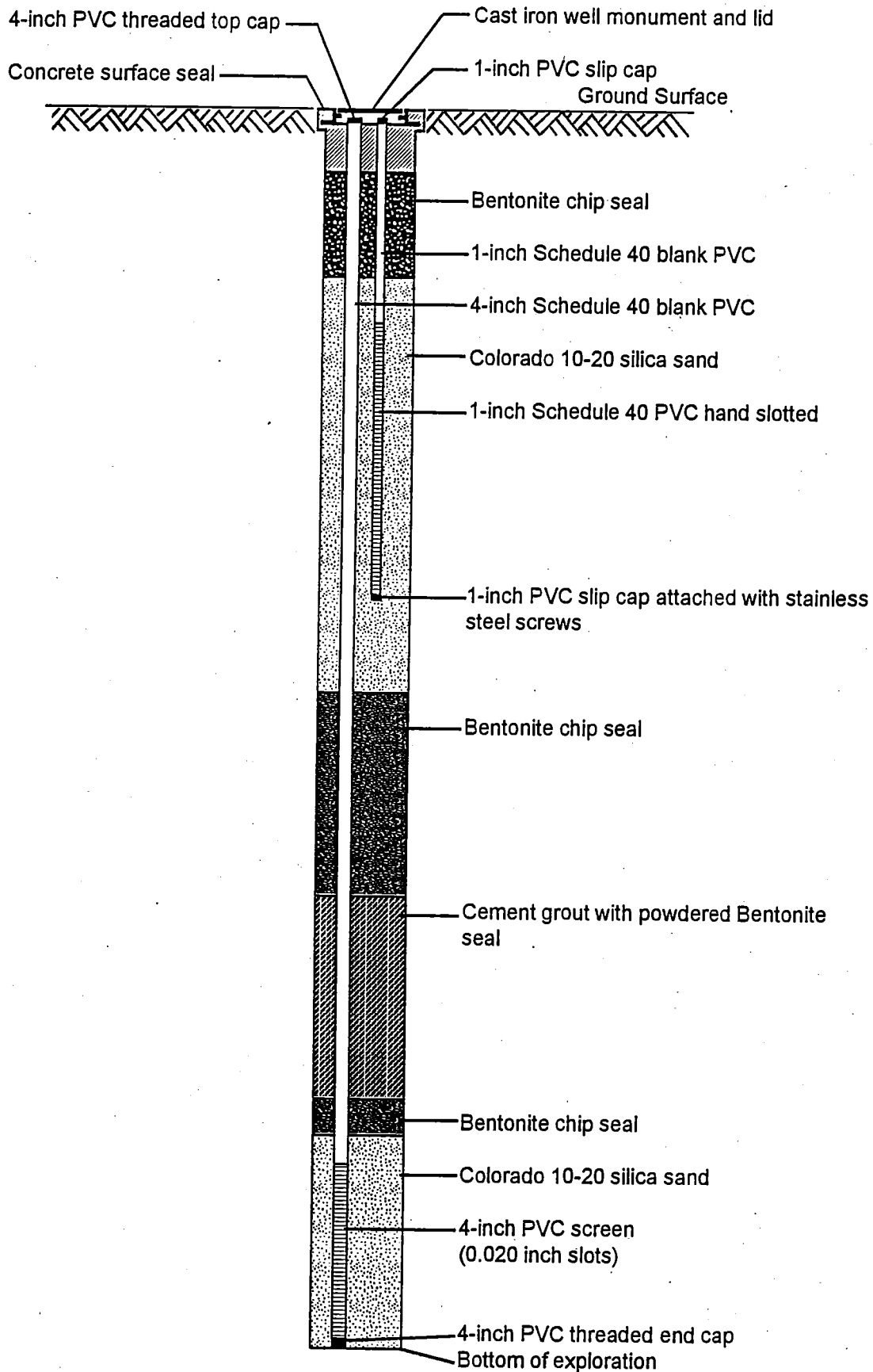
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SES/KM

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PPB

DATE
6 Dec 93

REVISED

DATE



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Monitoring Well Construction for MW3 and P21

PLATE

Burns Bros./Bingo Fuel Stop
Thorp, Washington

C5

JOB NUMBER
15,659.001

DRAWN
KM

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PPB

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well

Laboratory
Tests

OVM - PID

% LEL

Blows per
Foot

Depth

Sample

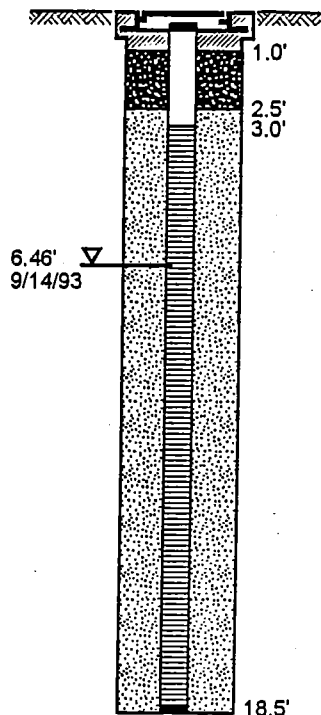
Equipment

Speed Star SD 300 Air Rotary

Land Surface
Elevation

1644.5

Date 7/2/93

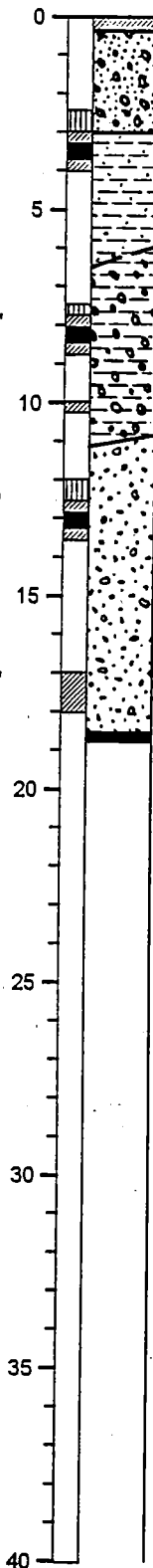


0 0 18

0 0 75/0.7'

0 0 90/0.8'

0 0 100/0.8'



Asphalt.

LIGHT BROWN SANDY GRAVEL (GP) dense, dry;
fine gravel, with fine to coarse sand, and some
silt.

BLACK SANDY SILT (ML) very stiff, moist; with fine
to coarse sand, and a trace of fine gravel.

BROWN GRAY SILTY GRAVEL (GM) very dense,
moist; fine gravel, with some fine to coarse sand.

Becomes wet at 9 feet.
With some cobbles at 10 feet.

BROWN GRAVELLY SAND (SW) very dense,
saturated; with fine to coarse gravel, some silt
and cobbles.

Boring terminated on 7/2/93.
Groundwater encountered at 11 feet during drilling.



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Log of Monitoring Well 1

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C6

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED
PAB

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well

Laboratory
Tests

OVM - PID

% LEL

Blows per
Foot

Depth

Sample

Equipment

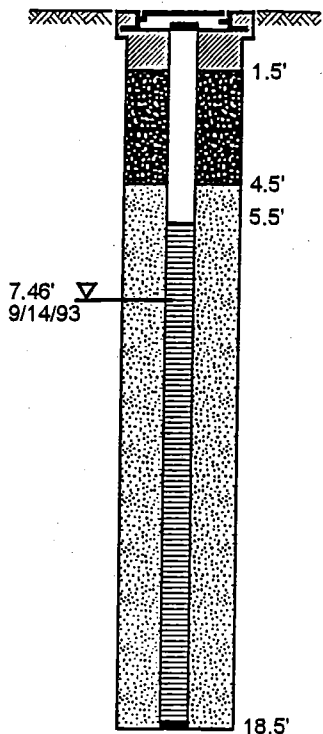
Speed Star SD 300 Air Rotary

Land Surface
Elevation

1645

Date

7/2/93



7.46'
9/14/93

0 0 34

0 0 72/0.8'

0 0 75/0.7'

0 0 50/0.3'

Asphalt.
Crushed rock.

BROWN SILTY SAND (SM) dense, moist; fine
grained, with a trace of fine gravel.

DARK BROWN SANDY GRAVEL (GW) very dense,
moist; with fine sand, and some silt and cobbles.

Abundant cobbles at 9 feet.

Becomes brown and saturated at 12.5 feet.

Boring terminated on 7/2/93.
Groundwater encountered at 12.5 feet during
drilling.



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Log of Monitoring Well 2

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C7

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED

PPS

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well and 1-inch
Piezometer

Laboratory
Tests

QVM - PID

% LEL

Blows per
Foot

Depth

Sample

Equipment

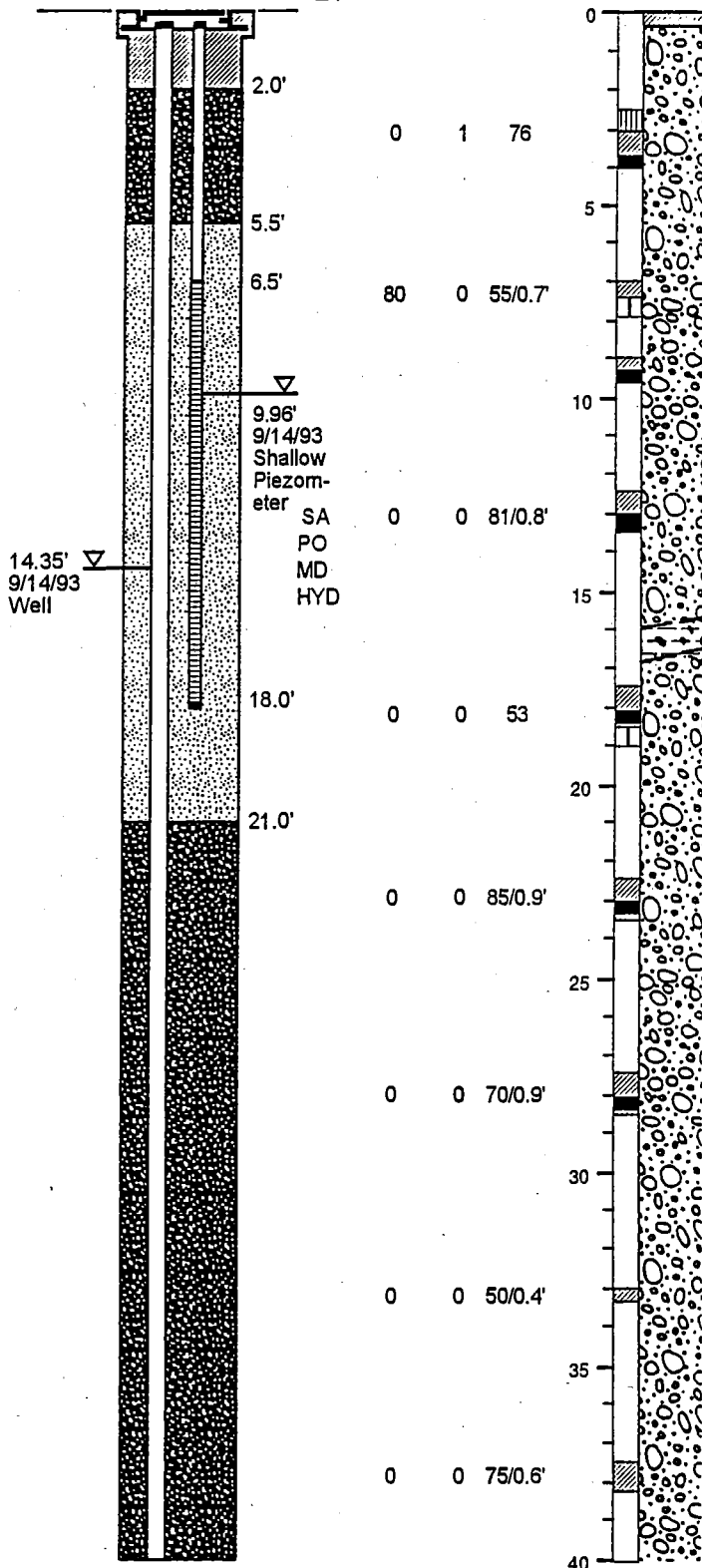
Speed Star SD 300 Air Rotary

Land Surface
Elevation

1642.5

Date

6/30/93



Asphalt.

BROWN SANDY GRAVEL (GW) very dense, dry;
with fine sand, and a trace of silt and cobbles.

Becomes dark gray, moist. Hydrocarbon odor noted
at 5 feet.

Increased cobbles at 7 feet.

Becomes wet and no hydrocarbon odor at 10 feet.

Becomes saturated, with some silt at 12.5 feet.

BROWN SILTY GRAVEL (GM) 1 foot thick
interbedded.

With a trace to some silt and cobbles at 17.5 feet.

Becomes brown, with some silt at 21 feet.

With a trace of silt at 27.5 feet.



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Log of Monitoring Well 3 (0-40')

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C8

JOB NUMBER
15,659.001

DRAWN
SES

APPROVED
PMS

DATE
6 Dec 93

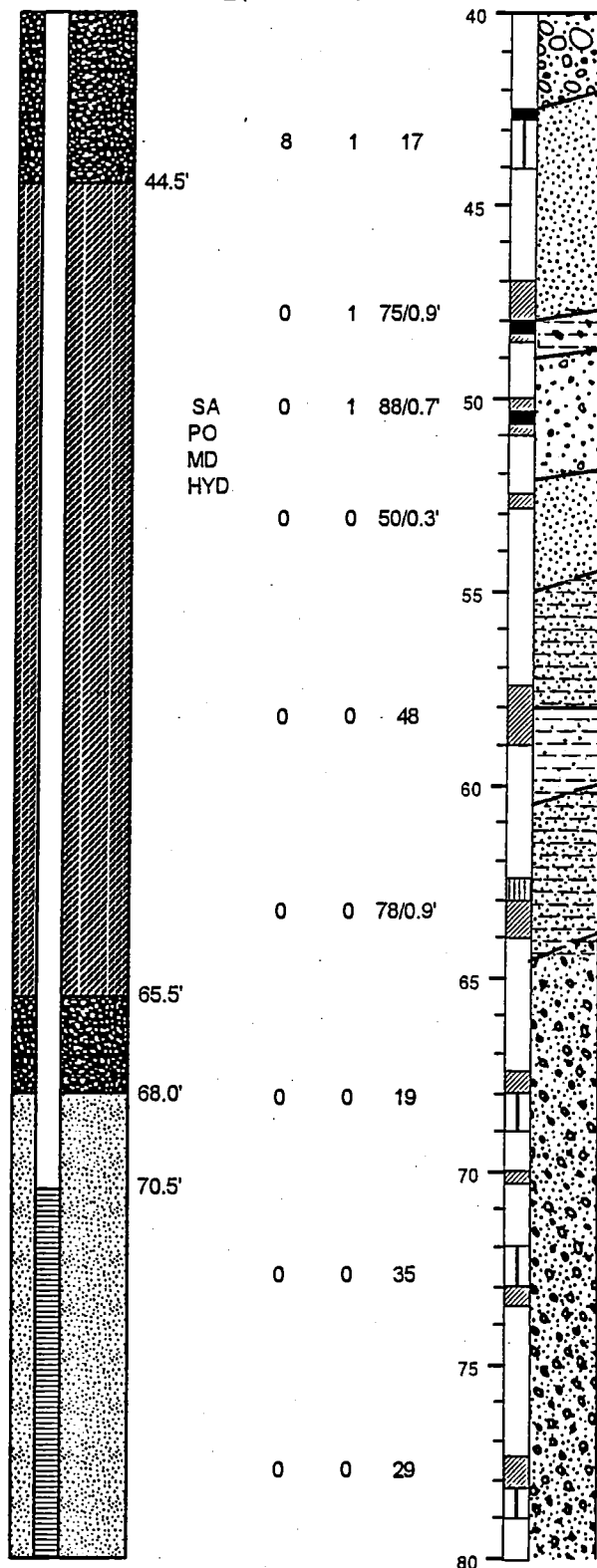
REVISED

DATE

Well Construction
Summary
4-inch Well

Equipment Speed Star SD 300 Air Rotary

Land Surface 1642.5 Date 6/30/93
Elevation



BROWN GRAVELLY SAND (SP) medium dense, saturated; medium to coarse sand, with fine gravel, and a trace of silt.

With some silt at 47 feet.

YELLOW BROWN SILTY GRAVEL (GM) very dense, wet; fine to coarse gravel, with some fine to coarse sand.

BROWN GRAVELLY SAND (SW) very dense, saturated; with fine to coarse gravel, and some interbedded silt lenses.

YELLOW BROWN SAND (SP) very dense, saturated; fine to medium sand, with a trace of coarse sand and silt.

BROWN SILTY SAND (SM) very dense, saturated; fine to coarse sand, with some gravel, and with intermittent sandy gravel lenses up to 1 inch thick.

LIGHT BROWN SANDY SILT (ML) very hard, wet; with fine sand, micaceous.

LIGHT GRAY SILTY SAND (SM) very dense, wet; fine sand, with silt. Interbedded with Brown Silty Gravel, fine to coarse gravel, with some fine to coarse sand.

BROWN SANDY GRAVEL (GP) very dense, saturated; fine gravel, with fine to coarse sand, and a trace to some silt. Interbedded with Brown Gravelly Sand (SP), fine to medium sand with fine gravel and some silt.



Applied Geotechnology Inc.

Log of Monitoring Well 3 (40-80')

PLATE

Burns Bros./Bingo Fuel Stop
Thorp, Washington

C9

JOB NUMBER
15,659.001

DRAWN
SES

APPROVED
PPS

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary

4-inch Well



Laboratory
Tests

OVM - PID

% LEL

Blows per
Foot

Depth

Sample

Equipment Speed Star

Land Surface 1642.5 Date 6/30/93
Elevation

80
85
90
95
100
105
110
115
120

Boring terminated on 6/30/93.
Groundwater encountered at 12.3 feet during drilling.



Applied Geotechnology Inc. **Log of Monitoring Well 3 (80'-80.9')**
Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C10

JOB NUMBER
15,659.001

DRAWN
SES

APPROVED

PMB

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well

Laboratory
Tests

OVM - PID

% LEL

Blows per
Foot

Depth

Sample

Equipment

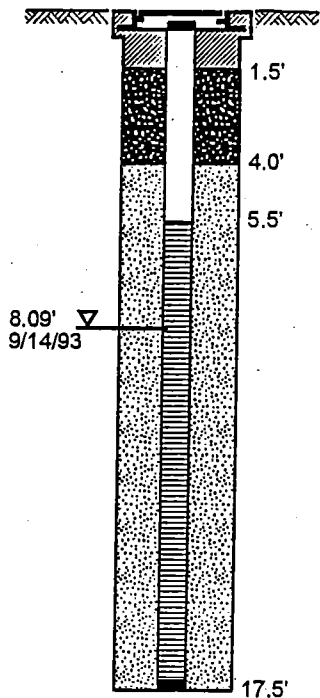
Speed Star SD 300 Air Rotary

Land Surface
Elevation

1641

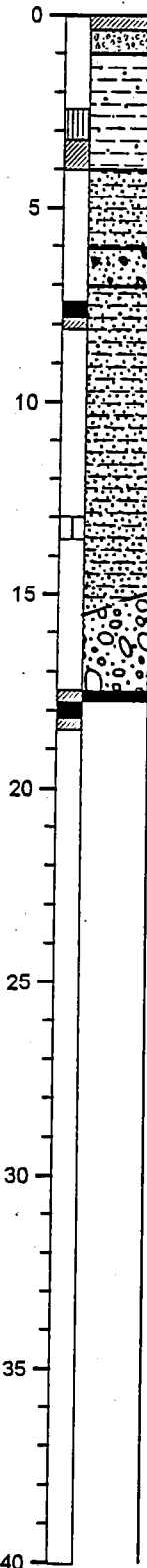
Date

7/6/93



8.09' ∇
9/14/93

0	0	33	
600	0	78/0.7'	
0	50/0.3'		
15	1	74/0.8'	



Asphalt.

Crushed Rock.

BLACK SANDY SILT (ML) hard, moist; with fine sand, with some gravel.

GRAY SILTY SAND (SM) dense, moist; fine sand, with some cobbles, and medium to coarse sand. Moderate hydrocarbon odor noted.

GRAVEL (GP) 1 foot thick interbed.

Becomes saturated at 13 feet, with increased cobbles.

No hydrocarbon odor at 14 feet.

BROWN SANDY GRAVEL (GW) very dense, saturated; with medium to coarse sand, some cobbles, and a trace of silt. Contains interbedded gray sand lenses up to 1 inch in thickness.

Boring terminated on 7/6/93.

Groundwater encountered at 13 feet during drilling.



Applied Geotechnology Inc.

Log of Monitoring Well 4

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C11

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED
PJS

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well

Laboratory
Tests

QVM - PID

% LEL

Blows per
Foot

Depth

Sample

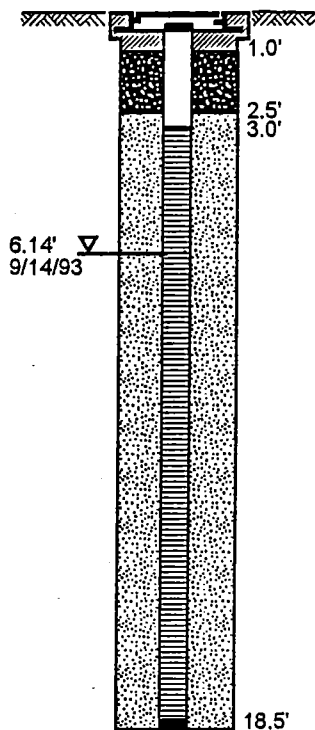
Equipment

Speed Star SD 300 Air Rotary

Land Surface
Elevation

1642.5

Date 7/1/932



0 1 90/0.9'

60

260 1 96/0.7'

0 0 96/0.8'

0 0 75/0.8'

0 0 68/0.7'

0

5

10

15

20

25

30

35

40

Asphalt.

Crushed rock.

BROWN SANDY GRAVEL (GW) very dense, dry;
with fine to coarse sand, some cobbles, and a
trace of silt.

Becomes dark gray. Moderate hydrocarbon odor
noted at 4 feet.

Becomes brown to gray, saturated, with some silt at
8.5 feet.

Boring terminated on 7/1/93.

Groundwater encountered at 8.5 feet during drilling.



Applied Geotechnology Inc.

Log of Monitoring Well 5

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C12

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED

SES

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary

4-inch Well

Laboratory
Tests

OVM - PID

% LEL

Blows per
Foot

Depth

Sample

Equipment

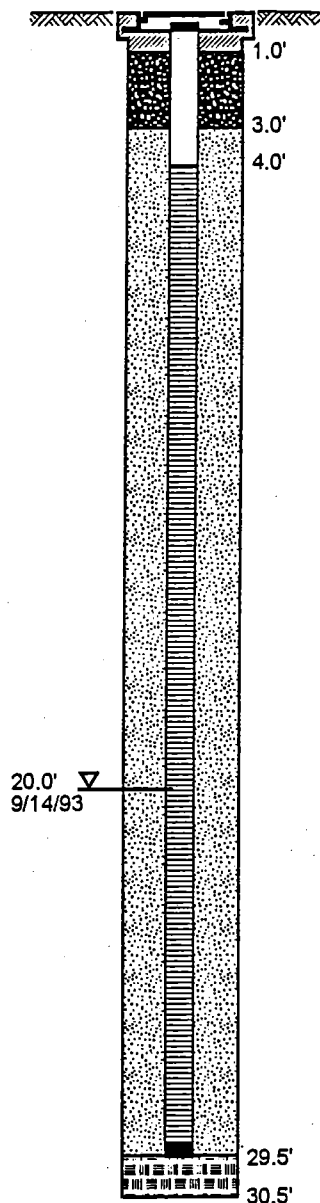
Speed Star SD 300 Air Rotary

Land Surface
Elevation

1639.5

Date

7/6/93



PL

0

0

7

PL

0

0

17

SA

21

0

9

PO

MD

HYD

90

0

15

>1000

5

5

75

0

82/0.7

Crushed Rock (Fill).

BROWN GRAVELLY CLAY (CL) medium stiff,
moist; with fine to coarse sand.

Becomes very stiff, wet at 7 feet.
Slight hydrocarbon odor noted at 8 feet.

Becomes brown to dark gray, stiff, at 10 feet.

Moderate hydrocarbon odor noted at 13 feet.

Becomes very stiff with increased gravel from 16 to
18 feet.

Becomes gray, medium stiff, saturated at 20 feet.
Moderate hydrocarbon odor noted at 21 feet.

GRAY SILTY SAND (SM) very dense, saturated;
fine sand, with fine to coarse gravel, and a trace
of cobbles.

BROWN SANDY GRAVEL (GW) very dense,
saturated; with fine to coarse sand, and some
silt and cobbles.

Boring terminated on 7/6/93.
Groundwater encountered at 20 feet during drilling.



Applied Geotechnology Inc.

Log of Monitoring Well 6

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C13

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED

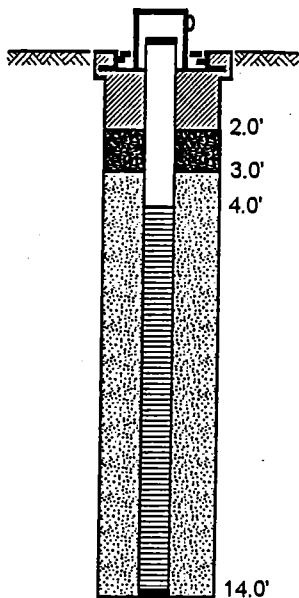
PAB

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well



Laboratory
Tests

OVM - PID

% IEL

Blows per
Foot

Depth

Sample

Equipment Mobile B-61

Land Surface 1623

Date 10/26/93

Elevation

BROWN SANDY SILT (ML) medium stiff, moist;
with fine sand, some medium to coarse sand,
and fine gravel (Fill).

BLACK SILT (MH) very soft, wet; with a trace of
fine sand, with organics and fine roots.

Becomes brown, with no organics.

BROWN SANDY GRAVEL (GW) very dense,
saturated; with fine to coarse sand, with some
silt and cobbles.

Boring terminated on 10/26/93.

Groundwater encountered at 9 feet during drilling.

0
5
10
15
20
25
30
35
40

0 0 2
0 0 50/4'
0 0 85



Applied Geotechnology Inc.

Log of Monitoring Well 7

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C14

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED

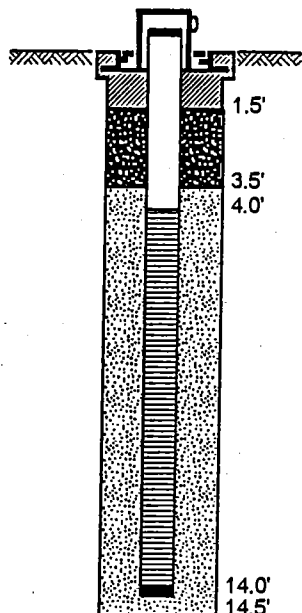
PPB

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well



Laboratory
Tests

OVM - PID

% LEL

Blows per
Foot

Depth

Sample

Equipment Mobile B-61

Land Surface 1625
Elevation

Date 10/27/93

BROWN SANDY SILT (ML) medium stiff, moist;
with fine to coarse sand, some fine gravel, trace
of fine roots (Fill).

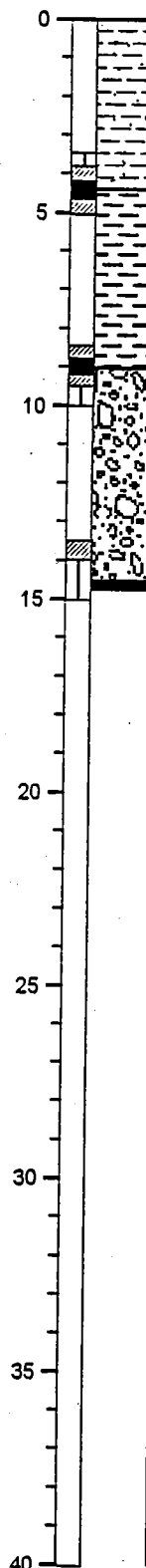
BLACK SILT (MH) medium stiff, wet; with a trace of
fine sand, with organics.

GRAY SANDY GRAVEL (GW) dense, saturated;
with fine to coarse sand, with some cobbles, and
a trace of silt, slight hydrocarbon odor.

Becomes very dense, saturated.

Boring terminated on 10/27/93.

Groundwater encountered at 9 feet during drilling.



Applied Geotechnology Inc.

Log of Monitoring Well 8

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C15

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED

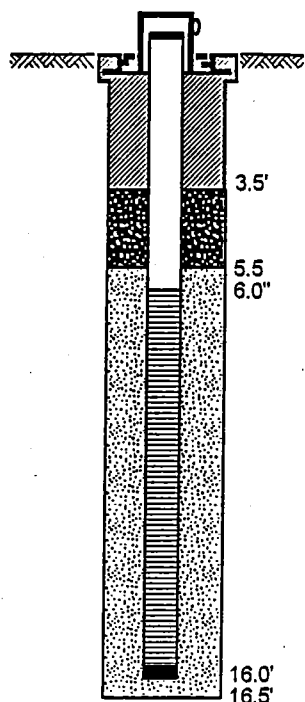
PPS

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well



Laboratory Tests	OVM - PID	% LEL	Blows per Foot	Depth	Sample
				0	
	0	0	50	5	
	0	0	78	10	
	0	0	33	15	
	0	0	50/4'	16.0'	
				16.5'	
				20	
				25	
				30	
				35	
				40	

Equipment Mobile B-61

Land Surface 1627 Date 10/27/93
Elevation

BROWN SANDY SILT (ML) hard, dry; with fine sand, some gravel and cobbles.

Becomes moist.

BROWN SANDY GRAVEL (GW) very dense, moist to wet; with fine to coarse sand, some cobbles and a trace of silt.

Becomes gray to brown and saturated at 9.3 feet.

GRAY SAND (SP) dense, saturated; fine to medium sand, with a trace of silt and fine gravel.

BROWN SANDY GRAVEL (GW) dense, saturated; with fine to coarse sand, and a trace of silt.

Boring terminated on 10/27/93.

Groundwater encountered at 9.3 feet during drilling.



Applied Geotechnology Inc.

Log of Monitoring Well 9

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C16

JOB NUMBER
15,659.001

DRAWN
SES/KM

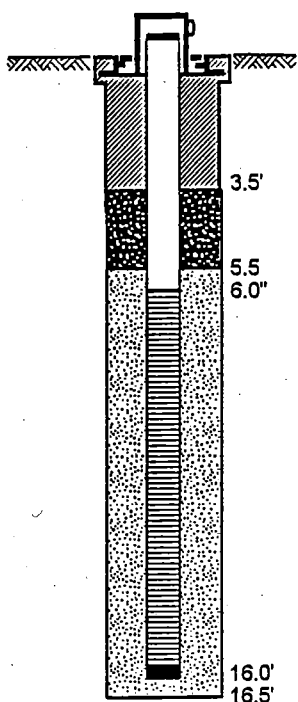
APPROVED
SES

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
4-inch Well



Laboratory
Tests

OVM - PID

% LEL

Blows per
Foot

SA
PO
MD
HYD

0 0 11

0 0 1

0 0 36

0 0 50/25'

Depth

Sample

0

5

10

15

20

25

30

35

40

Equipment Mobile B-61

Land Surface 1629 Date 10/28/93

Elevation

BROWN SANDY SILT (ML) medium stiff, dry; with fine to medium sand, a trace of fine roots and root hairs.

DARK BROWN SILT (MH) very soft, wet; with a trace to some fine sand.

Becomes saturated.

LIGHT BROWN TO YELLOW SANDY SILT (ML) very stiff, saturated; with fine grained sand.

BROWN SANDY GRAVEL (GW) very dense, saturated; with fine sand and a trace of silt.

Boring terminated on 10/28/93.
Groundwater encountered at 8.5 feet during drilling.



Applied Geotechnology Inc.

Log of Monitoring Well 10

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C17

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED

P.B.

DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary
2-inch Well

Laboratory
Tests

OVM - PID

% LEL

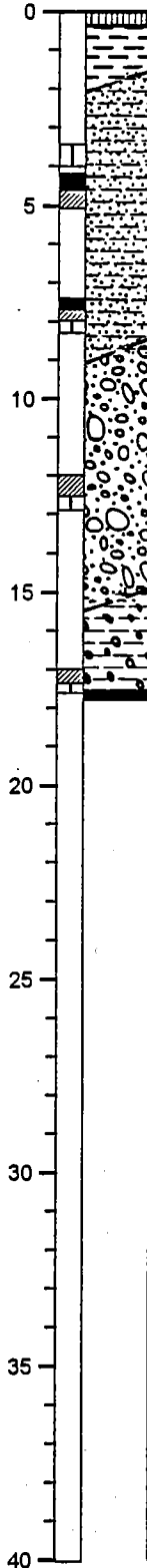
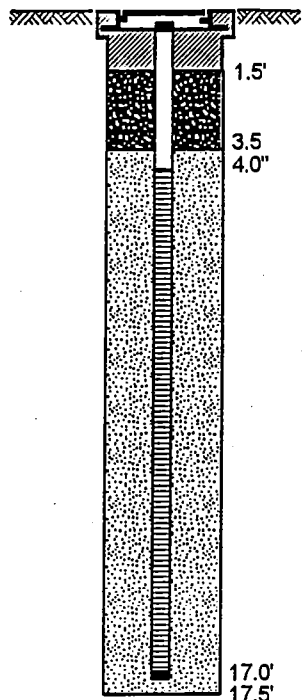
Blows per
Foot

Depth

Sample

Equipment Mobile B-61

Land Surface 1646.5 Date 10/29/93
Elevation



Asphalt.
BLACK SILT (MH) medium stiff, moist; with some fine sand. Becomes brown at 1.5 feet.
BROWN TO GRAY SILTY SAND (SM) dense, moist; fine to medium sand, slight hydrocarbon odor.
Some gravel and cobbles at 6 feet.
GRAY TO BROWN SANDY GRAVEL (GW) very dense, wet; with fine to coarse sand, some silt and cobbles.
Becomes saturated.
Hard drilling, cobbles at 14 feet.
BROWN SILTY GRAVEL (GM) very dense, saturated; fine to coarse gravel, with silt and fine to medium sand, some cobbles.
Boring terminated on 10/29/93.
Groundwater encountered at 12.3 feet during drilling.



Applied Geotechnology Inc.

Log of Monitoring Well 11

Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

C18

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED

PPB

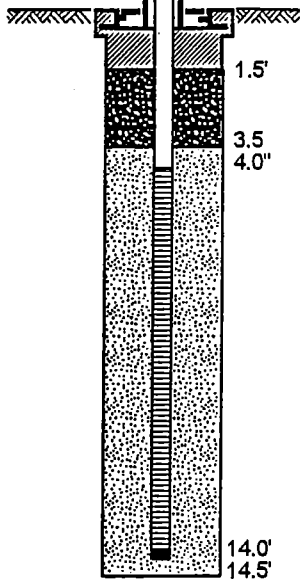
DATE
6 Dec 93

REVISED

DATE

Well Construction
Summary

2-inch Well



Laboratory
Tests

OVM - PID

% LEL

Blows per
Foot

Depth

Sample

Equipment Mobile B-61

Land Surface 1621.5

Date 10/28/93

Elevation

BROWN SANDY SILT (ML) stiff, dry; with fine sand, some gravel and cobbles (Fill).

BLACK SILT (MH) soft, moist; with a trace of fine sand and a trace of organics.

BROWN TO YELLOW SANDY SILT (ML) medium stiff, wet; with fine sand.

BROWN SANDY GRAVEL (GW) very dense, wet; with fine to coarse sand, and a trace of silt. Becomes saturated.

Hard drilling, cobbles at 10 feet.

GRAY SAND (SW) dense, saturated; with a trace of fine gravel and silt.

BROWN SANDY GRAVEL (GW) very dense, saturated; with fine to coarse sand, and a trace to some silt and cobbles.

Boring terminated on 10/28/93.

Groundwater encountered at 9 feet during drilling.

20

25

30

35

40



Applied Geotechnology Inc.

Log of Monitoring Well 12

Burns Bros./Bingo Fuel Stop
Thorpe, Washington

PLATE

C19

JOB NUMBER
15,659.001

DRAWN
SES/KM

APPROVED
PPB

DATE
6 Dec 93

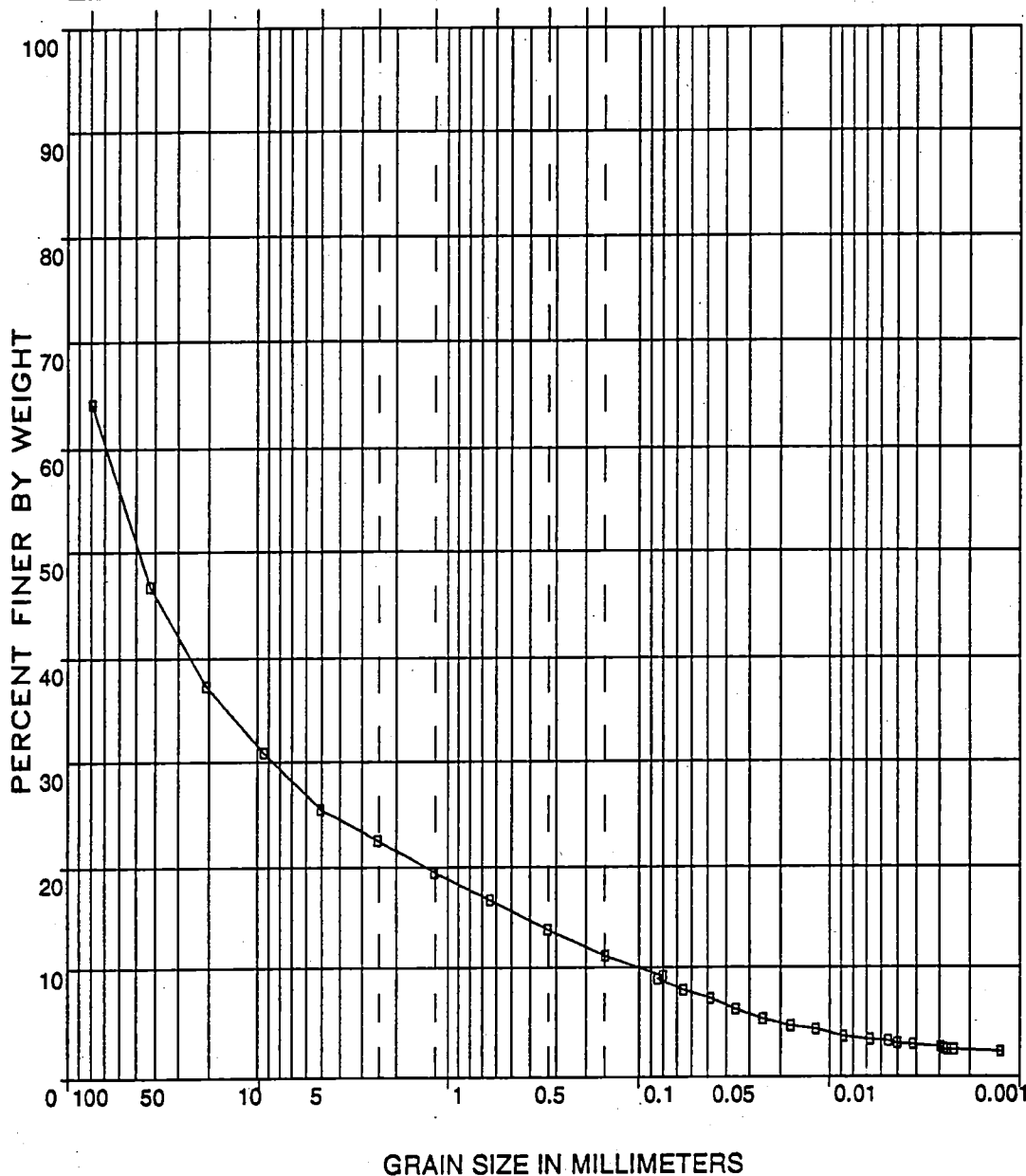
REVISED

DATE

APPENDIX D

Physical Properties Analyses

U.S. Standard Sieve Size (in.)					U.S. Standard Sieve Number					Hydrometer
3	1½	¾	⅜	4	8	16	30	50	100	200



COBBLES	COARSE	FINE	CRSE	MEDIUM	FINE	SILT or CLAY
	GRAVEL		SAND			

Sample Source	Classification
MW3 @ 13.0 ft.	GRAVEL (GW-GM) with sand and some silt



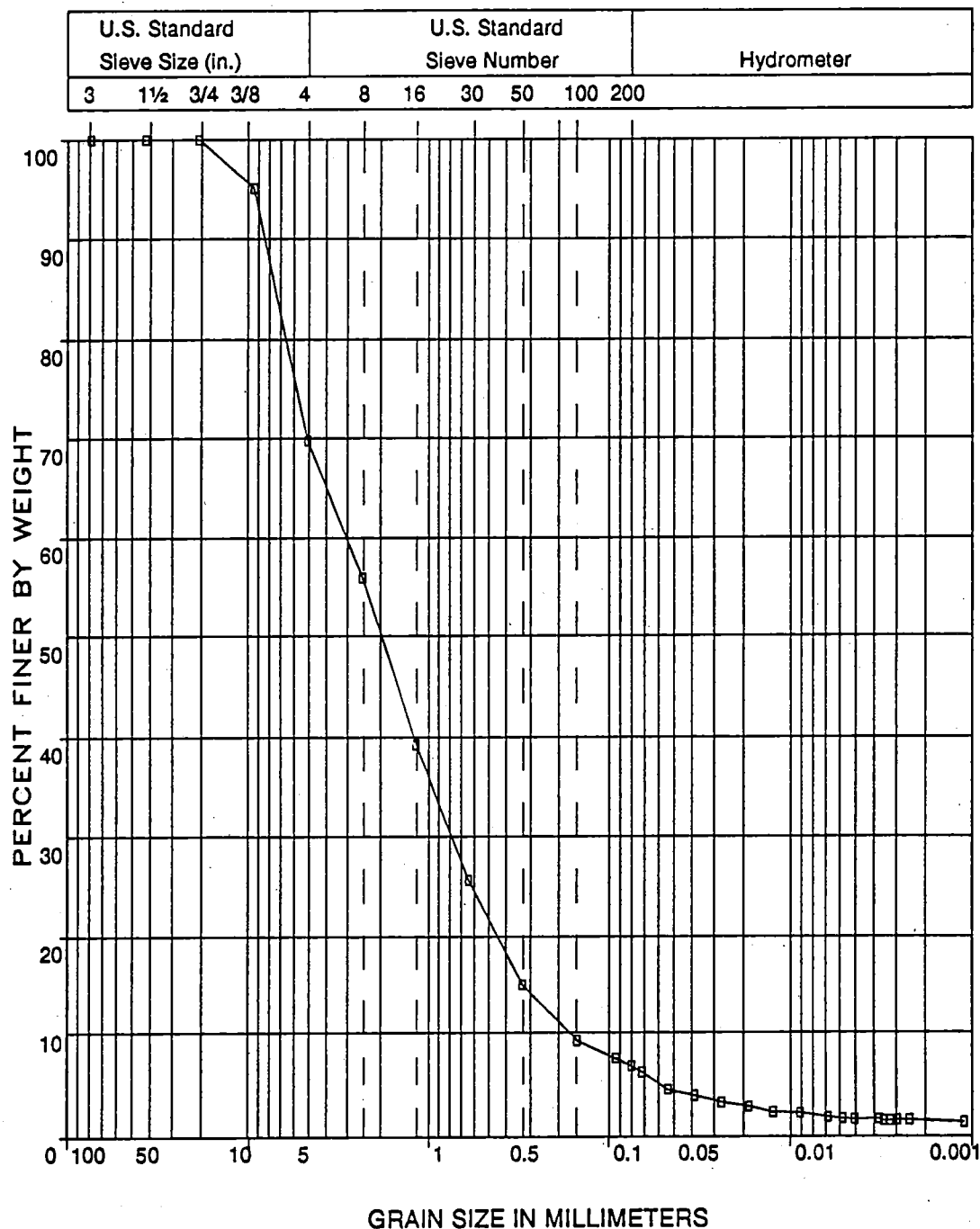
Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Particle Size Analysis
Burns Bros./Bingo Fuel Stop
Thorp, Washington

PLATE

D1

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	LKM	<i>PPB</i>	6 Dec 93		



COBBLES	COARSE	FINE	CRSE	MEDIUM	FINE	SILT or CLAY
	GRAVEL		SAND			

Sample Source	Classification
MW3 @ 50.0 ft.	SAND (SW-SM) with gravel and some silt

PLATE

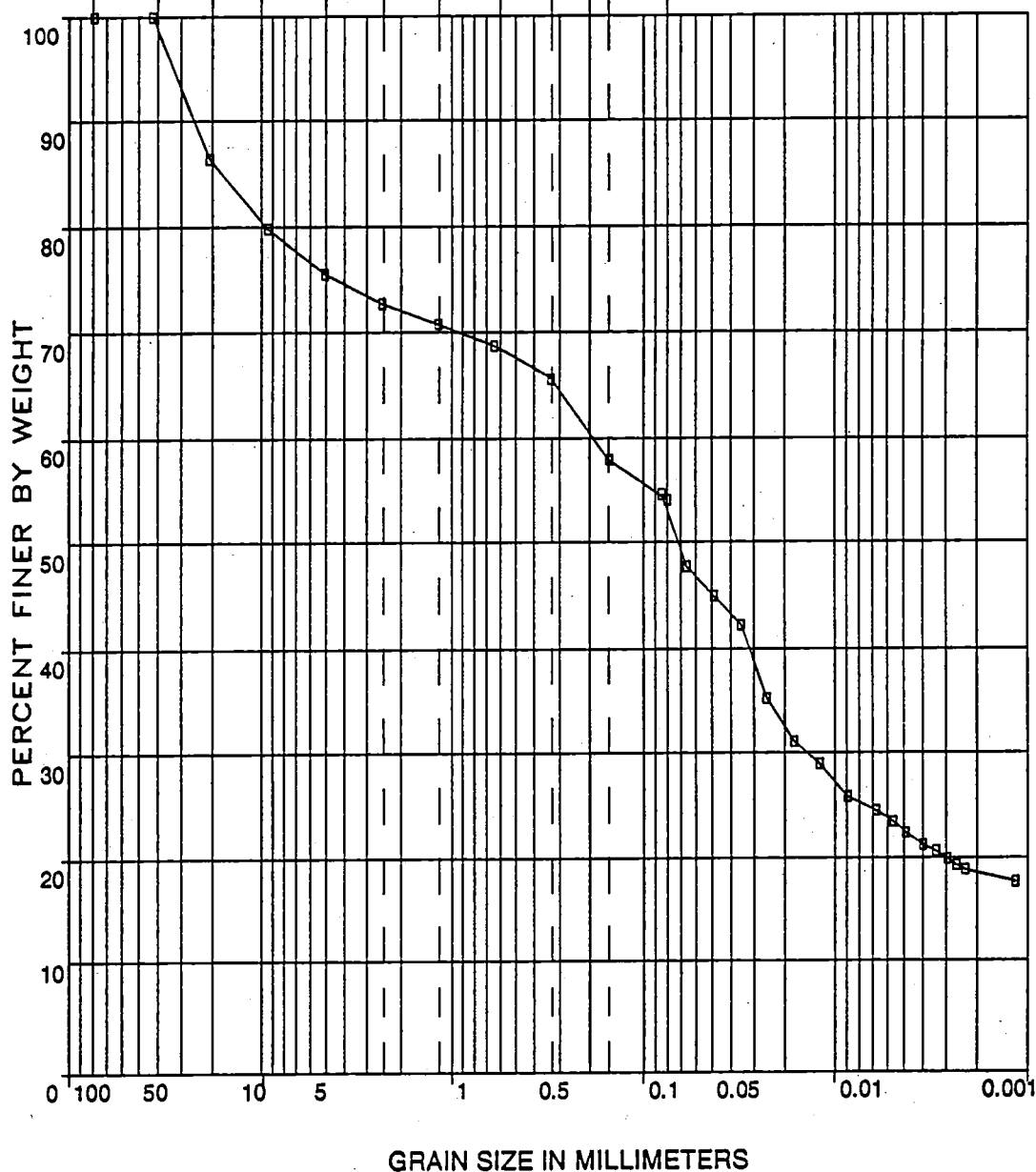


Applied Geotechnical Inc.
Geotechnical Engineering
Geology & Hydrogeology

Particle Size Analysis
Burns Bros./Bingo Fuel Stop
Thorp, Washington

D2

U.S. Standard Sieve Size (In.)					U.S. Standard Sieve Number					Hydrometer
3	1½	¾	3/8	4	8	16	30	50	100	200



COBBLES	COARSE	FINE	CRSE	MEDIUM	FINE	SILT or CLAY
	GRAVEL		SAND			

Sample Source	Classification
MW6 @ 12.5 ft.	GRAVELLY CLAY (CL) with sand



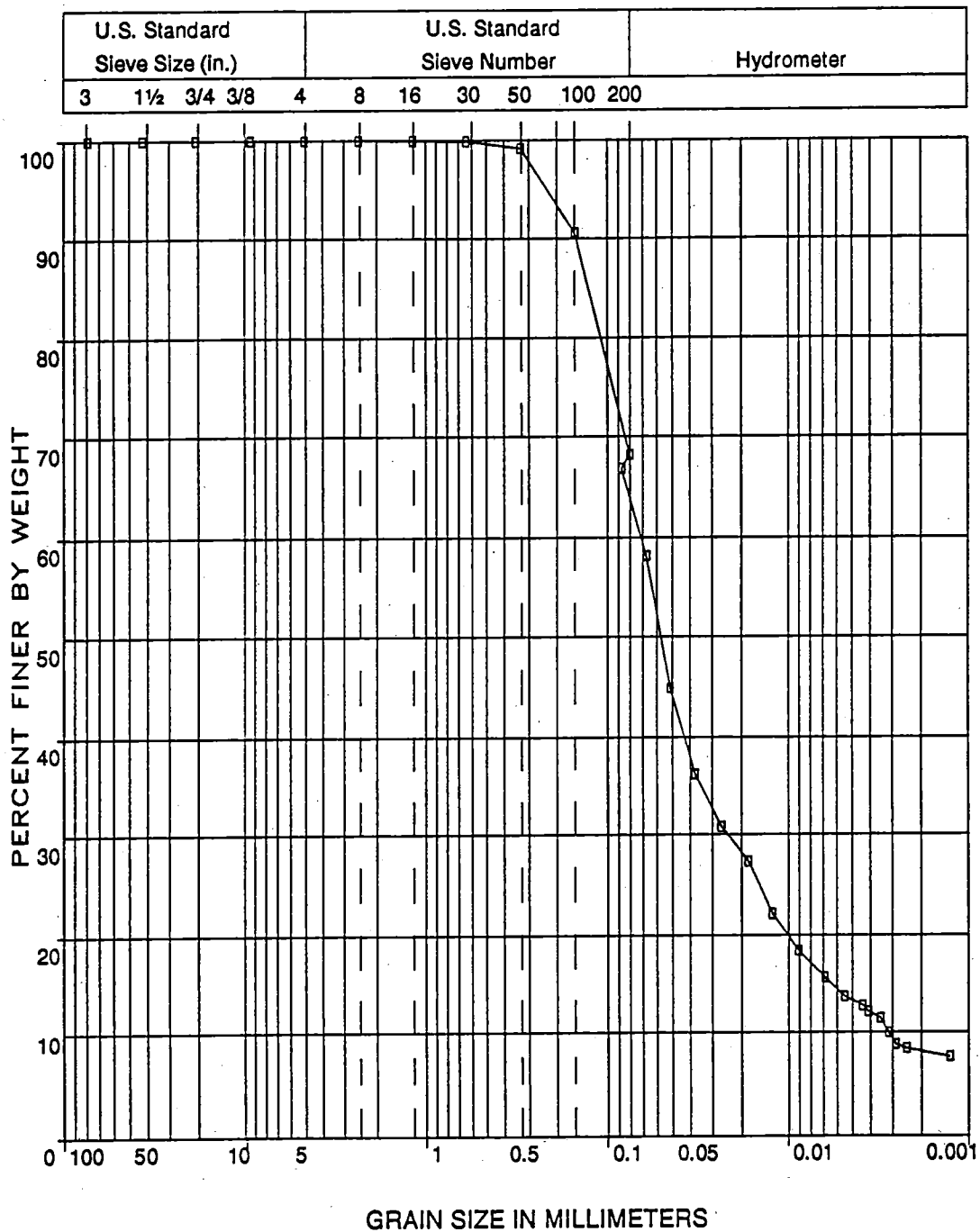
Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Particle Size Analysis
Burns Bros./Bingo Fuel Stop
Thorpe, Washington

PLATE

D3

JCB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,659.001	LKM	<i>PPB</i>	6 Dec 93		



COBBLES	COARSE	FINE	CRSE	MEDIUM	FINE	SILT or CLAY
	GRAVEL		SAND			

Sample Source	Classification
MW10 @ 13.0 ft.	SANDY SILT (ML)



Applied Geotechnology Inc.
 Geotechnical Engineering
 Geology & Hydrogeology

Particle Size Analysis
 Burns Bros./Bingo Fuel Stop
 Thorp, Washington

PLATE

D4

JOB NUMBER

15,659.001

DRAWN

LKM

APPROVED

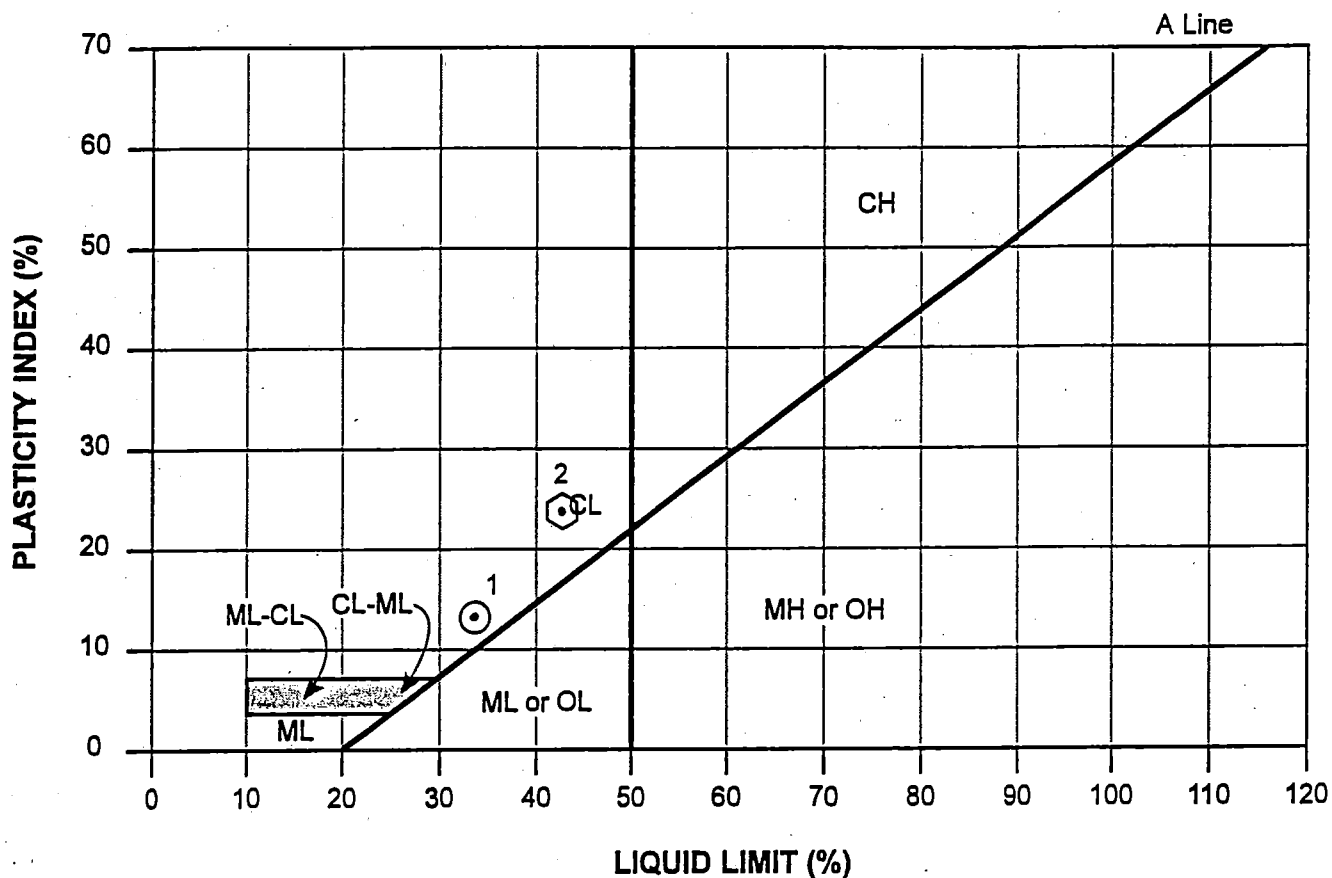
PPB

DATE

6 Dec 93

REVISED

DATE



Symbol	Source	Classification	Natural M.C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
○ 1	MW6 @ 7.5'	Lean Clay (CL)	17.2	33	13	
⬡ 2	MW6 @ 12.5'	Lean Clay (CL)	18.3	43	23	

PLATE

**Applied Geotechnology Inc.****Plasticity Chart**Burns Bros./Bingo Fuel Stop
Thorp, Washington**D5**JOB NUMBER
15.659.001DRAWN
LKMAPPROVED
*[Signature]*DATE
6 Dec 93

REVISED

DATE

Applied Geotechnology Inc.

A Report Prepared For

**Burns Bros., Inc.
516 Southeast Morrison, Suite 1200
Portland, Oregon 97214**

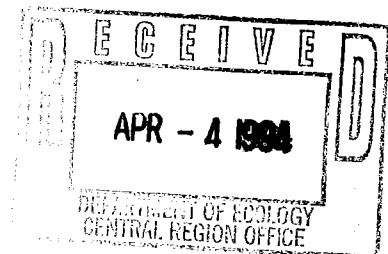
**VOLUME II
LABORATORY REPORTS AND
QUALITY ASSURANCE REPORTS
REMEDIAL INVESTIGATION REPORT
BINGO FUEL STOP
THORP, WASHINGTON**

AGI Project No. 15,659.001

OFFICIAL COPY

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

March 31, 1994



QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
 Project No.: 15,169.001
 Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
 Lab Number: 9306-304
 Sample No.: MW3 @9.0', MW3 @ 42.5', S30-SWAMPY AREA, S31-EAST CULVERT,
 S32-DRAIN BOX

Matrix: Soil

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
BETX	GC/PID	EPA 8020
Fuel Hydrocarbons	GC/FID	EPA 8015 Modified
TPH-Diesel	GC/FID	WTPH-D
Polycyclic Aromatic Hydrocarbons	HPLC/UV/Fluor	EPA 8310
Lead	AA/GF	EPA 7421
Moisture	Gravimetric	CLP SOW ILM01.0

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
PAHs	6/29/93 ^a	7/02/93	7/06/93	3(14)	4(40)
BETX	6/29/93	7/01/93	7/08/93 ^b	2	9(14)
Fuel Hydrocarbons	6/29/93	7/06/93	7/06/93	7	7(14)
TPH-D	6/29/93	7/02/93	7/03/93 ^c	4(14)	5(30)
Lead	6/29/93	7/06/93	7/09/93	7	10(180)
Moisture	6/29/93	NA	7/01/93	NA	2

NA - Not Applicable; extraction not required.

a - Sample MW3 @ 9.0' was collected 6/28/93.

b - BETX analysis dates were 7/6/93 through 7/8/93.

c - TPH-D analysis dates were 7/2/93 through 7/3/93.

Numbers in parentheses indicate recommended holding times in days for soil.

All samples were analyzed within recommended holding times for soil.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9306-304
Sample No.: MW3 @9.0', MW3 @ 42.5', S30-SWAMPY AREA, S31-EAST CULVERT,
S32-DRAIN BOX

FUEL HYDROCARBON CHROMATOGRAPHY

EPA 8015 Modified: Gasoline (C7 - C12) and diesel (C12 - C24) range petroleum hydrocarbons were detected in sample MW3 @ 9.0'. Diesel range petroleum hydrocarbons were detected in sample MW3 @ 42.5'. These detections were supported by the sample chromatograms.

TPH-D: Diesel (C12 - C24) range petroleum hydrocarbons were detected in samples S30-SWAMPY AREA, S31-EAST CULVERT, and S32-DRAIN BOX. These detections are supported by sample chromatograms.

FIELD QUALITY CONTROL SAMPLES

Field Blank: None collected.
Field Duplicates: None collected.
Rinsate: None collected.
Trip Blank: None collected.

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above the method reporting limit (MRL) by the following methods:

EPA 8310
EPA 8020
EPA 8015 Modified
WTPH-D
EPA 7421

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9306-304
Sample No.: MW3 @9.0', MW3 @ 42.5', S30-SWAMPY AREA, S31-EAST CULVERT,
S32-DRAIN BOX

Matrix Spikes: Matrix spike (MS) and MS duplicate (MSD) percent recovery and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8020

EPA 7421 (only a MS was analyzed)

WTPH-D: Two MS/MSD analyses were performed, one with acceptable results and the other with an MS percent recovery of 60; outside ATI's laboratory control limits of 63 to 131 percent. RPD for this analysis was acceptable. Since this MS was only slightly below the lower control limit and other spiked sample recoveries were acceptable, sample results are not qualified.

EPA 8310: MS and MSD percent recovery of phenanthrene exceeded ATI's control limits due to a high concentration of this analyte in the sample used for MS/MSD preparation. Phenanthrene RPD was acceptable, and blank spike recovery of this analyte is also acceptable. Sample results are therefore accepted without qualification.

EPA 8015 Modified: MS and MSD percent recovery of the diesel spike exceeded ATI's control limits due to the high concentration of diesel range petroleum hydrocarbons in the sample used for MS/MSD analysis. RPD was acceptable and blank spike recovery of diesel was acceptable. Sample results are therefore accepted without qualification.

Duplicates: Sample/sample duplicate RPD is within ATI's control limits for the following methods:

EPA 7421

CLP SOW ILM01.0

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9306-304
Sample No.: MW3 @9.0', MW3 @ 42.5', S30-SWAMPY AREA, S31-EAST CULVERT,
S32-DRAIN BOX

Duplicates:
(cont.)

EPA 8015 Modified: The RPD at 23 slightly exceeded ATI's control limit criterion of 20. The sample used for this analysis contained a high concentration of diesel range petroleum hydrocarbons and was diluted for analysis. The error introduced through dilution and subsequent back-calculation may have affected reproducibility. Sample results are not considered compromised and are accepted without qualification.

WTPH-D: Two duplicate sample analyses were performed, one with acceptable results and the second with an out of control RPD of 28. ATI's control limit is 20. Since this RPD is only slightly above the control limit and one of the sample results is < 5X the MRL, sample results are accepted without qualification.

Blank Spikes:

Blank spike percent recovery is within ATI's control limits for the following methods:

EPA 8310
EPA 8020
EPA 8015 Modified
WTPH-D (Blank spike and blank spike duplicate analyzed.)
EPA 7421

Surrogates:

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

EPA 8310
EPA 8020
WTPH-D

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9306-304
Sample No.: MW3 @9.0', MW3 @ 42.5', S30-SWAMPY AREA, S31-EAST CULVERT,
S32-DRAIN BOX

Surrogates: EPA 8020/WTPH-G: Recoveries of bromofluorobenzene and
(cont.) trifluorotoluene from sample S11:@7' were above ATI's
upper control limit due to dilution of the sample extract
during analysis. This sample contained high concentra-
tions of target analytes. Sample results are considered
acceptable without qualification.

SIGNATURES

Prepared by Katherine Bourbonais Date 8/23/93
Checked by Geoffrey C. Compton Date 8-23-93

QUALITY ASSURANCE REPORT
SUPPLEMENTAL PAGE

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9306-304
Sample No.: MW3 @9.0', MW3 @ 42.5', S30-SWAMPY AREA, S31-EAST CULVERT,
S32-DRAIN BOX

Matrix: Soil

FUEL HYDROCARBON CHEMISTRY

EPA 8015 Modified: Chromatogram profiles for both samples indicate diesel fuel; the presence of gasoline is not indicated.

WTPH-D: Chromatogram profiles indicate the presence of a mixture of petroleum hydrocarbon products. There appears to be high concentrations of diesel fuel in samples S31-EAST CULVERT and S32-DRAIN BOX, as well as low to moderate concentrations of a motor-oil range product. Sample S30-SWAMPY AREA appears to contain diesel fuel and motor oil components but the profile is highly atypical of either of these two products.



Analytical **Technologies, Inc.**

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

Karen L. Mixon, Laboratory Manager

RECEIVED

ATI I.D. # 9306-304

JUL 22 1993

APPLIED GEOTECHNOLOGY, INC.

July 20, 1993

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

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On June 30, 1993, Analytical Technologies, Inc. (ATI), received five 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.

Sincerely,

Donna M. McKinney
Senior Project Manager

DMM/hal/elf

Enclosure



Analytical Technologies, Inc.

ATI I.D. # 9306-304

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9306-304-1	MW3 @ 9.0'	06/28/93	SOIL
9306-304-2	MW3 @ 42.5'	06/29/93	SOIL
9306-304-3	S30-SWAMPY AREA	06/29/93	SOIL
9306-304-4	S31-EAST CULVERT	06/29/93	SOIL
9306-304-5	S32-DRAIN BOX	06/29/93	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 disposal date.



ATI I.D. # 9306-304

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
POLYNUCLEAR AROMATIC HYDROCARBONS	HPLC/UV/FLUOR	EPA 8310	R
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R
LEAD	AA/GF	EPA 7421	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
JB = Subcontract

ATI I.D. # 9306-304

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS

Two (2) soil samples were received by Analytical Technologies, Inc. (ATI), on June 30, 1993, for the following analysis: EPA method 8310.

The percent recoveries for phenanthrene in the matrix spike/matrix spike duplicate (MS/MSD) were not calculable due to high amounts of this analyte already present in the sample. The appropriate results were flagged with a "3"; out of limits due to high levels of target analytes in sample.

All other corresponding quality assurance and quality control results defined as blank spike (BS), method blank, and surrogate recoveries were within the established control limits.



Analytical Technologies, Inc.

ATI I.D. # 9306-304

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/02/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/06/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS

RESULTS

NAPHTHALENE	<0.083
ACENAPHTHYLENE	<0.17
1-METHYLNAPHTHALENE	<0.17
2-METHYLNAPHTHALENE	<0.17
ACENAPHTHENE	<0.17
FLUORENE	<0.017
PHENANTHRENE	<0.0083
ANTHRACENE	<0.0083
FLUORANTHENE	<0.017
PYRENE	<0.017
BENZO (A) ANTHRACENE	<0.017
CHRYSENE	<0.017
BENZO (B) FLUORANTHENE	<0.017
BENZO (K) FLUORANTHENE	<0.017
BENZO (A) PYRENE	<0.017
DIBENZO (A, H) ANTHRACENE	<0.034
BENZO (G, H, I) PERYLENE	<0.017
INDENO (1, 2, 3-CD) PYRENE	<0.017

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	79	25 - 134
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ATI I.D. # 9306-304-1

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 06/28/93
PROJECT # : 15659.001	DATE RECEIVED : 06/30/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/02/93
CLIENT I.D. : MW3 @ 9.0'	DATE ANALYZED : 07/06/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS

RESULTS

NAPHTHALENE	2.3
ACENAPHTHYLENE	<0.18
1-METHYLNAPHTHALENE	9.2
2-METHYLNAPHTHALENE	10
ACENAPHTHENE	<0.18
FLUORENE	1.1
PHENANTHRENE	2.8
ANTHRACENE	<0.0087
FLUORANTHENE	<0.018
PYRENE	<0.018
BENZO (A) ANTHRACENE	<0.018
CHRYSENE	<0.018
BENZO (B) FLUORANTHENE	<0.018
BENZO (K) FLUORANTHENE	<0.018
BENZO (A) PYRENE	<0.018
DIBENZO (A, H) ANTHRACENE	<0.035
BENZO (G, H, I) PERYLENE	<0.018
INDENO (1, 2, 3-CD) PYRENE	<0.018

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	116	25 - 134
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ATI I.D. # 9306-304-2

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 06/29/93
PROJECT # : 15659.001	DATE RECEIVED : 06/30/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/02/93
CLIENT I.D. : MW3 @ 42.5'	DATE ANALYZED : 07/06/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

NAPHTHALENE	<0.092
ACENAPHTHYLENE	<0.19
1-METHYLNAPHTHALENE	<0.19
2-METHYLNAPHTHALENE	<0.19
ACENAPHTHENE	<0.19
FLUORENE	<0.019
PHENANTHRENE	0.023
ANTHRACENE	<0.0092
FLUORANTHENE	<0.019
PYRENE	<0.019
BENZO (A) ANTHRACENE	<0.019
CHRYSENE	<0.019
BENZO (B) FLUORANTHENE	<0.019
BENZO (K) FLUORANTHENE	<0.019
BENZO (A) PYRENE	<0.019
DIBENZO (A, H) ANTHRACENE	<0.038
BENZO (G, H, I) PERYLENE	<0.019
INDENO (1, 2, 3-CD) PYRENE	<0.019

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	82	25 - 134
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ATI I.D. # 9306-304

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9306-304-1
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/06/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	4.18	84	4.18	84	0
PHENANTHRENE	2.73	0.333	2.67	G	2.17	G	21
PYRENE	<0.0170	0.333	0.268	80	0.256	77	5
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.315	95	0.321	96	2
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.271	81	0.277	83	2

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	33 - 116	20
PHENANTHRENE	20 - 154	35
PYRENE	20 - 147	34
BENZO (K) FLUORANTHENE	25 - 144	34
DIBENZO (A, H) ANTHRACENE	20 - 128	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	102	99	25 - 134

= Out of limits due to high level of target analytes in sample.



ATI I.D. # 9306-304

 POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
 QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/06/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	3.55	71	N/A	N/A	N/A
PHENANTHRENE	<0.00833	0.333	0.276	83	N/A	N/A	N/A
PYRENE	<0.0170	0.333	0.243	73	N/A	N/A	N/A
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.308	92	N/A	N/A	N/A
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.292	88	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	28 - 111	20
PHENANTHRENE	40 - 130	35
PYRENE	43 - 143	34
BENZO (K) FLUORANTHENE	43 - 138	34
DIBENZO (A, H) ANTHRACENE	37 - 125	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	80	N/A	25 - 134



ATI I.D. # 9306-304

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/01/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

105

52 - 116



Analytical Technologies, Inc.

ATI I.D. # 9306-304-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 06/28/93
PROJECT #	: 15659.001	DATE RECEIVED	: 06/30/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/01/93
CLIENT I.D.	: MW3 @ 9.0'	DATE ANALYZED	: 07/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDSRESULTS

BENZENE	<0.026
ETHYLBENZENE	1.0
TOLUENE	0.055
OTAL XYLENES	5.9

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

114

52 - 116



Analytical Technologies, Inc.

ATI I.D. # 9306-304-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 06/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 06/30/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/01/93
CLIENT I.D.	: MW3 @ 42.5'	DATE ANALYZED	: 07/06/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

BENZENE	<0.028
ETHYLBENZENE	<0.028
TOLUENE	<0.028
TOTAL XYLENES	0.041

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

88

52 - 116



ATI I.D. # 9306-304-3

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 06/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 06/30/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/01/93
CLIENT I.D.	: S30-SWAMPY AREA	DATE ANALYZED	: 07/06/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS	RESULTS
BENZENE	<0.10
ETHYLBENZENE	<0.10
TOLUENE	<0.10
TOTAL XYLENES	<0.10

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	92 52 - 116



ATI I.D. # 9306-304-4

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 06/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 06/30/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/01/93
CLIENT I.D.	: S31-EAST CULVERT	DATE ANALYZED	: 07/07/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

BENZENE	<0.086
ETHYLBENZENE	<0.086
TOLUENE	0.42
OTAL XYLENES	<0.086

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

91

52 - 116



ATI I.D. # 9306-304-5

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 06/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 06/30/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/01/93
CLIENT I.D.	: S32-DRAIN BOX	DATE ANALYZED	: 07/06/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

BENZENE	<0.029
ETHYLBENZENE	<0.029
TOLUENE	<0.029
OTAL XYLENES	<0.029

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

90

52 - 116

ATI I.D. # 9306-304

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : 9306-302-6
PROJECT # : 15659.001	DATE EXTRACTED : 07/01/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 07/02/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8020 (BETX)	

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.684	68	0.737	74	7
TOLUENE	<0.0250	1.00	0.803	80	0.787	79	2
TOTAL XYLENES	<0.0250	2.00	1.70	85	1.58	79	7

CONTROL LIMITS	% REC.	RPD
BENZENE	35 - 113	20
TOLUENE	43 - 107	20
TOTAL XYLENES	46 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	98	75	52 - 116



ATI I.D. # 9306-304

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.911	91	N/A	N/A	N/A
TOLUENE	<0.0250	1.00	1.04	104	N/A	N/A	N/A
TOTAL XYLENES	<0.0250	2.00	2.14	107	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	63 - 115	20
TOLUENE	75 - 110	20
TOTAL XYLENES	79 - 109	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	110	N/A	52 - 116



Analytical Technologies, Inc.

ATI I.D. # 9306-304

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : METHOD BLANK
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : N/A
DATE RECEIVED : N/A
DATE EXTRACTED : 07/06/93
DATE ANALYZED : 07/06/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<5
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<25
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

95

52 - 143



Analytical Technologies, Inc.

ATI I.D. # 9306-304-1

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW3 @ 9.0'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 06/28/93
DATE RECEIVED : 06/30/93
DATE EXTRACTED : 07/06/93
DATE ANALYZED : 07/06/93
UNITS : mg/Kg
DILUTION FACTOR : 10

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

310
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

3100
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

p-TERPHENYL

124

52 - 143



ATTI I.D. # 9306-304-2

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW3 @ 42.5'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 06/29/93
DATE RECEIVED : 06/30/93
DATE EXTRACTED : 07/06/93
DATE ANALYZED : 07/06/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<6
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

31
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

2-TERPHENYL

93

52 - 143



ATI I.D. # 9306-304

 FUEL HYDROCARBONS
 QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9306-304-1
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/06/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/06/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8015 (MODIFIED)		

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	2940	2330	23G	500	2730	G	2740	G	0
CONTROL LIMITS						% REC.			RPD
DIESEL						56 - 137			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				130		121		52 - 143	

= Out of limits due to high level of target analytes in sample.



ATI I.D. # 9306-304

FUEL HYDROCARBONS
QUALITY CONTROL DATA

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

SAMPLE I.D. # : BLANK
DATE EXTRACTED : 07/06/93
DATE ANALYZED : 07/06/93
UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<25.0	500	446	89	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
DIESEL				67 - 135			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		94		N/A		52 - 143	



ATI I.D. # 9306-304

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/02/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<10
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

90

50 - 150



ATI I.D. # 9306-304

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/02/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDRESULTS

FUEL HYDROCARBONS	<10
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL	109	50 - 150
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Analytical Technologies, Inc.

ATI I.D. # 9306-304-3

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 06/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 06/30/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/02/93
CLIENT I.D.	: S30-SWAMPY AREA	DATE ANALYZED	: 07/03/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDRESULTS

FUEL HYDROCARBONS	57
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL	97	50 - 150
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ATI I.D. # 9306-304-4

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 06/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 06/30/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/02/93
CLIENT I.D.	: S31-EAST CULVERT	DATE ANALYZED	: 07/03/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUND	RESULTS
FUEL HYDROCARBONS	2100
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY	LIMITS
O-TERPHENYL	111 50 - 150



ATI I.D. # 9306-304-5

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 06/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 06/30/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/02/93
CLIENT I.D.	: S32-DRAIN BOX	DATE ANALYZED	: 07/03/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDRESULTS

FUEL HYDROCARBONS	340
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL	113	50 - 150
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ATI I.D. # 9306-304

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9306-266-4
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D		

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	121	134	10	N/A	N/A	N/A	N/A	N/A	N/A
CONTROL LIMITS						% REC.			RPD
DIESEL						N/A			20
SURROGATE RECOVERIES				SAMPLE		SAMPLE DUP.		LIMITS	
O-TERPHENYL				103		100			50 - 150



Analytical Technologies, Inc.

ATI I.D. # 9306-304

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9306-286-5
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D		

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	45.7	60.7	28F	200	222	88	213	84	4
CONTROL LIMITS						% REC.			RPD
DIESEL						63 - 131			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				102		97		50 - 150	

= Out of limits due to matrix interference.



ATI I.D. # 9306-304

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9306-297-4
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D		

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	216	204	6	200	335	60F	345	65	3
CONTROL LIMITS						% REC.			RPD
DIESEL						63 - 131			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				92		88		50 - 150	

= Out of limits due to matrix interference.



ATI I.D. # 9306-304

 TOTAL PETROLEUM HYDROCARBONS
 QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<10.0	200	207	103	206	103	0
CONTROL LIMITS				% REC.			RPD
DIESEL				69 - 122			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		106		113		50 - 150	



Analytical Technologies, Inc.

ATI I.D. # 9306-304

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<10.0	200	195	98	189	95	3
CONTROL LIMITS				% REC.			RPD
DIESEL				69 - 122			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		89		91		50 - 150	



ATI I.D. # 9306-304

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

ELEMENT

DATE PREPARED

DATE ANALYZED

LEAD

07/06/93

07/09/93

ATI I.D. # 9306-304

METALS ANALYSIS
DATA SUMMARY

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

MATRIX : SOIL

UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	LEAD
9306-304-1	MW3 @ 9.0'	2.0
9306-304-2	MW3 @ 42.5'	2.3
METHOD BLANK	-	<0.15



ATI I.D. # 9306-304

 METALS ANALYSIS
 QUALITY CONTROL DATA

 CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : mg/Kg

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	9306-285-1	0.87	0.85	2	1.93	1.24	85
LEAD	BLANK	<0.15	N/A	N/A	1.09	1.25	87

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

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



ATI I.D. # 9306-304

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

PARAMETERDATE ANALYZED

MOISTURE

07/01/93



ATI I.D. # 9306-304

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

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

ATI I.D. # CLIENT I.D. MOISTURE

9306-304-1	MW3 @ 9.0'	4.0
9306-304-2	MW3 @ 42.5'	9.9
9306-304-3	S30-SWAMPY AREA	75
9306-304-4	S31-EAST CULVERT	71
9306-304-5	S32-DRAIN BOX	13



Analytical Technologies, Inc.

ATI I.D. # 9306-304

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9306-304-2	9.9	9.6	3	N/A	N/A	N/A

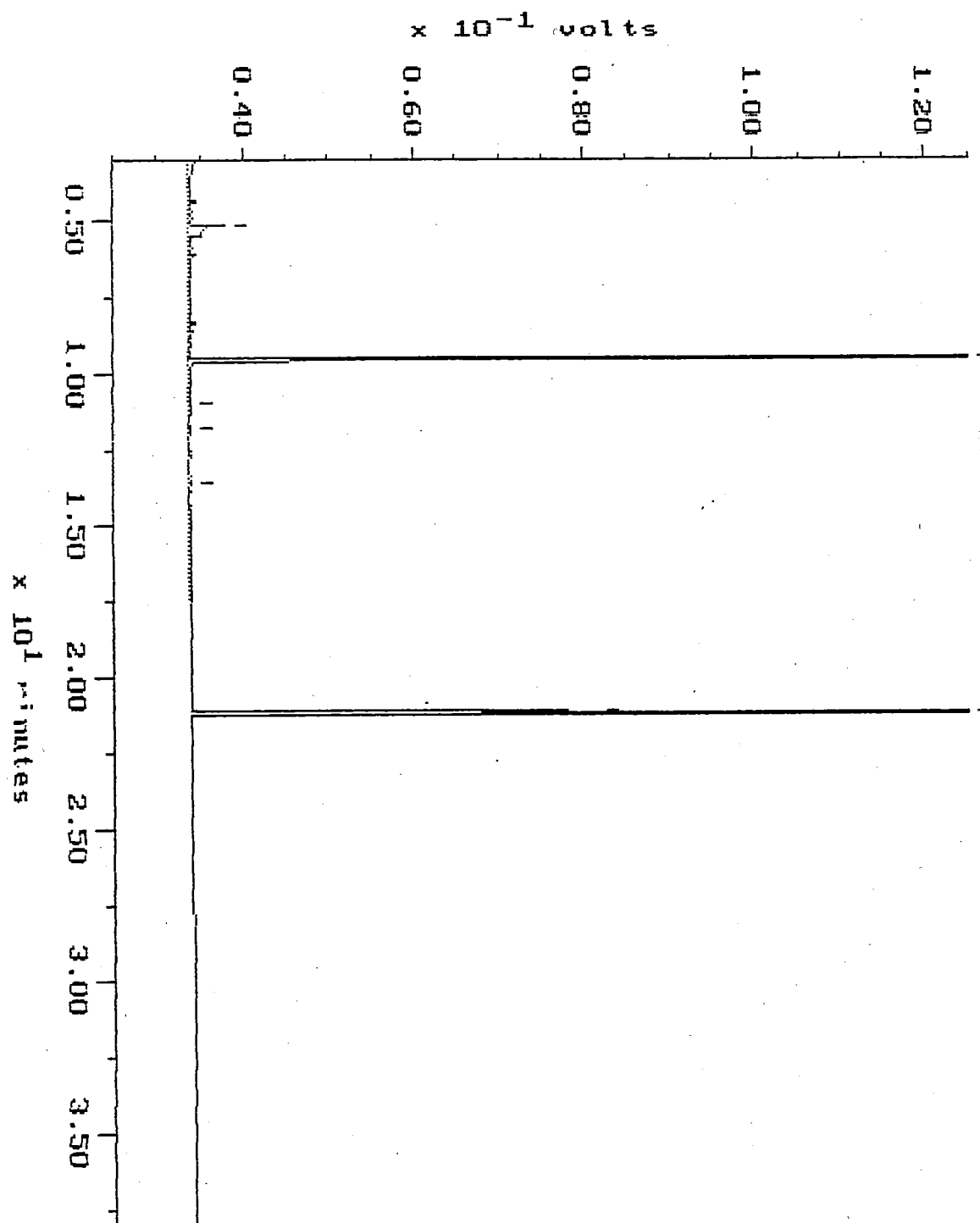
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

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

Blank

Sample: SRB 7-5 Channel: ERNIE
Acquired: 06-JUL-93 12:37 Method: F:\BRO2\MAXDATA\ERNIE\FUEL0706
Comments: ATI: THE QUALITY TEAM

Filename: R7068E03
Operator: ATI

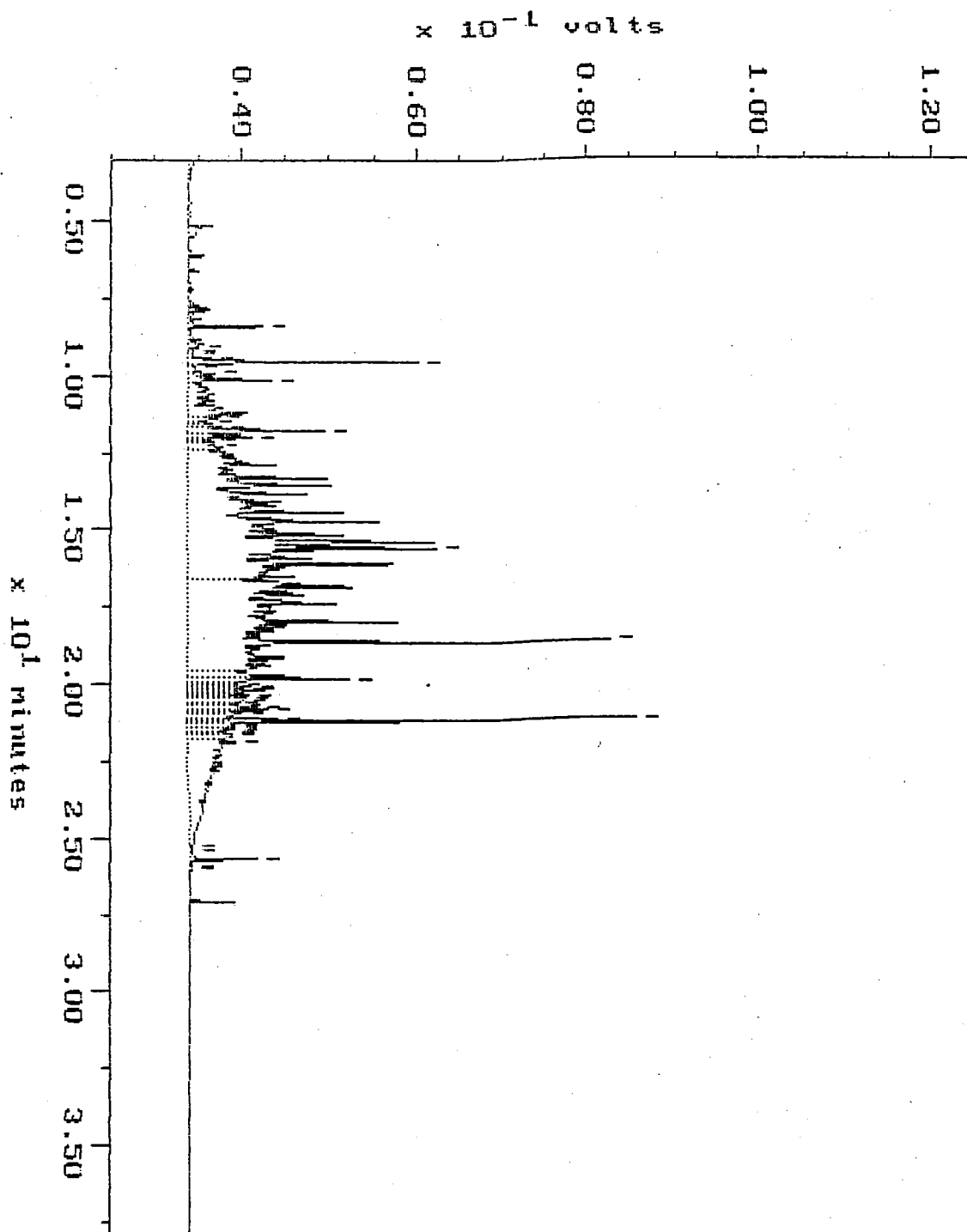


EPA 8015 Modified

Sample: 9386-384-1DIL
Acquired: 06-JUL-93 14:57
Dilution: 1 : 10.000
Comments: ATI: THE QUALITY TEAM

Channel: ERNIE
Method: F:\BRO2\MAXDATA\ERNIE\FUEL0706

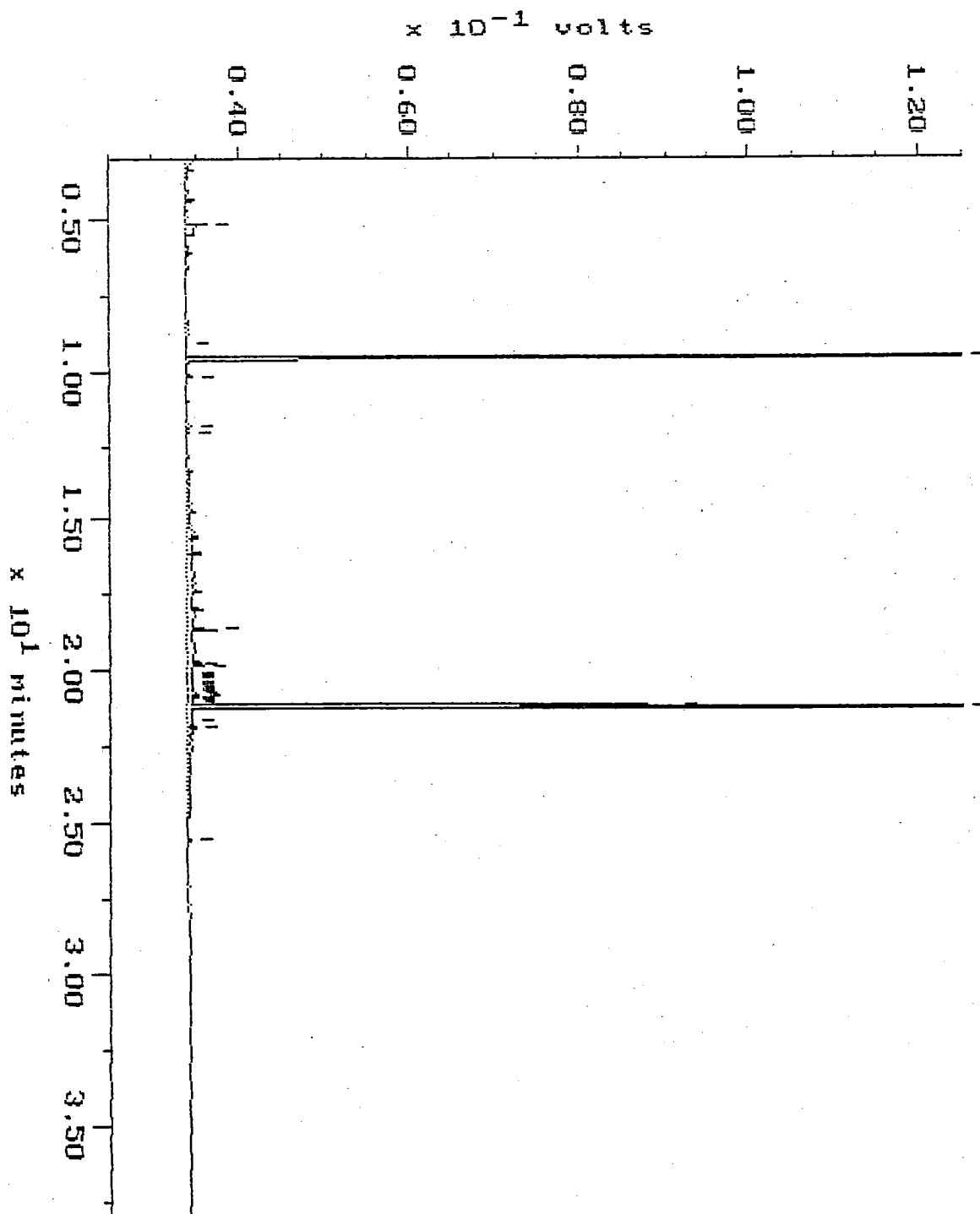
Filename: R7063E06
Operator: ATI



EPA 8015 Modified

Sample: 9306-304-2
Acquired: 06-JUL-93 18:02
Channel: ERNIE
Method: F:\BRO2\MAXDATA\ERNIE\FUEL0706
Comments: ATI: THE QUALITY TEAM

Filename: R7068E10
Operator: ATI



Continuing Calibration

Sample: DG 400

Channel: ERNIE

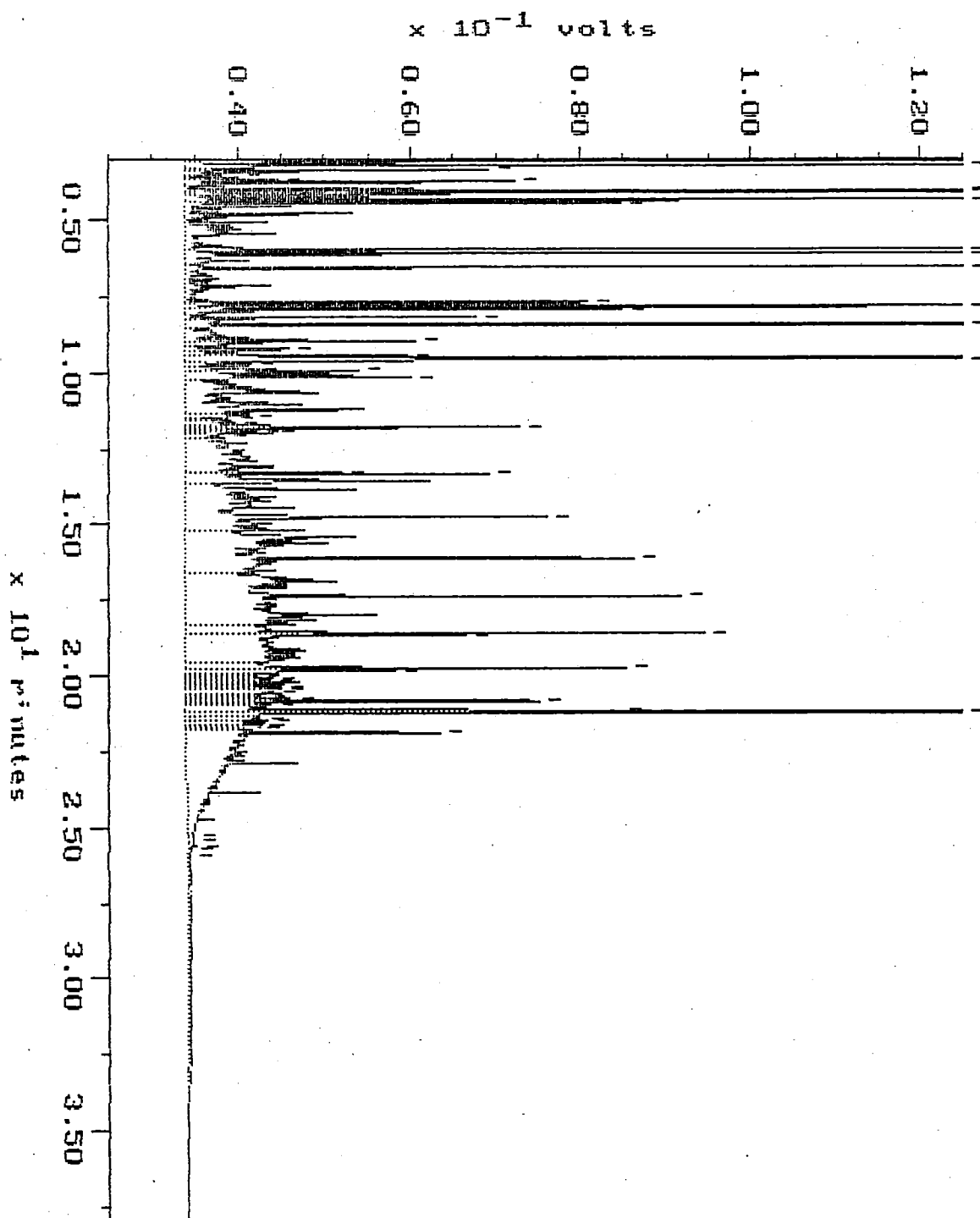
Filename: R7068E02

Acquired: 86-JUL-93 11:25

Method: F:\BRO2\MAXDATA\ERNIE\FUEL0706

Operator: ATI

Comments: ATI: THE QUALITY TEAM

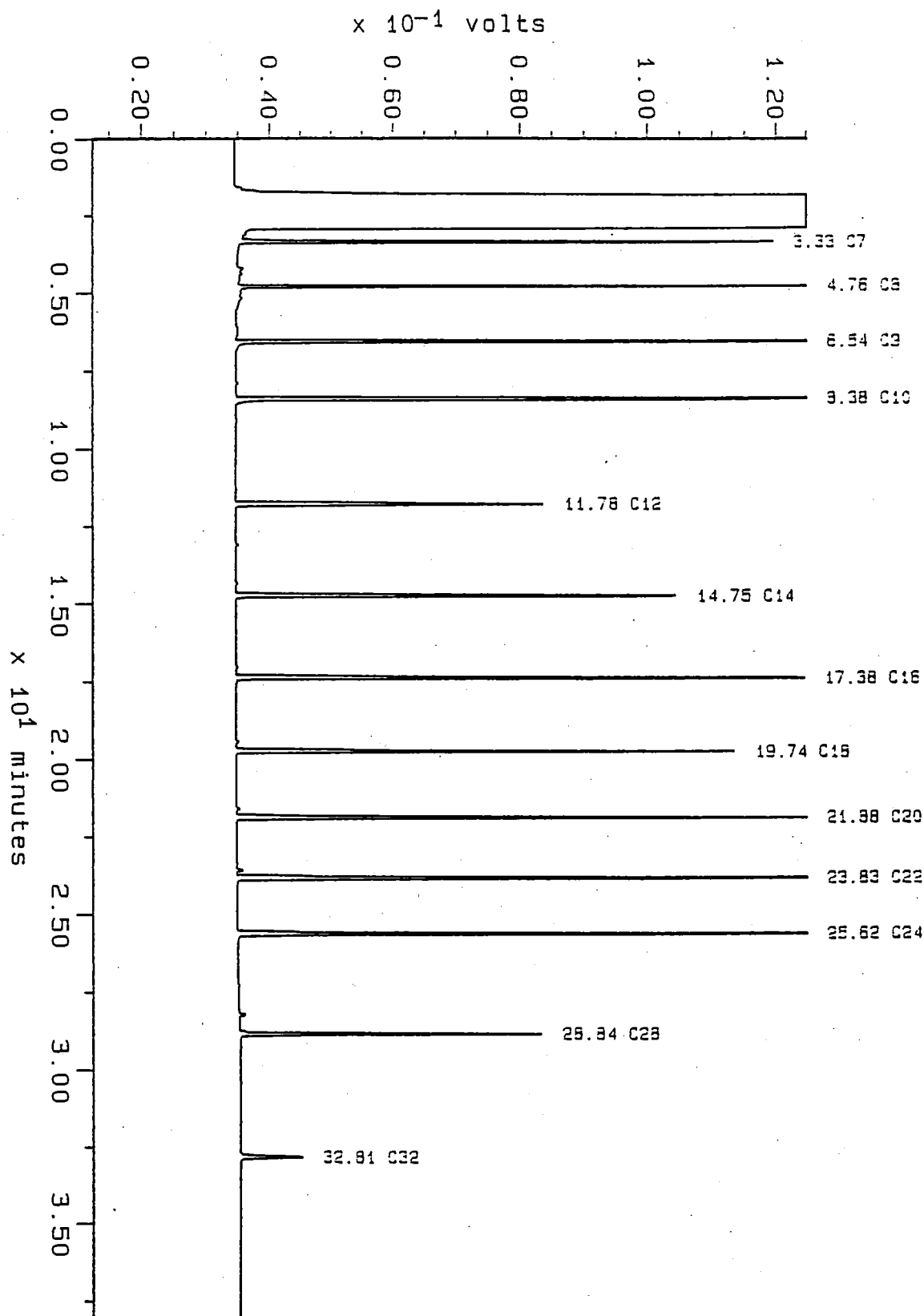


Sample: ALKANE
Acquired: 25-MAY-93 11:20
Inj Vol: 1.00

Channel: ERNIE
Method: F:\BR02\MAXDATA\ERNIE\FUEL0525

Filename: r5253e02
Operator: ATI

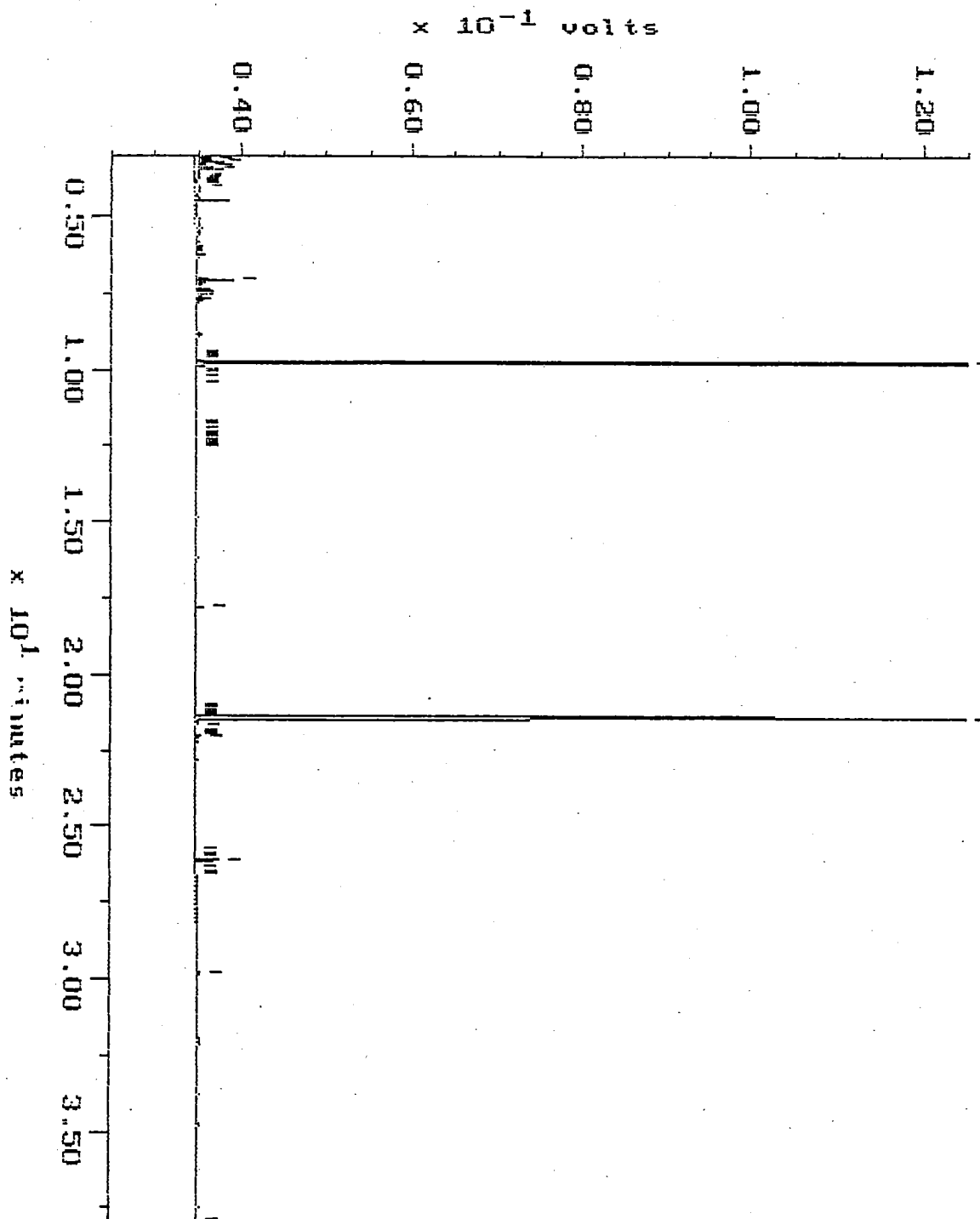
Alkane



WA DOE WTPH-D

Blank

Sample: SRBB 7-2 Channel: DEMITRI
Acquired: 02-JUL-93 18:23 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0702
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY
Filename: R7028D03
Operator: ATI

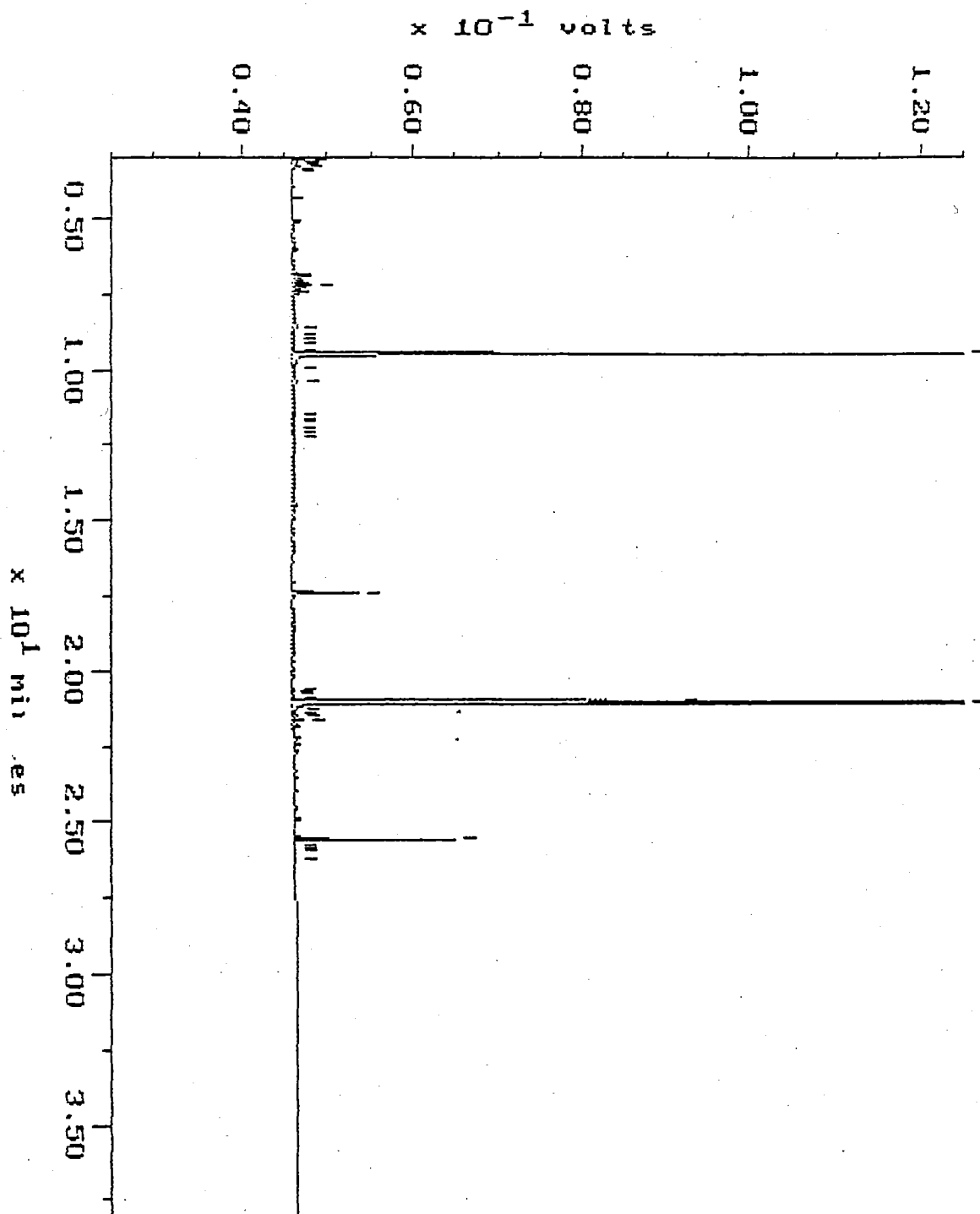


Blank

Sample: SRB 7-2
Acquired: 82-JUL-93 16:87

Channel: WILMA
Method: F:\BR02\MAXDATA\WILMA\FUEL0702

Filename: R7020W04
Operator: BR0



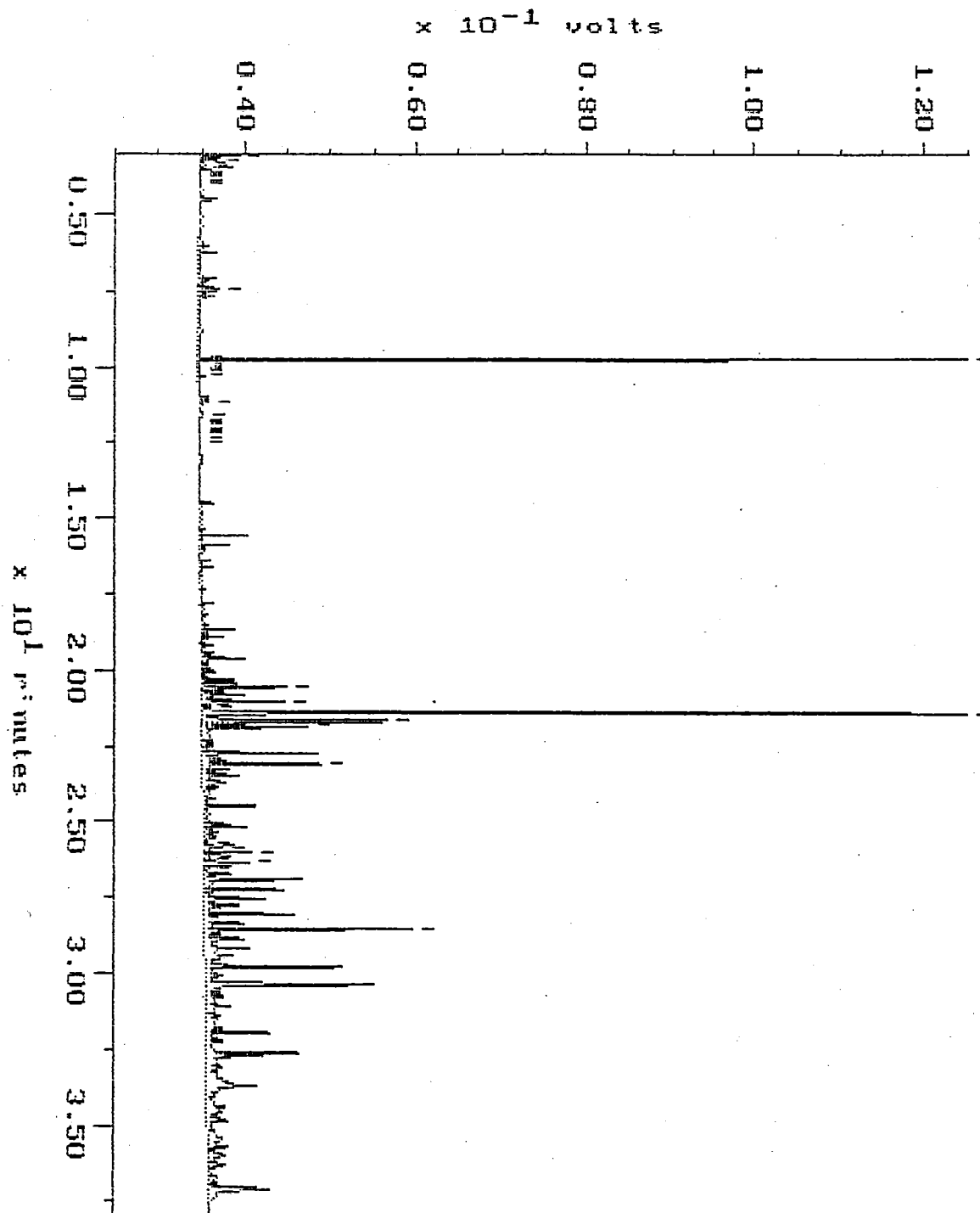
WA DOE WTPH-D

Sample: 9306-304-3
Acquired: 03-JUL-93 19:02

Channel: DENITRI
Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0702

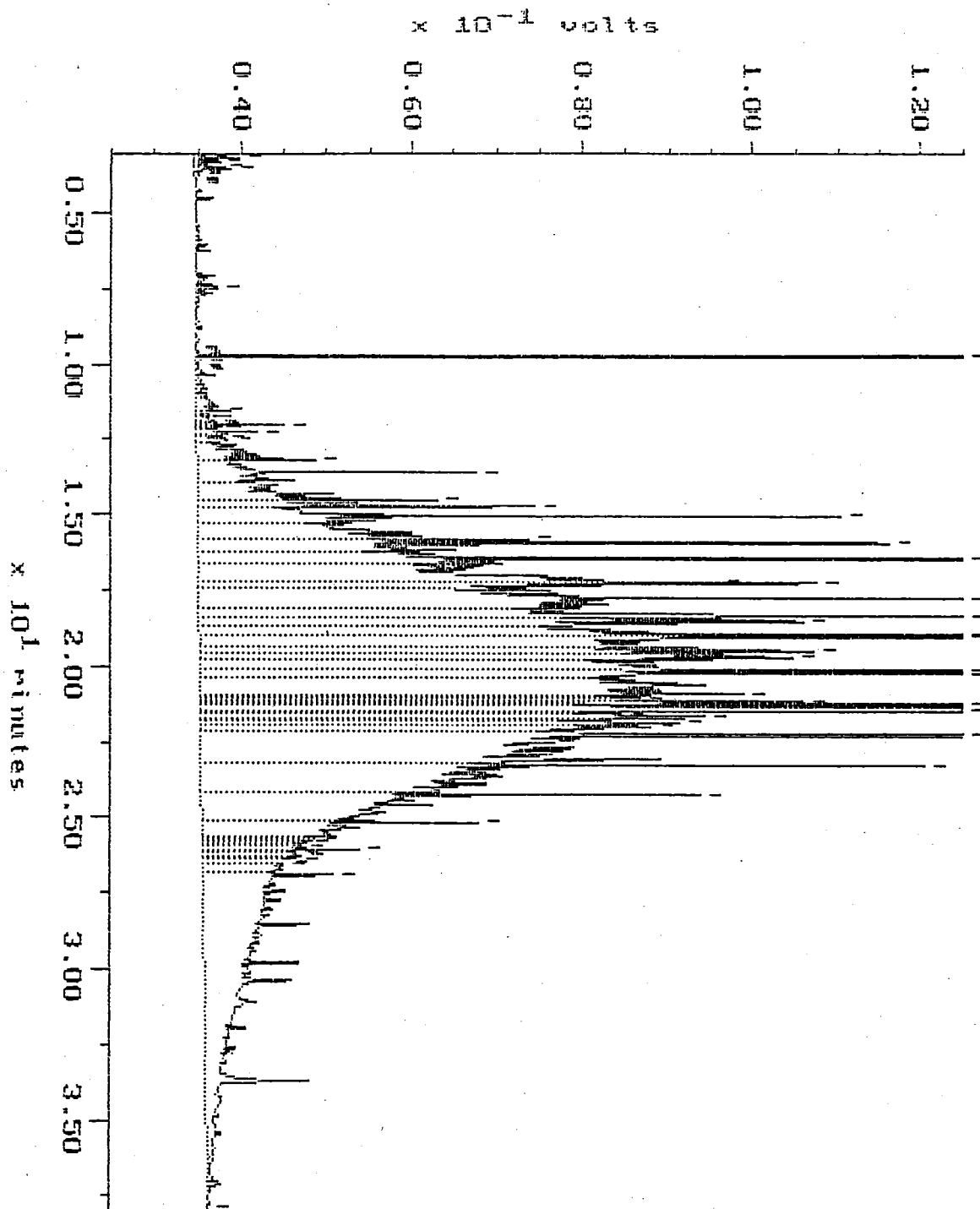
Filename: R7028D35
Operator: ATI

Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY



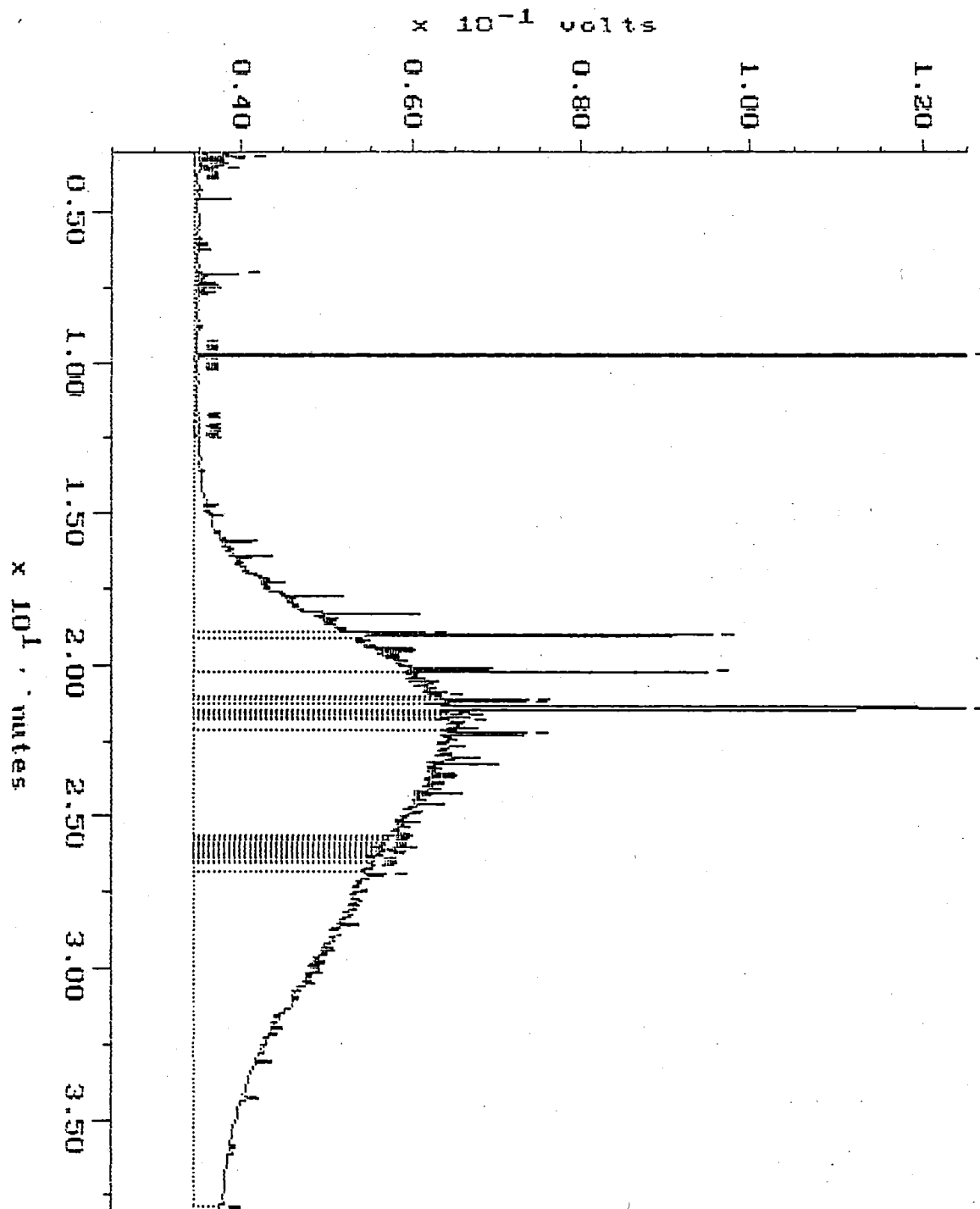
WA DOE WTPH-D

Sample: 9306-304-4 Channel: DEMITAI
Acquired: 03-JUL-93 19:48 Method: F:\802\MAXDATA\SERGE-D\FUEL0702
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY
Filename: 87029036
Operator: ATI



WA DOE WTPH-D

Sample: 9306-304-5 Channel: DEMITRI Filename: R7023037
Acquired: 03-JUL-93 20:35 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0702 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

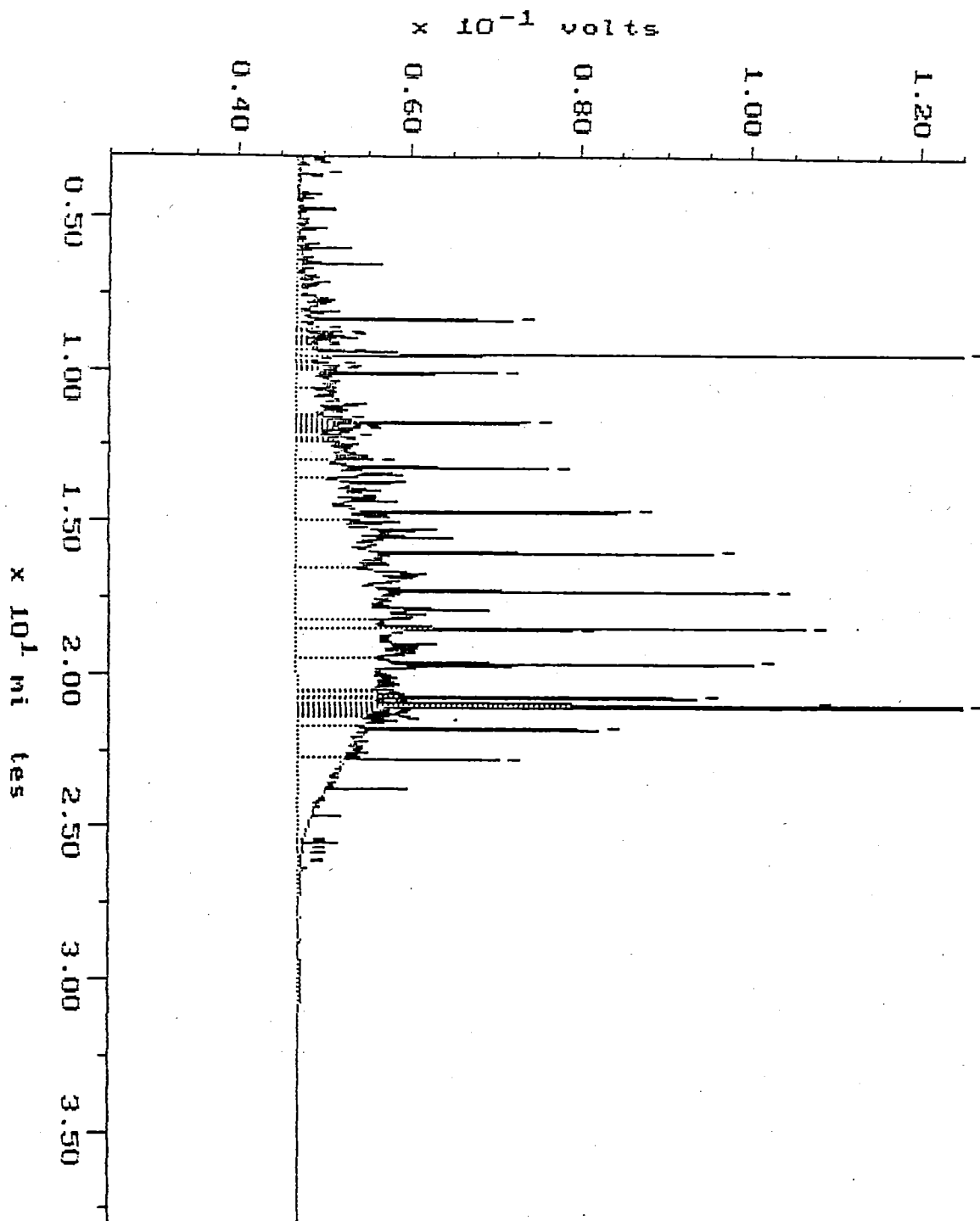


Continuing Calibration

Sample: D 500
Acquired: 02-JUL-93 14:30

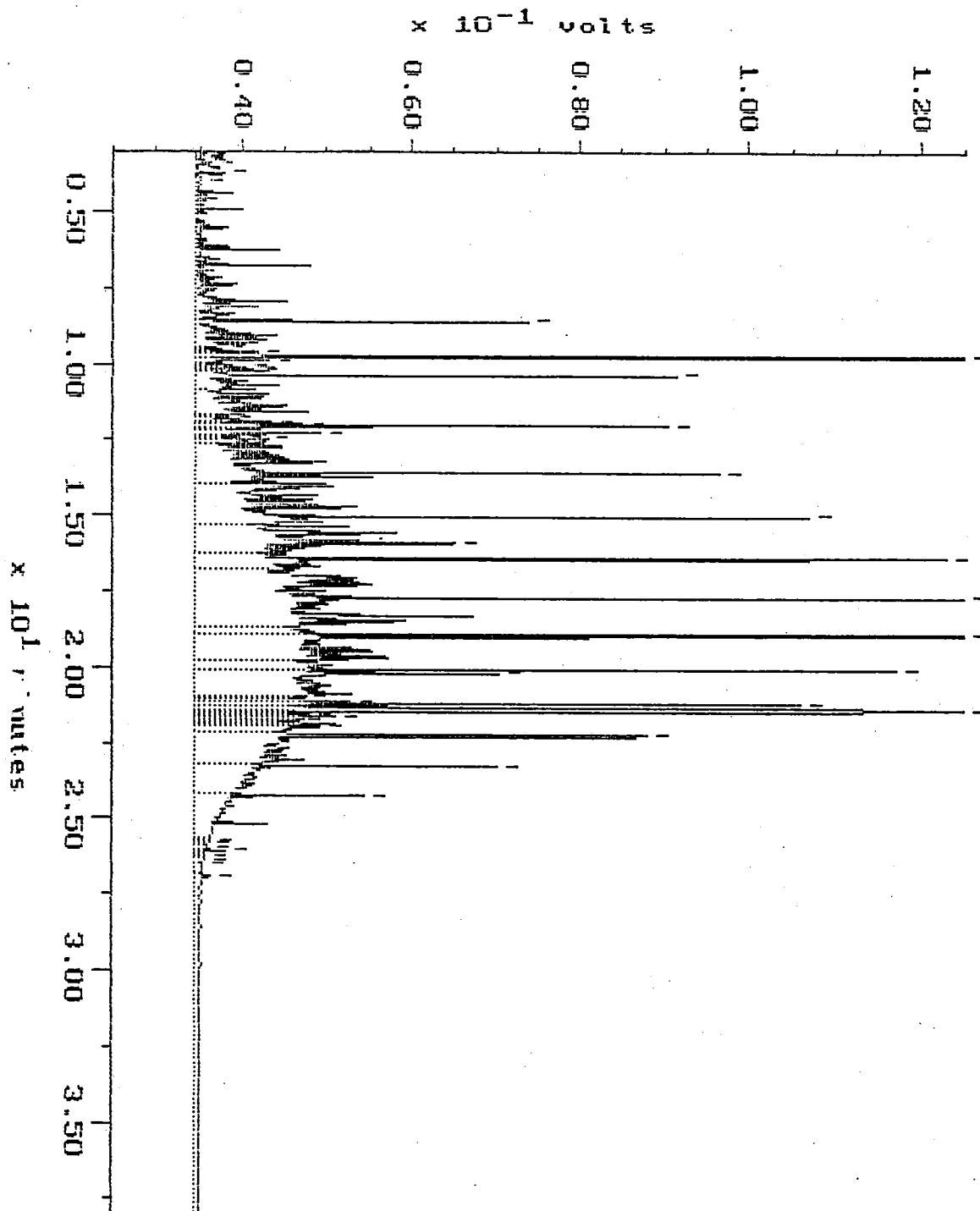
Channel: WILMA
Method: F:\BRO2\MAXDATA\WILMA\FUEL0702

Filename: R7028W02
Operator: BRO



Continuing Calibration

Sample: 0 500 Channel: DEMITRI File: R7028D02
Acquired: 02-JUL-93 17:36 Method: F:\BRO2\MAXDATA\SERGE-DAFUEL0702 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

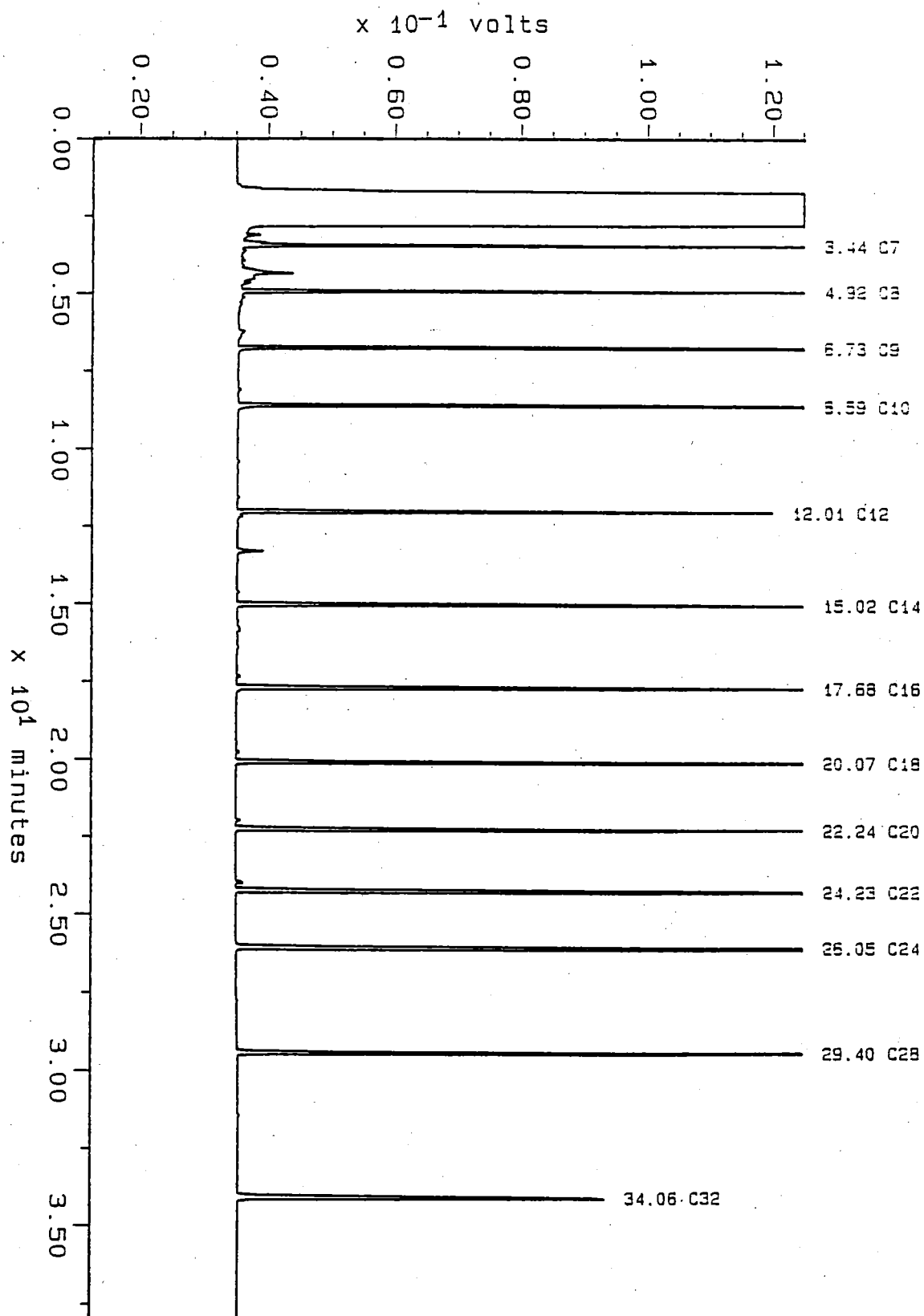


Sample: ALKANE
Acquired: 23-JUN-93 21: 41
Inj Vol: 1.00

Channel: DEMITRI
Method: F:\BR02\MAXDATA\SERGE-D\FUEL0623

Filename: r6239d11
Operator: ATI

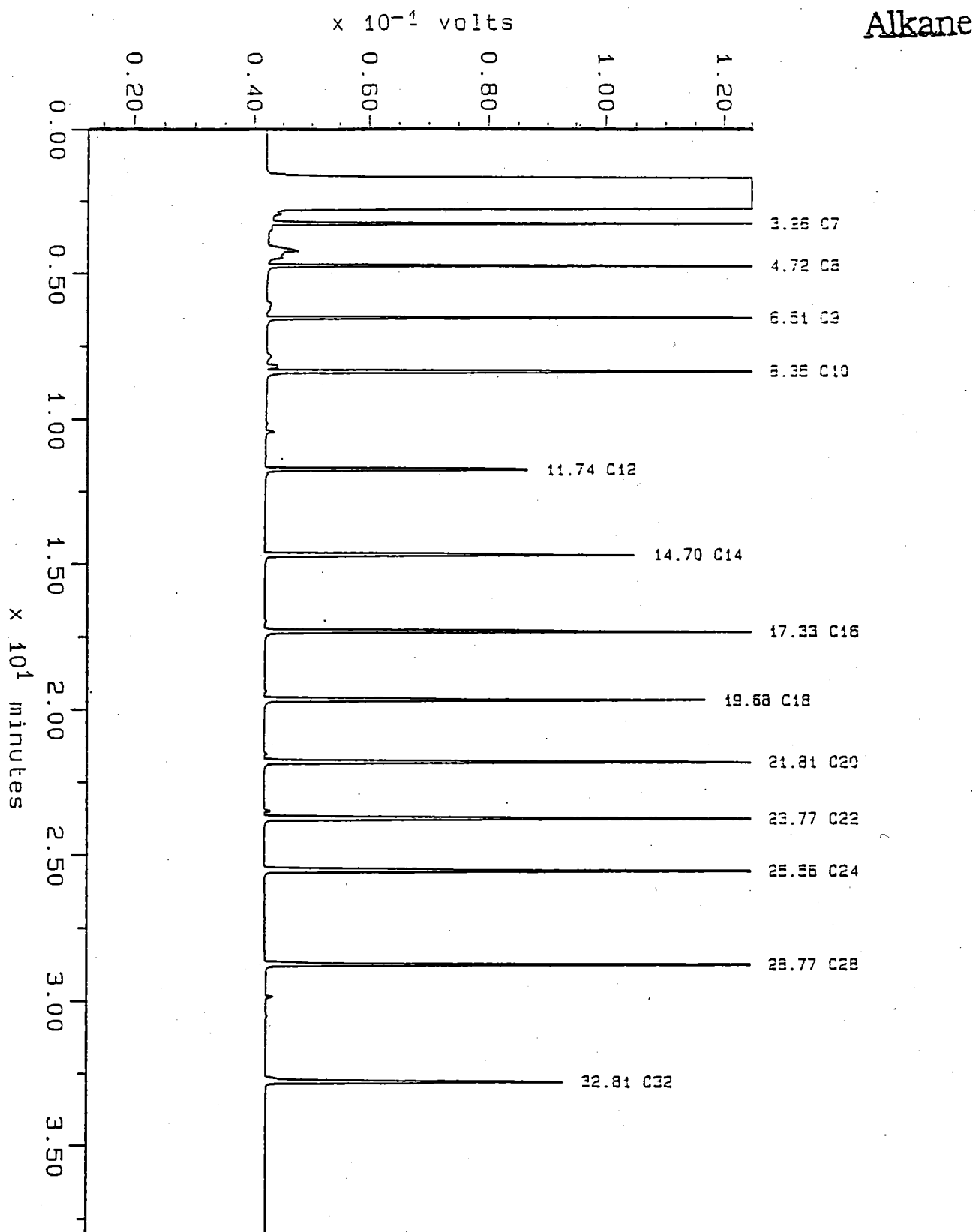
Alkane



Sample: ALKANE
Acquired: 08-APR-93 14:13
Inj Vol: 1.00

Channel: WILMA
Method: F:\SRC2\MAXDATA\WILMA\FUEL0408

Filename: R4098W02
Operator: BRQ





CHAIN-OF-JSTODY

Date 6-29-93 Page 1 of 1

PROJECT INFORMATION

Project Manager: Peter Barry
Project Name: Burns Bros. Therp
Project Number: 15,659.001
Site Location: Therp Wa
Sampled By: DDD

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

SAMPLE ID	DATE	TIME	MATRIX	LAB ID
NW3 @ 9.0'	6-28-93	1335	Soil	1
NW3 @ 42.5'	6-29-93	1050	Soil	2
S30-Swamp Area	6-29-93	1045	Soil	3
S31-East Culvert	6-29-93	1100	Soil	4
S32-Drain Box	6-29-93	1110	Soil	5

I AB INFORMATION

Lab Name: A7Z	Total Number of Containers:	5
Lab Address: 560 N. 4th St. A10	Chain of Custody Seals: Y/N/A	Y
Renton WA	Intact?: Y/N/A	Y
Via: Carrier	Received in Good Condition/Cold:	Y/Y

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: <i>[Signature]</i> Time: 1310	Signature: <i>[Signature]</i> Time: 0805	Signature: _____ Time: _____
Printed Name: David Duvigne Date: 6/29/93	Printed Name: Peter Barry Date: 6/30/93	Printed Name: _____ Date: _____
Company: AGI	Company: _____	Company: _____
RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: <i>[Signature]</i> Time: 1310	Signature: <i>[Signature]</i> Time: 1000	Signature: _____ Time: _____
Printed Name: Peter Barry Date: 6/29/93	Printed Name: KEN KITA Date: 6/30/93	Printed Name: _____ Date: _____
Company: AGI	Company: _____	Company: _____

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

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

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
 Project No.: 15,169.001
 Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
 Lab Number: 9307-038
 Sample No.: MW5 @7.5', MW5 @10.0', MW1 @7.5', MW2 @7.5' (Soil), Rinsate 1,
 Trip Blank (Water)

Matrix: 4 Soil, 2 Water

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
BETX	GC/PID	EPA 8020
Fuel Hydrocarbons	GC/FID	EPA 8015 Modified
Polycyclic Aromatic Hydrocarbons	HPLC/UV/Fluor	EPA 8310
Lead	AA/GF	EPA 7421
Moisture	Gravimetric	CLP SOW ILMO1.0

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
PAHs (water)	7/02/93 ^a	7/07/93	7/13/93	5(7)	6(40)
PAHs (soil)	7/02/93	7/06/93	7/12/93	4(14)	6(40)
PAHs (soil)	7/02/93	7/13/93 ^b	7/16/93	11(14)	3(40)
BETX (water)	7/02/93	NA	7/07/93	NA	5(14)
BETX (soil)	7/02/93	7/07/93	7/08/93	5	6(14)
Fuel Hydrocarbons (water)	7/02/93	7/08/93	7/08/93	6	6(14)
Fuel Hydrocarbons (soil)	7/02/93	7/07/93	7/08/93	5	6(14)
Lead (water)	7/02/93	7/06/93	7/07/93	4	5(180)
Lead (soil)	7/02/93	7/08/93	7/09/93	6	7(180)
Moisture	7/02/93	NA	7/06/93	NA	4

NA - Not Applicable; extraction not required.

a - Samples MW5 @ 7.5' and MW5 @10.0' collected July 1, 1993.

b - Sample MW5 @7.5'.

Numbers in parentheses indicate recommended holding times in days for soil and water.

All samples were analyzed within recommended holding times.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9307-038
Sample No.: MW5 @7.5', MW5 @10.0', MW1 @7.5', MW2 @7.5' (Soil), Rinsate 1,
Trip Blank (Water)

Matrix: 4 Soil, 2 Water

FUEL HYDROCARBON CHROMATOGRAPHY

EPA 8015 Modified: Gasoline (C7 - C12) and diesel (C12 - C24) range petroleum hydrocarbons were detected in sample MW5 @ 7.5'. These detections were supported by the sample chromatogram.

FIELD QUALITY CONTROL SAMPLES

Field Blank: None collected.

Field Duplicates: None collected.

Rinsate: Sample Rinsate 1 was analyzed by EPA 8310, EPA 8015 Modified, EPA 7421, and EPA 8020. No analytes were detected at or above the method reporting limit (MRL) by EPA 8310, 8015 Modified, or 7421. Toluene and xylenes were detected by EPA 8020 at 0.7 and 0.6 micrograms per liter ($\mu\text{g/L}$), respectively; both results are within 0.2 $\mu\text{g/L}$ of the MRLs for these analytes. Sample results are not considered compromised by the possibility of carry-over contamination at these levels.

Trip Blank: Sample Trip Blank was analyzed by EPA 8020. Toluene was detected at 0.7 $\mu\text{g/L}$. The MRL for this analyte is 0.5 $\mu\text{g/L}$; the associated method blank was free of contamination. Low concentrations of toluene can be seen as a contaminant in distilled water. Sample results are not considered compromised by detections at this concentration.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9307-038
Sample No.: MW5 @7.5', MW5 @10.0', MW1 @7.5', MW2 @7.5' (Soil), Rinsate 1,
Trip Blank (Water)

Matrix: 4 Soil, 2 Water

LAB QUALITY CONTROL SAMPLES

Reagent Blank: No analytes were detected at or above the MRL by the following methods:

EPA 8310 (water)
EPA 8020 (soil and water)
EPA 8015 Modified (soil and water)
EPA 7421 (soil and water)

EPA 8310 (soil): Phenanthrene and fluoranthene were detected at 0.026 and 0.081 milligrams per kilogram, respectively, in the method blank extracted on July 6, 1993. This blank is associated with all soil samples except MW5 @7.5'. Neither of these analytes were detected in associated samples. Data are accepted without qualification.

Matrix Spikes: Matrix spike (MS) and MS duplicate (MSD) percent recovery and relative percent difference (RPD) data are within ATI's control limit criteria for the following methods:

EPA 8020 (soil and water)
EPA 7421 (soil and water) (only a MS was analyzed)
EPA 8015 Modified (soil and water)

EPA 8310 (water): MS/MSD analyses were not performed; a blank spike and blank spike duplicate were substituted. Data are not considered compromised.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9307-038
Sample No.: MW5 @7.5', MW5 @10.0', MW1 @7.5', MW2 @7.5'(Soil), Rinsate 1,
Trip Blank (Water)

Matrix: 4 Soil, 2 Water

Matrix Spikes: EPA 8310 (soil): MS and MSD percent recoveries of all
(cont.) spiked analytes were within ATI's control limit criteria;
however, all RPDs exceeded ATI's control limits for the
samples extracted July 6, 1993. MSD results were
consistently 60 percent of MS results indicating a
laboratory error. RPDs ranged from 51 to 54; control
limits range from 20 to 35. The MS/MSD sample extracted
July 13, 1993 had acceptable recoveries and RPDs. Due to
the possibility of laboratory error and some acceptable
associated QC data for this parameter, results are
accepted without qualification.

Duplicates: Sample/sample duplicate RPD is within ATI's control
limits for the following methods:

EPA 7421 (soil and water)
EPA 8015 Modified (soil and water)
CLP SOW ILM01.0

Blank Spikes: Blank spike percent recovery is within ATI's control
limits for the following methods:

EPA 8310 (water) - Blank spike and blank spike duplicate
analyzed.
EPA 8310 (soil)
EPA 8020 (soil and water)
EPA 8015 Modified (soil and water)
EPA 7421 (soil and water)

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9307-038
Sample No.: MW5 @7.5', MW5 @10.0', MW1 @7.5', MW2 @7.5' (Soil), Rinsate 1,
Trip Blank (Water)

Matrix: 4 Soil, 2 Water

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

EPA 8310 (soil and water)
EPA 8020 (soil and water)
EPA 8015 Modified (soil and water)

SIGNATURES

Prepared by

Katherine Bourbonais

Date 8/23/93

Checked by

Gerry C. Cooper

Date 8-23-93

QUALITY ASSURANCE REPORT
SUPPLEMENTAL PAGE

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,169.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton, Washington
Lab Number: 9307-038
Sample No.: MW5 @7.5', MW5 @10.0', MW1 @7.5', MW2 @7.5' (Soil), Rinsate 1,
Trip Blank (Water)

Matrix: 4 Soil, 2 Water

FUEL HYDROCARBON CHEMISTRY

EPA 8015 Modified: Chromatogram profile for sample MW5 @7.5' appears to indicate either an extremely aged or biodegraded gasoline or other light petroleum product, or possibly a mixture of light products. Diesel fuel is not indicated.



Analytical **Technologies, Inc.**

560 Naches Avenue, S.W., Suite 101, Renton, WA 98055 (206) 228-8335
Karen L. Mixon, Laboratory Manager

RECEIVED

JUL 25 1993

ATI I.D. # 9307-038

APPLIED GEOTECHNOLOGY, INC.

July 23, 1993

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

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On July 2, 1993, Analytical Technologies, Inc. (ATI), received six 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.

Sincerely,

Donna M. McKinney
Senior Project Manager

DMM/hal/ff

Enclosure



Analytical Technologies, Inc.

ATI I.D. # 9307-038

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9307-038-1	MW5 @ 7.5'	07/01/93	SOIL
9307-038-2	MW5 @ 10.0'	07/01/93	SOIL
9307-038-3	MW1 @ 7.5'	07/02/93	SOIL
9307-038-4	RINSATE 1	07/02/93	WATER
9307-038-5	MW2 @ 7.5'	07/02/93	SOIL
307-038-6	TRIP BLANK	N/A	WATER

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	4
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. # 9307-038

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
POLYNUCLEAR AROMATIC HYDROCARBONS	HPLC/UV/FLUOR	EPA 8310	R
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
LEAD	AA/GF	EPA 7421	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
JB = Subcontract



ATI I.D. # 9307-038

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS

Four (4) soil samples and one water sample were received by Analytical Technologies, Inc. (ATI), on July 2, 1993 for the following analysis: EPA method 8310.

Fluoranthene and phenanthrene were confirmed to be present in the soil method blank extracted on July 6, 1993 at levels above the detection limit. The soil method blank extracted on July 13, 1993, as well as the water blank, was free of target analytes.

The relative percent differences (RPDs) in the matrix spike/matrix spike duplicate (MS/MSD) for sample 9307-038-5 (MW2 @ 7.5') were all outside ATI limits and were flagged with an "H"; out of limits.

All other corresponding quality assurance and quality control results defined as blank spike (BS), matrix spike/matrix spike duplicate (MS/MSD), method blank and surrogate recoveries were within the established control limits.

ATI I.D. # 9307-038

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : N/A
PROJECT # : 15659.001	DATE RECEIVED : N/A
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/07/93
CLIENT I.D. : METHOD BLANK	DATE ANALYZED : 07/13/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	DILUTION FACTOR : 1

COMPOUNDSRESULTS

NAPHTHALENE	<0.50
ACENAPHTHYLENE	<1.0
1-METHYLNAPHTHALENE	<0.50
2-METHYLNAPHTHALENE	<0.50
ACENAPHTHENE	<0.50
FLUORENE	<0.10
PHENANTHRENE	<0.050
ANTHRACENE	<0.050
FLUORANTHENE	<0.10
PYRENE	<0.10
BENZO (A) ANTHRACENE	<0.10
BENZO (B) FLUORANTHENE	<0.10
BENZO (K) FLUORANTHENE	<0.10
BENZO (A) PYRENE	<0.10
DIBENZO (A, H) ANTHRACENE	<0.20
BENZO (G, H, I) PERYLENE	<0.10
INDENO (1, 2, 3-CD) PYRENE	<0.10

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	88	33 - 123
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ATI I.D. # 9307-038-4

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 07/02/93
PROJECT # : 15659.001	DATE RECEIVED : 07/02/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/07/93
CLIENT I.D. : RINSATE 1	DATE ANALYZED : 07/13/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	DILUTION FACTOR : 1

----- COMPOUNDS	RESULTS -----
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NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	<0.47
2-METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	79	33 - 123
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ATI I.D. # 9307-038

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC..	SAMPLE I.D. # : BLANK
PROJECT # : 15659.001	DATE EXTRACTED : 07/07/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 07/13/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<1.00	30.0	22.2	74	18.6	62	18
PHENANTHRENE	<0.0500	2.00	1.79	90	1.74	87	3
FLUORENE	<0.100	2.00	1.62	81	1.48	74	9
BENZO (K) FLUORANTHENE	<0.100	2.00	2.11	106	1.93	97	9
DIBENZO (A, H) ANTHRACENE	<0.200	2.00	2.18	109	1.93	97	12

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	35 - 104	32
PHENANTHRENE	47 - 147	30
FLUORENE	31 - 155	30
BENZO (K) FLUORANTHENE	39 - 145	29
DIBENZO (A, H) ANTHRACENE	34 - 135	26

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	83	68	33 - 123



ATI I.D. # 9307-038

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/06/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS

RESULTS

NAPHTHALENE	<0.083
ACENAPHTHYLENE	<0.17
1-METHYLNAPHTHALENE	<0.17
METHYLNAPHTHALENE	<0.17
ACENAPHTHENE	<0.17
FLUORENE	<0.017
PHENANTHRENE	0.026
ANTHRACENE	<0.0083
FLUORANTHENE	0.081
PYRENE	<0.017
BENZO (A) ANTHRACENE	<0.017
THRYSENE	<0.017
BENZO (B) FLUORANTHENE	<0.017
BENZO (K) FLUORANTHENE	<0.017
BENZO (A) PYRENE	<0.017
DIBENZO (A, H) ANTHRACENE	<0.034
BENZO (G, H, I) PERYLENE	<0.017
INDENO (1, 2, 3-CD) PYRENE	<0.017

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE 77

25 - 134

ATI I.D. # 9307-038

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : N/A
PROJECT # : 15659.001	DATE RECEIVED : N/A
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/13/93
CLIENT I.D. : METHOD BLANK	DATE ANALYZED : 07/16/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
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NAPHTHALENE	<0.083
ACENAPHTHYLENE	<0.17
1-METHYLNAPHTHALENE	<0.17
2-METHYLNAPHTHALENE	<0.17
ACENAPHTHENE	<0.17
FLUORENE	<0.017
PHENANTHRENE	<0.0083
ANTHRACENE	<0.0083
FLUORANTHENE	<0.017
PYRENE	<0.017
BENZO (A) ANTHRACENE	<0.017
CHRYSENE	<0.017
BENZO (B) FLUORANTHENE	<0.017
BENZO (K) FLUORANTHENE	<0.017
BENZO (A) PYRENE	<0.017
DIBENZO (A, H) ANTHRACENE	<0.034
BENZO (G, H, I) PERYLENE	<0.017
INDENO (1, 2, 3-CD) PYRENE	<0.017

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	85	25 - 134
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ATI I.D. # 9307-038-1

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW5 @ 7.5'	DATE ANALYZED	: 07/16/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
NAPHTHALENE	0.44
ACENAPHTHYLENE	<0.21
1-METHYLNAPHTHALENE	0.30
-METHYLNAPHTHALENE	1.0
ACENAPHTHENE	<0.21
FLUORENE	<0.021
PHENANTHRENE	0.041
ANTHRACENE	<0.010
FLUORANTHENE	<0.021
PYRENE	<0.021
BENZO (A) ANTHRACENE	<0.021
CHRYSENE	<0.021
BENZO (B) FLUORANTHENE	<0.021
BENZO (K) FLUORANTHENE	<0.021
BENZO (A) PYRENE	<0.021
DIBENZO (A, H) ANTHRACENE	<0.041
BENZO (G, H, I) PERYLENE	<0.021
INDENO (1, 2, 3-CD) PYRENE	<0.021

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	85	25 - 134
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ATI I.D. # 9307-038-2

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/06/93
CLIENT I.D.	: MW5 @ 10.0'	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS

RESULTS

NAPHTHALENE	<0.092
ACENAPHTHYLENE	<0.19
1-METHYLNAPHTHALENE	<0.19
-METHYLNAPHTHALENE	<0.19
ACENAPHTHENE	<0.19
FLUORENE	<0.019
PHENANTHRENE	<0.0092
ANTHRACENE	<0.0092
FLUORANTHENE	<0.019
PYRENE	<0.019
BENZO (A) ANTHRACENE	<0.019
CHRYSENE	<0.019
BENZO (B) FLUORANTHENE	<0.019
BENZO (K) FLUORANTHENE	<0.019
BENZO (A) PYRENE	<0.019
DIBENZO (A, H) ANTHRACENE	<0.038
BENZO (G, H, I) PERYLENE	<0.019
INDENO (1, 2, 3 - CD) PYRENE	<0.019

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	77	25 - 134
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ATI I.D. # 9307-038-3

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/02/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/06/93
CLIENT I.D.	: MW1 @ 7.5'	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
NAPHTHALENE	<0.090
ACENAPHTHYLENE	<0.18
1-METHYLNAPHTHALENE	<0.18
2-METHYLNAPHTHALENE	<0.18
ACENAPHTHENE	<0.18
FLUORENE	<0.018
PHENANTHRENE	<0.0091
ANTHRACENE	<0.0091
FLUORANTHENE	<0.018
PYRENE	<0.018
BENZO (A) ANTHRACENE	<0.018
CHRYSENE	<0.018
BENZO (B) FLUORANTHENE	<0.018
BENZO (K) FLUORANTHENE	<0.018
BENZO (A) PYRENE	<0.018
DIBENZO (A, H) ANTHRACENE	<0.037
BENZO (G, H, I) PERYLENE	<0.018
INDENO (1, 2, 3-CD) PYRENE	<0.018

SURROGATE PERCENT RECOVERY	LIMITS
2-CHLOROANTHRACENE	83 25 - 134

ATI I.D. # 9307-038-5

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 07/02/93
PROJECT # : 15659.001	DATE RECEIVED : 07/02/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/06/93
CLIENT I.D. : MW2 @ 7.5'	DATE ANALYZED : 07/13/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
NAPHTHALENE	<0.088
ACENAPHTHYLENE	<0.18
1-METHYLNAPHTHALENE	<0.18
2-METHYLNAPHTHALENE	<0.18
ACENAPHTHENE	<0.18
FLUORENE	<0.018
PHENANTHRENE	<0.0088
ANTHRACENE	<0.0088
FLUORANTHENE	<0.018
PYRENE	<0.018
BENZO (A) ANTHRACENE	<0.018
CHRYSENE	<0.018
BENZO (B) FLUORANTHENE	<0.018
BENZO (K) FLUORANTHENE	<0.018
BENZO (A) PYRENE	<0.018
DIBENZO (A, H) ANTHRACENE	<0.036
BENZO (G, H, I) PERYLENE	<0.018
INDENO (1, 2, 3-CD) PYRENE	<0.018

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	82	25 - 134
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ATI I.D. # 9307-038

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9306-295-8
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/06/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	3.65	73	3.86	77	6
PHENANTHRENE	<0.00833	0.333	0.323	97	0.318	95	2
PYRENE	<0.0170	0.333	0.271	81	0.265	80	2
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.295	89	0.300	90	2
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.275	83	0.284	85	3

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	33 - 116	20
PHENANTHRENE	20 - 154	35
PYRENE	20 - 147	34
BENZO (K) FLUORANTHENE	25 - 144	34
DIBENZO (A, H) ANTHRACENE	20 - 128	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	82	81	25 - 134



ATI I.D. # 9307-038

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9307-038-5
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/06/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	4.10	82	2.43	49	51H
PHENANTHRENE	<0.00833	0.333	0.300	90	0.175	53	53H
PYRENE	<0.0170	0.333	0.267	80	0.153	46	54H
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.331	99	0.193	58	53H
DIBENZO (A,H) ANTHRACENE	<0.0340	0.333	0.319	96	0.185	56	53H

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	33 - 116	20
PHENANTHRENE	20 - 154	35
PYRENE	20 - 147	34
BENZO (K) FLUORANTHENE	25 - 144	34
DIBENZO (A,H) ANTHRACENE	20 - 128	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	85	49	25 - 134

H = Out of limits.

ATI I.D. # 9307-038

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9306-295-7
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/13/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/16/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	3.51	70	3.77	75	7
PHENANTHRENE	<0.00833	0.333	0.308	92	0.343	103	11
PYRENE	<0.0170	0.333	0.268	80	0.284	85	6
DIBENZO (K) FLUORANTHENE	<0.0170	0.333	0.325	98	0.313	94	4
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.304	91	0.299	90	2

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	33 - 116	20
PHENANTHRENE	20 - 154	35
PYRENE	20 - 147	34
DIBENZO (K) FLUORANTHENE	25 - 144	34
DIBENZO (A, H) ANTHRACENE	20 - 128	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	83	87	25 - 134



ATI I.D. # 9307-038

 POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
 QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/06/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	3.87	77	N/A	N/A	N/A
PHENANTHRENE	0.0262	0.333	0.289	79	N/A	N/A	N/A
PYRENE	<0.0170	0.333	0.245	74	N/A	N/A	N/A
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.315	95	N/A	N/A	N/A
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.296	89	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	28 - 111	20
PHENANTHRENE	40 - 130	35
PYRENE	43 - 143	34
BENZO (K) FLUORANTHENE	43 - 138	34
DIBENZO (A, H) ANTHRACENE	37 - 125	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	80	N/A	25 - 134



ATI I.D. # 9307-038

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/13/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/16/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	3.57	71	N/A	N/A	N/A
PHENANTHRENE	<0.00833	0.333	0.271	81	N/A	N/A	N/A
PYRENE	<0.0170	0.333	0.248	74	N/A	N/A	N/A
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.332	100	N/A	N/A	N/A
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.309	93	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	28 - 111	20
PHENANTHRENE	40 - 130	35
PYRENE	43 - 143	34
BENZO (K) FLUORANTHENE	43 - 138	34
DIBENZO (A, H) ANTHRACENE	37 - 125	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	82	N/A	25 - 134



ATI I.D. # 9307-038

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 FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/03/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
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BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	105	76 - 120
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ATI I.D. # 9307-038

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 FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/07/93
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 RECOVERY	LIMITS
BROMOFLUOROBENZENE	105 76 - 120

ATI I.D. # 9307-038-4

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/02/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: RINSATE 1	DATE ANALYZED	: 07/07/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDRESULT

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	0.7
TOTAL XYLENES	0.6

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	108	76 - 120
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ATI I.D. # 9307-038-6

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 07/07/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
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BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	0.7
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	104	76 - 120
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ATI I.D. # 9307-038

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9307-015-2
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/03/93
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	20.3	102	20.2	101	0
TOLUENE	1.04	20.0	22.2	106	22.2	106	0
TOTAL XYLENES	<0.5	40.0	42.5	106	42.2	106	1

CONTROL LIMITS	% REC.	RPD
BENZENE	77 - 112	20
TOLUENE	72 - 113	20
TOTAL XYLENES	80 - 110	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	104	105	76 - 120



ATI I.D. # 9307-038

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/03/93
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	21.7	109	N/A	N/A	N/A
TOLUENE	<0.5	20.0	22.1	111	N/A	N/A	N/A
TOTAL XYLENES	<0.5	40.0	43.1	108	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	80 - 111	20
TOLUENE	78 - 111	20
TOTAL XYLENES	80 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	99	N/A	76 - 120

ATI I.D. # 9307-038

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/07/93
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	20.6	103	N/A	N/A	N/A
TOLUENE	<0.5	20.0	21.4	107	N/A	N/A	N/A
TOTAL XYLENES	<0.5	40.0	42.8	107	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	80 - 111	20
TOLUENE	78 - 111	20
TOTAL XYLENES	80 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	101	N/A	76 - 120



ATI I.D. # 9307-038

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 FUEL STOP	DATE EXTRACTED	: 07/07/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/07/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	99 52 - 116



ATI I.D. # 9307-038-1

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/07/93
CLIENT I.D.	: MW5 @ 7.5'	DATE ANALYZED	: 07/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDSRESULTS

BENZENE	<0.030
ETHYLBENZENE	0.12
TOLUENE	0.080
TAL XYLENES	0.50

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

92

52 - 116



ATI I.D. # 9307-038-2

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/07/93
CLIENT I.D.	: MW5 @ 10.0'	DATE ANALYZED	: 07/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.028
ETHYLBENZENE	<0.028
TOLUENE	<0.028
TAL XYLENES	<0.028

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	85 52 - 116



ATI I.D. # 9307-038-3

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/02/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/07/93
CLIENT I.D.	: MW1 @ 7.5'	DATE ANALYZED	: 07/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS	RESULTS
BENZENE	<0.027
ETHYLBENZENE	<0.027
TOLUENE	<0.027
TAL XYLENES	<0.027

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	82	52 - 116
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ATI I.D. # 9307-038-5

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/02/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/07/93
CLIENT I.D.	: MW2 @ 7.5'	DATE ANALYZED	: 07/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.026
ETHYLBENZENE	<0.026
TOLUENE	<0.026
TAL XYLENES	<0.026

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	91 52 - 116



ATI I.D. # 9307-038

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9307-004-5
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/07/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/07/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.789	79	0.810	81	3
TOLUENE	<0.0250	1.00	0.846	85	0.867	87	2
TAL XYLENES	<0.0250	2.00	1.79	90	1.83	92	2

CONTROL LIMITS	% REC.	RPD
BENZENE	35 - 113	20
TOLUENE	43 - 107	20
TOTAL XYLENES	46 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	86	85	52 - 116

ATI I.D. # 9307-038

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : BLANK
PROJECT # : 15659.001	DATE EXTRACTED : 07/07/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 07/07/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8020 (BETX)	

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.923	92	N/A	N/A	N/A
TOLUENE	<0.0250	1.00	1.04	104	N/A	N/A	N/A
TAL XYLENES	<0.0250	2.00	2.20	110	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	63 - 115	20
TOLUENE	75 - 110	20
TOTAL XYLENES	79 - 109	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	111	N/A	52 - 116



ATI I.D. # 9307-038

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : METHOD BLANK
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : N/A
DATE RECEIVED : N/A
DATE EXTRACTED : 07/08/93
DATE ANALYZED : 07/08/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

C TERPHENYL

109

68 - 144



ATI I.D. # 9307-038-4

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/02/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/08/93
CLIENT I.D.	: RINSATE 1	DATE ANALYZED	: 07/08/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS
-----FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<1
C7 - C12
GASOLINEFUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

C TERPHENYL

109

68 - 144



ATI I.D. # 9307-038

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : 9307-038-4
PROJECT # : 15659.001	DATE EXTRACTED : 07/08/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 07/08/93*
SAMPLE MATRIX : WATER	UNITS : mg/L
EPA METHOD : 8015 (MODIFIED)	

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
GASOLINE	<1.00	<1.00	NC	50.0	40.4	81	41.5	83	3
CONTROL LIMITS						% REC.			RPD
GASOLINE						64 - 118			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				107		110		68 - 144	

= Not Calculable.

* Sample duplicate was run on July 12, 1993.



ATI I.D. # 9307-038

 FUEL HYDROCARBONS
 QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/08/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
GASOLINE	<1.00	50.0	42.2	84	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
GASOLINE				52 - 124			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		111		N/A		68 - 144	



ATI I.D. # 9307-038

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : METHOD BLANK
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : N/A
DATE RECEIVED : N/A
DATE EXTRACTED : 07/07/93
DATE ANALYZED : 07/08/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<5
C7 - C10
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<25
C10 - C28
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

C TERPHENYL

110

52 - 143

ATTI I.D. # 9307-038-1

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW5 @ 7.5'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 07/01/93
DATE RECEIVED : 07/02/93
DATE EXTRACTED : 07/07/93
DATE ANALYZED : 07/08/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

160
C7 - C10
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

43
C10 - C28
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

C TERPHENYL

110

52 - 143



ATI I.D. # 9307-038-2

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW5 @ 10.0'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 07/01/93
DATE RECEIVED : 07/02/93
DATE EXTRACTED : 07/07/93
DATE ANALYZED : 07/08/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<6
C7 - C10
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<28
C10 - C28
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

TERPHENYL

101

52 - 143



ATI I.D. # 9307-038-3

FUEL HYDROCARBONS DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 CLIENT I.D. : MW1 @ 7.5'
 SAMPLE MATRIX : SOIL
 EPA METHOD : 8015 (MODIFIED)
 RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 07/02/93
 DATE RECEIVED : 07/02/93
 DATE EXTRACTED : 07/07/93
 DATE ANALYZED : 07/08/93
 UNITS : mg/Kg
 DILUTION FACTOR : 1

COMPOUNDS

RESULTS

FUEL HYDROCARBONS
 HYDROCARBON RANGE
 HYDROCARBON QUANTITATION USING

<5
 C7 - C10
 GASOLINE

FUEL HYDROCARBONS
 HYDROCARBON RANGE
 HYDROCARBON QUANTITATION USING

<27
 C10 - C28
 DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

TERPHENYL

97

52 - 143



ATI I.D. # 9307-038-5

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW2 @ 7.5'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 07/02/93
DATE RECEIVED : 07/02/93
DATE EXTRACTED : 07/07/93
DATE ANALYZED : 07/08/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<5
C7 - C10
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<26
C10 - C28
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

TERPHENYL

106

52 - 143

ATI I.D. # 9307-038

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : 9307-038-5
PROJECT # : 15659.001	DATE EXTRACTED : 07/07/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 07/08/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8015 (MODIFIED)	

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	<25.0	<25.0	NC	500	471	94	480	96	2
CONTROL LIMITS						% REC.			RPD
DIESEL						56 - 137			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				110		108		52 - 143	

= Not Calculable.

ATI I.D. # 9307-038

FUEL HYDROCARBONS
QUALITY CONTROL DATA

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

SAMPLE I.D. # : BLANK
 DATE EXTRACTED : 07/07/93
 DATE ANALYZED : 07/08/93
 UNITS : mg/Kg

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<25.0	500	486	97	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
DIESEL				67 - 135			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		110		N/A		52 - 143	

Analytical**Technologies**, Inc.

ATI I.D. # 9307-038

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

ELEMENT

DATE PREPARED

DATE ANALYZED

LEAD

07/06/93

07/07/93



Analytical Technologies, Inc.

ATI I.D. # 9307-038

METALS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : WATER
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP UNITS : mg/L

ATI I.D. #	CLIENT I.D.	LEAD
9307-038-4	RINSATE 1	<0.0030
METHOD BLANK	-	<0.0030



ATI I.D. # 9307-038

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

UNITS : mg/L

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	9307-017-6	<0.0030	<0.0030	NC	0.0293	0.0250	117
LEAD	BLANK	<0.0030	N/A	N/A	0.0257	0.0250	103

NC = Not Calculable.

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

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

Analytical**Technologies, Inc.**

ATI I.D. # 9307-038

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

ELEMENT

DATE PREPARED

DATE ANALYZED

LEAD

07/08/93

07/09/93

ATI I.D. # 9307-038

METALS ANALYSIS
DATA SUMMARY

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

MATRIX : SOIL

UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	LEAD
9307-038-1	MW5 @ 7.5'	2.1
9307-038-2	MW5 @ 10.0'	1.3
9307-038-3	MW1 @ 7.5'	2.1
9307-038-5	MW2 @ 7.5'	1.9
METHOD BLANK	-	<0.15

ATI I.D. # 9307-038

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.

MATRIX : SOIL

PROJECT # : 15659.001

PROJECT NAME : BURNS BROS/BINGO FUEL STOP

UNITS : mg/Kg

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	9307-038-3	2.1	1.8	15	3.63	1.40	109
LEAD	BLANK	<0.15	N/A	N/A	1.03	1.25	82

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

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

Analytical**Technologies**, Inc.

ATI I.D. # 9307-038

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

PARAMETERDATE ANALYZED

MOISTURE

07/06/93

ATI I.D. # 9307-038

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE
------------	-------------	----------

9307-038-1	MW5 @ 7.5'	18
9307-038-2	MW5 @ 10.0'	9.6
9307-038-3	MW1 @ 7.5'	8.0
9307-038-5	MW2 @ 7.5'	5.6



ATI I.D. # 9307-038

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9306-295-8	19	18	5	N/A	N/A	N/A

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

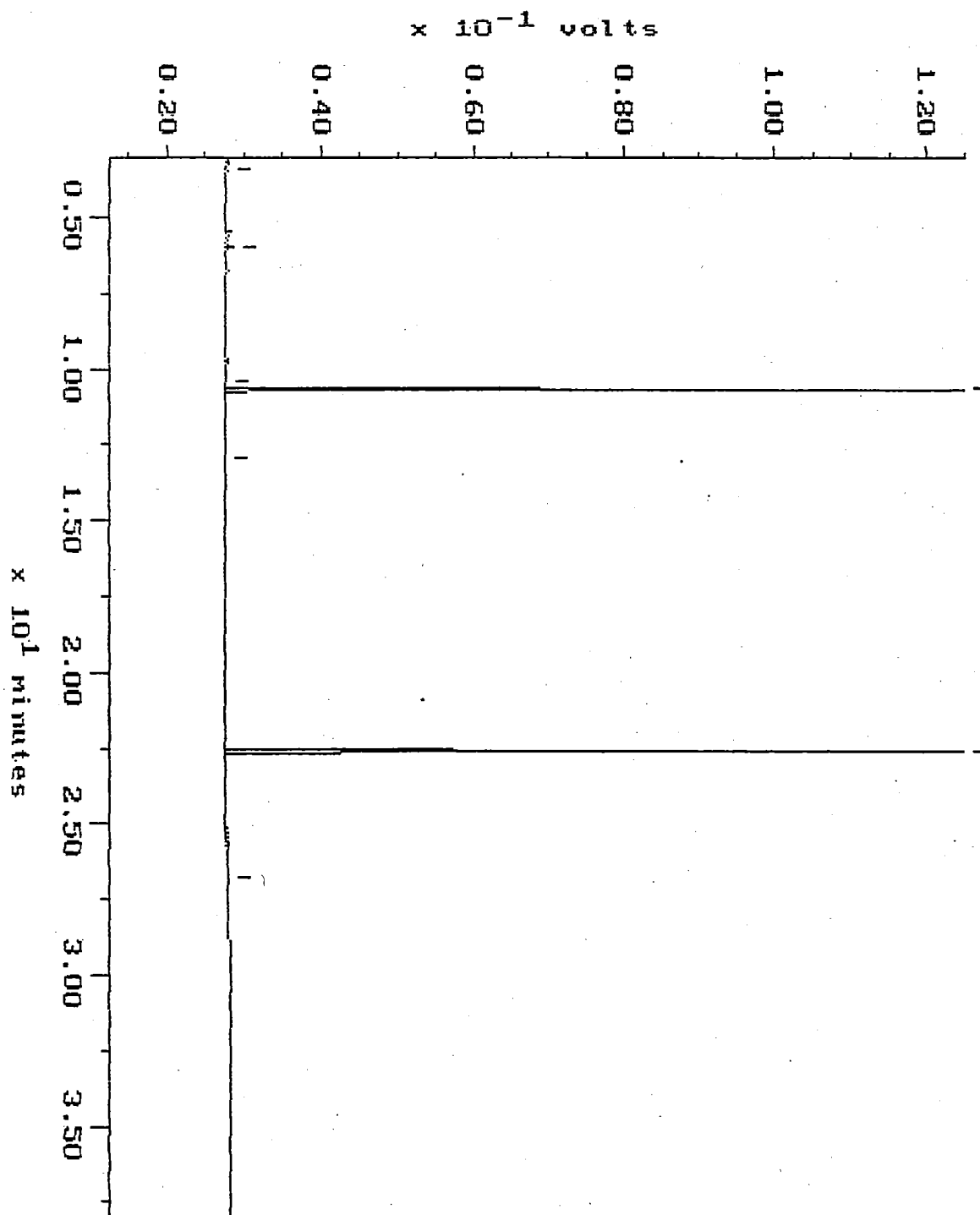
$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Blank

EPA 8015 Modified

Sample: WRB 7-8 Channel: BERT
Acquired: 08-JUL-93 17:43 Method: F:\BRO2\MAXDATA\BERT\FUEL0708
Comments: ATI: THE QUALITY TEAM

Filename: R7088B03
Operator: ATI

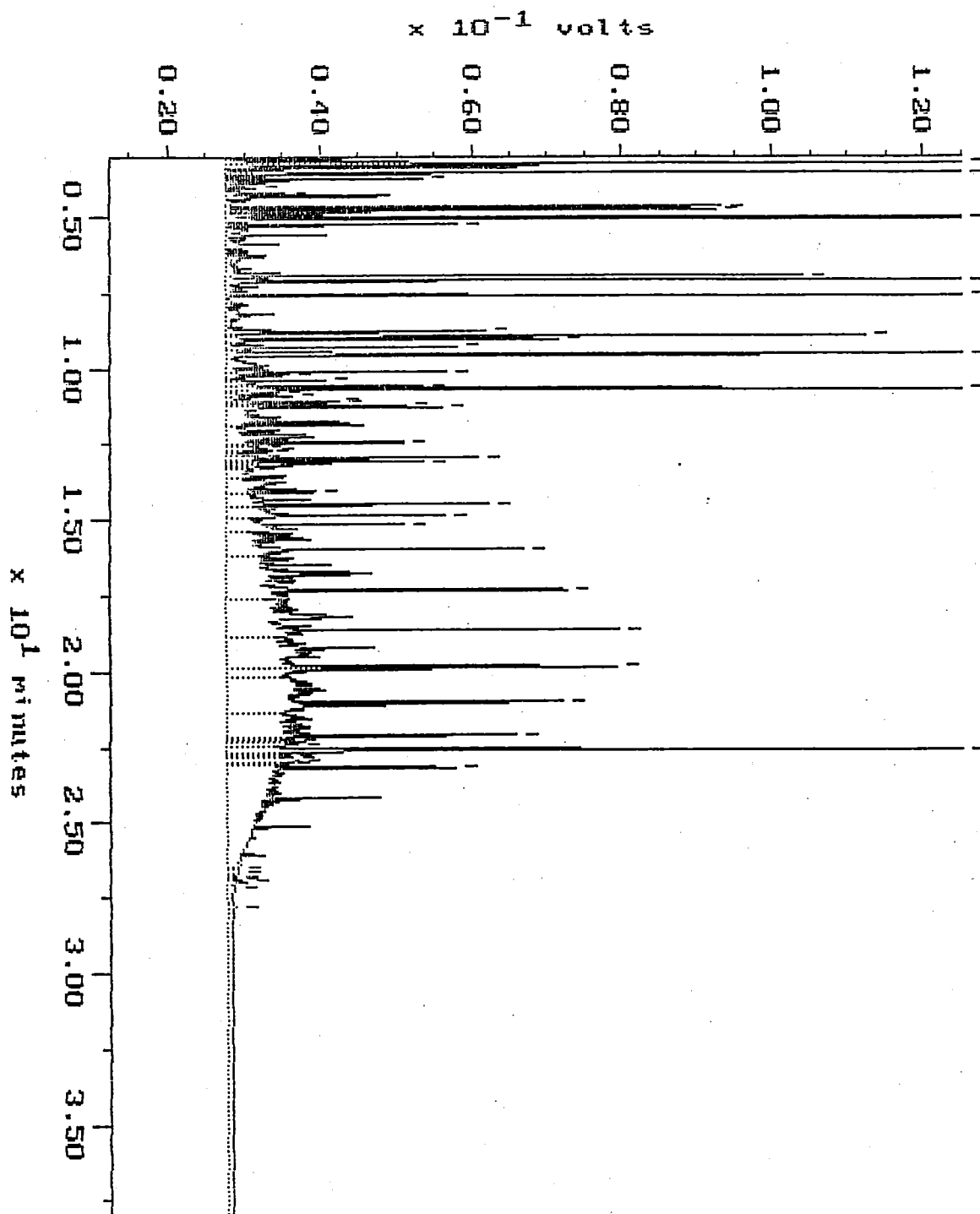


Continuing Calibration

Sample: DG 499
Acquired: 88-JUL-93 16:56
Comments: ATI: THE QUALITY TEAM

Channel: BERT
Method: F:\BRO2\MAXDATA\BERT\FUEL0708

Filename: R7088802
Operator: ATI

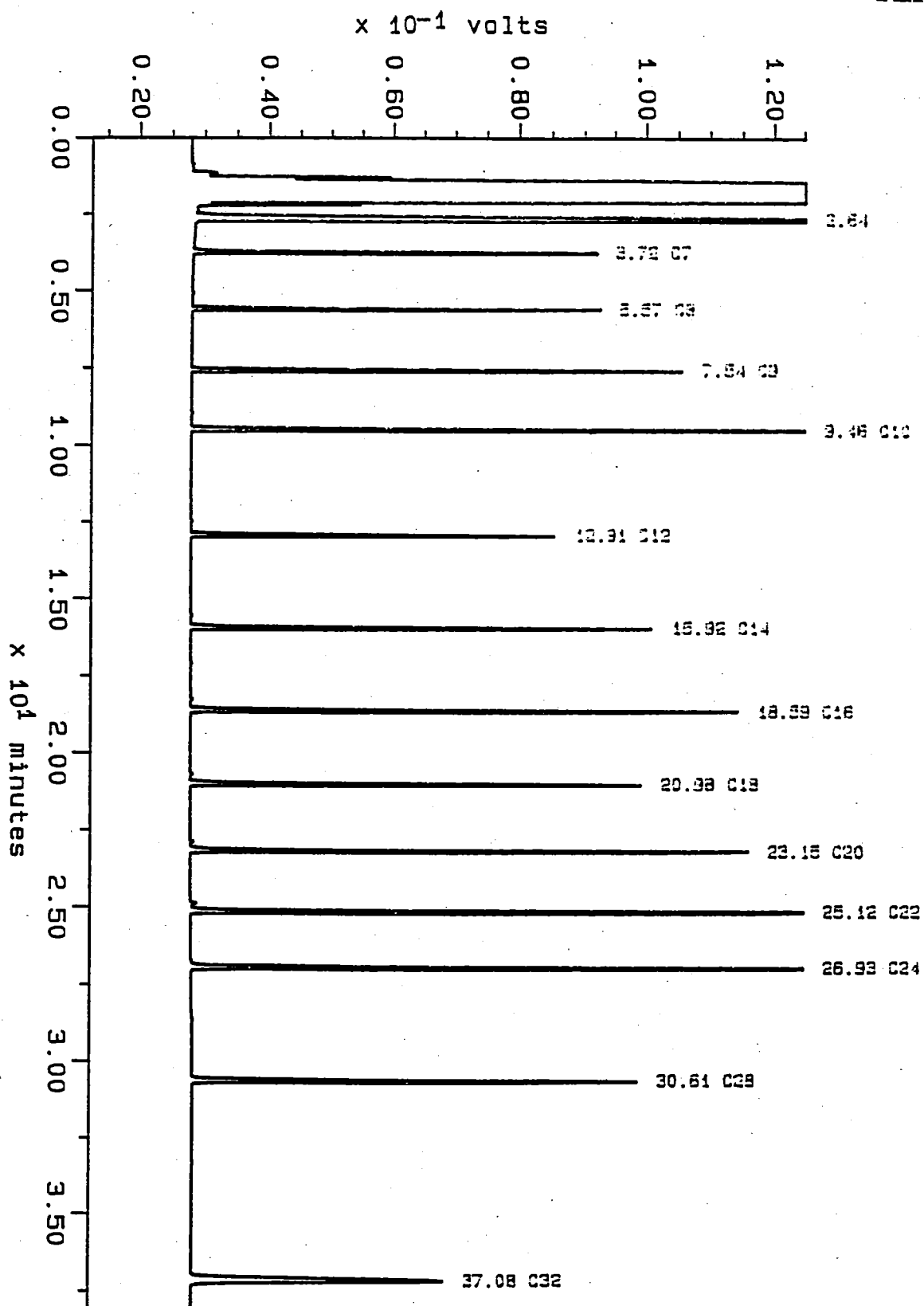


Sample: ALKANE
Acquired: 24-MAR-93 22:39
Inj Vol: 1.00

Channel: EHT
Method: F:\ERD2\MAXDATA\EHT\FUEL0324

Filename: R3243603
Operator: ATI

Alkane



EPA 8015 Modified

Sample: 9387-838-1

Channel: NANCY

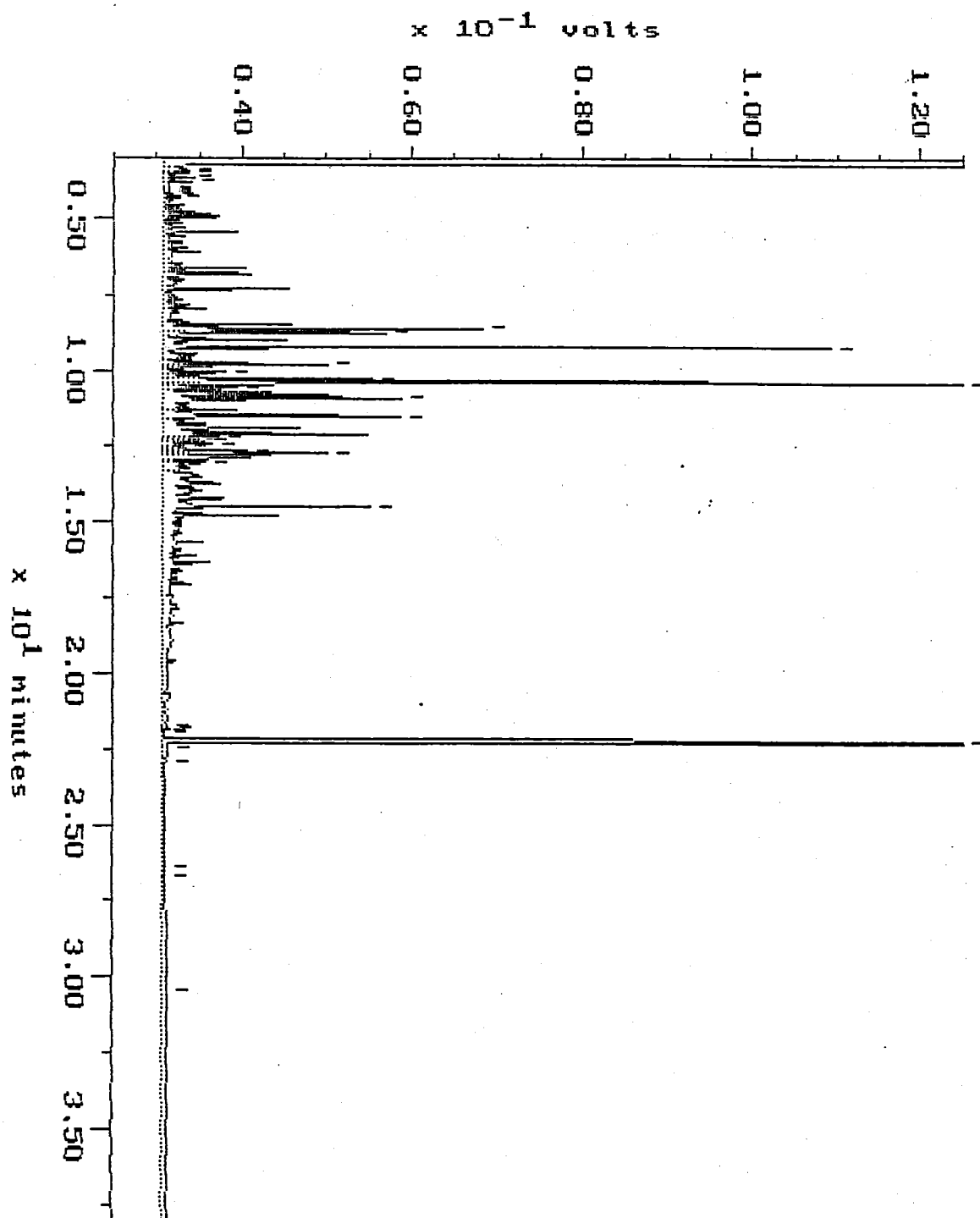
Filename: R7988N89

Acquired: 88-JUL-93 14:52

Method: F:\BRO2\MAXDATA\NANCY\FUEL8788

Operator: ATI

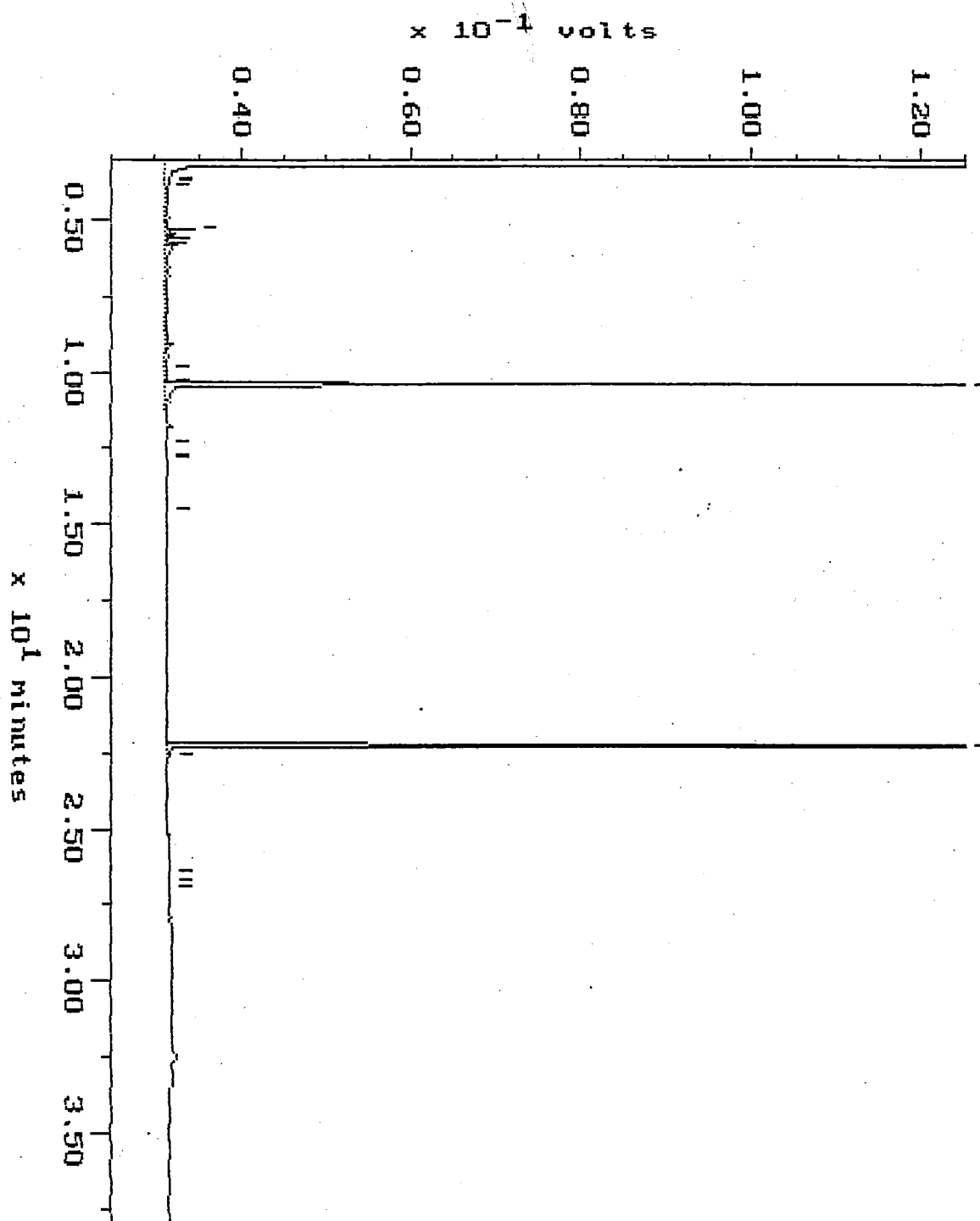
Comments: ATI RUSH FUELS: PROVIDERS OF EXCELLENCE AND QUALITY IN CLIENT SERVICE



EPA 8015 Modified

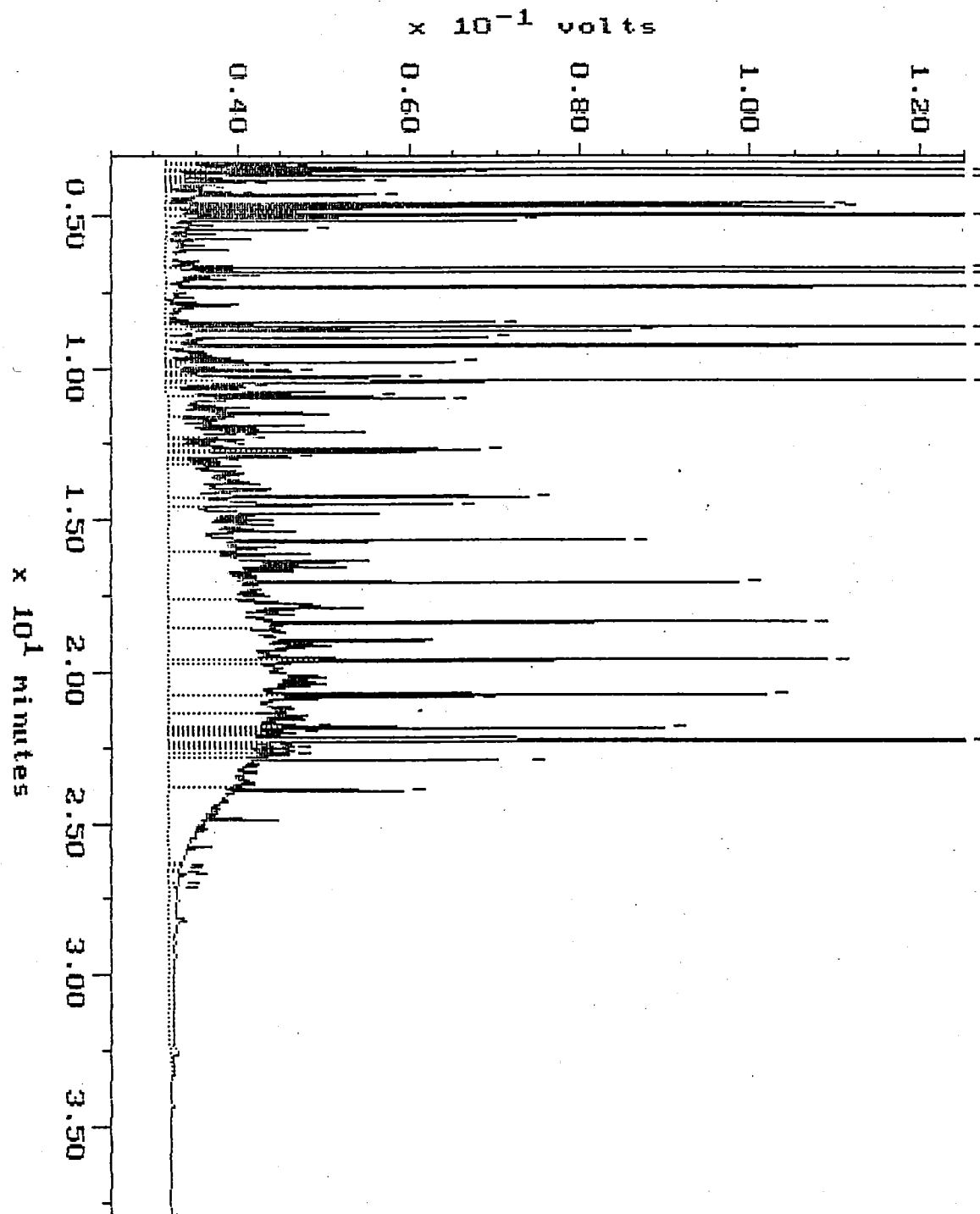
Blank

Sample: SRB 7-7 Channel: NANCY Filename: R7088N03
 Acquired: 08-JUL-93 10:07 Method: F:\BRO2\MAXDATA\NANCY\FUEL0708 Operator: ATI
 Comments: ATI RUSH FUELS: PROVIDERS OF EXCELLENCE AND QUALITY IN CLIENT SERVICE



Continuing Calibration

Sample: DG 400 Channel: NANCY Filename: R7080N02
Acquired: 00-JUL-93 8:48 Method: F:\BRO2\MAXDATA\NANCY\FUEL0700 Operator: ATI
Comments: ATI RUSH FUELS: PROVIDERS OF EXCELLENCE AND QUALITY IN CLIENT SERVICE

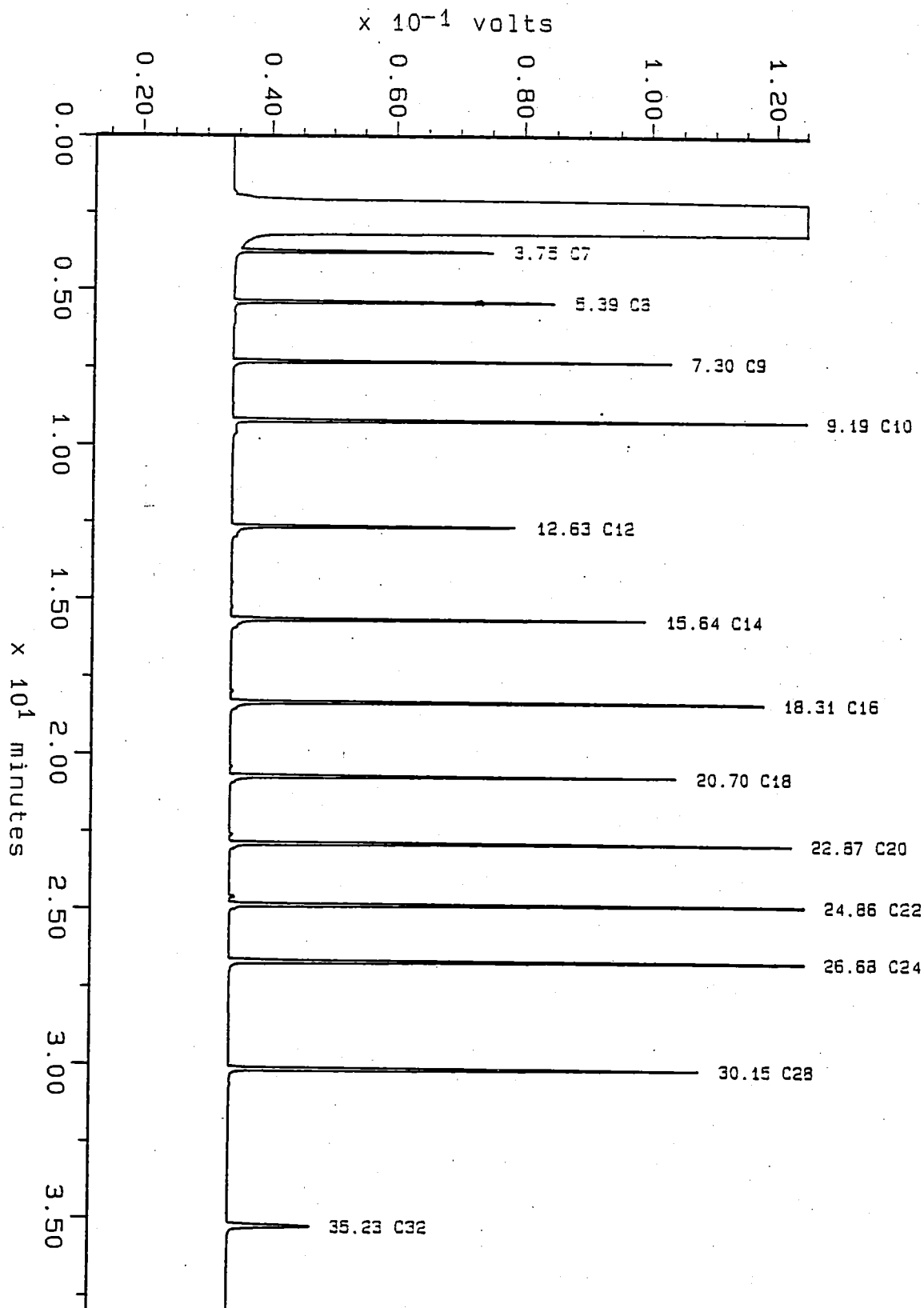


Sample: ALKANE
Acquired: 16-APR-93 13:35
Inj Vol: 1.00

Channel: NANCY
Method: F:\ER02\MAXDATA\NANCY\FUEL0416

Filename: R4162A02
Operator: ATI

Alkane





Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 7-2-93 Page 1 of 1

PROJECT INFORMATION				ANALYSIS REQUEST												
Project Manager: <u>Peter Barry</u>				Laboratory Number: <u>9307-038</u>												
Project Name: <u>Burns Bros. / Therp</u>																
Project Number: <u>15,659.001</u>																
Site Location: <u>Thorp WA</u> Sampled By: <u>DD</u>																
DISPOSAL INFORMATION				PETROLEUM HYDROCARBONS												
<input checked="" type="checkbox"/> Lab Disposal (return if not indicated)				8015M												
Disposal Method: _____				418.1 State:												
Disposed by: _____ Disposal Date: _____				TPH Special Instructions												
				TPH-D State:												
				TPH-G State:												
				TPH-ID State:												
QC INFORMATION (check one)				ORGANIC COMPOUNDS												
<input type="checkbox"/> SW-846 <input type="checkbox"/> CLP <input type="checkbox"/> Screening <input type="checkbox"/> AGI Std. <input type="checkbox"/> Special				DWS - Volatiles and Semivol.												
SAMPLE ID	DATE	TIME	MATRIX	LAB ID	8040 Phenols											
MW5 @ 7.5"	7-1-93	1025	Soil	1	8310 HPLC PAHs											
MW5 @ 10.0"	7-1-93	1107	Soil	2	8270 GCMS Semivol.											
MW1 @ 7.5"	7-2-93	0931	Soil	3	8240 GCMS Volatiles											
Rinsate 1	7-2-93	1015	160	4	8020M - BETX only											
MW @ 7.5"	7-2-93	1355	Soil	5	8020 Aromatic VOCs											
Trip Blank	7-23-93		160	6	8010 Halogenated VOCs											
				PESTS/PCB's												
				DWS - Herb/pest												
				8150 OC Herbicides												
				8140 OP Pesticides												
				8080M PCBs only												
				8080 OC Pest/PCBs												
				METALS												
				MFSP - Metals (Wa)												
				DWS - Metals												
				Priority Poll. Metals (13)												
				TCL Metals (23)												
				Organic Lead (Ca)												
				Total Lead (Wa)												
				Selected metals: list												
				LEACHING TESTS												
				TCLP - Metals												
				TCLP - Pesticides												
				TCLP - Semivolatiles												
				TCLP - Volatiles (ZHE)												
				OTHER												
				Lead by EPA 7421												
				NUMBER OF CONTAINERS												
				1												
				1												
				1												
				5												
				1												
				1												

LAB INFORMATION		SAMPLE RECEIPT		RELINQUISHED BY: 1.		RELINQUISHED BY: 2.		RELINQUISHED BY: 3.	
Lab Name:	ATZ	Total Number of Containers:	10	Signature:	Time:	Signature:	Time:	Signature:	Time:
Lab Address:	560 Naches Ave	Chain of Custody Seals:	Y/N/A	Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
Via:	Reuben Wa 1131234	Intact?:	Y/N/A	Company:		Company:		Company:	
Turn Around Time:	<input checked="" type="checkbox"/> Standard <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 72 hr. <input type="checkbox"/> 1 wk.	Received in Good Condition/Cold:	Y/N						
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA				RECEIVED BY: 1.		RECEIVED BY: 2.		RECEIVED BY: 3.	
				Signature:	Time:	Signature:	Time:	Signature:	Time:
				Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
				Company:		Company:		Company:	
Special Instructions:				Signature: <u>1848</u>		Signature: <u>1848</u>		Signature: <u>1848</u>	
				Printed Name: <u>1848</u>		Printed Name: <u>1848</u>		Printed Name: <u>1848</u>	
				Company: <u>1848</u>		Company: <u>1848</u>		Company: <u>1848</u>	

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
 Project No.: 15659.001
 Lab Name: Analytical Technologies, Inc. (ATI) - Renton, Washington
 Lab Number: 9307-068
 Sample No.: MW6@17.5', MW6@22.5', MW6@30', MW6@50', MW4@7.5', MW4@17.5'
 Matrix: Soil

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable for use.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
PAH ^a	HPLC/UV/FLUOR	EPA 8310
BETX	GC/PID	EPA 8020
TPH ^b	GC/FID	EPA 8015 Modified
Lead	AA/GF	EPA 7421
Moisture	Gravimetric	CLP SOW ILM01.0

a - Polycyclic aromatic hydrocarbons.

b - Fuel hydrocarbons, analyzed for gasoline (C₇ - C₁₂) and diesel (C₁₂ - C₂₄) range total petroleum hydrocarbons (TPH).

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
PAH	07/06/93	07/13/93 ^c	07/16/93	7(14)	3(40)
BETX	07/06/93	07/09/93 ^d	07/10/93	3	4(14)
TPH	07/06/93	07/13/93	07/14/93	7	8(14)
Lead	07/06/93	07/13/93	07/16/93	7	10(180)
Moisture	07/06/93	NA	07/12/93	NA	6(NA)

NA - Not applicable.

Numbers in parentheses indicate recommended holding times in days.

c - Sample MW4@17.5' analyzed July 17, 1993.

d - Sample MW4@7.5' analyzed July 13, 1993.

All samples were extracted and analyzed within recommended holding times.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, Washington
Lab Number: 9307-068
Sample No.: MW6@17.5', MW6@22.5', MW6@30', MW6@50', MW4@7.5', MW4@17.5'
Matrix: Soil

FUEL HYDROCARBON CHROMATOGRAMS

Gasoline range ($C_7 - C_{12}$) TPH were detected in samples MW6@17.5', MW6@22.5', and MW6@50'; diesel range ($C_{12} - C_{24}$) TPH were detected in sample MW6@22.5' by EPA 8015M. These detections are supported by sample chromatograms for this method.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: Sample MW6@50' is a duplicate of MW6@17.5'. Both samples were analyzed by EPA Methods 8015 Modified, 8020, 8310, and 7421. No analytes were detected at or above their MRLs by EPA 8310, indicating acceptable precision. Relative percent differences (RPDs) ranged from 10 percent (EPA 7421) to 42 percent for total xylenes (EPA 8020). Some field and/or laboratory variability is indicated by RPDs as high as 42 percent; however, variability is likely due to the inherent difficulty in obtaining true field duplicates of soil samples. Data are accepted without qualification.

Rinsate: None collected.

Trip Blank: None collected.

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above their method reporting limits (MRLs) in method blanks for the following methods:

EPA 8310
EPA 8020
EPA 8015M
EPA 7421

Matrix Spikes: Matrix spike percent recovery for EPA 7421 is within ATI's control limit criteria.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, Washington
Lab Number: 9307-068
Sample No.: MW6@17.5', MW6@22.5', MW6@30', MW6@50', MW4@7.5', MW4@17.5'
Matrix: Soil

Matrix Spikes: Matrix spike and matrix spike duplicate percent recoveries and RPDs are within ATI's control limit criteria for the following methods:

EPA 8310
EPA 8020
EPA 8015M

Duplicates: Duplicate sample RPDs are within ATI's control limit criteria for the following methods:

EPA 7421
CLP SOW ILM01.0

EPA 8015M: Analytes were not detected in either sample or duplicate sample at or above their MRLs. Reproducibility of this method is acceptable.

Blank Spikes: Blank spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8310
EPA 8015M
EPA 7421
EPA 8020

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

EPA 8310
EPA 8020
EPA 8015M

SIGNATURES

Prepared by

Kab for Mingta Lin

Date

8/23/93

Checked by

Katharine Bourbonais

Date

8/23/93



Analytical**Technologies**, Inc.

560 Naches Avenue, S.W., Suite 101, Renton, WA 98055 (206) 228-8335
Karen L. Mixon, Laboratory Manager

ATI I.D. # 9307-068

July 28, 1993

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

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On July 8, 1993, Analytical Technologies, Inc. (ATI), received six 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.

Sincerely,


Donna M. McKinley
Senior Project Manager

DMM/hal/ff

Enclosure



ATI I.D. # 9307-068

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9307-068-1	MW6 @ 17.5'	07/06/93	SOIL
9307-068-2	MW6 @ 22.5'	07/06/93	SOIL
9307-068-3	MW6 @ 30'	07/06/93	SOIL
9307-068-4	MW6 @ 50'	07/06/93	SOIL
9307-068-5	MW4 @ 7.5'	07/06/93	SOIL
9307-068-6	MW4 @ 17.5'	07/06/93	SOIL

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	6

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.



ATI I.D. # 9307-068

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
POLYNUCLEAR AROMATIC HYDROCARBONS	HPLC/UV/FLUOR	EPA 8310	R
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
LEAD	AA/GF	EPA 7421	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
B = Subcontract

ATI I.D. # 9307-068

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS

Six (6) soil samples were received by Analytical Technologies, Inc. (ATI), on July 8, 1993, for the following analysis: EPA method 8310.

All corresponding quality assurance and quality control results defined as blank spike (BS), matrix spike/matrix spike duplicate (MS/MSD), method blank and surrogate recoveries were within the established control limits.

ATI I.D. # 9307-068

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : N/A
PROJECT # : 15659.001	DATE RECEIVED : N/A
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/13/93
CLIENT I.D. : METHOD BLANK	DATE ANALYZED : 07/16/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS

RESULTS

NAPHTHALENE	<0.083
ACENAPHTHYLENE	<0.17
1-METHYLNAPHTHALENE	<0.17
METHYLNAPHTHALENE	<0.17
ACENAPHTHENE	<0.17
FLUORENE	<0.017
PHENANTHRENE	<0.0083
ANTHRACENE	<0.0083
FLUORANTHENE	<0.017
PYRENE	<0.017
BENZO (A) ANTHRACENE	<0.017
CHRYSENE	<0.017
BENZO (B) FLUORANTHENE	<0.017
BENZO (K) FLUORANTHENE	<0.017
BENZO (A) PYRENE	<0.017
DIBENZO (A, H) ANTHRACENE	<0.034
BENZO (G, H, I) PERYLENE	<0.017
INDENO (1, 2, 3-CD) PYRENE	<0.017

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	81	25 - 134
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ATI I.D. # 9307-068-1

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 07/06/93
PROJECT # : 15659.001	DATE RECEIVED : 07/08/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/13/93
CLIENT I.D. : MW6 @ 17.5'	DATE ANALYZED : 07/16/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
NAPHTHALENE	<0.10
ACENAPHTHYLENE	<0.21
1-METHYLNAPHTHALENE	<0.21
METHYLNAPHTHALENE	<0.21
ACENAPHTHENE	<0.21
FLUORENE	<0.021
PHENANTHRENE	<0.010
ANTHRACENE	<0.010
FLUORANTHENE	<0.021
PYRENE	<0.021
BENZO (A) ANTHRACENE	<0.021
CHRYSENE	<0.021
BENZO (B) FLUORANTHENE	<0.021
BENZO (K) FLUORANTHENE	<0.021
BENZO (A) PYRENE	<0.021
DIBENZO (A, H) ANTHRACENE	<0.042
BENZO (G, H, I) PERYLENE	<0.021
INDENO (1, 2, 3-CD) PYRENE	<0.021

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE 74

25 - 134

ATI I.D. # 9307-068-2

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 07/06/93
PROJECT # : 15659.001	DATE RECEIVED : 07/08/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/13/93
CLIENT I.D. : MW6 @ 22.5'	DATE ANALYZED : 07/16/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS

RESULTS

NAPHTHALENE	0.28
ACENAPHTHYLENE	<0.23
1-METHYLNAPHTHALENE	0.26
2-METHYLNAPHTHALENE	0.59
ACENAPHTHENE	<0.23
FLUORENE	<0.023
PHENANTHRENE	0.044
ANTHRACENE	<0.011
FLUORANTHENE	<0.023
PYRENE	<0.023
BENZO (A) ANTHRACENE	<0.023
CHRYSENE	<0.023
BENZO (B) FLUORANTHENE	<0.023
BENZO (K) FLUORANTHENE	<0.023
BENZO (A) PYRENE	<0.023
DIBENZO (A, H) ANTHRACENE	<0.047
BENZO (G, H, I) PERYLENE	<0.023
INDENO (1, 2, 3-CD) PYRENE	<0.023

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	78	25 - 134
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ATI I.D. # 9307-068-3

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 07/06/93
PROJECT # : 15659.001	DATE RECEIVED : 07/08/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/13/93
CLIENT I.D. : MW6 @ 30'	DATE ANALYZED : 07/16/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
NAPHTHALENE	<0.086
ACENAPHTHYLENE	<0.18
1-METHYLNAPHTHALENE	<0.18
METHYLNAPHTHALENE	<0.18
ACENAPHTHENE	<0.18
FLUORENE	<0.018
PHENANTHRENE	<0.0087
ANTHRACENE	<0.0087
FLUORANTHENE	<0.018
PYRENE	<0.018
BENZO (A) ANTHRACENE	<0.018
CHRYSENE	<0.018
BENZO (B) FLUORANTHENE	<0.018
BENZO (K) FLUORANTHENE	<0.018
BENZO (A) PYRENE	<0.018
DIBENZO (A, H) ANTHRACENE	<0.035
BENZO (G, H, I) PERYLENE	<0.018
INDENO (1, 2, 3-CD) PYRENE	<0.018

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	80	25 - 134
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ATI I.D. # 9307-068-4

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 07/06/93
PROJECT # : 15659.001	DATE RECEIVED : 07/08/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/13/93
CLIENT I.D. : MW6 @ 50'	DATE ANALYZED : 07/16/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
NAPHTHALENE	<0.099
ACENAPHTHYLENE	<0.20
1-METHYLNAPHTHALENE	<0.20
METHYLNAPHTHALENE	<0.20
ACENAPHTHENE	<0.20
FLUORENE	<0.020
PHENANTHRENE	<0.0099
ANTHRACENE	<0.0099
FLUORANTHENE	<0.020
PYRENE	<0.020
BENZO (A) ANTHRACENE	<0.020
CHRYSENE	<0.020
BENZO (B) FLUORANTHENE	<0.020
BENZO (K) FLUORANTHENE	<0.020
BENZO (A) PYRENE	<0.020
DIBENZO (A, H) ANTHRACENE	<0.040
BENZO (G, H, I) PERYLENE	<0.020
INDENO (1, 2, 3-CD) PYRENE	<0.020

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	76	25 - 134
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ATI I.D. # 9307-068-5

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW4 @ 7.5'	DATE ANALYZED	: 07/16/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
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NAPHTHALENE	<0.085
ACENAPHTHYLENE	<0.17
1-METHYLNAPHTHALENE	<0.17
METHYLNAPHTHALENE	<0.17
ACENAPHTHENE	<0.17
FLUORENE	<0.017
PHENANTHRENE	<0.0085
ANTHRACENE	<0.0085
FLUORANTHENE	<0.017
PYRENE	<0.017
BENZO (A) ANTHRACENE	<0.017
CHRYSENE	<0.017
BENZO (B) FLUORANTHENE	<0.017
BENZO (K) FLUORANTHENE	<0.017
BENZO (A) PYRENE	<0.017
DIBENZO (A, H) ANTHRACENE	<0.035
BENZO (G, H, I) PERYLENE	<0.017
INDENO (1, 2, 3-CD) PYRENE	<0.017

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	83	25 - 134
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ATI I.D. # 9307-068-6

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW4 @ 17.5'	DATE ANALYZED	: 07/17/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS

RESULTS

NAPHTHALENE	<0.089
ACENAPHTHYLENE	<0.18
1-METHYLNAPHTHALENE	<0.18
METHYLNAPHTHALENE	<0.18
ACENAPHTHENE	<0.18
FLUORENE	<0.018
PHENANTHRENE	<0.0090
ANTHRACENE	<0.0090
FLUORANTHENE	<0.018
PYRENE	<0.018
BENZO (A) ANTHRACENE	<0.018
CHRYSENE	<0.018
BENZO (B) FLUORANTHENE	<0.018
BENZO (K) FLUORANTHENE	<0.018
BENZO (A) PYRENE	<0.018
DIBENZO (A, H) ANTHRACENE	<0.037
BENZO (G, H, I) PERYLENE	<0.018
INDENO (1, 2, 3-CD) PYRENE	<0.018

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	82	25 - 134
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ATI I.D. # 9307-068

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9307-068-5
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/13/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/16/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	3.77	75	3.61	72	4
PHENANTHRENE	<0.00833	0.333	0.287	86	0.304	91	6
PYRENE	<0.0170	0.333	0.253	76	0.262	79	3
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.321	96	0.321	96	0
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.299	90	0.299	90	0

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	33 - 116	20
PHENANTHRENE	20 - 154	35
PYRENE	20 - 147	34
BENZO (K) FLUORANTHENE	25 - 144	34
DIBENZO (A, H) ANTHRACENE	20 - 128	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	82	82	25 - 134



ATI I.D. # 9307-068

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/13/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/16/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	5.00	3.56	71	N/A	N/A	N/A
PHENANTHRENE	<0.00833	0.333	0.289	87	N/A	N/A	N/A
PYRENE	<0.0170	0.333	0.251	75	N/A	N/A	N/A
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.310	93	N/A	N/A	N/A
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.292	88	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	28 - 111	20
PHENANTHRENE	40 - 130	35
PYRENE	43 - 143	34
BENZO (K) FLUORANTHENE	43 - 138	34
DIBENZO (A, H) ANTHRACENE	37 - 125	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	79	N/A	25 - 134



ATI I.D. # 9307-068

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/09/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/09/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
OTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

110

52 - 116



ATI I.D. # 9307-068-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/09/93
CLIENT I.D.	: MW6 @ 17.5'	DATE ANALYZED	: 07/10/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS	RESULTS
BENZENE	0.64
ETHYLBENZENE	1.2
TOLUENE	0.55
TOTAL XYLENES	4.3

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	95 52 - 116

ATI I.D. # 9307-068-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/09/93
CLIENT I.D.	: MW6 @ 22.5'	DATE ANALYZED	: 07/10/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDSRESULTS

BENZENE	3.5	
ETHYLBENZENE	3.6	
TOLUENE	17	D4
TOTAL XYLENES	21	D4

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	86	52 - 116
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D4 = Value from a ten fold diluted analysis.

ATI I.D. # 9307-068-3

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/09/93
CLIENT I.D.	: MW6 @ 30'	DATE ANALYZED	: 07/10/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDSRESULTS

BENZENE	<0.026
ETHYLBENZENE	<0.026
TOLUENE	<0.026
TOTAL XYLENES	<0.026

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

99

52 - 116



ATI I.D. # 9307-068-4

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/09/93
CLIENT I.D.	: MW6 @ 50'	DATE ANALYZED	: 07/10/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS

RESULTS

BENZENE	0.48
ETHYLBENZENE	0.79
TOLUENE	0.40
TOTAL XYLENES	2.8

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

92

52 - 116



ATI I.D. # 9307-068-5

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/09/93
CLIENT I.D.	: MW4 @ 7.5'	DATE ANALYZED	: 07/10/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

BENZENE	<0.026
ETHYLBENZENE	0.17
TOLUENE	0.11
OTAL XYLENES	1.3

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

108

52 - 116



ATI I.D. # 9307-068-6

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/09/93
CLIENT I.D.	: MW4 @ 17.5'	DATE ANALYZED	: 07/10/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.027
ETHYLBENZENE	<0.027
TOLUENE	<0.027
TOTAL XYLENES	<0.027

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	96 52 - 116



ATI I.D. # 9307-068

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9307-079-5
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/09/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.808	81	0.864	86	7
TOLUENE	<0.0250	1.00	0.913	91	0.991	99	8
TOTAL XYLENES	<0.0250	2.00	1.85	93	1.94	97	5

CONTROL LIMITS	% REC.	RPD
BENZENE	35 - 113	20
TOLUENE	43 - 107	20
TOTAL XYLENES	46 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	91	94	52 - 116

ATI I.D. # 9307-068

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/09/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.940	94	N/A	N/A	N/A
TOLUENE	<0.0250	1.00	1.04	104	N/A	N/A	N/A
TOTAL XYLENES	<0.0250	2.00	2.04	102	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	63 - 115	20
TOLUENE	75 - 110	20
TOTAL XYLENES	79 - 109	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	100	N/A	52 - 116



ATI I.D. # 9307-068

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDRESULT
-----FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<5
C7 - C12
GASOLINEFUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<25
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

p-TERPHENYL

116

52 - 143

ATI I.D. # 9307-068-1

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW6 @ 17.5'
SAMPLE MATRIX : SOIL
METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 07/06/93
DATE RECEIVED : 07/08/93
DATE EXTRACTED : 07/13/93
DATE ANALYZED : 07/14/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

10
C7 - C12
GASOLINE

LUJEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<31
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

1,2,4-TERPHENYL

111

52 - 143



ATI I.D. # 9307-068-2

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW6 @ 22.5'	DATE ANALYZED	: 07/14/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

99
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

38
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

o-TERPHENYL

107

52 - 143

ATI I.D. # 9307-068-3

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW6 @ 30'
SAMPLE MATRIX : SOIL
METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 07/06/93
DATE RECEIVED : 07/08/93
DATE EXTRACTED : 07/13/93
DATE ANALYZED : 07/14/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<5
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<26
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

-TERPHENYL

107

52 - 143



ATI I.D. # 9307-068-4

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW6 @ 50'	DATE ANALYZED	: 07/14/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

12
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<30
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

p-TERPHENYL

103

52 - 143



ATI I.D. # 9307-068-5

FUEL HYDROCARBONS DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 CLIENT I.D. : MW4 @ 7.5'
 SAMPLE MATRIX : SOIL
 METHOD : 8015 (MODIFIED)
 RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 07/06/93
 DATE RECEIVED : 07/08/93
 DATE EXTRACTED : 07/13/93
 DATE ANALYZED : 07/13/93
 UNITS : mg/Kg
 DILUTION FACTOR : 1

COMPOUND

RESULT

FUEL HYDROCARBONS
 HYDROCARBON RANGE
 HYDROCARBON QUANTITATION USING

<5
 C7 - C12
 GASOLINE

FUEL HYDROCARBONS
 HYDROCARBON RANGE
 HYDROCARBON QUANTITATION USING

<26
 C12 - C24
 DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

1,2-DI-TERPHENYL

108

52 - 143



ATI I.D. # 9307-068-6

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/06/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/08/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW4 @ 17.5'	DATE ANALYZED	: 07/14/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDRESULT
-----FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<5
C7 - C12
GASOLINELJEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<27
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

102

52 - 143

ATI I.D. # 9307-068

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. SAMPLE I.D. # : 9307-068-5
 PROJECT # : 15659.001 DATE EXTRACTED : 07/13/93
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP DATE ANALYZED : 07/13/93
 METHOD : 8015 (MODIFIED) UNITS : mg/Kg
 SAMPLE MATRIX : SOIL

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	<25.0	<25.0	NC	500	456	91	476	95	4
	CONTROL LIMITS					% REC.			RPD
DIESEL						56 - 137			20
	SURROGATE RECOVERIES			SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				104		113		52 - 143	

NC = Not Calculable.



ATI I.D. # 9307-068

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. SAMPLE I.D. # : BLANK
 PROJECT # : 15659.001 DATE EXTRACTED : 07/13/93
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP DATE ANALYZED : 07/13/93
 METHOD : 8015 (MODIFIED) UNITS : mg/Kg
 SAMPLE MATRIX : SOIL

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	<25.0	500	477	95	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
DIESEL				67 - 135			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		113		N/A		52 - 143	



ATI I.D. # 9307-068

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

ELEMENT

DATE PREPARED

DATE ANALYZED

LEAD

07/13/93

07/16/93



ATI I.D. # 9307-068

METALS ANALYSIS
DATA SUMMARY

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

MATRIX : SOIL

UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	LEAD
9307-068-1	MW6 @ 17.5'	21
9307-068-2	MW6 @ 22.5'	6.8
9307-068-3	MW6 @ 30'	1.2
9307-068-4	MW6 @ 50'	19
9307-068-5	MW4 @ 7.5'	3.0
9307-068-6	MW4 @ 17.5'	2.1
ETHOD BLANK	-	<0.15

ATI I.D. # 9307-068

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL
UNITS : mg/Kg

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	9307-068-5	3.0	2.5	18	4.38	1.32	104
LEAD	BLANK	<0.15	N/A	N/A	1.31	1.25	105

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

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



ATI I.D. # 9307-068

GENERAL CHEMISTRY ANALYSIS

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

PARAMETER DATE ANALYZED

MOISTURE 07/12/93



ATI I.D. # 9307-068

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

ATI I.D. # CLIENT I.D. MOISTURE

9307-068-1	MW6 @ 17.5'	19
9307-068-2	MW6 @ 22.5'	27
9307-068-3	MW6 @ 30'	3.7
9307-068-4	MW6 @ 50'	16
9307-068-5	MW4 @ 7.5'	2.5
307-068-6	MW4 @ 17.5'	7.2

ATI I.D. # 9307-068

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9307-047-6	22	21	5	N/A	N/A	N/A
MOISTURE	9307-102-2	11	11	0	N/A	N/A	N/A

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

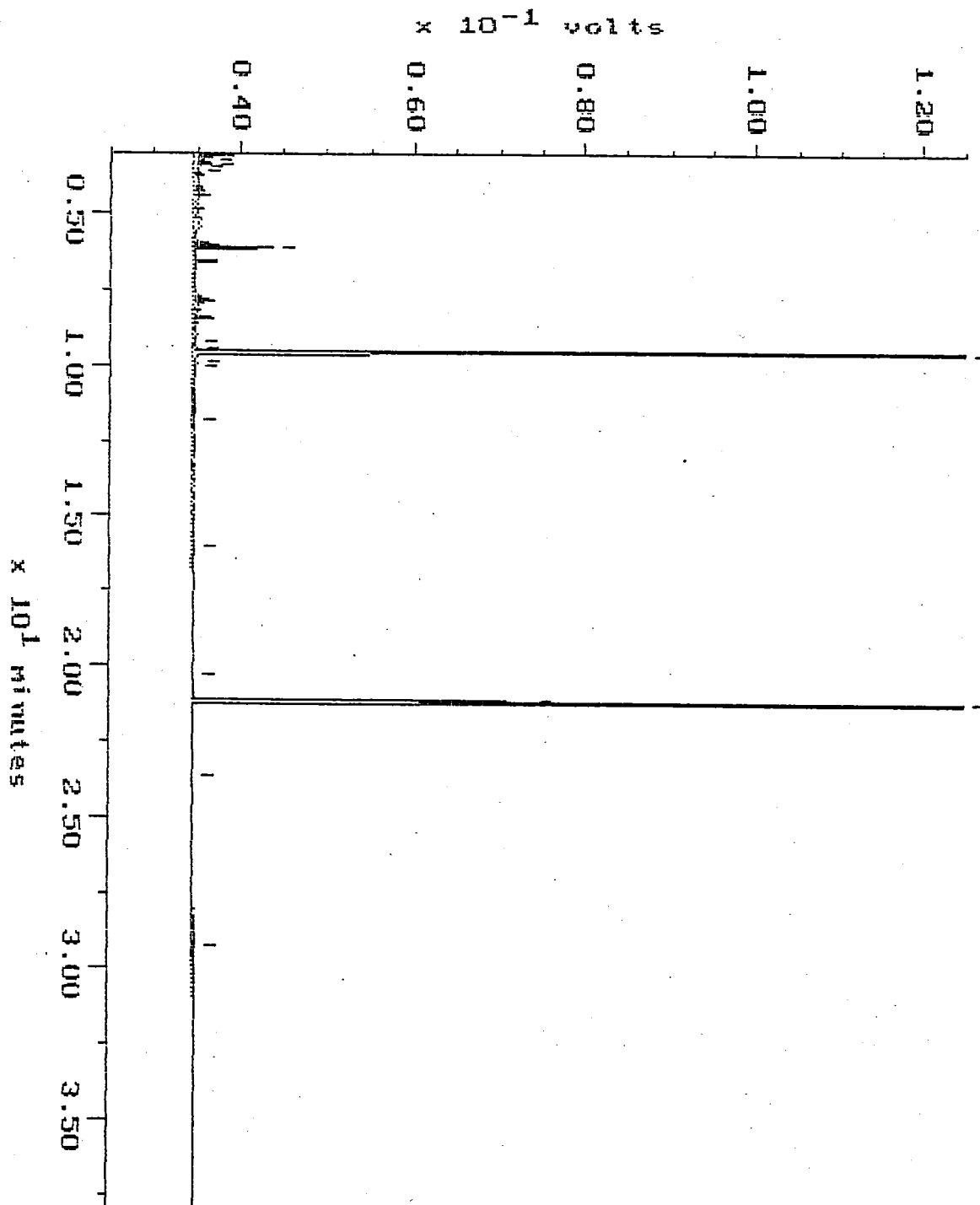
$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

EPA 8015 Modified

Sample: 9307-062-1
Acquired: 14-JUL-93 0:15
Comments: ATI: THE QUALITY TEAM

Channel: ERNIE
Method: F:\BRO2\MAXDATA\ERNIE\FUEL0713

Filename: R7138E19
Operator: ATI



EPA 8015 Modified

Sample: 9307-968-2

Channel: ERNIE

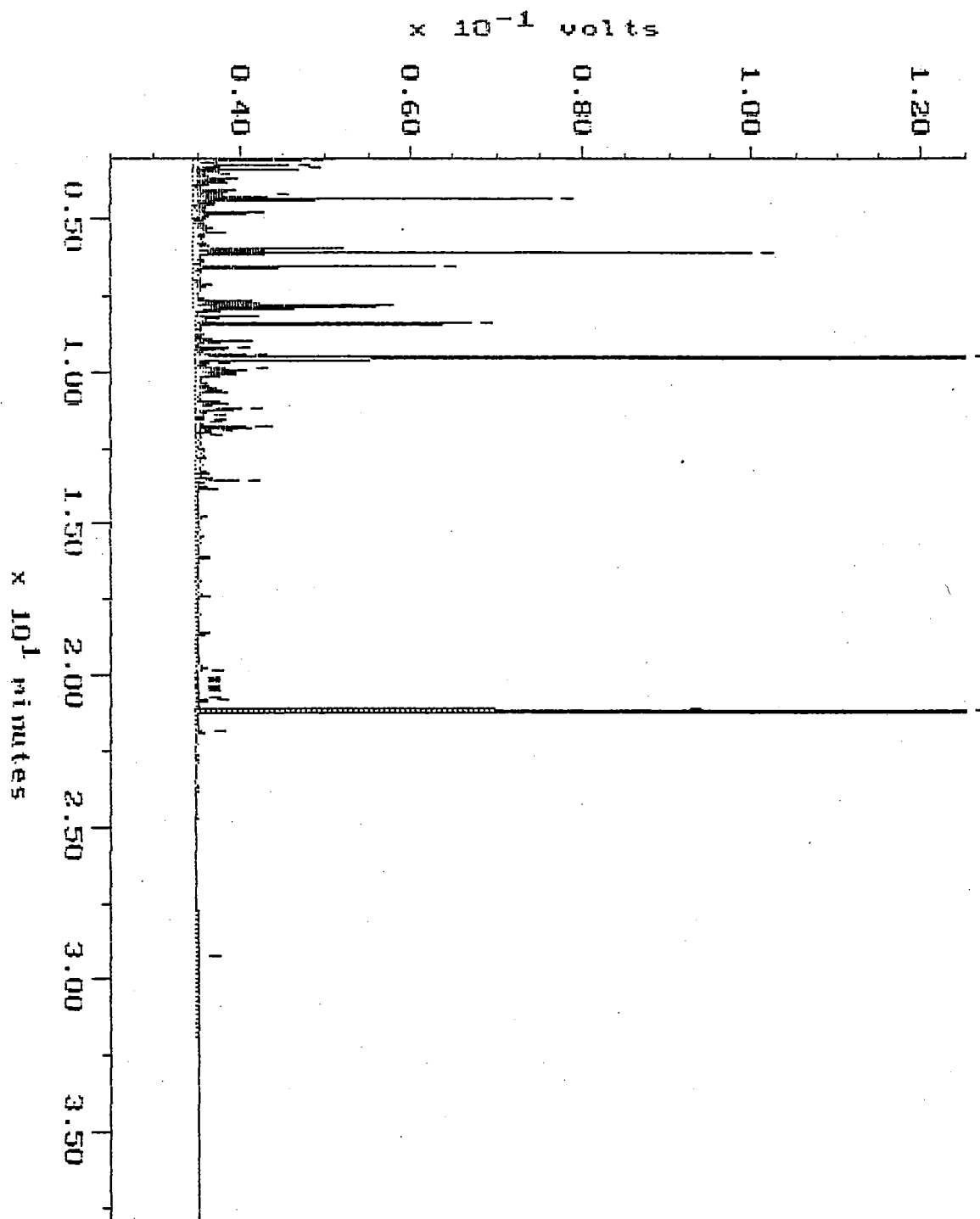
Filename: R7138E20

Acquired: 14-JUL-93 1:00

Method: F:\BRO2\MAXDATA\ERNIE\FUEL0713

Operator: ATI

Comments: ATI: THE QUALITY TEAM



EPA 8015 Modified

Sample: 9307-060-4

Channel: ERNIE

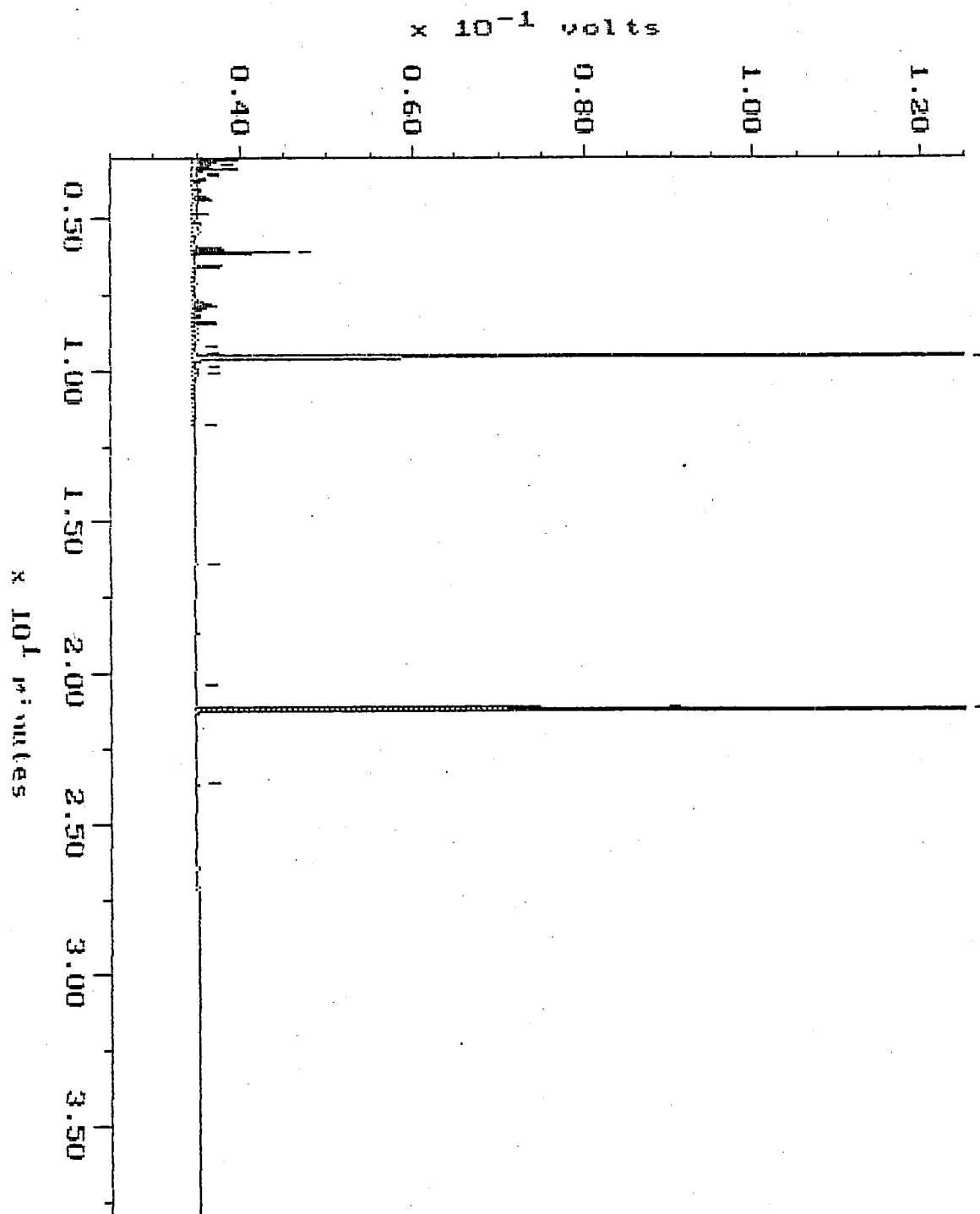
Filename: R7138E22

Acquired: 14-JUL-93 2:31

Method: F:\BRO2\MAXDATA\ERNIE\FUEL0713

Operator: ATI

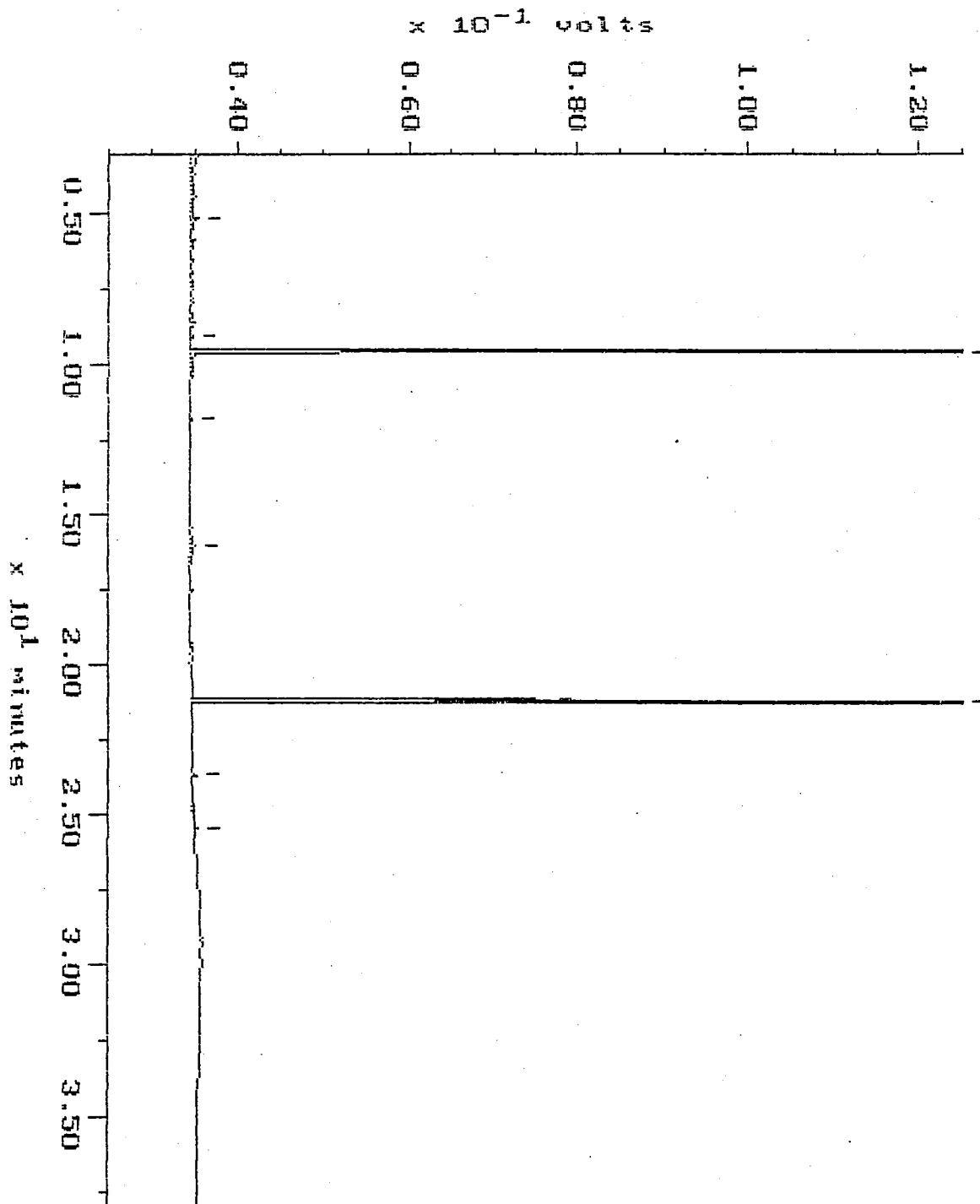
Comments: ATI: THE QUALITY TEAM



Blank

Sample: 8888 7-13 Channel: ERMIE
Acquired: 13-JUL-93 18:52 Method: F:\ER02\MAXDATA\ERMIE\FUEL0713
Comments: ATI: THE QUALITY TEAM

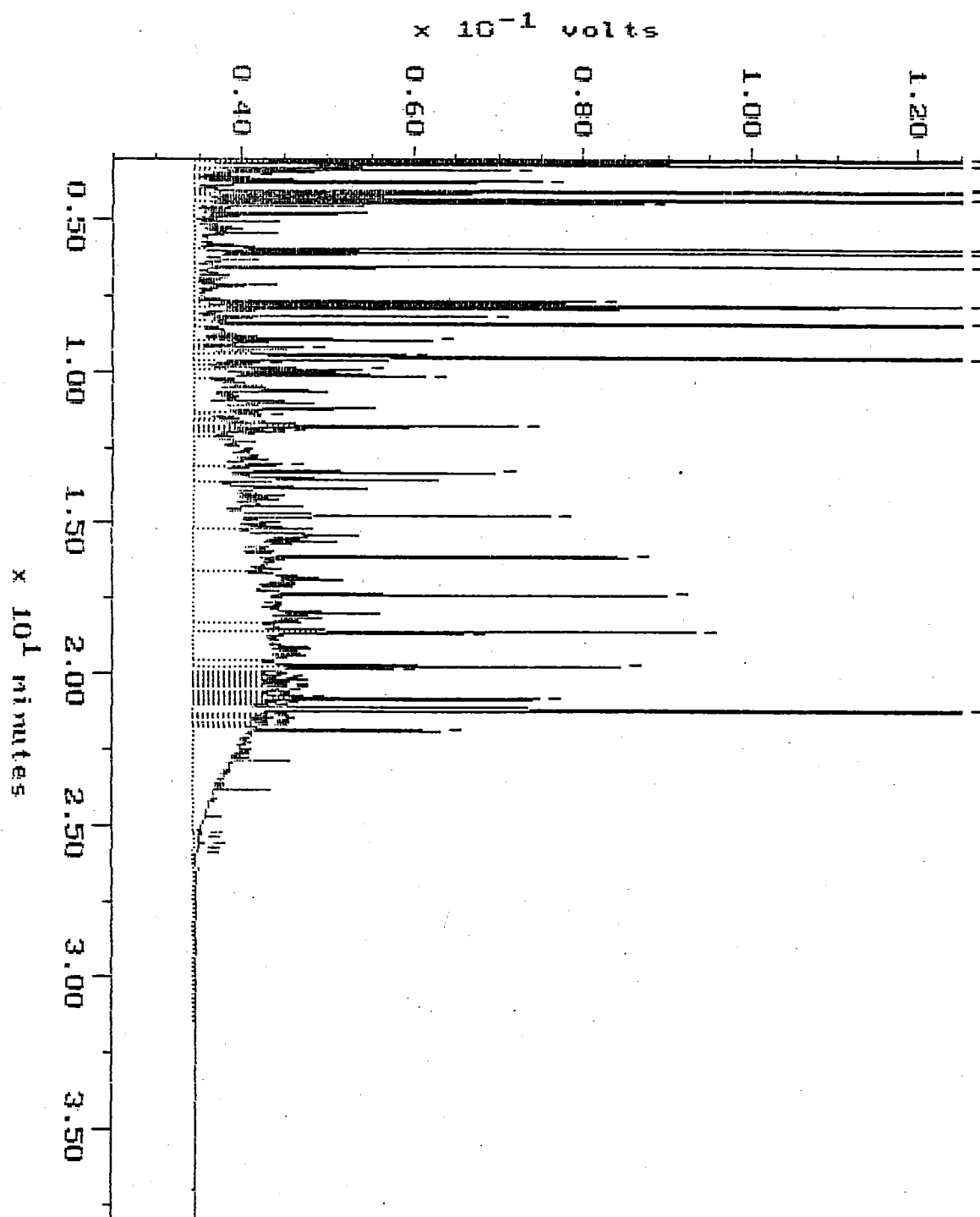
Filename: R7138E12
Operator: ATI



Continuing Calibration

Sample: DG 480 Channel: ERNIE
Acquired: 13-JUL-93 11:01 Method: F:\BR02\MAXDATA\ERNIE\FUEL0713
Comments: ATI: THE QUALITY TEAM

Filename: R7130E02
Operator: ATI

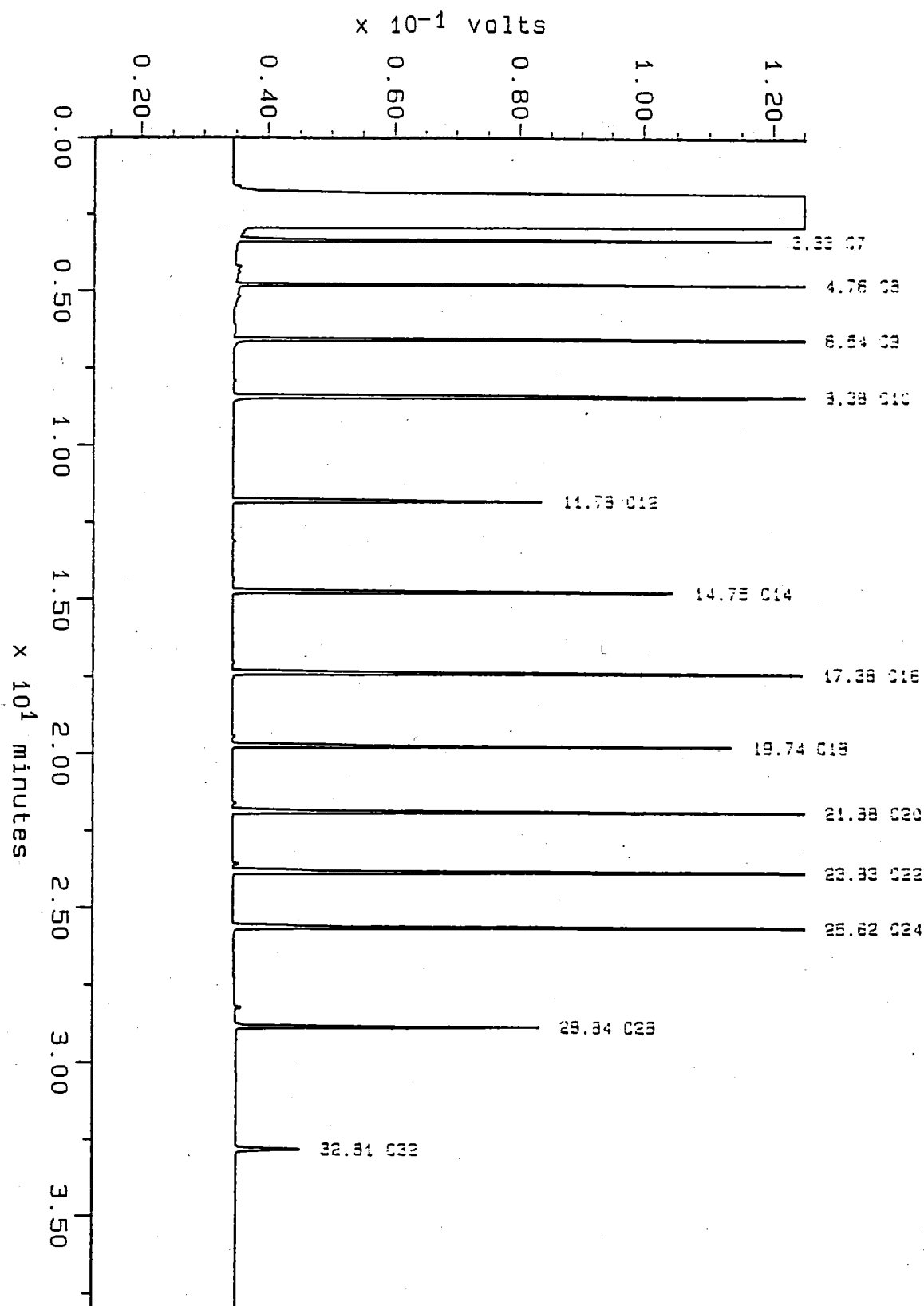


Sample: ALKANE
Acquired: 25-MAY-93 11:20
Inj Vol: 1.00

Channel: ERNIE
Method: F:\BROCK\MAXDATA\ERNIE\FUEL0525

Filename: r5255e02
Operator: ATI

Alkane





CHAIN-OF-~JSTODY

Date 7-7-93 Page 1 of 1

PROJECT INFORMATION				ANALYSIS REQUEST																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Project Manager: <u>Peter Barry</u>				<div style="display: flex; justify-content: space-between;"> <div> LAB INFORMATION Lab Name: <u>ATI</u> Lab Address: <u>560 Naches Blvd.</u> Via: <u>Fastway Express</u> </div> <div> QC INFORMATION (check one) <input type="checkbox"/> SW-846 <input type="checkbox"/> CLP <input type="checkbox"/> Screening <input type="checkbox"/> AGI Std. <input type="checkbox"/> Special Disposal Method: _____ Disposed by: _____ Disposal Date: _____ DISPOSAL INFORMATION <input type="checkbox"/> Lab Disposal (return if not indicated) Turn Around Time: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 72 hr. <input type="checkbox"/> 1 wk. PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA Special Instructions: _____ </div> </div>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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				<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">PETROLEUM HYDROCARBONS</th> <th colspan="4">ORGANIC COMPOUNDS</th> <th colspan="4">PESTS/PCB's</th> <th colspan="4">METALS</th> <th colspan="2">LEACHING TESTS</th> <th colspan="2">OTHER</th> </tr> </thead> <tbody> <tr> <td colspan="2">TPH-ID State:</td> <td colspan="4">8010 Halogenated VOCs</td> <td colspan="4">8080 OC Pest/PCBs</td> <td colspan="4">DWS - Metals</td> <td colspan="2">TCLP - Volatiles (ZHE)</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">TPH-G State:</td> <td colspan="4">8020 Aromatic VOCs</td> <td colspan="4">8080M PCBs only</td> <td colspan="4">Priority Poll. Metals (13)</td> <td colspan="2">TCLP - Semivolatiles</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">TPH-D State:</td> <td colspan="4">8020M - BETX only</td> <td colspan="4">8150 OC Herbicides</td> <td colspan="4">Organic Lead (Ca)</td> <td colspan="2">TCLP - Pesticides</td> <td colspan="2"></td> </tr> <tr> <td colspan="2">TPH Special Instructions</td> <td colspan="4">8240 GCMS Volatiles</td> <td colspan="4">8140 OP Pesticides</td> <td colspan="4">Total Lead (Wa)</td> <td colspan="2">TCLP - Metals</td> <td colspan="2"></td> </tr> <tr> <td colspan="2"></td> <td colspan="4">8270 GCMS Semivol.</td> <td colspan="4">8080 OC PCBs only</td> <td colspan="4">Selected metals: list</td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2"></td> <td colspan="4">8310 HPLC PAHs</td> <td colspan="4">DWS - Herb/pest</td> <td colspan="4"></td> <td colspan="2"></td> <td colspan="2"></td> </tr> <tr> <td colspan="2"></td> <td colspan="4">8400 Phenols</td> <td colspan="4">8150 OC 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WAGI OFFICES: Bellevue: (206) 453-8383
 Portland: (503) 222-2820
 Tacoma: (206) 383-4380
 Pleasanton: (415) 460-5495

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

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, Washington
Amtest - Redmond, Washington
Lab Number: 9307-088
Sample No.: MW1-7/93, MW2-7/93, MW3-7/93, MW5-7/93, MW50-7/93,
Rinsate 2, Trip Blank
Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable for use.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
Pesticides/PCBs ^a	GC/ECD	EPA 8080
PAH ^b	HPLC/UV/FLUOR	EPA 8310
BETX	GC/PID	EPA 8020
TPH ^c	GC/FID	EPA 8015 Modified
Lead	AA/GF	EPA 7421
Nitrate/Nitrite as Nitrogen ^d	Colorimetric	EPA 353.2
Nitrite as Nitrogen ^d	Colorimetric	EPA 354.1

Sample Rinsate 2 was analyzed for EPA 8310 and EPA 8020; sample Trip Blank was analyzed for EPA 8020 only.

- a - Organochlorine pesticides and PCBs; analyzed for sample MW1-7/93 only.
- b - Polycyclic aromatic hydrocarbons.
- c - Fuel hydrocarbons, analyzed for gasoline (C₇ - C₁₂) and diesel (C₁₂ - C₂₄) range TPH.
- d - Analyzed for sample MW1-7/93 only.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
 Project No.: 15,659.001
 Lab Name: Analytical Technologies, Inc. (ATI) - Renton, Washington
 Amtest - Redmond, Washington
 Lab Number: 9307-088
 Sample No.: MW1-7/93, MW2-7/93, MW3-7/93, MW5-7/93, MW50-7/93,
 Rinsate 2, Trip Blank
 Matrix: Water

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
Pesticides/PCBs	07/08/93	07/15/93	07/19/93	7(7)	4(40)
PAH	07/08/93	07/13/93	07/17/93	5(7)	4(40)
BETX	07/08/93	NA	07/13/93 ^e	NA	5(14)
TPH	07/08/93	07/13/93	07/14/93	5	6(14)
Lead	07/08/93	07/13/93	07/13/93	5	5(180)
Nitrate/Nitrite	07/08/93	NA	07/21/93 ^f	NA	13(28)
Nitrite	07/08/93	NA	07/21/93 ^f	NA	13(28)

NA - Not applicable.

Numbers in parentheses indicate recommended holding times in days.

e - Sample MW1-7/93, Rinsate 2, and Trip Blank were analyzed July 12, 1993.

f - The date on which analytical report was issued is used to verify holding time compliance.

All samples were extracted and analyzed within recommended holding times.

FUEL HYDROCARBON CHROMATOGRAMS

Gasoline (C₇ - C₁₂) and diesel range (C₁₂ - C₂₄) TPH were detected in sample MW5-7/93 by EPA 8015M, and the detections are supported by the sample chromatogram for this method.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: Sample MW50-7/93 is a duplicate of MW2-7/93. Both samples were analyzed by EPA Methods 8015 Modified, 8020, 8310, and 7421. No analytes were detected at or above their MRL by EPA 8015 Modified, indicating acceptable precision. Relative percent differences (RPDs) ranged from 18 percent (EPA 7421) to 22 percent (EPA 8310). Acceptable precision is indicated.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, Washington
Amtest - Redmond, Washington
Lab Number: 9307-088
Sample No.: MW1-7/93, MW2-7/93, MW3-7/93, MW5-7/93, MW50-7/93,
Rinsate 2, Trip Blank
Matrix: Water

Rinsate: Sample (Rinsate 2) was analyzed for EPA 8310 and EPA 8020. No analytes were detected at or above their method reporting limits by these methods. No carry-over contamination was identified.

Trip Blank: Sample Trip Blank was analyzed by EPA 8020. Toluene, which is a common laboratory contaminant, was detected at 1.1 µg/L. Since toluene was not detected in any field samples except sample MW5-7/93 (4500 µg/L), it is unlikely that cross-contamination has occurred. Data are acceptable without qualification.

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above their MRLs in method blanks for the following methods:

EPA 8080
EPA 8310
EPA 8020
EPA 8015M
EPA 7421
EPA 353.2
EPA 354.1

Matrix Spikes: Matrix spike percent recoveries are within acceptance control limit criteria for the following methods:

EPA 7421
EPA 353.2
EPA 354.1

Matrix spike and matrix spike duplicate percent recoveries and relative percent differences (RPDs) are within ATI's control limit criteria for the following methods:

EPA 8020
EPA 8015M

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, Washington
Amtest - Redmond, Washington
Lab Number: 9307-088
Sample No.: MW1-7/93, MW2-7/93, MW3-7/93, MW5-7/93, MW50-7/93,
Rinsate 2, Trip Blank
Matrix: Water

Duplicates: Duplicate sample RPDs are within ATI's control limit criteria for the following methods:

EPA 8015M
EPA 353.2
EPA 354.1

Blank Spikes: Blank spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8020
EPA 8015M
EPA 7421

Blank spike and blank spike duplicate percent recoveries and RPDs are within ATI's control limit criteria for EPA 8080.

EPA 8310: Blank spike and blank spike duplicate RPD for acenaphthylene of 38 percent exceeds ATI's control limit criteria of 32 percent. Sample results are considered not affected since other quality control parameters for this method are all within acceptance criteria.

Standard Reference: Standard Reference Material percent recoveries are within Amtest control limit criteria for EPA 353.2 and EPA 354.1.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros./Bingo Fuel Stop
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, Washington
Amtest - Redmond, Washington
Lab Number: 9307-088
Sample No.: MW1-7/93, MW2-7/93, MW3-7/93, MW5-7/93, MW50-7/93,
Rinsate 2, Trip Blank
Matrix: Water

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

EPA 8310
EPA 8020
EPA 8015M

EPA 8080: Surrogate spike recoveries for decachlorobiphenyl and dibutylchloroendate of 20 and 42 percent were slightly below ATI's lower control limit criteria of 22 and 43 percent for sample MW1-7/93 analysis. Since the exceedances are minor and other quality control parameters for this method are all within acceptance criteria, sample results are acceptable.

SIGNATURES

Prepared by Kab for Wington Rin Date 8/23/93
Checked by Katherine Bourbonais Date 8/23/93



Analytical**Technologies, Inc.**

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

Karen L. Mixon, Laboratory Manager

ATI I.D. # 9307-088

RECEIVED

AUG 12 1993

July 30, 1993

APPLIED GEOTECHNOLOGY INC.

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

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On July 9, 1993, Analytical Technologies, Inc. (ATI), received seven 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.

The analysis for nitrate/nitrite as nitrogen and nitrite as nitrogen are performed by a subcontractor. Their report is included as an appendix.

Sincerely,



Donna M. McKinney
Senior Project Manager

DMM/hal/ff

Enclosure



ATI I.D. # 9307-088

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9307-088-1	MW1-7/93	07/08/93	WATER
9307-088-2	MW2-7/93	07/08/93	WATER
9307-088-3	MW3-7/93	07/08/93	WATER
9307-088-4	MW5-7/93	07/08/93	WATER
9307-088-5	MW50-7/93	07/08/93	WATER
9307-088-6	RINSATE 2	07/08/93	WATER
9307-088-7	TRIP BLANK	N/A	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	7

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.



ATI I.D. # 9307-088

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
ORGANOCHLORINE PESTICIDES & PCBs	GC/ECD	EPA 8080	R
POLYNUCLEAR AROMATIC HYDROCARBONS	HPLC/UV/FLUOR	EPA 8310	R
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
LEAD	AA/GF	EPA 7421	R
NITRATE/NITRITE AS NITROGEN	COLORIMETRIC	EPA 353.2	SUB
NITRITE AS NITROGEN	COLORIMETRIC	EPA 354.1	SUB

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



ATI I.D. # 9307-088

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: ORGANOCHLORINE PESTICIDES AND PCB ANALYSIS

One (1) water sample was received by Analytical Technologoes, Inc. (ATI), on July 9, 1993, for the analysis of chlorinated pesticides.

The surrogate recoveries for sample 9307-088-1 (MW1-7/93) were above the established control limits for the chlorinated pesticide analysis. These results have been flagged with the letter "H", and footnoted in the analytical report.

All corresponding quality assurance and quality control results defined as matrix spike/matrix spike duplicate (MS/MSD), blank spike (BS) and method blank recoveries were within the established control limits.



ATI I.D. # 9307-088

ORGANOCHLORINE PESTICIDES AND PCB ANALYSIS DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/15/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/19/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8080	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

ALDRIN	<0.050
ALPHA-BHC	<0.050
BETA-BHC	<0.050
GAMMA-BHC (LINDANE)	<0.050
DELTA-BHC	<0.050
CHLORDANE (TOTAL)	<0.50
P,P'-DDD	<0.10
P,P'-DDE	<0.10
P,P'-DDT	<0.10
DIELDRIN	<0.10
ENDOSULFAN I	<0.050
ENDOSULFAN II	<0.10
ENDOSULFAN SULFATE	<0.10
ENDRIN	<0.10
ENDRIN ALDEHYDE	<0.10
ENDRIN KETONE	<0.10
HEPTACHLOR	<0.050
HEPTACHLOR EPOXIDE	<0.050
METHOXYCHLOR	<0.50
TOXAPHENE	<1.0
CB 1016	<1.0
PCB 1221	<1.0
PCB 1232	<1.0
PCB 1242	<1.0
PCB 1248	<1.0
PCB 1254	<1.0
PCB 1260	<1.0

SURROGATE PERCENT RECOVERY

LIMITS

DECACHLOROBIPHENYL	57	22 - 131
DIBUTYLCHLORENDATE	102	43 - 154



ATI I.D. # 9307-088-1

ORGANOCHLORINE PESTICIDES AND PCB ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/15/93
CLIENT I.D.	: MW1-7/93	DATE ANALYZED	: 07/19/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8080	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

ALDRIN	<0.047
ALPHA-BHC	<0.047
BETA-BHC	<0.047
GAMMA-BHC (LINDANE)	<0.047
DELTA-BHC	<0.047
CHLORDANE (TOTAL)	<0.47
P, P' -DDD	<0.094
P, P' -DDE	<0.094
P, P' -DDT	<0.094
DIELDRIN	<0.094
ENDOSULFAN I	<0.047
ENDOSULFAN II	<0.094
ENDOSULFAN SULFATE	<0.094
ENDRIN	<0.094
ENDRIN ALDEHYDE	<0.094
ENDRIN KETONE	<0.094
HEPTACHLOR	<0.047
HEPTACHLOR EPOXIDE	<0.047
METHOXYCHLOR	<0.47
TOXAPHENE	<0.94
CB 1016	<0.94
PCB 1221	<0.94
PCB 1232	<0.94
PCB 1242	<0.94
PCB 1248	<0.94
PCB 1254	<0.94
PCB 1260	<0.94

SURROGATE PERCENT RECOVERY

LIMITS

DECACHLOROBIPHENYL	20 H	22 - 131
DIBUTYLCHLORENDATE	42 H	43 - 154

H = Out of limits.

ATI I.D. # 9307-088

ORGANOCHLORINE PESTICIDES AND PCB ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 07/15/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/19/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8080		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ALDRIN	<0.0500	0.250	0.201	80	0.203	81	1
GAMMA-BHC (LINDANE)	<0.0500	0.250	0.221	88	0.215	86	3
P'-DDT	<0.100	0.500	0.483	97	0.479	96	1
DIELDRIN	<0.100	0.500	0.509	102	0.508	102	0
ENDRIN	<0.100	0.500	0.520	104	0.510	102	2
HEPTACHLOR	<0.0500	0.250	0.232	93	0.227	91	2

CONTROL LIMITS	% REC.	RPD
ALDRIN	40 - 116	35
GAMMA-BHC (LINDANE)	38 - 122	25
P'-DDT	52 - 150	35
DIELDRIN	49 - 152	34
ENDRIN	44 - 166	32
HEPTACHLOR	54 - 130	35

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
DECACHLOROBIPHENYL	52	61	22 - 131
BUTYLCHLORENDATE	102	102	43 - 154



ATI I.D. # 9307-088

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS

Six (6) water samples were received by Analytical Technologies, Inc. (ATI), on July 9, 1993, for the following analysis: EPA method 8310.

The relative percent difference (RPD) for acenaphthylene in the blank spike/blank spike duplicate (BS/BSD) was outside ATI limits and was flagged with an "H"; out of limits.

All other corresponding quality assurance and quality control results defined as blank spike/blank spike duplicate (BS/BSD), method blank, and surrogate recoveries were within the established control limits.



ATI I.D. # 9307-088

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/17/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.50
ACENAPHTHYLENE	<1.0
1-METHYLNAPHTHALENE	<0.50
2-METHYLNAPHTHALENE	<0.50
ACENAPHTHENE	<0.50
FLUORENE	<0.10
PHENANTHRENE	<0.050
ANTHRACENE	<0.050
FLUORANTHENE	<0.10
PYRENE	<0.10
BENZO (A) ANTHRACENE	<0.10
CHRYSENE	<0.10
BENZO (B) FLUORANTHENE	<0.10
BENZO (K) FLUORANTHENE	<0.10
BENZO (A) PYRENE	<0.10
DIBENZO (A, H) ANTHRACENE	<0.20
BENZO (G, H, I) PERYLENE	<0.10
INDENO (1, 2, 3-CD) PYRENE	<0.10

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	69%	33 - 123
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ATI I.D. # 9307-088-1

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW1-7/93	DATE ANALYZED	: 07/17/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	<0.47
2-METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	70	33 - 123
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ATI I.D. # 9307-088-2

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW2-7/93	DATE ANALYZED	: 07/17/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	0.58
2-METHYLNAPHTHALENE	0.96
ACENAPHTHENE	<0.47
FLUORENE	0.29
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	50	33 - 123
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ATI I.D. # 9307-088-3

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 CLIENT I.D. : MW3-7/93
 SAMPLE MATRIX : WATER
 EPA METHOD : 8310

DATE SAMPLED : 07/08/93
 DATE RECEIVED : 07/09/93
 DATE EXTRACTED : 07/13/93
 DATE ANALYZED : 07/17/93
 UNITS : ug/L
 DILUTION FACTOR : 1

 COMPOUNDS

RESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.95
1-METHYLNAPHTHALENE	1.1
METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	0.35
PHENANTHRENE	0.13
ANTHRACENE	<0.047
FLUORANTHENE	<0.095
PYRENE	<0.095
BENZO (A) ANTHRACENE	<0.095
CHRYSENE	<0.095
BENZO (B) FLUORANTHENE	<0.095
BENZO (K) FLUORANTHENE	<0.095
BENZO (A) PYRENE	<0.095
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.095
INDENO (1, 2, 3-CD) PYRENE	<0.095

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE 73

33 - 123



ATI I.D. # 9307-088-4

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW5-7/93	DATE ANALYZED	: 07/17/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	190	D4
ACENAPHTHYLENE	<0.95	
1-METHYLNAPHTHALENE	50	
2-METHYLNAPHTHALENE	97	D4
ACENAPHTHENE	<0.48	
FLUORENE	0.59	
PHENANTHRENE	0.45	
ANTHRACENE	0.075	
FLUORANTHENE	<0.095	
PYRENE	<0.095	
BENZO (A) ANTHRACENE	<0.095	
CHRYSENE	<0.095	
BENZO (B) FLUORANTHENE	<0.095	
BENZO (K) FLUORANTHENE	<0.095	
BENZO (A) PYRENE	<0.095	
DIBENZO (A, H) ANTHRACENE	<0.19	
BENZO (G, H, I) PERYLENE	<0.095	
INDENO (1, 2, 3-CD) PYRENE	<0.095	

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	76	33 - 123
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D4 = Value from a ten fold diluted analysis.



ATI I.D. # 9307-088-5

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 07/08/93
PROJECT # : 15659.001	DATE RECEIVED : 07/09/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 07/13/93
CLIENT I.D. : MW50-7/93	DATE ANALYZED : 07/17/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	DILUTION FACTOR : 1

COMPOUNDSRESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	0.71
2-METHYLNAPHTHALENE	1.2
ACENAPHTHENE	<0.47
FLUORENE	0.36
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
BENZO (B) ANTHRACENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A,H) ANTHRACENE	<0.19
BENZO (G,H,I) PERYLENE	<0.094
INDENO (1,2,3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	40	33 - 123
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ATI I.D. # 9307-088-6

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: RINSATE 2	DATE ANALYZED	: 07/17/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
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NAPHTHALENE	<0.48
ACENAPHTHYLENE	<0.95
1-METHYLNAPHTHALENE	<0.48
2-METHYLNAPHTHALENE	<0.48
ACENAPHTHENE	<0.48
FLUORENE	<0.095
PHENANTHRENE	<0.048
ANTHRACENE	<0.048
FLUORANTHENE	<0.095
PYRENE	<0.095
BENZO (A) ANTHRACENE	<0.095
BENZO (A) PYRENE	<0.095
BENZO (B) FLUORANTHENE	<0.095
BENZO (K) FLUORANTHENE	<0.095
BENZO (A) PYRENE	<0.095
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.095
INDENO (1, 2, 3-CD) PYRENE	<0.095

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	58	33 - 123
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ATI I.D. # 9307-088

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. SAMPLE I.D. # : BLANK
PROJECT # : 15659.001 DATE EXTRACTED : 07/13/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP DATE ANALYZED : 07/17/93
SAMPLE MATRIX : WATER UNITS : ug/L
EPA METHOD : 8310

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<1.00	30.0	21.9	73	14.9	50	38H
PHENANTHRENE	<0.0500	2.00	1.72	86	1.56	78	10
PYRENE	<0.100	2.00	1.48	74	1.41	71	5
BENZO (K) FLUORANTHENE	<0.100	2.00	1.91	96	1.82	91	5
DIBENZO (A, H) ANTHRACENE	<0.200	2.00	1.74	87	1.69	85	3

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	35 - 104	32
PHENANTHRENE	47 - 147	30
PYRENE	31 - 155	30
BENZO (K) FLUORANTHENE	39 - 145	29
DIBENZO (A, H) ANTHRACENE	34 - 135	26

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	78	63	33 - 123

H = Out of limits.



ATI I.D. # 9307-088

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

104

76 - 120



Analytical Technologies, Inc.

ATI I.D. # 9307-088

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	100	76 - 120
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ATI I.D. # 9307-088-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW1-7/93	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	106	76 - 120
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Analytical Technologies, Inc.

ATI I.D. # 9307-088-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW2-7/93	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	0.7
ETHYLBENZENE	<0.5
TOLUENE	<0.5
OTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	102	76 - 120
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ATI I.D. # 9307-088-3

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW3-7/93	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	1.4
ETHYLBENZENE	0.9
TOLUENE	<0.5
OTAL XYLENES	5.1

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	105	76 - 120
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ATI I.D. # 9307-088-4

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW5-7/93	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 100

COMPOUNDSRESULTS

BENZENE	1300
ETHYLBENZENE	840
TOLUENE	4500
TOTAL XYLENES	7000

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	104	76 - 120
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ATI I.D. # 9307-088-5

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW50-7/93	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	0.6
ETHYLBENZENE	<0.5
TOLUENE	<0.5
BTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

105

76 - 120

Analytical**Technologies**, Inc.

ATI I.D. # 9307-088-6

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: RINSATE 2	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
OTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BRCMOFLUOROBENZENE

104

76 - 120



ATI I.D. # 9307-088-7

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	1.1
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

102

76 - 120



Analytical Technologies, Inc.

ATI I.D. # 9307-088

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9307-082-1
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	20.0	19.7	99	20.1	101	2
TOLUENE	<0.500	20.0	20.4	102	21.1	106	3
TOTAL XYLENES	<0.500	40.0	41.2	103	42.5	106	3

CONTROL LIMITS	% REC.	RPD
BENZENE	77 - 112	20
TOLUENE	72 - 113	20
TOTAL XYLENES	80 - 110	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	105	104	76 - 120



ATI I.D. # 9307-088

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/12/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	20.0	20.1	101	N/A	N/A	N/A
TOLUENE	<0.500	20.0	21.1	106	N/A	N/A	N/A
TOTAL XYLENES	<0.500	40.0	41.6	104	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	80 - 111	20
TOLUENE	78 - 111	20
TOTAL XYLENES	80 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	104	N/A	76 - 120



Analytical Technologies, Inc.

ATI I.D. # 9307-088

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 07/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	20.0	20.9	105	N/A	N/A	N/A
TOLUENE	<0.500	20.0	21.3	107	N/A	N/A	N/A
TOTAL XYLENES	<0.500	40.0	41.7	104	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	80 - 111	20
TOLUENE	78 - 111	20
TOTAL XYLENES	80 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	100	N/A	76 - 120



ATI I.D. # 9307-088

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : METHOD BLANK
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : N/A
DATE RECEIVED : N/A
DATE EXTRACTED : 07/13/93
DATE ANALYZED : 07/14/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

...JEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

118

68 - 144



ATI I.D. # 9307-088-1

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW1-7/93
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : 07/08/93
DATE RECEIVED : 07/09/93
DATE EXTRACTED : 07/13/93
DATE ANALYZED : 07/14/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDS
-----RESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

ULFUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

1,2,4-TERPHENYL

113

68 - 144



ATI I.D. # 9307-088-2

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW2-7/93	DATE ANALYZED	: 07/14/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

o-TERPHENYL

110

68 - 144



ATI I.D. # 9307-088-3

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW3-7/93	DATE ANALYZED	: 07/14/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS
-----FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<1
C7 - C12
GASOLINEFUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

114

68 - 144

ATI I.D. # 9307-088-4

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW5-7/93	DATE ANALYZED	: 07/14/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS	34
HYDROCARBON RANGE	C7 - C12
HYDROCARBON QUANTITATION USING	GASOLINE

FUEL HYDROCARBONS	2
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

2-TERPHENYL	115	68 - 144
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Analytical Technologies, Inc.

ATI I.D. # 9307-088-5

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 07/08/93
PROJECT #	: 15659.001	DATE RECEIVED	: 07/09/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 07/13/93
CLIENT I.D.	: MW50-7/93	DATE ANALYZED	: 07/14/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

o-TERPHENYL

119

68 - 144



ATI I.D. # 9307-088

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. SAMPLE I.D. # : 9307-088-4
PROJECT # : 15659.001 DATE EXTRACTED : 07/13/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP DATE ANALYZED : 07/14/93
SAMPLE MATRIX : WATER UNITS : mg/L
EPA METHOD : 8015 (MODIFIED)

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
GASOLINE	33.7	34.5	2	50.0	73.2	79	72.8	78	1
CONTROL LIMITS						% REC.			RPD
GASOLINE						64 - 118			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				114		116		68 - 144	



ATI I.D. # 9307-088

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 SAMPLE MATRIX : WATER
 EPA METHOD : 8015 (MODIFIED)

SAMPLE I.D. # : BLANK
 DATE EXTRACTED : 07/13/93
 DATE ANALYZED : 07/14/93
 UNITS : mg/L

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
GASOLINE	<1.00	50.0	39.8	80	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
GASOLINE				52 - 124			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		117		N/A		68 - 144	

ATI I.D. # 9307-088

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

ELEMENT	DATE PREPARED	DATE ANALYZED
LEAD	07/13/93	07/13/93

ATTI I.D. # 9307-088

METALS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

UNITS : mg/L

ATTI I.D. #	CLIENT I.D.	LEAD
9307-088-1	MW1-7/93	0.013
9307-088-2	MW2-7/93	0.0049
9307-088-3	MW3-7/93	0.0036
9307-088-4	MW5-7/93	<0.0030
9307-088-5	MW50-7/93	0.0041
METHOD BLANK	-	<0.0030



ATI I.D. # 9307-088

METALS ANALYSIS
QUALITY CONTROL DATACLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

UNITS : mg/L

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	9306-041-5T	0.041	N/A	N/A	0.0712	0.0250	121
LEAD	BLANK	<0.0030	N/A	N/A	0.0264	0.0250	106

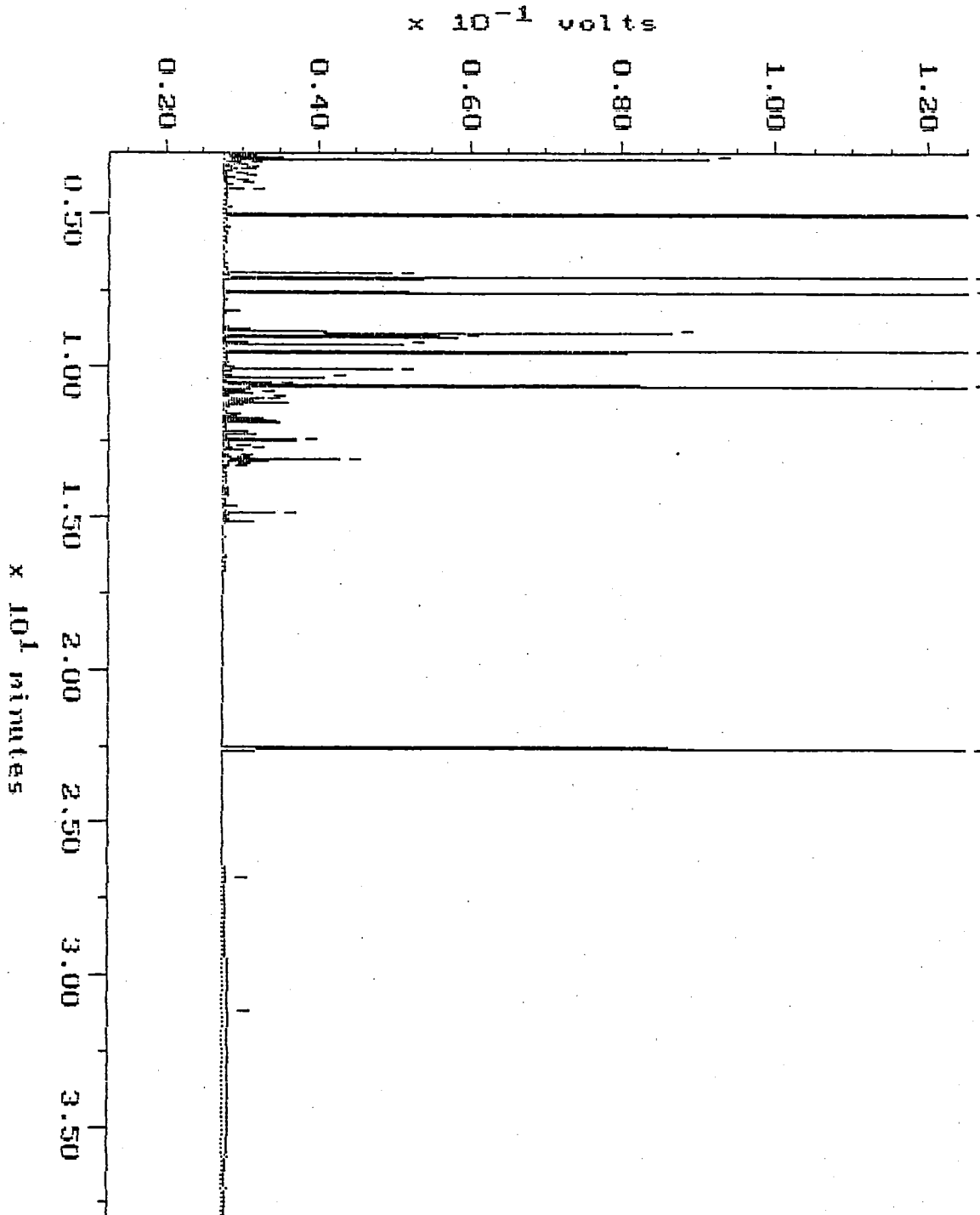
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

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

EPA 8015 Modified

Sample: 9307-988-4 Channel: BERT
Acquired: 14-JUL-93 12:19 Method: F:\BRO2\MAXDATA\BERT\FUEL0714
Comments: ATI: THE QUALITY TEAM

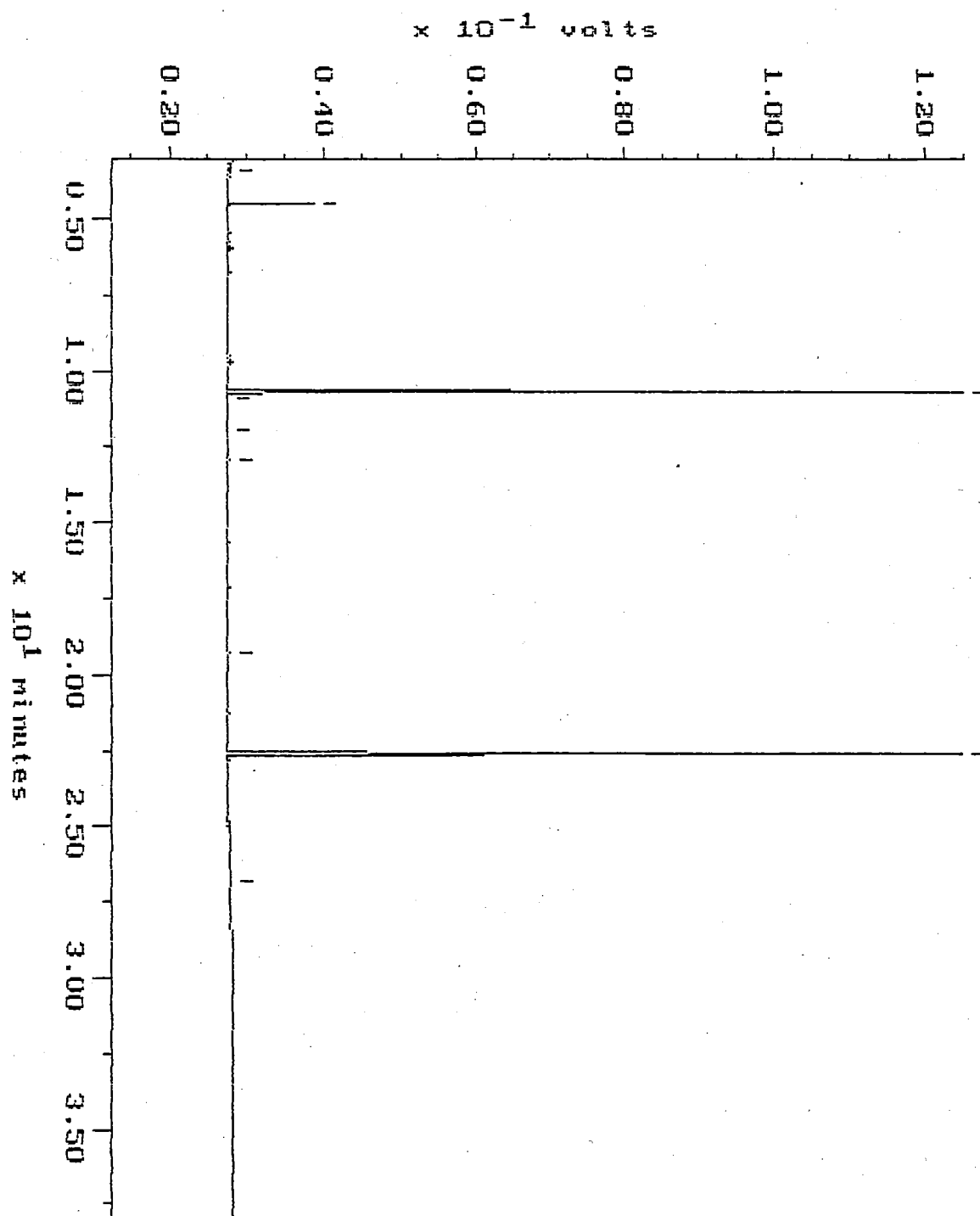
Filename: R7148805
Operator: ATI



Blank

Sample: WRB 7-13 Channel: BERT
Acquired: 14-JUL-93 10:47 Method: F:\BR02\MAXDATA\BERT\FUEL0714
Comments: ATI: THE QUALITY TEAM

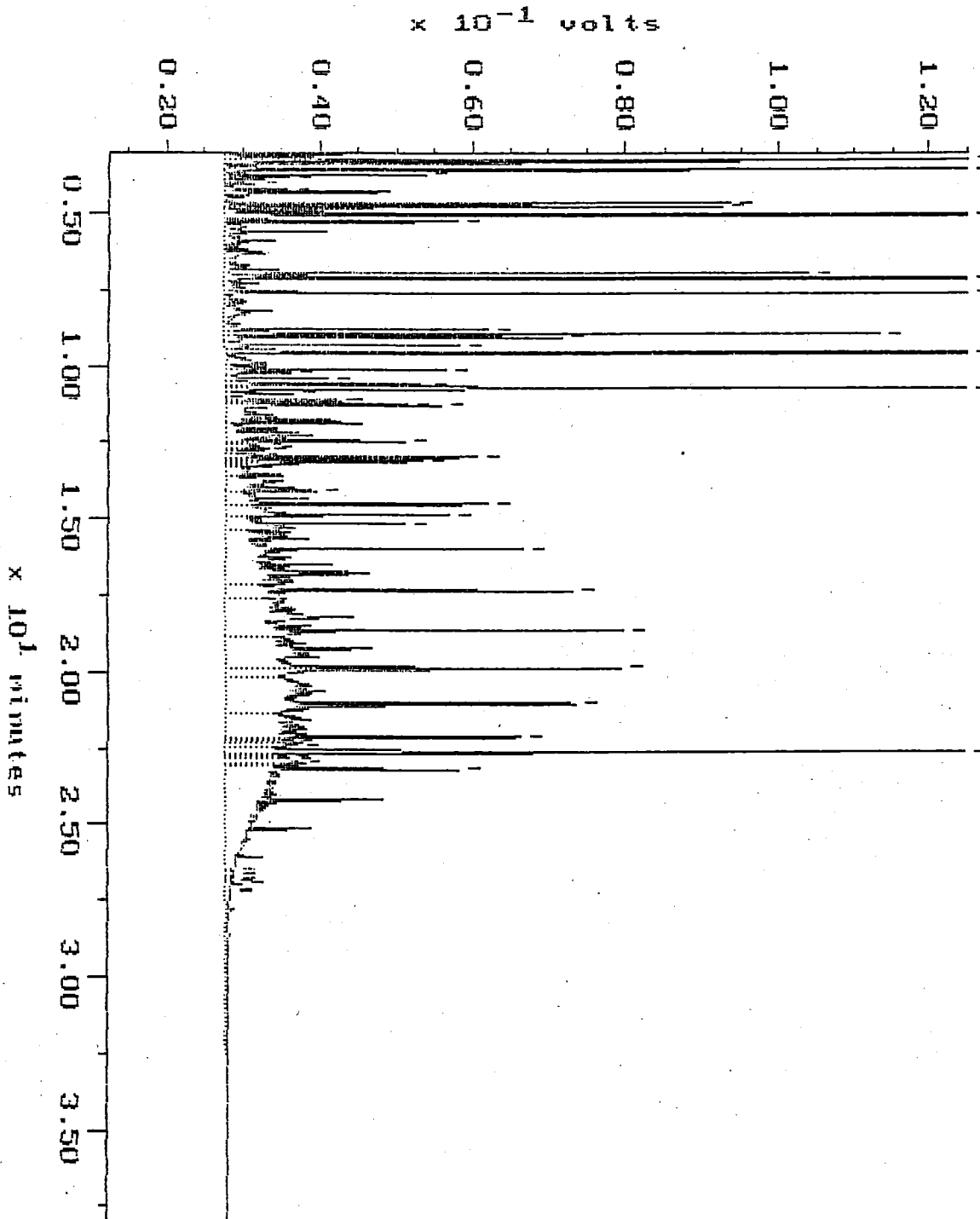
Filename: R7148803
Operator: ATI



Continuing Calibration

Sample: DG 400 Channel: BERT
Acquired: 14-JUL-93 9:10 Method: F:\BRO2\MAXDATA\BERT\FUEL0714
Comments: ATI: THE QUALITY TEAM

Filename: R7148802
Operator: ATI

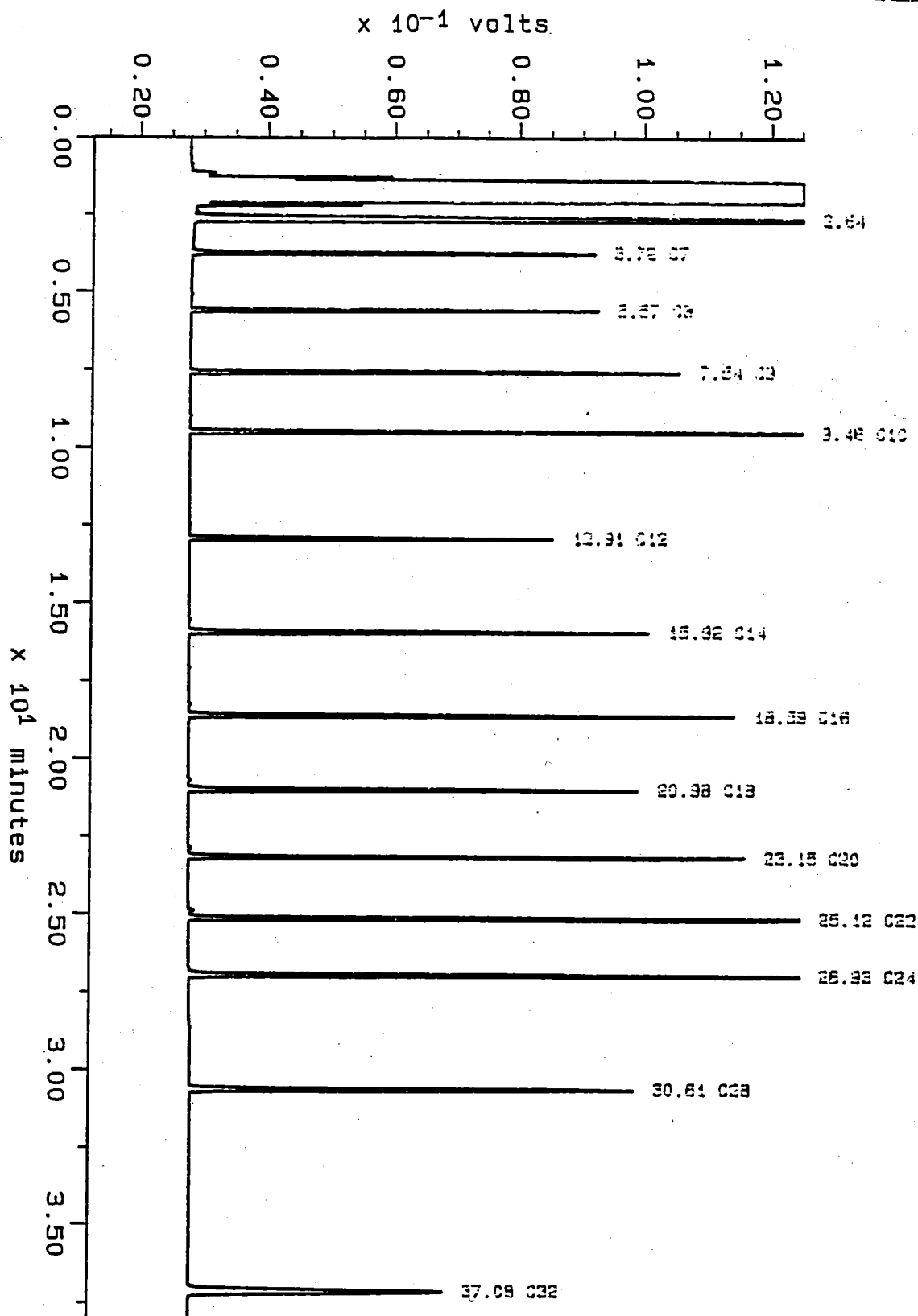


Sample: ALKANE
Acquired: 24-MAR-92 22:19
Inj Vol: 1.00

Channel: BERT
Method: F:\MSDCHEM\DATA\BERT\FUEL0334

Filename: R3248E03
Operator: ATI

Alkane





CHAIN-OF-~JSTODY

Date 7-9-93 Page 1 of 1

[illegible]

***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

APPENDIX



ANALYSIS REPORT

AmTest Inc.

Professional
Analytical
Services

14603 N.E. 87th St.
Redmond, WA
98052

Fax: 206 883 3495

Tel: 206 885 1664

Analytical Technologies, Inc.
560 Naches Avenue SW
Suite 101
Renton, WA 98055
Attention: Donna McKinney

Date Received: 7/13/93
Date Reported: 7/21/93

Project #: 9307-088
Date Sampled: 7/ 8/93

PARAMETER

UNITS

RESULT

93-A010978

Client ID: 9307-088-1

Nitrate + Nitrite

mg/l

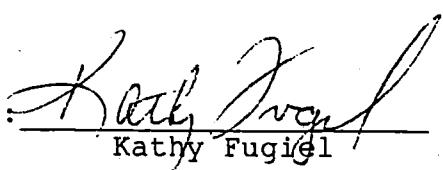
6.4

Nitrite Nitrogen

mg/l

0.15

Reported by:


Kathy Fugiel



AmTest Inc.

Professional
Analytical
Services

14603 N.E. 87th St.
Redmond, WA
98052

Fax: 206 883 3495

Tel: 206 885 1664

METHODOLOGY REPORT

ANALYTE	METHOD	METHOD REFERENCE	DETECTION LIMIT	DATE ANALYZED
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AM TEST IDENTIFICATION NUMBER 93-A010978
CLIENT ID 9307-088-1

Nitrate + Nitrite	353.2	EPA	0.010	7/16/93
Nitrite Nitrogen	354.1	EPA	0.001	7/16/93

AMTEST

ANALYSIS REPORT

Analytical Technologies, Inc.
Donna McKinney

Date Received: 07/13/93
Date Reported: 07/21/93
Project No.: 9307-088

QUALITY CONTROL - METHOD BLANK

AM TEST Sample Number
Client Identification

BLANK

ANALYTES	RESULTS (mg/l)
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Nitrate + Nitrite Nitrogen	ND
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Nitrite Nitrogen	ND
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QUALITY CONTROL - STANDARD REFERENCE MATERIAL

ANALYTES/SRM NOS.	TRUE VALUE (mg/l)	DETERMINATION (mg/l)	RECOVERY (%)
Nitrate + Nitrite Nitrogen 8035	8.69	8.83	98.
Nitrite Nitrogen CK STD	0.0263	0.0250	105.

ND = Not Detected

ANALYSIS REPORT

AMTEST

Analytical Technologies, Inc.
Donna McKinney

Date Received: 07/13/93
Date Reported: 07/21/93
Project No.: 9307-088

QUALITY CONTROL - DUPLICATE ANALYSIS

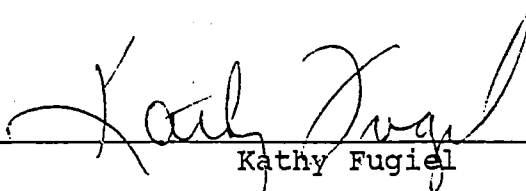
ANALYTES/SAMPLE NOS.	SAMPLE VALUE (mg/l)	DUPLICATE VALUE (mg/l)	RELATIVE PERCENT DIFFERENCE (%)
Nitrate + Nitrite Nitrogen 93-A011052	0.044	0.045	2.2
Nitrite Nitrogen 93-A011052	0.018	0.018	0.

QUALITY CONTROL - SPIKE RECOVERIES

NALYTES/SAMPLE NOS.	SAMPLE VALUE (mg/l)	SAMPLE + SPIKE (mg/l)	SPIKE CONCENTRATION (mg/l)	RECOVERY (%)
Nitrate + Nitrite Nitrogen 93-A011053	0.36	0.64	0.25	112.
Nitrite Nitrogen 93-A011053	0.066	0.089	0.025	92.

KF/pb

REPORTED BY


Kathy Fugiel

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
 Project No.: 15659.001
 Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
 Lab Number: 9310-269
 Sample No.: MW7@4.5', MW8@8.5', MW9@8', MW10@8', MW10@50'
 Matrix: Soil

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable for use.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
PAH ^a	HPLC/UV/FLUOR	EPA 8310
BETX	GC/PID	EPA 8020
TPH ^b	GC/FID	EPA 8015 Modified
Lead	ICAP	EPA 6010
Moisture	Gravimetric	CLP SOW ILM01.0

a - Polycyclic aromatic hydrocarbons.

b - Fuel hydrocarbons, analyzed for gasoline (C₇ - C₁₂) and diesel (C₁₂ - C₂₄) range TPH.

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
PAH	10/26/93	11/03/93	11/09/93 ^c	8 (14)	6 (40)
BETX	10/26/93	10/29/93	11/01/93 ^c	3	6 (14)
TPH	10/26/93	11/02/93	11/02/93	7	7 (14)
Lead	10/26/93	11/05/93	11/09/93	10	14 (180)
Moisture	10/26/93	NA	11/01/93	NA	6 (NA)

Samples were collected 10/26, 10/27, and 28/1993; 10/26/93 was used as sample collection date to verify holding time compliance.

NA - Not applicable.

() - Numbers in parentheses indicate recommended holding times in days.

c - The date on which the last sample extraction or analysis was completed was used to verify holding time compliance.

All samples were extracted and analyzed within recommended holding times.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9310-269
Sample No.: MW7@4.5', MW8@8.5', MW9@8', MW10@8', MW10@50'
Matrix: Soil

FUEL HYDROCARBON CHROMATOGRAMS

Gasoline or diesel range TPH were not detected at or above their method reporting limits (MRLs) by EPA 8015M in any samples documented under this report.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: Sample MW10@50' is a duplicate of MW10@8'. Both samples were analyzed by EPA Methods 8015 Modified, 8020, 8310, and 6010. No analytes were detected at or above their MRLs by EPA Methods 8015M, 8020, and 8310, and EPA 6010 has a relative percent difference (RPD) of 0 indicating acceptable precision for these methods.

Rinsate: None collected.

Trip Blank: None collected.

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above their MRLs in the method blanks for the following methods:

EPA 8310
EPA 8020
EPA 8015M
EPA 6010

Matrix Spikes: Matrix spike percent recovery for EPA 6010 is within ATI's control limit criteria.

Matrix spike and matrix spike duplicate percent recoveries and RPDs are within ATI's control limit criteria for the following methods:

EPA 8310
EPA 8020
EPA 8015M

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9310-269
Sample No.: MW7@4.5', MW8@8.5', MW9@8', MW10@8', MW10@50'
Matrix: Soil

Duplicates: Duplicate sample RPDs are within ATI's control limit criteria for the following methods:

EPA 8015M
EPA 6010
CLP SOW ILM01.0

Blank Spikes: Blank spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8310
EPA 8015M
EPA 8020
EPA 6010

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

EPA 8310
EPA 8020
EPA 8015M

SIGNATURES

Prepared by *Luigta Lin* Date 12/01/93
Checked by *Katherine Bourbonais* Date 12/1/93



Analytical**Technologies, Inc.**

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

Karen L. Mixon, Laboratory Manager

ATI I.D. # 9310-269

November 22, 1993

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

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On October 29, 1993, Analytical Technologies, Inc. (ATI), received five 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.

Sincerely,

Victoria L. Bayly
Project Manager

VLB/hal/ff

Enclosure

ATI I.D. # 9310-269

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9310-269-1	MW7 @ 4.5'	10/26/93	SOIL
9310-269-2	MW8 @ 8.5'	10/27/93	SOIL
9310-269-3	MW9 @ 8'	10/27/93	SOIL
9310-269-4	MW10 @ 8'	10/28/93	SOIL
9310-269-5	MW10 @ 50'	10/28/93	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 disposal date.



ATI I.D. # 9310-269

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
POLYNUCLEAR AROMATIC HYDROCARBONS	HPLC/UV/FLUOR	EPA 8310	R
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
LEAD	ICAP	EPA 6010	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
B = Subcontract

ATI I.D. # 9310-269

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS

Five (5) soil samples were received by ATI on October 29, 1993, for the following analysis: EPA method 8310.

All corresponding quality assurance and quality control results defined as matrix spike/matrix spike duplicate (MS/MSD), blank spike (BS), method blank and surrogate recoveries were within the established control limits.

ATI I.D. # 9310-269

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/03/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
NAPHTHALENE	<0.083
ACENAPHTHYLENE	<0.17
1-METHYLNAPHTHALENE	<0.17
2-METHYLNAPHTHALENE	<0.17
ACENAPHTHENE	<0.17
FLUORENE	<0.017
PHENANTHRENE	<0.0083
ANTHRACENE	<0.0083
FLUORANTHENE	<0.017
PYRENE	<0.017
BENZO (A) ANTHRACENE	<0.017
CHRYSENE	<0.017
BENZO (B) FLUORANTHENE	<0.017
BENZO (K) FLUORANTHENE	<0.017
BENZO (A) PYRENE	<0.017
DIBENZO (A, H) ANTHRACENE	<0.034
BENZO (G, H, I) PERYLENE	<0.017
INDENO (1, 2, 3-CD) PYRENE	<0.017

SURROGATE PERCENT RECOVERY		LIMITS
2-CHLOROANTHRACENE	80	25 - 134



ATI I.D. # 9310-269-1

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/26/93
PROJECT #	: 15659.001	DATE RECEIVED	: 10/29/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/03/93
CLIENT I.D.	: MW7 @ 4.5'	DATE ANALYZED	: 11/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
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NAPHTHALENE	<0.12
ACENAPHTHYLENE	<0.24
1-METHYLNAPHTHALENE	<0.24
2-METHYLNAPHTHALENE	<0.24
ACENAPHTHENE	<0.24
FLUORENE	<0.024
PHENANTHRENE	<0.012
ANTHRACENE	<0.012
FLUORANTHENE	<0.024
PYRENE	<0.024
BENZO (A) ANTHRACENE	<0.024
CHRYSENE	<0.024
BENZO (B) FLUORANTHENE	<0.024
BENZO (K) FLUORANTHENE	<0.024
BENZO (A) PYRENE	<0.024
DIBENZO (A, H) ANTHRACENE	<0.049
BENZO (G, H, I) PERYLENE	<0.024
INDENO (1, 2, 3-CD) PYRENE	<0.024

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	74	25 - 134
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ATI I.D. # 9310-269-2

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/27/93
PROJECT # : 15659.001	DATE RECEIVED : 10/29/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/03/93
CLIENT I.D. : MW8 @ 8.5'	DATE ANALYZED : 11/08/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS

RESULTS

NAPHTHALENE	<0.097
ACENAPHTHYLENE	<0.20
1-METHYLNAPHTHALENE	<0.20
2-METHYLNAPHTHALENE	<0.20
ACENAPHTHENE	<0.20
FLUORENE	<0.020
PHENANTHRENE	<0.0097
ANTHRACENE	<0.0097
FLUORANTHENE	<0.020
PYRENE	<0.020
BENZO (A) ANTHRACENE	<0.020
CHRYSENE	<0.020
BENZO (B) FLUORANTHENE	<0.020
BENZO (K) FLUORANTHENE	<0.020
BENZO (A) PYRENE	<0.020
DIBENZO (A, H) ANTHRACENE	<0.040
BENZO (G, H, I) PERYLENE	<0.020
INDENO (1, 2, 3-CD) PYRENE	<0.020

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	78	25 - 134
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ATI I.D. # 9310-269-3

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/27/93
PROJECT #	: 15659.001	DATE RECEIVED	: 10/29/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/03/93
CLIENT I.D.	: MW9 @ 8'	DATE ANALYZED	: 11/09/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
-----------	---------

NAPHTHALENE	<0.090
ACENAPHTHYLENE	<0.18
1-METHYLNAPHTHALENE	<0.18
2-METHYLNAPHTHALENE	<0.18
ACENAPHTHENE	<0.18
FLUORENE	<0.018
PHENANTHRENE	<0.0090
ANTHRACENE	<0.0090
FLUORANTHENE	<0.018
PYRENE	<0.018
BENZO (A) ANTHRACENE	<0.018
CHRYSENE	<0.018
BENZO (B) FLUORANTHENE	<0.018
BENZO (K) FLUORANTHENE	<0.018
BENZO (A) PYRENE	<0.018
DIBENZO (A, H) ANTHRACENE	<0.037
BENZO (G, H, I) PERYLENE	<0.018
INDENO (1, 2, 3-CD) PYRENE	<0.018

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	82	25 - 134
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ATI I.D. # 9310-269-4

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/28/93
PROJECT # : 15659.001	DATE RECEIVED : 10/29/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/03/93
CLIENT I.D. : MW10 @ 8'	DATE ANALYZED : 11/09/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
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NAPHTHALENE	<0.13
ACENAPHTHYLENE	<0.26
1-METHYLNAPHTHALENE	<0.26
2-METHYLNAPHTHALENE	<0.26
ACENAPHTHENE	<0.26
FLUORENE	<0.026
PHENANTHRENE	<0.013
ANTHRACENE	<0.013
FLUORANTHENE	<0.026
PYRENE	<0.026
BENZO (A) ANTHRACENE	<0.026
CHRYSENE	<0.026
BENZO (B) FLUORANTHENE	<0.026
BENZO (K) FLUORANTHENE	<0.026
BENZO (A) PYRENE	<0.026
DIBENZO (A, H) ANTHRACENE	<0.052
BENZO (G, H, I) PERYLENE	<0.026
INDENO (1, 2, 3-CD) PYRENE	<0.026

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	77	25 - 134
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ATI I.D. # 9310-269-5

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/28/93
PROJECT # : 15659.001	DATE RECEIVED : 10/29/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/03/93
CLIENT I.D. : MW10 @ 50'	DATE ANALYZED : 11/09/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

----- COMPOUNDS	RESULTS -----
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NAPHTHALENE	<0.12
ACENAPHTHYLENE	<0.24
1-METHYLNAPHTHALENE	<0.24
2-METHYLNAPHTHALENE	<0.24
ACENAPHTHENE	<0.24
FLUORENE	<0.024
PHENANTHRENE	<0.012
ANTHRACENE	<0.012
FLUORANTHENE	<0.024
PYRENE	<0.024
BENZO (A) ANTHRACENE	<0.024
CHRYSENE	<0.024
BENZO (B) FLUORANTHENE	<0.024
BENZO (K) FLUORANTHENE	<0.024
BENZO (A) PYRENE	<0.024
DIBENZO (A, H) ANTHRACENE	<0.047
BENZO (G, H, I) PERYLENE	<0.024
INDENO (1, 2, 3-CD) PYRENE	<0.024

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	77	25 - 134
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ATI I.D. # 9310-269

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : BLANK
PROJECT # : 15659.001	DATE EXTRACTED : 11/03/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 11/08/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	3.33	2.49	75	N/A	N/A	N/A
PHENANTHRENE	<0.00833	0.333	0.256	77	N/A	N/A	N/A
PYRENE	<0.0170	0.333	0.276	83	N/A	N/A	N/A
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.275	83	N/A	N/A	N/A
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.280	84	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	48 - 145	20
PHENANTHRENE	47 - 137	35
PYRENE	59 - 122	34
BENZO (K) FLUORANTHENE	50 - 126	34
DIBENZO (A, H) ANTHRACENE	54 - 138	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	81	N/A	25 - 134



ATI I.D. # 9310-269

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9311-001-2
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/03/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	3.33	2.46	74	2.26	68	8
PHENANTHRENE	<0.00833	0.333	0.265	80	0.254	76	4
PYRENE	<0.0170	0.333	0.288	86	0.280	84	3
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.285	86	0.276	83	3
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.285	86	0.281	84	1

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	50 - 136	20
PHENANTHRENE	14 - 162	35
PYRENE	25 - 143	34
BENZO (K) FLUORANTHENE	36 - 143	34
DIBENZO (A, H) ANTHRACENE	34 - 152	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	82	80	25 - 134

ATI I.D. # 9310-269

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 10/29/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 10/29/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
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BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

101

52 - 116



ATI I.D. # 9310-269-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/26/93
PROJECT #	: 15659.001	DATE RECEIVED	: 10/29/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 10/29/93
CLIENT I.D.	: MW7 @ 4.5'	DATE ANALYZED	: 11/01/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS	RESULTS
BENZENE	<0.036
ETHYLBENZENE	<0.036
TOLUENE	<0.036
TOTAL XYLENES	<0.036

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	94 52 - 116



ATI I.D. # 9310-269-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/27/93
PROJECT #	: 15659.001	DATE RECEIVED	: 10/29/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 10/29/93
CLIENT I.D.	: MW8 @ 8.5'	DATE ANALYZED	: 10/30/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.029
ETHYLBENZENE	<0.029
TOLUENE	<0.029
TOTAL XYLENES	<0.029

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	88 52 - 116



ATI I.D. # 9310-269-3

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/27/93
PROJECT #	: 15659.001	DATE RECEIVED	: 10/29/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 10/29/93
CLIENT I.D.	: MW9 @ 8'	DATE ANALYZED	: 10/30/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDSRESULTS

BENZENE	<0.027
ETHYLBENZENE	<0.027
TOLUENE	<0.027
TOTAL XYLENES	<0.027

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

80

52 - 116



ATI I.D. # 9310-269-4

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/28/93
PROJECT #	: 15659.001	DATE RECEIVED	: 10/29/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 10/29/93
CLIENT I.D.	: MW10 @ 8'	DATE ANALYZED	: 10/30/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDSRESULTS

BENZENE	<0.038
ETHYLBENZENE	<0.038
TOLUENE	<0.038
TOTAL XYLENES	<0.038

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

69

52 - 116



ATI I.D. # 9310-269-5

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/28/93
PROJECT #	: 15659.001	DATE RECEIVED	: 10/29/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 10/29/93
CLIENT I.D.	: MW10 @ 50'	DATE ANALYZED	: 10/30/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS	RESULTS
BENZENE	<0.035
ETHYLBENZENE	<0.035
TOLUENE	<0.035
TOTAL XYLENES	<0.035

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	77 52 - 116

ATI I.D. # 9310-269

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : BLANK
PROJECT # : 15659.001	DATE EXTRACTED : 10/29/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 10/29/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8020 (BETX)	

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.957	96	N/A	N/A	N/A
TOLUENE	<0.0250	1.00	1.02	102	N/A	N/A	N/A
TOTAL XYLENES	<0.0250	2.00	2.08	104	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	63 - 115	20
TOLUENE	75 - 110	20
TOTAL XYLENES	79 - 109	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	97	N/A	52 - 116

ATI I.D. # 9310-269

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

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

SAMPLE I.D. # : 9310-263-2
DATE EXTRACTED : 10/29/93
DATE ANALYZED : 10/29/93
UNITS : mg/Kg

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.948	95	0.939	94	1
TOLUENE	<0.0250	1.00	0.995	100	0.996	100	0
TOTAL XYLENES	<0.0250	2.00	2.02	101	2.02	101	0

CONTROL LIMITS

	% REC.	RPD
BENZENE	35 - 113	20
TOLUENE	43 - 107	20
TOTAL XYLENES	46 - 114	20

SURROGATE RECOVERIES

	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	90	92	52 - 116

ATI I.D. # 9310-269

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : METHOD BLANK
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : N/A
DATE RECEIVED : N/A
DATE EXTRACTED : 11/02/93
DATE ANALYZED : 11/02/93
UNITS : mg/Kg
DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<5
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<25
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

96

52 - 143



ATI I.D. # 9310-269-1

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW7 @ 4.5'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 10/26/93
DATE RECEIVED : 10/29/93
DATE EXTRACTED : 11/02/93
DATE ANALYZED : 11/02/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<7
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<36
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

-TERPHENYL

101

52 - 143



ATI I.D. # 9310-269-2

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW8 @ 8.5'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 10/27/93
DATE RECEIVED : 10/29/93
DATE EXTRACTED : 11/02/93
DATE ANALYZED : 11/02/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<6
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<29
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

o-TERPHENYL

99

52 - 143



ATI I.D. # 9310-269-3

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW9 @ 8'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 10/27/93
DATE RECEIVED : 10/29/93
DATE EXTRACTED : 11/02/93
DATE ANALYZED : 11/02/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<5
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<27
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

-TERPHENYL

101

52 - 143



ATI I.D. # 9310-269-4

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 CLIENT I.D. : MW10 @ 8'
 SAMPLE MATRIX : SOIL
 EPA METHOD : 8015 (MODIFIED)
 RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 10/28/93
 DATE RECEIVED : 10/29/93
 DATE EXTRACTED : 11/02/93
 DATE ANALYZED : 11/02/93
 UNITS : mg/Kg
 DILUTION FACTOR : 1

COMPOUNDS

RESULTS

FUEL HYDROCARBONS
 HYDROCARBON RANGE
 HYDROCARBON QUANTITATION USING

<8
 C7 - C12
 GASOLINE

FUEL HYDROCARBONS
 HYDROCARBON RANGE
 HYDROCARBON QUANTITATION USING

<38
 C12 - C24
 DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

98

52 - 143



ATI I.D. # 9310-269-5

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW10 @ 50'
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 10/28/93
DATE RECEIVED : 10/29/93
DATE EXTRACTED : 11/02/93
DATE ANALYZED : 11/02/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<7
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<35
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

TERPHENYL

100

52 - 143



ATI I.D. # 9310-269

FUEL HYDROCARBONS
QUALITY CONTROL DATA

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

SAMPLE I.D. # : BLANK
 DATE EXTRACTED : 11/02/93
 DATE ANALYZED : 11/02/93
 UNITS : mg/Kg

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<25.0	500	511	102	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
DIESEL				67 - 135			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		98		N/A		52 - 143	

ATI I.D. # 9310-269

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : 9310-269-5
PROJECT # : 15659.001	DATE EXTRACTED : 11/02/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 11/02/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8015 (MODIFIED)	

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	<25.0	<25.0	NC	500	505	101	476	95	6
CONTROL LIMITS						% REC.	RPD		
DIESEL						56 - 137	20		
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				101	93		52 - 143		

NC = Not Calculable.



ATI I.D. # 9310-269

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

ELEMENT

DATE PREPARED

DATE ANALYZED

LEAD

11/05/93

11/09/93

ATI I.D. # 9310-269

METALS ANALYSIS
DATA SUMMARY

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

MATRIX : SOIL

UNITS : mg/Kg

ATI I.D. #	CLIENT I.D.	LEAD
9310-269-1	MW7 @ 4.5'	3.4
9310-269-2	MW8 @ 8.5'	2.6
9310-269-3	MW9 @ 8'	<1.7
9310-269-4	MW10 @ 8'	2.4
9310-269-5	MW10 @ 50'	2.4
METHOD BLANK	-	<1.5



ATI I.D. # 9310-269

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL
UNITS : mg/Kg

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	BLANK	<1.5	N/A	N/A	43.8	50.0	88
LEAD	9310-251-14	3.2	3.8	17	57.1	62.5	86

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

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

ATI I.D. # 9310-269

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

PARAMETERDATE ANALYZED

MOISTURE

11/01/93

ATI I.D. # 9310-269

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE
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9310-269-1	MW7 @ 4.5'	30
9310-269-2	MW8 @ 8.5'	14
9310-269-3	MW9 @ 8'	7.8
9310-269-4	MW10 @ 8'	34
9310-269-5	MW10 @ 50'	28

ATI I.D. # 9310-269

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9310-265-4	19	18	5	N/A	N/A	N/A

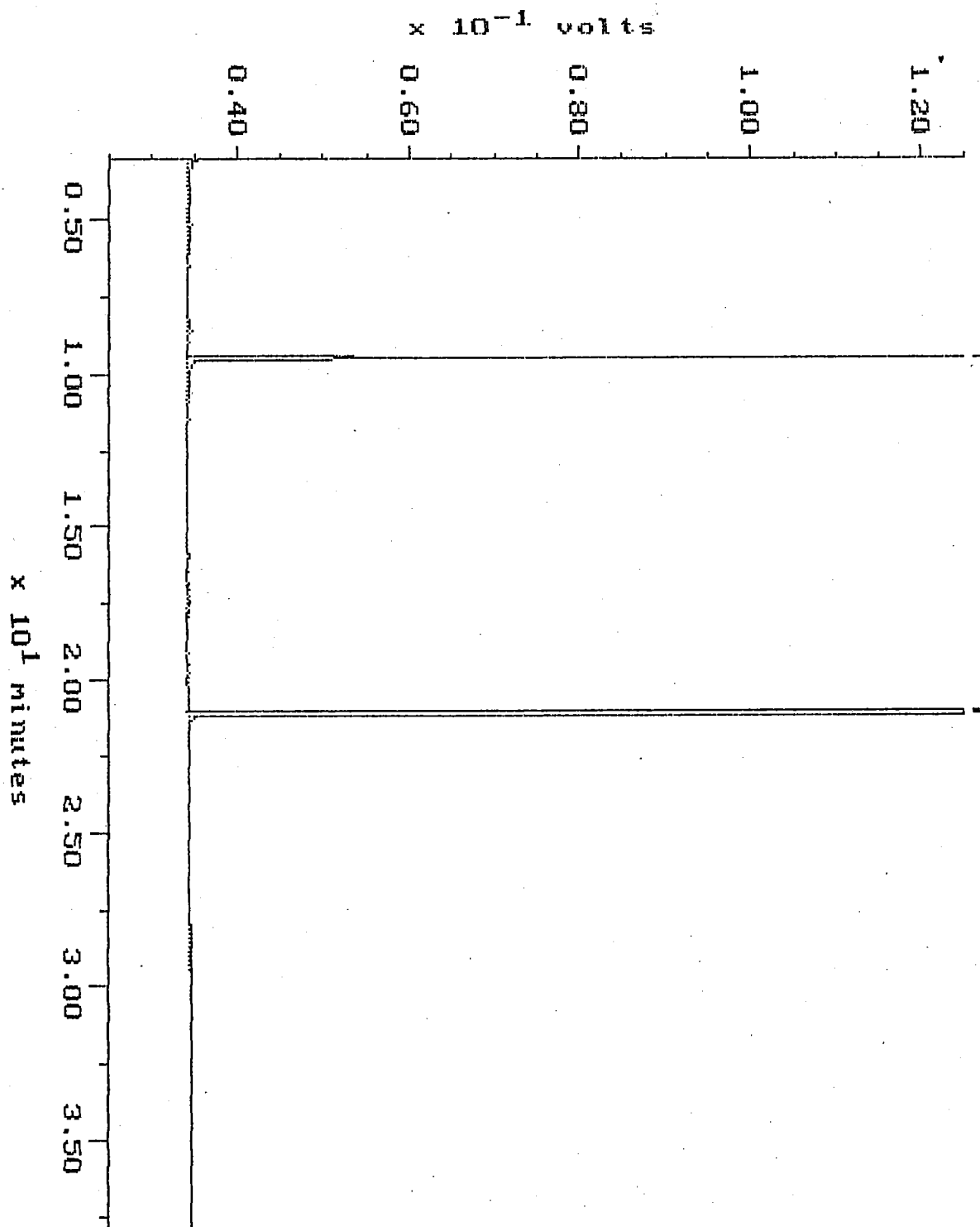
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

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

Blank

Sample: SRB 11-2 8015 Channel: ERNIE
Acquired: 02-NOV-93 14:19 Method: F:\BR02\MAXDATA\ERNIE\FUEL1102
Comments: ATI: THE QUALITY TEAM

Filename: R0020E03
Operator: ATI

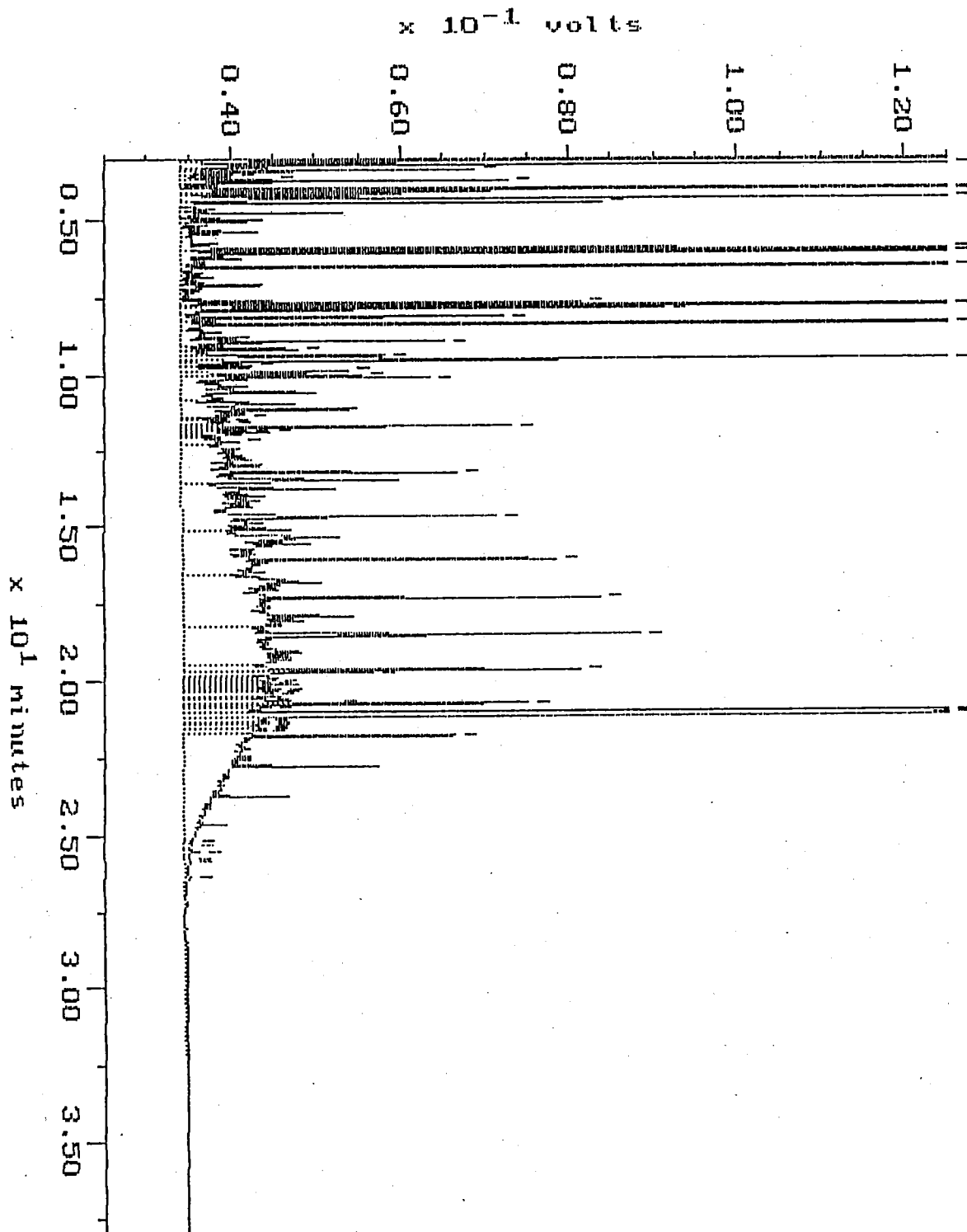


Continuing Calibration

Sample: DG 400
Acquired: 02-NOV-93 13:33
Comments: ATI: THE QUALITY TEAM

Channel: ERNIE
Method: F:\BRO2\MAXDATA\ERNIE\FUEL1102

Filename: RB028E02
Operator: ATI

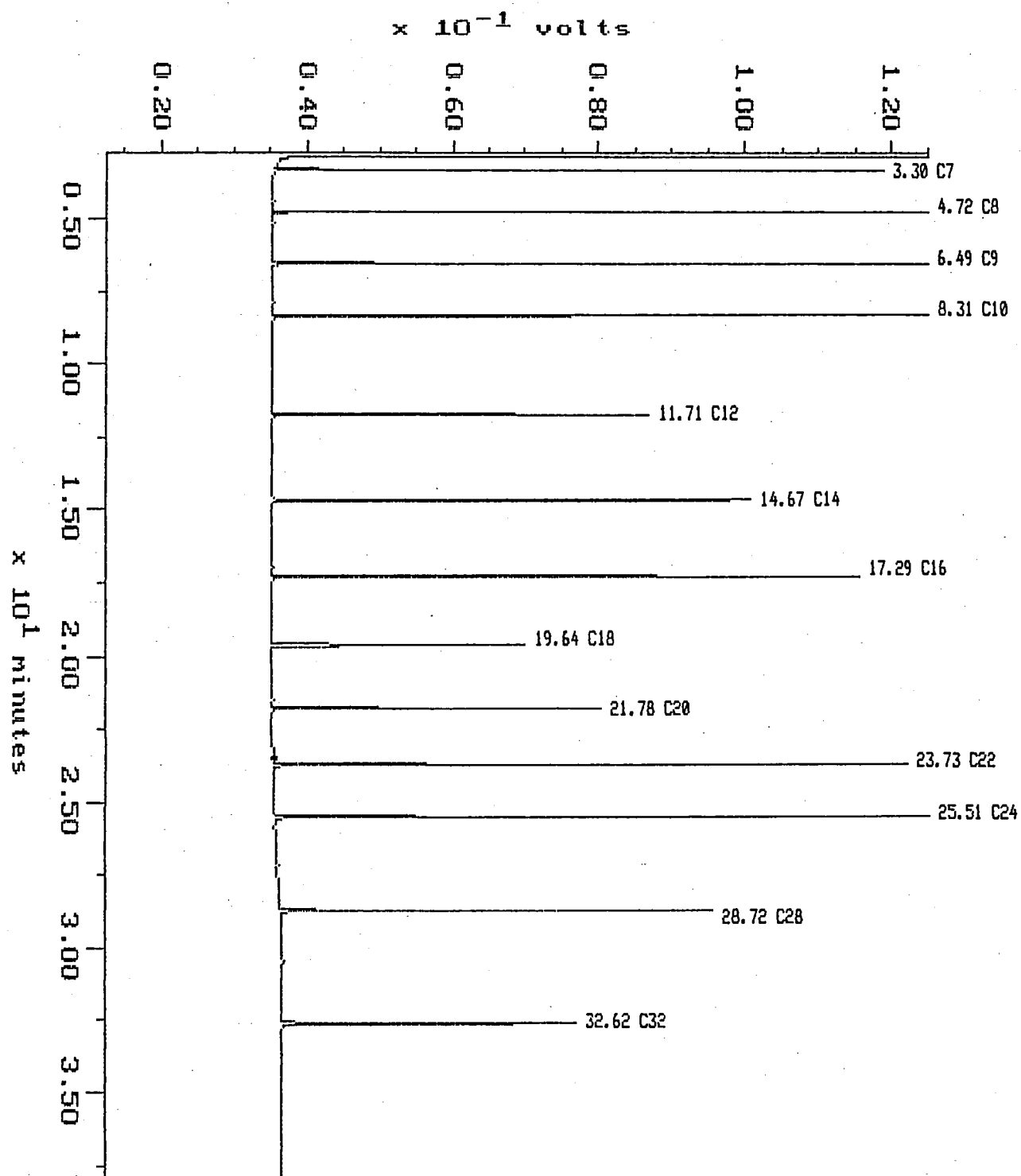


Alkane

Sample: ALKANE
Acquired: 01-NOV-93 15:17
Inj Vol: 1.00

Channel: ERNIE
Method: F:\BRO2\MAXDATA\ERNIE\FUEL1101

Filename: RB018E02
Operator: ATI





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

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9311-001
Sample No.: MW12@3.5', MW11@3.5', MW11@7.5', MW7-10/93, MW8-10/93,
MW9-10/93, MW12-10/93, Rinsate-10/93, TB
Matrix: Water/Soil (MW12@3.5', MW11@3.5', MW11@7.5')

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable for use.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
PAH ^a	HPLC/UV/FLUOR	EPA 8310
BETX	GC/PID	EPA 8020
TPH ^b	GC/FID	EPA 8015
Lead ^c	ICAP	EPA 6010
Lead	AA/GF	EPA 7421
Moisture	Gravimetric	CLP SOW ILM01.0

Sample Rinsate 10/93 was analyzed by EPA 8310, EPA 8015M, and EPA 8020;
sample TB was analyzed by EPA 8020 only.

- a - Polycyclic aromatic hydrocarbons.
- b - Fuel hydrocarbons, analyzed for gasoline (C₇ - C₁₂) and diesel (C₁₂ - C₂₄) range TPH.
- c - Analyzed for soil samples.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
 Project No.: 15659.001
 Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
 Lab Number: 9311-001
 Sample No.: MW12@3.5', MW11@3.5', MW11@7.5', MW7-10/93, MW8-10/93,
 MW9-10/93, MW12-10/93, Rinsate-10/93, TB
 Matrix: Water/Soil (MW12@3.5', MW11@3.5', MW11@7.5')

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
PAH ^c	10/28/93 ^e	11/03/93	11/09/93	6 (14)	6 (40)
PAH ^d	10/29/93	11/02/93	11/04/93	5 (7)	2 (40)
BETX ^c	10/28/93	11/03/93	11/08/93	6	11 (14)
BETX ^d	10/29/93	NA	11/04/93	NA	6 (14)
TPH ^c	10/28/93	11/02/93	11/03/93	5	6 (14)
TPH ^d	10/29/93	11/01/93	11/02/93	3	4 (14)
Lead ^c	10/28/93	11/09/93	11/10/93	12	13 (180)
Lead ^d	10/29/93	11/03/93	11/04/93	5	6 (180)
Moisture	10/28/93	NA	11/02/93	NA	5 (NA)

NA - Not applicable.

() - Numbers in parentheses indicate recommended holding times in days.

d - Analyzed for water samples.

e - Soil samples were collected 10/28 and 29/93; 10/28/93 was used as sample collection date to verify holding time compliance.

All samples were extracted and analyzed within recommended holding times.

FUEL HYDROCARBON CHROMATOGRAMS

Gasoline range (C₇ - C₁₂) TPH were detected in sample MW8-10/93 by EPA 8015M, and the detections is supported by the sample chromatogram for this method.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected.

Rinsate: Sample Rinsate-10/93 was analyzed by EPA 8310, EPA 8015M, and EPA 8020. No analytes were detected at or above their method reporting limits (MRLs) by these methods. No carry-over contamination was identified.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9311-001
Sample No.: MW12@3.5', MW11@3.5', MW11@7.5', MW7-10/93, MW8-10/93,
MW9-10/93, MW12-10/93, Rinsate-10/93, TB
Matrix: Water/Soil (MW12@3.5', MW11@3.5', MW11@7.5')

Trip Blank: Sample (Trip Blank) was analyzed by EPA 8020. Analytes were not detected at or above their MRLs in this sample. Cross-contamination was not identified.

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above their MRLs in method blanks for the following methods:

EPA 8310
EPA 8020
EPA 8015M
EPA 7421
EPA 6010

Matrix Spikes: Matrix spike percent recoveries are within acceptance control limit criteria for EPA 7421 and EPA 6010.

Matrix spike and matrix spike duplicate percent recoveries and relative percent differences (RPDs) are within ATI's control limit criteria for EPA 8020.

EPA 8310: The matrix spike and matrix spike duplicate associated with water samples had acenaphthylene percent recoveries of 319 and 321 percent, and benzo(k)-fluoranthene and dibenzo(a,h)anthracene recoveries ranging from 21 to 28 percent, which exceeded ATI's control limit criteria due to matrix interference. The spiked sample was not collected from the same site as that of the associated samples and other QC parameters for this method are within acceptance criteria. Sample results are not qualified on this basis.

EPA 8015M: The matrix spike and matrix spike duplicate associated with water samples had gasoline percent recoveries of 22 and 58 percent, which exceeded ATI's lower control limit criteria of 68 percent due to high concentrations of analytes in the sample. Since other QC parameters for this method are within acceptance criteria, sample results are not qualified on this basis.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9311-001
Sample No.: MW12@3.5', MW11@3.5', MW11@7.5', MW7-10/93, MW8-10/93,
MW9-10/93, MW12-10/93, Rinsate-10/93, TB
Matrix: Water/Soil (MW12@3.5', MW11@3.5', MW11@7.5')

Duplicates: Duplicate sample RPDs are within ATI's control limit criteria for the following methods:

EPA 8015M
EPA 7421
EPA 6010
CLP SOW ILM01.0

Blank Spikes: Blank spike percent recoveries are within ATI's control limit criteria for the following methods:

EPA 8310
EPA 8015M
EPA 7421
EPA 6010

Blank spike and blank spike duplicate percent recoveries and RPDs are within ATI's control limit criteria for EPA 8020.

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

EPA 8310
EPA 8020
EPA 8015M

SIGNATURES

Prepared by

Mingta Lin

Date 12/01/93

Checked by

Katherine Bourbonais

Date 12/1/93



Analytical**Technologies, Inc.**

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

Karen L. Mixon, Laboratory Manager

ATI I.D. # 9311-001

November 22, 1993

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

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On November 1, 1993, Analytical Technologies, Inc. (ATI), received nine 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.

Sincerely,

Victoria L. Bayly
Project Manager

VLB/hal/ff

Enclosure

ATI I.D. # 9311-001

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9311-001-1	MW12 @ 3.5'	10/28/93	SOIL
9311-001-2	MW11 @ 3.5'	10/29/93	SOIL
9311-001-3	MW11 @ 7.5'	10/29/93	SOIL
9311-001-4	MW7-10/93	10/29/93	WATER
9311-001-5	MW8-10/93	10/29/93	WATER
9311-001-6	MW9-10/93	10/29/93	WATER
9311-001-7	MW12-10/93	10/29/93	WATER
9311-001-8	RINSATE-10/93	10/29/93	WATER
9311-001-9	TB	N/A	WATER

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	3
WATER	6

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.



ATI I.D. # 9311-001

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
POLYNUCLEAR AROMATIC HYDROCARBONS	HPLC/UV/FLUOR	EPA 8310	R
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
LEAD	AA/GF	EPA 7421	R
LEAD	ICAP	EPA 6010	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
TB = Subcontract



ATI I.D. # 9311-001

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS

Five (5) water samples were received by ATI on November 1, 1993, for the following analysis: EPA method 8310.

The percent recovery for acenaphthylene in the matrix spike/matrix spike duplicate (MS/MSD) was outside ATI limits due to a nearby peak interfering with the acenaphthylene peak. The result was flagged with an "F"; out of limits due to matrix interference.

The percent recoveries for benzo(k)fluoranthene and dibenzo(a,h)anthracene in the (MS/MSD) were outside ATI limits. The results were flagged with an "F"; out of limits due to matrix interference. The results from the blank spike (BS) associated with this sample set were within limits.

All other corresponding quality assurance and quality control results defined MS/MSD, BS, method blank and surrogate recoveries were within the established control limits.



ATI I.D. # 9311-001

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/02/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.50
ACENAPHTHYLENE	<1.0
1-METHYLNAPHTHALENE	<0.50
2-METHYLNAPHTHALENE	<0.50
ACENAPHTHENE	<0.50
FLUORENE	<0.10
PHENANTHRENE	<0.050
ANTHRACENE	<0.050
FLUORANTHENE	<0.10
PYRENE	<0.10
BENZO (A) ANTHRACENE	<0.10
CHRYSENE	<0.10
BENZO (B) FLUORANTHENE	<0.10
BENZO (K) FLUORANTHENE	<0.10
BENZO (A) PYRENE	<0.10
DIBENZO (A, H) ANTHRACENE	<0.20
BENZO (G, H, I) PERYLENE	<0.10
INDENO (1, 2, 3-CD) PYRENE	<0.10

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	89	33 - 123
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ATI I.D. # 9311-001-4

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/02/93
CLIENT I.D.	: MW7-10/93	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	<0.47
2-METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	82	33 - 123
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Analytical Technologies, Inc.

ATI I.D. # 9311-001-5

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/29/93
PROJECT # : 15659.001	DATE RECEIVED : 11/01/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/02/93
CLIENT I.D. : MW8-10/93	DATE ANALYZED : 11/04/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	DILUTION FACTOR : 1

COMPOUNDS

RESULTS

NAPHTHALENE	27
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	5.8
2-METHYLNAPHTHALENE	4.7
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	59	33 - 123
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ATI I.D. # 9311-001-6

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/29/93
PROJECT # : 15659.001	DATE RECEIVED : 11/01/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/02/93
CLIENT I.D. : MW9-10/93	DATE ANALYZED : 11/04/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	DILUTION FACTOR : 1

COMPOUNDSRESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	<0.47
2-METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	75	33 - 123
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ATI I.D. # 9311-001-7

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/02/93
CLIENT I.D.	: MW12-10/93	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	<0.47
2-METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	56	33 - 123
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ATI I.D. # 9311-001-8

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/29/93
PROJECT # : 15659.001	DATE RECEIVED : 11/01/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/02/93
CLIENT I.D. : RINSATE-10/93	DATE ANALYZED : 11/04/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	DILUTION FACTOR : 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	<0.47
2-METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE 79

33 - 123



ATI I.D. # 9311-001

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : BLANK
PROJECT # : 15659.001	DATE EXTRACTED : 11/02/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 11/04/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<1.00	20.0	14.4	72	N/A	N/A	N/A
PHENANTHRENE	<0.0500	2.00	1.52	76	N/A	N/A	N/A
PYRENE	<0.100	2.00	1.70	85	N/A	N/A	N/A
BENZO (K) FLUORANTHENE	<0.100	2.00	1.66	83	N/A	N/A	N/A
DIBENZO (A, H) ANTHRACENE	<0.200	2.00	2.10	105	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	32 - 131	32
PHENANTHRENE	58 - 120	30
PYRENE	50 - 120	30
BENZO (K) FLUORANTHENE	50 - 120	29
DIBENZO (A, H) ANTHRACENE	56 - 129	26

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	86	N/A	33 - 123



ATI I.D. # 9311-001

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
SAMPLE MATRIX : WATER
EPA METHOD : 8310

SAMPLE I.D. # : 9310-279-4
DATE EXTRACTED : 11/02/93
DATE ANALYZED : 11/04/93
UNITS : ug/L

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.980	19.6	60.6	319F	61.0	321F	1
PHENANTHRENE	0.0990	1.96	1.32	64	1.29	63	2
PYRENE	<0.0980	1.96	0.929	49	0.829	44	11
BENZO (K) FLUORANTHENE	<0.0980	1.96	0.537	28F	0.430	23F	22
DIBENZO (A, H) ANTHRACENE	<0.196	1.96	0.502	26F	0.408	21F	21

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	31 - 127	32
PHENANTHRENE	31 - 143	30
PYRENE	37 - 140	30
BENZO (K) FLUORANTHENE	39 - 131	29
DIBENZO (A, H) ANTHRACENE	31 - 142	26

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	45	40	33 - 123

F = Out of limits due to matrix interference.

ATI I.D. # 9311-001

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS

Three (3) soil samples were received by ATI on November 1, 1993, for the following analysis: EPA method 8310.

All corresponding quality assurance and quality control results defined as matrix spike/matrix spike duplicate (MS/MSD), blank spike (BS), method blank and surrogate recoveries were within the established control limits.



ATI I.D. # 9311-001

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : N/A
PROJECT # : 15659.001	DATE RECEIVED : N/A
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/03/93
CLIENT I.D. : METHOD BLANK	DATE ANALYZED : 11/08/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS

RESULTS

NAPHTHALENE	<0.083
ACENAPHTHYLENE	<0.17
1-METHYLNAPHTHALENE	<0.17
2-METHYLNAPHTHALENE	<0.17
ACENAPHTHENE	<0.17
FLUORENE	<0.017
PHENANTHRENE	<0.0083
ANTHRACENE	<0.0083
FLUORANTHENE	<0.017
PYRENE	<0.017
BENZO (A) ANTHRACENE	<0.017
CHRYSENE	<0.017
BENZO (B) FLUORANTHENE	<0.017
BENZO (K) FLUORANTHENE	<0.017
BENZO (A) PYRENE	<0.017
DIBENZO (A, H) ANTHRACENE	<0.034
BENZO (G, H, I) PERYLENE	<0.017
INDENO (1, 2, 3-CD) PYRENE	<0.017

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	80	25 - 134
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ATI I.D. # 9311-001-1

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/28/93
PROJECT # : 15659.001	DATE RECEIVED : 11/01/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/03/93
CLIENT I.D. : MW12 @ 3.5'	DATE ANALYZED : 11/09/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

----- COMPOUNDS	RESULTS -----
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NAPHTHALENE	<0.10
ACENAPHTHYLENE	<0.21
1-METHYLNAPHTHALENE	<0.21
2-METHYLNAPHTHALENE	<0.21
ACENAPHTHENE	<0.21
FLUORENE	<0.021
PHENANTHRENE	<0.010
ANTHRACENE	<0.010
FLUORANTHENE	<0.021
PYRENE	<0.021
BENZO (A) ANTHRACENE	<0.021
CHRYSENE	<0.021
BENZO (B) FLUORANTHENE	<0.021
BENZO (K) FLUORANTHENE	<0.021
BENZO (A) PYRENE	<0.021
DIBENZO (A, H) ANTHRACENE	<0.043
BENZO (G, H, I) PERYLENE	<0.021
INDENO (1, 2, 3-CD) PYRENE	<0.021

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	85	25 - 134
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ATI I.D. # 9311-001-2

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/29/93
PROJECT # : 15659.001	DATE RECEIVED : 11/01/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/03/93
CLIENT I.D. : MW11 @ 3.5'	DATE ANALYZED : 11/08/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
NAPHTHALENE	<0.10
ACENAPHTHYLENE	<0.21
1-METHYLNAPHTHALENE	<0.21
2-METHYLNAPHTHALENE	<0.21
ACENAPHTHENE	<0.21
FLUORENE	<0.021
PHENANTHRENE	<0.010
ANTHRACENE	<0.010
FLUORANTHENE	<0.021
PYRENE	<0.021
BENZO (A) ANTHRACENE	<0.021
CHRYSENE	<0.021
BENZO (B) FLUORANTHENE	<0.021
BENZO (K) FLUORANTHENE	<0.021
BENZO (A) PYRENE	<0.021
DIBENZO (A, H) ANTHRACENE	<0.043
BENZO (G, H, I) PERYLENE	<0.021
INDENO (1, 2, 3-CD) PYRENE	<0.021

SURROGATE PERCENT RECOVERY	LIMITS
2-CHLOROANTHRACENE	84 25 - 134

ATI I.D. # 9311-001-3

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 10/29/93
PROJECT # : 15659.001	DATE RECEIVED : 11/01/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/03/93
CLIENT I.D. : MW11 @ 7.5'	DATE ANALYZED : 11/09/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	DILUTION FACTOR : 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
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NAPHTHALENE	<0.11
ACENAPHTHYLENE	<0.22
1-METHYLNAPHTHALENE	<0.22
2-METHYLNAPHTHALENE	<0.22
ACENAPHTHENE	<0.22
FLUORENE	<0.022
PHENANTHRENE	<0.011
ANTHRACENE	<0.011
FLUORANTHENE	<0.022
PYRENE	<0.022
BENZO (A) ANTHRACENE	<0.022
CHRYSENE	<0.022
BENZO (B) FLUORANTHENE	<0.022
BENZO (K) FLUORANTHENE	<0.022
BENZO (A) PYRENE	<0.022
DIBENZO (A, H) ANTHRACENE	<0.043
BENZO (G, H, I) PERYLENE	<0.022
INDENO (1, 2, 3-CD) PYRENE	<0.022

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	86	25 - 134
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ATI I.D. # 9311-001

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : BLANK
PROJECT # : 15659.001	DATE EXTRACTED : 11/03/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 11/08/93
SAMPLE MATRIX : SOIL	UNITS : mg/Kg
EPA METHOD : 8310	

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	3.33	2.49	75	N/A	N/A	N/A
PHENANTHRENE	<0.00833	0.333	0.256	77	N/A	N/A	N/A
PYRENE	<0.0170	0.333	0.276	83	N/A	N/A	N/A
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.275	83	N/A	N/A	N/A
DIBENZO (A,H) ANTHRACENE	<0.0340	0.333	0.280	84	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
ACENAPHTHYLENE	48 - 145	20
PHENANTHRENE	47 - 137	35
PYRENE	59 - 122	34
BENZO (K) FLUORANTHENE	50 - 126	34
DIBENZO (A,H) ANTHRACENE	54 - 138	33

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	81	N/A	25 - 134



ATTI I.D. # 9311-001

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9311-001-2
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/03/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<0.170	3.33	2.46	74	2.26	68	8
PHENANTHRENE	<0.00833	0.333	0.265	80	0.254	76	4
PYRENE	<0.0170	0.333	0.288	86	0.280	84	3
BENZO (K) FLUORANTHENE	<0.0170	0.333	0.285	86	0.276	83	3
DIBENZO (A, H) ANTHRACENE	<0.0340	0.333	0.285	86	0.281	84	1

CONTROL LIMITS

	% REC.	RPD
ACENAPHTHYLENE	50 - 136	20
PHENANTHRENE	14 - 162	35
PYRENE	25 - 143	34
BENZO (K) FLUORANTHENE	36 - 143	34
DIBENZO (A, H) ANTHRACENE	34 - 152	33

SURROGATE RECOVERIES

	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	82	80	25 - 134



ATI I.D. # 9311-001

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 FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/03/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDRESULT

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

111

76 - 120



ATI I.D. # 9311-001

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 FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/05/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDRESULT

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

112

76 - 120



ATI I.D. # 9311-001

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/28/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW7-10/93	DATE ANALYZED	: 11/04/93
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 RECOVERY	LIMITS
BROMOFLUOROBENZENE	113 76 - 120



ATI I.D. # 9311-001-5

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW8-10/93	DATE ANALYZED	: 11/03/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDRESULT

BENZENE	2800	D6
ETHYLBENZENE	4100	D6
TOLUENE	79	
TOTAL XYLENES	950	D6

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	102	76 - 120
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5 = Value from a 50 fold diluted analysis.



ATI I.D. # 9311-001-6

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW9-10/93	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDRESULT

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

111

76 - 120



ATI I.D. # 9311-001-7

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW12-10/93	DATE ANALYZED	: 11/04/93
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 RECOVERY	LIMITS
BROMOFLUOROBENZENE	112 76 - 120



ATI I.D. # 9311-001-8

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: RINSATE-10/93	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUND	RESULT
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BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	112	76 - 120
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ATI I.D. # 9311-001-9

VOLATILE ORGANIC ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: TB	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDRESULT

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

110

76 - 120

ATI I.D. # 9311-001

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. # : BLANK
PROJECT # : 15659.001	DATE EXTRACTED : N/A
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE ANALYZED : 11/03/93
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	19.1	96	18.6	93	3
TOLUENE	<0.5	20.0	21.0	105	20.0	100	5
TOTAL XYLENES	<0.5	40.0	42.4	106	40.5	101	5

CONTROL LIMITS	% REC.	RPD
BENZENE	80 - 111	20
TOLUENE	78 - 111	20
TOTAL XYLENES	80 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	110	111	76 - 120



ATI I.D. # 9311-001

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/05/93
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	18.5	93	18.5	93	0
TOLUENE	<0.5	20.0	20.0	100	20.1	101	0
TOTAL XYLENES	<0.5	40.0	41.0	102	40.7	102	1

CONTROL LIMITS	% REC.	RPD
BENZENE	80 - 111	20
TOLUENE	78 - 111	20
TOTAL XYLENES	80 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	112	109	76 - 120

ATI I.D. # 9311-001

VOLATILE ORGANIC ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9310-284-4
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/03/93
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	18.6	93	18.7	94	1
TOLUENE	<0.5	20.0	19.9	100	19.6	98	2
TOTAL XYLENES	<0.5	40.0	41.5	104	40.3	101	3

CONTROL LIMITS	% REC.	RPD
BENZENE	77 - 112	20
TOLUENE	72 - 113	20
TOTAL XYLENES	80 - 110	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	111	113	76 - 120



ATI I.D. # 9311-001

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/03/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS RESULTS

BENZENE	<0.025
ETHYLBENZENE	<0.025
TOLUENE	<0.025
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

98

52 - 116



ATI I.D. # 9311-001-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/28/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/03/93
CLIENT I.D.	: MW12 @ 3.5'	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.031
ETHYLBENZENE	<0.031
TOLUENE	<0.031
TOTAL XYLENES	<0.031

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	88 52 - 116



ATI I.D. # 9311-001-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/03/93
CLIENT I.D.	: MW11 @ 3.5'	DATE ANALYZED	: 11/08/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1
RESULTS ARE CORRECTED FOR MOISTURE CONTENT			

COMPOUNDS	RESULTS
BENZENE	<0.031
ETHYLBENZENE	<0.031
TOLUENE	<0.031
TOTAL XYLENES	<0.031

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	88 52 - 116



ATI I.D. # 9311-001-3

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/03/93
CLIENT I.D.	: MW11 @ 7.5'	DATE ANALYZED	: 11/05/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.032
ETHYLBENZENE	<0.032
TOLUENE	<0.032
TOTAL XYLENES	<0.032

SURROGATE PERCENT RECOVERY	LIMITS
BROMOFLUOROBENZENE	94 52 - 116



ATI I.D. # 9311-001

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/03/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.980	98	0.993	99	1
TOLUENE	<0.0250	1.00	1.03	103	1.05	105	2
TOTAL XYLENES	<0.0250	2.00	2.12	106	2.18	109	3

CONTROL LIMITS	% REC.	RPD
BENZENE	63 - 115	20
TOLUENE	75 - 110	20
TOTAL XYLENES	79 - 109	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	99	102	52 - 116



ATI I.D. # 9311-001

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9310-282-2
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/03/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	1.00	0.959	96	0.968	97	1
TOLUENE	<0.0250	1.00	1.03	103	1.04	104	1
TOTAL XYLENES	0.0480	2.00	2.14	105	2.18	107	2

CONTROL LIMITS	% REC.	RPD
BENZENE	35 - 113	20
TOLUENE	43 - 107	20
TOTAL XYLENES	46 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	99	95	52 - 116



ATI I.D. # 9311-001

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : METHOD BLANK
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : N/A
DATE RECEIVED : N/A
DATE EXTRACTED : 11/01/93
DATE ANALYZED : 11/01/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

115

68 - 144



ATI I.D. # 9311-001-4

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/01/93
CLIENT I.D.	: MW7-10/93	DATE ANALYZED	: 11/02/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDRESULT
-----FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<1
C7 - C12
GASOLINEFUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

113

68 - 144



ATI I.D. # 9311-001-5

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW8-10/93
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : 10/29/93
DATE RECEIVED : 11/01/93
DATE EXTRACTED : 11/01/93
DATE ANALYZED : 11/02/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

3
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

114

68 - 144



ATI I.D. # 9311-001-6

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW9-10/93
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : 10/29/93
DATE RECEIVED : 11/01/93
DATE EXTRACTED : 11/01/93
DATE ANALYZED : 11/02/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

112

68 - 144



ATI I.D. # 9311-001-7

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW12-10/93
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : 10/29/93
DATE RECEIVED : 11/01/93
DATE EXTRACTED : 11/01/93
DATE ANALYZED : 11/02/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

112

68 - 144



ATI I.D. # 9311-001-8

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/01/93
CLIENT I.D.	: RINSATE-10/93	DATE ANALYZED	: 11/02/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDRESULT

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

112

68 - 144

ATI I.D. # 9311-001

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/01/93
EPA METHOD	: 8015 (MODIFIED)	UNITS	: mg/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
GASOLINE	<1.0	50.0	40.4	81	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
GASOLINE				52 - 124			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		116		N/A		68 - 144	



ATI I.D. # 9311-001

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9310-271-1
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/02/93
EPA METHOD	: 8015 (MODIFIED)	UNITS	: mg/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
GASOLINE	327	307	6	50.0	338	22G	298	58G	13
CONTROL LIMITS						% REC.			RPD
GASOLINE						64 - 118			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				122		123		68 - 144	

G = Out of limits due to high levels of target analytes in sample.

ATI I.D. # 9311-001

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : METHOD BLANK
SAMPLE MATRIX : SOIL
EPA METHOD : 8015 (MODIFIED)
RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : N/A
DATE RECEIVED : N/A
DATE EXTRACTED : 11/02/93
DATE ANALYZED : 11/02/93
UNITS : mg/Kg
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<5
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<25
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

96

52 - 143



ATI I.D. # 9311-001-1

FUEL HYDROCARBONS DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/28/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/02/93
CLIENT I.D.	: MW12 @ 3.5'	DATE ANALYZED	: 11/02/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

----- COMPOUNDS

RESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<6
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<31
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

97

52 - 143



ATI I.D. # 9311-001-2

FUEL HYDROCARBONS DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 CLIENT I.D. : MW11 @ 3.5'
 SAMPLE MATRIX : SOIL
 EPA METHOD : 8015 (MODIFIED)
 RESULTS ARE CORRECTED FOR MOISTURE CONTENT

DATE SAMPLED : 10/29/93
 DATE RECEIVED : 11/01/93
 DATE EXTRACTED : 11/02/93
 DATE ANALYZED : 11/02/93
 UNITS : mg/Kg
 DILUTION FACTOR : 1

COMPOUNDS

RESULTS

FUEL HYDROCARBONS
 HYDROCARBON RANGE
 HYDROCARBON QUANTITATION USING

<6
 C7 - C12
 GASOLINE

FUEL HYDROCARBONS
 HYDROCARBON RANGE
 HYDROCARBON QUANTITATION USING

<31
 C12 - C24
 DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

2-TERPHENYL

110

52 - 143



ATI I.D. # 9311-001-3

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 10/29/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/01/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/02/93
CLIENT I.D.	: MW11 @ 7.5'	DATE ANALYZED	: 11/03/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<6
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<32
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

102

52 - 143



Analytical Technologies, Inc.

ATI I.D. # 9311-001

FUEL HYDROCARBONS
QUALITY CONTROL DATA

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

SAMPLE I.D. # : BLANK
 DATE EXTRACTED : 11/02/93
 DATE ANALYZED : 11/02/93
 UNITS : mg/Kg

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<25.0	500	511	102	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
DIESEL				67 - 135			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		98		N/A		52 - 143	



ATI I.D. # 9311-001

FUEL HYDROCARBONS
QUALITY CONTROL DATA

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

SAMPLE I.D. # : 9310-269-5
 DATE EXTRACTED : 11/02/93
 DATE ANALYZED : 11/02/93
 UNITS : mg/Kg

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	<25.0	<25.0	NC	500	505	101	476	95	6
CONTROL LIMITS						% REC.			RPD
DIESEL						56 - 137			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				101		93		52 - 143	

NC = Not Calculable.



ATI I.D. # 9311-001

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

ELEMENT	DATE PREPARED	DATE ANALYZED
---------	---------------	---------------

LEAD

11/03/93

11/04/93



ATI I.D. # 9311-001

METALS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

UNITS : mg/L

ATI I.D. #	CLIENT I.D.	LEAD
9311-001-4	MW7-10/93	<0.0030
9311-001-5	MW8-10/93	<0.0030
9311-001-6	MW9-10/93	<0.0030
9311-001-7	MW12-10/93	<0.0030
9311-001-8	RINSATE-10/93	<0.0030
METHOD BLANK	-	<0.0030

ATI I.D. # 9311-001

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

UNITS : mg/L

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	BLANK	<0.0030	N/A	N/A	0.0274	0.0250	110
LEAD	9311-020-1	0.0037	0.0037	0	0.0347	0.0250	124

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

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



Analytical Technologies, Inc.

ATI I.D. # 9311-001

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

ELEMENT

DATE PREPARED

DATE ANALYZED

LEAD

11/09/93

11/10/93



ATTI I.D. # 9311-001

METALS ANALYSIS
DATA SUMMARY

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

MATRIX : SOIL

UNITS : mg/Kg

ATTI I.D. #	CLIENT I.D.	LEAD
9311-001-1	MW12 @ 3.5'	3.0
9311-001-2	MW11 @ 3.5'	3.8
9311-001-3	MW11 @ 7.5'	3.6
METHOD BLANK	-	<1.5



ATI I.D. # 9311-001

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL
UNITS : mg/Kg

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	BLANK	<1.5	N/A	N/A	45.2	50.0	90
LEAD	9311-232-29	14	11	24	66.7	61.8	85

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

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

ATI I.D. # 9311-001

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

PARAMETER	DATE ANALYZED
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MOISTURE	11/02/93
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ATI I.D. # 9311-001

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE
------------	-------------	----------

9311-001-1	MW12 @ 3.5'	20
9311-001-2	MW11 @ 3.5'	20
9311-001-3	MW11 @ 7.5'	21



ATI I.D. # 9311-001

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : SOIL

UNITS : %

PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9311-001-3	21	20	5	N/A	N/A	N/A

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

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

EPA 8015 Modified

Sample: 9311-001-5

Channel: BERT

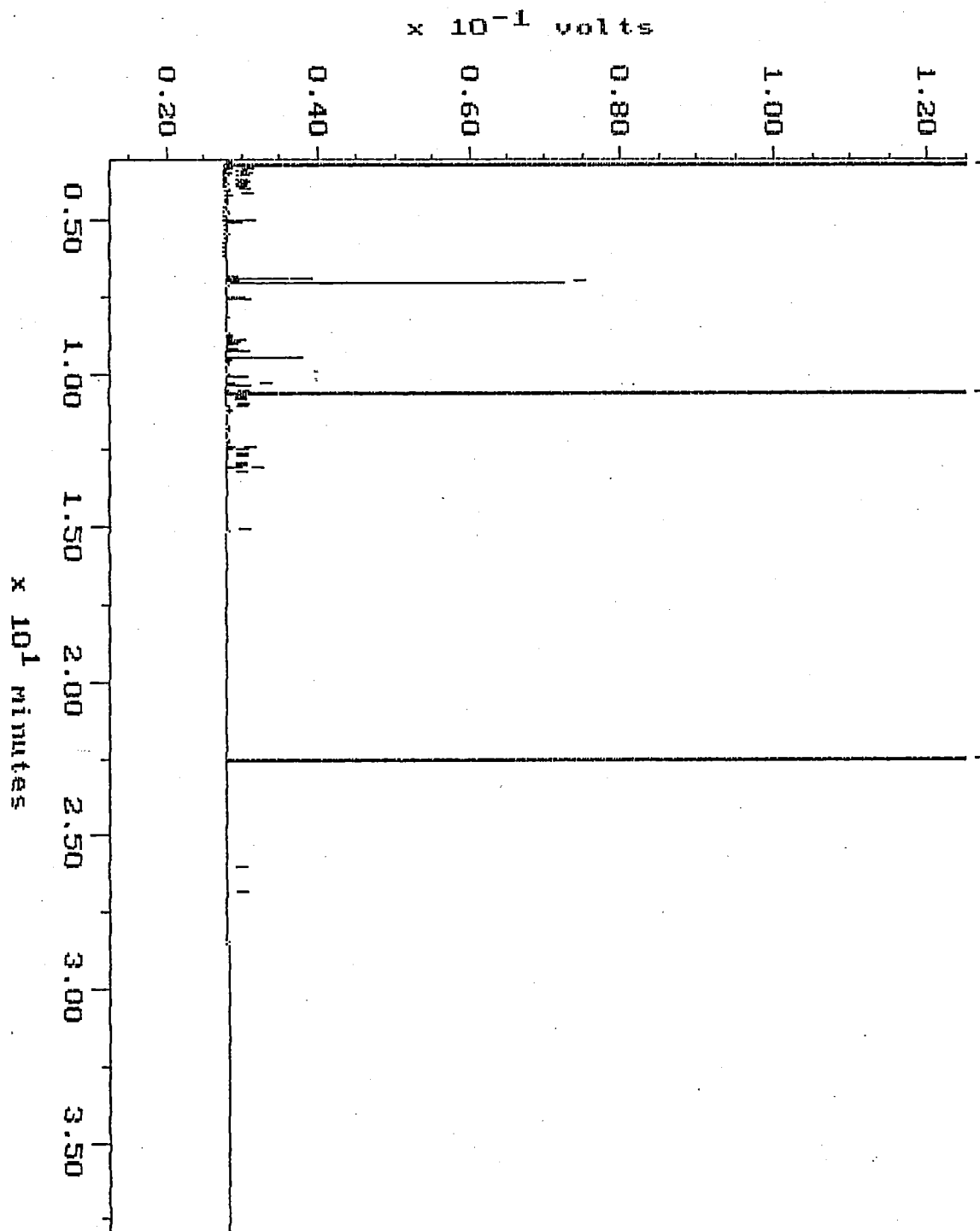
Filename: R0018B15

Acquired: 02-NOV-93 2:01

Method: F:\BRO2\MAXDATA\BERT\FUEL1101

Operator: ATI

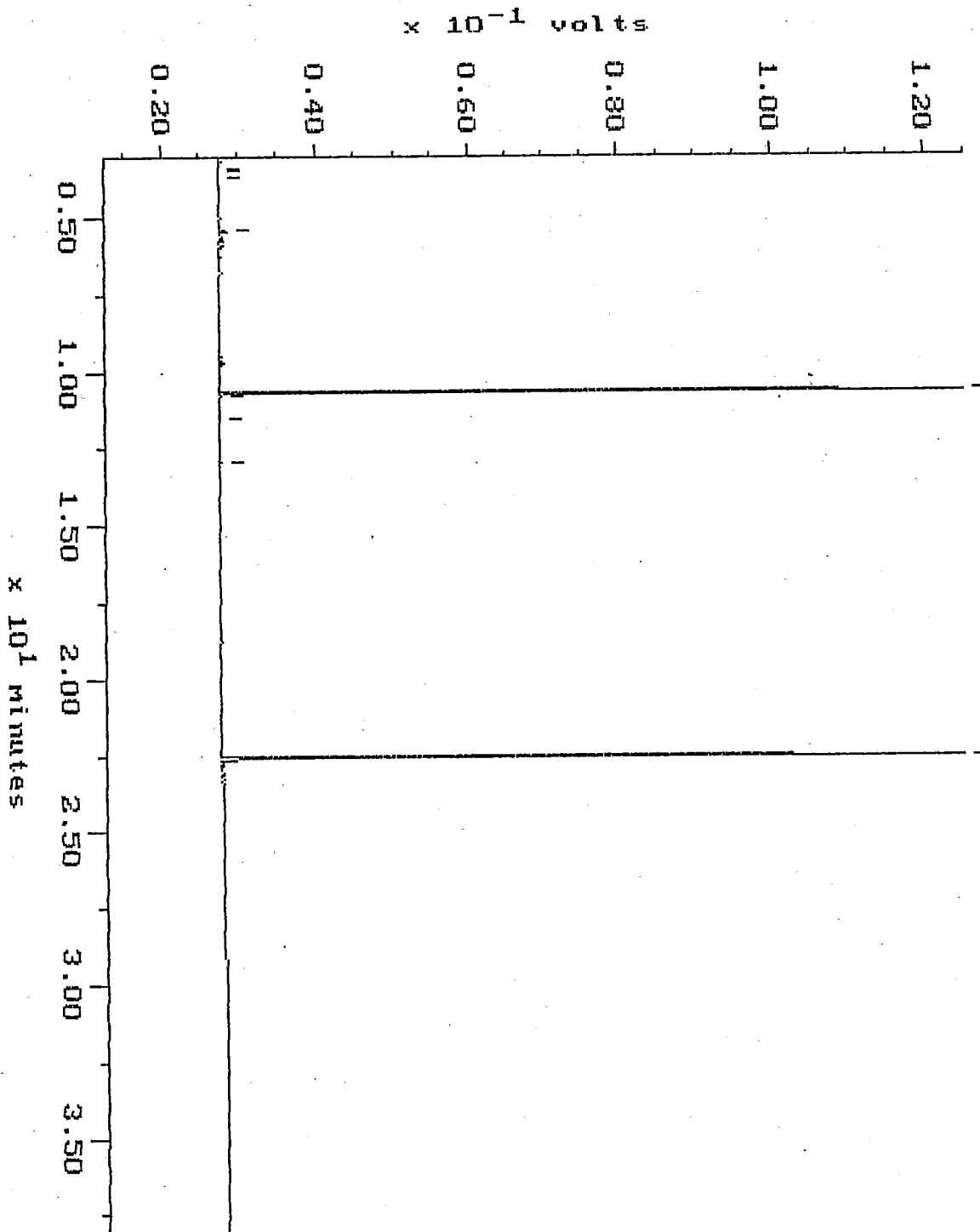
Comments: ATI: THE QUALITY TEAM



Blank

Sample: WRB 11-1 Channel: BERT
Acquired: 01-NOV-93 17:35 Method: F:\BRO2\MAXDATA\BERT\FUEL1101
Comments: ATI: THE QUALITY TEAM

Filename: RB018B04
Operator: ATI

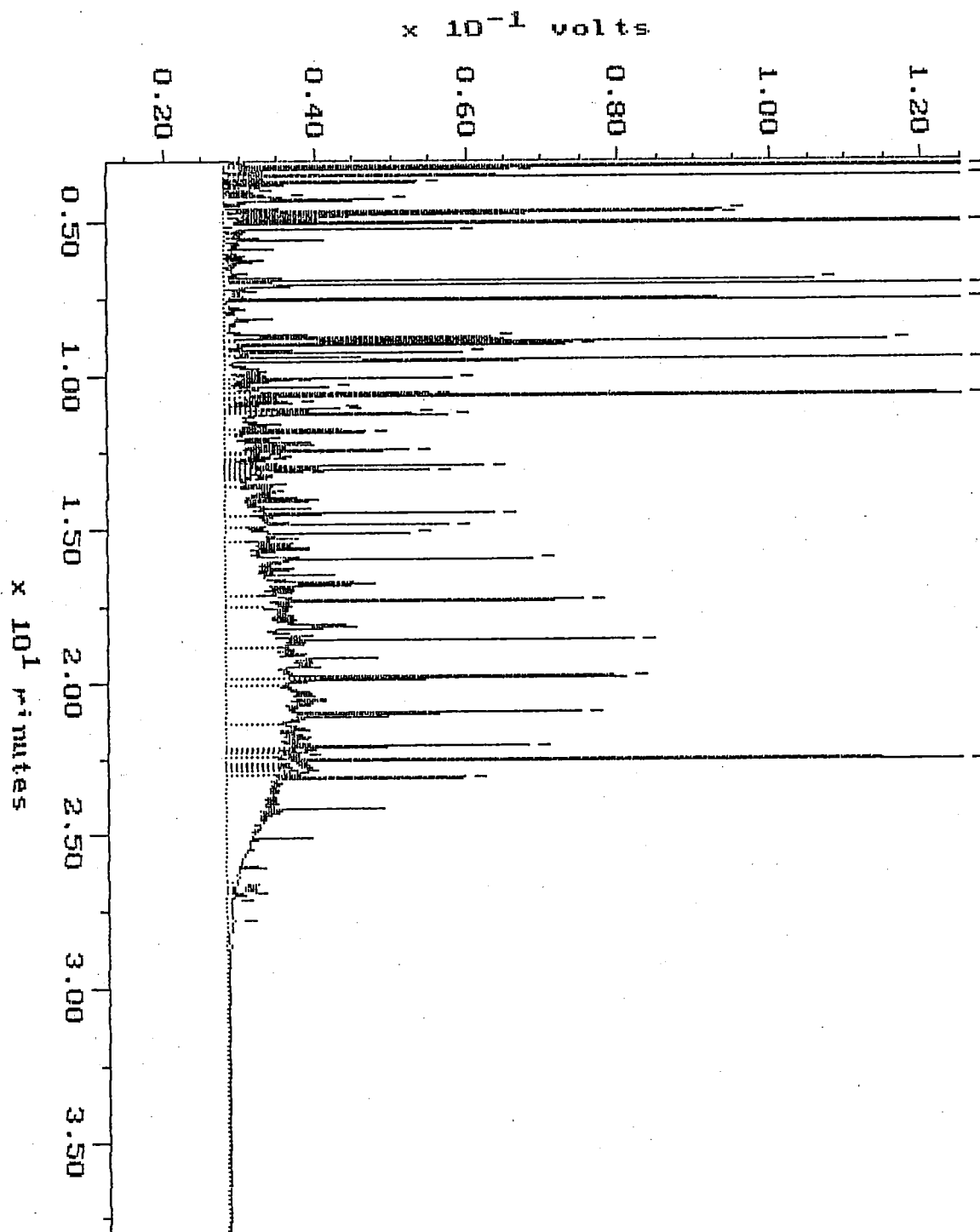


Continuing Calibration

Sample: DG 400
Acquired: 01-NOV-93 16:03
Comments: ATI: THE QUALITY TEAM

Channel: BERT
Method: F:\BR02\MAXDATA\BERT\FUEL1101

Filename: RB018B03
Operator: ATI

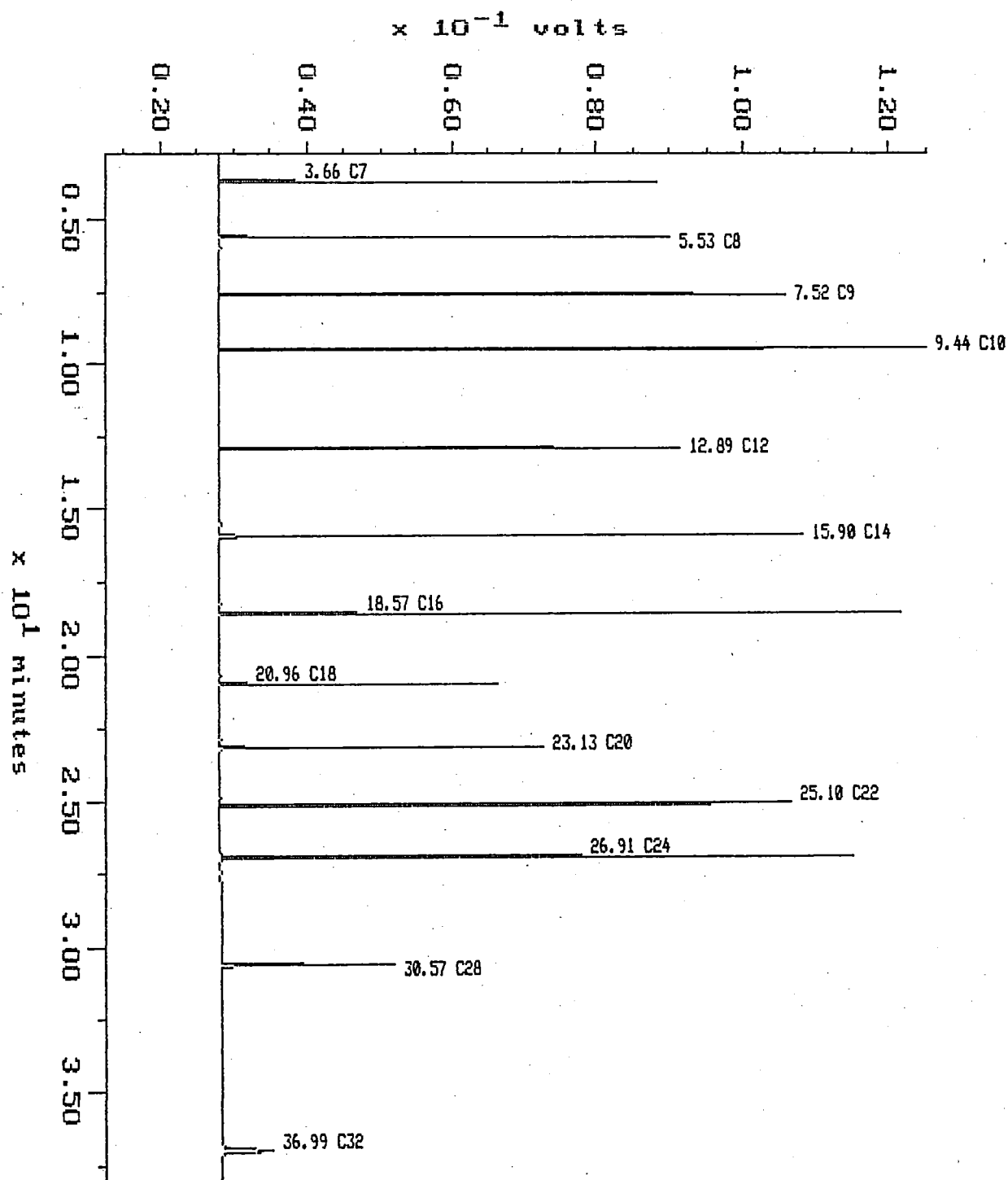


Alkane

Sample: ALKANE
Acquired: 01-NOV-93 15:17
Inj Vol: 1.00

Channel: BERT
Method: F:\BRO2\MAXDATA\BERT\FUEL1101

Filename: RB018B02
Operator: ATI

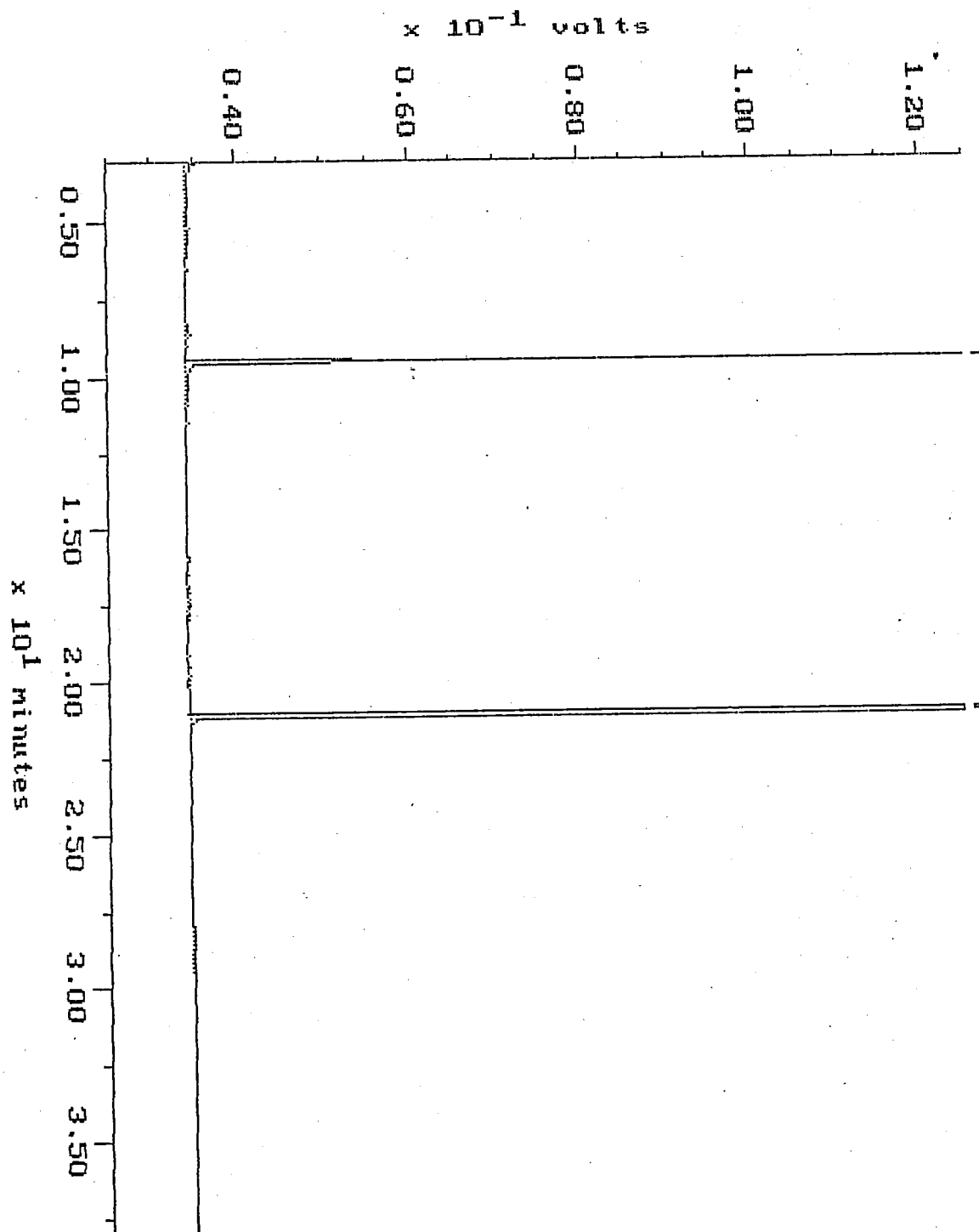


Blank

Sample: SRB 11-2 8015
Acquired: 02-NOV-93 14:19
Comments: ATI: THE QUALITY TEAM

Channel: ERNIE
Method: F:\BR02\MAXDATA\ERNIE\FUEL1102

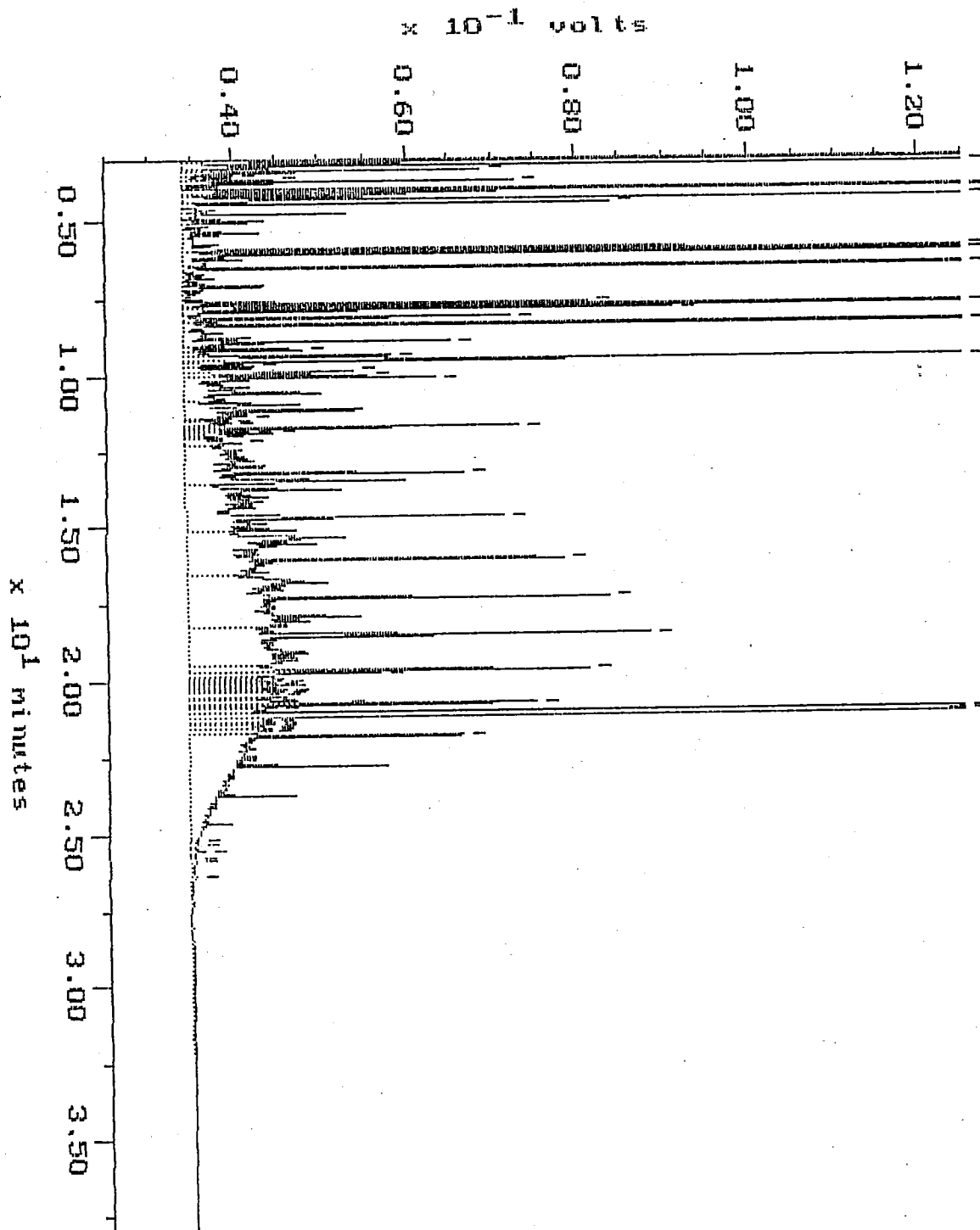
Filename: RB028E03
Operator: ATI



Continuing Calibration

Sample: DG 400 Channel: ERNIE
Acquired: 02-NOV-93 13:33 Method: F:\BRO2\MAXDATA\ERNIE\FUEL1102
Comments: ATI: THE QUALITY TEAM

Filename: RB026E02
Operator: ATI

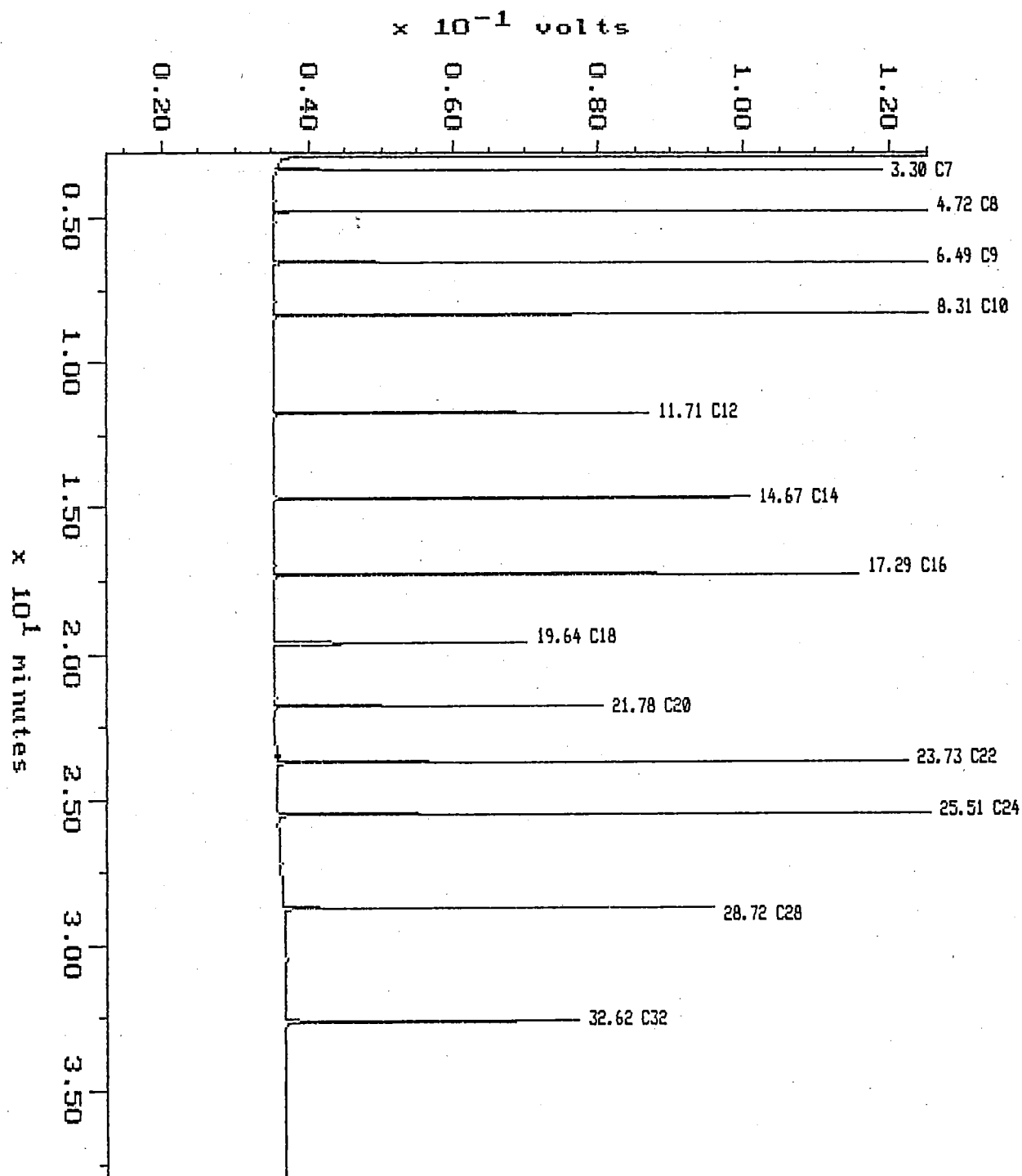


Alkane

Sample: ALKANE
Acquired: 01-NOV-93 15:17
Inj Vol: 1.00

Channel: ERNIE
Method: F:\BRO2\MAXDATA\ERNIE\FUEL1101

Filename: RB018E02
Operator: ATI





led Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-C STUDY

Date Oct 31 1993 Page 1 of 1

PROJECT INFORMATION				ANALYSIS REQUEST															
Project Manager: <u>Peter Barry</u>				Laboratory Number: <u>9311-001</u>															
Project Name: <u>Burns Bros. / Thorpe</u>																			
Project Number: <u>15,657,001</u>																			
Site Location: <u>Thorpe Wa</u> Sampled By: <u>DDD</u>																			
DISPOSAL INFORMATION																			
<input checked="" type="checkbox"/> Lab Disposal (return if not indicated)																			
Disposal Method: _____																			
Disposed by: _____ Disposal Date: _____																			
QC INFORMATION (check one)																			
<input type="checkbox"/> SW-846 <input type="checkbox"/> CLP <input type="checkbox"/> Screening <input type="checkbox"/> AGI Std. <input type="checkbox"/> Special																			
SAMPLE ID				DATE				TIME				MATRIX				LAB ID			
MW12 @ 3.5'				10-28-93				1434				Soil				1			
MW11 @ 3.5'				10-28-93				0655				Soil				2			
MW11 @ 7.5'				10-28-93				0710				Soil				3			
MW7 - 40/93				10-28-93				1510				Wet kr				4			
MW8 - 10/93				10-28-93				1645				Wet kr				5			
MW9 - 10/93				10-28-93				1745				Wet kr				6			
MW12 - 10/93				10-28-93				1825				Wet kr				7			
RW12 - 40/93				10-28-93				1850				Wet kr				8			
THB																			
LAB INFORMATION				SAMPLE RECEIPT				RELINQUISHED BY: 1.				RELINQUISHED BY: 2.				RELINQUISHED BY: 3.			
Lab Name: <u>ATI</u>				Total Number of Containers: <u>34</u>				Signature: <u>[Signature]</u> Time: <u>1830</u>				Signature: _____ Time: _____				Signature: _____ Time: _____			
Lab Address: <u>560 Nichols Blvd</u>				Chain of Custody Seals: <u>Y/N/A</u>				Printed Name: <u>David Pearson</u> Date: <u>10-31-93</u>				Printed Name: _____ Date: _____				Printed Name: _____ Date: _____			
Via: <u>Carrier</u>				Intact?: <u>Y/N/A</u>				Company: <u>AGI</u>				Company: _____				Company: _____			
Turn Around Time: <input checked="" type="checkbox"/> Standard <input type="checkbox"/> 24 hr. <input type="checkbox"/> 48 hr. <input type="checkbox"/> 72 hr. <input type="checkbox"/> 1 wk.				Received in Good Condition/Cold: <u>Y/N</u>				RECEIVED BY: 1.				RECEIVED BY: 2.				RECEIVED BY: 3.			
								Signature: <u>[Signature]</u> Time: <u>1830</u>				Signature: _____ Time: _____				Signature: _____ Time: _____			
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA								Printed Name: <u>STINA KENSLER</u> Date: <u>11/1/93</u>				Printed Name: _____ Date: _____				Printed Name: _____ Date: _____			
Special Instructions:								Company: <u>ATI-LLH</u>				Company: _____				Company: _____			

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

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

Rev. 4/92

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
 Project No.: 15659.001
 Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
 Lab Number: 9311-017
 Sample No.: MW10-10/96, MW11-10/96, MW100-10/96, Trip Blank
 Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable for use.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
PAH ^a	HPLC/UV/FLUOR	EPA 8310
BETX	GC/PID	EPA 8020
TPH ^b	GC/FID	EPA 8015
Lead	AA/GF	EPA 7421

Sample Trip Blank was analyzed by EPA 8020 only.

- a - Polycyclic aromatic hydrocarbons.
- b - Fuel hydrocarbons, analyzed for gasoline (C₇ - C₁₂) and diesel (C₁₂ - C₂₄) range TPH.

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
PAH	11/01/93	11/04/93	11/08/93	3 (7)	4 (40)
BETX	11/01/93	NA	11/04/93	NA	3 (14)
TPH	11/01/93	11/04/93	11/04/93	3	3 (14)
Lead	11/01/93	11/04/93	11/10/93	3	9 (180)

NA - Not applicable.

() - Numbers in parentheses indicate recommended holding times in days.

All samples were extracted and analyzed within recommended holding times.

FUEL HYDROCARBON CHROMATOGRAMS

Gasoline (C₇ - C₁₂) and diesel range (C₁₂ - C₂₄) TPH were not detected by EPA 8015 Modified in any samples documented by this report.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9311-017
Sample No.: MW10-10/96, MW11-10/96, MW100-10/96, Trip Blank
Matrix: Water

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: Sample MW100-10/96 is a duplicate of MW11-10/96. Both samples were analyzed by EPA Methods 8015, 8020, 8310, and 7421. No analytes were detected at or above their method reporting limits (MRLs) by these methods, indicating acceptable precision.

Rinsate: None collected.

Trip Blank: Sample Trip Blank was analyzed by EPA 8020. Analytes were not detected at or above their MRLs in this sample. Cross-contamination is not identified.

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above their MRLs in the method blanks for the following methods:

EPA 8310
EPA 8020
EPA 8015M
EPA 7421

Matrix Spikes: Matrix spike percent recoveries are within acceptance control limit criteria for EPA 7421.

Matrix spike and matrix spike duplicate percent recoveries and relative percent differences (RPDs) are within ATI's control limit criteria for EPA 8020 and EPA 8015M.

Duplicates: Duplicate sample RPDs are within ATI's control limit criteria for EPA 8015M and EPA 7421.

Blank Spikes: Blank spike percent recoveries are within ATI's control limit criteria for EPA 8015M and EPA 7421.

Blank spike and blank spike duplicate percent recoveries and RPDs are within ATI's control limit criteria for EPA 8310 and EPA 8020.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Bros/Bingo Fuel Stop
Project No.: 15659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9311-017
Sample No.: MW10-10/96, MW11-10/96, MW100-10/96, Trip Blank
Matrix: Water

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

EPA 8310
EPA 8020
EPA 8015M

SIGNATURES

Prepared by *Angela Piri* Date 12/01/93
Checked by *Katherine Bourbonnais* Date 12/1/93



Analytical**Technologies**, Inc.

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

Karen L. Mixon, Laboratory Manager

ATI I.D. # 9311-017

November 22, 1993

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

Attention : Peter Barry

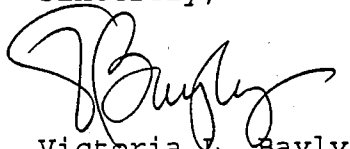
Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On November 2, 1993, Analytical Technologies, Inc. (ATI), received four 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.

Sincerely,


Victoria L. Bayly
Project Manager

VLB/hal/ms

Enclosure



ATI I.D. # 9311-017

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9311-017-1	MW10 - 10/96	11/01/93	WATER
9311-017-2	MW11 - 10/96	11/01/93	WATER
9311-017-3	MW100 - 10/96	11/01/93	WATER
9311-017-4	TRIP BLANK	N/A	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	4

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.

ATI I.D. # 9311-017

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
POLYNUCLEAR AROMATIC HYDROCARBONS	HPLC/UV/FLUOR	EPA 8310	R
BETX	GC/PID	EPA 8020	R
FUEL HYDROCARBONS	GC/FID	EPA 8015 MODIFIED	R
LEAD	AA/GF	EPA 7421	R

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

ATI I.D. # 9311-017

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS

Three (3) water samples were received by ATI on November 2, 1993, for the following analysis: EPA method 8310.

All corresponding quality assurance and quality control results defined as matrix spike/matrix spike duplicate (MS/MSD), blank spike (BS), method blank and surrogate recoveries were within the established control limits.



ATI I.D. # 9311-017

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : N/A
PROJECT # : 15659.001	DATE RECEIVED : N/A
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/04/93
CLIENT I.D. : METHOD BLANK	DATE ANALYZED : 11/08/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	DILUTION FACTOR : 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.50
ACENAPHTHYLENE	<1.0
1-METHYLNAPHTHALENE	<0.50
2-METHYLNAPHTHALENE	<0.50
ACENAPHTHENE	<0.50
FLUORENE	<0.10
PHENANTHRENE	<0.050
ANTHRACENE	<0.050
FLUORANTHENE	<0.10
PYRENE	<0.10
BENZO (A) ANTHRACENE	<0.10
CHRYSENE	<0.10
BENZO (B) FLUORANTHENE	<0.10
BENZO (K) FLUORANTHENE	<0.10
BENZO (A) PYRENE	<0.10
DIBENZO (A, H) ANTHRACENE	<0.20
BENZO (G, H, I) PERYLENE	<0.10
INDENO (1, 2, 3-CD) PYRENE	<0.10

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	80	33 - 123
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ATI I.D. # 9311-017-1

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : 11/01/93
PROJECT # : 15659.001	DATE RECEIVED : 11/02/93
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : 11/04/93
CLIENT I.D. : MW10 - 10/96	DATE ANALYZED : 11/08/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8310	DILUTION FACTOR : 1

COMPOUNDSRESULTS

NAPHTHALENE	<0.49
ACENAPHTHYLENE	<0.98
1-METHYLNAPHTHALENE	<0.49
2-METHYLNAPHTHALENE	<0.49
ACENAPHTHENE	<0.49
FLUORENE	<0.098
PHENANTHRENE	<0.049
ANTHRACENE	<0.049
FLUORANTHENE	<0.098
PYRENE	<0.098
BENZO (A) ANTHRACENE	<0.098
CHRYSENE	<0.098
BENZO (B) FLUORANTHENE	<0.098
BENZO (K) FLUORANTHENE	<0.098
BENZO (A) PYRENE	<0.098
DIBENZO (A, H) ANTHRACENE	<0.20
BENZO (G, H, I) PERYLENE	<0.098
INDENO (1, 2, 3-CD) PYRENE	<0.098

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	87	33 - 123
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ATI I.D. # 9311-017-2

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/04/93
CLIENT I.D.	: MW11 - 10/96	DATE ANALYZED	: 11/08/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	<0.47
2-METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	89	33 - 123
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ATI I.D. # 9311-017-3

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/04/93
CLIENT I.D.	: MW100 - 10/96	DATE ANALYZED	: 11/08/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.47
ACENAPHTHYLENE	<0.94
1-METHYLNAPHTHALENE	<0.47
2-METHYLNAPHTHALENE	<0.47
ACENAPHTHENE	<0.47
FLUORENE	<0.094
PHENANTHRENE	<0.047
ANTHRACENE	<0.047
FLUORANTHENE	<0.094
PYRENE	<0.094
BENZO (A) ANTHRACENE	<0.094
CHRYSENE	<0.094
BENZO (B) FLUORANTHENE	<0.094
BENZO (K) FLUORANTHENE	<0.094
BENZO (A) PYRENE	<0.094
DIBENZO (A, H) ANTHRACENE	<0.19
BENZO (G, H, I) PERYLENE	<0.094
INDENO (1, 2, 3-CD) PYRENE	<0.094

SURROGATE PERCENT RECOVERY

LIMITS

2-CHLOROANTHRACENE	74	33 - 123
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ATI I.D. # 9311-017

POLYNUCLEAR AROMATIC HYDROCARBON ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/04/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/08/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8310		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ACENAPHTHYLENE	<1.00	20.0	14.7	74	15.7	78	7
PHENANTHRENE	<0.0500	2.00	1.59	80	1.62	81	2
PYRENE	<0.100	2.00	1.78	89	1.79	90	1
BENZO (K) FLUORANTHENE	<0.100	2.00	1.84	92	1.81	91	2
DIBENZO (A, H) ANTHRACENE	<0.200	2.00	2.06	103	2.05	102	0

CONTROL LIMITS

	% REC.	RPD
ACENAPHTHYLENE	32 - 131	32
PHENANTHRENE	58 - 120	30
PYRENE	50 - 120	30
BENZO (K) FLUORANTHENE	50 - 120	29
DIBENZO (A, H) ANTHRACENE	56 - 129	26

SURROGATE RECOVERIES

	SPIKE	DUP. SPIKE	LIMITS
2-CHLOROANTHRACENE	89	87	33 - 123



Analytical Technologies, Inc.

ATI I.D. # 9311-017

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/02/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

91

76 - 120



ATI I.D. # 9311-017

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/03/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

95

76 - 120



ATI I.D. # 9311-017-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW10 - 10/96	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	95	76 - 120
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ATI I.D. # 9311-017-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW11 - 10/96	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

92

76 - 120



ATI I.D. # 9311-017-3

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW100 - 10/96	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

89

76 - 120



ATI I.D. # 9311-017-4

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: 11/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: TRIP BLANK	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE

91

76 - 120



Analytical Technologies, Inc.

ATI I.D. # 9311-017

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/02/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	20.0	19.4	97	19.5	98	1
TOLUENE	<0.500	20.0	20.4	102	20.7	103	1
TOTAL XYLENES	<0.500	40.0	42.0	105	42.6	107	1

CONTROL LIMITS	% REC.	RPD
BENZENE	80 - 111	20
TOLUENE	78 - 111	20
TOTAL XYLENES	80 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	97	98	76 - 120



ATI I.D. # 9311-017

 VOLATILE ORGANICS ANALYSIS
 QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/03/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	20.0	19.1	96	19.3	97	1
TOLUENE	<0.500	20.0	20.4	102	20.6	103	1
TOTAL XYLENES	<0.500	40.0	42.5	106	43.1	108	1

CONTROL LIMITS	% REC.	RPD
BENZENE	80 - 111	20
TOLUENE	78 - 111	20
TOTAL XYLENES	80 - 114	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	97	100	76 - 120



ATI I.D. # 9311-017

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
SAMPLE MATRIX : WATER
EPA METHOD : 8020 (BETX)

SAMPLE I.D. # : 9310-277-2
DATE EXTRACTED : N/A
DATE ANALYZED : 11/03/93
UNITS : ug/L

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	20.0	19.3	97	20.2	101	1
TOLUENE	<0.500	20.0	20.7	103	21.5	108	1
TOTAL XYLENES	<0.500	40.0	42.0	105	43.4	109	1

CONTROL LIMITS	% REC.	RPD
BENZENE	77 - 112	20
TOLUENE	72 - 113	20
TOTAL XYLENES	80 - 110	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	98	102	76 - 120



ATI I.D. # 9311-017

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : METHOD BLANK
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : N/A
DATE RECEIVED : N/A
DATE EXTRACTED : 11/04/93
DATE ANALYZED : 11/04/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

-TERPHENYL

106

68 - 144



Analytical Technologies, Inc.

ATI I.D. # 9311-017-1

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW10 - 10/96
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : 11/01/93
DATE RECEIVED : 11/02/93
DATE EXTRACTED : 11/04/93
DATE ANALYZED : 11/04/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
- HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

TERPHENYL

108

68 - 144



ATI I.D. # 9311-017-2

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
CLIENT I.D. : MW11 - 10/96
SAMPLE MATRIX : WATER
EPA METHOD : 8015 (MODIFIED)

DATE SAMPLED : 11/01/93
DATE RECEIVED : 11/02/93
DATE EXTRACTED : 11/04/93
DATE ANALYZED : 11/04/93
UNITS : mg/L
DILUTION FACTOR : 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

-TERPHENYL

108

68 - 144



ATI I.D. # 9311-017-3

FUEL HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/01/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/02/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/04/93
CLIENT I.D.	: MW100 - 10/96	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
EPA METHOD	: 8015 (MODIFIED)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C7 - C12
GASOLINE

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<1
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

TERPHENYL

107

68 - 144



ATI I.D. # 9311-017

 FUEL HYDROCARBONS
 QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 SAMPLE MATRIX : WATER
 METHOD : 8015 (MODIFIED)

SAMPLE I.D. # : BLANK
 DATE EXTRACTED : 11/04/93
 DATE ANALYZED : 11/04/93
 UNITS : mg/L

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED	DUP. %	RPD
					SAMPLE	REC.	
GASOLINE	<1.00	50.0	35.0	70	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
GASOLINE				52 - 124			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		109		N/A		68 - 144	



ATI I.D. # 9311-017

 FUEL HYDROCARBONS
 QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9311-017-1
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/04/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: 8015 (MODIFIED)		

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
GASOLINE	<1.00	<1.00	NC	50.0	38.1	76	40.4	81	6
CONTROL LIMITS						% REC.			RPD
GASOLINE						64 - 118			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				112		112		68 - 144	

NC = Not Calculable.

ATI I.D. # 9311-017

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

ELEMENT	DATE PREPARED	DATE ANALYZED
LEAD	11/04/93	11/10/93



ATI I.D. # 9311-017

FUEL HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9311-017-1
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/04/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/04/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: 8015 (MODIFIED)		

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
GASOLINE	<1.00	<1.00	NC	50.0	38.1	76	40.4	81	6
CONTROL LIMITS						% REC.			RPD
GASOLINE						64 - 118			20
SURROGATE RECOVERIES				SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL				112		112		68 - 144	

NC = Not Calculable.



ATI I.D. # 9311-017

METALS ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

ELEMENT

DATE PREPARED

DATE ANALYZED

LEAD

11/04/93

11/10/93

ATI I.D. # 9311-017

METALS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

UNITS : mg/L

ATI I.D. #	CLIENT I.D.	LEAD
9311-017-1	MW10 - 10/96	<0.0030
9311-017-2	MW11 - 10/96	<0.0030
9311-017-3	MW100 - 10/96	<0.0030
METHOD BLANK	-	<0.0030



Analytical Technologies, Inc.

ATI I.D. # 9311-017

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

UNITS : mg/L

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	BLANK	<0.0030	N/A	N/A	0.0240	0.0250	96
LEAD	9311-027-2D	<0.0030	<0.0030	NC	0.0223	0.0250	89

NC = Not Calculable.

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

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



ATI I.D. # 9311-017

METALS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

MATRIX : WATER

UNITS : mg/L

ATI I.D. #	CLIENT I.D.	LEAD
9311-017-1	MW10 - 10/96	<0.0030
9311-017-2	MW11 - 10/96	<0.0030
9311-017-3	MW100 - 10/96	<0.0030
METHOD BLANK	-	<0.0030

ATI I.D. # 9311-017

METALS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : WATER
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP UNITS : mg/L

ELEMENT	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
LEAD	BLANK	<0.0030	N/A	N/A	0.0240	0.0250	96
LEAD	9311-027-2D	<0.0030	<0.0030	NC	0.0223	0.0250	89

NC = Not Calculable.

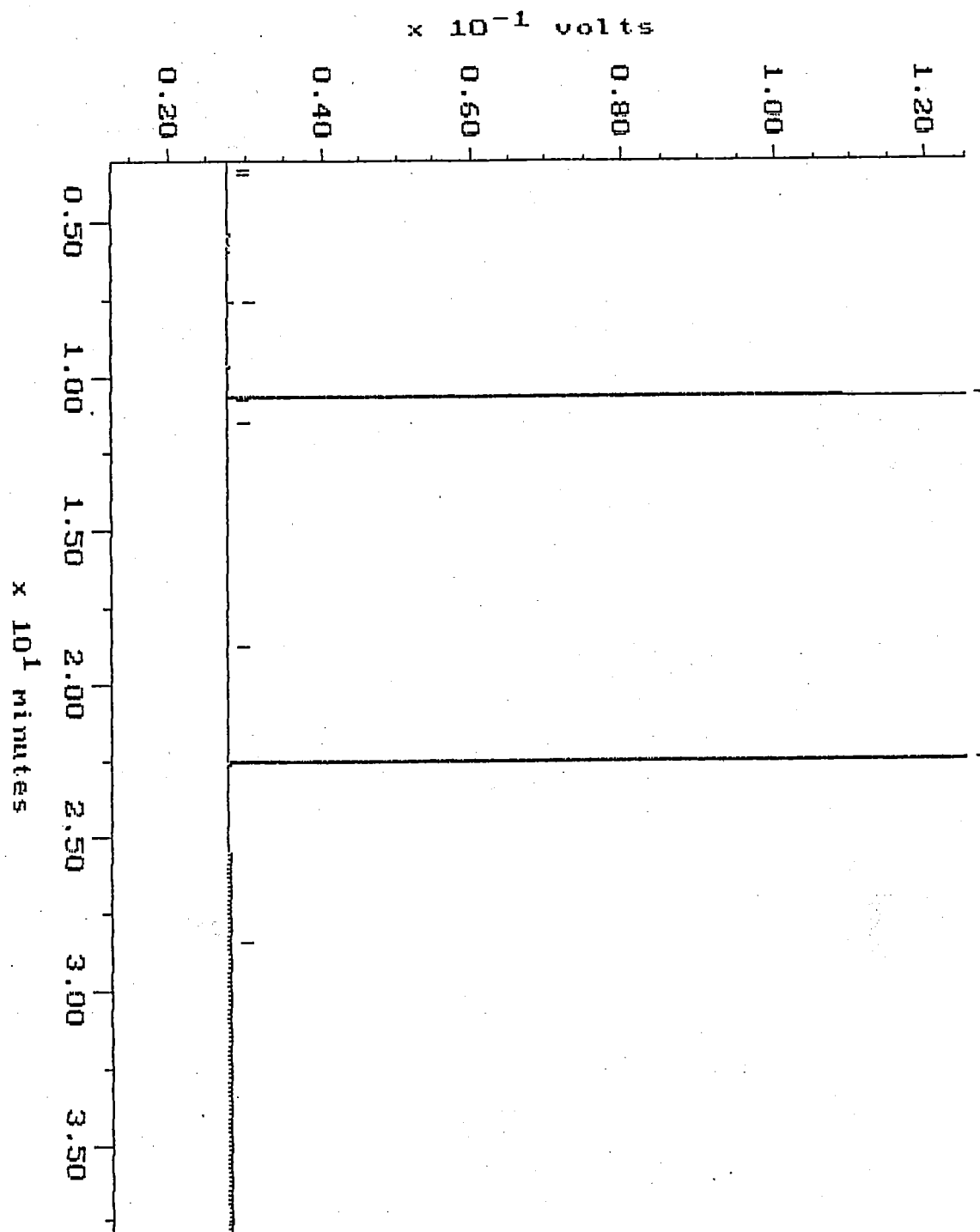
$$\% \text{ Recovery} = \frac{(\text{Spike Sample Result} - \text{Sample Result})}{\text{Spike Concentration}} \times 100$$

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

Blank

Sample: WRB 11-4 Channel: BERT
Acquired: 04-NOV-93 13:10 Method: F:\BRO2\MAXDATA\BERT\FUEL1104
Comments: ATI: THE QUALITY TEAM

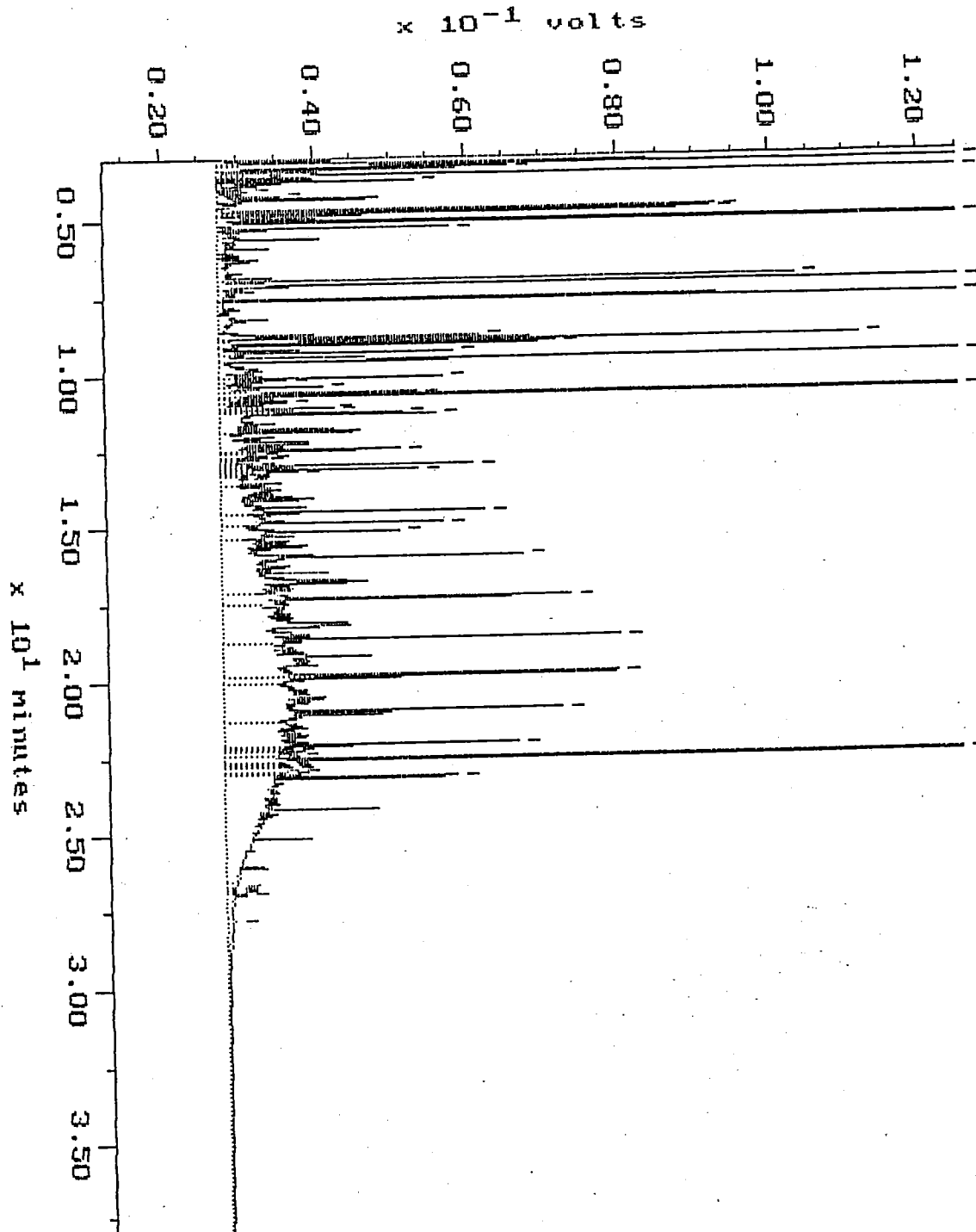
Filename: RB048B03
Operator: ATI



Continuing Calibration

Sample: DG 488 Channel: BERT
Acquired: 84-NOV-93 12:23 Method: F:\BRO2\MAXDATA\BERT\FUEL1104
Comments: ATI: THE QUALITY TEAM

Filename: RB048B02
Operator: ATI

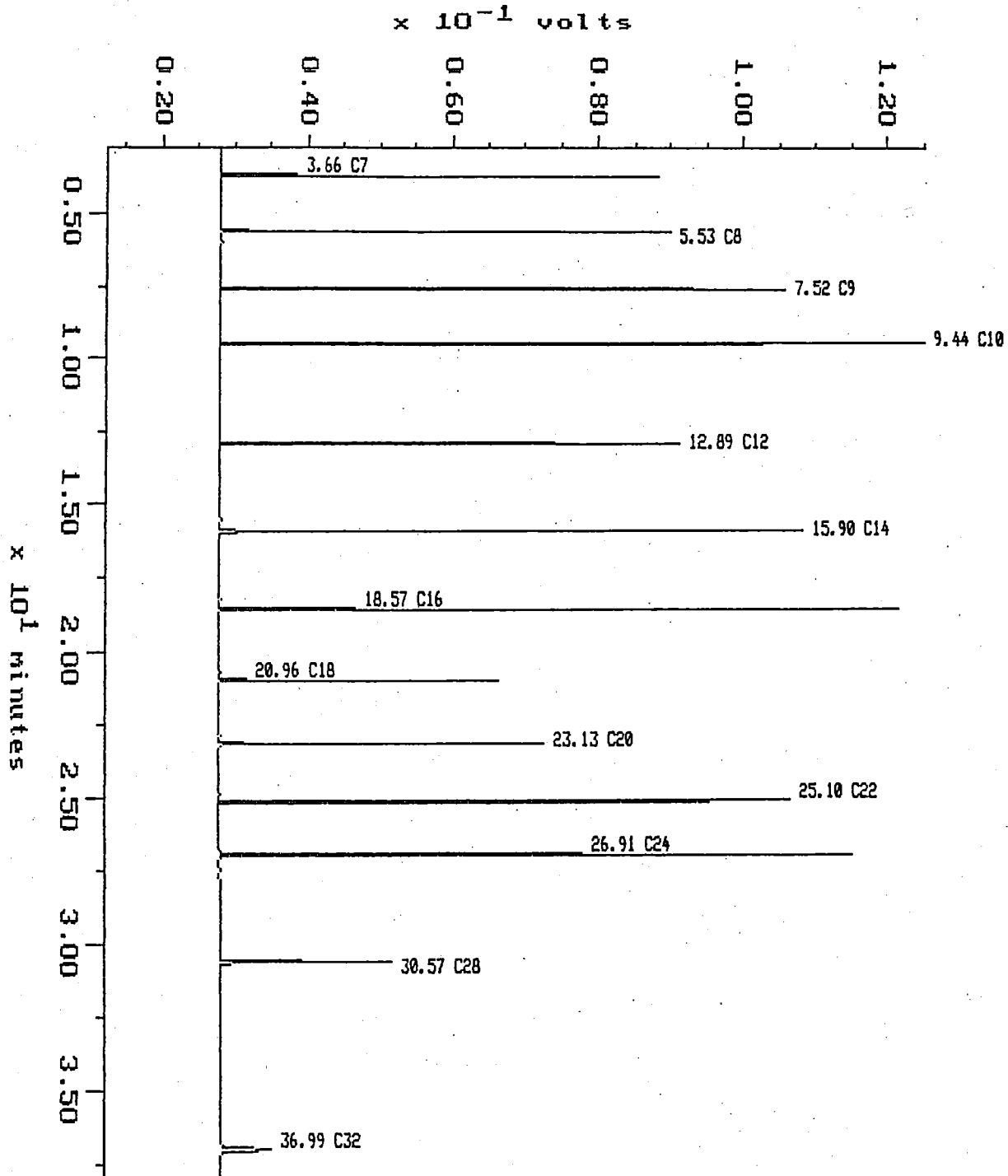


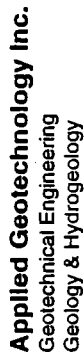
Alkane

Sample: ALKANE
Acquired: 01-NOV-93 15:17
Inj Vol: 1.00

Channel: BERT
Method: F:\BRO2\MAXDATA\BERT\FUEL1101

Filename: RB018B02
Operator: ATI





CHAIN-OF-CUSTODY

Date 11/1/93 Page 1 of 1

[illegible]

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. 4/92

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Brothers/Bingo Fuel Stop
 Project No.: 15,659.001
 Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
 Lab Number: 9311-228
 Sample No.: MW6
 Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable for use.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
VOCs ^a	GC/MS	EPA 8240
Pesticides & PCBs	GC/ECD	EPA 8080
Halogenated VOCs	GC/ECD	EPA 8010

a - Volatile organic compounds.

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
VOCs	11/22/93	NA	11/30/93	NA	8 (14)
Pesticides/PCBs	11/22/93	11/22/93	11/23/93	1 (14)	1 (40)
Halogenated VOCs	11/22/93	NA	11/23/93	NA	1 (14)

NA - Not applicable.

() - Numbers in parentheses indicate recommended holding times in days.

Sample was extracted and analyzed within recommended holding times.

FIELD QUALITY CONTROL SAMPLES

Rinsate: None collected.

Trip Blank: None collected.

Duplicate: None collected.

Field Blank: None collected.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Brothers/Bingo Fuel Stop
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9311-228
Sample No.: MW6
Matrix: Water

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above their method reporting limit (MRL) in method blanks for the following methods:

EPA 8240
EPA 8080
EPA 8010

Matrix Spikes: Matrix spike and matrix spike duplicate percent recoveries and relative percent differences (RPDs) are within ATI's control limit criteria for EPA 8240 and EPA 8010.

Duplicates: Duplicate sample analysis was not performed for any method documented by this report.

Blank Spikes: Blank spike percent recoveries are within ATI's control limit criteria for EPA 8240 and EPA 8010.

Blank spike and blank spike duplicate percent recoveries and RPDs are within ATI's control limit criteria for EPA 8080.

Surrogates: Surrogate spike percent recoveries are all within ATI's control limit criteria for EPA 8080 and EPA 8010.

EPA 8240: Surrogate spike (toluene-d₈) recovery from the matrix spike duplicate sample of 113 percent is slightly above ATI's upper control limit of 111 percent. This exceedance is minor and other QC parameters associated with this analysis are all acceptable. Sample results are not qualified on this basis.

SIGNATURES

Prepared by *Kingda Line*

Date 12/23/93

Checked by *Kenneth Bouillon*

Date 12/23/93



Analytical **Technologies, Inc.**

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

Karen L. Mixon, Laboratory Manager

RECEIVED

DEC 10 1993

ATI I.D. # 9311-228

APPLIED GEOTECHNOLOGY INC.

December 9, 1993

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

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On November 22, 1993, Analytical Technologies, Inc. (ATI), received one sample for analysis. The sample was 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.

Sincerely,

Victoria L. Bayly
Project Manager

VLB/hal/elf

Enclosure



ATI I.D. # 9311-228

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9311-228-1	MW 6	11/22/93	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	1

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.

ATI I.D. # 9311-228

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ANALYSIS	TECHNIQUE	REFERENCE	LAB
VOLATILE ORGANIC COMPOUNDS	GCMS	EPA 8240	R
PURGEABLE HALOCARBONS	GC/ELCD	EPA 8010	R
ORGANOCHLORINE PESTICIDES & PCBs	GC/ECD	EPA 8080	R

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

ATI I.D. # 9311-228

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE : VOLATILE ORGANICS ANALYSIS

The sample associated with this accession number was analyzed using EPA method 8240.

The method blank was free of all analytes of interest. All surrogate percent recoveries were within ATI control limits. The matrix spike/matrix spike duplicate (MS/MSD) recoveries and relative percent differences (RPDs) were within ATI control limits with the exception of toluene-D8 in the MSD. Since all other quality control data were within limits, no further action was taken. All blank spike (BS) recoveries were within ATI control limits. All sample analytical hold times were met.

In the initial calibration standards, the relative standard deviations were below 30% for all calibration check compounds. In the continuing calibration, the percent differences were below 25% for all continuing calibration check compounds. The relative response factors were above the minimum for all system performance check compounds in the initial and continuing calibration standards.

The daily tuning and mass calibration met all EPA criteria for this method. All sample internal standard areas were within 50% and 200% of the daily continuing calibration internal standard areas.

ATI I.D. # 9311-228

VOLATILE ORGANICS ANALYSIS DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/30/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
ACETONE	<10
BENZENE	<1
BROMODICHLOROMETHANE	<1
BROMOFORM	<5
BROMOMETHANE	<10
2-BUTANONE (MEK)	<10
CARBON DISULFIDE	<1
CARBON TETRACHLORIDE	<1
CHLOROBENZENE	<1
CHLOROETHANE	<1
CHLOROFORM	<1
CHLOROMETHANE	<10
1-BROMOCHLOROMETHANE	<1
1,1-DICHLOROETHANE	<1
1,2-DICHLOROETHANE	<1
1,1-DICHLOROETHENE	<1
1,2-DICHLOROETHENE (TOTAL)	<1
1,2-DICHLOROPROPANE	<1
CIS-1,3-DICHLOROPROPENE	<1
TRANS-1,3-DICHLOROPROPENE	<1
ETHYLBENZENE	<1
2-HEXANONE (MBK)	<10
4-METHYL-2-PENTANONE (MIBK)	<10
METHYLENE CHLORIDE	<5
STYRENE	<1
1,1,2,2-TETRACHLOROETHANE	<1
TETRACHLOROETHENE	<1
TOLUENE	<1
1,1,1-TRICHLOROETHANE	<1
1,1,2-TRICHLOROETHANE	<1
TRICHLOROETHENE	<1
VINYL ACETATE	<10
VINYL CHLORIDE	<1
TOTAL XYLENES	<1

SURROGATE PERCENT RECOVERY

LIMITS

1,2-DICHLOROETHANE-D4	105	86 - 120
TOLUENE-D8	99	85 - 111
BROMOFLUOROBENZENE	100	81 - 114



ATI I.D. # 9311-228

TENTATIVELY IDENTIFIED COMPOUNDS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/30/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 1

COMPOUNDS	ESTIMATED CONC.	FLAG	R.T.
-----------	-----------------	------	------

NO NON-HSL COMPOUNDS FOUND > 10% OF NEAREST INTERNAL STANDARD



ATI I.D. # 9311-228-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 CLIENT I.D. : MW 6
 SAMPLE MATRIX : WATER
 EPA METHOD : 8240

DATE SAMPLED : 11/22/93
 DATE RECEIVED : 11/22/93
 DATE EXTRACTED : N/A
 DATE ANALYZED : 11/30/93
 UNITS : ug/L
 DILUTION FACTOR : 50

COMPOUNDS	RESULTS
ACETONE	<500
BENZENE	6800
BROMODICHLOROMETHANE	<50
BROMOFORM	<250
BROMOMETHANE	<500
2-BUTANONE (MEK)	<500
CARBON DISULFIDE	<50
CARBON TETRACHLORIDE	<50
CHLOROBENZENE	<50
CHLOROETHANE	<50
CHLOROFORM	<50
CHLOROMETHANE	<500
1-BROMOCHLOROMETHANE	<50
1,1-DICHLOROETHANE	<50
1,2-DICHLOROETHANE	<50
1,1-DICHLOROETHENE	<50
1,2-DICHLOROETHENE (TOTAL)	<50
1,2-DICHLOROPROPANE	<50
CIS-1,3-DICHLOROPROPENE	<50
TRANS-1,3-DICHLOROPROPENE	<50
1-METHYLBENZENE	3400
2-HEXANONE (MBK)	<500
4-METHYL-2-PENTANONE (MIBK)	<500
METHYLENE CHLORIDE	<250
STYRENE	<50
1,1,2,2-TETRACHLOROETHANE	<50
TETRACHLOROETHENE	<50
TOLUENE	21000 D8
1,1,1-TRICHLOROETHANE	<50
1,1,2-TRICHLOROETHANE	<50
TRICHLOROETHENE	<50
VINYL ACETATE	<500
VINYL CHLORIDE	<50
TOTAL XYLENES	20000

SURROGATE PERCENT RECOVERY

LIMITS

1,2-DICHLOROETHANE-D4	108	86 - 120
TOLUENE-D8	101	85 - 111
BROMOFLUOROBENZENE	100	81 - 114

D8 = Value from a 250 fold diluted analysis.



ATI I.D. # 9311-228-1

TENTATIVELY IDENTIFIED COMPOUNDS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/22/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/22/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW 6	DATE ANALYZED	: 11/30/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240	DILUTION FACTOR	: 50

COMPOUNDS	ESTIMATED CONC.	FLAG	R.T.
AROMATIC HYDROCARBON	650		34.03
BENZENE, 1-ETHYL-2-METHYL-	3800		34.33

ATI I.D. # 9311-228

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP
SAMPLE MATRIX : WATER
EPA METHOD : 8240

SAMPLE I.D. # : BLANK
DATE EXTRACTED : N/A
DATE ANALYZED : 11/30/93
UNITS : ug/L

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<1.00	50.0	51.9	104	N/A	N/A	N/A
CHLOROBENZENE	<1.00	50.0	50.9	102	N/A	N/A	N/A
,1-DICHLOROETHENE	<1.00	50.0	45.7	91	N/A	N/A	N/A
TOLUENE	<1.00	50.0	48.9	98	N/A	N/A	N/A
TRICHLOROETHENE	<1.00	50.0	50.6	101	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	83 - 134	20
CHLOROBENZENE	86 - 133	20
,1-DICHLOROETHENE	73 - 135	20
TOLUENE	84 - 129	20
TRICHLOROETHENE	84 - 129	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
1,2-DICHLOROETHANE-D4	103	N/A	86 - 120
TOLUENE-D8	98	N/A	85 - 111
PROMOFLUOROBENZENE	98	N/A	81 - 114



ATI I.D. # 9311-228

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9311-236-1
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/30/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8240		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<1.00	50.0	52.1	104	60.0	120	14
CHLOROBENZENE	<1.00	50.0	50.8	102	58.0	116	13
,1-DICHLOROETHENE	<1.00	50.0	46.1	92	51.7	103	11
TOLUENE	<1.00	50.0	48.4	97	54.9	110	13
TRICHLOROETHENE	<1.00	50.0	50.8	102	58.1	116	13

CONTROL LIMITS	% REC.	RPD
BENZENE	74 - 139	20
CHLOROBENZENE	90 - 126	20
,1-DICHLOROETHENE	74 - 128	20
TOLUENE	69 - 138	20
TRICHLOROETHENE	84 - 126	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
1,2-DICHLOROETHANE-D4	101	120	86 - 120
TOLUENE-D8	98	113H	85 - 111
BROMOFLUOROBENZENE	98	113	81 - 114

H = Out of limits.



ATI I.D. # 9311-228

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: VOLATILE ORGANICS ANALYSIS

One (1) water sample was received by ATI on November 22, 1993, for the following analysis: EPA method 8010.

Sample 9311-228-1 (MW 6) was analyzed at a 100 fold dilution due to the high concentration of hydrocarbons present.

11 corresponding quality assurance and quality control results defined as matrix spike/matrix spike duplicate (MS/MSD), blank spike (BS), method blank and surrogate recoveries were within the established control limits.

ATI I.D. # 9311-228

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED : N/A
PROJECT # : 15659.001	DATE RECEIVED : N/A
PROJECT NAME : BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED : N/A
CLIENT I.D. : METHOD BLANK	DATE ANALYZED : 11/22/93
SAMPLE MATRIX : WATER	UNITS : ug/L
EPA METHOD : 8010	DILUTION FACTOR : 1

----- COMPOUNDS	RESULTS -----
--------------------	------------------

BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<1.0
ARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<1.0
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
1,2-DIBROMOETHANE (EDB)	<0.5
1,2-DICHLOROBENZENE	<0.5
1,3-DICHLOROBENZENE	<0.5
1,4-DICHLOROBENZENE	<0.5
1,1,1-TRIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
CIS-1,2-DICHLOROETHENE	<0.2
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<1.0

SURROGATE PERCENT RECOVERY

LIMITS

BROMOCHLOROMETHANE

98

58 - 126

ATI I.D. # 9311-228-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/22/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/22/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: MW 6	DATE ANALYZED	: 11/23/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010	DILUTION FACTOR	: 100

COMPOUNDS

RESULTS

BROMODICHLOROMETHANE	<20
BROMOFORM	<20
BROMOMETHANE	<100
CARBON TETRACHLORIDE	<20
CHLOROBENZENE	<50
CHLOROETHANE	<100
CHLOROFORM	<20
CHLOROMETHANE	<200
1,2-DIBROMOETHANE (EDB)	<50
1,2-DICHLOROBENZENE	<50
1,3-DICHLOROBENZENE	<50
1,4-DICHLOROBENZENE	<50
DIBROMOCHLOROMETHANE	<20
1,1-DICHLOROETHANE	<20
1,2-DICHLOROETHANE	<20
1,1-DICHLOROETHENE	<20
CIS-1,2-DICHLOROETHENE	<20
TRANS-1,2-DICHLOROETHENE	<20
1,2-DICHLOROPROPANE	<20
CIS-1,3-DICHLOROPROPENE	<20
TRANS-1,3-DICHLOROPROPENE	<20
METHYLENE CHLORIDE	<200
1,1,2,2-TETRACHLOROETHANE	<20
TETRACHLOROETHENE	<20
1,1,1-TRICHLOROETHANE	<20
1,1,2-TRICHLOROETHANE	<20
TRICHLOROETHENE	<20
TRICHLOROFLUOROMETHANE	<50
VINYL CHLORIDE	<100

SURROGATE PERCENT RECOVERY

LIMITS

BROMOCHLOROMETHANE

99

58 - 126



ATI I.D. # 9311-228

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/22/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
CHLOROBENZENE	<0.500	8.00	7.53	94	N/A	N/A	N/A
1,1-DICHLOROETHENE	<0.200	8.00	7.55	94	N/A	N/A	N/A
TRICHLOROETHENE	<0.200	8.00	8.22	103	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
CHLOROBENZENE	79 - 141	33
1,1-DICHLOROETHENE	56 - 158	22
TRICHLOROETHENE	72 - 138	21

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOCHLOROMETHANE	104	N/A	58 - 126



ATI I.D. # 9311-228

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. SAMPLE I.D. # : 9311-199-3
PROJECT # : 15659.001 DATE EXTRACTED : N/A
PROJECT NAME : BURNS BROS/BINGO FUEL STOP DATE ANALYZED : 11/22/93
SAMPLE MATRIX : WATER UNITS : ug/L
EPA METHOD : 8010

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
CHLOROBENZENE	<0.500	8.00	7.99	100	7.88	99	1
1,1-DICHLOROETHENE	<0.200	8.00	7.95	99	7.79	97	2
TRICHLOROETHENE	13.9	8.00	21.7	97	21.8	99	0

CONTROL LIMITS

	% REC.	RPD
CHLOROBENZENE	61 - 160	33
1,1-DICHLOROETHENE	37 - 182	22
TRICHLOROETHENE	61 - 149	21

SURROGATE RECOVERIES

	SPIKE	DUP. SPIKE	LIMITS
BROMOCHLOROMETHANE	106	121	58 - 126



ATI I.D. # 9311-228

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

CASE NARRATIVE: ORGANOCHLORINE PESTICIDES AND PCB ANALYSIS

One (1) water sample was received by ATI on November 22, 1993, for the analysis of organochlorine pesticides and PCBs.

All corresponding quality assurance and quality control results defined as blank spike/blank spike duplicate (BS/BSD), method blank, and surrogate recoveries were within the established control limits.



ATI I.D. # 9311-228

 ORGANOCHLORINE PESTICIDES AND PCB ANALYSIS
 DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/22/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 11/23/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8080	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

ALDRIN	<0.050
ALPHA-BHC	<0.050
BETA-BHC	<0.050
AMMA-BHC (LINDANE)	<0.050
DELTA-BHC	<0.050
CHLORDANE (TOTAL)	<0.50
P,P'-DDD	<0.10
P,P'-DDE	<0.10
P,P'-DDT	<0.10
DIELDRIN	<0.10
ENDOSULFAN I	<0.050
NDOSULFAN II	<0.10
ENDOSULFAN SULFATE	<0.10
ENDRIN	<0.10
ENDRIN ALDEHYDE	<0.10
ENDRIN KETONE	<0.10
HEPTACHLOR	<0.050
HEPTACHLOR EPOXIDE	<0.050
METHOXYCHLOR	<0.50
TOXAPHENE	<1.0
CB 1016	<1.0
PCB 1221	<1.0
PCB 1232	<1.0
PCB 1242	<1.0
PCB 1248	<1.0
PCB 1254	<1.0
PCB 1260	<1.0

SURROGATE PERCENT RECOVERY

LIMITS

DECACHLOROBIPHENYL	41	22 - 131
DIBUTYLCHLORENDATE	93	43 - 154



ATI I.D. # 9311-228-1

 ORGANOCHLORINE PESTICIDES AND PCB ANALYSIS
 DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 11/22/93
PROJECT #	: 15659.001	DATE RECEIVED	: 11/22/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 11/22/93
CLIENT I.D.	: MW 6	DATE ANALYZED	: 11/23/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8080	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

ALDRIN	<0.047
ALPHA-BHC	<0.047
BETA-BHC	<0.047
AMMA-BHC (LINDANE)	<0.047
DELTA-BHC	<0.047
CHLORDANE (TOTAL)	<0.47
P,P'-DDD	<0.094
P,P'-DDE	<0.094
P,P'-DDT	<0.094
DIELDRIN	<0.094
ENDOSULFAN I	<0.047
ENDOSULFAN II	<0.094
ENDOSULFAN SULFATE	<0.094
ENDRIN	<0.094
ENDRIN ALDEHYDE	<0.094
ENDRIN KETONE	<0.094
HEPTACHLOR	<0.047
HEPTACHLOR EPOXIDE	<0.047
METHOXYCHLOR	<0.47
TOXAPHENE	<0.94
CB 1016	<0.94
PCB 1221	<0.94
PCB 1232	<0.94
PCB 1242	<0.94
PCB 1248	<0.94
PCB 1254	<0.94
PCB 1260	<0.94

SURROGATE PERCENT RECOVERY

LIMITS

DECACHLOROBIPHENYL	42	22 - 131
DIBUTYLCHLORENDATE	62	43 - 154



ATI I.D. # 9311-228

ORGANOCHLORINE PESTICIDES AND PCB ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: 11/22/93
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 11/23/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8080		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
ALDRIN	<0.0500	0.250	0.193	77	0.197	79	2
GAMMA-BHC (LINDANE)	<0.0500	0.250	0.207	83	0.208	83	0
, P' -DDT	<0.100	0.500	0.427	85	0.411	82	4
DIELDRIN	<0.100	0.500	0.480	96	0.474	95	1
ENDRIN	<0.100	0.500	0.488	98	0.495	99	1
HEPTACHLOR	<0.0500	0.250	0.229	92	0.237	95	3

CONTROL LIMITS	% REC.	RPD
ALDRIN	40 - 116	35
GAMMA-BHC (LINDANE)	38 - 122	25
, P' -DDT	52 - 150	35
DIELDRIN	49 - 152	34
ENDRIN	44 - 166	32
HEPTACHLOR	54 - 130	35

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
DECACHLOROBIPHENYL	48	55	22 - 131
IBUTYLCHLORENDATE	93	88	43 - 154



Analytical**Technologies, Inc.**

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

Karen L. Mixon, Laboratory Manager

ATI I.D. # 9403-011

March 9, 1994

RECEIVED

MAR 11 1994

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

APPLIED GEOTECHNOLOGY INC.

Attention : Peter Barry

Project Number : 15659.001

Project Name : Burns Bros/Bingo Fuel Stop

Dear Mr. Barry:

On March 2, 1994, Analytical Technologies, Inc. (ATI), received two 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.

Sincerely,

Victoria L. Bayly
Project Manager

VLB/hal/ff

Enclosure

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Brothers/Bingo Fuel Stop
 Project No.: 15,659.001
 Lab Name: Analytical Technologies, Inc. (ATI), Renton
 Lab Number: 9403-011
 Sample No.: Irrig. Canal West of Site, Irrig. Canal Near S31
 Matrix: Water

QUALITY ASSURANCE SUMMARY

All data are of known quality and acceptable for use.

ANALYTICAL METHODS

<u>Parameter</u>	<u>Technique</u>	<u>Method</u>
BETX	GC/PID	EPA 8020
TPH-Gasoline ^a	GC/FID	WTPH-G
TPH-Diesel ^b	GC/FID	WTPH-D

TIMELINESS

<u>Parameter</u>	<u>Date Sampled</u>	<u>Date Extracted</u>	<u>Date Analyzed</u>	<u>Time Until Extraction</u>	<u>Time Until Analysis</u>
BETX	03/01/94	NA	03/03/94	NA	2 (14)
TPH-G	03/01/94	NA	03/03/94	NA	2- (14)
TPH-D	03/01/94	03/02/94	03/03/94	1 (7)	2 (30)

a - Quantify toluene to dodecane range petroleum hydrocarbons.

b - Quantify C₁₂ to C₂₄ range petroleum hydrocarbons.

NA - Not applicable.

() - Numbers in parentheses indicate recommended holding times in days.

All samples were extracted and analyzed within recommended holding times.

FUEL HYDROCARBON CHROMATOGRAMS

WTPH-G: Gasoline range petroleum hydrocarbons were not detected at or above their method reporting limit (MRL) in samples documented by this report.

WTPH-D: Diesel range petroleum hydrocarbons were not detected at or above their MRL in samples documented by this report.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: Burns Brothers/Bingo Fuel Stop
Project No.: 15,659.001
Lab Name: Analytical Technologies, Inc. (ATI), Renton
Lab Number: 9403-011
Sample No.: Irrig. Canal West of Site, Irrig. Canal Near S31

FIELD QUALITY CONTROL SAMPLES

Field Blank: None collected.
Field Duplicates: None collected.
Rinsate: None collected.
Trip Blank: None collected.

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above their MRL by EPA 8020, WTPH-G, and WTPH-D.
Matrix Spikes: Matrix spike and matrix spike duplicate percent recoveries and relative percent differences (RPDs) are within ATI's control limit criteria for EPA 8020 and WTPH-G.
Duplicates: Duplicate sample RPDs are within ATI's control limit criteria for WTPH-G and WTPH-D.
Blank Spikes: Blank spike and blank spike duplicate (WTPH-D only) percent recoveries and RPDs are within ATI's control limit criteria for EPA 8020, WTPH-G, and WTPH-D.
Surrogates: Surrogate spike percent recoveries are within ATI's control limit criteria for EPA 8020, WTPH-G, and WTPH-D.

SIGNATURES

Prepared by

Kingto Lin

Date 03/30/1994

Checked by

Katherine Bourbonais

Date 3/30/94



ATI I.D. # 9403-011

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9403-011-1	IRRIG. CANAL WEST OF SITE	03/01/94	WATER
9403-011-2	IRRIG. CANAL NEAR S31	03/01/94	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.



ATI I.D. # 9403-011

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15659.001
PROJECT NAME : BURNS BROS/BINGO FUEL STOP

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



ATI I.D. # 9403-011

BETX - GASOLINE
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 03/02/94
SAMPLE MATRIX	: WATER	UNITS	: ug/L
METHOD	: WA DOE WTPH-G/8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
OTAL XYLENES	<0.5

FUEL HYDROCARBONS	<100
HYDROCARBON RANGE	TOLUENE TO DODECANE
HYDROCARBON QUANTITATION USING	GASOLINE

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	106	76 - 120
TRIFLUOROTOLUENE	99	50 - 150



ATI I.D. # 9403-011-1

BETX - GASOLINE
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/01/94
PROJECT #	: 15659.001	DATE RECEIVED	: 03/02/94
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: N/A
CLIENT I.D.	: IRRIG. CANAL WEST OF SITE	DATE ANALYZED	: 03/03/94
SAMPLE MATRIX	: WATER	UNITS	: ug/L
METHOD	: WA DOE WTPH-G/8020 (BETX)	DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

FUEL HYDROCARBONS	<100
HYDROCARBON RANGE	TOLUENE TO DODECANE
HYDROCARBON QUANTITATION USING	GASOLINE

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	104	76 - 120
TRIFLUOROTOLUENE	100	50 - 150



ATI I.D. # 9403-011-2

BETX - GASOLINE
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC.
 PROJECT # : 15659.001
 PROJECT NAME : BURNS BROS/BINGO FUEL STOP
 CLIENT I.D. : IRRIG. CANAL NEAR S31
 SAMPLE MATRIX : WATER
 METHOD : WA DOE WTPH-G/8020 (BETX)

DATE SAMPLED : 03/01/94
 DATE RECEIVED : 03/02/94
 DATE EXTRACTED : N/A
 DATE ANALYZED : 03/03/94
 UNITS : ug/L
 DILUTION FACTOR : 1

 COMPOUNDS

RESULTS

BENZENE	<0.5
ETHYLBENZENE	<0.5
TOLUENE	<0.5
TOTAL XYLENES	<0.5

FUEL HYDROCARBONS	<100
HYDROCARBON RANGE	TOLUENE TO DODECANE
HYDROCARBON QUANTITATION USING	GASOLINE

SURROGATE PERCENT RECOVERY

LIMITS

BROMOFLUOROBENZENE	104	76 - 120
TRIFLUOROTOLUENE	102	50 - 150



ATI I.D. # 9403-011

BETX - GASOLINE
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 03/02/94
SAMPLE MATRIX	: WATER	UNITS	: ug/L
METHOD	: WA DOE WTPH-G/8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	20.0	19.5	98	N/A	N/A	N/A
TOLUENE	<0.500	20.0	20.0	100	N/A	N/A	N/A
TOTAL XYLENES	<0.500	40.0	39.1	98	N/A	N/A	N/A
GASOLINE	<100	1000	965	97	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	89 - 110	10
TOLUENE	89 - 113	10
TOTAL XYLENES	89 - 111	10
GASOLINE	78 - 116	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	105	N/A	76 - 120
TRIFLUOROTOLUENE	102	N/A	50 - 150



ATI I.D. # 9403-011

 BETX - GASOLINE
 QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9403-011-1
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 03/02/94
SAMPLE MATRIX	: WATER	UNITS	: ug/L
METHOD	: WA DOE WTPH-G/8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
GASOLINE	<100	<100	NC	N/A	N/A	N/A	N/A	N/A	N/A
CONTROL LIMITS						% REC.			RPD
GASOLINE						N/A			20
SURROGATE RECOVERIES				SAMPLE		SAMPLE DUP.		LIMITS	
TRIFLUOROTOLUENE				100		101		50 - 150	

NC = Not Calculable.

ATI I.D. # 9403-011

BETX - GASOLINE
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9403-018-2
PROJECT #	: 15659.001	DATE EXTRACTED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 03/02/94
SAMPLE MATRIX	: WATER	UNITS	: ug/L
METHOD	: WA DOE WTPH-G/8020 (BETX)		

COMPOUNDS	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
BENZENE	<0.500	N/A	N/A	20.0	19.5	98	19.9	100	2
TOLUENE	<0.500	N/A	N/A	20.0	19.7	99	19.8	99	1
TOTAL XYLENES	0.700	N/A	N/A	40.0	39.5	97	39.8	98	1
GASOLINE	<100	<100	NC	1000	952	95	901	90	6

CONTROL LIMITS	% REC.	RPD
BENZENE	86 - 113	10
TOLUENE	87 - 114	10
TOTAL XYLENES	85 - 113	10
GASOLINE	80 - 113	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOFLUOROBENZENE	106	106	76 - 120
TRIFLUOROTOLUENE	101	100	50 - 150

NC = Not Calculable.



Analytical Technologies, Inc.

ATI I.D. # 9403-011

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15659.001	DATE RECEIVED	: N/A
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 03/02/94
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 03/03/94
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<0.25
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

100

50 - 150



ATI I.D. # 9403-011-1

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/01/94
PROJECT #	: 15659.001	DATE RECEIVED	: 03/02/94
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 03/02/94
CLIENT I.D.	: IRRIG. CANAL WEST OF SITE	DATE ANALYZED	: 03/03/94
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUNDSRESULTS
-----FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING<0.25
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

104

50 - 150



Analytical Technologies, Inc.

ATI I.D. # 9403-011-2

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 03/01/94
PROJECT #	: 15659.001	DATE RECEIVED	: 03/02/94
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE EXTRACTED	: 03/02/94
CLIENT I.D.	: IRRIG. CANAL NEAR S31	DATE ANALYZED	: 03/03/94
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUNDSRESULTS

FUEL HYDROCARBONS
HYDROCARBON RANGE
HYDROCARBON QUANTITATION USING

<0.25
C12 - C24
DIESEL

SURROGATE PERCENT RECOVERY

LIMITS

O-TERPHENYL

112

50 - 150



ATI I.D. # 9403-011

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9403-011-1
PROJECT #	: 15659.001	DATE EXTRACTED	: 03/02/94
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 03/03/94
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D		

COMPOUNDS	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	<0.250	<0.250	NC	N/A	N/A	N/A	N/A	N/A	N/A
CONTROL LIMITS						% REC.			RPD
DIESEL						N/A			20
SURROGATE RECOVERIES				SAMPLE		SAMPLE DUP.		LIMITS	
O-TERPHENYL				104		103		50 - 150	

NC = Not Calculable.



Analytical Technologies, Inc.

ATI I.D. # 9403-011

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

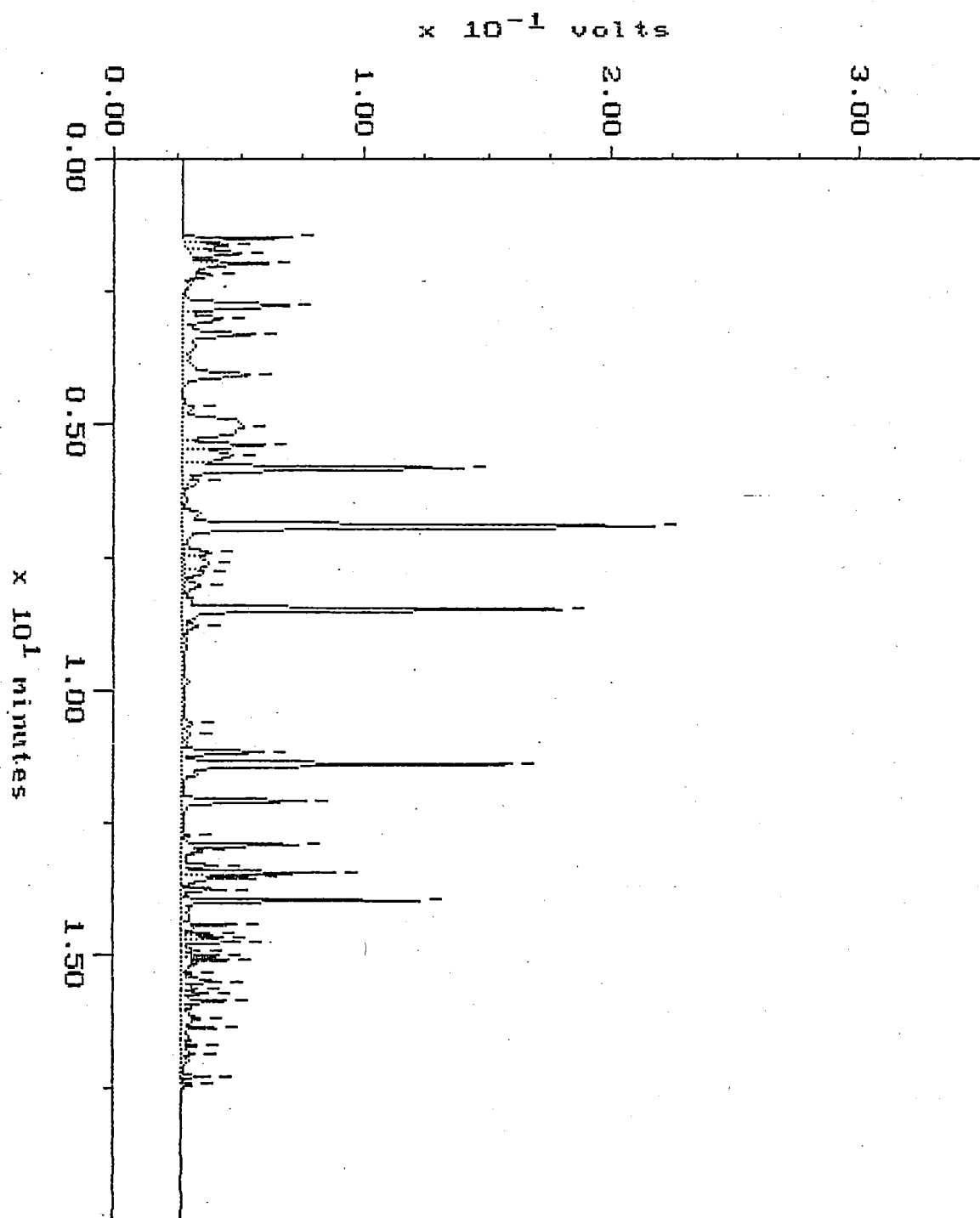
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PROJECT #	: 15659.001	DATE EXTRACTED	: 03/02/94
PROJECT NAME	: BURNS BROS/BINGO FUEL STOP	DATE ANALYZED	: 03/03/94
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<0.250	2.50	2.17	87	2.27	91	5
CONTROL LIMITS				% REC.			RPD
DIESEL				70 - 114			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		101		105		50 - 150	

Continuing Calibration

Sample: STD-C G Channel: FID
Acquired: 02-MAR-94 9:03 Method: F:\BRO2\MAXDATA\PICARD\030294PC
Comments: ATI FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY.

Filename: R3029P01
Operator: ATI

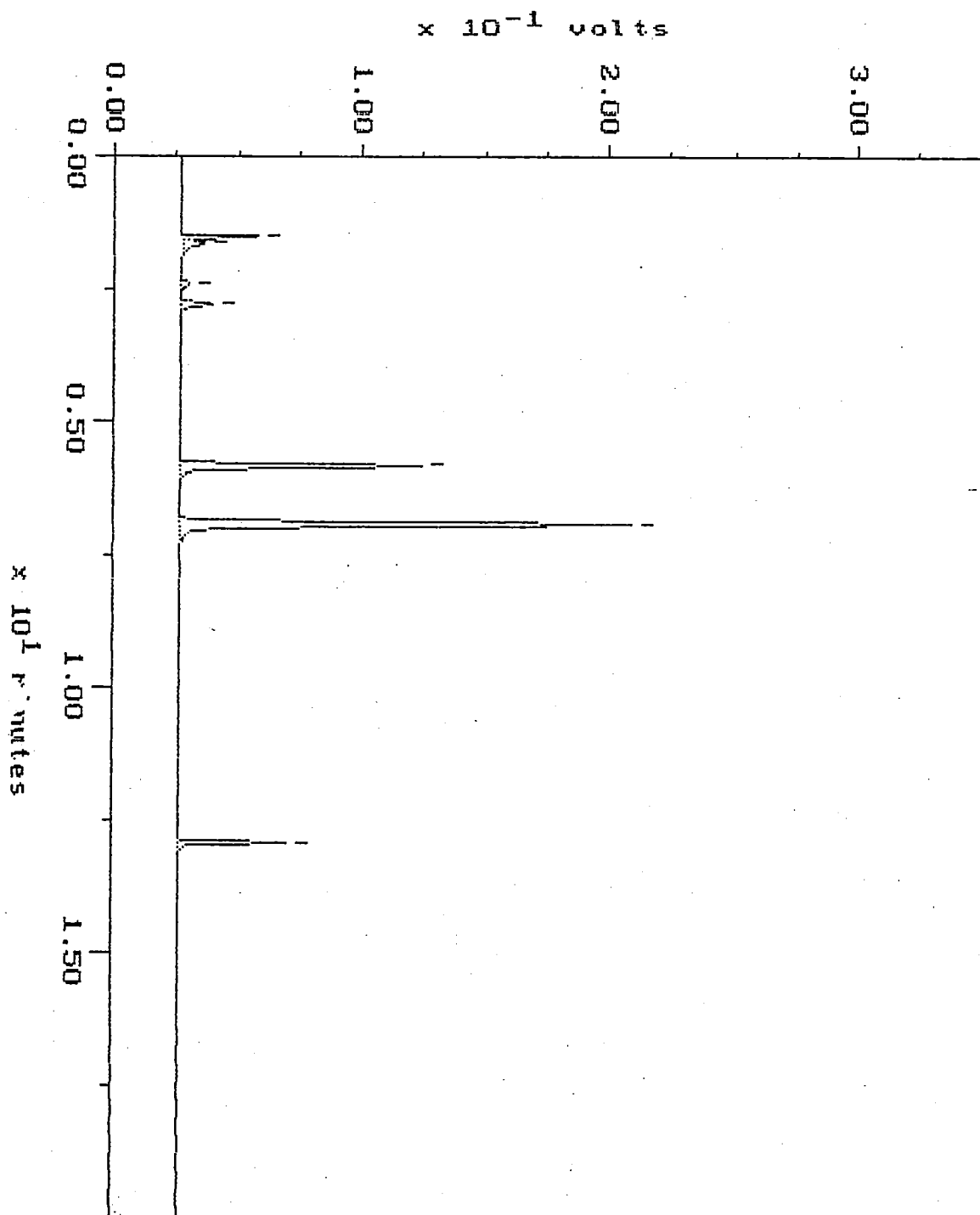


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WAD TTPH-G

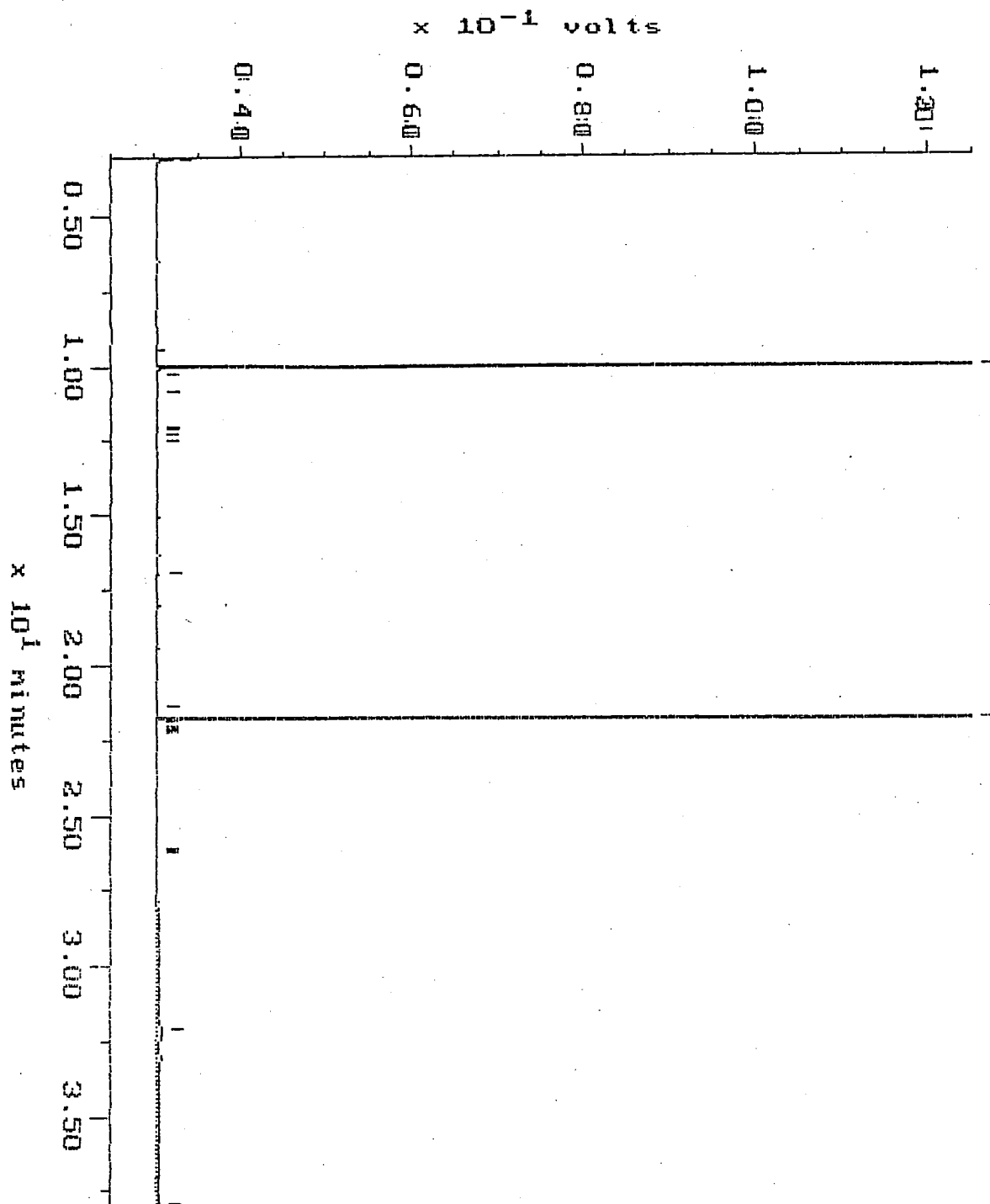
Sample: WR8 3-2 Channel: FID
Acquired: 82-MAR-94 10:43 Method: F:\BRO2\MAXDATA\PICARD\030294PC
Comments: ATI FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY.

Filename: R3029P03
Operator: ATI

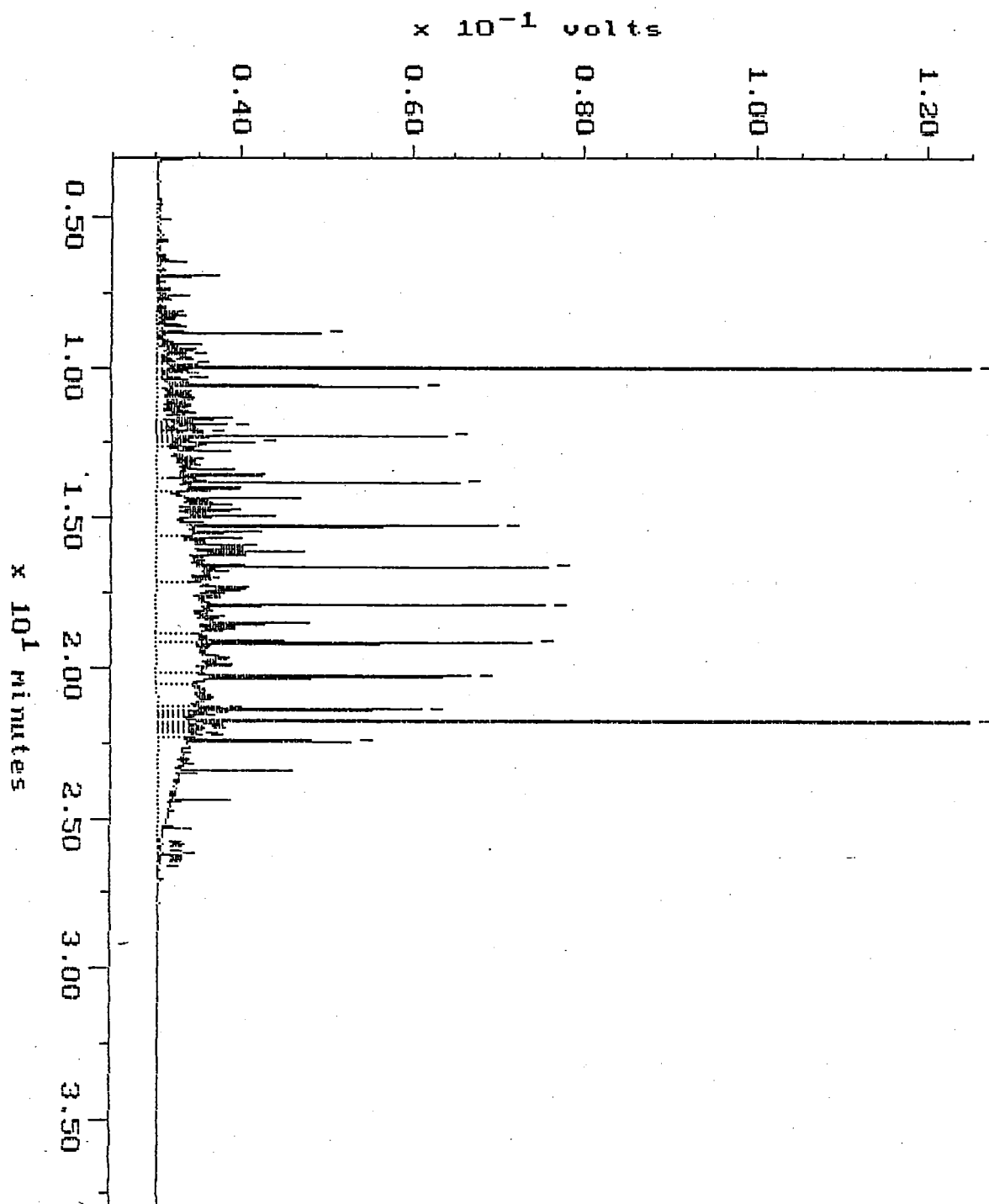


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Sample: WRB 3-2 Channel: NANCY Filename: R3020N22
Acquired: 03-MAR-94 3:08 Method: F:\BRO2\MAXDATA\NANCY\FUEL0302 Operator: ATI
Comments: ATI RUSH FUELS: PROVIDERS OF EXCELLENCE AND QUALITY IN CLIENT SERVICE



Sample: D 500 Channel: NANCY Filename: R3028N05
Acquired: 02-MAR-94 13:40 Method: F:\BRO2\MAXDATA\NANCY\FUEL0302 Operator: ATI
Comments: ATI RUSH FUELS: PROVIDERS OF EXCELLENCE AND QUALITY IN CLIENT SERVICE



Alkane

Sample: ALKANE NANCY
Acquired: 28-FEB-94 14:32
Inj Vol: 1.00

Channel: NANCY
Method: F:\BRO2\MAXDATA\NANCY\FUEL0228

Filename: r228EN02
Operator: ATI

