A Report Prepared For

The Society of St. Vincent de Paul
909 8th Avenue
Seattle, Washington 98104-1220

ENVIRONMENTAL ASSESSMENT
SAHLBERG EQUIPMENT PROPERTY
5950 4TH AVENUE SOUTH
SEATTLE, WASHINGTON

AGI Project No. 15,740.001

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1.0 INTRODUCTION

1.1 GENERAL

This report presents the results of Applied Geotechnology Inc.'s (AGI) Environmental Assessment (EA) of the property (site) located at 5950 4th Avenue South in Seattle, Washington as shown on Figure 1, Vicinity Map. The property was formerly occupied by Sahlberg Equipment, but is currently vacant, pending its sale.

Previous environmental studies of the site include Level I and II EAs and a site characterization/soil remediation project. In accordance with our April 29, 1993 proposal to CNA Architecture Group, AGI reviewed the reports from these investigations. Our evaluation of the site based on the review was presented in our May 6, 1993 *Environmental Site Information Evaluation and Phase II Environmental Assessment Proposal*. Additional services for the site were performed for St. Vincent de Paul in accordance with our updated May 12, 1993 proposal. Our scope of services included soil and groundwater testing based on reported historical site activities and previous analytical results which indicated the presence of petroleum hydrocarbons and various chlorinated and aromatic organic compounds in soil and groundwater.

1.2 PURPOSE AND SCOPE OF WORK

This EA was completed as a prepurchase due diligence review. The EA included reviewing previous environmental investigation reports for the site and updating information provided in the initial Phase I EA. Based on our evaluation of these documents, we conducted additional investigation of subsurface soil and groundwater quality to define and document environmental liabilities with respect to existing soil and groundwater contamination. Our scope of services to conduct this EA included the following tasks:

- Reviewing reports on previous environmental investigations for the site prepared by other consultants.
- Conducting an updated review of federal, state, and local databases to identify potential hazardous materials and waste generators and/or contaminated sites within 1/2 mile of the subject property, and evaluating their potential to impact the subject property.
- Reviewing historical aerial photographs to aid in our evaluation of on-site and nearby off-site activities.
- Observing Pacific Testing Laboratories' (PTL) sampling of two replaced monitoring wells and collecting split samples to submit to AGI's contract laboratory.
- Performing a site reconnaissance to identify appropriate locations for additional monitoring wells.

- Advancing two soil borings to 14 feet below ground surface (bgs) and installing groundwater monitoring wells in each of the borings.
- Developing and sampling the installed wells.
- Analyzing three soil samples and five groundwater samples for selected chemical parameters.
- Preparing this report presenting our findings, conclusions, and opinions regarding potential contamination of site soil and groundwater.

1.3 DATA SOURCES

1.3.1 Databases

Databases were reviewed to locate sites having known and potential contamination, and those that store, generate, or dispose of hazardous materials within a 1/2-mile radius of the subject property. Databases included:

- National Priorities List (NPL). The U.S. Environmental Protection Agency (EPA) NPL identifies uncontrolled or abandoned hazardous waste sites requiring priority remedial actions under the Superfund program.
- Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS). EPA's CERCLIS list is a comprehensive database and management system that inventories and tracks releases addressed or needing to be addressed by the Superfund program.
- Resource Conservation and Recovery Act (RCRA) Notifiers List. The RCRA Notifiers List includes companies or individuals who either use, generate, or transport RCRA classified hazardous substances and/or wastes. It is not a list of contaminated sites or documented hazardous materials releases.
- Facility Index System (FINDS). The FINDS list is a compilation of properties or sites that EPA has investigated, reviewed, or been made aware of in connection with its various regulatory programs. Each record indicates which EPA program office may have files on the specified site or facility.
- Washington Department of Ecology (Ecology) Underground Storage Tank (UST) List. This list provides an inventory of registered underground storage tanks including information on the tank owner, address, and number of registered tanks.
- Ecology Leaking Underground Storage Tank (LUST) List. This list provides an inventory of reported leaking underground storage tanks, including information on the location, tank status, and cleanup status.
- Ecology Toxics Cleanup Program (TCP) Affected Media and Contaminants Report (TCP). This report lists names and locations of contaminated sites and includes a tabulation of affected media (soil, water, air.), contaminants, and waste management practices.

- Emergency Response Notification System (ERNS) List. This EPA Region X database lists emergency response information for releases occurring since 1987. The list includes the responsible party, location, material released, and estimated quantity.

Results of the database search are summarized in Tables 1 through 5 and discussed in Section 3.3.

1.3.2 Reports

AGI reviewed the following documents previously prepared for the site:

Rittenhouse-Zeman & Associates (RZA AGRA). April 1991. Level I Environmental Site Assessment, Sahlberg Equipment, Inc. Property, 5950 4th Avenue South, Seattle, Washington. W-7497.

RZA AGRA. May 1992. (Level II) Environmental Assessment, Sahlberg Equipment Facility, 5850 Fourth Avenue South, Seattle, Washington. W-7497-1.

Pacific Testing Laboratories. November 1992. Addendum No. 3 to Proposal No. ENV-L-141; Revised Proposal for Site Characterization and Soil Remediation of Sahlberg Equipment, Inc. Property, Seattle, Washington. ENV-L-141.3.

Pacific Testing Laboratories. March 1993. Soils Remediation at Sahlberg Equipment, 5950 Fourth Avenue South, Seattle, Washington, Certificate No. 9212-6600.7.

Pacific Testing Laboratories. May 1993. Ground Water Monitoring Well Installation and Analysis. Certificate No. 9304-6610.

2.0 SITE FEATURES

2.1 SITE DESCRIPTION

The subject property is located at the northeast corner of 4th Avenue South and South Front Street in Seattle, Washington. The property is rectangular, measuring approximately 409 feet north-south by approximately 108 feet east-west. The site is relatively flat, lying in a local topographic depression approximately 5 feet below surrounding roads and properties.

The site was formerly occupied by Sahlberg Equipment, a wholesaler/retailer of heavy equipment and safety supply equipment. There are four buildings on the subject property, as shown on Figure 2, Site Plan. According to RZA AGRA's Phase 1 EA, the northernmost building (Building 1, see Figure 2), a two-story, wood-frame structure was constructed in the mid 1950s, with additions completed by 1970. The upper level was used as a reception area and executive offices while the lower level contained parts and supplies. The central building (Building 2) was constructed around 1940 and is a two-story, wood-frame warehouse storage facility formerly used for safety supply equipment. Adjacent to the south side of the central building is another two-story, wood-frame structure (Building 3) that housed the service department offices and the service department shop. Building 3 was constructed in the late 1940s or early 1950s. All three buildings have second level street grade entrances. An open shed (Building 4) lies at the southern end of the property and was used for equipment storage and maintenance.

The property is primarily paved with asphalt and concrete, with the exception of an approximately 40-foot-square unpaved area in the southeast corner. What was described by previous consultants as an equipment wash area is situated between Building 4 and the unpaved area. Several sumps (shown on Figure 2) situated throughout the site, including the wash area, provide site drainage. Water from the sumps is pumped into the city storm drain system.

2.2 NEARBY LAND USE

The site and vicinity are part of the industrialized Duwamish River Valley. An import business occupies the property to the north. A railroad spur from the east ends at the northeast corner of the property. East of the site is a large warehouse complex which is occupied by numerous companies. Office buildings lie to the south across South Front Street and various commercial businesses lie to the west across 4th Avenue South.

2.3 SUBSURFACE CONDITIONS

2.3.1 Geology

Surface and near surface site sediments are alluvial, while adjacent properties were likely developed on approximately 5 feet of fill material. The alluvium in the Duwamish River Valley consists primarily of sand interbedded with silt and clay and occasional zones of peat. Fill materials generally

consist of dredged sediments of similar origin and makeup. The alluvium in this area is approximately 200 feet thick and is underlain by approximately 50 to 100 feet of older, unconsolidated deposits of sand, silt, clay, gravel, till, and volcanic ash. This material is in turn underlain by marine sedimentary rocks.

2.3.2 Surface and Groundwater

Shallow groundwater occurs in the alluvial sediments, ranging in depth from approximately 4 to 10 feet bgs, depending on the amount of fill material overlying the site. Groundwater flow generally moves west, toward the Duwamish River.

Because the site rests in a depression, surface water is directed into sumps located throughout the site where it is pumped into the city stormwater collection system.

3.0 POTENTIAL CONTAMINATION SOURCE REVIEW

3.1 PREVIOUS ENVIRONMENTAL STUDIES

3.1.1 General

AGI reviewed the reports of environmental studies by RZA AGRA and PTL (referenced in Section 1.3.2). The following sections summarize information collected and work conducted by these consultants, along with the results of their studies. Where pertinent, previous data are tabulated along with data from our investigation to provide comparisons.

3.1.2 Information Review Summary

According to RZA AGRA's Level I EA, Sahlberg Equipment, Inc. occupied the site from the mid 1950s until recently. The site was developed by the early 1940s. The original and co-occupants of the site from this time up until the mid 1960s (when Sahlberg took over the entire site) included: a sheet metal manufacturer, machinists, dry cleaner, textile company, electric company, and reprocessing company (animal byproducts and brewer's yeast).

During their site survey, RZA AGRA found visible evidence of petroleum product leakage or spillage from 55-gallon drums stored on unpaved ground in the southeast portion of the property. The drums reportedly contained used anti-freeze and hydraulic fluid. In addition, an abandoned, partially full heating oil UST was discovered near the northwest corner of the property. The UST had an estimated capacity of 300 gallons.

RZA AGRA's Level II EA for the site contains the results of a preliminary subsurface investigation. Two monitoring wells (MW1 and MW2) were drilled and installed in the unpaved area where the drums had been observed during the Level I ESA. Groundwater was encountered at approximately 4 to 5 feet bgs. Soil and groundwater samples were analyzed for total petroleum hydrocarbons as diesel (TPH-D) by Washington State Method WTPH-D; total recoverable petroleum hydrocarbons (TRPH), which quantifies heavier gasoline constituents, diesel and petroleum oils by Washington State Method WTPH-418.1; volatile organic compounds (VOCs) by EPA Method 8240; and ethylene glycol by EPA Method 8260. Soil samples exceeded Method A cleanup levels for TRPH as promulgated by the Model Toxics Control Act (MTCA) Cleanup Regulation, Chapter 173-340 Washington Administrative Code (WAC). TPH-D, TRPH, total xylenes, ethylbenzene, toluene, and chlorobenzene concentrations in groundwater also exceeded cleanup levels. RZA AGRA's groundwater test results are summarized in Tables 6 and 7.

During their investigation, PTL resampled MW1 and MW2, drilled five borings, installed two additional monitoring wells (MWA and MWB), and excavated soil in the unpaved drum storage area for remediation. After the wells were sampled, MW1 and MW2 were destroyed during excavation activities. Soil samples collected from the borings were analyzed for TPH-D, and groundwater samples were analyzed for TPH-D and TRPH. Selected groundwater samples were also analyzed for benzene, ethylbenzene, toluene, and xylenes (BETX) by EPA Method 8020. PTL's groundwater test results for TPH-D and BETX are summarized in Tables 6 and 7.

TPH-D concentrations in groundwater sampled from MW1 and MW2 were similar to the initial sampling performed by RZA AGRA; however, TRPH was much lower than the previous sampling. These data appear inconsistent because the 418.1 method of analysis should also detect the diesel range petroleum hydrocarbons which were detected by the WTPH-D method of analysis. Diesel range petroleum hydrocarbons exceeding cleanup levels were detected in soil samples collected from the borehole of MWA, but not in the groundwater samples from either MWA or MWB. Neither of the studies determined a clear groundwater gradient for the site, so a conclusive source(s) of observed contamination was not apparent.

PTL remediated contaminated soils within the unpaved drum storage area by excavation and removal. PTL reported contamination was confined to a surface layer of coarse gravel that did not exist at the north end, but ranged up to 3 feet thick at the south end of the excavation. The remedial excavation was therefore sloped, ranging in depth from 1 foot at the north end to 5 feet at the south end. Soil samples were collected from the base and sidewalls of the excavation for laboratory analysis; excavation was terminated when all of the soil samples collected were below detection limits of the Washington State hydrocarbon identification analysis (WTPH-HCID). Some of the excavated soil was found to be contaminated with petroleum hydrocarbons and transported off site for disposal at a landfill. The remainder of the excavated soil was replaced in the excavation.

During RZA AGRA's Level II EA, petroleum hydrocarbons were analyzed by two methods: WTPH-D and WTPH-418.1. Chemical testing results for the soil sample collected from a depth of 3 feet in MW2 indicated concentrations of 187 and 570 milligrams per kilogram (mg/kg) for WTPH-D and WTPH-418.1, respectively. The state cleanup level for TPH is 200 mg/kg. A low concentration of chlorobenzene (0.19 mg/kg) was also detected in the same soil sample. The area around MW2 was not excavated deeper than 1 foot bgs during PTL's remediation.

3.2 HISTORICAL AERIAL PHOTOGRAPHS

As a part of our review of the site history, we examined available in-house historical aerial photographs dated 1956, 1959, 1960, 1965, 1976, and 1978. Observed conditions are summarized below.

1956: All of the buildings currently on site had been constructed by this time, although Building 3 was about half of its present size. Several other structures were also located on the site. Two houses and another warehouse type structure were situated on the southwest corner of the site. Another warehouse type structure was situated over the currently unpaved area where MW1 and MW2 are located. A small lean-to type structure was located on the north side of Building 2. Another warehouse type structure was also located just north of this lean-to. Activity or storage was noted in a yard area between. There appeared to be several large vehicles parked just north of Building 1. The property did not appear to be paved.

Surrounding properties were undeveloped, although grading in preparation of future development was noted on large tracts of land surrounding the site. Placement of fill material surrounding the site may also have occurred about this time.

1959: In 1959, buildings on the site appeared essentially the same as the 1956 photograph except that an addition had been constructed on Building 3. There appeared to be a large collection of stored items in the yard east of Building 1, as well as in the yard area north of Building 2. Some commercial development had occurred west of the site, while surrounding conditions to the north, south, and east appeared similar to the previous photograph.

1960: Site conditions were similar to the 1959 photograph, although the stored items in the yard east of Building 1 had been removed and there appeared to be a small structure along the northern property line. The site did not appear to be paved.

1965: The two houses and warehouse at the southwest corner of the site had been removed, as was the warehouse at the southeast corner (currently the unpaved area). Equipment appeared stored in the southeast corner. A few unidentifiable items were noted in the yard area north and west of Building 1 and ground surface in this area appeared much darker than the remainder of the property (possibly indicating oil staining or vegetation). Development north and east of the site still had not occurred by this time. The property south of the site appeared to be a parking area for large equipment (Sahlberg?) and growth continued to occur to the west of the site.

1976 and 1978: A significant amount of development had occurred in the area between 1965 and 1976, and commercial developments on surrounding properties appeared similar to the present. Buildings on the site had not visibly changed since 1965, except for the removal of two small structures north of Building 2. The site itself appeared to be much more orderly, although a significant amount of equipment/parts storage was noted throughout the site. A long, thin, unidentifiable structure was noted west of Building 1. The ground in this area was surfaced with concrete instead of asphalt.

3.3 DATABASE REVIEW

For their April 1991 Level 1 EA, RZA AGRA reviewed state and federal data sources to identify sites having known or potential contamination and those that use, generate, or transport hazardous materials within a 1/2-mile radius of the site. Because 2 years have elapsed since RZA AGRA reviewed these databases, we updated this aspect of the Level I EA by reviewing current database sources. Our evaluation and findings of these sites are discussed below:

No NPL sites were identified within 1/2 mile of the site.

The CERCLIS list includes two sites within a 1/2-mile radius of the site. These two sites are Burlington Environmental Inc. at 734 S. Lucile Street and the 1st Avenue Bridge Landfill at East Marginal Way and S. Fidalgo Street. Both sites are flagged "No Further Action."

The RCRA Notifiers list identifies 73 sites within 1/2 mile of the subject property. The FINDS list identifies nearly all of the RCRA sites, and an additional 13 sites. Listed sites nearest to the subject property are identified in Table 1. The RCRA facilities are those that store, use, generate, or transport hazardous substances and/or wastes.

The presence of these facilities on the lists, however, does not necessarily indicate the sites are contaminated or have documented releases. Facilities listed by FINDS are any sites that EPA has investigated, reviewed, or been made aware of in connection with its various regulatory programs; the listing may or may not be due to known or suspected contamination. The subject site is included on the RCRA and FINDS lists. The RCRA list identifies Sahlberg Equipment as being a conditionally exempt generator.

Ecology's UST list identifies 37 sites with registered USTs within a 1/2-mile radius of the subject property. Those sites within 1/4 mile of the subject property are listed in Table 2. The two closest nearly upgradient sites are Air Data Express at 525 S. Front Street and Westmar Services at 5930 6th Avenue S., approximately 400 to 800 feet away from the site.

Ecology's LUST list documents 14 sites with reported fuel releases within 1/2 mile of the subject property (see Table 3). All of these sites are 1/4 mile or greater from the subject property and none appear to be upgradient of the subject property.

Ecology TCP Affected Media and Contaminants Report lists four sites within 1/2 mile of the subject property. These sites are listed in Table 4. All of these sites are greater than 1/4 mile from the subject property and the nearest nearly upgradient site is approximately 1/2 mile from the subject property.

The ERNS list identifies at least seven emergency response spill cases within 1/2 mile of the subject property, as listed in Table 5. Address information was too limited to identify any additional sites on this list. The only potentially upgradient ERNS site is TKL Productions at 5817 6th Avenue South, reported for improper disposal of plastic. Considering the product release, this site does not pose a potential threat of impacting the subject property soil or groundwater.

3.4 SUMMARY OF POTENTIAL CONTAMINANT SOURCE/AREAS

From our review of RZA AGRA's and PTL's work, we conclude that site soil and groundwater has been impacted by petroleum hydrocarbons and VOCs (i.e., chlorobenzenes, xylenes, and toluene) which exceed state mandated cleanup levels. Neither of the studies fully defined the source and extent of contamination, and groundwater data were not available to determine whether remediation efforts by PTL had been successful.

The most obvious source of contamination would be from spillage and leakage associated with drums formerly stored in the unpaved area at the southeast corner of the site. Most of the drums were reported to have contained motor oil and hydraulic fluid. Another possible source of the contamination is the equipment wash area. Neither PTL nor RZA AGRA explored the possibility of soil and groundwater contamination occurring from maintaining and washing heavy equipment in this area. Various solvents may have been used as cleaning and degreasing agents. The wash area is a low spot where water for much of the site accumulates in the sumps and is pumped off site. Concrete pavement was noted to be in very poor condition, which could allow chemicals to penetrate.

PTL may not have removed all of the contaminated soil, as evidenced by discrepancies between the data presented by RZA AGRA and PTL. PTL believed soil contamination was limited to a surficial gravel layer which ranged in depth from 0 to 3 feet bgs. Soil testing by RZA AGRA found some of the heaviest contamination between 3 and 4 feet bgs, within the underlying sand, where PTL had only excavated to 1 foot bgs. Therefore, contaminated soil may still be in place beneath part of the unpaved area.

It is our understanding that a heating oil UST was removed in April 1992. We were informed that the documentation of the tank removal indicates soil samples were collected and no contamination was recorded. Based on this information, additional investigation regarding the UST appears unwarranted.

Aerial photographs suggest a long history of commercial/industrial activities on the site, much of it not really identifiable from the photographs. The photographs indicate the site was not fully paved up through the mid- to late-1960s. Based on historical occupants, likely materials handled and stored on site include heavy machinery; sheet metal; electrical cables and supplies; lube, cutting, and hydraulic oils; cleaning fluids; and animal byproducts.

Based on our review of agency databases, there does not appear to be listed off-site contamination sources that are likely to impact the subject property.

4.0 FIELD INVESTIGATION

4.1 GENERAL

The purpose of our field investigation was to: 1) define groundwater conditions (depth, gradient, direction of movement), 2) document existing soil and groundwater quality, and 3) identify whether any site contamination is migrating off site. Our scope of services to accomplish this purpose is described in the following sections.

4.2 SPLIT SAMPLING

On May 11, 1993, AGI personnel observed PTL purge and sample two monitoring wells, NE and SW, which they had recently installed to replace MW2 and MW1, respectively. We also collected split samples to submit to our contract laboratory for comparison to PTL's laboratory data. For the remainder of this report, these wells are referred to as MW2/NE and MW1/SE to reduce confusion from the different acronyms given by different consultants.

4.3 DRILLING AND WELL INSTALLATION

AGI installed two additional monitoring wells (AGI1 and AGI2) on May 21, 1993. A CME 75 drill rig equipped with 8-inch-diameter hollow stem augers was used to advance the boreholes for each monitoring well. Field exploration and sampling procedures are detailed in Appendix A. Monitoring well locations are shown on Figure 2.

The borings were advanced to approximately 14 feet bgs. During drilling, soil conditions were characterized and logged according to the Unified Soil Classification System shown on Plate B1 in Appendix B. Soil samples were collected for logging and/or laboratory analysis every 2.5 feet using an 18-inch-long split-barrel sampler. Subsurface sediments were alluvial and consisted of approximately 2 or 3 feet of gray brown to dark gray sand underlain by at least 10 to 13 feet of dark gray silty sand with sand and sandy silt interlayers. In AGI2, a black sand was encountered at approximately 12 feet bgs. Encountered sediments were generally loose and wet or saturated. Plates B3 and B4 in Appendix B summarize sediments encountered in borings AGI1 and AGI2.

Sampled soil was field screened for VOCs using an organic vapor meter equipped with a photoionization detector (OVM-PID). None of the samples exceeded background levels--0 to 1 part per million (ppm). Field screening was performed by placing soil samples in a plastic resealable bag, disaggregating the sample, and after approximately 5 minutes, inserting the OVM-PID probe through the bag in the space (headspace) above the soil. The maximum reading on the instrument was recorded. This screening technique is not a compound-specific analysis and is affected by, among other influences, climate (e.g., temperature and humidity), soil type and condition, and instrument calibration and operation. The intent of this analysis is to qualitatively compare samples and assist in selecting samples for chemical analysis.

Groundwater was encountered at approximately 4 to 7.5 feet bgs in the borings. The monitoring wells were screened across this water-bearing zone from 4 to 14 feet bgs. General well construction procedures are described in Appendix A and shown on Plate B2 in Appendix B. Well construction details for each well are shown on the boring logs.

4.4 WELL DEVELOPMENT, SAMPLING, AND SURVEY

The monitoring wells installed by AGI were developed by surging and bailing on May 21, 1993. Groundwater samples were collected on the same day from AGI1, AGI2, and MWA (installed by PTL in December 1992). Just prior to sampling, an additional three to five well volumes were purged from each well. Monitoring well development and groundwater sampling procedures are further described in Appendix A.

Well casing elevations were surveyed to a common datum on May 21, 1993. All elevations in this report are referenced to the crown of a fire hydrant located at the southeast corner of S. Front Street and 4th Avenue S.

Depths to groundwater in the monitoring wells were measured to the nearest 0.01 foot and ranged from approximately 4 to 4.5 feet below the subject property's ground surface. Based on the May 21, 1993 measurements, the direction of groundwater flow was inferred to be generally toward the southwest as shown on Figure 3, Groundwater Contour Map.

5.0 LABORATORY ANALYSIS

5.1 ANALYTICAL METHODS

Selected soil and groundwater samples were submitted under chain-of-custody procedures to Analytical Technologies, Inc. (ATI) in Renton, Washington for testing. The analytical parameters and test methods selected were based on analytical results from prior environmental studies. Soil and groundwater samples were tested for TPH-D and total petroleum hydrocarbons quantified as motor oil (TPH-O) by Washington State method WTPH-D extended. Groundwater samples were also analyzed for aromatic and halogenated VOCs by EPA Methods 8010 and 8020.

5.2 ANALYTICAL RESULTS

ATI's laboratory reports from the soil and groundwater testing are provided in Appendix C. Chemical results were reviewed by an AGI chemist for completeness and data quality, and Quality Assurance Reports are included with the laboratory reports in Appendix C. The following sections discuss the regulatory requirements and the results of soil and groundwater testing.

5.2.1 Regulatory Requirements

Chapter 173-340 WAC, as promulgated under MTCA, establishes the administrative processes and standards to identify, investigate, and clean up facilities where hazardous substances are located. MTCA regulations provide three approaches for determining cleanup standards: Methods A, B, and C. The order of the methods does not reflect an order of preference for application. In fact, the regulations indicate that Method B is the conventional approach for determining cleanup standards.

Method A provides a simplified approach for routine site cleanup actions using tabulated cleanup levels.

Method B allows development of cleanup levels for specific compounds based on evaluation of applicable state and federal laws, groundwater and surface water protection, and risk-based concentrations calculated using the risk equations specified in the regulations (WAC 173-340-720 through 173-340-750).

Method C allows less protective cleanup levels for specific site uses where "all practicable methods of treatment have been utilized, and institutional controls are implemented." This is primarily for instances where cleanup to Method A or B levels is impracticable, may cause greater environmental harm, or would be below area background levels.

For this site, we have compared analytical laboratory results to MTCA Method A and B cleanup levels. Where available, Method A cleanup levels were used, including those determined for petroleum hydrocarbons and four of its constituents: benzene, ethylbenzene, toluene, and xylenes. Otherwise, data were compared to the most stringent Method B cleanup levels. MTCA regulations state that Methods A and B provide conservative cleanup levels for

sites with relatively few hazardous substances and may be inappropriate for some sites. The regulations also state that Methods A and B should not automatically be used to define cleanup levels that must be met for financial, real estate, insurance coverage, or similar purposes. Additionally, exceedance of Method A and Method B cleanup levels does not necessarily mandate a cleanup action at a site.

5.2.2 Soil Analytical Results

Soil test results are summarized in Table 8. Two soil samples were analyzed from AGI1 at 2 and 5 feet bgs (AGI-1-2' and AGI-1-5', respectively). One soil sample was analyzed from AGI2 at 3 feet bgs (AGI-2-3'). TPH-D and TPH-O were detected in AGI-1-2' and were undetected in the other two soil samples. The concentration of TPH-O--730 milligrams per kilogram (mg/kg)--in AGI-1-2' exceeded the 200 mg/kg Method A cleanup level.

5.2.3 Groundwater Test Results

Current groundwater test results are summarized in Tables 6 and 7 and are compared against PTL's split sampling and historical test results by previous consultants.

As in previous test results, petroleum hydrocarbons were detected in MW1/SW and MW2/NE. In MW2/NE, TPH-D and TPH-O concentrations were elevated above cleanup levels. TPH-D and TPH-O concentrations were also detected in MW1/SW, but were not above cleanup levels. Neither TPH-D nor TPH-O were detected in AGI1 or AGI2. TPH-D and TPH-O were detected in MWA, but at concentrations below cleanup levels.

VOCs were detected in MW2/NE, several of which exceeded cleanup levels (chlorobenzene, 1,4-dichlorobenzene, 1,1-dichloroethane, ethylbenzene, and xylenes). Most of the same VOCs were detected in MW1/SW and AGI2, but at lower concentrations. None of the VOCs analyzed were detected in groundwater sampled from AGI1 or MWA.

6.0 DISCUSSION

6.1 PETROLEUM HYDROCARBONS - SOILS

The presence of high levels of TPH-O in the 2-foot soil sample from AGI1 may have occurred from three possible sources: 1) historical usage of used oil as dust control, 2) tac coat spray applied prior to asphalt paving, and 3) drips and spills associated with heavy equipment stored on site. Historical aerial photographs suggest that S. Front Street and the subject property were not paved until the early 1960s or later. Historically, oils, including used motor oil, were commonly used for dust control on unpaved high traffic areas and may have been used in this capacity on site. In addition, aerial photographs indicate that the northern parking/yard area was actively used by Sahlberg for numerous years. Normal spillage and drips from stored heavy equipment and daily maintenance, as well as any number of unidentified activities, could also have led to buildup of petroleum oils in near-surface soils.

6.2 PETROLEUM HYDROCARBONS - GROUNDWATER

Analysis of contamination at a site partially relies upon knowledge of specific chemicals of concern to avoid misidentification. Chemical testing and identification is based upon the tendency for individual chemical compounds or mixtures (i.e., gasoline, diesel) to separate by chromatographic means, which provides a chemist with a "fingerprint" for a given chemical or chemical mixture. Various environmental factors, such as weathering and biodegradation, may change the fingerprint somewhat, but the overall pattern generally remains similar. However, since some chemical mixtures have overlapping chromatographic ranges (i.e., gasoline, jet fuel, and some components of diesel), misidentification may occur if the target compound is not accurately known. This should be considered when examining laboratory results.

Examination of the three chromatograms for groundwater sampled from MWA, MW1/SW, and MW2/NE indicates relatively dissimilar fingerprints which do not appear to resemble diesel and motor oil. Comparison of the sample chromatograms to a variety of standard petroleum hydrocarbon product indicates some similarities. For example, the hydrocarbon fingerprint for MW2/NE suggests the presence of hydraulic fluid range hydrocarbons with interferences from VOCs. This interpretation is reasonable considering the reported contents of drums stored in this area and the VOCs detected. The hydrocarbon fingerprint for MWA suggests a mixture of two products, possibility similar to kerosene and motor oil, which is inconsistent with products recorded to be on the subject site. The chromatogram for MW1/SW does not resemble any of the available petroleum hydrocarbon product standards.

6.3 VOLATILE ORGANIC COMPOUNDS - GROUNDWATER

Historically and currently, MW2/NE has had the highest concentrations of VOCs. However, there appears to be a significant decline in most recent chemical concentrations when compared to test results obtained a year ago. Chemical concentrations in downgradient wells AGI2 and MW1/SW are much lower

than those found in MW2/NE, and with one exception, do not exceed cleanup levels. This indicates that contamination is attenuating with time and distance from MW2/NE. Groundwater migrating off site does not appear to have VOCs at concentrations above cleanup levels. Based on the test results of MWA and AGI1, historical site usage, and our understanding of off-site activities, we believe that the source of VOCs is probably contaminated soil on site.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Based on current and historical analytical results, soil and groundwater contamination has been identified at the subject property. These include the following:

- The concentration of TPH-O exceeds the MTCA Method A cleanup level in near-surface soils in the vicinity of AGI1.
- Petroleum hydrocarbon concentrations exceed MTCA Method A cleanup levels in groundwater in the vicinity of MW2/NE.
- Concentrations of various chlorinated and aromatic VOCs, including chlorobenzene, xylenes, and ethylbenzene, exceed MTCA Method B cleanup levels in the groundwater in the vicinity of MW2/NE. Some of the same compounds were detected in MW1/SW and AGI2, although with one exception, none exceeded Method B cleanup levels.

TPH-O detected in the soil at AGI1 may originate from historical use of oil as dust control, asphalt tac coat application, or from general use of the area for storage and maintenance of heavy equipment. There are no indications that groundwater has been impacted by petroleum hydrocarbons and, given the relatively immobile nature of petroleum oil in soils and the length of time it has been in the soil (30+ years), we expect the potential for future contamination of groundwater from currently contaminated site soils near AGI1 is low.

Based on our review of a Phase I EA for the site prepared by RZA AGRA, review of historical aerial photographs, a site reconnaissance, and the types of chemical contaminants detected, we believe the likely source of groundwater contamination at MW2/NE is soils contaminated by historical practices in the wash area and improper drum storage on exposed soils in the vicinity of MW2/NE. The laboratory and survey data indicate that VOCs and petroleum hydrocarbons are attenuating to below MTCA cleanup levels before migrating to the downgradient edge of the site. Additionally, VOC and TPH concentrations in groundwater sampled from MW2/NE have declined significantly when compared to samples collected by RZA AGRA a year ago.

7.2 MTCA REQUIREMENTS AND REMEDIAL ALTERNATIVES

Under MTCA, site soil and groundwater contaminated with petroleum hydrocarbons and VOCs is subject to requirements for cleanup actions. The party liable for cleanup may proceed with independent remedial action, or may negotiate with Ecology for a consent decree or an agreed order. Independent remedial actions on relatively routine sites are generally recommended because they tend to be more expeditious and less costly; however, persons performing independent remedial actions do so at their own risk and may be required to take additional remedial actions if Ecology deems necessary.

Cleanup alternatives are varied and may include destruction or detoxification, off-site disposal at an engineered facility; immobilization; and institutional controls with monitoring. The appropriate cleanup method(s) are dependent upon the types of contaminants, concentrations, and site conditions. The following paragraphs present possible remedial alternatives for contaminated soil and groundwater at the subject site.

7.2.1 Contaminated Soil at AGI1

For soil contaminated with petroleum oils in the vicinity of AGI1, we explored two remedial alternatives:

- Alternative 1 - leave the soil in place.
- Alternative 2 - perform additional site assessment to determine the lateral extent of soil contamination; remediate soil.

Alternative 1 does not fully address the contamination problem because it leaves contaminated soil in place at concentrations above cleanup levels and the liability for this contamination remains. Based on our experience with Ecology, this alternative may be viable because the asphalt pavement may be considered an institutional control. The asphalt minimizes personal exposure to and the leaching potential of petroleum oil. The fact that groundwater is not currently contaminated indicates there is a lower possibility of future water contamination from the soil if infiltration is limited. However, should land uses change and require removal of the asphalt cover, the justification for this remedial alternative would no longer be valid. Further, Ecology could require remedial action at any time, although this seems unlikely based on our experience. Another concern is the impact of documented contamination on future property transactions. A future buyer's lending institution may not be willing to loan on a property with documented contamination above cleanup levels.

Alternative 2 would require additional site assessment and remediation of contaminated soil. There is not currently sufficient data to accurately estimate the extent of contamination or appropriate remediation approach. Therefore, additional assessment would have to be conducted before implementation of a remediation program. Assessment could include a series of asphalt cores and hand-augered borings to collect soil samples for analysis. Remediation alternatives could include excavating contaminated soil for off-site disposal or on-site treatment.

7.2.2 Contaminated Groundwater at MW1/SW, MW2/NE, and AGI2

Three remedial alternatives were considered for groundwater contamination:

- Alternative 1 - continue to monitor wells MW1/SW, MW2/NE, and AGI2.
- Alternative 2 - excavate soils in the vicinity of MW2/NE and continue to monitor the groundwater.
- Alternative 3 - pump and treat contaminated groundwater.

Analytical results indicate that VOCs and petroleum hydrocarbons have significantly attenuated in the past year in MW2/NE and that they may continue to decline. To date, groundwater contamination does not appear to have significant off-site impact; therefore, Ecology may accept Alternative 1. However, previous soil testing data indicates that contaminated soil may have been left in place in the vicinity of MW2/NE and the wash rack. We believe this contaminated soil is a possible source of the noted groundwater contamination, and may continue to contribute to the groundwater contamination for a number of years.

Additional excavation to remove contaminated soils, as proposed by Alternative 2, should accelerate natural attenuation of VOCs and petroleum hydrocarbons in groundwater. If the source of groundwater contamination is removed, we expect groundwater contamination concentrations would meet cleanup levels in a relatively short time. It would be important to install a replacement for MW2/NE if the well is destroyed during excavation, so groundwater contamination can be monitored.

Alternative 3 may be the most time consuming and costly of the three methods. Due to the volatile and nonvolatile nature of the different contaminants the most likely treatment method would be by carbon absorption. After installation of the system, treatment and monitoring would likely continue for several months or years until cleanup levels are attained.

7.3 RECOMMENDATIONS

As an informed purchaser aware of site contamination present at concentrations above state cleanup levels, we believe St. Vincent de Paul will assume responsibility for future site cleanup actions unless a legal agreement in the purchase clearly assigns cleanup liability to the current owner. The remedial alternatives presented above are only meant to give general guidance on possible options, and do not constitute a feasibility study for the site. St. Vincent de Paul should carefully consider the potential liability associated with each of the remedial alternatives presented before deciding on a course of action. It is important to consider that future marketability of the property may be impaired based on documented contamination.

MWA on South Front Street is particularly vulnerable to damage from traffic and vandalism and no longer serves any purpose. We recommend requesting the current property owner abandon this well as soon as possible.

8.0 LIMITATIONS

This report was prepared for exclusive use by St. Vincent de Paul for this project only. Our scope of services was developed in conjunction with your involvement to achieve specific project objectives with the intent of establishing an appropriate balance between level of effort and uncertainty. Providing the report to others not party to this mutual scope determination, or using it for other projects or purposes, can result in misunderstanding or incorrect assumptions. AGI cannot be responsible for interpretation or extrapolation of the data contained herein, except as stated in our conclusions.

Our conclusions are based on data described herein and our experience and professional judgement. The data were either made available to AGI or reasonably obtained within the practical constraints of our scope of services. Nothing can be done to eliminate all unknowns; however, we can help you take steps to lessen their impact. If you become aware of data we did not consider, or have any questions concerning our conclusions, please advise us immediately.

There is no such thing as perfect due diligence and no practical study or procedure can or should be expected to discover all potential contamination. However, we believe this environmental assessment does represent due diligence as determined in accordance with the professional standard of care. This standard is the current level of care and skill ordinarily exercised by members of the engineering profession practicing under similar conditions in the project area. AGI cannot be responsible if due diligence standards change or if you are required to meet a higher standard.

DISTRIBUTION

4 Copies	The Society of St. Vincent de Paul 909 8th Avenue Seattle, Washington 98104-1220 Attention: Mr. Harry Coveny
2 Copies	CNA Architecture Group 3500 Carillon Point Kirkland, Washington 98033 Attention: Mr. Arlan Collins

Quality Assurance/Technical Review by:

John E. Newby, P.E.
President

PJM/SJP/tag

Table 1
USEPA RCRA Notifiers List
St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

Name	Address	City	Zip Code	EPA I.D. No.	(1) GEN
Clough Equipment Co.	515 S. Front Street	Seattle	98108	WAD009264367	1
Air Data Express	525 S. Front Street	Seattle	98108	WAD988468518	2
General Electric Co. SCMC Seattle	540 S. Front Street	Seattle	98108	WAD980979645	2
Pacific Marine Testing Co.	5807 4th Avenue S.	Seattle	98108	WAD988478046	2
Wear–Cote Northwest Inc.	5811 4th Avenue S.	Seattle	98108	WAD137698049	2
Art Brass Plating	5815 4th Avenue S.	Seattle	98108	WAD009247404	1
A M International	5901 4th Avenue S.	Seattle	98108	WAD001680883	1
Sahlberg	5950 4th Avenue S.	Seattle	98108	WAD988490496	3
Emerald City Freight Distribution Inc.	6003 6th Avenue S.	Seattle	98108	WAD981765258	
NIVAS Business Corp Savin of Washington	6100 6th Aveue S.	Seattle	98108	WAD981761687	2
International Graphics	725 S. Fidalgo	Seattle	98108	WAD991304437	3

Note:

(1) GEN – Hazardous Waste Generator
- 1 – Generates more than 1000 kilograms per month of hazardous waste (Large Quantity Generator).
- 2 – Generates between 100 and 1000 kilograms per month of hazardous waste (Small Quantity Generator).
- 3 – Generates less than 100 kilograms per month of hazardous waste (Conditionally Exempt Small Quantity Generator).

Reference: 2/10/93 USEPA Region 10 RCRA Notifiers Report.

Table 2
Ecology Underground Storage Tank Locations
St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

Site Name	Address	City	Zip Code	Site Number	Tank Age (years)	Gallons (X1000)	Status	Substance
Ronaco, Inc.	650 South Michigan	Seattle	98108	004487	6	10–20	Operational	Leaded Gasoline
					6	10–20	Operational	Unleaded Gasoline
					6	10–20	Operational	Unleaded Gasoline
					6	10–20	Operational	Diesel Fuel
					6	2–5	Exempt	Heating Fuel
					6	11–20	Operational	Used Oil/Waste
Western Bridge Co.	5900 Second Avenue S.	Seattle	98108	010209	19	2–5	Operational	Diesel Fuel
					31	5–10	Operational	Diesel Fuel
					31	2–5	Operational	Unleaded Gasoline
					19	11–20	Operational	Used Oil/Waste
					31	11–20	Exempt	Heating Fuel
Consolidated Freightways	6401 Occidental Avenue S.	Seattle	98108	011012	10	20–30	Operational	Diesel Fuel
					10	20–30	Operational	Diesel Fuel
					31	2–5	Exempt	Heating Fuel
Beckwith & Kuffel	5830 First Avenue S.	Seattle	98108	009853	24	2–5	Removed	Unleaded Gasoline
					24	2–5	Removed	Used Oil/Waste
Ray Burgess Co.	6361 First Avenue S.	Seattle	98108	101434	28	2–5	Closure	Leaded Gasoline
Tayags Auto Repair Inc.	6185 4th Avenue S.	Seattle	98108	100530	9	5–10	Operational	Unleaded Gasoline
					9	2–5	Operational	Unleaded Gasoline
					9		Operational	Leaded Gasoline
					25	11–20	Operational	Used Oil/Waste
Westmar Services Inc.	5930 6th Avenue S.	Seattle	98108	011537	14	2–5	Temp Out	Leaded Gasoline
					14	5–10	Temp Out	Diesel Fuel
Air Data Express	525 South Front Street	Seattle	98108	097775	4	5–10	Operational	Diesel Fuel
					4	5–10	Operational	Unleaded Gasoline
Gas "N" Wash	551 S. Michigan Street	Seattle	98108	005289	14	10–20	Operational	Unleaded Gasoline
					14	10–20	Operational	Unleaded Gasoline
					14	10–20	Operational	Leaded Gasoline
					14	10–20	Operational	Unleaded Gasoline

Reference: 10/27/92 Washington State Department of Ecology Listing of Underground Storage Tanks Reported in Washington State.

Table 3
Ecology Leaking Underground Storage Tank Sites
St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

Incident No.	Site Name	Address	City	Zip Code	Release Control	Cleanup Complete	Media
2724	Mobil Transfer/Peterson Proper	4315 11th Avenue N.W.	Seattle	98107	Owner/Operator	No Action	Groundwater
3047	Unocal Station #5479	5409 15th Avenue N.W.	Seattle	98107	No Action	No Action	Groundwater
4017	Texaco Station #004464	5500 15th Avenue N.W.	Seattle	98107	No Action	No Action	Soil
4114	ARCO Station	5715 15th AVenue N.W.	Seattle	98107	No Action	No Action	Soil
1685	Shell Station	803 N.W. Market Street	Seattle	98107	Owner/Operator	No Action	Groundwater
1565	Car Wash Enterprises	5111 15th Avenue N.W.	Seattle	98107	Owner/Operator	Owner/Operator	Soil
1551	ARK Welding	834 N.W. 48th Street	Seattle	98107	Owner/Operator	Owner/Operator	Soil
2216	Salmon Bay Steel Corp.	4315 Ninth Avenue N.W.	Seattle	98107	No Action	No Action	Groundwater
2862	N.W. Bolt & Nut	4250 8th Avenue N.W.	Seattle	98107	Owner/Operator	No Action	Soil
2211	Olympic Stain Mfg. Plant	1141 N.W. 50th Street	Seattle	98107	Owner/Operator	No Action	Soil
3734	Bardahl Manufacturing	1400 N.W. 52nd Street	Seattle	98107	No Action	No Action	Soil

Reference: 2/10/93 Department of Ecology Leaking Underground Storage Tank Sites.

Table 4
Ecology Toxics Cleanup Program
Affected Media and Contaminants Report
St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

Site Name	Address	City	Zip Code	Site Cat.	Affected Media					
					Ground–water	Surface–water	Air	Soil	Sediment	Drinking Water
Frank's Used Cars	6305 E. Marginal Way S.	Seattle	98108	C1	P	T	P	T	P	
Inland Transportation Co.	6737 Corson S.	Seattle	98108	C2		P			P	
Longview Fibre Co.	5901 E. Marginal Way S.	Seattle	98134	C1	T			P		
Seattle Commercial Finishing	5700 Corson Avenue S.	Seattle	98108	C1	P	P		T	P	
VIOX	551 S. River Street	Seattle	98108	C1	P		P	T		

Media Key: T – True; F – False; P – Potential; U – Unknown.

Site Category: C1 – Confirmed Hazardous Substance Sites; C2 – Potential Hazardous Substance Sites; A – National Priorities List, Federal lead; L – State sites undergoing long–term monitoring.

Reference: 4/7/93 Washington State Department of Ecology Toxics Cleanup Program Affected Media and Contaminants.

Table 4
Ecology Toxics Cleanup Program
Affected Media and Contaminants Report
St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

Site Name	Contaminant Number																Waste Mgmt Practice(s)
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
Frank's Used Cars	S	C		C		S											9,2,11
Inland Transportation Co.	S	S	S			S		S				S		S			9,10
Longview Fibre Co.						C											11
Seattle Commercial Finishing		C								S				C			
VIOX		C															9,4,2

Contaminant Key: S – Suspected; C – Confirmed; R – Remediated.

Reference: 4/7/93 Washington State Department of Ecology Toxics Cleanup Program Affected Media and Contaminants.

Table 4
Ecology Toxics Cleanup Program
Affected Media and Contaminants Report
St. Vincent de Paul\Sahlberg Equipment Property
Seattle, Washington

Contaminant Definitions/Examples

1. Halogenated Organic Compounds: Organic compounds, typically solvents, with one or more of the halogens (e.g., Cl, Br, F) in their structure. Examples are: Carbon Tetrachloride, Chloroform, Vinyl Acetate.

2. Metals – Priority Pollutants: Metals included in EPA's priority pollutant compounds list. Examples are: Antimony, Arsenic, Lead, Silver.

3. Metals – Other: Other nonpriority pollutant metals. Examples are: Aluminum, Barium, Cobalt, Tin.

4. Polychlorinated Biphenyls (PCBs): A specific "family" of chlorinated organic compounds, sometimes identified by labs as "AROCLOR." Common types are: AROCLOR–1016, AROCLOR–1221, AROCLOR–1260.

5. Pesticides: Chemical agents used to control pests such as: fungicides, herbicides, and insecticides. Examples are: Aldrin, Chlordane, Endrin, Diazinon, Folex.

6. Petroleum Products: Crude oil and any fraction thereof. Each of these materials may consist of many specific chemical compounds. Examples are: gasoline, diesel fuel, mineral oil.

7. Phenolic Compounds: Hazardous substances typically included in the acid extractable fraction of EPA's priority pollutant compound list. Examples are: Phenol, 2,4,6–trichloro–; Phenol; Benzoic Acid.

8. Non–Halogenated Solvents: Organic solvents, typically volatile, not containing any halogens. Examples are: Acrolein, Benzene, Toluene, Acetone, 4–Methyl–2–Pentanone.

9. Dioxin: All dioxins.

10. Polynuclear Aromatic Hydrocarbons: Hydrocarbons with multiple benzene rings. Examples are: Fluoranthene benzo, Chrysene, Anthracene.

Table 4
Ecology Toxics Cleanup Program
Affected Media and Contaminants Report
St. Vincent de Paul\Sahlberg Equipment Property
Seattle, Washington

Contaminant Definitions/Examples

11. Reactive Wastes: Wastes that react violently upon contact with water as defined by the Dangerous Waste Regulation (WAC 173–303).

12. Corrosive Wastes: Wastes that are highly corrosive as defined by the Dangerous Waste Regulations (WAC 173–303).

13. Radioactive Wastes: Wastes that omit more than background levels of radiation. Examples are: high level nuclear wastes, low level nuclear wastes, Uranium mine tailings.

14. Conventional Contaminants Organic: Unspecified organic matter that imposes an oxygen demand during its decomposition. This is reflected by elevated BOD, COD, and/or TOC. Typically a component of municipal solid waste leachates, sewage, septage, food wastes, wood waste leachate, and similar organic wastes.

15. Conventional Contaminants Inorganic: Non–metallic inorganic substances and changed nonspecific indicator parameters. Examples are: Chloride, Sulfur compounds, Nitrogen compounds.

16. Base/Neutral Organics: Hazardous substances typically included in the Base/Neutral fraction of EPA's priority pollutant compound list. Examples are: Acenaphthene; Benzene, hexachloro–; Fluoranthene; Toluene, 2,4–dinitro–; Isophorone.

Waste Management Practices Key

1. Drug Lab
2. Drum
3. Impoundment
4. Improper Handling
5. Landfill
6. Land Application
7. Pesticide Application
8. Pesticide Disposal
9. Spill
10. Storm Drain
11. Tank
12. Unknown

Table 5
Emergency Response Notification System List
St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

Case No.	Potential Responsible Party	Material Spilled	Quantity	Spill Location	City	State	Report Date
9015691	Consolidated Freightways	Chloroform (liquid state)	18 Pints	6050 E. Marginal Way	Seattle	WA	04/03/90
9161775	Consolidated Freightways	Oil: Diesel	400 Gallons	6050 E. Marginal Way	Seattle	WA	03/02/91
90681	J.D. Ott (Machinery)	Cooling/Lubricating Oil	Unknown	115 South Lucille Street	Seattle	WA	05/30/91
90435	Longview Fiber Co.	Hydraulic Fluid	7100 Gallons	5901 E. Marginal Way	Seattle	WA	09/04/90
90431	TKL Productions	Disposal of Plastic	Unknown	5817 6th Avenue S.	Seattle	WA	08/31/90
1615	Rail–Incon Glass	Acidic Cleaning Solution	Unknown	5801 E. Marginal Way	Seattle	WA	06/27/89
1566	Ball Glass Mfg.	Oily Waste	Unknown	5801 E. Marginal Way	Seattle	WA	07/12/89

Reference: EPA Emergency Response Notification System List October 1990 – December 1992.

Table 6
Historical and Current Analytical Results – Groundwater
Petroleum Hydrocarbons as Diesel and Oil
St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

			Washington State Test Method WTPH-D		Washington State Test Method WTPH-418.1
			TPH as Diesel	TPH as Oil	TRPH
Sample I.D.	Consultant [a]	Date Sampled	mg/L		
MW1/SW [b]	RZA AGRA	04/28/92	3.0	NA	41
	PTL	12/08/92	1.8	NA	<1
	PTL	05/11/93 [c]	<0.20	NA	NA
	AGI	05/11/93	0.45	0.91	NA
MW2/NE [d]	RZA AGRA	04/28/92	6.3	NA	24.9
	PTL	12/08/92	8.3	NA	1.1
	PTL	05/11/93	1.0	NA	NA
	AGI	05/11/93	1.7	1.1	NA
MWA	PTL	12/14/92	<1	NA	<1
	AGI	5/21/93	0.55	0.89	NA
MWB	PTL	12/14/92	<1	NA	<1
AGI-1	AGI	05/21/93	<0.25	<0.75	NA
AGI-2	AGI	05/21/93	<0.25	<0.75	NA
State Cleanup Level [e]			1.0	1.0	1.0

Notes:

Outlined values exceed cleanup levels.
a) See text for explanation of previous consultants.
b) SW is the redrill of MW1.
c) Samples collected 5/11/93 were split between PTL and AGI.
d) NE is the redrill of MW2.
e) Method A suggested cleanup level for groundwater promulgated under Washington Administrative Code Chapter 173-340, Model Toxics Control Act Cleanup Regulation.
mg/L – Milligrams per liter.
TPH – Total petroleum hydrocarbons.
TRPH – Total recoverable petroleum hydrocarbons.

Table 7
Historical and Current Analytical Results – Groundwater
Volatile Organic Compounds Quantified by
EPA Methods 8240/8260, 8010 and/or 8020

St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

Sample I.D.:	MW1/SW [a]		MW2/NE [b,c]				MWA		MWB	AGI–1	AGI–2	MTCA Cleanup Level [e]		
Consultant: [d]	RZA AGRA	AGI	RZA AGRA	PTL	PTL	AGI	PTL	AGI	PTL	AGI	AGI		Method B	
Test Method:	8240/8260	8010/8020	8240/8260	8020	8010/8020	8010/8020	8020	8010/8020	8020	8010/8020	8010/8020		at 1 x 10^{-6}	
Date Sampled:	04/28/92	05/11/93	04/28/92	12/08.92	05/11/93	05/11/93	12/14/92	05/21/93	12/14/92	05/21/93	05/21/93			
Compound	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	Method A (µg/L)	Cancer Risk (µg/L)	at HI=1 (µg/L)
Acetone	42	NA	61	NA	NA	NA	NA	NA	NA	NA	NA	--	--	800
Benzene	<2.0	<0.5	<4.0	<1	3	3.7	<1	<0.5	<1	<0.5	1.8	5	1.5	--
Chlorobenzene	<2.0	6.1	1,200	NA	860	790	NA	<0.5	NA	<0.5	93	--	--	160
1,2–Dichlorobenzene	NA	1.8	NA	NA	120	130	NA	<0.5	NA	<0.5	<0.5	--	--	720
1,3–Dichlorobenzene	NA	<0.5	NA	NA	NA	10	NA	<0.5	NA	<0.5	<0.5	--	--	--
1,4–Dichlorobenzene	NA	<0.5	NA	NA	NA	33	NA	<0.5	NA	<0.5	0.8	--	1.82	
1,1–Dichloroethane	<2.0	<0.2	<4	NA	NA	1.4	NA	<0.2	NA	<0.2	0.5	--	0.48	800
cis–1,2–Dichloroethene	<2.0	1.3	<4	NA	NA	0.7	NA	<0.2	NA	<0.2	<0.2	--	--	80
Ethylbenzene	<2.0	<0.5	200	<10	26	31	<10	<0.5	<10	<0.5	<0.5	30	--	800
Toluene	<2.0	<0.5	380	<25	21	21	<25	<0.5	<25	<0.5	<0.5	40	--	1,600
Trichloroethene	<2.0	<0.2	<4	NA	0.5	0.5	NA	<0.2	NA	<0.2	<0.2	5	3.98	--
Total Xylenes	2.3	1.6	1,000	<15	110	130	<15	<0.5	<20	<0.5	<0.5	20	--	1,600

Notes:

Outlined values exceed cleanup levels.

a) SW is the redrill of MW1.

b) NE is the redrill of MW2.

c) Samples collected 5/11/93 from MW2 were split between PTL and AGI.

d) See text for explanation of previous consultants.

e) Sources: Washington State Department of Ecology Model Toxics Control Act Human Health Risk–Based Method B formula and IRIS, July 1993.

NA – Not analyzed.

µg/L – Micrograms per liter.

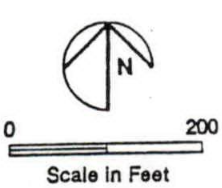
Table 8
Analytical Results – Soil
Petroleum Hydrocarbons as Diesel and Oil
St. Vincent de Paul/Sahlberg Equipment Property
Seattle, Washington

Well I.D.	Washington State Test Method WTPH–D	
	TPH as Diesel (mg/kg)	TPH as Oil (mg/kg)
AGI–1–2'	54.0	720
AGI–1–5'	<13	<51
AGI–2–3'	<12	<47
State Cleanup Level [a]	200	200

Notes:

Outlined value exceeds cleanup level.
a) Method A suggested cleanup level for soil promulgated under Washington Administrative Code Chapter 173–340 Model Toxics Control Act Cleanup Regulation.
mg/kg – Milligrams per kilogram.
TPH – Total petroleum hydrocarbons.

541914



Reference: Thomas Guide to King, Pierce and Snohomish Counties, 1990 Edition.

Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

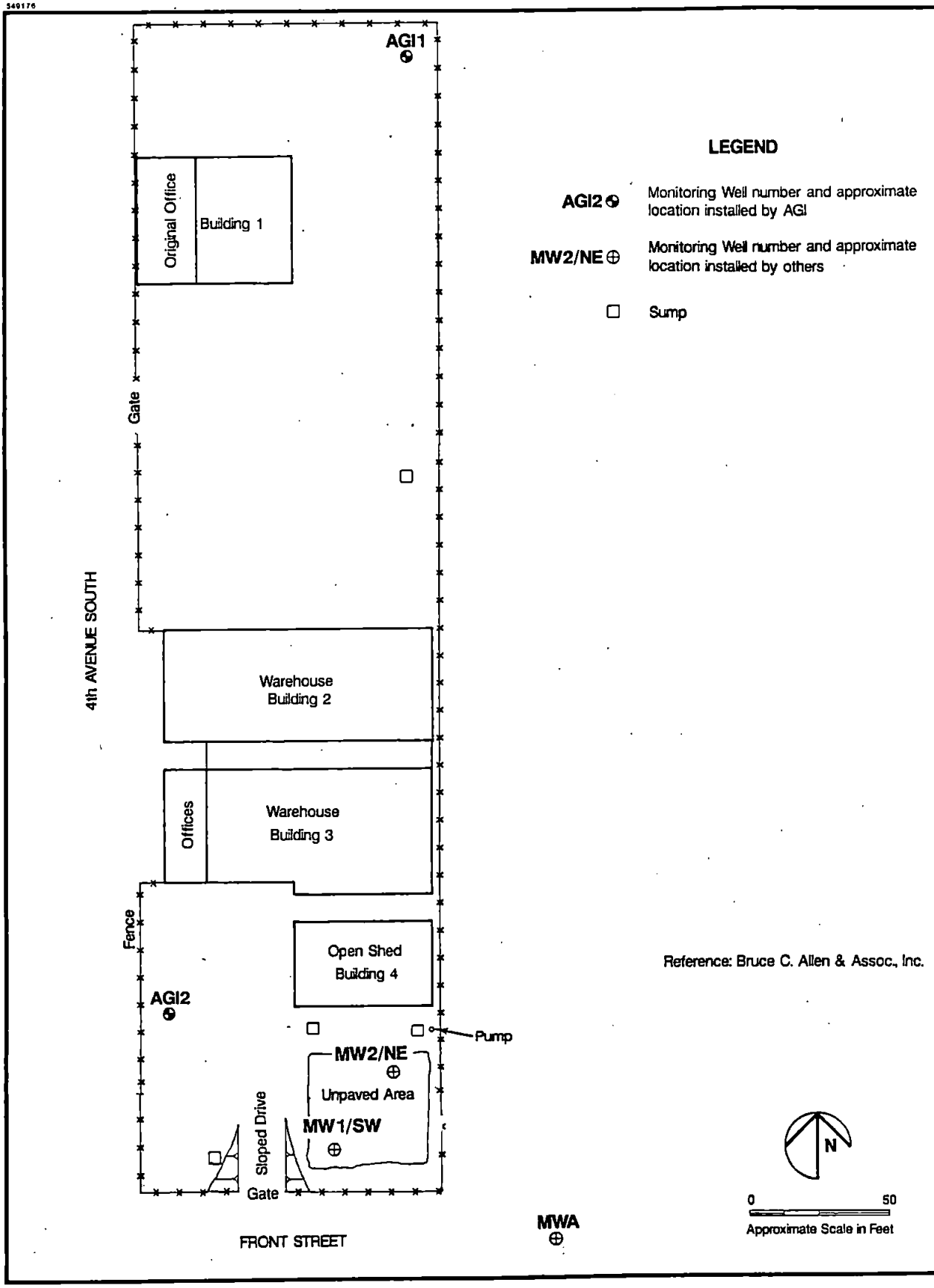
Vicinity Map

St. Vincent de Paul/Sahlberg Property
Seattle, Washington

FIGURE
1

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,740.001	KM	SJP	17 Jun 93		

549176



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

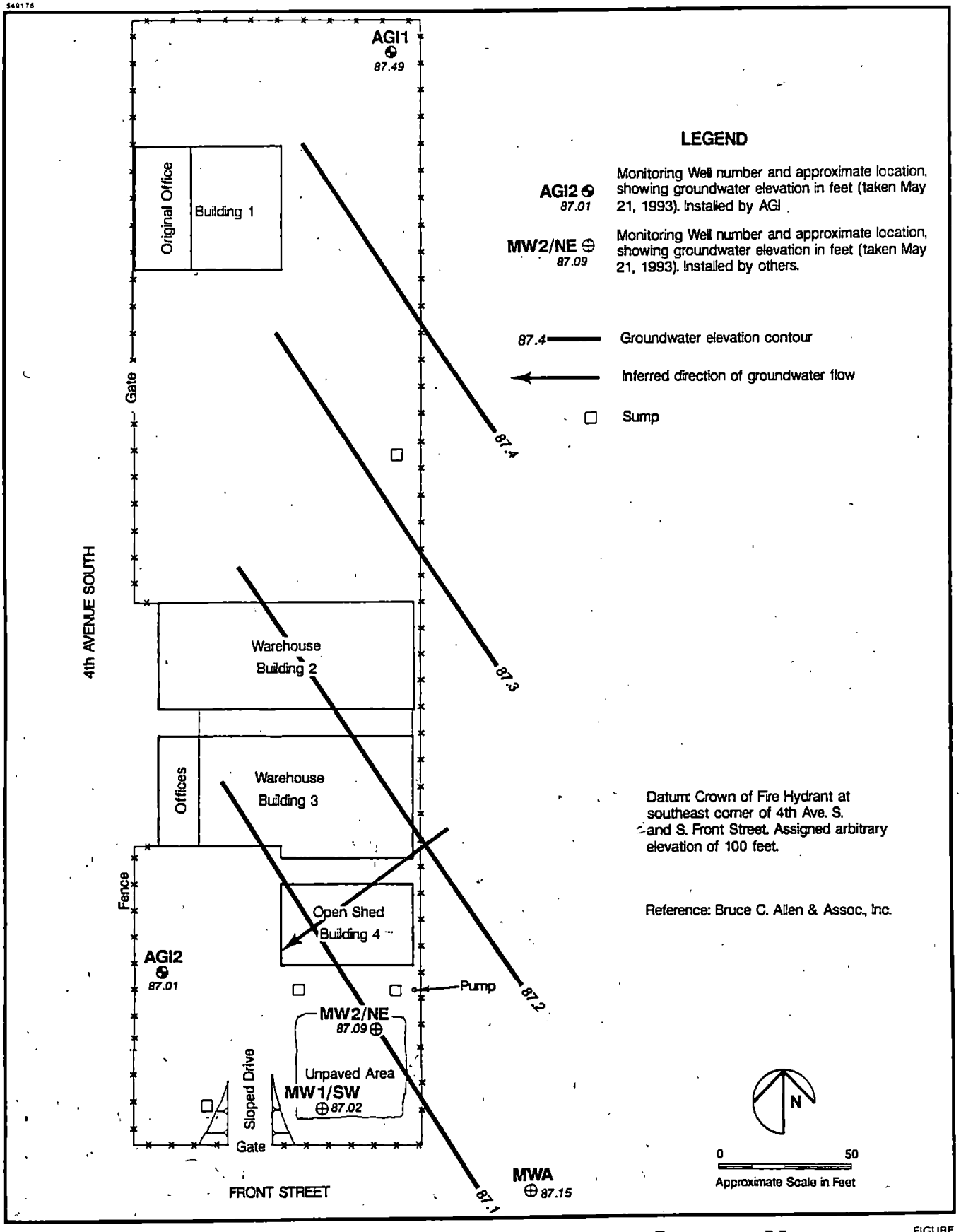
Site Plan

St. Vincent de Paul/Sahlberg Property
Seattle, Washington

FIGURE
2

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,740.001	KM		17 Jun 93		

549176



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

Groundwater Contour Map

St. Vincent de Paul/Sahlberg Property
Seattle, Washington

FIGURE
3

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15.740.001	KM		17 Jun 93		

APPENDIX A

Field Exploration and Sampling Procedures

APPENDIX A

Field Exploration and Sampling Procedures

DRILLING

Cascade Drilling of Woodinville, Washington drilled and installed two monitoring wells at the site on May 21, 1992. An Applied Geotechnology Inc. (AGI) hydrogeologist observed the drilling and monitoring well installation. The borings were advanced to approximately 14 feet below ground surface (bgs) by a drill rig equipped with 8-inch outside-diameter hollow-stem augers.

Organic vapors were monitored during drilling to aid in protecting on-site personnel from potential inhalation hazards and to make qualitative judgements about the degree of soil contamination. Measurements were taken routinely around the workers' breathing space. No organic vapors above background concentrations were measured during site activities.

SOIL SAMPLING

During drilling, soil was logged and sampled at 2-1/2 foot intervals by driving a 2-inch-diameter split-barrel sampler 18 inches into undisturbed soil ahead of the borehole bottom. Driving was terminated when the full 18-inch drive was completed. Each sampled interval was logged according to the Unified Soil Classification System as described on Plate B1.

The following procedures were used to collect subsurface soil samples:

1. Driller retrieved split-barrel sampler from borehole.

2. The split-barrel sampler was opened and sample recovery was measured.

3. A soil sample was collected into 4 ounce laboratory-grade sample jars if the sampled interval was to be submitted for analysis. The sample containers were labeled, secured with a chain-of-custody seal, placed in a cooler, and chilled with Blue Ice.

4. A representative sample was placed in a resealable plastic bag to measure headspace using an organic vapor meter equipped with a photoionization detector (OVM-PID).

5. The contents of the sampler were described on the field log.

6. The split-barrel sampler was decontaminated by the procedures described later in this appendix.

MONITORING WELL INSTALLATION

A 2-inch-diameter monitoring well, approximately 14 feet deep, was installed in each boring as the augers were extracted. Wells were constructed in accordance with Chapter 173-160 Washington Administrative Code (WAC) *Standards for Resource Protection Wells* (March 13, 1990), with the exception of the surface seal. A well variance was obtained from the northwest

regional office of the Washington State Department of Ecology to allow for a shorter surface seal than normally installed due to high water table conditions. Monitoring well construction details are shown on Plate B2 in Appendix B.

The monitoring wells were constructed of 2-inch-diameter Schedule 40, flush-threaded PVC screen and riser pipe. All screen, casing, and caps were precleaned by the manufacturer and shipped in plastic. Each well had a 10-foot-long machine-slotted (No. 10 slot) screen with a threaded bottom cap. The screen extended above the top of the water table encountered during drilling to allow floating product (if present) to be detected. A blank riser pipe extended from the top of the screen to approximately 0.4 foot bgs. A locking cap was placed at the top of the blank riser pipe.

The filter pack was installed in the borehole as the auger flights were withdrawn. Quantities of material used were recorded in the daily field investigation report.

Depths to the well construction materials were measured frequently with a precleaned weighted measuring tape during installation to prevent overfilling and bridging in the augers. The length of the end cap, screen, and riser were measured and recorded in the log prior to installation. The 10-20 silica sand pack was then placed in the annular space from the bottom of the screen to approximately 1 foot above the top of the screen.

A seal of bentonite chips was placed on top of the sand pack to about 1.0 foot bgs. A concrete seal was placed between the bentonite seal and the ground surface.

A tamper-resistant, flush-mount, protective casing was set over the upper end of the PVC riser. The monitoring well identification number was permanently marked on the PVC riser cap and on the protective casing.

WELL DEVELOPMENT AND SAMPLING

Well Development

Each of the wells was developed surging by bailing. Temperature, pH, and specific conductance of the purged groundwater were measured during development; these data are on file in AGI's Bellevue office. All development water was collected and stored in labeled 55-gallon drums.

Groundwater Sampling

The monitoring wells were sampled in general accordance with Environmental Protection Agency (EPA) specifications and recommendations presented in the *Groundwater Technical Enforcement Guidance Document* and *Practical Guide to Groundwater Sampling*. Sampling was performed as follows:

Initial Measurements: Prior to purging, water depths were measured to the nearest 0.01 foot using a SINCO water level indicator.

Well Purging: After initial measurements were recorded, monitoring wells were purged using a bailer. Purge water was placed in 55-gallon drums and stored on site. During purging, pH, temperature, and specific conductance were measured and recorded.

Well Sampling: After purging was completed, water samples were collected using a bailer lowered into the well on nylon twine. Water was poured gently into sample containers to avoid sample overflow or degassing. Samples were labeled, secured with a chain-of-custody seal, and placed in a chilled ice chest.

Decontamination: Bailers used during well development were decontaminated prior to each use. Disposable bailers were used and discarded between well sampling events. Nylon twine was replaced between well sampling events. Equipment decontamination was performed in accordance with the procedures described in the following sections.

DECONTAMINATION PROCEDURES

Drilling Equipment

Drilling equipment, including the auger flights and sampling tools, was decontaminated with a high-pressure steam cleaner/pressure wash prior to each use.

Sampling Equipment

The following decontamination procedures were used to decontaminate the sampling equipment.

1. Rinse and preclean in potable water.
2. Wash and scrub with nonphosphate-based detergent and potable water.
3. Rinse with potable tap water.
4. Rinse with n-propanol or similar water soluble solvent.
5. Rinse with deionized water.
6. Rinse with dilute reagent-grade nitric acid (only if sampling for metals).
7. Rinse in deionized water.
8. Air dry and store in clean plastic bags between sampling.

SURVEYING

Each of the new well and boring locations were measured horizontally to the nearest 0.5 foot with respect to site boundaries or permanent structures. Well casing elevations were measured to the nearest 0.01 foot using an arbitrary datum of 100.00 feet. The benchmark was the crown of the green cap on a fire hydrant at the southeast corner of S. Front Street and 4th Avenue South.

SAMPLE HANDLING AND SHIPPING

Samples selected for analytical testing were kept out of direct sunlight and were checked for label completeness and cap tightness. Each sealed sample container was placed in packing material upright in a cooler and chilled with Blue Ice. The samples were stored and transported under chain-of-custody procedures. Copies of the completed chain-of-custody forms are presented in Appendix C.

MATERIALS GENERATED DURING FIELDWORK

All materials generated during fieldwork were placed in 55-gallon drums, labeled to identify the contents, and temporarily stored on site pending laboratory results. Materials included soil cuttings, groundwater generated during well development and purging, and decontamination water.

DOCUMENTATION

Daily Field Report

The AGI representative reported daily activities on a Field Investigation Daily Report form. Personnel on site, visitors, weather, general activities planned and performed, and any problems were included on the Daily Report. Daily Field Reports and other documentation of field activities are on file in AGI's Bellevue office.

Drilling and Well Construction

Drilling was conducted by Cascade Drilling and documented by an AGI geologist. Documentation of drilling, soil sampling, and well construction was made on a Drilling and Well Installation Log. The log was completed in the field by an AGI hydrogeologist.

Soil and Groundwater Sampling

AGI documented field activities associated with media sampling. This included a comprehensive discussion of field observations, including visual observations, field parameter measurements, QA observations, and problems encountered. Soil Sampling Records and Groundwater Sampling Records were completed for all samples submitted to laboratories. Well development was documented in a Well Development Record.

Sample containers were labeled with the following information:

- Project identification
- Date
- Time
- Sampler's initials
- Sample identification number

Chain-of-custody forms were filled out with the requested analyses information and accompanied the samples to the laboratory.

APPENDIX B

Boring Logs

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 PLASITICITY, 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 DIATOMACIOUS 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
- "Undisturbed"
- Bulk/Grab
- Not Recovered
- Recovered, Not Retained

CONTACT BETWEEN UNITS
- Well Defined Change
- Gradational Change
- Obscure Change
- End of Exploration

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

LABORATORY TESTS
- 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

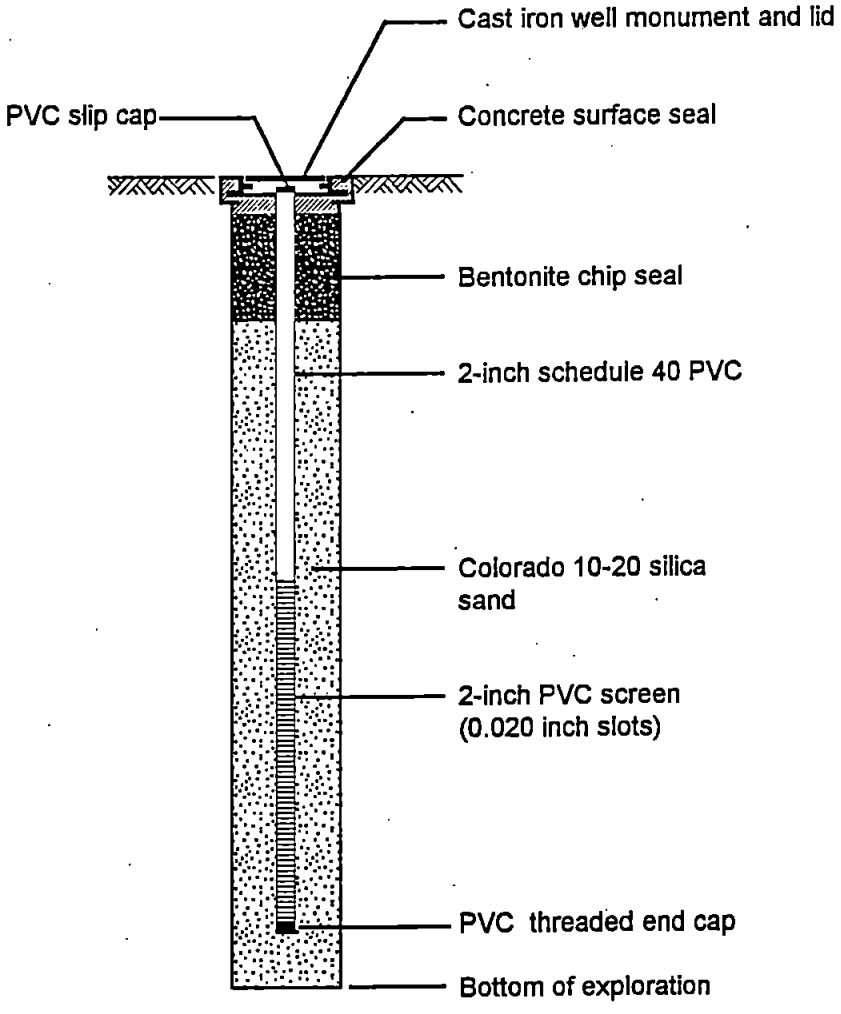
Applied Geotechnology Inc.

Soil Classification/Legend

St. Vincent de Paul/Sahlberg Property
Seattle, Washington

PLATE **B1**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,740.001	KM		17 Jun. 93		



Applied Geotechnology Inc.

Monitoring Well Construction

St. Vincent de Paul/Sahlberg Property
Seattle, Washington

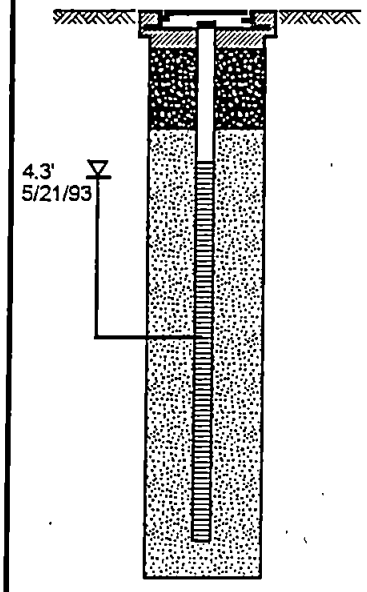
PLATE **B2**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,740.001	KM	SOB	4 June 93		

Equipment CME 75

Top of Casing Elevation 91.82 feet* Date 5/21/93

Well Construction Summary



Depth	Sample	Sheen	OVM	Blows per Foot	
0					Asphalt.
				4	GRAY BROWN SAND (SP) loose, moist; fine grained, with a trace of silt, and fine sand.
5			0	7	DARK GRAY SILTY SAND (SM) interlayered with SAND (SP) loose, wet; fine grained, and some thin layers of organics.
			0	12	Becomes saturated.
10			0	21	
			0	18	
15					Groundwater encountered at 7.5 feet during drilling.
20					
25					
30					
35					
40					

*Datum: arbitrary benchmark, elevation 100.00 feet

Applied Geotechnology Inc.

Log of Monitoring Well AGI1

St. Vincent de Paul/Sahlberg Property
Seattle, Washington

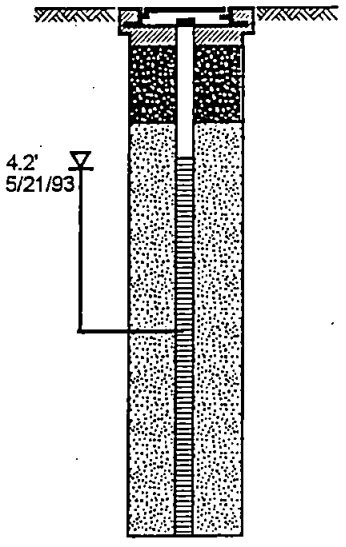
PLATE **B3**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,740.001	KM		24 May 93		

Equipment CME 75

Top of Casing Elevation 91.16 feet* Date 5/21/93

Well Construction Summary



Depth	Sample	Sheen	OVM	Blows per Foot	
0					Concrete.
			0	26	DARK GRAY SAND (SP) loose, moist; fine grained, with a trace of gravel.
5			0	13	DARK GRAY SILTY SAND (SM) interlayered with SAND (SP) loose, saturated; fine grained, with some thin layers of organics.
			0	13	With sandy silt interlayers.
10			1.0	26	BLACK SAND (SP) loose, saturated; fine grained.
			0	19	
15					Groundwater encountered at 4 feet during drilling.
20					
25					
30					
35					
40					

*Datum: arbitrary benchmark, elevation 100.00 feet

Applied Geotechnology Inc.

Log of Monitoring Well AGI2

St. Vincent de Paul/Sahlberg Property
Seattle, Washington

PLATE **B4**

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,740.001	KM		24 May 93		

APPENDIX C

Analytical and Quality Assurance Reports

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: St. Vincent de Paul/Sahlberg Property
Project No.: 15,740.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9305-100/9305-250
Sample No.: NE, SW, AGI-1-5'
Matrix: Water/Soil

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality.

ANALYTICAL METHODS

Parameter	Technique	Method
Purgeable Halocarbons	GC/ECD	EPA 8010
Purgeable Aromatics	GC/PID	EPA 8020
TPH[a]	GC/FID	WTPH-D
Moisture[b]	Gravimetric	CLP SOW ILM01.0

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
VOC[c]	05/11/93	NA	05/13/93	NA	2 (14)
TPH-D	05/11/93	05/12/93	05/13/93	1 (7)	2 (30)
TPH-D[b]	05/21/93	05/26/93	05/26/93	5 (7)	5 (30)
Moisture	05/21/93	NA	05/26/93	NA	5 (NA)

a - Diesel and motor oil range petroleum hydrocarbons
b - Analyzed for soil sample (sample AGI 1-5)
c - Purgeable halocarbons and purgeable aromatics
NA - Not Applicable
() - Numbers in parentheses indicate recommended holding times in days for water or soil.

All samples were extracted and analyzed within recommended holding times.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: St. Vincent de Paul/Sahlberg Property
Project No.: 15,740.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9305-100/9305-250
Sample No.: NE, SW, AGI-1-5'
Matrix: Water/Soil

CHROMATOGRAM

WTPH-D: Diesel and motor oil range petroleum hydrocarbons (TPH) detected in both samples NE and SW are confirmed by the chromatograms.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected.

Rinsate: None collected.

Trip Blank: None collected.

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above the method reporting limits in method blanks by the following methods:

EPA 8010/8020
WTPH-D

Matrix Spikes: Matrix spike and matrix spike duplicate percent recovery and relative percent difference (RPD) are within ATI's control limit criteria for WTPH-D.

EPA 8010/8020: Matrix spike and matrix spike duplicate percent recoveries for benzene and toluene exceeded acceptance criteria due to high analyte levels in the sample. Data are not compromised.

Duplicates: Sample/sample duplicate RPDs are within ATI's control limit criteria for the following methods:

WTPH-D
CLP SOW ILM01.0

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: St. Vincent de Paul/Sahlberg Property
Project No.: 15,740.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9305-100/9305-250
Sample No.: NE, SW, AGI-1-5'
Matrix: Water/Soil

Blank Spike: Blank spike percent recoveries are within ATI's control limit criteria for EPA 8010/8020.

WTPH-D: Blank spike and blank spike duplicate percent recovery and RPD for water sample analysis and blank spike percent recovery for soil sample analysis are within ATI's control limit criteria.

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

EPA 8010/8020
WTPH-D

SIGNATURES

Prepared by Knight Lin Date 06/14/93

Checked by Katherine Boudonais Date 6/15/93

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

ATI I.D. # 9305-100

May 27, 1993

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

Attention : Susan Penoyar

Project Number : 15,734.001

Project Name : St. Vincent De Paul

ear Ms. Penoyar:

On May 12, 1993, 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,

Donna M. McKinney
Senior Project Manager

DMM/hal/dmc

Enclosure

Analytical Technologies, Inc.

ATI I.D. # 9305-100

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9305-100-1	NE	05/11/93	WATER
9305-100-2	SW	05/11/93	WATER

----- TOTALS -----

MATRIX	# SAMPLES
WATER	2

ATI STANDARD DISPOSAL PRACTICE

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

Analytical Technologies, Inc.

ATI I.D. # 9305-100

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

ANALYSIS	TECHNIQUE	REFERENCE	LAB
PURGEABLE HALOCARBONS	GC/ELCD	EPA 8010	R
PURGEABLE AROMATICS	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R

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

Analytical Technologies, Inc.

ATI I.D. # 9305-100

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

CASE NARRATIVE: VOLATILE ORGANICS ANALYSIS

Two (2) water samples were received by Analytical Technologies, Inc. (ATI), on May 12, 1993, for the following analysis: EPA methods 8010/8020.

Sample 9305-070-3 was used for the matrix spike/matrix spike duplicate (MS/MSD) for the analysis. The MS/MSD recoveries for benzene and toluene were not calculable due to high levels of target analytes. The corresponding blank spike (BS) is within established control limits. The analytical report has been flagged with the letter "G" and footnoted.

All surrogate recoveries are within the established control limits.

AnalyticalTechnologies,Inc.

ATI I.D. # 9305-100

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,734.001	DATE RECEIVED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 05/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<1.0
CARBON 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
,3-DICHLOROBENZENE	<0.5
,4-DICHLOROBENZENE	<0.5
DIBROMOCHLOROMETHANE	<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
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY		LIMITS
BROMOCHLOROMETHANE	93	58 - 126
OMOFLUOROBENZENE	108	76 - 136

AnalyticalTechnologies,Inc.

ATI I.D. # 9305-100-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/11/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/12/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: N/A
CLIENT I.D.	: NE	DATE ANALYZED	: 05/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS	
BENZENE	3.7	
BROMODICHLOROMETHANE	<0.2	
BROMOFORM	<0.2	
BROMOMETHANE	<1.0	
CARBON TETRACHLORIDE	<0.2	
CHLOROBENZENE	790	D6
CHLOROETHANE	<1.0	
CHLOROFORM	<0.2	
CHLOROMETHANE	<2.0	
1,2-DIBROMOETHANE (EDB)	<0.5	
1,2-DICHLOROBENZENE	130	D4
,3-DICHLOROBENZENE	10	
,4-DICHLOROBENZENE	33	D4
DIBROMOCHLOROMETHANE	<0.2	
1,1-DICHLOROETHANE	1.4	
1,2-DICHLOROETHANE	<0.2	
1,1-DICHLOROETHENE	<0.2	
CIS-1,2-DICHLOROETHENE	0.7	
TRANS-1,2-DICHLOROETHENE	<0.2	
1,2-DICHLOROPROPANE	<0.2	
CIS-1,3-DICHLOROPROPENE	<0.2	
TRANS-1,3-DICHLOROPROPENE	<0.2	
ETHYLBENZENE	31	
METHYLENE CHLORIDE	<2.0	
1,1,2,2-TETRACHLOROETHANE	<0.2	
TETRACHLOROETHENE	<0.2	
TOLUENE	21	
1,1,1-TRICHLOROETHANE	<0.2	
1,1,2-TRICHLOROETHANE	<0.2	
TRICHLOROETHENE	0.5	
TRICHLOROFLUOROMETHANE	<0.5	
VINYL CHLORIDE	<1.0	
TOTAL XYLENES	130	

SURROGATE PERCENT RECOVERY		LIMITS
BROMOCHLOROMETHANE	100	58 - 126
OMOFLUOROBENZENE	107	76 - 136

D4 = Value from a ten fold diluted analysis.
D6 = Value from a 50 fold diluted analysis.

Analytical Technologies, Inc.

ATI I.D. # 9305-100-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/11/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/12/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: N/A
CLIENT I.D.	: SW	DATE ANALYZED	: 05/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<1.0
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	6.1
CHLOROETHANE	<1.0
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
1,2-DIBROMOETHANE (EDB)	<0.5
1,2-DICHLOROBENZENE	1.8
.3-DICHLOROBENZENE	<0.5
.,4-DICHLOROBENZENE	<0.5
DIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
CIS-1,2-DICHLOROETHENE	1.3
TRANS-1,2-DICHLOROETHENE	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	1.6

SURROGATE PERCENT RECOVERY		LIMITS
?ROMOCHLOROMETHANE	91	58 - 126
ɔMOFLUOROBENZENE	111	76 - 136

Analytical Technologies, Inc.

ATI I.D. # 9305-100

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9305-070-3
PROJECT #	: 15,734.001	DATE EXTRACTED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/13/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	>80.0	8.00	>80.0	G	>80.0	G	NC
CHLOROBENZENE	<0.500	8.00	8.03	100	7.87	98	2
1,1-DICHLOROETHENE	<0.200	8.00	8.92	112	8.47	106	5
TOLUENE	56.8	8.00	30.0	G	30.6	G	2
TRICHLOROETHENE	<0.200	8.00	8.70	109	8.31	104	5

CONTROL LIMITS	% REC.	RPD
BENZENE	55 - 148	20
CHLOROBENZENE	61 - 160	33
1,1-DICHLOROETHENE	37 - 182	22
TOLUENE	60 - 158	29
TRICHLOROETHENE	61 - 149	21

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOCHLOROMETHANE	104	105	58 - 126
BROMOFLUOROBENZENE	101	98	76 - 136

NC = Not Calculable.
G = Out of limits due to high level of target analytes in sample.

Analytical Technologies, Inc.

ATI I.D. # 9305-100

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL
SAMPLE MATRIX : WATER
EPA METHOD : 8010/8020

SAMPLE I.D. # : BLANK SPIKE
DATE EXTRACTED : N/A
DATE ANALYZED : 05/13/93
UNITS : ug/L

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	16.0	16.5	103	N/A	N/A	N/A
CHLOROBENZENE	<0.500	16.0	16.9	106	N/A	N/A	N/A
1,1-DICHLOROETHENE	<0.200	16.0	16.6	104	N/A	N/A	N/A
TOLUENE	<0.500	16.0	16.6	104	N/A	N/A	N/A
TRICHLOROETHENE	<0.200	16.0	15.8	99	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	73 - 134	20
CHLOROBENZENE	79 - 141	33
1-DICHLOROETHENE	56 - 158	22
TOLUENE	83 - 136	29
TRICHLOROETHENE	72 - 138	21

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOCHLOROMETHANE	99	N/A	58 - 126
BROMOFLUOROBENZENE	104	N/A	76 - 136

Analytical Technologies, Inc.

ATI I.D. # 9305-100

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,734.001	DATE RECEIVED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/12/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 05/12/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<0.25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	<0.75
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
TERPHENYL	103	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-100-1

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/11/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/12/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/12/93
CLIENT I.D.	: NE	DATE ANALYZED	: 05/12/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	1.7
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	1.1
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
o-TERPHENYL	89	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-100-2

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/11/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/12/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/12/93
CLIENT I.D.	: SW	DATE ANALYZED	: 05/13/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	0.45
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	0.91
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
`-TERPHENYL	96	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-100

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL
SAMPLE MATRIX : WATER
METHOD : WA DOE WTPH-D

SAMPLE I.D. # : 9305-101-4
DATE EXTRACTED : 05/12/93
DATE ANALYZED : 05/12/93
UNITS : mg/L

COMPOUNDS	SAMPLE RESULT	DUP. SAMPLE RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	0.85	1.0	16	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	101	99	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-100

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL
SAMPLE MATRIX : WATER
METHOD : WA DOE WTPH-D

SAMPLE I.D. # : 9305-108-1
DATE EXTRACTED : 05/12/93
DATE ANALYZED : 05/12/93
UNITS : mg/L

COMPOUNDS	SAMPLE RESULT	DUP. SAMPLE RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	0.43	0.48	11	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	109	107	50 - 150

AnalyticalTechnologies,Inc.

ATI I.D. # 9305-100

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK SPIKE
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/12/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/12/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D		

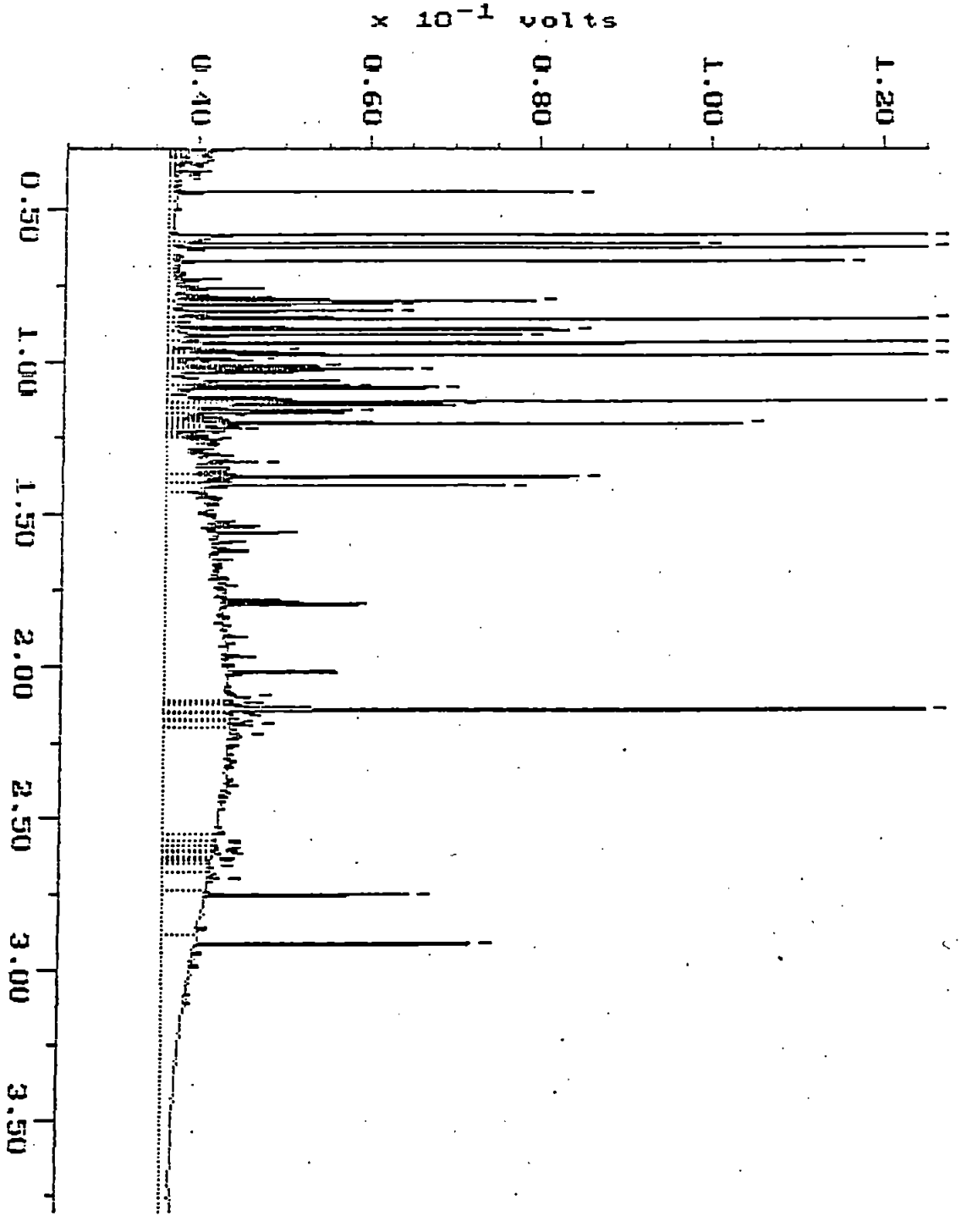
COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<0.250	2.50	2.56	102	2.37	95	8

CONTROL LIMITS	% REC.	RPD
DIESEL	70 - 115	20

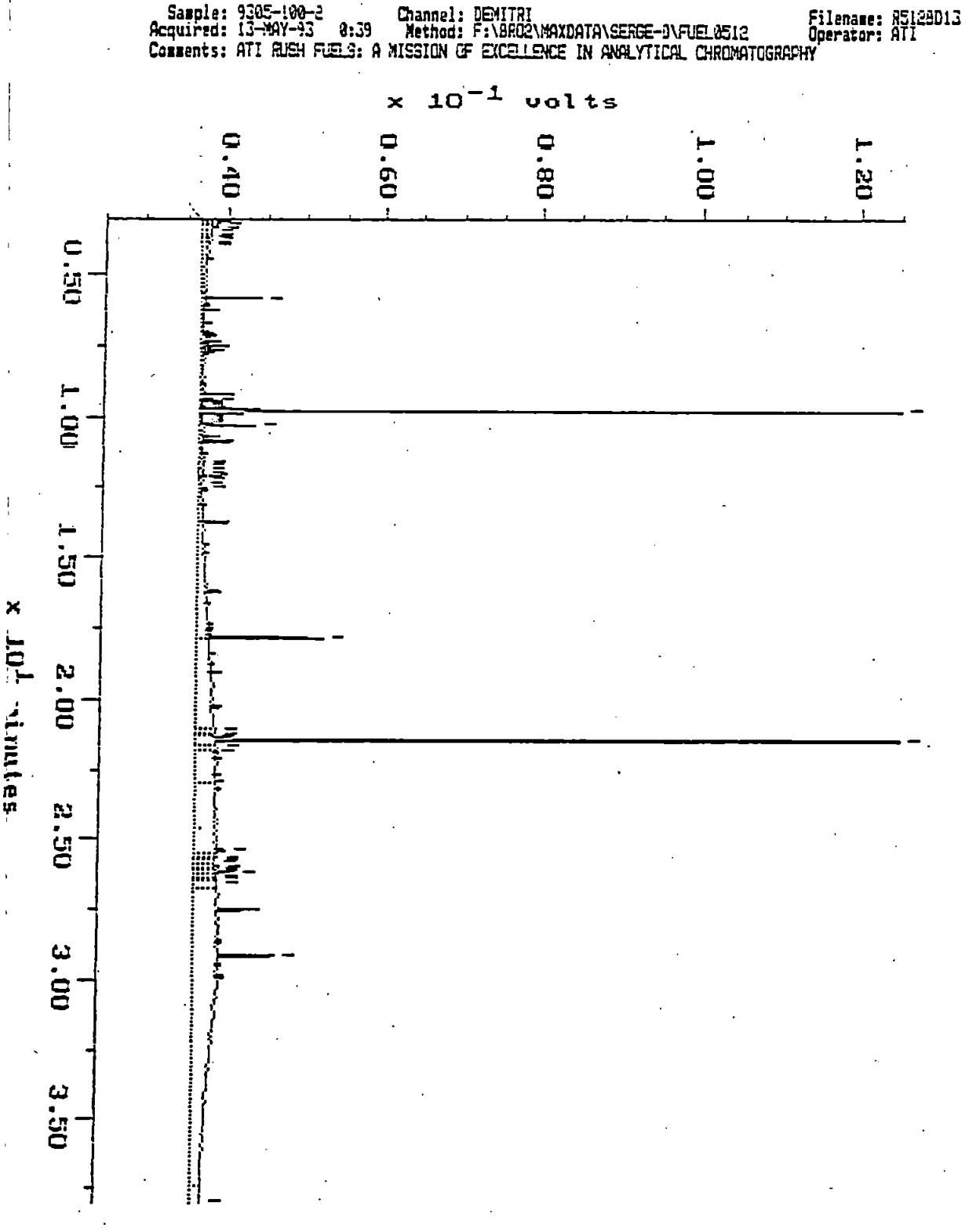
SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
O-TERPHENYL	106	107	50 - 150

WA DOE WTPH-D

Sample: 9305-100-1 Channel: DEMITRI Filename: R5120D12
Acquired: 12-MAY-93 23:53 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0512 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

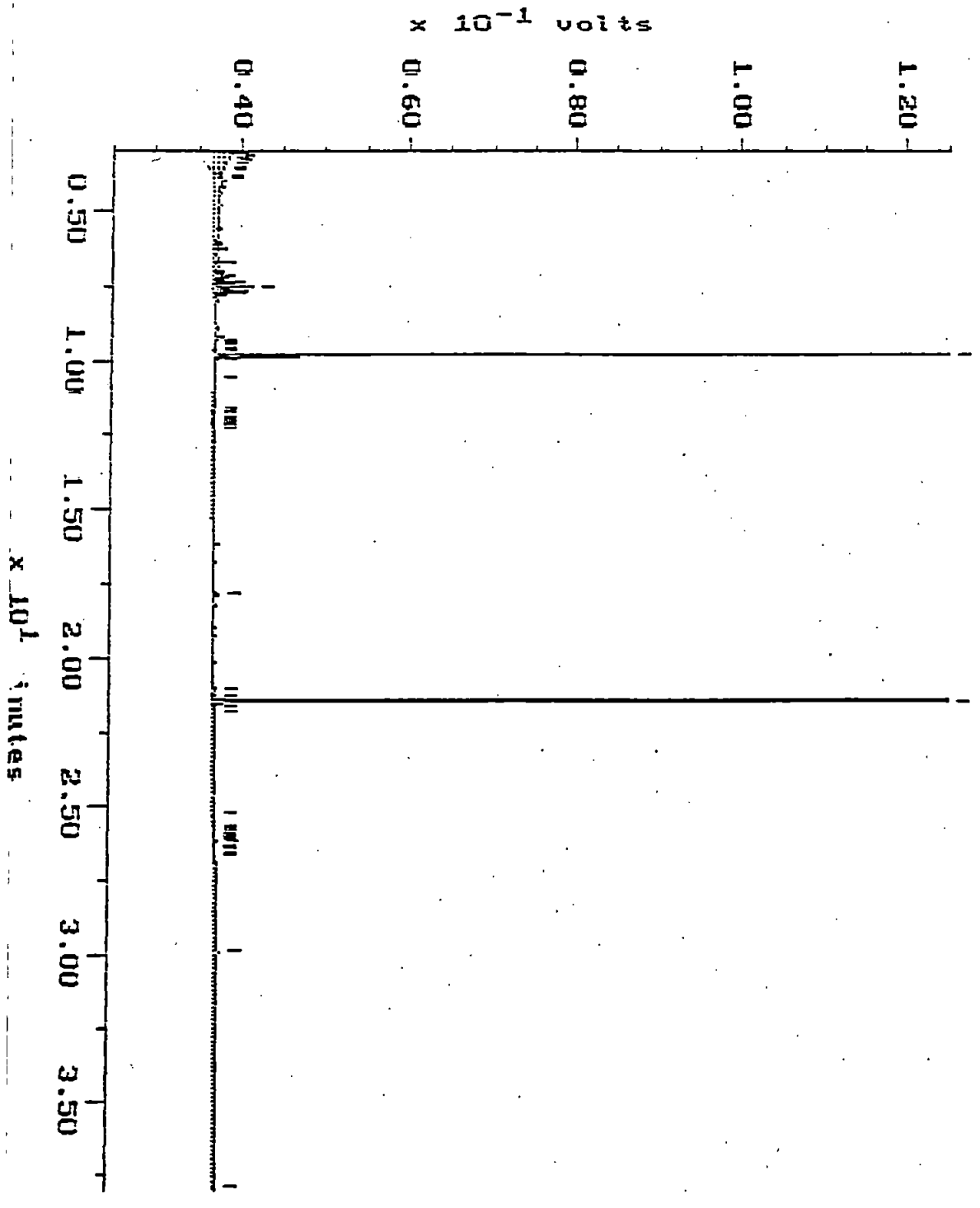


WA DOE WTPH-D

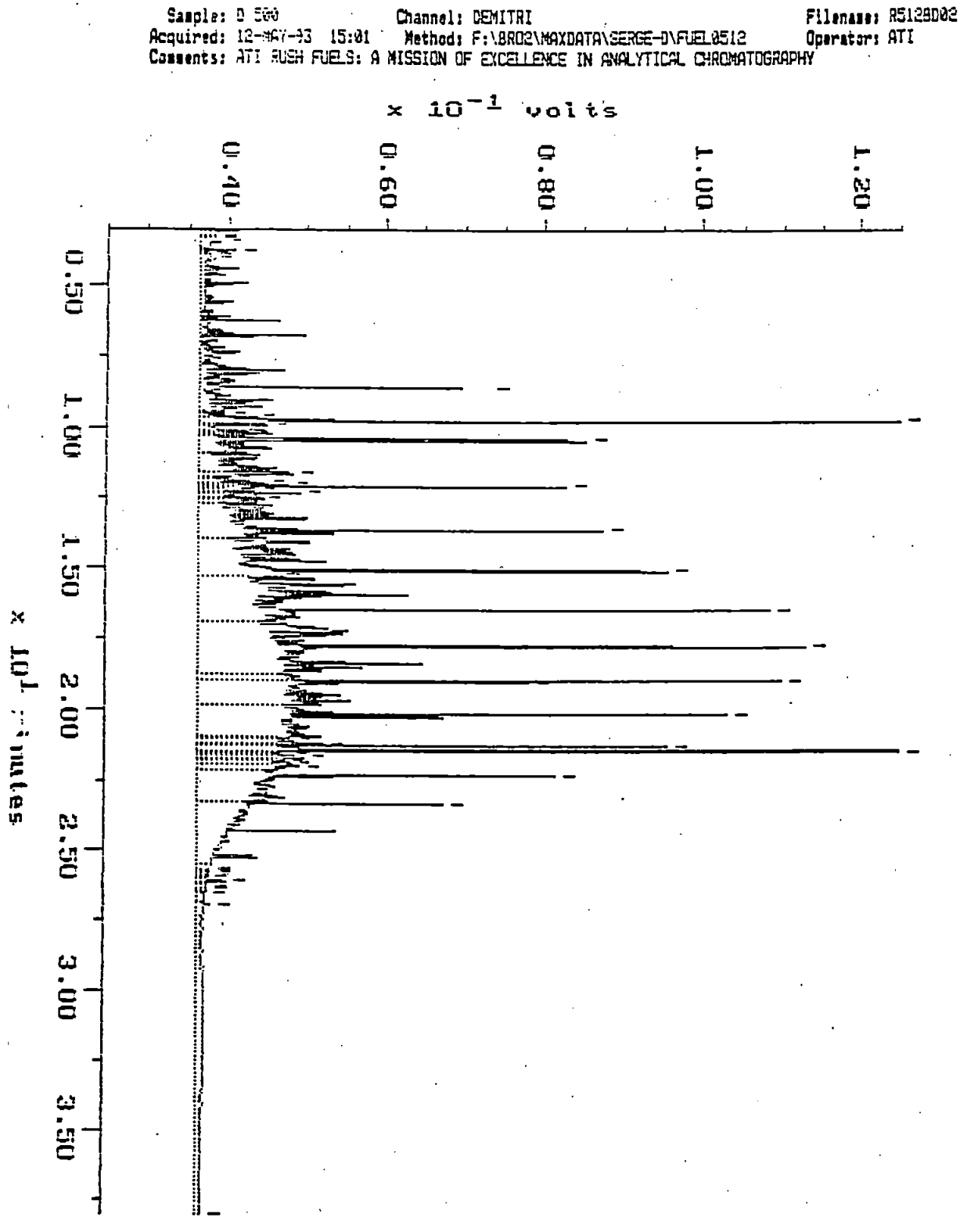

Sample: 9305-100-2
Channel: DEMITRI
Filename: R5128D13
Acquired: 13-MAY-93 8:39
Method: F:\BR02\MAXDATA\SERGE-D\FUEL0512
Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY
x 10^-1 volts
0.40
0.60
0.80
1.00
1.20
0.50
1.00
1.50
2.00
2.50
3.00
3.50
x 10^1 minutes

Blank

Sample: WAB 5-12 Channel: DEMITRI Filename: R5128D04
Acquired: 12-MAY-93 17:45 Method: F:\BR02\MAXDATA\SERGE-D\FUEL0512 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

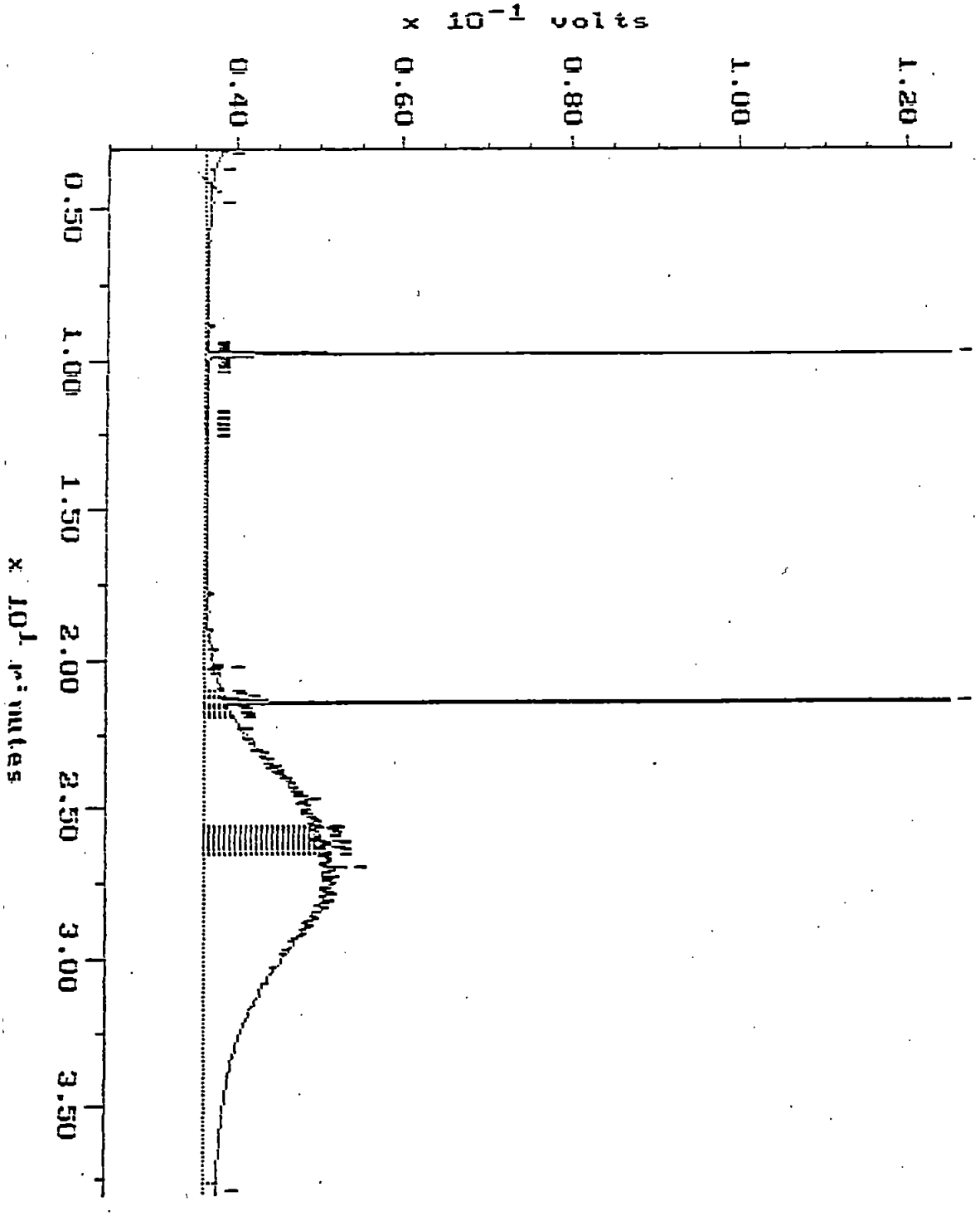


Continuing Calibration



Continuing Calibration

Sample: MO 500 Channel: DEMITRI Filename: R5129003
Acquired: 12-MAY-93 15:48 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0512 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

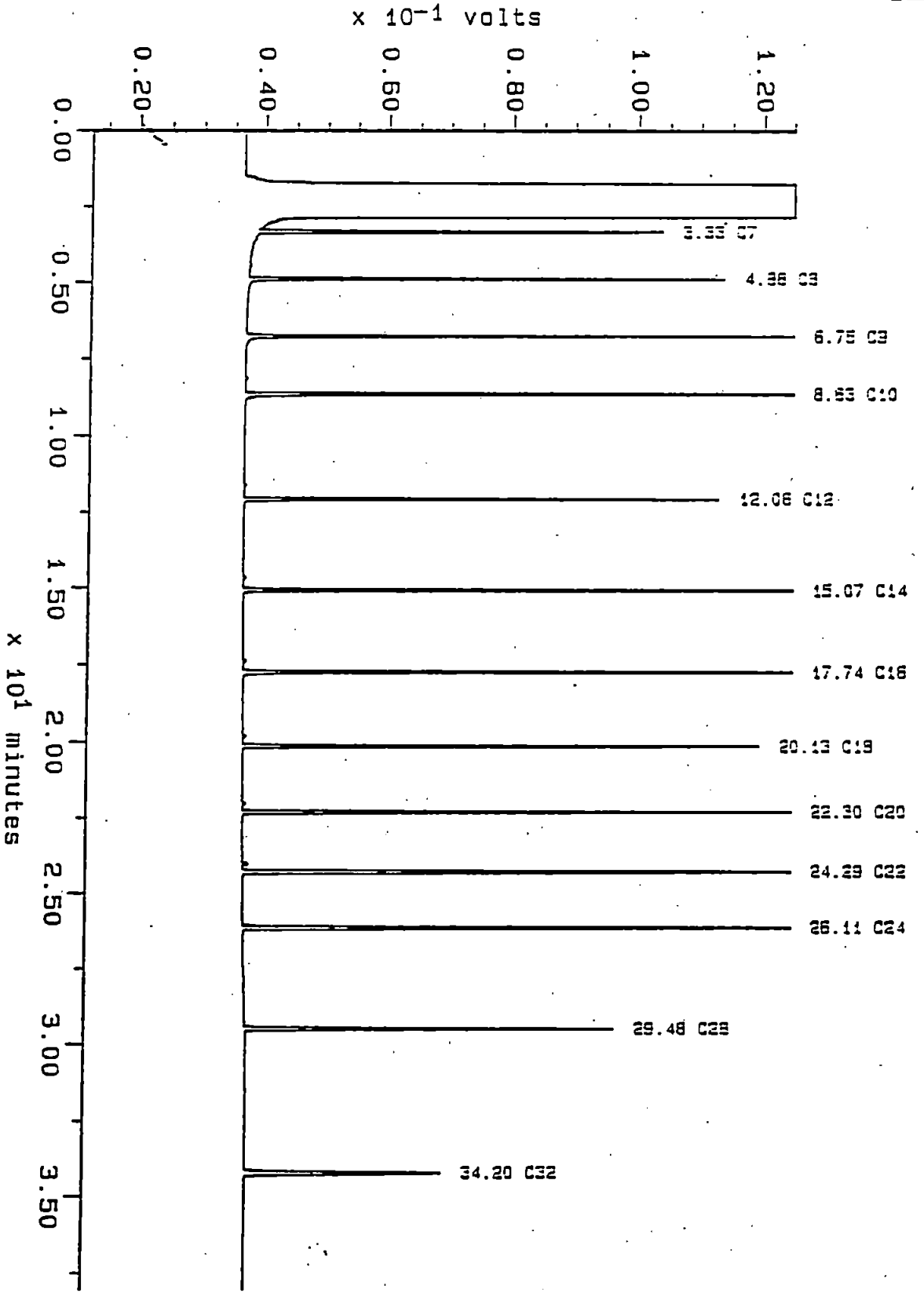


Sample: ALKANE
Acquired: 07-MAY-93 18:39
Inj Vol: 1.00

Channel: CEMITRI
Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0507

Filename: R5078003
Operator: ATI

Alkane



...pplied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 5/11/93 Page 1 of 1

PROJECT INFORMATION

Project Manager: SUSAN PENOYAR
Project Name: ST. VINCENTS DE PAUL
Project Number: 15,934.001
Site Location: S. SEATTLE Sampled By: JMS

DISPOSAL INFORMATION

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

QC INFORMATION (check one)

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

Laboratory Number: 9305-100

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	PETROLEUM HYDROCARBONS: TPH-ID State:	TPH-G State:	TPH-D State: WA EXT.	TPH Special Instructions	418.1 State:	8015M	ORGANIC COMPOUNDS: 8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	PESTS/PCB's: 8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	METALS: Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	LEACHING TESTS: TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER	NUMBER OF CONTAINERS
NE	5/11/93	1125	WATER	1			X				X	X																								3
SW	5/11/93	1140	WATER	2			X				X	X																								3

LAB INFORMATION

Lab Name: ATT
Lab Address:
Via: COURIER

SAMPLE RECEIPT

Total Number of Containers: 6
Chain of Custody Seals: Y/N/NA: Y
Intact?: Y/N/NA: Y
Received in Good Condition/Cold: Y/Y

Turn Around Time: ☒ Standard ☐ 24 hr. ☐ 48 hr. ☐ 72 hr. ☐ 1 wk.
PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: [signature] Time: 0845	Signature: Time:	Signature: Time:
Printed Name: JOHN R. SCHWANTZ Date: 5/12/93	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: [signature] Time: 10:45	Signature: Time:	Signature: Time:
Printed Name: STAKEN Date: 5/12/93	Printed Name: Date:	Printed Name: Date:
Company: ATT-WD	Company:	Company:

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

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

ATI I.D. # 9305-250

June 7, 1993

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

Attention : Susan Penoyar

Project Number : 15,734.001

Project Name : St. Vincent De Paul

Dear Ms. Penoyar:

On May 26, 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,

Donna M. McKinney
Senior Project Manager

DMM/hal/ff

Enclosure

AnalyticalTechnologies,Inc.

ATI I.D. # 9305-250

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9305-250-1	AGI 1-5	05/21/93	SOIL

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	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.

Analytical Technologies, Inc.

ATI I.D. # 9305-250

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

ANALYSIS	TECHNIQUE	REFERENCE	LAB
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	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

Analytical Technologies, Inc.

ATI I.D. # 9305-250

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,734.001	DATE RECEIVED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/26/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 05/26/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<10
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	<40
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
O-TERPHENYL	112	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-250-1

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/26/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/26/93
CLIENT I.D.	: AGI 1-5	DATE ANALYZED	: 05/26/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<13
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	<51
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
-TERPHENYL	110	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-250

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9305-250-1
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/26/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/26/93
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	<10	<10	NC	200	193	97	197	99	2

CONTROL LIMITS	% REC.	RPD
DIESEL	63 - 131	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
O-TERPHENYL	119	110	50 - 150

NC = Not Calculable.

Analytical Technologies, Inc.

ATI I.D. # 9305-250

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/26/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/26/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<10	200	190	95	N/A	N/A	N/A
CONTROL LIMITS				% REC.			RPD
DIESEL				69 - 122			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		115		N/A		50 - 150	

Analytical Technologies, Inc.

ATI I.D. # 9305-250

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

PARAMETER	DATE ANALYZED
MOISTURE	05/26/93

Analytical Technologies, Inc.

ATI I.D. # 9305-250

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE
9305-250-1	AGI 1-5	22

Analytical Technologies, Inc.

ATI I.D. # 9305-250

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL UNITS : %

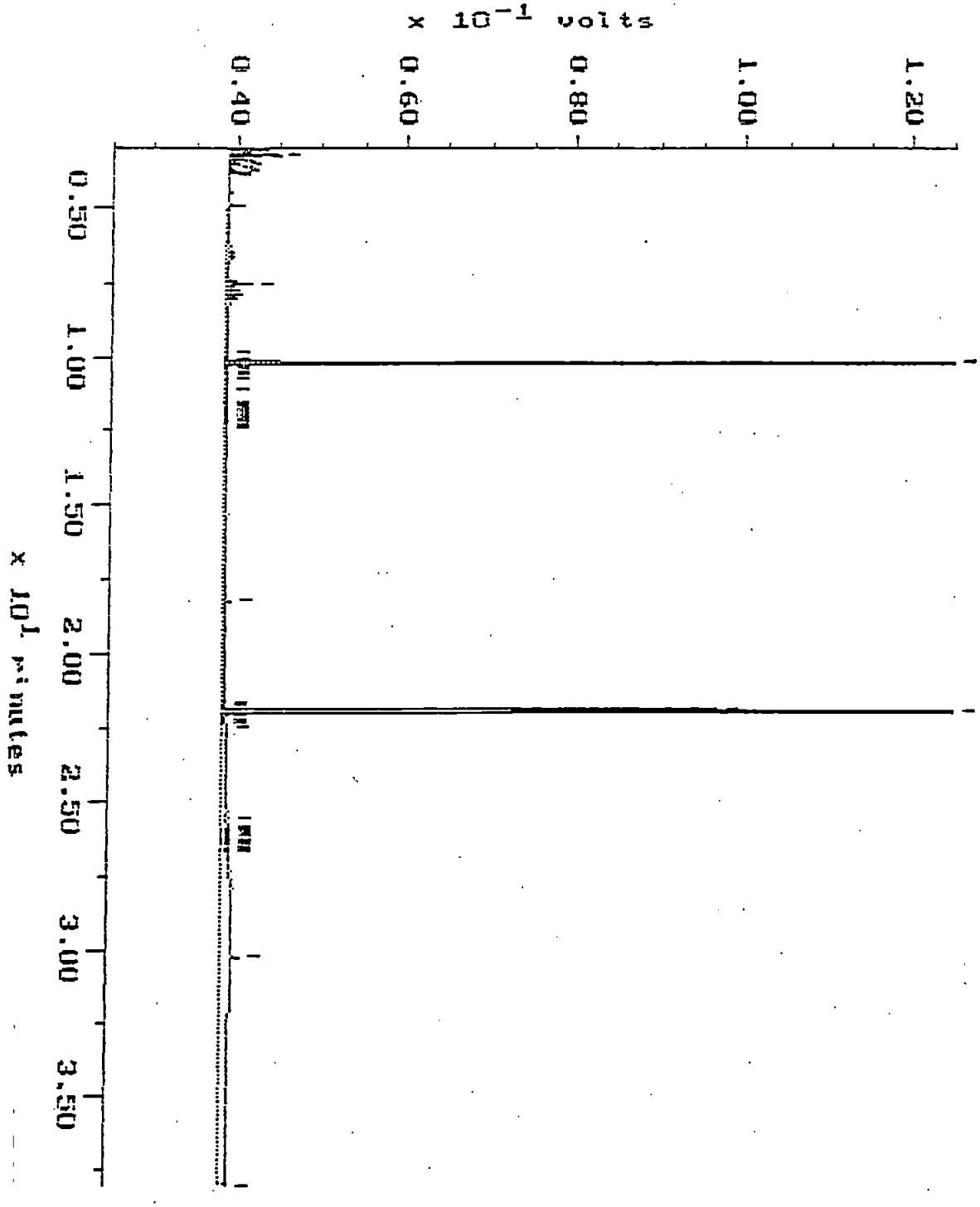
PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9305-245-21	5.1	5.0	2	N/A	N/A	N/A

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

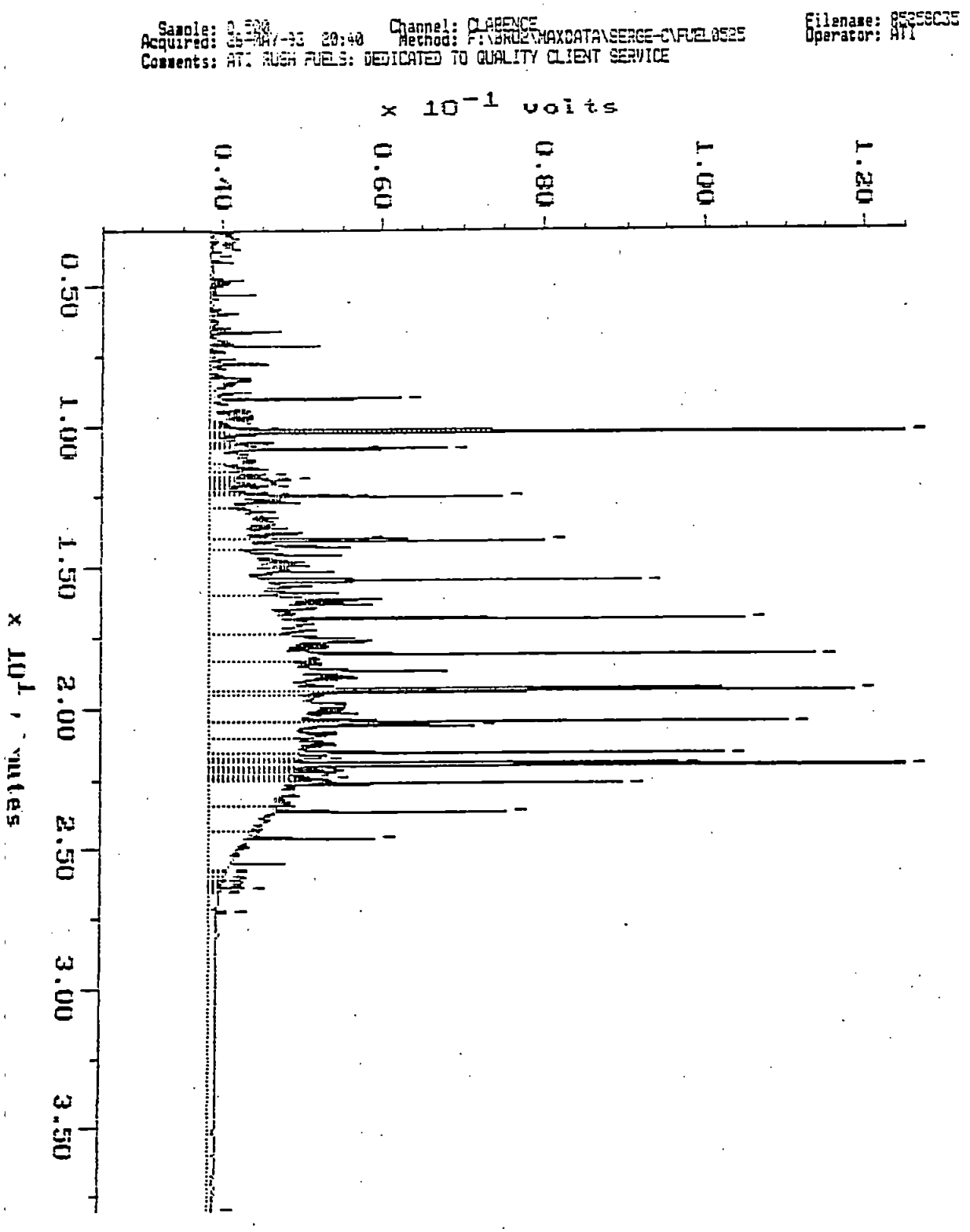
$$\text{RPD (Relative \% Difference)} = \frac{(\text{Sample Result} - \text{Duplicate Result})}{\text{Average Result}} \times 100$$

Blank WA DOE WTPH-D

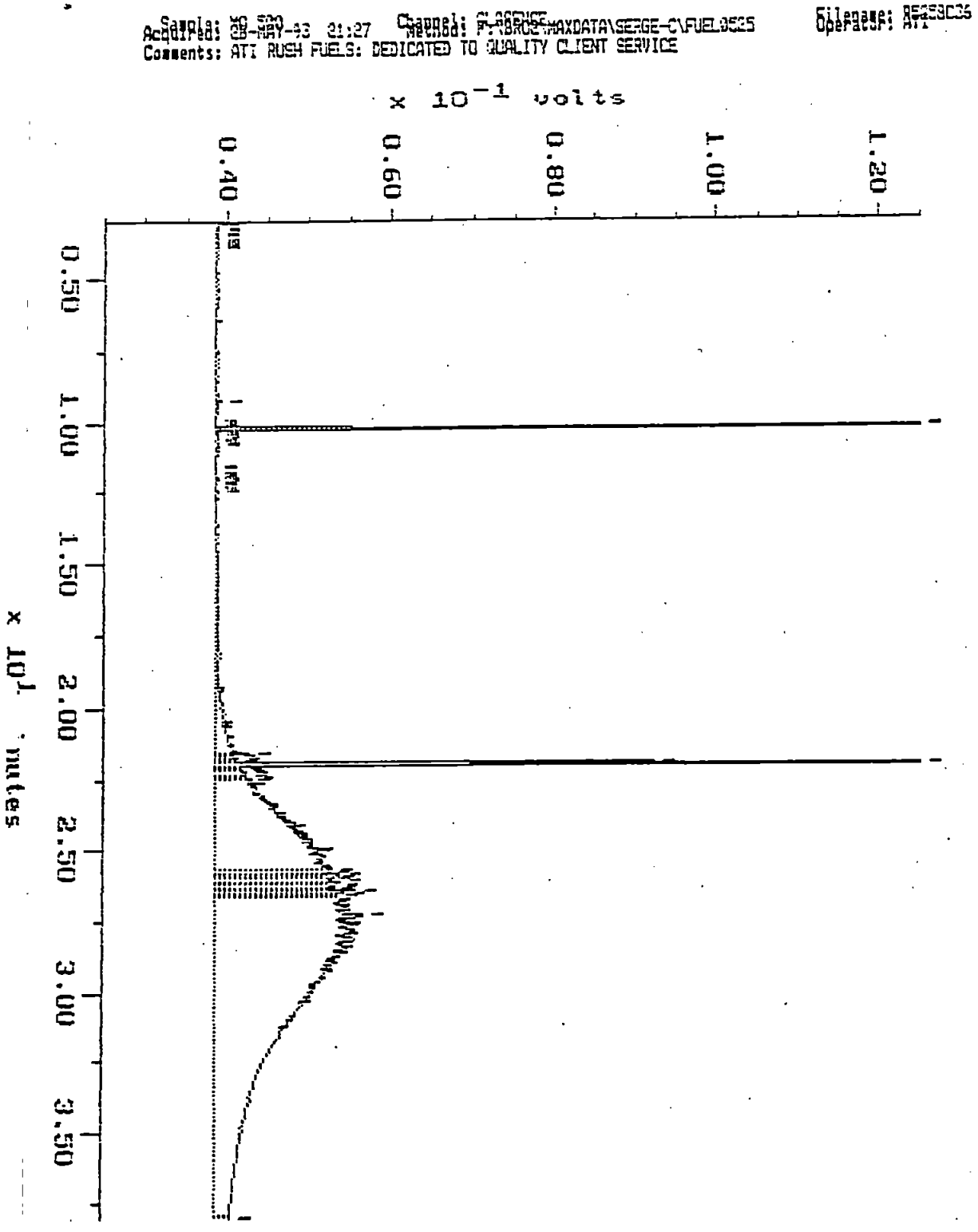
Sample: A0526-3RB Channel: CLARENCE Filename: RE358037
Acquired: 26-MAY-93 22:14 Method: F:\BRO2\MAXDATA\SERGE-C\FUEL0526 Operator: ATI
Comments: ATI RUSH FUELS: DEDICATED TO QUALITY CLIENT SERVICE



Continuing Calibration



Continuing Calibration

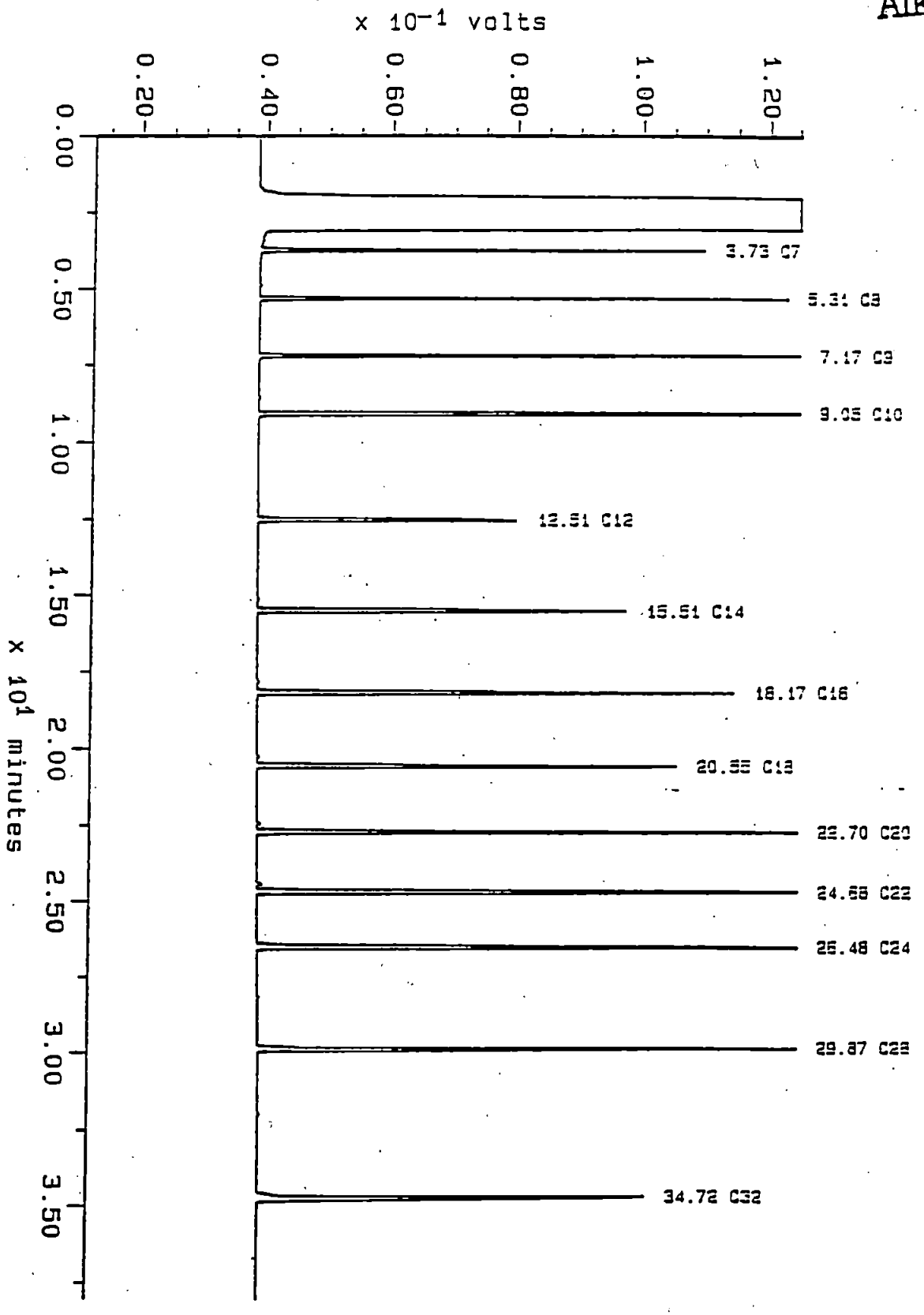


Sample: ALKANE
Acquired: 07-MAY-93 16:39
Inj Vol: 1.00

Channel: CLARENCE
Method: F:\ERO3\MAXDATA\SERGE-C\FUEL0507

Filename: R5078C03
Operator: ATI

Alkane



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 5/26/93 Page 1 of 1

PROJECT INFORMATION

Project Manager: Susan Pengra
Project Name: St Vincent de Paul
Project Number: K734.001
Site Location: 4th Ave S. Seattle Sampled By: PJM

DISPOSAL INFORMATION

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

QC INFORMATION (check one)

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

Laboratory Number: 9305-250

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	PETROLEUM HYDROCARBONS: TPH-ID State:	TPH-G State:	TPH-D State: w/ Ext	TPH Special Instructions	418.1 State:	8015M	ORGANIC COMPOUNDS: 8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	PESTS/PCB's: 8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	METALS: Selected metals: list	Total Lead (Pb)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	LEACHING TESTS: TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER				NUMBER OF CONTAINERS
AG1-5'	5/21/93	735	Soil	1			X																																1

LAB INFORMATION

Lab Name: ATT
Lab Address: Renton
Via: Courier

SAMPLE RECEIPT

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

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

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Pamela J Merrell Time: 930	Signature: Time:	Signature: Time:
Printed Name: Pamela J Merrell Date: 5/26/93	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:

RECEIVED BY: 1.	RECEIVED BY: 2.	RECEIVED BY: 3.
Signature: Time: 1020	Signature: Time:	Signature: Time:
Printed Name: STHA KENSEEL Date: 5/26/93	Printed Name: Date:	Printed Name: Date:
Company: ATT-WA	Company:	Company:

AGI OFFICES: Bellevue: (206) 453-8383 Tacoma: (206) 383-4380
Portland (503) 223-8224 Pleasanton: (415) 460-6406

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

Rev. 4/93

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: St. Vincent de Paul/Sahlberg Property
Project No.: 15,740.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9305-214
Sample No.: MWA, AGI-1,AGI-2, AGI-1-2', AGI-2-3'

Matrix: Water/Soil

QUALITY ASSURANCE SUMMARY

All data are of known and acceptable quality.

ANALYTICAL METHODS

Parameter	Technique	Method
Purgeable Halocarbons	GC/ECD	EPA 8010
Purgeable Aromatics	GC/PID	EPA 8020
TPH[a]	GC/FID	WTPH-D
Moisture	Gravimetric	CLP SOW ILM01.0

TIMELINESS

Parameter	Date Sampled	Date Extracted	Date Analyzed	Time Until Extraction	Time Until Analysis
VOC[b] (water)	05/21/93	NA	05/24/93	NA	3 (14)
VOC[b] (soil)	05/21/93	05/24/93	05/25/93	3	4 (14)
TPH-D (water)	05/21/93	05/21/93	05/22/93	<1 (7)	1 (30)
TPH-D (soil)	05/21/93	05/24/93	05/25/93	3 (14)	4 (30)
Moisture	05/21/93	NA	05/24/93	NA	3 (NA)

a - Diesel and motor oil range petroleum hydrocarbons
b - Purgeable halocarbons and purgeable aromatics
NA - Not Applicable
() - Numbers in parentheses indicate recommended holding times in days for water or soil.

All samples were extracted and analyzed within recommended holding times.

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: St. Vincent de Paul/Sahlberg Property
Project No.: 15,740.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9305-214
Sample No.: MWA, AGI-1,AGI-2, AGI-1-2', AGI-2-3'

CHROMATOGRAM

WTPH-D: Diesel and motor oil range petroleum hydrocarbon (TPH) detections in both samples MWA and AGI-1-2' are supported by the chromatograms.

FIELD QUALITY CONTROL SAMPLES

Field Duplicates: None collected.

Rinsate: None collected.

Trip Blank: None collected.

LAB QUALITY CONTROL SAMPLES

Method Blank: No analytes were detected at or above the method reporting limits in method blanks by the following methods:

EPA 8010/8020
WTPH-D

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

EPA 8010/8020
WTPH-D.

Duplicates: Sample/sample duplicate RPDs are within ATI's control limit criteria for the following methods:

WTPH-D
CLP SOW ILM01.0

QUALITY ASSURANCE REPORT

PROJECT AND SAMPLE INFORMATION

Project Name: St. Vincent de Paul/Sahlberg Property
Project No.: 15,740.001
Lab Name: Analytical Technologies, Inc. (ATI) - Renton, WA
Lab Number: 9305-214
Sample No.: MWA, AGI-1,AGI-2, AGI-1-2', AGI-2-3'

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

EPA 8010/8020.
WTPH-D

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

EPA 8010/8020
WTPH-D

SIGNATURES

Prepared by _____ Date 6/16/93

Checked by Katherine Bourbonais Date 6/16/93

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

Karen L. Mixon, Laboratory Manager

ATI I.D. # 9305-214

June 10, 1993

RECEIVED

JUN 11 1993

APPLIED GEOTECHNOLOGY INC.

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

Attention : Susan Penoyar

Project Number : 15,734.001

Project Name : St. Vincent De Paul

Dear Ms. Penoyar:

On May 21, 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. # 9305-214

SAMPLE CROSS REFERENCE SHEET

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

ATI #	CLIENT DESCRIPTION	DATE SAMPLED	MATRIX
9305-214-1	MWA	05/21/93	WATER
9305-214-2	AGI-1	05/21/93	WATER
9305-214-3	AGI-2	05/21/93	WATER
9305-214-4	AGI-1-2'	05/21/93	SOIL
9305-214-5	AGI-2-3'	05/21/93	SOIL

----- TOTALS -----

MATRIX	# SAMPLES
SOIL	2
WATER	3

ATI STANDARD DISPOSAL PRACTICE

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

Analytical Technologies, Inc.

ATI I.D. # 9305-214

ANALYTICAL SCHEDULE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

ANALYSIS	TECHNIQUE	REFERENCE	LAB
PURGEABLE HALOCARBONS	GC/ELCD	EPA 8010	R
PURGEABLE AROMATICS	GC/PID	EPA 8020	R
TOTAL PETROLEUM HYDROCARBONS	GC/FID	WA DOE WTPH-D	R
MOISTURE	GRAVIMETRIC	CLP SOW ILM01.0	R

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

Analytical Technologies, Inc.

ATI I.D. # 9305-214

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

CASE NARRATIVE: VOLATILE ORGANICS ANALYSIS

Three (3) water samples were received by Analytical Technologies, Inc. (ATI), on May 21, 1993, for the following analysis: EPA method 8010/8020.

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.

Analytical Technologies, Inc.

ATI I.D. # 9305-214

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,734.001	DATE RECEIVED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: N/A
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<1.0
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<1.0
CHLOROFORM	<0.2
CHLOROMETHANE	<2.0
1,2-DIBROMOETHANE (EDB)	<0.5
,2-DICHLOROBENZENE	<0.5
,3-DICHLOROBENZENE	<0.5
1,4-DICHLOROBENZENE	<0.5
DIBROMOCHLOROMETHANE	<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
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY		LIMITS
OMOCHLOROMETHANE	100	58 - 126
ROMOFLUOROBENZENE	101	76 - 136

AnalyticalTechnologies,Inc.

ATI I.D. # 9305-214-1

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: N/A
CLIENT I.D.	: MWA	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<1.0
CARBON 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
DIBROMOCHLOROMETHANE	<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
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY		LIMITS
OMOCHLOROMETHANE	104	58 - 126
ROMOFLUOROBENZENE	100	76 - 136

Analytical Technologies, Inc.

ATI I.D. # 9305-214-2

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: N/A
CLIENT I.D.	: AGI-1	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<1.0
CARBON 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
DIBROMOCHLOROMETHANE	<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
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY		LIMITS
DIBROMOCHLOROMETHANE	106	58 - 126
BROMOFLUOROBENZENE	101	76 - 136

AnalyticalTechnologies,Inc.

ATI I.D. # 9305-214-3

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: N/A
CLIENT I.D.	: AGI-2	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	1.8
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<1.0
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	93 D4
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	0.8
DIBROMOCHLOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.5
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
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERY		LIMITS
BROMOCHLOROMETHANE	108	58 - 126
BROMOFLUOROBENZENE	105	76 - 136

D4 = Value from a ten fold diluted analysis.

Analytical Technologies, Inc.

ATI I.D. # 9305-214

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9305-152-6
PROJECT #	: 15,734.001	DATE EXTRACTED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	8.00	8.14	102	7.34	92	10
CHLOROBENZENE	<0.500	8.00	8.46	106	6.92	87	20
1,1-DICHLOROETHENE	<0.200	8.00	7.65	96	6.45	81	17
TOLUENE	<0.500	8.00	8.17	102	7.31	91	11
TRICHLOROETHENE	<0.200	8.00	7.55	94	6.54	82	14

CONTROL LIMITS	% REC.	RPD
BENZENE	55 - 148	20
CHLOROBENZENE	61 - 160	33
1,1-DICHLOROETHENE	37 - 182	22
TOLUENE	60 - 158	29
TRICHLOROETHENE	61 - 149	21

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOCHLOROMETHANE	102	99	58 - 126
BROMOFLUOROBENZENE	106	105	76 - 136

Analytical Technologies, Inc.

ATI I.D. # 9305-214

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15,734.001	DATE EXTRACTED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: WATER	UNITS	: ug/L
EPA METHOD	: 8010/8020		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.500	8.00	8.74	109	N/A	N/A	N/A
CHLOROBENZENE	<0.500	8.00	8.78	110	N/A	N/A	N/A
,1-DICHLOROETHENE	<0.200	8.00	8.79	110	N/A	N/A	N/A
TOLUENE	<0.500	8.00	8.77	110	N/A	N/A	N/A
TRICHLOROETHENE	<0.200	8.00	8.26	103	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	73 - 134	20
CHLOROBENZENE	79 - 141	33
,1-DICHLOROETHENE	56 - 158	22
TOLUENE	83 - 136	29
TRICHLOROETHENE	72 - 138	21

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOCHLOROMETHANE	106	N/A	58 - 126
BROMOFLUOROBENZENE	99	N/A	76 - 136

Analytical Technologies, Inc.

ATI I.D. # 9305-214

CASE NARRATIVE

CLIENT : APPLIED GEOTECHNOLOGY, INC.
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

CASE NARRATIVE: VOLATILE ORGANICS ANALYSIS

Two (2) soil samples were received by Analytical Technologies, Inc. (ATI), on May 21, 1993, for the following analysis: EPA method 8010/8020.

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.

Analytical Technologies, Inc.

ATI I.D. # 9305-214

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,734.001	DATE RECEIVED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/24/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.025
BROMODICHLOROMETHANE	<0.010
BROMOFORM	<0.010
BROMOMETHANE	<0.050
CARBON TETRACHLORIDE	<0.010
CHLOROBENZENE	<0.025
CHLOROETHANE	<0.050
CHLOROFORM	<0.010
CHLOROMETHANE	<0.10
1,2-DIBROMOETHANE (EDB)	<0.025
1,2-DICHLOROBENZENE	<0.025
1,3-DICHLOROBENZENE	<0.025
1,4-DICHLOROBENZENE	<0.025
DIBROMOCHLOROMETHANE	<0.010
1,1-DICHLOROETHANE	<0.010
1,2-DICHLOROETHANE	<0.010
1,1-DICHLOROETHENE	<0.010
CIS-1,2-DICHLOROETHENE	<0.010
TRANS-1,2-DICHLOROETHENE	<0.010
1,2-DICHLOROPROPANE	<0.010
CIS-1,3-DICHLOROPROPENE	<0.010
TRANS-1,3-DICHLOROPROPENE	<0.010
ETHYLBENZENE	<0.025
METHYLENE CHLORIDE	<0.10
1,1,2,2-TETRACHLOROETHANE	<0.010
TETRACHLOROETHENE	<0.010
TOLUENE	<0.025
1,1,1-TRICHLOROETHANE	<0.010
1,1,2-TRICHLOROETHANE	<0.010
TRICHLOROETHENE	<0.010
TRICHLOROFLUOROMETHANE	<0.025
VINYL CHLORIDE	<0.050
TOTAL XYLENES	<0.025

SURROGATE PERCENT RECOVERY		LIMITS
BROMOCHLOROMETHANE	122	38 - 140
BROMOFLUOROBENZENE	120	60 - 175

Analytical Technologies, Inc.

ATI I.D. # 9305-214-4

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/24/93
CLIENT I.D.	: AGI-1-2'	DATE ANALYZED	: 05/25/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.032
BROMODICHLOROMETHANE	<0.013
BROMOFORM	<0.013
BROMOMETHANE	<0.064
CARBON TETRACHLORIDE	<0.013
CHLOROBENZENE	<0.032
CHLOROETHANE	<0.064
CHLOROFORM	<0.013
CHLOROMETHANE	<0.13
1,2-DIBROMOETHANE (EDB)	<0.032
1,2-DICHLOROBENZENE	<0.032
1,3-DICHLOROBENZENE	<0.032
1,4-DICHLOROBENZENE	<0.032
DIBROMOCHLOROMETHANE	<0.013
1,1-DICHLOROETHANE	<0.013
1,2-DICHLOROETHANE	<0.013
1,1-DICHLOROETHENE	<0.013
CIS-1,2-DICHLOROETHENE	<0.013
TRANS-1,2-DICHLOROETHENE	<0.013
1,2-DICHLOROPROPANE	<0.013
CIS-1,3-DICHLOROPROPENE	<0.013
TRANS-1,3-DICHLOROPROPENE	<0.013
ETHYLBENZENE	<0.032
METHYLENE CHLORIDE	<0.13
1,1,2,2-TETRACHLOROETHANE	<0.013
TETRACHLOROETHENE	<0.013
TOLUENE	<0.032
1,1,1-TRICHLOROETHANE	<0.013
1,1,2-TRICHLOROETHANE	<0.013
TRICHLOROETHENE	<0.013
TRICHLOROFLUOROMETHANE	<0.032
VINYL CHLORIDE	<0.064
TOTAL XYLENES	<0.032

SURROGATE PERCENT RECOVERY		LIMITS
BROMOCHLOROMETHANE	87	38 - 140
BROMOFLUOROBENZENE	91	60 - 175

AnalyticalTechnologies,Inc.

ATI I.D. # 9305-214-5

VOLATILE ORGANICS ANALYSIS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/24/93
CLIENT I.D.	: AGI-2-3'	DATE ANALYZED	: 05/25/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8010/8020	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
BENZENE	<0.029
BROMODICHLOROMETHANE	<0.012
BROMOFORM	<0.012
BROMOMETHANE	<0.058
CARBON TETRACHLORIDE	<0.012
CHLOROBENZENE	<0.029
CHLOROETHANE	<0.058
CHLOROFORM	<0.012
CHLOROMETHANE	<0.12
1,2-DIBROMOETHANE (EDB)	<0.029
1,2-DICHLOROBENZENE	<0.029
1,3-DICHLOROBENZENE	<0.029
1,4-DICHLOROBENZENE	<0.029
DIBROMOCHLOROMETHANE	<0.012
1,1-DICHLOROETHANE	<0.012
1,2-DICHLOROETHANE	<0.012
1,1-DICHLOROETHENE	<0.012
CIS-1,2-DICHLOROETHENE	<0.012
TRANS-1,2-DICHLOROETHENE	<0.012
1,2-DICHLOROPROPANE	<0.012
CIS-1,3-DICHLOROPROPENE	<0.012
TRANS-1,3-DICHLOROPROPENE	<0.012
ETHYLBENZENE	<0.029
METHYLENE CHLORIDE	<0.12
1,1,2,2-TETRACHLOROETHANE	<0.012
TETRACHLOROETHENE	<0.012
TOLUENE	<0.029
1,1,1-TRICHLOROETHANE	<0.012
1,1,2-TRICHLOROETHANE	<0.012
TRICHLOROETHENE	<0.012
TRICHLOROFLUOROMETHANE	<0.029
VINYL CHLORIDE	<0.058
TOTAL XYLENES	<0.029

SURROGATE PERCENT RECOVERY		LIMITS
BROMOCHLOROMETHANE	90	38 - 140
BROMOFLUOROBENZENE	97	60 - 175

AnalyticalTechnologies, Inc.

ATI I.D. # 9305-214

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9305-214-4
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/24/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/25/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8010/8020		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	0.400	0.334	84	0.329	82	2
CHLOROBENZENE	<0.0250	0.400	0.371	93	0.364	91	2
,1-DICHLOROETHENE	<0.0100	0.400	0.292	73	0.291	73	0
TOLUENE	<0.0250	0.400	0.350	87	0.347	87	1
TRICHLOROETHENE	<0.0100	0.400	0.315	79	0.308	77	2

CONTROL LIMITS	% REC.	RPD
BENZENE	50 - 130	20
CHLOROBENZENE	55 - 166	20
,1-DICHLOROETHENE	35 - 141	22
TOLUENE	62 - 134	20
TRICHLOROETHENE	49 - 139	24

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOCHLOROMETHANE	91	93	38 - 140
BROMOFLUOROBENZENE	99	96	60 - 175

Analytical Technologies, Inc.

ATI I.D. # 9305-214

VOLATILE ORGANICS ANALYSIS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/24/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
EPA METHOD	: 8010/8020		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
BENZENE	<0.0250	0.400	0.412	103	N/A	N/A	N/A
CHLOROBENZENE	<0.0250	0.400	0.414	103	N/A	N/A	N/A
1,1-DICHLOROETHENE	<0.0100	0.400	0.369	92	N/A	N/A	N/A
TOLUENE	<0.0250	0.400	0.422	106	N/A	N/A	N/A
TRICHLOROETHENE	<0.0100	0.400	0.386	97	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
BENZENE	57 - 144	20
CHLOROBENZENE	71 - 163	20
1,1-DICHLOROETHENE	51 - 161	22
TOLUENE	65 - 155	20
TRICHLOROETHENE	55 - 146	24

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
BROMOCHLOROMETHANE	118	N/A	38 - 140
BROMOFLUOROBENZENE	117	N/A	60 - 175

Analytical Technologies, Inc.

ATI I.D. # 9305-214

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,734.001	DATE RECEIVED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/21/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 05/21/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	<0.75
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
TERPHENYL	97	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214-1

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/21/93
CLIENT I.D.	: MWA	DATE ANALYZED	: 05/22/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	0.55
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	0.89
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
TERPHENYL	100	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214-2

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/21/93
CLIENT I.D.	: AGI-1	DATE ANALYZED	: 05/22/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	<0.75
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
TERPHENYL	97	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214-3

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/21/93
CLIENT I.D.	: AGI-2	DATE ANALYZED	: 05/22/93
SAMPLE MATRIX	: WATER	UNITS	: mg/L
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

COMPOUND	RESULT
FUEL HYDROCARBONS	<0.25
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	<0.75
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
TERPHENYL	100	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9305-193-4
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/21/93
METHOD	: WA DOE WTPH-D	UNITS	: mg/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SAMPLE DUP. RESULT	RPD	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	0.37	0.46	22	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	94	94	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/21/93
METHOD	: WA DOE WTPH-D	UNITS	: mg/L
SAMPLE MATRIX	: WATER		

COMPOUND	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED RESULT	DUP. % REC.	RPD
DIESEL	<0.250	2.50	2.37	95	2.40	96	1
CONTROL LIMITS				% REC.			RPD
DIESEL				70 - 115			20
SURROGATE RECOVERIES		SPIKE		DUP. SPIKE		LIMITS	
O-TERPHENYL		98		99		50 - 150	

Analytical Technologies, Inc.

ATI I.D. # 9305-214

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: N/A
PROJECT #	: 15,734.001	DATE RECEIVED	: N/A
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/24/93
CLIENT I.D.	: METHOD BLANK	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<10
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	<40
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
TERPHENYL	91	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214-4

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/24/93
CLIENT I.D.	: AGI-1-2'	DATE ANALYZED	: 05/25/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	54
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	730
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
-TERPHENYL	95	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214-5

TOTAL PETROLEUM HYDROCARBONS
DATA SUMMARY

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	DATE SAMPLED	: 05/21/93
PROJECT #	: 15,734.001	DATE RECEIVED	: 05/21/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE EXTRACTED	: 05/24/93
CLIENT I.D.	: AGI-2-3'	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D	DILUTION FACTOR	: 1

RESULTS ARE CORRECTED FOR MOISTURE CONTENT

COMPOUNDS	RESULTS
FUEL HYDROCARBONS	<12
HYDROCARBON RANGE	C12 - C24
HYDROCARBON QUANTITATION USING	DIESEL
FUEL HYDROCARBONS	<47
HYDROCARBON RANGE	C24 - C34
HYDROCARBON QUANTITATION USING	MOTOR OIL

SURROGATE PERCENT RECOVERY		LIMITS
TERPHENYL	96	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: 9305-214-5
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/24/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/24/93
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	<10.0	<10.0	NC	200	200	100	196	98	2

CONTROL LIMITS	% REC.	RPD
DIESEL	63 - 131	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
O-TERPHENYL	101	101	50 - 150

NC = Not Calculable.

Analytical Technologies, Inc.

ATI I.D. # 9305-214

TOTAL PETROLEUM HYDROCARBONS
QUALITY CONTROL DATA

CLIENT	: APPLIED GEOTECHNOLOGY, INC.	SAMPLE I.D. #	: BLANK
PROJECT #	: 15,734.001	DATE EXTRACTED	: 05/24/93
PROJECT NAME	: ST. VINCENT DE PAUL	DATE ANALYZED	: 05/24/93
SAMPLE MATRIX	: SOIL	UNITS	: mg/Kg
METHOD	: WA DOE WTPH-D		

COMPOUNDS	SAMPLE RESULT	SPIKE ADDED	SPIKED RESULT	% REC.	DUP. SPIKED SAMPLE	DUP. % REC.	RPD
DIESEL	<10.0	200	195	98	N/A	N/A	N/A

CONTROL LIMITS	% REC.	RPD
DIESEL	69 - 122	20

SURROGATE RECOVERIES	SPIKE	DUP. SPIKE	LIMITS
O-TERPHENYL	101	N/A	50 - 150

Analytical Technologies, Inc.

ATI I.D. # 9305-214

GENERAL CHEMISTRY ANALYSIS

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL

PARAMETER	DATE ANALYZED
MOISTURE	05/24/93

Analytical Technologies, Inc.

ATI I.D. # 9305-214

GENERAL CHEMISTRY ANALYSIS
DATA SUMMARY

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL UNITS : %

ATI I.D. #	CLIENT I.D.	MOISTURE
9305-214-4	AGI-1-2'	22
9305-214-5	AGI-2-3'	14

Analytical Technologies, Inc.

ATI I.D. # 9305-214

GENERAL CHEMISTRY ANALYSIS
QUALITY CONTROL DATA

CLIENT : APPLIED GEOTECHNOLOGY, INC. MATRIX : SOIL
PROJECT # : 15,734.001
PROJECT NAME : ST. VINCENT DE PAUL UNITS : %

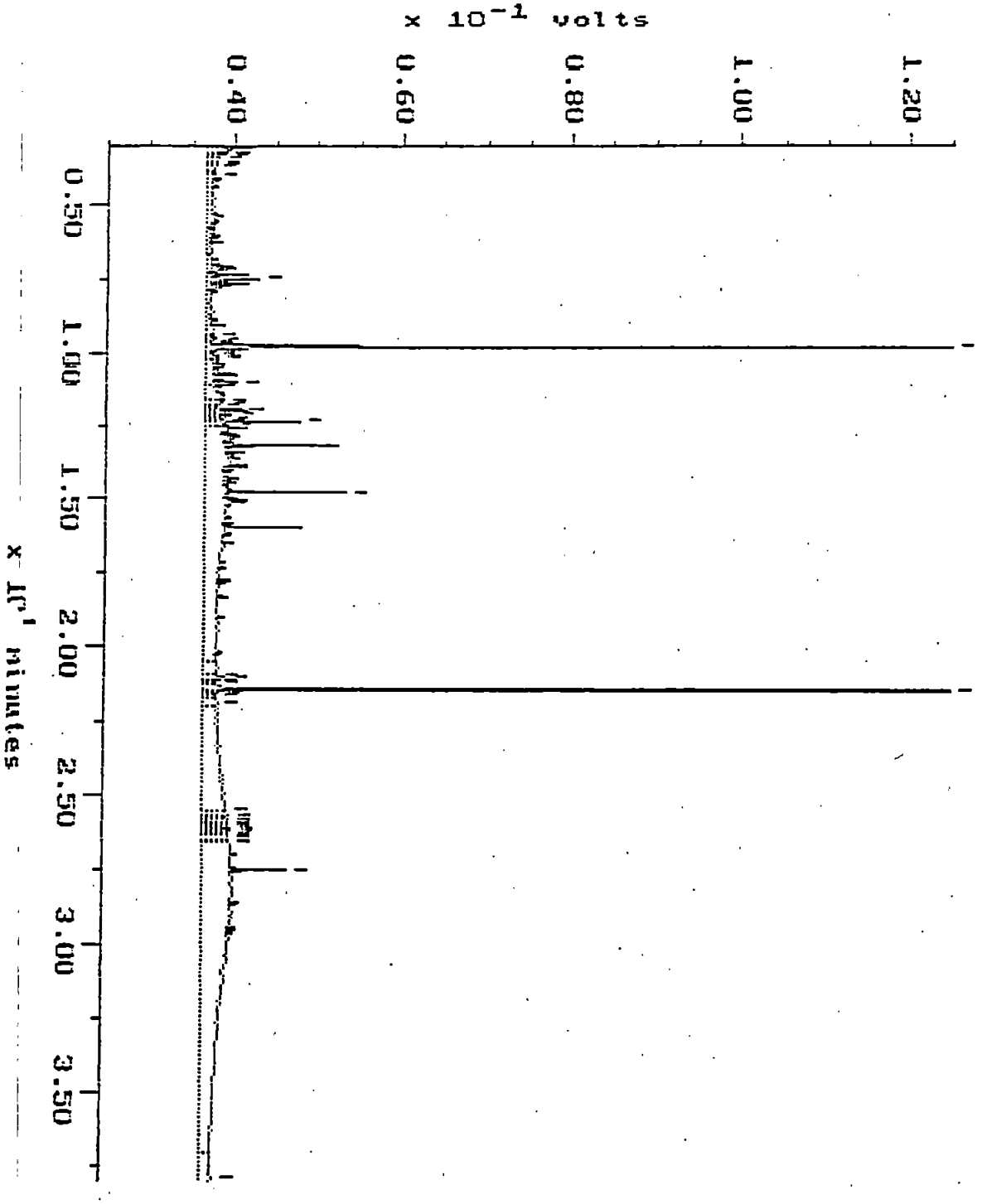
PARAMETER	ATI I.D.	SAMPLE RESULT	DUP RESULT	RPD	SPIKED RESULT	SPIKE ADDED	% REC
MOISTURE	9305-223-8	9.5	9.0	5	N/A	N/A	N/A

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

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

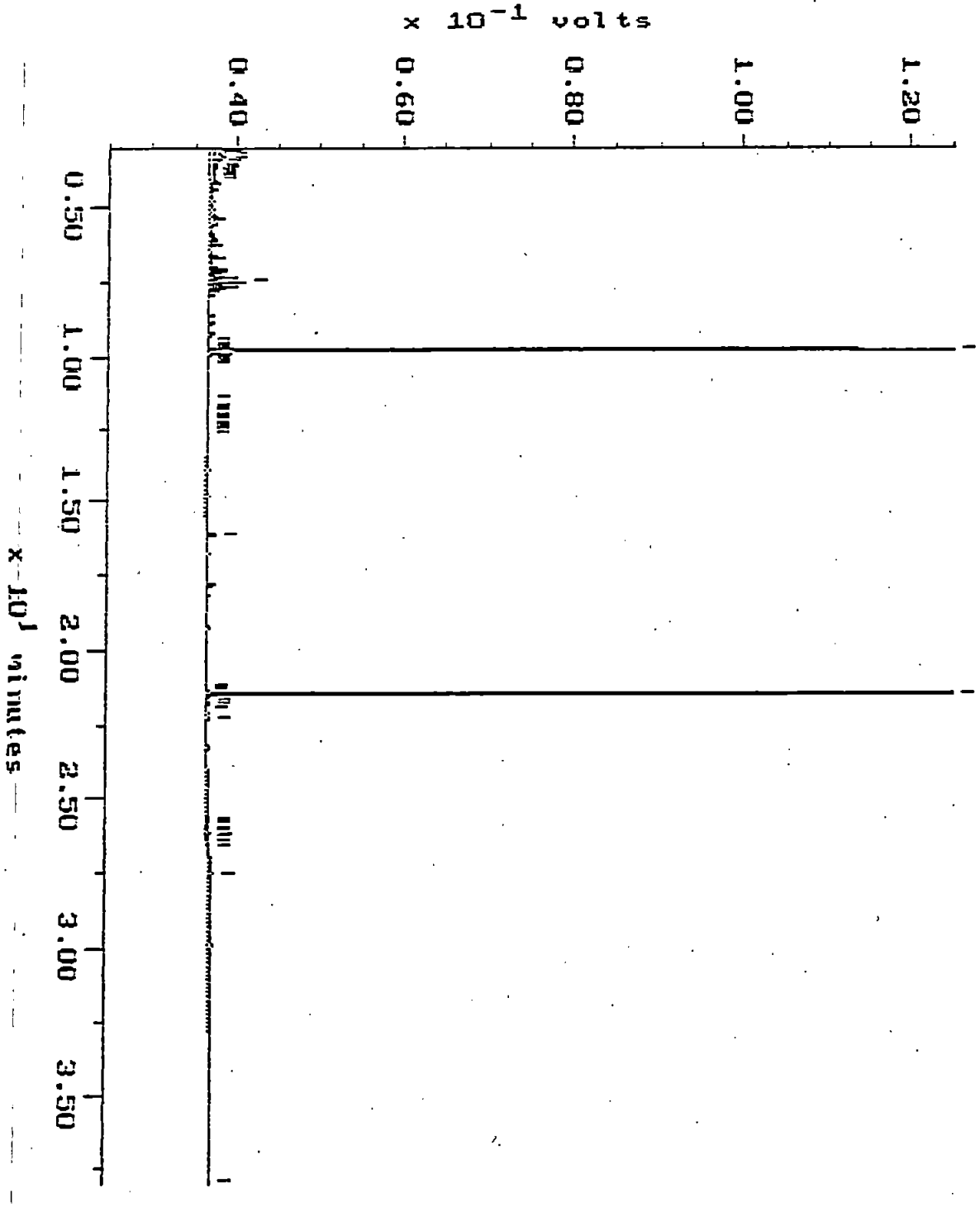
WA DOE WTPH-D

Sample: 3305-216-1 Channel: DEMITRI Filename: R5218D16
Acquired: 22-MAY-13 4:43 Method: F:\BRUE\MAXDATA\SERGE-D\FUEL3521 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY



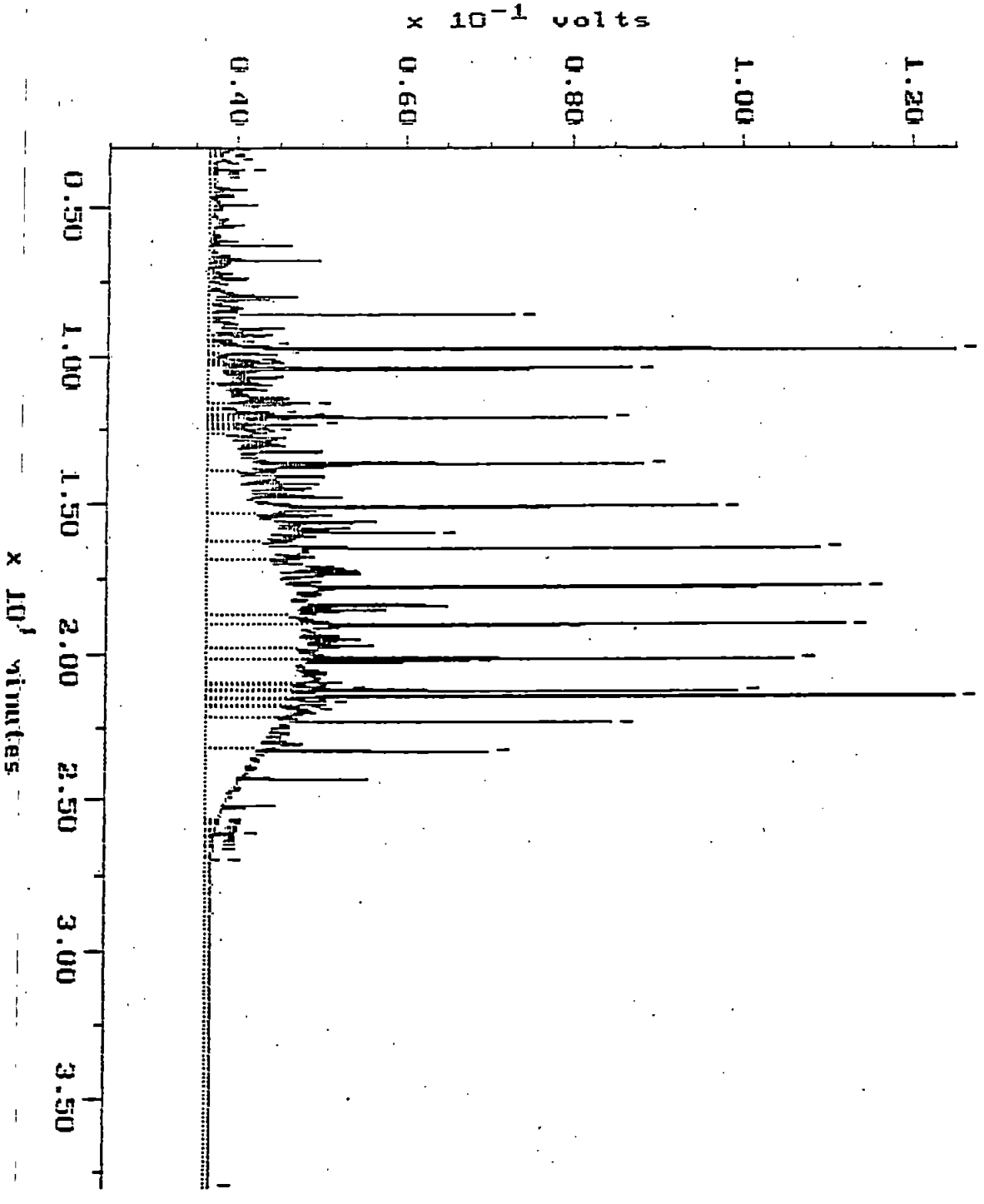
Blank

Sample: WRB 5-21 Channel: DEMITRI Filename: R5218004
Acquired: 21-MAY-93 19:23 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL3521 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

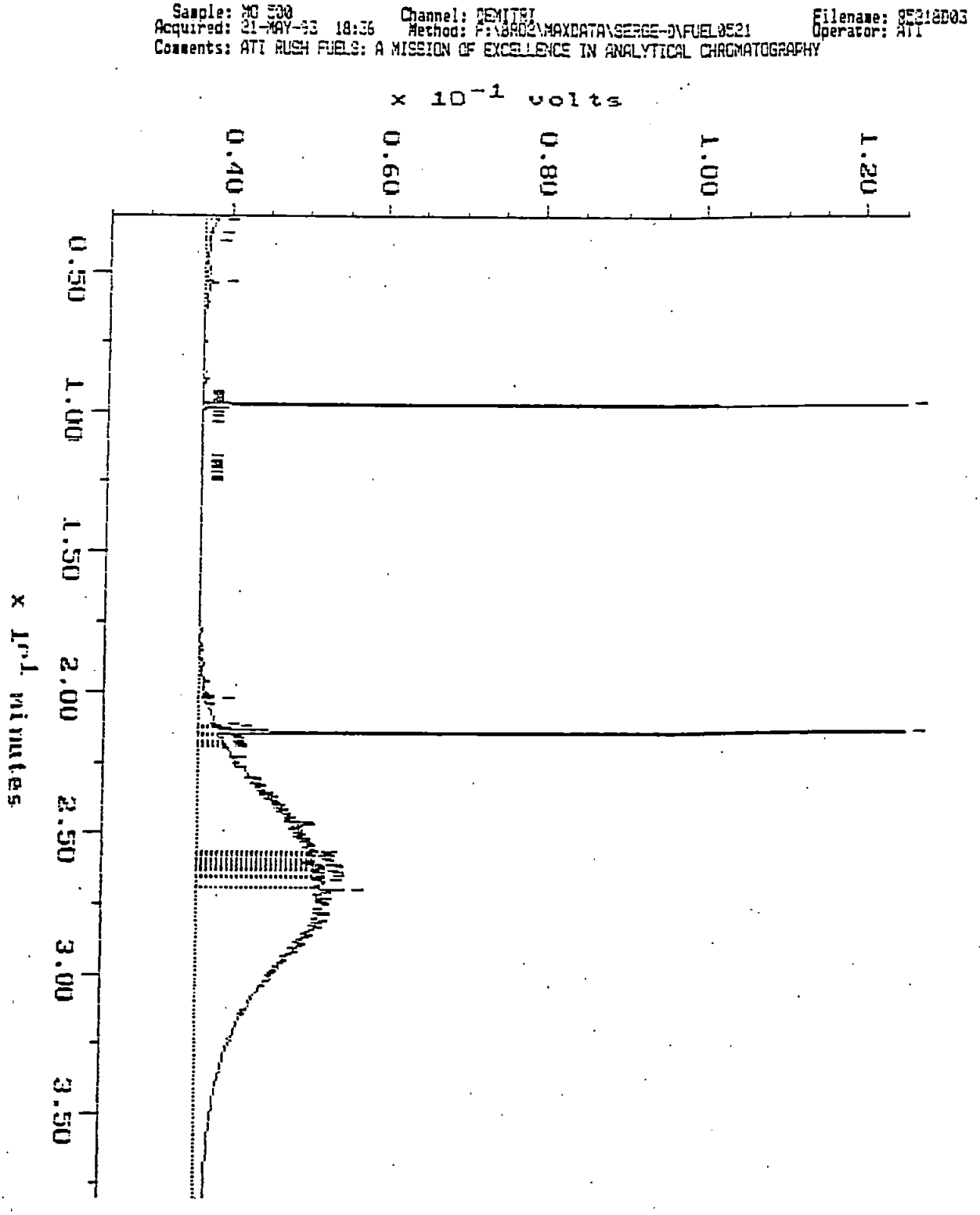


Continuing Calibration

Sample: D 500 Channel: DEMITRI Filename: R5218D02
Acquired: 21-MAY-13 17:49 Method: F:\BR02\MAXDATA\SERGE-D\FUEL8521 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

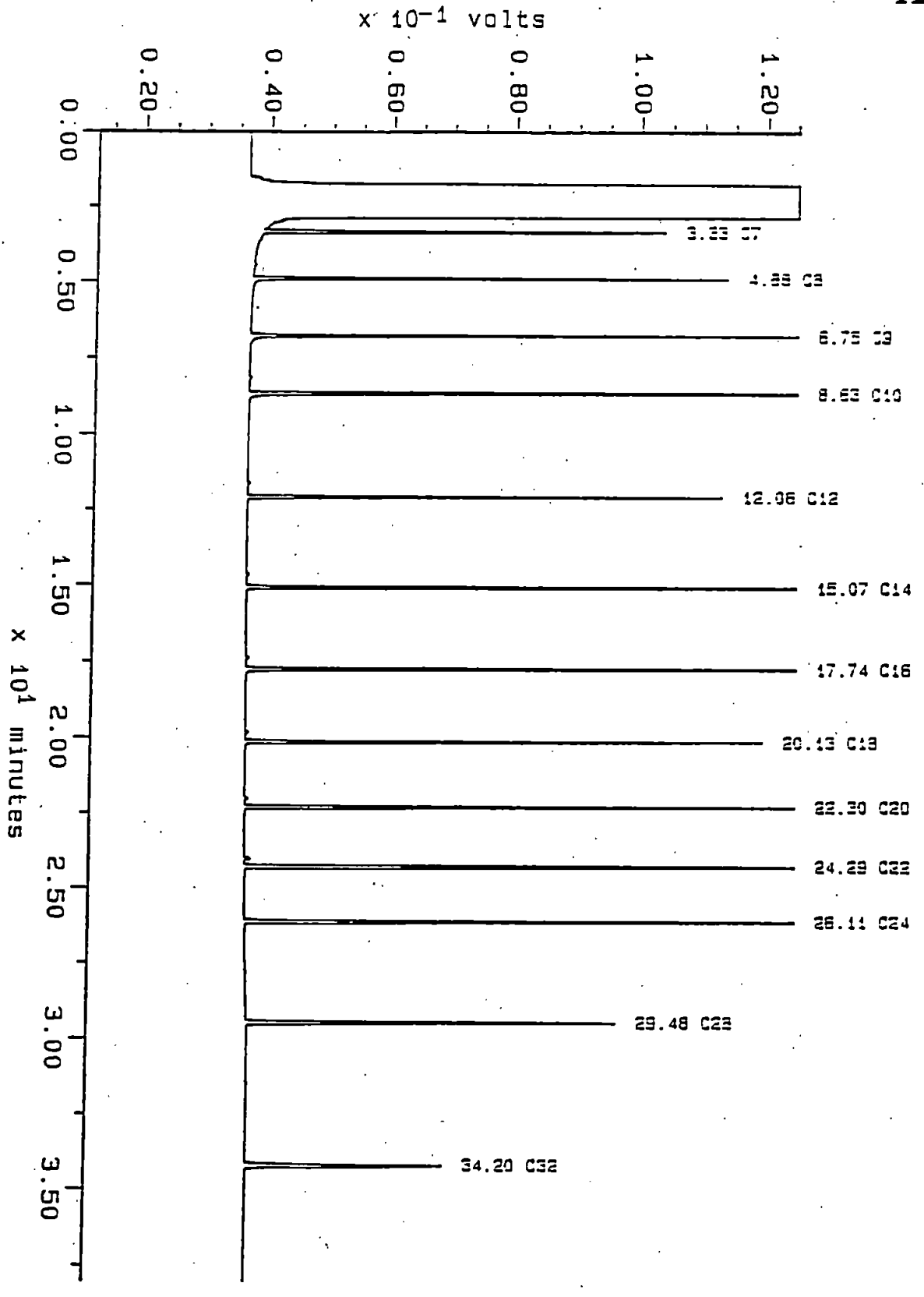


Continuing Calibration



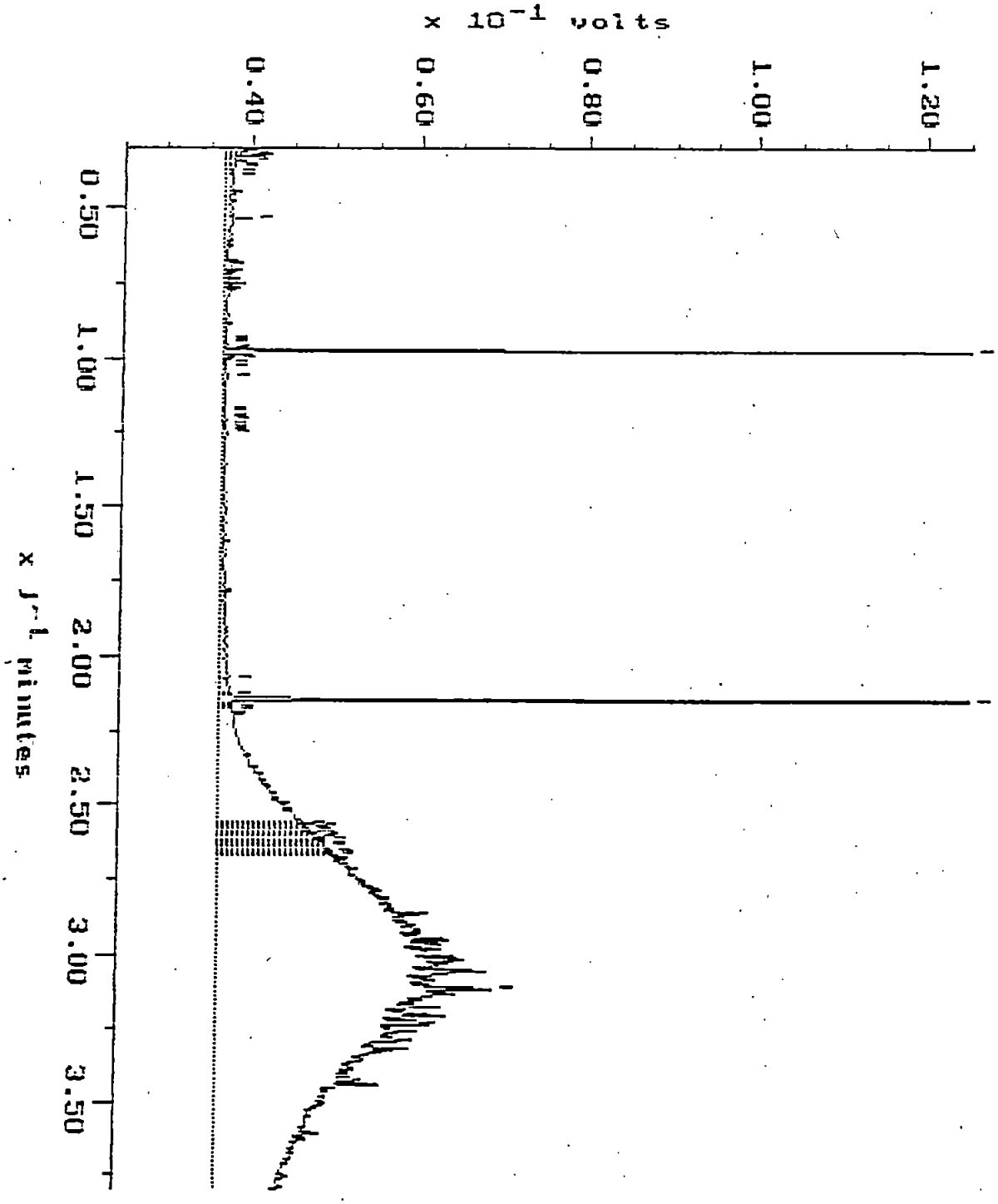
Sample: ALKANE Channel: DEMITRI Filename: R5072003
Acquired: 07-MAY-93 18:39 Method: F:\BRG2\MAXDATA\SERGE-D\FUEL0507 Operator: ATI
Inj Vol: 1.00

Alkane



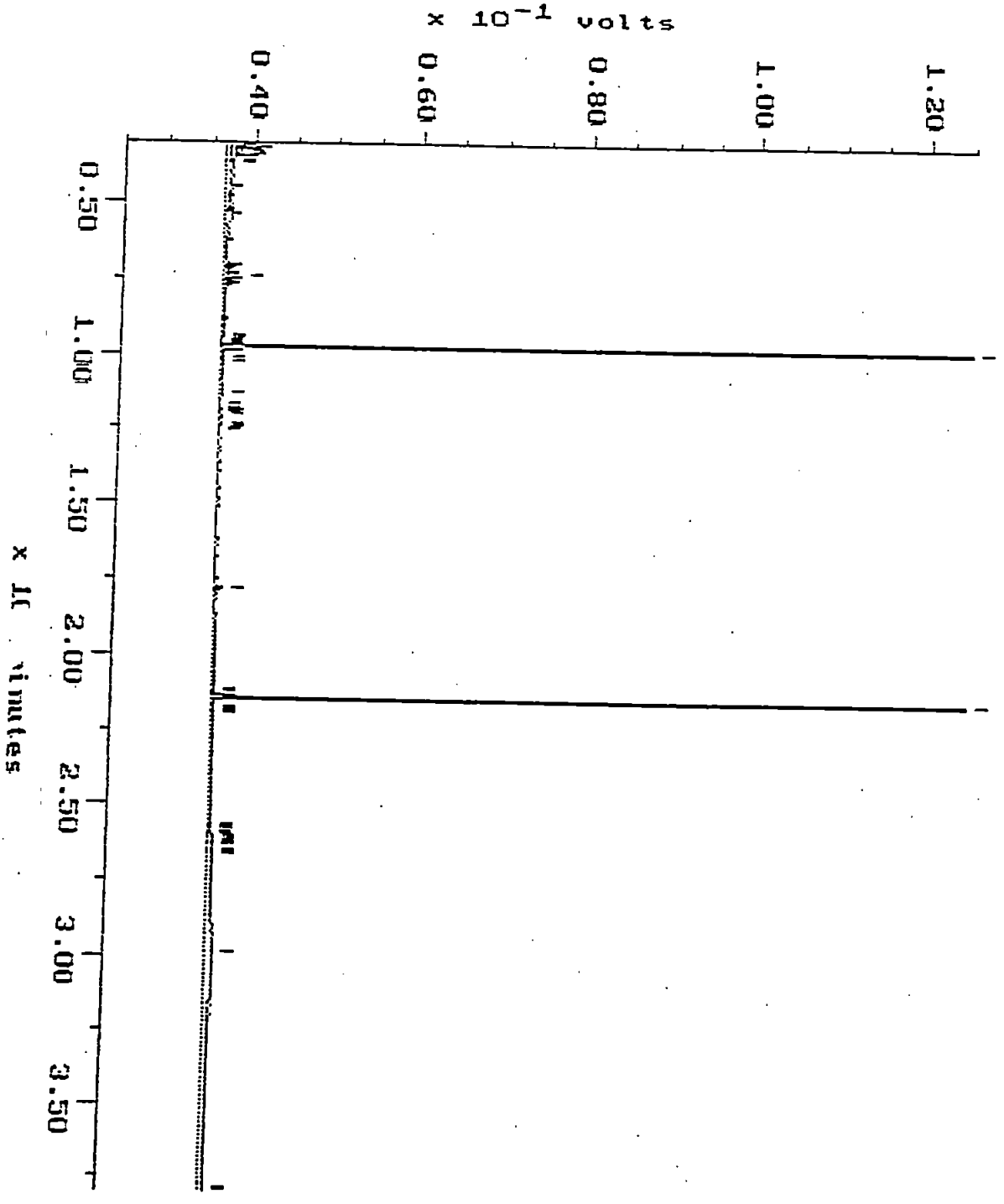
WA DOE WTPH-D

Sample: 9305-214-4 Channel: DE4ITRI Filename: R5258D03
Acquired: 25-MAY-93 11:42 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0525 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY



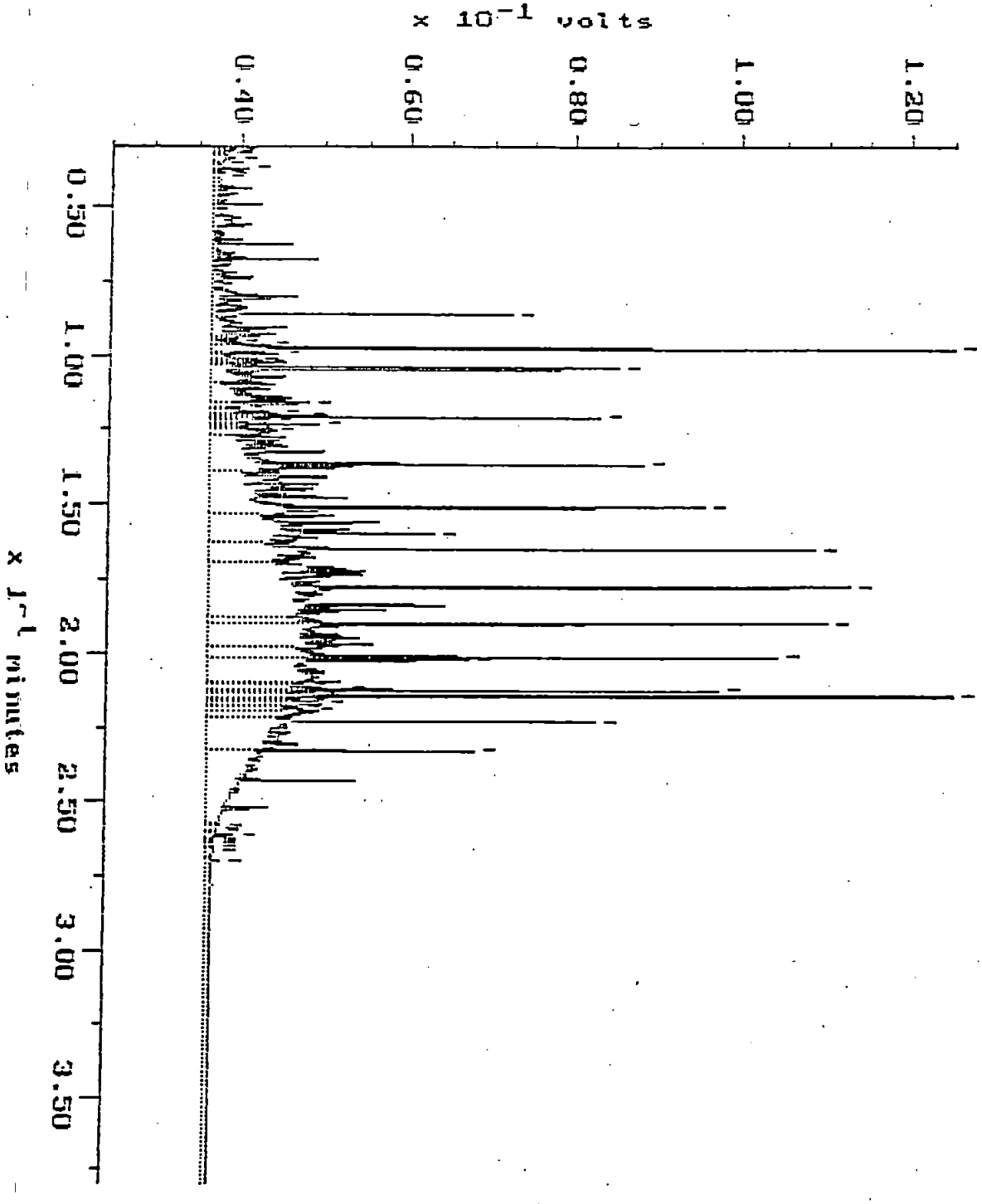
Blank

Sample: SRB S-24
Acquired: 24-MAY-93 13:55 Channel: DEMITRI
Method: F:\BR02\MAXDATA\SERGE-D\FUEL0524 Filename: B5248D05
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY Operator: ATI



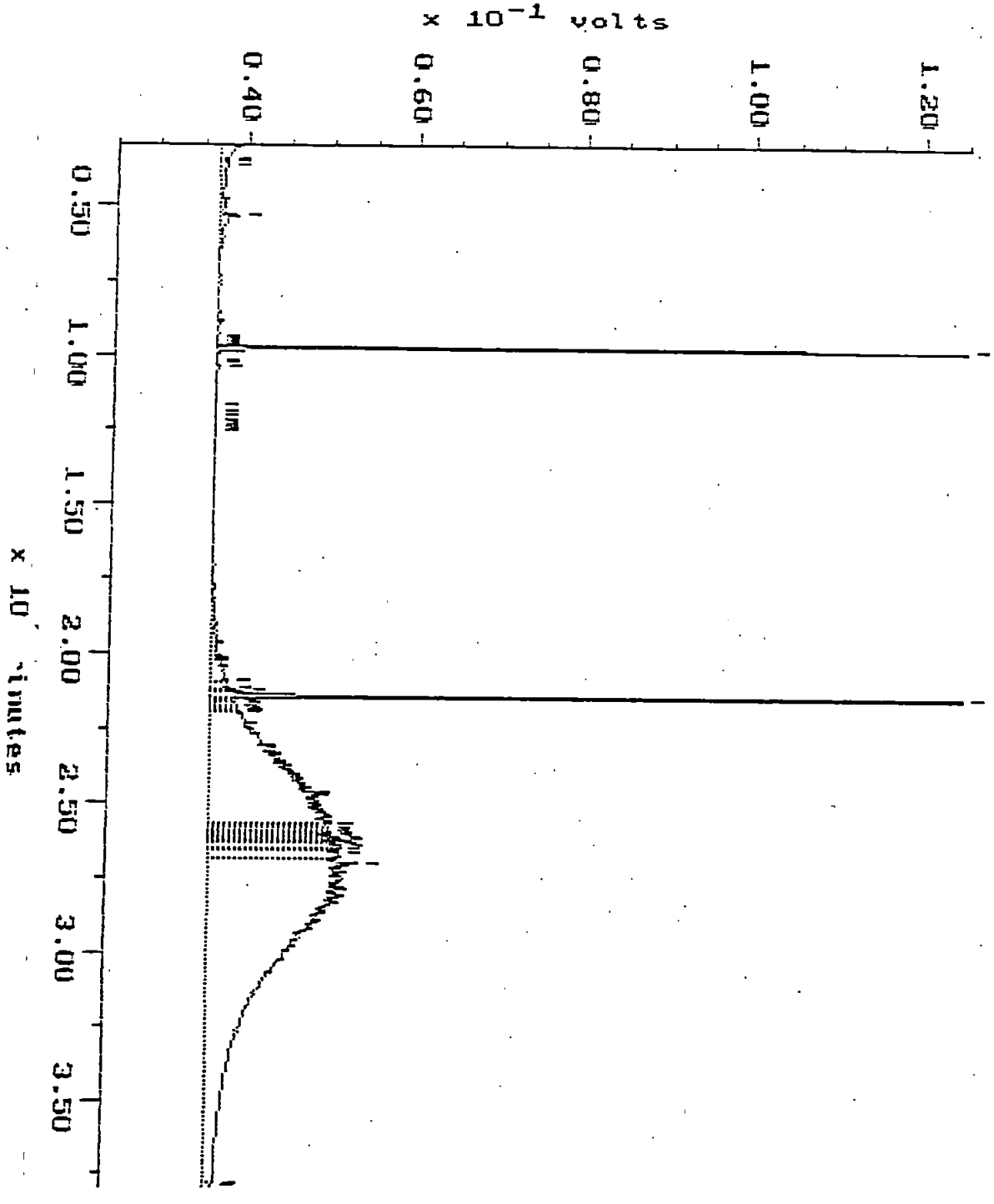
Continuing Calibration

Sample: D 500 Channel: DEMITRI Filename: R5248D02
Acquired: 24-MAY-93 11:05 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0524 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

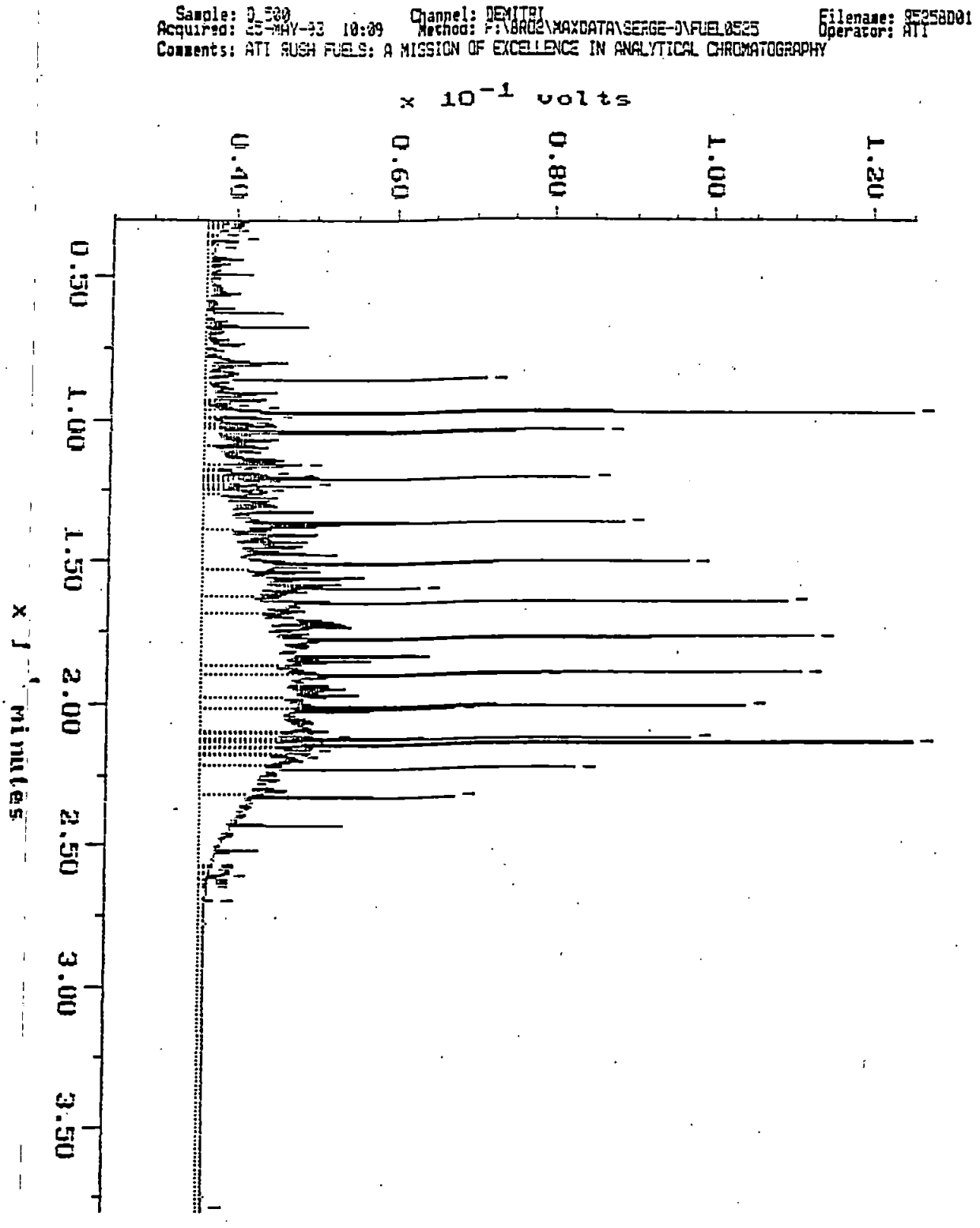


Continuing Calibration

Sample: MO 500 Channel: DEMITRI Filename: R5248D03
Acquired: 24-MAY-93 11:53 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0524 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY

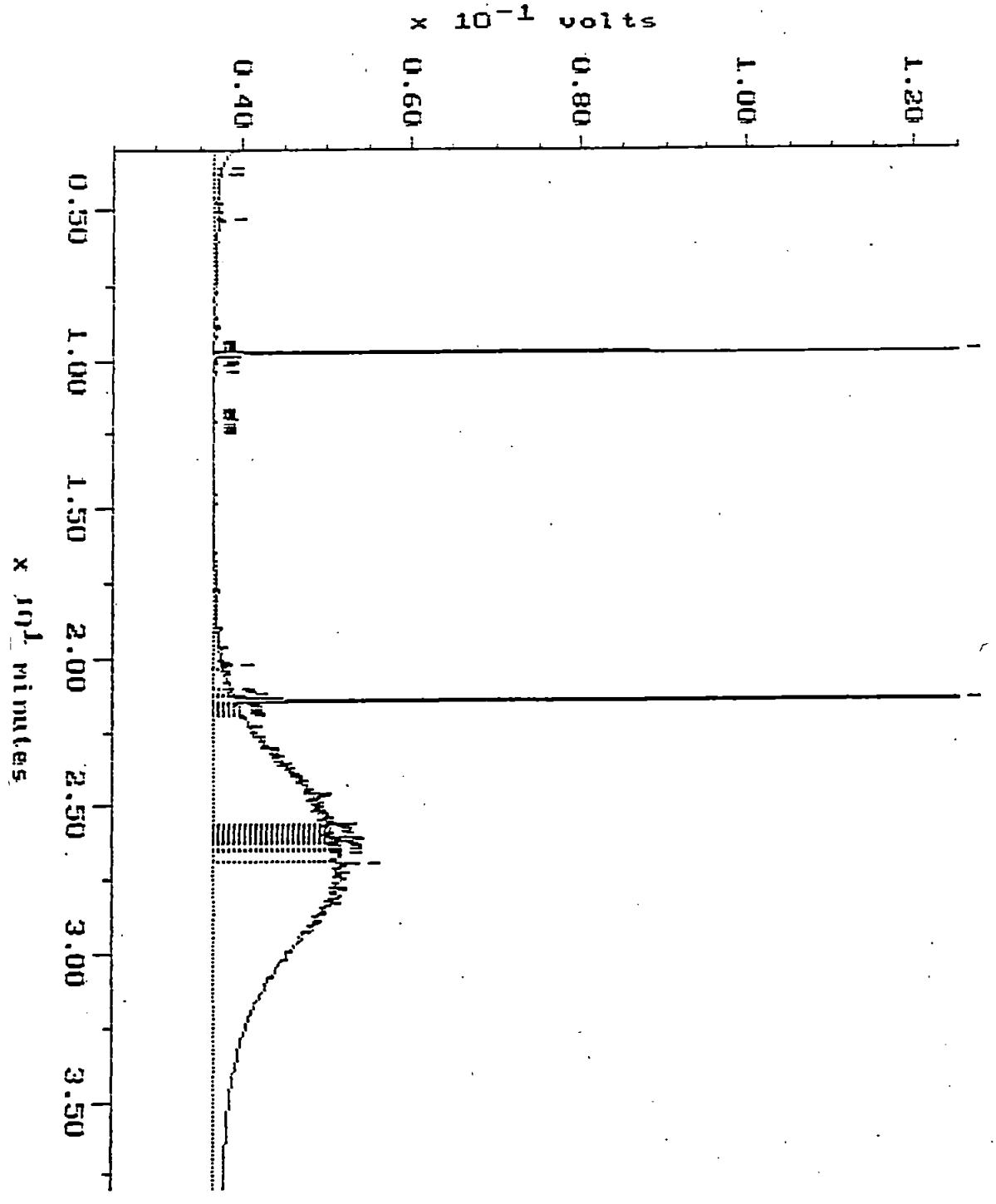


Continuing Calibration



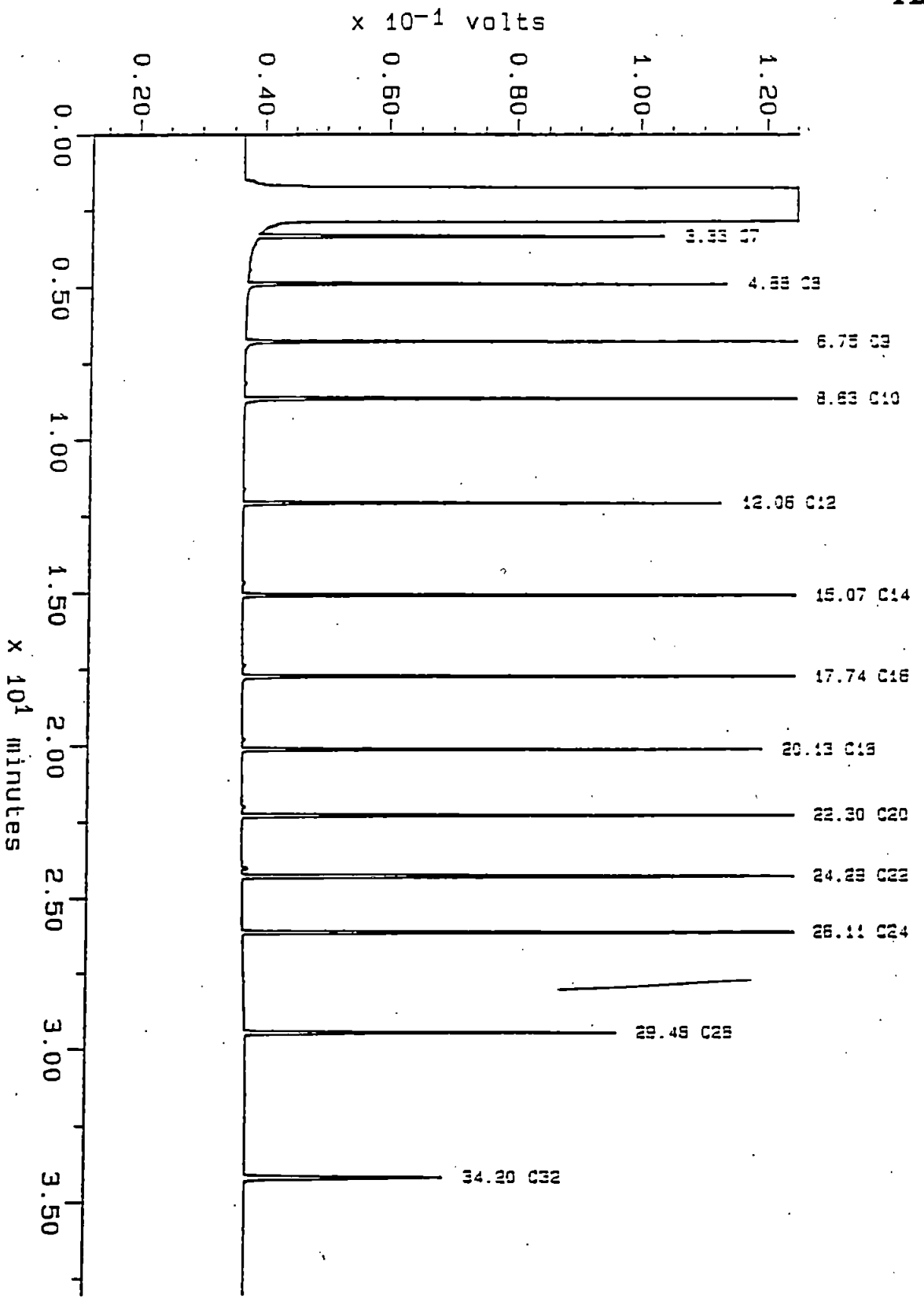
Continuing Calibration

Sample: MO 500 Channel: DEMITRI Filename: R5258D02
Acquired: 25-MAY-93 10:56 Method: F:\BRD2\MAXDATA\SERGE-D\FUEL2625 Operator: ATI
Comments: ATI RUSH FUELS: A MISSION OF EXCELLENCE IN ANALYTICAL CHROMATOGRAPHY



Sample: ALKANE Channel: CEMITRI Filename: R5078003
Acquired: 07-MAY-93 16:39 Method: F:\BRO2\MAXDATA\SERGE-D\FUEL0507 Operator: ATI
Inj Vol: 1.00

Alkane



Applied Geotechnology Inc.
Geotechnical Engineering
Geology & Hydrogeology

CHAIN-OF-CUSTODY

Date 5/21/93 Page 1 of 1

PROJECT INFORMATION

Project Manager: Susan Pennaluzzi
Project Name: St Vincent de Paul
Project Number: 15734.001
Site Location: 4th Ave S. & S. Bell St Sampled By: PJM

DISPOSAL INFORMATION

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

QC INFORMATION (check one)

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

Laboratory Number: 9305-214

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	LAB ID	PETROLEUM HYDROCARBONS: TPH-ID State:	TPH-G State:	TPH-D State: WA extended (all)	TPH Special Instructions	418.1 State:	8015M	ORGANIC COMPOUNDS: 8010 Halogenated VOCs	8020 Aromatic VOCs	8020M - BETX only	8240 GCMS Volatiles	8270 GCMS Semivol.	8310 HPLC PAHs	8040 Phenols	DWS - Volatiles and Semivol.	PESTS/PCB's: 8080 OC Pest/PCBs	8080M PCBs only	8140 OP Pesticides	8150 OC Herbicides	DWS - Herb/pest	METALS: Selected metals: list	Total Lead (Wa)	Organic Lead (Ca)	TCL Metals (23)	Priority Poll. Metals (13)	DWS - Metals	MFSP - Metals (Wa)	LEACHING TESTS: TCLP - Volatiles (ZHE)	TCLP - Semivolatiles	TCLP - Pesticides	TCLP - Metals	OTHER	NUMBER OF CONTAINERS
MW A	5/21/93	1440	water	1			X				X	X																							3
AGI-1	5/21/93	1515	water	2			X				X	X																							3
AGI-2	5/21/93	1345	water	3			X				X	X																							3
AGI-1-2'	5/21/93	231	soil	4			X				X	X																							—
AGI-2-3'	5/21/93	905	soil	5			X				X	X																							1

LAB INFORMATION

Lab Name: ATL
Lab Address: Renton
Via: Sampler

SAMPLE RECEIPT

Total Number of Containers:	11
Chain of Custody Seals: Y/N/NA	N
Intact?: Y/N/NA	NA
Received in Good Condition/Cold:	Y/Y

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

PRIOR AUTHORIZATION IS REQUIRED FOR RUSH DATA

Special Instructions:

RELINQUISHED BY: 1.	RELINQUISHED BY: 2.	RELINQUISHED BY: 3.
Signature: Pamela Morrell Time: 1605	Signature: Time:	Signature: Time:
Printed Name: Pamela J. Morrell Date: 5/21	Printed Name: Date:	Printed Name: Date:
Company: AGI	Company:	Company:
RECEIVED BY: 1.	**RECEIVED BY: 2.**	**RECEIVED BY: 3.**
Signature: Time: 1605	Signature: Time:	Signature: Time:
Printed Name: STINA KENAEL Date: 5/21/93	Printed Name: Date:	Printed Name: Date:
Company: ATL-LIA	Company:	Company: