ENVIROCON

Excavation Test Program Summary Report
Sylvania Electric Products Facility
Hicksville, New York

Submitted To:

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1.0 INTRODUCTION

This report provides an overview of the field activities and a summary of the findings from an Excavation Test Program at the Sylvania Electric Products Facility in Hicksville, New York (the "Site"). Field activities were conducted on December 18 and 19, 2001 by Envirocon, Inc. (Envirocon) in cooperation with URS Corporation (URS) on behalf of GTE Operations Support Incorporated (GTEOSI). The excavation test area was in the eastern portion of the former Gilbert Displays, Inc. building (140 Property) as shown on Figure 1. During the excavation test activities, representatives from New York State Department of Environmental Conservation (NYSDEC) were present.

The test excavation program was conducted to better understand subsurface conditions that will affect project implementation. The key element of this work was to develop protocols for radioactivity field screening and to define the correlation between field instrument readings and the concentrations.

The Excavation Test Program consisted of the following activities:

- Removal of a specified area of concrete floor to expose underlying soils;
- Monitoring work activities to assess the presence of volatile organic compounds (VOCs) and radioactive materials; and
- Collection of soil samples for laboratory analyses to characterize residuals at the Site.

The investigation was performed on soils from beneath the building slab to a depth of approximately 4 feet below ground surface (bgs) with a portion of the excavation extending to a depth of 5 feet. Soils were removed in approximate 1-foot lifts using a backhoe. The surface of each lift was screened with portable field instruments to evaluate the horizontal extent of radioactive impacts. The screening was conducted using a 1-meter square grid system. The radioactive measurements were also used to segregate excavated soils into impacted (containing residual radioactivity) and non-impacted (exhibiting background radioactivity levels) piles. Soils were also screened at random using a Photoionization detector (PID) to assess the presence of VOCs.

2.0 SUMMARY OF EXCAVATION TEST PROGRAM OBJECTIVES

The objectives of the excavation test program were to develop an improved understanding of the existing Site conditions and to establish field protocols for future remediation at the Site. The excavation activities were conducted to achieve the following goals:

- **Develop a Correlation of Exposure Rate to Concentration**– Definition, to the extent possible, of the anticipated relationship between the gamma exposure rate or measurements and the associated concentration of uranium 238 (U-238) as measured by the analytical laboratory. The correlation will be used to guide field-screening activities during the remediation program. The correlation will also be used to define the sampling and analysis frequency.

- **Evaluate Uniformity of Radionuclide Distribution** – The uniformity of radionuclide distributions in soils was reviewed or monitored to evaluate whether residuals are present within discrete locations indicative of localized releases, or whether residuals are more broadly distributed. The nature of this distribution is important to understand due to its influence on field screening techniques, excavation equipment selection, and the overall volume of impacted soil that will be recovered during the project. Field readings indicated a relatively uniform distribution of radioactive impacts within the subsurface with a relatively well-defined concentration gradient that can be measured in the field. This type of distribution will allow timely delineation to be made of excavation areas using field instruments, the use of higher volume excavation equipment, and a less intensive frequency of sampling for verification purposes.

- **Assess Geotechnical Conditions** – Geotechnical parameters associated with the subsurface soils will influence a number of factors, including the excavation of impacted materials, the foundation requirements for enclosure systems and the new load-bearing wall foundation (140 Building), and the types of shoring or sloping that will be required to ensure stability within open pit excavations. In general, the subsurface materials can be classified as gravelly sands that will thus possess high shear strengths but no cohesion. Tests are presently underway to assess key design parameters associated with these soils, the results of which will be used to support the calculations necessary for the required evaluations and designs.

- **Evaluate Excavation Productivity** – An evaluation has been made of the potential range of excavation processes and the associated productivity that may be expected during the removal of soils impacted in excess of cleanup levels. The location of the test program excavation (near SB-137, SB-134, SB-135 and SB-133) was selected based on a review of previously drilled soil borings within Building 140. Since excavation productivity during full-scale operations will be represented by a composite of both hand and mechanical excavation techniques, this location is representative of the broader area to be addressed as it appeared to

require both techniques. However, due to the detailed screening performed during excavation, accurate productivity estimates were not possible. Estimates were developed however, based on the production rates measured during active periods of excavation. Cycle times based on bucket size were evaluated to develop an overall estimate of production.

- **Assess Foundation Configuration** – During the excavation activities, an evaluation was made of the configuration of the foundation supporting the internal column. Since the full-scale work will require installation of a new load-bearing wall along this column line, an assessment was made of the foundation to ascertain potential design options. This information will be used while removing residual impacts to maintain proper structural support for the columns.

3.0 EXCAVATION TEST PROGRAM COMPONENTS

This section describes various components of the excavation test program and outlines the activities conducted during the test excavation program performed at the Site including the Project Team, preparation activities, and excavation activities.

3.1 Project Team

Personnel present during the field activities also included team members from Envirocon, URS, and GTEOSI. The field team included personnel that possess significant expertise in all facets of remediation for radioactive and chemically impacted materials. The Envirocon team members included:

- Field Manager – Dale Evans
- Superintendent - Norman Clingan
- Certified Health Physicist – Shane Brightwell
- Sampling Coordinator – Chip Mickel
- Health and Safety Officer – Vince Daliessio
- Operator – Scott Vaughan

The URS team members included:

- Oversight Manager – Pam Cox
- Health Physicist – Joe Ross

The GTEOSI team members included:

- GTEOSI Project Manager – Al Ludwig
- GTEOSI Project Manager – Jean Agostinelli

3.2 Field Preparation

The preparation activities included health and safety training, equipment mobilization, grid layout, pre-work gamma exposure rate screening (site walkover survey), saw cutting concrete flooring within the limits of the excavation area, and performing a baseline gamma exposure rate survey on exposed surface soils.

3.2.1 Health and Safety Training

Site-specific health and safety training was provided to all personnel involved with the program to address potential radiological and chemical issues, as well as key site hazards. This training included a review of personnel monitoring, work procedures and the principal hazards likely to be encountered.

3.2.2 Equipment and Instrumentation

A rubber tired backhoe (Case 580) was used to remove the concrete and excavate soils. The backhoe was equipped with an extendahoe feature that increased the length of the boom to support excavation to a potential depth of approximately 16-feet. Other equipment used during the excavation test program included a concrete saw and an assortment of hand tools.

The field instruments used for radioactive material screening included portable gamma exposure rate meters with end-window alpha-beta detection capability and a portable gamma spectroscopy system. The field instrumentation used for radioactive screening is described in Appendix A.

Soil monitoring for VOCs was performed using a photo-ionization detector (PID) supplemented with Draëger tube analysis to document the concentrations of volatile organic compounds present.

3.2.3 Grid / Excavation Test Program Layout

The test excavation area was defined by marking the limits of excavation on the concrete floor using a perimeter defined based on the concentrations noted in borings SB-137, SB-134, SB-133. The test excavation location and limits of concrete and soil removal are illustrated on Figure 2. Prior to excavation, baseline conditions were established. The soil and concrete storage areas and other work area locations were subject to a gamma exposure rate walkover survey to establish baseline conditions and covered with visqueen to limit contact with the floor to the extent practicable. An exclusion zone perimeter adjacent to the excavation was delineated using fencing and caution tape to limit access and prevent falls into the excavation. In addition, access and egress for workers conducting activities in the exclusion zone was set up in a decontamination zone corridor. All personnel and equipment/materials were surveyed for residual surface contamination prior to unrestricted release from the work area.

3.3 Pre-excavation Survey

A Site walkover survey was performed to establish the baseline gamma exposure rates within the limits of the work area. This data was used to identify whether any pre-existing or post-excavation impacts were present. Prior to conducting the walkover survey, a 1-square meter (m^2) grid was established within the work area and marked with paint on the concrete slab as shown on Figure 1.

The grid area was labeled west-to-east with the letters A through O, and south-to-north with numbers 1 through 30, for a total of 450 1-m^2 grids. The pre-work screening was performed to obtain gamma exposure rates at the concrete surface and at a height of 1-meter above the concrete surface. The walkover survey was performed using Ludlum Model 19 and Model 12S Micro-R survey meters. The measured exposure rates were recorded in microRoentgen per hour (uR/hour) in each grid.

3.4 Saw-Cutting Concrete

The perimeter of the excavation area, defined as approximately 5 meters by 4 meters, was marked to delineate the perimeter of the test excavation area (Figure 1). A concrete saw was used to cut the slab along this perimeter into pieces that could be easily removed. In general, the sizes of the concrete pieces were approximately 1-meter by 2 meters to support safe removal by the equipment and movement to the adjacent concrete storage area.

During concrete removal, soils adhered to the underside of concrete. These soils were screened during removal to evaluate whether radioactive impacts were present. Based on the screening performed, no such impacts were evident. However, additional screening will be performed during full-scale field operations on the concrete fragments using the correlation guidance developed to verify that no impacts exist.

3.5 Baseline Gamma Exposure Rate Surface Soil Screening

Subsequent to saw cutting and removing the concrete from within the excavation area, a baseline gamma exposure rate survey was performed over the exposed soil surface prior to initiating excavation activities. These measurements were made using 1-meter grid spacing and included readings at the soil surface as well as at a height of 1-meter above the surface. Measurements were performed using a Micro-R meter and a collimator comprised of a lead shielded Ludlum Model 44-20-1, 3-inch sodium iodide (NaI) detector in combination with a calibrated Ludlum Model 2350-1 Data Logger (Appendix A).

3.6 Excavation Test Program Activities

Upon completion of the Site preparation activities noted, the Excavation Test Program was initiated. A summary of the activities performed is described in the following sub-sections.

3.6.1 Test Excavation

The excavation activities were implemented in a manner that followed the protocols anticipated for full-scale field operations. A cross-section of the finished excavation is illustrated on Figure 2.

Excavation activities involved both hand and mechanical excavation of a surgical nature subject to field screening with handheld instrumentation. Accordingly, the protocols employed provided for excavation of the upper 4 feet of soil in 1-foot lifts. The horizontal extent of the excavation was limited by the subsurface foundation of the column and a subsurface utility pipe.

Soils within each lift were screened and the results documented prior to continuing with each successive lift's excavation activities. The gamma readings documented for each lift are presented in Table 2. During the screening process, gamma exposure rates or collimator readings were used to guide the sample locations for gamma spectroscopy analysis. The soil screening grid and sampling locations are presented on Figure 3.

As noted previously, the screening work was performed to identify a viable method of surveying the presence and extent of radioactive impacts in the field, and to quantify radionuclide constituents via soil samples. The desired correlation will link the exposure rates obtained from gamma measurements (and the extent of variations associated with these measurements) to the known radionuclide concentrations (and variations in such concentrations) obtained from the gamma spectroscopy analyses. A detailed description of these surveys is provided in Appendix C.

As part of the excavation process, the productivity of hand versus mechanical excavation processes was evaluated (Section 4.8). The productivity of these processes was evaluated against the ability to provide an adequate degree of screening to ensure that only impacted materials were removed.

Soils excavated during the program were side-cast onto the adjacent concrete floor slab. The areas of the floor used for soil segregation and storage were covered with polyethylene sheeting to minimize uncontained release of soils onto the floor. The backhoe was isolated from the excavation to the extent possible to limit contact with the

soils to just the bucket and the tires. This limited decontamination and final screening requirements. Personnel working within the excavations used disposable booties to prevent tracking of soils from the excavation onto the concrete floor.

3.6.2 Field Sampling

Samples of soil were obtained for analytical characterization of radioactive materials, as well as for geotechnical and size fractionation testing. These samples were obtained using both composite and grab sample techniques. Radioactive samples were placed directly into sealed plastic bags, labeled, documented on chains of custody, and placed within sealed polyethylene buckets for shipment to the off-site laboratory for gamma spectroscopy analyses. The identification, sample type and analysis performed on these samples are summarized in Table 1. The locations of the samples collected are illustrated on Figure 3. Radioactive samples recovered were shipped to Severn Trent Laboratories (STL) in St. Louis, Missouri for analysis. Samples of clean soils recovered for geotechnical and size fractionation testing were sent to Advanced Terra Testing in Lakewood, Colorado.

Composite samples over the surface within selected 1-square meter grids were collected from the surface of each lift within the excavation. Samples were homogenized prior to shipping to the laboratory for analyses. Grab samples were collected at elevated measurement (EM) locations. This radioactive analysis was used to correlate gamma readings to nuclide concentrations within the soils. The soil-screening grid and soil sampling locations are presented on Figure 3.

The soil sampling locations corresponded to locations selected for 1-meter and contact shielded gamma readings. Initially, a point sample was collected directly under the marked location where the contact readings were measured; these sample/gamma data were for developing correlation's in impacted areas. The following steps were used for point sample collection.

1. A large Ziploc™ sample bag was labeled (date, sample location, etc.);

2. Using an extended handle soil trowel, a sample of approximately 1.5 to 2 kilograms (kg) of soil was collected at a specific point and placed in the sample bag,

3. The sample bag was evacuated, sealed, and documented on the chain-of-custody. The sample was then placed into a 5-gallon bucket for shipping.

4. The soil trowel was thoroughly cleaned and dried between sampling locations.

5. The above steps were repeated for all point sample locations.

Subsequently, a composite sample was collected from the surface within the entire 1-m^2 grid where the 1-meter readings were measured; these sample/gamma data were for developing the general field shielded gamma survey correlation's. The following steps were used for composite sample collection.

1. A 5-gallon bucket was labeled (date, sample location, etc.)

2. Using a hand shovel, a soil sample was collected from the top few inches of the entire grid and placed in a bucket; this process continued until the bucket was approximately one-half to two-thirds full.

3. The sample bucket was taken to an area outside the excavation and thoroughly mixed (homogenized) by repeatedly and intermittently pouring the contents between the original bucket and two additional mixing buckets.

4. After mixing, a 1.5 to 2 kg aliquot was collected in a Ziploc™ bag.

5. The sample bag was evacuated?, sealed, and documented on the chain-of-custody. The sample was then placed into a new 5-gallon bucket for shipping.

6. The shovel was thoroughly cleaned and dried between sampling at each location.

7. The above steps were repeated for all grid sample locations.

Copies of the Chains of Custody for radioactive analyses are provided in Appendix C, Attachment C-3.

The samples were scheduled for laboratory analysis by STL Laboratory. STL maintains a Nuclear Regulatory Commission (NRC) Radioactive Materials License (Appendix C, Attachment C-5) as well as maintaining National Environmental Laboratory Accreditation Conference (NELAC) Certification in the State of New York (Appendix C, Attachment C-5).

All soil samples were scheduled for both gamma spectroscopy for specific gamma-emitting radionuclides of interest and alpha spectroscopy for specific alpha-emitting radionuclides of interest (Appendix C, Attachment C-4).

In order to support an applicable correlation to field gamma measurements, the following gamma-emitters were requested for analysis:

Table 1. Soil Sample Analysis Summary

Radionuclide	Gamma-spec	Alpha-spec	Purpose
Ac-228	X		Field gamma correlation of Th-232 concentrations
Cs-137	X		Impact on field gamma correlation's
K-40	X		Impact on field gamma correlation's
Pa-234M	X		Assess viability as surrogate for quantifying U-238 in field gamma correlation's
Th-230		X	Quantify concentrations for potential dose-based cleanup criteria assessment
Th-232		X	Evaluate any correlation to uranium concentrations; quantify concentrations for potential dose-based cleanup criteria assessment
Th-234	X		Assess viability as surrogate for quantifying U-238 in field gamma correlation's
U-234		X	Evaluate potential uranium enrichment properties; quantify concentrations for potential dose-based cleanup criteria assessment
U-235	X	X	Gamma-spec: Assess viability in field gamma correlation's; Alpha-spec: Evaluate potential uranium enrichment properties; quantify concentrations for potential dose-based cleanup criteria assessment
U-238		X	Confirm viability of surrogate gamma-emitters used in field gamma correlation

A total of 67 soil samples (42 point, 25 composite) were collected. Of the 42 point samples, one was collected in each of the 25 composite grid sample locations; 16 point samples were collected on the first lift in grids, and a "rock" sample which appeared to be elevated was collected.

To expedite the initial gamma/concentration correlation's, some of the composite and point samples were scheduled for rapid turn-around-time (TAT) of the gamma-spectroscopy analysis results. Samples were selected from a range of gamma readings as follows:

1. XR shielded contact and 1-meter readings were separately entered into a spreadsheet.

2. Each data set was ranked by gamma value from lowest to highest.

3. Fifteen samples were selected from each data set, and uniformly distributed by rank from lowest to highest.

4. The fifteen point and fifteen composite samples were scheduled on the Chains of Custody for "Rush TAT."

The results of the rush TAT samples are evaluated in the correlation's presented in Appendix C, Attachment C-4.

3.7 Health and Safety Program

Health and safety during the project was addressed using the Site-specific health and safety plan (HASP) included in Appendix B. This plan will be modified and used to support the full-scale remediation program. The HASP addressed the full-range of equipment, chemical, radioactive, and stability-related risks anticipated during the project. Prior to personnel performing work at the Site, all workers were provided training in radiation safety. A detailed description and the results of the radiation safety program are provided in Appendix C. All personnel participating with the excavation program were provided with optically-stimulated luminescence dosimeter (OSLD) badges. The results of the OSLD program are provided in Appendix B, Attachment B-1. Baseline screening using urine bioassay analyses for isotopic uranium and thorium radionuclides was also performed as outlined in Appendix B, Attachment B-2.

During the excavation activities, an evaluation was made of the factors that required consideration in relation to the protection of workplace health and safety. These factors included building ventilation, overhead clearances, field monitoring, and delineation and flagging of work zones.

3.7.1 Air Monitoring

During excavation activities, air monitoring was performed to ensure those airborne concentrations of dust, VOCs, and radioactive particulates did not exceed the action levels and the necessary level of protection, as defined by the health and safety plan. This monitoring was continued through the field operations to validate that particulates, VOCs and/or radioactive materials were not subject to airborne migration.

During the excavation test program, the following air monitoring and sampling activities were conducted:

- PID, Flame Ionization Detector (FID), and Draeger Tube monitoring for VOCs;

- Personnel air sampling pumps and DustTraks monitoring for total particulates;
- Integrated air sampling for alpha-emitting radionuclide particulates; and
- Integrated air sampling for tetrachloroethene, trichloroethene, and benzene.

The locations sampled are illustrated on the Figure 3 and sampling and monitoring sheets are provided in Appendix E (note there is no appendix E). The results of the air monitoring and sampling activities are presented in Section 4.3.

3.8 Decontamination

Once field activities were completed, equipment used during the program was decontaminated. To the extent possible, decontamination involved limited amounts of water in combination with brushes to remove residual impacted material. Concrete floors within the work areas were subject to wet sweeping to remove residue. Upon completion of the decontamination process on equipment, floors, or other material, a detailed final screening was performed to validate that no radioactive residues remain.

3.9 Site Restoration

Upon completion of the excavation s, the internal limits of the excavation were flagged using excavation tape. Soils were carefully placed back into the excavation using the bucket of the backhoe in a manner to prevent particulate emissions. The exposed soils within the backfilled excavation were then covered with a concrete grout to seal the surface. Side cast concrete and debris was covered with polyethylene plastic and left adjacent to the excavation area.

4.0 EXCAVATION TEST PROGRAM TEST RESULTS

This section presents both the field and analytical results of the excavation test program.

4.1 Pre-Excavation Gamma Screening Survey Results

A pre-excavation gamma screening survey was performed in all 450 grids within the work area in Building 140. The survey identified an elevated contact reading in Grid G-9 of 15 uR/hr. This location was previously identified as elevated during drilling operations. Other readings were typically considered to represent background conditions.

After the concrete was cut, slabs were removed using the backhoe. The underside of the slabs was subject to screening and typically indicated background conditions. As noted, these materials were placed on visqueen in an area adjacent to the excavation area. A large block of granite was encountered directly beneath the elevated measurement location, adjacent to the column. Based on an inspection it appeared that the block might have been associated with the building foundations from the former Site structures. A sample of the block was recovered and shipped for testing. Analytical results indicated background concentrations of U-238. With the exception of the rock, all other measurements directly beneath the slab were in the range of 5 to 9 uR/hr for both contact and 1-m measurements. The results of the pre-excavation screening survey are present in Table 2.

4.2 Post-excavation Gamma Screening Results

Following completion of the excavation work, post-excavation gamma screening surveys were performed on 413 of the 450 grids. The 20 grids where the excavation was performed (G-9 through J-13) could not be surveyed because new concrete was poured; however, adjacent readings were relatively unchanged. There were 17 grids (K-9 through M-13, L-14, and M-14) east of the excavation on which concrete and debris remained. These materials obscured the ability to obtain exposure rate readings. However, measurements obtained adjacent to these grids appeared unchanged. Given the plastic cover and the background readings obtained on the underside of the concrete slabs, there is no reason to believe any impacts to the floor occurred within this area.

Throughout the work area, the results of the post-excavation screening were essentially the same as the pre-excavation surveys. The maximum increase observed on any measurement was 2 uR/hr and the maximum decrease was 3 uR/hr. These differences are well within the variability expected for ratemeter readings using a Micro-R meter under background conditions (4 to 8 uR/hr). The pre/post-excavation screening survey data are included in Table 2.

4.3 Results of Pre/Post Concrete Screening

There were no distinguishable increases in any of the post excavation screening measurements that indicated residual contamination remained on any of the concrete surfaces as a result of excavation activities. Therefore, it was concluded that the concrete surfaces were not adversely impacted by Site activities. More specifically, it is anticipated that the radioactivity in soils is bound sufficiently to allow removal from hard surfaces such as concrete through sweeping or vacuuming.

4.4 Air Monitoring Results

Air monitoring and sampling activities was conducted during the excavation test program to monitor potential exposure hazards and to gain information relevant to performing full-scale remedial work at the Site. The results of the air monitoring activities are summarized as follows:

- Ambient air readings obtained using the PID during the Excavation Test Program ranged from a background of 0.2 to 0.6 parts per million (ppm) total VOCs. Ambient air FID readings ranged from background of 1.1 to 2.1 ppm total VOCs. There were no ambient air readings above these background levels within the work area, upwind or downwind. Headspace samples above excavated soils in the work area (readings taken less than 1 inch above the excavated soils) ranged from background to 25 ppm.

- Carbon monoxide readings inside the building were obtained through continuous monitoring and ranged from less than 1 to 18 ppm during gas-powered saw cutting of concrete.

- Total particulate readings upwind of the work area (west of the building and adjacent to Cantiague Rock Road) ranged from 0.003 to 0.032 mg/m^3. Indoor work area readings, as expected, were greater than outdoor readings and ranged from 0.015 to 0.269 mg/m^3. In particular, a high degree of diesel exhaust particulate from operating the backhoe in the building exaggerated these readings in the work zone.

- Ventilation of the work area was performed by keeping a door open and by running a large exhaust fan during times when the backhoe was in use.

- Downwind readings obtained during the indoor work activities ranged from 0.003 to 0.032 mg/m^3. These values indicate that particulate emissions from the work area did not contribute to increased particulate levels within outdoor areas during the Excavation Test Program.

- Integrated air sampling for alpha-emitting radionuclide particulates, including U-238, U-235, and U-234 was conducted. The air samples were evaluated for compliance with a general public effluent concentration (action limit) of 1E-12

microcuries per milliliter (μCi/ml). Area samples were collected upwind and downwind of the work area. Personal exposure samples were collected from workers in the work area.

On December 18, 2001 samples collected upwind, downwind, and in the work area exhibited no measurable activity above background. On December 19, 2001 the upwind sample exhibited a concentration of 1.9E-14 μCi/ml, which is approximately 1.9 percent of the allowable exposure to the general public. Because this sample was an upwind sample and much farther from the work area than the downwind sample that exhibited non-detectable concentrations, it is possible that this reading reflects local background levels or sample contamination subsequent to the sampling event.

The worker breathing zone sample collected from a worker that worked 8 hours inside the work zone exhibited a concentration of 1.8E-13 μCi/ml. This concentration is 18 percent of the allowable exposure to the public and a much smaller percentage of the allowable occupational exposure limit. The downwind sample had no measurable activity above background. Radioactivity was not released to the environment during the Excavation Test Program.

- Integrated air sampling for tetrachloroethene, trichloroethene, and benzene was conducted by placing personal breathing zone sampler pumps on workers in the work zone. The samples were subsequently sent to a laboratory for analysis to ensure that breathing zone VOCs are within compliance with occupational action levels for the respective chemicals.

The air monitoring and sampling results indicate that the work practices and personal protective equipment used during this work were sufficient to protect both workers and members of the public from exposure to chemical or radiological agents above established levels. This validates the approach identified in the excavation work plan and the HASP and therefore is appropriate, for the future remedial activities.

4.5 Soil Survey Results and Correlation's

A key goal of the field program was to develop an understanding of the relationship between the measured gamma exposure rate and the actual laboratory concentrations. This subsection presents the results of the soil survey and the correlation's developed.

4.5.1 Shielded and Unshielded Gamma Survey Results

The results of the surveys were documented on digital and hardcopy forms, were applicable. The hardcopy log pages are presented in Appendix C, Attachment C-1. The digital data were verified against these hardcopy log results. Some minor nomenclature discrepancies were identified in the digital data (names entered incorrectly on the data logger) and were subsequently corrected. All data values were consistent between digital

and hardcopy logs. These survey results are used in the correlation evaluation in a later section.

4.5.2 Gamma/Concentration Correlation's

Based on the correlation produced, remediation efforts will be directed using shielded gamma surveys, These efforts should achieve the current release criteria with an acceptable degree of certainty. However, as the concentrations of radionuclides decrease, given the detection capabilities of the proposed shielded gamma measurement methods, then the following points should be considered:

1. Background values for radionuclide constituents of interest should be quantified more accurately to ensure adequate discrimination between impacted and background conditions.

2. The on-Site gamma spectroscopy system will play a more important role in verifying that remediation efforts have met release criteria.

The primary purpose of the gamma/concentration correlation's was to identify any direct relationships between levels/variations of gamma readings and levels/variations of radionuclide constituents of interest. Successful correlation should allow the use of field gamma surveys to direct remediation efforts in a real-time fashion.

Two main types of correlation's were evaluated:

1. Shielded Residual Impacts - Contact gamma readings to point sample concentrations.

2. Shielded General - Gamma readings at a height of 1-meter to composite sample concentrations.

The gamma/concentration correlation data are presented in Appendix C, Attachment C-4. These data are applicable to all gamma-spectroscopy results of samples collected during the field excavation program.

4.5.3 Shielded Hot Spot Correlation's

The hot spot correlation from impacted areas were evaluated using the gamma-spectroscopy results and the associated contact shielded gamma readings for the point samples. The results support a relationship between the shielded XR channel gamma measurements and the U-238 (by Pa-234m) concentrations. Additionally, a relationship was identified between the shielded U-235 gamma channel and the U-235

concentrations, although the detection limit appears to be more restrictive than that for the XR/U-238.

Although the correlation's appear viable with the use of all available data, setting aside the data from the first lift improves the correlation.

The Thorium-232 (by Ac-228) concentrations do not appear to maintain any defensible correlation to the U-238 (by Pa-234m) concentrations. Additionally, there was no viable correlation between the Ac-228 gamma channel and Ac-228 concentrations.

4.5.4 Shielded General Correlation's

The shielded 1-meter general correlation was evaluated using the gamma-spectroscopy results and associated contact shielded gamma readings for the samples. The results were essentially the same as the hot spot correlation's, which support a correlation between the shielded XR channel gamma measurements and the U-238 (by Pa-234m) concentrations. Additionally, a correlation was identified between the shielded U-235 gamma channel and the U-235 concentrations, although the detection limit appears to be more restrictive than that for the XR/U-238.

Although the above-described correlation's appeared viable with the use of all available data, not using the data from the first lift actually tends to improve the correlation.
The Th-232 (by Ac-228) concentrations do not appear to maintain any defensible correlation to the U-238 (by Pa-234m) concentrations. Additionally, there was no viable correlation between the Ac-228 gamma channel and Ac-228 concentrations.

4.5.5 Soil Shielded Gamma/Concentration Correlation

A quantifiable direct relationship between gamma readings and contaminant concentrations in areas where contamination was present in the surface/exposed soils was anticipated. However, there was some concern that there might be some interference by other radionuclides (primarily natural K-40) that might complicate the development of a good correlation.

The preliminary indications were that correlation's can be developed for the project between shielded gamma readings (most likely in the XR channel) and radionuclide concentrations. There appears to be no significant adverse impact on the correlation's by the presence/variations in K-40 concentrations. Furthermore, initial indications are that the Th-232 concentrations are not directly related to the U-238 concentrations.

These correlation's should not be used for quantification purposes using shielded gamma measurements to extrapolate to higher concentrations. If it is desired to estimate soil

concentrations, using shielded gamma measurements, at readings higher than the highest readings used in the correlation, then this study should be extended to include higher values. However, development of correlation's for higher concentrations should not be necessary if the release criteria are within the range of the concentration values in this initial study. Any higher gamma readings would indicate concentrations in excess of release criteria, which would then lead to remediation efforts.

4.6 Concentration Gradient

A qualitative evaluation of lateral and vertical concentration gradients was performed in the test excavation. Based on review of the changes in gamma readings and soil concentrations between grids in each lift (horizontal variation), values varied to the degree detectable by gamma measurements within a 1-meter distance (gamma readings in the XR channel were observed to vary between background and residual levels from one grid to the next). Based on a similar review between readings in the same grid in successive lifts (vertical variation), a noticeable shift in readings could be identified between lifts (approximately 0.3 m). This evaluation may indicate that the residual concentration gradients within impacted areas are significant. Further, the data developed indicates that the gradients that exist can be measured in the field using correlation data from the highest concentrations measured to the lowest (i.e. within the range of the cleanup level).

In summary, two conclusions can be drawn from the radiological data about the uniformity of variations in the concentrations of the constituents of interest:

1. Analytical results indicate that concentrations varied between background levels and concentrations exceeding the current release criteria within the vertical distance of one lift (approximately 0.3 m), such as was seen in the vertical profile of Grid J-13.

2. The ability to distinguish between background and residual levels of constituents of interest using shielded gamma measurements was also demonstrated in the vertical measurements on the lifts within Grid J-13.

In addition to the relatively uniform distribution, rather distinct boundaries appear to exist between impacted and relatively clean soils. Accordingly, due to the size of the backhoe bucket compared to the rather distinct boundaries between residual contamination and background soils, it was difficult to prevent some degree of mixing between clean and impacted soils. However, hand excavation was observed to be adequate for surgical segregation and achieving background soil levels following bulk removal of contaminated soils in some areas within the excavation.

4.7 Uniformity of Radionuclide Distribution

Based on the radionuclide distribution within the excavation area inferred from analysis results associated with previous investigations, it appeared that a relatively uniform distribution was present and that a defined concentration gradient existed (i.e. large variations in concentrations within the study area were not present). Using the results of screening in the field coupled with the subsequently obtained analytical results from sampling indicates that such inference was appropriate. In particular, the radioactivity appears to be relatively uniform in its distribution and typically follows a defined concentration gradient from high concentrations to the points at which lower readings are obtained.

4.8 Excavation Productivity

The productivity of excavation was difficult to measure due to the detailed level of screening that was performed during the effort. However, estimates of production based on the cycle times measured during active portions of the excavation were obtained and used to estimate production rates. Excavation productivity using the backhoe was measured and determined to be approximately 20 cubic yards per hour (yds^3/hr). This production rate was estimated based on a 30-inch bucket and accommodates equipment moves and screening within the excavated area. Production estimates for hand excavation will depend upon the rate of recovery, as dictated by screening requirements. However, on the average, it was estimated that the production rate under such conditions would be approximately 4- $feet^3$ per hour.

4.9 Geotechnical Conditions

Geotechnical parameters that will be used to support design efforts are presently being obtained and will be summarized in a separate report. The gravelly sands sampled during the program should provide significant bearing capacity due to the anticipated shear strength. This information, as well as other relevant parameters such as compaction density will be provided in the report.

4.10 Foundation Configuration

The foundation configuration anticipated for the replacement of the load-bearing wall will be a strip-footing configuration based on the anticipated high bearing capacity provided by the sand. This will allow construction to proceed in a timely manner regardless of whether impacts exist.

APPENDIX A

RADIATION MEASUREMENT INSTRUMENTATION

The three primary types of radiation measurement instrumentation used during the pilot test included:

- Portable gamma survey instruments - used to measure gamma radiation levels in the bay area, on soils in the excavation area, and levels emitted from samples collected in the excavation area.

- Portable gamma spectroscopy system - used to remotely screen samples collected from the excavation.

- Portable alpha/beta contamination instruments - used to survey personnel and equipment for surface contamination and to measure air particulate filter samples for quantifying airborne radionuclide concentrations.

A.1 Portable Gamma Survey Instruments

Portable gamma survey instruments were used to measure gamma radiation levels in the bay area, on soils in the excavation area, and levels emitted from samples collected in the excavation area. The following describes the types of gamma surveys performed and the associated instrumentation.

A.1.1 Unshielded Gamma Exposure Rate Surveys

Unshielded gamma exposure rate surveys were performed using portable industry standard "Micro-R" meters. These instruments were Ludlum Model 12S and Model 19 Micro-R meters calibrated for exposure rate to Cs-137 by the manufacturer within the past twelve months. These instruments both incorporate a one-inch sodium iodide (1" NaI) and associated electronics contained in a single hand-held unit. Both instruments operate identically with the exception that the Model 12S uses a decade incremented scale readout and the Model 19 uses a scale that increments in multiples of five.

In order to confirm comparable measurement operation prior to field use, both instruments were taken to locations exhibiting a range of exposure rate levels and comparison readings were performed. Readings from both instruments were observed to be essentially the same for all locations; therefore, it was concluded that they could be used interchangeably.

A.1.2 Shielded Gamma Surveys

Shielded gamma surveys were performed using a portable Ludlum Model 44-20-1, 3" NaI probe (44-20-1) calibrated to a Ludlum Model 2350-1 Data Logger (2350-1) by the manufacturer within the past twelve months. In order to focus the gamma measurements and identify/quantify relatively small areas of elevated gamma levels, a collar-type ½" thick collimator was placed around the NaI crystal.

This instrumentation was initially calibrated by the manufacturer for unshielded exposure rate to Cs-137. However, the use of the collimator meant that the quantitative exposure rate readings were no longer accurate. Therefore, shielded readings taken with this instrumentation are referred to as "gamma" readings to avoid confusion with actual "exposure rate" readings taken with unshielded instruments.

The use of the 2350-1 allowed for single channel analysis (SCA) operation. Prior to field use, the 2350-1/44-20-1 was set up to measure three independent channels, each corresponding to a specified gamma energy or energy range. Each channel was stored in the 2350-1 as a separate detector configuration, which could be called up digitally and used on command without having to make any physical instrument adjustments. The intent with setting up three independent channels was to attempt to identify an optimum gamma energy or energy range for use in the gamma-to-radionuclide concentration correlation.

A.1.2.1 Channel 1 (Detector 5)

Channel 1 was set up to measure all gamma energies, ranging from approximately 60 kiloelectron volts (keV) up to and over 3 megaelectron volts (MeV). This channel range includes essentially all principal gamma energies from all radionuclides/constituents of interest in this investigation.

The parameters for this channel were transferred directly from the exposure rate detector configuration (Detector 1 in the 2350-1 memory). Parameters modified on the detector were the calibration constant (set to 1.0) and the associated scalar readout [changed from microRoentgens-per-hour (uR/hr) to counts-per-minute (cpm)]. This was done in order to be consistent with the readouts of the other two channels and to avoid confusion with actual exposure rate readings.

A.1.2.2 Channel 2 (Detector 3)

Channel 2 was set up to measure the 185 keV gamma energy emitted from the decay of the U-235 radionuclide. This channel was actually set up to measure gamma energies in the range from 176 to 196 keV to allow for the relatively broad resolution of photopeak energy registered by the NaI. The emission yield of this gamma energy from U-235 is relatively high; however, interference with its identification and quantification typically results from:

i) Being a relatively low gamma energy, which places it in the high background Compton Continuum region created by high-energy gammas in natural background (such as emissions from Ra-226/Rn-222 decay products, K-40, etc.), and

ii) Presence of the 186 keV gamma emitted by Ra-226, if present in sufficient concentrations.

A.1.2.3 Channel 3 (Detector 4)

Channel 3 was set up to measure the 908 keV (approximately 25 percent yield) and 960 keV (approximately 20 percent yield) gamma energies emitted from the decay of Ac-228 (Th-232 decay product), as well as the 1,001 keV (approximately 1 percent yield) gamma energy emitted from the decay of Pm-234m (U-238 decay product). This channel was set up to measure gamma energies in the range from 890 to 1,110 keV to include all three photopeak energies. The emission yields of these gamma energies are low in comparison to that of U-235; however, the higher energy range potentially places the channel in a lower background region of the full natural background energy spectrum.

A.1.3 Gamma Dose Rate Measurements for Sample Shipping Compliance

Gamma dose rate surveys were performed using a portable Bicron Micro-Rem meter, calibrated within the past twelve months by the manufacturer to measure dose rate in mixed gamma energy fields. This instrument was used to measure dose rate emissions from samples prepared for shipment to the laboratories in accordance with Department of Transportation (DOT) regulatory compliance.

Although these samples have been demonstrated to come from locations exhibiting radionuclide concentrations well below the DOT exemption level for radioactive materials (2 nanocuries per gram), there are still requirements that dose rate (not exposure rate) levels emitted from shipping packages also must be below specified levels. Past experience with using exposure rate readings from NaI detectors (calibrated against Cs-137) for estimating dose rate values from soil matrices have resulted in overestimating the true dose rate values. Therefore, to avoid potentially unnecessary special packaging/labeling of soil sample shipments, it was decided to use a survey instrument that measures true dose rate, such as the Bicron Micro-Rem.

A.2 Portable Gamma Spectroscopy System

Mobile gamma spectroscopy (gamma-spec) system was used to remotely screen samples collected from the excavation. This system consisted of a 3" NaI coupled to a Princeton Electronic Systems (PES) Model PN-114 Portable Spectroscopy System.

The gamma-spec was energy calibrated using a range of gamma energies from multiple sealed gamma check sources (Ba-133m, Cs-137 and Co-60). There was no efficiency calibration source available; therefore, the system was only set up for qualitative (radionuclide identification) purposes.

A.3 Surface Contamination Measurements

Surface contamination measurements were performed using Ludlum Model 43-1-1 Dual Phosphor alpha/beta (α/β) Scintillator Probes calibrated to Ludlum Model 2360 Data Loggers. Bench/electronic calibrations were performed on this instrumentation by the manufacturer within the previous twelve months. Due to the sensitivity of these instruments to variations in survey geometry, geometry-specific efficiency calibrations were performed on-site.

The probe is a 75-cm² end-window detector that can be used for simultaneous and independent α/β surface contamination measurements on personnel, equipment/materials, building structure surfaces, etc. It can also be used in a fixed geometry counting stand for measuring contamination on removable surface swipes, air filter samples, etc.

A.4 Portable Instrumentation Operational Documentation

In order to assure proper operation of instrumentation used in the field for quantitative measurements, certain operational checks were performed. The operational checks included:

1. Annual Manufacturer's Calibration (all instruments) – verified for each instrument prior to first use.

2. Reliability Factor Procedure (all counting instruments) – evaluates the performance of a counting instrument with respect to standard counting statistics; performed prior to first use, and monthly or as deemed necessary.

3. Exposure Rate Procedure (all exposure rate measuring instruments) – evaluates the accuracy of an exposure rate measurement instrument; performed prior to first use, and monthly or as deemed necessary.

4. Source Checks Procedure (all instruments) – evaluates the performance of an instrument within an expected range; prior to day's first use, following extended day's use, and any time deemed necessary.

A.5 Radiation Measurement Instrumentation Summary

Table A-1 summarizes instrumentation used in the initial field investigation.

Table A-1

Radiation Measurement Instrumentation Summary Table

Instrumentation	Instrument		Probe		Calibration Date	Radiation Type	Use
	Model #	Serial #	Model #	Serial #			
Ludlum 3" NaI & Data Logger	2350-1	134742	44-20-1	PR167645	2/12/01	Gamma	Correlated field gamma measurements – shielded
Ludlum 3" NaI & Data Logger	2350-1	134764	44-20-1	PR164316	2/12/01	Gamma	Correlated field gamma measurements – shielded (backup)
Ludlum Micro-R Meter	12S	176124	N/A	N/A	12/11/01	Gamma	Field gamma measurements – unshielded
Ludlum Micro-R Meter	19		N/A	N/A		Gamma	Field gamma measurements – unshielded
BICRON Micro-Rem Meter	Micro-Rem	B990Y	N/A	N/A	2/15/01	Gamma	External dose rate measurements – shipping requirements
Ludlum Dual Phosphor Scintillator & Data Logger	2360	164329	43-1-1	PR157225	8/20/01	Alpha & Beta	Surface contamination surveys, swipe & filter measurements
Ludlum Dual Phosphor Scintillator & Data Logger	2360	164682	43-1-1	PR168658	7/3/01	Alpha & Beta	Surface contamination surveys, swipe & filter measurements

APPENDIX B

RADIATION AND SITE OPERATIONS HEALTH & SAFETY PROGRAM

There were five primary components of the radiation safety program including:

1. Personnel monitoring for external gamma dose as shown in Section B.1;

2. Personnel and site boundary monitoring for internal dose from airborne particulates as shown in Attachment B-1;

3. Baseline urine bioassays for isotopic uranium and thorium radionuclides as shown in Attachment B-2;

4. Personnel contamination monitoring as shown in Section B.4;

5. Equipment and materials surface contamination monitoring as shown in Attachment B-3, and

6. Site-specific Health and Safety program as shown in Attachment B.4.

B.1 Personnel Monitoring for External Gamma Dose

Landauer Luxel Optically-stimulated Luminescent Dosimetry (OSLD) badges were used to monitor all personnel at the Site. These badges were issued to all personnel for the duration of the work, with specific instructions to wear them on the front of the torso, on the outside of exterior clothing, at all times in the work area, then return to the specified storage location when not in use. The specified location was a cardboard box containing the control badge and all dosimetry documentation, which was located in the temporary health & safety office, where background radiation levels were observed to exist.

During the work periods, all workers were periodically checked (visually) to verify that badges were being properly worn. Visual observation verified that all workers were diligent in proper use of the badges.

Following completion of the work, all badges were collected, logged, and returned to the manufacturer for measurement and subsequent reporting. The results will basically only serve to verify if any worker received an external dose component in excess of the detection limits of the badge; the results should not be used to draw conclusions about the effectiveness or ineffectiveness of the radiation safety program, because 2½ days of exposure to environmental levels of residual external gamma radiation are hardly conclusive. Detailed evaluations may be approachable based on results from monthly monitoring during full-scale project operations.

B.2 Internal Dose Monitoring of Airborne Particulates

Breathing zone air samples (BZAS) were collected at three locations on the two full days of fieldwork (when excavation activities took place) to evaluate the presence, if any, of residual airborne particulates during work activities. These three locations included:

1. Upwind at the Site boundary;

2. Downwind at the Site boundary, and

3. In the breathing zone of the occupational worker scheduled to be in closest proximity of excavation activities for the greatest duration of time (maximally exposed individual).

B.2.1 Action Limit

The action limit used was 1E-12 microcuries per milliliter (1E-12 uCi/ml), which is the air effluent concentration value, for the anticipated chemical form of the contaminants, applicable to the assessment and control of dose to the general public for all three uranium radionuclides of interest (U-238, U-235, and U-234) (REF: 10 CFR 20,

Appendix B, Table 2, Column 1, Clearance Class W). This is a conservative value, especially because it applies to concentration levels averaged over an entire year, not just two days. If all samples exhibit levels below this limit, then concentrations in the breathing zones were below general public limits, and far below occupational limits (occupational limits are higher). If any of the occupational values exceed this general public limit, then it can be re-evaluated against the applicable occupational limit for less conservative, but more accurate results.

The following measurement parameters were used:

- Gross alpha activity was measured on each sample. The assumption was made that all alpha activity on a sample was attributed to the decay of uranium radionuclides; no credit was taken for the ingrowth of any subsequent alpha-emitting progeny. Therefore, contribution by any progeny would result in overestimating the uranium concentration, and would add to conservatism.

- Count time for the samples was determined by setting the minimum detectable concentration (MDC) equal to the action limit of 1E-12 uCi/ml. The count time was then solved for using the applicable MDC equation. The resulting count time to achieve the desired MDC was 83 minutes; therefore, the count times were set at 90 minutes for each sample.

B.2.2 Results

B.2.2.1 December 18, 2001 Samples

Three samples were collected on December 18, 2001 including 121801-01, 02, and 03. The concentrations of these samples were indistinguishable from background. This is based on the fact that the gross count for each collection sample was lower in value than the gross count for the BLANK. In other words, based on the breathing zone air measurement and subsequent sample counting techniques used, there were no measurable

residual concentrations of uranium particulate (or any alpha-emitting radionuclides for that matter) in any of the three zones monitored on December 18, 2001.

B.2.2.2 December 19, 2001 Samples

The results of samples collected on December 19, 2001 are described below.

Sample 121901-01: Measured concentration was 1.9E-14 uCi/ml, which is 1.9 percent of the 1E-12 action limit. This low positive value is well below the detection limit, and is most likely well within the variability of background for the applicable sample counting method. Therefore, based on the sample counting method, the residual concentrations at the sample collection location were indistinguishable from background.

Sample 121901-02: Measured concentration was 1.8E-13 uCi/ml, which is 18 percent of the 1E-12 action limit. This positive value is below the detection limit; however, it represents a value that is likely distinguishable from background if the sample was analyzed by more sensitive analytical techniques.

Sample 121901-03: Sample gross count was less than BLANK count; therefore, activity was indistinguishable from background.

The sample collection forms are included in Attachment B-1.

B.3 Baseline Urine Bioassays

Baseline urine bioassay samples were collected from all workers during the initial period of the pilot test. These samples were shipped to Severn Trent Laboratories (STL) in Richland, Washington for isotopic uranium and thorium analyses (Attachment B-2). The results show that most reported concentrations are below the associated detection limit values. All values that were higher than the detection limits (positive values) were in the range of typical values resulting from non-occupational exposure ambient levels of naturally occurring radionuclides. None of the positive results indicated any exposure to residual levels of associated radionuclides that may have resulted from Site activities.

The results of the baseline urine samples can be used to establish pre-operational concentrations of specified radionuclides detectable in urine. Subsequent samples should be collected during full-scale operations on a routine basis to assist in evaluating the effectiveness of the radiation safety program for controlling internal exposure.

B.4 Personnel Contamination Surveys

Personnel contamination monitoring was continuously performed at the egress point of the work area.

B.4.1 Survey Equipment

A Model 2360/43-1-1 Dual alpha/beta Scintillator detector with simultaneous audible and visual readouts of both alpha and beta activity levels was set up for personnel scans.

B.4.2 Action Limit

Typical standard industry action limits for residual contamination on personnel skin and clothing range from 22 dpm/100 cm^2 for alpha-emitters to 2,200 dpm/100 cm^2 for beta-emitters. Basically, all applicable limits represent count rate values that would be clearly distinguishable above associated background count rates for the given instrument. Therefore, for this initial investigation, the action limit was set as any count rate (alpha or beta) distinguishable above background during a thirty-second scan.

B.4.3 Scanning Procedure

The following steps were used in performing personnel and clothing scans.

1. All workers were required to scan prior to leaving the controlled access area.

2. Scans were performed by holding the probe window surface as close to the scanning surface as possible without making contact, then slowly moving the probe over the applicable surface area.

3. First scan was performed on hand and feet PPE. If cleared, they could be removed and set aside for future use; if distinguishable contamination identified, affected PPE were removed and discarded in radwaste container.

4. Second scan was performed on dry surface of palm of hands, then soles of footwear. If cleared, then worker could exit work area; any skin surface exhibiting detectable levels of contamination was surveyed in greater detail to determine the areal extent of contamination, then thoroughly decontaminated using soapy water and disposable paper towels.

5. Any decontaminated surfaces were allowed to completely dry prior to re-survey for clearance.

B.4.4 Results

The only detectable contamination was identified on the soles of outer footwear PPE surfaces. This was the case in approximately 10 to15 percent of surveys of PPE footwear used in the excavation area on soils. All contaminated footwear PPE were disposed of in radwaste container. No detectable contamination was identified on any hand-worn PPE, on bare hands, or on the soles of workers' footwear.

B.5 Equipment/Materials Contamination Surveys

Equipment/materials contamination surveys were performed on all potentially contaminated equipment and materials used in the work area following the completion of all work and thorough decontamination of all candidate equipment/materials.

B.5.1 Survey Equipment

A Model 2360/43-1-1 Dual alpha/beta Scintillator detector with simultaneous audible and visual readouts of both alpha and beta activity levels was set up for equipment/materials surveys.

B.5.2 Action Limit

The standard industry action limits for residual contamination on equipment and materials were used. These values were 5,000 dpm/100 cm^2 for total contamination and 1,000 dpm/100 cm^2 for removable contamination, based on radionuclides in the uranium decay series. The survey parameters were actually set up so that a two-minute scan for gross alpha activity could be used to quantify residual contamination levels below the removable contamination action limit of 1,000 dpm/100 cm^2. Therefore, any survey results that were below the removable action limit could be used to demonstrate that the surface of interest met unrestricted release criteria without the need for removable swipe measurements. However, if any direct measurement results indicated residual levels of contamination in excess of the removable action limit but below the total limit, removable swipe surveys could be used to quantify the removable component for further evaluation.

B.5.3 Scanning Procedure

The following steps were used in performing equipment/material surveys.

1. All candidate equipment/materials were thoroughly cleaned and dried prior to surveys.

2. Surveys were performed by holding the probe window surface as close to the scanning surface as possible without making contact, initiating a two-minute survey count, then slowly moving the probe over the applicable surface area (no more than ½ probe width per second).

3. The two-minute survey was used to quantify the total activity component over a surface area of no more than 1-m^2. Multiple surveys were performed on areas of interest larger than 1-m^2.

4. When the two-minute survey was complete, the alpha gross count value was compared to the value equal to the removable action limit. If the survey value was

lower, the surface was considered a candidate for unrestricted release; any surface exceeding the removable limit would actually be scheduled for more intense and focused decontamination.

5. Any decontaminated surfaces were allowed to completely dry prior to re-survey for clearance.

B.5.4 Applicable Equipment

All sampling and hand excavation equipment (hand shovels and trowels) were qualitatively scanned, found to be clean, and stored for future use at the Site. The only other equipment to be release surveyed included the backhoe used for excavation, and the concrete cutting saw.

B.5.5 Survey Results

The results of all surveys on the applicable equipment were well below the removable limit for unrestricted release (Attachment B-3). The highest residual reading was on inside of the backhoe bucket; this reading was less than 100 dpm/100 cm^2, which was less than 10 percent of the release limit. Subsequently, all equipment was released for unrestricted use.

APPENDIX B ATTACHMENTS

Attachment B-1

OSLD Badge Results

Breathing Zone Air Samples –

- **Sample Collection Form**
- **Sample Analysis Results**

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RADIATION DOSIMETRY REPORT

ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
171350	RMN	9700100003	02/06/02			1

PARTICIPANT NUMBER	NAME / ID NUMBER / BIRTH DATE / SEX	DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW: DEEP DDE	EYE LDE	SHALLOW SDE	YEAR TO DATE DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	LIFETIME DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	RECORDS FOR YEAR	INCEPTION DATE (MM/YY)
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00027	RIGGI J 131527311 03/25/1959 M	P	WHBODY		M	M	M	M	M	M	M	M	M	1	01/02
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00029	AGOSTINELLI J 188482080 05/26/1957 F	P	WHBODY		M	M	M	M	M	M	M	M	M	1	01/02
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M: MINIMAL REPORTING SERVICE OF 1 MREM

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ACCOUNT NO.	SERIES CODE	ANALYTICAL WORK ORDER	REPORT DATE	DOSIMETER RECEIVED	REPORT TIME IN WORK DAYS	PAGE NO.
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** LAST PAGE **

PARTICIPANT NUMBER	NAME / ID NUMBER / BIRTH DATE / SEX	DOSIMETER	USE	RADIATION QUALITY	DOSE EQUIVALENT (MREM) FOR PERIODS SHOWN BELOW: DEEP DDE	EYE LDE	SHALLOW SDE	YEAR TO DATE DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	LIFETIME DOSE EQUIVALENT (MREM): DEEP DDE	EYE LDE	SHALLOW SDE	RECORDS FOR YEAR	INCEPTION DATE (MM/YY)
[illegible]															
00031	BORGHESE S 488756305 03/07/1972 M	P	WHBODY		M	M	M	M	M	M	M	M	M	1	01/02

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GENERAL INFORMATION

ANNUAL RADIATION EXPOSURE LIMITS

Whole body, blood forming organs, gonads:	5,000 mrem/yr
Lens of eye:	15,000 mrem/yr
Extremities and skin:	50,000 mrem/yr
Fetal:	500 mrem/gestation period
General Public:	100 mrem/yr

Based on USNRC Regulations, Title 10, Part 20, Code of Regulations and adopted by many states. Certain states and other regulatory agencies may adhere to different limits.

CONTROL DOSIMETER: A control dosimeter (master control and/or series control) is included with each shipment of dosimeters for monitoring radiation exposure received during transit. At the customer's facility, the control should be stored in a radiation free area during the wear period.

MINIMAL DOSE EQUIVALENT REPORTED: Dose equivalents below the minimum measurable quantity for the current monitoring period are recorded as "M". The minimal reporting levels vary according to the dosimeter type and radiation quality as follows:

x-ray,gamma:	1 mrem
beta:	10 mrem
neutron:	20 mrem fast, 10 mrem thermal
fetal:	1 mrem
rings:	30 mrem

RING BADGE READING: Ring badge readings are reported as a shallow dose.

SPECIAL CALCULATIONS: Special dose calculations can be applied to radiation workers who wear lead aprons.

1) EDE 1 - two dosimeters: 1 dosimeter worn at waist level under lead apron and 1 dosimeter worn at collar level outside lead apron.
   1.5 (Waist) + 0.04 (Collar) = Assigned Deep Dose
2) EDE 2 - one dosimeter: 1 dosimeter worn outside lead apron.
   0.30 (Whole Body Badge) = Assigned Deep Dose

The "ASSIGNED" line will follow all of the original whole body dosimeter doses with the EDE 1 or EDE 2 calculation results or Landauer's standard dose assessment protocol (deep and shallow whole body dose from the highest reading whole body badge, lens dose from badge closest to the eye).

FETAL BADGE: A declared pregnant worker will possess a fetal exposure on an extra page of the report, based upon the whole body badge being worn closest to the fetus. The dose assigned to the fetus will be kept for current wear period, estimated dose from conception to declaration (if provided by customer), and total dose from conception to present.

EXPOSURE REPORT INFORMATION

The reported information for each participant will be a two-line minimum as follows:

FIRST LINE EXPLANATION

Participant number: Unique number assigned by Landauer.

Name: To whom the dosimeter is assigned.

Dosimeter: Badge type according to radiation monitoring needs:

- P Luxel: x-ray, beta, gamma
- J Luxel: x-ray, beta, gamma, fast neutron
- T Luxel: x-ray, beta, gamma, fast and thermal neutron
- U Ring: TLD 100
- W Escort
- I Neutrak ER (intermediate and fast neutron)
- N Neutrak 144 (fast neutron)

Use: Refers to the use or location of the body for which the dose is given.

Code	Location	Abbr	Code	Location	Abbr
1	Whole Body(chest)	WHBODY	12	Left Ankle	LANKLE
2	Eye	EYE	13	Collar	COLLAR
3	Right Ring	RFINGR	14	Waist	WAIST
4	Left Ring	LFINGR	15	U Back	UPBACK
5	Right Wrist	RWRIST	16	L Back	LWBACK
6	Left Wrist	LWRIST	17	Fetal	FETAL
7	Right U Arm	RUARM	18	Control	CNTRL
8	Left U Arm	LUARM	19	Area Monitor	AREA
9	Right U Leg	RULEG	20	Other Extrem	OEXTRM
10	Left U Leg	LULEG	21	Other Whole Body	OWHBDY
11	Right Ankle	RANKLE	22	Special Purpose	SPECL

Radiation Quality: Types and energies of radiation contributing to whole body dose equivalent.

P: x-ray or gamma exposure	PH: greater than 100 keV PL: less than 100 keV
PB: photon, beta mixture	BT: thallium beta BU: uranium beta BS: strontium beta BK: krypton beta
PN: photon, neutron mixture	NF: fast neutron exposure NT: thermal neutron exposure

Dosimeter Results: Deep, eye and shallow dose equivalents - Deep dose equivalent applies to external whole body exposure at a tissue depth of 1 cm (1000 mg/cm2). Eye dose equivalent applies to external exposure of the lens at a tissue depth of 0.3 cm (300 mg/cm2). Shallow dose equivalent applies to the external exposure of the skin or extremity at a tissue depth of 0.007 cm (7 mg/cm2) averaged over an area 1 cm2. Deep, eye and shallow dose equivalents are reported for the time frame indicated by "For Monitoring Period" indicating by separate lines the individual radiation component results and combined totals. Quarterly accumulated results total doses received within the calendar 3-month time frame. Note: Quarterly accumulated columns will either be eliminated for bi-monthly service or will display "Not applicable". Year-to-date accumulation will total doses received from the beginning of the current year to present date. Lifetime accumulation totals all doses received from inception date of badge service to present date. Internal exposure, if applicable, will be summed with Landauer external dose equivalents. Total effective dose equivalent is the sum of both deep dose equivalent (external exposure) and committed effective dose (internal exposure).

Records for year: The number of times that a participant's name has appeared on Landauer reports during current year, including absentee reports and corrections.

Inception date: The date Landauer began keeping dosimeter records for a given dosimeter for a badging participant on the current account.

SECOND LINE EXPLANATION

Participant's personal information consisting of ID number, birthdate and sex. This information can be suppressed on "Duplicate Reports" for privacy and/or posting needs.

Notes: Text messages explaining any abnormalities or comments. The note will appear on a separate line below all dosimeter exposure information.

* Thermal neutron not NVLAP accredited

Landauer, Inc. 2 Science Road Glenwood, Illinois 60425-1586 Telephone: (800) 323-8830 Facsimile: (708) 755-7016

AIR MONITORING AND SAMPLING RESULTS- Former Sylvania Facility, Hicksville, NY

Summary:
Envirocon conducted air monitoring and sampling during the Pilot Test Excavation Project to determine the potential exposure hazards involved with performing remedial work at the site. All readings and levels were below allowable safe exposure levels.

Introduction:
Envirocon conducted a Pilot Test Excavation Project at the former Sylvania Electric Products facility. The pilot test excavation was performed to clarify the level, delineation, and extent of chemical and radiological contamination beneath the current building slab at the site. A former nuclear fuel fabrication facility, the site is currently being studied in preparation for remediation by URS on behalf of GTEOSI, a successor company to Sylvania.

During the pilot test excavation, the following air monitoring and sampling were conducted:

- Photoionization Detector (PID) and Flame Ionization Detector (FID) monitoring for volatile organic compounds (VOCs)
- Monitoring for carbon monoxide (CO)
- Monitoring for Total Particulate
- Integrated Air Sampling for alpha-emitting radionuclide particulates
- Integrated Air Sampling for tetrachloroethylene, trichloroethylene, and benzene

Locations sampled are indicated in the accompanying map (marked-up plate 3). Sampling and monitoring sheets are included.

Results:
The results are summarized as follows:

- Ambient air PID readings during the Pilot Test Excavation Project ranged from a background of 0.2ppm to 0.6ppm total VOCs. Ambient air FID readings ranged from a background of 1.1ppm to 2.1ppm total VOCs. There were no ambient air readings above these background levels either in the work area or upwind or downwind of the work area. Headspace samples above excavated soils in the work area (readings taken <1" above the excavated soils) ranged from background to 25ppm.

- Carbon monoxide (CO) readings inside the work area (inside the building) ranged from less than 1ppm to 18ppm (gas-powered saw cutting of concrete).

- Total Particulate readings upwind of the work area (west of the building and adjacent to Cantiague Rock Road) ranged from 0.003 mg/m^3 to 0.032 mg/m^3. This establishes the background concentration. Work area readings ranged from 0.015 mg/m^3 to 0.269 mg/m^3. A steadily building level of diesel exhaust particulate from the tractor-loader-backhoe used for excavation in the building exaggerated these readings in the work zone. Actual particulate readings exclusive of diesel exhaust would have been lower. Downwind readings ranged from 0.003 mg/m^3 to 0.032 mg/m^3. This indicates that no particulate emissions from the work area above background were measured at any time during the Pilot Test Excavation.

- Integrated Air Sampling for alpha-emitting radionuclide particulates, including uranium- 238 (U-238), U-235, and U-234 was conducted and the samples evaluated for compliance with a general public exposure action limit of 1E-12 microcuries per milliliter (uCi/ml) of air sampled. Area samples were taken upwind and downwind of the work area, and personal exposure samples were taken on workers in the work area. On 12/18, samples taken upwind, downwind, and in the work area exhibited no

measurable activity above background. On 12/19, the upwind sample had a measured concentration of 1.9E-14 uCi/ml, which is approximately 1.9% of the action limit for allowable exposure to the general public. Because the amount of activity is so low, it is not statistically significant. This sample was an upwind sample, and much farther from the work area than the downwind sample (see location map) that exhibited no activity, so had it been a significant amount, it is also possible that this reading reflected local background levels, or sample contamination subsequent to the sampling event. The worker breathing zone sample, taken on a worker who worked 8 hours inside the work zone, had a measured concentration of 1.8E-13 uCi/ml, which is 18% of the allowable exposure to the public, and a much smaller percentage of the allowable occupational exposure limit. The downwind sample had no measurable activity above background. These results indicate that no radioactivity in any significant detectable amount was released to the environment during the Pilot Test Excavation.

- Integrated Air Sampling for tetrachloroethylene, trichloroethylene, and benzene was conducted as personal breathing zone samples on workers in the work zone, and the samples sent to a laboratory to be evaluated for compliance with occupational action levels for the respective chemicals. All samples were below the limit of detection for PCE, TCE, and benzene.

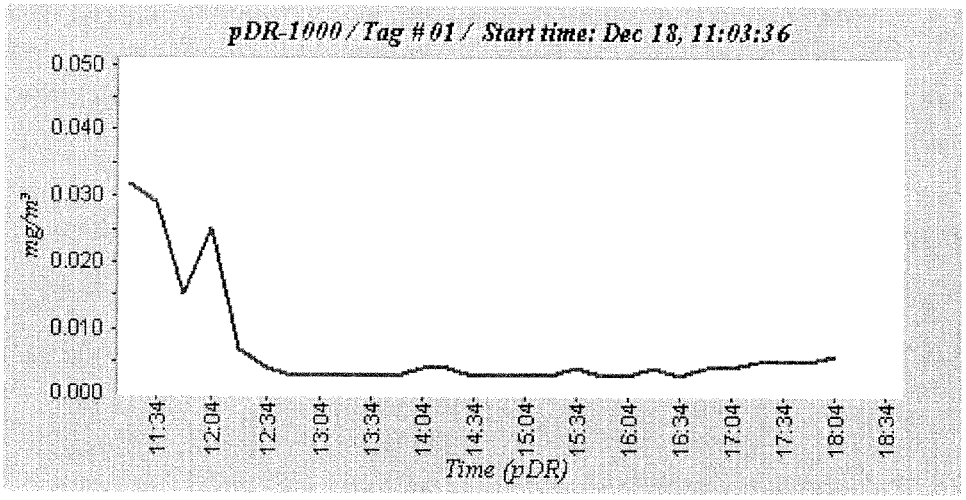
Conclusions:

The air monitoring and sampling results from the Pilot Test Excavation indicate that the work practices and protective equipment used during this work were sufficient to protect both workers and members of the public from exposure to chemical or radiological agents above established safe levels. This validates the approach utilized in the both the pilot excavation work plan and the pilot excavation health and safety plan and establishes the appropriateness of using them, as amended, for the remedial work to follow.

December 18, 2001 – 001 (upwind)

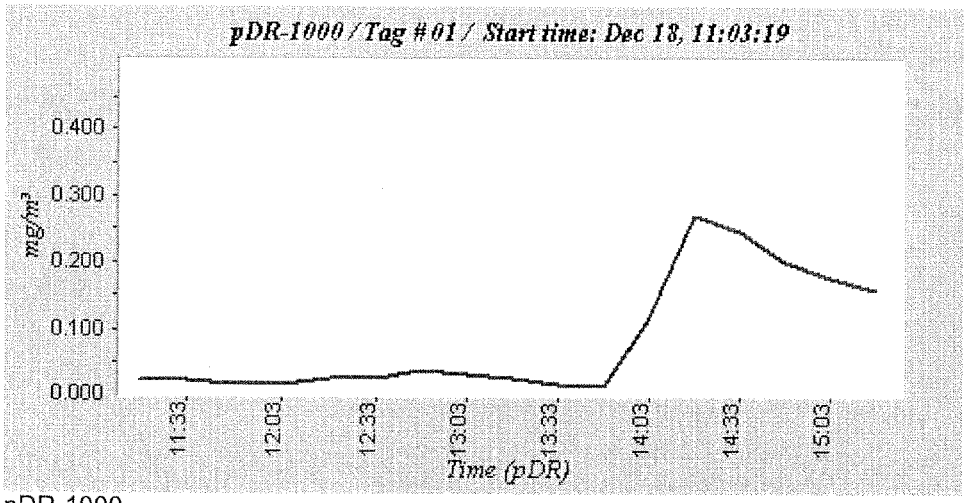
pDR-1000
User ID: 02347
Tag Number: 01
Number of logged points: 28
Start time and date: 11:03:36 18-Dec
Elapsed time: 07:00:00
Logging period (sec): 900
Calibration Factor (%): 100
Max Display Concentration: 0.237 mg/m³
Time at maximum: 11:10:45 Dec 18
Max STEL Concentration: 0.033 mg/m³
Time at max STEL: 11:19:40 Dec 18
Overall Avg Conc: 0.007 mg/m³
Logged Data:

Point	Date	Time	Avg.(mg/m³)
1	18 Dec	11:18:36	0.032
2	18 Dec	11:33:36	0.029
3	18 Dec	11:48:36	0.015
4	18 Dec	12:03:36	0.025
5	18 Dec	12:18:36	0.007
6	18 Dec	12:33:36	0.004
7	18 Dec	12:48:36	0.003
8	18 Dec	13:03:36	0.003
9	18 Dec	13:18:36	0.003
10	18 Dec	13:33:36	0.003
11	18 Dec	13:48:36	0.003
12	18 Dec	14:03:36	0.004
13	18 Dec	14:18:36	0.004
14	18 Dec	14:33:36	0.003
15	18 Dec	14:48:36	0.003
16	18 Dec	15:03:36	0.003
17	18 Dec	15:18:36	0.003
18	18 Dec	15:33:36	0.004
19	18 Dec	15:48:36	0.003
20	18 Dec	16:03:36	0.003
21	18 Dec	16:18:36	0.004
22	18 Dec	16:33:36	0.003
23	18 Dec	16:48:36	0.004
24	18 Dec	17:03:36	0.004
25	18 Dec	17:18:36	0.005
26	18 Dec	17:33:36	0.005
27	18 Dec	17:48:36	0.005
28	18 Dec	18:03:36	0.006

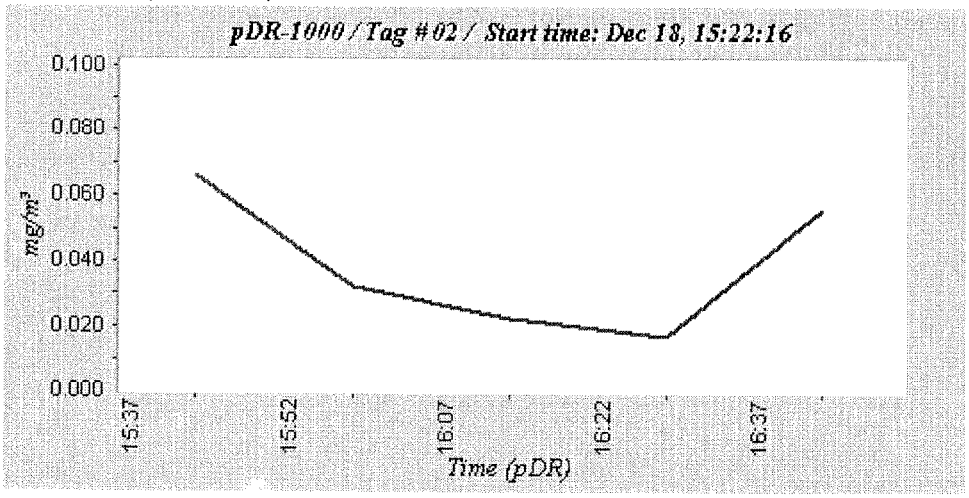


December 18, 2001-002 (work area)
pDR-1000
User ID: 02347
Tag Number: 01
Number of logged points: 17
Start time and date: 11:03:19 18-Dec
Elapsed time: 04:15:00
Logging period (sec): 900
Calibration Factor (%): 100
Max Display Concentration: 0.529 mg/m³
Time at maximum: 14:11:00 Dec 18
Max STEL Concentration: 0.269 mg/m³
Time at max STEL: 14:18:19 Dec 18
Overall Avg Conc: 0.084 mg/m³
Logged Data:

Point	Date	Time	Avg.(mg/m³)
1	18 Dec	11:18:19	0.022
2	18 Dec	11:33:19	0.023
3	18 Dec	11:48:19	0.016
4	18 Dec	12:03:19	0.016
5	18 Dec	12:18:19	0.026
6	18 Dec	12:33:19	0.026
7	18 Dec	12:48:19	0.037
8	18 Dec	13:03:19	0.032
9	18 Dec	13:18:19	0.026
10	18 Dec	13:33:19	0.016
11	18 Dec	13:48:19	0.015
12	18 Dec	14:03:19	0.116
13	18 Dec	14:18:19	0.269
14	18 Dec	14:33:19	0.245
15	18 Dec	14:48:19	0.200
16	18 Dec	15:03:19	0.175
17	18 Dec	15:18:19	0.156



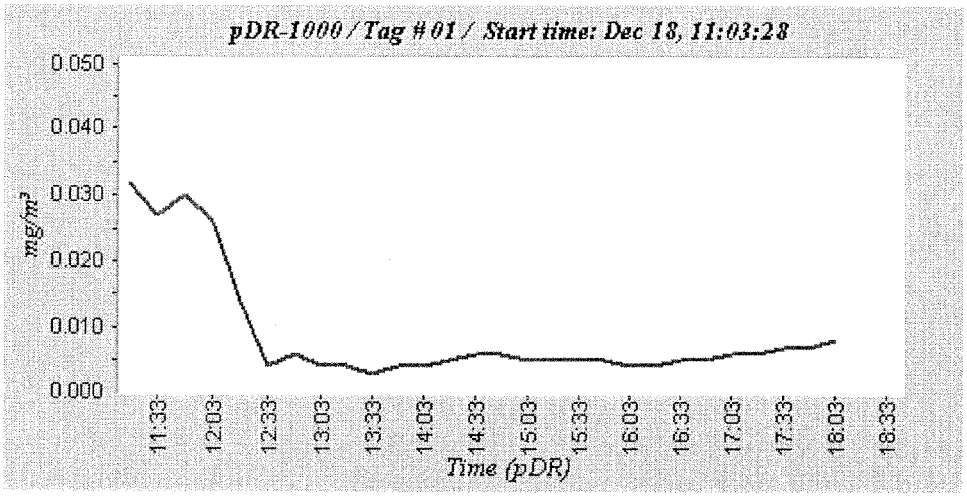
pDR-1000
User ID: 02347
Tag Number: 02
Number of logged points: 5
Start time and date: 15:22:16 18-Dec
Elapsed time: 01:15:00
Logging period (sec): 900
Calibration Factor (%): 100
Max Display Concentration: 0.715 mg/m³
Time at maximum: 15:22:33 Dec 18
Max STEL Concentration: 0.065 mg/m³
Time at max STEL: 15:37:16 Dec 18
Overall Avg Conc: 0.040 mg/m³
Logged Data:
Point, Date , Time , Avg.(mg/m³)
1, 18 Dec, 15:37:16, 0.066
2, 18 Dec, 15:52:16, 0.032
3, 18 Dec, 16:07:16, 0.022
4, 18 Dec, 16:22:16, 0.017
5, 18 Dec, 16:37:16, 0.056



December 18, 2001 – 003 (downwind)
pDR-1000
User ID: 02347

Tag Number: 01
Number of logged points: 28
Start time and date: 11:03:28 18-Dec
Elapsed time: 07:00:00
Logging period (sec): 900
Calibration Factor (%): 100
Max Display Concentration: 0.167 mg/m³
Time at maximum: 11:43:10 Dec 18
Max STEL Concentration: 0.033 mg/m³
Time at max STEL: 11:19:32 Dec 18
Overall Avg Conc: 0.009 mg/m³
Logged Data:

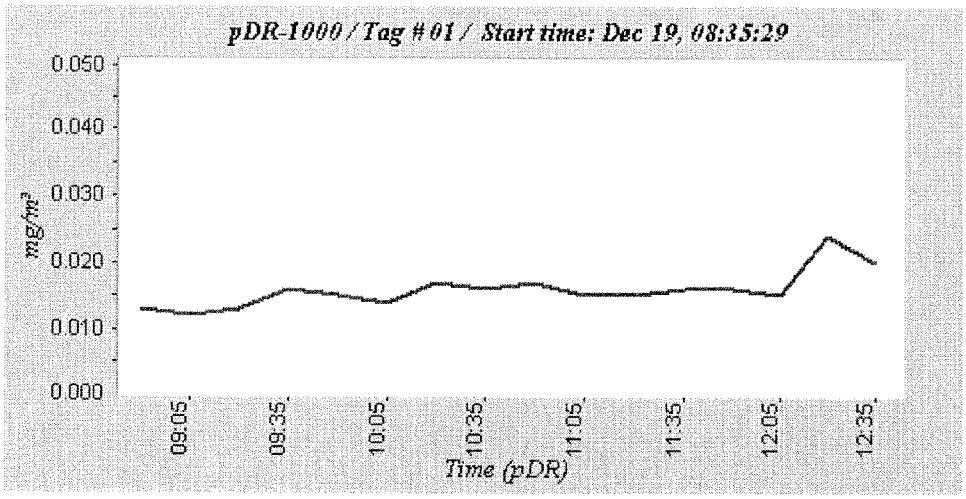
Point	Date	Time	Avg.(mg/m³)
1	18 Dec	11:18:28	0.032
2	18 Dec	11:33:28	0.027
3	18 Dec	11:48:28	0.030
4	18 Dec	12:03:28	0.026
5	18 Dec	12:18:28	0.014
6	18 Dec	12:33:28	0.004
7	18 Dec	12:48:28	0.006
8	18 Dec	13:03:28	0.004
9	18 Dec	13:18:28	0.004
10	18 Dec	13:33:28	0.003
11	18 Dec	13:48:28	0.004
12	18 Dec	14:03:28	0.004
13	18 Dec	14:18:28	0.005
14	18 Dec	14:33:28	0.006
15	18 Dec	14:48:28	0.006
16	18 Dec	15:03:28	0.005
17	18 Dec	15:18:28	0.005
18	18 Dec	15:33:28	0.005
19	18 Dec	15:48:28	0.005
20	18 Dec	16:03:28	0.004
21	18 Dec	16:18:28	0.004
22	18 Dec	16:33:28	0.005
23	18 Dec	16:48:28	0.005
24	18 Dec	17:03:28	0.006
25	18 Dec	17:18:28	0.006
26	18 Dec	17:33:28	0.007
27	18 Dec	17:48:28	0.007
28	18 Dec	18:03:28	0.008



December 19, 2001 – 001 (upwind)

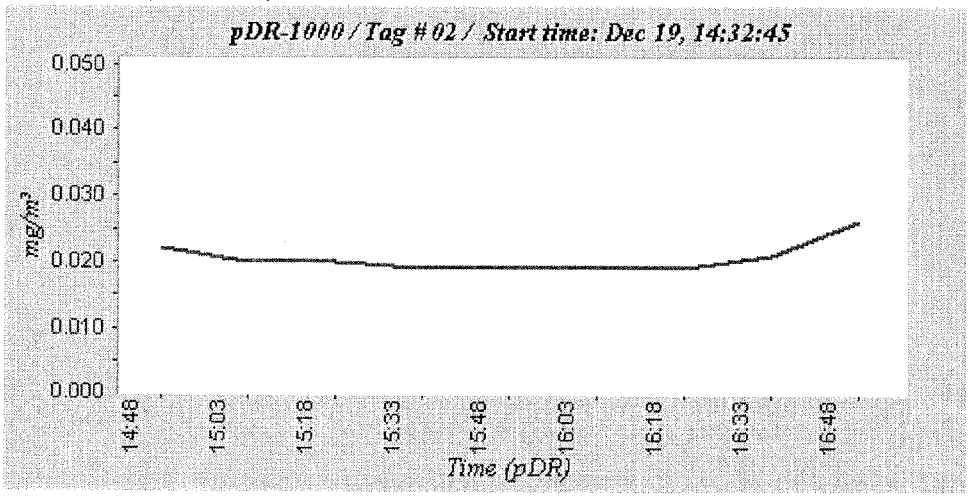
pDR-1000
User ID: 02347
Tag Number: 01
Number of logged points: 16
Start time and date: 08:35:29 19-Dec
Elapsed time: 04:00:00
Logging period (sec): 900
Calibration Factor (%): 100
Max Display Concentration: 0.563 mg/m³
Time at maximum: 12:06:10 Dec 19
Max STEL Concentration: 0.024 mg/m³
Time at max STEL: 12:19:45 Dec 19
Overall Avg Conc: 0.016 mg/m³
Logged Data:

Point	Date	Time	Avg.(mg/m³)
1	19 Dec	08:50:29	0.013
2	19 Dec	09:05:29	0.012
3	19 Dec	09:20:29	0.013
4	19 Dec	09:35:29	0.016
5	19 Dec	09:50:29	0.015
6	19 Dec	10:05:29	0.014
7	19 Dec	10:20:29	0.017
8	19 Dec	10:35:29	0.016
9	19 Dec	10:50:29	0.017
10	19 Dec	11:05:29	0.015
11	19 Dec	11:20:29	0.015
12	19 Dec	11:35:29	0.016
13	19 Dec	11:50:29	0.016
14	19 Dec	12:05:29	0.015
15	19 Dec	12:20:29	0.024
16	19 Dec	12:35:29	0.020



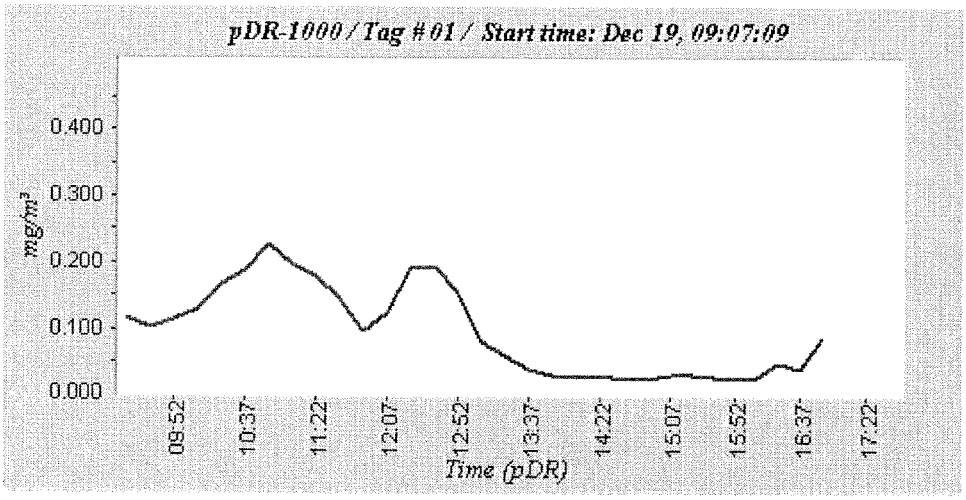
User ID: 02347
Tag Number: 02
Number of logged points: 9
Start time and date: 14:32:45 19-Dec
Elapsed time: 02:15:00
Logging period (sec): 900
Calibration Factor (%): 100
Max Display Concentration: 0.166 mg/m³
Time at maximum: 14:34:30 Dec 19
Max STEL Concentration: 0.028 mg/m³
Time at max STEL: 16:53:26 Dec 19
Overall Avg Conc: 0.021 mg/m³
Logged Data:

Point, Date , Time , Avg.(mg/m³)
1, 19 Dec, 14:47:45, 0.022
2, 19 Dec, 15:02:45, 0.020
3, 19 Dec, 15:17:45, 0.020
4, 19 Dec, 15:32:45, 0.019
5, 19 Dec, 15:47:45, 0.019
6, 19 Dec, 16:02:45, 0.019
7, 19 Dec, 16:17:45, 0.019
8, 19 Dec, 16:32:45, 0.021
9, 19 Dec, 16:47:45, 0.026



December 19, 2001 –002 (work area)
pDR-1000
User ID: 02347
Tag Number: 01
Number of logged points: 31
Start time and date: 09:07:09 19-Dec
Elapsed time: 07:45:00
Logging period (sec): 900
Calibration Factor (%): 100
Max Display Concentration: 0.813 mg/m³
Time at maximum: 10:30:40 Dec 19
Max STEL Concentration: 0.229 mg/m³
Time at max STEL: 10:53:39 Dec 19
Overall Avg Conc: 0.095 mg/m³
Logged Data:

Point	Date	Time	Avg.(mg/m³)
1	19 Dec	09:22:09	0.117
2	19 Dec	09:37:09	0.102
3	19 Dec	09:52:09	0.115
4	19 Dec	10:07:09	0.130
5	19 Dec	10:22:09	0.165
6	19 Dec	10:37:09	0.186
7	19 Dec	10:52:09	0.226
8	19 Dec	11:07:09	0.198
9	19 Dec	11:22:09	0.179
10	19 Dec	11:37:09	0.144
11	19 Dec	11:52:09	0.095
12	19 Dec	12:07:09	0.123
13	19 Dec	12:22:09	0.191
14	19 Dec	12:37:09	0.195
15	19 Dec	12:52:09	0.153
16	19 Dec	13:07:09	0.081
17	19 Dec	13:22:09	0.060
18	19 Dec	13:37:09	0.037
19	19 Dec	13:52:09	0.030
20	19 Dec	14:07:09	0.025
21	19 Dec	14:22:09	0.030
22	19 Dec	14:37:09	0.024
23	19 Dec	14:52:09	0.023
24	19 Dec	15:07:09	0.029
25	19 Dec	15:22:09	0.030
26	19 Dec	15:37:09	0.027
27	19 Dec	15:52:09	0.023
28	19 Dec	16:07:09	0.026
29	19 Dec	16:22:09	0.046
30	19 Dec	16:37:09	0.038
31	19 Dec	16:52:09	0.087

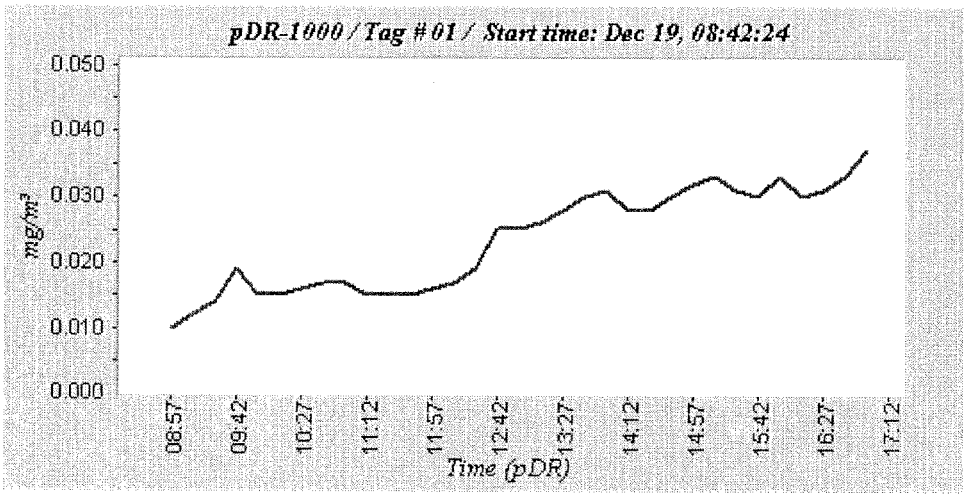


December 19, 2001 – 003 (downwind)

pDR-1000
User ID: 02347
Tag Number: 01
Number of logged points: 33
Start time and date: 08:42:24 19-Dec
Elapsed time: 08:15:00
Logging period (sec): 900
Calibration Factor (%): 100
Max Display Concentration: 0.266 mg/m³
Time at maximum: 16:59:01 Dec 19
Max STEL Concentration: 0.039 mg/m³
Time at max STEL: 16:58:58 Dec 19
Overall Avg Conc: 0.024 mg/m³
Logged Data:

Point	Date	Time	Avg.(mg/m³)
1	19 Dec	08:57:24	0.010
2	19 Dec	09:12:24	0.012
3	19 Dec	09:27:24	0.014
4	19 Dec	09:42:24	0.019
5	19 Dec	09:57:24	0.015
6	19 Dec	10:12:24	0.015
7	19 Dec	10:27:24	0.016
8	19 Dec	10:42:24	0.017
9	19 Dec	10:57:24	0.017
10	19 Dec	11:12:24	0.015
11	19 Dec	11:27:24	0.015
12	19 Dec	11:42:24	0.015
13	19 Dec	11:57:24	0.016
14	19 Dec	12:12:24	0.017
15	19 Dec	12:27:24	0.019
16	19 Dec	12:42:24	0.025
17	19 Dec	12:57:24	0.025
18	19 Dec	13:12:24	0.026
19	19 Dec	13:27:24	0.028
20	19 Dec	13:42:24	0.030
21	19 Dec	13:57:24	0.031
22	19 Dec	14:12:24	0.028

23, 19 Dec, 14:27:24, 0.028
24, 19 Dec, 14:42:24, 0.030
25, 19 Dec, 14:57:24, 0.032
26, 19 Dec, 15:12:24, 0.033
27, 19 Dec, 15:27:24, 0.031
28, 19 Dec, 15:42:24, 0.030
29, 19 Dec, 15:57:24, 0.033
30, 19 Dec, 16:12:24, 0.030
31, 19 Dec, 16:27:24, 0.031
32, 19 Dec, 16:42:24, 0.033
33, 19 Dec, 16:57:24, 0.037



ENVIROCON
500 W Dutton's Mill Rd, Aston PA 19014
(610) 485-9732 FAX (610) 485-9728

Industrial Hygiene Sampling Form

DATE: 12/18/01 PROJECT: GTE-LI #: 14400

SAMPLE#: 121801-01 SAMP. BY: [signature]

~~AREA:~~ Upwind - Contagua Rock Rd.

ACTIVITY: Prep, Concrete Cutting

Personal Sample Information:

NAME: _____ SS#_____

TITLE: _____ PPE: _____

SHIFT: _____ EXPOS. HRS: _____ TOT. HRS.: _____

WEATHER: P. Cldy TEMP: 40 PRECIP: an 1" RH: 50%

CONTAMINANTS: *Radionuclides

RANGE: _____ COC#: _____

CALIBRATION DATA:

PRE:		POST:		AVG:		TOTAL	
TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME (min)	VOLUME (L)
1100	1.992		1.75		1.87	365	682.6

*Indistinguishable from Background

RESULTS: RAW: _____ CONC: _____ TWA: _____

REVIEWED WITH: _____ DATE: _____

REVIEWED BY: [signature] (signature) DATE: 12/31/01

ENVIROCON
500 W Dutton's Mill Rd, Aston PA 19014
(610) 485-9732 FAX (610) 485-9728

Industrial Hygiene Sampling Form

DATE: 12/18/01 PROJECT: GTE-LI #: 14400

SAMPLE#: 121801-02 SAMP. BY: [illegible]

~~AREA:~~ BZ.

ACTIVITY: Prep, Breaking/cutting Concrete.

Personal Sample Information:

NAME: Scott Vaughan SS# 346-50-3055

TITLE: Tech. PPE: D.

SHIFT: 1st EXPOS. HRS: 6.1 TOT. HRS.: 7.1

WEATHER: PCldy TEMP: 40 PRECIP: Am 1" RH: 50%

CONTAMINANTS: PCE, TCE, *Radionuclides

RANGE: _____ COC#: _____

CALIBRATION DATA:

PRE:		POST:		AVG:		TOTAL	
TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME (min)	VOLUME (L)
1100	2.013		1.961		1.987	430	854.4

*Indistinguishable

RESULTS: RAW: _____ CONC: from Background TWA: _____

REVIEWED WITH: _____ DATE: _____
(signature)

REVIEWED BY : [signature] DATE: 12/31/01
(signature)

ENVIROCON
500 W Dutton's Mill Rd, Aston PA 19014
(610) 485-9732 FAX (610) 485-9728

Industrial Hygiene Sampling Form

DATE: 12/18/01 PROJECT: GTE-CI #: 14400

SAMPLE#: 121801-03 SAMP. BY: Y.O.

AREA: Downwind - Rear of bldg.

ACTIVITY: Concrete cutting, prep.

Personal Sample Information:

NAME: _____ SS#_____

TITLE: _____ PPE: _____

SHIFT: _____ EXPOS. HRS: _____ TOT. HRS.: _____

WEATHER: P'Cldy TEMP: 40 PRECIP: Am-1" RH: 50%

CONTAMINANTS: *Radionuclides

RANGE: _____ COC#: _____

CALIBRATION DATA:

PRE:		POST:		AVG:		TOTAL	
TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME (min)	VOLUME (L)
1100	1,979		2,062		2,02	435	878.7
~~1079~~							

* Indistinguishable from Background

RESULTS: RAW: _____ CONC: _____ TWA: _____

REVIEWED WITH: _____ DATE: _____

REVIEWED BY : _____ (signature) DATE: 12/31/01
(signature)

ENVIROCON
500 W Dutton's Mill Rd, Aston PA 19014
(610) 485-9732 FAX (610) 485-9728

Industrial Hygiene Sampling Form

DATE: 12/19/01 PROJECT: GTE-LI #: 14400

SAMPLE#: 121901-01 SAMP. BY: _____

AREA: Pilot Test Excavation Area - upwind sample.

ACTIVITY: Excavation

Personal Sample Information:

NAME: N/A SS#_____

TITLE: _____ PPE: _____

SHIFT: _____ EXPOS. HRS: _____ TOT. HRS.: _____

WEATHER: Sunny TEMP: 40 PRECIP: 0 RH: 50?

CONTAMINANTS: *Radionuclides

RANGE: _____ COC#: _____

CALIBRATION DATA:

PRE:		POST:		AVG:		TOTAL	
TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME (min)	VOLUME (L)
0820	1.997		2.059		2.028	523	1061

RESULTS: RAW: _____ CONC: *1.9E-14 uCi/ml TWA: _____

REVIEWED WITH: _____ DATE: _____

REVIEWED BY: (signature) _____ DATE: 12/31/01
(signature)

ENVIROCON
500 W Dutton's Mill Rd, Aston PA 19014
(610) 485-9732 FAX (610) 485-9728

Industrial Hygiene Sampling Form

DATE: 12/19/01 PROJECT: Sylvania GTE-LI #: 14400

SAMPLE#: 121901-02 SAMP. BY: [signature]

AREA: Pilot Test Excavation Area

ACTIVITY: Excavation

Personal Sample Information:

NAME: Norman Clangan SS# 346-50-3055

TITLE: Tech PPE: Mod D.

SHIFT: am EXPOS. HRS: _____ TOT. HRS.: _____

WEATHER: Sunny TEMP: 40 PRECIP: 0 RH: _____

CONTAMINANTS: *Radionuclides

RANGE: _____ COC#: _____

CALIBRATION DATA:

PRE:		POST:		AVG:		TOTAL	
TIME	FLOW	TIME	FLOW	TIME	FLOW	TIME (min)	VOLUME (L)
0815	1.955		1.944		1.950	535	1043

RESULTS: RAW: _____ CONC: *1.8E-13 uCi/ml TWA: _____

REVIEWED WITH: _____ DATE: _____

REVIEWED BY : (signature) [signature] DATE: 12/31/01
(signature)

ENVIROCON

500 W Dutton's Mill Rd, Aston PA 19014
(610) 485-9732 FAX (610) 485-9728

Industrial Hygiene Sampling Form

DATE: 12/19/01 PROJECT: Sylvania GTELI #: 14400

SAMPLE#: 121907-03 SAMP. BY: [signature]

AREA: Pilot Test Excavation - Downwind Sample

ACTIVITY: Excavation

Personal Sample Information:

NAME: _____ SS# _____

TITLE: _____ PPE: _____

SHIFT: _____ EXPOS. HRS: _____ TOT. HRS.: _____

WEATHER: _____ TEMP: _____ PRECIP: _____ RH: _____

CONTAMINANTS: *Radionuclides. NOTE! Battery died and pump stopped working at about 400 minutes (estimated)

RANGE: _____ COC#: _____

CALIBRATION DATA:

PRE:		POST:		AVG:		TOTAL	
TIME	FLOW	~~TIME~~	FLOW	~~TIME~~	FLOW	TIME (min)	VOLUME (L)
0825	1.986		~~[illegible]~~ 1.44	—	1.72	400 (est)	688.

RESULTS: RAW: _____ CONC: *Indistinguishable from Background TWA: _____

REVIEWED WITH: _____ DATE: _____
(signature)

REVIEWED BY : [signature] DATE: 12/31/01
(signature)

Survey Data

Date: 12/30/01

Logbook Page 02

Number	Location <or> Equipment/Material Description, Serial#	Survey Type: Average Activity Scan (2 min) α	Average Activity Scan (2 min) β	Maximum Activity Static (2 min) α	Maximum Activity Static (2 min) β	~~1) Removable~~ → Breathing Zone; ~~3) Activity~~ → Air Sample; ~~3) Swipe~~ → Filter; ~~3) (5 min)~~ → (90 min) Gamma α	Gamma β	Comments Follow-up Actions Release Information
011	BLANK 121801-BLANK	N/A	N/A	N/A	N/A	213	N/A 20,566	— Inconsistent measurement & geometry conditions; re-count
012	121801-01					92	20,127	—
013	121801-02					92	20,150	—
014	121801-03					148	20,395	—
015	BLANK-REPEAT 121801-BLANK					158	20,593	—
016	BLANK 121901-BLANK					136	20,632	—
017	121901-01					137	20,595	—
018	121901-02					145	20,367	—
019	121901-03					105	20,211	—
020								

Attachment B-2

Baseline Urine Bioassay Analysis Results

Analytical Data Package Prepared For

Envirocon

GTE - Long Island, NY

Radiochemical Analysis By

STL Richland

2800 G.W. Way, Richland, Wa 99352, (509) 375-3131

Assigned Laboratory Code:

Data Package Contains 30 Pages

Report No.: 18641

SDG No.	Order No.	Client Sample ID (List Order)	Lot-Sa No.	Work Order	Report DB ID	Batch No.
19163		01-JR	J1L210266-1	EQ0DA1AA	9EQ0DA10	1361451
		01-JR	J1L210266-1	EQ0DA1AC	9EQ0DA10	1361452
		02-SB	J1L210266-2	EQ0DE1AA	9EQ0DE10	1361451
		02-SB	J1L210266-2	EQ0DE1AC	9EQ0DE10	1361452
		03-VD	J1L210266-3	EQ0DG1AA	9EQ0DG10	1361451
		03-VD	J1L210266-3	EQ0DG1AC	9EQ0DG10	1361452
		04-DE	J1L210266-4	EQ0DL1AA	9EQ0DL10	1361451
		04-DE	J1L210266-4	EQ0DL1AC	9EQ0DL10	1361452
		05-NC	J1L210266-5	EQ0DP1AA	9EQ0DP10	2014454
		05-NC	J1L210266-5	EQ0DP1AC	9EQ0DP10	2014455
		06-SV	J1L210266-6	EQ0DT1AA	9EQ0DT10	1361451
		06-SV	J1L210266-6	EQ0DT1AC	9EQ0DT10	1361452
		07-PC	J1L210266-7	EQ0DX1AA	9EQ0DX10	1361451
		07-PC	J1L210266-7	EQ0DX1AC	9EQ0DX10	1361452
		09-JR	J1L210266-8	EQ0D31AA	9EQ0D310	1361451
		09-JR	J1L210266-8	EQ0D31AC	9EQ0D310	1361452
		10-CM	J1L210266-9	EQ0D41AA	9EQ0D410	1361451
		10-CM	J1L210266-9	EQ0D41AC	9EQ0D410	1361452
		11-JA	J1L210266-10	EQ0D61AA	9EQ0D610	1361451
		11-JA	J1L210266-10	EQ0D61AC	9EQ0D610	1361452
		12-AL	J1L210266-11	EQ0D91AA	9EQ0D910	1361451
		12-AL	J1L210266-11	EQ0D91AC	9EQ0D910	1361452

SEVERN TRENT SERVICES

CERTIFICATE OF ANALYSIS

Envirocon
17301 West Colfax Ave. Suite 275
Golden CO 80401

January 23, 2002

Attention: Shane Brightwell

Date Received	:	December 21, 2001
Number of Samples	:	Eleven (11)
Sample Type	:	Urine
SDG Number	:	19163
Data Deliverable	:	Summary Report # 18641

I. Introduction

On December 21, 2001, the STL Richland Laboratory (STLR) received eleven urine samples for radiochemical analysis. The samples were assigned laboratory identification numbers that correspond to the Envirocon identification numbers as shown on the front page of the Analytical Data Package.

II. Analytical Results/Methodology

The analytical results for this report are presented by laboratory sample ID. Each set of data includes sample identification information; analytical results and the appropriate associated statistical errors.

The requested analysis was: **Alpha Spectrometry**
Sample preparation by method RICHRB5002
Isotopic uranium by method RICHRC5030/5039 (HASL 300)
Isotopic thorium by method RICHRB5006 (HASL 300)
Counting by method RICHRD0008

III. Quality Control

The analytical results for each analysis performed under this sample delivery group include a minimum of one Laboratory Control Sample (LCS) and one method (reagent) blank. Any exceptions have been noted in the "Comments" section.

Quality control and sample results are reported as pCi/Liter.

Calibrations for alpha spectrometry detectors are stable over extended periods. Background and check standards are run monthly. Efficiency checks are control charted. Only if the checks are outside the three sigma control limits are the efficiencies changed. These data remain on file at STL and are available upon request.

IV. Comments

Samples were split for analysis. Half of each sample was taken for each analysis. Sample 05-NC became separated from the remaining samples in the batch due to a laboratory mis-communication. That sample was run in a separate batch.

Alpha Spectrometry

Isotopic uranium by method RICHRC5030
The analysis progressed according to procedure. Sample, blank and LCS performance was within analytical specifications.

Isotopic Thorium by method RICHRB5006
The analysis progressed according to procedure. Sample, blank and LCS performance was within analytical specifications.

Release of the data contained in this hard copy data package has been authorized by the Laboratory Manager or a designee, as verified by the following signature.

Reviewed and approved:

Lee Scott, Project Manager

Sample Results Summary

STL Richland

Ordered by Client Sample ID, Batch No.

Date: 23-Jan-02

Report No. : 18641

SDG No: 19163

Client ID	Work Order Number	Parameter	Result +- Uncertainty	Qual	Units	Yield	MDC|MDA	RER
01-JR	EQ0DA1AA	U-234	1.09E-02 +- 1.1E-02 (2s)	J	pCi/L	66.90%	7.36E-03	
		U-235	0.00E+00 +- 6.7E-03 (2s)	U	pCi/L	66.90%	7.36E-03	
		U-238	2.72E-03 +- 5.5E-03 (2s)	U	pCi/L	66.90%	7.36E-03	
01-JR	EQ0DA1AC	TH-228	3.25E-02 +- 3.0E-02 (2s)	U	pCi/L	73.20%	4.31E-02	
		TH-230	-1.80E-03 +- 3.6E-03 (2s)	U	pCi/L	73.20%	2.54E-02	
		TH-232	4.50E-03 +- 9.1E-03 (2s)	U	pCi/L	73.20%	1.22E-02	
02-SB	EQ0DE1AA	U-234	1.75E-02 +- 1.4E-02 (2s)	J	pCi/L	62.01%	1.30E-02	
		U-235	2.30E-03 +- 4.6E-03 (2s)	U	pCi/L	62.01%	6.23E-03	
		U-238	2.76E-02 +- 1.7E-02 (2s)	J	pCi/L	62.01%	6.23E-03	
02-SB	EQ0DE1AC	TH-228	1.11E-02 +- 2.2E-02 (2s)	U	pCi/L	75.15%	4.46E-02	
		TH-230	-2.52E-03 +- 3.6E-03 (2s)	U	pCi/L	75.15%	2.17E-02	
		TH-232	0.00E+00 +- 7.7E-03 (2s)	U	pCi/L	75.15%	8.55E-03	
03-VD	EQ0DG1AA	U-234	-1.15E-03 +- 2.3E-03 (2s)	U	pCi/L	66.41%	1.63E-02	
		U-235	0.00E+00 +- 7.1E-03 (2s)	U	pCi/L	66.41%	7.81E-03	
		U-238	2.88E-03 +- 5.8E-03 (2s)	U	pCi/L	66.41%	7.81E-03	
03-VD	EQ0DG1AC	TH-228	-2.31E-03 +- 2.8E-02 (2s)	U	pCi/L	61.11%	7.21E-02	
		TH-230	5.61E-03 +- 1.1E-02 (2s)	U	pCi/L	61.11%	1.52E-02	
		TH-232	3.36E-03 +- 1.2E-02 (2s)	U	pCi/L	61.11%	3.17E-02	
04-DE	EQ0DL1AA	U-234	2.96E-02 +- 1.8E-02 (2s)	J	pCi/L	62.52%	6.68E-03	
		U-235	0.00E+00 +- 6.0E-03 (2s)	U	pCi/L	62.52%	6.68E-03	
		U-238	2.12E-02 +- 1.6E-02 (2s)	J	pCi/L	62.52%	1.39E-02	
04-DE	EQ0DL1AC	TH-228	-1.51E-03 +- 1.3E-02 (2s)	U	pCi/L	65.43%	3.73E-02	
		TH-230	3.65E-03 +- 7.3E-03 (2s)	U	pCi/L	65.43%	9.88E-03	
		TH-232	3.65E-03 +- 7.3E-03 (2s)	U	pCi/L	65.43%	9.88E-03	
05-NC	EQ0DP1AA	U-234	4.73E-02 +- 4.3E-02 (2s)	J	pCi/L	69.88%	2.57E-02	
		U-235	9.47E-03 +- 1.9E-02 (2s)	U	pCi/L	69.88%	2.57E-02	
		U-238	1.89E-02 +- 2.7E-02 (2s)	U	pCi/L	69.88%	2.57E-02	
05-NC	EQ0DP1AC	TH-228	-4.75E-02 +- 5.5E-02 (2s)	U	pCi/L	68.20%	1.81E-01	
		TH-230	-7.62E-03 +- 3.3E-02 (2s)	U	pCi/L	68.20%	1.09E-01	
		TH-232	1.01E-02 +- 5.8E-02 (2s)	U	pCi/L	68.20%	1.40E-01	
06-SV	EQ0DT1AA	U-234	1.24E-02 +- 1.7E-02 (2s)	U	pCi/L	70.65%	2.69E-02	
		U-235	-1.90E-03 +- 3.8E-03 (2s)	U	pCi/L	70.65%	2.69E-02	
		U-238	0.00E+00 +- 1.2E-02 (2s)	U	pCi/L	70.65%	1.29E-02	

STL Richland

rptSTLRchSaSum V3.81 A97

RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify

Sample Results Summary

STL Richland

Ordered by Client Sample ID, Batch No.

Date: 23-Jan-02

Report No. : 18641

SDG No: 19163

Client ID	Work Order Number	Parameter	Result +- Uncertainty	Qual	Units	Yield	MDC|MDA	RER
06-SV	EQ0DT1AC	TH-228	4.48E-02 +- 5.3E-02 (2s)	U	pCi/L	75.76%	9.04E-02	
		TH-230	1.34E-02 +- 2.5E-02 (2s)	U	pCi/L	75.76%	4.72E-02	
		TH-232	1.34E-02 +- 2.5E-02 (2s)	U	pCi/L	75.76%	4.72E-02	
07-PC	EQ0DX1AA	U-234	6.51E-03 +- 9.0E-03 (2s)	U	pCi/L	67.72%	1.41E-02	
		U-235	-3.00E-03 +- 3.5E-03 (2s)	U	pCi/L	67.72%	1.95E-02	
		U-238	3.00E-03 +- 7.7E-03 (2s)	U	pCi/L	67.72%	1.72E-02	
07-PC	EQ0DX1AC	TH-228	1.13E-02 +- 1.6E-02 (2s)	U	pCi/L	57.72%	2.45E-02	
		TH-230	-1.68E-03 +- 3.4E-03 (2s)	U	pCi/L	57.72%	2.37E-02	
		TH-232	-5.89E-03 +- 1.2E-02 (2s)	U	pCi/L	57.72%	4.17E-02	
09-JR	EQ0D31AA	U-234	9.23E-03 +- 1.1E-02 (2s)	J	pCi/L	75.14%	8.34E-03	
		U-235	0.00E+00 +- 7.5E-03 (2s)	U	pCi/L	75.14%	8.34E-03	
		U-238	-2.46E-03 +- 3.5E-03 (2s)	U	pCi/L	75.14%	2.11E-02	
09-JR	EQ0D31AC	TH-228	6.04E-03 +- 1.7E-02 (2s)	U	pCi/L	73.22%	3.70E-02	
		TH-230	1.08E-02 +- 1.5E-02 (2s)	U	pCi/L	73.22%	2.36E-02	
		TH-232	1.25E-02 +- 1.5E-02 (2s)	J	pCi/L	73.22%	1.13E-02	
10-CM	EQ0D41AA	U-234	3.80E-03 +- 9.7E-03 (2s)	U	pCi/L	69.39%	2.17E-02	
		U-235	6.33E-04 +- 7.3E-03 (2s)	U	pCi/L	69.39%	2.17E-02	
		U-238	3.80E-03 +- 9.7E-03 (2s)	U	pCi/L	69.39%	2.17E-02	
10-CM	EQ0D41AC	TH-228	2.26E-02 +- 2.8E-02 (2s)	U	pCi/L	69.18%	4.64E-02	
		TH-230	-4.60E-03 +- 6.6E-03 (2s)	U	pCi/L	69.18%	3.95E-02	
		TH-232	3.45E-03 +- 1.2E-02 (2s)	U	pCi/L	69.18%	3.25E-02	
11-JA	EQ0D61AA	U-234	1.03E-02 +- 9.3E-03 (2s)	U	pCi/L	76.49%	1.04E-02	
		U-235	0.00E+00 +- 4.5E-03 (2s)	U	pCi/L	76.49%	4.96E-03	
		U-238	2.56E-03 +- 7.0E-03 (2s)	U	pCi/L	76.49%	1.57E-02	
11-JA	EQ0D61AC	TH-228	3.82E-02 +- 3.1E-02 (2s)	U	pCi/L	61.16%	3.94E-02	
		TH-230	-1.64E-03 +- 3.3E-03 (2s)	U	pCi/L	61.16%	2.32E-02	
		TH-232	4.11E-03 +- 8.3E-03 (2s)	U	pCi/L	61.16%	1.11E-02	
12-AL	EQ0D91AA	U-234	7.69E-03 +- 7.1E-03 (2s)	J	pCi/L	60.25%	4.17E-03	
		U-235	0.00E+00 +- 3.8E-03 (2s)	U	pCi/L	60.25%	4.17E-03	
		U-238	1.85E-03 +- 4.7E-03 (2s)	U	pCi/L	60.25%	1.06E-02	
12-AL	EQ0D91AC	TH-228	3.65E-03 +- 1.6E-02 (2s)	U	pCi/L	68.62%	3.58E-02	
		TH-230	3.03E-03 +- 7.7E-03 (2s)	U	pCi/L	68.62%	1.74E-02	
		TH-232	0.00E+00 +- 6.2E-03 (2s)	U	pCi/L	68.62%	6.85E-03	

RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify

Sample Results Summary

STL Richland

Ordered by Client Sample ID, Batch No.

Date: 23-Jan-02

Report No. : 18641

SDG No: 19163

Client ID	Work Order Number	Parameter	Result	+- Uncertainty	Qual	Units	Yield	MDC|MDA	RER
Number of Results:	66								

STL Richland

RER - Replicate Error Ratio = (S-D)/[sqrt(sq(TPUs)+sq(TPUd))] as defined by ICPT BOA.

rptSTLRchSaSum V3.81 A97

QC Results Summary

STL Richland

Ordered by QC Type, Batch No.

Date: 23-Jan-02

Report No. : 18641

SDG No.: 19163

QC Type	Work Order Number	Parameter	Result +- Uncertainty	Qual	Units	Yield	Recovery	Bias	MDC|MDA
BLANK QC	EQ3VQ1AA	U-234	6.16E-03 +- 7.2E-03 (2s)	J	pCi/L	62.12%			5.56E-03
		U-235	-8.21E-04 +- 1.7E-03 (2s)	U	pCi/L	62.12%			1.16E-02
		U-238	6.16E-03 +- 7.2E-03 (2s)	J	pCi/L	62.12%			5.56E-03
BLANK QC	EQ3VT1AA	TH-228	1.02E-02 +- 1.8E-02 (2s)	U	pCi/L	80.74%			3.53E-02
		TH-230	2.74E-03 +- 5.5E-03 (2s)	U	pCi/L	80.74%			7.42E-03
		TH-232	7.12E-03 +- 9.9E-03 (2s)	U	pCi/L	80.74%			1.55E-02
BLANK QC	ERL6J1AA	U-234	1.03E-02 +- 8.6E-03 (2s)	J	pCi/L	76.44%			8.79E-03
		U-235	3.11E-04 +- 3.6E-03 (2s)	U	pCi/L	76.44%			1.07E-02
		U-238	3.11E-03 +- 4.4E-03 (2s)	U	pCi/L	76.44%			4.21E-03
BLANK QC	ERL6N1AA	TH-228	1.33E-03 +- 8.8E-03 (2s)	U	pCi/L	73.05%			2.19E-02
		TH-230	3.40E-03 +- 6.3E-03 (2s)	U	pCi/L	73.05%			1.20E-02
		TH-232	0.00E+00 +- 5.2E-03 (2s)	U	pCi/L	73.05%			5.75E-03
LCS	EQ3VQ1AC	U-234	1.85E-01 +- 5.0E-02 (2s)		pCi/L	66.45%	85.51%	-0.1	9.63E-03
		U-238	1.93E-01 +- 5.2E-02 (2s)		pCi/L	66.45%	85.10%	-0.1	1.17E-02
LCS	EQ3VT1AC	TH-230	2.22E-01 +- 7.3E-02 (2s)		pCi/L	78.81%	97.15%	0.0	7.08E-03
LCS	ERL6J1AC	U-234	2.24E-01 +- 5.9E-02 (2s)		pCi/L	76.86%	103.31%	0.0	1.17E-02
		U-238	2.23E-01 +- 5.9E-02 (2s)		pCi/L	76.86%	98.19%	0.0	9.59E-03
LCS	ERL6N1AC	TH-230	2.61E-01 +- 6.6E-02 (2s)		pCi/L	76.18%	114.03%	0.1	2.15E-02

Number of Results: 18

STL Richland

rptSTLRchQcSum V3.81 A97

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-1 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 01-JR | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0DA1AA			Report DB ID: 9EQ0DA10								
U-234	1.09E-02	J	1.1E-02	1.1E-02	7.36E-03	pCi/L	66.90%	*(1.5)*	1/10/02 06:54 p	1329.9	0.66495	RICHRC5079
							1.00E-01	*(2.)*		ML	L	ALP49
U-235	0.00E+00	U	0.0E+00	6.7E-03	7.36E-03	pCi/L	66.90%	*0.*	1/10/02 06:54 p	1329.9	0.66495	RICHRC5079
							1.00E-01	*0.*		ML	L	ALP49
U-238	2.72E-03	U	5.4E-03	5.5E-03	7.36E-03	pCi/L	66.90%	*0.37*	1/10/02 06:54 p	1329.9	0.66495	RICHRC5079
							1.00E-01	*1.*		ML	L	ALP49
								Ratio U-234/238 = 4.0				
Batch: 1361452	Work Order: EQ0DA1AC			Report DB ID: 9EQ0DA10								
TH-228	3.25E-02	U	2.9E-02	3.0E-02	4.31E-02	pCi/L	73.20%	*0.75*	1/13/02 04:37 p	1329.9	0.66495	RICHRB5006
						1.53E-02	1.00E-01	*(2.2)*		ML	L	ALP116
TH-230	-1.80E-03	U	3.6E-03	3.6E-03	2.54E-02	pCi/L	73.20%	*-0.07*	1/13/02 04:37 p	1329.9	0.66495	RICHRB5006
						6.62E-03	1.00E-01	*-0.99*		ML	L	ALP116
TH-232	4.50E-03	U	9.0E-03	9.1E-03	1.22E-02	pCi/L	73.20%	*0.37*	1/13/02 04:37 p	1329.9	0.66495	RICHRB5006
							1.00E-01	*0.99*		ML	L	ALP116

Number of Results: 6

Comments:

8000

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-2 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 02-SB | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0DE1AA			Report DB ID: 9EQ0DE10								
U-234	1.75E-02	J	1.3E-02	1.4E-02	1.30E-02	pCi/L	62.01%	*(1.3)*	1/10/02 06:55 p	1813.0	0.9065	RICHRC5079
						3.38E-03	1.00E-01	*(2.6)*		ML	L	ALP50
U-235	2.30E-03	U	4.6E-03	4.6E-03	6.23E-03	pCi/L	62.01%	*0.37*	1/10/02 06:55 p	1813.0	0.9065	RICHRC5079
							1.00E-01	*0.99*		ML	L	ALP50
U-238	2.76E-02	J	1.6E-02	1.7E-02	6.23E-03	pCi/L	62.01%	*(4.4)*	1/10/02 06:55 p	1813.0	0.9065	RICHRC5079
							1.00E-01	*(3.3)*		ML	L	ALP50
								Ratio U-234/238 = 0.6				
Batch: 1361452	Work Order: EQ0DE1AC			Report DB ID: 9EQ0DE10								
TH-228	1.11E-02	U	2.2E-02	2.2E-02	4.46E-02	pCi/L	75.15%	*0.25*	1/13/02 04:38 p	1813.0	0.9065	RICHRB5006
						1.79E-02	1.00E-01	*(1.)*		ML	L	ALP117
TH-230	-2.52E-03	U	3.6E-03	3.6E-03	2.17E-02	pCi/L	75.15%	*-0.12*	1/13/02 04:38 p	1813.0	0.9065	RICHRB5006
						6.56E-03	1.00E-01	*-(1.4)*		ML	L	ALP117
TH-232	0.00E+00	U	0.0E+00	7.7E-03	8.55E-03	pCi/L	75.15%	*0.*	1/13/02 04:38 p	1813.0	0.9065	RICHRB5006
							1.00E-01	*0.*		ML	L	ALP117

Number of Results: 6

Comments:

000

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-3 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 03-VD | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0DG1AA			Report DB ID: 9EQ0DG10								
U-234	-1.15E-03	U	2.3E-03	2.3E-03	1.63E-02	pCi/L	66.41%	*-0.07*	1/10/02 06:55 p	1290.5	0.64525	RICHRC5079
						4.24E-03	1.00E-01	*-1.*		ML	L	ALP51
U-235	0.00E+00	U	0.0E+00	7.1E-03	7.81E-03	pCi/L	66.41%	*0.*	1/10/02 06:55 p	1290.5	0.64525	RICHRC5079
							1.00E-01	*0.*		ML	L	ALP51
U-238	2.88E-03	U	5.8E-03	5.8E-03	7.81E-03	pCi/L	66.41%	*0.37*	1/10/02 06:55 p	1290.5	0.64525	RICHRC5079
							1.00E-01	*1.*		ML	L	ALP51
								Ratio U-234/238 = -0.4				
Batch: 1361452	Work Order: EQ0DG1AC			Report DB ID: 9EQ0DG10								
TH-228	-2.31E-03	U	2.8E-02	2.8E-02	7.21E-02	pCi/L	61.11%	*-0.03*	1/13/02 04:38 p	1290.5	0.64525	RICHRB5006
						2.82E-02	1.00E-01	*-0.17*		ML	L	ALP118
TH-230	5.61E-03	U	1.1E-02	1.1E-02	1.52E-02	pCi/L	61.11%	*0.37*	1/13/02 04:38 p	1290.5	0.64525	RICHRB5006
							1.00E-01	*0.99*		ML	L	ALP118
TH-232	3.36E-03	U	1.2E-02	1.2E-02	3.17E-02	pCi/L	61.11%	*0.11*	1/13/02 04:38 p	1290.5	0.64525	RICHRB5006
						8.25E-03	1.00E-01	*0.56*		ML	L	ALP118

Number of Results: 6

Comments:

0010

STL Richland

rptSTLRchSample V3.81 A97

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-4 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 04-DE | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0DL1AA			Report DB ID: 9EQ0DL10								
U-234	2.96E-02	J	1.7E-02	1.8E-02	6.68E-03	pCi/L	62.52%	*(4.4)*	1/10/02 06:58 p	1725.7	0.86285	RICHRC5079
							1.00E-01	*(3.3)*		ML	L	ALP52
U-235	0.00E+00	U	0.0E+00	6.0E-03	6.68E-03	pCi/L	62.52%	*0.*	1/10/02 06:58 p	1725.7	0.86285	RICHRC5079
							1.00E-01	*0.*		ML	L	ALP52
U-238	2.12E-02	J	1.5E-02	1.6E-02	1.39E-02	pCi/L	62.52%	*(1.5)*	1/10/02 06:58 p	1725.7	0.86285	RICHRC5079
						3.63E-03	1.00E-01	*(2.7)*		ML	L	ALP52
								Ratio U-234/238 = 1.4				
Batch: 1361452	Work Order: EQ0DL1AC			Report DB ID: 9EQ0DL10								
TH-228	-1.51E-03	U	1.3E-02	1.3E-02	3.73E-02	pCi/L	65.43%	*-0.04*	1/13/02 04:38 p	1725.7	0.862805	RICHRB5006
						1.36E-02	1.00E-01	*-0.23*		ML	L	ALP119
TH-230	3.65E-03	U	7.3E-03	7.3E-03	9.88E-03	pCi/L	65.43%	*0.37*	1/13/02 04:38 p	1725.7	0.862805	RICHRB5006
							1.00E-01	*0.99*		ML	L	ALP119
TH-232	3.65E-03	U	7.3E-03	7.3E-03	9.88E-03	pCi/L	65.43%	*0.37*	1/13/02 04:38 p	1725.7	0.862805	RICHRB5006
							1.00E-01	*0.99*		ML	L	ALP119

Number of Results: 6

Comments:

0014

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-5 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 05-NC | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 2014454	Work Order: EQ0DP1AA			Report DB ID: 9EQ0DP10								
U-234	4.73E-02	J	4.2E-02	4.3E-02	2.57E-02	pCi/L	69.88%	*(1.8)*	1/18/02 09:50 p	372.8	0.1842	RICHRC5079
							1.00E-01	*(2.2)*		ML	L	ALP27
U-235	9.47E-03	U	1.9E-02	1.9E-02	2.57E-02	pCi/L	69.88%	*0.37*	1/18/02 09:50 p	372.8	0.1842	RICHRC5079
							1.00E-01	*1.*		ML	L	ALP27
U-238	1.89E-02	U	2.7E-02	2.7E-02	2.57E-02	pCi/L	69.88%	*0.74*	1/18/02 09:50 p	372.8	0.1842	RICHRC5079
							1.00E-01	*(1.4)*		ML	L	ALP27
								Ratio U-234/238 = 2.5				
Batch: 2014455	Work Order: EQ0DP1AC			Report DB ID: 9EQ0DP10								
TH-228	-4.75E-02	U	5.4E-02	5.5E-02	1.81E-01	pCi/L	68.20%	*-0.26*	1/21/02 04:27 p	372.8	0.1884	RICHRB5006
						7.27E-02	1.00E-01	*-(1.7)*		ML	L	ALP113
TH-230	-7.62E-03	U	3.2E-02	3.3E-02	1.09E-01	pCi/L	68.20%	*-0.07*	1/21/02 04:27 p	372.8	0.1884	RICHRB5006
						3.73E-02	1.00E-01	*-0.47*		ML	L	ALP113
TH-232	1.01E-02	U	5.8E-02	5.8E-02	1.40E-01	pCi/L	68.20%	*0.07*	1/21/02 04:27 p	372.8	0.1884	RICHRB5006
						5.28E-02	1.00E-01	*0.35*		ML	L	ALP113

Number of Results: 6

Comments:

0012

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-6 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 06-SV | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0DT1AA			Report DB ID: 9EQ0DT10								
U-234	1.24E-02	U	1.7E-02	1.7E-02	2.69E-02	pCi/L	70.65%	*0.46*	1/10/02 06:59 p	690.9	0.34545	RICHRC5079
						7.00E-03	1.00E-01	*(1.4)*		ML	L	ALP64
U-235	-1.90E-03	U	3.8E-03	3.8E-03	2.69E-02	pCi/L	70.65%	*-0.07*	1/10/02 06:59 p	690.9	0.34545	RICHRC5079
						7.00E-03	1.00E-01	*-1.*		ML	L	ALP64
U-238	0.00E+00	U	0.0E+00	1.2E-02	1.29E-02	pCi/L	70.65%	*0.*	1/10/02 06:59 p	690.9	0.34545	RICHRC5079
							1.00E-01	*0.*		ML	L	ALP64
Batch: 1361452	Work Order: EQ0DT1AC			Report DB ID: 9EQ0DT10								
TH-228	4.48E-02	U	5.2E-02	5.3E-02	9.04E-02	pCi/L	75.76%	*0.5*	1/13/02 04:38 p	690.9	0.34545	RICHRB5006
						3.36E-02	1.00E-01	*(1.7)*		ML	L	ALP120
TH-230	1.34E-02	U	2.5E-02	2.5E-02	4.72E-02	pCi/L	75.76%	*0.28*	1/13/02 04:38 p	690.9	0.34545	RICHRB5006
						1.23E-02	1.00E-01	*(1.1)*		ML	L	ALP120
TH-232	1.34E-02	U	2.5E-02	2.5E-02	4.72E-02	pCi/L	75.76%	*0.28*	1/13/02 04:38 p	690.9	0.34545	RICHRB5006
						1.23E-02	1.00E-01	*(1.1)*		ML	L	ALP120

Number of Results: 6

Comments:

0013

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-7 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 07-PC | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0DX1AA			Report DB ID: 9EQ0DX10								
U-234	6.51E-03	U	8.9E-03	9.0E-03	1.41E-02	pCi/L	67.72%	*0.46*	1/10/02 06:59 p	1344.2	0.6721	RICHRC5079
						3.68E-03	1.00E-01	*(1.4)*		ML	L	ALP65
U-235	-3.00E-03	U	3.5E-03	3.5E-03	1.95E-02	pCi/L	67.72%	*-0.15*	1/10/02 06:59 p	1344.2	0.6721	RICHRC5079
						6.38E-03	1.00E-01	*-(1.7)*		ML	L	ALP65
U-238	3.00E-03	U	7.6E-03	7.7E-03	1.72E-02	pCi/L	67.72%	*0.17*	1/10/02 06:59 p	1344.2	0.6721	RICHRC5079
						5.21E-03	1.00E-01	*0.79*		ML	L	ALP65
								Ratio U-234/238 = 2.2				
Batch: 1361452	Work Order: EQ0DX1AC			Report DB ID: 9EQ0DX10								
TH-228	1.13E-02	U	1.5E-02	1.6E-02	2.45E-02	pCi/L	57.72%	*0.46*	1/14/02 05:13 p	1344.2	0.6721	RICHRB5006
						6.39E-03	1.00E-01	*(1.4)*		ML	L	ALP113
TH-230	-1.68E-03	U	3.4E-03	3.4E-03	2.37E-02	pCi/L	57.72%	*-0.07*	1/14/02 05:13 p	1344.2	0.6721	RICHRB5006
						6.18E-03	1.00E-01	*-0.99*		ML	L	ALP113
TH-232	-5.89E-03	U	1.2E-02	1.2E-02	4.17E-02	pCi/L	57.72%	*-0.14*	1/14/02 05:13 p	1344.2	0.6721	RICHRB5006
						1.51E-02	1.00E-01	*-0.99*		ML	L	ALP113

Number of Results: 6

Comments:

00014

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-9 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 10-CM | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0D41AA			Report DB ID: 9EQ0D410								
U-234	3.80E-03	U	9.6E-03	9.7E-03	2.17E-02	pCi/L	69.39%	*0.17*	1/10/02 07:00 p	1054.9	0.52745	RICHRC5079
						6.59E-03	1.00E-01	*0.79*		ML	L	ALP241
U-235	6.33E-04	U	7.3E-03	7.3E-03	2.17E-02	pCi/L	69.39%	*0.03*	1/10/02 07:00 p	1054.9	0.52745	RICHRC5079
						6.59E-03	1.00E-01	*0.17*		ML	L	ALP241
U-238	3.80E-03	U	9.6E-03	9.7E-03	2.17E-02	pCi/L	69.39%	*0.17*	1/10/02 07:00 p	1054.9	0.52745	RICHRC5079
						6.59E-03	1.00E-01	*0.79*		ML	L	ALP241
								Ratio U-234/238 = 1.0				
Batch: 1361452	Work Order: EQ0D41AC			Report DB ID: 9EQ0D410								
TH-228	2.26E-02	U	2.8E-02	2.8E-02	4.64E-02	pCi/L	69.18%	*0.49*	1/14/02 05:14 p	1054.9	0.527405	RICHRB5006
						1.52E-02	1.00E-01	*(1.6)*		ML	L	ALP115
TH-230	-4.60E-03	U	6.5E-03	6.6E-03	3.95E-02	pCi/L	69.18%	*-0.12*	1/14/02 05:14 p	1054.9	0.527405	RICHRB5006
						1.20E-02	1.00E-01	*-(1.4)*		ML	L	ALP115
TH-232	3.45E-03	U	1.2E-02	1.2E-02	3.25E-02	pCi/L	69.18%	*0.11*	1/14/02 05:14 p	1054.9	0.527405	RICHRB5006
						8.47E-03	1.00E-01	*0.56*		ML	L	ALP115

Number of Results: 6

Comments:

00169

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland | **SDG:** 19163 | **Collection Date:** 12/18/01 4:00:00 PM

Lot-Sample No.: J1L210266-8 | **Report No. :** 18641 | **Received Date:** 12/21/01 12:55:00 PM

Client Sample ID: 09-JR | **COC No. :** | **Matrix:** URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0D31AA			Report DB ID: 9EQ0D310								
U-234	9.23E-03	J	1.1E-02	1.1E-02	8.34E-03	pCi/L	75.14%	*(1.1)*	1/10/02 07:00 p	1015.5	0.50775	RICHRC5079
							1.00E-01	*(1.7)*		ML	L	ALP67
U-235	0.00E+00	U	0.0E+00	7.5E-03	8.34E-03	pCi/L	75.14%	*0.*	1/10/02 07:00 p	1015.5	0.50775	RICHRC5079
							1.00E-01	*0.*		ML	L	ALP67
U-238	-2.46E-03	U	3.5E-03	3.5E-03	2.11E-02	pCi/L	75.14%	*-0.12*	1/10/02 07:00 p	1015.5	0.50775	RICHRC5079
						6.40E-03	1.00E-01	*-(1.4)*		ML	L	ALP67
								Ratio U-234/238 = -3.7				
Batch: 1361452	Work Order: EQ0D31AC			Report DB ID: 9EQ0D310								
TH-228	6.04E-03	U	1.6E-02	1.7E-02	3.70E-02	pCi/L	73.22%	*0.16*	1/14/02 05:13 p	1015.5	0.507705	RICHRB5006
						1.27E-02	1.00E-01	*0.73*		ML	L	ALP114
TH-230	1.08E-02	U	1.5E-02	1.5E-02	2.36E-02	pCi/L	73.22%	*0.46*	1/14/02 05:13 p	1015.5	0.507705	RICHRB5006
						6.14E-03	1.00E-01	*(1.4)*		ML	L	ALP114
TH-232	1.25E-02	J	1.4E-02	1.5E-02	1.13E-02	pCi/L	73.22%	*(1.1)*	1/14/02 05:13 p	1015.5	0.507705	RICHRB5006
							1.00E-01	*(1.7)*		ML	L	ALP114

Number of Results: 6

Comments:

0015

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.

J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.

U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland
Lot-Sample No.: J1L210266-10
Client Sample ID: 11-JA

SDG: 19163
Report No. : 18641
COC No. :

Collection Date: 12/18/01 4:00:00 PM
Received Date: 12/21/01 12:55:00 PM
Matrix: URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0D61AA			Report DB ID: 9EQ0D610								
U-234	1.03E-02	U	9.1E-03	9.3E-03	1.04E-02	pCi/L	76.49%	*0.99*	1/10/02 07:01 p	1741.6	0.8708	RICHRC5079
						2.70E-03	1.00E-01	*(2.2)*		ML	L	ALP68
U-235	0.00E+00	U	0.0E+00	4.5E-03	4.96E-03	pCi/L	76.49%	*0.*	1/10/02 07:01 p	1741.6	0.8708	RICHRC5079
							1.00E-01	*0.*		ML	L	ALP68
U-238	2.56E-03	U	7.0E-03	7.0E-03	1.57E-02	pCi/L	76.49%	*0.16*	1/10/02 07:01 p	1741.6	0.8708	RICHRC5079
						5.39E-03	1.00E-01	*0.73*		ML	L	ALP68
								Ratio U-234/238 = 4.0				
Batch: 1361452	Work Order: EQ0D61AC			Report DB ID: 9EQ0D610								
TH-228	3.82E-02	U	2.9E-02	3.1E-02	3.94E-02	pCi/L	61.16%	*0.97*	1/14/02 05:14 p	1741.6	0.8708	RICHRB5006
						1.40E-02	1.00E-01	*(2.5)*		ML	L	ALP116
TH-230	-1.64E-03	U	3.3E-03	3.3E-03	2.32E-02	pCi/L	61.16%	*-0.07*	1/14/02 05:14 p	1741.6	0.8708	RICHRB5006
						6.05E-03	1.00E-01	*-0.99*		ML	L	ALP116
TH-232	4.11E-03	U	8.2E-03	8.3E-03	1.11E-02	pCi/L	61.16%	*0.37*	1/14/02 05:14 p	1741.6	0.8708	RICHRB5006
							1.00E-01	*0.99*		ML	L	ALP116

Number of Results: 6

Comments:

0012

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM I

SAMPLE RESULTS

Date: 23-Jan-02

Lab Name: STL Richland
Lot-Sample No.: J1L210266-11
Client Sample ID: 12-AL

SDG: 19163
Report No. : 18641
COC No. :

Collection Date: 12/18/01 4:00:00 PM
Received Date: 12/21/01 12:55:00 PM
Matrix: URINE

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ0D91AA			Report DB ID: 9EQ0D910								
U-234	7.69E-03	J	6.9E-03	7.1E-03	4.17E-03	pCi/L	60.25%	*(1.8)*	1/10/02 07:02 p	2476.4	1.2382	RICHRC5079
							1.00E-01	*(2.2)*		ML	L	ALP69
U-235	0.00E+00	U	0.0E+00	3.8E-03	4.17E-03	pCi/L	60.25%	*0.*	1/10/02 07:02 p	2476.4	1.2382	RICHRC5079
							1.00E-01	*0.*		ML	L	ALP69
U-238	1.85E-03	U	4.7E-03	4.7E-03	1.06E-02	pCi/L	60.25%	*0.17*	1/10/02 07:02 p	2476.4	1.2382	RICHRC5079
						3.20E-03	1.00E-01	*0.79*		ML	L	ALP69
								Ratio U-234/238 = 4.2				
Batch: 1361452	Work Order: EQ0D91AC			Report DB ID: 9EQ0D910								
TH-228	3.65E-03	U	1.6E-02	1.6E-02	3.58E-02	pCi/L	68.62%	*0.1*	1/14/02 05:14 p	2476.4	1.2382	RICHRB5006
						1.44E-02	1.00E-01	*0.46*		ML	L	ALP117
TH-230	3.03E-03	U	7.7E-03	7.7E-03	1.74E-02	pCi/L	68.62%	*0.17*	1/14/02 05:14 p	2476.4	1.2382	RICHRB5006
						5.26E-03	1.00E-01	*0.78*		ML	L	ALP117
TH-232	0.00E+00	U	0.0E+00	6.2E-03	6.85E-03	pCi/L	68.62%	*0.*	1/14/02 05:14 p	2476.4	1.2382	RICHRB5006
							1.00E-01	*0.*		ML	L	ALP117

Number of Results: 6

Comments:

0018

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

Date: 23-Jan-02

BLANK RESULTS

Lab Name: STL Richland **SDG:** 19163

Lot-Sample No.: J1L270000-451 **Report No. :** 18641 **Matrix:** URINE

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Lc	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ3VQ1AA			Report DB ID: EQ3VQ1AX								
U-234	6.16E-03	J	7.1E-03	7.2E-03	5.56E-03	pCi/L	62.12%	(1.1)	1/10/02 07:02 p	1000.0	1.0	RICHRC5079
						1.00E-01		(1.7)		ML	L	ALP70
U-235	-8.21E-04	U	1.6E-03	1.7E-03	1.16E-02	pCi/L	62.12%	-0.07	1/10/02 07:02 p	1000.0	1.0	RICHRC5079
					3.02E-03	1.00E-01		-0.99		ML	L	ALP70
U-238	6.16E-03	J	7.1E-03	7.2E-03	5.56E-03	pCi/L	62.12%	(1.1)	1/10/02 07:02 p	1000.0	1.0	RICHRC5079
						1.00E-01		(1.7)		ML	L	ALP70

Ratio U-234/238 = 1.0

Number of Results: 3

Comments:

0019

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

BLANK RESULTS

Date: 23-Jan-02

Lab Name: STL Richland **SDG:** 19163

Lot-Sample No.: J1L270000-452 **Report No. :** 18641 **Matrix:** URINE

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Lc	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 1361452	Work Order: EQ3VT1AA			Report DB ID: EQ3VT1AX								
TH-228	1.02E-02	U	1.8E-02	1.8E-02	3.53E-02	pCi/L	80.74%	0.29	1/14/02 05:15 p	1000.0	1.0	RICHRB5006
					1.38E-02	1.00E-01		(1.1)		ML	L	ALP118
TH-230	2.74E-03	U	5.5E-03	5.5E-03	7.42E-03	pCi/L	80.74%	0.37	1/14/02 05:15 p	1000.0	1.0	RICHRB5006
						1.00E-01		0.99		ML	L	ALP118
TH-232	7.12E-03	U	9.7E-03	9.9E-03	1.55E-02	pCi/L	80.74%	0.46	1/14/02 05:15 p	1000.0	1.0	RICHRB5006
					4.03E-03	1.00E-01		(1.4)		ML	L	ALP118

Number of Results: 3

Comments:

002

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

Date: 23-Jan-02

BLANK RESULTS

Lab Name: STL Richland **SDG:** 19163

Lot-Sample No.: J2A140000-454 **Report No. :** 18641 **Matrix:** URINE

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Lc	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 2014454	Work Order: ERL6J1AA			Report DB ID: ERL6J1AX								
U-234	1.03E-02	J	8.3E-03	8.6E-03	8.79E-03	pCi/L	76.44%	(1.2)	1/18/02 09:50 p	1000.0	1.0	RICHRC5079
					2.29E-03	1.00E-01		(2.4)		ML	L	ALP28
U-235	3.11E-04	U	3.6E-03	3.6E-03	1.07E-02	pCi/L	76.44%	0.03	1/18/02 09:50 p	1000.0	1.0	RICHRC5079
					3.24E-03	1.00E-01		0.17		ML	L	ALP28
U-238	3.11E-03	U	4.4E-03	4.4E-03	4.21E-03	pCi/L	76.44%	0.74	1/18/02 09:50 p	1000.0	1.0	RICHRC5079
						1.00E-01		(1.4)		ML	L	ALP28

Ratio U-234/238 = 3.3

Number of Results: 3

Comments:

0021

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
J Qual - No U qualifier has been assigned and the result is below the Reporting Limit, RL (CRDL) or Report Value is Estimated.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

Date: 23-Jan-02

BLANK RESULTS

Lab Name: STL Richland **SDG:** 19163

Lot-Sample No.: J2A140000-455 **Report No. :** 18641 **Matrix:** URINE

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA, Lc	Rpt Unit, CRDL	Yield	Rst/MDC, Rst/TotUcert	Analysis, Prep Date	Total Sa Size	Aliquot Size	Analy Method, Primary Detector
Batch: 2014455	Work Order: ERL6N1AA			Report DB ID: ERL6N1AX								
TH-228	1.33E-03	U	8.8E-03	8.8E-03	2.19E-02	pCi/L	73.05%	0.06	1/21/02 04:27 p	1000.0	1.0	RICHRB5006
					7.96E-03	1.00E-01		0.3		ML	L	ALP114
TH-230	3.40E-03	U	6.2E-03	6.3E-03	1.20E-02	pCi/L	73.05%	0.28	1/21/02 04:27 p	1000.0	1.0	RICHRB5006
					3.12E-03	1.00E-01		(1.1)		ML	L	ALP114
TH-232	0.00E+00	U	0.0E+00	5.2E-03	5.75E-03	pCi/L	73.05%	0.	1/21/02 04:27 p	1000.0	1.0	RICHRB5006
						1.00E-01		0.		ML	L	ALP114

Number of Results: 3

Comments:

2200

MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

FORM II

Date: 23-Jan-02

LCS RESULTS

Lab Name: STL Richland **SDG:** 19163

Lot-Sample No.: J1L270000-451 **Report No. :** 18641 **Matrix:** URINE

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 1361451	Work Order: EQ3VQ1AC			Report DB ID: EQ3VQ1CM									
U-234	1.85E-01		3.6E-02	5.0E-02	9.63E-03	pCi/L	66.45%	2.16E-01	1.5E-03	85.51%	1/10/02 07:02 p	1.0	RICHRC5079
							Rec Limits:	.	.	-0.1		L	ALP71
U-238	1.93E-01		3.6E-02	5.2E-02	1.17E-02	pCi/L	66.45%	2.27E-01	1.6E-03	85.10%	1/10/02 07:02 p	1.0	RICHRC5079
							Rec Limits:	.	.	-0.1		L	ALP71

Number of Results: 2

Comments:

0023

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

FORM II

Date: 23-Jan-02

LCS RESULTS

Lab Name: STL Richland **SDG:** 19163

Lot-Sample No.: J1L270000-452 **Report No. :** 18641 **Matrix:** URINE

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 1361452	Work Order: EQ3VT1AC			Report DB ID: EQ3VT1CM									
TH-230	2.22E-01		4.8E-02	7.3E-02	7.08E-03	pCi/L	78.81%	2.29E-01	6.9E-03	97.15%	1/14/02 05:15 p	1.0	RICHRB5006
							Rec Limits:	70.	130.	0.0		L	ALP119

Number of Results: 1

Comments:

00024

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

FORM II

Date: 23-Jan-02

LCS RESULTS

Lab Name: STL Richland **SDG:** 19163

Lot-Sample No.: J2A140000-454 **Report No. :** 18641 **Matrix:** URINE

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 2014454	Work Order: ERL6J1AC			Report DB ID: ERL6J1CM									
U-234	2.24E-01		3.9E-02	5.9E-02	1.17E-02	pCi/L	76.86%	2.17E-01	3.9E-03	103.31%	1/18/02 09:51 p	1.0	RICHRC5079
							Rec Limits:	.	.	0.0		L	ALP29
U-238	2.23E-01		3.9E-02	5.9E-02	9.59E-03	pCi/L	76.86%	2.28E-01	4.1E-03	98.19%	1/18/02 09:51 p	1.0	RICHRC5079
							Rec Limits:	.	.	0.0		L	ALP29

Number of Results: 2

Comments:

0025

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

FORM II

Date: 23-Jan-02

LCS RESULTS

Lab Name: STL Richland **SDG:** 19163

Lot-Sample No.: J2A140000-455 **Report No. :** 18641 **Matrix:** URINE

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC|MDA	Report Unit	Yield	Expected	Expected Uncert	Recovery, Bias	Analysis, Prep Date	Aliquot Size	Analy Method, Primary Detector
Batch: 2014455	Work Order: ERL6N1AC			Report DB ID: ERL6N1CM									
TH-230	2.61E-01		5.4E-02	6.6E-02	2.15E-02	pCi/L	76.18%	2.29E-01	6.9E-03	114.03%	1/21/02 04:28 p	1.0	RICHRB5006
							Rec Limits:	70.	130.	0.1		L	ALP115

Number of Results: 1

Comments:

0026

Bias - (Result/Expected)-1 as defined by ANSI N13.30.

Drinking Water Method Cross References

	DRINKING WATER ASTM METHOD CROSS REFERENCES	
Referenced Method	**Isotope(s)**	**STL Richland's SOP number**
EPA 901.1	Cs-134, I-131	RICH-RC-5017
EPA 900.0	Alpha & Beta	RICH-RC-5014
EPA 903.1	Ra-226	RICH-RC-5005
EPA 904.0	Ra-228	RICH-RC-5005
EPA 905.0	Sr89/90	RICH-RC-5006
ASTM D2460	Total Radium	RICH-RC-5027
Standard Method 7500-U-C & ASTM D5174	Uranium	RICH-RC-5058
EPA 906.0	Tritium	RICH-RC-5007
NOTE:		
The Gross Alpha LCS is prepared with Am-241 (unless otherwise specified in the case narrative)		
The Gross Beta LCS is prepared with Sr/Y-90 (unless otherwise specified in the case narrative)		

Uncertainty Estimation

STL Richland has adopted the internationally accepted approach to estimating uncertainties described in "NIST Technical Note 1297, 1994 Edition". The approach, "Law of Propagation of Errors", involves the identification of all variables in an analytical method which are used to derive a result. These variables are related to the analytical result (R) by some functional relationship, R = constants * f(x,y,z,...). The components (x,y,z) are evaluated to determine their contribution to the overall method uncertainty. The individual component uncertainties (u_i) are then combined using a statistical model that provides the most probable overall uncertainty value. All component uncertainties are categorized as type A, evaluated by statistical methods, or type B, evaluated by other means. Uncertainties not included in the components, such as sample homogeneity, are combined with the component uncertainty as the square root of the sum-of-the-squares of the individual uncertainties. The uncertainty associated with the derived result is the combined uncertainty (u_c) multiplied by the coverage factor (1,2, or 3).

When three or more sample replicates are used to derive the analytical result, the type A uncertainty is the standard deviation of the mean value (S/vn), where S is the standard deviation of the derived results. The type B uncertainties are all other random or non-random components that are not included in the standard deviation.

The derivation of the general "Law of Propagation of Errors" equations and specific example are available on request.

Report Definitions

Action Lev	An agreed upon activity level used to trigger some action when the final result is greater than or equal to the Action Level. Often the Action Level is related to the Decision Limit.
Batch	The QC preparation batch number that relates laboratory samples to QC samples that were prepared and analyzed together.
Bias	Defined by the equation (Result/Expected)-1 as defined by ANSI N13.30.
COC No	Chain of Custody Number assigned by the Client or STL Richland.
Count Error (#s)	Poisson counting statistics of the gross sample count and background. The uncertainty is absolute and in the same units as the result. For Liquid Scintillation Counting (LSC) the batch blank count is the background.
Total Uncert (#s) *u_c - Combined Uncertainty.*	All known uncertainties associated with the preparation and analysis of the sample are propagated to give a measure of the uncertainty associated with the result, *u_c the combined uncertainty*. The uncertainty is absolute and in the same units as the result.
(#s), Coverage Factor	The coverage factor defines the width of the confidence interval, 1, 2 or 3 standard deviations.
CRDL (RL)	Contractual Required Detection Limit as defined in the Client's Statement Of Work or STL Richland "default" nominal detection limit. Often referred to the reporting level (RL)
Lc	Decision Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume associated with the sample. The Type I error probability is approximately 5%. Lc=(1.645 * Sqrt(2*(BkgrndCnt/BkgrndCntMin)/SCntMin)) * (ConvFct/(Eff*Yld*Abn*Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability. Lc cannot be calculated when the background count is zero.
Lot-Sample No	The number assigned by the LIMS software to track samples received on the same day for a given client. The sample number is a sequential number assigned to each sample in the Lot.
MDC|MDA	Detection Level based on instrument background or blank, adjusted by the Efficiency, Chemical Yield, and Volume with a Type I and II error probability of approximately 5%. MDC = (4.65 * Sqrt((BkgrndCnt/BkgrndCntMin)/SCntMin) + 2.71/SCntMin) * (ConvFct/(Eff * Yld * Abn * Vol) * IngrFct). For LSC methods the batch blank is used as a measure of the background variability.
Primary Detector	The instrument identifier associated with the analysis of the sample aliquot.
Ratio U-234/U-238	The U-234 result divided by the U-238 result. The U-234/U-238 ratio for natural uranium in NIST SRM 4321C is 1.038.
Rst/MDC	Ratio of the Result to the MDC. A value greater than 1 may indicate activity above background at a high level of confidence. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Rst/TotUcert	Ratio of the Result to the Total Uncertainty. If the uncertainty has a coverage factor of 2 a value greater than 1 may indicate activity above background at approximately the 95% level of confidence assuming a two-sided confidence interval. Caution should be used when applying this factor and it should be used in concert with the qualifiers associated with the result.
Report DB No	Sample Identifier used by the report system. The number is based upon the first five digits of the **Work Order** Number.
RER	The equation Replicate Error Ratio = (S-D)/[sqrt($TPUs^2$ + $TPUd^2$)] as defined by ICPT BOA where S is the original sample result, D is the result of the duplicate, TPUs is the total uncertainty of the original sample and TPUd is the total uncertainty of the duplicate sample.
SDG	Sample Delivery Group Number assigned by the Client or assigned by STL Richland upon sample receipt.
Sum Rpt Alpha Spec Rst(s)	The sum of the reported alpha spec results for tests derived from the same sample excluding duplicate result where the results are in the same units.
Work Order	The LIMS software assign test specific identifier.
Yield	The recovery of the tracer added to the sample such as Pu-242 used to trace a Pu-239/40 method.

CHAIN OF CUSTODY

Chain of Custody Record

STL Richland
2800 George Washington Way
Richland, WA 99352

Q-456634 SDG 191102
Due 1-11
JIL2102606

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

STL-4124 (0700) R (1100)

Client	Project Manager	Date	Chain of Custody Number
Environcon	Dale Evans	12/18/01	022647
Address 17301 W. Colfax	**Telephone Number (Area Code)/Fax Number** (303) 215-0187 / (303) 215-0182	**Lab Number** —	**Page** 1 of 1
City Golden; **State** CO; **Zip Code**	**Site Contact** Shane Brightwell	**Lab Contact** —	
Project Name and Location (State) GTE - Long Island, NY	**Carrier/Waybill Number**		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)		Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Drink	Containers & Preservatives: Unpres.	H_2SO_4	HNO3	HCl	NaOH	ZnAc/NaOH	U-238	U-235	U-234	Th-230	Th-232
01 - JR	EQ0DA	X	12/18/01	1600		•			X							X	X	X	X	X
02 - SB	EQ0DE	X							X							X	X	X	X	X
03 - VD	EQ0DG	X							X							X	X	X	X	X
04 - DF	EQ0DL	X							X							X	X	X	X	X
05 - NC	EQ0DP	X							X							X	X	X	X	X
06 - SV	EQ0DT	X							X							X	X	X	X	X
07 - TC	EQ0DX	X							X							X	X	X	X	X
~~08 - SR~~	~~EQ0D3~~																			
09 - JR	EQ0D3	X							X							X	X	X	X	X
10 - CM	EQ0D4	X							X							X	X	X	X	X
11 - JA	EQ0D6	X							X							X	X	X	X	X
12 - AL	EQ0D9	X							X							X	X	X	X	X

Analysis (Attach list if more space is needed)

Special Instructions/ Conditions of Receipt

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☒ 21 Days (Std.) ☐ Other _____

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: Shane Brightwell	12/20/01	1200	1. Received By: [signature]	12/21/01	1255
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Attachment B-3

Equipment/Materials Unrestricted Release Survey Results

PA = Project # 01104-1

Environ Project # 14402

Survey Data

Date: 12/20/01

Logbook Page 01

Number	Location <or> Equipment/Material Description, Serial#	Survey Type						Gamma	Comments Follow-up Actions Release Information
		Average Activity Scan (2 min)		Maximum Activity Static (2 min)		Removable Activity Swipe (5 min)			
		α	β	α	β	α	β		
01	Hertz Backhoe - Front Bucket Inside Left Bottom/side	8	—	N/A	—	N/A	—		Pass
02	Hertz Backhoe - Front Bucket Inside Right Bottom/side	5	—	N/A	—	N/A	—		Pass
03	Hertz Backhoe - Cab Floor Mat	ϕ	—	N/A	—	N/A	—		Pass
04	Hertz Backhoe - Hoe Back Bucket Inside	15	—	N/A	—	N/A	—		Pass
05	Hertz Backhoe - Hoe Back Bucket Outside	8	—	N/A	—	N/A	—		Pass
06	Hertz Concrete Saw Blade	1	—	N/A	—	N/A	—		Pass
07	Hertz Concrete Saw Lower Housing	1	—	N/A	—	N/A	—		Pass
08	—	—	—	—	—	—	—	—	—
09	—	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—	—

∝ Removable Action Limit (171 cpm) = 342 cp2m

Backhoe ID# 222-05-8031

Concrete Saw ID# 133-21-0029

Attachment B-4

Site-Specific Health and Safety Plan

ENVIROCON

Former Sylvania Electric Products Facility Site

Envirocon Project # 14400

Site-Specific Health and Safety Plan

Prepared for:
GTEOSI
URS

Prepared By:

Vince Daliessio, CIH
Eastern Regional Health and Safety Manager
Envirocon, Inc.
500 West Dutton's Mill Road
Aston, PA 19014

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1.0 PROJECT OVERVIEW

1.1 Introduction

This site-specific Health and Safety Plan (HASP) has been developed by Envirocon Inc. to establish the health and safety procedures required to minimize any potential risk to personnel who will be involved with site investigation activities at the Former Sylvania Electric Products Facility Site in Hicksville, Nassau County, New York. The provisions of this plan apply to all Envirocon personnel and Envirocon subcontractor personnel assigned to this project. The procedures in this plan have been developed based on the "Supplemental Investigative Report", "History Report", "Soil Clean Up Level Support Document", "Alternate Clean Up Level Support Document", and "Health and Safety Plan", for the Former Sylvania Electric Products Facility Site (O'Brien & Gere, 2001) regarding the specific chemical and physical hazards which are known or anticipated for the operations to be conducted at this site. If site conditions or work activity vary from the Work Plan, amendments to this HASP will be made as necessary.

This HASP has been written to comply with the requirements of the Occupational Safety and Health Administration (OSHA) Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120). as well as applicable regulations administered by the United States Nuclear Regulatory Commission (NRC). All site activities must be conducted in compliance with this HASP and applicable federal, state, and local health and safety regulations. If conflicts exist between this document and the referenced standard, the one that offers the most protection will govern.

Subcontract personnel will follow the Envirocon HASP and must make this HASP available to each employee who will work at the site. Any new employee or site visitor must sign in with the Envirocon Site Safety Officer (SSO) prior to any site activity. Each employee must sign a copy of the attached HASP sign-off sheet.

Responsibility for the implementation of health and safety at the site is an integrated effort among the Envirocon Project Manager (PM), the Regional Health and Safety Manager (RHSM), the designated Site Safety officer (SSO), and the field staff.

The RHSM is responsible for developing, interpreting and modifying the site- specific HASP. When required, the RHSM is responsible for auditing the project to verify compliance with the HASP.

The PM and SSO are responsible for implementing the requirements of the HASP. In consultation with the RHSM, the SSO has the authority to correct all health and safety deficiencies and to immediately stop work in cases where imminent danger is perceived. The SSO is responsible for initiating emergency response and coordinating site evacuation when necessary. The SSO will maintain daily sign-in log and head count logs during all excavation activities.

The PM is responsible for ensuring accessibility to a copy of this HASP to all members of the Envirocon field team and the subcontractors. The PM is responsible for collecting the training and medical documentation from Envirocon subcontractors as well as the HASP sign-off sheets from Envirocon and Envirocon subcontractor employees.

Subcontractors must comply with the provisions of this HASP and all other federal, state, and local health and safety regulations that are applicable to the activities being performed. All personnel on-site are responsible for abiding by the health and safety procedures listed in this HASP and for maintaining their personal safety equipment. Any Envirocon or Envirocon subcontractor employee who does not adhere to the provisions of this HASP will be excluded from the site.

1.2 Site Description

The former Sylvania facility is located at 70-140 Cantiague Rock Road, Hicksville, New York in Section 11, Block 499, lots 79, 80, and Lots 94, 99, and 100 of the Nassau County Land and Tax Maps. For the purpose of this plan, GTE Operations Support Incorporated (GTEOSI) is the owner of the site.

1.2.1 Site History

The Former Sylvania Electric Products Facility Site is a former nuclear fuel fabrication facility. Predecessor companies of GTEOSI in interest operated processing units at this facility from approximately 1952 until 1966. These companies fabricated fuel element plates for various customers. The fabrication process included melting, shearing, punching, pressing, welding, heating, brazing, machining, powder blending, sintering, and chemical cleaning and milling. The United States Atomic Energy Commission (AEC) terminated the facility's license in 1967. Sylvania continued non-licensed activities on the site until 1972, when the properties were sold. Several buildings that existed during the period when Sylvania conducted nuclear fuel activities have been demolished, with only one building remaining from the period.

1.3 Project Description

This project consists of the excavation of test pits and other associated investigative activities at the Former Sylvania Electric Products Facility Site, in accordance with federal, state, and local rules and regulations. The work includes mobilization/demobilization, survey, utility markout, soil screening (rad and chemical parameters), manual soil sampling, and site restoration.

Scheduled project tasks include:

- Mobilization/demobilization (non-intrusive)
- Survey (non-intrusive)
- Utility markout (non-intrusive)
- Soil screening (intrusive)

- Manual soil sampling (intrusive)
- Site restoration (non-intrusive)

Envirocon has assembled the following personnel for the site investigation activities and associated work at the Former Sylvania Electric Products Facility Site in Hicksville, Nassau County NY.

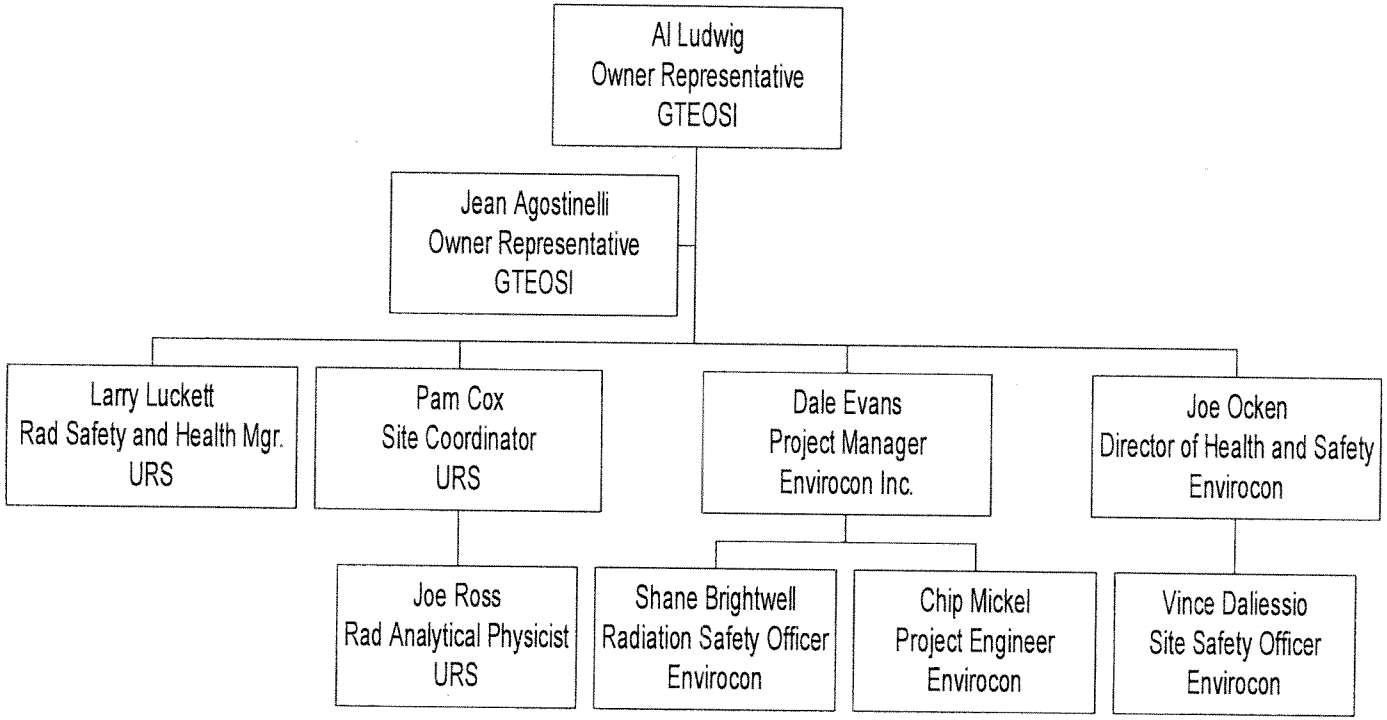
- Project Manager – Dale Evans
- Site Superintendent –
- Project Engineer – Chip Mickel
- Certified Health Physicist – Shane Brightwell
- Regional Health and Safety Manager / Site Safety Officer - Vince Daliessio, CIH

The following table provides the key project position assignments and associated responsibilities.

Position	Job Description	Interactions
Project Manager / Site Superintendent	Responsible for technical and administrative performance of overall contract to ensure conformance with technical and scope requirements, progress vs. schedule, expenditures vs. budget, and appropriate issues. Acts as point of contact for client/client's representative. Direct supervision over all on-site personnel and subcontractors. Coordinates daily site-specific work efforts, and ensures all activities are in strict compliance with site-specific health and safety plan. Has authority to suspend all work that posses any health and safety risk. Maintains consistency of technical approach. Briefs subordinate technical personnel on task requirements. Identifies and resolves technical problems. Provides periodic review of project progress. Provides overview of project on regular basis to include monthly reports and projections. Assigns key on-site personnel and identifies, requests, secures, and monitors use of resources for project. Approves program expenditures and invoices.	Reports directly to Eastern Regional Manager. Interacts closely with CHP, SSO, RHSM.
Regional Health & Safety Manager	Defining, developing, implementing, and enforcing the on-site safety program. Oversees all health and safety aspects of project, conducts periodic audits to ensure compliance. Is available at all times to discuss project progress and health and safety related issues.	Reports directly to Health and Safety Director. Interfaces with Project Manager / Site Superintendent and Site Safety Officer.
Site Safety Officer	Present on site full time during intrusive activities. Assures compliance with HASP. Instructs site personnel in health and safety procedures through daily pre-work meeting. Develops and implements site-specific health and safety plan. Performs any monitoring activities as required. Evaluate air monitoring data to make field decisions regarding safety and health. Has authority to discontinue site operations if safety violations exist. Effect evacuation of the site or work area if necessary.	Reports directly to Regional Health & Safety Manager. Interacts closely with Project Manager / Site Superintendent.
Certified Health Physicist / Technician (CHP / HPT)	On site during excavation and any radiological materials handling. Monitors the excavation. Performs field screening of air and soil samples.	Reports to Project Manager. Interacts closely with Site Safety Officer, Site Superintendent

Soil Remediation Program
Pilot Test Excavation
Former Sylvania Electric Products Facility

Project Organization



2.0 HAZARD ASSESSMENT

The following chemical and physical hazard assessment applies only to the activities covered by this HASP. The chemical hazards are those present in occupationally significant concentrations as identified in the data package provided to Envirocon with the contract Specifications.

2.1 Chemical Hazards

The chemical hazards are those identified in in the Specifications. Contaminant concentrations in soil are expressed in milligrams per kilogram (mg/kg) which is equivalent to parts per million (ppm), or in micrograms per kilogram (ug/kg) which is equivalent to parts per billion (pbb). Contaminant concentrations in water are expressed in milligrams per liter (mg/l) which is equivalent to ppm, or in micrograms per liter (ug/l) which is equivalent to ppb. Exposure assessments (after Marlowe, 1995) for chemicals in soils and groundwater were conducted using this data. Based upon the results of the exposure assessments, it is possible, but unlikely, that workers on this site will be exposed to chemicals known to be present at this site above the OSHA Permissible Exposure Limit (PEL). The exposure assessments are included in Appendix A.

2.1.1 Carbon Monoxide

Carbon Monoxide is a colorless, odorless gas. It is a chemical asphyxiant, which works by binding itself to the hemoglobin molecules in the red blood cells. Because carbon monoxide binds to hemoglobin better than either oxygen or carbon dioxide does, the affected red blood cells are ineffective at oxygen exchange. Carbon monoxide is sometimes a component of landfill gas. It is also formed by the incomplete combustion of motor fuels, such as gasoline.

2.1.2 Volatile Organic Compounds (VOCs)

2.1.2.1 Tetrachloroethene is a colorless liquid with a chloroform odor. It is non-flammable. Routes of exposure include inhalation, ingestion, and contact. Symptoms of exposure include irritation of the eyes and mucous membranes, fatigue, weakness, confusion, dizziness, and a headache, as well as depression of the central nervous system. Tetrachloroethylene damages the liver.

2.1.2.2 Trichloroethene is a colorless liquid with a chloroform odor. It is non-flammable. Routes of exposure include inhalation, ingestion, and contact. Symptoms of exposure are irritation of the eyes and mucous membranes, and headache, as well as depression of the central nervous system. Trichloroethylene damages the liver.

2.1.3 Metals:

2.1.3.1 Arsenic is a (ubiquitous) metal that is naturally found in soils. Arsenic can rarely be found in its elemental form but is most commonly identified in a trivalent (3+) or pentavalent (5+). Most industrial uses for arsenic involve its trivalent compounds while the more commonly found natural arsenic is in its pentavalent state in soils. Arsenic is a natural constituent of food. Arsenic compounds have been medically useful and are still in common use in veterinarian practice and agriculture. Arsenic is a by-product of coal combustion. Arsenic compounds may be toxic by ingestion or inhalation. The trivalent forms of arsenic are more toxic than pentavalent forms. Arsenic accumulates in the liver, muscle tissue, hair, nails, and skin. The symptoms of acute inorganic arsenic toxicity include burning and dryness of oral and nasal cavities, gastrointestinal disturbance, muscle spasms, vertigo, delirium (dizziness), and coma. Swelling of the face and eyelids also occur. Chronic arsenic toxicity is characterized by malaise and fatigue. Pale bands on the fingernails and toenails may occur. Hyperpigmentation and peripheral neuropathy also occur. Nasal septum ulceration is seen after long periods of industrial exposure. Increased arsenic is identified in hair, nails, and urine long after exposure situations are eliminated. Industrial and agricultural exposure to arsenic has been related to skin and respiratory tract cancer.

2.1.3.2 Barium is usually found in compound form such as barium chloride, barium nitrate, or barium sulfate (occurs in nature). It is a white, odorless solid or powder. Symptoms of barium exposure include eye, skin, upper respiratory irritation, skin burns, gastroenteritis, muscle spasm, slow pulse, extrasystoles, hypokalemia (potassium deficiency) Barium is present in site soils.

2.1.3.3 Beryllium is a hard, brittle, gray-white solid. It is an extremely lightweight, strong metal. Chronic beryllium exposure causes an allergic pneumoconiosis called beryllosis, symptoms of which include anorexia, weight loss, weakness, chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency. Other symptoms of beryllium exposure include eye irritation, dermatitis. NIOSH considers beryllium to be an occupational carcinogen. Beryllium is present in site soils.

2.1.3.4 Cadmium is a silver-white, blue-tinged lustrous, odorless solid metal. It is a noncombustible solid, however it will burn in powder form. Cadmium has a melting point of 610°F. Cadmium is used in battery manufacture. Symptoms of cadmium exposure include: pulmonary edema; dyspnea; cough; chest tightness; substernal pain; headache; chills; muscle aches; nausea; diarrhea; anosmia (loss of sense of smell); emphysema; proteinuria; mild anemia. Cadmium has caused lung and prostate cancers. Cadmium is present in site soils.

2.1.3.5 Chromium is a metallic element that is hard, brittle, and gray in color. The chromium ion forms many compounds that vary in color. In compounds, chromium may exist in one of three valence states: +2 (divalent), +3 (trivalent), or +6 (hexavalent).

The hexavalent chromium compounds such as chromic acid and its salts--chromates--are more toxic than the other valence states. Certain hexavalent chromium compounds are confirmed human carcinogens, while other hexavalent compounds such as monochromates and dichromates are non-carcinogenic. Hexavalent chromium compounds are generally more toxic than trivalent compounds. Hexavalent compounds are irritants and corrosives that can enter the body through inhalation, ingestion, and skin absorption. Trivalent, divalent, and elemental chromium metal can enter the body through inhalation and ingestion. In some individuals, chromium compounds act as allergens with skin dermatitis reported, while other forms show a definite corrosive action on skin and mucous membranes. Acute exposure to dust or mist ($Cr^{+6 \text{ or } +3}$) may cause coughing, wheezing, headache, fever, and chest pain. Respiratory irritation and edema may persist. Chromic acid mists and chromate dusts may cause severe irritation of the nose, throat, bronchial tubes, and lungs. Long-term or repeated exposure may cause ulceration/perforation of the nasal septum; respiratory irritation with asthma-like symptoms; skin rashes or allergic dermatitis may develop. Contact should be avoided.

2.1.3.6 **Lead** is a bluish gray, soft metal. When lead is ingested, much of it passes through the body unabsorbed, and is eliminated in the feces. The greater portion of the lead that is absorbed is caught by the liver and excreted, in part, in the bile. For this reason, larger amounts of lead are necessary to cause toxic effects by ingestion and a longer period of exposure is necessary. On the other hand, upon inhalation, absorption takes place easily from the respiratory tract and symptoms tend to develop more quickly. Therefore, inhalation is a more important potential route of exposure for this project. Inhalation or ingestion of lead is known to cause neurological, blood, liver, and kidney disorders. Symptoms of exposure include: decreased appetite, insomnia, headache, muscle and joint pain, colic, and conjunctivitis.

2.1.3.7 **Nickel** is principally found in ores with iron or copper. It has been mainly used in electronics, coins, steel alloys, batteries, food processing, and stainless steel. Dermatitis is the most frequent effect of exposure to nickel.

2.1.3.8 **Radioactive compounds** present at the site include actinium-228; bismuth-211, 214; cesium-137; francium-223; lead-210, 211, 212; potassium-40; protactinium-231,234, 234m; radium-223, 224, 226; thallium-208; thorium-227, 228, 230, 231, 232, 234; uranium-233, 234, 235, 236, 238.

2.1.4 Hazardous Materials Brought On-Site by Envirocon and Subcontractors

Material safety data sheets (MSDSs) for chemicals Envirocon will use during the remedial activities will be available onsite. All containers of hazardous materials brought onto the site must be clearly marked in accordance with OSHA's Hazard Communication Standard. MSDSs must be presented for any hazardous materials Envirocon or its subcontractors bring on-site.

TABLE 2-1: CHEMICAL HAZARDS AND LIMITS						
CONTAMINANT CAS#	OSHA PEL*	OSHA CEILING/STEL	NIOSH REL	ACGIH TLV*	ACGIH STEL / C	B
CARBON MONOXIDE 630-08-0	50ppm	N/A	35ppm	25ppm	N/A	1200ppm
TETRACHLOROETHENE 127-18-4	100ppm	200ppm (C) 300ppm (max)	Ca LFC	25ppm	100ppm	Ca (150ppm)
TRICHLOROETHENE 79-01-6	100ppm	200ppm (C) 300ppm (max)	Ca LFC	50ppm	100ppm	Ca (1000ppm)
ARSENIC †† 7440-38-2	0.01mg/m³	n/a	0.002mg/m³ (C)	0.01mg/m³	n/a	Ca (5mg/m³)
BARIUM(soluble) 10361-37-2	0.5mg/m³	0.5mg/m³	n/a	0.5mg/m³	n/a	50 mg/m³
BERYLLIUM †† 7440-41-7	0.002mg/m³	0.005mg/m³(C) 0.025mg/m³max	0.0005mg/m³ (max)	0.002mg/m³ (0.0002mg/m³)**	0.01mg/m³ ST	10mg/m³
CADMIUM †† 7440-43-9	0.005mg/m³	(9mg/m³ IDLH)	Ca LFC	0.01mg/m³ 0.002mg/m³(cpds)	n/a	9mg/m³
CHROMIUM (+3)† 7440-47-3	0.5mg/m³	N/A	0.5mg/m³	0.5mg/m³	N/A	25mg/m³
CHROMIUM (+6)†† (Insoluble)	LFC	0.1mg/m³(C)	0.001mg/m³	0.05mg/m³	N/A	Ca (15mg/m³)
	N/A	N/A	N/A	(0.01mg/m³)		
LEAD 7439-92-1	0.050mg/m³	N/A	0.10mg/m³	0.050mg/m³	N/A	100mg/m³
CKEL† (metal) (sol.cpds) (insol.cpds) 7440-02-0	1mg/m³	n/a	0.015mg/m³	1.5mg/m³ 0.1mg/m³ 0.2mg/m³	n/a	Ca (10mg/m³)

- All are 8-hour time weight average exposure (NIOSH RELs are for 10-hour TWAs unless other noted).
** - Intended Change.
† - Potential human carcinogen.
††-Confirmed human carcinogen.
^ - Vapor
Ceiling limit (C)- should not be exceeded at any time.
ACGIH – American Conference of Governmental Industrial Hygienists
LFC – Lowest Feasible Concentration.
OSHA – Occupational Safety and Health Administration.
PEL – OSHA Permissible Exposure Limit (June 1997).
NIOSH – National Institutes for Occupational Safety and Health.
REL – NIOSH Recommended Exposure Limit (June 1997).
STEL (ST) – Short-Term Exposure Limit (15 minute)
SKIN (SK) – Significant exposure possible via skin absorption
TLV – ACGIH Threshold Limit Value (2001).
IDLH – Immediately Dangerous to Life and Health

2.2 Physical Hazards

The following list of potential physical hazards have been identified for the planned site activities:

- Heavy Equipment
- Exposure to Noise
- Electrical Hazards
- Slip, Trip, and Fall Hazards
- Illumination
- Concrete Saw Use
- Hand Tool Use
- Pneumatic Tools
- Cutting and Welding
- Excavations
- Drum Handling
- Heat Stress
- Cold Stress

2.2.1 Heavy Equipment

The use of heavy equipment will require all personnel in the immediate work area to wear hard hats and steel-toed footwear in addition to personal protective equipment (PPE) required for performing work activities in the work area. No person shall walk underneath a piece of equipment when it is carrying a load, or if it is transporting materials to another area.

The following information warrants extra attention regarding work around heavy equipment (front end wheel loaders, backhoes, rollers, bulldozers, etc.) and heavy materials:

- Hardhats are to be worn at all times on site. Other protective gear as specified in this HASP is applicable as well.

- Obtain visual contact with the equipment operator before passing into swing radius or other danger zone.

- Establish hand signal communication when verbal communication is difficult. Determine one person per work group to give hand signals to equipment operators.

- Be cautious of solid footing at all times.
- Heavy equipment should have backup alarms of some type.
- Only qualified people are to operate heavy equipment.
- Use proper chains, hoists, straps, and any other equipment to safely move heavy materials. Tow chains are not to be used for lifting.
- Use proper personal lifting techniques. Use your legs, not your back.
- Do not walk directly in back of or to the side of heavy equipment without the operator's eye contact.
- Do not use a piece of equipment unless you are familiar with its operation. This applies to heavy and light equipment.
- Pipe sections and other materials to be utilized during this project will be heavy. Make sure all precautions have been taken prior to moving materials. Use equipment to move objects that are awkward or heavy.
- Be sure no underground or overhead power lines, electrical conduit, sewer lines, gas lines, water lines, telephone lines, or other utilities will present a hazard in the work area.
- Get information whenever you are in doubt about a material's weight.
- Use the buddy system.

2.2.2 Exposure to Noise

Exposure to occupational noise in the construction industry is regulated by 29 CFR 1926.52. The standard requires protection from the effects of noise exposure to be provided when exposures exceed 90 dB (A) for an 8-hour day. Exposure to impact or impulse noise should not exceed 115 dB (A) peak sound pressure level. Depending upon the noise levels generated, ENVIROCON may choose to perform noise monitoring of its personnel to determine when, and during what activities, hearing protection will be required and to determine the appropriate noise reduction rating (NRR) that the protection must provide.

Exposure to noise may result in the following:

- Temporary hearing losses where normal hearing returns after a rest period;
- Interference with speech communication and perception of auditory signals;
- Interference with the performance of complicated tasks; and
- Permanent hearing loss due to repeated exposure resulting in nerve destruction in the inner ear.

The Envirocon Health and Safety Program Manual (HSPM) contains guidelines for noise monitoring and hearing protection which will be adhered to during the course of construction.

2.2.3 Electrical Hazards

Ground fault circuit interrupters will be used on all portable, electrically operated equipment.

Equipment (i.e., backhoes, cranes, man lifts, etc.), which has the potential to come in contact with overhead power lines, shall not be positioned or operated within 10 feet of energized power transmission lines.

All equipment and power lines with a potential electrical exposure will be verified, locked, and tagged as being out of service. This will be accomplished before any dismantlement operations are initiated. All lines must be traced to the main electrical panel or nearest junction box to confirm the lines have been de-energized. All lockout/tag out procedures found in the Envirocon HSPM will be followed.

2.2.4 Slip, Trip and Fall Hazards

Employees will be aware of slip, trip, and fall hazards on-site and discuss at the daily tailgate safety meeting. The presence of heavy equipment requires all personnel on-site to wear steel-toed footwear and hard-hats. Personnel in the immediate work vicinity should maintain a safe distance from operating machinery. Also, during any decontamination in Level C PPE, it may be possible that the floor is slippery, surfaces unreliable, debris present, and wet or dusty areas exist. Additional on-site slip, trip, and fall hazards include aboveground piping, loose stone, existing landfill side slopes, existing access roads, and existing active landfill area. All personnel should be aware of the variability of the work surface in their work area. Every attempt will be made to prevent accidents due to slips, trips, and falls by thorough review of the daily tasks and site conditions during the morning tailgate safety meeting.

2.2.5 Illumination

If work takes place during other than daylight hours, or in confined spaces where there is insufficient natural light, work areas will be lit to provide each activity illumination in accordance with the requirements of 29 CFR 1910.120(m).

2.2.6 Concrete Sawing (walk-behind and/or demo saw)

Concrete sawing using walk-behind and/or portable gas-powered saws will occur on this project. Only properly trained workers are to use saws on the project. Saws must be maintained with all critical guards and safety devices intact and functioning. In addition to standard PPE, the following PPE will be used:

- Respirator with P100 filters (dry-sawing only)
- Face Shield
- Hearing Protection
- Leather Work Gloves

2.2.7 Hand Tool Use

A variety of hand and power tools will be used during this project. This includes, plate tampers, jumping jacks, cut-off saws, chain saws, and other electrical and combustion-powered equipment. Prior to use of any equipment, the operator will make themselves knowledgeable of proper operation either by receiving instructions or reading manufacturer's operating manual. All operators will be required to demonstrate proficiency in tool operation. Prior to each day's use, all guards, governors, and protective devices will be checked. Proper PPE for specific tools that may be required in addition to standard Level D or Level C PPE will be assigned by SSO and used. This may include face shield, chaps, metatarsal or foot guards. Loose clothing will not be worn when using power tools. All electrical hand tools shall be approved double-insulated or properly grounded, and used only with ground fault circuit interrupters.

2.2.8 Pneumatic Tools

Pneumatic power tools shall be secured to the hose or whip in a positive manner to prevent accidental disconnection. Safety clips shall be securely installed and maintained on impact tools. The manufacturer's safe operating pressure for all fittings shall not be exceeded. Proper PPE as determined by the SSO will be used for all such operations. The SSO will review operations and use HSPM for guidance in determining additional PPE requirements.

2.2.9 Cutting and Welding

Envirocon will issue a Hot Work Permit prior to any welding or torch cutting on site. No work will take place until the permit is issued. An example of this permit is included. Air monitoring

for flammable and explosive atmospheres will be conducted prior to and during any hot work activity. A second person with ready access a portable fire extinguisher will be on standby during cutting/hot work operations. Additional PPE for welding/cutting operations will be assigned by the SSO following guidelines established in the HSPM. This may include, but not limited to, welder's face shield with lenses meeting ANSI Z 87.1-1989 standards, leather gloves, gauntlets, and aprons.

2.2.10 Excavations

Envirocon will perform excavation operations to install materials at depths greater than or equal to 4 feet. Envirocon will conduct trenching by initially clearing the trench line, and then delineating the trench boundaries with caution tape and/or barriers. An excavator will straddle the centerline of the trench and dig down to the depths provided in the Contract Drawings. Typically, the spoils will be adjacent to the trench or loaded into off-road trucks and any contaminated water will be channeled to flow back into the trench for collection. Initially, sloping back the sides of the trench to an angle of repose of 1:1.5 or gentler, and/or use trench boxes. The installation of geotextile and bedding material will not require entry of Envirocon personnel into the trench. In the event hazardous materials are encountered, work will be stopped and the Envirocon SSO will be notified immediately. All parties will assess the situation, and work will proceed in accordance with the contract documents.

2.2.11 Drum Handling

It is not anticipated that buried drums will be encountered during waste relocation activities on this project. If buried drums are encountered, work will stop to determine whether the drums are empty or filled, intact or fragmented. Intact, filled drums will be handled, stored, sampled, and disposed of as specified in section 02150 of the project specifications. Empty or fragmented drums will be crushed, moved and placed within the waste fill areas to be covered by the soil cap.

2.2.12 Heat Stress

Sweating does not cool the body unless moisture is removed from the skin by evaporation. The wearing of personal protective equipment (PPE) reduces the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's efforts to maintain an acceptable temperature become impaired.

Heat related problems include heat fatigue, heat rash, fainting, heat cramps, heat exhaustion and heat stroke. Heat rash occurs because sweat isn't evaporating, making the skin wet most

of the time. Standing erect and immobile in the heat allows blood to pool to lower parts of the body. As a result, blood does not return to the heart to be pumped to the brain, and fainting may occur.

Heat cramps are painful spasms of the muscles due to excessive salt loss associated with profuse sweating. The loss of large amounts of fluid and excessive loss of salt results in heat exhaustion. The skin will be clammy and moist and persons exhibit extreme wetness, giddiness, nausea and headache.

Heat stroke occurs when the body's temperature regulatory system has failed. Skin is hot, dry, red and spotted. The affected person may be mentally confused and delirious. Convulsions could occur. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH. A person exhibiting signs of heat stroke should be removed from the work area to a shaded area. The person should be soaked with water to promote evaporation. Fan the person's body to increase cooling, and GET MEDICAL ATTENTION IMMEDIATELY.
Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

Early Symptoms of Heat Related Problems:

- Decline in task performance
- Excessive fatigue
- Incoordination
- Insomnia
- Decline in alertness
- Muscle cramps
- Unsteady walk
- Dizziness

Susceptibility to Heat Stress Increases due to:

- Lack of physical fitness
- Obesity
- Lack of acclimation
- Drug or alcohol abuse
- Increased age
- Sunburn
- Dehydration
- Infection

People unaccustomed to heat are particularly susceptible to heat fatigue. First timers in Level D Modified PPE or higher need to gradually adjust to the heat.

Measures to Avoid Heat Stress:

- Establish work-rest cycles (short and frequent are more beneficial than long and seldom).
- Identify a shaded, cool rest area.
- Rotate personnel, alternative job functions.
- Water intake should be equal to the sweat produced. Most workers exposed to hot conditions drink less fluids than needed because of an insufficient thirst. DO NOT DEPEND ON THIRST TO SIGNAL WHEN AND HOW MUCH TO DRINK. For an 8-hour workday, 50 ounces of fluids should be drunk.
- Eat lightly salted foods or drink salted drinks such as Gatorade to replace lost salt.
- Save most strenuous tasks for non-peak hours such as the early morning or at night.
- Avoid alcohol during prolonged periods of heat. Alcohol will cause additional dehydration.
- Avoid double shifts and/or overtime.

The implementation and enforcement of the above mentioned measures will be joint responsibility of the Project Manager, Site Supervisor, and Site Safety Officer. Potable water must be available each day for the field team.

Site personnel should monitor their heart rate as an indicator of heat strain by the following method:

Radial pulse rates should be checked by using fore and middle fingers and applying light pressure to the pulse in the wrist for one minute at the beginning of each rest cycle. If the pulse rate exceeds 110 beat/minute, the next rest period should be increased by 1/3. If the pulse rate still exceeds 110 beats/minute, the work cycle will be shortened by 1/3. The Envirocon heat stress monitoring log will be used during to record this activity.

2.2.13 Cold Stress

Cold injury is classified as either localized, as in frostbite, frostnip or chilblain; or generalized, as in hypothermia. The main factors contributing to cold injury are exposure to humidity, high

winds, contact with wetness and inadequate clothing.

The likelihood of developing **frostbite** occurs when the face or extremities are exposed to a cold wind in addition to cold temperatures. The freezing point of the skin is about 30°F. The fluids around the cells of the body tissue freeze causing the skin to turn white. This freezing is due to exposure to extremely low temperatures. As wind velocity increases, heat loss is greater and frostbite will occur more rapidly. The first symptom of frostbite is usually an uncomfortable sensation of coldness followed by numbness. There may be a tingling, stinging or aching feeling in the effected area. The most vulnerable parts of the body are the nose, cheeks, ears, fingers and toes.

Symptoms of **hypothermia**, a condition caused by abnormally low body temperature, include uncontrollable shivering and sensations of cold. The heartbeat slows and may become irregular, the pulse weakens and the blood pressure changes. Pain in the extremities and severe shivering can be the first warning of dangerous exposure to cold.

When the ambient temperature or wind chill equivalent falls to below 32°F, ENVIROCON site personnel who must remain outdoors should wear insulated coveralls, insulated boot liners, hardhat helmet liners and insulated hand protection. Woolen mittens are more efficient insulators than gloves. The head can lose 40% of body heat when exposed. When it is not necessary to wear a hard hat, a wool knit cap provides the best head protection. A facemask may also be worn if respiratory protection is not required.

Envirocon site personnel should dress in several layers rather than one single heavy outer garment. The outer piece of clothing should be wind and waterproof. Clothing made of thin cotton fabric is ideal since it helps to evaporate sweat. Loosely fitting clothing also aids in sweat evaporation. Socks with a high wool content are best. If two pairs of socks are worn, the inner sock should be smaller and made of cotton. If clothing becomes wet, it should be taken off immediately and a dry set of clothing put on.

It may become necessary to shield the work area temporarily if wind conditions become adverse. The SSO will determine if this type of action is necessary, and heated break trailers will be available during the winter months.

2.2.13.1 Jobsite Monitoring Procedures

Since prolonged exposure to cold air, or to immersion to cold water, at temperatures well above freezing can lead to dangerous hypothermia, whole body protection must be provided.

Adequate insulating dry clothing to maintain core temperatures above 36°C (96.8°F) must be

provided to workers if work is performed in air temperatures below 4°C (40°F). Wind chill cooling rate and the cooling power of air are critical factors. (Wind chill cooling rate is defined as heat loss from a body expressed in watts per meter squared which is a function of the air temperature and wind velocity upon the exposed body.) The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required. An equivalent chill temperature chart relating the actual dry bulb air temperature and the wind velocity is presented in the below table. The equivalent chill temperature should be used when estimating the combined cooling effect of wind and low air temperatures on exposed skin or when determining clothing insulation requirements to maintain the deep body core temperature.

Cooling Power of Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	-10	-20	-30	-40	-50	-60
5	48	37	27	16	6	-5	-15	-26	-36	-47	-57	-68
10	40	28	16	4	-9	-24	-33	-46	-58	-70	-83	-95
15	36	22	9	-5	-18	-32	-45	-58	-72	-85	-99	-112
20	32	18	4	-10	-25	-39	-53	-67	-82	-96	-110	-121
25	30	16	0	-15	-29	-44	-59	-74	-88	-104	-118	-133
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109	-125	-140
35	27	11	-4	-20	-35	-51	-67	-82	-98	-113	-129	-145
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116	-132	-148
(Wind speeds greater than 40 mph have little additional effect)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security.				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trench foot and immersion foot may occur at any point on this chart.											

* Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.
☐ Equivalent chill temperature requiring dry clothing to maintain core body temperature above 36°C (96.8°F) per cold stress TLV.

Unless there are unusual or extenuating circumstances, cold injury to other than hands, feet, and head is not likely to occur without the development of the initial signs of hypothermia. Older workers or workers with circulatory problems require special precautionary protection against cold injury. The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions that should be considered. The precautionary actions to be taken will depend upon the physical condition of the worker and should be determined with the advice of a physician with knowledge of the cold stress factors and the medical condition of the worker.

For exposed skin, continuous exposure should not be permitted when the air speed and temperature results in an equivalent chill temperature of -32°C (-25.6°F). Superficial or deep local tissue freezing will occur only at temperatures below -1°C (30.2°F) regardless of wind speed.

At air temperatures of 2°C (35.6°F) or less, it is imperative that workers who become immersed in water or whose clothing becomes wet be immediately provided a change of clothing and be treated for hypothermia.

Provisions for additional total body protection are required if work is performed in an environment at or below 4°C (39.2°F). The workers should wear cold protective clothing appropriate for the level of cold and physical activity:

- If the air velocity at the jobsite is increased by wind, draft, or artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.

- If only light work is involved and if the clothing on the worker may become wet on the jobsite, the outer layer of the clothing in use may be of a type impermeable to water. With more sever work under such conditions, the outer layer should be water repellent, and the outerwear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of inner layers by sweat. If work is done at normal temperatures or in a hot environment before entering the cold area, the employee should make sure that clothing is not wet as a consequence of sweating. If clothing is wet, the employee should change into dry clothes before entering the cold area. The workers should change socks and any removable felt insoles at regular daily intervals or use vapor barrier boots. The optimal frequency of change should be determined empirically and will vary individually and according to the type of shoe worn and how much the individual's feet sweat.

- If exposed areas of the body cannot be protected sufficiently to prevent sensation of excessive cold or frostbite, protective items should be supplied in auxiliary heated versions.

- If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.

- Workers handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below 4°C (39.2°F) should take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling. Special note should be taken of the particularly acute effects of splashes of "cryogenic fluids" or those liquids with a boiling point that is just above ambient temperature.

For work practices at or below -12°C (10.4°F) equivalent chill temperature (ECT), the following should apply:

- The worker should be under constant protective observation (buddy system or supervision).
- The work rate should not be so high as to cause heavy sweating that will result in wet clothing; if heavy work must be done, rest periods should be taken in heated shelters and opportunity for changing into dry clothing should be provided.
- New employees should not be required to work full time in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing.
- The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the worker.
- The work should be arranged in such a way that sitting still or standing still for long periods is minimized. Unprotected metal chair seats should not be used. The worker should be protected from drafts to the greatest extent possible.
- The workers should be instructed in safety and health procedures. The training program should include, as a minimum, instruction in:
    - Proper re-warming procedures and appropriate first aid treatment.
    - Proper clothing practices,
    - Proper eating and drinking habits.
    - Recognition of impending frostbite.
    - Recognition of signs and symptoms of impending hypothermia or excessive cooling of the body even when shivering does not occur.
    - Safe work practices.

2.2.14 Poisonous Plants, Insects, Ticks, and Snakes

Persons working on the site should be aware of the possible presence of poisonous plants and insects.

Poison ivy is a climbing plant with leaves that consist of three glossy, greenish leaflets. Poison

ivy has conspicuous red foliage in the fall. Small yellowish-white flowers appear in May through July at the lower leaf axils of the plant. White berries appear from August through November. Poison ivy is typically found east of the Rockies. **Poison oak** is similar to poison ivy but its leaves are oak-like in form. Poison oak occurs mainly in the south and southwest. **Poison sumac** typically occurs as a small tree or shrub and may be 6 to 20 feet in height. The bark is smooth, dark, and speckled with darker spots. Poison sumac is typically found in swampy areas and east of the Mississippi. The leaves have 7 to 13 smooth-edged leaflets and drooping clusters of ivory-white berries appear in August and last through spring.

The leaves, roots, stems, and fruit of these poisonous plants contain an oil called *Urushiol.* Contact with the irritating oil causes an intensely itching skin rash and characteristic blister-like lesions. The oil can be transmitted on soot particles when burned and may be carried on the fur of animals, equipment, and apparel.

Proper identification of these plants is the key to preventing contact and subsequent dermatitis. Wear long sleeves and pants when working in wooded areas. In areas of known infestation, wear Tyvek coveralls and gloves. Oils are easily transferred from one surface to another. Wash all contaminated clothing and equipment promptly.

If you come in contact with these poisonous plants, wash all exposed areas immediately with cool water to remove the oils. Some commercial products such as Tecnu's Poison Oak-n-Ivy Cleanser claim to further help with the removal of oils.

Ticks are bloodsuckers, attaching themselves to warm-blooded vertebrates to feed. Deer ticks, which are associated with the transmission of Lyme Disease (ticks transmit the bacteria that causes the disease) have been observed in New England and Mid-Atlantic states. Not all ticks carry the disease.

Personnel should carefully inspect themselves each day for the presence of ticks or any rashes. This is important since prompt removal of the tick can prevent disease transmission. Female deer ticks are about ¼-inch in length and are black and brick red in color. Males are smaller and all black.

Removal of the tick is important in that the tick should not be crushed and care must be taken so that the head is also removed. If the head is not completely removed or if the tick is allowed to remain for days feeding on human blood, a condition known as **tick paralysis** can develop, which is due to a neurotoxin that the tick apparently iNYects while engorging. This neurotoxin acts upon the spinal cord causing incoordination, weakness, and paralysis.

One characteristic symptom of Lyme Disease is a bulls-eye rash that develops around the bite

site. The rash appears in about 60-80% of all Lyme Disease cases. Contact your SSO immediately if you develop such a rash.

Tick season lasts from April through October; peak season is May through July. Wear light-colored clothing (easier to spot ticks) with long sleeves and make sure that shirts are tucked into pants and pants are tucked into socks or boots. Ticks have a tendency to crawl upwards. These procedures will make it more difficult for a tick to reach your skin.

Studies have determined that repellents containing *DEET* as a main ingredient are most effective against mosquitoes and ticks. DEET can be directly applied to the exposed skin of adults and/or clothing. *Permanone* is another repellent; however, it can only be directly applied to clothing.

Poisonous snake bite is a potentially serious accident. It can lead to severe pain or other problems, occasionally even death. However, in North America it is not nearly as dangerous as most believe. These snakes seldom bite humans and even when they do, such bites are seldom fatal. Snakes will usually avoid you if you give them a chance. Try to be sure they know you are coming, don't reach into places they might hide, be careful turning over rocks, boards, etc. in snake country. Leave snakes alone unless you are sure they are safe (there is no simple rule to identify which are poisonous). This also applies to dead snakes and detached heads--reflex bites are just as dangerous as bites by a live snake.

If someone is bitten:

- Clean and disinfect the wound.
- Transport to a hospital as quickly as reasonably possible. Try to keep the patient quiet and resting. If necessary, a victim alone must walk to reach treatment, but this should be avoided if possible.
- Immobilize the area much as for a fracture. Use constricting bands above and below the site but be certain they do not interfere with blood circulation; they are only to slow down the movement of lymphatic fluids just under the skin. Alternatively, wrap entire area snugly with a cloth, elastic bandage, etc., again being careful not to interfere with blood circulation.
- As best you can, identify the snake to aid in determining the proper treatment.
- **DO NOT** cut into the wound area.

3.0 TASK AND OPERATION HAZARDS

WORK ACTIVITY	POTENTIAL HAZARDS	PREVENTIVE OR CORRECTIVE MEASURES
Mobilization	Slips, Trips & Falls	Housekeeping, material storage. (29 CFR 1926.250)
	Eye, Face Injuries	Safety glasses/face shield. (29 CFR 1926.102)
	Electrical Shock	De-energize power lines, only double insulated or grounded power tools will be used. (29 CFR 1926.400, 401)
	Struck by or Against Equipment, Tools or Vehicles	Back-up alarms, spotter, reflective vests serving areas. (29 CFR 1926.201, 600)
	Cuts or Lacerations	Proper gloves, PPE. (29 CFR 1910.132)
	Muscle and Back Sprains and Strains	Training on proper lifting technique.
	Noise	Monitoring, engineering controls, and hearing protection. (29 CFR 1926.52)
	Poisonous Plants/Insects	PPE, training, and repellent.
Site Preparation	Underground Utilities	Location disconnect. (29 CFR 1926.400)
	Overhead power lines	De-energize, maintain clearance. (29 CFR 1926.400, 401)
	Struck by or Against Heavy Equipment, Tools, and Vehicles	g
	Caught in or Between Objects (Pinch Points)	Maintain safe distances, wear proper work gloves. (29 CFR 1926.301, 1910.132)
	Exposure to Airborne Contaminants	Air monitoring, PPE. (29 CFR 1910.1000, 120)
	Contact with Contaminated Soil and Water	PPE, splash protection. (29 CFR 1910.132, 1910.120)
	Noise	Monitor, hearing protection. (29 CFR 1926.52)
	Eye Injuries	Safety glasses, face shield. (29 CFR 1926.102)
	Thermal Stress	Training on symptoms, control measures.
	Poisonous Plants/Insects	PPE, training, and repellent.
Excavation	Fire Explosion, Hot Cutting	Hot work permit, no smoking, monitor LEL fire protection equipment, proper PPE. (29 CFR 1926.150-154, 350, 352, 353).
	Confined Space	Monitor air, ventilate, permit procedures. (29 CFR 1910.146)
	Falling into Excavations	Barricade. (29 CFR 1926.202)
	Exposure to Hazardous Materials, Air Contaminants	Monitor with instruments, PPE and decon procedures, dust control. (29 CFR 1910.1000, 120)

WORK ACTIVITY	POTENTIAL HAZARDS	PREVENTIVE OR CORRECTIVE MEASURES
	Struck by Heavy Equipment or Falling Debris	Backup alarms, maintain safe distances. (29 CFR 1926.201, 600)
	Material Handling	All slings, hooks, cables inspected and maintained in safe condition. (29 CFR 1926.550)
	Slips, Trips, Falls	Material storage, secure areas. (29 CFR 1926.250
	Noise	Monitor, hearing protection. (29 CFR 1926.52)
	Cave-Ins	Proper shoring, sloping, ladders or stairs provided for access and egress. (29 CFR 1926.651)
	Poisonous Plants/Insects	PPE, training, and repellent.
Concrete Sawing	Slips, Trips, Falls on Wet Surfaces	Keep walkways clear, free of equipment and debris. (29 CFR 1926.250)
	Sprains, Strains	Training proper lifting techniques.
	Contact With Contaminated Soil, Water	Wear PPE, decon procedures. (29 CFR 1910.120, 132)
	Exposure to Airborne Contaminants	Monitor air, PPE. (29 CFR 1910.1000, 120)
	Confined Space Hazards, Oxygen Deficiency, Toxic, Hazardous Vapors	Monitor O_2, air contaminants, training on confined space procedures. Permit requirements. (29 CFR 1910.146)
	Noise	Monitor, hearing protection. (29 CFR 1926.52)
	Dust (silica)	Wet cutting, respirators
	Fire, Explosion	Fire protection, bonding, grounding. (29 CFR 1926.150-154)
	Striking or Being Struck by Equipment, Tools	Reflective vests, barricades secure work areas, backup alarms. (29 1926.201, 600)
	Poisonous Plants/Insects	PPE, training, and repellent.
Soil Monitoring, sampling	Struck by Equipment, Vehicles	Backup alarms, reflective vests, barricades, spotters. (29 CFR 1926.201, 600)
	Slips, Trips, Falls	Material storage, secure areas. (29 CFR 1926.250
	Underground, Overhead Utilities, Powerlines	Disconnect, de-energize utilities, maintain safe distances, Hand Test Pit area. (29 CFR 1926.550, 651)
	Noise	Monitor, hearing protection. (29 CFR 1926.52)
	Exposure to Contaminated Soil, Water	PPE, air monitoring, dust control. (29 CFR 1910.120, 132)
	Cave-Ins	Proper shoring, sloping, ladders or stairs provided for access and egress. (29 CFR 1926.651)
	Confined Space Hazards	Permit procedures, training for confined space. (29 CFR 1910.146)

WORK ACTIVITY	POTENTIAL HAZARDS	PREVENTIVE OR CORRECTIVE MEASURES
	Poisonous Plants/Insects	PPE, training, and repellent.
Backfilling	Slips, Trips, Falling into Excavations	Housekeeping, barricades secure areas. (29 CFR 1925, 1926.250, 202)
	Struck by or Against Equipment	Backup alarms, reflective vests. (29 CFR 1926.600, 201)
	Contact With Contaminated Soils, Water	PPE, decon procedures, dust control. (29 CFR 1910.120, 132)
	INJuries From Falling Materials, Debris	Inspect all slings, chains, ropes prior to use, maintain safe distance. (29 CFR 1926.550)
	Confined Space Hazards	Monitor air, permit procedures. (29 CFR 1910.146)
	Working over or near water	Life jackets or buoyants vests. Ring buoys and skiff (29 CFR 1926.106)
	Noise	Monitor, hearing protection. (29 CFR 1026.52)
	Poisonous Plants/Insects	PPE, training, and repellent.

4.0 TRAINING REQUIREMENTS

4.1 General

All personnel performing intrusive work in areas on-site covered by this HASP must have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual must have completed an 8-hour refresher training course and/or initial 40-hour training course within the last year prior to performing any intrusive work on-site. Also, on-site managers and supervisors directly responsible for supervising individuals engaged in hazardous waste operations must have completed the specified 8-hour supervisors training course. Envirocon corporate policy requires whenever three (3) or more Envirocon employees are performing work on the same site, at least one (1) of these individuals must have completed the supervisor's training course. Records will be maintained on-site in the Envirocon field offices that demonstrate all persons subject to the training requirements have actually met the requirements. The Project Manager and Site Safety Officer are responsible for verifying compliance of the project team and other parties subject to the training requirement.

At least one person qualified in First Aid and CPR should be present during site work, although not required by 29 CFR 1910.

Prior to the commencement of on-site activities, a Pre-Construction On-Site Safety Meeting will be held to review the specific information and requirements of the approved HASP. HASP sign-off sheets will be collected at this meeting, and as new employees arrive on-site. Short safety refresher meetings will be conducted, as needed, throughout the duration of the project.

Site-specific training will include:

- Location of MSDS's.
- Explanation of the approved HASP.
- Health and Safety Personnel and Organization.
- Brief site history.
- Special attention to signs and symptoms of overexposure to known and suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.
- Physical hazards associated with the project.
- Selection, use and limitations of available safety equipment.
- Personal hygiene and decontamination.
- Respirator face piece fit testing.
- PPE fitting to determine proper size for individuals.
- Site rules and regulations.
- Work zone establishment and markings.
- Site communication and the "Buddy System".
- Emergency preparedness and evacuation procedures.
- Decontamination activities.

- Medical monitoring procedures.
- Contingency Plan.
- Confined Space Entry and Permits.
- Hot Work Permits.

4.2 Hazard Communication

The Envirocon Hazard Communication Program has been established in order to comply with 29 CFR 1910.1200, Hazard Communication. All employees will be briefed on this program, and have access to a copy for review.

4.2.1 Container Labeling

All containers received on-site will be inspected to ensure the following:

- All containers will be clearly labeled as to the contents;
- The appropriate hazard warnings will be noted; and
- The name and address of the manufacturer will be listed.

All secondary containers will be labeled with either an extra copy of the original manufacturer's label or generic labels. All hazardous waste containers shall have labels that list the date when storage began in the container, i.e., out-of-service date.

4.2.2 Material Safety Data Sheets (MSDSs)

Copies of MSDSs for all hazardous chemicals known or suspected on site will be maintained in the Envirocon field office. MSDSs will be available to all employees for review at all times, and shown file location during site orientation. The MSDSs will be made available to the attending physician, and emergency medical staff in the event of a medical emergency.

4.2.3 Employee Training

Prior to starting work, each employee will attend a health and safety orientation, taken on a supervised site tour, and receive information and training on the following:

- An overview of the requirements contained in the Hazard Communication Standard, 29 CFR 1910.1200;
- Chemicals present in their workplace operations;
- Location and availability of a Hazard Communication Program;
- Physical and health effects of the hazardous chemicals;
- How to lessen or prevent exposure to these hazardous chemicals through usage of control/work practices and PPE;
- Emergency procedures to follow if they are exposed to these chemicals;
- How to read labels and review MSDSs to obtain appropriate hazard information;

- Location of MSDS file and location of hazardous chemical list in the Envirocon field office.

The following subcontractors who will be performing work outside of the waste fill limits, or non-intrusive work within the site boundary are as follows:

- Electrical
- Fence Installation
- Surveying

These contractors will be will receive a site orientation but will not require training or physicals for entry to the site. They will be allowed to work in non-waste contact areas only.

An Envirocon Site Superintendent will be on 24-hour call if Exclusion Zone entry is required after working hours.

Envirocon support personnel and vendors will be allowed to enter the site up to the Office Support Area. These individuals will not be required to have 40-hour training or to be allowed to proceed past the Office Support Area.

4.3 Training Records

Training records will be submitted before the employee starts work on-site and will be maintained onsite. A copy of all training certificates will be kept at the job site for each person working at the site.

SITE SPECIFIC TRAINING

I have attended a Site-Specific Health and Safety briefing, outlining health and safety provisions for remedial activities at the Former Sylvania Electric Products Facility Site in Hicksville, Nassau County, New York, including:

- Explanation of the approved HASP.
- Health and Safety personnel and organization.
- Brief site history.
- Special attention to the signs & symptoms of overexposure to known & suspected site contaminants.
- Health effects of site contaminants.
- Air monitoring description.
- Physical hazards associated with the project.
- Selection, use, & limitations of safety equipment & proper procedures for its use.
- Personal hygiene and decontamination.
- Respirator face piece fit testing.
- PPE fitting to determine proper size for individual use.
- Site rules and regulations.
- Site communications and the "Buddy System".
- Emergency preparedness procedures.
- Equipment decontamination.
- Medical monitoring procedures.
- Contingency Plan.
- Confined Space Entry.

EMPLOYEE INFORMATION

Print Name	Signature	Date

SITE HEALTH AND SAFETY OFFICER

Print Name	Signature	Date

Position:
OSHA HAZWOPER 40-Hours
OSHA HAZWOPER 8-Hour Refresher
OSHA HAZWOPER Supervisor
Medical Monitoring

Respirator Fit Test

5.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) will be donned as described below for the tasks covered by this HASP to protect Envirocon employees and subcontractors from coming in direct contact with potentially contaminated soils and groundwater.

5.1 Levels Of Protection

Level D PPE
Long Sleeve/Long Pants Work Clothes or Coveralls
Steel-toed Boots
Hard Hat
Safety Glasses or Goggles
Leather or Cotton Work Gloves
Hearing Protection (if necessary as determined by the SSO)
Tyvek Coveralls (if modified level D as determined by the SSO)

Level D Modified PPE
Long Sleeve/Long Pants Work Clothes or Coveralls
Steel-toed Boots
Nitrile Overboots
Hard Hat
Safety Glasses or Goggles
Leather or Cotton Work Gloves
Latex Inner Gloves
Nitrile Inner Gloves
Hearing Protection (if necessary as determined by the SSO)
Tyvek Coveralls

Level C PPE
Hard Hat
Safety Glasses or Goggles (if prescription eyewear is necessary it will conform to the requirements of ANSI Z87.1)
Steel-toed Boots
Long Sleeve/Long Pants Work Clothes
Polyethylene Tyvek Coveralls
Latex Surgical Inner Gloves
Nitrile Outer Gloves
Over the Shoe Booties (if product saturated material are encountered)
Canvas or Leather Gloves
Hearing Protection
Full Face Air Purifying Respirators with Combination (Organic Vapor/HEPA) Cartridges
Hearing Protection (if necessary as determined by the SSO)

Level B
Hard Hat
Safety Glasses or Goggles (if prescription eyewear is necessary, it will conform to the requirements of ANSI Z87.1)
Steel-toed Boots
Long Sleeve/Long Pants Work Clothes
Polylaminated Tyvek Coveralls (if product saturated materials are encountered)
Latex Surgical Inner Gloves
Nitrile Outer Gloves
Over-the-Shoe Booties (if product saturated materials are encountered)
Canvas or Leather Gloves
Hearing Protection (if necessary as determined by the SSO)
NIOSH Certified Supplied Air Respirator (SCBA or Air-Line Respirator with SCBAE, pressure demand regulators, full face piece)

Task	Initial LOP Assignment	Contingent Upgrade
Mobilization	Level D	Level D
Excavation	Level D	Level C
Concrete Cutting	Level D	Level C
Drum Handling (if required)	Level C	Level B

PPE Levels will be upgraded / downgraded based upon air monitoring data in accordance with Section 7.0 of this HASP.

Hearing protection will be necessary if noise levels exceed 85 dBA or understanding normal speech becomes difficult at a distance of 3 feet.

Envirocon employees or subcontractors with vision restrictions will not use level C and Level B PPE unless prescription insert glasses are used.

5.2 Respiratory Protection

During the course of work on the project, atmospheric conditions may exist where respiratory protection is required. If Level C (full-face air-purifying respirator) and Level B (full-face air-supplied respirator) respirators are required, they will be donned in accordance with the action levels defined in Section 7.0 of this HASP. All requirements of the Envirocon HSPM will be followed. All Envirocon or Envirocon subcontractor personnel on-site entering the exclusion and contamination reduction zones will have medical clearance for respirator use and fit test

documentation.

The SSO will address PPE action levels in accordance with Section 7.0 of this HASP. Respiratory protection can be donned whenever odors are objectionable. If dust levels exceed 5mg/m^3 measured over a 5-minute period, dust suppression activities will commence.

5.3 Additional Safety Equipment

Envirocon will bring the following additional safety equipment on-site:

- ANSI-Approved 15-minute Eyewash
- Site Telephone and 2-way radios
- First Aid Kit
- Fire Extinguishers
- Visitor PPE
- (2) Emergency Self-Contained Breathing Apparatus (SCBA)

5.4 PPE Program

The Envirocon PPE program can be found in detail in the HSPM, which will be located and accessible in the Envirocon field office on-site.

6.0 MEDICAL SURVEILLANCE

6.1 General Medical Surveillance Requirements

All Envirocon employees and subcontractors covered by this HASP who will enter restricted areas on-site during intrusive work must meet the medical surveillance requirements specified in 1910.120(f). Therefore, such personnel must have completed a baseline occupational medical surveillance examination, or an annual occupational medical surveillance examination within the last twelve (12) months.

The requirements for the medical surveillance examination for Envirocon personnel are contained in the HSPM. A copy of this manual will be available in The Envirocon field office. These requirements will be used as guidance in assessing the adequacy of examinations performed on its subcontractors. The Envirocon medical surveillance examination includes the following components:

- Personal Medical Questionnaire
- Occupational Exposure History
- Physical Examination
- Vision Testing
- Spirometry
- Audiometry
- Blood Chemistry Panel (e.g., SMAC-20)
- Complete Blood Count with Differential
- Urinalysis
- Urine Drug Screen
- Chest X-Ray (every two [2] years at a minimum)
- Electrocardiogram (At Physician's Discretion)

6.2 Site-Specific Medical Surveillance Requirements

Envirocon maintains these medical records at the office of the Corporate Medical Program Director. A copy of the physician's medical clearance form categorizing employees as fit for work and/or able to wear respiratory protection will be kept on-site and provided as required. Specific records are available to employees, upon request, by contacting the Medical Surveillance Program Director:

Dr. P. Greaney
333 South Anita Drive
Suite 630

Orange, CA 92868

All Envirocon personnel performing activities on hazardous materials on-site covered by this HASP must be active participants in the Envirocon Medical Monitoring Program or in a similar program which complies with 29 CFR 1910.120(i). The specifics of the Envirocon Medical Monitoring Program may be found in the HSPM. This program provides mechanism for pre-employment, annual, and exit medical exams. All craft labor will receive project pre-employment and exit exams as appropriate. Permanent Envirocon employees will remain on an annual exam schedule. No site- specific medical monitoring is required for this project.

6.3 Medical Clearance

All Envirocon employees and subcontractors covered by this HASP will be provided with a completed Medical Clearance Form.

7.0 MONITORING

7.1 Introduction

The primary potential routes of exposure to hazardous materials will be inhalation hazard during this project from the generation of dusts or gases from contaminated soils or garbage, contamination or direct exposure to radionuclides, or ingestion of contaminants through inadvertent hand to mouth transfer. Both direct reading instrumentation and personal air samples will be used to assess worker exposure to total dust, including radionuclides, volatile organic chemicals and toxic/flammable gas/oxygen deficiency within the established restricted areas and at their perimeter during closure construction.

The use of each type of direct reading instrument and requirements for personal monitoring are specified below. The designated Envirocon SSO and CHP or designee will perform all monitoring within the restricted areas.

7.2 Direct Reading Instrumentation

Instrument 1 - MIE Data-Ram Total Dust Monitor (or its equivalent)

Dust control measures, as described in this HASP, will be implemented to control total dust levels below an action level of 5mg/m^3. The total dust monitor will be used to determine that total dust levels within the established restricted areas are maintained below this action level. The readings will be taken at the locations within the restricted area, and during the time periods that are likely to represent worst-case conditions. The determination of worst case will be made by the Envirocon SSO and will be dependent upon such variables as the type of work being performed and number of employees or level of activity in the zone.

Instrument 2 - GasTech Combustible Gas/Oxygen/H_2S / CO Indicator

The combustible gas indicator (GCI) will be used to determine the potential presence of flammable atmospheres during confined space and hot work activities. Its calibration should be verified at a minimum of once, at the beginning, and once at the end of each day's use. The instrument should be calibrated against a 50 percent lower explosive limit (LEL) methane in air standard, (or other flammable gas or vapor with relative response similar to methane) according to the manufacturer's instructions. CGI readings should be taken whenever PID readings in excess of 50 units above background have been measured. The instrument's alarm will sound when 10 percent of the lower explosive limit (LEL) has been reached. Should the alarm sound, all sources of ignition should be shut down and field team members should back away from the immediate work area. Work should not resume until percent LEL readings have subsided

below 10 percent. Oxygen, carbon monoxide, and hydrogen sulfide levels will also be measured.

Instrument 3 - HNu - Organic Vapor Photoionization Detector or Equivalent

The HNu is a direct reading instrument that will be used to provide instantaneous measurement of total hydrocarbons in the breathing air of employees. The process of photoionization is initiated by the absorption of a photon of ultraviolet radiation energetic enough to ionize a molecule releasing an electron. A lamp generates the UV radiation and the released ions are collected in an ionization chamber that is adjacent to the lamp and contains an accelerating electrode (+) and a collection electrode where the current is measured. After amplification, the current measured is proportional to the concentration of hydrocarbons with an ionization potential less than or equal to the energy of the lamp. The PID will be calibrated using 100 ppm of isobutylene.

The Envirocon SSO routinely throughout the project will conduct area and personnel environmental air monitoring. The sampling plan can be divided into three (3) major segments. The segments are: 1) pre-testing to determine ambient background conditions; 2) air monitoring during construction activities; and 3) personnel air sampling during construction activities. Each segment is described separately as follows.

7.3 Background Sampling

Prior to on-site activity, The Envirocon SSO will review or collect background ambient air quality monitoring for flammable gas, oxygen deficiency, total VOCs, and total particulates. This background study will provide a baseline for evaluation of subsequent perimeter ambient air tests and personal protective equipment selection.

7.4 Air Monitoring During Intrusive Site Activities

During intrusive site activity, air monitoring will be conducted using real time air monitoring equipment according to the following schedule.

Real-time monitoring (using direct reading instrumentation) will be conducted in each active intrusive work area. The real time air monitoring equipment includes:

- Organic vapor monitor - HNu Model PI-101 with a 10.2 eV Lamp
- GasTech or equivalent combustible gas, oxygen, H_2S, CO meter, with alarm
- MIE Miniram dust monitor

The Envirocon SSO will utilize this equipment continuously and readings will be recorded in the field log on a regular basis. If direct monitoring levels for total dust, total organic vapors or explosive/flammable atmospheres exceed the action levels listed below, the Envirocon SSO will stop work and continue investigation and sampling until a resolution is achieved.

The Envirocon SSO and PM will prepare daily and/or weekly updated Exclusion Zone sketches that will be posted in the Envirocon trailers for general informational purposes. This will be done to depict the exclusion zones as they change during construction phases.

7.4.1 Real Time Monitoring

Real-time air monitoring will be conducted at the worker breathing zone, at the perimeter of active Exclusion Zones (EZs) and at the site perimeter on a regular basis during on-site construction and environmental remediation activity. The results of the real time monitoring will be evaluated according to the operational and perimeter action level tables. If the results indicate concentrations of contaminants at the perimeter in excess of the action levels specified, the client will be notified immediately. The Envirocon SSO will inspect the site to determine the cause of the elevated levels. Envirocon will modify activity to reduce elevated levels. If elevated levels persist, work will stop until the situation is rectified and acceptable levels are achieved.

OPERATIONAL ACTION LEVELS

CONTAMINANT	ACTION LEVEL*	RESPONSE
VOLATILE ORGANIC COMPOUNDS - HNu PI-101 Volatile Organic Monitor or equivalent	0 to 25 PPM above background	Level D, continue monitoring.
	25 to 150 PPM above background at the breathing zone & sustained for 15 minutes.	Level C continuous air monitoring. >50 ppm and benzene present, work will stop for evaluation.
	150 to 500 PPM above background at the breathing zone & sustained for 15 minutes.	Upgrade to Level B, continuous air monitoring
	>500 PPM above background at the breathing zone & sustained for 15 minutes.	Stop work, evacuate work zone and evaluate.
COMBUSTIBLE GAS IN AIR - MSA Passport LEL/02/H2S Monitor or equivalent.	Less than 10% LEL	Continue with caution.
	Greater than 10% LEL	Immediate exit work area and ventilate.
OXYGEN IN AIR - MSA Passport LEL/02/H2S Monitor or equivalent.	Less than 19.5%	Stop work & ventilate, re-test prior to re-entry or upgrade to Level B.
	Greater than 23.5%	Immediate withdrawal of personnel and investigate.
	19.5 to 23.5%	Continue work with air monitoring.
HYDROGEN SULFIDE IN AIR - MSA Passport LEL/02/H2S Monitor or equivalent.	Less than 5 PPM	Level D, no action taken to upgrade PPE; continue monitoring.
	Greater than 5 PPM, sustained for 1 minute.	Upgrade to Level B; continuous air monitoring.
TOTAL DUST MIE-DATARAM OR EQUIVALENT	0 to 0.1 mg/m^3 above background	Level D, no action taken.
	0.1 to 5 mg/m^3 above background, sustained for 5 minutes.	Level C, initiate dust control
	5 to 50 mg/m^3 above background.	Upgrade to Level B, continuous air monitoring; dust control, stop or modify work if necessary.
* All readings taken in the worker's breathing zone and sustained for 15 minutes, except where indicated.		

7.5 Perimeter Monitoring

The SSO or designee will visit the site perimeter at least three times per day to monitor for particulates and volatile organic compounds using direct reading instruments. Action levels for this monitoring activity will be as follows:

Perimeter Action Levels:

Contaminant/Instrument	Action Level	Response
Volatile Organic Compounds HNu-PID 101 or equivalent	1 ppm	Stop Work.
Total Dust-MIE Data-Ram	0.5 mg/m3	Stop Work / Dust Control.

7.6 Personnel Air Sampling

Personnel Air Sampling will be conducted for the first three days of intrusive activity for radionuclides (alpha emitters) using NIOSH 0500. Should additional personnel air sampling become necessary, it will be conducted using the appropriate NIOSH methods.

7.7 Radiological Monitoring

7.7.1 Integrated Particulate Sampling (pump and filter sampling)

Hazard monitored: Alpha radiation.

Application. Detects the presence and activity levels of alpha radiation associated with uranium and thorium.

Detection method. Perimeter work area air sampling at up to four locations will be established. Alpha particles that have been collected on the filter react with a detector that is proportional to the activity present.

General care and maintenance. Keep clean. Calibrate sampling equipment daily prior to field activities.

Personal air samples will be taken on workers performing intrusive activities. Area air samples for alpha radiation will be collected at the perimeter of the work zone at up to four locations. The number of sample locations will be determined by the SSHC. Air sample collection will consist of a mixed cellulose ester (MCE) filter in a plastic cassette attached to a calibrated vacuum pump with flexible tubing. The MCE filter will be analyzed using a Ludlum Model 2360 and 43-1-1 probe (or equivalent instrument).

The filter apparatus will be mounted at approximately 3 to 5 feet off the ground and shall be

operated for the duration of soil sampling activities at the determination of the SSO. Filters will be analyzed the following workday or at a frequency established by the SSO in consultation with the RHSM.

7.7.2 Thermoluminescent dosimeter (TLD) or equivalent

Hazard monitored: Accumulated radiation dose.

Application. One whole body badge and one ring badge will be worn by each worker engaged in Site activities to evaluate radiation exposure to the body and to extremities.

Detection method. TLDs contain crystals of lithium fluoride or an equivalent which when exposed to radiation, become excited and have the ability to maintain an excited state over a long period of time. The energy accumulated from exposure to radiation is maintained in the badge media until it is analyzed.

General care and maintenance. Whole body and ring badges must be replaced after a maximum sample period of one month and submitted for analysis. All body and ring badges must be kept on-Site with the control badge for each type of dosimeter for quality control and quality assurance.

Exposure-rate monitoring will be using real-time reading portable radiation survey instruments such as Ludlum model 12-s and Bicron Micro-Rem.

7.7.3 Wipe Samples

Hazard monitored: Radiological Contamination

Application: Detects the presence and activity levels of alpha radiation associated with uranium and thorium.

Detection method: Wipe samples will be taken on equipment exiting the established Exclusion Zones on the project subsequent to initial decontamination. Alpha particles that have been collected on the sample media react with a detector proportional to the activity present.

General care and maintenance: Keep clean. Calibrate sampling equipment daily prior to field activities.

Method: Wipe samples will be taken on all equipment exiting any Exclusion Zone. Wipe samples will be taken using commercially available wipe sampling media or 4" cotton gauze pads soaked in distilled, deionized water. The sample media will be wiped over a defined area (such as a 10cmx10cm area) of a portion of the equipment (such as tires or bucket) of the equipment that is likely to have been in contact with contamination. The sample media will be analyzed using a Ludlum Model 2360 and 43-1-1 probe (or equivalent instrument).

Samples will be analyzed the following workday and equipment will not be released for

unrestricted use until the equipment has been determined to be clean. Samples may also be taken in areas outside the Exclusion Zone that are known or suspected to have been contaminated, or as Quality Assurance samples for decontamination. These samples will be collected in locations and at frequencies established by the SSO in consultation with the CHP and RHSM.

8.0 SITE CONTROL MEASURES

To prevent both exposure of unprotected personnel and migration of contamination due to tracking by personnel or equipment, Work Zones, along with PPE requirements will be clearly identified.

8.1 Site Control and Security

All Envirocon employees, subcontractors, and visitors will be required to sign in and out on the Sign-In Log located in the Envirocon field office in the office support area. An Envirocon representative will accept all deliveries.

'Work Zones' (WZs) will be established around waste excavation and placement work areas, and be moved as work progresses. Only authorized personnel will be allowed to enter the active Work Zones. Envirocon will control access to the active work area. No visitor will be permitted to enter the facility unless accompanied by authorized personnel. Names and affiliation of each visitor will be recorded and maintained. A brief documented safety meeting detailing safety procedures must be held for visiting personnel before they can enter and observe site activities. A copy of the HASP will be kept on-site for reference and must be reviewed by all visitors and assigned personnel. All persons allowed on-site will require written acknowledgement of having reviewed the HASP.

Additionally, a site map clearly delineating Work Zones and routes into and out of Work Zones and the site will be posted. The Envirocon SSO will post EZ sketches in The Envirocon field office for visitors' information. The primary and alternate site evacuation routes will be designated on the site map, and permanently posted in The Envirocon field office.

8.2 Designation of Zones

Where applicable, (i.e. drum or bulk hazardous waste handling), Envirocon delineates Work Zones as suggested in the "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH / OSHA / USCG / EPA, November 1985. They recommend the areas surrounding each of the intrusive work areas on hazardous waste sites where there is a potential for exposure to be divided into three (3) zones:

- Exclusion or "Hot" Zone (EZ)
- Contamination Reduction Zone (CRZ)
- Support Zone (SZ)

8.2.1 Exclusion Zone

The Exclusion Zone (EZ) will consist of a corridor around the active work area where excavation, dewatering, or other soil or water handling activities area taking place and there is chance of exposure to subsurface contaminants or groundwater. It will be large enough to allow heavy equipment movement while being kept as small as possible so as not to impact facility operations. The perimeter of the EZ will also be sufficiently large to protect unprotected personnel from contact with vapors that may arise from these operations. The perimeter of the EZ will be marked with yellow caution tape, hi-visibility fence, traffic cones, etc. All personnel entering these areas must wear the prescribed level of protective equipment and satisfy training requirements.

The EZ includes those areas that are considered contaminated or have the potential to be contaminated in the event of a spill. A checkpoint will be established at the interface of the EZ and Contamination Reduction Zone (CRZ) to control the movement of personnel and equipment into and out of the contaminated area. It will be large enough to allow heavy equipment to pass through. The EZ will be clearly bounded and delineated by the "hotline". An EZ sign-in sheet will be maintained in the CRZ to log personnel times in and out of the EZ.

8.2.2 Contamination Reduction Zone

The Contamination Reduction Zone (CRZ) will be a clearly marked corridor between the EZ and Support Zone (SZ). This is where personnel will be in the sequential decontamination process when exiting the EZ. To prevent cross contamination and for accountability purposes, all personnel will enter and leave the EZ through the CRZ. Equipment will also be initially decontaminated in this area to allow repeated passage in and out of the EZ. Operators who will not be leaving their equipment are not required to go through the decontamination process until the last passage out of the EZ is made. The CRZ serves as a buffer zone between the SZ and the EZ.

Personnel will process through the "clean" end of the CRZ on their way into the EZ. Personnel will process through the contaminated side of the CRZ when leaving the EZ, and will be "contaminant free" before entering the SZ. The CRZ will be located in the direction upwind from the EZ, based upon prevailing wind patterns. Exiting from the CRZ requires the removal of all suspected or known contaminants through compliance with the personnel and equipment decontamination procedures as outlined in Section 9.0 of this HASP.

8.2.3 Support Zone

The Support Zone (SZ) will consist of those areas around the CRZ where support equipment is staged. It will be set up in an area believed to be free of above surface contamination. The SZ

includes the area where the command post and all other support for operations will be located. It will also include already remediated areas.

8.4 Additional Control Measures

The following measures are designed to augment the specific health and safety guidelines regarding the designation of work zones.

- The "buddy system" will be used at all times by all Envirocon field personnel. No one is to perform fieldwork alone. Standby team members must be intimately familiar with the procedures for initiating an emergency response.

- Avoidance of contamination is important. Whenever possible, avoid contact with contaminated (or potentially contaminated) surfaces or materials. Walk around (not through) puddles and discolored surfaces. To minimize the potential for puncture wounds due to sharp objects, do not walk through exposed waste if you can avoid it. Do not kneel on the ground or set equipment on the ground if possible.

- The office support area has been designated for eating and drinking on-site. **NO SMOKING** except in designated areas.

- Eating, drinking, chewing gum, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in all work areas.

- Hands and face must be thoroughly washed upon leaving the work area and before eating, drinking or any other activities.

- Beards or other facial hair that interfere with respirator fit are prohibited when respiratory protection is required.

- The use of alcohol or illicit drugs is prohibited at all times, and grounds for **immediate termination**.

- PPE equipment described in Section 5.0 will be required for all field personnel unless otherwise approved by the RHSM or SSO.

8.5 Site Safety Equipment

The following safety equipment will be available for Envirocon personnel. Envirocon subcontractors will be responsible for supplying their own safety equipment.

- 10 A-B-C fire extinguisher
- First aid kit
- ANSI-approved 15 minute eyewash
- Respirators and air purifying cartridges
- Tyvek coveralls
- Nitrile gloves
- Hardhats
- Work gloves
- Eye/face protection
- Disposable outer boots
- Hearing Protection

9.0 DECONTAMINATION PROCEDURES

9.1 Personnel Decontamination

A decontamination area will be established within each EZ just inside the access/ egress point. Upon exiting an EZ, the following cleanup procedures will be normally performed. For short duration entry into EZs, disposable boot coverings will be used and discarded upon exit through the clean-up area in lieu of full boot decontamination.

- Go to end of exclusion zone
- Cross into CRZ
- Remove booties; discard
- Remove tyvek; discard
- Remove and wash respirator or airline mask
- Rinse respirator or airline mask; hang to dry
- Wash inner gloves
- Rinse inner gloves; discard
- Wash hands and face

9.2 Personal Hygiene

Portable hand and face wash-up facilities will be provided outside of each of the established exclusion zones. To reduce the possibility of hand to mouth transfer of contaminants and absorption through skin contact, personnel will be required to wash their face and hands upon exiting the work areas and prior to smoking, eating, or drinking, if necessary. Eating will not be allowed in exclusion or contamination reduction zones.

In addition, portable sanitary facilities will be provided. The number of facilities provided will be in accordance with the requirements of 1910.120(n). They will be maintained in clean condition at all times.

9.3 Instrument Decontamination Activities

Instruments will be decontaminated whenever they are taken out of the EZ. Instrument clean up will occur in the CRZ. It will consist of the removal of any dust or soil from the surfaces of instruments, followed by screening with an instrument, such as a Ludlum Model 2360 and 43-1-1 probe (or equivalent instrument).

Equipment decontamination will be under the supervision of the SS, the CHP and the SSO.

9.4 Disposal of Decontamination Waste Streams

Decontamination water and solid waste such as disposable clothing may be generated as part of the decontamination process. Any decontamination water will be collected and disposed of properly. All waste PPE will be disposed of properly.

9.5 Site Equipment Decontamination

Envirocon will define the Exclusion, Contamination Reduction, and Support Zones (EZ, CRZ, and SZ, respectively) prior to commencing any intrusive work in the EZs. The EZ will be delineated and marked with caution tape, high-visibility fence, traffic cones, etc. Temporary signs will also be posted defining levels of protection required for entry. Subsequently, the CRZ will be constructed and delineated for personnel and equipment decontamination activities.

Any spent personal protective equipment (PPE) will be collected within the CRZ in clearly marked waste containers. This PPE will be checked by screening with an instrument, such as a Ludlum Model 2360 and 43-1-1 probe (or equivalent instrument), and, if not contaminated, disposed as trash, or, if sufficiently contaminated, disposed of with excavated waste. Only properly decontaminated personnel will be allowed to leave the CRZ and enter the SZ as judged by the CHP, SSO or designee. This will alleviate any potential cross-contamination into the clean areas.

The PM/Site Superintendent, CHP, and SSO, will complete the Equipment Decontamination Log. Equipment will be inspected and screened according to the method in 7.7.3 0f this HASP. Envirocon will utilize the following checklist during this activity.

Decontamination Checklist Former Sylvania Electric Products Facility Site		
ENVIROCON Equipment Description:		Date:
1	Exterior of vehicle/equipment visually decontaminated?	☐ Yes ☐ No
2	No soil or other materials are adhering to the vehicle/equipment body or undercarriage?	☐ Yes ☐ No
3	Is the vehicle/equipment leaking or dripping liquids?	☐ Yes ☐ No
4	Is the vehicle/equipment completely decontaminated so as not to permit potentially fugitive particulate matter to become airborne?	☐ Yes ☐ No
5	Is the vehicle adequately decontaminated, permitted to leave the decontamination pad, and removed from the site?	☐ Yes ☐ No
6	Wipe Sample results, Additional comments	☐ Yes ☐ No
Printed Name/ Envirocon Title Signature		Date

EQUIPMENT DECONTAMINATION LOG

Date	Time	Equip. Make & Model	ID #	Operation Location	Method of Decontamination	Method of Verification

10.0 EMERGENCY PLAN

10.1 Emergency Management

A site emergency is classified as an emergency considered to be a major event that has or threatens to have a detrimental physical impact on facilities, people, and/or the environment and requires immediate action. This definition applies to work locations and employees, as well as the people and property associated with contractors and the community.

Emergencies can be grouped into three categories:

- Fire, leak, spill, or release
- Medical
- Natural (hurricanes, flooding, etc.)

10.1.1 How to Respond to an Emergency

Fire, Leak, Spill, or Release

If an employee discovers a fire, leak, spill, or release:

- Report the emergency by site radio to the SSO or Superintendent. Give your name, exact location, and the nature of the emergency.
- Shut down all equipment.
- Leave the area.

Medical

For medical emergencies that are life threatening, the appropriate community emergency services will be mobilized. The Envirocon personnel within the Exclusion Zone, regardless of level of PPE, will bring the injured person out of the Exclusion Zone, bypassing the decon. The injured person will be ready at the CRZ for immediate evacuation by emergency personnel or local ambulance.

For employees with less serious injuries, Envirocon is responsible for providing first aid care. Injuries that border being first aid cases that do require outside assistance, i.e., emergency transportation, Envirocon will expedite emergency ambulance services. The Envirocon or subcontractor will stabilize the injured person as much as possible within the Exclusion Zone. Emergency response personnel will enter the Exclusion Zone in appropriate PPE to conduct first aid and will remove the injured person for appropriate medical attention through decontamination procedures.

Natural

In the event of a natural emergency, such as flooding, hurricane, tornado, etc., Envirocon will take appropriate precautions (e.g., secure material, gas bottles, tanks, as well as cranes and other equipment). Personnel may also be required to get off high structures or platforms. The phone numbers of the police and fire departments, ambulance service, local hospital, and Envirocon representatives are provided in the Emergency Reference sheet on the following page. Directions to the hospital are also provided.

10.2 Personnel Responsibilities

Prior to initiating work on-site, an Envirocon field team member, usually the SSO will be appointed to activate emergency response actions. In the event an injury or illness requires more than first aid treatment, the SSO or designee will accompany the injured person to the medical facility and will remain with the person until release or admittance is determined. The escort will relay all appropriate medical information to the SSO, PM, and the RHSM.

The PM has the authority and responsibility both to commit company resources to appropriately respond to an emergency and to exclude all personnel not directly responding to the emergency.

10.3 Emergency Reporting

Any incident (other than minor first aid treatment) resulting in injury, illness or property damage requires an accident investigation report, and will be reported to the SSO. The investigation will be initiated as soon as emergency conditions are under control. The purpose of this investigation is not to attribute blame but to determine the pertinent facts so that repeat or similar occurrences can be avoided.

The investigation should begin while details are fresh in the mind of anyone involved. The person administering first aid may be able to start the fact gathering process if the injured are able to speak. Pertinent facts must be determined. Questions beginning with who, what, when, where, and how are usually most effective to discover ways to improve job performance in terms of efficiency, quality of work, as well as safety and health concerns.

Potential emergencies that may arise are most likely to be associated with physical hazards from heavy equipment operation and/or lifting and loading of debris. Emergency response will in most cases be permissible to be performed in Level D.

10.5 Evacuation Plan

The basic elements of an emergency evacuation plan include employee training, alarm systems, escape routes, escape procedures, critical operations or equipment, rescue and medical duty assignments, designation of responsible parties, emergency reporting procedures and methods to account for all employees after evacuation.

Employee Training: Employees will be instructed in the specific aspects of emergency evacuation applicable to the site as part of the site safety meeting prior to the commencement of all on-site activities. On-site refresher or update training is required anytime escape routes or procedures are modified or personnel assignments are changed.

During the Pre-Construction Site Safety Meeting held, all employees will be trained in and reminded of the location of the evacuation plan, the procedures outlined in this plan, the communication systems and evacuation routes used during an emergency. Figure 1 details the emergency route to Shore Memorial Hospital located in Somers Point, New York, and Table 10-1 lists emergency phone numbers. Safe distances and rally points will be established for each phase of work, posted, and reviewed by all workers at the daily tailgate safety meetings.

On a continual basis, individual personnel should be constantly alert for indicators of potentially hazardous situations and signs and symptoms in themselves and others that warn of hazardous conditions and exposures. Rapid recognition of dangerous situations can avert an emergency. Potential emergencies that may arise are most likely to be associated with physical hazards from heavy equipment operation and/or lifting and loading of debris.

In the event of any emergency that necessitates an evacuation of the site, on-site personnel shall be notified by two-way radios to evacuate the area by immediate emergency exit. An alternate method of communication will be the use of portable air horns sounded in regularly spaced, repeated blasts, as detailed in the following section (10.5) of this HASP.

During an evacuation, all non-emergency radio transmissions shall cease. The SSO and SS shall control the scene until the appropriate municipal and state agencies arrive as necessary. The SSO/SS are responsible for head count of all personnel at rally points following evacuation.

10.5 Alarm Systems/Emergency Signals

An emergency communication system must be in effect on-site. The most simple and most effective emergency communication system in many situations will be direct verbal communications. Verbal communications will be supplemented anytime voices can not be clearly perceived above ambient noise levels (i.e., noise from heavy equipment; drilling rigs, backhoes, etc.) and anytime a clear-line-of-sight cannot be easily maintained amongst all site personnel because of distance, terrain, or other obstructions. When verbal communications must be supplemented, the following Emergency Signals (using hand held portable air horns) shall be implemented:

- **ONE HORN BLAST: GENERAL WARNING**

  One horn blast is used to signal relatively minor, yet important events on-site. An example of this type of event would be a minor chemical spill where there is no immediate danger to life or health yet personnel working on-site should be

aware of the situation so unnecessary problems can be avoided. If one horn blast is sounded, personnel must stop all activity and equipment on-site and await further instructions from the SSO and PM.

- **TWO HORN BLASTS: MEDICAL EMERGENCY**

  Two horn blasts are used to signal a medical emergency where immediate first aid or emergency medical care is required. If two horn blasts are sounded all first-aid and/or CPR trained personnel should respond as appropriate, all other activity and equipment should stop and personnel should await further instructions from the SSO and PM.

- **THREE HORN BLASTS FOLLOWED BY ONE CONTINUOUS BLAST: IMMEDIATE DANGER TO LIFE OR HEALTH**

  Three horn blasts followed by another extended or continuous horn blast signals a situation that could present an immediate danger to the life or health (IDLH) of all personnel on-site. Examples of possible IDLH situations could include fires, explosions, hazardous chemical spills or releases, hurricanes, tornadoes, blizzards or floods. If three horn blasts followed by a continuous blast are sounded, all activity and equipment must stop, all personnel must evacuate the site to an appropriately designated site located outside the site gate or further off-site if necessary. (Note: Unless otherwise specified, all decontamination procedures must be implemented.) All personnel must be accounted for and other response actions determined by the SSO or PM must be observed.

10.6 Medical Treatment/First Aid

The on-site SSO and PM shall have first aid kits for use in a medical emergency. First Aid Kits and eye wash stations will be located in the Envirocon field office main support area, and at work activity locations. On-site employees that have a basic knowledge of first aid can assist the SSO. Community emergency services (EMS, Fire, and Police) shall be notified immediately if deemed their resources are needed on site, and the phone numbers are provided in Table 10-1.

If necessary, the injured or sick party shall be taken to Shore Memorial Hospital located in Somers Point, New York. Please refer to Figure 1 (route to closest hospital) located at the end of this section.

A copy of the map and emergency reference information table shall be posted in The Envirocon office trailers and guardhouse, located near the entrance gate.

10.7 Fire Extinguishers

Support Area - Each trailer will be equipped with 10 A; 30BC multipurpose dry chemical type fire extinguishers. One fire extinguisher will be located by each door.

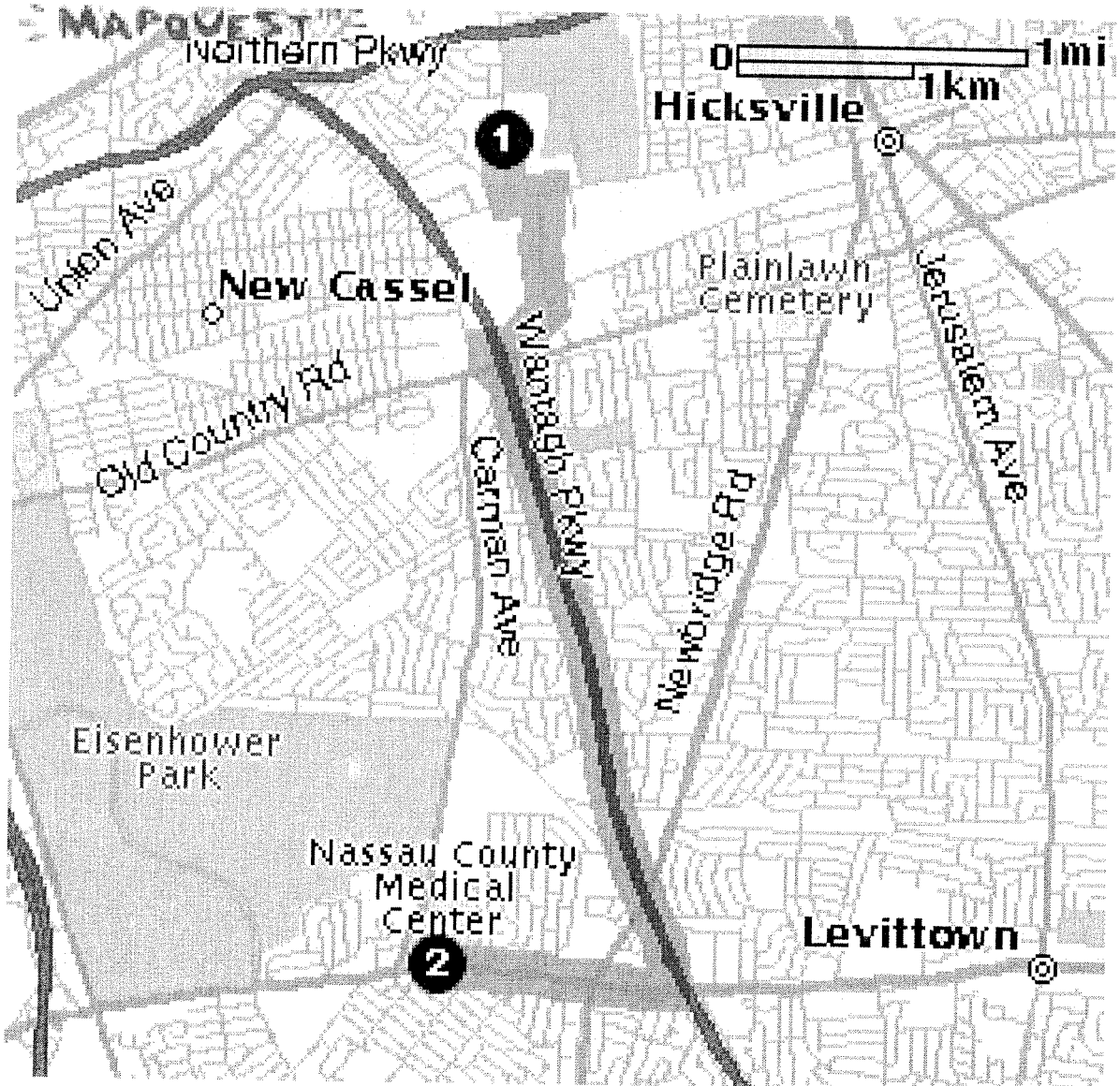
Hot Work - Two 20 ABC fire extinguishers will be located at each hot work location.

Equipment - All of The Envirocon heavy equipment are supplied with at least 2ABC multipurpose dry chemical type fire extinguishers. ABC type fire extinguishers can also be found in all vehicles.

TABLE 10-1
EMERGENCY REFERENCE INFORMATION

Municipality/Company	Contact/Name	Phone Number
Ambulance	(516) 542-0123	**911**
Police	(516) 573-6200	**911**
Fire	(516) 931-0026	**911**
Spill Reporting	National Response Center	(800) 424-8802
Chemical Transportation Emergency Center (Chemtrec)		(800) 424-9300
Poisoning (New York)	Poison Control Center	(800) 764-7661
Hospital	Nassau County Medical Center	(516) 542-0233
Spill Response	NYSDEC Hotline	1-800-457-7362
• Directions to the Hospital - Turn left onto Cantiague Rock Road (south). Take Cantiague Rock Road ½ block to traffic light (Prospect Avenue/West John Street) turn left. Turn right onto Charlotte Avenue. Go under railroad (slight right onto Duffy Ave.). Turn right at Hess Station onto Old Country Road. Turn right onto Wantagh State Parkway – south Exit 3W – NY Route 24 West – Hempstead. Turn left on Hempstead Turnpike (NY-24E). Hospital emergency entrance on the right side of the street.		
ENVIROCON Representatives		
· Field Manager	Dale Evans	(303) 215-0187 (office) (303) 885-2161 (cell)
· Site Safety Officer	Vince Daliessio, CIH	(610) 485-9732 (office) (610) 662-7988 (cell)
· Certified Health Physicist	Shane Brightwell, CHP	(970) 203-0195 (970) 481-5302 cell
· Site Engineer	Chip Mickel, PE	(303) 215-0297 (720) 253-8112 cell
GTEOSI	Al Ludwig	(214) 770-8267 cell
URS · Radiation Analytical Tech · Onsite Coordinator	 Joe Ross Pam Cox	 (716) 675-7130 (315) 450-4598 cell
Envirocon Corp. Dir Health & Safety	Mr. Joe Ocken	(406)-523-1194
Envirocon Loss Control/Investigations	Mr. Mel Lockridge	(406) 523-1179
Envirocon Medical Monitoring	Dyana Allison	(406) 523-1181

ENVIROCON SAFETY HOTLINE:		800-224-7389


MAPQUEST
Northern Pkwy
0
1mi
1km
Hicksville
1
Union Ave
New Cassel
Plainlawn Cemetery
Jerusalem Ave
Old Country Rd
Carman Ave
Wantagh Pkwy
Meadowridge Rd
Eisenhower Park
Nassau County Medical Center
2
Levittown
©2000 MapQuest.com, Inc.; ©2000 Navigation Technologies

11.0 SPILL RESPONSE

Reportable spills occurring on-site, whether liquid or solid, will be reported promptly to The Envirocon Project Manager and Site Safety Officer. It is not anticipated, due to the nature of this project, that any reportable quantities of solid materials will be released. No liquids that would pose a threat if spilled are being utilized. However, the following section describes management of waste spills and preventive measures.

Any solids spilled during the removal action will be promptly recovered and replaced into the container they came from if possible. If container is damaged, the spill will be contained with local soil or a spill control kit. The following procedures will then be implemented:

1. Notify ENVIROCON representative(s) immediately.

2. Isolate the spill area and control entry to the area quarantined.

3. Only personnel in the proper PPE will be allowed to enter the area.

4. Keep all traffic away from the spill.

5. Use a water fog to suppress vapors, fumes, dust or mist if imminent release from the site is apparent.

6. Remove and stockpile or containerize the waste immediately or as directed by SSO and/or PM.

12.0 HEALTH AND SAFETY INSPECTION

The Envirocon Regional Health and Safety Manager (RHSM) or his representative may perform a site-specific Health and Safety Inspection during site activities. Inspections are typically conducted monthly.

The purpose of the Health and Safety Inspection will be to: verify the effectiveness of the HASP in protecting the health and safety of both the employees of Envirocon and any contractors or subcontractors hired by Envirocon to assist in the completion of the project; confirm that the Site Operations Plan and HASP are being correctly implemented; and assure all aspects of the project safety are properly represented by these plans.

13.0 CONFINED SPACE ENTRY

Envirocon does not anticipate that any entry to Permit-Required Confined Spaces will be required for any work on this project. Should confined space work be required, Envirocon will adhere to the following procedures:

All employees required to enter confined spaces will observe requirements specified in 29 CFR 1910.146. Prior to entry, employees will have completed a confined space training program. Depending upon risk level, atmosphere testing for oxygen deficiency, combustible gases, and toxic agents may be required.

Confined spaces pose special hazards to the remedial workers because they can allow contaminants to concentrate to levels which are immediately hazardous and restrict the employees' movement as necessary to escape hazards such as moving equipment, collapsing earth, etc. Procedures for entry into the confined space are prepared for each project and included in this HASP.

The following items should be addressed prior to entry into the confined space:

- Sources of ignition shall be removed from confined spaces where flammable vapors may be present.
- Provisions of the lockout procedure must be satisfied, where applicable.
- Employees working in the confined space must be under the constant observation of a competent employee stationed outside the confined space.
- Every person entering an **enclosed**, confined space must wear a rescue harness with lifeline attached.
- When a ladder is required to enter a vessel, the ladder must be made secure at the top and must not be removed while anyone is inside.
- Adequate illumination must be provided. Approved, low-voltage, protected-type fixtures should be employed.
- The confined space is to be emptied, flushed, or otherwise purged of hazardous substances.
- Pipes or lines which convey any kind of substance to the confined space are to be disconnected, blinded, or have the valve locked off to prevent such substances from entering the confined space while work is in progress.
- Rescue equipment must be at the project site prior to commencing work. Rescue equipment will include extra rope, safety harnesses, and emergency self-contained

breathing apparatus (SCBA). No one should enter a confined space until adequate safety equipment is present to remove an unconscious person.

The following procedures apply to all projects conducted by Envirocon. The SSO is responsible for evaluating general safety hazards including executing confined space permits, locking out equipment, providing adequate lighting, tools, etc., and for assuring the conditions established for the confined space entry are maintained.

Definitions. A ***"confined space"*** is defined as a space that by design or construction has one or more of the following characteristics:

- Limited openings for entry and exit;
- Is large enough and so configured that an employee can enter and perform assigned work.
- Is not intended for continuous employee occupancy.

A ***"Permit-required confined space (permit space)"*** means a confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere.
- Contains a material that has the potential for engulfing an entrant.
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section.
- Contains any other recognized serious safety or health hazard.

Atmospheres. The primary hazard presented by entry to the confined space is the likely presence of an atmosphere that provides a hazardous situation. Hazardous atmospheres normally encountered in confined spaces can be divided into four (4) distinct categories:

- ***Flammable*** - A flammable atmosphere generally arises from enriched oxygen atmospheres, vaporization of flammable liquids within the explosive range, by products of work, chemical reactions, concentrations of combustibles, dust, and desorption of chemicals from the inner surfaces of the confined space. Flammability is measured in terms of the lower explosive limit (LEL) and upper explosive limit (UEL). The LEL is the point above which a sufficient concentration of gas exists to support combustion. The UEL is the point at which an excess amount of flammable gas is present to support combustion. The LEL and UEL are different for each

individual type of explosive gas.

- ***Toxic*** - The substances to be regarded as toxic in a confined space can cover the entire spectrum of gases, vapors and finely-divided airborne dust in industry. The sources of toxic atmospheres encountered include flammable materials listed above, volatile nonflammable gases that pose a threat to health (e.g., hydrogen cyanide, hydrogen sulfide).

- ***Irritant*** - An atmosphere posing a threat of irritation that may or may not be immediately evident. The body's sensitivity abilities can be generally weakened due to damage of the nerve endings in many cases. Thus, the worker is not aware of any increase in the exposure to toxic substances. An example of an irritant would be elemental iodine.

- ***Oxygen Depletion*** - An asphyxiating atmosphere can be created by three (3) basic operations:

    - Consumption of oxygen takes place during combustion of flammable substances, as in welding, heating, cutting, and brazing operations.

    - Oxygen can also be consumed during non-combustion chemical reactions, as in the formation of rust on the exposed surfaces of the confined space.

    - Oxygen displacement by another gas, such as argon, carbon dioxide, nitrogen and methane can displace the oxygen-bearing air, thus creating an environment immediately dangerous to life and health.

- ***Oxygen Enrichment*** - A toxic atmosphere could be present containing >23.5% Oxygen.

Pre-Entry Testing. Typically, monitoring tests are performed prior to the entry of personnel into the confined space. The testing regime is developed to detect the presence of flammable atmospheres (i.e., higher than LEL or lower than UEL), toxic atmospheres, oxygen enrichment (i.e., >23.5%), oxygen deficiency (i.e., <19.5%), or other harmful physical agents.

Combustible gas detectors are used to detect the potential for a flammable environment. These devices are usually calibrated to issue an alarm when a given percentage of the LEL (usually 25 percent) is reached. Other types of gas detectors such as Dräger tubes, photoionization detectors, flame ionization detectors may be used to detect the presence of other potentially harmful gases. An oxygen meter can be used to detect the concentration of oxygen in the confined space to alert operators to the presence of an oxygen deficient condition.

Equipment and Tools. The standards for the use of equipment and tools in the confined space must be increased to account for the special dangers presented by the confined space

environment. These enhanced standards are selected for each project and can include any combination of the following procedures can include:

- Increased inspection frequency.
- All equipment must be clean and in good repair.
- Any time 110-volt electrical power is to be used in confined space entry, power must be provided through a ground fault interrupter. The ground fault interrupter must be located outside of the vessel and as close to permanent wiring as possible to ensure against shock hazards from faulty or damaged power tools and extension cords.
- Lighting fixtures must meet appropriate codes depending on the expected atmosphere (i.e., explosion-proof, intrinsically safe, etc.).
- Air-driven hand tools shall be used when flammable liquids are present.
- Cylinders of flammable compressed gases shall never be taken into a confined space.
- Torches or other equipment must not be left in confined spaces where an open or leaking valve could fill the space with flammable gas and / or oxygen. Gases should be shut off at their source when not in immediate use.
- An approved lifeline and harness will be used when entering a closed type confined space.

Standby Person. A standby person is required when activities are being conducted inside a confined space. The standby person is assigned the responsibility of assisting the individual(s) who are entering the confined space. The standby person has the following duties:

- Assuring the entrants to the confined space have a valid permit each day.
- Knowing who is in the confined space and keeping them under surveillance from outside the confined space.
- Keeping unauthorized people out of the area.
- Recognizing early symptoms of danger in the space.
- Watching for hazards outside as well as inside the space.
- Maintaining clear access to and from the space.
- Remaining at his station at all times except when necessary to summon help.

If rescue of the individuals inside the confined space becomes necessary, the standby person is the person responsible for assuring that the appropriate measures are carried out in a timely manner. These duties include:

- Calling for rescue personnel.
- Staying outside until back-up personnel arrive.
- Performing the rescue from outside the confined space, whenever possible.
- Being able to promptly summon assistance.
- Being able to quickly locate and provide safety equipment, such as fire extinguishers and safety showers.
- Shutting down the equipment used in the confined space, such as welding equipment.
- The observer does not enter the vessel in case of emergency until other assistance arrives. Every person entering any vessel for rescue purposes must wear a harness with lifeline attached and a positive pressure air supplied respirator or SCBA.

Authorized Entry Supervisor. All confined space entry work conducted is thoroughly evaluated prior to starting. The space, potential hazardous materials present, planned work activities, assigned PPE, surrounding work activities, and site location are reviewed by the confined space entry supervisor. This individual must:

- Know potential hazards that may occur with confined space entry.
- Verify and check that the confined space entry permit is complete, all tests specified on the permit have been made, and all procedures and equipment specified on the permit are in place. This verification is to be followed by signature on the permit.
- Terminate entry by cancelling permit when necessary.
- Verify that rescue services are in place, available, and procedures established for calling them if necessary.
- Remove unauthorized individuals from permit spaces.
- Determines entry operations remain consistent and acceptable if attendant or entrant assignments change.

Authorized Entrant. Any employee directed to enter a confined space as part of their assigned duties has the responsibility to perform said duties knowledgeably and safely. In order to accomplish this, Envirocon provides confined space training to authorize employees as

confined space entry trained.

The responsibilities of an authorized entrant are:

- To know the hazards that may be faced during entry. These will be found in the site-specific HASP and include signs, symptoms, and consequences of exposure.
- To properly use assigned PPE.
- To communicate any unexpected/changed conditions or symptoms of exposure in the space to the attendant.
- To exit the permit space as quickly as possible when ordered by attendant to evacuate.

Cessation of Activities. A confined space entry permit becomes void and activities should be interrupted and the confined space evacuated if any of the following occur:

- The job is interrupted for more than 60 minutes, for any reason.
- An employee working in the vessel becomes ill or injured.
- A power failure occurs which renders the lighting or the telephone inoperative.
- Communication systems become inactive or non-functional.

Atmospheric Monitoring Procedures. The monitoring equipment will be operated according to the procedures for that particular piece of equipment. Placement of the probe into the confined air vessel should use extra care to hold the probe off the bottom of the confined space and to avoid pumping liquid into the analyzer. Often times longer lengths of sampling lines may be necessary in deep vessels to avoid entering the vessels. Typically, an oxygen measurement should be conducted to assure that the O_2 level is normal. For this project, any confined space entry will require monitoring for O_2, CO, volatile organics, and hydrogen sulfide using direct read instrumentation and action levels defined in Section 7.0 of this HASP.

Hot Work in Confined Spaces. Confined space environments also place special requirements on practices employed for hot work. No welding, cutting, or use of spark producing tools is permitted in any confined space where the flammable vapor concentration is or becomes above zero on the test unit. Welding and burning equipment, other than torches, hoses, cables and electrodes, will not be taken into any vessel. Gas cylinders and/or welding machines will be left outside the vessel.

All welding and burning equipment used inside a vessel must be provided with quick shut-offs under control of the outside observers. When gas welding or burning is suspended for an indefinite period of time, the gas supply is to be shut off at the cylinders and the torch removed from the vessel.

The SSO will execute hot work permits, and a copy of this document is included.

Try Procedure. Prior to starting dismantlement, efforts to start process equipment locked and tagged will be made by the SS and/or SSO.

Permit System. Entry into a permit-required confined space normally requires a permit specific to that particular entry. Exceptions to that rule include projects that largely consist of dedicated confined space entry such as when an enclosure has been constructed over the project. The permit is an authorization and approval in writing that specifies the location and type of work to be done, and certifies that all existing hazards have been evaluated by the SSO, and necessary protective measures have been taken to insure the safety of each worker.

The permit shall be dated and carry an expiration time that will be valid for one shift only. The permit shall be updated for each shift with the same requirements. The permit should be filled out completely, all questions should be answered, where the questions are "not applicable" then "NA" should be filled in for those questions. Entry into the confined space cannot be executed until all questions are addressed and all required signatures are obtained.

A copy of the Confined Space Permit and Diagram Form is included.

ENVIROCON

HOT WORK PERMIT

Project Name:	Date:
Site Supervisor:	Welder's Name:
Description of Work:	Estimated Length of Task:
Visual inspection of site for combustible materials completed.	Yes ☐ No ☐
All combustible materials removed or protected from heat source.	Yes ☐ No ☐
Confined spaces checked for flammable gases.	Yes ☐ No ☐
Fire Watch	Name:
Flame/Heat Resistant Clothing Worn	Yes ☐ No ☐
Eye Protection Adequate	Yes ☐ No ☐
Fire Extinguishers	Size and Type:
Other Project Workers notified of hot work	Yes ☐ No ☐

Signature of Site Supervisor:

copy to be retained in permanent project file

ENVIROCON Confined Space Entry Permit

Date: _____

Customer: _____ Customer Address: _____ Project #: _____

General Job Location: _____ Tank or Vessel I.D.: _____

Describe Material in Space: _____

Description of Work Planned: _____

TIME	L.E.L. %	OXYGEN %	BENZENE (PPM)	TOLUENE (PPM)	XYLENE (PPM)	_____ (PPM)	_____ (PPM)	_____ (PPM)	INIT

CHECKLIST	INITIAL	
	Yes	Not applic.
All lines to and from confined space have been blinded or disconnected		
Electrical services disconnected or locked out		
All grounding and bonding cables in place		
All lighting, fittings and cords are approved explosion-proof equipment		
Ground fault circuit indicator operational		
All ignition sources isolated		
Breathing supply and alarms in proper condition		
Respiratory supply system in proper condition		
All safety harnesses and lifelines in proper condition		
All required protective clothing, gloves, boots, etc. used		
Employees trained in the use, care and limitations of PPE		
Outside safety watch trained in emergency procedures and resuscitation		
Vessel contains leaded product		
Emergency systems (air packs, fire extinguishers, etc) ready for use		
Special warning signs posted		
Ventilation system in use		
No facial hair, eye glasses preventing respirator seal incl. standby observer		
No contact lenses in an atmosphere where respirator is needed		

Personal Protectiv Equipment

EYES

chemical goggles

safety glasses

face shield

EXTREMITIES

gloves

boots (pvc/neopren

BODY

hvy suit (pvc/neopren

saranex suit

tyvek suit: white-yello

RESPIRATORY:

airline respirator

airline w/egress

cartridge type:_____

Hearing Protection

Lifeline and Harness

Signature of Person Making Entry: Date:

Supervisor's Signature:

DIAGRAM THE CONFINED SPACE. INDICATE THE LOCATION OF MANWAYS AND VENTILATION. INDICATE THE LOCATIONS WHERE TESTS WERE CONDUCTED.

VIEW FROM TOP (INDICATE NORTH)	VIEW FROM SIDE
( ) MANWAYS (00) VENTILATOR	X-TEST LOCATION

THIS LOG OF INSPECTIONS AND TESTS FOR PERMIT TO ENTER A CONFINED SPACE IS APPLICABLE AND VALID ONLY FOR ONE SHIFT ONLY FOR THE EMPLOYEES DESIGNATED BELOW:

EMPLOYEES ASSIGNED (PRINT NAME)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

ATTENDANT PERSONNEL ASSIGNED

_____

_____

_____

_____

_____

_____

_____

_____

_____

QUALIFIED PERSONNEL:

_____

_____

_____

SUPERVISOR NAME:_____

SIGNATURE:_____

DATE:_____

CLOSEOUT DATE:_____

ENVIROCON INC.

HEALTH AND SAFETY PLAN

FOR

FORMER SYLVANIA ELECTRIC PRODUCTS FACILITY SITE

HICKSVILLE, NY

December 14, 2001

ENVIROCON Project No. 14400

Prepared by: Date:

Vincent M. Daliessio Jr., CIH

Reviewed by: Date:

Dale Evans, Project Manager

HEALTH AND SAFETY PLAN

FOR

FORMER SYLVANIA ELECTRIC PRODUCTS FACILITY SITE

HICKSVILLE, NY

December 14, 2001

ENVIROCON Project No. 14400

I, the undersigned, have reviewed a copy of the above referenced document. I have read and understand its contents and agree to abide by them.

Name (print):_____ Date:_____

Signature:_____

Represented Company:_____

APPENDIX C

SOIL GAMMA MEASUREMENTS

Gamma surveys (shielded and unshielded surveys) were conducted on soils in the field using portable instrumentation to quantify radionuclide constituents of interest (COI) in order to develop correlations between field instrumentation and laboratory analytical results. The desired correlation would result in gamma measurements (and variations in such measurements) that correspond to known radionuclide concentrations (and variations in such concentrations). With such a correlation, the applicable survey method could be used in the field to direct cleanup efforts on a real-time basis, thereby substantially reducing the need to rely on time-consuming sampling and subsequent laboratory analyses. As a result, the need for laboratory analyses could be reduced to verification and confirmatory sampling after an area has been adequately remediated, based on such field gamma surveys.

C.1 Shielded Gamma Surveys on Soils

As described Appendix A, a shielded 3" NaI probe calibrated to a data logger was set up to measure three independent channels, each corresponding to a specified gamma energy or energy range. The intent with setting up three independent channels was to identify an optimum gamma energy or energy range for use in the gamma-to-radionuclide concentration correlation.

After the concrete floor slab was removed from the pilot test area and the underlying soils were exposed, qualitative gamma surveys were performed to compare adjacent concrete surface levels (concrete typically contains NORM that can influence background soil gamma measurements) to the range of exposed soil levels. Readings on concrete were slightly lower than the lowest reading on the surface of the soil in the first lift (0 to 1 foot). Readings at the edge of the soil/concrete boundary were quite distinct; holding the shielded probe directly over either material at the interface indicated that there should be no detectable influence by the concrete's lower readings on adjacent soils.

Prior to selecting grids in each lift for quantitative measurement, a qualitative survey was performed over the soil surface to identify elevated measurement locations. This was important

to allow selecting a full range of gamma levels (and subsequent soil sampling locations) that would be most conducive to the correlation. For selected grids to be measured, six independent one-minute integrated gamma measurements were recorded (three on contact with the soil and three at one-meter height above the soil) using one of the three channels for each measurement. The quantitative measurements were used as follows:

1. A set of one-meter readings that could be correlated to:

   a) The full gamma energy range (XR channel),
   b) The U-235 gamma energy peak (U-235 channel), and
   c) The Ac-228 gamma energy peak (Ac-228 channel).

2. A set of contact gamma readings that could be correlated to:

   a) The full gamma energy range (XR channel),
   b) The U-235 gamma energy peak (U-235 channel), and
   c) The Ac-228 gamma energy peak (Ac-228 channel).

C.1.1 One-meter Readings

The primary purpose of the one-meter readings was to evaluate the feasibility of establishing a method for identifying and quantifying general areas of residual contamination during remediation. Establishing a one-meter correlation method would allow a surveyor to walk over an area using the shielded gamma detector suspended approximately one-meter above the soil surface and identify the areal extent of contaminated soil requiring excavation, as well as identifying areas that may not need excavation.

One-meter readings were recorded in selected grids on each lift. Grids were selected such that an adequate range of gamma levels (and subsequent soil concentrations) would be conducive to the correlation. The following protocol describes the steps implemented while performing quantitative one-meter gamma measurements on a given grid.

1. The data logger was programmed with the desired detector configuration (Channel 1, 2, or 3).

2. The grid location name, lift designation, and contact/one-meter designation were entered into the data logger (e.g., grid J-13, lift 3, one-meter reading would be entered as J133M).

3. The probe was suspended in the collimator on a strap over the shoulder to the surveyor's side, approximately one-meter above the center of the grid.

4. A quantitative one-minute integrated count was initiated; during the count, the surveyor stood still, holding the probe in the same location.

5. At the completion of the count, the measurement information was automatically logged in the data logger's memory. Additionally, the count was documented on a hardcopy log page.

6. This procedure was repeated for the remaining two channels.

C.1.2 Contact Readings

The primary purpose of the contact readings was to evaluate the feasibility of establishing a method for identifying and quantifying small locations, or "hot spots" of residual contamination during remediation. Establishing a contact reading correlation method would allow a surveyor to walk over an area using the shielded gamma detector to identify and evaluate hot spots that may be candidate for detailed excavation.

Contact readings were recorded in the same grids selected for one-meter readings. Readings were recorded either on a hot spot identified in the grid (if applicable), or in the center of the grid. The following protocol describes the steps implemented while performing quantitative contact gamma measurements on a given grid.

1. The data logger was programmed with the desired detector configuration (Channel 1, 2, or 3).

2. The grid location name, lift designation, and contact designation were entered into the data logger (e.g., grid G-9, lift 2, contact reading would be entered as G92C).

3. The shielded probe was placed directly on top of the selected location in the applicable grid.

4. A quantitative one-minute integrated count was initiated; during the count, the probe remained in the same location.

5. At the completion of the count, the measurement information was automatically logged in the data logger's memory. Additionally, the count was documented on a hardcopy log page.

6. This procedure was repeated for the remaining two channels.

7. Following the last of the three contact measurements, the exact measurement spot was clearly marked for correlation soil sampling.

C.2 Unshielded Gamma Surveys on Soils

In order to identify a viable method of performing general screening level gamma surveys on soils in the field using portable survey instruments, data was collected at the shielded measurement locations using unshielded Micro-R meters. This survey method could be used in the field to identify and delineate relatively large areas of residual contamination that could be scheduled for more detailed (shielded gamma) surveys and subsequent remediation.

C.2.1 Unshielded Gamma Survey Procedure

The following procedures were implemented when performing quantitative unshielded gamma surveys within a given grid.

1. The instrument was held at the surveyor's side and approximately one-meter above the soil surface in the center of the grid.

2. The surveyor observed the meter reading until a stable value could be obtained. This value was documented on a hardcopy log page.

3. The instrument was then placed directly on the soil surface at the point where the shielded contact reading was taken.

4. The surveyor observed the meter reading until a stable value could be obtained. This value was documented on a hardcopy log page.

The unshielded gamma surveys were only recorded for lifts 2, 3, and 4.

C.3 Gamma Spectroscopy

The mobile gamma spectroscopy (gamma-spec) system was used to remotely screen samples collected from the excavation for radionuclide identification. This system was included in the pilot test to determine its potential utility for measuring soil activity concentrations in selected samples as described below:

- From locations where field gamma surveys might be impractical, and

- To reduce the need to depend on time-consuming and expensive remote laboratory analyses.

Additionally, if the cleanup criteria are decreased to levels that are lower than the detection capabilities of the field shielded gamma surveys, then an on-site gamma-spec could be instrumental in verifying the success of remediation efforts. In this case, the field shielded gamma surveys could be used until readings are reduced to the lower end of the method's capabilities, then a decision to either continue excavation or sample for on-site gamma-spec could be made.

The PES gamma-spec system itself appeared to have limitations that could reduce its utility in the field. It would take a considerable amount of maintenance, software upgrade, and batch (automated) counting procedure development before this particular system would meet the specified needs of the project. Additionally, field gamma-spec measurements using the 3" NaI detector also appeared to have substantial limitations. Furthermore, discussions between the URS health physicist and a technician at a known gamma-spec system manufacturer revealed additional limitations to using 3" NaIs in our application. The technician did, however recommend using a high-purity germanium (HPGe) detector in this application to achieve the desired goals. Envirocon's CHP concurs with this evaluation, based on past experience with

HPGes in similar field gamma-spec applications. The potential utility of an on-site HPGe gamma-spec system should be considered as well as the availability of other catered/automated systems that are readily available in the industry.

APPENDIX C ATTACHMENTS

Attachment C-1

Pre/Post-work Unshielded Gamma Screening Survey Data

Pilot Test

Baseline Gamma Survey Readings Above Concrete

GTE - Sylvania Site

Hicksville, New York

12/18/01

Cell	Gamma Survey XR (Contact)	XR (1M)
A 1	6 6	6 6
B 1	6 7	6 6
C 1	6 6	6 6
D 1	6 5	6 6
E 1	6 5	6 6
F 1	6 6	6 7
G 1	6 6	7 6
H 1	6 7	6 7
I 1	7 7	6 7
J 1	7 7	7 8
K 1	7 7	7 7
L 1	7 7	7 7
M 1	7 7	7 7
N 1	7 7	7 7
O 1	7 6	6 7
A 2	5 5	6 5
B 2	6 6	6 6
C 2	6 6	6 6
D 2	6 6	6 6
E 2	6 7	6 6
F 2	6 6	7 6
G 2	6 6	6 6
H 2	7 6	7 6
I 2	6 6	6 6
J 2	6 6	6 6
K 2	6 7	6 6
L 2	6 6	6 7
M 2	7 7	6 7
N 2	6 7	7 7
O 2	7 7	7 7

Cell	Gamma Survey XR (Contact)	XR (1M)
A 3	5 5	6 6
B 3	6 6	6 5
C 3	6 6	6 6
D 3	6 6	6 6
E 3	7 6	6 6
F 3	6 6	7 7
G 3	6 6	6 7
H 3	6 6	6 6
I 3	6 7	7 7
J 3	7 7	7 6
K 3	6 6	7 6
L 3	7 6	7 7
M 3	7 8	6 7
N 3	7 7	7 7
O 3	7 7	8 7
A 4	6 6	6 6
B 4	6 6	6 6
C 4	6 7	6 6
D 4	6 6	6 5
E 4	6 5	6 6
F 4	7 6	6 5
G 4	6 6	6 6
H 4	7 6	6 6
I 4	6 6	6 7
J 4	6 6	6 7
K 4	6 7	7 6
L 4	7 7	7 6
M 4	6 7	6 6
N 4	6 6	7 7
O 4	6 8	6 7

Notes:

~~Sample Location is a 1 minute reading~~ ④

Cell = 1 meter squared

~~Lift = 1 foot depth~~ 12/18/01 - Left # in column

12/20/01 - Right # in column

Instrument Model #: Model 19 S/N 144029

MODEL 125 S/N 176 124 12/20/01

Pilot Test

Baseline Gamma Survey Readings Above Concrete

GTE - Sylvania Site

Hicksville, New York

12/18/01

Cell	Gamma Survey XR (Contact)	Gamma Survey XR (1M)
A 5	6 6	6 5
B 5	6 6	5 6
C 5	6 5	6 5
D 5	7 7	6 6
E 5	6 6	7 5
F 5	7 6	7 6
G 5	6 7	7 7
H 5	7 7	7 7
I 5	7 7	6 6
J 5	6 5	6 6
K 5	7 6	7 6
L 5	7 7	6 7
M 5	7 7	6 6
N 5	8 7	6 6
O 5	7 7	7 7
A 6	6 6	6 5
B 6	6 7	6 6
C 6	6 5	6 6
D 6	6 6	6 6
E 6	6 6	6 5
F 6	7 6	6 6
G 6	6 6	6 6
H 6	6 6	6 6
I 6	7 6	7 6
J 6	7 7	6 7
K 6	7 5	7 6
L 6	6 6	6 8
M 6	7 7	7 8
N 6	8 8	8 6
O 6	9 8	7 7

Cell	Gamma Survey XR (Contact)	Gamma Survey XR (1M)
A 7	5 5	6 6
B 7	6 5	6 6
C 7	6 5	7 6
D 7	6 6	5 6
E 7	6 6	6 6
F 7	6 7	6 7
G 7	6 6	6 5
H 7	6 6	5 6
I 7	6 7	7 6
J 7	6 7	7 7
K 7	6 7	6 7
L 7	7 7	6 7
M 7	6 7	8 7
N 7	7 7	7 7
O 7	7 7	8 7
X A 8	5 5	6 6
B 8	6 6	6 6
C 8	7 5	6 5
D 8	6 7	7 6
E 8	6 6	6 6
F 8	6 6	5 6
G 8	6 5	6 6
H 8	5 6	6 6
I 8	5 6	6 7
J 8	7 6	6 6
K 8	6 6	6 6
L 8	6 7	5 6
M 8	7 6	7 6
N 8	6 8	6 7
O 8	7 6	7 7

Notes:

~~Sample Location is a 1 minute reading~~ (6)

~~Cell~~ = 1 meter squared

~~Lift = 1 foot depth~~

12/18/01 - Left # in column

Instrument Model #: Model 19

S/N 144029

12/20/01 - Right # in column

Model 125

S/N 176124

12/20/01

Pilot Test

Baseline Gamma Survey Readings Above Concrete

GTE - Sylvania Site

Hicksville, New York

12/18/01

Cell	Gamma Survey XR (Contact)	Gamma Survey XR (1M)
A 9	5 5	5 5
B 9	6 6	6 5
C 9	6 5	5 5
D 9	6 6	6 5
E 9	6 6	6 6
F 9	6 6	6 5
G 9	5	6
H 9	7	7
I 9	7	6
J 9	6	6
K 9	5	6
L 9	6	7
M 9	7	7
N 9	7 7	6 7
O 9	6 6	6 8
A 10	5 6	6 6
B 10	6 6	6 5
C 10	6 6	6 5
D 10	5 6	6 6
E 10	6 5	7 5
F 10	5 5	5 5
G 10	7	7
H 10	6	6
I 10	6	6
J 10	6	6
K 10	6	6
L 10	7	6
M 10	7	7
N 10	7 6	7 7
O 10	7 7	7 6

Cell	Gamma Survey XR (Contact)	Gamma Survey XR (1M)
A 11	5 5	5 5
B 11	6 5	6 5
C 11	5 6	5 5
D 11	6 6	6 5
E 11	5 5	6 5
F 11	6 5	6 6
G 11	5	6
H 11	6	6
I 11	6	6
J 11	6	6
K 11	6	8
L 11	6	7
M 11	6	8
N 11	7 6	8 6
O 11	7 6	7 7
A 12	5 5	5 6
B 12	6 5	6 5
C 12	6 5	5 5
D 12	6 6	6 6
E 12	5 5	6 6
F 12	6 5	6 6
G 12	7	6
H 12	6	5
I 12	6	5
J 12	7	6
K 12	6	5
L 12	7	6
M 12	7	7
N 12	7 6	7 7
O 12	7 6	7 7

Notes:

~~Sample Location is a 1 minute reading~~ ⑤

~~Cell~~ = 1 meter squared

~~Lift = 1 foot depth~~ ⑤

12/18/01 - Left # in Column

Instrument Model #: Model 19

S/N 144029

12/20/01 Right # in Column

MODEL 125

S/N 176124

12/20/01

Pilot Test
Baseline Gamma Survey Readings Above Concrete
GTE - Sylvania Site
Hicksville, New York
12/18/01

Cell	Gamma Survey XR (Contact)	XR (1M)
A 13	5 5	6 6
B 13	6 5	5 5
C 13	6 5	5 5
D 13	5 5	5 6
E 13	6 5	5 5
F 13	5 5	6 5
G 13	6	7
H 13	6	6
I 13	5	6
J 13	6	6
K 13	6	6
L 13	6	6
M 13	6	6
N 13	7 6	8 7
O 13	6 5	6 6
A 14	6 5	6 5
B 14	5 5	5 5
C 14	5 5	6 5
D 14	5 5	6 5
E 14	6 5	6 5
F 14	6 5	6 5
G 14	7 5	6 5
H 14	6 5	6 5
I 14	6 5	6 5
J 14	7 6	6 5
K 14	7 5	6 5
L 14	7	6
M 14	6	6
N 14	6 5	7 6
O 14	8 5	8 5

Cell	Gamma Survey XR (Contact)	XR (1M)
A 15	5 5	6 6
B 15	5 5	6 5
C 15	6 5	6 5
D 15	5 5	5 5
E 15	6 5	6 5
F 15	6 5	6 5
G 15	6 5	6 5
H 15	5 5	6 5
I 15	6 5	6 6
J 15	6 5	6 5
K 15	6 5	6 5
L 15	7 6	7 5
M 15	6 5	6 5
N 15	7 5	6 5
O 15	7 5	7 5
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		
K		
L		
M		
N		
O		

Notes:

~~Sample Location is a 1 minute reading~~ (5)

Cell = 1 meter squared

~~Lift = 1 foot depth~~ (3)

12/18/01 - Left # in Column

Instrument Model #: MODEL 19
Instrument Serial #: 144029

12/20/01 - Right # in column

MODEL 125
ITC 124
12/20/01

Pilot Test

Baseline Gamma Survey Readings Above Concrete
GTE - Sylvania Site
Hicksville, New York
12/18/01

Cell	Gamma Survey XR (uR/hr) (Contact)	Gamma Survey XR (uR/hr) (1M)
A 18	5 6	5 4
B	5.5 4	5 5
C	6 6	6 6
D	5.5 6	5.5 6
E	5 5	5 6
F	5.5 5	5.5 5
G	6 6	5.5 6
H	6 5	6 4
I	6 6	6 6
J	6 6	6 7
K	6.5 6	6 6
L	6.5 6	6.5 7
M	6.5 7	7 7
N	7.5 7	7.5 8
O	8 7	8 8
A 17	5.5 4	5.5 4
B	6 5	6 6
C	5.5 6	6 6
D	5.5 5	6 5
E	6 6	6 5
F	5.5 5	6 5
G	6.5 6	6.5 5
H	6 5	6 5
I	6 6	6 5
J	6.5 5	6.5 5
K	6 6	6.5 6
L	7 6	7 6
M	7 6	7 7
N	7.5 6	7 7
O	7.5 6	7.5 7

Cell	Gamma Survey XR (uR/hr) (Contact)	Gamma Survey XR (uR/hr) (1M)
A 16	6 6	5.5 5
B	5.5 6	5.5 5
C	6 5	5.5 6
D	6 6	6 5
E	5.5 5	5.5 6
F	6 6	6 5
G	6 5	6 5
H	6 5	5.5 6
I	6 6	5.5 6
J	6 7	6 7
K	6 6	6 6
L	6 6	6 6
M	7 6	6.5 7
N	7 6	7 7
O	7.5 6	7 5
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		
K		
L		
M		
N		
O		

Notes:

~~Sample Location is a 1 minute reading.~~ (5)

Cell = 1 meter squared

~~Lift = 1 foot depth~~ (3)

12/18/01 - Left # in Column

12/20/01 - Right # in column

Instrument Model #: 12S
Instrument Serial #: 176124

12/18/01

MODEL 12S
S/N 176124
12/20/01

Baseline Gamma Survey Readings Above Concrete
GTE - Sylvania Site
Hicksville, New York
12/18/01

Cell	Gamma Survey XR (μR/hr) (Contact)	XR (μR/hr) (1M)
A 22	6 6	6 4
B	6 5	6 5
C	6 6	6 6
D	6 5	6 5
E	6 5	6 5
F	6 6	6 5
G	6.5 5	6 6
H	6.5 6	6 6
I	6.5 6	6.5 7
J	6.5 7	6 6
K	7 6	7 6
L	7 7	7 7
M	7 7	7.5 7
N	7.5 7	7.5 6
O	7 7	7.5 8
A 21	6 6	6 6
B	6 6	6 5
C	5.5 6	5.5 5
D	5.5 5	5.5 5
E	6 5	6 5
F	6 5	6 5
G	6 5	6 5
H	6.5 6	6.5 5
I	6.5 6	6.5 6
J	6.5 5	6 6
K	6.5 6	6.5 7
L	7.5 7	7.06
M	7.5 6	8 7
N	7.5 7	7.5 7
O	7.5 7	7.5 8

Cell	Gamma Survey XR (μR/hr) (Contact)	XR (μR/hr) (1M)
A 20	5.5 5	6 5
B	5.5 5	5.5 5
C	6 5	5.5 6
D	6 6	5.5 6
E	6 6	6 5
F	6 5	6 6
G	6 6	6 6
H	6 6	6 6
I	6 6	6 6
J	6 6	6.5 6
K	6.5 6	7 6
L	6.5 6	6.5 7
M	7 7	7 6
N	6.5 7	7.5 7
O	7 7	8 8
A 19	6 5	6 5
B	6 6	5.5 5
C	5.5 6	6 6
D	5.5 5	5.5 6
E	5.5 6	6 6
F	6 5	6 6
G	6 6	6 5
H	6 6	6 6
I	7 6	6 5
J	7 5	7 6
K	7.5 5	7 5
L	7 6	7 7
M	7 6	7 6
N	7 8	7.5 7
O	7.5 7	8 7

Notes:

~~Sample Location is a 1 minute reading.~~ (3)

Cell = 1 meter squared

~~Lift = 1 foot depth~~ (5)

12/18/01 - Left # in column

12/20/01 - Right # in Column

Instrument Model #: 125
Instrument Serial #: 176124

CEM 12/18/01

Model 125 S/N 176124 12/20/01

Pilot Test
Baseline Gamma Survey Readings Above Concrete
GTE - Sylvania Site
Hicksville, New York
12/18/01

Cell	Gamma Survey XR (uR/HR) (Contact)	XR(uR/HR) (1M)
A26	6.5 6	6 7
B	6 5	7 6
C	6.5 6	6.5 6
D	6 6	6 6
E	7 6	6.5 6
F	6.5 6	6.5 6
G	6.5 6	6.5 6
H	6 6	6.5 7
I	7 6	6.5 7
J	6.5 7	6 6
K	7 6	6.5 6
L	7 6	7 5
M	7 7	7 8
N	7.5 8	8 8
O	8 8	8.5 8
A 25	ctr 8 6.5 6	6.5 6
B	6 6	6 6
C	6 6	6 5
D	6.5 5	6 6
E	6.5 7	6.5 7
F	6.5 6	6.5 6
G	6.5 5	6.5 6
H	6.5 6	7.5 6
I	7.5 7	7.5 6
J	8 7	7.5 6
K	7.5 7	8 7
L	7.5 7	8 6
M	7.5 8	7 7
N	7.5 7	8 8
O	8 7	8 6

Cell	Gamma Survey XR (MR/hr) (Contact)	XR (uR/hr) (1M)
A24	6 6	6 5
B	6 6	5.5 7
C	6 6	6 6
D	5.5 6	5.5 6
E	6.5 7	6.5 6
F	5.5 6	6 5
G	6 7	6 5
H	6 7	6 7
I	6.5 7	6.5 6
J	6.5 6	7 7
K	6.5 6	6.5 6
L	7 6	6.5 8
M	7 8	7.5 8
N	8 6	8 7
O	7.57	7.57
A23	5.5 6	5.5 6
B	5.5 5	6 5
C	5.5 5	6 5
D	6 5	6 6
E	6 5	6 6
F	6 5	6 5
G	6 6	6 5
H	6.5 7	6 7
I	6 6	6.5 6
J	6.5 6	6.5 6
K	6.5 6	7 6
L	7 6	7.5 6
M	7 6	7 6
N	7.5 6	7 7
O	8 6	8 7

Notes:

~~Sample Location is a 1 minute reading~~ 5

Cell = 1 meter squared

~~Lift = 1 foot depth~~ 5

12/18/01 - Left # in column

ctr 12/18/01

12/20/01 - Right # in column

MODEL 125
S/N 176124
12/20/01

Instrument Model #: 125
Instrument Serial #: 176124

Pilot Test

Baseline Gamma Survey Readings Above Concrete

GTE - Sylvania Site

Hicksville, New York

12/18/01

Cell	Gamma Survey XR (µR/hr) (Contact)	XR (µR/hr) (1M)
A 28	7.7	7 7
B	6.5 6	7 6
C	7 9	7 8
D	6.5 8	6.5 8
E	7 7	7 8
F	8.0 8	7.5 7
G	8 7	8 7
H	7 7	7 8
I	7.5 7	8 8
J	7.5 7	7.5 7
K	8 8	8 8
L	8 6	8 8
M	8 8	8 8
N	8 8	8 9
O	8 8	8 9
A 29	7 5	6.5 5
B	7 5	7 6
C	7 6	7 6
D	6.5 7	6.5 6
E	6.5 7	6.5 8
F	7 6	7 6
G	7.5 6	7.5 6
H	7 7	7 7
I	7 7	7 7
J	8 7	6.5 6
K	7.5 8	7.5 7
L	8 7	8 6
M	7.5 6	8 6
N	7.5 6	7.5 8
O	7 6	8 5

Cell	Gamma Survey XR (NR/hr) (Contact)	XR (NR/hr) (1M)
A 28	6.5 7	7 7
B	6.5 7	7 6
C	7 6	6.5 6
D	6.5 7	7 7
E	7 7	6.5 6
F	6.5 6	7 7
G	7 8	7 8
H	7 8	7 7
I	7 7	7 6
J	7 7	7 6
K	7.5 8	7 8
L	8 8	7.5 7
M	7.56	8 7
N	8 7	7.5 7
O	8 7	8 6
A 27	7 7	6.5 7
B	6.5 7	6.5 6
C	7 7	7 6
D	7 6	7 6
E	6.5 7	6.5 7
F	6 7	6 6
G	6.5 7	6.5 7
H	7.5 5	7 6
I	7 7	7 7
J	7 7	7 7
K	7.5 7	7 7
L	7.5 6	7 6
M	7.5 7	7.5 6
N	7.5 8	7.58
O	8 8	8.58

Notes:

~~Sample Location is a 1 minute reading~~ (5)

~~ll = 1 meter squared~~

~~Lift = 1 foot depth~~ (5)

12/18/01 - Left # in column

12/20/01 - Right # in column

Instrument Model #: 125 Ser. 176124 Cal 12/18/01

MODEL 125

S/N 176124

12/20/01

DG

Attachment C-2

Log Pages - Gamma Survey Results

Pilot Test
GTE - Sylvania Site
Hicksville, New York
12/18/01

Lift was on Soil immediately below Concrete Slab

Cell	Sample Location	Lift (feet)	Gamma Surveys XR (Contact)	XR (1M)	U-235 (Contact)	U-235 (1M)	Ac-228 (Contact)	Ac-228 (1M)	Laboratory Sample ID	Date	Time	Jar Type	Analysis Type
G9	Center	1 (ϕ)	6848	6006	381	361	206	168					
G10	Center	1	7548	6336	397	385	219	189					
G11	Center	1	7464	6266	398	381	210	145					
G12	CENTER	1	6135	5242	329	311	181	165					
G13	CENTER	1	5532	4822	318	274	154	113					
H9	CENTER	1	6856	5961	377	355	200	158					
H10	CENTER	1	9326	6578	582	370	249	167					
H11	CENTER	1	6903	6187	395	399	201	187					
H12	CENTER	1	6244	5396	303	299	150	155					
H13	CENTER	1	5279 *	5009	281	305	169	119					
I9	CENTER	1	10971	7013	595	434	351	174					
I10	CENTER	1	7779	6563	457	385	238	145					
I11	CENTER	1	6830	6093	423	362	207	173					
I12	CENTER	1	5941	5630	336	328	153	130					
I13	CENTER	1	5855	5222	326	304	179	138					
J13	CENTER	1	5541	5213	331	282	149	152					
J12	CENTER	1	6911	5362	385	277	194	129					
J11	CENTER	1	6236	5889	326	309	181	162					
J10	CENTER	1	6787	5939	378	360	181	158					
J9	CENTER	1	7260	5681	422	300	221	122					

Contact ridge on chunk of concrete.

Notes:

D1 Exposure Rate (XR): H 850, T 100, W OFF

D3 U-235: H 508, T 87, W 10

D4 Ac-228: H 508, T 445, W 60

Sample Location is a 1 minute reading.

Cell = 1 meter squared

Lift = 1 foot depth

Note: Concrete Slab ~5" Thick

Pilot Test
GTE - Sylvania Site
Hicksville, New York
~~12/18/01~~ 12/19/01

Cell	Sample Location	Depth from top of concrete Lift (feet)	Gamma Surveys XR (Contact)	XR (1M)	U-235 (Contact)	U-235 (1M)	Ac-228 (Contact)	Ac-228 (1M)	Laboratory Sample ID	Date	Time	Jar Type	Analysis Type
G9		2 (~2')	12259	6494	671	387	350	139					
G10		2											
G11		2											
G12		2											
G13		2	7527	5462	425	355	215	132					
H9		2	10098	6787	592	459	289	163					
H10		2											
H11		2											
H12		2											
H13		2											
I9		2											
I10		2											
I11		2											
I12		2											
I13		2											
J9		2											
J10		2											
J11		2											
J12		2											
J13		2	12030	7745	758	455	365	191					

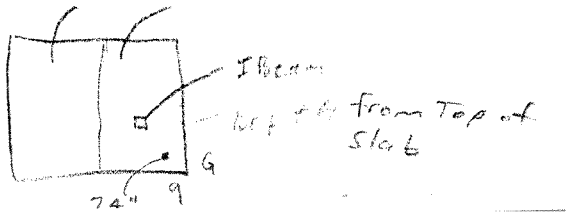
Meter 19

Contact	1m
14	7
11	7
10	9
10	8
9	7
12	7
10	9
10	8
9	8
9	9
10	7
9	7
10	8
9	8
10	7
9.5	6.5
9	8
13	9
14	9
15	9

Notes:

D1 Exposure Rate (XR): H 850, T 100, W OFF
D3 U-235: H 508, T 87, W 10
D4 Ac-228: H 508, T 445, W 60

Sample Location is a 1 minute reading.
Cell = 1 meter squared
Lift = 1 foot depth



Pilot Test
GTE - Sylvania Site
Hicksville, New York
~~12/18/01~~ 12/19/01

Meter 19

Cell	Sample Location	Lift (feet)	Gamma Surveys XR (Contact)	XR (1M)	U-235 (Contact)	U-235 (1M)	Ac-228 (Contact)	Ac-228 (1M)	Laboratory Sample ID	Date	Time	Jar Type	Analysis Type
G9		3											
G10		3											
G11		3											
G12		3											
G13		3											
H9		3											
H10		3	8652	7548	528	427	274	182					
H11		3											
H12		3											
H13		3											
I9		3											
I10		3											
I11		3											
I12		3											
I13		3	8899	7790	517	457	270	168					
J9		3	8841	8394	510	475	230	161					
J10		3	10786	8489	575	529	292	189					
J11		3	12609	9159	625	594	273	211					
J12		3	12346	9424	761	632	340	198					
J13		3											

Contact	1M
15	8
14	10
12	10
10	9
9	8
10	8
9	8
10	9
10	9
10	9
9	9
9	8
11	9
12	9
12	10
10	8
11	9
11	10
15	10
15	9

H10
H9

N.B.
G9 HAS WALLS ON 3 SIDES

J-K - PIPE ~2FT BELOW GRADE
Boundary

Notes:

Exposure Rate (XR): H_____, T_____, W_____.
U-235: H_____, T_____, W_____.
Ac-228: H_____, T_____, W_____.

Sample Location is a 1 minute reading.
Cell = 1 meter squared
Lift = 1 foot depth

Pilot Test
GTE - Sylvania Site
Hicksville, New York
~~12/18/01~~ 12/19/01

INACCESSIBLE GRIDS

G9
G10

H10
H9

Cell	Sample Location	DEPTH Lift (feet)	Gamma Surveys XR (Contact)	XR (1M)	U-235 (Contact)	U-235 (1M)	Ac-228 (Contact)	Ac-228 (1M)	Laboratory Sample ID	Date	Time	Jar Type	Analysis Type
G9		4											
G10		4	6805	6298	329	324	193	136					
G11		4											
G12		4											
G13		4											
H9		4											
H10		4											
H11		4											
H12		4											
H13		4											
I9		4	7733	6612	424	344	198	160					
I10		4	7012	6571	405	332	213	149					
I11		4	7584	7394	402	409	243	183					
I12		4	9668	7513	567	436	281	144					
I13		4											
J9		4											
J10		4											
J11		4											
J12		4	10215	8085	598	460	282	185					
J13		4	10888	8250	744	491	311	182					

uR/hr

(Contact)	(1m)
15	9
~~14~~	~~14~~
8	8
8	8
9	7
~~11~~	~~6~~
8	8
9	8
10	8
10	8
9	8
9	8
9	8
11	8
9	8
9	8
9	8
11	10
12	9

Notes:

Exposure Rate (XR): H_____, T _____, W _____.
U-235: H_____, T _____, W _____.
Ac-228: H_____, T _____, W _____.

Sample Location is a 1 minute reading.
Cell = 1 meter squared
Lift = 1 foot depth

Pilot Test
GTE - Sylvania Site
Hicksville, New York
~~12/18/01~~ 12/19/01

METER 19
Contact | 1M

LIFT 5
FILL SAND
NATIVE

Cell	Sample Location	Lift (feet)	Gamma Surveys XR (Contact)	XR (1M)	U-235 (Contact)	U-235 (1M)	Ac-228 (Contact)	Ac-228 (1M)	Laboratory Sample ID	Date	Time	Jar Type	Analysis Type
I12		5 (~5')	7949	7113	513	400	223	183					
I13		5	9213	7571	506	426	264	189					
J12		5	8615	8005	468	430	244	213					
J13		5	9451	~~7973~~	571	420	~~274~~	209					

Notes:

Exposure Rate (XR): H_____, T_____, W_____.
U-235: H_____, T_____, W_____.
Ac-228: H_____, T_____, W_____.

Sample Location is a 1 minute reading.
Cell = 1 meter squared
Lift = 1 foot depth

Attachment C-3

Sample Chains of Custody
Radioanalytical Analysis Results

Chain of Custody Record

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

STL-4124 (0700)

Client: ENVIROCON	Project Manager: DALE EVANS	Date: 12/19/01	Chain of Custody Number: 057071
Address: 17301 W. Colfax Ave, Suite 275	Telephone Number (Area Code)/Fax Number: 303 215 0187	Lab Number:	Page 1 of 1
City: GOLDEN	State: CO	Zip Code: 80401	Site Contact: NA	Lab Contact:
Project Name and Location (State): Sylvania Hicksville, NY	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: Gamma-Spec, Agreed Suite	Alpha-Spec - Iso Uran	Alpha-Spec - Iso Th	Special Instructions/ Conditions of Receipt
SyL-121901-G-9-2-PT	12/19/01	1200				X	X						X	X	X	* RUSH TAT
SyL-121801-G-13-1-PT	12/18/01	1600				X	X						X	X	X	
SyL-121801-G-12-1-PT	12/18/01	1600				X	X						X	X	X	
SyL-121801-G-9-1-PT	12/18/01	1600				X	X						X	X	X	
SyL-121901-H-11-3-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SyL-121801-G-11-1-PT	12/18/01	1200				X	X						X	X	X	* RUSH TAT
SyL-121801-G-10-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121901-G-13-2-PT	12/19/01	1200				X	X						X	X	X	* RUSH TAT
SyL-121901-H-9-2-PT	12/19/01	1200				X	X						X	X	X	* RUSH TAT
SyL-121801-H-9-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121801-H-11-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121801-H-13-1-PT	12/18/01	1200				X	X						X	X	X	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [X] Return To Client [ ] Disposal By Lab [ ] Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Per Comment STD = 1 W

QC Requirements (Specify)

	Date	Time
1. Relinquished By	12/20/01	1200
2. Relinquished By		
3. Relinquished By		

	Date	Time
1. Received By		
2. Received By		
3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

STL-4124 (0700)

Client: ENVIROCON	Project Manager: DALE EVANS	Date: 12/19/01	Chain of Custody Number: 057072
Address: 17301 W. Colfax Ave; Suite 275	Telephone Number (Area Code)/Fax Number: 303 215 0187	Lab Number	Page 1 of 1
City: GOLDEN / State: CO / Zip Code: 80401	Site Contact: N/A	Lab Contact	
Project Name and Location (State): Sylvania Hicksville, NY	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNOS	HCl	NaOH	ZnAc/NaOH	Analysis: Gamma - Spec Agrred Suite	Alpha - Spec ISO-URAN	Alpha - Spec ISO TH	Special Instructions/ Conditions of Receipt
SyL-121801-I-10-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121801-I-9-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121801-I-11-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121801-I-12-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121801-I-13-1-PT	12/18/01	1200				X	X						X	X	X	* RUSH TAT
SyL-121901-I-13-2-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SyL-121801-J-9-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121901-J-11-3-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SyL-121901-J-12-3-PT	12/19/01	1600				X	X						X	X	X	
SyL-121801-J-12-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121801-J-11-1-PT	12/18/01	1200				X	X						X	X	X	
SyL-121801-J-13-1-PT	12/18/01	1200				X	X						X	X	X	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [X] Return To Client [ ] Disposal By Lab [ ] Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other per Comment

QC Requirements (Specify)

	Date	Time
1. Relinquished By	12/20/01	1200
2. Relinquished By		
3. Relinquished By		

	Date	Time
1. Received By		
2. Received By		
3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

STL-4124 (0700)

Client: ENVIROCON	Project Manager: DALE EVANS	Date: 12/19/01	Chain of Custody Number: 057073
Address: 17301 W. Colfax Ave, Suite 275	Telephone Number (Area Code)/Fax Number: 303 2150187	Lab Number:	Page 1 of 1
City: GOLDEN / State: CO / Zip Code: 80401	Site Contact: N/A	Lab Contact:	
Project Name and Location (State): SYLVANIA Hicksville, NY	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: Gamma Spec Aglerd Suite	Alpha - Spec Iso-URAN	Alpha - Spec Iso TH	Special Instructions/ Conditions of Receipt
SYL-121801-J-10-1-PT	12/18/01	1200				X	X						X	X	X	
SYL-121901-J-9-3-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-J-13-3-PT	12/19/01	1600				X	X						X	X	X	
SYL-121901-J-10-3-PT	12/19/01	1600				X	X						X	X	X	
SYL-121901-J-12-4-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-J-13-4-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-I-12-4-PT	12/19/01	1600				X	X						X	X	X	
SYL-121901-I-13-4-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-I-11-4-PT	12/19/01	1600				X	X						X	X	X	
SYL-121901-G-11-4-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-J-10-1-COMP	12/19/01	1200				X	X						X	X	X	* RUSH TAT
SYL-121901-H-9-2-COMP	12/19/01	1600				X	X						X	X	X	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [X] Return To Client [ ] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other STD or * per Comment

QC Requirements (Specify)

	Date	Time
1. Relinquished By	12/20/01	1200
2. Relinquished By		
3. Relinquished By		
1. Received By		
2. Received By		
3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

STL-4124 (0700)

Client: ENVIROCON
Project Manager: DALE EVANS
Date: 12/19/01
Chain of Custody Number: 057074
Address: 1301 W. Colfax Ave; Suite 275
Telephone Number (Area Code)/Fax Number: (303) 215 0187
Lab Number:
Page 1 of 1
City: Golden | State: CO | Zip Code: 80401
Site Contact: N/A | Lab Contact:
Project Name and Location (State): Sylvania Hicksville, NY
Carrier/Waybill Number:
Contract/Purchase Order/Quote No.:

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNOS	HCl	NaOH	ZnAc/NaOH	Analysis: Gamma Spec Mixed Suite	Alpha Spec ISO - URAN	Alpha - Spec ISO - TH	Special Instructions/ Conditions of Receipt
SYL-121901-I-12-5-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-I-13-5-PT	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-I-11-4-comp	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-J-13-5-comp	12/19/01	1600				X	X						X	X	X	
SYL-121901-J-12-5-comp	12/19/01	1600				X	X						X	X	X	* RUSH TAT
SYL-121901-I-13-5-comp	12/19/01	1600				X	X						X	X	X	
SYL-121901-I-12-5-comp	12/19/01	1600				X	X						X	X	X	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [X] Return To Client [ ] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Per comment STD TAT

QC Requirements (Specify):

	Date	Time
1. Relinquished By	12/20/01	1200
2. Relinquished By		
3. Relinquished By		

	Date	Time
1. Received By		
2. Received By		
3. Received By		

Comments:

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

[redacted]

Chain o[redacted] Custody Record

SEVERN TRENT SERVICES

Severn Trent Laboratories, Inc.

STL-4124 (0700)

Client: ENVIROCON	Project Manager: DALE EVANS	Date: 12/19/01	Chain of Custody Number: 057075
Address: 17301 W. Colfax Ave ; Suite 275	Telephone Number (Area Code)/Fax Number: (303) 215 0187	Lab Number:	Page 1 of 1
City: GOLDEN; State: CO; Zip Code: 80401	Site Contact: N/A; Lab Contact:		
Project Name and Location (State): SYLVANIA Hicksville, NY	Carrier/Waybill Number:		
Contract/Purchase Order/Quote No.:			

Analysis (Attach list if more space is needed)

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNOS	HCl	NaOH	ZnAc/NaOH	Gamma Spec	Agreed Suite	Alpha-Spec	Iso-URAN	Alpha-Spec	Iso-TH	Special Instructions/ Conditions of Receipt
SYL-121901-G-13-2-Comp	12/19/01	1200				X	X						X		X		X		* RUSH TAT
SYL-121901-H-10-1-Comp	12/19/01	1200				X	X						X		X		X		* RUSH TAT
SYL-121901-H-12-1-Comp	12/19/01	1200				X	X						X		X		X		* RUSH TAT
SYL-121901-J-11-3-Comp	12/19/01	1600				X	X						X		X		X		
SYL-121901-J-12-3-Comp	12/19/01	1600				X	X						X		X		X		* RUSH TAT
SYL-121901-J-9-3-Comp	12/19/01	1600				X	X						X		X		X		
SYL-121901-I-9-1-Comp	12/19/01	1200				X	X						X		X		X		[redacted]
SYL-121901-J-13-3-Comp	12/19/01	1600				X	X						X		X		X		* RUSH TAT
SYL-121901-J-13-2-Comp	12/19/01	1200				X	X						X		X		X		* RUSH TAT
SYL-121901-G-9-2-Comp	12/19/01	1200				X	X						X		X		X		* RUSH TAT
SYL-121901-J-10-3-Comp	12/19/01	1600				X	X						X		X		X		
SYL-121901-H-11-3-Comp	12/19/01	1600				X	X						X		X		X		

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal: ☒ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: ☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other STD or * per Comment

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished By: [signature]	12/20/01	1200	1. Received By		
2. Relinquished By			2. Received By		
3. Relinquished By			3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

SEVERN TRENT SERVICES — Severn Trent Laboratories, Inc.

STL-4124 (0700)

Client: ENVIROCON	Project Manager: DALE EVANS	Date: 12/19/01	Chain of Custody Number: 057076
Address: 17301 W. Colfax Ave; Suite 275	Telephone Number (Area Code)/Fax Number: (303) 215 0107	Lab Number	Page 1 of 1
City: Golden; State: CO; Zip Code: 80401	Site Contact: N/A	Lab Contact	
Project Name and Location (State): Sylvania Hicksville, NY	Carrier/Waybill Number		
Contract/Purchase Order/Quote No.			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: Gamma Spec	Hazcat Suite	Alpha - Spec ISO - Uran	Alpha - Spec ISO - Th	Special Instructions/ Conditions of Receipt
SYL-121801-H-13-1-PT	12/18/01	1200				X	X						X		X	X	* RUSH TAT
SYL-121801-H-12-1-PT	12/18/01	1200				X	X								X	X	
SYL-121901-Rock-PT	12/19/01	1200				X	X						X		X	X	
SYL-121901-I-10-4-PT	12/19/01	1600				X	X						X		X	X	* RUSH TAT
SYL-121901-G-11-4-COMP	12/19/01	1600				X	X						X		X	X	
SYL-121901-I-10-4-COMP	12/19/01	1600				X	X						X		X	X	
SYL-121901-I-13-4-COMP	12/19/01	1600				X	X						X		X	X	* RUSH TAT
SYL-121901-J-13-4-COMP	12/19/01	1600				X	X						X		X	X	
SYL-121901-J-12-4-COMP	12/19/01	1600				X	X						X		X	X	* RUSH TAT
SYL-121901-J-12-4-COMP	12/19/01	1600				X	X						X		X	X	
SYL-121901-J-12-5-PT	12/19/01	1600				X	X						X		X	X	* RUSH TAT
SYL-121901-J-13-5-PT	12/19/01	1600				X	X						X		X	X	

Possible Hazard Identification: [X] Non-Hazard [ ] Flammable [ ] Skin Irritant [ ] Poison B [ ] Unknown

Sample Disposal: [X] Return To Client [ ] Disposal By Lab [ ] Archive For ____ Months (A fee may be assessed if samples are retained longer than 3 months)

Turn Around Time Required: [ ] 24 Hours [ ] 48 Hours [ ] 7 Days [ ] 14 Days [ ] 21 Days [X] Other Per Comment

QC Requirements (Specify)

	Date	Time
1. Relinquished By	12/20/01	1200
2. Relinquished By		
3. Relinquished By		

	Date	Time
1. Received By		
2. Received By		
3. Received By		

Comments

DISTRIBUTION: WHITE - Stays with the Sample; CANARY - Returned to Client with Report; PINK - Field Copy

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-3-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-001
Work Order: EQ178
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.37	U	0.41	0.69	12/28/01	12/28/01	1362231	
Cesium 137	0.079	U	0.066	0.14	12/28/01	12/28/01	1362231	
Potassium 40	**13.8**		2.9	1.0	**12/28/01**	**12/28/01**	**1362231**	
Protactinium 234M	**112**		30	54	**12/28/01**	**12/28/01**	**1362231**	
Thorium 234	**66.0**		8.8	1.8	**12/28/01**	**12/28/01**	**1362231**	
Uranium 235	**3.23**		0.42	0.11	**12/28/01**	**12/28/01**	**1362231**	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.70		0.14	0.15	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-3-PT DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-001X
Work Order: EQ178
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	1.02		0.28	0.31	12/28/01	12/28/01	1362231	
Cesium 137	0.01	U	0.057	0.11	12/28/01	12/28/01	1362231	
Potassium 40	14.4		2.7	0.9	12/28/01	12/28/01	1362231	
Protactinium 234M	94		25	20	12/28/01	12/28/01	1362231	
Thorium 234	62.5		9.0	6.1	12/28/01	12/28/01	1362231	
Uranium 235	3.33		0.41	0.14	12/28/01	12/28/01	1362231	
--- Other Detected Radionuclides ---								
Thallium 208	0.24		0.11	0.1	12/28/01	12/28/01	1362231	
Uranium 238DHP	61.9		6.1	2.7	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-002
Work Order: EQ18P
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.56		0.25	0.47	12/28/01	12/28/01	1362231	
Cesium 137	0.022	U	0.044	0.084	12/28/01	12/28/01	1362231	
Potassium 40	6.8		1.5	0.8	12/28/01	12/28/01	1362231	
Protactinium 234M	62		22	34	12/28/01	12/28/01	1362231	
Thorium 234	30.9		4.4	1.3	12/28/01	12/28/01	1362231	
Uranium 235	1.56		0.19	0.08	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-I-12-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-003
Work Order: EQ18R
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.62		0.24	0.44	12/28/01	12/28/01	1362231	
Cesium 137	-0.002	U	0.035	0.065	12/28/01	12/28/01	1362231	
Potassium 40	6.7		1.5	0.6	**12/28/01**	**12/28/01**	1362231	
Protactinium 234M	13.7	U	9.8	18	12/28/01	12/28/01	1362231	
Thorium 234	8.5		1.8	2.2	**12/28/01**	**12/28/01**	1362231	
Uranium 235	0.53		0.11	0.08	**12/28/01**	**12/28/01**	1362231	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.469		0.085	0.15	12/28/01	12/28/01	1362231	
Uranium 238DHP	8.3		1.5	1.2	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-I-11-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-004
Work Order: EQ18T
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.45		0.26	0.42	12/28/01	12/28/01	1362231	
Cesium 137	0.016	U	0.038	0.076	12/28/01	12/28/01	1362231	
Potassium 40	6.6		1.6	0.2	12/28/01	12/28/01	1362231	
Protactinium 234M	12.8	U	8.4	19	12/28/01	12/28/01	1362231	
Thorium 234	5.5		1.2	1.7	12/28/01	12/28/01	1362231	
Uranium 235	0.386		0.089	0.054	12/28/01	12/28/01	1362231	
--- Other Detected Radionuclides ---								
Uranium 238DHP	6.0		1.0	0.9	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-J-10-1-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-005
Work Order: EQ18W
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.65		0.28	0.38	12/28/01	12/28/01	1362231	
Cesium 137	0.013	U	0.037	0.072	12/28/01	12/28/01	1362231	
Potassium 40	2.7		1.2	0.8	**12/28/01**	**12/28/01**	1362231	
Protactinium 234M	16.2	U	8.4	19	12/28/01	12/28/01	1362231	
Thorium 234	13.5		2.2	0.9	**12/28/01**	**12/28/01**	1362231	
Uranium 235	0.66		0.11	0.06	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-H-9-2-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-006
Work Order: EQ180
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD					12/28/01	12/28/01	1362231	
Actinium 228	0.88		0.35	0.57	12/28/01	12/28/01	1362231	
Cesium 137	-0.012	U	0.053	0.093	12/28/01	12/28/01	1362231	
Potassium 40	7.0		1.7	0.6	12/28/01	12/28/01	1362231	
Protactinium 234M	47		17	35	12/28/01	12/28/01	1362231	
Thorium 234	25.3		4.3	3.2	12/28/01	12/28/01	1362231	
Uranium 235	1.34		0.20	0.07				
--- Other Detected Radionuclides ---								
Thorium 232DA	0.75		0.12	0.12	12/28/01	12/28/01	1362231	
Uranium 238DHP	25.0		2.9	1.2	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121801-G-13-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-007
Work Order: EQ181
Matrix: SOLID

Date Collected: 12/18/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	**0.67**		0.29	0.53	12/28/01	12/28/01	1362231	
Cesium 137	0.0004	U	0.048	0.089	12/28/01	12/28/01	1362231	
Potassium 40	**8.3**		2.0	0.5	**12/28/01**	**12/28/01**	**1362231**	
Protactinium 234M	10.8	U	9.4	20	12/28/01	12/28/01	1362231	
Thorium 234	**5.6**		1.2	1	**12/28/01**	**12/28/01**	**1362231**	
Uranium 235	**0.351**		0.090	0.074	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121801-G-11-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-008
Work Order: EQ185
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.54		0.22	0.42	12/28/01	12/28/01	1362231	
Cesium 137	-0.022	U	0.039	0.067	12/28/01	12/28/01	1362231	
Potassium 40	17.5		2.8	0.6	12/28/01	12/28/01	1362231	
Protactinium 234M	28		14	25	12/28/01	12/28/01	1362231	
Thorium 234	14.3		2.3	1.5	12/28/01	12/28/01	1362231	
Uranium 235	0.91		0.15	0.08	12/28/01	12/28/01	1362231	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.506		0.097	0.13	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121801-G-10-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-009
Work Order: EQ188
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.81		0.37	0.58	12/28/01	12/28/01	1362231	
Cesium 137	-0.01	U	0.049	0.087	12/28/01	12/28/01	1362231	
Potassium 40	7.6		1.7	0.7	12/28/01	12/28/01	1362231	
Protactinium 234M	46		15	32	12/28/01	12/28/01	1362231	
Thorium 234	26.5		3.8	1.3	12/28/01	12/28/01	1362231	
Uranium 235	1.28		0.19	0.08	12/28/01	12/28/01	1362231	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.76		0.11	0.14	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-H-9-2-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-010
Work Order: EQ19A
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.89		0.38	0.50	12/28/01	12/28/01	1362231	
Cesium 137	-0.003	U	0.043	0.079	12/28/01	12/28/01	1362231	
Potassium 40	5.3		1.5	0.8	12/28/01	12/28/01	1362231	
Protactinium 234M	25	U	17	26	12/28/01	12/28/01	1362231	
Thorium 234	21.1		3.2	1.2	12/28/01	12/28/01	1362231	
Uranium 235	1.19		0.16	0.07	12/28/01	12/28/01	1362231	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.548		0.0996	0.11	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-H-9-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-011
Work Order: EQ19E
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.43		0.20	0.40	12/28/01	12/28/01	1362231	
Cesium 137	0.006	U	0.035	0.067	12/28/01	12/28/01	1362231	
Potassium 40	6.1		1.5	0.6	**12/28/01**	**12/28/01**	**1362231**	
Protactinium 234M	16.7	U	8.0	19	12/28/01	12/28/01	1362231	
Thorium 234	8.2		1.6	1.1	**12/28/01**	**12/28/01**	**1362231**	
Uranium 235	0.56		0.11	0.07	**12/28/01**	**12/28/01**	**1362231**	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-I-13-5-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-012
Work Order: EQ19G
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.34	U	0.31	0.51	12/28/01	12/28/01	1362231	
Cesium 137	-0.008	U	0.036	0.066	12/28/01	12/28/01	1362231	
Potassium 40	**9.7**		2.0	0.7	**12/28/01**	**12/28/01**	**1362231**	
Protactinium 234M	14.3	U	9.3	21	12/28/01	12/28/01	1362231	
Thorium 234	**10.6**		1.8	0.9	**12/28/01**	**12/28/01**	**1362231**	
Uranium 235	0.50		0.11	0.07	**12/28/01**	**12/28/01**	**1362231**	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-I-11-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-013
Work Order: EQ19K
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	**1.24**		0.31	0.33	12/28/01	12/28/01	1362231	
Cesium 137	-0.044	U	0.057	0.095	12/28/01	12/28/01	1362231	
Potassium 40	**9.0**		2.1	0.9	**12/28/01**	**12/28/01**	**1362231**	
Protactinium 234M	20.6	U	9.8	22	12/28/01	12/28/01	1362231	
Thorium 234	**8.4**		1.7	1.1	**12/28/01**	**12/28/01**	**1362231**	
Uranium 235	**0.41**		0.13	0.08	**12/28/01**	**12/28/01**	**1362231**	
--- Other Detected Radionuclides ---								
Radium 226DA	**1.03**		0.15	0.15	**12/28/01**	**12/28/01**	**1362231**	
Thallium 208	**0.37**		0.11	0.08	**12/28/01**	**12/28/01**	**1362231**	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-5-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-014
Work Order: EQ19M
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.68		0.26	0.47	12/28/01	12/28/01	1362231	
Cesium 137	-0.019	U	0.040	0.069	12/28/01	12/28/01	1362231	
Potassium 40	8.0		1.6	0.6	12/28/01	12/28/01	1362231	
Protactinium 234M	35		11	24	12/28/01	12/28/01	1362231	
Thorium 234	12.0		2.3	2.7	12/28/01	12/28/01	1362231	
Uranium 235	0.72		0.14	0.09	12/28/01	12/28/01	1362231	
--- Other Detected Radionuclides ---								
Radium 226DA	0.560		0.099	0.11	12/28/01	12/28/01	1362231	
Thorium 232DA	0.58		0.10	0.14	12/28/01	12/28/01	1362231	
Uranium 238DHP	11.9		1.9	1.4	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-I-13-5-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-015
Work Order: EQ19P
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.75		0.34	0.57	12/28/01	12/28/01	1362231	
Cesium 137	0.008	U	0.053	0.099	12/28/01	12/28/01	1362231	
Potassium 40	7.3		1.8	0.2	**12/28/01**	12/28/01	1362231	
Protactinium 234M	28	U	13	30	12/28/01	12/28/01	1362231	
Thorium 234	16.5		2.5	1.1	**12/28/01**	12/28/01	1362231	
Uranium 235	0.84		0.15	0.07	**12/28/01**	12/28/01	1362231	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.57		0.10	0.12	12/28/01	12/28/01	1362231	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121801-H-12-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-016
Work Order: EQ19R
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	**0.46**		0.24	0.37	12/28/01	12/28/01	1362301	
Cesium 137	-0.005	U	0.035	0.065	12/28/01	12/28/01	1362301	
Potassium 40	**8.0**		1.7	0.2	**12/28/01**	**12/28/01**	1362301	
Protactinium 234M	11.8	U	9.3	20	12/28/01	12/28/01	1362301	
Thorium 234	**6.9**		1.3	0.9	**12/28/01**	**12/28/01**	1362301	
Uranium 235	**0.41**		0.10	0.06	**12/28/01**	**12/28/01**	1362301	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.396		0.083	0.096	12/28/01	12/28/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121801-H-12-1-PT DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-016X
Work Order: EQ19R
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.39		0.19	0.38	12/28/01	12/28/01	1362301	
Cesium 137	-0.005	U	0.029	0.054	12/28/01	12/28/01	1362301	
Potassium 40	6.6		1.3	0.6	**12/28/01**	**12/28/01**	1362301	
Protactinium 234M	7.4	U	8.0	17	12/28/01	12/28/01	1362301	
Thorium 234	7.7		1.3	0.8	**12/28/01**	**12/28/01**	1362301	
Uranium 235	0.380		0.081	0.054	**12/28/01**	**12/28/01**	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-G-11-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-017
Work Order: EQ19X
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.49		0.21	0.38	12/28/01	12/28/01	1362301	
Cesium 137	-0.008	U	0.036	0.066	12/28/01	12/28/01	1362301	
Potassium 40	5.5		1.5	0.6	**12/28/01**	**12/28/01**	1362301	
Protactinium 234M	15.5	U	8.4	19	12/28/01	12/28/01	1362301	
Thorium 234	2.88		0.74	0.68	**12/28/01**	**12/28/01**	1362301	
Uranium 235	0.193		0.059	0.046	**12/28/01**	**12/28/01**	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-018
Work Order: EQ192
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	**0.85**		0.24	0.25	12/28/01	12/28/01	1362301	
Cesium 137	0.035	U	0.042	0.083	12/28/01	12/28/01	1362301	
Potassium 40	**7.8**		1.7	0.8	12/28/01	12/28/01	1362301	
Protactinium 234M	**29**		11	22	12/28/01	12/28/01	1362301	
Thorium 234	**17.1**		2.5	1.5	12/28/01	12/28/01	1362301	
Uranium 235	**1.04**		0.16	0.1	12/28/01	12/28/01	1362301	
--- Other Detected Radionuclides ---								
Thallium 208	**0.394**		0.092	0.062	12/28/01	12/28/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-I-12-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-019
Work Order: EQ193
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD					12/28/01	12/28/01	1362301	
Actinium 228	0.35	U	0.18	0.38	12/28/01	12/28/01	1362301	
Cesium 137	-0.006	U	0.034	0.063	**12/28/01**	**12/28/01**	**1362301**	
Potassium 40	**3.9**		**1.1**	**0.4**	12/28/01	12/28/01	1362301	
Protactinium 234M	5.1	U	7.6	16	**12/28/01**	**12/28/01**	**1362301**	
Thorium 234	**3.35**		**0.74**	**0.65**	**12/28/01**	**12/28/01**	**1362301**	
Uranium 235	0.194		0.066	0.046				

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-5-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-020
Work Order: EQ199
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.42		0.20	0.38	12/28/01	12/28/01	1362301	
Cesium 137	0.002	U	0.033	0.064	12/28/01	12/28/01	1362301	
Potassium 40	6.7		1.6	0.7	**12/28/01**	**12/28/01**	**1362301**	
Protactinium 234M	19	U	11	19	12/28/01	12/28/01	1362301	
Thorium 234	5.5		1.2	1.0	**12/28/01**	**12/28/01**	**1362301**	
Uranium 235	0.312		0.087	0.063	**12/28/01**	**12/28/01**	**1362301**	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121801-I-13-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-021
Work Order: EQ2AD
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD				pCi/g	300 MOD			
Actinium 228	0.49	U	0.26	0.53	12/28/01	12/29/01	1362301	
Cesium 137	0.031	U	0.047	0.093	12/28/01	12/29/01	1362301	
Potassium 40	7.2		1.6	0.8	**12/28/01**	**12/29/01**	**1362301**	
Protactinium 234M	21	U	11	24	12/28/01	12/29/01	1362301	
Thorium 234	10.6		1.9	1	**12/28/01**	**12/29/01**	**1362301**	
Uranium 235	0.57		0.11	0.07	**12/28/01**	**12/29/01**	**1362301**	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-J-9-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-022
Work Order: EQ2AE
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.42	U	0.23	0.44	12/28/01	12/29/01	1362301	
Cesium 137	-0.018	U	0.034	0.058	12/28/01	12/29/01	1362301	
Potassium 40	5.2		1.3	0.5	12/28/01	12/29/01	1362301	
Protactinium 234M	26		11	22	12/28/01	12/29/01	1362301	
Thorium 234	14.5		2.3	1.1	12/28/01	12/29/01	1362301	
Uranium 235	0.80		0.12	0.06	12/28/01	12/29/01	1362301	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.380		0.082	0.11	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-J-12-3-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-023
Work Order: EQ2AG
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.73		0.29	0.50	12/28/01	12/29/01	1362301	
Cesium 137	-0.032	U	0.044	0.073	12/28/01	12/29/01	1362301	
Potassium 40	7.3		1.7	0.6	12/28/01	12/29/01	1362301	
Protactinium 234M	85		18	14	12/28/01	12/29/01	1362301	
Thorium 234	42.1		6.2	4.7	12/28/01	12/29/01	1362301	
Uranium 235	2.28		0.28	0.10	12/28/01	12/29/01	1362301	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.63		0.10	0.16	12/28/01	12/29/01	1362301	
Uranium 238DHP	43.0		4.6	2.2	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-G-13-2-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-024
Work Order: EQ2AJ
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.82		0.37	0.57	12/28/01	12/29/01	1362301	
Cesium 137	0.012	U	0.049	0.093	12/28/01	12/29/01	1362301	
Potassium 40	6.9		1.7	0.6	**12/28/01**	**12/29/01**	1362301	
Protactinium 234M	24	U	13	27	12/28/01	12/29/01	1362301	
Thorium 234	10.9		1.8	1.0	**12/28/01**	**12/29/01**	1362301	
Uranium 235	0.62		0.12	0.07	**12/28/01**	**12/29/01**	1362301	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.81		0.12	0.12	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-H-10-1-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-025
Work Order: EQ2AM
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.91		0.36	0.56	12/28/01	12/29/01	1362301	
Cesium 137	0.041	U	0.048	0.097	12/28/01	12/29/01	1362301	
Potassium 40	5.9		1.6	0.8	12/28/01	12/29/01	1362301	
Protactinium 234M	32		18	29	12/28/01	12/29/01	1362301	
Thorium 234	24.7		4.6	3.1	12/28/01	12/29/01	1362301	
Uranium 235	1.43		0.19	0.07	12/28/01	12/29/01	1362301	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.71		0.12	0.12	12/28/01	12/29/01	1362301	
Uranium 238DHP	25.9		3.2	1.3	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-H-12-1-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-026
Work Order: EQ2AQ
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.50		0.30	0.49	12/28/01	12/29/01	1362301	
Cesium 137	0.015	U	0.040	0.078	12/28/01	12/29/01	1362301	
Potassium 40	5.8		1.3	0.1	**12/28/01**	**12/29/01**	1362301	
Protactinium 234M	17.1	U	8.0	19	12/28/01	12/29/01	1362301	
Thorium 234	8.8		1.6	1.2	**12/28/01**	**12/29/01**	1362301	
Uranium 235	0.56		0.12	0.07	**12/28/01**	**12/29/01**	1362301	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.472		0.097	0.14	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-12-3-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-027
Work Order: EQ2AR
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.68	U	0.44	0.77	12/28/01	12/29/01	1362301	
Cesium 137	0.093	U	0.069	0.14	12/28/01	12/29/01	1362301	
Potassium 40	**9.6**		2.4	1.2	12/28/01	12/29/01	1362301	
Protactinium 234M	**139**		35	25	12/28/01	12/29/01	1362301	
Thorium 234	**90**		12	2	12/28/01	12/29/01	1362301	
Uranium 235	**4.51**		0.54	0.12	12/28/01	12/29/01	1362301	
--- Other Detected Radionuclides ---								
Thorium 232DA	**0.81**		0.15	0.18	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-3-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-028
Work Order: EQ2AW
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	1.01		0.48	0.72	12/28/01	12/29/01	1362301	
Cesium 137	0.090	U	0.077	0.15	12/28/01	12/29/01	1362301	
Potassium 40	10.8		2.3	0.7	12/28/01	12/29/01	1362301	
Protactinium 234M	139		39	55	12/28/01	12/29/01	1362301	
Thorium 234	65.3		9.2	2.0	12/28/01	12/29/01	1362301	
Uranium 235	3.47		0.40	0.12	12/28/01	12/29/01	1362301	
--- Other Detected Radionuclides ---								
Thorium 232DA	0.88		0.15	0.18	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-2-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-029
Work Order: EQ2A1
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	1.00		0.29	0.27	12/28/01	12/29/01	1362301	
Cesium 137	0.084	U	0.057	0.12	12/28/01	12/29/01	1362301	
Potassium 40	15.0		2.6	0.8	12/28/01	12/29/01	1362301	
Protactinium 234M	27	U	17	28	12/28/01	12/29/01	1362301	
Thorium 234	14.2		2.5	1.6	12/28/01	12/29/01	1362301	
Uranium 235	0.95		0.16	0.1	12/28/01	12/29/01	1362301	
--- Other Detected Radionuclides ---								
Thallium 208	0.40		0.10	0.08	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

STL ST. LOUIS

ENVIROCON INC

Client Sample ID: SYL-121901-G-9-2-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260128-030
Work Order: EQ2A2
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.49		0.24	0.43	12/28/01	12/29/01	1362301	
Cesium 137	0.002	U	0.032	0.062	12/28/01	12/29/01	1362301	
Potassium 40	5.2		1.3	0.6	12/28/01	12/29/01	1362301	
Protactinium 234M	27		10	21	12/28/01	12/29/01	1362301	
Thorium 234	12.0		1.9	1.4	12/28/01	12/29/01	1362301	
Uranium 235	0.82		0.13	0.09	12/28/01	12/29/01	1362301	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F1L260128
Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Lab Sample ID Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			**pCi/g**	**300 MOD**			**F1L280000-301B**	
Actinium 228	0.031	U	0.094	0.25	12/28/01	12/29/01	1362301	
Cesium 137	-0.009	U	0.026	0.048	12/28/01	12/29/01	1362301	
Potassium 40	0.02	U	0.33	0.87	12/28/01	12/29/01	1362301	
Protactinium 234M	0.1	U	4.2	9.5	12/28/01	12/29/01	1362301	
Thorium 234	-0.26	U	0.25	0.51	12/28/01	12/29/01	1362301	
Uranium 235	**0.08**		**0.11**	**0.05**	**12/28/01**	**12/29/01**	**1362301**	
Gamma Cs-137 & Hits by HASL 300 MOD			**pCi/g**	**300 MOD**			**F1L280000-231B**	
Actinium 228	0.01	U	0.10	0.21	12/28/01	12/28/01	1362231	
Cesium 137	0.021	U	0.026	0.059	12/28/01	12/28/01	1362231	
Potassium 40	-0.18	U	0.31	0.69	12/28/01	12/28/01	1362231	
Protactinium 234M	-1.3	U	3.9	7.6	12/28/01	12/28/01	1362231	
Thorium 234	-0.16	U	0.24	0.52	12/28/01	12/28/01	1362231	
Uranium 235	**0.057**		**0.081**	**0.041**	**12/28/01**	**12/28/01**	**1362231**	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

U Result is less than the sample detection limit.

DUPLICATE EVALUATION REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F1L260128
Matrix: SOLID

Date Sampled: 12/19/01
Date Received: 12/26/01

Parameter	SAMPLE Result		Total Uncert. (2σ +/-)	% Yld	DUPLICATE Result		Total Uncert. (2 σ +/-)	% Yld	QC Sample ID Precision	
Gamma Cs-137 & Hits by HASL 300 MOD			**pCi/g**		**300 MOD**				**F1L260128-001**	
Actinium 228	0.37	U	0.41		1.02		0.28		93	%RPD
Cesium 137	0.079	U	0.066		0.01	U	0.057		156	%RPD
Potassium 40	13.8		2.9		14.4		2.7		4	%RPD
Protactinium 234M	112		30		94		25		17	%RPD
Thorium 234	66.0		8.8		62.5		9.0		5	%RPD
Uranium 235	3.23		0.42		3.33		0.41		3	%RPD
	Batch #:		1362231 (Sample)		1362231 (Duplicate)					
Gamma Cs-137 & Hits by HASL 300 MOD			**pCi/g**		**300 MOD**				**F1L260128-016**	
Actinium 228	0.46		0.24		0.39		0.19		18	%RPD
Cesium 137	-0.005	U	0.035		-0.005	U	0.029		-3	%RPD
Potassium 40	8.0		1.7		6.6		1.3		19	%RPD
Protactinium 234M	11.8	U	9.3		7.4	U	8.0		45	%RPD
Thorium 234	6.9		1.3		7.7		1.3		11	%RPD
Uranium 235	0.41		0.10		0.380		0.081		6	%RPD
	Batch #:		1362301 (Sample)		1362301 (Duplicate)					

NOTE(S)

Data are incomplete without the case narrative.
Calculations are performed before rounding to avoid round-off error in calculated results

U Result is less than the sample detection limit.

Laboratory Control Sample Report

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F1L260128
Matrix: SOLID

Parameter	Spike Amount	Result	Total Uncert. (2 σ +/-)	MDC	% Yld	% Rec	Lab Sample ID QC Control Limits
Gamma Cs-137 & Hits by HASL 300 MOD		pCi/g		300 MOD			F1L280000-231C
Americium 241	292	309	39	3		106	(75 - 125)
Cesium 137	121	114	14	0.6		94	(88 - 117)
Cobalt 60	198	192	15	0.6		97	(75 - 125)
	Batch #:	1362231		**Analysis Date:**	12/28/01		
Gamma Cs-137 & Hits by HASL 300 MOD		pCi/g		300 MOD			F1L280000-301C
Americium 241	292	289	46	1		99	(75 - 125)
Cesium 137	121	118	20	0.7		97	(88 - 117)
Cobalt 60	198	189	16	0.5		96	(75 - 125)
	Batch #:	1362301		**Analysis Date:**	12/29/01		

NOTE(S)

MDC is determined by instrument performance only
Calculations are performed before rounding to avoid round-off error in calculated results

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-5-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-043
Work Order: EQ2GK
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.90	J	0.35	0.23	01/11/02	01/20/02	2011374	56
Thorium 230	0.52	J	0.25	0.16	01/11/02	01/20/02	2011374	56
Thorium 232	1.00		0.37	0.15	01/11/02	01/20/02	2011374	56
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	11.7		2.8	0.1	01/11/02	01/22/02	2011370	55
Uranium 235	0.89	J	0.34	0.11	01/11/02	01/22/02	2011370	55
Uranium 238	12.6		3.0	0.09	01/11/02	01/22/02	2011370	55

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121801-I-10-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-044
Work Order: EQ2GL
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.60		0.44	0.13	01/11/02	01/19/02	2011374	76
Thorium 230	0.93	J	0.30	0.07	01/11/02	01/19/02	2011374	76
Thorium 232	1.45		0.40	0.07	01/11/02	01/19/02	2011374	76
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	15.2		3.7	0.2	01/11/02	01/18/02	2011370	49
Uranium 235	1.26		0.47	0.13	01/11/02	01/18/02	2011370	49
Uranium 238	15.4		3.7	0.1	01/11/02	01/18/02	2011370	49
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.51		0.25	0.49	01/02/02	01/08/02	2002220	
Cesium 137	0.018	U	0.045	0.088	01/02/02	01/08/02	2002220	
Potassium 40	5.4		1.3	0.6	01/02/02	01/08/02	2002220	
Protactinium 234M	52		17	33	01/02/02	01/08/02	2002220	
Thorium 234	23.2		3.5	1.2	01/02/02	01/08/02	2002220	
Uranium 235	1.36		0.52	0.08	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.60		0.14	0.11	01/02/02	01/08/02	2002220	
Lead 214	0.31		0.11	0.11	01/02/02	01/08/02	2002220	
Uranium 238DHP	25.2		4.1	1.2	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-I-9-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-045
Work Order: EQ2G5
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	8.4		1.8	0.2	01/11/02	01/19/02	2011374	80
Thorium 230	1.43		0.40	0.11	01/11/02	01/19/02	2011374	80
Thorium 232	8.2		1.7	0.08	01/11/02	01/19/02	2011374	80
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	64		16	0.2	01/11/02	01/19/02	2011370	40
Uranium 235	4.8		1.4	0.2	01/11/02	01/19/02	2011370	40
Uranium 238	66		16	0.08	01/11/02	01/19/02	2011370	40
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	3.7		1.0	0.3	01/02/02	01/08/02	2002220	
Cesium 137	0.059	U	0.072	0.14	01/02/02	01/08/02	2002220	
Potassium 40	9.7		2.0	1.2	01/02/02	01/08/02	2002220	
Protactinium 234M	60		21	39	01/02/02	01/08/02	2002220	
Thorium 234	38.7		5.3	1.6	01/02/02	01/08/02	2002220	
Uranium 235	1.64		0.67	0.13	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	4.07		0.58	0.15	01/02/02	01/08/02	2002220	
Thallium 208	1.42		0.26	0.11	01/02/02	01/08/02	2002220	
Thorium 232DA	3.03		0.75	0.15	01/02/02	01/08/02	2002220	
Uranium 238DHP	35.8		5.5	1.6	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-I-11-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-046
Work Order: EQ2G9
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	2.23		0.53	0.16	01/11/02	01/19/02	2011374	95
Thorium 230	0.78	J	0.24	0.09	01/11/02	01/19/02	2011374	95
Thorium 232	2.27		0.54	0.06	01/11/02	01/19/02	2011374	95
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	37.2		9.3	0.2	01/11/02	01/19/02	2011370	47
Uranium 235	3.0		1.0	0.2	01/11/02	01/19/02	2011370	47
Uranium 238	41		10	0.09	01/11/02	01/19/02	2011370	47
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	1.05		0.33	0.20	01/02/02	01/08/02	2002220	
Cesium 137	-0.016	U	0.039	0.074	01/02/02	01/08/02	2002220	
Potassium 40	5.2		1.5	0.6	01/02/02	01/08/02	2002220	
Protactinium 234M	36		12	26	01/02/02	01/08/02	2002220	
Thorium 234	16.3		3.2	1.1	01/02/02	01/08/02	2002220	
Uranium 235	0.76		0.40	0.08	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.74		0.18	0.13	01/02/02	01/08/02	2002220	
Lead 214	0.35		0.13	0.10	01/02/02	01/08/02	2002220	
Thorium 232DA	0.47		0.30	0.13	01/02/02	01/08/02	2002220	
Uranium 238DHP	16.0		3.2	1.1	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-I-12-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-047
Work Order: EQ2HA
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.24		0.36	0.17	01/11/02	01/19/02	2011374	75
Thorium 230	0.69	J	0.23	0.10	01/11/02	01/19/02	2011374	75
Thorium 232	1.09		0.32	0.10	01/11/02	01/19/02	2011374	75
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	16.8		4.2	0.1	01/11/02	01/19/02	2011370	51
Uranium 235	1.36		0.52	0.21	01/11/02	01/19/02	2011370	51
Uranium 238	16.8		4.2	0.1	01/11/02	01/19/02	2011370	51
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.46		0.22	0.45	01/02/02	01/08/02	2002220	
Cesium 137	-0.025	U	0.046	0.078	01/02/02	01/08/02	2002220	
Potassium 40	4.1		1.3	0.5	01/02/02	01/08/02	2002220	
Protactinium 234M	11.7	U	8.1	18	01/02/02	01/08/02	2002220	
Thorium 234	9.0		1.7	0.9	01/02/02	01/08/02	2002220	
Uranium 235	0.31		0.31	0.07	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.47		0.12	0.12	01/02/02	01/08/02	2002220	
Uranium 238DHP	8.7		1.9	0.9	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-I-13-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-048
Work Order: EQ2HC
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM	(SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			
Thorium 228	1.55		0.60	0.41	01/11/02	01/19/02	2011374	33
Thorium 230	1.17		0.48	0.21	01/11/02	01/19/02	2011374	33
Thorium 232	1.61		0.59	0.16	01/11/02	01/19/02	2011374	33
Iso URANIUM	(SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			
Uranium 234	19.6		4.8	0.2	01/11/02	01/19/02	2011370	55
Uranium 235	1.87		0.67	0.09	01/11/02	01/19/02	2011370	55
Uranium 238	19.8		4.9	0.2	01/11/02	01/19/02	2011370	55

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121901-I-13-2-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-049
Work Order: EQ2HD
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g		RP-725 MOD		
Thorium 228	2.43		0.61	0.1	01/11/02	01/19/02	2011374	75
Thorium 230	1.36		0.39	0.07	01/11/02	01/19/02	2011374	75
Thorium 232	2.39		0.60	0.07	01/11/02	01/19/02	2011374	75
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g		RP-725 MOD		
Uranium 234	61		15	0.2	01/11/02	01/19/02	2011370	38
Uranium 235	5.4		1.5	0.2	01/11/02	01/19/02	2011370	38
Uranium 238	62		15	0.2	01/11/02	01/19/02	2011370	38
Gamma Cs-137 & Hits by HASL 300 MOD			MDC	pCi/g		300 MOD		
Actinium 228	1.03		0.45	0.29	01/02/02	01/08/02	2002220	
Cesium 137	0.099	U	0.069	0.14	01/02/02	01/08/02	2002220	
Potassium 40	6.9		1.7	1	01/02/02	01/08/02	2002220	
Protactinium 234M	62		19	40	01/02/02	01/08/02	2002220	
Thorium 234	29.1		4.3	1.4	01/02/02	01/08/02	2002220	
Uranium 235	1.00		0.43	0.1	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	1.09		0.22	0.20	01/02/02	01/08/02	2002220	
Lead 214	0.71		0.23	0.16	01/02/02	01/08/02	2002220	
Thorium 232DA	1.26		0.44	0.19	01/02/02	01/08/02	2002220	
Uranium 238DHP	27.3		4.4	1.4	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-J-9-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-050
Work Order: EQ2HG
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	1.12		0.33	0.07	01/11/02	01/19/02	2011374	73
Thorium 230	0.73	J	0.24	0.08	01/11/02	01/19/02	2011374	73
Thorium 232	1.14		0.33	0.08	01/11/02	01/19/02	2011374	73
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	37.5		8.5	0.08	01/11/02	01/19/02	2011370	62
Uranium 235	2.28		0.68	0.14	01/11/02	01/19/02	2011370	62
Uranium 238	37.4		8.5	0.1	01/11/02	01/19/02	2011370	62

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-11-3-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-051
Work Order: EQ2HH
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.08		0.36	0.14	01/11/02	01/19/02	2011374	58
Thorium 230	1.11		0.36	0.12	01/11/02	01/19/02	2011374	58
Thorium 232	0.82	J	0.29	0.13	01/11/02	01/19/02	2011374	58
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	56		13	0.3	01/11/02	01/19/02	2011370	42
Uranium 235	3.6		1.1	0.2	01/11/02	01/19/02	2011370	42
Uranium 238	59		14	0.2	01/11/02	01/19/02	2011370	42
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.90		0.43	0.59	01/02/02	01/08/02	2002220	
Cesium 137	-0.036	U	0.050	0.087	01/02/02	01/08/02	2002220	
Potassium 40	16.1		2.6	0.7	01/02/02	01/08/02	2002220	
Protactinium 234M	43		17	19	01/02/02	01/08/02	2002220	
Thorium 234	30.4		5.6	1.6	01/02/02	01/08/02	2002220	
Uranium 235	1.48		0.54	0.09	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.63		0.16	0.14	01/02/02	01/08/02	2002220	
Lead 214	0.49		0.16	0.15	01/02/02	01/08/02	2002220	
Thorium 232DA	0.72		0.31	0.14	01/02/02	01/08/02	2002220	
Uranium 238DHP	27.4		5.1	1.6	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-12-3-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-052
Work Order: EQ2HK
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	2.41		0.69	0.12	01/11/02	01/19/02	2011374	48
Thorium 230	1.08		0.38	0.13	01/11/02	01/19/02	2011374	48
Thorium 232	1.81		0.55	0.17	01/11/02	01/19/02	2011374	48
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	75		19	0.3	01/11/02	01/19/02	2011370	35
Uranium 235	5.1		1.5	0.2	01/11/02	01/19/02	2011370	35
Uranium 238	79		19	0.4	01/11/02	01/19/02	2011370	35

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121801-J-12-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-053
Work Order: EQ2HL
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		RP-725 MOD			
Iso THORIUM (SHORT CT) DOE ONLY MOD								
Thorium 228	1.32		0.39	0.13	01/11/02	01/19/02	2011374	65
Thorium 230	1.41		0.41	0.1	01/11/02	01/19/02	2011374	65
Thorium 232	1.43		0.41	0.09	01/11/02	01/19/02	2011374	65
			pCi/g		RP-725 MOD			
Iso URANIUM (SHORT CT) DOE ONLY MOD								
Uranium 234	15.8		3.9	0.1	01/11/02	01/19/02	2011370	43
Uranium 235	0.87	J	0.38	0.19	01/11/02	01/19/02	2011370	43
Uranium 238	17.9		4.4	0.2	01/11/02	01/19/02	2011370	43
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.38	U	0.21	0.44	01/02/02	01/08/02	2002220	
Cesium 137	0.020	U	0.042	0.084	01/02/02	01/08/02	2002220	
Potassium 40	8.1		1.9	0.2	01/02/02	01/08/02	2002220	
Protactinium 234M	7.9	U	8.8	19	01/02/02	01/08/02	2002220	
Thorium 234	8.6		1.6	0.8	01/02/02	01/08/02	2002220	
Uranium 235	0.51		0.10	0.07	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.44		0.14	0.13	01/02/02	01/08/02	2002220	
Lead 214	0.34		0.13	0.12	01/02/02	01/08/02	2002220	
Uranium 238DHP	8.5		1.9	0.8	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-J-11-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-054
Work Order: EQ2HN
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	0.91	J	0.31	0.10	01/11/02	01/19/02	2011374	67
Thorium 230	0.53	J	0.21	0.09	01/11/02	01/19/02	2011374	67
Thorium 232	0.86	J	0.29	0.08	01/11/02	01/19/02	2011374	67
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	28.6		6.8	0.1	01/11/02	01/19/02	2011370	49
Uranium 235	1.94		0.64	0.08	01/11/02	01/19/02	2011370	49
Uranium 238	28.0		6.6	0.06	01/11/02	01/19/02	2011370	49
Gamma Cs-137 & Hits by HASL 300 MOD				pCi/g	300 MOD			
Actinium 228	0.82		0.33	0.61	01/02/02	01/08/02	2002220	
Cesium 137	0.014	U	0.051	0.099	01/02/02	01/08/02	2002220	
Potassium 40	8.0		1.7	0.8	01/02/02	01/08/02	2002220	
Protactinium 234M	27	U	13	28	01/02/02	01/08/02	2002220	
Thorium 234	16.3		2.7	1.2	01/02/02	01/08/02	2002220	
Uranium 235	0.78	U	0.42	0.90	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.67		0.15	0.14	01/02/02	01/08/02	2002220	
Uranium 238DHP	17.3		3.0	1.2	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-J-13-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-055
Work Order: EQ2HP
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.81	J	0.28	0.14	01/11/02	01/20/02	2011374	87
Thorium 230	0.68	J	0.24	0.09	01/11/02	01/20/02	2011374	87
Thorium 232	0.74	J	0.26	0.07	01/11/02	01/20/02	2011374	87
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	15.2		3.6	0.1	01/11/02	01/19/02	2011370	57
Uranium 235	1.28		0.44	0.13	01/11/02	01/19/02	2011370	57
Uranium 238	14.5		3.4	0.1	01/11/02	01/19/02	2011370	57
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.61		0.26	0.50	01/02/02	01/08/02	2002220	
Cesium 137	0.035	U	0.042	0.091	01/02/02	01/08/02	2002220	
Potassium 40	7.5		1.8	0.6	01/02/02	01/08/02	2002220	
Protactinium 234M	13.2	U	9.5	20	01/02/02	01/08/02	2002220	
Thorium 234	6.9		1.5	0.9	01/02/02	01/08/02	2002220	
Uranium 235	0.366		0.084	0.059	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.37		0.12	0.11	01/02/02	01/08/02	2002220	
Lead 214	0.29		0.11	0.09	01/02/02	01/08/02	2002220	
Uranium 238DHP	8.1		2.2	0.9	01/02/02	01/08/02	2002220	

NOTE (S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-G-13-2-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-056
Work Order: EQ2HQ
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	1.59		0.49	0.17	01/11/02	01/20/02	2011374	62
Thorium 230	0.88	J	0.33	0.22	01/11/02	01/20/02	2011374	62
Thorium 232	1.31		0.42	0.15	01/11/02	01/20/02	2011374	62
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	19.7		4.8	0.2	01/11/02	01/19/02	2011370	43
Uranium 235	1.75		0.62	0.20	01/11/02	01/19/02	2011370	43
Uranium 238	21.6		5.3	0.3	01/11/02	01/19/02	2011370	43

NOTE(S)

ata are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-H-10-1-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-057
Work Order: EQ2HT
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	2.12		0.56	0.04	01/11/02	01/20/02	2011374	74
Thorium 230	0.89	J	0.30	0.09	01/11/02	01/20/02	2011374	74
Thorium 232	1.50		0.43	0.04	01/11/02	01/20/02	2011374	74
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	65		17	0.3	01/11/02	01/19/02	2011370	29
Uranium 235	4.7		1.5	0.4	01/11/02	01/19/02	2011370	29
Uranium 238	67		17	0.4	01/11/02	01/19/02	2011370	29

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-H-12-1-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-058
Work Order: EQ2HW
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	2.54		0.68	0.22	01/11/02	01/20/02	2011374	76
Thorium 230	0.96	J	0.33	0.11	01/11/02	01/20/02	2011374	76
Thorium 232	2.88		0.74	0.09	01/11/02	01/20/02	2011374	76
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	23.5		5.6	0.2	01/11/02	01/19/02	2011370	47
Uranium 235	1.77		0.60	0.13	01/11/02	01/19/02	2011370	47
Uranium 238	25.8		6.1	0.1	01/11/02	01/19/02	2011370	47

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-11-3-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-059
Work Order: EQ2H0
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	48		12	0.2	01/11/02	01/19/02	2011370	31
Uranium 235	2.59		0.93	0.20	01/11/02	01/19/02	2011370	31
Uranium 238	52		13	0.2	01/11/02	01/19/02	2011370	31
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.85		0.43	0.72	01/02/02	01/08/02	2002220	
Cesium 137	0.007	U	0.066	0.12	01/02/02	01/08/02	2002220	
Potassium 40	8.7		2.0	0.8	01/02/02	01/08/02	2002220	
Protactinium 234M	48		17	37	01/02/02	01/08/02	2002220	
Thorium 234	28.9		4.3	1.4	01/02/02	01/08/02	2002220	
Uranium 235	1.46		0.57	0.1	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.61		0.18	0.16	01/02/02	01/08/02	2002220	
Lead 214	0.65		0.16	0.16	01/02/02	01/08/02	2002220	
Thorium 232DA	1.39		0.54	0.15	01/02/02	01/08/02	2002220	
Uranium 238DHP	31.5		4.6	1.4	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-12-3-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-060
Work Order: EQ2H1
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	1.66		0.50	0.1	01/11/02	01/20/02	2011374	70
Thorium 230	1.04		0.36	0.1	01/11/02	01/20/02	2011374	70
Thorium 232	1.15		0.38	0.05	01/11/02	01/20/02	2011374	70
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	126		34	0.4	01/11/02	01/19/02	2011370	28
Uranium 235	9.5		2.9	0.4	01/11/02	01/19/02	2011370	28
Uranium 238	125		34	0.4	01/11/02	01/19/02	2011370	28

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121901-J-9-3-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-061
Work Order: EQ2H2
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g		RP-725 MOD		
Thorium 228	2.41		0.72	0.31	01/11/02	01/18/02	2011376	42
Thorium 230	1.54		0.51	0.18	01/11/02	01/18/02	2011376	42
Thorium 232	2.03		0.62	0.17	01/11/02	01/18/02	2011376	42
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g		RP-725 MOD		
Uranium 234	35.3		8.6	0.2	01/11/02	01/17/02	2011371	47
Uranium 235	2.05		0.71	0.23	01/11/02	01/17/02	2011371	47
Uranium 238	37.7		9.2	0.2	01/11/02	01/17/02	2011371	47
Gamma Cs-137 & Hits by HASL 300 MOD				pCi/g		300 MOD		
Actinium 228	0.81		0.37	0.34	01/02/02	01/08/02	2002220	
Cesium 137	0.033	U	0.058	0.12	01/02/02	01/08/02	2002220	
Potassium 40	8.0		2.0	0.9	01/02/02	01/08/02	2002220	
Protactinium 234M	31		13	30	01/02/02	01/08/02	2002220	
Thorium 234	17.7		3.5	1.4	01/02/02	01/08/02	2002220	
Uranium 235	0.44		0.46	0.08	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.78		0.19	0.17	01/02/02	01/08/02	2002220	
Lead 214	0.69		0.18	0.16	01/02/02	01/08/02	2002220	
Thorium 232DA	0.75		0.39	0.16	01/02/02	01/08/02	2002220	
Uranium 238DHP	18.9		3.2	1.4	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC
U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-9-3-COMP DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-061X
Work Order: EQ2H2
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso URANIUM	(SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD		
Uranium 234	31.4		7.4	0.1	01/11/02	01/17/02	2011371	56
Uranium 235	2.10		0.69	0.17	01/11/02	01/17/02	2011371	56
Uranium 238	30.0		7.1	0.1	01/11/02	01/17/02	2011371	56
Iso THORIUM	(SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD		
Thorium 228	1.42		0.45	0.23	01/11/02	01/18/02	2011376	57
Thorium 230	0.80	J	0.30	0.11	01/11/02	01/18/02	2011376	57
Thorium 232	1.25		0.40	0.09	01/11/02	01/18/02	2011376	57

OTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-9-1-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-062
Work Order: EQ2H3
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	2.31		0.57	0.08	01/11/02	01/18/02	2011376	79
Thorium 230	0.73	J	0.24	0.06	01/11/02	01/18/02	2011376	79
Thorium 232	2.14		0.53	0.06	01/11/02	01/18/02	2011376	79
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	55		13	0.3	01/11/02	01/17/02	2011371	45
Uranium 235	2.98		0.95	0.36	01/11/02	01/17/02	2011371	45
Uranium 238	56		14	0.2	01/11/02	01/17/02	2011371	45
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	1.17		0.44	0.58	01/02/02	01/08/02	2002220	
Cesium 137	-0.051	U	0.043	0.071	01/02/02	01/08/02	2002220	
Potassium 40	4.4		1.5	0.7	01/02/02	01/08/02	2002220	
Protactinium 234M	51		17	11	01/02/02	01/08/02	2002220	
Thorium 234	29.8		5.3	1.2	01/02/02	01/08/02	2002220	
Uranium 235	1.17		0.46	0.08	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.85		0.19	0.14	01/02/02	01/08/02	2002220	
Lead 214	0.29		0.11	0.12	01/02/02	01/08/02	2002220	
Thorium 232DA	0.99		0.39	0.14	01/02/02	01/08/02	2002220	
Uranium 238DHP	29.4		5.2	1.2	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-3-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-063
Work Order: EQ2H4
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM	(SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD		
Thorium 228	1.79		0.56	0.11	01/11/02	01/18/02	2011376	45
Thorium 230	1.37		0.46	0.13	01/11/02	01/18/02	2011376	45
Thorium 232	1.66		0.53	0.13	01/11/02	01/18/02	2011376	45
Iso URANIUM	(SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD		
Uranium 234	76		18	0.2	01/11/02	01/17/02	2011371	43
Uranium 235	4.5		1.3	0.2	01/11/02	01/17/02	2011371	43
Uranium 238	75		18	0.07	01/11/02	01/17/02	2011371	43

OTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-2-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-064
Work Order: EQ2H6
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.71		0.49	0.15	01/11/02	01/18/02	2011376	61
Thorium 230	1.21		0.38	0.13	01/11/02	01/18/02	2011376	61
Thorium 232	1.57		0.46	0.15	01/11/02	01/18/02	2011376	61
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	32.6		7.8	0.2	01/11/02	01/17/02	2011371	58
Uranium 235	2.30		0.76	0.15	01/11/02	01/17/02	2011371	58
Uranium 238	33.9		8.1	0.07	01/11/02	01/17/02	2011371	58

OTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121901-G-9-2-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-065
Work Order: EQ2H7
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	0.87	J	0.28	0.09	01/11/02	01/18/02	2011376	75
Thorium 230	0.64	J	0.22	0.09	01/11/02	01/18/02	2011376	75
Thorium 232	0.87	J	0.28	0.11	01/11/02	01/18/02	2011376	75
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	34.7		8.2	0.1	01/11/02	01/17/02	2011371	57
Uranium 235	2.12		0.69	0.19	01/11/02	01/17/02	2011371	57
Uranium 238	33.1		7.8	0.1	01/11/02	01/17/02	2011371	57

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-10-3-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-066
Work Order: EQ2H8
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.49		0.45	0.14	01/11/02	01/18/02	2011376	57
Thorium 230	1.06		0.35	0.12	01/11/02	01/18/02	2011376	57
Thorium 232	1.60		0.47	0.09	01/11/02	01/18/02	2011376	57
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	53		13	0.2	01/11/02	01/17/02	2011371	51
Uranium 235	3.2		1.0	0.1	01/11/02	01/17/02	2011371	51
Uranium 238	53		13	0.2	01/11/02	01/17/02	2011371	51
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.77		0.31	0.59	01/02/02	01/08/02	2002220	
Cesium 137	0.035	U	0.048	0.098	01/02/02	01/08/02	2002220	
Potassium 40	7.2		1.7	0.7	01/02/02	01/08/02	2002220	
Protactinium 234M	40		18	33	01/02/02	01/08/02	2002220	
Thorium 234	27.3		3.8	1.2	01/02/02	01/08/02	2002220	
Uranium 235	1.63		0.57	0.09	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.63		0.16	0.14	01/02/02	01/08/02	2002220	
Lead 214	0.53		0.19	0.14	01/02/02	01/08/02	2002220	
Uranium 238DHP	30.6		4.9	1.2	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-H-11-3-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-067
Work Order: EQ2JA
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.60		0.47	0.11	01/11/02	01/18/02	2011376	63
Thorium 230	1.16		0.37	0.1	01/11/02	01/18/02	2011376	63
Thorium 232	1.72		0.49	0.08	01/11/02	01/18/02	2011376	63
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	53		13	0.2	01/11/02	01/17/02	2011371	42
Uranium 235	3.4		1.0	0.2	01/11/02	01/17/02	2011371	42
Uranium 238	53		13	0.2	01/11/02	01/17/02	2011371	42
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.95		0.39	0.68	01/02/02	01/08/02	2002220	
Cesium 137	-0.004	U	0.048	0.089	01/02/02	01/08/02	2002220	
Potassium 40	8.2		1.7	0.2	01/02/02	01/08/02	2002220	
Protactinium 234M	39		15	32	01/02/02	01/08/02	2002220	
Thorium 234	19.4		3.1	1.3	01/02/02	01/08/02	2002220	
Uranium 235	1.03		0.47	0.09	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.84		0.17	0.17	01/02/02	01/08/02	2002220	
Lead 214	0.38		0.14	0.16	01/02/02	01/08/02	2002220	
Uranium 238DHP	19.7		3.3	1.3	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

METHOD BLANK REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F1L260136
Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Lab Sample ID Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g	300 MOD			F2A020000-215B	
Actinium 228	0.069	U	0.076	0.20	01/02/02	01/07/02	2002215	
Cesium 137	-0.009	U	0.032	0.059	01/02/02	01/07/02	2002215	
Potassium 40	0.40	U	0.31	0.86	01/02/02	01/07/02	2002215	
Protactinium 234M	5.5	U	5.0	13	01/02/02	01/07/02	2002215	
Thorium 234	-0.77	U	0.31	0.60	01/02/02	01/07/02	2002215	
Uranium 235	0.15		0.13	0.07	01/02/02	01/07/02	2002215	
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g	300 MOD			F2A020000-220B	
Actinium 228	-0.0003	U	0.075	0.16	01/02/02	01/08/02	2002220	
Cesium 137	-0.010	U	0.022	0.050	01/02/02	01/08/02	2002220	
Potassium 40	0.19	U	0.35	0.88	01/02/02	01/08/02	2002220	
Protactinium 234M	-0.2	U	4.7	9.5	01/02/02	01/08/02	2002220	
Thorium 234	-0.27	U	0.25	0.49	01/02/02	01/08/02	2002220	
Uranium 235	-0.10	U	0.091	0.048	01/02/02	01/08/02	2002220	
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			F2A090000-328B	
Uranium 234	0.090	U	0.095	0.16	01/09/02	01/16/02	2009328	86
Uranium 235	0.071	U	0.096	0.18	01/09/02	01/16/02	2009328	86
Uranium 238	-0.000006	U	0.033	0.11	01/09/02	01/16/02	2009328	86
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			F2A090000-330B	
Thorium 228	0.036	U	0.059	0.11	01/09/02	01/15/02	2009330	81
Thorium 230	0.48	J	0.20	0.15	01/09/02	01/15/02	2009330	81
Thorium 232	0.006	U	0.034	0.10	01/09/02	01/15/02	2009330	81
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			F2A100000-318B	
Thorium 228	0.108	J	0.094	0.087	01/10/02	01/18/02	2010318	82
Thorium 230	0.15	J	0.11	0.11	01/10/02	01/18/02	2010318	82
Thorium 232	0.0	U	0.0	0.05	01/10/02	01/18/02	2010318	82
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			F2A100000-312B	
Uranium 234	0.05	U	0.17	0.41	01/10/02	01/18/02	2010312	26
Uranium 235	-0.011	U	0.023	0.27	01/10/02	01/18/02	2010312	26
Uranium 238	-0.073	U	0.055	0.39	01/10/02	01/18/02	2010312	26
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			F2A110000-374B	
Thorium 228	0.027	U	0.043	0.081	01/11/02	01/20/02	2011374	97
Thorium 230	0.056	J	0.054	0.056	01/11/02	01/20/02	2011374	97
Thorium 232	-0.0023	U	0.0047	0.056	01/11/02	01/20/02	2011374	97
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			F2A110000-370B	
Uranium 234	0.044	U	0.055	0.075	01/11/02	01/19/02	2011370	91
Uranium 235	0.054	U	0.068	0.092	01/11/02	01/19/02	2011370	91
Uranium 238	0.044	U	0.055	0.075	01/11/02	01/19/02	2011370	91

METHOD BLANK REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F1L260136
Matrix: SOLID

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Lab Sample ID Batch #	Yld %
Iso URANIUM	(SHORT CT) DOE ONLY MOD		pCi/g	RP-725 MOD			F2A110000-371B	
Uranium 234	0.074	U	0.085	0.14	01/11/02	01/17/02	2011371	76
Uranium 235	-0.0045	U	0.0091	0.11	01/11/02	01/17/02	2011371	76
Uranium 238	-0.0037	U	0.0074	0.088	01/11/02	01/17/02	2011371	76
Iso THORIUM	(SHORT CT) DOE ONLY MOD		pCi/g	RP-725 MOD			F2A110000-376B	
Thorium 228	0.042	U	0.056	0.10	01/11/02	01/18/02	2011376	106
Thorium 230	0.158	J	0.088	0.051	01/11/02	01/18/02	2011376	106
Thorium 232	0.032	J	0.037	0.029	01/11/02	01/18/02	2011376	106

OTE(S)

Data are incomplete without the case narrative.

MDC is determined using instrument performance only
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

DUPLICATE EVALUATION REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F1L260136
Matrix: SOLID

Date Sampled: 12/18/01
Date Received: 12/26/01

Parameter	SAMPLE Result		Total Uncert. (2σ+/-)	% Yld	DUPLICATE Result		Total Uncert. (2 σ+/-)	% Yld	QC Sample ID Precision	
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD				F1L260136-001	
Actinium 228	0.37	U	0.19		0.36	U	0.19		4	%RPD
Cesium 137	0.016	U	0.039		-0.008	U	0.031		601	%RPD
Potassium 40	3.9		1.1		3.2		1.1		21	%RPD
Protactinium 234M	23		13		13.5	U	9.4		53	%RPD
Thorium 234	12.3		1.8		11.9		1.9		3	%RPD
Uranium 235	0.88		0.37		0.51		0.26		53	%RPD
---Other Dedected Radionuclides---										
Uranium 238DHP	12.9		2.5		12.6		2.3		2	%RPD
	Batch #:		2002215	(Sample)	2002215	(Duplicate)				
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD				F1L260136-001	
Uranium 234	33.1		7.5	69	35.9		8.4	60	8	%RPD
Uranium 235	1.92		0.59	69	1.92		0.64	60	0.4	%RPD
Uranium 238	35.1		8.0	69	35.8		8.3	60	2	%RPD
	Batch #:		2009328	(Sample)	2009328	(Duplicate)				
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD				F1L260136-001	
Thorium 228	0.84	J	0.30	71	0.64	J	0.26	71	27	%RPD
Thorium 230	1.02		0.33	71	0.65	J	0.26	71	45	%RPD
Thorium 232	0.61	J	0.24	71	0.46	J	0.21	71	28	%RPD
	Batch #:		2009330	(Sample)	2009330	(Duplicate)				
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD				F1L260136-021	
Uranium 234	36		11	25	40		10	8	10	%RPD
Uranium 235	2.6		1.1	25	2.72		0.94	8	3	%RPD
Uranium 238	38		11	25	40		10	8	5	%RPD
	Batch #:		2010312	(Sample)	2010312	(Duplicate)				
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD				F1L260136-037	
Actinium 228	0.36		0.24		0.50		0.22		34	%RPD
Cesium 137	0.005	U	0.040		0.020	U	0.035		118	%RPD
Potassium 40	6.1		1.5		5.7		1.4		7	%RPD
Protactinium 234M	14.3	U	9.3		11.5	U	7.5		22	%RPD
Thorium 234	6.4		1.2		7.1		1.4		11	%RPD
Uranium 235	0.348		0.091		0.47		0.22		30	%RPD
---Other Dedected Radionuclides---										
Lead 212	0.43		0.13		0.42		0.12		2	%RPD
Uranium 238DHP	6.7		1.9		7.9		1.8		17	%RPD
	Batch #:		2002220	(Sample)	2002220	(Duplicate)				
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD				F1L260136-041	
Uranium 234	11.7		2.8	51	11.7		2.9	45	0.3	%RPD
Uranium 235	0.67	J	0.31	51	1.26		0.48	45	61	%RPD
Uranium 238	11.5		2.8	51	11.3		2.8	45	2	%RPD
	Batch #:		2011370	(Sample)	2011370	(Duplicate)				

DUPLICATE EVALUATION REPORT

Severn Trent Laboratories - Radiochemistry

Client Lot ID: F1L260136 Date Sampled: 12/19/01
Matrix: SOLID Date Received: 12/26/01

Parameter	SAMPLE Result		Total Uncert. (2σ +/-)	% Yld	DUPLICATE Result		Total Uncert. (2 σ +/-)	% Yld	QC Sample ID Precision	
Iso THORIUM (SHORT CT) DOE ONLY MOD	**pCi/g**		**RP-725 MOD**						**F1L260136-041**	
Thorium 228	0.83	J	0.31	64	0.96	J	0.36	72	15	%RPD
Thorium 230	0.70	J	0.27	64	0.66	J	0.27	72	6	%RPD
Thorium 232	0.90	J	0.32	64	0.83	J	0.31	72	8	%RPD
Batch #:	2011374 (Sample)				2011374 (Duplicate)					
Iso URANIUM (SHORT CT) DOE ONLY MOD	**pCi/g**		**RP-725 MOD**						**F1L260136-061**	
Uranium 234	35.3		8.6	47	31.4		7.4	56	12	%RPD
Uranium 235	2.05		0.71	47	2.10		0.69	56	2	%RPD
Uranium 238	37.7		9.2	47	30.0		7.1	56	23	%RPD
Batch #:	2011371 (Sample)				2011371 (Duplicate)					
Iso THORIUM (SHORT CT) DOE ONLY MOD	**pCi/g**		**RP-725 MOD**						**F1L260136-061**	
Thorium 228	2.41		0.72	42	1.42		0.45	57	52	%RPD
Thorium 230	1.54		0.51	42	0.80	J	0.30	57	63	%RPD
Thorium 232	2.03		0.62	42	1.25		0.40	57	47	%RPD
Batch #:	2011376 (Sample)				2011376 (Duplicate)					

NOTE (S)

Data are incomplete without the case narrative.
Calculations are performed before rounding to avoid round-off error in calculated results

J Result is greater than sample detection limit but less than stated reporting limit.
U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-J-10-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-001
Work Order: EQ2EV
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.84	J	0.30	0.19	01/09/02	01/15/02	2009330	71
Thorium 230	1.02		0.33	0.14	01/09/02	01/15/02	2009330	71
Thorium 232	0.61	J	0.24	0.13	01/09/02	01/15/02	2009330	71
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	33.1		7.5	0.2	01/09/02	01/15/02	2009328	69
Uranium 235	1.92		0.59	0.16	01/09/02	01/15/02	2009328	69
Uranium 238	35.1		8.0	0.2	01/09/02	01/15/02	2009328	69
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.37	U	0.19	0.38	01/02/02	01/03/02	2002215	
Cesium 137	0.016	U	0.039	0.077	01/02/02	01/03/02	2002215	
Potassium 40	3.9		1.1	0.1	01/02/02	01/03/02	2002215	
Protactinium 234M	23		13.	22	01/02/02	01/03/02	2002215	
Thorium 234	12.3		1.8	1	01/02/02	01/03/02	2002215	
Uranium 235	0.88		0.37	0.06	01/02/02	01/03/02	2002215	
--- Other Detected Radionuclides ---								
Uranium 238DHP	12.9		2.5	1	01/02/02	01/03/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-J-10-1-PT DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-001X
Work Order: EQ2EV
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.36	U	0.19	0.39	01/02/02	01/03/02	2002215	
Cesium 137	-0.008	U	0.031	0.057	01/02/02	01/03/02	2002215	
Potassium 40	3.2		1.1	0.6	01/02/02	01/03/02	2002215	
Protactinium 234M	13.5	U	9.4	20	01/02/02	01/03/02	2002215	
Thorium 234	11.9		1.9	0.8	01/02/02	01/03/02	2002215	
Uranium 235	0.51		0.26	0.06	01/02/02	01/03/02	2002215	
--- Other Detected Radionuclides ---								
Uranium 238DHP	12.6		2.3	0.8	01/02/02	01/03/02	2002215	
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	35.9		8.4	0.1	01/09/02	01/15/02	2009328	60
Uranium 235	1.92		0.64	0.16	01/09/02	01/15/02	2009328	60
Uranium 238	35.8		8.3	0.1	01/09/02	01/15/02	2009328	60
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.64	J	0.26	0.17	01/09/02	01/15/02	2009330	71
Thorium 230	0.65	J	0.26	0.11	01/09/02	01/15/02	2009330	71
Thorium 232	0.46	J	0.21	0.09	01/09/02	01/15/02	2009330	71

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-J-9-3-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-002
Work Order: EQ2EW
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.24		0.43	0.07	01/09/02	01/15/02	2009330	47
Thorium 230	1.30		0.44	0.12	01/09/02	01/15/02	2009330	47
Thorium 232	1.28		0.43	0.07	01/09/02	01/15/02	2009330	47
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	22.0		5.0	0.2	01/09/02	01/15/02	2009328	66
Uranium 235	1.63		0.53	0.24	01/09/02	01/15/02	2009328	66
Uranium 238	22.1		5.0	0.1	01/09/02	01/15/02	2009328	66
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.88		0.39	0.66	01/02/02	01/03/02	2002215	
Cesium 137	0.015	U	0.055	0.11	01/02/02	01/03/02	2002215	
Potassium 40	8.6		1.8	1.1	01/02/02	01/03/02	2002215	
Protactinium 234M	16	U	12	25	01/02/02	01/03/02	2002215	
Thorium 234	13.5		2.3	1.1	01/02/02	01/03/02	2002215	
Uranium 235	0.65		0.33	0.09	01/02/02	01/03/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.96		0.19	0.15	01/02/02	01/03/02	2002215	
Lead 214	0.51		0.19	0.17	01/02/02	01/03/02	2002215	
Thorium 232DA	0.94		0.41	0.15	01/02/02	01/03/02	2002215	
Uranium 238DHP	15.8		3.3	1.1	01/02/02	01/03/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-3-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-003
Work Order: EQ2EX
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	1.32		0.57	0.42	01/09/02	01/15/02	2009330	36
Thorium 230	1.23		0.52	0.19	01/09/02	01/15/02	2009330	36
Thorium 232	1.39		0.56	0.19	01/09/02	01/15/02	2009330	36
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	113		28	0.2	01/09/02	01/15/02	2009328	40
Uranium 235	4.9		1.5	0.2	01/09/02	01/15/02	2009328	40
Uranium 238	117		29	0.08	01/09/02	01/15/02	2009328	40

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121901-J-10-3-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-004
Work Order: EQ2E0
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.99	J	0.38	0.28	01/09/02	01/15/02	2009330	58
Thorium 230	0.84	J	0.32	0.13	01/09/02	01/15/02	2009330	58
Thorium 232	0.95	J	0.35	0.13	01/09/02	01/15/02	2009330	58
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	18.6		4.2	0.1	01/09/02	01/15/02	2009328	79
Uranium 235	1.14		0.41	0.11	01/09/02	01/15/02	2009328	79
Uranium 238	17.6		4.0	0.05	01/09/02	01/15/02	2009328	79
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.43		0.22	0.43	01/02/02	01/03/02	2002215	
Cesium 137	-0.001	U	0.034	0.069	01/02/02	01/03/02	2002215	
Potassium 40	9.4		1.8	0.5	01/02/02	01/03/02	2002215	
Protactinium 234M	16.2	U	8.8	19	01/02/02	01/03/02	2002215	
Thorium 234	9.7		2.0	0.9	01/02/02	01/03/02	2002215	
Uranium 235	0.67		0.33	0.07	01/02/02	01/03/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.35		0.12	0.13	01/02/02	01/03/02	2002215	
Lead 214	0.27		0.11	0.1	01/02/02	01/03/02	2002215	
Radium 226DA	0.31		0.14	0.1	01/02/02	01/03/02	2002215	
Uranium 238DHP	9.8		2.6	0.9	01/02/02	01/03/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-12-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-005
Work Order: EQ2E1
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.71	J	0.27	0.09	01/09/02	01/15/02	2009330	71
Thorium 230	0.62	J	0.25	0.09	01/09/02	01/15/02	2009330	71
Thorium 232	0.75	J	0.28	0.05	01/09/02	01/15/02	2009330	71
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	39.5		9.0	0.1	01/09/02	01/15/02	2009328	65
Uranium 235	2.95		0.84	0.16	01/09/02	01/15/02	2009328	65
Uranium 238	40.0		9.1	0.09	01/09/02	01/15/02	2009328	65
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.62		0.25	0.45	01/02/02	01/04/02	2002215	
Cesium 137	-0.003	U	0.046	0.084	01/02/02	01/04/02	2002215	
Potassium 40	9.8		1.7	0.6	01/02/02	01/04/02	2002215	
Protactinium 234M	35		13	25	01/02/02	01/04/02	2002215	
Thorium 234	17.4		2.7	1.2	01/02/02	01/04/02	2002215	
Uranium 235	0.81		0.38	0.09	01/02/02	01/04/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.32		0.10	0.12	01/02/02	01/04/02	2002215	
Uranium 238DHP	16.2		3.0	1.2	01/02/02	01/04/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-13-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-006
Work Order: EQ2E2
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM	(SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			
Thorium 228	1.02		0.37	0.14	01/09/02	01/15/02	2009330	44
Thorium 230	1.07		0.38	0.16	01/09/02	01/15/02	2009330	44
Thorium 232	1.13		0.39	0.17	01/09/02	01/15/02	2009330	44
Iso URANIUM	(SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			
Uranium 234	89		22	0.2	01/09/02	01/15/02	2009328	45
Uranium 235	7.6		2.2	0.1	01/09/02	01/15/02	2009328	45
Uranium 238	92		23	0.2	01/09/02	01/15/02	2009328	45

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121901-I-12-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-007
Work Order: EQ2E5
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.02		0.32	0.11	01/09/02	01/15/02	2009330	70
Thorium 230	0.92	J	0.29	0.08	01/09/02	01/15/02	2009330	70
Thorium 232	0.97	J	0.30	0.08	01/09/02	01/15/02	2009330	70
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	20.1		4.4	0.09	01/09/02	01/15/02	2009328	75
Uranium 235	1.47		0.45	0.12	01/09/02	01/15/02	2009328	75
Uranium 238	19.8		4.3	0.1	01/09/02	01/15/02	2009328	75

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-13-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-008
Work Order: EQ2E6
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.61		0.49	0.20	01/09/02	01/15/02	2009330	56
Thorium 230	1.06		0.37	0.16	01/09/02	01/15/02	2009330	56
Thorium 232	1.16		0.38	0.12	01/09/02	01/15/02	2009330	56
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	28.2		6.1	0.08	01/09/02	01/15/02	2009328	78
Uranium 235	1.44		0.44	0.1	01/09/02	01/15/02	2009328	78
Uranium 238	27.1		5.8	0.1	01/09/02	01/15/02	2009328	78
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.50	U	0.26	0.51	01/02/02	01/18/02	2002215	
Cesium 137	0.017	U	0.042	0.084	01/02/02	01/18/02	2002215	
Potassium 40	7.2		1.5	1	01/02/02	01/18/02	2002215	
Protactinium 234M	44		15	31	01/02/02	01/18/02	2002215	
Thorium 234	15.0		2.4	1.0	01/02/02	01/18/02	2002215	
Uranium 235	0.88		0.35	0.07	01/02/02	01/18/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.48		0.14	0.12	01/02/02	01/18/02	2002215	
Lead 214	0.45		0.15	0.12	01/02/02	01/18/02	2002215	
Uranium 238DHP	15.8		2.8	1.0	01/02/02	01/18/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-11-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-009
Work Order: EQ2E8
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM	(SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			
Thorium 228	0.51	J	0.21	0.18	01/09/02	01/15/02	2009330	81
Thorium 230	0.55	J	0.21	0.09	01/09/02	01/15/02	2009330	81
Thorium 232	0.62	J	0.22	0.08	01/09/02	01/15/02	2009330	81
Iso URANIUM	(SHORT CT) DOE ONLY MOD			pCi/g	RP-725 MOD			
Uranium 234	10.9		2.5	0.07	01/09/02	01/15/02	2009328	83
Uranium 235	0.65	J	0.26	0.11	01/09/02	01/15/02	2009328	83
Uranium 238	11.5		2.6	0.1	01/09/02	01/15/02	2009328	83

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-G-11-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-010
Work Order: EQ2E9
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	8.8		1.7	0.2	01/09/02	01/15/02	2009330	74
Thorium 230	2.76		0.64	0.12	01/09/02	01/15/02	2009330	74
Thorium 232	9.3		1.8	0.07	01/09/02	01/15/02	2009330	74
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	219		64	0.4	01/09/02	01/16/02	2009328	23
Uranium 235	12.1		3.9	0.4	01/09/02	01/16/02	2009328	23
Uranium 238	232		68	0.3	01/09/02	01/16/02	2009328	23
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	4.8		1.5	0.6	01/02/02	01/03/02	2002215	
Cesium 137	0.08	U	0.12	0.22	01/02/02	01/03/02	2002215	
Potassium 40	5.8		2.0	0.9	01/02/02	01/03/02	2002215	
Protactinium 234M	790		120	30	01/02/02	01/03/02	2002215	
Thorium 234	440		76	4	01/02/02	01/03/02	2002215	
Uranium 235	21.0		4.1	0.2	01/02/02	01/03/02	2002215	
--- Other Detected Radionuclides ---								
Bismuth 212	6.6		2.8	3.0	01/02/02	01/03/02	2002215	
Lead 212	5.01		0.85	0.26	01/02/02	01/03/02	2002215	
Thallium 208	1.53		0.38	0.20	01/02/02	01/03/02	2002215	
Thorium 232DA	4.5		1.2	0.2	01/02/02	01/03/02	2002215	
Uranium 238DHP	426		66	4	01/02/02	01/03/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-10-1-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-011
Work Order: EQ2FA
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.13		0.33	0.18	01/09/02	01/15/02	2009330	77
Thorium 230	1.0	J	0.30	0.12	01/09/02	01/15/02	2009330	77
Thorium 232	1.30		0.35	0.12	01/09/02	01/15/02	2009330	77
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	33.7		7.5	0.2	01/09/02	01/15/02	2009328	66
Uranium 235	1.56		0.50	0.10	01/09/02	01/15/02	2009328	66
Uranium 238	33.4		7.4	0.2	01/09/02	01/15/02	2009328	66

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-H-9-2-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-012
Work Order: EQ2FC
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.39		0.38	0.15	01/09/02	01/15/02	2009330	74
Thorium 230	0.78	J	0.25	0.08	01/09/02	01/15/02	2009330	74
Thorium 232	1.31		0.36	0.07	01/09/02	01/15/02	2009330	74
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	36.5		7.9	0.2	01/09/02	01/15/02	2009328	68
Uranium 235	1.99		0.57	0.13	01/09/02	01/15/02	2009328	68
Uranium 238	35.9		7.8	0.2	01/09/02	01/15/02	2009328	68

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-G-9-2-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-013
Work Order: EQ2FE
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.04		0.35	0.12	01/09/02	01/15/02	2009330	57
Thorium 230	0.84	J	0.30	0.09	01/09/02	01/15/02	2009330	57
Thorium 232	0.96	J	0.33	0.09	01/09/02	01/15/02	2009330	57
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	65		15	0.1	01/09/02	01/15/02	2009328	57
Uranium 235	2.97		0.85	0.13	01/09/02	01/15/02	2009328	57
Uranium 238	65		15	0.2	01/09/02	01/15/02	2009328	57
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.83		0.36	0.51	01/02/02	01/04/02	2002215	
Cesium 137	0.0008	U	0.043	0.083	01/02/02	01/04/02	2002215	
Potassium 40	5.2		1.2	0.6	01/02/02	01/04/02	2002215	
Protactinium 234M	67		18	34	01/02/02	01/04/02	2002215	
Thorium 234	33.3		5.9	1.3	01/02/02	01/04/02	2002215	
Uranium 235	1.54		0.54	0.08	01/02/02	01/04/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.58		0.15	0.12	01/02/02	01/04/02	2002215	
Lead 214	0.22		0.12	0.12	01/02/02	01/04/02	2002215	
Thorium 232DA	0.52		0.36	0.12	01/02/02	01/04/02	2002215	
Uranium 238DHP	33.7		6.1	1.3	01/02/02	01/04/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-G-13-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-014
Work Order: EQ2FF
Matrix: SOLID

Date Collected: 12/18/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g		RP-725 MOD		
Thorium 228	0.84	J	0.26	0.07	01/09/02	01/15/02	2009330	75
Thorium 230	0.85	J	0.27	0.08	01/09/02	01/15/02	2009330	75
Thorium 232	0.96	J	0.29	0.08	01/09/02	01/15/02	2009330	75
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g		RP-725 MOD		
Uranium 234	12.2		2.7	0.07	01/09/02	01/15/02	2009328	79
Uranium 235	0.71	J	0.27	0.08	01/09/02	01/15/02	2009328	79
Uranium 238	12.1		2.7	0.04	01/09/02	01/15/02	2009328	79

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121801-G-12-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-015
Work Order: EQ2FG
Matrix: SOLID

Date Collected: 12/18/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.04		0.31	0.12	01/09/02	01/15/02	2009330	73
Thorium 230	0.74	J	0.25	0.10	01/09/02	01/15/02	2009330	73
Thorium 232	1.24		0.35	0.12	01/09/02	01/15/02	2009330	73
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	24.8		5.6	0.1	01/09/02	01/16/02	2009328	73
Uranium 235	1.51		0.49	0.16	01/09/02	01/16/02	2009328	73
Uranium 238	26.2		5.9	0.1	01/09/02	01/16/02	2009328	73
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	1.06		0.38	0.25	01/02/02	01/18/02	2002215	
Cesium 137	0.010	U	0.055	0.10	01/02/02	01/18/02	2002215	
Potassium 40	7.7		1.6	0.7	01/02/02	01/18/02	2002215	
Protactinium 234M	26		11	25	01/02/02	01/18/02	2002215	
Thorium 234	12.1		1.9	1.0	01/02/02	01/18/02	2002215	
Uranium 235	0.61		0.35	0.08	01/02/02	01/18/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.92		0.19	0.15	01/02/02	01/18/02	2002215	
Lead 214	0.45		0.16	0.15	01/02/02	01/18/02	2002215	
Thorium 232DA	0.79		0.32	0.14	01/02/02	01/18/02	2002215	
Uranium 238DHP	11.7		2.7	1.0	01/02/02	01/18/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-G-9-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-016
Work Order: EQ2FH
Matrix: SOLID

Date Collected: 12/18/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.99	J	0.30	0.08	01/09/02	01/15/02	2009330	69
Thorium 230	0.64	J	0.23	0.09	01/09/02	01/15/02	2009330	69
Thorium 232	0.82	J	0.27	0.11	01/09/02	01/15/02	2009330	69
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	38.7		8.6	0.2	01/09/02	01/15/02	2009328	65
Uranium 235	1.88		0.56	0.11	01/09/02	01/15/02	2009328	65
Uranium 238	38.4		8.5	0.2	01/09/02	01/15/02	2009328	65
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.36	U	0.19	0.39	01/02/02	01/03/02	2002215	
Cesium 137	0.032	U	0.040	0.082	01/02/02	01/03/02	2002215	
Potassium 40	5.9		1.4	0.6	01/02/02	01/03/02	2002215	
Protactinium 234M	29		11	25	01/02/02	01/03/02	2002215	
Thorium 234	13.8		2.2	0.9	01/02/02	01/03/02	2002215	
Uranium 235	0.73		0.29	0.07	01/02/02	01/03/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.42		0.10	0.09	01/02/02	01/03/02	2002215	
Uranium 238DHP	13.6		2.7	0.9	01/02/02	01/03/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-H-11-3-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-017
Work Order: EQ2FJ
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.58		0.46	0.15	01/09/02	01/15/02	2009330	57
Thorium 230	1.07		0.35	0.12	01/09/02	01/15/02	2009330	57
Thorium 232	1.55		0.45	0.09	01/09/02	01/15/02	2009330	57
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	49		11	0.2	01/09/02	01/15/02	2009328	61
Uranium 235	2.11		0.64	0.17	01/09/02	01/15/02	2009328	61
Uranium 238	43.7		9.8	0.2	01/09/02	01/15/02	2009328	61
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.65		0.33	0.52	01/02/02	01/03/02	2002215	
Cesium 137	0.014	U	0.043	0.087	01/02/02	01/03/02	2002215	
Potassium 40	5.7		1.4	0.5	01/02/02	01/03/02	2002215	
Protactinium 234M	37		13	25	01/02/02	01/03/02	2002215	
Thorium 234	15.2		2.8	1	01/02/02	01/03/02	2002215	
Uranium 235	0.71		0.34	0.07	01/02/02	01/03/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.54		0.15	0.1	01/02/02	01/03/02	2002215	
Thorium 232DA	0.79		0.32	0.09	01/02/02	01/03/02	2002215	
Uranium 238DHP	15.2		3.1	1	01/02/02	01/03/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-G-11-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-018
Work Order: EQ2FK
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.20		0.36	0.10	01/09/02	01/15/02	2009330	62
Thorium 230	1.30		0.38	0.09	01/09/02	01/15/02	2009330	62
Thorium 232	1.02		0.32	0.08	01/09/02	01/15/02	2009330	62
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	29.9		6.7	0.1	01/09/02	01/15/02	2009328	61
Uranium 235	1.79		0.54	0.1	01/09/02	01/15/02	2009328	61
Uranium 238	30.2		6.8	0.08	01/09/02	01/15/02	2009328	61

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121801-G-10-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-019
Work Order: EQ2FL
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM	(SHORT CT) DOE ONLY MOD		pCi/g		RP-725 MOD			
Thorium 228	2.80		0.73	0.23	01/09/02	01/15/02	2009330	63
Thorium 230	1.64		0.49	0.16	01/09/02	01/15/02	2009330	63
Thorium 232	3.85		0.93	0.15	01/09/02	01/15/02	2009330	63
Iso URANIUM	(SHORT CT) DOE ONLY MOD		pCi/g		RP-725 MOD			
Uranium 234	46		10	0.1	01/09/02	01/15/02	2009328	60
Uranium 235	2.28		0.69	0.13	01/09/02	01/15/02	2009328	60
Uranium 238	46		10	0.1	01/09/02	01/15/02	2009328	60

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121901-G-13-2-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-020
Work Order: EQ2FM
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.92		0.53	0.05	01/09/02	01/15/02	2009330	66
Thorium 230	1.07		0.35	0.11	01/09/02	01/15/02	2009330	66
Thorium 232	1.34		0.40	0.05	01/09/02	01/15/02	2009330	66
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	25.1		5.8	0.1	01/09/02	01/16/02	2009328	64
Uranium 235	1.41		0.49	0.14	01/09/02	01/16/02	2009328	64
Uranium 238	26.1		6.0	0.1	01/09/02	01/16/02	2009328	64
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.85		0.33	0.55	01/02/02	01/04/02	2002215	
Cesium 137	0.024	U	0.046	0.089	01/02/02	01/04/02	2002215	
Potassium 40	6.8		1.5	0.8	01/02/02	01/04/02	2002215	
Protactinium 234M	15.8	U	9.9	21	01/02/02	01/04/02	2002215	
Thorium 234	9.0		1.8	1.1	01/02/02	01/04/02	2002215	
Uranium 235	0.51		0.11	0.08	01/02/02	01/04/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.65		0.15	0.13	01/02/02	01/04/02	2002215	
Lead 214	0.36		0.12	0.12	01/02/02	01/04/02	2002215	
Thorium 232DA	0.93		0.41	0.13	01/02/02	01/04/02	2002215	
Uranium 238DHP	9.1		2.5	1.1	01/02/02	01/04/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC
U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-H-9-2-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-021
Work Order: EQ2FP
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	1.32		0.47	0.25	01/10/02	01/18/02	2010318	52
Thorium 230	0.70	J	0.30	0.18	01/10/02	01/18/02	2010318	52
Thorium 232	1.47		0.49	0.16	01/10/02	01/18/02	2010318	52
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	36		11	0.4	01/10/02	01/17/02	2010312	25
Uranium 235	2.6		1.1	0.5	01/10/02	01/17/02	2010312	25
Uranium 238	38		11	0.4	01/10/02	01/17/02	2010312	25

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-H-9-2-PT DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-021X
Work Order: EQ2FP
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	40		10	0.3	01/10/02	01/20/02	2010312	8
Uranium 235	2.72		0.94	0.35	01/10/02	01/20/02	2010312	8
Uranium 238	40		10	0.3	01/10/02	01/20/02	2010312	8

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

ENVIROCON INC

Client Sample ID: SYL-121801-H-9-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-022
Work Order: EQ2FQ
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.58	J	0.28	0.20	01/10/02	01/18/02	2010318	53
Thorium 230	0.41	J	0.23	0.25	01/10/02	01/18/02	2010318	53
Thorium 232	0.50	J	0.25	0.17	01/10/02	01/18/02	2010318	53
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	16.1		4.3	0.4	01/10/02	01/17/02	2010312	35
Uranium 235	0.79	J	0.46	0.49	01/10/02	01/17/02	2010312	35
Uranium 238	17.1		4.6	0.3	01/10/02	01/17/02	2010312	35

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121801-H-11-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-023
Work Order: EQ2FR
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.99		0.60	0.06	01/10/02	01/18/02	2010318	54
Thorium 230	0.60	J	0.27	0.13	01/10/02	01/18/02	2010318	54
Thorium 232	1.37		0.45	0.06	01/10/02	01/18/02	2010318	54
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	42		12	0.3	01/10/02	01/18/02	2010312	21
Uranium 235	3.4		1.3	0.4	01/10/02	01/18/02	2010312	21
Uranium 238	46		13	0.4	01/10/02	01/18/02	2010312	21
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.83		0.37	0.57	01/02/02	01/04/02	2002215	
Cesium 137	-0.051	U	0.047	0.079	01/02/02	01/04/02	2002215	
Potassium 40	7.4		1.5	0.8	01/02/02	01/04/02	2002215	
Protactinium 234M	38		14	29	01/02/02	01/04/02	2002215	
Thorium 234	23.4		4.4	1.4	01/02/02	01/04/02	2002215	
Uranium 235	1.18		0.42	0.08	01/02/02	01/04/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.70		0.16	0.12	01/02/02	01/04/02	2002215	
Lead 214	0.33		0.12	0.12	01/02/02	01/04/02	2002215	
Thorium 232DA	0.90		0.47	0.11	01/02/02	01/04/02	2002215	
Uranium 238DHP	24.7		4.6	1.4	01/02/02	01/04/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit..

ENVIROCON INC

Client Sample ID: SYL-121801-H-13-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-024
Work Order: EQ2FT
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	1.51		0.54	0.29	01/02/02	01/04/02	2002215	
Cesium 137	0.085	U	0.070	0.14	01/02/02	01/04/02	2002215	
Potassium 40	8.1		1.8	1	01/02/02	01/04/02	2002215	
Protactinium 234M	122		26	15	01/02/02	01/04/02	2002215	
Thorium 234	51.4		7.2	2.3	01/02/02	01/04/02	2002215	
Uranium 235	3.20		0.88	0.12	01/02/02	01/04/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	1.17		0.26	0.17	01/02/02	01/04/02	2002215	
Thorium 232DA	0.92		0.53	0.16	01/02/02	01/04/02	2002215	
Uranium 238DHP	52.4		7.4	2.3	01/02/02	01/04/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-12-5-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-025
Work Order: EQ2FV
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.83	J	0.49	0.52	01/10/02	01/18/02	2010318	30
Thorium 230	0.26	U	0.24	0.26	01/10/02	01/18/02	2010318	30
Thorium 232	0.99	J	0.50	0.26	01/10/02	01/18/02	2010318	30
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.52		0.22	0.42	01/02/02	01/04/02	2002215	
Cesium 137	-0.011	U	0.034	0.067	01/02/02	01/04/02	2002215	
Potassium 40	6.9		1.5	0.8	01/02/02	01/04/02	2002215	
Protactinium 234M	19.2	U	8.7	20	01/02/02	01/04/02	2002215	
Thorium 234	7.7		1.7	0.8	01/02/02	01/04/02	2002215	
Uranium 235	0.49		0.26	0.05	01/02/02	01/04/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.36		0.10	0.1	01/02/02	01/04/02	2002215	
Lead 214	0.24		0.11	0.09	01/02/02	01/04/02	2002215	
Uranium 238DHP	6.6		2.1	0.8	01/02/02	01/04/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-11-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-027
Work Order: EQ2F1
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.82	J	0.35	0.17	01/10/02	01/18/02	2010318	38
Thorium 230	0.50	J	0.26	0.19	01/10/02	01/18/02	2010318	38
Thorium 232	0.91	J	0.37	0.20	01/10/02	01/18/02	2010318	38
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	13.6		3.6	0.2	01/10/02	01/17/02	2010312	34
Uranium 235	0.86	J	0.41	0.24	01/10/02	01/17/02	2010312	34
Uranium 238	13.2		3.4	0.3	01/10/02	01/17/02	2010312	34

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-5-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-028
Work Order: EQ2F2
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		RP-725 MOD			
Iso THORIUM	(SHORT CT) DOE ONLY MOD							
Thorium 228	0.77	J	0.37	0.35	01/10/02	01/21/02	2010318	26
Thorium 230	0.66	J	0.31	0.19	01/10/02	01/21/02	2010318	26
Thorium 232	0.67	J	0.31	0.15	01/10/02	01/21/02	2010318	26
			pCi/g		RP-725 MOD			
Iso URANIUM	(SHORT CT) DOE ONLY MOD							
Uranium 234	20.1		5.7	0.3	01/10/02	01/17/02	2010312	24
Uranium 235	0.87	J	0.52	0.34	01/10/02	01/17/02	2010312	24
Uranium 238	19.7		5.6	0.3	01/10/02	01/17/02	2010312	24

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-12-5-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-042
Work Order: EQ2GJ
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.14		0.40	0.25	01/11/02	01/19/02	2011374	66
Thorium 230	0.44	J	0.21	0.11	01/11/02	01/19/02	2011374	66
Thorium 232	0.96	J	0.34	0.11	01/11/02	01/19/02	2011374	66
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	9.0		2.1	0.1	01/11/02	01/18/02	2011370	65
Uranium 235	0.78	J	0.31	0.16	01/11/02	01/18/02	2011370	65
Uranium 238	9.3		2.2	0.2	01/11/02	01/18/02	2011370	65
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.49		0.26	0.37	01/02/02	01/08/02	2002220	
Cesium 137	-0.035	U	0.032	0.056	01/02/02	01/08/02	2002220	
Potassium 40	5.3		1.3	0.6	01/02/02	01/08/02	2002220	
Protactinium 234M	2.3	U	7.1	14	01/02/02	01/08/02	2002220	
Thorium 234	3.9		1.1	0.7	01/02/02	01/08/02	2002220	
Uranium 235	0.36		0.22	0.05	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.266		0.097	0.10	01/02/02	01/08/02	2002220	
Uranium 238DHP	5.1		1.4	0.7	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-12-5-COMP → PT?

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-029
Work Order: EQ2F3
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g		RP-725 MOD		
Thorium 228	0.82	J	0.29	0.15	01/10/02	01/18/02	2010318	70
Thorium 230	0.76	J	0.27	0.12	01/10/02	01/18/02	2010318	70
Thorium 232	0.67	J	0.25	0.08	01/10/02	01/18/02	2010318	70
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g		RP-725 MOD		
Uranium 234	15.0		3.6	0.2	01/10/02	01/17/02	2010312	58
Uranium 235	1.23		0.47	0.20	01/10/02	01/17/02	2010312	58
Uranium 238	15.8		3.8	0.2	01/10/02	01/17/02	2010312	58
Gamma Cs-137 & Hits by HASL 300 MOD				pCi/g		300 MOD		
Actinium-228	0.36	U	0.24	0.40	01/02/02	01/07/02	2002215	
Cesium 137	-0.006	U	0.035	0.064	01/02/02	01/07/02	2002215	
Potassium 40	5.8		1.3	0.5	01/02/02	01/07/02	2002215	
Protactinium 234M	16.9	U	8.6	19	01/02/02	01/07/02	2002215	
Thorium 234	6.0		1.4	0.9	01/02/02	01/07/02	2002215	
Uranium 235	0.42		0.29	0.08	01/02/02	01/07/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.26		0.10	0.11	01/02/02	01/07/02	2002215	
Lead 214	0.28		0.11	0.1	01/02/02	01/07/02	2002215	
Uranium 238DHP	6.3		1.9	0.9	01/02/02	01/07/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-13-5-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-030
Work Order: EQ2F4
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	0.93	J	0.32	0.20	01/10/02	01/18/02	2010318	67
Thorium 230	1.10		0.35	0.10	01/10/02	01/18/02	2010318	67
Thorium 232	0.93	J	0.31	0.09	01/10/02	01/18/02	2010318	67
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	21.5		5.1	0.1	01/10/02	01/17/02	2010312	57
Uranium 235	1.11		0.44	0.16	01/10/02	01/17/02	2010312	57
Uranium 238	23.8		5.7	0.1	01/10/02	01/17/02	2010312	57

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-12-5-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-031
Work Order: EQ2F5
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.20		0.37	0.20	01/10/02	01/18/02	2010318	75
Thorium 230	1.03		0.32	0.11	01/10/02	01/18/02	2010318	75
Thorium 232	1.24		0.37	0.08	01/10/02	01/18/02	2010318	75
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	12.6		2.9	0.2	01/10/02	01/17/02	2010312	65
Uranium 235	1.15		0.41	0.11	01/10/02	01/17/02	2010312	65
Uranium 238	14.3		3.3	0.2	01/10/02	01/17/02	2010312	65
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.38	U	0.22	0.47	01/02/02	01/07/02	2002215	
Cesium 137	0.008	U	0.041	0.079	01/02/02	01/07/02	2002215	
Potassium 40	8.9		1.7	0.5	01/02/02	01/07/02	2002215	
Protactinium 234M	8.6	U	6.7	16	01/02/02	01/07/02	2002215	
Thorium 234	4.5		1.2	0.8	01/02/02	01/07/02	2002215	
Uranium 235	0.305		0.087	0.054	01/02/02	01/07/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.32		0.10	0.11	01/02/02	01/07/02	2002215	
Lead 214	0.26		0.12	0.12	01/02/02	01/07/02	2002215	
Uranium 238DHP	4.7		1.6	0.8	01/02/02	01/07/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-H-13-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-032
Work Order: EQ2F6
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.04		0.31	0.16	01/10/02	01/18/02	2010318	84
Thorium 230	0.80	J	0.25	0.1	01/10/02	01/18/02	2010318	84
Thorium 232	1.16		0.32	0.1	01/10/02	01/18/02	2010318	84
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	19.3		4.5	0.2	01/10/02	01/17/02	2010312	54
Uranium 235	1.58		0.53	0.17	01/10/02	01/17/02	2010312	54
Uranium 238	19.1		4.4	0.2	01/10/02	01/17/02	2010312	54
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.40	U	0.28	0.47	01/02/02	01/07/02	2002215	
Cesium 137	-0.035	U	0.045	0.078	01/02/02	01/07/02	2002215	
Potassium 40	7.7		1.5	0.9	01/02/02	01/07/02	2002215	
Protactinium 234M	18.6	U	9.6	21	01/02/02	01/07/02	2002215	
Thorium 234	11.9		2.5	1.1	01/02/02	01/07/02	2002215	
Uranium 235	0.64		0.48	0.06	01/02/02	01/07/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.43		0.12	0.11	01/02/02	01/07/02	2002215	
Lead 214	0.42		0.13	0.10	01/02/02	01/07/02	2002215	
Thorium 232DA	0.64		0.34	0.10	01/02/02	01/07/02	2002215	
Uranium 238DHP	13.7		2.9	1.1	01/02/02	01/07/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121801-H-12-1-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-033
Work Order: EQ2F8
Matrix: SOLID

Date Collected: 12/18/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.21		0.35	0.15	01/10/02	01/18/02	2010318	81
Thorium 230	0.78	J	0.25	0.06	01/10/02	01/18/02	2010318	81
Thorium 232	1.03		0.30	0.06	01/10/02	01/18/02	2010318	81
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	20.6		4.8	0.1	01/10/02	01/17/02	2010312	53
Uranium 235	1.58		0.53	0.17	01/10/02	01/17/02	2010312	53
Uranium 238	19.8		4.5	0.2	01/10/02	01/17/02	2010312	53
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.59		0.26	0.47	01/02/02	01/07/02	2002215	
Cesium 137	0.024	U	0.041	0.081	01/02/02	01/07/02	2002215	
Potassium 40	5.7		1.5	0.4	01/02/02	01/07/02	2002215	
Protactinium 234M	29		10	23	01/02/02	01/07/02	2002215	
Thorium 234	13.8		2.4	1.2	01/02/02	01/07/02	2002215	
Uranium 235	0.61		0.42	0.08	01/02/02	01/07/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.48		0.14	0.12	01/02/02	01/07/02	2002215	
Uranium 238DHP	14.1		3.0	1.2	01/02/02	01/07/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-10-4-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-035
Work Order: EQ2GA
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.36		0.38	0.07	01/10/02	01/18/02	2010318	70
Thorium 230	1.04		0.31	0.08	01/10/02	01/18/02	2010318	70
Thorium 232	1.25		0.36	0.08	01/10/02	01/18/02	2010318	70
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	15.6		3.6	0.1	01/10/02	01/17/02	2010312	58
Uranium 235	1.02		0.37	0.12	01/10/02	01/17/02	2010312	58
Uranium 238	16.6		3.8	0.1	01/10/02	01/17/02	2010312	58
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.73		0.27	0.42	01/02/02	01/07/02	2002215	
Cesium 137	0.008	U	0.040	0.081	01/02/02	01/07/02	2002215	
Potassium 40	7.5		1.5	0.4	01/02/02	01/07/02	2002215	
Protactinium 234M	2.7	U	8.4	16	01/02/02	01/07/02	2002215	
Thorium 234	7.3		1.4	0.8	01/02/02	01/07/02	2002215	
Uranium 235	0.40		0.24	0.06	01/02/02	01/07/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.287		0.099	0.10	01/02/02	01/07/02	2002215	
Uranium 238DHP	6.2		1.9	0.8	01/02/02	01/07/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-G-11-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-036
Work Order: EQ2GC
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		RP-725 MOD			
Iso THORIUM (SHORT CT) DOE ONLY MOD								
Thorium 228	0.98	J	0.29	0.1	01/10/02	01/18/02	2010318	91
Thorium 230	0.96	J	0.28	0.09	01/10/02	01/18/02	2010318	91
Thorium 232	0.99	J	0.29	0.1	01/10/02	01/18/02	2010318	91
			pCi/g		RP-725 MOD			
Iso URANIUM (SHORT CT) DOE ONLY MOD								
Uranium 234	6.7		1.6	0.1	01/10/02	01/17/02	2010312	70
Uranium 235	0.37	J	0.19	0.12	01/10/02	01/17/02	2010312	70
Uranium 238	7.0		1.6	0.2	01/10/02	01/17/02	2010312	70

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-10-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-037
Work Order: EQ2GD
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.46		0.41	0.09	01/10/02	01/18/02	2010318	70
Thorium 230	0.63	J	0.23	0.1	01/10/02	01/18/02	2010318	70
Thorium 232	1.19		0.36	0.12	01/10/02	01/18/02	2010318	70
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	17.4		4.9	0.2	01/10/02	01/17/02	2010312	52
Uranium 235	1.46		0.51	0.20	01/10/02	01/17/02	2010312	52
Uranium 238	18.3		4.3	0.2	01/10/02	01/17/02	2010312	52
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.36		0.24	0.28	01/02/02	01/08/02	2002220	
Cesium 137	0.005	U	0.040	0.078	01/02/02	01/08/02	2002220	
Potassium 40	6.1		1.5	0.8	01/02/02	01/08/02	2002220	
Protactinium 234M	14.3	U	9.3	21	01/02/02	01/08/02	2002220	
Thorium 234	6.4		1.2	0.9	01/02/02	01/08/02	2002220	
Uranium 235	0.348		0.091	0.067	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.43		0.13	0.10	01/02/02	01/08/02	2002220	
Uranium 238DHP	6.7		1.9	0.9	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-10-4-COMP DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-037X
Work Order: EQ2GD
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.50		0.22	0.45	01/02/02	01/08/02	2002220	
Cesium 137	0.020	U	0.035	0.072	01/02/02	01/08/02	2002220	
Potassium 40	5.7		1.4	0.5	01/02/02	01/08/02	2002220	
Protactinium 234M	11.5	U	7.5	17	01/02/02	01/08/02	2002220	
Thorium 234	7.1		1.4	0.8	01/02/02	01/08/02	2002220	
Uranium 235	0.47		0.22	0.07	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.42		0.12	0.1	01/02/02	01/08/02	2002220	
Uranium 238DHP	7.9		1.8	0.8	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-13-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-038
Work Order: EQ2GE
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Thorium 228	1.01		0.33	0.12	01/10/02	01/18/02	2010318	62
Thorium 230	1.09		0.34	0.10	01/10/02	01/18/02	2010318	62
Thorium 232	1.15		0.36	0.09	01/10/02	01/18/02	2010318	62
Iso URANIUM (SHORT CT) DOE ONLY MOD			pCi/g		RP-725 MOD			
Uranium 234	43.7		9.9	0.1	01/10/02	01/17/02	2010312	56
Uranium 235	2.50		0.73	0.11	01/10/02	01/17/02	2010312	56
Uranium 238	45		10	0.09	01/10/02	01/17/02	2010312	56
Gamma Cs-137 & Hits by HASL 300 MOD			pCi/g		300 MOD			
Actinium 228	0.69		0.31	0.46	01/02/02	01/08/02	2002220	
Cesium 137	-0.032	U	0.040	0.070	01/02/02	01/08/02	2002220	
Potassium 40	6.5		1.3	0.8	01/02/02	01/08/02	2002220	
Protactinium 234M	43		15	27	01/02/02	01/08/02	2002220	
Thorium 234	21.2		4.0	1.2	01/02/02	01/08/02	2002220	
Uranium 235	0.77		0.45	0.06	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.47		0.12	0.11	01/02/02	01/08/02	2002220	
Lead 214	0.36		0.13	0.09	01/02/02	01/08/02	2002220	
Thorium 232DA	0.56		0.26	0.10	01/02/02	01/08/02	2002220	
Uranium 238DHP	19.1		3.7	1.2	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.
Bold results are greater than the MDC

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-13-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-039
Work Order: EQ2GF
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		RP-725 MOD			
Iso THORIUM (SHORT CT) DOE ONLY MOD								
Thorium 228	0.92	J	0.29	0.08	01/10/02	01/18/02	2010318	77
Thorium 230	0.48	J	0.19	0.07	01/10/02	01/18/02	2010318	77
Thorium 232	0.53	J	0.20	0.04	01/10/02	01/18/02	2010318	77
			pCi/g		RP-725 MOD			
Iso URANIUM (SHORT CT) DOE ONLY MOD								
Uranium 234	38.2		8.7	0.1	01/10/02	01/17/02	2010312	58
Uranium 235	3.02		0.86	0.13	01/10/02	01/17/02	2010312	58
Uranium 238	42.1		9.6	0.1	01/10/02	01/17/02	2010312	58

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-J-12-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-040
Work Order: EQ2GG
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
			pCi/g		RP-725 MOD			
Iso THORIUM (SHORT CT) DOE ONLY MOD								
Thorium 228	1.18		0.40	0.22	01/10/02	01/18/02	2010318	64
Thorium 230	1.06		0.37	0.16	01/10/02	01/18/02	2010318	64
Thorium 232	0.84	J	0.32	0.15	01/10/02	01/18/02	2010318	64
			pCi/g		RP-725 MOD			
Iso URANIUM (SHORT CT) DOE ONLY MOD								
Uranium 234	41.3		9.9	0.3	01/10/02	01/17/02	2010312	48
Uranium 235	2.36		0.79	0.35	01/10/02	01/17/02	2010312	48
Uranium 238	43		10	0.2	01/10/02	01/17/02	2010312	48
			pCi/g		300 MOD			
Gamma Cs-137 & Hits by HASL 300 MOD								
Actinium 228	0.37	U	0.23	0.49	01/02/02	01/08/02	2002220	
Cesium 137	0.020	U	0.047	0.093	01/02/02	01/08/02	2002220	
Potassium 40	6.6		1.5	0.2	01/02/02	01/08/02	2002220	
Protactinium 234M	36		15	30	01/02/02	01/08/02	2002220	
Thorium 234	18.3		2.9	1.3	01/02/02	01/08/02	2002220	
Uranium 235	1.08		0.47	0.08	01/02/02	01/08/02	2002220	
--- Other Detected Radionuclides ---								
Lead 212	0.40		0.13	0.14	01/02/02	01/08/02	2002220	
Uranium 238DHP	21.6		3.9	1.3	01/02/02	01/08/02	2002220	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-12-4-COMP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-041
Work Order: EQ2GH
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	0.83	J	0.31	0.05	01/11/02	01/19/02	2011374	64
Thorium 230	0.70	J	0.27	0.11	01/11/02	01/19/02	2011374	64
Thorium 232	0.90	J	0.32	0.05	01/11/02	01/19/02	2011374	64
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	11.7		2.8	0.1	01/11/02	01/18/02	2011370	51
Uranium 235	0.67	J	0.31	0.15	01/11/02	01/18/02	2011370	51
Uranium 238	11.5		2.8	0.1	01/11/02	01/18/02	2011370	51

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-I-12-4-COMP DUP

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-041X
Work Order: EQ2GH
Matrix: SOLID

Date Collected: 12/19/01 1600
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
				pCi/g	RP-725 MOD			
Iso URANIUM	(SHORT CT) DOE ONLY MOD		2.9	0.2	01/11/02	01/18/02	2011370	45
Uranium 234	11.7		0.48	0.20	01/11/02	01/18/02	2011370	45
Uranium 235	1.26		2.8	0.3	01/11/02	01/18/02	2011370	45
Uranium 238	11.3							
				pCi/g	RP-725 MOD			
Iso THORIUM	(SHORT CT) DOE ONLY MOD		0.36	0.24	01/11/02	01/19/02	2011374	72
Thorium 228	0.96	J	0.27	0.11	01/11/02	01/19/02	2011374	72
Thorium 230	0.66	J	0.31	0.1	01/11/02	01/19/02	2011374	72
Thorium 232	0.83	J						

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

ENVIROCON INC

Client Sample ID: SYL-121901-ROCK-PT

Severn Trent Laboratories - Radiochemistry

Lab Sample ID: F1L260136-034
Work Order: EQ2F9
Matrix: SOLID

Date Collected: 12/19/01 1200
Date Received: 12/26/01 0915

Parameter	Result	Qual	Total Uncert. (2 σ+/-)	MDC	Prep Date	Analysis Date	Batch #	Yld %
Iso THORIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Thorium 228	0.44	J	0.19	0.1	01/10/02	01/18/02	2010318	76
Thorium 230	0.56	J	0.21	0.07	01/10/02	01/18/02	2010318	76
Thorium 232	0.53	J	0.21	0.07	01/10/02	01/18/02	2010318	76
Iso URANIUM (SHORT CT) DOE ONLY MOD				pCi/g	RP-725 MOD			
Uranium 234	5.3		1.4	0.1	01/10/02	01/17/02	2010312	54
Uranium 235	0.39	J	0.22	0.07	01/10/02	01/17/02	2010312	54
Uranium 238	6.2		1.6	0.06	01/10/02	01/17/02	2010312	54
Gamma Cs-137 & Hits by HASL 300 MOD				pCi/g	300 MOD			
Actinium 228	0.1	U	0.14	0.32	01/02/02	01/07/02	2002215	
Cesium 137	0.018	U	0.034	0.073	01/02/02	01/07/02	2002215	
Potassium 40	7.8		1.6	0.5	01/02/02	01/07/02	2002215	
Protactinium 234M	3.0	U	6.7	14	01/02/02	01/07/02	2002215	
Thorium 234	1.70		0.70	1.1	01/02/02	01/07/02	2002215	
Uranium 235	0.104		0.058	0.054	01/02/02	01/07/02	2002215	
--- Other Detected Radionuclides ---								
Lead 212	0.237		0.094	0.076	01/02/02	01/07/02	2002215	

NOTE(S)

Data are incomplete without the case narrative.

MDC is determined by instrument performance only.

Bold results are greater than the MDC

J Result is greater than sample detection limit but less than stated reporting limit.

U Result is less than the sample detection limit.

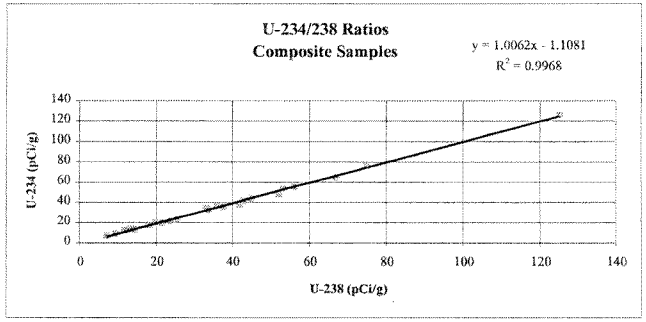
Attachment C-4

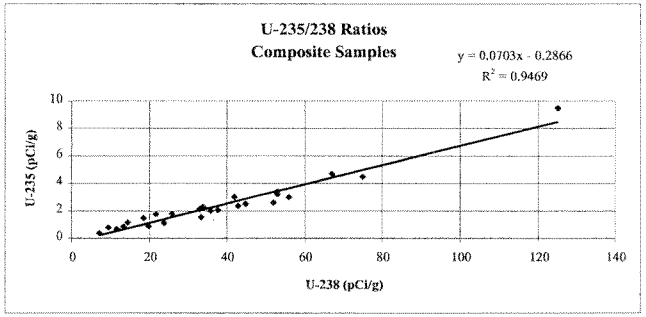
Gamma/Concentration Correlation Data

Composite Sample
Uranium Isotope Comparison

CLIENT ID	LAB ID	Uranium 238 (pCi/g)	Uranium 235 (pCi/g)	Uranium 234 (pCi/g)	U-238/235 Ratio	U-238/234 Ratio
SYL-121901-G-11-4-COMP	F1L260136036	7	0.37	6.7	18.919	1.045
SYL-121901-G-13-2-COMP	F1L260136056	21.6	1.75	19.7	12.343	1.096
SYL-121901-G-9-2-COMP	F1L260136065	33.1	2.12	34.7	15.613	0.954
SYL-121901-H-10-1-COMP	F1L260136057	67	4.7	65	14.255	1.031
SYL-121901-H-11-3-COMP	F1L260136067	53	3.4	53	15.588	1.000
SYL-121901-H-12-1-COMP	F1L260136058	25.8	1.77	23.5	14.576	1.098
SYL-121901-H-9-2-COMP	F1L260136012	35.9	1.99	36.5	18.040	0.984
SYL-121901-I-10-4-COMP	F1L260136037	18.3	1.46	17.4	12.534	1.052
SYL-121901-I-11-4-COMP	F1L260136027	13.2	0.86	13.6	15.349	0.971
SYL-121901-I-12-4-COMP	F1L260136041	11.5	0.67	11.7	17.164	0.983
SYL-121901-I-12-5-COMP	F1L260136031	14.3	1.15	12.6	12.435	1.135
SYL-121901-I-13-4-COMP	F1L260136038	45	2.5	43.7	18.000	1.030
SYL-121901-I-13-5-COMP	F1L260136030	23.8	1.11	21.5	21.441	1.107
SYL-121901-I-9-1-COMP	F1L260136062	56	2.98	55	18.792	1.018
SYL-121901-J-10-1-COMP	F1L260136011	33.4	1.56	33.7	21.410	0.991
SYL-121901-J-10-3-COMP	F1L260136066	53	3.2	53	16.563	1.000
SYL-121901-J-11-3-COMP	F1L260136059	52	2.59	48	20.077	1.083
SYL-121901-J-12-3-COMP	F1L260136060	125	9.5	126	13.158	0.992
SYL-121901-J-12-4-COMP	F1L260136040	43	2.36	41.3	18.220	1.041
SYL-121901-J-12-5-COMP	F1L260136042	9.3	0.78	9	11.923	1.033
SYL-121901-J-13-2-COMP	F1L260136064	33.9	2.3	32.6	14.739	1.040
SYL-121901-J-13-3-COMP	F1L260136063	75	4.5	76	16.667	0.987
SYL-121901-J-13-4-COMP	F1L260136039	42.1	3.02	38.2	13.940	1.102
SYL-121901-J-13-5-COMP	F1L260136028	19.7	0.87	20.1	22.644	0.980
SYL-121901-J-9-3-COMP	F1L260136061	37.7	2.05	35.3	18.390	1.068

MEAN =	38.0	2.4	37.1	16.5	1.0
STDEV =	25.7	1.9	26.0	3.1	0.0
MEDIAN =	33.9	2.1	34.7	16.6	1.0

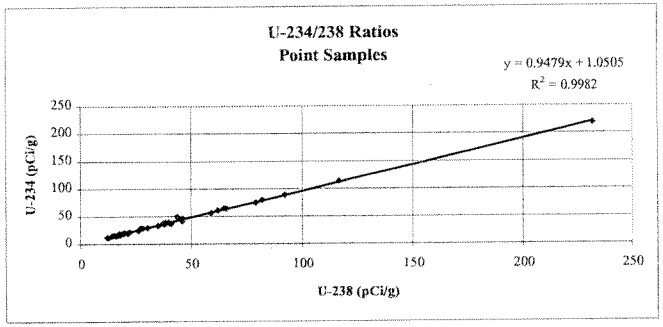


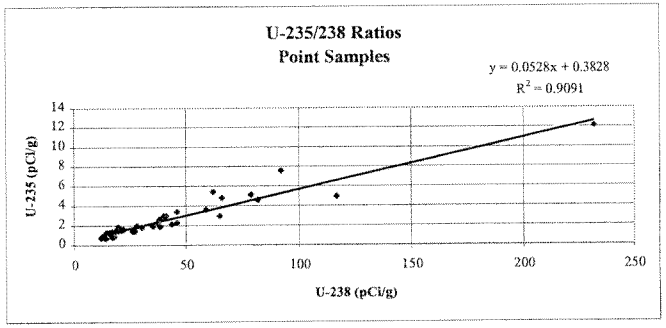


Point Sample
Uranium Isotope Comparison

CLIENT ID	LAB ID	Uranium 238	Uranium 235	Uranium 234	U-238/235 Ratio	U-238/234 Ratio
SYL-121901-G-11-4-PT	**F1L260136010**	**232**	**12.1**	**219**	**19.174**	**1.059**
SYL-121901-J-13-3-PT	F1L260136003	117	4.9	113	23.878	1.035
SYL-121901-I-13-4-PT	F1L260136006	92	7.6	89	12.105	1.034
SYL-121801-H-13-1-PT	F1L260136024	82	4.6	80	17.826	1.025
SYL-121901-J-12-3-PT	F1L260136052	79	5.1	75	15.490	1.053
SYL-121801-I-9-1-PT	F1L260136045	66	4.8	64	13.750	1.031
SYL-121901-G-9-2-PT	F1L260136013	65	2.97	65	21.886	1.000
SYL-121901-I-13-2-PT	F1L260136049	62	5.4	61	11.481	1.016
SYL-121901-J-11-3-PT	F1L260136051	59	3.6	56	16.389	1.054
SYL-121801-G-10-1-PT	F1L260136019	46	2.28	46	20.175	1.000
SYL-121801-H-11-1-PT	F1L260136023	46	3.4	42	13.529	1.095
SYL-121901-H-11-3-PT	F1L260136017	43.7	2.11	49	20.711	0.892
SYL-121801-I-11-1-PT	F1L260136046	41	3	37.2	13.667	1.102
SYL-121901-J-12-4-PT	F1L260136005	40	2.95	39.5	13.559	1.013
SYL-121801-G-9-1-PT	F1L260136016	38.4	1.88	38.7	20.426	0.992
SYL-121901-H-9-2-PT	F1L260136021	38	2.6	36	14.615	1.056
SYL-121801-J-9-1-PT	F1L260136050	37.4	2.28	37.5	16.404	0.997
SYL-121801-J-10-1-PT	F1L260136001	35.1	1.92	33.1	18.281	1.060
SYL-121801-G-11-1-PT	F1L260136018	30.2	1.79	29.9	16.872	1.010
SYL-121801-J-11-1-PT	F1L260136054	28	1.94	28.6	14.433	0.979
SYL-121901-I-13-4-PT	F1L260136008	27.1	1.44	28.2	18.819	0.961
SYL-121801-G-12-1-PT	F1L260136015	26.2	1.51	24.8	17.351	1.056
SYL-121901-G-13-2-PT	F1L260136020	26.1	1.41	25.1	18.511	1.040
SYL-121801-J-9-3-PT	F1L260136002	22.1	1.63	22	13.558	1.005
SYL-121901-I-13-5-PT	F1L260136026	21.3	1.49	19.4	14.295	1.098
SYL-121801-H-12-1-PT	F1L260136033	19.8	1.58	20.6	12.532	0.961
SYL-121801-I-13-1-PT	F1L260136048	19.8	1.87	19.6	10.588	1.010
SYL-121901-I-12-4-PT	F1L260136007	19.8	1.47	20.1	13.469	0.985
SYL-121801-H-13-1-PT	F1L260136032	19.1	1.58	19.3	12.089	0.990
SYL-121801-J-12-1-PT	F1L260136053	17.9	0.87	15.8	20.575	1.133
SYL-121901-J-10-3-PT	F1L260136004	17.6	1.14	18.6	15.439	0.946
SYL-121801-H-9-1-PT	F1L260136022	17.1	0.79	16.1	21.646	1.062
SYL-121801-I-12-1-PT	F1L260136047	16.8	1.36	16.8	12.353	1.000
SYL-121901-I-10-4-PT	F1L260136035	16.6	1.02	15.6	16.275	1.064
SYL-121901-J-12-5-PT	F1L260136029	15.8	1.23	15	12.846	1.053
SYL-121801-I-10-1-PT	F1L260136044	15.4	1.26	15.2	12.222	1.013
SYL-121801-J-13-1-PT	F1L260136055	14.5	1.28	15.2	11.328	0.954
SYL-121901-I-12-5-PT	F1L260136025	14.2	0.64	15	22.188	0.947
SYL-121901-J-13-5-PT	F1L260136043	12.6	0.89	11.7	14.157	1.077
SYL-121801-G-13-1-PT	F1L260136014	12.1	0.71	12.2	17.042	0.992
SYL-121901-I-11-4-PT	F1L260136009	11.5	0.65	10.9	17.692	1.055

MEAN =	40.5	2.5	39.4	16.1	1.0
STDEV =	39.2	2.2	37.3	3.5	0.0
MEDIAN =	27.1	1.8	28.2	15.5	1.0

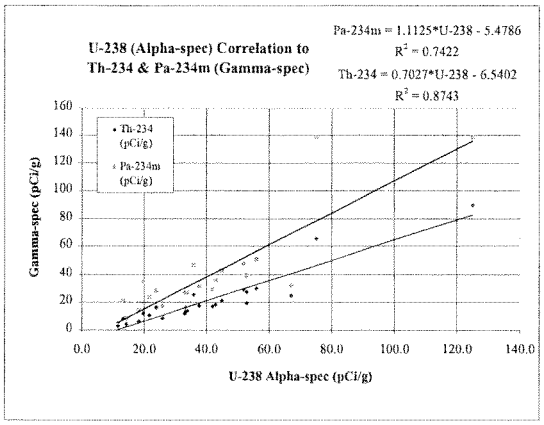


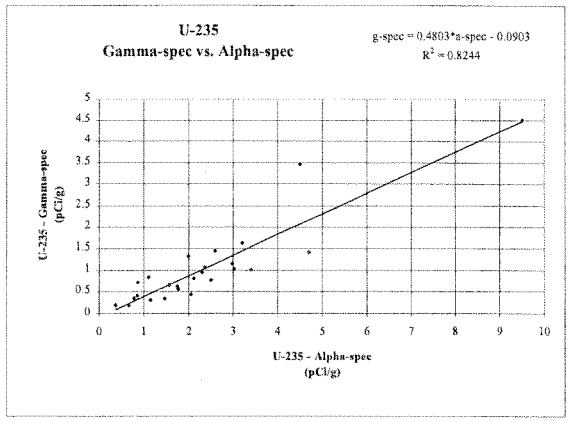


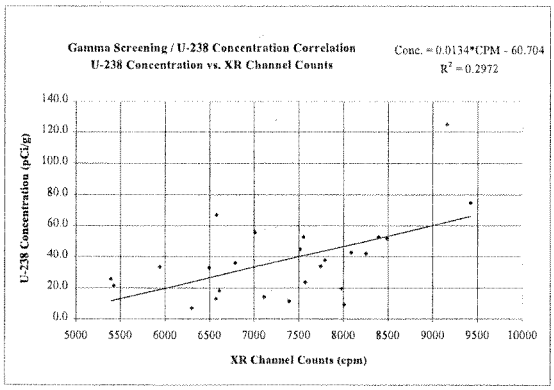
Composite Sample
Gamma/XR Correlation Data

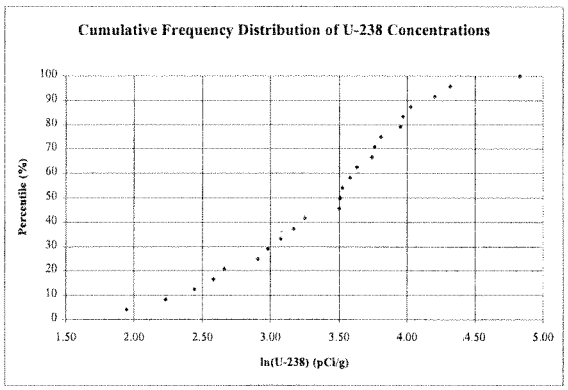
		SURVEYS	ISO-U		GAMMA-SPEC				CFD		
CLIENT ID	LAB ID	XR Channel cpm	U-238 (pCi/g)	aU-235 (pCi/g)	LAB ID	Th-234 (pCi/g)	Pa-234m (pCi/g)	gU-235 (pCi/g)	U-238 Rank	ln(U-238)	%
SYL-121901-J-12-3-COMP	FIL260136060	9159	125.0	9.5		90	159	4.51	24	4.83	100
SYL-121901-J-13-3-COMP	FIL260136065	9424	79.0	4.5		65.3	139	3.47	23	4.32	96
SYL-121901-H-10-1-COMP	FIL260136057	6578	67.0	4.7		24.7	82	1.43	22	4.20	92
SYL-121901-I-9-1-COMP	FIL260136062	7013	56.0	2.98	FIL260136062	29.8	511	1.17	21	4.03	88
SYL-121901-J-10-3-COMP	FIL260136066	8394	53.0	3.2	FIL260136066	27.3	40	1.63	20	3.97	83
SYL-121901-H-11-3-COMP	FIL260136067	7548	53.0	3.4	FIL260136067	19.4	39	1.03	20	3.97	83
SYL-121901-J-11-3-COMP	FIL260136059	8489	52.0	2.59	FIL260136059	28.9	48	1.46	19	3.95	79
SYL-121901-I-13-4-COMP	FIL260136038	7513	45.0	2.5	FIL260136038	21.2	43	0.77	18	3.81	75
SYL-121901-J-12-4-COMP	FIL260136040	8085	43.0	2.36	FIL260136040	18.3	36	1.08	17	3.76	71
SYL-121901-J-13-4-COMP	FIL260136039	8250	42.1	3.62		17.1	29	1.04	16	3.74	67
SYL-121901-J-9-3-COMP	FIL260136061	7790	37.7	2.05	FIL260136061	17.7	31	0.44	15	3.63	63
SYL-121901-H-9-2-COMP	FIL260136012	6787	35.9	1.99		25.3	47	1.34	14	3.58	58
SYL-121901-I-13-2-COMP	FIL260136064	7745	33.9	2.3		14.2	27	0.95	13	3.52	54
SYL-121901-J-10-1-COMP	FIL260136011	5939	33.4	1.56		13.5	16.2	0.66	12	3.51	50
SYL-121901-G-9-2-COMP	FIL260136065	6494	33.1	2.12		12	27	0.82	11	3.50	46
SYL-121901-H-12-1-COMP	FIL260136058	5396	28.8	1.77		8.8	17.1	0.56	10	3.25	42
SYL-121901-I-13-5-COMP	FIL260136036	7571	28.8	1.11		16.5	28	0.84	9	3.17	38
SYL-121901-G-13-2-COMP	FIL260136056	5428	21.6	1.51		10.9	24	0.67	8	3.07	33
SYL-121901-J-13-5-COMP	FIL260136028	7973	19.7	0.87		12	35	0.72	7	2.98	29
SYL-121901-I-10-4-COMP	FIL260136037	6612	18.3	1.45	FIL260136037	6.4	14.3	0.348	6	2.91	25
SYL-121901-J-12-5-COMP	FIL260136031	7113	14.3	1.15	FIL260136031	4.5	8.6	0.305	5	2.66	21
SYL-121901-I-11-4-COMP	FIL260136027	6571	13.2	0.86		8.4	20.6	0.41	4	2.58	17
SYL-121901-I-12-4-COMP	FIL260136041	7994	11.5	0.67		3.35	5.1	0.194	3	2.44	13
SYL-121901-I-12-5-COMP	FIL260136042	8005	9.3	0.78	FIL260136042	3.9	2.3	0.35	2	2.23	8
SYL-121901-G-11-4-COMP	FIL260136036	6298	7.0	0.37		2.88	15.5	0.193	1	1.95	4

BKG mean	7076	11.1
BKG STDEV	678	3.0



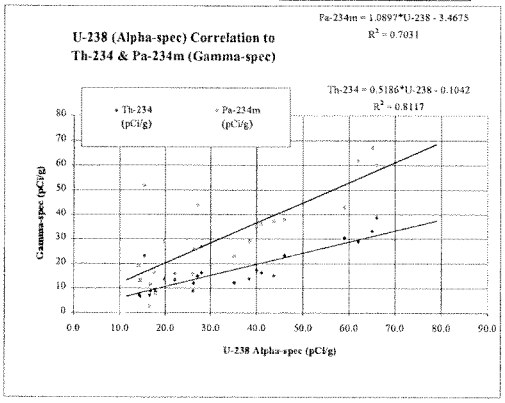


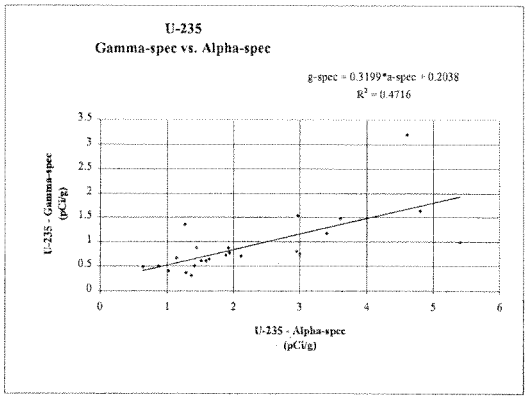


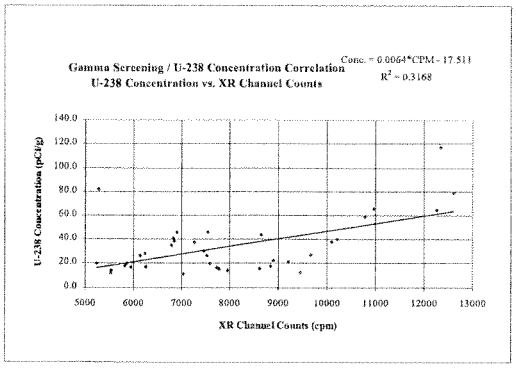


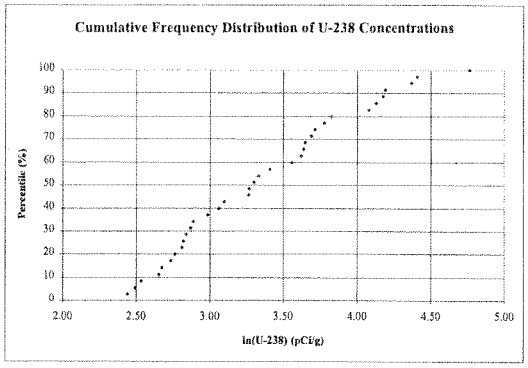
		SURVEYS	ISO-U		GAMMA-SPEC				CFD		
CLIENT ID	LAB ID	XR Channel cpm	U-238 (pCi/g)	U-235 (pCi/g)	LAB ID	Th-234 (pCi/g)	Pa-234m (pCi/g)	g-U-235 (pCi/g)	U-238 Rank	ln(U-238)	%
SYL-121901-I-11-4-PT	FIL260136009	7032	11.5	0.65					1	2.44	3
SYL-121901-G-13-1-PT	FIL260136014	5332	12.1	0.71					2	2.49	6
SYL-121901-J-13-3-PT	FIL260136043	9451	12.5	0.89					3	2.53	9
SYL-121901-I-12-5-PT	FIL260136025	7949	14.2	0.64	FIL260136025	7.7	19.2	0.49	4	2.65	11
SYL-121901-J-13-1-PT	FIL260136055	5581	14.5	1.28	FIL260136055	6.9	13.2	0.366	5	2.67	14
SYL-121901-I-10-1-PT	FIL260136044	7179	15.4	1.26	FIL260136044	23.2	32	1.39	6	2.73	17
SYL-121901-J-12-3-PT	FIL260136029	8615	15.8	1.23					7	2.76	20
SYL-121901-I-10-4-PT	FIL260136035	7733	15.6	1.02	FIL260136035	7.3	27	0.43	8	2.81	23
SYL-121901-I-12-1-PT	FIL260136047	5941	16.8	1.36	FIL260136047	8	17.7	0.31	9	2.82	26
SYL-121901-H-9-1-PT	FIL260136022	6259	17.1	0.79					10	2.84	29
SYL-121901-J-10-3-PT	FIL260136004	8841	17.6	1.14	FIL260136004	9.7	16.2	0.67	11	2.87	31
SYL-121801-I-12-1-PT	FIL260136053	5811	17.9	0.87	FIL260136053	8.6	7.9	0.51	12	2.88	34
SYL-121801-H-12-1-PT	FIL260136033	5244	19.8	1.58	FIL260136033	13.8	29	0.63	13	2.99	37
SYL-121801-I-13-1-PT	FIL260136048	5855	19.9	1.87					13	2.99	37
SYL-121901-I-12-4-PT	FIL260136027	7586	19.8	1.47					13	2.99	37
SYL-121901-I-13-3-PT	FIL260136026	9213	21.3	1.495					14	3.06	40
SYL-121801-J-9-3-PT	FIL260136002	8999	22.1	1.63	FIL260136002	13.5	16	0.63	15	3.10	43
SYL-121901-G-13-2-PT	FIL260136020	7327	26.1	1.41	FIL260136020	9	13.8	0.51	16	3.26	46
SYL-121801-G-12-1-PT	FIL260136015	8133	26.2	1.51	FIL260136015	12.1	25	0.63	17	3.27	49
SYL-121901-I-13-4-PT	FIL260136008	9468	27.1	1.44	FIL260136008	15	44	0.88	18	3.30	51
SYL-121801-J-11-1-PT	FIL260136054	8238	28.0	1.94	FIL260136054	16.3	27	0.78	19	3.33	54
SYL-121801-G-11-1-PT	FIL260136018	7484	32.2	1.79					20	3.47	57
SYL-121801-J-10-1-PT	FIL260136001	8787	35.1	1.92	FIL260136001	12.3	23	0.88	21	3.56	60
SYL-121801-J-9-1-PT	FIL260136050	7260	37.4	2.28					22	3.62	63
SYL-121901-H-9-2-PT	FIL260136021	10098	38.6	2.6					23	3.64	66
SYL-121801-G-9-1-PT	FIL260136016	8848	38.9	1.88	FIL260136016	13.8	25	0.73	24	3.65	69
SYL-121901-I-12-4-PT	FIL260136063	10215	40.0	2.95	FIL260136063	17.4	33	0.83	25	3.69	71
SYL-121801-I-11-1-PT	FIL260136046	9830	41.0	3	FIL260136046	16.3	36	0.76	26	3.71	74
SYL-121901-H-11-3-PT	FIL260136017	8652	43.7	2.11	FIL260136017	15.2	37	0.71	27	3.78	77
SYL-121801-G-10-1-PT	FIL260136019	7548	46.0	2.28					28	3.83	80
SYL-121801-H-13-1-PT	FIL260136023	8963	46.0	3.4	FIL260136023	23.4	38	1.18	28	3.83	80
SYL-121901-J-11-3-PT	FIL260136051	10786	59.0	3.6	FIL260136051	30.4	43	1.48	29	4.08	83
SYL-121901-I-13-2-PT	FIL260136049		62.0	5.4	FIL260136049	29.1	62	1	30	4.13	86
SYL-121901-G-9-2-PT	FIL260136013	12289	65.6	2.87	FIL260136013	33.3	67	1.54	31	4.17	89
SYL-121801-I-8-1-PT	FIL260136045	10971	66.0	4.8	FIL260136045	38.7	60	1.64	32	4.19	91
SYL-121901-J-12-3-PT	FIL260136052	12689	79.6	5.1					33	4.37	94
SYL-121801-H-13-1-PT	FIL260136024	5279	82.0	4.6	FIL260136024	51.4	122	3.2	34	4.41	97
SYL-121901-J-13-3-PT	FIL260136003	12340	117.0	4.9					35	4.76	100
SYL-121901-G-11-4-PT	FIL260136010	6968	232.0	12.1	FIL260136010	440	790	21			

BKG mean	10593	81.8
BKG STDV	3062	21.1









Attachment C-5

Severn Trent Laboratories (Saint Louis, Missouri)

- Nuclear Regulatory Commission Radioactive Materials Possession License
- State of New York National Environmental Laboratory Accreditation Conference (NELAC) Certification

NRC FORM 374

U.S. NUCLEAR REGULATORY COMMISSION

Amendment No. 12

MATERIALS LICENSE

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974 (Public Law 93-438), and Title 10, Code of Federal Regulations, Chapter I, Parts 30, 31, 32, 33, 34, 35, 36, 39, 40, and 70, and in reliance on statements and representations heretofore made by the licensee, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer byproduct, source, and special nuclear material designated below; to use such material for the purpose(s) and at the place(s) designated below; to deliver or transfer such material to persons authorized to receive it in accordance with the regulations of the applicable Part(s). This license shall be deemed to contain the conditions specified in Section 183 of the Atomic Energy Act of 1954, as amended, and is subject to all applicable rules, regulations, and orders of the Nuclear Regulatory Commission now or hereafter in effect and to any conditions specified below.

Licensee	In accordance with letter dated August 29, 2000
1. Severn Trent Laboratories-St. Louis	3. License number 24-24817-01 is amended in its entirety to read as follows:
2. 13715 Rider Trail North Earth City, MO 63045	4. Expiration date May 31, 2002
	5. Docket No. 030-29601 Reference No.

6. Byproduct, source, and/or special nuclear material	7. Chemical and/or physical form	8. Maximum amount that licensee may possess at any one time under this license
A. Any byproduct material, listed in 10 CFR 33.100, Schedule A., except as specified below	A. Any	A. As specified in 10 CFR Part 33, Schedule A., Column II
B. Strontium-90	B. Any	B. 100 millicuries
C. Cesium-137	C. Any	C. 100 millicuries
D. Cobalt-60	D. Any	D. 100 millicuries
E. Hydrogen-3	E. Any	E. 3 curies
F. Plutonium	F. Any	F. 2 grams
G. Uranium-233	G. Any	G. 2 grams
H. Uranium-235	H. Any	H. 340 grams
I. Any byproduct material with Atomic Numbers between 84-103, inclusive	I. Any	I. 5 millicuries each radionuclide with a total possession limit of 100 millicuries
J. Natural Uranium	J. Any	J. 136 kilograms (300 pounds)
K. Barium-133	K. Sealed sources	K. 2 sources, not to exceed 20 microcuries per source
L. Nickel-63	L. Plated sources	L. 15 sources, not to exceed 15 millicuries per source
M. Natural Thorium	M. Any	M. 200 millicuries

NRC FORM 374A U.S. NUCLEAR REGULATORY COMMISSION

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
24-24817-01

Docket or Reference Number
030-29601

Amendment No. 12

8. Authorized Use:

A. through J. and M. To be used incident to the performance of chemical and radiochemical analysis of samples and as calibration standards for calibration of instruments.

K. To be used as internal calibration sources for liquid scintillation counters.

L. To be used in Gas Chromatographs for sample analysis.

CONDITIONS

9. Licensed material shall be used only at the licensee's facilities located at 13715 Rider Trail North, Earth City, Missouri.

10. The On-site Radiation Safety Officer for this license is **Joel Kempema.**

11. Licensed material shall be used by, or under the supervision of, Joel Kempema, William R. Deckelmann, Robert W. Dempsey, Barbara S. Dihel, Brian S. Crandall, Ronald S. Martino and James M. Kleszczewski.

12. In addition to the possession limits in Item 8, the licensee shall further restrict the possession of licensed material to quantities below the limits specified in 10 CFR 30.72 which require consideration of the need for an emergency plan for responding to a release of licensed material.

13. A. Sealed sources and detector cells shall be tested for leakage and/or contamination at intervals not to exceed 6 months or at such other intervals as specified by the certificate of registration referred to in 10 CFR 32.210.

B. Notwithstanding Paragraph A of this Condition, sealed sources and detector cells designed to emit alpha particles shall be tested for leakage and/or contamination at intervals not to exceed 3 months.

C. In the absence of a certificate from a transferor indicating that a leak test has been made within 6 months prior to the transfer, a sealed source or detector cell received from another person shall not be put into use until tested.

D. Sealed sources need not be leak tested if:

(i) they contain only hydrogen-3; or

(ii) they contain only a radioactive gas; or

(iii) the half-life of the isotope is 30 days or less; or

MATERIALS LICENSE
SUPPLEMENTARY SHEET

License Number
24-24817-01

Docket or Reference Number
030-29601

Amendment No. 12

(iv) they contain not more than 100 microcuries of beta and/or gamma emitting material or not more than 10 microcuries of alpha emitting material; or

(v) they are not designed to emit alpha particles, are in storage, and are not being used. However, when they are removed from storage for use or transferred to another person, and have not been tested within the required leak test interval, they shall be tested before use or transfer. No sealed source or detector cell shall be stored for a period of more than 10 years without being tested for leakage and/or contamination.

E. The leak test shall be capable of detecting the presence of 0.005 microcurie of radioactive material on the test sample. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. If the test reveals the presence of 0.005 microcurie or more of removable contamination, a report shall be filed with the U.S. Nuclear Regulatory Commission and the source shall be removed immediately from service and decontaminated, repaired, or disposed of in accordance with Commission regulations. The report shall be filed within 5 days of the date the leak test result is known with the U.S. Nuclear Regulatory Commission, Region III, 801 Warrenville Road, Lisle, Illinois 60532-4351, ATTN: Chief, Materials Licensing Branch. The report shall specify the source involved, the test results, and corrective action taken. Records of leak test results shall be kept in units of microcuries and shall be maintained for inspection by the Commission. Records may be disposed of following Commission inspection.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner

Expires 12:01 AM April 01, 2002
Issued July 28, 2001
Revised October 30, 2001

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. WILLIAM DECKELMANN
STL ST. LOUIS
13715 RIDER TRAIL NORTH
EARTH CITY MO 63045 USA

NY Lab Id No: 11616
EPA Lab Code: MO00054

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Drinking Water Metals I

Arsenic, Total	EPA 200.7
	EPA 200.9
Barium, Total	EPA 200.7
Cadmium, Total	EPA 200.7
Chromium, Total	EPA 200.7
Copper, Total	EPA 200.7
Iron, Total	EPA 200.7
Lead, Total	EPA 200.9
Manganese, Total	EPA 200.7
Mercury, Total	EPA 245.1
	EPA 245.2
Selenium, Total	EPA 200.9
Sodium, Total	EPA 200.7
Zinc, Total	EPA 200.7

Drinking Water Metals II

Antimony, Total	EPA 200.9
Beryllium, Total	EPA 200.7
Nickel, Total	EPA 200.7
Thallium, Total	EPA 200.9

Drinking Water Non-Metals

Alkalinity	SM18 2320-B
Calcium Hardness	EPA 200.7
Chloride	EPA 300.0

Drinking Water Non-Metals

Cyanide	SM18, 4500- CN-C
Fluoride, Total	EPA 300.0
Hydrogen Ion (pH)	EPA 150.1
Nitrate (as N)	EPA 300.0
Sulfate (as SO4)	EPA 300.0
	EPA 375.4

Drinking Water Trihalomethanes

Bromodichloromethane	EPA 524.2
Bromoform	EPA 524.2
Chloroform	EPA 524.2
Dibromochloromethane	EPA 524.2

Radiological Analytes

Gross Alpha	EPA 900.0
Gross Beta	EPA 900.0
Photon Emitters	EPA 901.1
Plutonium	EPA 907.0
Radium-228	EPA 904.0
	SM18 7500-Ra D
Strontium-89	EPA, 1980, METHOD 905.0
	SM18 7500-Sr B
Strontium-90	DOE 1990 Sr-02
	EPA, 1980, METHOD 905.0
	SM18 7500-Sr B

Serial No.: 14176

Property of the New York State Department of Health. Valid only at the address shown Must be conspicuously posted. Valid certificates have a raised seal and may be verified by calling (518)485-5570.

DOH-3317 (3/97)

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Radiological Analytes	
Tritium	SM18 7500-3H B
Uranium	DOE 1990 U-02
	EPA 908.0
Volatile Aromatics	
1,2,3-Trichlorobenzene	EPA 524.2
1,2,4-Trichlorobenzene	EPA 524.2
1,2,4-Trimethylbenzene	EPA 524.2
1,2-Dichlorobenzene	EPA 524.2
1,3,5-Trimethylbenzene	EPA 524.2
1,3-Dichlorobenzene	EPA 524.2
1,4-Dichlorobenzene	EPA 524.2
2-Chlorotoluene	EPA 524.2
4-Chlorotoluene	EPA 524.2
Benzene	EPA 524.2
Bromobenzene	EPA 524.2
Chlorobenzene	EPA 524.2
Ethyl benzene	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Isopropylbenzene	EPA 524.2
m-Xylene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
o-Xylene	EPA 524.2
Volatile Aromatics	
p-Isopropyltoluene (P-Cymene	EPA 524.2
p-Xylene	EPA 524.2
sec-Butylbenzene	EPA 524.2
Styrene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Toluene	EPA 524.2
Volatile Halocarbons	
1,1,1,2-Tetrachloroethane	EPA 524.2
1,1,1-Trichloroethane	EPA 524.2
1,1,2,2-Tetrachloroethane	EPA 524.2
1,1,2-Trichloroethane	EPA 524.2
1,1-Dichloroethane	EPA 524.2
1,1-Dichloroethene	EPA 524.2
1,1-Dichloropropene	EPA 524.2
1,2,3-Trichloropropane	EPA 524.2
1,2-Dichloroethane	EPA 524.2
1,2-Dichloropropane	EPA 524.2
1,3-Dichloropropane	EPA 524.2
Bromochloromethane	EPA 524.2
Bromomethane	EPA 524.2
Carbon tetrachloride	EPA 524.2
Chloroethane	EPA 524.2
Chloromethane	EPA 524.2

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All approved analytes are listed below:

Volatile Halocarbons

cis-1,2-Dichloroethene	EPA 524.2
cis-1,3-Dichloropropene	EPA 524.2
Dibromomethane	EPA 524.2
Methylene chloride	EPA 524.2
Tetrachloroethene	EPA 524.2
trans-1,2-Dichloroethene	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Trichloroethene	EPA 524.2
Trichlorofluoromethane	EPA 524.2
Vinyl chloride	EPA 524.2

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ENVIRONMENTAL ANALYSES POTABLE WATER
All approved subcategories and/or analytes are listed below:

Drinking Water Non-Metals

Solids, Total Dissolved	Method Not Specified

Serial No.: 14177

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DOH-3317 (3/97)

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ENVIRONMENTAL ANALYSES NON POTABLE WATER
All approved subcategories and/or analytes are listed below:

Chlorinated Hydrocarbon Pesticides

4,4-DDD	EPA 608
alpha-BHC	EPA 608
Dieldrin	EPA 608
Endosulfan I	EPA 608
Endosulfan sulfate	EPA 608
Endrin aldehyde	EPA 608
Heptachlor epoxide	EPA 608
Lindane	EPA 608
Methoxychlor	Method Not Specified
Toxaphene	EPA 608

Chlorophenoxy Acid Pesticides

2,4,5-T	Method Not Specified
2,4,5-TP (Silvex)	Method Not Specified
2,4-D	Method Not Specified
Dicamba	Method Not Specified

Polychlorinated Biphenyls

PCB-1016	EPA 608
PCB-1221	EPA 608
PCB-1242	EPA 608
PCB-1248	EPA 608
PCB-1254	EPA 608

Polynuclear Aromatics

Acenaphthylene	EPA 625

Polynuclear Aromatics

Benzo(ghi)perylene	EPA 625
Benzo(k)fluoranthene	EPA 625
Chrysene	EPA 625
Dibenzo(a,h)anthracene	EPA 625
Fluorene	EPA 625
Naphthalene	EPA 625
Phenanthrene	EPA 625

Purgeable Aromatics

1,2-Dichlorobenzene	EPA 624
	EPA 625
1,4-Dichlorobenzene	EPA 624
	EPA 625

Purgeable Halocarbons

1,1,2-Trichloroethane	EPA 624
1,1-Dichloroethane	EPA 624
1,2-Dichloroethene (total)	EPA 624
1,2-Dichloropropane	EPA 624
2-Chloroethylvinyl ether	Method Not Specified
Bromodichloromethane	EPA 624
Bromoform	EPA 624
Chloromethane	EPA 624
cis-1,3-Dichloropropene	EPA 624
Dichlorodifluoromethane	Method Not Specified

Serial No.: 14179

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Purgeable Halocarbons

Tetrachloroethene	EPA 624
trans-1,3-Dichloropropene	EPA 624
Trichlorofluoromethane	Method Not Specified

TCLP Additional Compounds

Cresol	SW-846 8270C
Methylethyl ketone (2-butanone	8015 B
	SW-846 8260B
Pyridine	SW-846 8270C
	SW-846 8260B

Wastewater Metals II

Chromium VI	Method Not Specified

Serial No.: 14179

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Benzidines

3,3 -dichlorobenzidine	EPA 625
Benzidine	EPA 625

Chlorinated Hydrocarbon Pesticides

4,4 -DDE	EPA 608
4,4 -DDT	EPA 608
Aldrin	EPA 608
beta-BHC	EPA 608
Chlordane Total	EPA 608
delta-BHC	EPA 608
Endosulfan II	EPA 608
Endrin	EPA 608
Heptachlor	EPA 608

Chlorinated Hydrocarbons

1,2,4-Trichlorobenzene	EPA 625
2-Chloronaphthalene	EPA 625
Hexachlorobenzene	EPA 625
Hexachlorobutadiene	EPA 625
Hexachlorocyclopentadiene	EPA 625
Hexachloroethane	EPA 625

Demand

Biochemical Oxygen Demand	EPA 405.1
Chemical Oxygen Demand	EPA 410.4

Haloethers

4-Bromophenylphenyl ether	EPA 625
4-Chlorophenylphenyl ether	EPA 625
Bis (2-chloroisopropyl) ether	EPA 625
Bis(2-chloroethoxy)methane	EPA 625
Bis(2-chloroethyl)ether	EPA 625

Mineral

Acidity	EPA 1979,305.1
Chloride	EPA 300.0
Fluoride, Total	EPA 300.0
	EPA 340.2
Hardness, Total	EPA 130.2
	EPA 200.7
	SM 18 2340B or C

Nitroaromatics and Isophorone

2,4-Dinitrotoluene	EPA 625
2,6-Dinitrotoluene	EPA 625
Isophorone	EPA 625
Nitrobenzene	EPA 625

Nitrosoamines

N-Nitrosodimethylamine	EPA 625
N-Nitrosodi-n-propylamine	EPA 625
N-Nitrosodiphenylamine	EPA 625

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WADSWORTH CENTER
Antonia C. Novello, M.D., M.P.H., Dr.P.H. Commissioner

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Issued July 28, 2001
Revised October 30, 2001

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Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. WILLIAM DECKELMANN
STL ST. LOUIS
13715 RIDER TRAIL NORTH
EARTH CITY MO 63045 USA

NY Lab Id No: 11616
EPA Lab Code: MO00054

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All approved analytes are listed below:

Nutrient	
Ammonia (as N)	EPA 350.1
Nitrate (as N)	EPA 300.0
	EPA 353.1
	SM18 4500-NO3 H
Orthophosphate (as P)	EPA 300.0
Phosphorus, Total	SM18 4500-P B&E
hthalate Esters	
Benzyl butyl phthalate	EPA 625
Bis(2-ethylhexyl) phthalate	EPA 625
Diethyl phthalate	EPA 625
Dimethyl phthalate	EPA 625
Di-n-butyl phthalate	EPA 625
Di-n-octyl phthalate	EPA 625
Polychlorinated Biphenyls	
PCB-1232	EPA 608
PCB-1260	EPA 608
Polynuclear Aromatics	
Acenaphthene	EPA 625
Anthracene	EPA 625
Benzo(a)anthracene	EPA 625
Benzo(a)pyrene	EPA 625
Benzo(b)fluoranthene	EPA 625
Fluoranthene	EPA 625
Polynuclear Aromatics	
Indeno(1,2,3-cd)pyrene	EPA 625
Pyrene	EPA 625
Priority Pollutant Phenols	
2,4,5-Trichlorophenol	SW-846 8270C
2,4,6-Trichlorophenol	EPA 625
2,4-Dichlorophenol	EPA 625
2,4-Dimethylphenol	EPA 625
2,4-Dinitrophenol	EPA 625
2-Chlorophenol	EPA 625
2-Methyl-4,6-dinitrophenol	EPA 625
2-Nitrophenol	EPA 625
4-Chloro-3-methylphenol	EPA 625
4-Nitrophenol	EPA 625
Pentachlorophenol	EPA 625
Phenol	EPA 625
Purgeable Aromatics	
1,3-Dichlorobenzene	EPA 624
	EPA 625
Benzene	EPA 624
Chlorobenzene	EPA 624
Toluene	EPA 624
Total Xylenes	EPA 624

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Purgeable Halocarbons	
1,1,1-Trichloroethane	EPA 624
1,1,2,2-Tetrachloroethane	EPA 624
1,1-Dichloroethene	EPA 624
1,2-Dichloroethane	EPA 624
Bromomethane	EPA 624
Carbon tetrachloride	EPA 624
Chloroethane	EPA 624
Chloroform	EPA 624
Dibromochloromethane	EPA 624
Methylene chloride	EPA 624
Trichloroethene	EPA 624
Vinyl chloride	EPA 624
Radiological Analytes	
Gross Alpha	EPA 900.0
Gross Beta	EPA 900.0
Photon Emitters	EPA 901.1
Plutonium	EPA 907.0
Radium-226	EPA 1980 903.0
	SM18 7500-Ra C
Radium-228	EPA 904.0
	SM18 7500-Ra D
Strontium-89	EPA 905
	SM18 7500-Sr B
Radiological Analytes	
Strontium-90	DOE 1990 Sr-02
	EPA 901.0
	EPA 905
	SM18 7500-Sr B
Tritium	EPA 901.0
Uranium	DOE 1990 U-02
	EPA 908.0
Residue	
Solids, Total	EPA 160.3
Solids, Total Dissolved	EPA 160.1
Solids, Total Suspended	EPA 160.2
Wastewater Metals I	
Barium, Total	EPA 200.7
Cadmium, Total	EPA 200.7
Calcium, Total	EPA 200.7
Chromium, Total	EPA 200.7
Copper, Total	EPA 200.7
Iron, Total	EPA 200.7
Lead, Total	EPA 200.7
Magnesium, Total	EPA 200.7
Manganese, Total	EPA 200.7
Nickel, Total	EPA 200.7
Potassium, Total	EPA 200.7

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1,1,2,2-Tetrachloroethane	EPA 624
1,1-Dichloroethene	EPA 624
1,2-Dichloroethane	EPA 624
Bromomethane	EPA 624
Carbon tetrachloride	EPA 624
Chloroethane	EPA 624
Chloroform	EPA 624
Dibromochloromethane	EPA 624
Methylene chloride	EPA 624
Trichloroethene	EPA 624
Vinyl chloride	EPA 624
Radiological Analytes	
Gross Alpha	EPA 900.0
Gross Beta	EPA 900.0
Photon Emitters	EPA 901.1
Plutonium	EPA 907.0
Radium-226	EPA 1980 903.0
	SM18 7500-Ra C
Radium-228	EPA 904.0
	SM18 7500-Ra D
Strontium-89	EPA 905
	SM18 7500-Sr B

Radiological Analytes	
Strontium-90	DOE 1990 Sr-02
	EPA 901.0
	EPA 905
	SM18 7500-Sr B
Tritium	EPA 901.0
Uranium	DOE 1990 U-02
	EPA 908.0
Residue	
Solids, Total	EPA 160.3
Solids, Total Dissolved	EPA 160.1
Solids, Total Suspended	EPA 160.2
Wastewater Metals I	
Barium, Total	EPA 200.7
Cadmium, Total	EPA 200.7
Calcium, Total	EPA 200.7
Chromium, Total	EPA 200.7
Copper, Total	EPA 200.7
Iron, Total	EPA 200.7
Lead, Total	EPA 200.7
Magnesium, Total	EPA 200.7
Manganese, Total	EPA 200.7
Nickel, Total	EPA 200.7
Potassium, Total	EPA 200.7

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All approved analytes are listed below:

Wastewater Metals I

Silver, Total	EPA 200.7
Sodium, Total	EPA 200.7

Wastewater Metals II

Aluminum, Total	EPA 200.7
Antimony, Total	EPA 200.7
	EPA 200.9
Beryllium, Total	EPA 200.7
Mercury, Total	EPA 245.1
	EPA 245.2
Selenium, Total	EPA 200.7
Vanadium, Total	EPA 200.7
Zinc, Total	EPA 200.7

Wastewater Metals III

Cobalt, Total	EPA 200.7
Molybdenum Total	EPA 200.7
Thallium, Total	EPA 200.7

Wastewater Miscellaneous

Boron, Total	EPA 200.7
Cyanide, Total	EPA 335.2
Hydrogen Ion (pH)	EPA 150.1
Oil & Grease Total Recoverabl	EPA 1664-A
	EPA 413.1
Organic Carbon, Total	EPA 415.1

Wastewater Miscellaneous

Phenols	EPA 420.2
Silica, Dissolved	EPA 200.7
Sulfide (as S)	EPA 376.1

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ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Chlorinated Hydrocarbon Pesticides

4,4 -DDE	SW-846 8081A
4,4 -DDT	SW-846 8081A
Aldrin	SW-846 8081A
beta-BHC	SW-846 8081A
delta-BHC	SW-846 8081A
Endosulfan II	SW-846 8081A
Endrin	SW-846 8081A
Heptachlor	Method Not Specified
Toxaphene	SW-846 8081A

Metals II

Chromium VI	SW-846 7196A
Mercury, Total	SW846 7470A
	SW846 7471A

Miscellaneous

Cyanide, Total	SW-846 9012A
	SW-846 9010B

Nitroaromatics and Isophorone

2,6-Dinitrotofuene	Method Not Specified
Isophorone	Method Not Specified

Polynuclear Aromatic Hydrocarbons

Acenaphthene	SW-846 8270C
	SW-846 8310

Polynuclear Aromatic Hydrocarbons

Anthracene	SW-846 8270C
	SW-846 8310
Benzo(a)anthracene	SW-846 8270C
	SW-846 8310
Benzo(a)pyrene	SW-846 8270C
	SW-846 8310
Fluoranthene	SW-846 8270C
	SW-846 8310
Indeno(1,2,3-cd)pyrene	SW-846 8270C
	SW-846 8310
Pyrene	SW-846 8270C
	SW-846 8310

Purgeable Aromatics

1,2-Dichlorobenzene	SW-846 8260B
1,3-Dichlorobenzene	SW-846 8260B
1,4-Dichlorobenzene	SW-846 8260B
Benzene	SW-846 8021B
	SW-846 8260B
Chlorobenzene	SW-846 8260B
Ethyl benzene	SW-846 8021B
	SW-846 8260B
Toluene	SW-846 8021B
	SW-846 8260B

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All approved analytes are listed below:

Nitroaromatics and Isophorone	
Nitrobenzene	SW-846 8270C
Phthalate Esters	
Benzyl butyl phthalate	SW-846 8270C
Bis(2-ethylhexyl) phthalate	SW-846 8270C
Diethyl phthalate	SW-846 8270C
Dimethyl phthalate	SW-846 8270C
Di-n-butyl phthalate	SW-846 8270C
Di-n-octyl phthalate	SW-846 8270C
Polychlorinated Biphenyls	
PCB-1016	SW-846 8082
PCB-1221	SW-846 8082
PCB-1232	SW-846 8082
PCB-1242	SW-846 8082
PCB-1248	SW-846 8082
PCB-1254	SW-846 8082
Polynuclear Aromatic Hydrocarbons	
Acenaphthylene	SW-846 8270C
	SW-846 8310
Benzo(b)fluoranthene	SW-846 8270C
	SW-846 8310
Benzo(ghi)perylene	SW-846 8270C
	SW-846 8310
Chrysene	SW-846 8270C

Polynuclear Aromatic Hydrocarbons	
Chrysene	SW-846 8310
Dibenzo(a,h)anthracene	SW-846 8270C
	SW-846 8310
Fluorene	SW-846 8310
Naphthalene	SW-846 8270C
	SW-846 8310
Phenanthrene	SW-846 8270C
	SW-846 8310
Priority Pollutant Phenols	
2,4,6-Trichlorophenol	SW-846 8270C
2,4-Dichlorophenol	SW-846 8270C
2,4-Dimethylphenol	SW-846 8270C
2,4-Dinitrophenol	SW-846 8270C
2-Chlorophenol	SW-846 8270C
2-Methyl-4,6-dinitrophenol	SW-846 8270C
2-Nitrophenol	SW-846 8270C
4-Chloro-3-methylphenol	SW-846 8270C
4-Nitrophenol	SW-846 8270C
Pentachlorophenol	SW-846 8270C
Phenol	SW-846 8270C

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All approved analytes are listed below:

Characteristic Testing	
Ignitability	SW846 1010
Reactivity	SW846 Ch7, Sec. 7.3
TCLP	FED REG 1311
Chlorinated Hydrocarbon Pesticides	
4,4-DDD	SW-846 8081A
alpha-BHC	SW-846 8081A
Chlordane Total	SW-846 8081A
Dieldrin	SW-846 8081A
Endosulfan I	SW-846 8081A
Endosulfan sulfate	SW-846 8081A
Endrin aldehyde	SW-846 8081A
Heptachlor epoxide	SW-846 8081A
Lindane	SW-846 8081A
Chlorinated Hydrocarbons	
1,2,4-Trichlorobenzene	SW-846 8270C
2-Chloronaphthalene	SW-846 8270C
Hexachlorobenzene	SW-846 8270C
Hexachlorobutadiene	SW-846 8270C
Hexachlorocyclopentadiene	SW-846 8270C
Hexachloroethane	SW-846 8270C
Chlorophenoxy Acid Pesticides	
2,4,5-T	SW846 8151-A
2,4,5-TP (Silvex)	SW846 8151-A
Chlorophenoxy Acid Pesticides	
2,4-D	SW846 8151-A
Dicamba	SW846 8151-A
Haloethers	
Bis (2-chloroisopropyl) ether	SW-846 8270C
Bis(2-chloroethoxy)methane	SW-846 8270C
Metals I	
Barium, Total	SW-846 6010B
Cadmium, Total	SW-846 6010B
Chromium, Total	SW-846 6010B
Lead, Total	SW-846 6010B
Nickel, Total	SW-846 6010B
Silver, Total	SW-846 6010B
Metals II	
Antimony, Total	SW-846 6010B
Arsenic, Total	SW-846 6010B
Selenium, Total	SW-846 6010B
Miscellaneous	
Hydrogen Ion (pH)	SW-846 9040B & 9045C
Sulfide (as S)	SW-846 9030B
Nitroaromatics and Isophorone	
2,4-Dinitrotoluene	SW-846 8270C
2,6-Dinitrotoluene	SW-846 8091

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Purgeable Aromatics	
Total Xylenes	SW-846 8021B
	SW-846 8260B
Purgeable Halocarbons	
1,1,1-Trichloroethane	SW-846 8260B
1,1,2,2-Tetrachloroethane	SW-846 8260B
1,1,2-Trichloroethane	SW-846 8260B
1,1-Dichloroethane	SW-846 8260B
1,1-Dichloroethene	SW-846 8260B
1,2-Dichloroethane	SW-846 8260B
1,2-Dichloropropane	SW-846 8260B
2-Chloroethylvinyl ether	SW-846 8260B
Bromodichloromethane	SW-846 8260B
Bromoform	SW-846 8260B
Bromomethane	SW-846 8260B
Carbon tetrachloride	SW-846 8260B
Chloroethane	SW-846 8260B
Chloroform	SW-846 8260B
Chloromethane	SW-846 8260B
cis-1,3-Dichloropropene	Method Not Specified
Dibromochloromethane	SW-846 8260B
Dichlorodifluoromethane	SW-846 8260B
Methylene chloride	SW-846 8260B
Tetrachloroethene	SW-846 8260B

Purgeable Halocarbons	
trans-1,3-Dichloropropene	Method Not Specified
Trichloroethene	SW-846 8260B
Trichlorofluoromethane	SW-846 8260B
Vinyl chloride	SW-846 8260B

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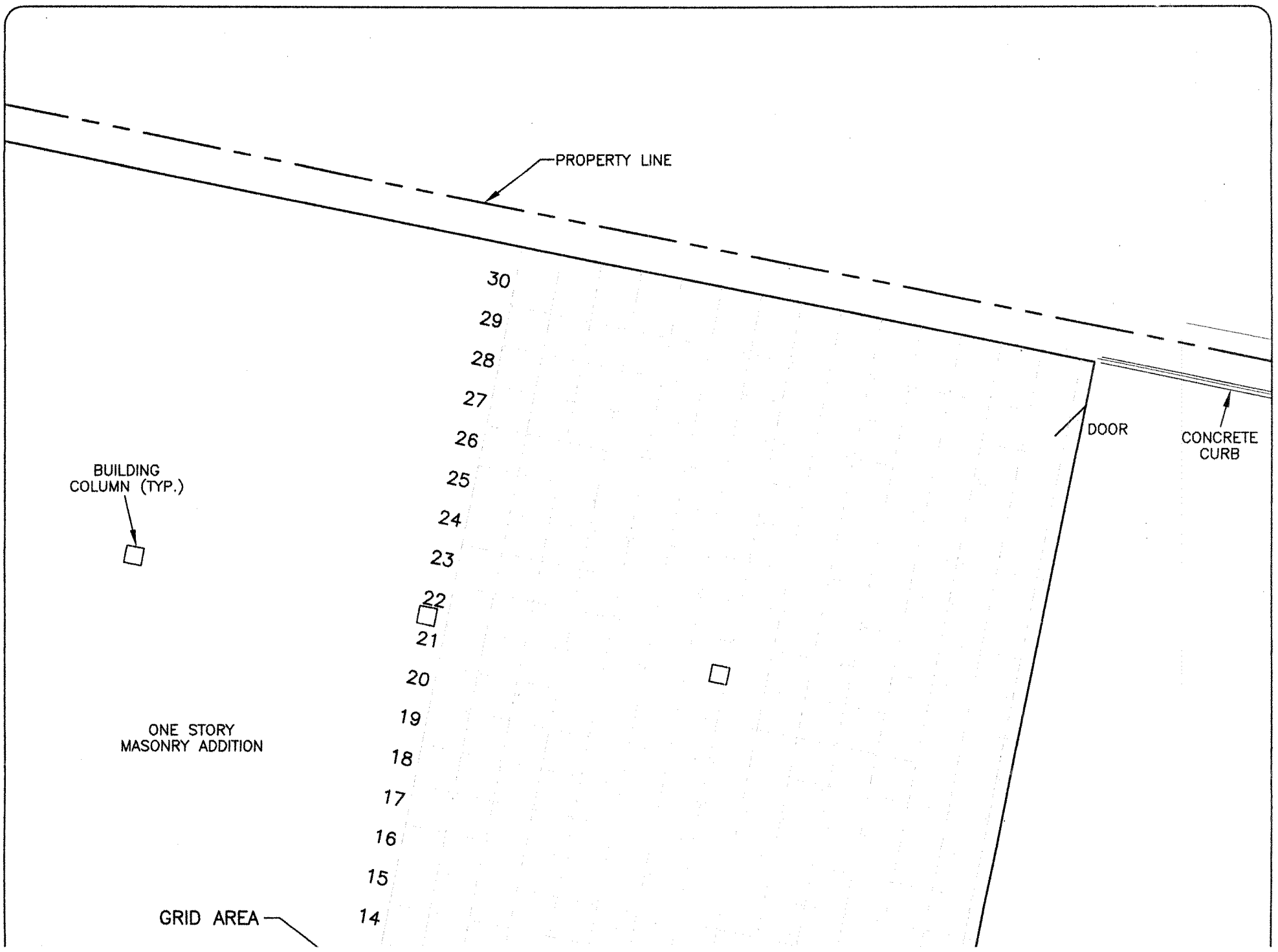
FIGURES


PROPERTY LINE
DOOR
CONCRETE CURB
BUILDING COLUMN (TYP.)
ONE STORY MASONRY ADDITION
GRID AREA
30
29
28
27
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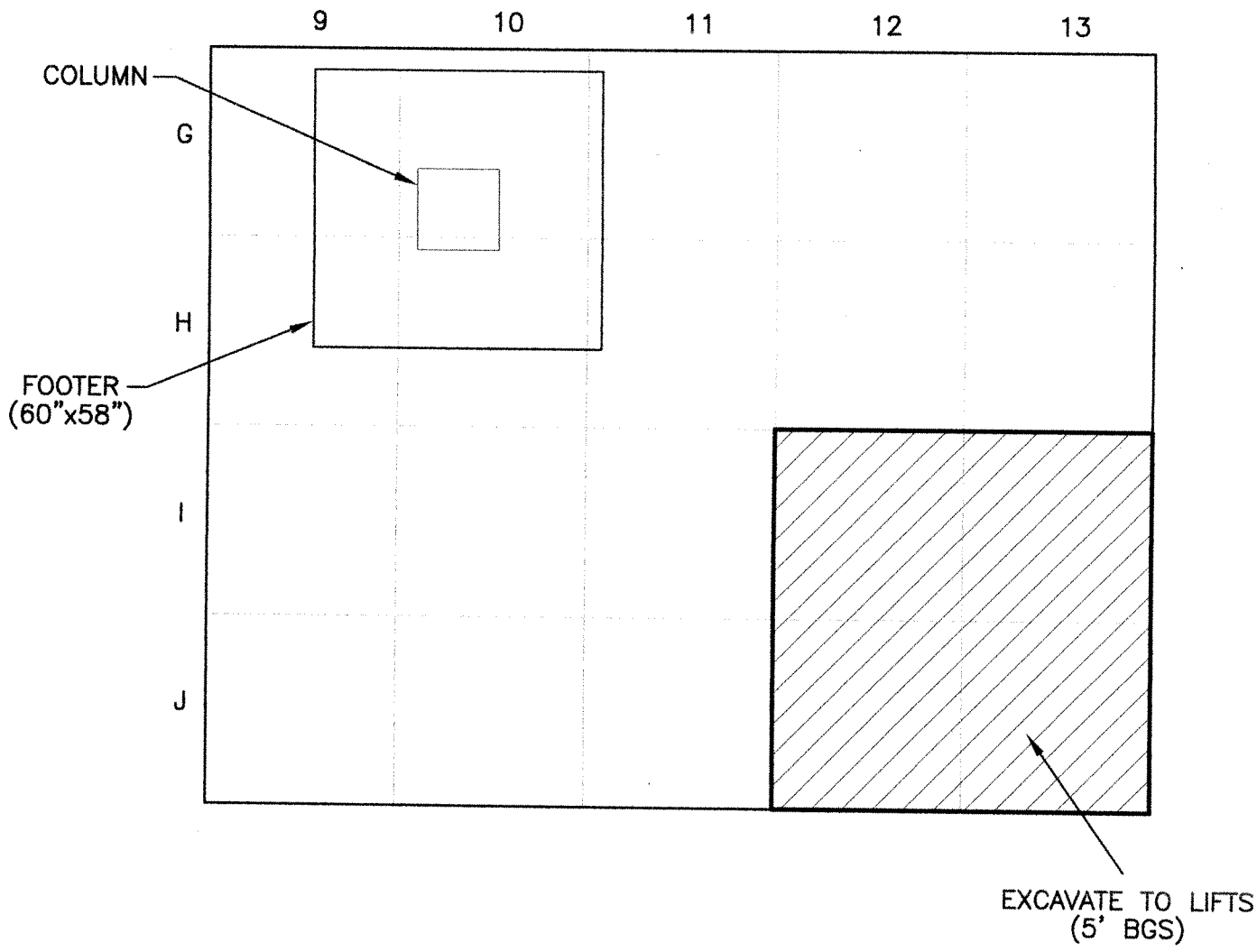

PLAN VIEW

5816.009

EXHIBIT A

INTERIM TECHNICAL MEMORANDUM

Ground Penetrating Radar Survey and Exterior Radiation Survey Results Former Sylvania Electric Products, Incorporated Facility

Cantiague Rock Road
Hicksville, New York
GTE Operations Support, Incorporated

James T. Mickam, PG
Vice President

March 1998

O'BRIEN & GERE ENGINEERS, INC.

O'Brien & Gere Engineers, Inc.
5000 Brittonfield Parkway
Syracuse, NY 13221

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Exhibits

1. Final Report - Radiological Characterization of the GTEOSI Site, Hicksville, NY, February 1998

1. Introduction

This technical memorandum summarizes the methods and results of a ground penetrating radar (GPR) survey and an exterior radiation survey which were conducted at the former Sylvania Electric Products Incorporated Facility (Sylvania Electric Products Facility, (the site- Figure 1) in Hicksville, NY. The former Sylvania Electric Products Facility is being investigated under New York State's Voluntary Cleanup Program for the presence of process residuals that may be related to manufacturing operations conducted by predecessor companies (as successor in interest) of GTE Operations Support Incorporated (GTEOSI). The surveys described herein were conducted in accordance with, and as a component of, the scope of work described in the Sylvania Electric Products Incorporated Facility Work Plan (Work Plan) [O'Brien & Gere Engineers, April 1997].

The former Sylvania Electric Products Facility consisted of a variety of buildings and subsurface structures, in use between the mid-1950s to the mid-1960s. In the mid-1960s, these buildings and structures were demolished or otherwise abandoned with the exception of a portion of the building currently occupied by Air Techniques, Inc. Buildings presently occupying the site are shown on Figure 2, and buildings comprising the former Sylvania Electric Products Facility are shown on Figure 3. Although the focus of the GPR and radiation surveys was the former buildings and structures, by necessity, the surveys were performed taking into consideration the footprint of the current buildings and appurtenances. Buildings and structures that once existed on-site such as the recharge basins, however, were sufficiently accessible that the surveys can be considered representative of previous site conditions.

Businesses currently occupying the property formerly occupied by GTEOSI's predecessor companies are:

- Gilbert Displays Incorporated at 140 Cantiague Rock Road,
- Magazine Distributors Incorporated (MDI) at 100 Cantiague Rock Road, and

- Air Techniques, Incorporated at 70 Cantiague Rock Road.

For the most part, these properties are either paved or covered by buildings. In addition, a portion of a public golf course driving range owned by Nassau County was included as part of the surveys. The public golf course driving range is located to the east of the Gilbert Displays, Magazine Distributors, and Air Techniques. Property owners were informed of, and gave permission to perform, the surveys prior to their implementation. Throughout the text of this report, survey locations are referenced to these buildings and their property boundaries.

The surveys were conducted with both the oversight and participation of New York State Department of Environmental Conservation (NYSDEC) personnel. Robert Stewart (NYSDEC) provided oversight while several individuals from the NYSDEC Bureau of Pesticides and Radiation performed approximately 75% of the radiation survey. Details regarding NYSDEC's role in this portion of the investigation is explained more fully in the text of this document.

1.1. Objectives

The objectives of the surveys were as follows:

- The GPR survey was conducted in order to evaluate and confirm the presence of formerly used on-site accessible subsurface structures (e.g. recharge basins), define the depth of such structures prior to the installation of borings, and, if possible, evaluate the methodology by which the structures were filled (soil vs building rubble).

- The radiation survey was conducted in order to define, to the extent practicable, the lateral extent of above-background gamma emitting radioactive materials that may indicate the presence of process residuals, particularly uranium and thorium progeny.

The combined goal of the surveys was to assist in identifying the locations for subsequent surface and subsurface soil sampling activities.

1.2. Report format

The GPR survey is discussed first and the radiation survey second in the following sections of this report. A capsule summary of each survey is provided following the discussion. The report concludes with a listing of recommended soil sampling locations.

2. Field investigations

2.1. GPR survey

A high resolution ground-penetrating radar survey was conducted at the site by O'Brien & Gere Engineers, Inc. (O'Brien & Gere) on December 5 and 6, 1997. This employed a portable subsurface interface radar, model SIR-2, manufactured by Geophysical Survey Systems, Inc. of North Salem NH. The system configuration for this investigation was composed of a single channel 500 MHZ antennae, a portable SIR-2 recording system, and a connecting 23 conductor communication cable.

2.1.1. GPR methodologies

The SIR -2 unit was operated in two modes during the survey.

1. From the back of a mini-van with a 30-meter communication cable in clear areas without obstructions. The geophysicist operated and monitored data as they were collected on the SIR-2 recorder. An assistant pulled the 500 MHZ antenna and communication cable over predesignated scan lines.

2. Using a back-pack in areas with obstructions such as trucks, fencing and/or parking stops. The back-pack mode consisted of a back mounted battery pack, a forward viewed SIR-2 recording system, and a 3-meter communication cable. In this mode, the back-pack operator was required to both operate and monitor data collection.

While in operation, a low intensity microwave beam (equivalent to the intensity of a 100 watt light bulb) was transmitted downward or side-view (back-pack mode) by the antenna. The reflected microwave energy was received and translated to an approximate depth based on the estimated two-way travel time of the pulsed radar. For each survey scan, the depth data were collected at the rate of 32 times per second or, in terms of distance, approximately once per inch. As the GPR profiles were collected,

data were converted to digital information and stored in the subsurface interface (SIR-2) recording unit. The distance between GPR survey lines varied between 5 and 10 feet.

Survey transects were measured from the common fence line separating Gilbert Displays, MDI, and Air Techniques from the Cantiague Golf Course Driving range. The fence pole located at the northeast corner of the Gilbert Displays' property was selected as the 0,0 point for measurement purposes (Figure 2). The distance of each fence pole was measured away from the 0,0 pole providing the coordinate system from which the GPR (as well as the radiation) survey grid lines were established. In total, 66 fence poles were marked covering a total distance of 663.5 ft. Fence pole 17 marked the boundary between Gilbert Displays and MDI and, fence pole 46 the boundary between MDI and Air Techniques.

Each GPR profile was reviewed in real-time on the SIR-2 unit as it was being collected. New profiles were obtained when the initial profile appeared to be incomplete or of poor quality. Of 305 profiles obtained during the survey, four profiles were re-run (Scans 295, 334, 368, & 538) for these reasons.

The approximate depth of GPR reflectors was calibrated by comparing the known depth of a buried object, in this case a UST located at Magazine Distributors Inc., and the observed GPR reflector depth. Calibration is completed by adjusting the internal variable for the dielectric constant in the data acquisition program. Typically, this calibration will permit the estimation of depth of reflectors within six-inches. Based on the UST calibration the assigned dielectric constant at this site was established to be 6.0. A dielectric value of 6.0 is consistent with dry, slightly clayey sand.

Following completion of the field phase of data collection, the data were transferred from the SIR-2 unit to O'Brien & Gere's file server located in Syracuse, NY. Using post-processing software for the subsurface interface radar (SIR-2) known as WINRAD (also called RADAN for Windows), each GPR profile was reviewed and anomalous features noted. Afterwards, the location of each GPR profile line, the depth to each noted reflector, and the extent of broad features were compiled for reference purposes. The GPR profile summaries are included as Appendix A.

2.1.2. Area of survey

The GPR site survey area was selected in consideration of subsurface structures that may have received process materials, and previous radiation surveys conducted by NYSDEC and the NRC.. The areas surveyed are shown on Figure 2 and include the following.

- Cantiague Public Golf Driving Range - A 400 ft by 100 ft area located along the western edge of the Cantiague Public Golf Driving Range. This area represents a five to seven foot high easterly facing slope grading from the chain link fence (baseline) to the middle of the driving range. The driving range was not in any way used by GTEOSI or its predecessor complaints according to reviewed file records. This area was surveyed in order to corroborate the reviewed file records, establish background signal characteristics, and assist in the evaluation of local geology.

- Gilbert Displays Inc.- A 150 ft by 100 ft parking lot and driveway located east of the building. The existing subsurface structures are comprised of several parking lot storm water drywells. Six-inch high curbing separates the natural areas from the paved asphalt areas.

- Magazine Distributors Inc.- A 125 ft by 275 ft area located east of the building currently used for parking, loading, access, and fueling and, a 450 ft by 100 ft parking and access area located south of the building. Several storm water drainage drywells are located in the parking lot south and east of the building while fuel distribution facilities, underground fuel storage tanks, and a caged storage area are located at the rear of the building. An abandoned truck and miscellaneous items were located at the extreme southeastern corner of the property at the time of the survey.

- Air Techniques, Inc. - A 125 ft by 500 ft parking lot and driveway located north of the building. Existing structures include several storm water catch basins located in the parking and access areas to the north of the facility and an underground concrete vault of unknown dimensions located near the northwest corner of the facility. Reportedly, the westernmost portion of what is now the Air Techniques building was used as the Sylvania AEC Administration and Production building.

2.1.3. GPR survey results

The relationship between the observed GPR reflectors and formerly used subsurface structures (identified from historical records listed in the site Work Plan) is described below. The basis of this relationship was established by comparing the results of the GPR survey (Appendix A), the visual graphic GPR output reviewed using WINRAD, and Figures 2 and 3 illustrating current and historic site usage. The results are described in context of current property ownership. Consistent with the output of the GPR SIR-2 unit, discussion of depths are in units of meters. Depths below land surface (bls) are in discussed in three ranges:

1. upper -0 to 1 meter bls
2. moderate - 1 to 2 meters bls; and
3. deep - 2 to 5 meters bls.

For reference and interpretation purposes, a variety of figures were prepared and referenced throughout this report.

- Figure 2 - a site map illustrating the location of the GPR profile lines with respect to the existing facility.

- Figure 3 - a site map illustrating the location of the GPR profile lines with respect to the former Sylvania Electric Products facility.

- Figure 4 - a site map illustrating color contours plotted to illustrate the each GPR reflector and the former Sylvania Electric Products facility. The map illustrates the depth distribution of identified GPR reflectors.

The maps listed below were developed to illustrate the relationship of GPR reflectors to a predetermined depth pattern based on historical data, particularly the depth of individual structures (e.g., no structure was identified that was greater than 5 meters below ground surface on historical maps of the Sylvania facility) as well as the overall patterns of the GPR reflectors.

- Figure 5 - illustrates the depth distribution of identified GPR reflectors greater than 0.5 meters in depth.

- Figure 6 - illustrates the depth distribution of identified GPR reflectors greater than 1.0 meters in depth.

- Figure 7 - illustrates the depth distribution of identified GPR reflectors greater than 2.0 meters in depth.

- Figure 8 - illustrates the depth distribution of identified GPR reflectors greater than 3.0 meters in depth.

- Figure 9 - illustrates the depth distribution of identified GPR reflectors greater than 4.0 meters in depth.

The maps illustrated in Figures 5 through 9 indicate that the majority of total reflectors identified at the former Sylvania Electric Products facility were located between 0.3 and 3.3 meters (1 ft to 10 ft) bls.

Cantiague Park Public Golf Driving Range

The Cantiague Park Public Golf Driving Range (Driving Range) comprises the eastern most portion of the study area. The area is relatively flat, sloping eastward away from the fence which separates this area from the site. As shown on Figure 2, forty-two GPR profiles were obtained from this area of study. Each traverse trended from east to west. Signal penetration was to up to 5 meters in depth (approximately 15 feet). Interpretations of the GPR profiles from this area indicate that there is a well defined reflective surface characteristic of sandy soils which thin to the west. An example area profile is GPR Profile 296 shown in Appendix B.

Gilbert Displays, Inc.

The Gilbert Displays, Inc investigation area was formerly the location of Sylvania's Recharge Basin #2 and Building #8 where, according to reports, burning and chemical processing took place.

Shallow and moderate reflectors in this area correspond to the location of Recharge Basin #3. The absence of shallow and moderate depth GPR reflectors in the reported area of Building #8 (profiles 345-351) suggests that subsurface structures associated with this building no longer exist. Near-surface GPR reflectors identified within the parking lot area are likely a result of fill and regrading prior to construction of the parking lot. In addition, a moderate depth east-west trending GPR reflector may provide further evidence of the existing underground recharge basins observed at the site.

Magazine Distributors, Inc.

Prior to the construction of the Magazine Distributors Inc. building, the area was occupied by Sylvania facilities designated as Building #6 (a single story building which was used for solvent and storage) and Building # 7(a single story concrete block building reportedly used to house a pump station). Several metal sheds and a single reservoir were also reportedly located immediately east of the Magazine Distributors building. Other structures included recharge basins #1 and #2 which were located to the east and south of the current building (Figure 2).

Interpretation of the GPR profiles obtained from this portion of the former Sylvania facility confirmed the presence of reflectors corresponding to the location of Recharge Basin #1 (profiles 355-376& 436), Recharge Basin #2 (profiles 534-548) and the reservoir basin located west of Pump House Building #7 (profiles 577-589). The deepest GPR reflectors correspond with the central axis of each of the recharge basins, suggesting that the basins were abandoned by filling. The fill material did not exhibit small, well defined reflectors which would be indicative of metal debris.

GPR profiles 550 to 555 (excluding 554), Appendix B, illustrate well-defined subsurface reflectors. These reflectors correspond to the existing underground storage tanks located southeast of the MDI building.

Air Techniques, Inc.

The area of study included the parking lot at the rear and north of the building. This area is reportedly the former location of six small sheds and buildings and the northern portion of Recharge Basin #4 (Figure 3).

The GPR profiles obtained from this area contain reflectors that correspond, and thereby confirm, the location of Recharge Basin #4 (profiles 446-460) and the foot-print former utility buildings. A deep reflector trend was also observed, corresponding to a series of former manholes and drains. No evidence of extensive buried metal debris was observed. A single moderate depth reflector (4-5 ft bls), however, was observed north of the former gas storage shed (Building # 11, profiles 490 & 491-Appendix B).

2.1.4. GPR survey summary

The GPR survey corroborated the location of many of the subsurface structures associated with the former Sylvania Electric Products Facility and identified in site file records. With the exception the unidentified reflector located north of the former gas storage shed and the recharge basis, suspected subsurface structures associated with past activities appear to be limited to the upper 1 meter.

The upper one meter of the site appears to have been disturbed by building construction activities. At depths greater than this, the subsurface GPR signals appear to correspond to the deepest portions of several of the recharge basins and to a greater extent several deeper geologic structures. Two potential geologic structures are present along the western one-half of the driving range. These GPR structures may be related to zones of stratigraphic change or change in permeability warranting further sampling. Another deeper linear structure is located north of the Air Techniques, Inc. facility and trends along the axis of Recharge Basins # 1 and #2. These GPR signals.

2.2. Radiation survey

Approximately 2/3 of the exterior radiation survey was performed by personnel from the NYSDEC Bureau of Pesticides and Radiation (the Bureau) and the remaining 1/3 by Chemrad Tennessee Corporation (Chemrad) under contract to O'Brien & Gere Engineers. The survey performed by the Bureau took place on November 17, 18, and 19, 1997. It is noted at the time of writing this report the NYSDEC has not issued a final report on their portion of the radiation survey. As such the findings of the NYSDEC portion of the radiation survey discussed in this report should be considered preliminary.

That portion of the survey performed by Chemrad took place initially on December 6, 1997 and again on February 7, 1997. The February 7 survey was required when the data from the December 6, 1997 survey was inadvertently lost because of a computer hardware failure. In each instance, the survey was conducted by trained personnel using equipment manufactured by Chemrad.

2.2.1. Methodology

The following radiation detection and positioning equipment was utilized for the survey:

- A Ludlum Model 3 rate meter with a 2-inch x 2-inch sodium-iodide (NaI) gamma scintillation detector (Model # 44-10). This equipment was used to measure radiological activity in counts per minute (cpm).

- Real-time positioning equipment designated by Chemrad as the Ultrasonic Ranging and Data System (USRADS 2200 Ultrasonic system).

- Radio frequency (RF) communications which were utilized for system timing and data transfer.

- A portable computer system that was used in the field to receive, display, store, and reduce data.

For consistency, the baseline for the radiation survey was established at the common large chain link fence that is located on the property boundary separating the former Sylvania Electric Products facility and the Cantiague Park golf driving range. The same reference 0,0 point, consisting of the fence pole located at the northeast corner of the Gilbert Display property, was utilized for both the radiation as well as the GPR survey.

To position the radiation detector in space, The USRADS system uses a series of stationary receivers and RF transmitters to establish the location of recorded detector readings which are displayed in real-time on a lap top computer. Because they are real-time, the exact location as well as the extent of elevated radiation readings can be readily confirmed in the field. In addition, graphic illustrations of the survey can be produced at any time during the survey for further evaluation. Such illustrations have been designated by Chemrad as NavTracMaps. The NavTracMaps show the path taken by the surveyor as a series of small, color coded dots. For locations with data exceeding a selected threshold value, the surveyor's position is indicated by larger color-filled circles on the NavTracMap. NavTracMaps are presented in Appendix C.

The survey was performed by two individuals. The "surveyor" performed the actual walkover wearing a backpack containing the radiological detection instrumentation and positioning equipment (the "Back Pack") and

the "operator" who operated a mobile base station consisting of a host microcomputer and a master controller. The "surveyor" performed transects at a rate of 2 ft/sec along traverses that were approximately 3 feet apart. Radiation readings were taken at a relatively constant position approximately 1 to 1.5 inches above the ground surface. The radiological and positional data collected by the Data Pack were transmitted to the base station Master Controller via a radio frequency (RF) link each second. The location and corresponding data value was plotted on a NavTrac grid map displayed on the host computer. Once proper survey coverage was accomplished, the operator ran the data reduction routines on the microcomputer. Several software routines enable the operator to review coverage and identify anomalies, missed areas, or other points of interest which were resurveyed, as appropriate.

The radiation instrumentation was calibrated using a Cesium-137 NIST traceable source. Calibrations were coordinated by Chemrad and the NYSDEC, as applicable. Records are retained by Chemrad and the NYSDEC. Each radiation survey instrument received a daily response check prior to use in the field and at the end of the survey day. This daily response check included battery checks, background checks and a source check. Daily response checks were performed at the GTEOSI site using a Cs 137 source for the NaI probe. Consistent with standard practice the instruments were maintained within ± 20% for the duration of the survey..

2.2.2. Radiation survey results

The exterior radiation survey results are illustrated on the NavTracMaps developed during each survey is included as Appendix C and discussed below. Chemrad's Final Radiological Characterization Report dated February 1998 is included as Exhibit 1. Background radiation readings varied for each property surveyed as discussed below. Variation is normal and is attributed to location, whether the survey was done in an area of exposed surface soils, and in response to different NaI detectors.

Cantiague Park Golf Driving Range

The Cantiague Park golf driving range survey was conducted along the east of the common fence that separates the former Sylvania Electric Products Facility and the driving range on Wednesday, November 17, 1997. Background radiation readings ranged between 8600 cpm and 9900 cpm. Background readings at the NYSDEC background sample location adjacent to the Cantiague Park exit road ranged between 7600 cpm and 8000 cpm.

Locations of above background radiation on the Cantiague Park golf driving range property were:

- A 15 ft by 10 ft area located at the southeastern corner of the Gilbert Displays property H as shown at the 150 ft point on the NavTrackMap (Appendix C). ere, radiation readings ranged between 1.5 and 2 times background.

- A 10 ft by 10 ft area located between fence poles 31 and 32, at a distance of 305 ft to 315 ft as indicated on the NavTrackMap.

Gilbert Displays Property

The Gilbert Displays property survey was conducted in the back parking (east side) and the south-side parking area and driveway. Background radiation readings ranged from approximately 6800 cpm to 8800 cpm. Slightly elevated radiation readings were noted in the following locations:

- a 100 ft x 20 ft area (point 11 on NavTrackMap -Appendix C) adjacent to the back of Gilbert Displays building. This area exhibited readings approximately 1.5 times background. The radiation readings may be related to the building construction materials, however, this should be further evaluated with subsurface sample collection.

- a 20 ft x 80 ft area at the southeast corner of the property. In terms of radiation, this area can be divided into subareas one of which is 10 ft x 40 ft (coded in yellow) where radiation levels were twice background and another which is 30 x 10 ft (coded in red) at the property boundary where levels were recorded >2.5 times background. Radiation levels at the property boundary were approximately 5 times background.

MDI Property

The MDI property survey was conducted in the side parking (south side) area and the east-side parking area which borders the Cantiague Park driving range property. The background radiation reading on December 6, 1997 was 6165 cpm and on February 7, 1998 was 2000 cpm. Above background levels of radiation were noted at the following locations:

- An approximate 5 ft diameter area located in the south-side parking area 104 ft west of fence corner post and 33 ft north of the fence-line that

separates MDI and Air Techniques. The location is shown at the -250 ft point on the NavTrackMap. The area exhibited readings of 1.5 to 2 times above background.

- The two northernmost blacktopped entrance ramps located in the east-side parking area as shown between the -100 and -150 ft point on the NavTrackMap. Readings in these areas were about twice background.

- The corner of the MDI/Gilbert Displays property line between fence poles 17 and 18 exhibited consistent readings about 3 times background. The location is shown at the (0,150 ft) location on the NavTrackMap.

- An approximate 20 ft diameter area located 18 ft west of pole 30 exhibited readings up to 4 times background as shown offset from the 300 ft point on the NavTrackMap.

- An area approximately 27 ft west of poles 40 and 41 exhibited readings up to 1.5 times background. The location is shown offset from the 400 ft point on the NavTrackMap..

Air Techniques Property

The Air Techniques property survey was conducted in the back parking (east side) area and the north-side parking area on Tuesday, November 17, 1997. Background radiation readings ranged between 5000 cpm and 6500 cpm. Locations of above background levels of radiation identified during the survey include:

- A localized area 20 ft from the northeast corner of building shown about at the (500,-100) location on the NavTrackMap. The location was about the diameter of a quarter and exhibited readings greater than 3 times background.

- A 20 ft x 20 ft area located at the eastern edge of the north parking area as shown offset from the -150 ft point on the NavTrackMap. This area exhibited readings approximately 3 times background. The center of this area (approximately 1 ft in diameter), however, exhibited readings 50 times background at 0.5 ft above ground surface and 100 times background approximately 1 cm above the ground surface. The detector responses suggest a near surface point source.

- Four additional areas where readings were approximately twice background. The four areas are depicted on the NavTrackMap as four

blue areas. The geometry of the first two areas coincided with areas where the asphalt parking lot was patched. The third area covered was 20 ft x 40 ft and located in the eastern parking lot about 5 ft from the fence line with MDI. The fourth area was located at the western end on the north parking lot between a subsurface concrete vault and the Air Techniques building.

2.2.3. Radiation survey summary

Several areas of above background levels of radiation were encountered during the radiation survey:

- two on the Cantiague Park golf course driving range,
- two on the Gilbert Displays' property,
- six on Magazine Distributors Inc, and
- six on Air Techniques, Inc.

For the most part the above background readings were twice background or less. A very localized area approximately 1 ft in diameter at the eastern edge of the Air Techniques north parking area exhibited readings 50 times background. As presented in the following section, further evaluation of each of the above background areas is proposed.

Although at the writing of this memorandum the NYSDEC portion of the radiation survey is considered preliminary , the data collected is suitable for proposing the locations for further investigation.

3. Recommendations

In consideration of the results of the GPR and exterior radiation surveys, invasive surface and subsurface sampling activities are proposed at the locations illustrated on Figure 10 and as described below. The described locations designate biased sampling locations. The soil boring program presented in the 4/97 Work Plan and previously reviewed by NYSDEC, the NYS Department of Health, and Nassau County has been revised to incorporate the recommended soil boring locations. The boring numbers and locations are presented below.

Gilbert Displays Property

1 to 3- located along the axis of Recharge Basin #3. One boring will be advanced at the southern end of the recharge basin to evaluate the area where GPR reflectors were observed between 6 ft and 8 ft bls.

4 & 5 - located adjacent to and on the east side of the Gilbert Displays building to evaluate the general area where radiation readings were 1.5 times background.

6 to 9 - located at the southeast corner of the property. Borings 6 & 7 will be located in the 10 ft x 40 ft area were radiation readings were 2 times background and borings 8 & 9 will be located in the 10 ft x 30 ft area where readings ranged from 2.5 to 5 times background.

10 - located in the vicinity of the former metals storage tank.

11 - the former leaching pool location along the Gilbert Display/MDI property line.

MDI Property

12 -the former leaching pool location along the Gilbert Display/MDI property line.

13 & 14 - located at the corner of the MDI/Gilbert Displays property line between poles 17 and 18 where radiation readings were about 3 times background.

15 & 16 - located along the fence-line adjacent to poles 30 and 31 where elevated radiation readings were observed on both sides of the fence.

17 - located in the approximate 20 ft diameter area located 18 ft west of pole 30 that exhibited readings up to 4 times background.

18 & 19 - located along the axis of the former reservoir location.

20 & 21 - one boring each located on the two northernmost ramps adjacent to the MDI building.

22 - located in the area approximately 27 ft west of poles 40 and 41 that exhibited radiation readings up to 1.5 times background.

23 to 25 - located along the axis of former Recharge Basin #2

26 to 28 - located along the axis of former Recharge Basin #1

29 - located in the south-side parking area which exhibited radiation readings of 1.5 to 2 times above background.

30 to 38 - located at various historical leaching pool locations along the south side of the MDI Building.

Air Techniques

39 - area located 20 ft from northeast corner of building which exhibited readings greater than 3 times background.

40 - 20 ft x 20 ft area located at the eastern edge of the north parking area that exhibited readings greater than 3 times background. In addition, the center of this area exhibited readings up to 50 times background at 0.5 ft above ground surface.

41 & 42 - located in the northern portion of former Recharge Basin #4 and in the vicinity of an asphalt patch where radiation readings were about 2 x background.

43 & 44 - locations will correspond to two areas with radiation readings approximately 2 times background. Boring 43 is located in a 20 ft x 40 ft area and is located in the eastern parking lot about 5 ft from the fence line with MDI. Boring 44 is located in the vicinity of a storm water drain.

45 - is located where a possible man-made GPR reflector was observed north of the former gas storage shed # 11.

46 & 47 - are located at the northwest corner of the Air Techniques building where elevated radiation readings were observed between the building and a subsurface concrete vault.

48 - is located at the former location of the electric transformer yard.

Cantiague Park Golf Driving Range

53 to 59 - will be located adjacent to the fence line so as to focus on a 15 ft by 10 ft area located at the southeastern corner of the Gilbert Displays property and the area located between poles 31 and 32.

Others

49 &50 - will be located west of the Air Techniques facility to provide an assessment of conditions in this vicinity.

51 & 52 - will be located in the access drive south of Gilbert Displays to provide an assessment of conditions in this vicinity.

Based on the results of these initial soil borings, up to 20 additional soil borings may be completed to further evaluate the nature and extent of former process residuals, if required. Soil borings will be completed in accordance with the methodology presented in the Work Plan.

Former Sylvania Electric Products Incorporated Facility
Hicksville, NY
Voluntary Cleanup Program
Site No. V000089-1

GROUNDWATER INTERPRETATION REPORT

Volume II of II

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July 2005

4563001

Appendix A A

Appendix A
USEPA Region II Low-Flow Groundwater Sampling Protocol

STANDARD OPERATING PROCEDURE FOR LOW-STRESS (Low Flow) / MINIMAL DRAWDOWN GROUND-WATER SAMPLE COLLECTION

INTRODUCTION

The collection of "representative" water samples from wells is neither straightforward nor easily accomplished. Ground-water sample collection can be a source of variability through differences in sample personnel and their individual sampling procedures, the equipment used, and ambient temporal variability in subsurface and environmental conditions. Many site inspections and remedial investigations require the sampling at ground-water monitoring wells within a defined criterion of data confidence or data quality, which necessitates that the personnel collecting the samples are trained and aware of proper sample-collection procedures.

The purpose of this standard operating procedure (SOP) is to provide a method which minimize the amount of impact the purging process has on the ground water chemistry during sample collection and to minimize the volume of water that is being purged and disposed. This will take place by placing the pump intake within the screen interval and by keeping the drawdown at a minimal level (0.33 feet) (Puls and Barcelona, 1996) until the water quality parameters have stabilized and sample collection is complete. The flow rate at which the pump will be operating will be depended upon both hydraulic conductivity of the aquifer and the drawdown with the goal of minimizing the drawdown. The flow rate from the pump during purging and sampling will be at a rate that will not compromise the integrity of the analyte that is being sampled. This sampling procedure may or may not provide a discrete ground water sample at the location of the pump intake. The flow of ground-water to the pump intake will be dependent on the distribution of the hydraulic conductivity (K) of the aquifer within the screen interval. In order to minimize the drawdown in the monitoring well a low-flow rate must be utilized. Low-flow refers to the velocity with which water enters the pump intake from the surrounding formation in the

immediate vicinity of the well screen. It does not necessarily refer to the flow rate of water discharged at the surface, which can be affected by flow regulators or restrictions (Puls and Barcelona, 1996). This SOP was developed by the Superfund/RCRA Ground Water Forum and draws from an USEPA's Ground Water Issue Paper, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedure, by Robert W. Puls and Michael J. Barcelona. Also, available USEPA Regional SOPs regarding Low-Stress(Low Flow)Purging and Sampling were used for this SOP.

SCOPE AND APPLICATION

This SOP should be used primarily at monitoring wells which have a screen or an open interval with a length of ten feet or less and can accept a sampling device which minimizes the disturbance to the aquifer or the water column in the well casing. The screen or open interval should have been optimally located to intercept an existing contaminant plume(s) or along flowpaths of potential contaminant releases. Knowledge of the contaminant distribution within the screen interval is highly recommended and is essential for the success of this sampling procedure. The ground-water samples which are collected using this procedure are acceptable for the analyses of ground-water contaminants which may be found at Superfund and RCRA contamination sites. The analytes may be volatile, semi-volatile organic compounds, pesticides, PCBs, metals and other inorganic compounds. The screened interval should be located within the contaminant plume(s) and the pump intake should be placed at or near the known source of the contamination within the screened interval. It is critical to place the pump intake in the exact location or depth for each sampling event. This argues for the use of dedicated, permanently installed sampling devices whenever possible. If this is not possible then the placement of the pump intake should be positioned with a calibrated sampling pump hose sounded with a weighted-tape or using a pre-measured hose. The pump intake should not be placed near the bottom of the screened interval to avoid disturbing any sediment that may have settled at the bottom of the well.

Water-quality indicator parameters and water levels must be measured during purging, prior to sample collection. Stabilization of the water quality parameters as well as

monitoring water levels are a prerequisite to sample collection. The water-quality indicator parameters which are recommended include the following: specific electrical conductance, dissolved oxygen, turbidity, oxidation-reduction potential, pH, and temperature. The latter two parameters are useful data, but are generally insensitive as purging parameters. Oxidation-reduction potential may not always be appropriate stabilization parameter, and will depend on site-specific conditions. However, readings should be recorded because of its value as a double check for oxidation conditions, and for fate and transport issues. Also, when samples are collected for metals, semi-volatile organic compounds, and pesticides every effort must be made to reduce turbidity to 10 NTUs or less (not just the stabilization of turbidity) prior to the collection of the water sample. In addition to the measurement of the above parameters, depth to water must be measured during purging (U.S. Environmental Protection Agency, 1995).

Proper well construction, development and maintenance are essential for any ground-water sampling procedure. Prior to conducting the field work, information on the construction of the well and well development should be obtained and that information factored into the site specific sampling procedure. The attached Sampling Checklist is an example of the type of information that is useful.

Stabilization of the water-quality indicator parameters is the criterion for sample collection. But if stabilization is not occurring and the procedure has been strictly followed, then sample collection can take place once three (minimum) to six (maximum) casing volumes have been removed (Schuller et al., 1981 and U.S. Environmental Protection Agency., 1986; Wilde et al., 1998; Gibs and Imbrigiotta., 1990). The specific information on what took place during purging must be recorded in the field notebook or in the ground-water sampling log.

This SOP is not to be used where non-aqueous phase liquids (immiscible fluids) are present in the monitoring well.

EQUIPMENT

- Depth-to-water measuring device - An electronic water-level indicator or steel tape and chalk, with marked intervals of

0.01 foot. Interface probe for determination of liquid products (NAPL) presence, if needed.

- Steel tape and weight - Used for measuring total depth of well. Lead weight should not be used.
- Sampling pump - Submersible or bladder pumps with adjustable rate controls are preferred. Pumps are to be constructed of inert materials, such as stainless steel and teflon®. Pump types that are acceptable include gear and helical driven, centrifugal (low-flow type) and air-activated piston. Adjustable rate, peristaltic pump can be used when the depth to water is 20 feet or less.
- Tubing - Teflon® or Teflon® lined polyethylene tubing is preferred when sampling for organic compounds. Polyethylene tubing can be used when sampling inorganics.
- Power Source - If a combustion type (gasoline or diesel-driven) generator is used, it must be placed downwind of the sampling area.
- Flow measurement supplies - flow meter, graduated cylinder and a stop watch.
- Multi-Parameter meter with flow-through-cell - This can be one instrument or more contained in a flow-through cell. The water-quality indicator parameters which must be monitored are pH, ORP/EH, dissolved oxygen (DO), turbidity, specific conductance, and temperature. Turbidity readings must be collected before the flow cell because of the potential for sediment buildup which can bias the turbidity measurements. Calibration fluids for all instruments should be NIST-traceable and there should be enough for daily calibration through-out the sampling event. The inlet of the flow cell must be located near the bottom of the flow cell and the outlet near the top. The size of the flow cell should be kept to a minimum and a closed cell is preferred. The flow cell must not contain any air or gas bubbles when monitoring for the water-quality indicator parameters.
- Decontamination Supplies - Including a reliable and documented source of distilled water and any solvents (if used). Pressure sprayers, buckets or decontamination tubes for pumps, brushes and non-phosphate soap will also be needed.
- Sample bottles, sample preservation supplies, sample tags or labels and chain of custody forms.
- Approved Field Sampling and Quality Assurance Project Plan.
- Well construction data, field and water quality data from the previous sampling event.
- Well keys and map of well locations.

- Field notebook, ground-water sampling logs and calculator. A suggested field data sheet (ground-water sampling record or ground-water sampling log) are provided in the attachment.
- Filtration equipment, if needed. An in-line disposable filter is recommended.
- Polyethylene sheeting which will be placed on ground around the well head.
- Personal protective equipment specified in the site Health and Safety Plan.
- Air monitoring equipment as specified in the Site Health and Safety Plan.
- Tool box - All needed tools for all site equipment used.
- A 55-gallon drum or container to contain the purged water.

Materials of construction of the sampling equipment (bladders, pumps, tubing, and other equipment that comes in contact with the sample) should be limited to stainless steel, Teflon®, glass and other inert material. This will reduce the chance of the sampling materials to alter the ground-water where concentrations of the site contaminants are expected to be near the detection limits. The sample tubing diameter thickness should be maximized and the tubing length should be minimized so that the loss of contaminants into and through the tubing walls may be reduced and the rate of stabilization of ground-water parameters is maximized. The tendency of organics to sorb into and out of material makes the appropriate selection of sample tubing material critical for trace analyses (Pohlmann and Alduino, 1992; Parker and Ranney, 1998).

PURGING AND SAMPLING PROCEDURES

The following describes the purging and sampling procedures for the Low-Stress (Low Flow)/ Minimal Drawdown method for the collection of ground-water samples. These procedures also describe steps for dedicated and non-dedicated systems.

Pre-Sampling Activities (Non-dedicated and dedicated system)

1. Sampling locations must begin at the monitoring well with the least contamination, generally up-gradient or furthest from the site or suspected source. Then proceed systematically to the monitoring wells with the most contaminated ground water.

2. Check and record the condition of the monitoring well for damage or evidence of tampering. Lay out polyethylene sheeting around the well to minimize the likelihood of contamination of sampling/purging equipment from the soil. Place monitoring, purging and sampling equipment on the sheeting.

3. Unlock well head. Record location, time, date and appropriate information in a field logbook or on the ground-water sampling log (See attached ground-water sampling record and ground-water sampling log as examples).

4. Remove inner casing cap.

5. Monitor the headspace of the monitoring well at the rim of the casing for volatile organic compounds (VOC) with a Photo-ionization detector (PID) or Flame ionization detector (FID), and record in the logbook. If the existing monitoring well has a history of positive readings of the headspace, then the sampling must be conducted in accordance with the Health and Safety Plan.

6. Measure the depth to water (water level must be measured to nearest 0.01 feet) relative to a reference measuring point on the well casing with an electronic water level indicator or steel tape and record in logbook or ground-water sampling log. If no reference point is found, measure relative to the top of the inner casing, then mark that reference point and note that location in the field logbook. Record information on depth to ground water in the field logbook or ground water sampling log. Measure the depth to water a second time to confirm initial measurement; measurement should agree within 0.01 feet or re-measure.

7. Check the available well information or field information for the total depth of the monitoring well. Use the information from the depth of water in step six and the total depth of the monitoring well to calculate the volume of the water in the monitoring well or the volume of one casing. Record information in field logbook or ground-water sampling log.

Purging and Sampling Activities

8A. Non-dedicated system - Place the pump and support equipment at the wellhead and slowly lower the pump and tubing down into the monitoring well until the location of the pump intake is set

at a pre-determined location within the screen interval. The placement of the pump intake should be positioned with a calibrated sampling pump hose, sounded with a weighted-tape, or using a pre-measured hose. Refer to the available monitoring well information to determine the depth and length of the screen interval. Measure the depth of the pump intake while lowering the pump into location. Record pump location in field logbook or groundwater sampling log.

8B. Dedicated system - Pump has already been installed, refer to the available monitoring well information and record the depth of the pump intake in the field logbook or ground-water sampling log.

9. Non-dedicated system and dedicated system - Measure the water level (water level must be measured to nearest 0.01 feet) and record information on the ground-water sampling log, leave water level indicator probe in the monitoring well.

10. Non-dedicated and dedicated system - Connect the discharge line from the pump to a flow-through cell. A "T" connection is needed prior to the flow cell to allow for the collection of water for the turbidity measurements. The discharge line from the flow-through cell must be directed to a container to contain the purge water during the purging and sampling of the monitoring well.

11. Non-dedicated and dedicated system - Start pumping the well at a low flow rate (0.2 to 0.5 liter per minute) and slowly increase the speed. Check water level. Maintain a steady flow rate while maintaining a drawdown of less than 0.33 feet (Puls and Barcelona, 1996). If drawdown is greater than 0.33 feet lower the flow rate. 0.33 feet is a goal to help guide with the flow rate adjustment. It should be noted that this goal may be difficult to achieve under some circumstances due to geologic heterogeneities within the screened interval, and may require adjustment based on site-specific conditions and personal experience (Puls and Barcelona, 1996).

12. Non-dedicated and dedicated system - Measure the discharge rate of the pump with a graduated cylinder and a stop watch. Also, measure the water level and record both flow rate and water level on the groundwater sampling log. Continue purging, monitor and record water level and pump rate every three to five minutes during purging. Pumping rates should be kept at minimal flow to

ensure minimal drawdown in the monitoring well.

13. Non-dedicated and dedicated system - During the purging, a minimum of one tubing volume (including the volume of water in the pump and flow cell) must be purged prior to recording the water-quality indicator parameters. Then monitor and record the water-quality indicator parameters every three to five minutes. The water-quality indicator field parameters are turbidity, dissolved oxygen, specific electrical conductance, pH, redox-potential and temperature. Oxidation-reduction potential may not always be an appropriate stabilization parameter, and will depend on site-specific conditions. However, readings should be recorded because of its value as a double check for oxidizing conditions. Also, for the final dissolved oxygen measurement, if the readings are less than 1 milligram per liter, it should be collected and analyze with the spectrophotometric method (Wilde et al., 1998 Wilkin et al., 2001), colorimetric or Winkler titration (Wilkin et al., 2001). The stabilization criterion is based on three successive readings of the water quality field parameters; the following are the criteria which must be used:

Parameter	**Stabilization Criteria**	**Reference**
pH	± 0.1 pH units	Puls and Barcelona, 1996; Wilde et al.,
Specific electrical conductance (SEC)	± 3% μS/cm	Puls and Barcelona, 1996
oxidation-reduction potential (ORP)	± 10 millivolts	Puls and Barcelona 1996
turbidity	± 10 % NTUs (when turbidity is greater than 10 NTUs)	Puls and Barcelona, 1996 Wilde et al., 1998
dissolved oxygen	± 0.3 milligrams per liter	Wilde et al., 1998

Once the criteria have been successfully met indicating that the water quality indicator parameters have stabilized, then sample collection can take place.

14. If a stabilized drawdown in the well can't be maintained at 0.33 feet and the water level is approaching the top of the screened interval, reduce the flow rate or turn the pump off (for 15 minutes) and allow for recovery. It should be noted whether or not the pump has a check valve. A check valve is required if the pump is shut off. Under no circumstances should the well be

pumped dry. Begin pumping at a lower flow rate, if the water draws-down to the top of the screened interval again turn pump off and allow for recovery. If two tubing volumes (including the volume of water in the pump and flow cell) have been removed during purging then sampling can proceed next time the pump is turned on. This information should be noted in the field notebook or ground-water sampling log with a recommendation for a different purging and sampling procedure.

15. Non-dedicated and dedicated system - Maintain the same pumping rate or reduce slightly for sampling (0.2 to 0.5 liter per minute) in order to minimize disturbance of the water column. Samples should be collected directly from the discharge port of the pump tubing prior to passing through the flow-through cell. Disconnect the pump's tubing from the flow-through-cell so that the samples are collected from the pump's discharge tubing. For samples collected for dissolved gases or Volatile Organic Compounds (VOCs) analyses, the pump's tubing needs to be completely full of ground water to prevent the ground water from being aerated as the ground water flows through the tubing. The sequence of the samples is immaterial unless filtered (dissolved) samples are collected and they must be collected last (Puls and Barcelona, 1996). All sample containers should be filled with minimal turbulence by allowing the ground water to flow from the tubing gently down the inside of the container. When filling the VOC samples a meniscus must be formed over the mouth of the vial to eliminate the formation of air bubbles and head space prior to capping. In the event that the ground water is turbid, (greater then 10 NTUs), a filtered metal (dissolved) sample also should be collected.

If filtered metal sample is to be collected, then an in-line filter is fitted at the end of the discharge tubing and the sample is collected after the filter. The in-line filter must be pre-rinsed following manufacturer's recommendations and if there are no recommendations for rinsing, a minimum of 0.5 to 1 liter of ground water from the monitoring well must pass through the filter prior to sampling.

16A. Non-dedicated system - Remove the pump from the monitoring well. Decontaminate the pump and dispose of the tubing if it is non-dedicated.

16B Dedicated system - Disconnect the tubing that extends from the plate at the wellhead (or cap) and discard after use.

17. Non-dedicated system - Before locking the monitoring well, measure and record the well depth (to 0.1 feet).
Measure the total depth a second time to confirm initial measurement; measurement should agree within 0.01 feet or re-measure.

18. Non-dedicated and dedicated system - Close and lock the well.

DECONTAMINATION PROCEDURES

Decontamination procedures for the water level meter and the water quality field parameter sensors.
The electronic water level indicator probe/steel tape and the water-quality field parameter sensors will be decontaminated by the following procedures:
1. The water level meter will be hand washed with phosphate free detergent and a scrubber, then thoroughly rinsed with distilled water.

2. Water quality field parameter sensors and flow-through cell will be rinsed with distilled water between sampling locations. No other decontamination procedures are necessary or recommended for these probes since they are sensitive. After the sampling event, the flow cell and sensors must be cleaned and maintained per the manufacturer's requirements.

Decontamination Procedure for the Sampling Pump

Upon completion of the ground water sample collection the sampling pump must be properly decontaminated between monitoring wells. The pump and discharge line including support cable and electrical wires which were in contact with the ground water in the well casing must be decontaminated by the following procedure:

1. The outside of the pump, tubing, support cable and electrical wires must be pressured sprayed with soapy water, tap water and distilled water. Spray outside of tubing and pump until water is flowing off of tubing after each rinse. Use bristle brush to help remove visible dirt and contaminants.
2.Place the sampling pump in a bucket or in a short PVC casing (4-in. diameter) with one end capped. The pump placed in this device must be completely submerged in the water. A small amount of phosphate free detergent must be added to the potable water

(tap water).
3. Remove the pump from the bucket or 4-in. casing and scrub the outside of the pump housing and cable.
4. Place pump and discharge line back in the 4-in. casing or bucket, start pump and re-circulate this soapy water for 2 minutes (wash).
5. Re-direct discharge line to a 55-gallon drum, continue to add 5 gallons of potable water (tap water)or until soapy water is no longer visible.
6. Turn pump off and place pump into a second bucket or 4-in. Casing which contains tap water, continue to add 5-gallons of tap water (rinse).
7. Turn pump off and place pump into a third bucket or 4-in. casing which contains distilled/deionized water, continue to add three to five gallons of distilled/deionized water (final rinse).
8. If a hydrophobic contaminant is present (such as separate phase, high levels of PCB's, etc.) An additional decon step, or steps, may be added. For example, an organic solvent, such as reagent-grade isopropanol alcool may be added as a first spraying/bucket prior to the soapy water rinse/bucket.

FIELD QUALITY CONTROL

Quality control (QC) samples must be collected to verify that sample collection and handling procedures were performed adequately and that they have not compromised the quality of the ground water samples. The appropriate EPA program guidance must be consulted in preparing the field QC sample requirements for the site-specific Quality Assurance Project Plan (QAPP).

There are five primary areas of concern for quality assurance (QA) in the collection of representative ground-water samples:

1. Obtaining a ground-water sample that is representative of the aquifer or zone of interest in the aquifer. Verification is based on the field log documenting that the field water-quality parameters stabilized during the purging of the well, prior to sample collection.
2. Ensuring that the purging and sampling devices are made of materials, and utilized in a manner, which will not interact with or alter the analyses.
3. Ensuring that results generated by these procedures are reproducible; therefore, the sampling scheme should incorporate co-located samples (duplicates).

4. Preventing cross-contamination. Sampling should proceed from least to most contaminated wells, if known. Field equipment blanks should be incorporated for all sampling and purging equipment, and decontamination of the equipment is therefore required.
5. Properly preserving, packaging, and shipping samples.

All field quality control samples must be prepared the same as regular investigation samples with regard to sample volume, containers, and preservation. The chain of custody procedures for the QC samples will be identical to the field ground water samples. The following are quality control samples which must be collected during the sampling event:

Sample Type	Frequency
• Field duplicates	1 per 20 samples
• Matrix spike	1 per 20 samples
• Matrix spike duplicate	1 per 20 samples
• Equipment blank	Per Regional requirements or policy
• Trip blank (VOCs)	1 per sample cooler
• Temperature blank	1 per sample cooler

HEALTH AND SAFETY CONSIDERATIONS

Depending on the site-specific contaminants, various protective programs must be implemented prior to sampling the first well. The site Health and Safety Plan should be reviewed with specific emphasis placed on the protection program planned for the sampling tasks. Standard safe operating practices should be followed, such as minimizing contact with potential contaminants in both the liquid and vapor phase through the use of appropriate personal protective equipment.

Depending on the type of contaminants expected or determined in previous sampling efforts, the following safe work practices will be employed:

Particulate or metals contaminants

1. Avoid skin contact with, and incidental ingestion of, purge water.
2. Use protective gloves and splash protection.

Volatile organic contaminants

1. Avoid breathing constituents venting from well.
2. Pre-survey the well head space with an appropriate device as specified in the Site Health and Safety Plan.
3. If monitoring results indicate elevated organic constituents, sampling activities may be conducted in level C protection. At a minimum, skin protection will be afforded by disposable protective clothing, such as Tyvek®.

General, common practices should include avoiding skin contact with water from preserved sample bottles, as this water will have pH less than 2 or greater than 10. Also, when filling pre-acidified VOA bottles, hydrochloric acid fumes may be released and should not be inhaled.

POST-SAMPLING ACTIVITIES

Several activities need to be completed and documented once ground-water sampling has been completed. These activities include, but are not limited to:

1. Ensure that all field equipment has been decontaminated and returned to proper storage location. Once the individual field equipment has been decontaminated, tag it with date of cleaning, site name, and name of individual responsible.
2. All sample paperwork should be processed, including copies provided to the Regional Laboratory, Sample Management Office, or other appropriate sample handling and tracking facility.
3. All field data should be complied for site records.
4. All analytical data when processed by the analytical laboratory, should be verified against field sheets to ensure all data has been returned to sampler.

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SAMPLING CHECKLIST

Well Identification:_____

Map of Site Included: Y or N
Wells Clearly Identified w/ Roads: Y or N
Well Construction Diagram Attached: Y or N

Well Construction:

Diameter of Borehole:_____ Diameter of Casing:_____
Casing Material:_____ Screen Material:_____

Screen Length:_____ Total Depth:_____

Approximate Depth to Water:_____
Maximum Well Development Pumping Rate:_____
Date of Last Well Development:_____

Previous Sampling Information:

Was the Well Sampled Previously: Y or N
(If Sampled, Fill Out Table Below)

Table of Previous Sampling Information

Parameter	Previously Sampled	Number of Times Sampled	Maximum Concentration	Notes (include previous purge rates)

Ground-Water Sampling Log

Site Name: **Well #:** **Date:**

Well Depth(Ft-BTOC[1]): **Screen Interval**(Ft):

Well Dia.: **Casing Material:** **Sampling Device:**

Pump placement(Ft from TOC[2]):

Measuring Point: **Water level (static)**(Ft):

Water level (pumping)(Ft): **Pump rate**(Liter/min):

Sampling Personnel:

Other info: (such as sample numbers, weather conditions and field notes)

Water Quality Indicator Parameters

Time	Pumping rates (L/min)	Water level (ft)	DO (mg/l)	ORP (mv)	Turb. (NTU)	SEC[3] (μS/cm)	pH	Temp. (C°)	Volume pumped (L)

Type of Sample collected:

1-casing volume was:

Total volume purged prior to sample collection:

Stabilization Criteria		
DO	±	0.3 mg/l
Turb.	±	10%
SEC	±	3%
ORP	±	10 mv
pH	±	0.1 unit

[1]BTOC-Below Top of Casing
[2]TOC-Top of Casing
[3]Specific electrical conductance

MALCOLM PIRNIE

Appendix B B

Appendix B
Groundwater Sampling Logs

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTR

PROJECT NO.:

STAFF: Chris M & Scott M

DATE: 10/13/07

START PURGE: 1200

END PURGE: 1215

WELL NO.: MW-1

1. TOTAL CASING AND SCREEN LENGTH (FT.): 76.92

2. CASING INTERNAL DIAMETER (IN.): .66

3. WATER LEVEL BELOW TOP OF CASING (FT.): 75.54

4. VOLUME OF WATER IN CASING (GAL.): .91

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: _____ GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	.5	1.0	1.5	2.0	2.5	Sampl				
pH	6.34	6.29	6.26	6.26	6.26	6.26	6.26				
SPEC. COND. (µmhos) MS	.165	.163	.162	.160	.157	.156	.156				
TURBIDITY (NTU)	203.0	246	86.2	45.1	23.4	16.3	8.7				
TEMPERATURE (°C)	16.6	18.2	19.5	19.8	19.8	19.9	20.0				
DISSOLVED OXYGEN (mg/L)	5.40	5.43	5.44	5.53	5.63	5.64	5.65				
ORP (mV)	184	170	185	194	200	204	213				
COMMENTS: true	74.6	74.61	74.61	74.61	7.61	7.61	7.61				

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Chris M & Scott M

DATE: 10/13/02

START PURGE: 0857

END PURGE: 0930

Sample

WELL NO.: MW-2

1. TOTAL CASING AND SCREEN LENGTH (FT.): 77.30
2. CASING INTERNAL DIAMETER (IN.): .66
3. WATER LEVEL BELOW TOP OF CASING (FT.): 74.26
4. VOLUME OF WATER IN CASING (GAL.): 2.0

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: _____ GAL

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.7
pH	5.76	5.78	5.77	5.72	5.67	5.67	5.68	5.71	5.76	5.83	5.91
SPEC. COND. (µmhos) mS	.364	.361	.360	.353	.344	.342	.341	.339	.335	.332	.330
TURBIDITY (NTU)	480	559	>1000	876	292.0	234	189	135	99.5	79	55
TEMPERATURE (°C)	16.3	16.5	17.4	18.3	20.3	20.6	20.8	20.9	21.0	20.9	21.0
DISSOLVED OXYGEN (mg/L)	5.61	5.46	5.20	4.97	5.06	5.07	5.13	5.18	5.19	5.19	5.16
ORD mV	172	158	142	149	172	177	182	183	185	189	185
COMMENTS: Depth to water	74.3	74.3	74.3	74.3	74.3	74.2	74.3	74.3	74.3	74.3	74.3

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTR

PROJECT NO.:

STAFF: Chan & Scott M

DATE: 10/10/02 START PURGE: 0853

END PURGE: 0931

WELL NO.: MW-7

		WELL ID.	VOL. (GAL./FT.)
1. TOTAL CASING AND SCREEN LENGTH (FT.):	27.30	1"	0.04
		2"	0.17
2. CASING INTERNAL DIAMETER (IN.):	1.66	3"	0.38
		4"	0.66
3. WATER LEVEL BELOW TOP OF CASING (FT.):	24.26	5"	1.04
		6"	1.50
4. VOLUME OF WATER IN CASING (GAL.):	2.0	8"	2.60

#1-#3 x #2 (Gal/Ft.)

VOLUME OF 3 CASINGS: _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)											
	~~5.5~~	6.0	6.5	7.0	Sample							
pH	6.01	6.05	6.08	6.10	6.13							
SPEC. COND. (umhos/cm)	~~.328~~	.328	.327	327	327							
TURBIDITY (NTU)	45.7	37.7	36.5	34.1	30.6							
TEMPERATURE (°C)	21.0	20.9	21.0	20.9	20.9							
DISSOLVED OXYGEN (mg/L)	5.21	5.22	5.22	5.22	5.23							
ORP MV	184	183	183	183	182							
COMMENTS: Depth to wat	24.3	24.3	24.3	24.3	24.3							

Page ___ of ___

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Bob Fabian / Rob Murphy

DATE: 10-13-02

Pump GT-2

START PURGE: 09:21

END PURGE:

WELL NO.: MW-3

1. TOTAL CASING AND SCREEN LENGTH (FT.): 77.45
2. CASING INTERNAL DIAMETER (IN.): .66
3. WATER LEVEL BELOW TOP OF CASING (FT.): 73.17
4. VOLUME OF WATER IN CASING (GAL.): 2.82

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: 8.47 GAL

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0 Initial	3	6	9	SAMPLE						
pH	5.35	5.55	5.58	5.60	6.16						
SPEC. COND. (µmhos)	.116	.101	.099	.098	.100						
TURBIDITY (NTU)	754	453	107	82.6	20.0						
TEMPERATURE (°C)	16.43	17.45	17.02	17.00	18.38						
DISSOLVED OXYGEN (mg/L)	10.53	9.37	9.28	9.24	10.07						
ORP	209	189	226	240	250						
W.L.	73.17	73.27	73.3	73.27	73.21						
COMMENTS: TIME	09:21	09:26	09:31	09:34	09:45						

Running @ 208.8 Hz

URSF-[illegible] OF 3/WPL/GM

Page ___ of ___

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Bob Fabian / Rob Murphy

DATE: 10-13-02 START PURGE: 11:00

Pump GT-2 END PURGE:

WELL NO.: MW-4

1. TOTAL CASING AND SCREEN LENGTH (FT.): 76.55

2. CASING INTERNAL DIAMETER (IN.): .66

3. WATER LEVEL BELOW TOP OF CASING (FT.): 72.71

4. VOLUME OF WATER IN CASING (GAL.): 2.53

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: 7.60 GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	Initial	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	SAMPLE
pH	6.13	6.34	6.36	6.36	6.35	6.37	6.38	6.38	6.38	6.38	6.31
SPEC. COND. (µmhos) m S/cm	.104	.103	.103	.103	.102	.102	.102	.101	.101	.101	.102
TURBIDITY (NTU)	567	310	415	487	333	163	53	32.9	29.1	26.5	12.3
TEMPERATURE (°C)	17.05	16.78	16.91	17.74	17.84	17.85	17.78	17.84	17.86	17.86	17.89
DISSOLVED OXYGEN (mg/L)	10.45	9.40	8.93	8.86	8.85	8.87	8.78	8.78	8.74	8.74	9.38
ORP	202	192	174	164	169	176	189	194	197	199	223
W.L.	72.71		72.75		72.76		72.77		72.77		72.77
COMMENTS: TIME	11:00	11:06	11:08	11:10	11:11	11:13	11:15	11:17	11:19	11:21	11:25

Page ___ of ___

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: CTE

PROJECT NO.:

STAFF: Chris M & Scott M

DATE: 10/13/02

START PURGE: 1425

END PURGE: 1455

WELL NO.: MW-05

1. TOTAL CASING AND SCREEN LENGTH (FT.): 76.05
2. CASING INTERNAL DIAMETER (IN.): .66
3. WATER LEVEL BELOW TOP OF CASING (FT.): 74.14
4. VOLUME OF WATER IN CASING (GAL.): 1.26

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: _____ GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	Surge
pH	5.64	5.43	5.36	5.39	5.34	5.39	5.34	5.39	5.35	5.35	5.33
SPEC. COND. ~~(µmhos)~~ mS	.154	.152	.151	.152	.152	.153	.154	.155	.156	.156	.157
TURBIDITY (NTU)	308	510	327	210	91	51.3	36.3	25.7	14.8	11.3	9.7
TEMPERATURE (°C)	15.9	17.0	18.1	18.3	18.4	18.7	18.8	18.9	19.0	19.2	19.3
DISSOLVED OXYGEN (mg/L)	5.70	5.58	5.57	5.58	5.62	5.63	5.64	5.62	5.61	5.63	5.63
ORP (mV)	257	240	247	254	261	268	272	276	278	279	281
COMMENTS: Depth to water	74.22	74.22	74.22	74.21	74.20	74.20	74.20	74.20	74.20	74.21	74.21

URSF-021/B OF 2/WPL/DM

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTR

PROJECT NO.:

STAFF: Chris M & Scott M

DATE: 10/13/02

START PURGE: 1020

END PURGE: 1115

WELL NO.: MW-6

		WELL ID.	VOL. (GAL./FT.)
1. TOTAL CASING AND SCREEN LENGTH (FT.):	128.91	1"	0.04
		2"	0.17
2. CASING INTERNAL DIAMETER (IN.):	1.66	3"	0.38
		4"	0.66
3. WATER LEVEL BELOW TOP OF CASING (FT.):	74.32	5"	1.04
		6"	1.50
4. VOLUME OF WATER IN CASING (GAL.):	36.	8"	2.60

#1-#3 x #2 (Gal/Ft.)

VOLUME OF 3 CASINGS: _____ GAL

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	5	10	15	20	25	30	33	34	36	Sample
pH	7.79	7.48	6.85	6.57	6.40	6.32	6.29	6.27	6.28	6.29	6.31
SPEC. COND. (~~mhos~~) mS	.456	.489	.530	.525	.531	.533	.539	.543	.538	.538	.541
TURBIDITY (NTU)	363	211	32.7	4.1	4.5	7.9	4.5	3.7	3.3	3.7	4.1
TEMPERATURE (°C)	14.6	15.1	15.3	15.4	15.4	15.4	15.4	15.9	16.1	16.2	16.1
DISSOLVED OXYGEN (mg/L)	5.40	5.20	6.60	6.52	5.31	5.29	5.37	5.29	5.38	5.27	5.36
ORP (mV)	160	162	208	216	219	224	227	230	228	227	231
COMMENTS: water elev	74.32	74.42	74.42	74.42	74.42	74.42	74.42	74.42	74.42	74.42	74.42

URSF-0016 OF 3/4/2004

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Scott M / Chris M

DATE: 10/13/02

START PURGE: 1530

END PURGE: 1600

WELL NO.: MW-7

1. TOTAL CASING AND SCREEN LENGTH (FT.): 78.80

2. CASING INTERNAL DIAMETER (IN.): .66

3. WATER LEVEL BELOW TOP OF CASING (FT.): 74.91

4. VOLUME OF WATER IN CASING (GAL.): 2.6

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: _____ GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	Sample	
pH	6.13	6.11	6.13	6.14	6.14	6.15	6.17	6.17	6.18	6.18	
SPEC. COND. (µmhos) mS	.178	.177	.177	.177	.175	.176	.179	.180	.181	.183	
TURBIDITY (NTU)	115	94.4	80.3	67.1	59.2	33.0	19.1	17.9	17.6	14.2	
TEMPERATURE (°C)	16.4	16.5	16.5	16.8	17.5	17.7	17.7	17.7	17.8	17.8	
DISSOLVED OXYGEN (mg/L)	5.39	5.34	4.83	4.66	4.41	4.43	4.46	4.47	4.46	4.46	
ORP (mV)	203	204	200	197	197	200	205	206	207	208	
COMMENTS: Dept to water	75.03	75.02	75.03	75.03	75.03	75.03	75.03	75.03	75.03	75.03	

URSF-8810 OF 2/WPL/GM

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Rob Murphy / Bob Fabian

DATE: 10-13-02

Pump - Pine #3

START PURGE: 12:25

END PURGE:

WELL NO.: MW-8

1. TOTAL CASING AND SCREEN LENGTH (FT.): 130.25

2. CASING INTERNAL DIAMETER (IN.): .66

3. WATER LEVEL BELOW TOP OF CASING (FT.): 72.91

4. VOLUME OF WATER IN CASING (GAL.): 37.84

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: 113.53 GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	Initial	3	6	9	12	15	18	21	24	27	30
pH	6.92	6.48	6.43	6.42	6.40	6.42	6.41	6.42	6.42	6.42	6.42
SPEC. COND. (µmhos)	.161	.172	.171	.171	.171	.172	.172	.173	.173	.174	.173
TURBIDITY (NTU)	205	151	102	46.3	29	29.6	21	18.9	17.9	17.8	16.3
TEMPERATURE (°C)	16.09	15.24	15.34	15.36	15.36	15.35	15.35	15.35	15.35	15.34	15.35
DISSOLVED OXYGEN (mg/L)	9.68	7.70	7.87	7.87	7.84	7.85	7.82	7.81	7.81	7.80	7.79
ORP	85	85	119	149	159	168	175	179	182	186	190
W.L.	72.91	72.94	72.94	72.94	72.94	72.94	72.94	72.94	72.94	72.94	72.94
COMMENTS: TIME	12:25	12:30	12:33	12:36	12:39	12:42	12:45	12:48	12:51	12:54	12:57

Pumping @ 227.1 Hz (~ 1 gal/min)

URSF-0214 OF 8/WPL/GM

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Rob Murphy / Bob Fabian

DATE: 10-13-02

START PURGE:

END PURGE:

WELL NO.: MW-8 cont...

1. TOTAL CASING AND SCREEN LENGTH (FT.):

2. CASING INTERNAL DIAMETER (IN.):

3. WATER LEVEL BELOW TOP OF CASING (FT.):

4. VOLUME OF WATER IN CASING (GAL.):

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: _____ GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.80

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	33	36	39	SAMPLE							
pH	6.43	6.43	6.43	6.51							
SPEC. COND. (µmhos)	.173	.174	.174	.175							
TURBIDITY (NTU)	15.8	15.8	15	17.5							
TEMPERATURE (°C)	15.34	15.34	15.41	15.80							
DISSOLVED OXYGEN (mg/L)	7.79	7.77	7.75	9.54							
ORP	193	195	196	197							
W.L.	72.94	72.95	72.93	72.93							
COMMENTS: TIME	13:00	13:03	13:06	13:10							

- Took blind Dup here too

URSF-021/2 OF 3/WPL/GM

Page ___ of ___

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Bob Fabian / Rob Murphy

DATE: 10-13-02

Pump GT-2

START PURGE: 14:55

END PURGE:

WELL NO.: MW-9

1. TOTAL CASING AND SCREEN LENGTH (FT.): 85.2
2. CASING INTERNAL DIAMETER (IN.): .66
3. WATER LEVEL BELOW TOP OF CASING (FT.): 73.59
4. VOLUME OF WATER IN CASING (GAL.): 7.66
   #1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: 22.98 GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.80

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0 Initial	2	3	4	5	6	7	8	9	10	Sample
pH	6.52	5.87	5.63	5.45	5.34	5.29	5.28	5.27	5.27	5.27	5.26
SPEC. COND. (µmhos)	.061	.043	.038	.036	.035	.034	.034	.033	.034	.034	.034
TURBIDITY (NTU)	201	43.4	30.9	25.5	20.7	19.1	18.7	18.8	19.3	18.7	11
TEMPERATURE (°C)	16.00	16.22	16.37	16.46	16.51	16.54	16.56	16.56	16.55	16.55	16.84
DISSOLVED OXYGEN (mg/L)	10.55	8.40	8.76	8.99	9.04	9.00	9.01	8.97	9.00	8.98	10.25
ORP	66	132	169	195	216	231	240	244	247	250	261
W.L.	73.59	73.64	73.64	73.64	73.64	73.64	73.64	73.64	73.64	73.64	73.62
COMMENTS: TIME	14:55	13:57	14:00	14:03	14:05	14:07	14:08	14:09	14:10	14:11	14:15

URSF-021/2 OF 3/WPL/GM

Page ___ of ___

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Bob Fabian / Rob Murphy

DATE: 10-13-02 START PURGE: 14:55

Pump GT-2 END PURGE:

WELL NO.: MW-9

1. TOTAL CASING AND SCREEN LENGTH (FT.): 85.2

2. CASING INTERNAL DIAMETER (IN.): .66

3. WATER LEVEL BELOW TOP OF CASING (FT.): 73.59

4. VOLUME OF WATER IN CASING (GAL.): 7.66

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: 22.98 GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	Initial	2	3	4	5	6	7	8	9	10	Sample
pH	6.52	5.87	5.63	5.45	5.34	5.29	5.28	5.27	5.27	5.27	5.26
SPEC. COND. (µmhos)	.061	.043	.038	.036	.035	.034	.034	.033	.034	.034	.034
TURBIDITY (NTU)	201	43.4	30.9	25.5	20.7	19.1	18.7	18.8	19.3	18.7	11
TEMPERATURE (°C)	16.00	16.22	16.37	16.46	16.51	16.54	16.56	16.56	16.55	16.55	16.84
DISSOLVED OXYGEN (mg/L)	10.55	8.40	8.76	8.99	9.04	9.00	9.01	8.97	9.00	8.98	10.25
ORP	66	132	169	195	216	231	240	244	247	250	261
W.L.	73.59	73.64	73.64	73.64	73.64	73.64	73.64	73.64	73.64	73.64	73.62
COMMENTS: TIME	14:55	13:57	14:00	14:03	14:05	14:07	14:08	14:09	14:10	14:11	14:15

URSF-001/2 OF 2/WPL/GM

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Bob Fabian / Rob Murphy

DATE: 10-13-02 START PURGE: 14:54

Pine #3 END PURGE:

WELL NO.: MW-10

1. TOTAL CASING AND SCREEN LENGTH (FT.): 130.00

2. CASING INTERNAL DIAMETER (IN.): .66

3. WATER LEVEL BELOW TOP OF CASING (FT.): 73.40

4. VOLUME OF WATER IN CASING (GAL.): 37.3

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: 112 GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										SAMPLE
	~~0~~ Initial	3	6	9	15	20	~~18~~ 25	~~21~~ 30	~~24~~ 35	~~29~~ 40	~~30~~
pH	5.47	5.38	5.29	5.23	5.20	5.17	5.17	5.17	5.17	5.17	5.22
SPEC. COND. (µmhos)	.057	.060	.058	.059	.059	.060	.060	.060	.060	.061	.063
TURBIDITY (NTU)	119	54.6	36.1	28.9	21.3	17.7	16.1	15.0	14.5	14.2	15.5
TEMPERATURE (°C)	15.10	14.78	14.91	14.97	14.98	~~8.30~~ 14.98	14.98	14.98	14.98	14.99	15.56
DISSOLVED OXYGEN (mg/L)	9.73	8.38	8.37	8.32	8.28	~~14~~ RTF 8.30	8.31	8.32	8.29	8.28	9.74
ORP	226	227	251	273	284	294	300	306	309	312	307
W.L.	73.40	73.51	73.50	73.50	73.50	73.50	73.50	73.50	73.51	73.51	73.46
COMMENTS: Time	14:54	14:57	15:00	15:02	15:06	15:11	15:16	15:21	15:26	15:31	15:40

Page ___ of ___

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Chris M, Sarah

DATE: 10/13/02

START PURGE: 1350

END PURGE: 1300

WELL NO.: MW-11

1. TOTAL CASING AND SCREEN LENGTH (FT.): 79.93
2. CASING INTERNAL DIAMETER (IN.): .66
3. WATER LEVEL BELOW TOP OF CASING (FT.): 73.65
4. VOLUME OF WATER IN CASING (GAL.): 4.1

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: _____ GAL.

WELL ID.	VOL. (GAL./FT.)
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.80

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	Sample
pH	6.36	6.33	6.28	6.23	5.91	5.82	5.80	5.75	5.71	5.70	5.70
SPEC. COND. (µmhos) µS	.079	.077	.074	.072	.064	.064	.064	.064	.064	.064	.064
TURBIDITY (NTU)	122	101	89.6	80.6	47.6	46.3	41.2	39.2	35.3	34.3	34.0
TEMPERATURE (°C)	16.9	17.1	17.3	17.4	17.8	17.9	17.9	18.0	18.1	18.1	18.1
DISSOLVED OXYGEN (mg/L)	5.28	5.18	5.20	5.24	5.47	5.50	5.50	5.51	5.51	5.53	5.59
ORP (mV)	253	254	256	259	271	272	270	270	267	264	264
COMMENTS: Depth to water	73.75	73.75	73.75	73.75	73.75	73.75	73.75	73.75	73.75	73.75	73.75

WELL PURGING LOG

URS CONSULTANTS, INC.

PROJECT TITLE: GTE

PROJECT NO.:

STAFF: Bob Fabian / Rob Murphy

DATE: 10-13-02 START PURGE: 16:05

Pine #2 END PURGE:

WELL NO.: MW-12

		WELL ID.	VOL. (GAL./FT.)
1. TOTAL CASING AND SCREEN LENGTH (FT.):	129.5	1"	0.04
		2"	0.17
2. CASING INTERNAL DIAMETER (IN.):	.66	3"	0.38
		(4")	0.66
3. WATER LEVEL BELOW TOP OF CASING (FT.):	74.21	5"	1.04
		6"	1.50
4. VOLUME OF WATER IN CASING (GAL.):	36.49	8"	2.60

#1-#3 x #2 (Gal./Ft.)

VOLUME OF 3 CASINGS: 109.47 GAL

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	Initial	5	10	15	20	25	30	35	40	SAMPLE
pH	7.53	7.03	7.01	7.02	7.05	7.06	7.05	7.07	7.06	7.25
SPEC. COND. (µmhos)	.207	.224	.233	.233	.242	.245	.240	.243	.248	.248
TURBIDITY (NTU)	122	42.9	34.1	28.3	25.9	23.4	25.1	21.2	21.0	15.8
TEMPERATURE (°C)	14.45	14.02	14.07	14.10	14.15	14.15	14.17	14.15	14.32	14.85
DISSOLVED OXYGEN (mg/L)	9.78	2.46	2.65	2.73	2.88	2.99	3.03	3.20	3.35	7.02
ORP	257	209	171	120	80	67	61	56	53	82
W.L.	74.21	74.36	74.35	74.33	74.35	74.39	74.33	74.33	74.25	74.25
COMMENTS: Time	16:05	16:10	16:14	16:18	16:22	16:26	16:30	16:34	16:38	16:45

MALCOLM PIRNIE · 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER:	4563 001	DATE:	3-15-03
PROJECT NAME:	GTEOSI	SAMPLERS:	A Wood
SITE LOCATION:	Hicksville		K Hayes
SITE CONTACT:	Jean Agostinelli	WEATHER:	Fine, windy 36°F

WELL IDENTIFICATION NUMBER: MW-01 PERMIT: --

WELL HEADSPACE READING:	-	PID MODEL/LAMP:	-
DEPTH TO WATER (Before Purging):	73.77	FEET FROM TOP OF CASING	
WELL DEPTH:	77.00	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL:	- 3.23	FEET	
WATER IN ONE WELL VOLUME:	- 2.10	GALLONS	
PURGE TIME (start/finish):	1318 to 1356	PURGE RATE:	0.30 l/m
WELL EVACUATION DEVICE:	Rediflow electrosubmersible		
SAMPLING TIME (start/finish):	1400 to 1412	SAMPLE RATE:	100 ml/min for VOA
SAMPLE COLLECTION DEVICE:	Rediflow electrosubmersible		150 ml/min for Radiometals
SAMPLE APPEARANCE:	Clear clear		

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	1320	1325	1335	1340	1345	1350	1355			
pH (SU)	7.53	6.95	6.87	6.68	6.65	6.64	6.61			
specific conductivity (mS)	0.075	0.071	0.070	0.069	0.069	0.069	0.070			
turbidity (NTU's)	4	5	7	7	4	4	2			
dissolved oxygen (mg/l)	7.22	5.40	6.00	5.64	6.09	6.11	6.13			
temperature (degrees C)	12.9	13.6	14.0	14.8	20	14.9	14.9			
redox potential (mv)	223	201	174	173	174	176	176			
depth to water (feet)	73.81	73.77	73.78	73.78	73.78	73.78	73.78			
volume purged (~~gal or~~ L)	~~73.762~~ 1.5	~~73.77~~ 3.0l	6.0	7.5	9.0	10.5	12.0			

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED:	VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY:	STL St.Louis
CONTACT:	John Powel

Casing Diameter/Volume conversions	
(inches)	(gallons per foot)
2.0	0.1632
(4.0)	(0.6528)
6.0	1.4687
8.0	2.6115

NOTES: soft bottom. Windy. Open top flow through cell. Water surface subject to wind effects. Pump blockage / outages 1325 to 1335 hr. Dark to 300 ml/min at 1332 hr

MALCOLM PIRNIE 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli
DATE: 3-15-03
SAMPLERS: A Wood, K Hayes
WEATHER: Fine, windy 36°F

WELL IDENTIFICATION NUMBER: MW-02 PERMIT: -

WELL HEADSPACE READING: - 0 PID MODEL/LAMP: -
DEPTH TO WATER (Before Purging): 73.48 FEET FROM TOP OF CASING
WELL DEPTH: 79.00 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: - 5.52 FEET
WATER IN ONE WELL VOLUME: - 3.60 GALLONS
PURGE TIME (start/finish): 1125 to 1210 PURGE RATE: 0.3 l/min
WELL EVACUATION DEVICE: Rediflow electrosubmersible
SAMPLING TIME (start/finish): 1215 to 1228 SAMPLE RATE: 100ml/m for VOA. 150ml/min for others.
SAMPLE COLLECTION DEVICE: Rediflow electrosubmersible
SAMPLE APPEARANCE: Clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	1130	1135	1140	1145	1150	1155	1200	1205	1210	
pH (SU)	7.16	7.23	7.11	7.10	7.28	7.12	7.08	7.06	7.06	
specific conductivity (mS)	0.257	0.262	0.262	0.262	0.262	1261	0.261	0.259	0.259	
turbidity (NTU's)	25	31	37	35	29	21	20	18	16	
dissolved oxygen (mg/l)	10.75	10.24	9.64	10.02	9.4	2.81	3.23	3.32	3.15	
temperature (degrees C)	13.4	14.0	14.4	14.6	14.8	14.9	15.4	15.8	16.0	
redox potential (mv)	172	152	140	143	150	147	135	124	120	
depth to water (feet)	73.48	73.48	73.48	73.48	73.48	73.48	73.48	73.48	73.48	
volume purged ~~(gal or~~ L)	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions	
(inches)	(gallons per foot)
2.0	0.1632
4.0	(0.6528)
6.0	1.4687
8.0	2.6115

NOTES: soft bottom, windy conditions. Open top flow through cells. Constant aeration of water surface. Sample rate: 100ml/min VOA. 150ml/min radiochem & metals.

MALCOLM PIRNIE · 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli
DATE: 3-16-03
SAMPLERS: A Wood, K Hayes
WEATHER: fine, light breeze 45°F

WELL IDENTIFICATION NUMBER: MW 3 PERMIT: --

WELL HEADSPACE READING: - 0 PID MODEL/LAMP: -
DEPTH TO WATER (Before Purging): 72.33 FEET FROM TOP OF CASING
WELL DEPTH: 77.75 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: - 5.42 FEET
WATER IN ONE WELL VOLUME: - 3.53 GALLONS
PURGE TIME (start/finish): 0935 ~ 1030 PURGE RATE: 0.32 l/min
WELL EVACUATION DEVICE: Electrosubmersible
SAMPLING TIME (start/finish): 1032 to 1050 SAMPLE RATE: 100 ml/min VOA, 150 ml/min Rad & metals
SAMPLE COLLECTION DEVICE: Electrosubmersible
SAMPLE APPEARANCE: clear, clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	0940	0945	0950	0955	1000	1005	1015	1020	1025	1030
pH (SU)	5.86	6.31	6.45	6.51	6.53		6.63	6.63	6.63	6.64
specific conductivity (mS)	0.117	0.110	0.105	0.104	0.105		0.105	0.105	0.105	0.105
turbidity (NTU's)	7	7	9	10	10		12	10	10	10
dissolved oxygen (mg/l)	6.89	5.62	5.43	5.38	5.14		5.76	5.49	5.52	5.50
temperature (degrees C)	14.5	15.1	16.3	17.4	17.1		19.2	19.2	19.1	19.2
redox potential (mv)	238	228	210	190	190		185	182	182	180
depth to water (feet)	72.33	72.33	72.33	72.33	72.33		72.33	72.33	72.33	72.33
volume purged (gal or L)	1.6	3.2	4.8	6.4	8.0	9.6	11.2	12.8	14.4	16.0

pump stopped at 1004, 1004 to 1010 restart at 1010 hr at 9.6 l total.

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions (Inches)	(gallons per foot)
2.0	0.1632
(4.0)	(0.6528)
6.0	1.4687
8.0	2.6115

NOTES: soft bottom
Samples (MW DUP & MW3)
Sample times MW3 = 1032 hr (MW 3)
MW DUP = ~~1034 hr~~ @ 0900 hr

MALCOLM PIRNIE 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli

DATE: 3/16/03
SAMPLERS: John Trovits, Emily Mostues
WEATHER: Sunny, Slight Breeze, 45F

WELL IDENTIFICATION NUMBER: MW-4
PERMIT: --

WELL HEADSPACE READING: -
PID MODEL/LAMP: --
DEPTH TO WATER (Before Purging): 71.91 FEET FROM TOP OF CASING
WELL DEPTH: 80.00 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: - FEET
WATER IN ONE WELL VOLUME: - GALLONS
PURGE TIME (start/finish): 1108/1130
PURGE RATE: 400 ml/min
WELL EVACUATION DEVICE:
SAMPLING TIME (start/finish): 1131/1196
SAMPLE RATE: 180ml/min / 200ml/min
SAMPLE COLLECTION DEVICE: Clear
SAMPLE APPEARANCE:

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	1115	1120	1125	1130						
pH (SU)	6.30	6.31	6.33	6.33						
specific conductivity (mS)	0.125	0.125	0.126	0.126						
turbidity (NTU's)	4	10	10	10						
dissolved oxygen (mg/l)	6.76	6.16	6.95	6.89						
temperature (degrees C)	19.0	18.6	18.2	18.6						
redox potential (mv)	334	345	381	381						
depth to water (feet)	71.93	71.93	71.93	71.93						
volume purged (gal or L)	2	4	6	8						

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions (inches)	(gallons per foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687
8.0	2.6115

NOTES:

MALCOLM PIRNIE · 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli
DATE: March 18, 2003
SAMPLERS: Emily Nicholson, Jen Ifkovic
WEATHER: PClody Rain, 35°F

WELL IDENTIFICATION NUMBER: MW-5 PERMIT: --

WELL HEADSPACE READING: -- PID MODEL/LAMP: --
DEPTH TO WATER (Before Purging): 73.39 FEET FROM TOP OF CASING
WELL DEPTH: 78.00 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: -- FEET
WATER IN ONE WELL VOLUME: -- GALLONS
PURGE TIME (start/finish): 1150 / 12:58 PURGE RATE: 400 mL/min
WELL EVACUATION DEVICE:
SAMPLING TIME (start/finish): 12:52 / 13:07 SAMPLE RATE: 100 mL/min VOC, 200 mL/min Rad/metals
SAMPLE COLLECTION DEVICE:
SAMPLE APPEARANCE: clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th (2x)	8th	9th
time (00:00)	12:00	1205	12:10	12:15	1220	12:25	12:30	1235	1245	1250
pH (SU)	5.71	5.74	5.77	5.79	5.80	5.82	5.80	5.87	5.87	5.88
specific conductivity (mS)	.128	.124	.119	.117	.118	.118	.118	.119	.116	.116
turbidity (NTU's)	91	86	67	39	35	25	21	29	28	17
dissolved oxygen (mg/l)	6.15	6.72	6.79	6.56	6.39	6.21	8.45	5.98	5.70	6.08
temperature (degrees C)	14.1	145	16.3	18.1	18.6	19.1	18.8	16.4	16.3	16.8
redox potential (mv)	220	202	195	208	212	217	225	224	227	225
depth to water (feet)	73.35	73.37	73.37	73.37	73.37	73.37	73.37	73.37	73.37	73.37
volume purged (gal or L)	initial	4	6	8	10	12	14	16	20	22

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions	
(inches)	(gallons per foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687
8.0	2.6115

NOTES: Pump flow adjusted @ 1235

MALCOLM PIRNIE 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli

DATE: March 16, 2003
SAMPLERS: Emily Moshier, John Hawk
WEATHER: Sunny Slight Breeze, 4

WELL IDENTIFICATION NUMBER: MW-6 PERMIT: --

WELL HEADSPACE READING: -- PID MODEL/LAMP: --
DEPTH TO WATER (Before Purging): 73.55 FEET FROM TOP OF CASING
WELL DEPTH: 132.90 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: -- FEET
WATER IN ONE WELL VOLUME: -- GALLONS
PURGE TIME (start/finish): 0935 / 1025 PURGE RATE: 400 ml/min
WELL EVACUATION DEVICE: Grundfos Submersible w/ dedicated poly
SAMPLING TIME (start/finish): 1026 / 1040 SAMPLE RATE: 100 ml/min VOC
SAMPLE COLLECTION DEVICE: 200 ml/min
SAMPLE APPEARANCE: clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	0940	0945	0950	0955	10:00	1005	1010	1015	1020	1025
pH (SU)	6.57	.395	6.81	6.91	6.74	6.85	6.84	6.82	6.80	6.78	6.78
specific conductivity (mS)	.395	.409	.415	.437	.436	.437	.438	.439	.439	.439
turbidity (NTU's)	0	12		5	1	5	7	9	10	10
dissolved oxygen (mg/l)	5.52	7.09		7.21	6.57	6.18	6.28	6.28	6.31	6.12
temperature (degrees C)	14.8	14.6		15.5	15.7	15.8	15.8	15.9	15.9	16.0
redox potential (mv)	153	150	124	139	152	167	176	185	191	195
depth to water (feet)	73.55	73.55	73.58	73.58	73.57	73.58	73.58	73.58	73.58	73.58
volume purged (gal or L)	2	4	6	8	10	12	14	16	18	20

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions (inches)	(gallons per foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687
8.0	2.6115

NOTES: 0950 - recalibrated U10

MALCOLM PIRNIE 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli

DATE: 3-15-03
SAMPLERS: Ken Hayes, H. Wood
WEATHER: Cloudy windy 35°F

WELL IDENTIFICATION NUMBER: MW-~~9~~ 7 PERMIT: --

WELL HEADSPACE READING: - 0 PID MODEL/LAMP: --
DEPTH TO WATER (Before Purging): 74.11 FEET FROM TOP OF CASING
WELL DEPTH: 82.70 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: - 8.59 FEET
WATER IN ONE WELL VOLUME: - 5.61 GALLONS
PURGE TIME (start/finish): 0930 to 1011hr PURGE RATE: 330 ml/min
WELL EVACUATION DEVICE: Rediflow pump electrosubmersible
SAMPLING TIME (start/finish): 1012 to 1028 SAMPLE RATE: 150ml/min, VOA=100ml/min
SAMPLE COLLECTION DEVICE: Rediflow pump - electrosubmersible
SAMPLE APPEARANCE: Clear clean

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	0938	0943	0948	0953	0958	1003	1008			
pH (SU)	5.67	6.51	6.69	6.70	6.70	6.71	6.68			
specific conductivity (mS)	0.44	0.129	0.122	0.123	0.126	0.126	0.129			
turbidity (NTU's)	6	6	6	2	1	1	0			
dissolved oxygen (mg/l)	4.11	2.65	3.90	3.86	11.27	11.40	12.0			
temperature (degrees C)	12.3	12.5	13.1	14.3	14.5	14.7	14.8			
redox potential (mv)	124	138	142	145	152	154	157			
depth to water (feet)	~~74.12~~ 74.12	74.11	74.11	74.11	74.11	74.11	74.11			
volume purged (~~gal or~~ L)	2.64	4.29	5.94	7.59	9.24	10.90	12.6			

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions (inches)	(gallons per foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687
8.0	2.6115

NOTES: Soft bottom Windy conditions. Open top to Flow Through cell.

MALCOLM PIRNIE · 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli
DATE: 3-16-03
SAMPLERS: A Wood, K Hayes
WEATHER: Fine light breeze 45°F

WELL IDENTIFICATION NUMBER: MW-8 PERMIT: --

WELL HEADSPACE READING: -- PID MODEL/LAMP: --
DEPTH TO WATER (Before Purging): 72.08 FEET FROM TOP OF CASING
WELL DEPTH: 130.30 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: - 57.5 FEET
WATER IN ONE WELL VOLUME: - 37.54 GALLONS
PURGE TIME (start/finish): 1120 to 1154 PURGE RATE: 0.3 l/min
WELL EVACUATION DEVICE: Electrosubmersible
SAMPLING TIME (start/finish): 1155 to 1207 SAMPLE RATE: 100ml/min VOA, 150ml/min Radionuclides
SAMPLE COLLECTION DEVICE: electrosubmersible
SAMPLE APPEARANCE: clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	1128	1133	1138	1143	1148	1153				
pH (SU)	7.12	7.29	7.28	7.38	7.30	7.33				
specific conductivity (mS)	0.187	0.182	0.188	0.190	0.191	0.191				
turbidity (NTU's)	10	10	10	8	9	9				
dissolved oxygen (mg/l)	7.9	5.95	5.68	5.83	5.58	5.57				
temperature (degrees C)	16.9	15.8	15.9	16.3	16.2	16.2				
redox potential (mv)	181	164	150	151	149	148				
depth to water (feet)	72.08	72.08	72.08	72.08	72.08	72.08				
volume purged (~~gal or~~ L)	2.4	3.9	5.4	6.9	8.4	9.9				

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions	
(inches)	(gallons per foot)
2.0	0.1632
(4.0)	(0.6528)
6.0	1.4687
8.0	2.6115

NOTES: Sample MW8 at 1155 hr
sample rate = 100ml/min VOA, 150ml/min Rad + metals

MALCOLM PIRNIE 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli
DATE: 3/15/03
SAMPLERS: John Ilkovits, Emily Mosher
WEATHER: P.Cloudy Breezy 40s

WELL IDENTIFICATION NUMBER: MW-9 PERMIT: --

WELL HEADSPACE READING: -- PID MODEL/LAMP: --
DEPTH TO WATER (Before Purging): 72.78 FEET FROM TOP OF CASING
WELL DEPTH: 86.5 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: -- FEET
WATER IN ONE WELL VOLUME: -- GALLONS
PURGE TIME (start/finish): 1600 / 1630 PURGE RATE: 400mL/min
WELL EVACUATION DEVICE:
SAMPLING TIME (start/finish): 1632 / 1647 SAMPLE RATE: 100 ml/min VOA 300ml/min
SAMPLE COLLECTION DEVICE:
SAMPLE APPEARANCE: Clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	1605	1610	1615	1620	1625	1630				
pH (SU)	5.55	5.52	5.49	5.46	5.44	5.43				
specific conductivity (mS)	.041	0.039	.037	.036	.036	.036				
turbidity (NTU's)	0	0	0	0	1	1				
dissolved oxygen (mg/l)	7.66	7.61	7.35	7.31	7.23	6.83				
temperature (degrees C)	14.1	15.0	15.8	16.3	16.6	16.7				
redox potential (mv)	284	286	288	294	298	302				
depth to water (feet)	72.78	72.78	72.76	72.77	72.77	72.77				
volume purged (gal or L)	2/initial	4	6	8	10	12				

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions	
(inches)	(gallons per foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687
8.0	2.6115

NOTES:

PIRNIE 17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli
DATE: 3/15/03
SAMPLERS: John Iskovitz, Emily Mosher
WEATHER: P Cloudy Breezy 35°

WELL IDENTIFICATION NUMBER: MW-10
PERMIT: --

WELL HEADSPACE READING: -
PID MODEL/LAMP: -
DEPTH TO WATER (Before Purging): 72.64 FEET FROM TOP OF CASING
WELL DEPTH: 130 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: (GW 14:30) - FEET
WATER IN ONE WELL VOLUME: - GALLONS
PURGE TIME (start/finish): ~~15:30~~ / 15:17
PURGE RATE: 400 ml/min
WELL EVACUATION DEVICE:
SAMPLING TIME (start/finish): 15:18 / 15:45
SAMPLE RATE: 200/200 ml/min
SAMPLE COLLECTION DEVICE:
SAMPLE APPEARANCE: Clear

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	1435	1440	1445	1450	1455	1500	1505	1510	1515	
pH (SU)	5.46	5.25	5.24	5.24	5.26	5.27	5.29	5.29	5.30	
specific conductivity (mS)	.073	.109	.113	.112	.109	.107	.107	.106	.107	
turbidity (NTU's)	0	0	0	0	0	0	0	0	0	
dissolved oxygen (mg/l)	5.00	5.85	5.84	5.65	5.65	5.72	5.67	5.64	5.72	
temperature (degrees C)	14.2	15.2	15.6	15.8	15.8	15.9	15.8	15.9	15.8	
redox potential (mv)	267	233	244	263	273	278	283	283	284	
depth to water (feet)	72.64	72.64	72.64	72.64	72.64	72.64	72.64	72.64	72.64	
volume purged (gal or (L))	2L	4	6	8	10	12	14	16	18	

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions	
(Inches)	(gallons per foot)
2.0	0.1632
4.0	0.6528
6.0	1.4687
8.0	2.6115

NOTES: MS/MSD Triple volume

MALCOLM PIRNIE

17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER: 4563 001
PROJECT NAME: GTEOSI
SITE LOCATION: Hicksville
SITE CONTACT: Jean Agostinelli
DATE: 3-15-03
SAMPLERS: A. Wood, M. Hayes
WEATHER: Fine Windy 36°F

WELL IDENTIFICATION NUMBER: MW-11
PERMIT: --

WELL HEADSPACE READING: - 0
PID MODEL/LAMP: -
DEPTH TO WATER (Before Purging): 72.90 FEET FROM TOP OF CASING
WELL DEPTH: 80.25 FEET FROM TOP OF CASING
HEIGHT OF WATER IN WELL: - 7.30 FEET
WATER IN ONE WELL VOLUME: - 4.57 GALLONS
PURGE TIME (start/finish): 1538 to 1619
PURGE RATE: 0.3 l/min
WELL EVACUATION DEVICE: RediFlow electrosubmersible
SAMPLING TIME (start/finish): 1622 to 1638
SAMPLE RATE: 100 ml/min VOA, 150 ml/min Rad+Metals
SAMPLE COLLECTION DEVICE: RediFlow electrosubmersible
SAMPLE APPEARANCE: clear, clean

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	1544 1444	1549	1554	1559	1604	1609	1614	1619		
pH (SU)	7.10	6.80	6.78	6.69	6.68	6.50	6.50	6.50		
specific conductivity (mS)	0.044	0.04	0.04	0.040	0.04	0.04	0.04	0.04		
turbidity (NTU's)	1	0	0	0	0	0	0			
dissolved oxygen (mg/l)	8.2	7.30	7.10	7.60	7.80	7.30	7.3	7.28		
temperature (degrees C)	11.6	12.0	12.0	13.0	13.0	13.0	13	13		
redox potential (mv)	175	188	188	188	187	184	184	184		
depth to water (feet)	72.90	72.90	72.90	72.90	72.90	72.90	72.90	72.90		
volume purged (gal or L)	2.65	4.15	5.65	7.15	8.65	10.15	11.65	13.15		

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED: VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY: STL St.Louis
CONTACT: John Powel

Casing Diameter/Volume conversions (Inches)	(gallons per foot)
2.0	0.1632
(4.0)	(0.6528)
6.0	1.4687
8.0	2.6115

NOTES: Little sludge on bottom, lowered rate after initial reading to 0.3 l/min. Open top flow through cell.
Flow rates = 100 ml/min for VOA
= 150 ml/min for Rad + metals

MALCOLM PIRNIE

17-17 ROUTE 208 NORTH, FAIRLAWN, NEW JERSEY 07410

GROUNDWATER MONITORING WELL SAMPLE COLLECTION LOGS

PROJECT NUMBER:	4563 001	DATE:	3-15-03
PROJECT NAME:	GTEOSI	SAMPLERS:	A Wood
SITE LOCATION:	Hicksville		JC Hayes.
SITE CONTACT:	Jean Agostinelli	WEATHER:	W.NW 35°

WELL IDENTIFICATION NUMBER: MW-12 PERMIT: --

WELL HEADSPACE READING:	0	PID MODEL/LAMP:	--
DEPTH TO WATER (Before Purging):	73.42	FEET FROM TOP OF CASING	
WELL DEPTH:	129.65	FEET FROM TOP OF CASING	
HEIGHT OF WATER IN WELL:	56.32	FEET	
WATER IN ONE WELL VOLUME:	36.71	GALLONS	
PURGE TIME (start/finish):	1653 to 1728	PURGE RATE:	300 ml/min
WELL EVACUATION DEVICE:	Rediflow electrosubmersible		
SAMPLING TIME (start/finish):	1730 to 1747	SAMPLE RATE:	100 ml/min VOA, 150 ml/min rad-metals
SAMPLE COLLECTION DEVICE:	Rediflow electrosubmersible		
SAMPLE APPEARANCE:	clear		

FIELD PARAMETERS	initial	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
time (00:00)	1658	1703	1708	1713	1718	1723	1728			
pH (SU)	7.1	7.40	7.50	7.50	7.50	7.50	7.50			
specific conductivity (mS)	0.17	0.18	0.17	0.18	0.18	0.18	0.18			
turbidity (NTU's)	0	0	0	0	0	0	0			
dissolved oxygen (mg/l)	4.08	2.42	7.5	2.5	2.0	1.8	1.8			
temperature (degrees C)	12.1	12.0	12.0	12.0	12.0	12.0	12			
redox potential (mv)	157	154	149	149	143	141	141			
depth to water (feet)	73.42	73.42	73.42	73.42	73.42	73.42	73.42			
volume purged (~~gal or~~ L)	1.5	3	4.5	6.0	7.5	9.0	10.5			

SAMPLE ANALYSIS INFORMATION

ANALYSIS REQUIRED:	VOC's,, Isotopic Uranium, Isotopic Thorium, Technetium 99, Isotopic Radium, and select metals
LABORATORY:	STL St.Louis
CONTACT:	John Powel

Casing Diameter/Volume conversions	
(Inches)	(gallons per foot)
2.0	0.1632
(4.0)	(0.6528)
6.0	1.4687
8.0	2.6115

NOTES: 1730hr Sample time
100 ml/min VOA
150 ml/min Rad & metal

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Appendix C C

Appendix C
Geologic Logs

Boring ID:

MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

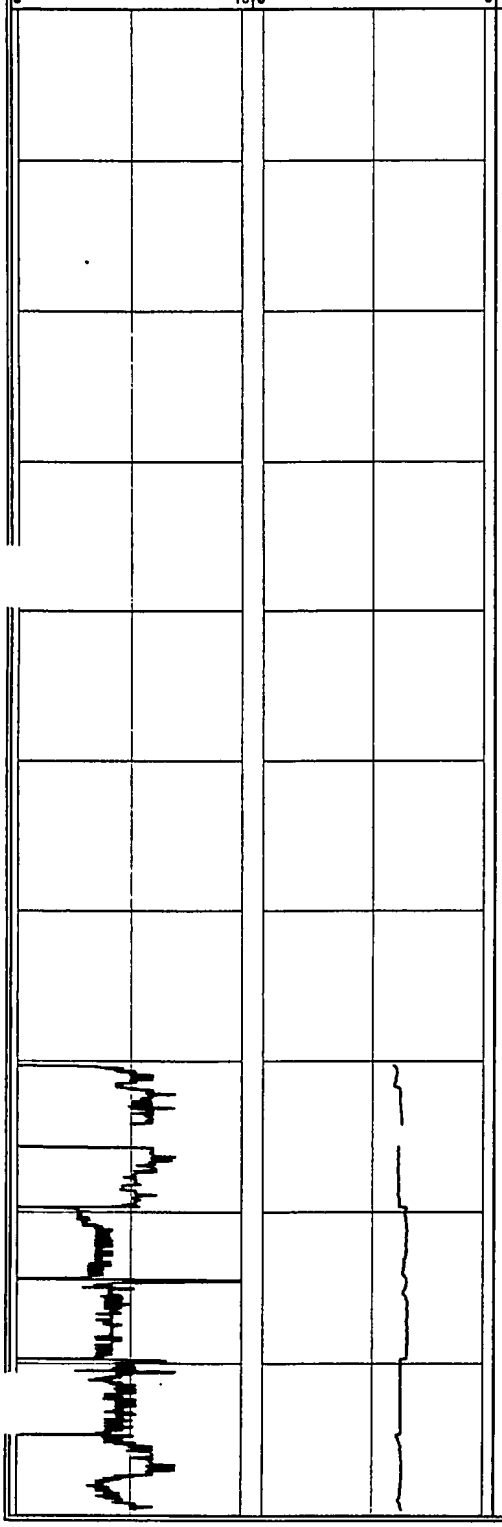
P-15

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 27, 2003
JOB NUMBER:	4563001	END DATE:	June 3, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd,
DRILLING METHOD:	Mud Rotary	WEATHER:	adjacent to Nassau Co driving range
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carly	HYDROGEOLOGIST:	Garrett Ferguson

Total depth of Profile: 339.2 ft

Total depth of Boring: 280 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) and GRAVEL; dark brown	SP-GP		Hollow stem auger used from 0 to 10 ft. Begin mud rotary drilling at 10 ft
10	Well-graded SAND (fine to coarse); tan	SW		
20	Poorly-graded SAND (coarse) with gravel (fine); tan to light brown	SP-GP		
30				Gravel fraction increases with depth
40				
50	Well-graded SAND (fine to coarse); tan	SW		
60	Poorly-graded SAND (fine to medium); tan to gray	SP		
70	Well-graded SAND (fine to coarse) with some gravel (fine); tan to gray	SW		Profile data gap due to poor KPRO equilibration
80	Poorly-graded SAND (fine to medium) with trace gravel (fine); tan to gray	SP		
90	Poorly-graded SAND (fine to medium) with trace gravel (fine); tan to gray	SP		

Boring ID:

MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

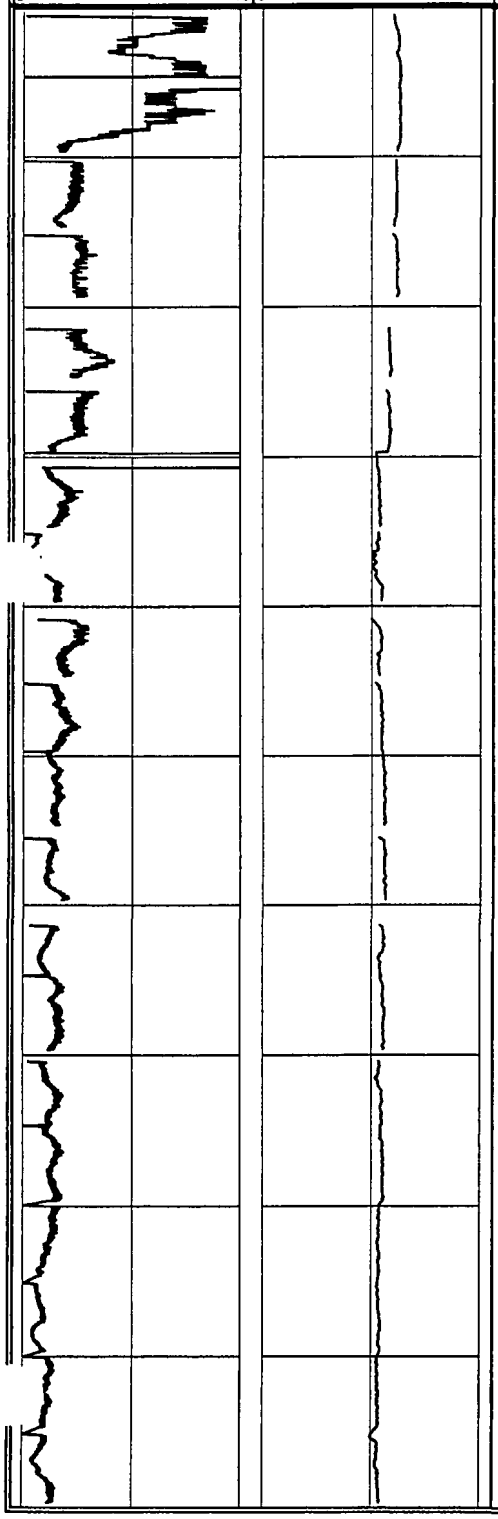
P-15

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 27, 2003
JOB NUMBER:	4563001	END DATE:	June 3, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd,
DRILLING METHOD:	Mud Rotary	WEATHER:	adjacent to Nassau Co driving range
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carly	HYDROGEOLOGIST:	Garrett Ferguson

Total depth of Profile: 339.2 ft

Total depth of Boring: 280 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110				
120	Poorly-graded SAND (fine to medium); tan to gray	SP		Profile data gaps due to poor KPRO equilibration
130				
140				Profile data gaps due to poor KPRO equilibration
150	Poorly graded GRAVEL (fine) with some sand (fine to medium); tan to gray	GP		
160	Poorly-graded SAND (fine to medium); tan to gray	SP		Profile data gaps due to poor KPRO equilibration
170				
180				
190				

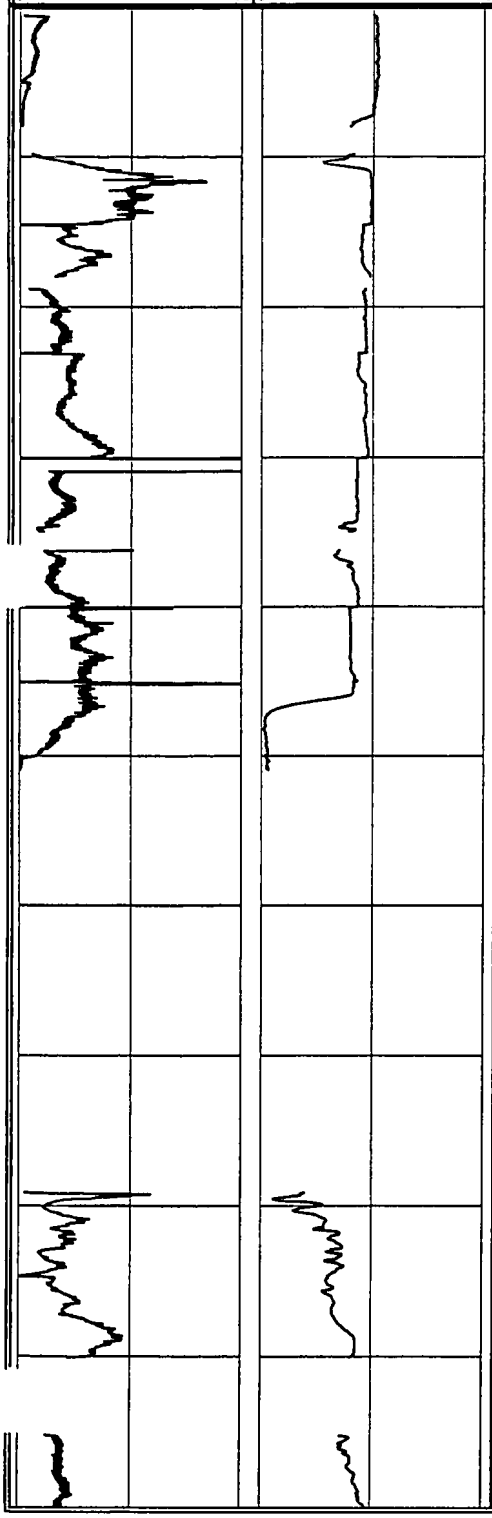
Boring ID:

P-15

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 27, 2003
JOB NUMBER:	4563001	END DATE:	June 3, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd,
DRILLING METHOD:	Mud Rotary	WEATHER:	adjacent to Nassau Co driving range
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carly	HYDROGEOLOGIST:	Garrett Ferguson
Total depth of Profile:	339.2 ft	Total depth of Boring:	280 ft

GEOLOGIC INFORMATION



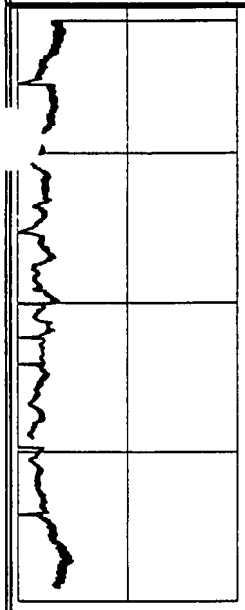
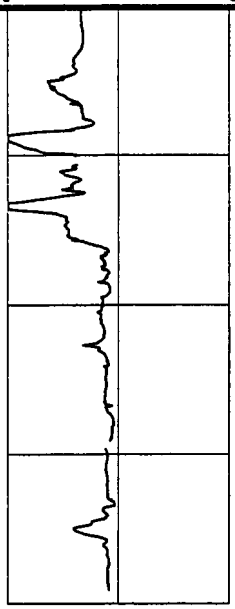
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		SP		
210	Well-graded SAND; tan to red	SW		Profiler refusal at 208 ft, no penetration rate or IK data from 208 to 209.81 ft due to drilling activities Profile data gap due to poor KPRO equilibration
220	Poorly-graded SAND (fine to medium) with trace silt; tan to red	SP		
230				Profile data gaps due to poor KPRO equilibration
240				
250	Poorly graded SAND (fine to medium) and CLAY with some silt; tan to light brown	SC- CL		Profiler refusal at 250.95 ft, no penetration rate or IK data from 250.95 to 279.15 ft due to drilling activities
260				
270				
280				End of mud rotary boring at 280 ft
290				Profile data gap from 290 to 295.05 ft due to equipment problems

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-15**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 27, 2003
JOB NUMBER:	4563001	END DATE:	June 3, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd,
DRILLING METHOD:	Mud Rotary	WEATHER:	adjacent to Nassau Co driving range
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carly	HYDROGEOLOGIST:	Garrett Ferguson

Total depth of Profile: 339.2 ft — Total depth of Boring: 280 ft

GEOLOGIC INFORMATION						
Penetration Rate (ft/min) 0–15	Index of Hyd. Conductivity 0–6	Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
		300 310 320 330 340				Profile data gaps due to poor KPRO equilibration End of Profile at 339.2 ft

Boring ID:

ALCOLM PIRNIE, INC.

.7 Route 208 North Fair Lawn, NJ 07401

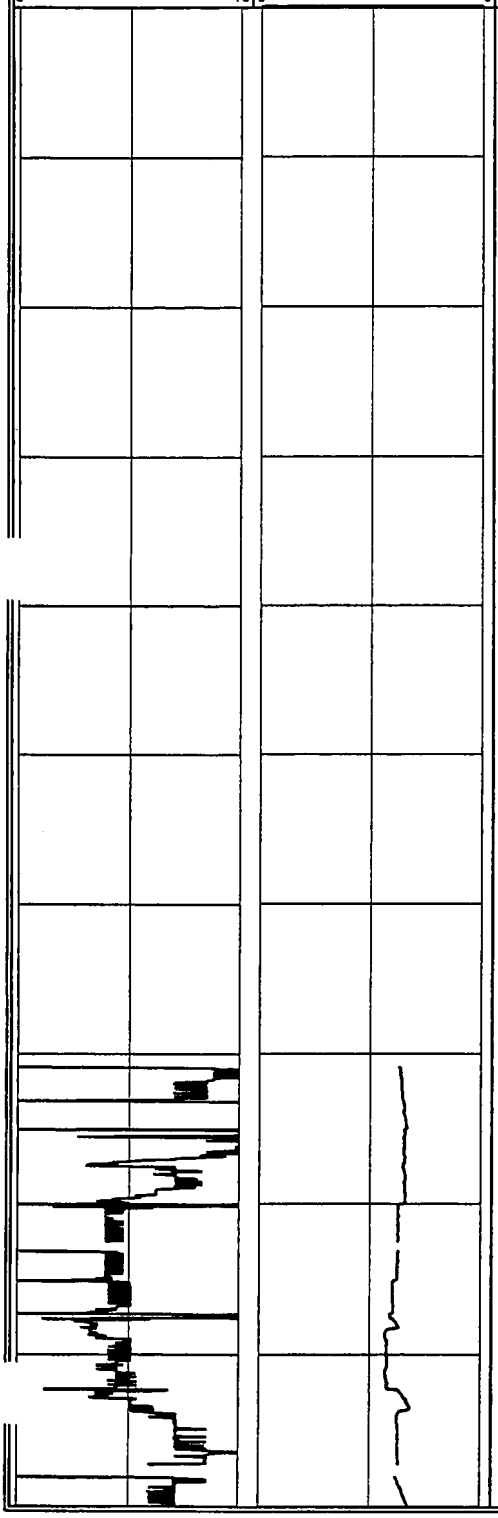
P-17

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	April 24, 2003
JOB NUMBER:	4563001	END DATE:	April 27, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantigue Rock Rd, E of 70 Property, on
DRILLING METHOD:	Mud Rotary	WEATHER:	Nassau Co driving range
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 235.63 ft

Total depth of Boring: 235 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND (fine to medium) and GRAVEL (fine to coarse); light brown	SW-GW		
10				
20				Hollow stem auger to used from 0 to 20 ft, begin mud rotary drilling at 20 ft
30	Well-graded GRAVEL; light brown	GW		Based on drilling rig response
	Well-graded SAND (fine to medium) and GRAVEL; light brown	SW-GP		
40				
50				
60				
70	No geologic description recorded below 70 ft			Begin Profiling at 70.88 ft
80				Profile data gaps due to poor KPRO equilibration
90				

Boring ID:

MALCOLM PIRNIE, INC.

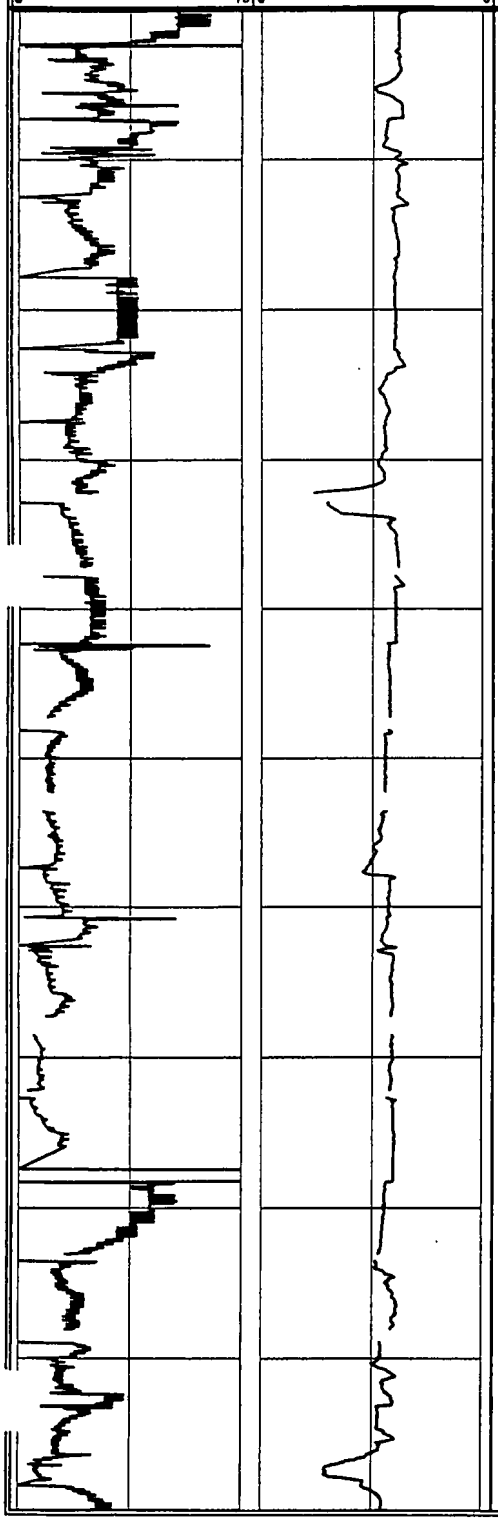
17 Route 208 North Fair Lawn, NJ 07401

P-17

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	April 24, 2003
JOB NUMBER:	4563001	END DATE:	April 27, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantigue Rock Rd, E of 70 Property, on
DRILLING METHOD:	Mud Rotary	WEATHER:	Nassau Co driving range
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 235.63 ft — Total depth of Boring: 236 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100				
110				
120				
130				
140				Profile data gaps due to poor KPRO equilibration
150				
160				
170				Profile data gaps due to poor KPRO equilibration
180				
190				Profile data gaps due to poor KPRO equilibration

Boring ID:

MALCOLM PIRNIE, INC.

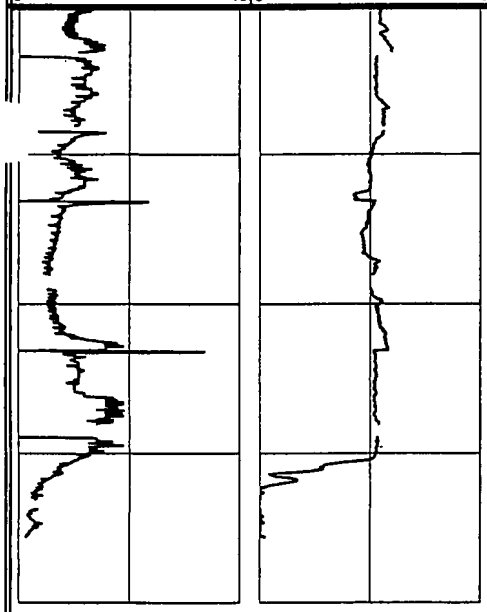
17-17 Route 208 North Fair Lawn, NJ 07401

P-17

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	April 24, 2003
JOB NUMBER:	4563001	END DATE:	April 27, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantigue Rock Rd, E of 70 Property, on
DRILLING METHOD:	Mud Rotary	WEATHER:	Nassau Co driving range
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 235.63 ft

Total depth of Boring: 235 ft

GEOLOGIC INFORMATION						
Penetration Rate (ft/min) 0 – 15	Index of Hyd. Conductivity 0 – 6	Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
		200 210 220 230 240				Profile data gaps due to poor KPRO equilibration Profiler refusal at 235.63 ft. End of profile End of boring at 235 ft

Boring ID:

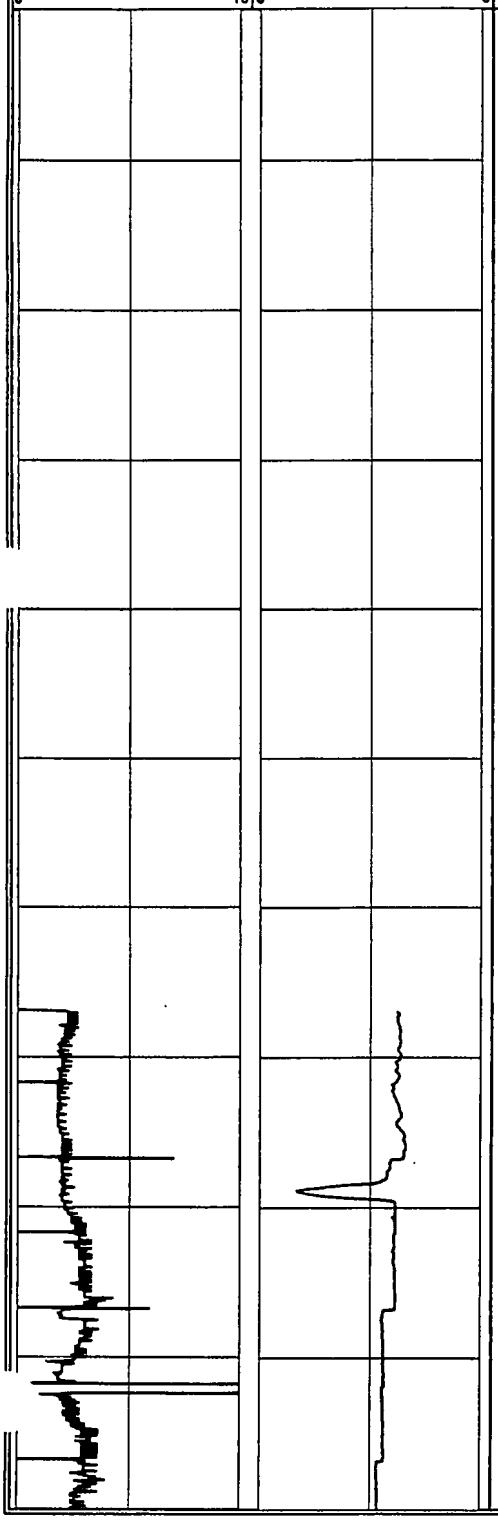
MALCOLM PIRNIE, INC.

P-18

17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 4, 2003
JOB NUMBER:	4563001	END DATE:	October 10, 2003
DRILLING FIRM:	CT&E	LOCATION:	W of Cantiague Rock Rd, Across from the 70 and 100 Properties
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Brian Siecker	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	350.25 ft	Total depth of Boring:	325 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) and GRAVEL (fine to coarse); brown	SP-GP		
10				
				Hollow stem auger used from 0 to 20 ft
20				Begin mud rotary drilling at 20 ft
	Poorly-graded SAND (medium to coarse) with some gavel (fine); brown to yellow	SP		
30				
				Micaceous
40				Micaceous
50				
	Well-graded SAND with some gravel (well-graded); light brown to white	SW		
60				
	Poorly-graded SAND (medium to coarse) with trace gravel (fine) and trace clay; light brown to white	SP		Begin Profiling at 66.8 ft
70				
80				
	Well-graded SAND (fine to coarse); light brown	SW		
90				
	Poorly-graded SAND (medium) with trace gravel (fine); light brown to white	SP		

Boring ID:

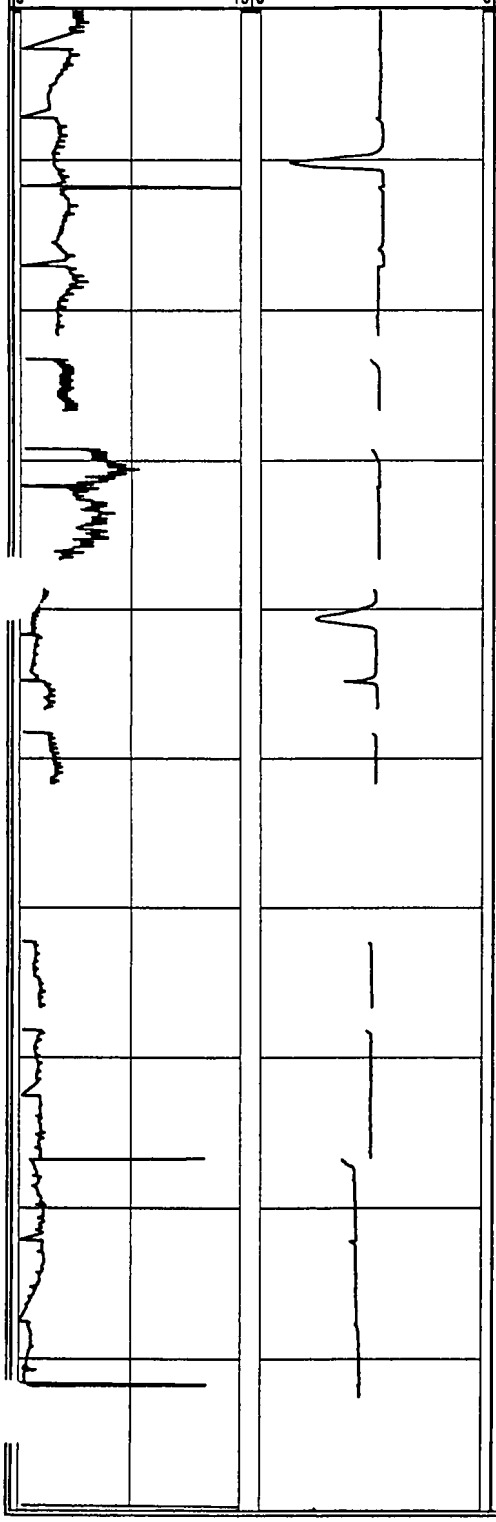
P-18

MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 4, 2003
JOB NUMBER:	4563001	END DATE:	October 10, 2003
DRILLING FIRM:	CT&E	LOCATION:	W of Cantiague Rock Rd, Across from the 70 and 100 Properties
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Jim Lewis	HYDROGEOLOGIST:	Colleen Sullivan
HELPER:	Brian Siecker		

Total depth of Profile: 350.25 ft — Total depth of Boring: 325 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110				
	Well-graded SAND (fine to coarse) with trace gravel (fine); light brown	SW		
120	Poorly-graded SAND (medium to coarse) with some gravel (coarse); light brown	SP		Profile data gaps due to poor KPRO equilibration from 121.72 to 123.2, 126.7 to 129.15, 136.71 to 138.61 and 146.70 to 148.19 ft
130				
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); tan	SP-GP		Gravel lens from 135 to 136 ft
140	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light brown to white	SP		
	Poorly-graded SAND (medium to coarse) with little gravel (fine); light brown	SP		
150				No profile data from 151.70 to 162.26 ft due to malfunctioning Profiling equipment
160				
170				Profile data gaps due to poor KPRO equilibration
180				
190				Profiler refusal at 192.5 ft bgs, no penetration rate or IK data from 192.5 to 199.73 ft due to drilling activities

Boring ID:

MALCOLM PIRNIE, INC.

P-18

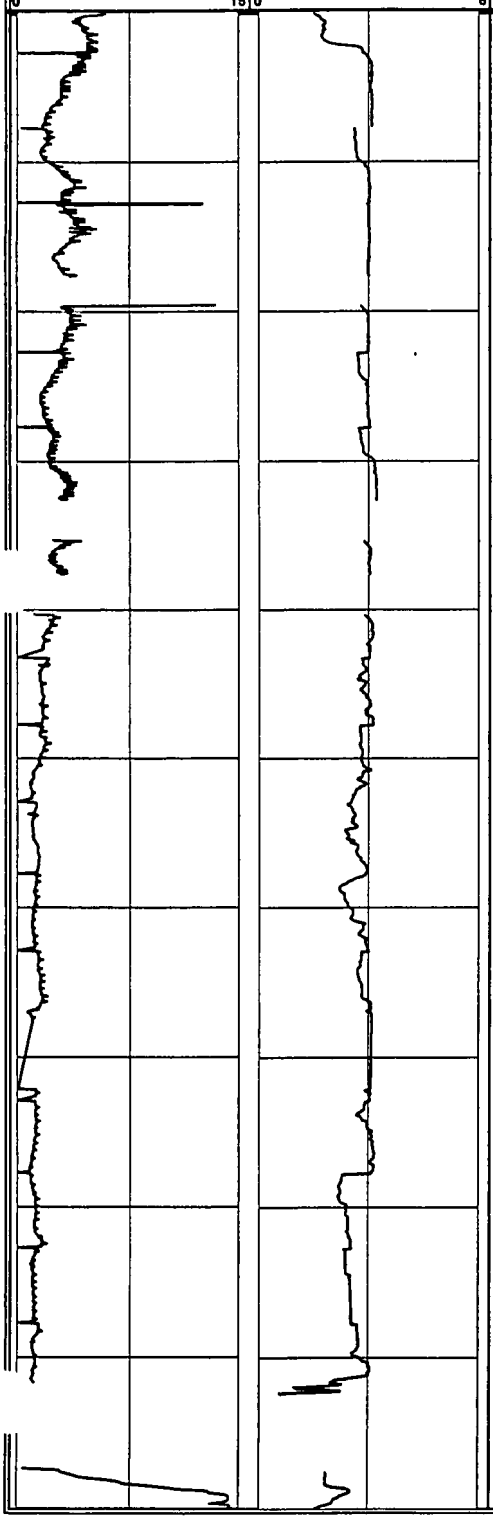
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 4, 2003
JOB NUMBER:	4563001	END DATE:	October 10, 2003
DRILLING FIRM:	CT&E	LOCATION:	W of Cantiague Rock Rd, Across from the 70 and 100 Properties
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Jim Lewis	HYDROGEOLOGIST:	Colleen Sullivan
HELPER:	Brian Siecker		

Total depth of Profile: 350.25 ft

Total depth of Boring: 325 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (medium to coarse) with trace gravel (fine); white to light brown	SP		
210				Profile data gap due to poor KPRO equilibration
220				
230				Loss of circulation of drilling fluids from 230 to 235 ft, no recovery of cuttings. Much drilling fluid lost into the formation.
240	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown to white	SP-GP		Profile data gaps due to poor KPRO equilibration
250				
260	Poorly-graded SAND (medium to coarse) with trace gravel and trace silt; light brown to white	SP		
270				
280	Well-graded SAND with trace clay; light brown to orange	SW		
290				Profiler refusal at 292.4 ft, no penetration rate or IK data from 292.4 to 297.3 ft due to drilling activities
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown to orange	SP-GP		

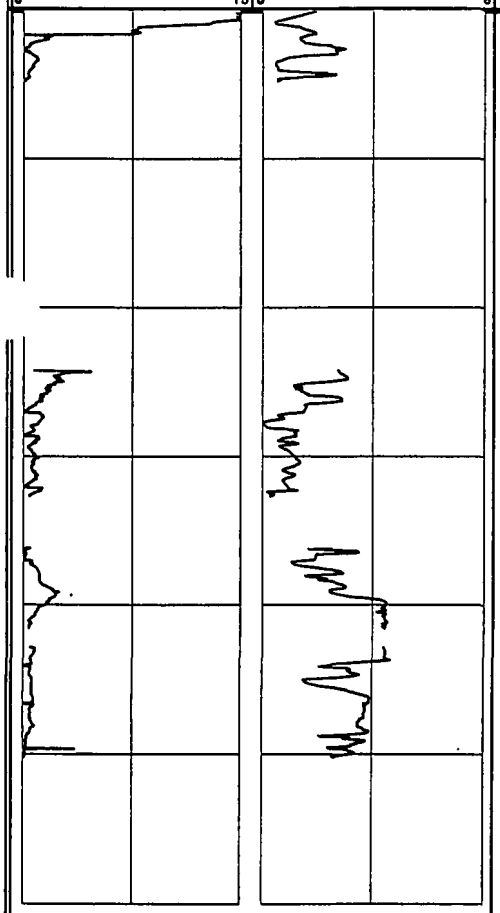
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-18

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 4, 2003
JOB NUMBER:	4563001	END DATE:	October 10, 2003
DRILLING FIRM:	CT&E	LOCATION:	W of Cantiague Rock Rd, Across from the 70 and 100 Properties
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Jim Lewis	HYDROGEOLOGIST:	Colleen Sullivan
HELPER:	Brian Siecker		

Total depth of Profile: 350.25 ft
Total depth of Boring: 325 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	Well-graded SAND with trace clay; red to brown	SW		Micaceous
310				Profiler refusal at 307.71 ft, no penetration rate or IK data from 307.7 to 324.66 due to drilling activities.
320				End of boring at 325 ft
330				Loss of IK data from 332.71 to 336.41 ft due to dead generator
340				
350				Profiler refusal at 350.25 ft, end of profile
360				

Boring ID:

MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

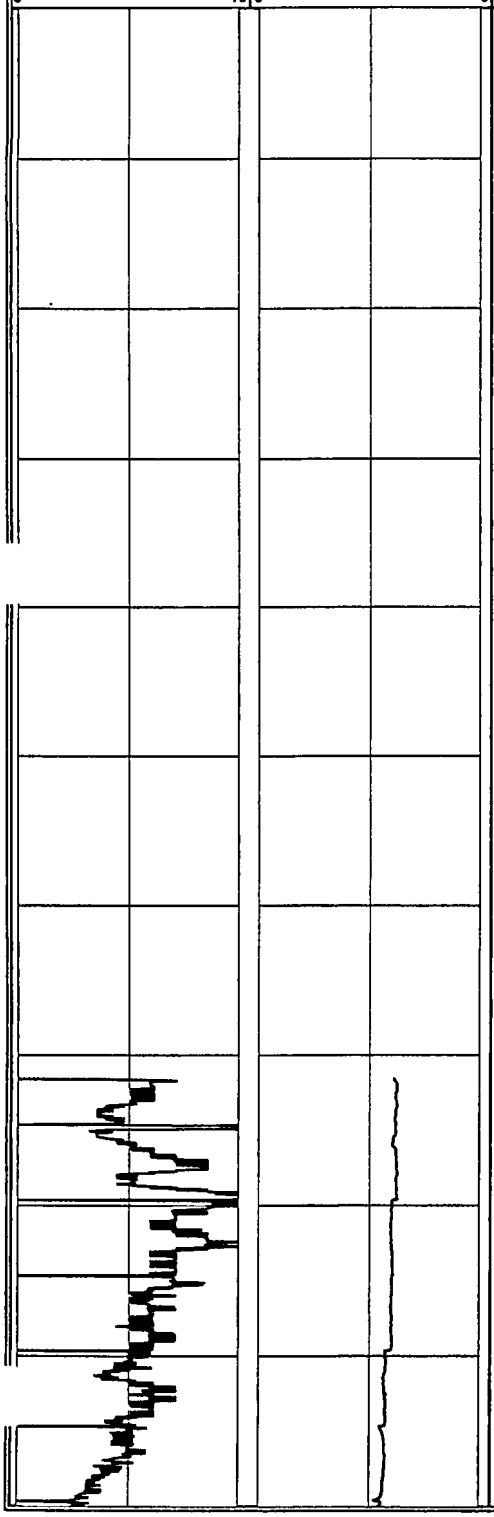
P-20

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	NE corner of Property, S of W John St, W of Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Garret Furguson, Colleen Sullivan

Total depth of Profile: 477.73 ft

Total depth of Boring: 459 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (fine to medium) and GRAVEL (fine); brown	SP-GP		
10				Hollow stem auger used from 0 to 15 ft
20				Begin mud rotary drilling - 3 inch hole at 15 ft
	Well-graded SAND (fine to coarse) and GRAVEL (fine); brown	SW-GP		
30				
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
40				
50				
60				
	Well-graded SAND with some gravel (fine)	SW		
70	Well-graded SAND with some silt; light brown	SW		Begin Profiling at 71.61 ft
80				Micaceous
	Well-graded SAND with some gravel (fine); light brown	SW		
90				Lost ~50 gal drilling fluid
	Well-graded SAND; light brown	SW		Micaceous

Boring ID:

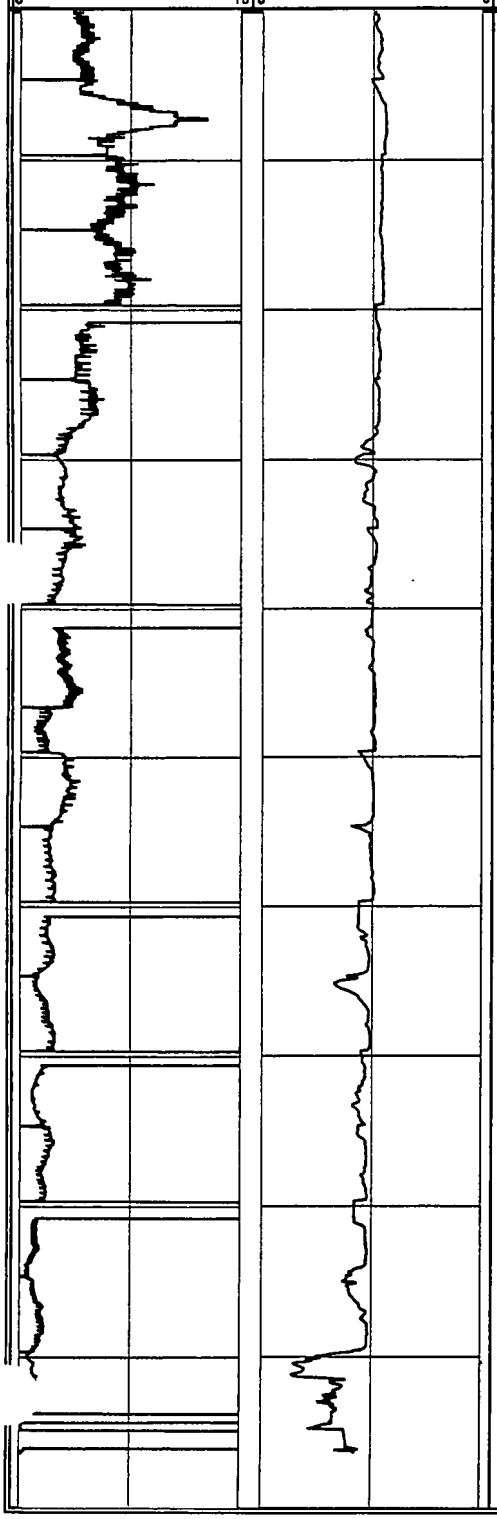
MALCOLM PIRNIE, INC.

P-20

17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	NE corner of Property, S of W John St, W of Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Garret Furguson, Colleen Sullivan
Total depth of Profile:	477.73 ft	Total depth of Boring:	459 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SW		
	Poorly-graded SAND (fine to medium) with little gravel (fine); light brown	SP		Micaceous
110				Micaceous
	Well-graded SAND; light brown	SW		Some loss of drilling fluid
120				
	Well-graded SAND (fine to coarse) with little silt; light brown	SM		
130				
	Poorly-graded SAND (medium to coarse) with some silt and trace clay; light brown	SM		
140				
	Poorly-graded SAND (medium to coarse) with little silt and clay; light brown	SM		Micaceous
150				
	Poorly-graded SAND (medium to coarse) with trace clay; light brown	SP		Micaceous
160	Well-graded SAND; light brown	SW		Some fluid loss
				Micaceous
170				
180				
190				Profiler refusal at 196.38 ft, no penetration rate or IK data from to 196.38 to 201.06 ft due to drilling activities

Boring ID:

MALCOLM PIRNIE, INC.

P-20

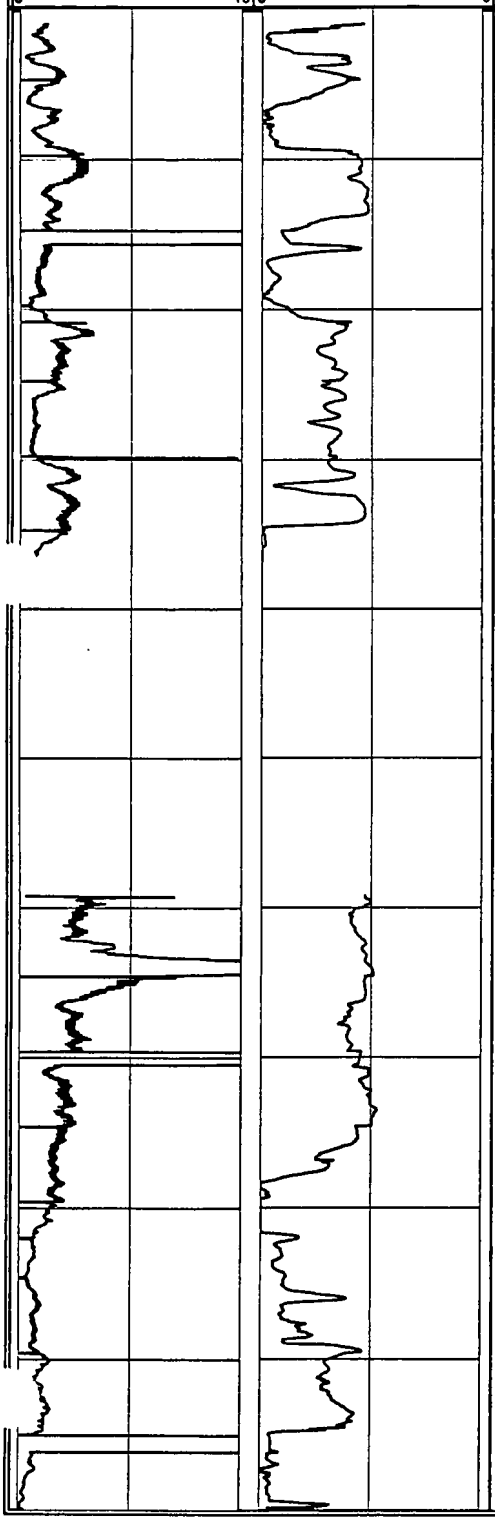
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	NE corner of Property, S of W John St, W of Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Garret Furguson, Colleen Sullivan

Total depth of Profile: 477.73 ft

Total depth of Boring: 459 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Well-graded SAND with trace clay; orange to red	SW		
210				Micaceous
220				
230				
	LIGNITE with some sand (medium) and clay; black	PT		Profiler refusal at 236.88 ft, no penetration rate or IK data from 236.88 to 259.21 ft due to drilling activities
240				
				Bedded lignite
250				
	Poorly-graded SAND (medium); light brown to gray	SP		Micaceous
260				
270				
	Poorly-graded SAND (medium to coarse) with some clay; gray	SC		
280				Micaceous
	CLAY with some silt and some sand (fine to medium); gray	CL		
290	Poorly-graded SAND (fine) with some to little clay and trace lignite; light brown	SC		Micaceous

Boring ID:

MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

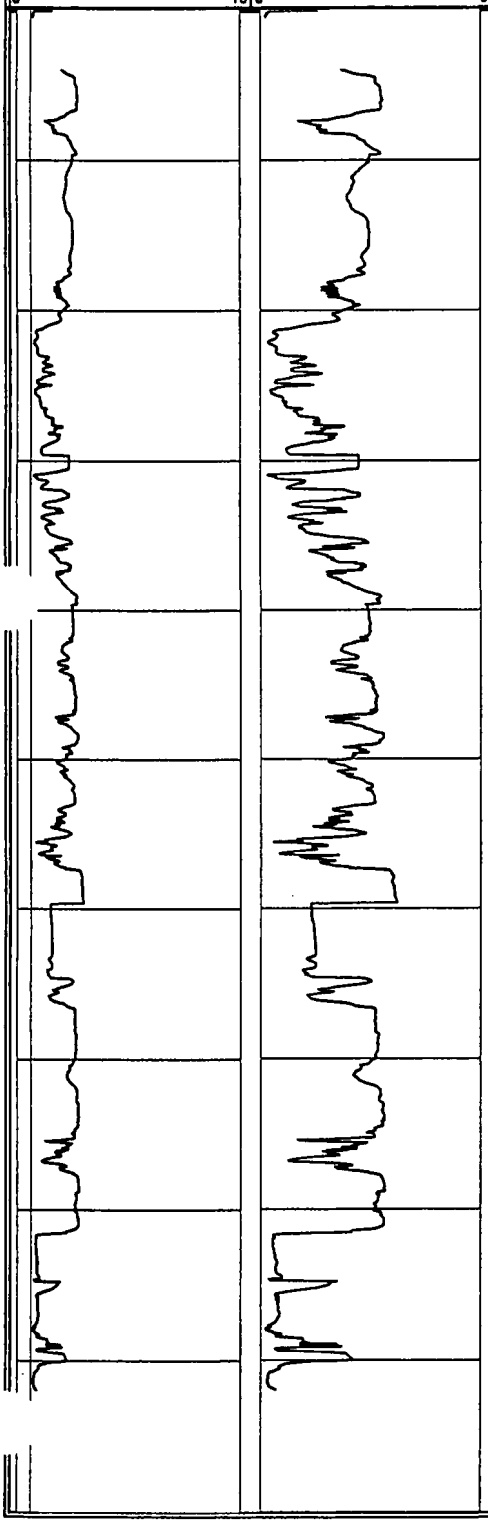
P-20

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	NE corner of Property, S of W John St, W of Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Garret Furguson, Colleen Sullivan

Total depth of Profile: 477.73 ft

Total depth of Boring: 459 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		SC		Profiler refusal at 300.56 ft, no penetration rate or IK data from 300.56 to 300.05 ft due to drilling activities
310				
320				
330				
340	Poorly-graded SAND (fine to medium) with trace clay and trace lignite; light brown	SP		Micaceous
350	Poorly-graded SAND (fine to medium); white-gray	SP		Micaceous
360				
370	Poorly-graded SAND (medium) and trace clay; white-gray	SP		
380	LIGNITE; black	PT		Bedded Lignite
	Well-graded SAND with trace silt and clay; white to gray	SW		Profiler refusal a 385 ft Restart profiler at 384.15 ft
390				Profiler refusal at 391.96 ft, no penetration rate or IK data from 391.96 to 404.46 ft due to drilling activities

Boring ID:

MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

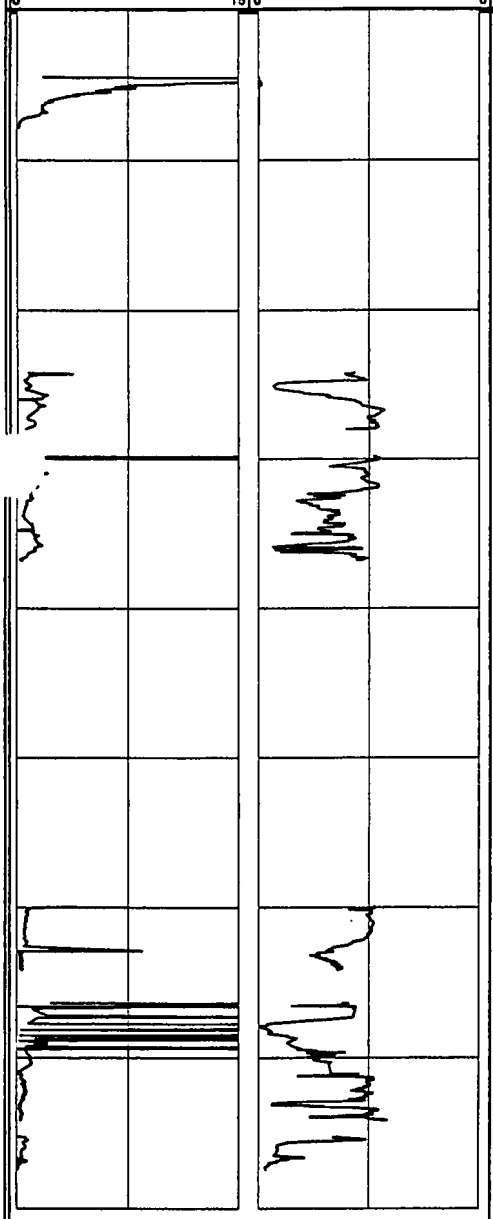
P-20

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	NE corner of Property, S of W John St, W of Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Garret Furguson, Colleen Sullivan

Total depth of Profile: 477.73 ft

Total depth of Boring: 459 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
		SW		
	Well-graded SAND with some silt and trace lignite; white to gray	SM		Profiler refusal at 407.85 ft, no penetration rate or IK data from 407.85 to 424.2 ft due to drilling activities
				IK data from 428 to 429 ft is erroneous due to computer malfunction
	Poorly-graded SAND (medium to coarse); light brown	SP		Bad IK data from 435 to 437.15 ft, broken reed valve
	CLAY with some sand (medium); white to gray	CL		Profiler refusal at 436.77 ft, no penetration rate or IK data from 436.77 to 459.95 ft due to drilling activities
	CLAY with some sand and silt; white-pink-gray	CL		Lignite present in cuttings
	Poorly-graded SAND (medium) with some lignite and trace clay; light	SP		Micaceous
				End boring at 459 ft
				Invalid IK data from 474.15 to 475.22 ft - insufficient KPRO fluid
				End of Profile at 477.73 ft

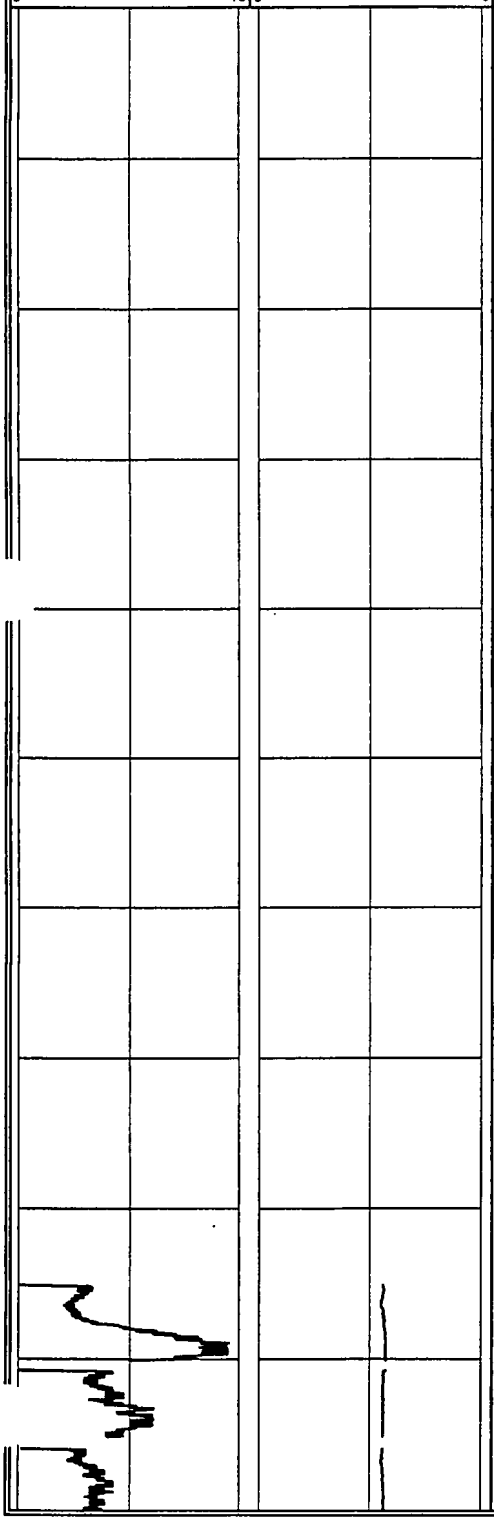
MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-23

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 24, 2003
JOB NUMBER:	4563001	END DATE:	July 3, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd, W
DRILLING METHOD:	Mud Rotary	WEATHER:	of P-H
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 347.36 ft
Total depth of Boring: 330 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Silty SAND (medium), with some gravel (fine), and trace clay; brown	SM		Pavement from 0 to 1 ft
10	Poorly-graded SAND (medium to coarse) with some gravel (fine); brown to tan	SP		Hollow stem auger used from 0 to 15 ft. Begin mud rotary drilling at 15 ft
20	Poorly-graded SAND (fine to medium) with some gravel (fine), trace silt; brown	SP		
30	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); brown to tan	SP-GP		
40	Well-graded SAND with little gravel (fine); tan	SW		
50	Well-graded SAND and GRAVEL (fine); white-tan	SW-GP		Micaceous
60	Poorly-graded SAND (medium to coarse); tan	SP		IK and Drive rate data from 69.75 to 80.1 ft did not record
70	Poorly-graded SAND (medium); tan	SP		
80				Profile data gaps due to poor KPRO equilibration
90	Poorly-graded SAND (fine to medium); tan	SP		Micaceous

Boring ID:

MALCOLM PIRNIE, INC.

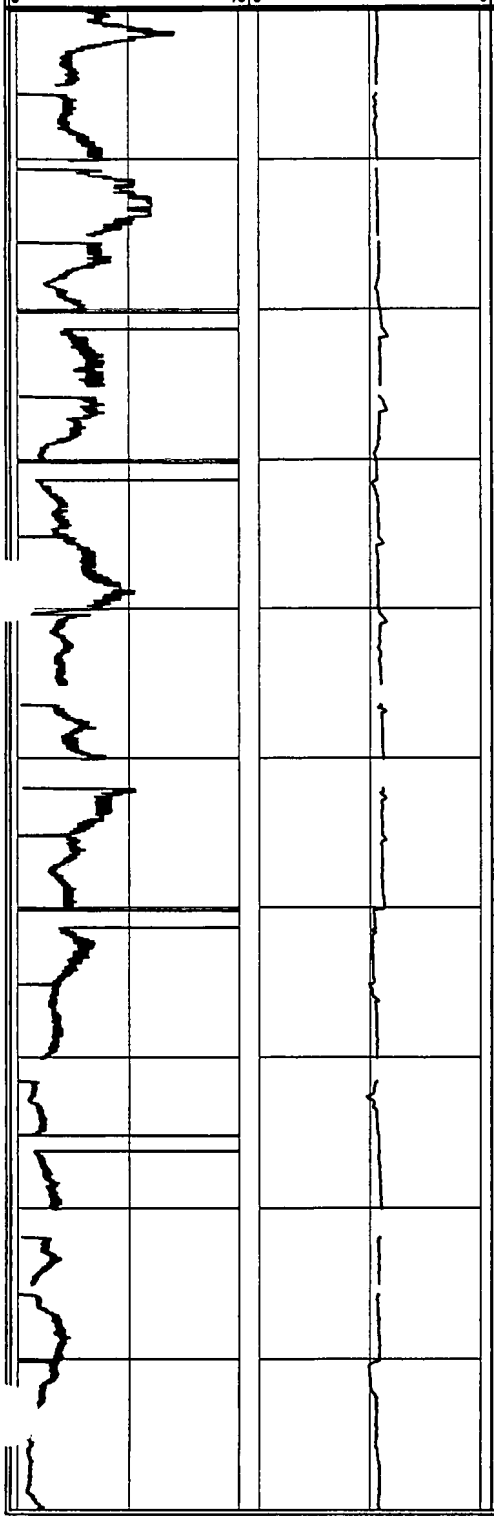
'7 Route 208 North Fair Lawn, NJ 07401

P-23

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 24, 2003
JOB NUMBER:	4563001	END DATE:	July 3, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd, W
DRILLING METHOD:	Mud Rotary	WEATHER:	of P-H
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 347.36 ft — Total depth of Boring: 330 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110	Poorly-graded SAND (medium with little fine and coarse); tan	SP		Profile data gaps due to poor KPRO equilibration
120				Micaceous
				Profile data gaps due to poor KPRO equilibration
130				
140				
	Poorly-graded SAND (medium to coarse) with trace gravel; tan	SP		Profile data gaps due to poor KPRO equilibration
150				
	Poorly-graded SAND (medium with little fine and coarse); tan	SP		
160				Micaceous
170				Profile data gaps due to poor KPRO equilibration
180				
190	Poorly-graded SAND (medium to coarse) with trace gravel; tan	SP		Micaceous
	Poorly-graded SAND (medium with little fine and coarse); tan	SP		

Boring ID:

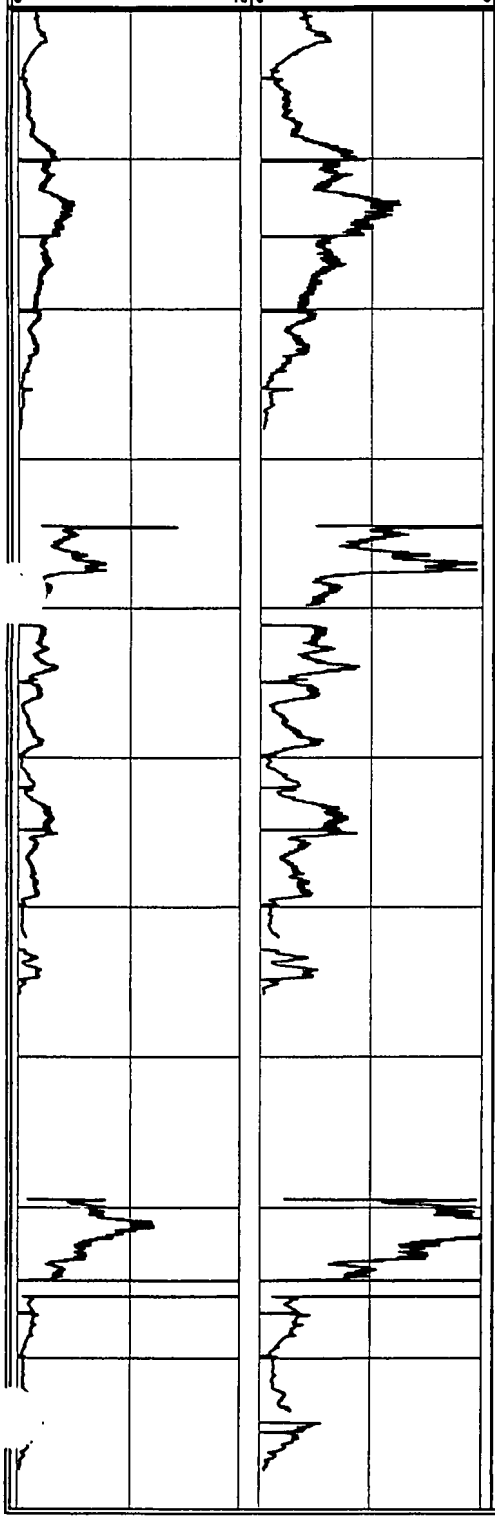
MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

P-23

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 24, 2003
JOB NUMBER:	4563001	END DATE:	July 3, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd, W
DRILLING METHOD:	Mud Rotary	WEATHER:	of P-H
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Jeff Dekoskie
Total depth of Profile:	347.36 ft	Total depth of Boring:	330 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		SP		Micaceous
210				
	Poorly-graded SAND (medium to coarse); tan	SP		Micaceous
220	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); tan	SP-GP		
	Well-graded SAND and GRAVEL (fine); tan to brown	SW-GP		Profiler refusal at 227.97 ft, no penetration rate or IK data from 227.97 to 234.51 ft due to drilling activities
230	Poorly-graded SAND (medium to coarse) with little gravel (fine); tan to brown	SP		
	Poorly-graded SAND (fine) with trace clay and silt; tan to brown	SP		Most cuttings pass through strainer
240	Poorly-graded SAND (fine) with little clay; tan and white	SC		Profile data gap due to poor KPRO equilibration
	Poorly-graded SAND (fine) with some clay	SC		
250	Poorly-graded SAND (fine) and CLAY; tan and white	SC- CL		Micaceous
	Poorly-graded SAND (fine) with little clay and silt; tan	SC		
260	Poorly-graded SAND (fine) and CLAY with some silt; tan	SC- CL		Clay and silt fractions decrease with depth
	Poorly-graded SAND (fine to medium) with trace clay, trace lignite; tan	SM		Profiler refusal at 265.85 ft, no penetration rate or IK data from 265.85 to 279.46 ft due to drilling activities
270	Poorly-graded SAND (fine to medium) with trace lignite; tan	SP		
280				Loss of circulation of drilling fluids from 280 to 330 ft. No recovery of cuttings. No geologic log.
290				Profile data gap due to poor KPRO equilibration

Boring ID:

MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

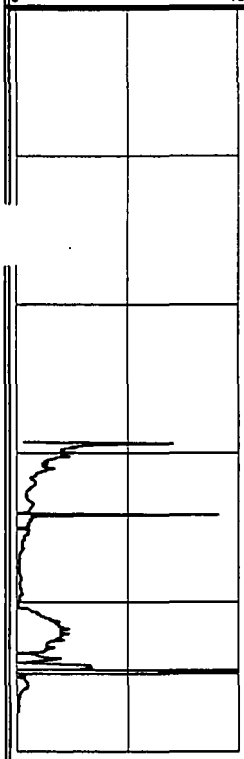
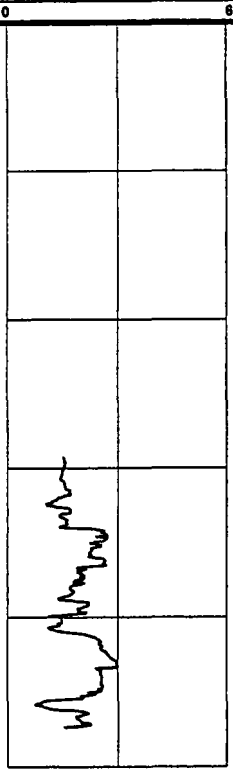
P-23

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 24, 2003
JOB NUMBER:	4563001	END DATE:	July 3, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd, W
DRILLING METHOD:	Mud Rotary	WEATHER:	of P-H
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 347.36 ft

Total depth of Boring: 330 ft

GEOLOGIC INFORMATION

Penetration Rate (ft/min) 0 – 15	Index of Hyd. Conductivity 0 – 6	Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
		300				Profiler refusal at 297.36 ft, no penetration rate or IK data from 297.36 to 329.29 ft due to drilling activities
		310				
		320				
		330				End of boring at 330 ft
		340				End of profile at 347.36 ft
		350				

Boring ID:

MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

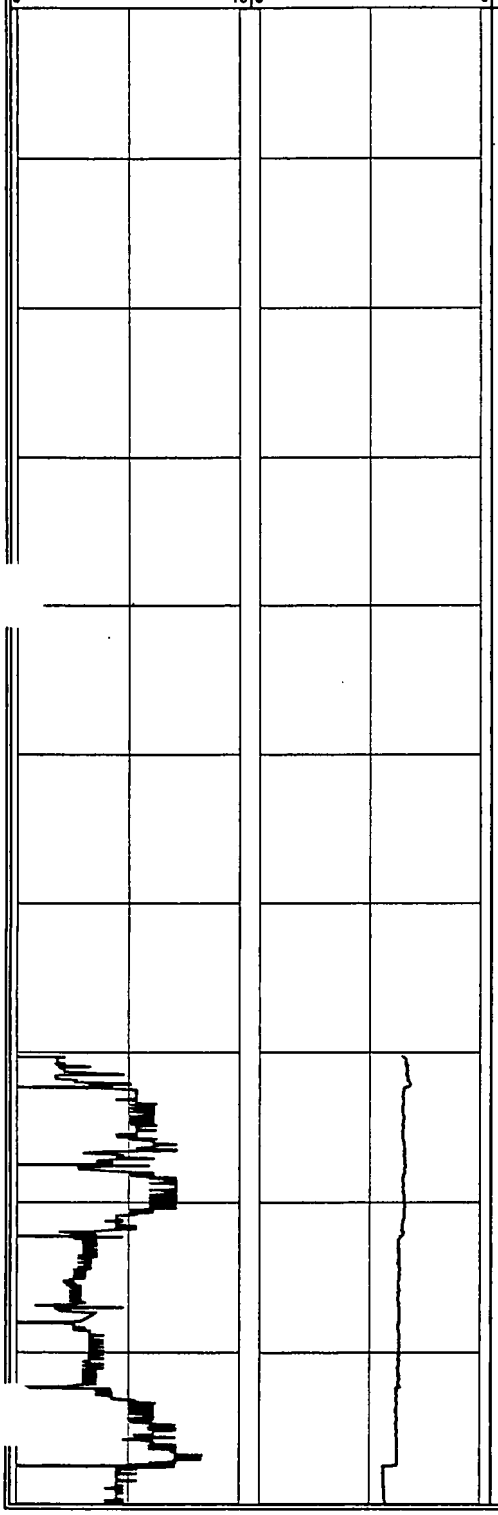
P-24

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 16, 2003
JOB NUMBER:	4563001	END DATE:	June 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near NW corner of 100 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 297.3 ft

Total depth of Boring: 120 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND with trace gravel (fine); light brown	SW		6 1/4 hollow stem auger used from 0 to 20 ft
10	Well-graded GRAVEL with little sand; light brown	GW		
	Well-graded SAND with trace gravel (fine); medium brown	SW		
20	Poorly-graded SAND (fine to medium); light brown	SP		Begin mud rotary drilling at 20 ft
	Poorly-graded GRAVEL (fine)	GP		
30				
	Poorly-graded SAND (fine to medium) with trace to little gravel (fine); light to medium brown	SP		
40				
50	Well-graded GRAVEL; tan to white	GP		
	Poorly-graded SAND (fine); light tan to white	SP		
60				
70	Poorly-graded SAND (fine to medium) with trace gravel (fine); light tan to brown	SP		Begin Profiling at 70.12 ft
80				
90				

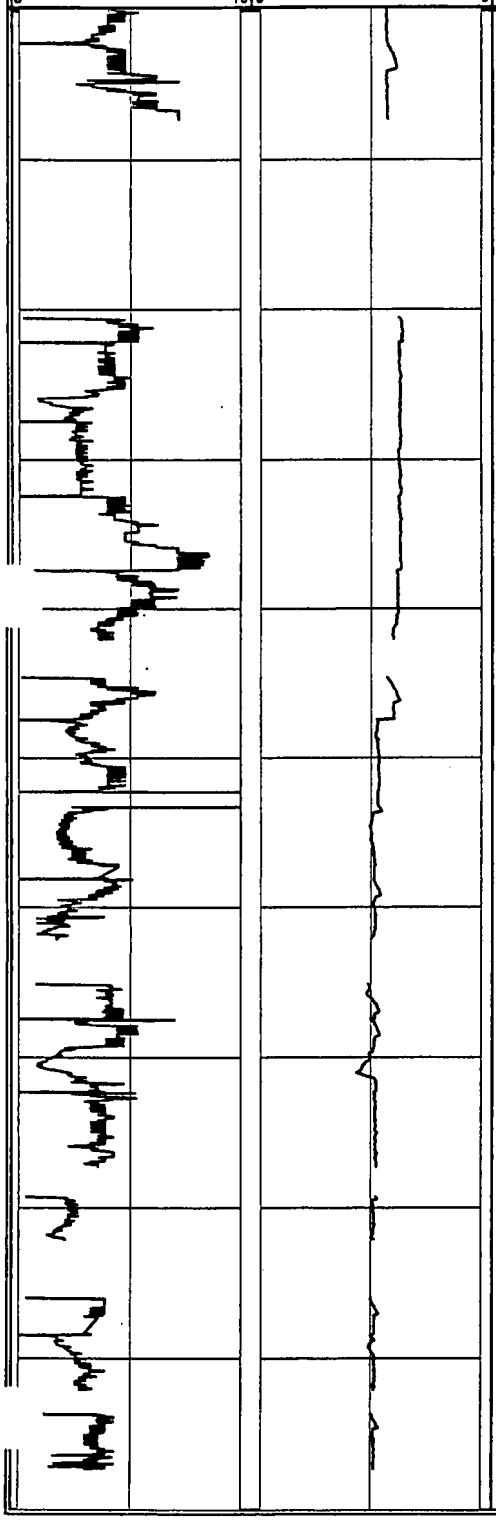
MALCOLM PIRNIE, INC.
'7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-24

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 16, 2003
JOB NUMBER:	4563001	END DATE:	June 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near NW corner of 100 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 297.3 ft Total depth of Boring: 120 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110				No IK data from 107.35 to 120.41 malfunctioning profiling equipment and drilling activity.
120				End of boring/mudlog at 120 ft
130				
140				Profile data gap due to poor KPRO equilibration
150				
160				Profile data gap due to poor KPRO equilibration
170				
180				Profile data gaps due to poor KPRO equilibration
190				

Boring ID:

MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

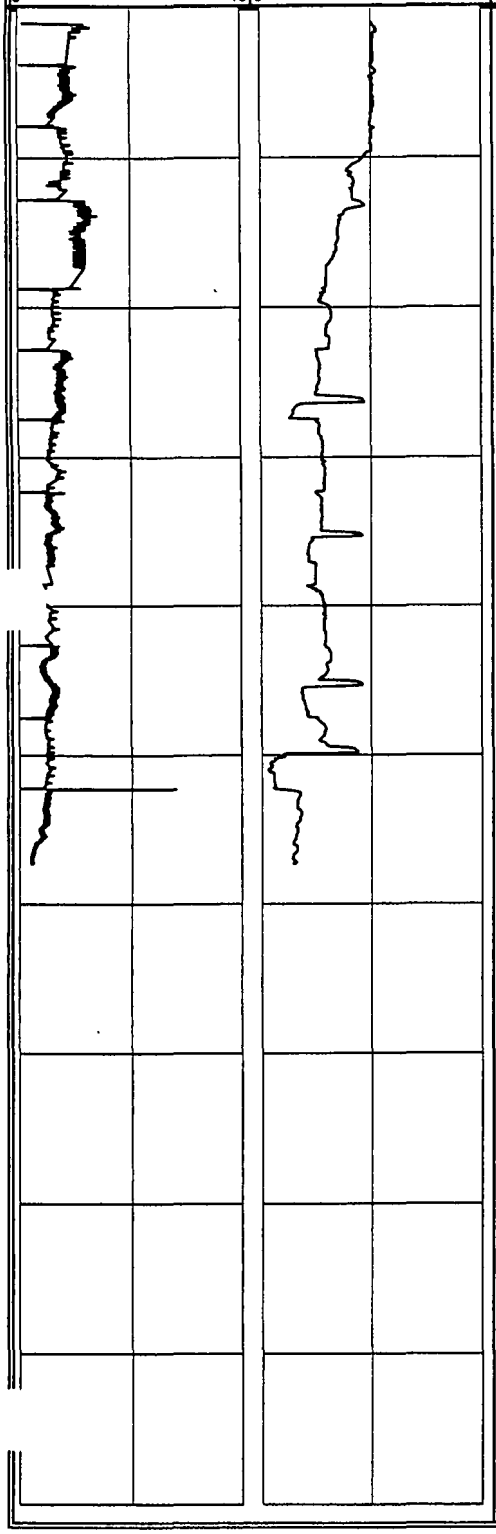
P-24

OJECT NAME:	GTEOSI-Hicksville	START DATE:	June 16, 2003
JOB NUMBER:	4563001	END DATE:	June 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near NW corner of 100 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
RELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 297.3 ft

Total depth of Boring: 120 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200				
210				
220				
230				
240				
250				Plugged KPRO line from 257.35 to 297.3 ft
260				
270				
280				
290				End of profile at 297.3 ft bgs
300				

MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-25**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 8, 2003
JOB NUMBER:	4563001	END DATE:	July 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Cantiague Rock Rd, on NW corner of 70 building
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carly	HYDROGEOLOGIST:	Jeff Dekoskie/John Hilton

Total depth of Profile: 379.15 ft — Total depth of Boring: 365 ft

GEOLOGIC INFORMATION

Penetration Rate (ft/min) 0–15	Index of Hyd. Conductivity 0–6	Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
		0	Well-graded silty SAND with gravel (fine); brown to light brown	SM		Drilled with hollow stem auger from 0 to 13 ft
		10				Begin mud rotary drilling at 13 ft
			Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown	SP		
		20				
		30	Poorly-graded SAND (fine to medium) with trace gravel (fine); light brown	SP		
		40	Poorly-graded GRAVEL (fine); white to tan	GP		
			Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown	SP		
		50	Poorly-graded GRAVEL (fine) and SAND (coarse); white, tan	GP-SP		
			Poorly-graded SAND (fine to medium); light brown, trace black	SP		
		60				
		70	Poorly-graded SAND (fine to medium) with trace gravel (fine); light brown	SP		Begin profiling at 69.7 ft, no profile data from 69.7 to 91.88 ft due to plugged KPRO line
			Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown	SP		
		80	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
		90	Poorly-graded SAND (medium to coarse) with some to little gravel (fine); light brown	SP		Gravel fraction decreases with depth

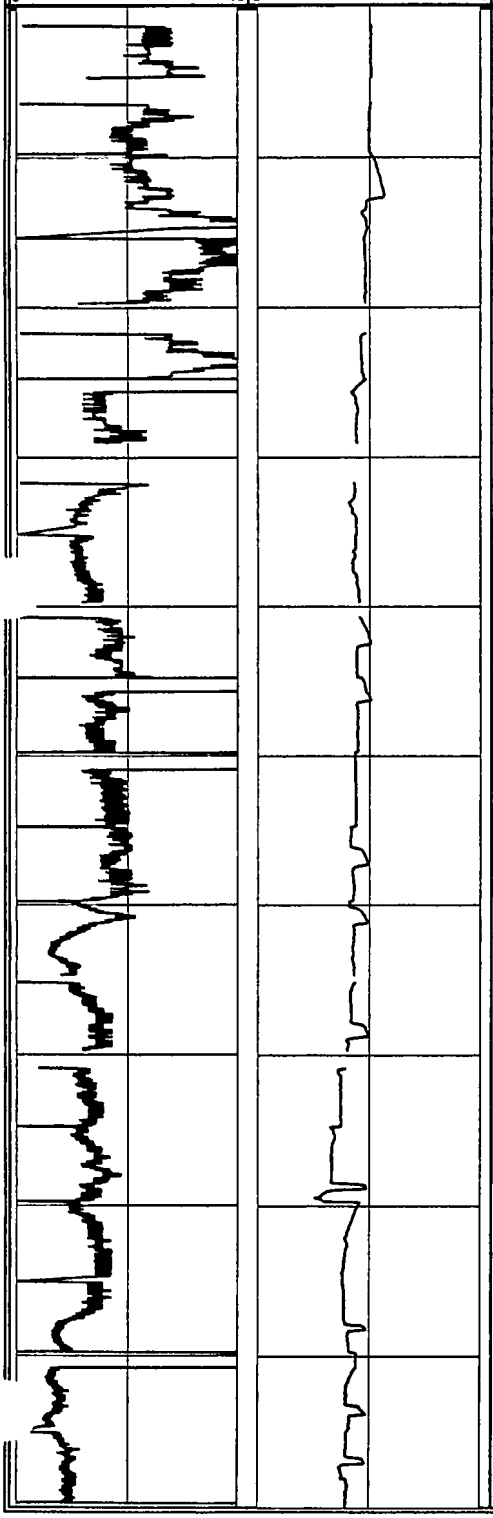
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-25**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 8, 2003
JOB NUMBER:	4563001	END DATE:	July 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Cantiague Rock Rd, on NW corner of 70 building
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Wes Eicfeld	HYDROGEOLOGIST:	Jeff Dekoskie/John Hilton
HELPER:	Karri Carly		

Total depth of Profile: 379.15 ft — Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (fine to medium); light brown	SP		
	Well-graded SAND with trace gravel (fine); light brown	SW		Profile data gap due to poor KPRO equilibration
110	Well-graded SAND and GRAVEL (fine); light brown	SW-GP		
120	Well-graded SAND; light brown	SW		Profile data gaps due to poor KPRO equilibration
130				
140	Well-graded SAND with some gravel; light brown	SW		
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
150	Poorly-graded SAND (medium to coarse) with some to trace gravel (fine); light brown	SP		Gravel fraction decreases with depth
160	Poorly-graded SAND (fine to medium); light brown	SP		Profile data gaps due to poor KPRO equilibration
170	Well-graded sand; light brown to tan	SW		Some loss of drilling fluid
180	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
190				
	Poorly-graded SAND (medium to coarse) and some gravel (fine); light brown	SP		Profile data gap due to poor KPRO equilibration

Boring ID:

MALCOLM PIRNIE, INC.

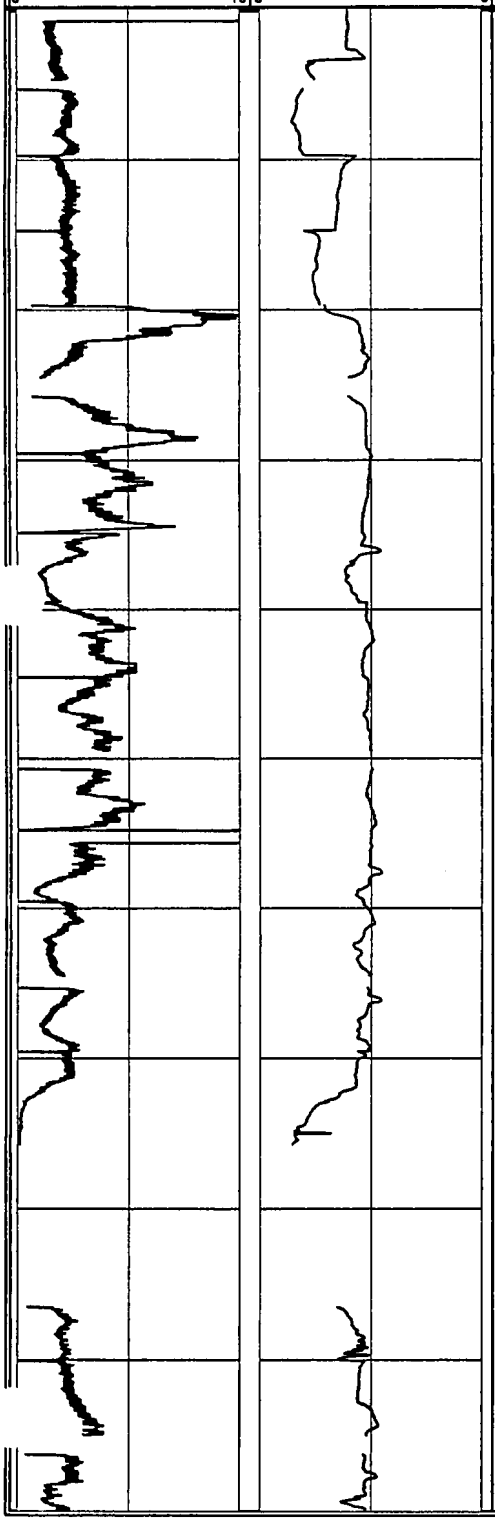
7 Route 208 North Fair Lawn, NJ 07401

P-25

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 8, 2003
JOB NUMBER:	4563001	END DATE:	July 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Cantiague Rock Rd, on NW corner of 70 building
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Wes Eicfeld	HYDROGEOLOGIST:	Jeff Dekoskie/John Hilton
HELPER:	Karri Carly		

Total depth of Profile: 379.15 ft Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		SP		
	Well-graded SAND; light brown	SW		Profile data gap due to poor KPRO equilibration
210				
220	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light brown	SP		Profile data gap due to poor KPRO equilibration
230	Well-graded SAND; light brown	SW		
240				
250	Well-graded SAND with trace gravel (fine); light brown	SW		Profile data gap due to poor KPRO equilibration
	Poorly-graded SAND (fine to medium) and GRAVEL (fine); light brown	SP-GP		
260	Well-graded SAND with trace gravel (fine); light brown	SW		Profile data gap due to poor KPRO equilibration
270	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		Increased down pressure, but drive rate decreasing
	Poorly-graded SAND (fine to medium); light brown	SP		Profiler refusal at 275.8 ft. No penetration rate or IK data from 275.8 to 284.65 ft due to drilling activity, and from 284.65 to 286.42 due to malfunctioning profile equipment.
280	Poorly-graded SAND (medium to coarse); light brown to white	SP		
290	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		Profile data gap due to poor KPRO equilibration

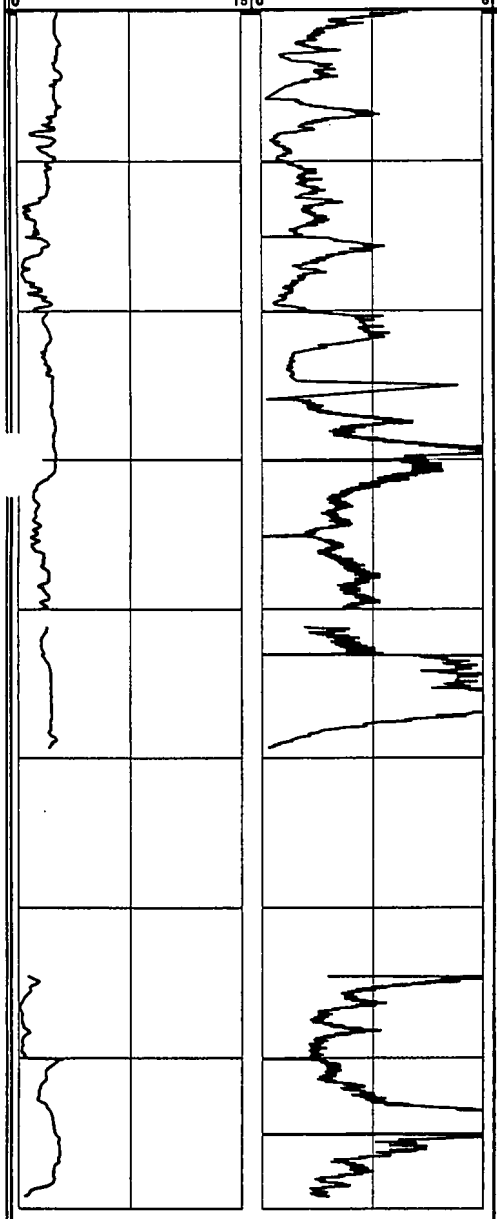
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-25

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 8, 2003
JOB NUMBER:	4563001	END DATE:	July 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Cantiague Rock Rd, on NW corner of 70 building
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carly	HYDROGEOLOGIST:	Jeff Dekoskie/John Hilton

Total depth of Profile: 379.15 ft
Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		SP-GP		
	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light brown	SP		
310				
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
320	Poorly-graded SAND (fine to medium); light brown	SP		
330				
340				Profile data gap due to poor KPRO equilibration
	SAND and SILT with some clay; gray	SM-CL		Silt and clay fractions increase with depth.
350				Profiler refusal at 349.4 ft. No penetration rate or IK data from 349.4 to 364.5 ft due to drilling activity
	CLAY with some sand; gray	CL		Sand occurs as thin interbeds within the clay
360				
	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light brown			End of boring at 365 ft
370				
380				End of profile at 379.15 ft bgs

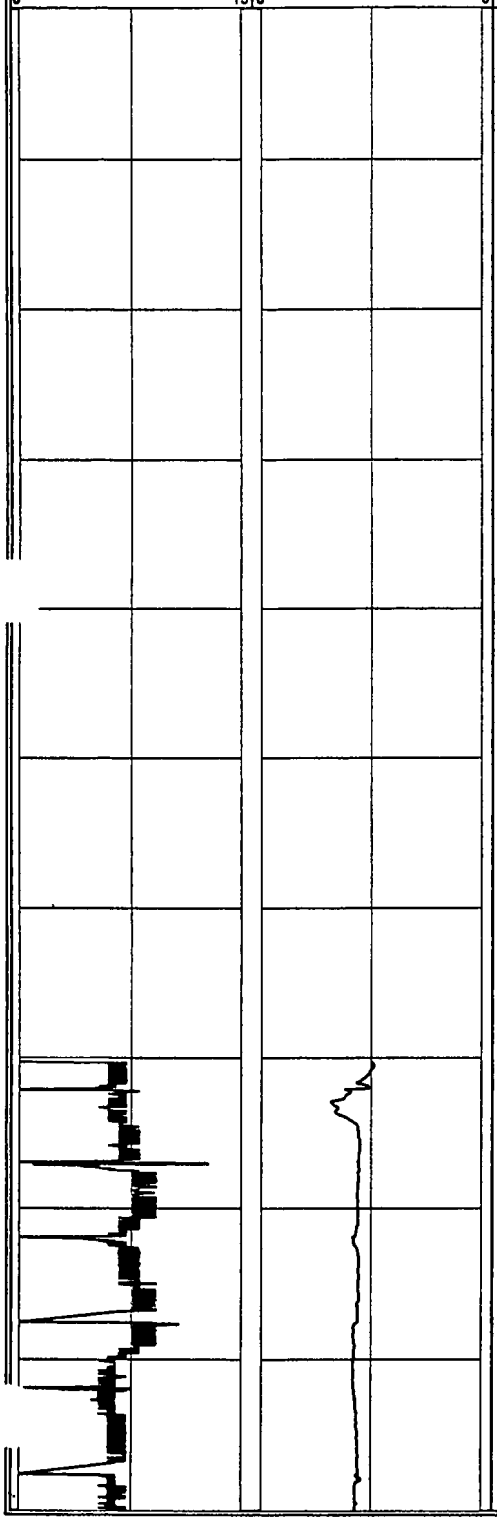
MALCOLM PIRNIE, INC.
'7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-26

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 12, 2003
JOB NUMBER:	4563001	END DATE:	May 20, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near NW corner of 140 property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 295.8 ft — Total depth of Boring: 300 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND with gravel; light to medium brown	SW		8 in steel casing used to drill from 0 to 8 ft
10	Poorly-graded SAND (medium to coarse) with little gravel (fine); light tan to brown	SP		Begin mud rotary drilling with 3 in casing at 8 ft
20				Significant loss of drilling fluid from 20 to 30 ft
30	Poorly-graded GRAVEL (fine to medium) with some sand (fine to medium); orange to brown	GP		
40	Poorly-graded SAND (medium to coarse) with little gravel (fine); light gray to white	SP		
50	Silty-SAND; tan, orange, brown	SM		Silt occurs as interbeds (< 1ft thick) within the sand
60	SAND (medium to coarse) and GRAVEL (fine); white to gray	SP-GP		
70	Poorly-graded SAND (medium) with trace gravel (fine); gray to white	SP		Begin profiling at 69.55 ft
80				
90				

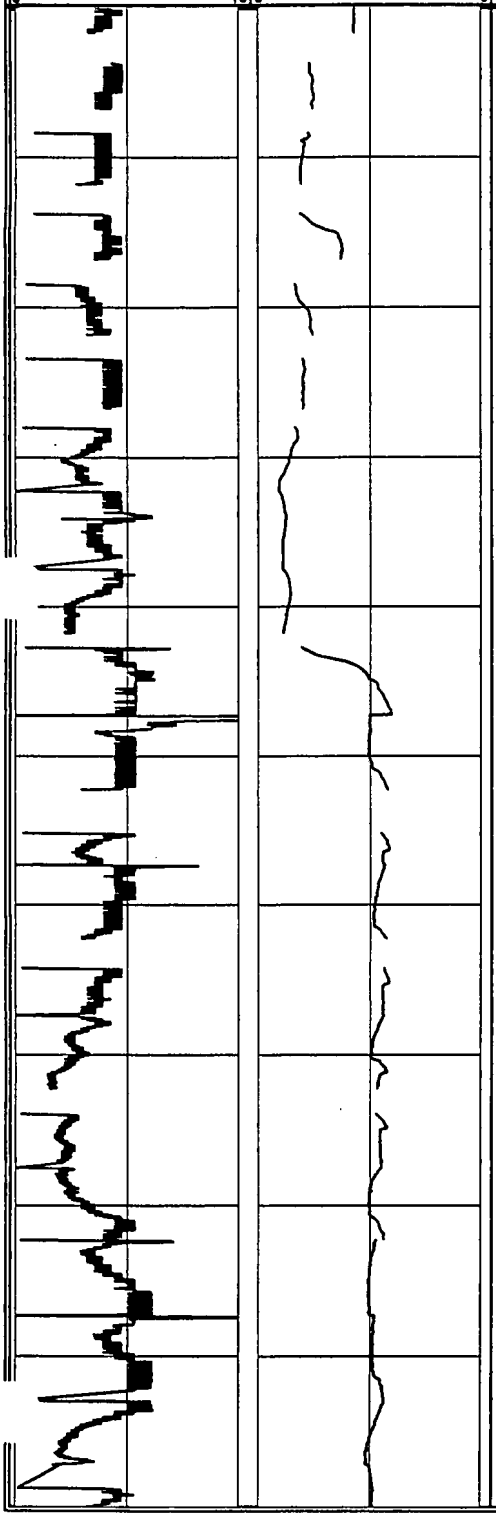
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-26

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 12, 2003
JOB NUMBER:	4563001	END DATE:	May 20, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near NW corner of 140 property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 295.8 ft Total depth of Boring: 300 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		Profile data gaps due to poor KPRO flow equilibration from 101.85 to 103.74, 106.8 to 108.4, 111.85 to 113.72, and 116.85 to 118.43 ft.
	Poorly-graded SAND (fine to medium) with trace gravel (fine); light gray to white	SP		
110				
120				Gravel occurs as thin (<1 ft) thick interbeds within the sand from 120 to 135 ft Profile data gaps due to poor KPRO equilibration
130				
140				Profile data gap due to poor KPRO equilibration
150	Poorly-graded SAND (fine to medium) with silt and trace gravel (coarse); light gray to brown.	SP-SM		Profile data gap due to poor KPRO equilibration
160				Profile data gap due to poor KPRO equilibration
170				Profile data gap due to poor KPRO equilibration Silt lenses (< 1 ft) at 175 - 180 ft and 185 - 190 ft
180				
190				Trace gravel (coarse) at 190 - 195 ft

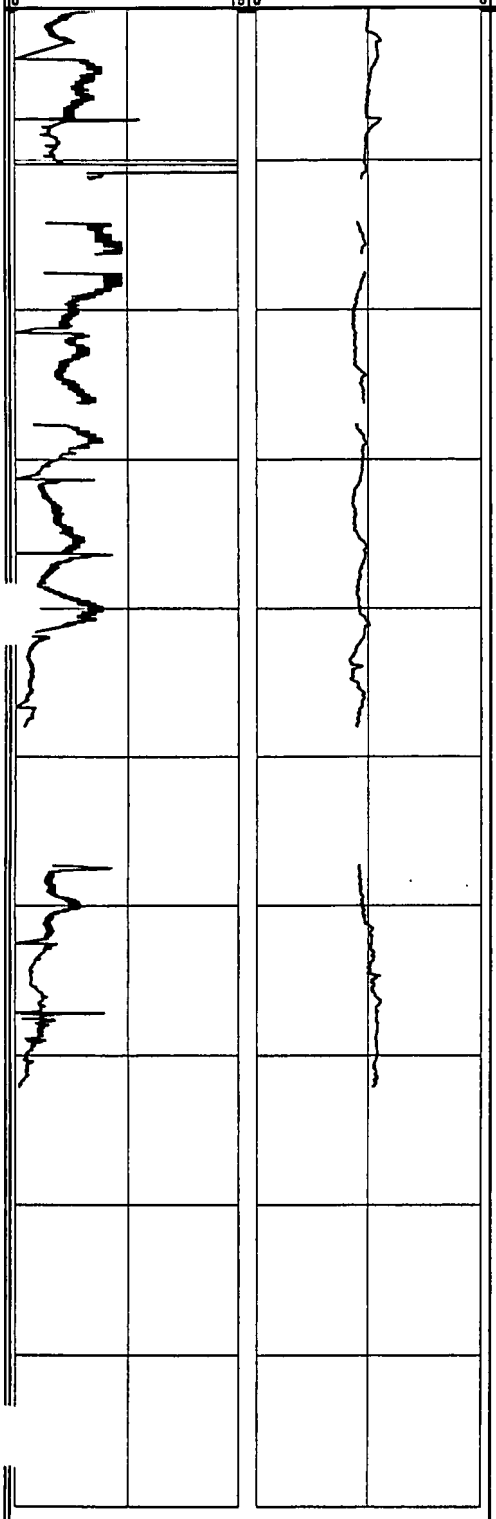
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-26**

OJECT NAME:	GTEOSI-Hicksville	START DATE:	May 12, 2003
JOB NUMBER:	4563001	END DATE:	May 20, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near NW corner of 140 property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 295.8 ft — Total depth of Boring: 300 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Well-graded SAND with trace gravel; light gray to brown	SW		
210				Profile data gap due to poor KPRO equilibration
				Coarsens downward, gravel fraction increases with depth
220				
				Profile data gap due to poor KPRO equilibration
230				
	Poorly-graded GRAVEL (fine)	GP		
240	Well-graded SAND with trace gravel; brown to tan	SW		
250				Gravel interbeds from 250 - 255 ft
				Profile data gap from 247.97 to 257.3 ft due to drilling activities
	Poorly-graded SAND (medium to coarse); white to tan	SP		
260				Coarsens with depth
270				Drilling equipment malfunctions, lost 5 ft of 3 in casing and tri-cone roller bit in bore hole. Abandoned bore hole and off-set drilling location. Much drilling fluid lost during drilling upper 80 ft of new hole
280				End of Profile at 272.12 ft
	Poorly-graded SAND (medium to coarse) with trace gravel; orange to pink	SP		
290				Gravel from 291 to 292 ft, Increased K-feldspar (up to 50% at 295 to 298 ft bgs)
				End of boring at 300 ft, end profile at 295.8 ft bgs
300				

MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

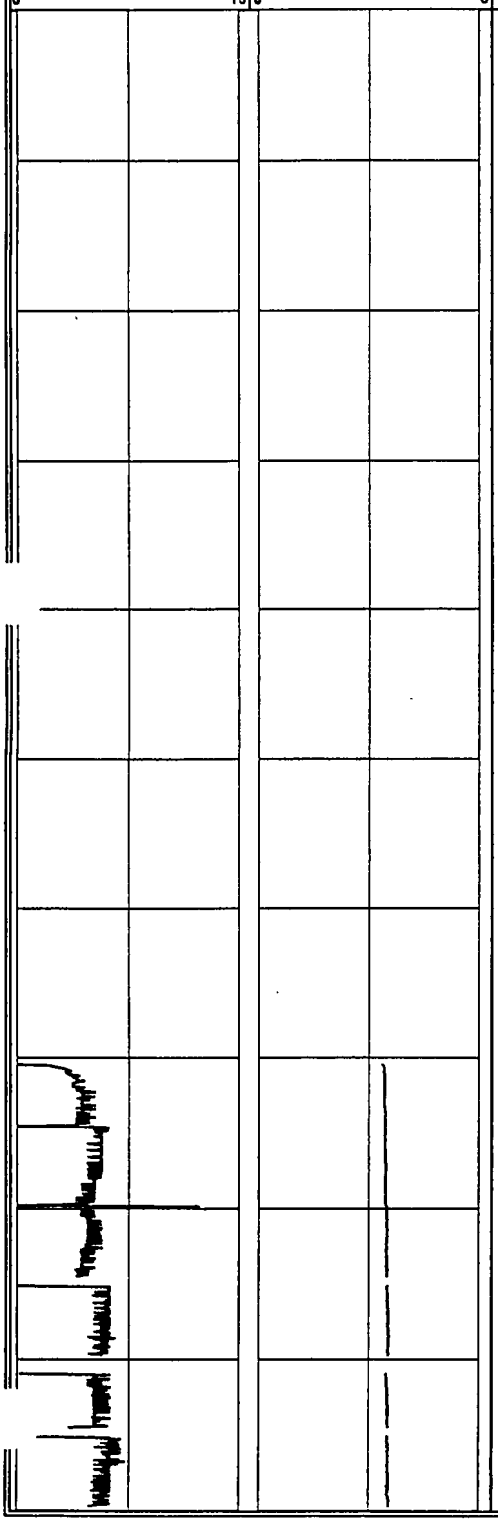
Boring ID: **P-27**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 1, 2003
JOB NUMBER:	4563001	END DATE:	May 9, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. Next to 70 property south driveway
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Wes Eicfeld	HYDROGEOLOGIST:	Garrett Ferguson
HELPER:	Karri Carley		

Total depth of Profile: 285.02 ft

Total depth of Boring: 280.5 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) with some gravel; brown	SP		
10				Hollow stem auger used from 0 to 13 ft
				Begin mud rotary drilling at 13 ft.
20	Well-graded SAND with some gravel (fine); brown	SW		
30				
40	Poorly-graded SAND (coarse) and GRAVEL (fine); brown	SP-GP		
50				
60				
70	Poorly-graded SAND (medium to coarse) with trace gravel (fine); brown	SP		Begin profiling at 70.47 ft
80				
				Profile data gaps due to poor KPRO equilibration
90				

Boring ID:

MALCOLM PIRNIE, INC.

P-27

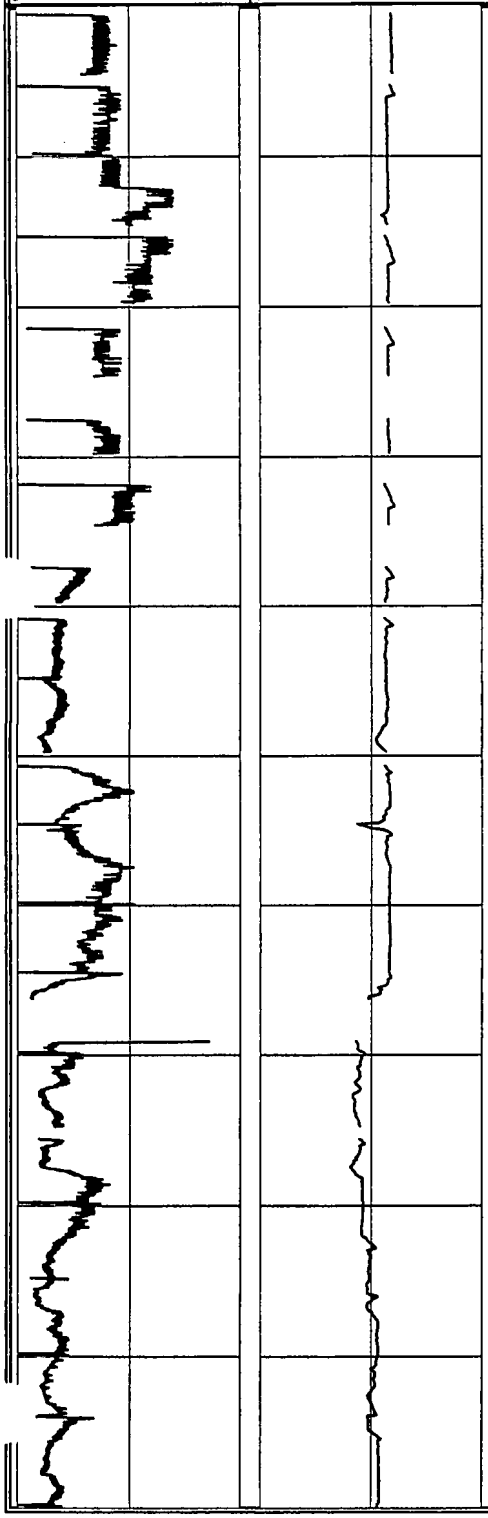
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 1, 2003
JOB NUMBER:	4563001	END DATE:	May 9, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. Next to 70 property south driveway
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Garrett Ferguson

Total depth of Profile: 285.02 ft

Total depth of Boring: 280.5 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		Profile data gap due to poor KPRO equilibration
110	Poorly-graded SAND (medium to coarse) with some gravel (fine); brown	SP		Micaceous
120	Poorly graded SAND (medium to coarse); brown	SP		Micaceous Profile data gaps due to poor KPRO equilibration
130	Well-graded SAND with trace gravel; brown	SW		
140	Well-graded SAND with some gravel (fine); brown	SW		Micaceous Pulled profile rods at 149.75 ft
150	Well-graded SAND with trace gravel and trace silt; brown	SW		Micaceous
160	Well-graded SAND with some gravel (fine); brown	SW		Micaceous Profile data gap due to poor KPRO equilibration
170				
180				
190	Poorly-graded SAND (medium to fine); brown	SP		Micaceous

Boring ID:

ALCOLM PIRNIE, INC.

P-27

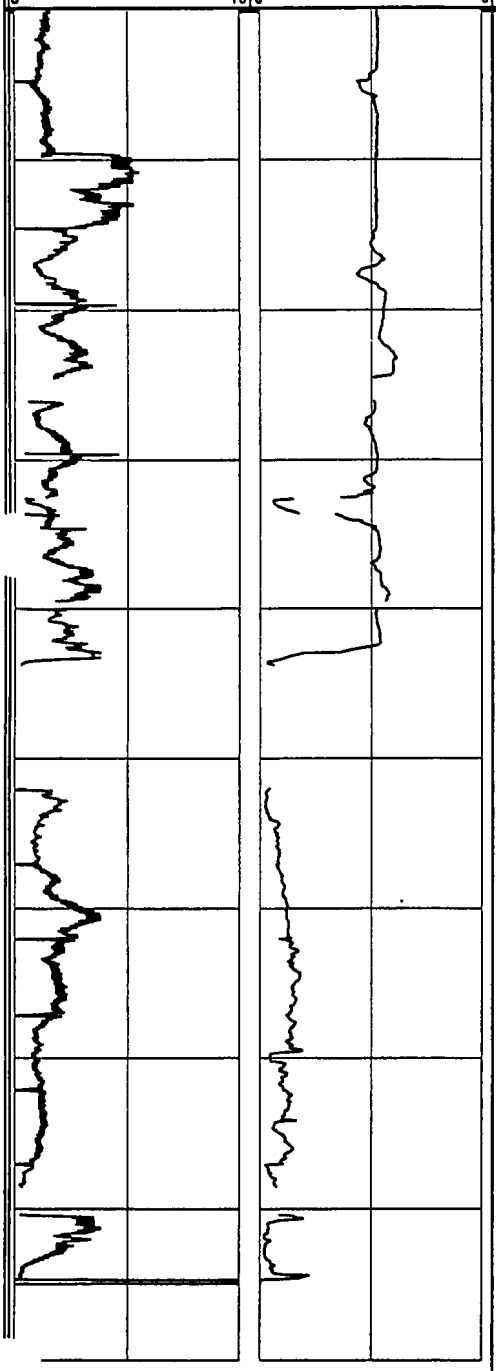
17-17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 1, 2003
JOB NUMBER:	4563001	END DATE:	May 9, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. Next to 70 property south driveway
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Garrett Ferguson

Total depth of Profile: 285.02 ft

Total depth of Boring: 280.5 ft.

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Well-graded SAND with some gravel (fine); brown	SW		
210				
220				Profile data gaps due to poor KPRO equilibration
230	Poorly-graded SAND (fine to medium); brown	SP		
240	Well-graded SAND (fine to coarse) with some clay and silt; brown	SC		Profiler refusal at 245 ft, no penetration rate or IK data from 243.76 to 252.05 ft due to drilling activities
250	Poorly-graded SAND (medium to coarse) with some gravel and some clay; brown	SC		
260	Poorly-graded SAND (fine to medium) and CLAY with trace gravel; brown	SC- CL		
270				Profiler refusal at 278.58 ft, no penetration rate or IK data from 278.58 to 280.42 ft due to drilling activities
280				End boring at 280.5 ft End of profile at 285.02 ft
290				

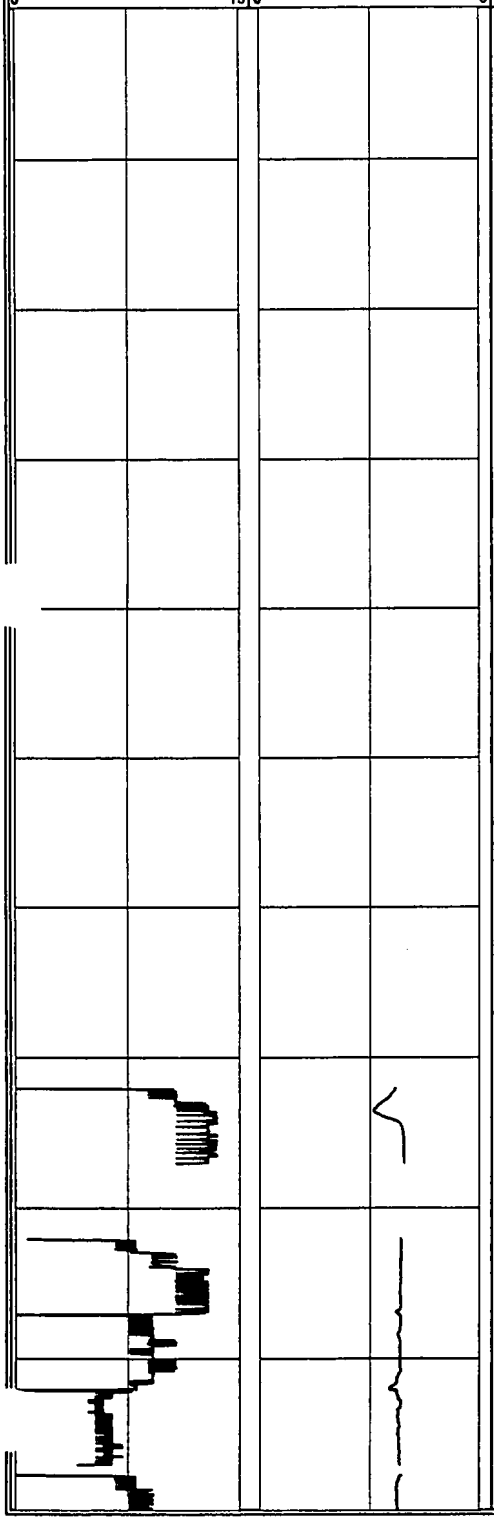
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-28

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 2, 2003
JOB NUMBER:	4563001	END DATE:	May 7, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd, on
DRILLING METHOD:	Mud Rotary	WEATHER:	Nassau Co. Golf Course's driving range
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 247 ft
Total depth of Boring: 200 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded GRAVEL with little sand (medium to coarse) and trace silt; light brown	GP		
10	Well-graded SAND with trace to little gravel (fine); light brown to brown	SW		
20	Well-graded SAND with trace silt and gravel (fine); medium brown	SW		~300 gallons drilling fluid lost in upper 15 ft of boring
30	SAND (fine to medium) and GRAVEL (fine); light to medium brown	SP-GP		
40	Well-graded SAND with trace silt and gravel (fine); light brown to gray	SW		
50				Sand unit fines downward from having fine gravel from 35 to 55 ft, to fine sand at 70 ft
60				Begin profiling at 67.98 ft
70	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light gray to white	SP		No IK data from 67.89 to 72.07 ft due to plugged KPRO lines
80				No record of penetration rate or IK from 77.02 to 82.02 due to broken string potentiometer
90	Poorly-graded SAND (fine to medium); light tan to brown	SP		Profile data gap due to poor KPRO equilibration

Boring ID:

MALCOLM PIRNIE, INC.

P-28

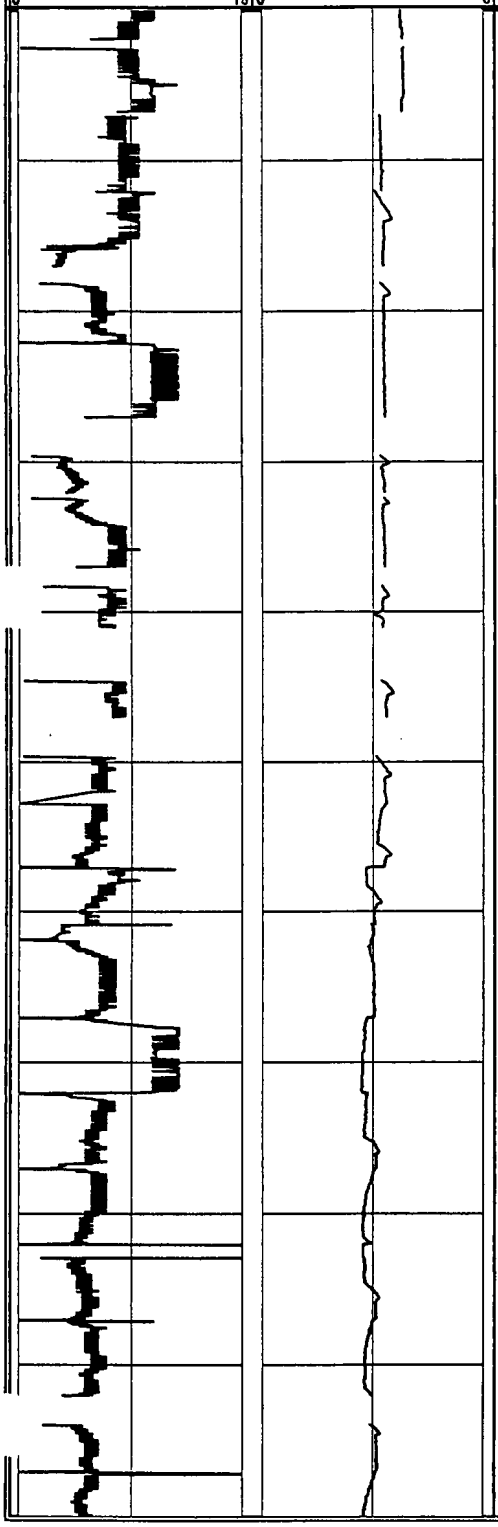
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 2, 2003
JOB NUMBER:	4563001	END DATE:	May 7, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd, on
DRILLING METHOD:	Mud Rotary	WEATHER:	Nassau Co. Golf Course's driving range
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 247 ft

Total depth of Boring: 200 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110				Profile data gaps due to poor KPRO equilibration
120				
128				Trace fine gravel interbeds at 128 to 130 ft
130				Profile data gaps due to poor KPRO equilibration
140	Poorly-graded SAND (medium) with trace gravel (fine); light tan to brown	SP		
150				Profile data gaps due to poor KPRO equilibration
	Poorly-graded SAND (medium to coarse); gray to white	SP		
160				
170				
180				
190				Profile data gaps due to poor KPRO equilibration

Boring ID:

MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

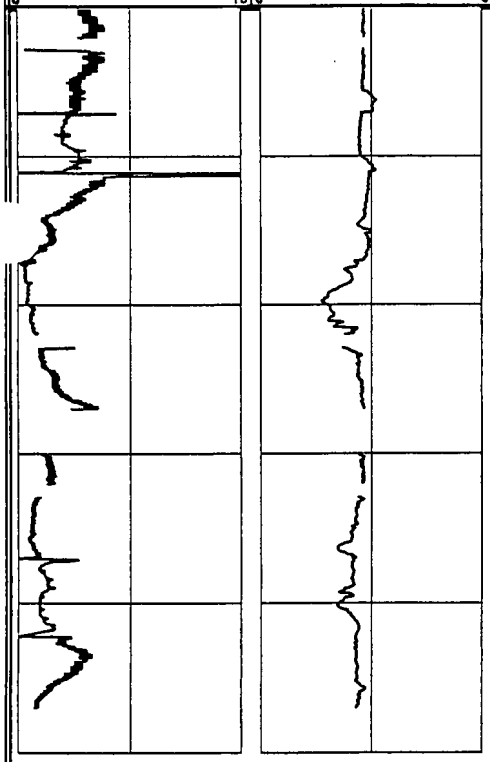
P-28

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 2, 2003
JOB NUMBER:	4563001	END DATE:	May 7, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, E of Cantiague Rock Rd, on
DRILLING METHOD:	Mud Rotary	WEATHER:	Nassau Co. Golf Course's driving range
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 247 ft

Total depth of Boring: 200 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200				End of mud rotary boring at 200 ft. End mud log.
210				
220				
230				Profile data gaps due to poor KPRO equilibration
240				
250				End of profile at 247 ft

Boring ID:

MALCOLM PIRNIE, INC.

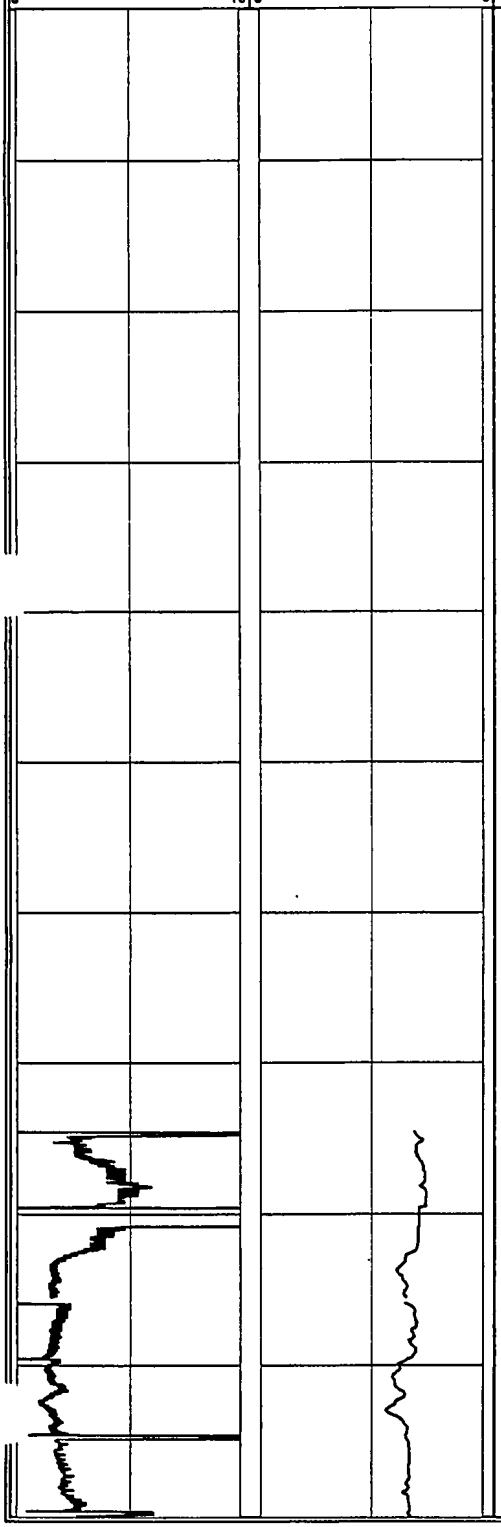
P-29

.7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 16, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	John Hilton
HELPER:	Larry Carlin		

Total depth of Profile: 410.7 Total depth of Boring: 410 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	SAND (fine to medium) and GRAVEL (fine); dark brown	SP-GP		6 1/4 hollow stem auger used to drill from 0 to 14 ft
14	GRAVEL (coarse) with some sand (medium to coarse); light brown	GP		Begin mud rotary drilling at 14 ft
20	Poorly-graded SAND with trace gravel (fine); light brown	SP		
	SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
50	Poorly-graded SAND (fine to medium) with trace gravel (fine); light brown to white	SP		Gravel occurs as interbeds <1 ft thick.
69				Begin profiling at 69.0 ft, but no data due to disconnected string potentiometer, reconnected at 74.57 ft
70	Poorly-graded SAND (fine to medium); light brown to white	SP		
80				Profile data gap due to poor KPRO equilibration

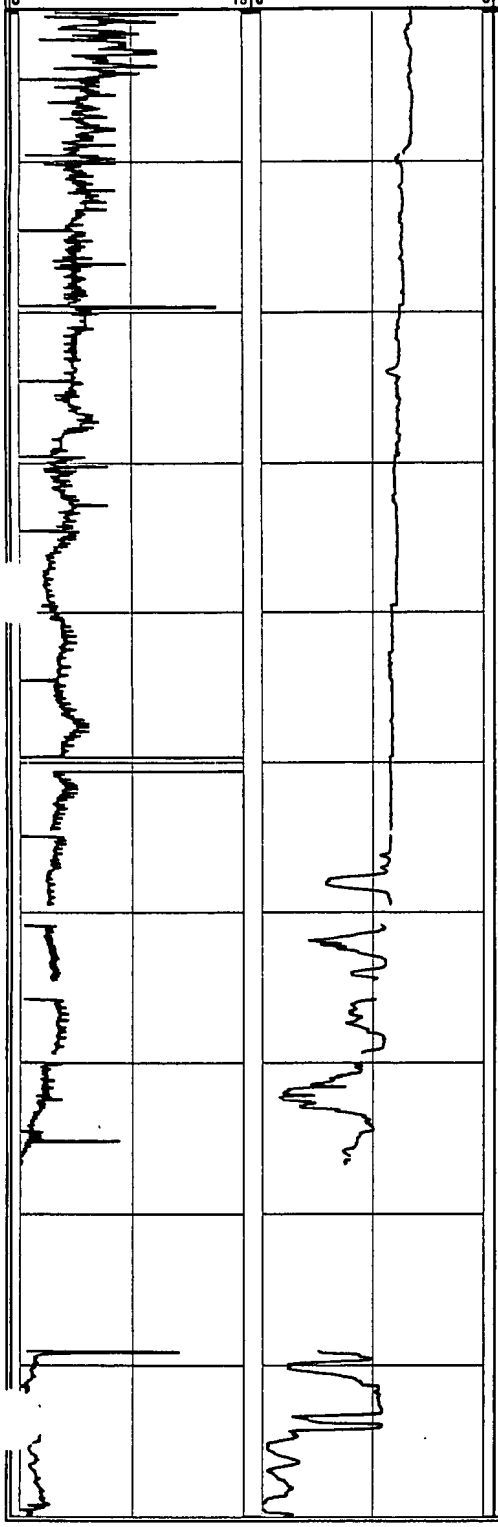
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-29**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 16, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 410.7 Total depth of Boring: 410 ft

GEOLOGIC INFORMATION



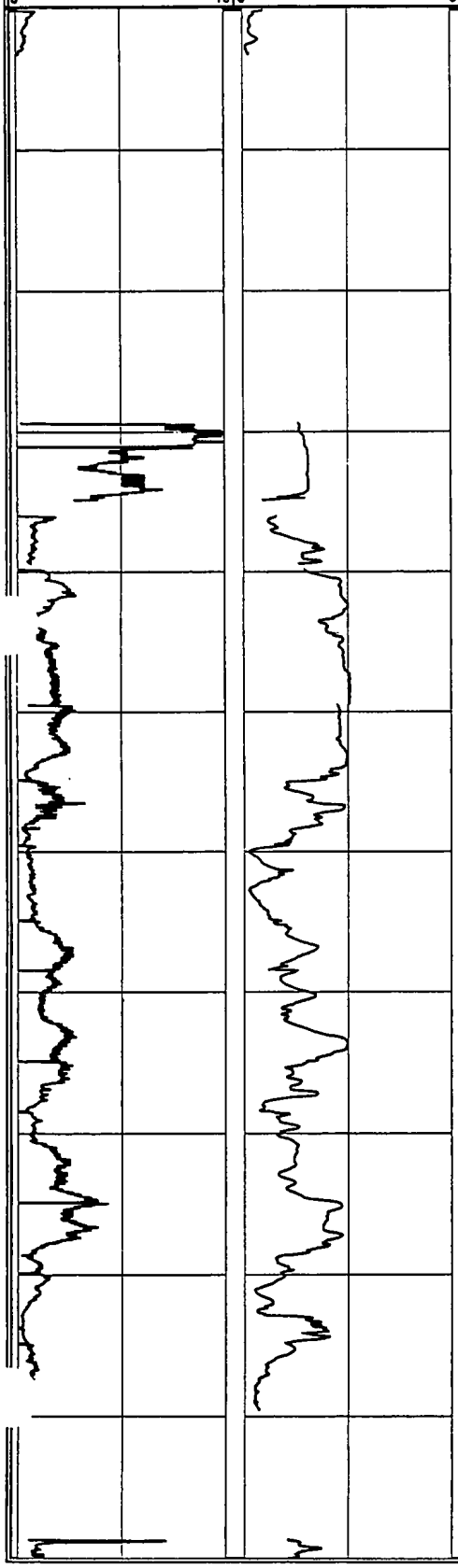
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100				
	Poorly-graded SAND (medium); light gray to brown	SP		
110				
	Poorly-graded SAND (medium) with trace clay and silt; light gray to brown	SP		Clay and silt occurs as thin interbeds
120				
130				
140				
	Poorly-graded SAND (medium to coarse) with some gravel (fine)	SP		Gravel occurs as thin interbeds
150	Silty sand; light brown	SM		Silt occurs as thin interbeds < 1 ft
160				Profile data gaps due to poor KPRO equilibration
170	Poorly-graded SAND (medium to coarse); light brown	SP		Profiler refusal at 176.7 ft, no pentration rate or IK data from 176.7 to 189.07 ft due to drilling activities
180	SAND and GRAVEL (fine)	SP-GP		
	SAND with some silt and clay; light tan to brown	SM		Silt and clay occur as thin interbeds
190				

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-29**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 16, 2003
9 NUMBER:	4563001	END DATE:	September 24, 2003
LLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
ILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	John Hilton
Total depth of Profile:	410.7	Total depth of Boring:	410 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	SILT and CLAY; light gray-white to dark brown	ML- CL		Some carbonaceous clay Profiler refusal at 203.32 ft
210				No penetration rate or IK data from 203.32 to 229.4 ft due to drilling activities
220				
	Silty SAND; light brown to yellow	SM		
230	Poorly-graded SAND (fine); light tan to brown	SP		Profile data gaps due to poor KPRO equilibration
240		SP		
250				
260				
	Poorly-graded sand with some silt and clay; light brown	SM		Silty clay interbeds
270				
280				
290	Silty SAND with some clay; light brown	SM		Carbonaceous clay interbeds Profiler refusal at 299.55 ft. No penetration rate or IK data from 299.55 to 308.71 ft due to drilling activities
300				

Boring ID:

MALCOLM PIRNIE, INC.

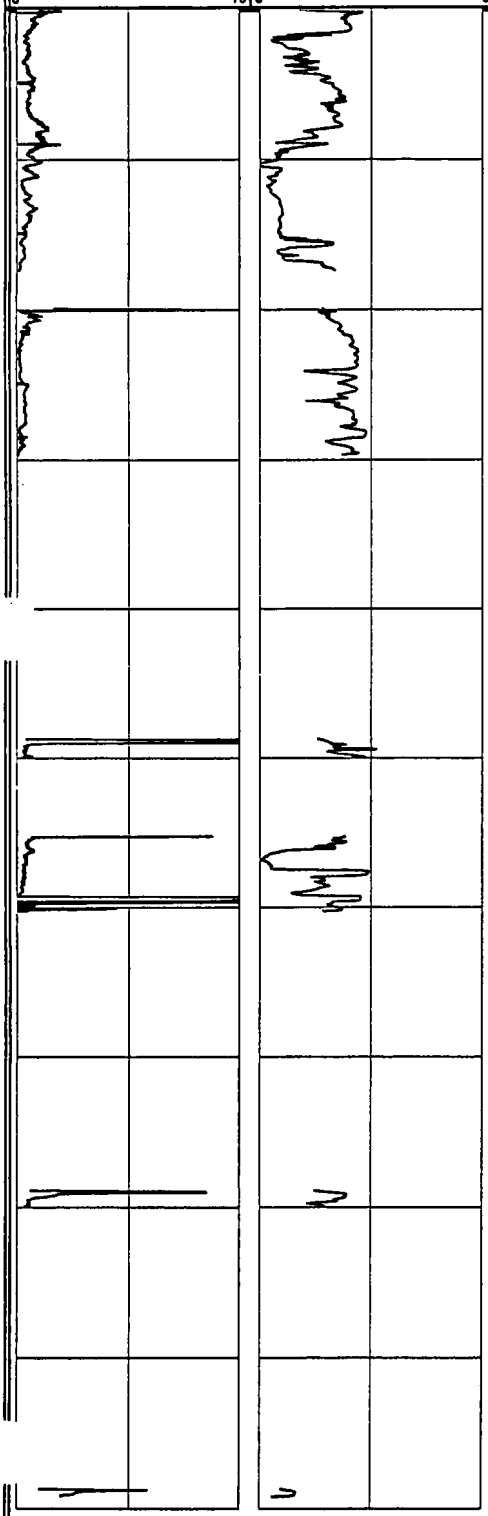
17-17 Route 208 North Fair Lawn, NJ 07401

P-29

)JECT NAME:	GTEOSI-Hicksville	START DATE:	September 16, 2003
3 NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	John Hilton
HELPER:	Larry Carlin		

Total depth of Profile: 410.7 Total depth of Boring: 410 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
310	Poorly-graded SAND (fine to medium) with trace to little silt; gray to white	SP		Silty clay interbeds
320				
330				Profile data gap due to equipment malfunction
	Well-graded SAND; gray to white	SW		Profiler refusal at 339.70. High IK, but very low penetration rate
340				No penetration rate or IK data from 339.70 to 358.75 due to drilling activities
350				
				No profile data from 360.08 to 365.19 due to equipment malfunction
360	Poorly-graded SAND with trace clay; light gray to white	SP		
				Profiler refusal at 370.3 ft
370				No penetration rate or IK data from 370.3 to 388.91 ft due to drilling activities
380				
	CLAY with trace lignite; dark brown, carbonaceous	CL		
	Silty SAND with trace clay; light yellow to white	SM		Profiler refusal at 390.0 ft
390				
	Well-graded SAND; light gray to white	SW		No penetration rate or IK data from 390.0 to 408.71 ft due to drilling activities
400				
				Profiler refusal at 410.7 ft, end of Profile. End of boring at 410 ft.
				Upon pulling 3 in mud rotary casing, casing broke, interval from 279 to 409 ft left in boring
410				

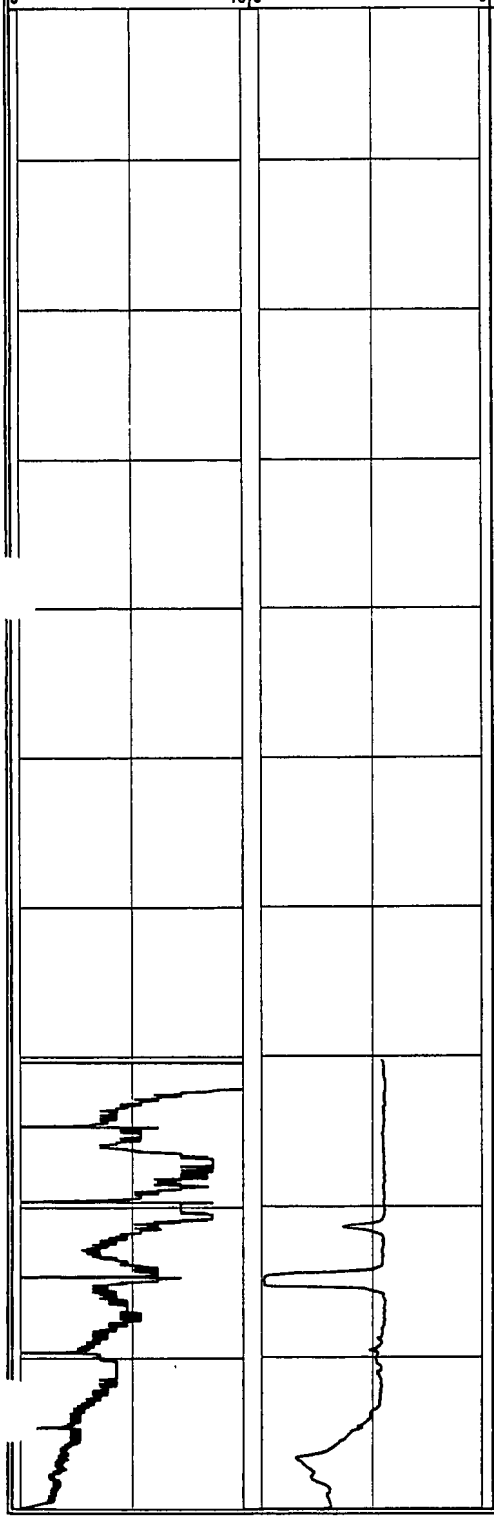
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-30

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 30, 2003
JOB NUMBER:	4563001	END DATE:	October 9, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-29
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier, John Hilton
HELPER:	Brian Sieker		

Total depth of Profile: 406.55 ft
Total depth of Boring: 390 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND and GRAVEL (fine to coarse); medium to dark brown	SP-GP		6 1/4 in hollow stem auger used to drill from 0 to 14 ft
10				Begin mud rotary drilling at 14 ft
	Poorly-graded SAND (coarse to medium) with trace gravel; light to medium brown	SP		
20				
	Well-graded SAND and GRAVEL (fine to medium); light brown	SP-GP		
30				Gravel fraction increases with depth
40	Poorly-graded SAND (medium to coarse) with trace gravel (fine); medium to light brown	SP		
50				
60				
	Poorly-graded SAND (medium to coarse); medium to light brown			Begin profiling at 70.34 ft
70				
80	Poorly-graded SAND (medium) with trace clay; light brown to orange	SC		
	CLAY with some sand; medium brown to orange	CL		
90	Poorly-graded SAND (medium to fine); light brown to white, some orange	SP		

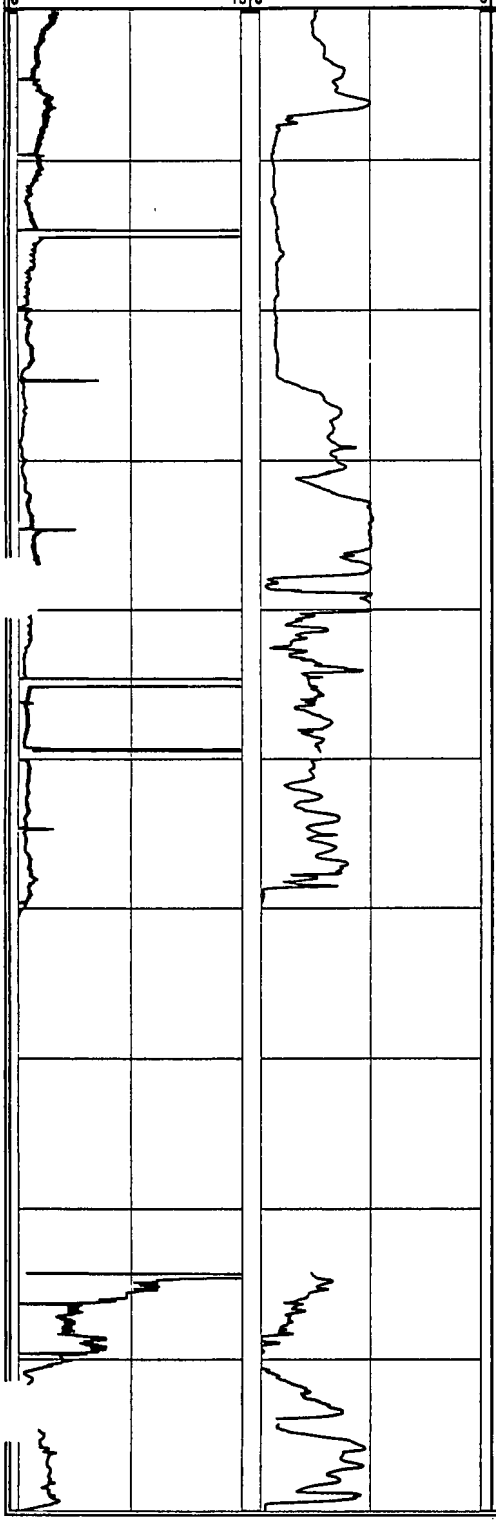
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-30

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 30, 2003
JOB NUMBER:	4563001	END DATE:	October 9, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-29
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Sieker	HYDROGEOLOGIST:	Emily Moshier, John Hilton

Total depth of Profile: 406.55 ft
Total depth of Boring: 390 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
	Poorly-graded SAND (fine) and SILT; light brown	SM-ML		
110				
120				
	Poorly-graded SAND (medium to fine); light tan	SP		
130				
140	SAND and CLAY; orange-brown	SC- CL		
150	Poorly-graded SAND (coarse); light brown	SP		
	CLAY with some sand; orange-brown	CL		
160	Clay; light gray to brown	CL		Profiler refusal at 160.5 ft, no penetration rate or IK data from 160.5 to 184.27 ft due to drilling activities
170				
180	SILT and SAND (medium); brown and orange	ML-SM		
	SILT; medium brown to orange	ML		
190	CLAY; light brown to white	CL		
	SILT and SAND (fine); dark to light brown	ML-SM		

Boring ID:

MALCOLM PIRNIE, INC.

P-30

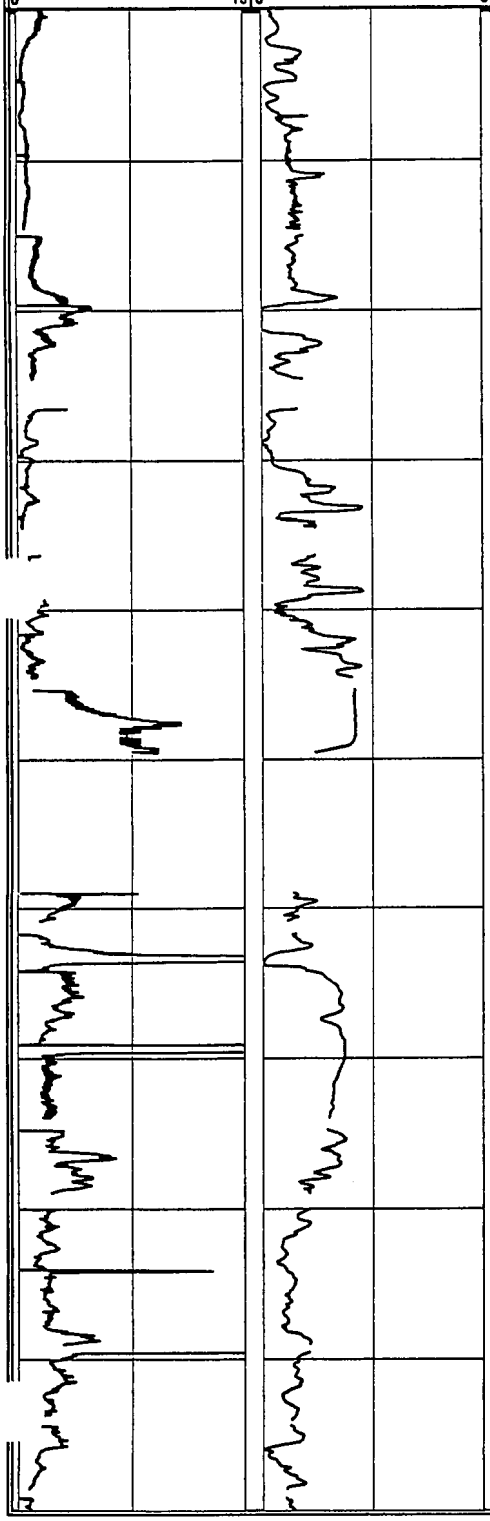
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 30, 2003
JOB NUMBER:	4563001	END DATE:	October 9, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-29
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier, John Hilton
HELPER:	Brian Sieker		

Total depth of Profile: 406.55 ft

Total depth of Boring: 390 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		ML-SM		
210				Profile data gap due to poor KPRO equilibration
220	CLAY and SAND (fine); light brown	SC- CL		Drill casing broke in hole at 223 ft, casing from 211 to 223 ft abandoned in hole, initiated drilling in off-set location
230				
240				Profile data gaps due to poor KPRO equilibration
250				Profiler refusal at 249.55 ft, no penetration rate or IK data from 249.55 ft to 258.95 ft due to drilling activities
260	Poorly-graded SAND (fine) with trace to little silt; light brown to gray	SP		Profile data gaps due to poor KPRO equilibration
270				
280				
290				Profile data gaps due to poor KPRO equilibration

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

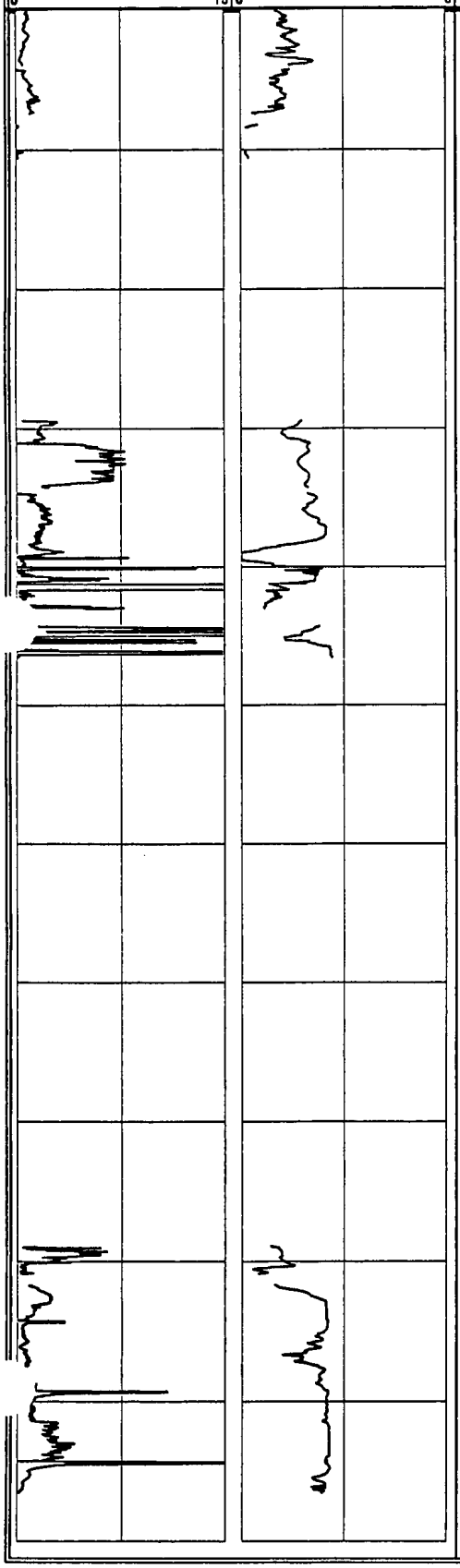
Boring ID: **P-30**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 30, 2003
JOB NUMBER:	4563001	END DATE:	October 9, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-29
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Sieker	HYDROGEOLOGIST:	Emily Moshier, John Hilton

Total depth of Profile: 406.55 ft

Total depth of Boring: 390 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	SAND with some silt and clay; light brown to gray	SM		Profile data gaps due to poor KPRO equilibration Silt and clay interbeds (< 2 ft) from 305 to 330 ft
310				Profiler refusal at 310.6 ft, no penetration rate or IK data from 310.6 to 329.43 ft due to drilling activities
320				
330	Poorly-graded SAND (fine) with trace silt; light brown to gray	SP		
340				
350	Well-graded SAND; light gray to white (1 ft clay lens from 354 to 355 ft)	SW		Profiler refusal at 346.59 ft, no penetration rate or IK data from 346.59 to 388.95 ft due to drilling activities
360	Well-graded SAND with trace gravel (fine); light gray to brown	SW		
370				
380				End of boring at 390 ft
390				Profile data gap due to poor KPRO equilibration
400				Profiler refusal at 406.55 ft. End of profile.
410				

Boring ID:

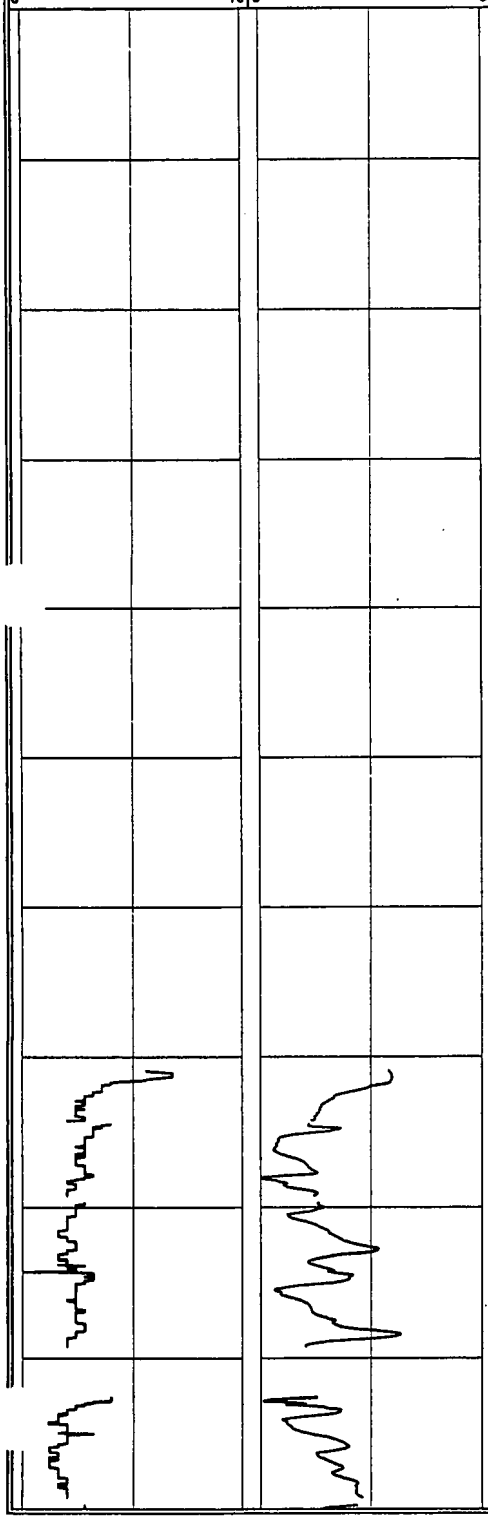
MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

P-31

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 5, 2004
JOB NUMBER:	4563001	END DATE:	January 24, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	451.5 ft	Total depth of Boring:	440 ft

GEOLOGIC INFORMATION

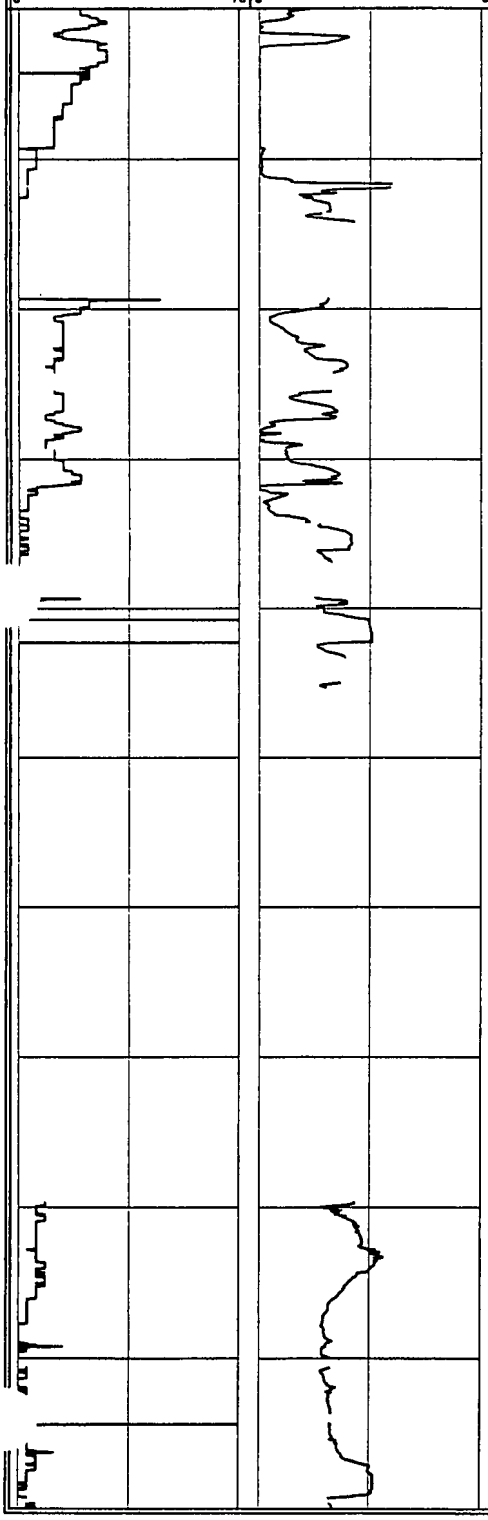


Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND (fine to coarse) with some gravel and cobbles; light brown.	SW		Hollow stem augers used from 0 to 15 ft
10				
	Poorly-graded SAND (medium to coarse) and GRAVEL; light brown-white-orange	SP-GP		Begin mud rotary drilling at 15 ft
20				
30				
40	Poorly-graded SAND (medium to coarse) with some silt; light brown to white	SM		Micaceous
50	Poorly-graded SAND (fine) with silt and clay; white-gray-orange	SM-SC		
60	Poorly-graded SAND (fine) with little clay; light brown to white	SC		
70	Poorly-graded SAND (fine to medium) with trace silt and clay; light brown to orange	SP		Begin profiling at 69.29 ft Profile data gaps due to poor KPRO equilibriation
80				
90	Poorly-graded SAND (fine to medium) with little clay and silt; brown	SC		Profile data gaps due to poor KPRO equilibriation

MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-31**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 5, 2004
JOB NUMBER:	4563001	END DATE:	January 24, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	451.5 ft	Total depth of Boring:	440 ft



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (fine to medium) with little clay and silt; brown	SC		
	SILT and CLAY with little sand (fine); orange-light brown-black	ML-CL		Profile data gaps due to poor KPRO equilibriation
110	Poorly-graded SAND (fine); dark brown to black	SP		Micaceous Profiler refusal at 114.20. No penetration rate or IK data from 114.2 to 119.25 ft due to drilling activities
120	SILT and CLAY with some sand (fine); dark brown-white-black	ML-CL		Profile data gaps due to poor KPRO equilibriation
130	Poorly-graded SAND (fine) and SILT with trace clay	SM-ML		Profiler refusal at 136.9. No penetration rate or IK data from 136.9 to 139.25 ft due to drilling activities
140	Poorly-graded SAND (fine); light brown to orange	SP		Profile data gaps due to poor KPRO equilibriation
	Poorly-graded SAND (fine); light brown to orange	SP		Interbedded clay from 148 to 173 ft
150				Profiler refusal at 145.2. No penetration rate or IK data from 145.2 to 179.25 ft due to drilling activities
160				
170	Poorly-graded SAND (fine); brown	SP		Micaceous
180	Poorly-graded SAND (fine) and SILT; brown	SM-ML		Profile data gaps due to poor KPRO equilibriation
190				

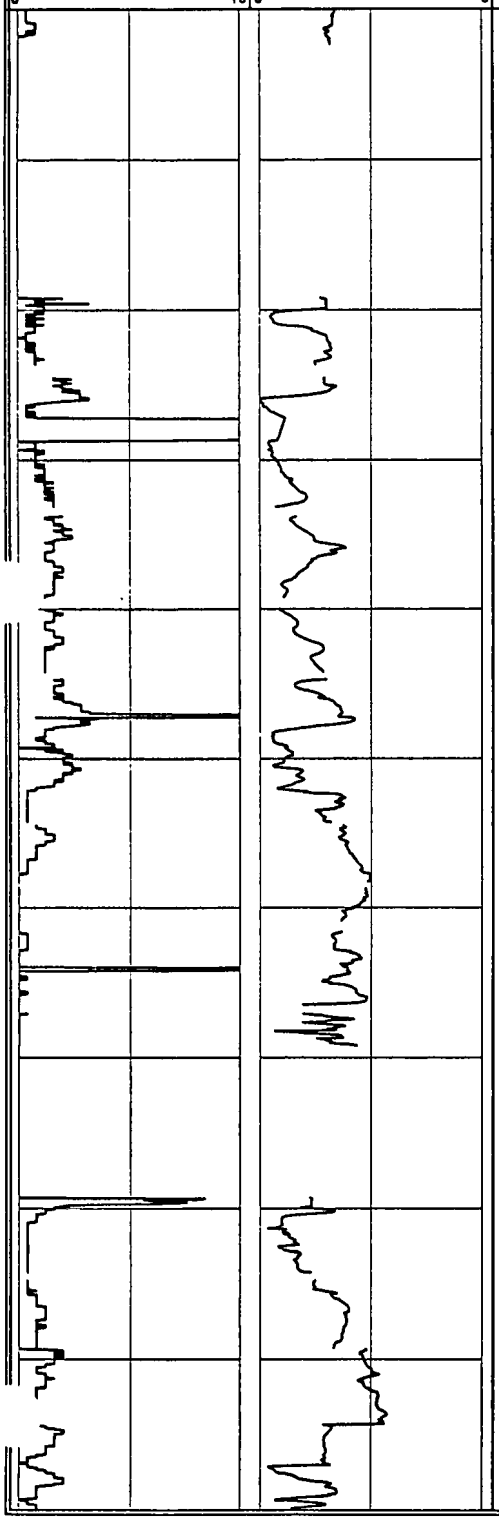
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-31**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 5, 2004
JOB NUMBER:	4563001	END DATE:	January 24, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 451.6 ft — Total depth of Boring: 440 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (fine to medium); white to orange	SP		Clay lenses from 200 to 220 ft Micaceous Profiler refusal at 202.38. No penetration rate or IK data from 202.38 to 219.25 ft due to drilling activities
220	Poorly-graded SAND (fine) with trace clay; light brown to white	SP		Micaceous Profile data gaps due to poor KPRO equilibriation
260	Poorly-graded SAND (fine); light brown	SP		Micaceous Profile data gaps due to poor KPRO equilibriation Profiler refusal at 269.20. No penetration rate or IK data from 269.20 to 279.75 ft due to drilling activities
280	Poorly-graded SAND (fine) with trace clay; light brown-white-gray	SP		Profile data gaps due to poor KPRO equilibriation

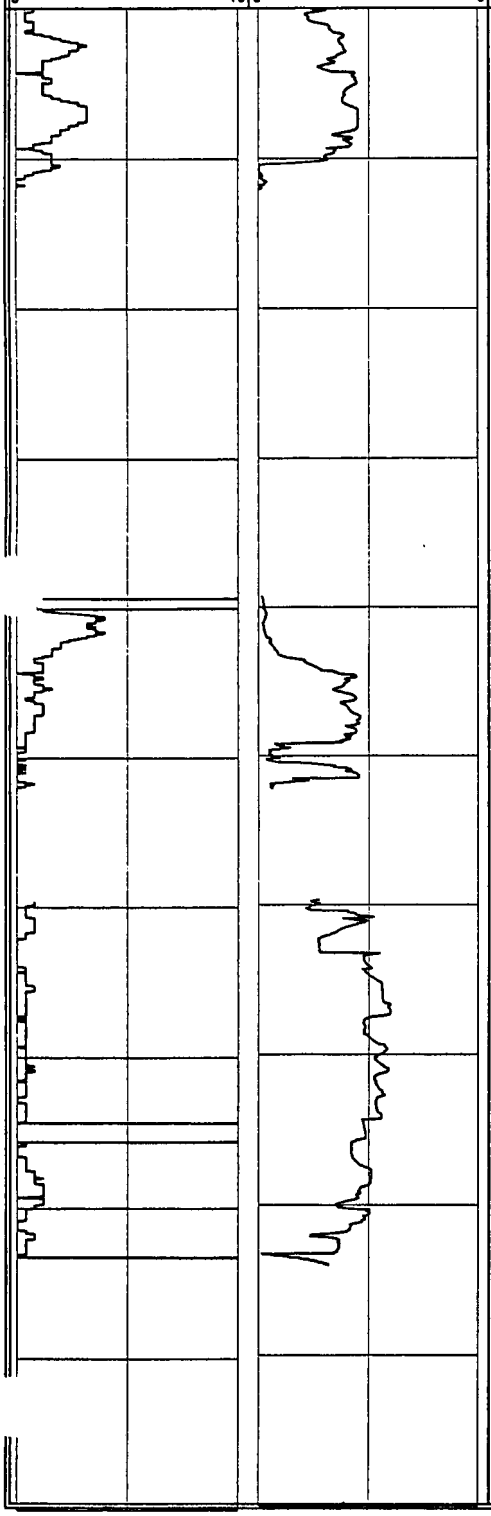
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-31

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 5, 2004
JOB NUMBER:	4563001	END DATE:	January 24, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 451.5 ft
Total depth of Boring: 440 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	Poorly-graded SAND (fine); light brown	SP		Micaceous
310	Poorly-graded SAND (fine) with silt and clay; white-orange-black	SM-SC		Profiler refusal at 312.04. No penetration rate or IK data from 312.04 to 339.25 ft due to drilling activities
320	Poorly-graded SAND (fine) and SILT with some clay and lignite; gray	SM-ML		
330	Poorly-graded SAND (fine) and SILT with trace clay	SM-ML		
340	Poorly-graded SAND (fine to medium); light brown to white	SP		Micaceous
350	Poorly-graded SAND (fine to medium); light brown to white	SP		Micaceous Thin clay layer at 352 ft Profiler refusal at 352.20. No penetration rate or IK data from 352.20 to 359.40 ft due to drilling activities
360	Well-graded SAND (fine to coarse) with trace clay; brown-orange-white	SW		Micaceous
370				
380	SILT and CLAY with some sand (fine to medium) and lignite; white-gray-orange	ML-CL		Micaceous Profiler refusal at 384.02. No penetration rate or IK data from 384.02 to 399.25 ft due to drilling activities
390	Poorly-graded SAND (medium to coarse); light brown to white	SP		

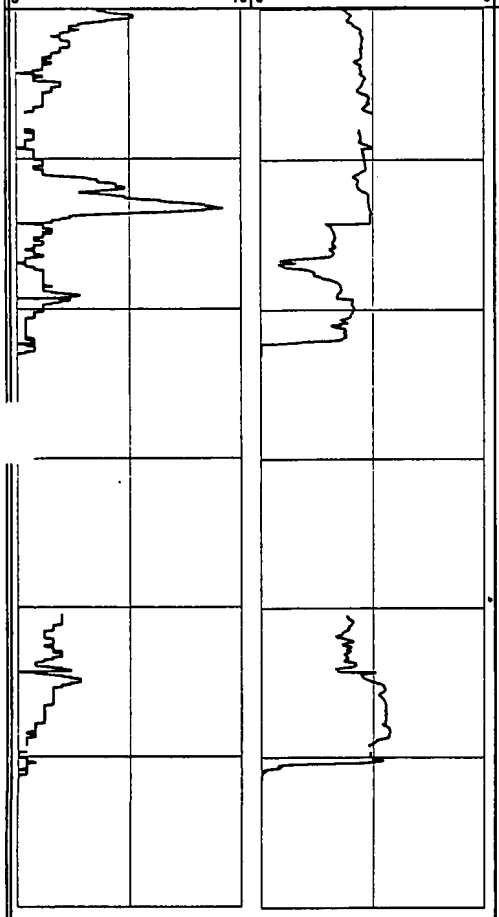
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-31**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 5, 2004
JOB NUMBER:	4563001	END DATE:	January 24, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 451.5 ft
Total depth of Boring: 440 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400	Poorly-graded SAND (medium to coarse); light brown to white	SP		No penetration rate or IK data from 407.0 to 408.0 ft due to leak in harness
410	Well-graded SAND (fine to coarse); light brown-white-orange	SW		
420	Well-graded SAND (fine to coarse) with little clay; light brown-white-orange	SC		Profiler refusal at 423.09. No penetration rate or IK data from 423.09 to 439.25 ft due to drilling activities
430	Poorly-graded SAND (medium to coarse) with trace clay; white-gray-tan	SP		End of boring at 440 ft
440				Profile data gap due to poor KPRO equilibriation
450				End of profile at 451.5 ft
460				
470				

Boring ID:

MALCOLM PIRNIE, INC.

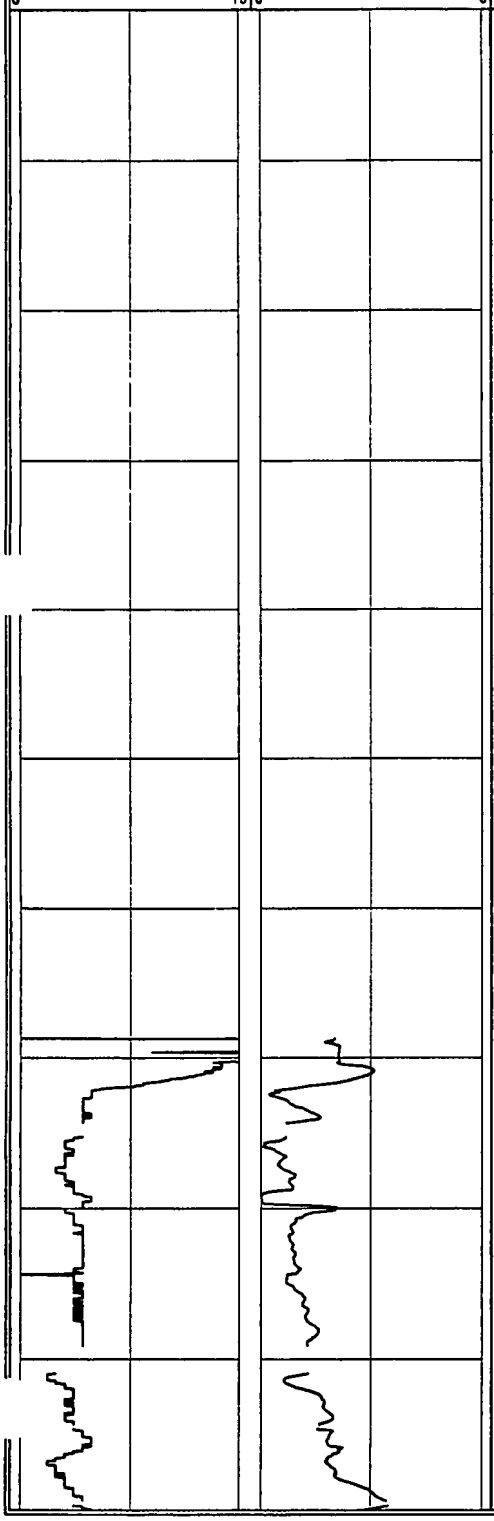
P-32

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	February 9, 2004
JOB NUMBER:	4563001	END DATE:	February 19, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	J. Hilton, C. Sullivan, E. Mosier
HELPER:	Larry Carlin		

Total depth of Profile: 492.68 | Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND (fine to coarse) with trace gravel (fine); brown	SW		Hollow stem augers used from 0 to 15 ft
	Well-graded SAND (fine to coarse) with some gravel (fine to coarse); brown	SW		
10	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		Begin mud rotary drilling at 15 ft
20				
30	Poorly-graded SAND (medium to coarse) with little gravel (fine); tan to brown	SP		
40				
50	Poorly-graded SAND (fine to medium) and GRAVEL (fine); brown	SP-GP		
60	Poorly-graded SAND (fine to medium) with trace silt; light brown to white	SP		Begin profiling at 68.65 ft
70				Profile data gaps due to poor KPRO equilibriation
80				
90	Poorly-graded SAND (fine) with trace silt; light gray to brown	SP		Profile data gaps due to poor KPRO equilibriation

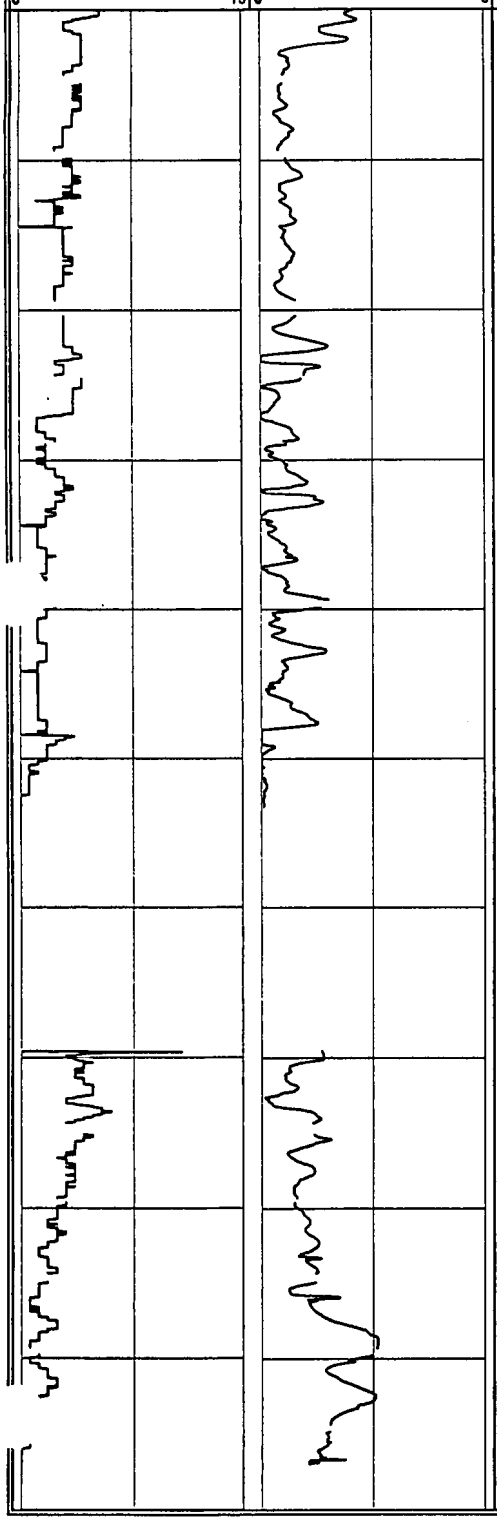
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-32**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	February 9, 2004
JOB NUMBER:	4563001	END DATE:	February 19, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	J. Hilton, C. Sullivan, E. Mosier
HELPER:	Larry Carlin		

Total depth of Profile: 492.58 Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (fine) with trace silt; light gray to brown	SP		Profile data gaps due to poor KPRO equilibriation
110				
120				Profile data gaps due to poor KPRO equilibriation
130	Poorly-graded SAND (fine and coarse) with trace silt and clay; light gray to brown	SP		
140				Profile data gaps due to poor KPRO equilibriation
150				Profiler refusal at 153.23 ft. No penetration rate or IK data from 153.23 to 169.50 ft due to drilling activities
160	Poorly-graded SAND (fine) with silt; light tan to white	SM		
170				Profile data gaps due to poor KPRO equilibriation
180	Poorly-graded SAND (medium to coarse); light tan to brown	SP		Micaceous
190	Poorly-graded SAND (fine to medium); brown			Profiler refusal at 196.96 ft. No penetration rate or IK data from 196.96 to 219.38 ft due to drilling activities

Boring ID:

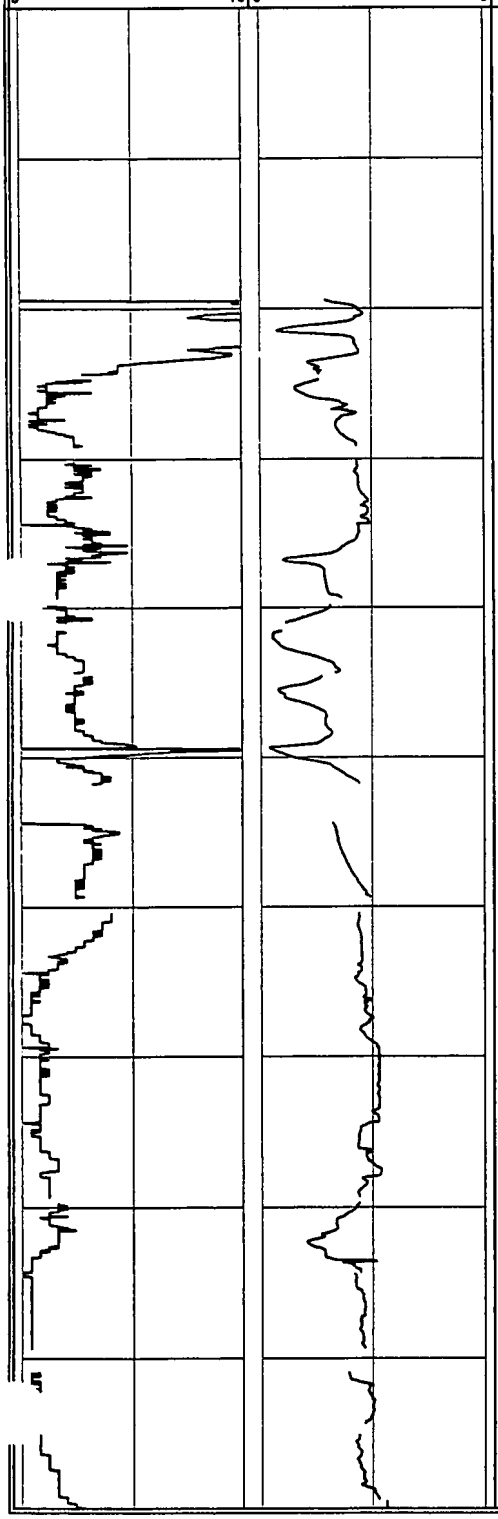
P-32

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	February 9, 2004
JOB NUMBER:	4563001	END DATE:	February 19, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	J. Hilton, C. Sullivan, E. Mosier

Total depth of Profile: 492.58 Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (fine) with little silt; olive brown to gray-white	SM		
210				
220				Profile data gaps due to poor KPRO equilibriation
230				
240				Profile data gaps due to poor KPRO equilibriation
	Poorly-graded SAND (fine) with little silt and clay; olive brown to gray-white	SM		
250	Poorly-graded SAND (fine) with little silt; light tan to white	SM		No penetration rate or IK data from 251.83 to 254.35 ft due to plugged KPRO line
260				Profile data gaps due to poor KPRO equilibriation
270				
280				Clay interbeds from 282 to 284 ft
290	Poorly-graded SAND (fine) with trace silt; light tan to white	SP		Profile data gaps due to poor KPRO equilibriation

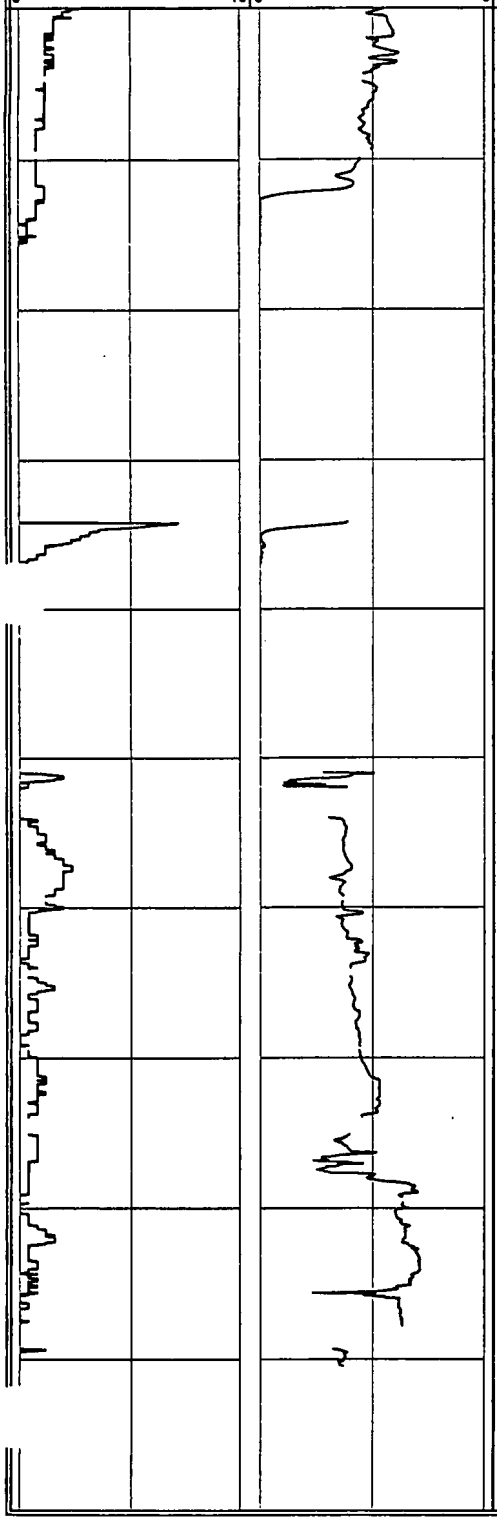
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-32**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	February 9, 2004
JOB NUMBER:	4563001	END DATE:	February 19, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	J. Hilton, C. Sullivan, E. Mosier

Total depth of Profile: 492.58 | Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	Poorly-graded SAND (fine) with trace silt; light tan to white	SP		Profile data gaps due to poor KPRO equilibriation
310	SILT and CLAY; dark gray to brown	ML-CL		Thin bedded fine sand (< 2 ft)
				Profiler refusal at 315.0 ft. No penetration rate or IK data from 315.0 to 334.15 ft due to drilling activities
320				
330	CLAY with little silt, trace sand (fine), and trace lignite; dark gray to brown	CL		
				Profiler refusal at 336.93 ft. No penetration rate or IK data from 336.93 to 349.05 ft due to drilling activities
340				
	Poorly graded SAND (fine to medium); light brown to tan	SP		No penetration rate or IK data from 349.10 to 350.95 ft due to low pressure reading
350				No penetration rate or IK data from 352.00 to 353.96 ft due to computer malfunction
360				Profile data gaps due to poor KPRO equilibriation
370	Well-graded SAND (fine to coarse) with trace silt; light brown to white	SW		Profile data gaps due to poor KPRO equilibriation
380				Profiler refusal at 387.8 ft. No penetration rate or IK data from 387.8 to 389.25 ft due to drilling activities
390	Well-graded SAND (fine to coarse); gray-white to tan-white	SW		Profiler refusal at 390.1 ft. No penetration rate or IK data from 390.1 to 409.30 ft due to drilling activities

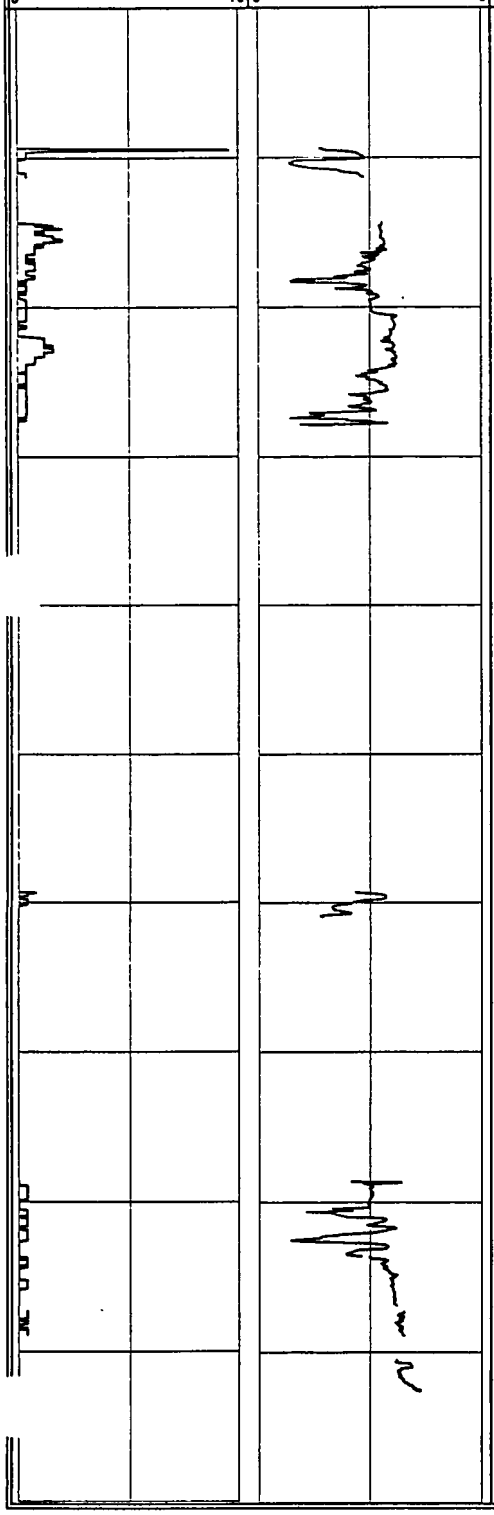
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-32**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	February 9, 2004
JOB NUMBER:	4563001	END DATE:	February 19, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd., North of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	J. Hilton, C. Sullivan, E. Mosier

Total depth of Profile: 492.58 | Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400	Well-graded SAND (fine to coarse); gray-white to tan-white	SW		
410	No Recovery			Lost circulation. No recovery of cuttings
				No penetration rate or IK data from 449.51 to 451.04 ft due to low pressure reading
420				Profile data gaps due to poor KPRO equilibriation
				Profiler refusal at 427.7 ft. No penetration rate or IK data from 427.7 to 449.45 ft due to drilling activities
430				
440				
450		CL		Rig response indicated interbedded silty sand and clay from 450 to 460 ft
460				
470				
480				End of boring at 480 ft
490				End of profile at 492.58 ft

Boring ID:

MALCOLM PIRNIE, INC.

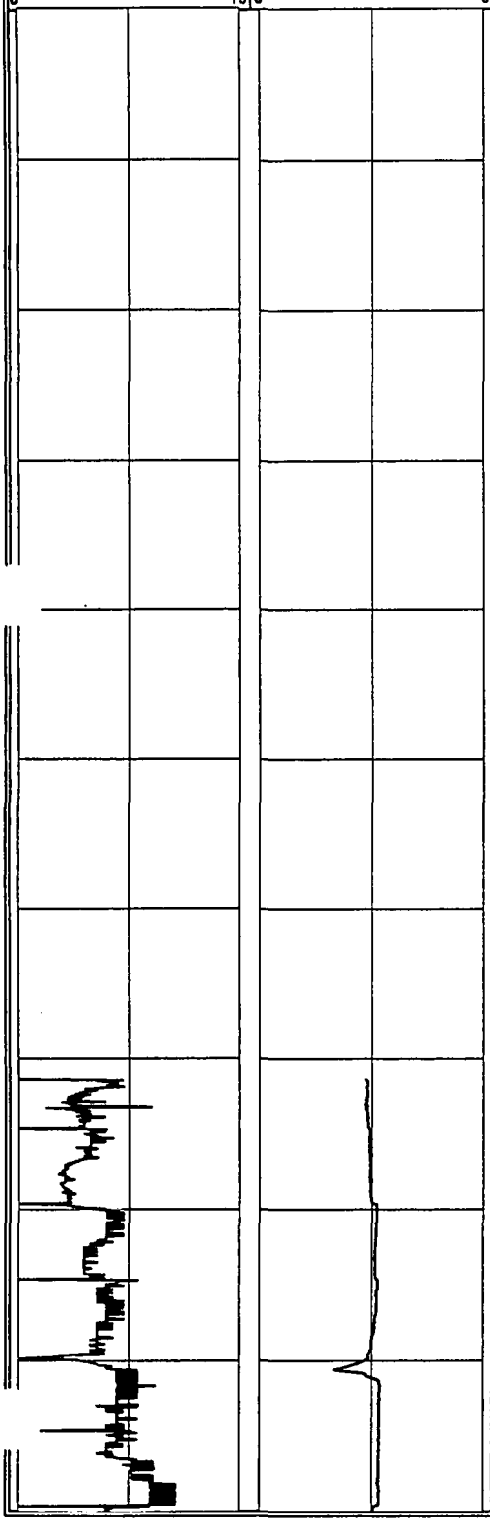
7 Route 208 North Fair Lawn, NJ 07401

P-33

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	December 5, 2003
JOB NUMBER:	4563001	END DATE:	December 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on North side of 140 building
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier
HELPER:	Larry Carlin		

Total depth of Profile: 500.1 ft Total depth of Boring: 500 ft

GEOLOGIC INFORMATION



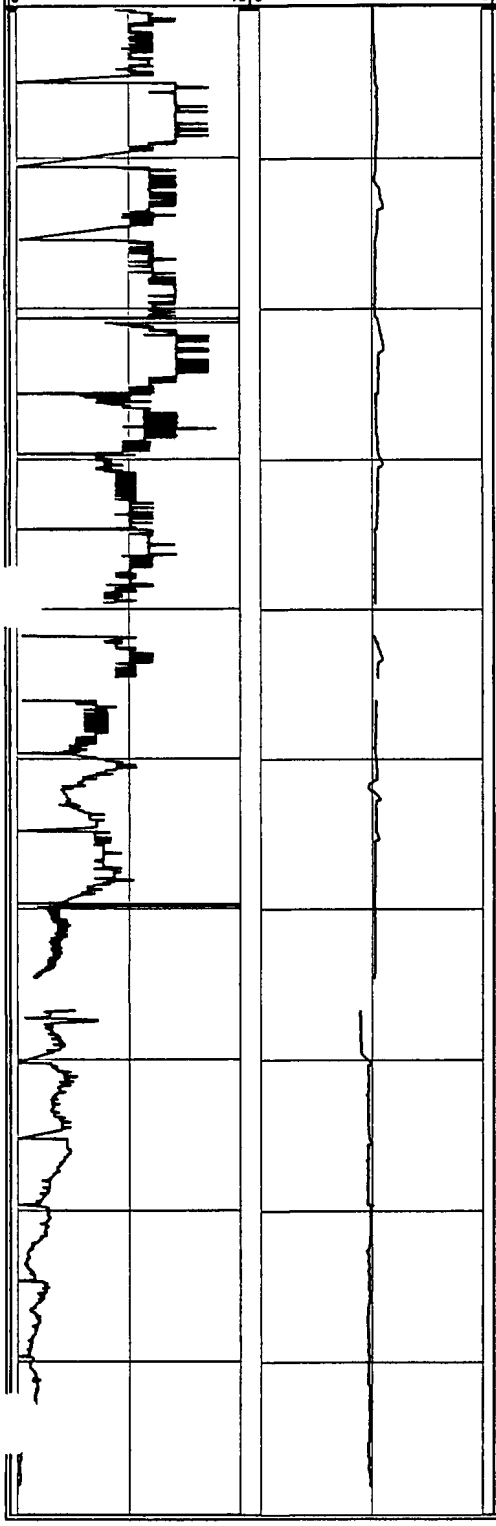
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (fine to medium) with little gravel (fine); dark brown to orange	SP		
10				Auger to 15 ft bgs
	Poorly-graded SAND (medium) and GRAVEL (fine to coarse); brown	SP-GW		Begin mud rotary drilling at 15 ft
20				
30				
40	Poorly-graded SAND (medium to coarse) with little gravel (fine); white to light brown	SP		
50				
60				
70	Poorly-graded SAND (fine to medium) with trace gravel (fine); white to light brown	SP		Begin Profiling at 71.37 ft
80				
90				

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-33**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	December 5, 2003
JOB NUMBER:	4563001	END DATE:	December 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on North side of 140 building
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier
HELPER:	Larry Carlin		
Total depth of Profile:	500.1 ft	Total depth of Boring:	500 ft

GEOLOGIC INFORMATION

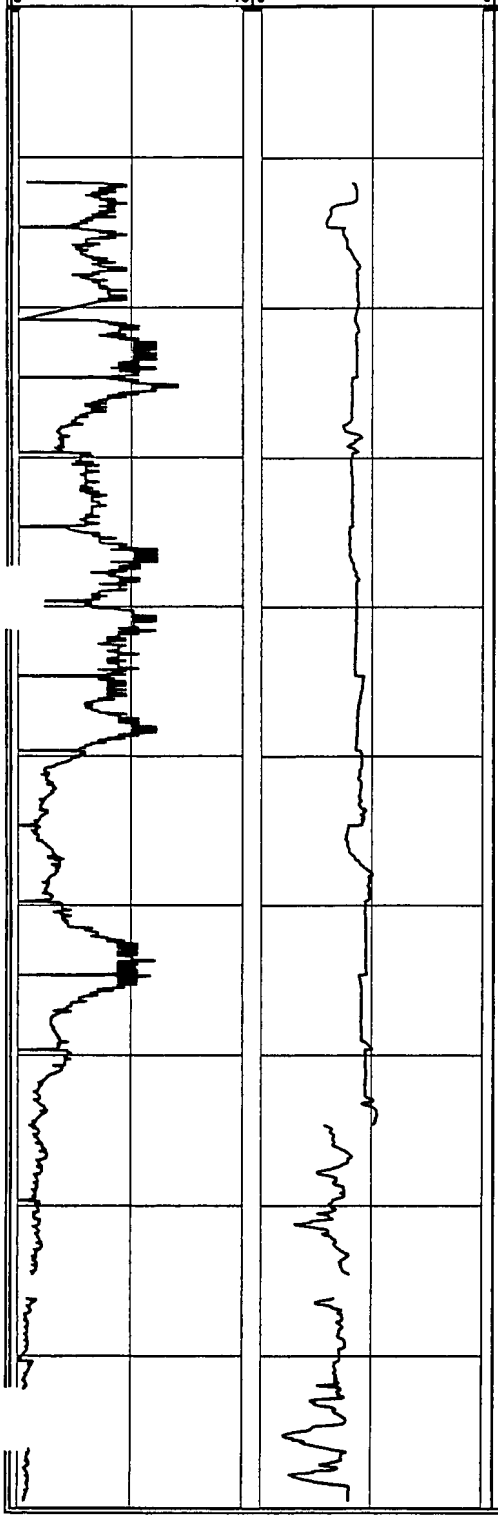


Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110				
120				
130	Poorly-graded SAND (fine to medium) with little gravel (fine); white	SP		
140				Profile data gaps due to poor KPRO equilibration
150	Poorly-graded SAND (fine to medium) and GRAVEL (fine); light brown to white	SP-GP		
160				Profile data gap due to poor KPRO equilibration
170	Well-graded SAND (fine to coarse) with some gravel (fine); light brown to white	SW		
180				
190				Refusal at 198.1 ft bgs

MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-33**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	December 5, 2003
JOB NUMBER:	4563001	END DATE:	December 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on North side of 140 building
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier
HELPER:	Larry Carlin		
Total depth of Profile:	500.1 ft	Total depth of Boring:	500 ft



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		SW		No penetration rate or IK data from 198.1 to 209.66 ft due to drilling activities, and from 209.66 to 211.61 due to blocked profiler ports
210	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light brown	SP		
220				
230	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
240				
250				
260	Poorly-graded SAND (medium) and GRAVEL (fine); light brown	SP-GP		
	Poorly-graded SAND (fine) with trace silt; light brown	SP		
270				
280				Profile data gaps due to poor KPRO equilibration
290				

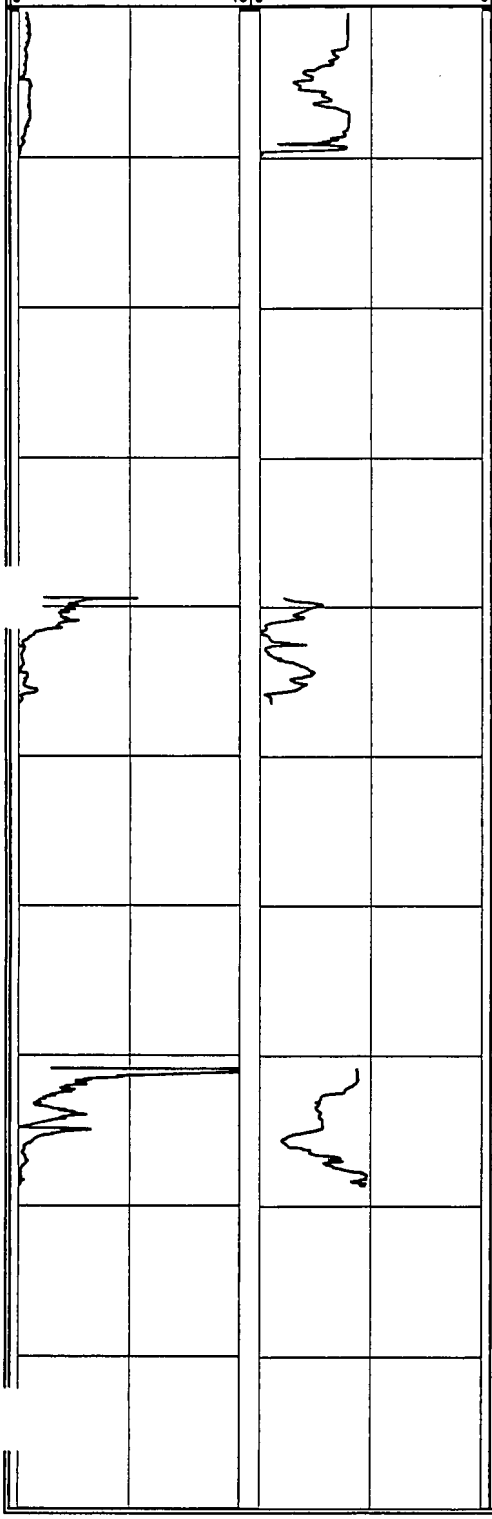
MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-33**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	December 5, 2003
JOB NUMBER:	4563001	END DATE:	December 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on North side of 140 building
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	Emily Moshier

Total depth of Profile: 500.1 ft — Total depth of Boring: 500 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	CLAY;gray	CL		
310				Profiler refusal at 309.83 ft, no penetration rate or IK data from 309.83 to 339.4 ft due to drilling activities
320				
330	SAND	SW		No recovery, description based on rig response
340	CLAY with some sand (fine); gray	CL		
350				Profiler refusal at 346.41 ft, no penetration rate or IK data from 346.41 to 370.88 ft due to drilling activities
360	SAND	SW		No recovery, description based on rig response
				4" clay layer at 363 ft bgs
370	Poorly-graded SAND (fine); white	SP		
380				Profiler refusal at 378.65 ft, no penetration rate or IK data from 378.65 to 409.3 ft due to drilling activities
390	Poorly-graded SAND (medium to coarse); light brown	SP		

Boring ID:

MALCOLM PIRNIE, INC.

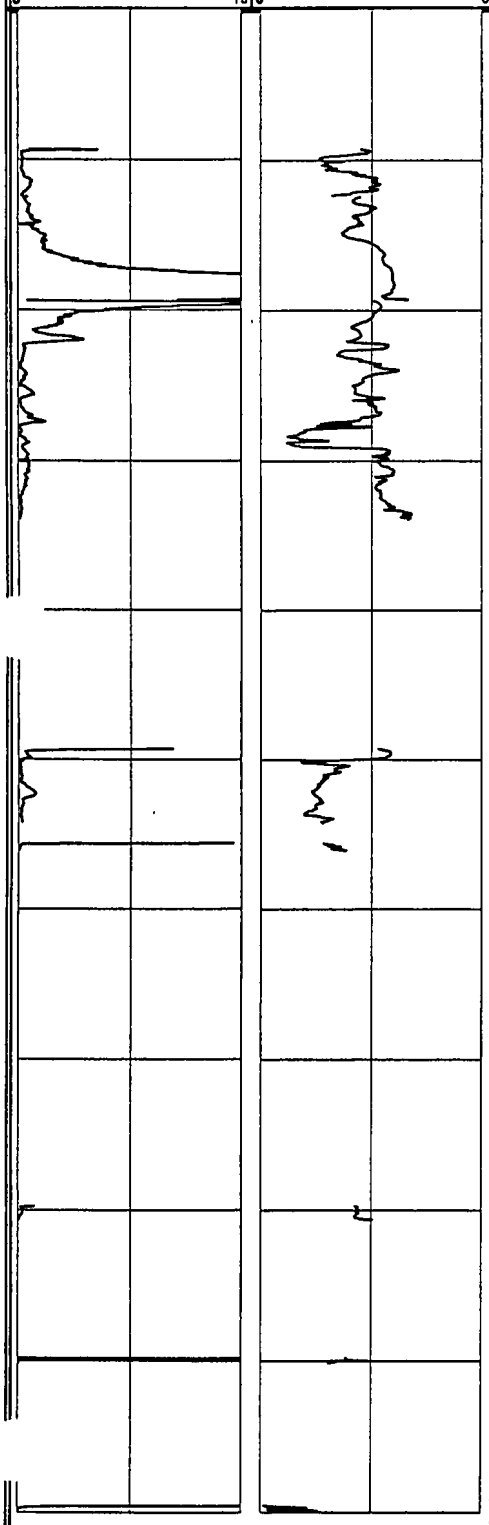
17-17 Route 208 North Fair Lawn, NJ 07401

P-33

JECT NAME:	GTEOSI-Hicksville	START DATE:	December 5, 2003
J NUMBER:	4563001	END DATE:	December 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on North side of 140 building
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Larry Carlin	HYDROGEOLOGIST:	Emily Moshier

Total depth of Profile: 500.1 ft — Total depth of Boring: 500 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400	Poorly-graded SAND (fine to medium); white	SP		
410	Poorly-graded SAND (fine); white	SP		No return of cuttings, description based on material in de-sander
420				
430				Profiler refusal at 433.9 ft, no penetration rate or IK data from 443.9 to 449.3 ft due to drilling activities
440				
450	No Recovery			Lost circulation, no return of cuttings Profile data gap due to poor KPRO equilibration Profiler refusal at 456.06 ft, no penetration rate or IK data from 456.06 to 479.76 ft due to drilling activities
460				
470				
480				Profiler refusal at 480.66 ft, no penetration rate or IK data from 480.66 to 489.8 ft due to drilling activities
490				Profiler refusal at 490.15 ft, no penetration rate or IK data from 490.75 to 499.55 ft due to drilling activities
500				Refusal at 500.1 ft, end of Profile

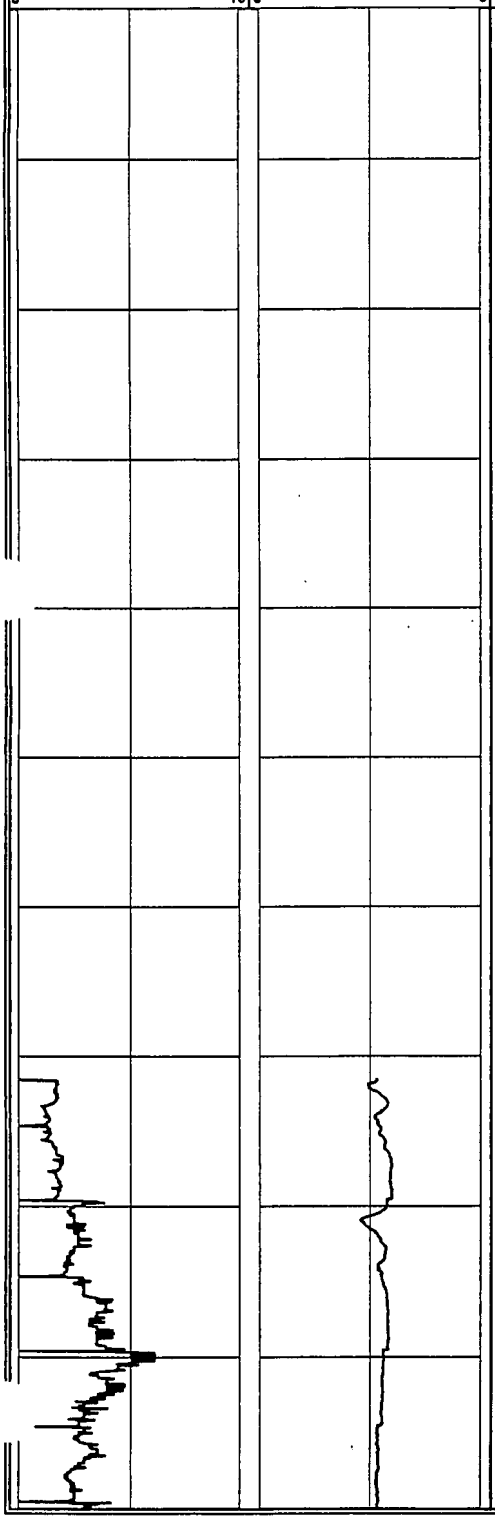
MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-34

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 21, 2003
JOB NUMBER:	4563001	END DATE:	December 4, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near N-central edge of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Seicker	HYDROGEOLOGIST:	Collen Sullivan

Total depth of Profile: 401.58 ft
Total depth of Boring: 380 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) and GRAVEL ; brown	SP-GP		Blacktop and concrete from 0 to 6 inches.
10				Hollow stem augers used to drill from 0 to 15 ft. Begin mud rotary drilling at 15 ft.
20				
30				
40				
50	Silty CLAY and SAND (fine to medium) with some gravel (fine); red-orange	CL- SC		
60	Poorly-graded SAND with some silty clay and some gravel (fine); reddish-brown	SP-SC		
				Begin profiling at 71.57 ft
70	Well-graded SAND with some silt and trace gravel; white-yellow	SW		
80				
90	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown to yellow	SP-GP		

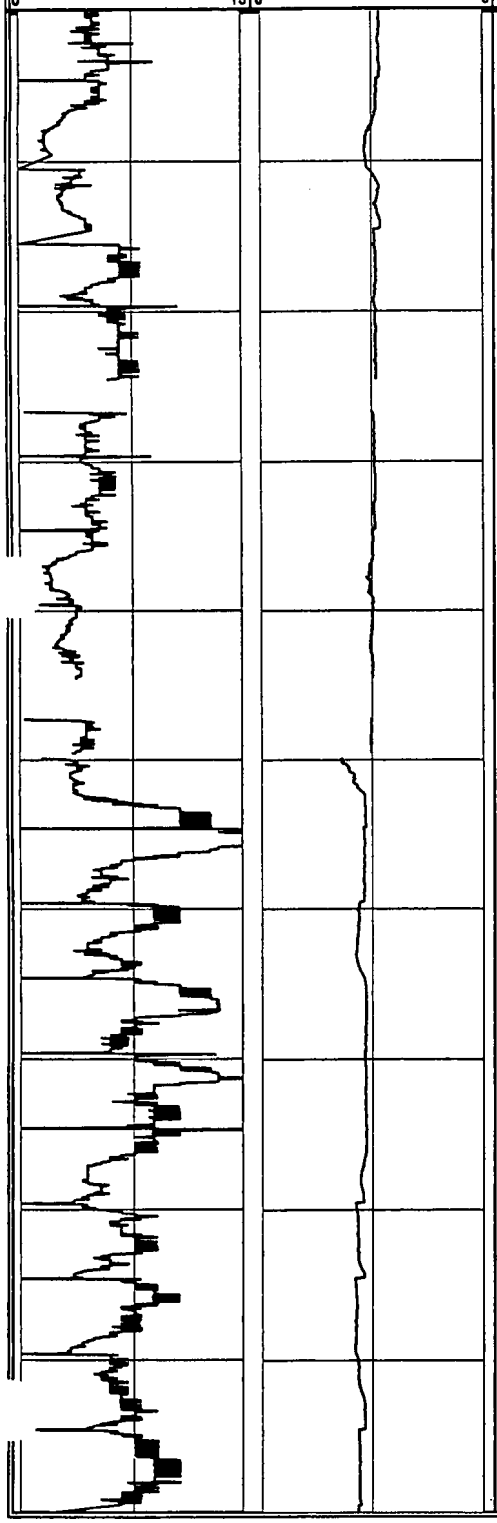
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-34

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 21, 2003
JOB NUMBER:	4563001	END DATE:	December 4, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near N-central edge of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Seicker	HYDROGEOLOGIST:	Collen Sullivan

Total depth of Profile: 401.58 ft
Total depth of Boring: 380 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (medium to coarse); light brown to yellow	SP		
110	Poorly-graded SAND (medium to coarse) and well-graded GRAVEL; white, yellow, brown, orange, pink	SP-GP		
120				Profile data gap due to poor KPRO flow equilibration
130				
140				Profile data gap due to poor KPRO flow equilibration
150				Profile data gap due to poor KPRO flow equilibration
160				
170				
180				
190				

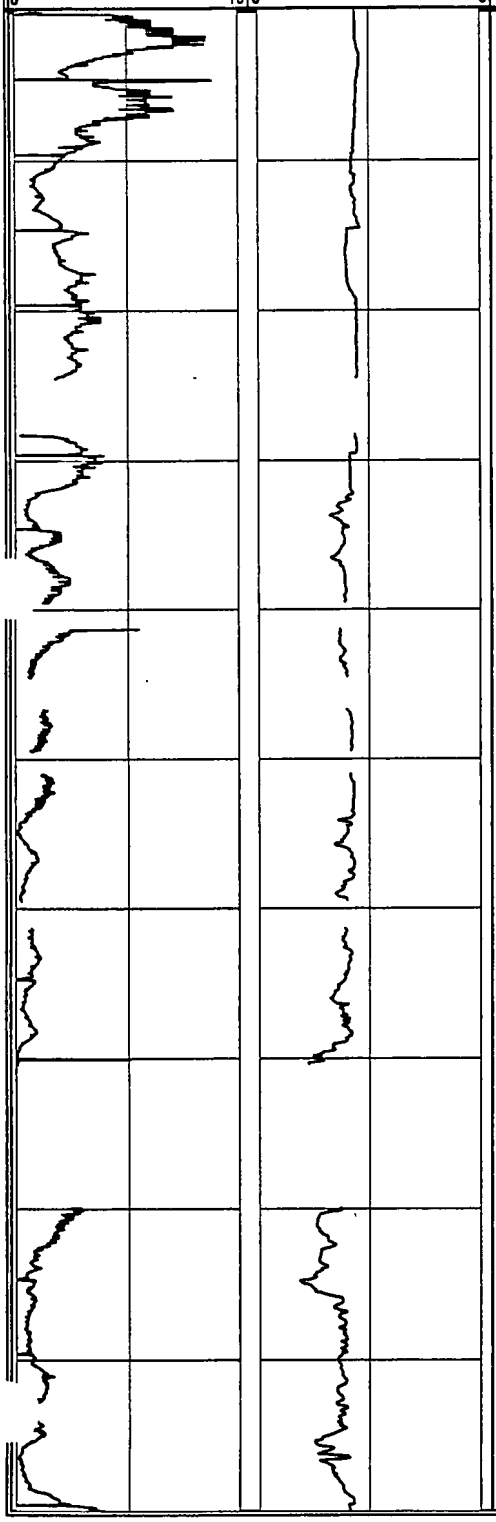
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-34

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 21, 2003
JOB NUMBER:	4563001	END DATE:	December 4, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near N-central edge of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Seicker	HYDROGEOLOGIST:	Collen Sullivan

Total depth of Profile: 401.58 ft
Total depth of Boring: 380 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		SP-GP		
210				
220				No profile data from 224.6 to 228.26 ft due to plugged profile tip
230				
240				Profile data gaps due to poor KPRO flow equilibration from 224.6 to 228.26, 239.6 to 241.29, 244.6 to 246.64, 249.6 to 250.96, and 259.6 to 261.31 ft
250				
260				
270				Profiler refusal at 270.46 ft. No penetration rate or IK data from 270.46 to 279.85 ft due to drilling activities
280	Poorly-graded SAND with some gravel (fine); red-orange	SP		
290	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); red to light brown	SP-GP		

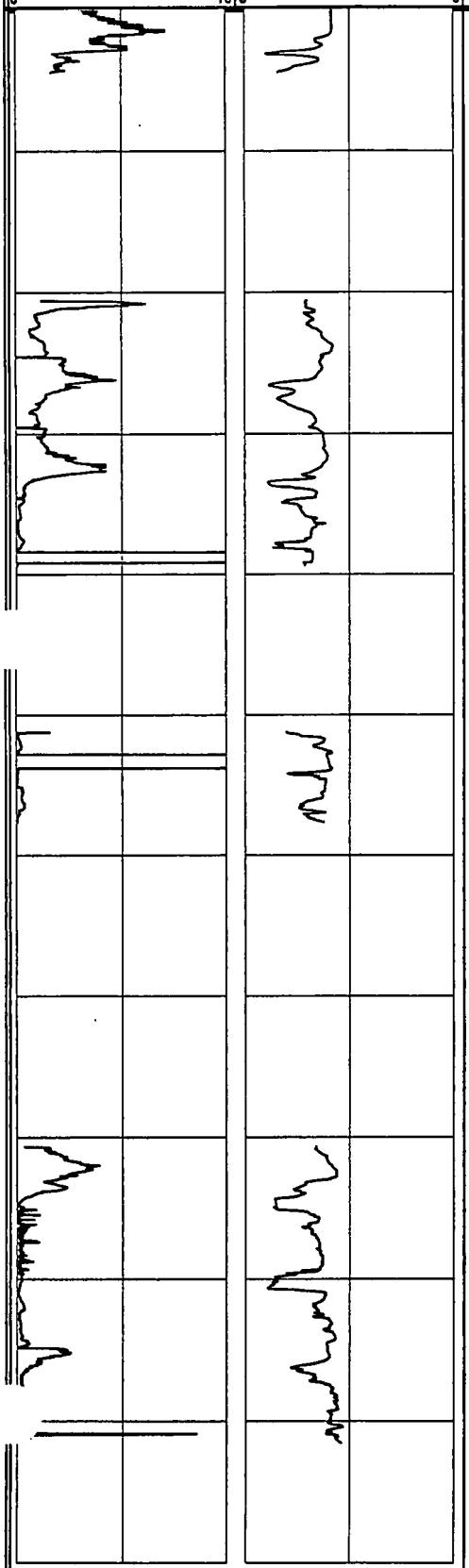
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-34**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 21, 2003
JOB NUMBER:	4563001	END DATE:	December 4, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiague Rock Rd, near N-central edge of 140 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Seicker	HYDROGEOLOGIST:	Collen Sullivan

Total depth of Profile: 401.58 ft — Total depth of Boring: 380 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	Poorly-graded SAND with some clay and trace gravel (fine); light brown-red-black-gray	SP-SC		Pulled profiling equipment from 304.5 ft. No penetration rate or IK data from 304.5 to 320.52 ft due to drilling activities
310	Poorly-graded SAND (fine to medium) with trace clay; light brown to red	SP		
320	Poorly-graded SAND (medium to coarse) with trace clay; light brown to red	SP		
330	Poorly-graded SAND (medium to coarse); light brown-white-red-gray	SP		Profiler refusal at 339.37 ft. No penetration rate or IK data from 339.37 to 349.61 ft due to drilling activities or from 349.61 to 351.18 due to Profiler equipment problems
340	Well-graded SAND; gray to light brown	SW		
350	Poorly-graded SAND (medium to fine) and SILT; gray to light brown	SM-ML		Profiler refusal at 357.6 ft. No penetration rate or IK data from 357.6 to 379.4 ft due to drilling activities and from 379.4 to 380.62 due to Profiler equipment problems
360				
370				
380				
390				
400				Profiler refusal at 401.58 ft, End of profile.
410				

Boring ID:

MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

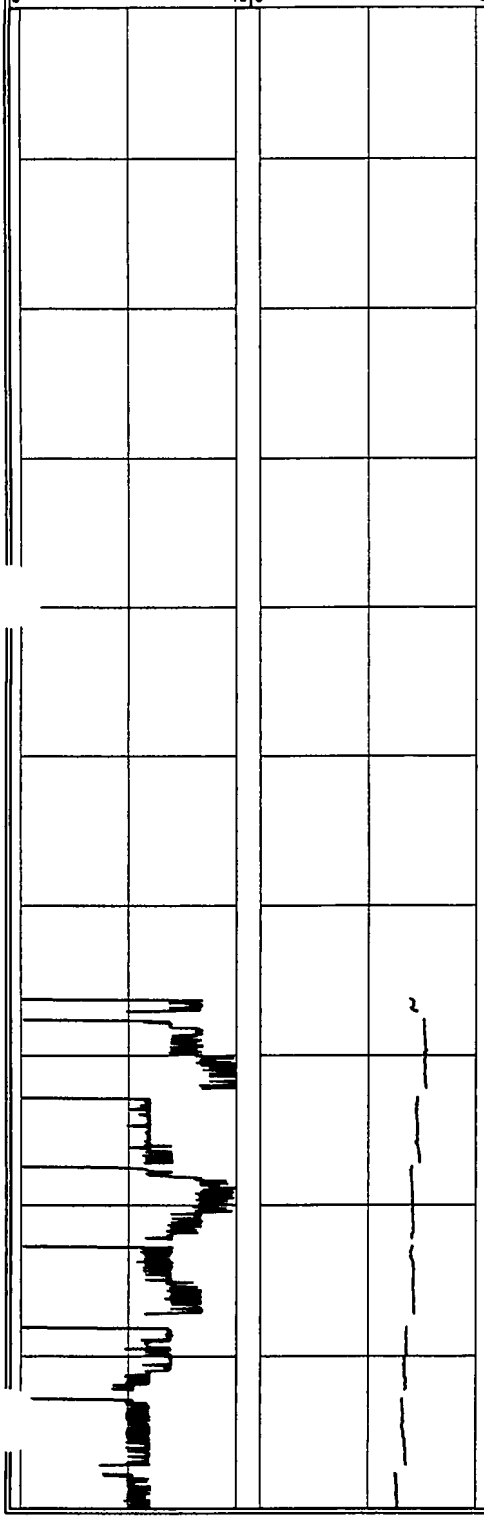
P-35

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 9, 2003
JOB NUMBER:	4563001	END DATE:	July 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Canitague Rock Rd.
DRILLING METHOD:	Mud Rotary	WEATHER:	North side of 70 building
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Kevin Wheeler

Total depth of Profile: 347.2 ft

Total depth of boring: 340 ft

GEOLOGIC INFORMATION



USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
Well-graded SAND (fine to medium) with some gravel (fine to coarse) and trace silt; dark brown	SP		Fill from 0 to 2.5 ft bgs
Poorly-graded SAND (medium) and GRAVEL (fine); light brown	SP-GP		Hollow stem auger used from 0 to 20 ft. Begin mud rotary drilling at 20 ft.
Poorly-graded SAND (medium to coarse); light brown	SP		
Poorly-graded SAND (medium) and GRAVEL (fine); light brown	SP-GP		
Poorly-graded SAND (fine to medium) with little gravel (fine); light brown	SP		Coarsens with depth Loss of circulation of drilling fluids. Begin Profiling at 62.88 ft Profile data gaps due to poor KPRO equilibration Loss of circulation of drilling fluids

Boring ID:

MALCOLM PIRNIE, INC.

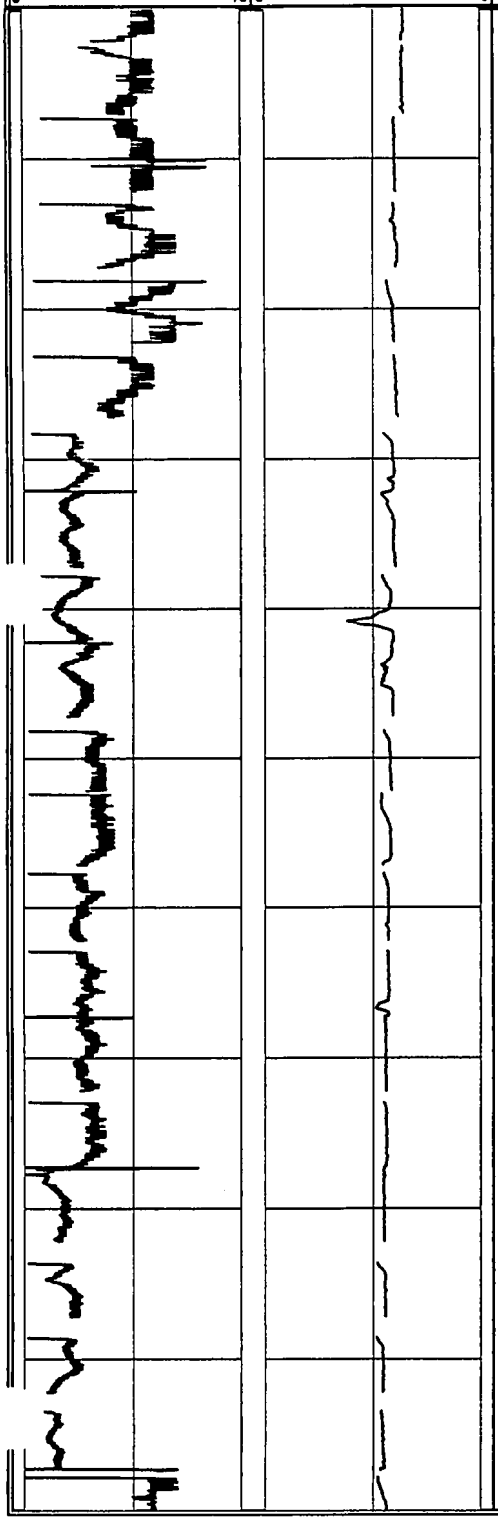
P-35

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 9, 2003
JOB NUMBER:	4563001	END DATE:	July 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Canitague Rock Rd.
DRILLING METHOD:	Mud Rotary	WEATHER:	North side of 70 building
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Kevin Wheeler

Total depth of Profile: 347.2 ft — Total depth of boring: 340 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110				Profile data gaps due to poor KPRO equilibration
120	Poorly-graded SAND (fine to medium) with little gravel (fine); brown	SP		
130	Poorly-graded SAND (fine to medium) with some gravel (fine) and little silt; brown	SM		Profile data gaps due to poor KPRO equilibration
140	Poorly-graded SAND (medium) with little gravel (fine); light brown to tan	SP		
150	Poorly-graded SAND (medium to coarse) with some gravel (fine); tan	SP		
160	Poorly-graded SAND (medium to coarse) with some gravel (fine); tan	SP		
170	Well-graded SAND (fine to coarse) and GRAVEL (fine); tan	SW-GP		
180	Well-graded SAND (fine to coarse) and GRAVEL (fine); light brown	SW-GP		Profile data gaps due to poor KPRO equilibration
190	Poorly-graded SAND (medium) with trace gravel (fine); brown	SP		

Boring ID:

MALCOLM PIRNIE, INC.

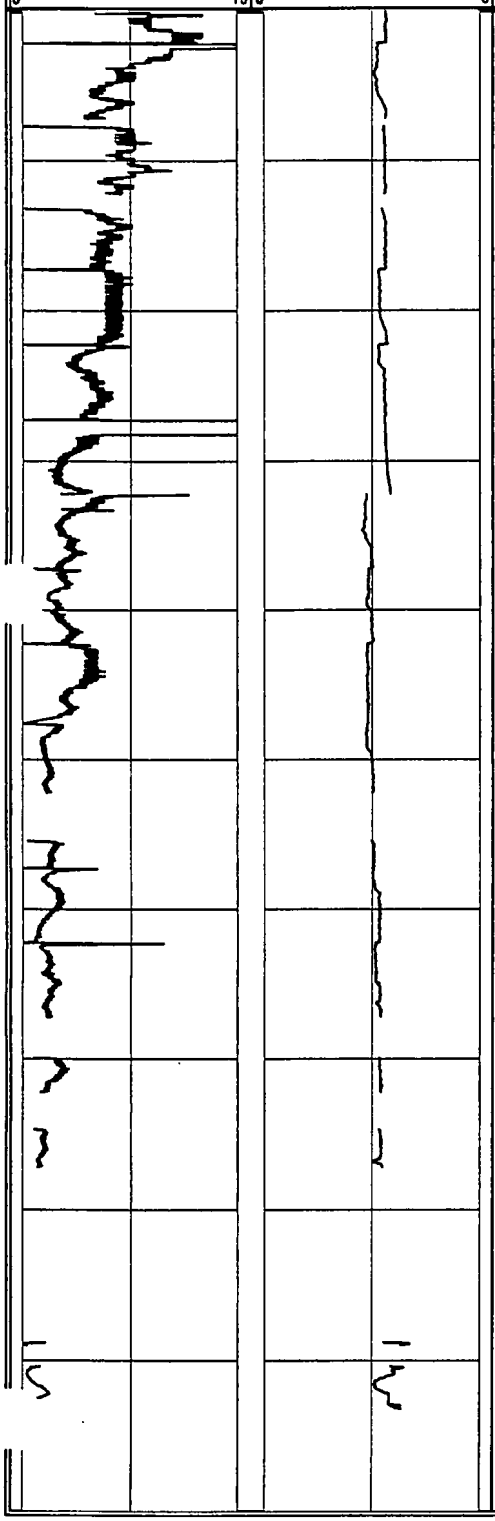
7 Route 208 North Fair Lawn, NJ 07401

P-35

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 9, 2003
JOB NUMBER:	4563001	END DATE:	July 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Canitague Rock Rd.
DRILLING METHOD:	Mud Rotary	WEATHER:	North side of 70 building
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Kevin Wheeler

Total depth of Profile: 347.2 ft — Total depth of boring: 340 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200				
210	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
220				Some hardpan
230				Profile data gaps due to poor KPRO equilibration
240				
250	Poorly-graded SAND (fine to medium) and GRAVEL (fine); tan	SP-GP		Profile data gaps due to poor KPRO equilibration
260	Poorly-graded SAND (fine to medium) with trace gravel; tan	SP		Profile data gaps due to poor KPRO equilibration
270	Poorly-graded SAND (medium to coarse); tan	SP		
280	Well-graded SAND; tan	SW		Profiler refusal at 280 ft, no penetration rate or IK data from 277 to 291 ft due to malfunctioning Profiling equipment and drilliing activities
290	Poorly-graded sand; orange	SP		Profiler refusal at 293.21ft

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

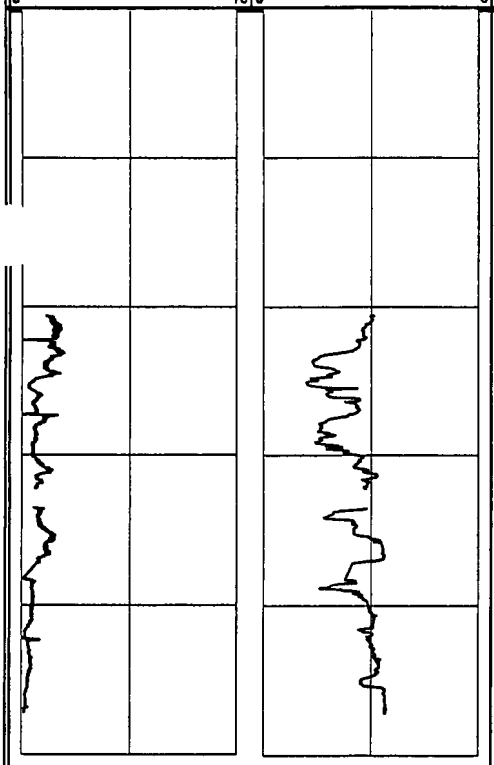
Boring ID: **P-35**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 9, 2003
JOB NUMBER:	4563001	END DATE:	July 15, 2003
DRILLING FIRM:	CT&E	LOCATION:	East of Canitague Rock Rd.
DRILLING METHOD:	Mud Rotary	WEATHER:	North side of 70 building
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Kevin Wheeler

Total depth of Profile: 347.2 ft

Total depth of boring: 340 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	Poorly-graded SAND (fine to medium); light brown	SP		No penetration rate or IK data from 293.21 to 319.3 ft due to drilling activities and from 319.3 to 320.6 ft due to poor KPRO equilibration
	Poorly-graded SAND (fine to medium) with trace gravel, trace clay, and trace silt	SP		
310	SILT and CLAY; gray	ML- CL		
	Poorly-graded SAND (fine to medium); brown	SP		
320	SILT and SAND (fine to coarse); tan to gray	ML-SM		
330				Profile data gap due to poor KPRO equilibration
				End boring at 340 ft
340				End of profile at 347.2 ft
350				

Boring ID:

MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

P-36

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	August 26, 2003
DRILLING FIRM:	CT&E	LOCATION:	On N edge of Property on S side of W John
DRILLING METHOD:	Mud Rotary	WEATHER:	St, across from BIT parking
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jon Turk

Total depth of Profile: 373.02 ft

Total depth of Boring: 470 ft

GEOLOGIC INFORMATION

Penetration Rate (ft/min) 0–15	Index of Hyd. Conductivity 0–6	Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
		0	Well-graded SAND and GRAVEL with some to little cobbles; tan	SW-GW		
		10				
		20	Well-graded SAND and GRAVEL; tan	SW-GW		
		30				
		40				
		50				
		60	Well-graded SAND with trace gravel; tan	SW		6 in clay lens at ~65 ft
		70	Poorly-graded SAND (medium to coarse) and GRAVEL (fine to medium); tan	SP-GP		Begin profiling at 72.21 ft
		80				
		90				Profile data gap due to poor KPRO equilibration
			CLAY and SAND (fine)	CL-SM		Gravel lens from 94 to 95 ft

Boring ID:

MALCOLM PIRNIE, INC.

P-36

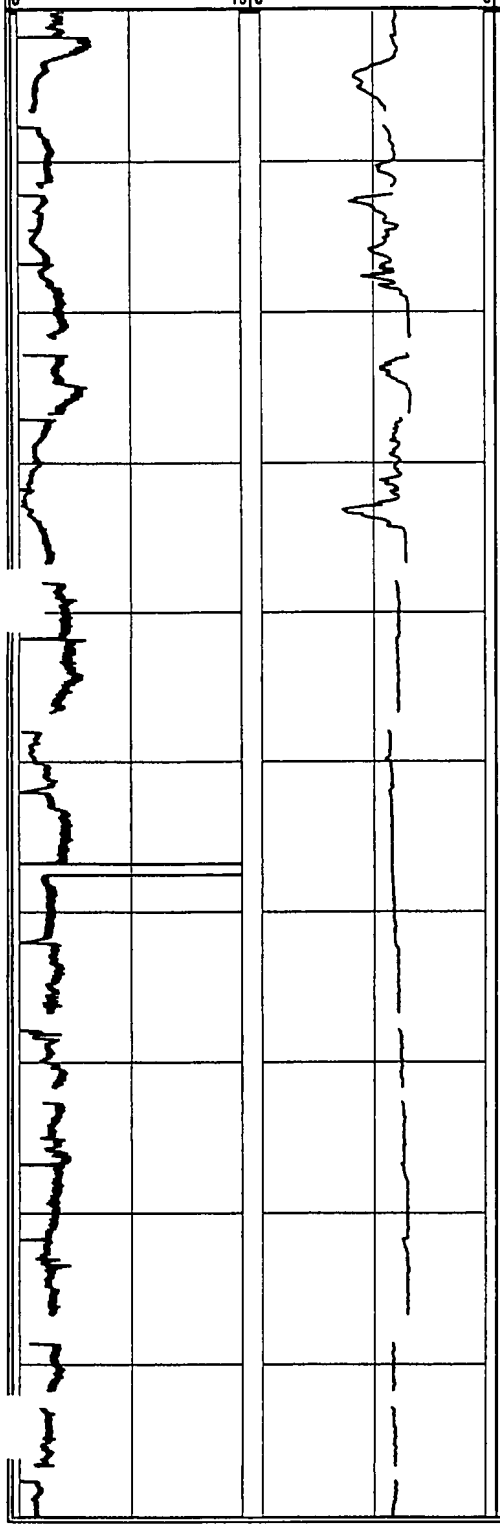
7 Route 208 North Fair Lawn, NJ 07401

OJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	August 26, 2003
DRILLING FIRM:	CT&E	LOCATION:	On N edge of Property on S side of W John
DRILLING METHOD:	Mud Rotary	WEATHER:	St, across from BIT parking
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jon Turk

Total depth of Profile: 373.02 ft

Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Well-graded clayey SAND with gravel; tan	SC		
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine to medium); tan	SP-GP		Profile data gaps due to poor KPRO equilibration Much hardpan present from 105 to 195 ft
140				Profile data gaps due to poor KPRO equilibration
190				Profile data gaps due to poor KPRO equilibration
	Well-graded SAND and GRAVEL with trace silt and clay; tan	SW-GW		

Boring ID:

MALCOLM PIRNIE, INC.

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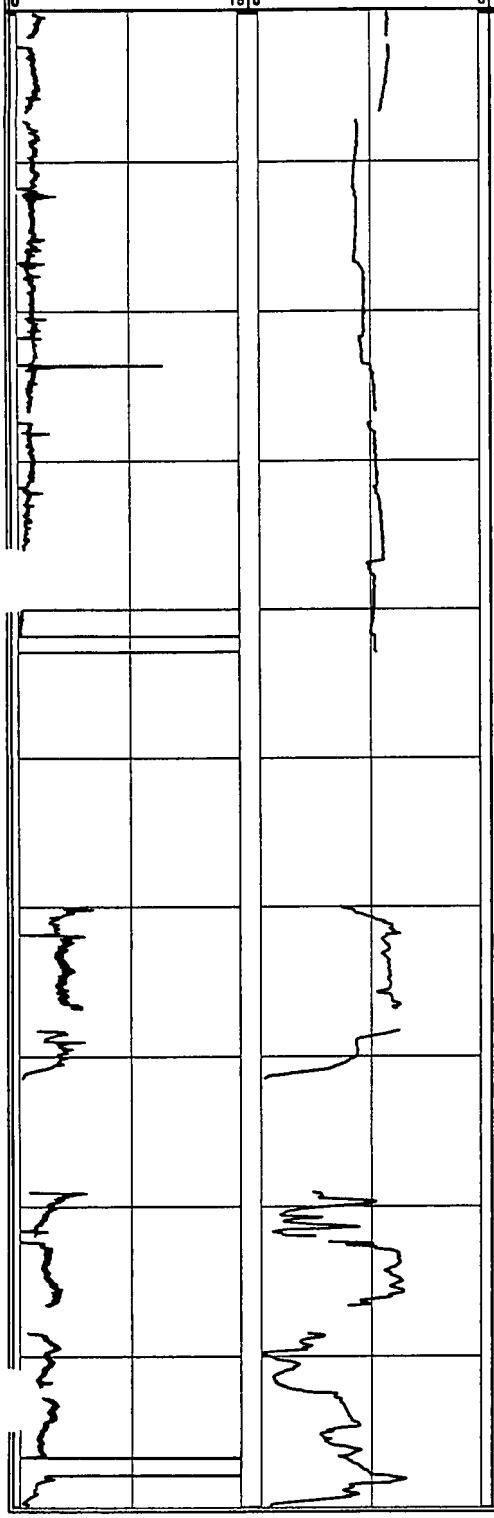
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	August 26, 2003
DRILLING FIRM:	CT&E	LOCATION:	On N edge of Property on S side of W John
DRILLING METHOD:	Mud Rotary	WEATHER:	St, across from BIT parking
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jon Turk

Total depth of Profile: 373.02 ft

Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
		SW-GW		Profile data gaps due to poor KPRO equilibration
	Silty SAND with some clay; tan to orange	SM		Poor recovery of cuttings, most cutting pass through strainer, presumed interbedded silty sand and clay from 205 to 230 ft
230	Silty SAND and CLAY; tan to white	SM-CL		Poor recovery of cuttings, most cutting pass through strainer from 230 to 255 ft
240	Silty CLAY with some sand; tan to white-gray	CL		Profiler refusal at 242 .9 ft. Profiling rods broke upon extraction. Profiling probe and ~65 ft of geoprobe rods abandoned in hole. Off-set drilling location and resumed.
250	Silty SAND with some to little clay; tan to gray	SM		No penetration rate or IK data from 242.9 to 259.98 ft due to drilling activity
				Poor recovery of cuttings, most cutting pass through strainer, presumed interbedded silty sand and clay from 255 to 300 ft
270				Profiler refusal at 271.44 ft. No penetration rate or IK data from 271.44 to 279.06 ft due to drilling activities
280				Profile data gaps due to poor KPRO equilibration
290				

Boring ID:

MALCOLM PIRNIE, INC.

P-36

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	August 26, 2003
DRILLING FIRM:	CT&E	LOCATION:	On N edge of Property on S side of W John
DRILLING METHOD:	Mud Rotary	WEATHER:	St, across from BIT parking
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jon Turk

Total depth of Profile: 373.02 ft

Total depth of Boring: 470 ft

GEOLOGIC INFORMATION

Penetration Rate (ft/min) 0–15	Index of Hyd. Conductivity 0–6	Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
		300		SM		Profiler refusal at 300.74 ft. No penetration rate or IK data from 300.74 to 324.06 ft due to drilling activities
			SILT with some sand (fine); gray	ML		
		310				
			Silty SAND; tan	SM		
		320	Poorly-graded SAND (coarse); tan	SP		Profiler drove from 324.06 to 328.4 ft. Profiler refusal at 328.4 ft. No penetration rate or IK data from 328.4 to 369.23 ft due to drilling activities.
			SILT with some sand and trace gravel; gray to white	ML		
		330				
			Silty CLAY and silty SAND; gray to white	CL-SM-SC		Interbedded silty clays and silty sands from 335 to 365 ft. Sand fraction increases downward
		340				
		350				
		360				
			SILT with some sand (fine); gray to white	ML-SM		
		370	SILT with trace sand and clay; white to gray	ML		Profiler drove from 368 to 373.02 ft. Profiler refusal at 373.02 ft. Broken String potentiometer cable at ~371.25 ft. No penetration rate or IK data from 371.25 to 373.02 ft.
			SILT and CLAY with trace sand; gray to white	ML- CL		
		380	CLAY with some sand; gray to white	CL		
			SILT with little sand and clay; gray	ML		Poor/little recovery of cuttings from 375 to 470 ft. Most cuttings pass through strainer.
		390				
		400				

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-36**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	August 26, 2003
DRILLING FIRM:	CT&E	LOCATION:	On N edge of Property on S side of W John
DRILLING METHOD:	Mud Rotary	WEATHER:	St, across from BIT parking
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jon Turk

Total depth of Profile: 373.02 ft
Total depth of Boring: 470 ft

GEOLOGIC INFORMATION

Penetration Rate (ft/min) 0–15	Index of Hyd. Conductivity 0–6	Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
			CLAY with some silt; white to gray	CL		No penetration rate or IK data from 373.02 to 467.3 ft due to drilling activities. Mud log indicates the occurrence of lithologies that disallow profiling.
		410				
			SILT with some sand and trace clay; gray to white	ML		
		420	Clay; white to red-orange	CL		
		430	SILT; gray	ML		No recovery from 430 to 435 ft, presumed silt
			CLAY; white, pink, red	CL		
		440				
		450				
			Silty CLAY; white	CL		
		460	Silty SAND with trace clay; white	SM		Attempted to drive profiler from 467.25 ft. Refused at 468.90.
			CLAY and silty SAND; white	CL-SM		Attempted to drive at 473.28, refused at 475.6 ft - end of Profile. End of boring at 470 ft.
		470				

Boring ID:

MALCOLM PIRNIE, INC.

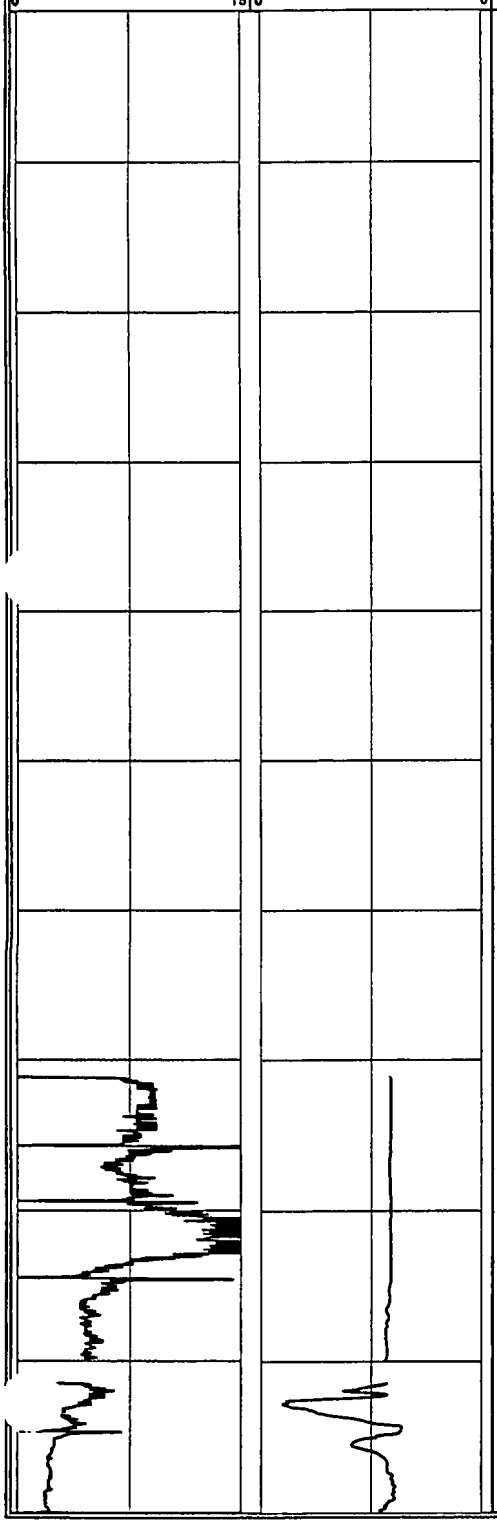
Route 208 North Fair Lawn, NJ 07401

P-37

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 18, 2003
JOB NUMBER:	4563001	END DATE:	August 27, 2003
DRILLING FIRM:	CT&E	LOCATION:	NW corner of property on S side of W John St, Just E of Cantigue Rock Rd
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	John Hilton
HELPER:	Brian Siecker		

Total depth of Profile: 395.83 Total depth of Boring: 395 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (fine to medium) with some gravel (fine); light brown	SP		6 1/4 Hollow stem augers used from 0 to 15 ft
10				Begin mud rotary drilling at 15 ft
	Well-graded SAND with trace to little gravel (fine); light brown	SW		
20				
	Poorly-graded SAND (medium); light brown	SP		
30				
	Poorly-graded SAND (coarse); light brown	SP		
40				
50	Poorly-graded SAND (fine); light brown to white	SP		
60				Begin profiling at 71.16 ft
70	Well-graded SAND with some gravel (fine); light tan to brown	SW		Gravel occurs as thin interbeds within the sand
80				Profile data gap due to poor KPRO equilibration
90				Lost tricone roller bit and wire line assembly at ~90 ft

Boring ID:

MALCOLM PIRNIE, INC.

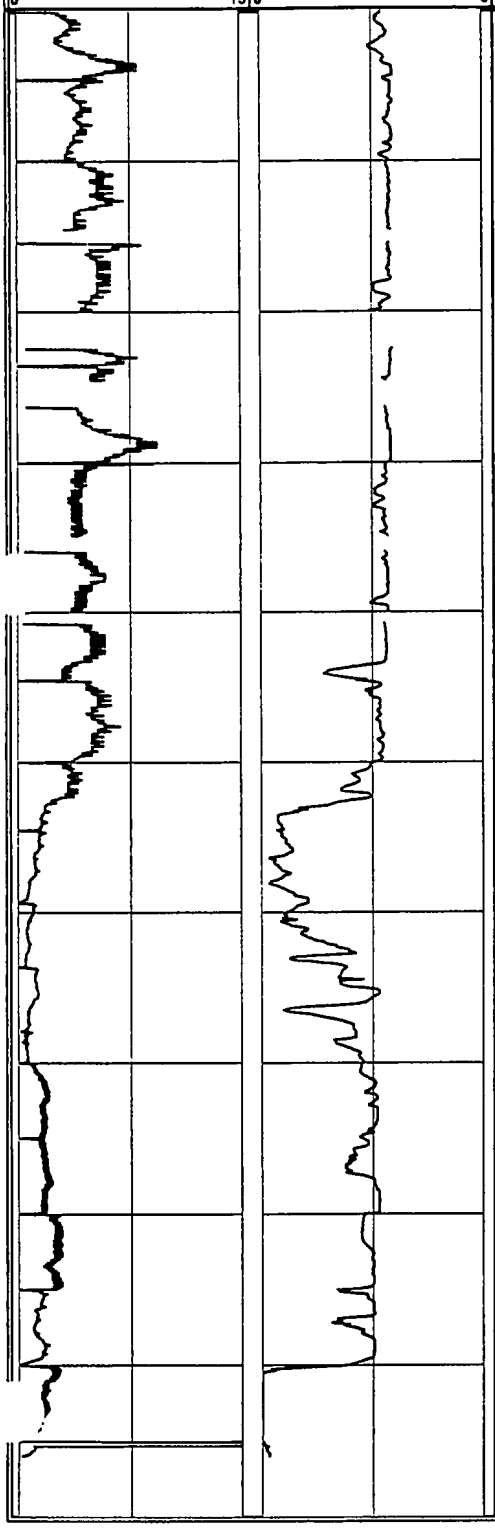
7 Route 208 North Fair Lawn, NJ 07401

P-37

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 18, 2003
JOB NUMBER:	4563001	END DATE:	August 27, 2003
DRILLING FIRM:	CT&E	LOCATION:	NW corner of property on S side of W John St, just E of Cantigue Rock Rd
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Siecker	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 395.83 Total depth of Boring: 395 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (fine) with trace gravel (fine); light tan to white	SP		
110				
120				Profile data gaps due to poor KPRO equilibration
130				
140				
150	SAND (fine) and SILT with trace medium to coarse sand; orange to brown	SM-ML		
160				
170	Silty SAND	SM		No recovery of cuttings from 170 to 220 ft. Drilling characteristics indicative of silty sand
180				
190				Profiler refusal at 196.02 ft, no penetration rate or IK data from 196.02 to 219.65 ft due to drilling activities

Boring ID:

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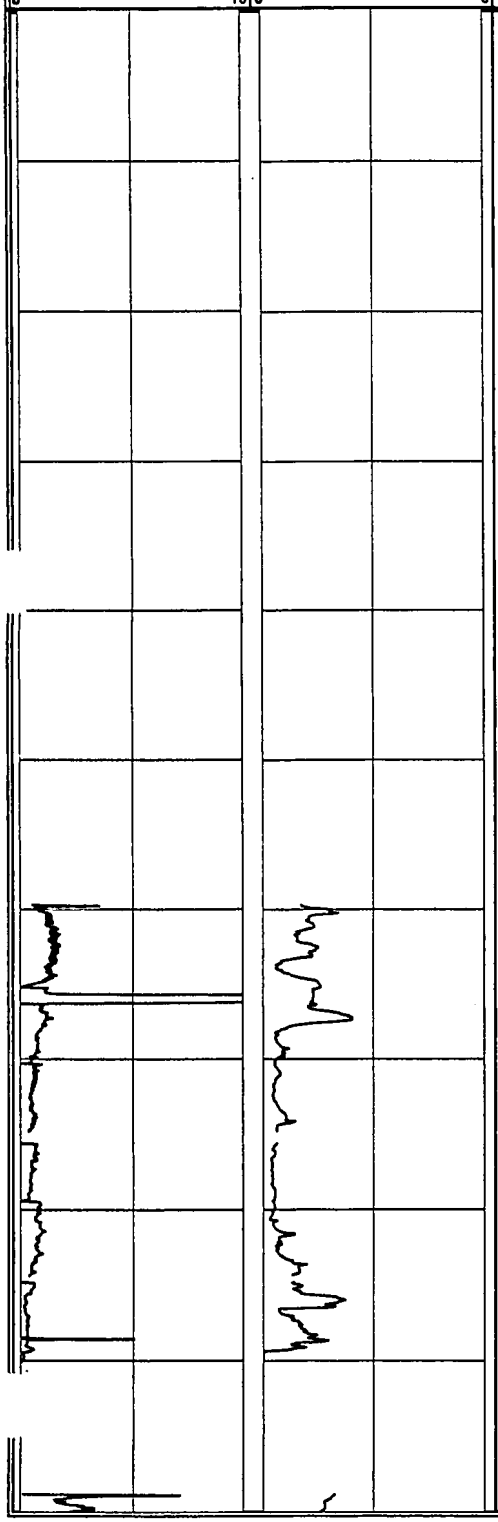
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 18, 2003
JOB NUMBER:	4563001	END DATE:	August 27, 2003
DRILLING FIRM:	CT&E	LOCATION:	NW corner of property on S side of W John St, just E of Cantigue Rock Rd
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Siecker	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 395.83 ft — Total depth of Boring: 395 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		SM		
210				No penetration rate or IK data from 219.65 to 234.75 ft due to Profiler malfunctions
220	Poorly-graded SAND (fine to medium) with some silt and clay; light gray	SM		
230				Profiler refusal at 234.75 ft
	CLAY and SILT with some sand (fine)	CL- ML		Interbedded clay and silt with some fine sand stringers. Lignite seam from 235 to 237 ft
240				
250				No penetration rate or IK data from 234.75 to 259.7 ft due to drilling activities
	Silty SAND to poorly-graded SAND (fine) with silt; light gray to white	SM-SP		
260				Some lignite present in cuttings
270				
280				Profile data gap due to poor KPRO equilibration
290	Poorly-graded SAND (fine) with some silt; light gray to white	SM-SP		Profiler refusal at 290.09 ft, no penetration rate or IK data from 290.09 to 298.81 ft due to drilling activities

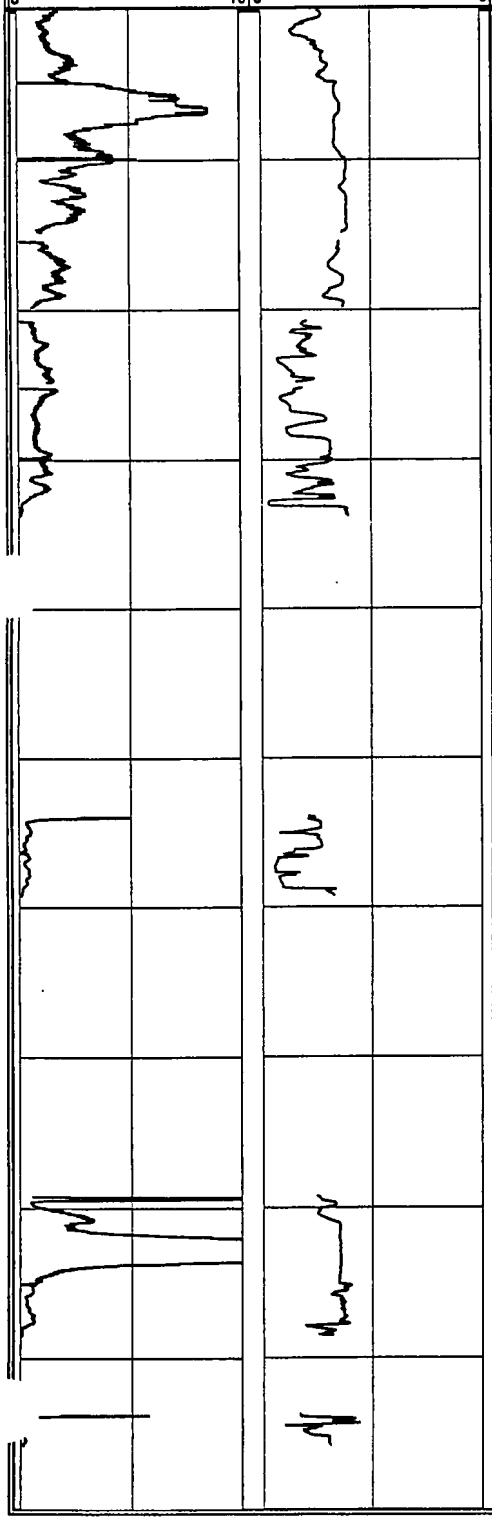
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-37**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 18, 2003
JOB NUMBER:	4563001	END DATE:	August 27, 2003
DRILLING FIRM:	CT&E	LOCATION:	NW corner of property on S side of W John St, just E of Cantigue Rock Rd
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Siecker	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 395.83 Total depth of Boring: 395 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300				Mud rotary casing refused at ~290 ft. Thought to be on top of lost bit and line assembly. 10 ft of casing broke off in hole, abandoned bore hole and resumed drilling in offset location
310				Silt fraction increases with depth
320				Profile data gap due to poor KPRO equilibration
330				Profiler refusal at 333.8 ft, no penetration rate or IK data from 333.8 to 353.91 ft due to drilling activities
340	SAND (fine to medium) and SILT with few clay; light gray to white	SM-ML		Poor recovery of cuttings from 335 to 355 ft
350				
360	Well-graded SAND with trace to little silt and trace clay; gray to white	SW		Profiler refusal at 359.27 ft, no penetration rate or IK data from 359.27 to 379.26 ft due to drilling activities
370				
380				Profiler refusal at 388.52 ft, no penetration rate or IK data from 388.52 to 393.72 ft due to drilling activities.
390				End of profile at 395.83 ft bgs. End of boring at 395 ft.

Boring ID:

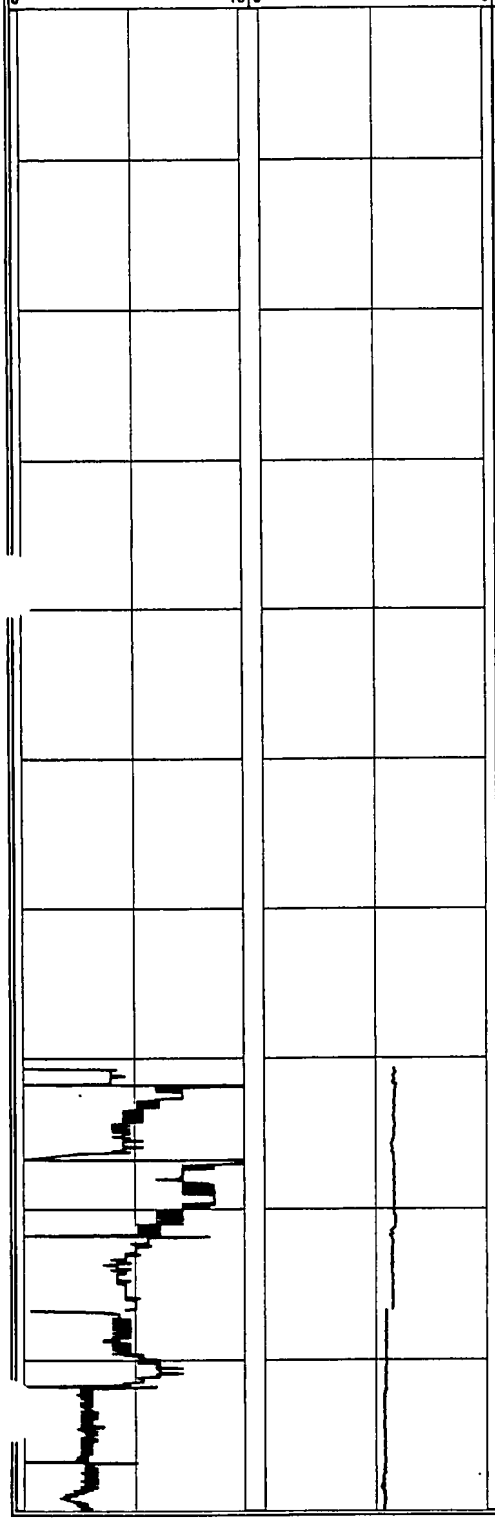
P-38

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 16, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	On NE corner of property on S side of W
DRILLING METHOD:	Mud Rotary	WEATHER:	John St, W of Cantlague Ln
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Ken Heinz, Brian Seicker	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 400.69 ft — Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND with gravel (fine to coarse) and trace cobbles; brown	SW		7 1/4 hollow stem auger used to drill from 0 to 20 ft.
10				
20	Well-graded SAND; light brown	SW		Begin mud rotary drilling at 20 ft
30	Poorly-graded GRAVEL with trace sand (coarse); very pale brown	GP		
40	Poorly-graded GRAVEL (fine) with trace sand (coarse); very pale brown	GP		
50	Poorly-graded SAND (fine to medium); very pale brown	SP		
60				
70				Begin profiling at 69.45 ft
80	Poorly-graded GRAVEL and SAND; very pale brown	GP-SP		
	Well-graded SAND with trace gravel (fine); very pale brown	SW		Profile data gap due to poor KPRO equilibration
90				

Boring ID:

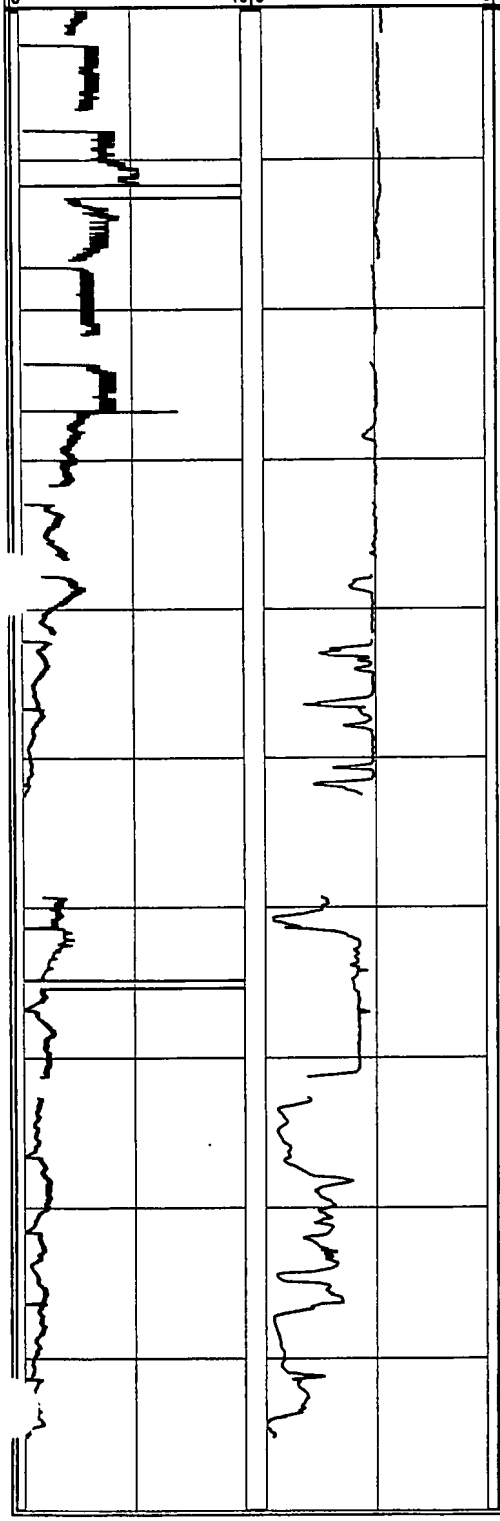
P-38

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 16, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	On NE corner of property on S side of W
DRILLING METHOD:	Mud Rotary	WEATHER:	John St, W of Cantlague Ln
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Ken Heinz, Brian Seicker	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 400.69 ft — Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SW		Profile data gaps due to poor KPRO equilibration
110				
120				
130				
140	Poorly-graded SAND (fine to medium); very pale brown	SP		
150	Well-graded SAND with little silt and trace gravel (fine); orange/light brown	SW		Profiler refusal at 152.52 ft. No penetration rate or IK data from 152.52 to 159.31 ft due to drilling activities
160				
170	Poorly-graded SAND (fine); orange/light brown	SP		
180				
190	Poorly-graded SAND (fine to medium); pale yellow-orange	SP		Profiler refusal at 195.18 ft. No penetration rate or IK data from 195.18 to 199.48 ft due to drilling activities. No data from 199.48 to 201.3 due to bad profiler connection.
	SILT and GRAVEL (fine); orange/light brown	ML-GM		

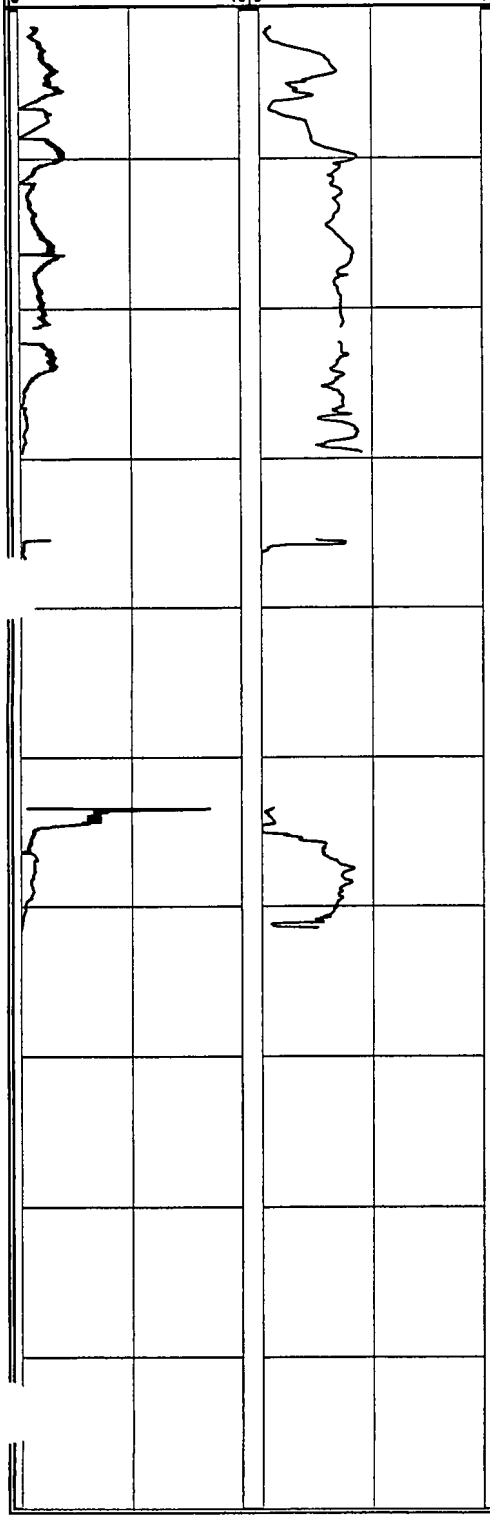
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-38**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 16, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	On NE corner of property on S side of W
DRILLING METHOD:	Mud Rotary	WEATHER:	John St, W of Cantlague Ln
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Ken Heinz, Brian Seicker	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 400.69 ft — Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Well-graded SAND with some silt and gravel; pale yellow-orange	SW		
	SILT with trace sand and gravel; pale yellow-orange	ML		
210	SILT with trace sand; yellow-orange	ML		
220				Profile data gaps due to poor KPRO equilibration
	SILT and SAND (fine); orange/light brown	ML SM		Profiler refusal at 229.61 ft. No penetration rate or IK data from 229.61 to 234.48 ft due to drilling activities.
230	Well-graded SAND (fine); orange/ light brown	SW		
	CLAY; pale yellow-brown	CL		Profiler refusal at 237.1 ft. No penetration rate or IK data from 237.1 to 253.41 ft due to drilling activities.
240				Some lignite fragments in the cuttings
250	Well-graded SAND and GRAVEL (fine); yellow orange to very pale brown	SW-GP		
260				Profiler refusal at 261.43 ft. No penetration rate or IK data from 261.43 to 309.51 ft due to drilling activities.
270				
280				
	CLAY with some sand; light brownish gray	CL		
290				

Boring ID:

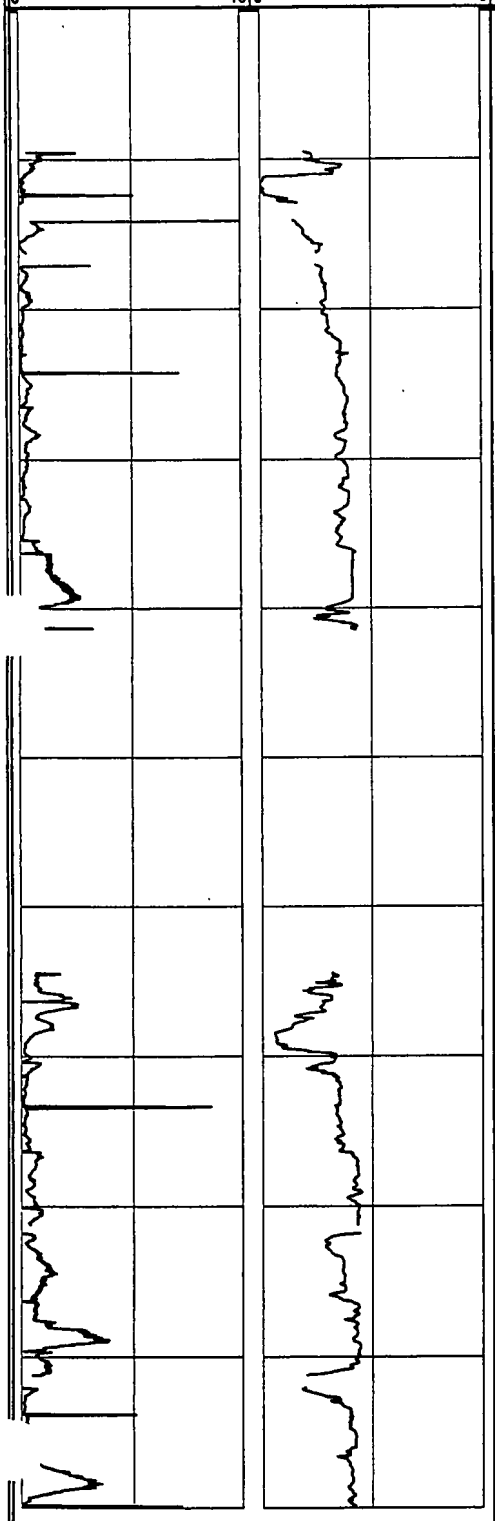
MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

P-38

JECT NAME:	GTEOSI-Hicksville	START DATE:	September 16, 2003
.B NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	On NE corner of property on S side of W
DRILLING METHOD:	Mud Rotary	WEATHER:	John St, W of Cantiague Ln
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Ken Heinz, Brian Selcker	HYDROGEOLOGIST:	Jeff Dekoskie
Total depth of Profile:	400.69 ft	Total depth of Boring:	365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		CL		
	Well-graded SAND; light brownish gray	SW		
310	CLAY with some sand	CL		
	Poorly-graded GRAVEL with trace clay	GP		Profile data gaps due to poor KPRO equilibration
320				
	Well-graded SAND with trace gravel (fine) and trace clay	SW		
330				
340				Profiler refusal at 341.51 ft. No penetration rate or IK data from 341.51 to 364.45 ft due to drilling activities.
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine)	SP-GP		
350				
360				End of Boring at 365 ft
370				
380				Profile data gap due to poor KPRO equilibration
390				
400				Profiler refusal at 400.69 ft. End of Profile

Boring ID:

MALCOLM PIRNIE, INC.

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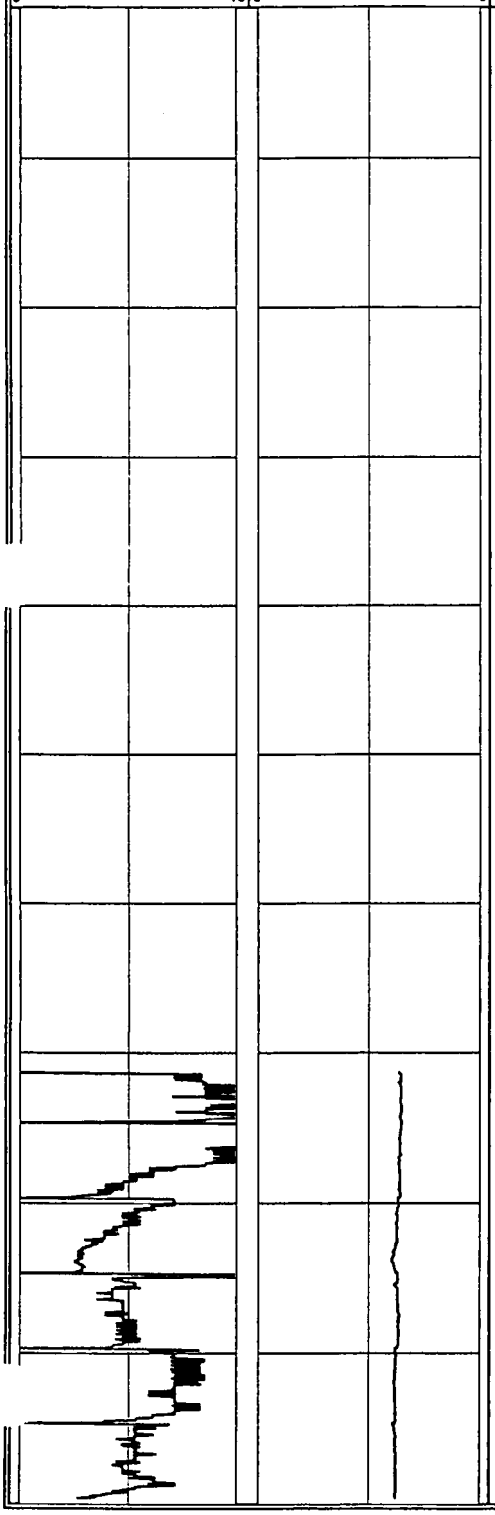
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 22, 2003
JOB NUMBER:	4563001	END DATE:	July 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	In SE corner of property, S of W John St, W of Charlotte St, and N of RR tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Wes Eicfeld	HYDROGEOLOGIST:	Jeff Dekoskie, Garret Furguson
HELPER:	Karri Carly		

Total depth of Profile: 441.27 ft

Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND and GRAVEL (fine to medium) with few silt; brown	SW-GP		Hollow stem augers used from 0 to 15 ft
10				
	Well-graded SAND with little gravel (fine); white and tan	SW		Begin mud rotary drilling at 15 ft
20				
30				
40				
50				
60				
70				Begin profiling at 69.75 ft
80				
90				

Boring ID:

MALCOLM PIRNIE, INC.

P-42

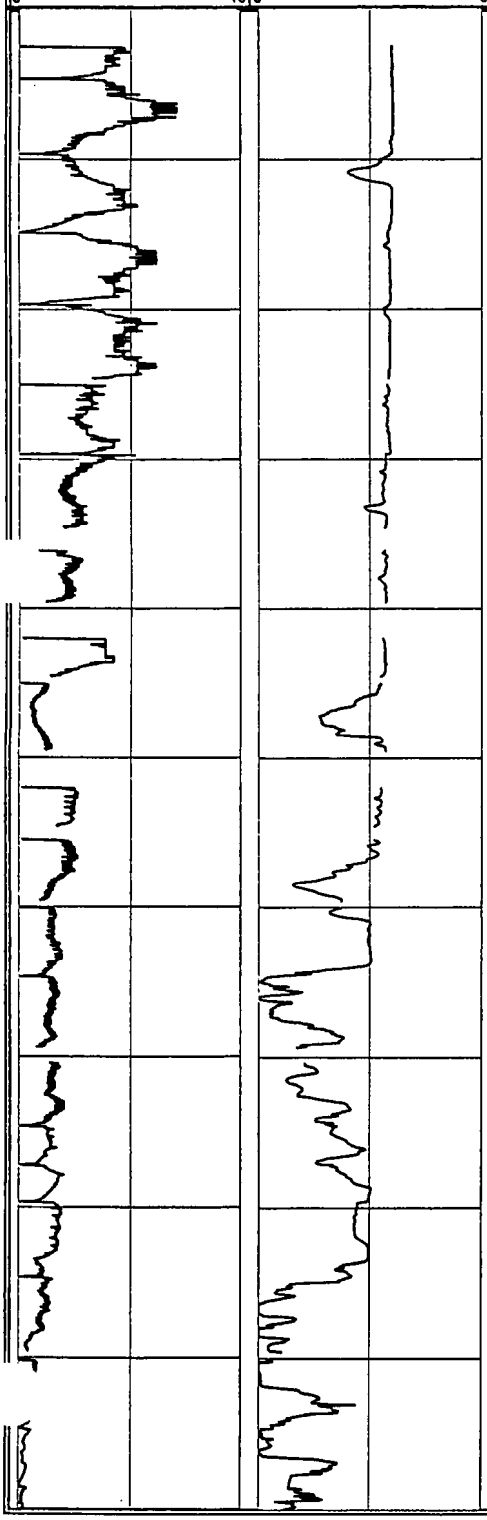
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 22, 2003
JOB NUMBER:	4563001	END DATE:	July 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	In SE corner of property, S of W John St, W of Charlotte St, and N of RR tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Wes Eicfeld	HYDROGEOLOGIST:	Jeff Dekoskie, Garret Furguson
HELPER:	Karri Carly		

Total depth of Profile: 441.27 ft

Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SW		Profile data gap due to poor KPRO equilibration
110				
120				
130				
140				Profile data gaps due to poor KPRO equilibration
150	Silty SAND with trace gravel (fine); gray, white, tan	SM		
	Well-graded SAND with some gravel (fine); gray, white, tan	SW		Profile data gaps due to poor KPRO equilibration
160				
170				Profile data gaps due to poor KPRO equilibration
180				
	Sandy CLAY; white, gray	CL		
190				Profile data gaps due to poor KPRO equilibration

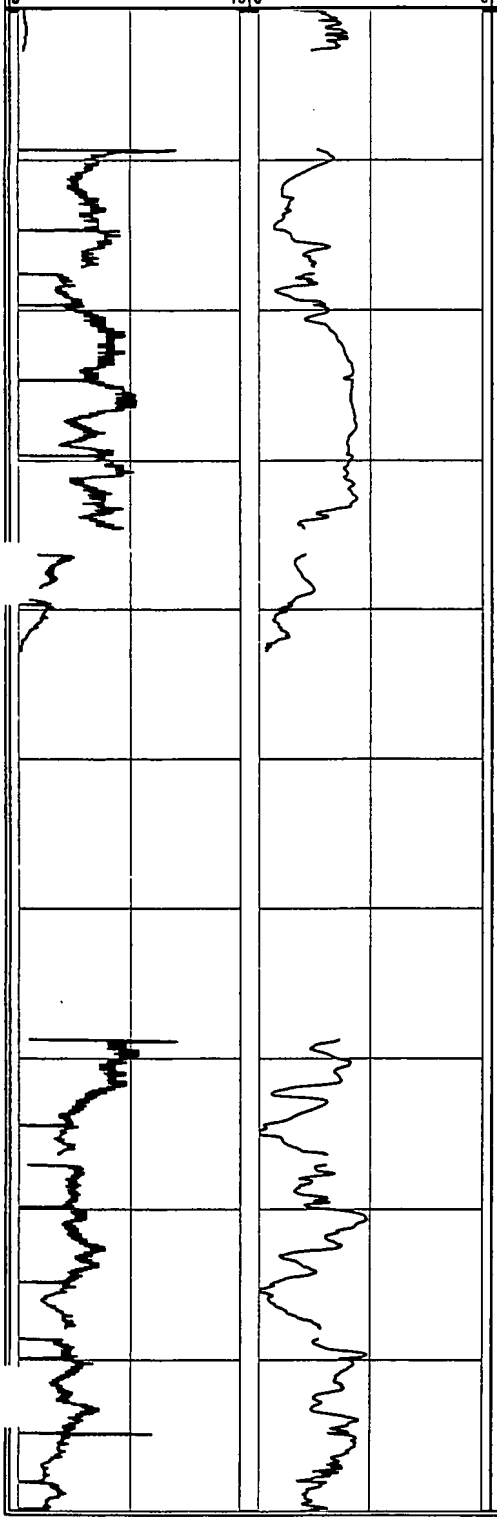
'ALCOLM PIRNIE, INC.
.7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-42**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 22, 2003
JOB NUMBER:	4563001	END DATE:	July 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	In SE corner of property, S of W John St, W of Charlotte St, and N of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carly	HYDROGEOLOGIST:	Jeff Dekoskie, Garret Furguson

Total depth of Profile: 441.27 ft Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		CL		
	Well-graded SAND with trace gravel (fine); white, tan	SW		Profiler refusal at 202.76 ft. No penetration rate or IK data from 202.76 to 209.31 ft due to drilling activities.
210				
220				
230				
				Profile data gap due to poor KPRO equilibration
240				
	Sandy, silty CLAY; gray, white	CL		Profiler refusal at 242.78 ft. No penetration rate or IK data from 242.78 to 268.76 ft due to drilling activities.
250				
260				
	Poorly-graded SAND (fine to medium) with trace silt; tan, gray, white	SP		
270				
280				
				Profile data gaps due to poor KPRO equilibration
290	Silty SAND (fine); tan	SM		

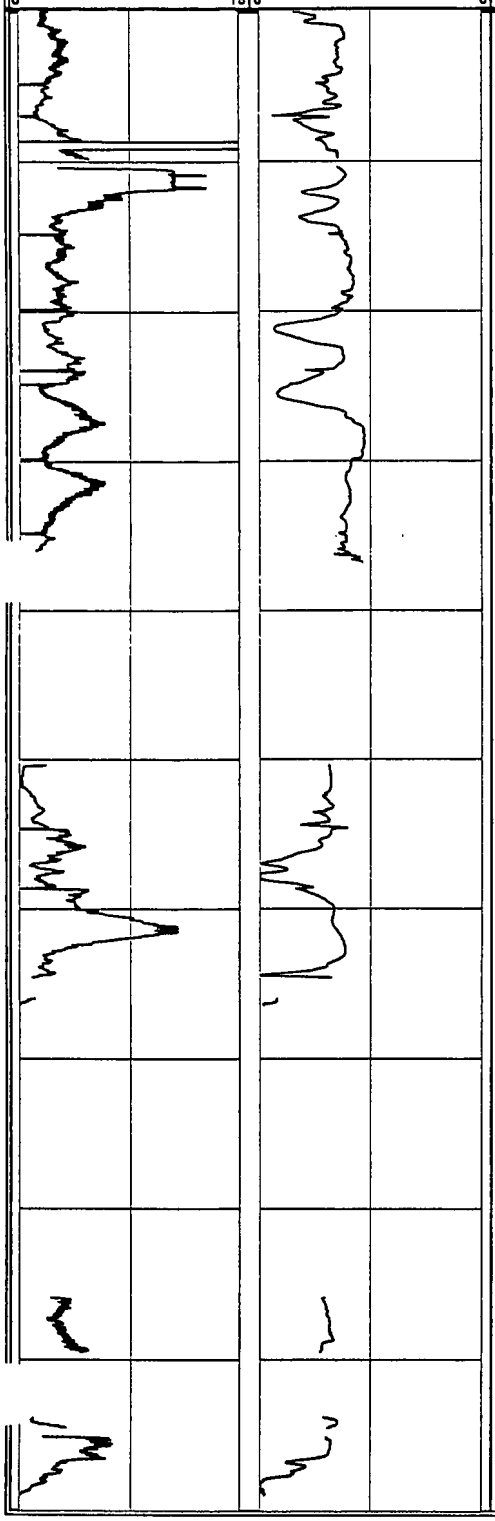
'ALCOLM PIRNIE, INC.
,7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-42**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 22, 2003
JOB NUMBER:	4563001	END DATE:	July 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	In SE corner of property, S of W John St, W of Charlotte St, and N of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carly	HYDROGEOLOGIST:	Jeff Dekoskie, Garret Furguson

Total depth of Profile: 441.27 ft Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		SM		Profile data gap due to poor KPRO equilibration
310				
320				
330	Poorly-graded SAND (fine to medium); tan	SP		Profiler refusal at 336.82 ft. No penetration rate or IK data from 336.82 to 350.41 ft due to drilling activities.
	Poorly-graded SAND (fine) with trace clay; tan	SP		Clay lens from 338 to 338.5 ft
340				
	Poorly-graded SAND with trace gravel (fine); tan, white	SP		
350				
360				
	CLAY with few sand; gray	CL		Profiler refusal at 366.46 ft. No penetration rate or IK data from 366.46 to 385.88 ft due to drilling activities.
370				
380	Poorly-graded SAND (fine to medium); gray	SP		
390				Profiler refusals at 389.5 and 398.94 ft. No penetration rate or IK data from 389.5 to 393.78 ft and from 398.94 to 405.85 ft due to drilling activities.

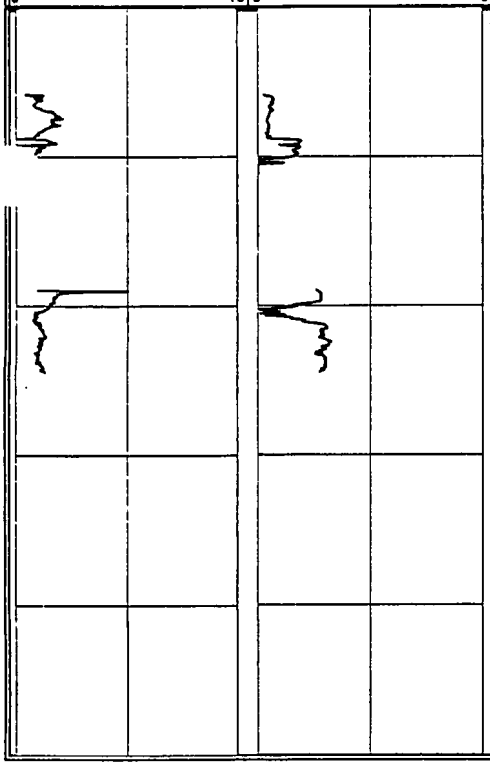
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-42

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 22, 2003
JOB NUMBER:	4563001	END DATE:	July 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	In SE corner of property, S of W John St, W of Charlotte St, and N of RR tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Wes Eicfeld	HYDROGEOLOGIST:	Jeff Dekoskie, Garret Furguson
HELPER:	Karri Carly		

Total depth of Profile: 441.27 ft
Total depth of boring: 420 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400		SP		
410				Profiler refusal at 411.17 ft. No penetration rate or IK data from 411.17 to 418.95 ft due to drilling activities.
420				End of boring at 420 ft
430				Profile data gap from 424.5 to 441.27 ft due to equipment malfunction
440				Profiler refusal at 441.27 ft. End of profile

Boring ID:

ALCOLM PIRNIE, INC.

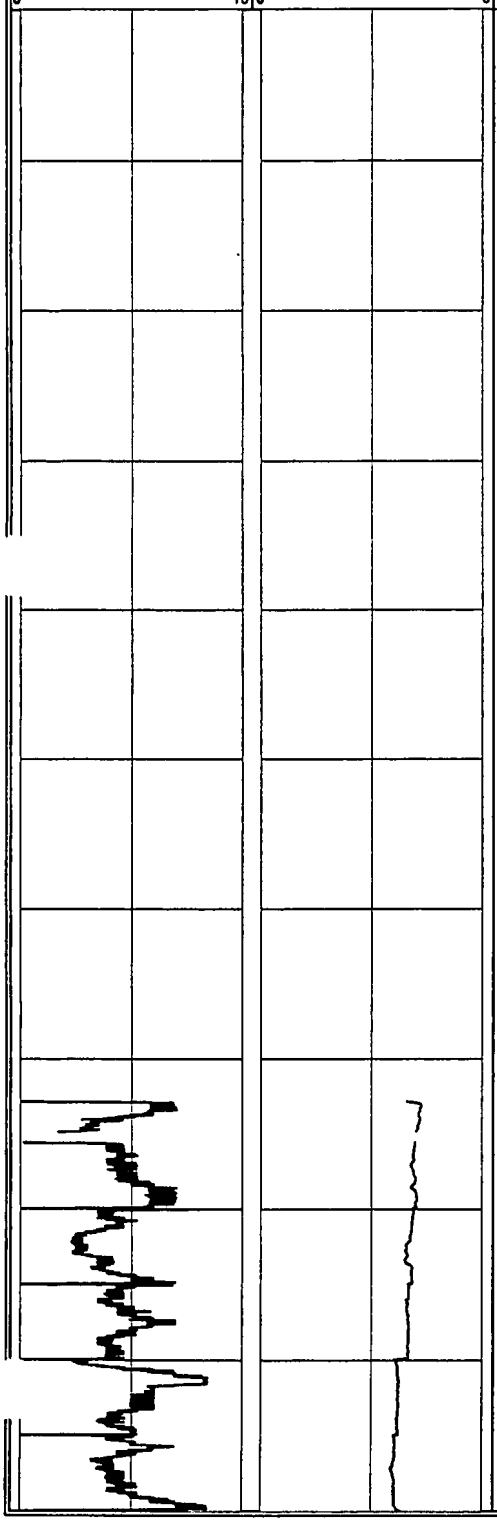
7 Route 208 North Fair Lawn, NJ 07401

P-43

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 8, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, W of Charlotte St, S of W John St, W of P-42
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carly	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 324 ft — Total depth of Boring: 250 ft

GEOLOGIC INFORMATION



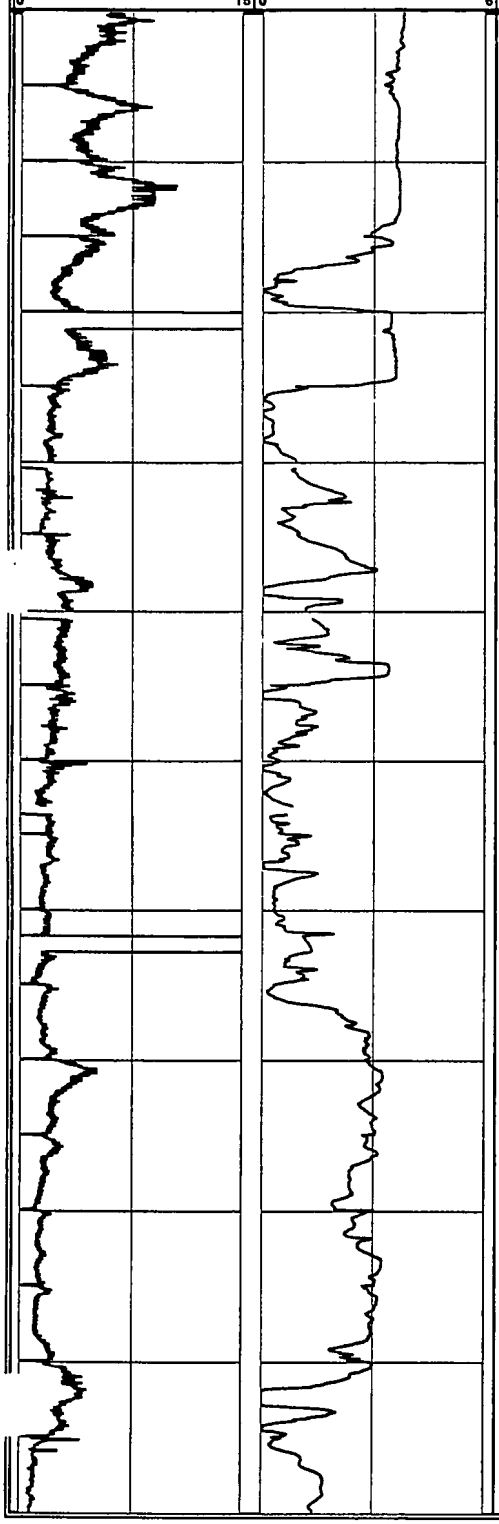
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	SAND (medium to coarse) and GRAVEL (fine); brown to dark brown	SP-GP		Hollow stem augers used from 0 to 15 ft
10				
				Begin mud rotary drilling at 15 ft
20				
30	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light brown	SP		
40	Well-graded GRAVEL and SAND (coarse); light brown	GW-SP		
	Poorly-graded SAND (medium to coarse) with little to some gravel (fine); light brown	SP		
50				
60				
70				Begin profiling at 72.84 ft
	Poorly-graded SAND (medium to coarse); light brown to white	SP		
80				
90				

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-43

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 8, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, W of Charlotte St, S of W John St, W of P-42
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carly	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	324 ft	Total depth of Boring:	250 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown to white	SP-GP		
110	Well-graded SAND with little gravel and trace silt and clay; light brown to white	SW		
120				Gravel fraction increases with depth
130				
140	Clayey SILT; yellow-orange-white	ML- CL		Profile data gap due to poor KPRO equilibration
150				Profile data gap due to poor KPRO equilibration
160	Poorly-graded SAND with trace clay; brown to gray	SP		
170				
180				
190				

Boring ID:

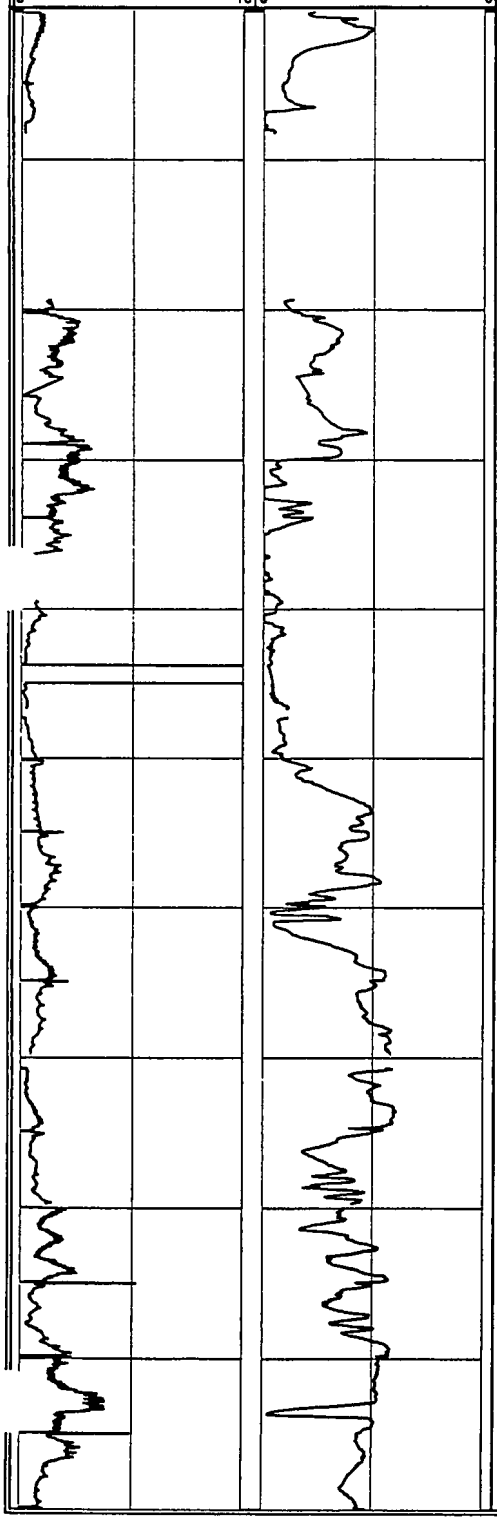
MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

P-43

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 8, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, W of Charlotte St, S of W John St, W of P-42
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carly	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	324 ft	Total depth of Boring:	250 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (medium) with trace gravel (fine); brown to gray	SP		
				Clay lens from 207 to 208 ft
210				Profiler refusal at 208.25 ft. No penetration rate or IK data from 208.25 to 219.32 ft due to drilling activities
220				Loss of circulation of drilling fluid at 210 ft. No recovery of cuttings below 210 ft.
230				
240				End of boring at 250 ft
				Profile data gap due to poor KPRO equilibration
250				
260				
270				Profile data gap due to poor KPRO equilibration
280				
290				

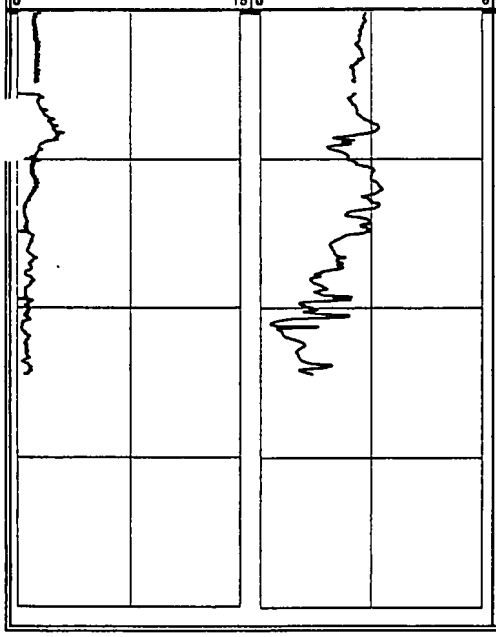
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-43

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 8, 2003
JOB NUMBER:	4563001	END DATE:	September 24, 2003
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, W of Charlotte St, S of W John St, W of P-42
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carly	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 324 ft
Total depth of Boring: 250 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300				
				Profile data gap due to poor KPRO equilibration
310				
				Problems with profiling equipment, and heave within mud rotary casing from 309 to 338 ft.
320				
330				
				No Profile data available below 324.45 ft, end of Profile
340				

Boring ID:

`ALCOLM PIRNIE, INC.

P-44

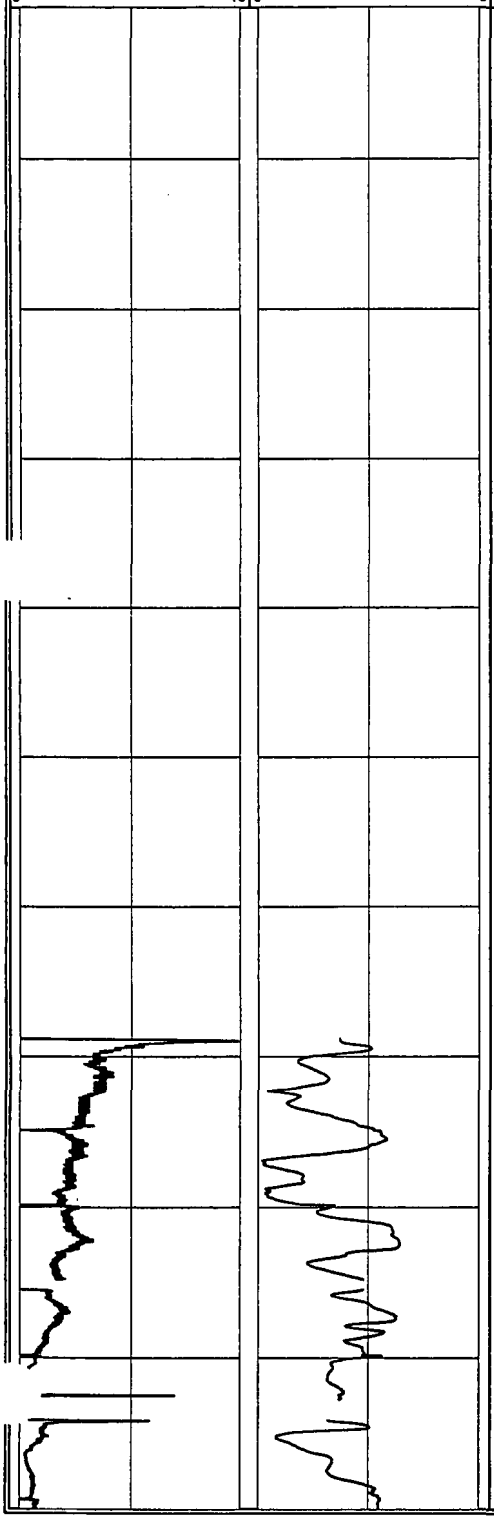
.7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 2, 2003
JOB NUMBER:	4563001	END DATE:	September 10, 2003
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, W of Charlotte St, S of W John St, W of P-43
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Siecker	HYDROGEOLOGIST:	J. Hilton, J. Ifkovits, K. Wheeler

Total depth of Profile:

Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND and GRAVEL (fine); medium to light brown	SW		6 1/4 hollow stem auger used from 0 to 14 ft.
10	Well-graded SAND with some gravel; light brown	SW		Begin mud rotary drilling at 14 ft.
20				
30				
40				Gravel occurs as interbeds <2 ft thick from 30 to 60 ft.
50				
60	SAND (fine to medium) with some silt; medium brown	SM		Begin profiling at 68.82 ft
70	Poorly-graded SAND (fine); light brown	SP		
80	Silty SAND; light orange-brown to medium gray-brown	SM		
90				Profiler refusal at 92.78 ft. No penetration rate or IK data from 92.78 to 94.05 ft due to drilling activities.
	SILT with trace sand (fine); medium to dark gray	ML		

Boring ID:

MALCOLM PIRNIE, INC.

P-44

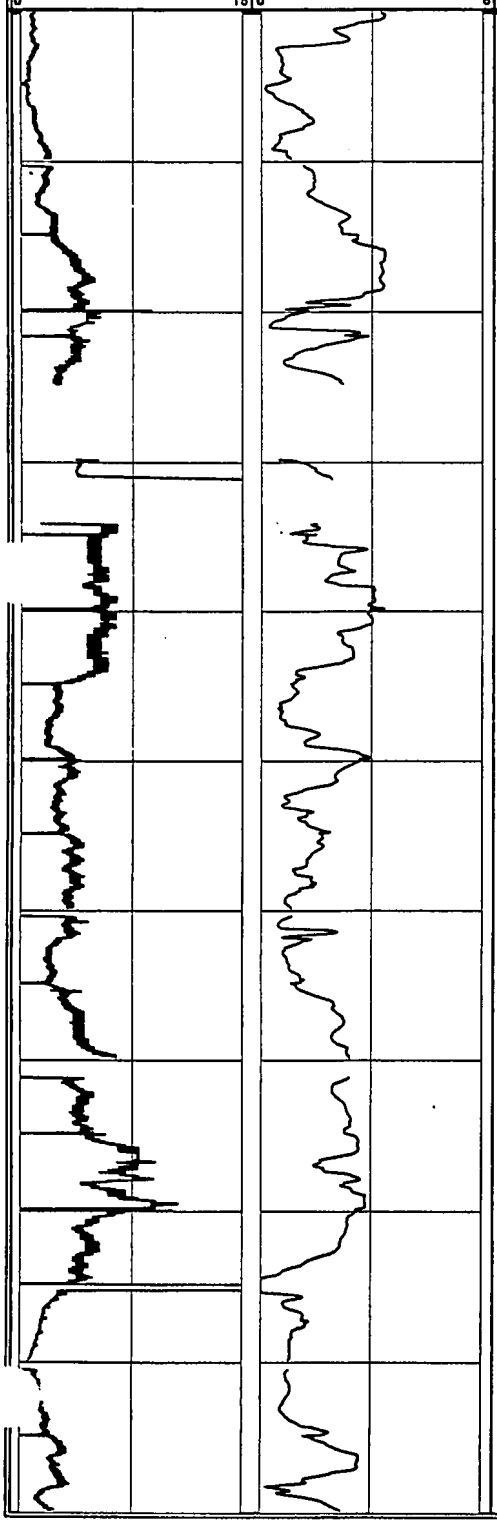
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 2, 2003
JOB NUMBER:	4563001	END DATE:	September 10, 2003
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, W of Charlotte St, S of W John St, W of P-43
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	J. Hilton, J. Ifkovits, K. Wheeler
HELPER:	Brian Siecker		

Total depth of Profile:

Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (fine) with some to little silt and clay; light tan to brown	SM-SC		
110				
	SILT and SAND (fine); light orange	ML-SM		
120	Poorly-graded SAND (fine) with some silt and clay; light gray to white	SM-SC		Profile data gap due to equipment malfunction
130				Profile data gap due to poor KPRO equilibration
140	SILT and SAND (fine) with trace clay; tan to brown	ML-SM		
150				
160				Profile data gaps due to poor KPRO equilibration
170	SAND (fine to medium) and SILT; tan to light brown	SM-ML		
180	SILT and SAND; tan to reddish-brown	ML-SM		
190	Poorly-graded SAND (fine to medium) with some silt; tan to light brown	SM		

Boring ID:

MALCOLM PIRNIE, INC.

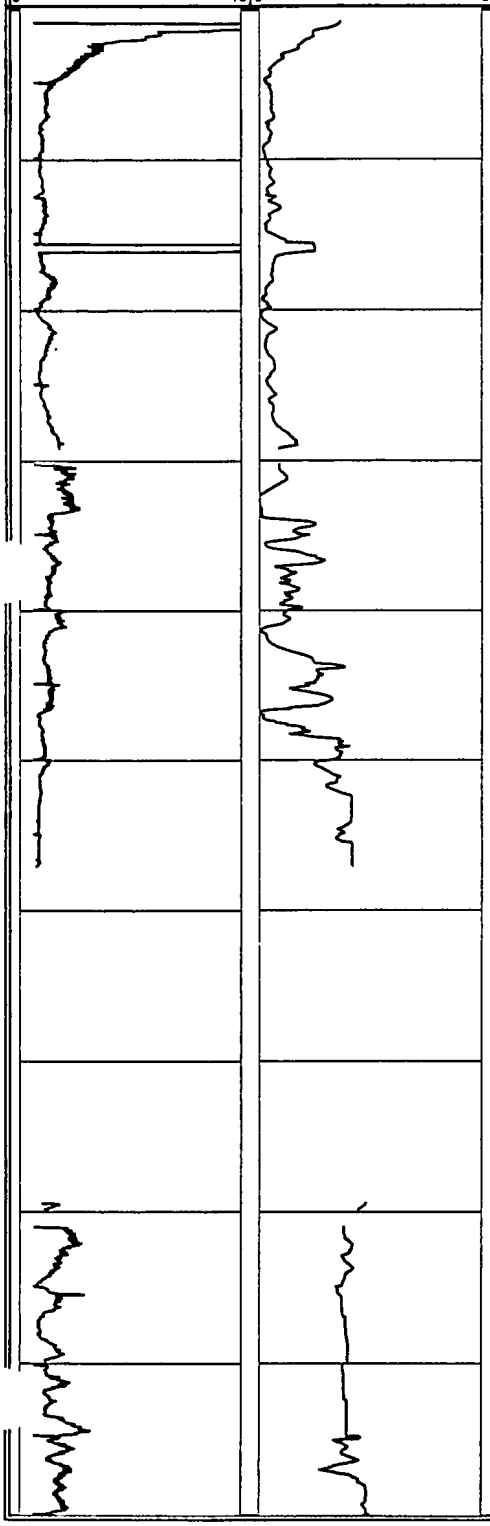
17 Route 208 North Fair Lawn, NJ 07401

P-44

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 2, 2003
JOB NUMBER:	4563001	END DATE:	September 10, 2003
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, W of Charlotte St, S of W John St, W of P-43
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	J. Hilton, J. Ifkovits, K. Wheeler
HELPER:	Brian Siecker		

Total depth of Profile: Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Clayey SILT; light brown to light gray	ML-CL		Profile data gap due to poor KPRO equilibration
210	CLAY with some silt and trace sand; gray	CL		
220				
230				
240	SAND and SILT with little clay and trace gravel (fine); light brown	SM-ML		
250				Profiler refusal at 257.06 ft, no penetration rate or IK data from 257.06 to 279.42 ft due to drilling activities
260	Clayey SILT; light brown	ML- CL		
270	Poorly-graded SAND (fine to medium) with little clayey silt; light brown	SP-SM		
				No recovery of cuttings from 275 to 290 ft.
280				
290	Poorly-graded SAND (fine to medium) with some silt and little gravel; tan	SP		

Boring ID:

MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

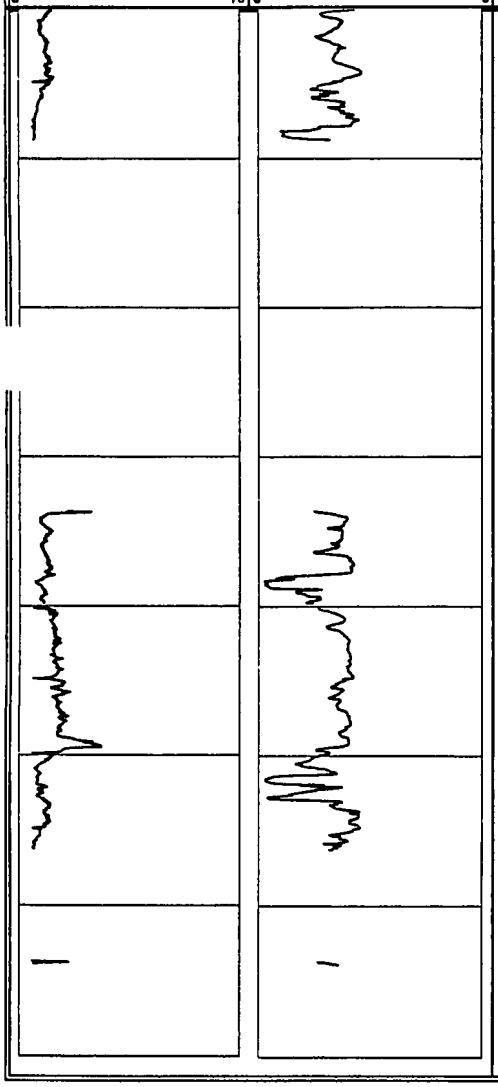
P-44

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 2, 2003
JOB NUMBER:	4563001	END DATE:	September 10, 2003
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, W of Charlotte St, S of W John St, W of P-43
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Siecker	HYDROGEOLOGIST:	J. Hilton, J. Ifkovits, K. Wheeler

Total depth of Profile:

Total depth of Boring: 365 ft

GEOLOGIC INFORMATION



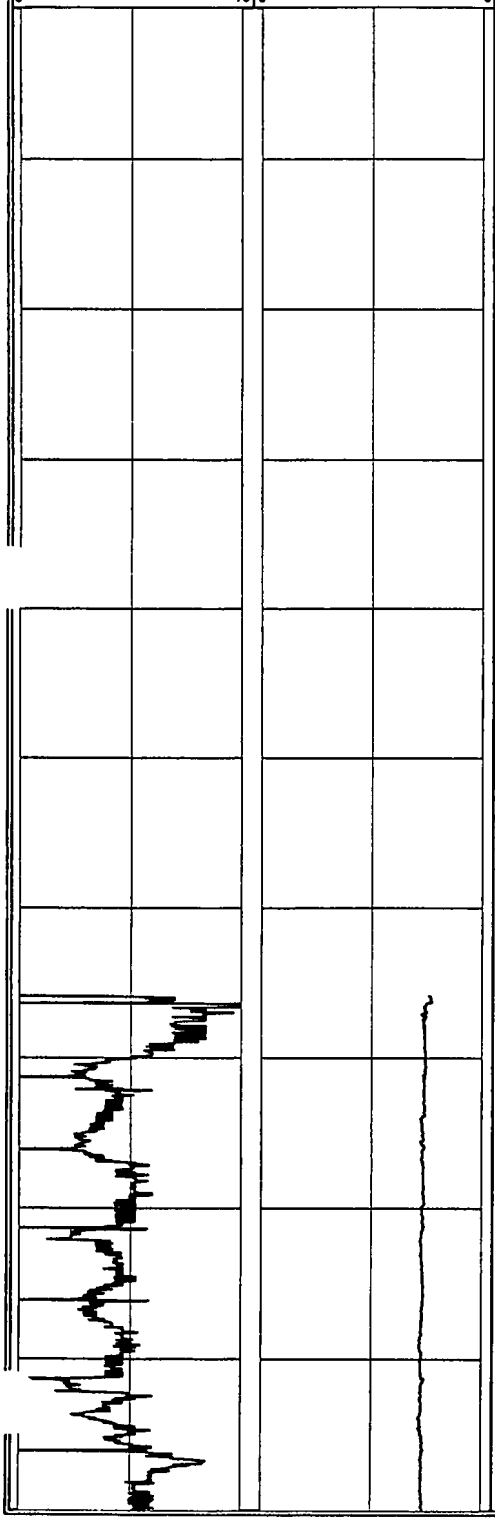
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		SP		
	Poorly-graded GRAVEL (fine) with trace clay; gray to white			
310	CLAY with little sand; gray	CL		Profiler refusal at 308.75 ft, no penetration rate or IK data from 308.75 to 333.66 ft due to drilling activities
320				
	Poorly-graded SAND (fine to medium); light gray	SP		
330				Sand coarsens with depth
340	Poorly-graded SAND (medium) with trace gravel (fine); light gray to light brown	SP		
350	Well-graded SAND with trace sandy clay; light gray	SW		Profile data gap due to drilling activities
360				End of profile at 363 ft
				End of boring at 365 ft
370				

MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-45

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	SE corner of intersection of Cantiague Rock Rd. and W John St.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jon Turk
Total depth of Profile:	390.37 ft	Total depth of Boring:	395 ft

GEOLOGIC INFORMATION



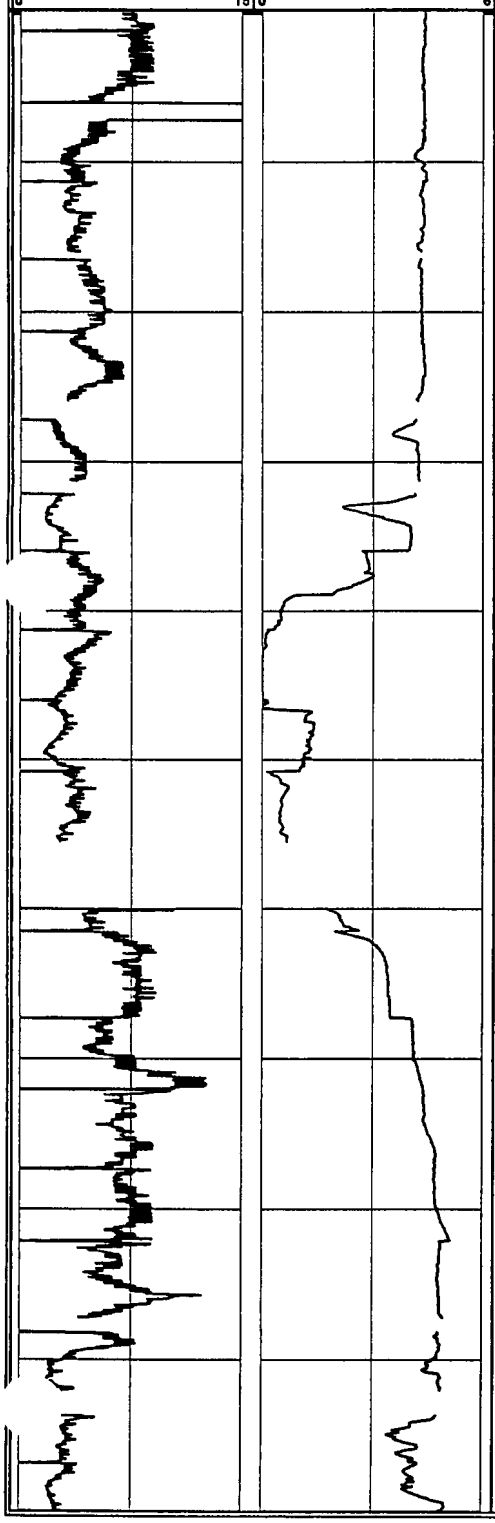
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown	SP		
10				Hollow stem auger used from 0 to 18 ft. Begin mud rotary drilling at 18 ft.
20	Well-graded SAND with some gravel; tan	SW		
30				
40	Well-graded SAND and GRAVEL; tan	SW-GW		
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine) with trace clay; light brown	SP-GP		
50	Poorly-graded SAND (fine to medium); tan	SP		
	Poorly-graded SAND (medium to coarse) with trace gravel (fine to coarse); tan	SP		
60	Well-graded GRAVEL and SAND; tan	GW-SW		
	Well-graded SAND; tan	SW		Begin Profiling at 65.85 ft
70	Well-graded SAND with trace gravel (fine); tan	SW		
80	Well-graded SAND; tan	SW		
90	Well-graded SAND; tan	SW		
	Well-graded SAND with trace gravel (fine); tan	SW		
	Well-graded SAND with some silt,	SW		

MALCOLM PIRNIE, INC.
Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-45

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	SE corner of intersection of Cantlague Rock Rd. and W John St.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jon Turk
Total depth of Profile:	390.37 ft	Total depth of Boring:	395 ft

GEOLOGIC INFORMATION



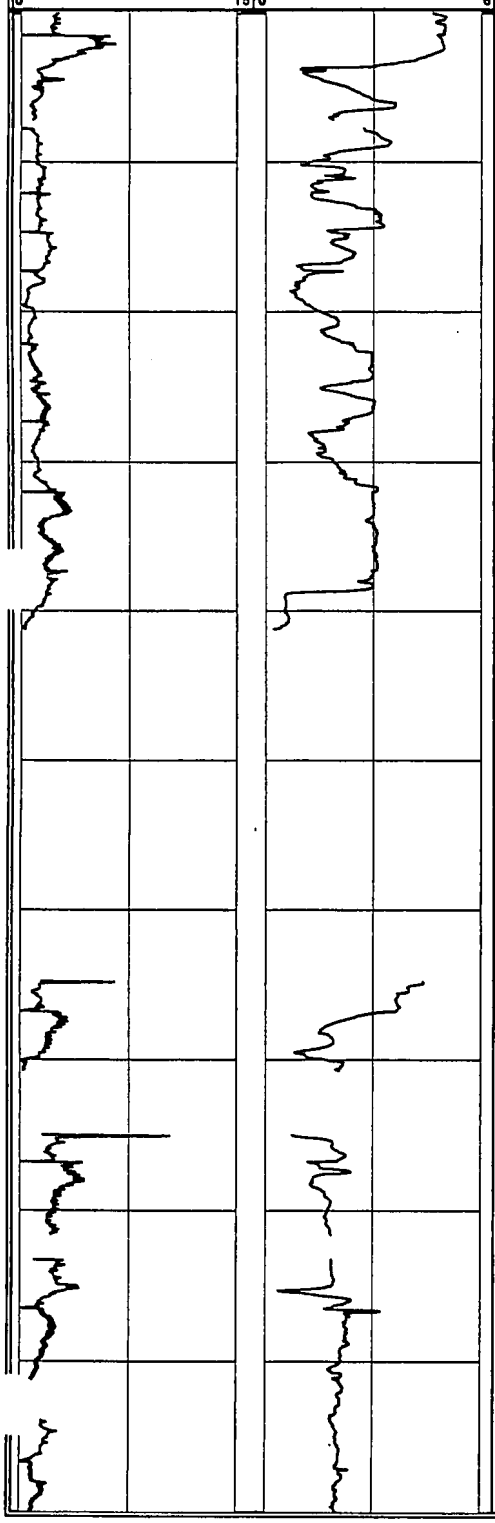
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	trace gravel and trace clay; tan	SW		
	Poorly-graded SAND (coarse) and GRAVEL (fine); tan	SP-GP		
110				
	Poorly-graded SAND (fine to medium); tan	SP		
120				
	Well-graded SAND; tan	SW		
	Well-graded SAND and GRAVEL (fine); tan	SW-GP		Profile data gaps to poor KPRO equilibration
130				
	Well-graded SAND with trace gravel (fine); tan	SW		
	Well-graded SAND (fine to coarse) with some silt; tan	SM		
140				
	Well-graded SAND with some silt, some gravel; tan	SM		
150				
	Well -graded SAND with trace gravel (fine) and trace clay; tan	SW		Sampler ports clogged from 155.55 to 159.99 ft. Pulled sampler to unclog.
	Poorly-graded SAND (coarse) and GRAVEL (fine); tan	SP-GP		
160				
	Well-graded SAND and GRAVEL; tan	SW		
170				
	Poorly-graded SAND (medium to coarse and GRAVEL (fine); tan	SP-GP		
	Poorly-graded SAND (med to crs);tan	SP		
180	Poorly-graded SAND (med to crs);tan	SP		
	Poorly-graded SAND (coarse) and GRAVEL (fine); tan	SP-GP		
	Well-graded SAND with some silt and some clay; tan	SM		Profile data gaps to poor KPRO equilibration
190				
	Well-graded SAND and CLAY; orange-tan	SC- CL		
	SILT and CLAY with some sand	ML- CL		

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-45**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	SE corner of intersection of Cantiague Rock Rd. and W John St.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jon Turk
Total depth of Profile:	390.37 ft	Total depth of Boring:	395 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	(fine to medium); tan to orange	ML- CL		
	Poorly-graded SAND (fine to medium) and CLAY; tan	SC- CL		
210	Poorly graded SAND (fine) and SILT with some clay; tan-orange	SM-ML		Profile data gap to poor KPRO equilibration
220	SILT and SAND (fine) with trace clay; tan	ML-SM		
	Poorly-graded SAND (fine) and CLAY with some silt; tan	SC- CL		
230				
240	Poorly-graded SAND (fine) and CLAY, with some lignite; gray to black	SC- CL		Profiler refusal at 241.26 ft. No penetration rate or IK data from 241.26 to 264.79 ft due to drilling activities.
250	SILT and CLAY with some lignite; gray	ML- CL		
	SILT and CLAY with trace sand (fine) and trace gravel (fine); gray	ML- CL		
	CLAY; gray to white	CL		
260	Poorly-graded SAND (fine to medium) and SILT; gray	SM-ML		
	CLAY with some lignite; gray to white	CL		
270	Poorly-graded SAND (fine) with some silt and trace gravel; tan	SM		Profiler refusal at 270.76 ft. No penetration rate or IK data from 270.76 to 275.01 ft due to drilling activities.
	Poorly-graded SAND (coarse) and GRAVEL (fine); tan	SP-GP		
280	Well-graded GRAVEL with some sand (fine to coarse) and little silt; tan	GW		3-inch casing broke off. Move to alternate location (P-45B). Approximately 10 ft south
	Well-graded GRAVEL with some sand; tan	GW		
	Poorly-graded SAND (medium to coarse) and CLAY with trace gravel (medium); gray	SC- CL		Profile data gap to poor KPRO equilibration
290	CLAY and LIGNITE with some sand (medium) and trace gravel (fine);gray	CL-PT		
	Poorly-graded SAND (coarse) and CLAY with trace gravel (fine); gray	SC- CL		

Boring ID:

MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

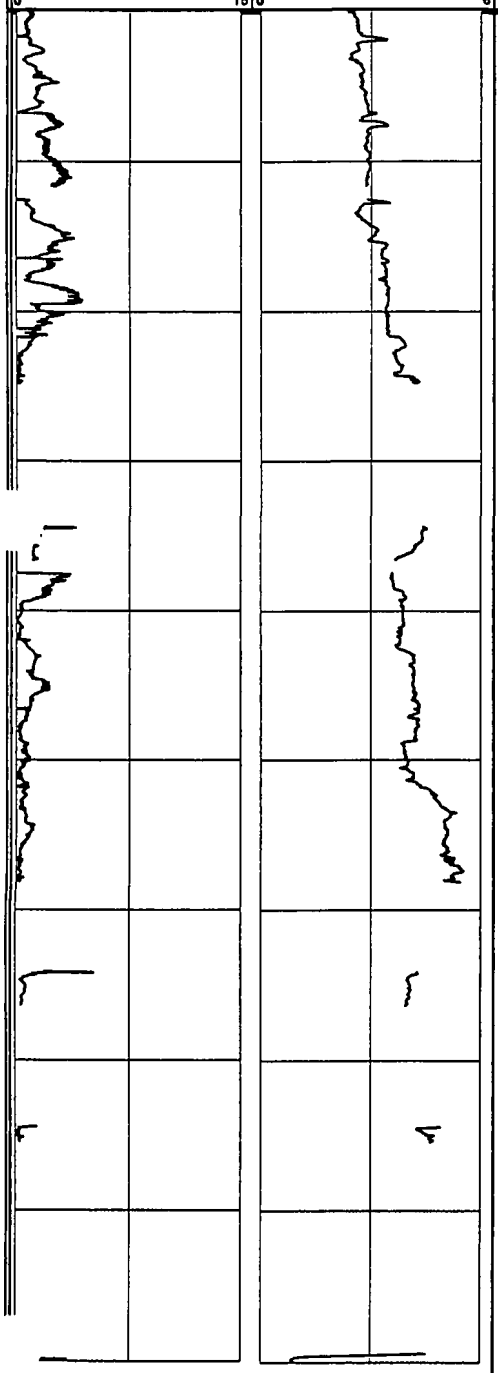
P-45

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 4, 2003
JOB NUMBER:	4563001	END DATE:	August 14, 2003
DRILLING FIRM:	CT&E	LOCATION:	SE corner of intersection of Cantiague Rock Rd. and W John St.
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Bill Petley	HYDROGEOLOGIST:	Jon Turk
HELPER:	Ken Heinz		

Total depth of Profile: 390.37 ft

Total depth of Boring: 395 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	Poorly-graded SAND (coarse) and CLAY with some gravel (fine); tan to gray	SC- CL		
310	Poorly-graded SAND (medium to coarse) with trace gravel (fine) and trace clay; tan	SP		Profile data gap to poor KPRO equilibration
	Well-graded SAND with trace gravel (fine) and trace clay; gray	SW		Profiler refusal at 324.77 ft. No penetration rate or IK data from 324.77 to 334.36 ft due to drilling activities.
320	CLAY with some sand (medium to coarse) and trace lignite; gray	CL		
	No recovery			Lost circulation of drilling fluids from 325 to 395 ft
330				
				Profile data gap to poor KPRO equilibration
340				
350				
				Profiler rod broke at 358 ft. Pulled rods to fix problem
360				
				Profile rod broken between 364.78 and 366.4 ft bgs. Was not noticed until profiler was pulled at 375.46. Probably caused the inability to drive the profiler
370				
				Profiler refusals at 366.4 ft and 375.46 ft, no penetration rate or IK data due to drilling activities
380				
				Profiler refusal at 390.37 ft, end of profile
390				

Boring ID:

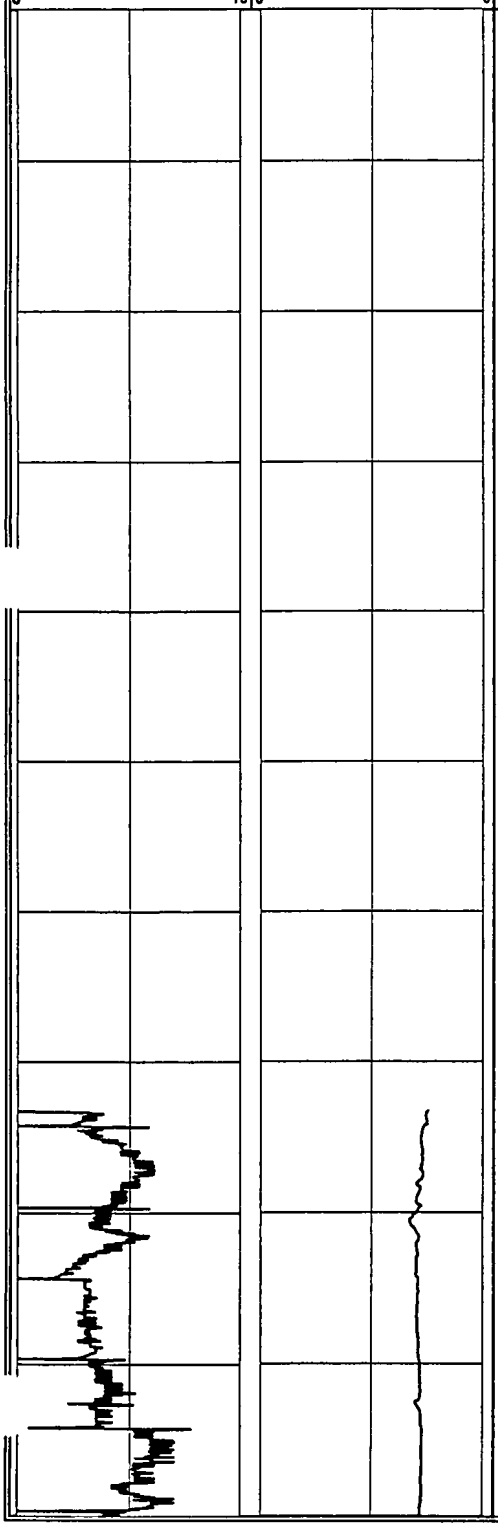
MALCOLM PIRNIE, INC.

P-46

17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	September 8, 2003
DRILLING FIRM:	CT&E	LOCATION:	On S side of W John St, between Cantiague Ln and Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carley	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	500.07 ft	Total depth of Boring:	465 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND with trace to little gravel (fine to coarse); brown	SP		
10				
	Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown	SP		Hollow stem auger used from 0 to 15 ft. Begin mud rotary drilling at 15 ft.
20				
30				
40	Poorly-graded SAND (medium to coarse); light brown	SP		
50	Poorly-graded SAND (coarse) with some gravel (fine); light brown to yellow	SP		
60	Poorly-graded SAND (medium to coarse) with some silt and trace clay and gravel; yellowish-brown	SM		
70	Poorly-graded SAND (medium); light brown	SP		Begin Profiling at 73.29 ft
80				Micaceous
90	Poorly-graded SAND (medium to coarse); light brown	SP		

Boring ID:

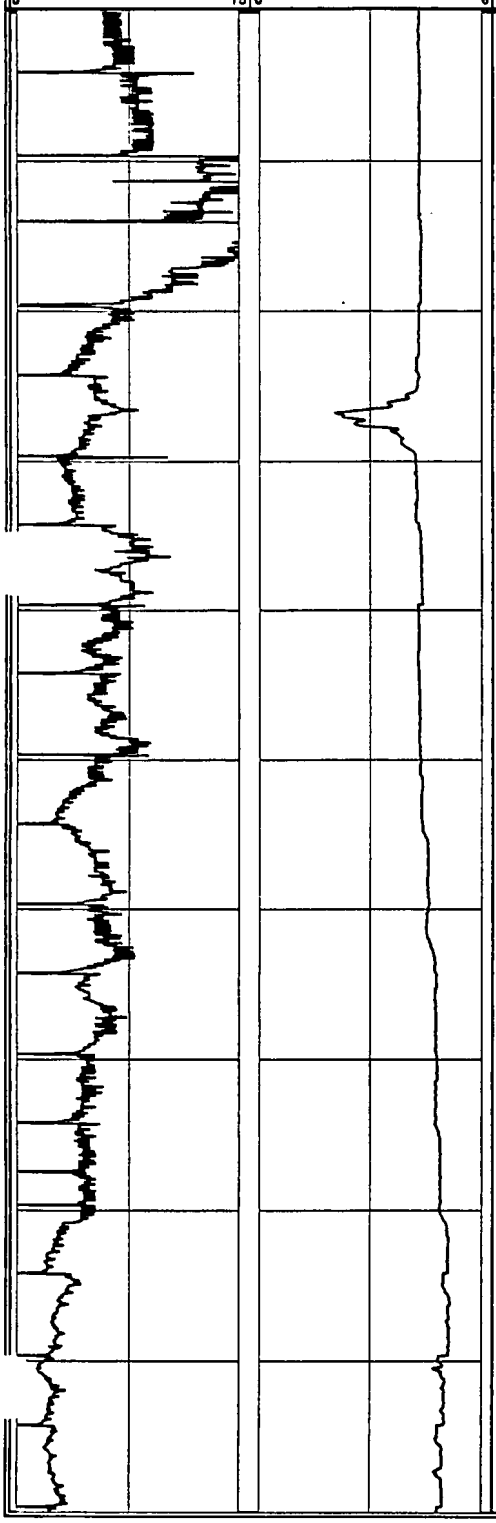
ALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

P-46

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	September 8, 2003
DRILLING FIRM:	CT&E	LOCATION:	On S side of W John St, between Cantiague Ln and Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carley	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	500.07 ft	Total depth of Boring:	465 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (medium to coarse) with trace gravel (fine); white-yellow-tan	SP		
110	Poorly-graded SAND (medium to coarse) with some gravel (fine to coarse); light brown	SP		
120	Poorly-graded SAND (medium to coarse) with trace silt ; light brown	SP		
130	Poorly-graded SAND (medium to coarse) with little gravel (fine); light brown to tan	SP		
140				
150	Poorly-graded SAND (medium to coarse); light brown to gray	SP		
160	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light brown to gray	SP		
170				
180	Poorly-graded SAND (medium to coarse) with little gravel (fine) and trace lignite; light brown to gray	SP		
190	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown to gray	SP-GP		

Boring ID:

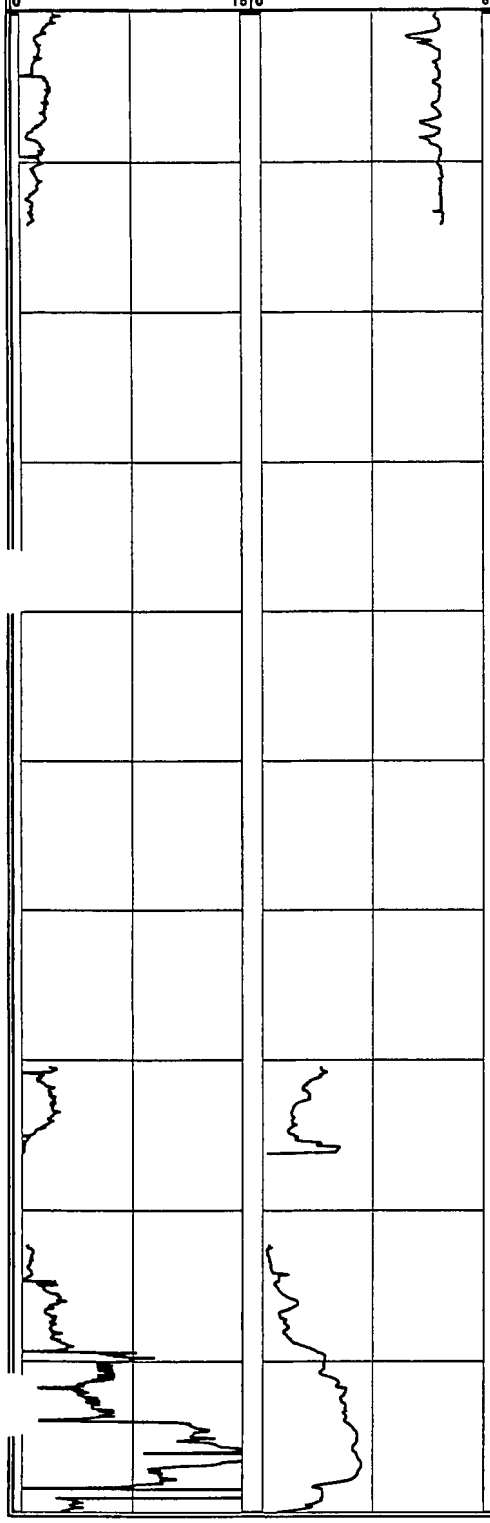
MALCOLM PIRNIE, INC.

P-46

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	September 8, 2003
DRILLING FIRM:	CT&E	LOCATION:	On S side of W John St, between Cantiague Ln and Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carley	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	500.07 ft	Total depth of Boring:	465 ft

GEOLOGIC INFORMATION



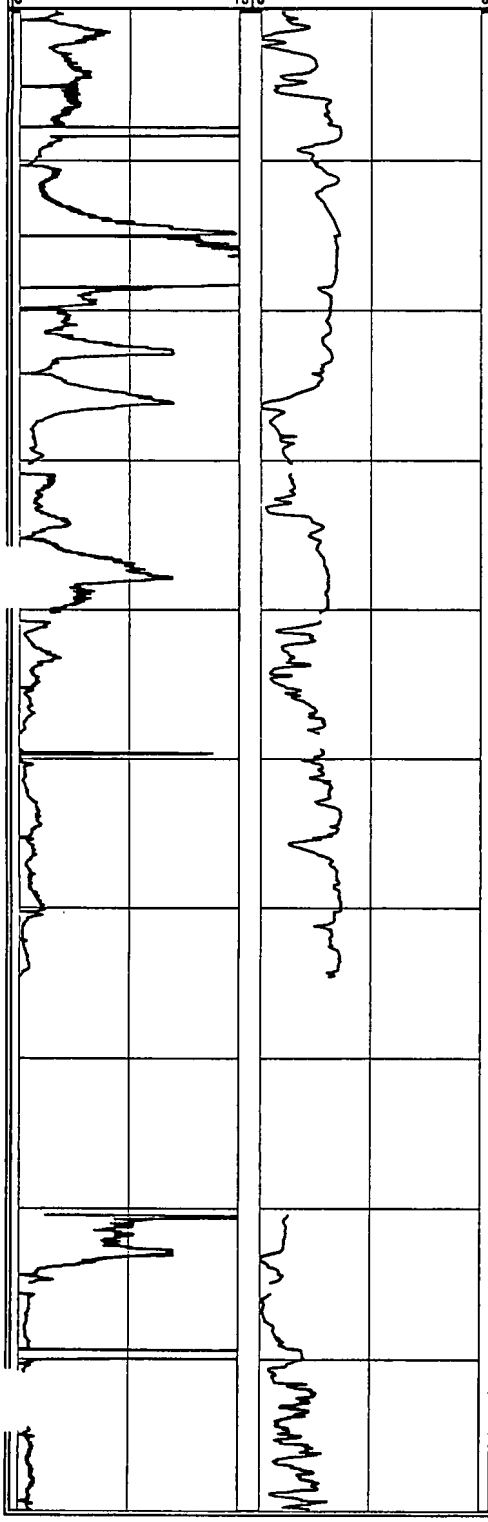
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light reddish-brown	SP		
210	Poorly-graded SAND (medium); light reddish-brown	SP		Profiler refusal 214.19 ft, no penetration rate or IK data from 214.19 to 270.5 ft due to drilling activities
	Well-graded SAND with some silt and trace clay; light brown to red	SM		
220	Well-graded SAND with some silt, some clay, and trace lignite; light brown to red	SM		
230	Poorly-graded SAND (fine) and CLAY with trace lignite; white-gray-yellow	SC- CL		
240	CLAY and SILT with some sand (fine) and some lignite; white-yellow-gray	CL- ML		Micaceous
250	CLAY and LIGNITE with some sand (fine to medium); dark gray	CL-PT		
260	Poorly-graded SAND (fine to medium) with some lignite; light brown	SP		
270	Poorly-graded SAND (fine to medium) with some silt; light brown to gray	SM		Micaceous Profiler refusal at 276.22 ft, no penetration rate or IK data from 276.22 to 282.36 ft due to drilling activities
280				
290	Poorly-graded SAND (medium); light tan	SP		

MALCOLM PIRNIE, INC.
.7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-46

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	September 8, 2003
DRILLING FIRM:	CT&E	LOCATION:	On S side of W John St, between Cantiague Ln and Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carley	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	500.07 ft	Total depth of Boring:	465 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		SP		
310	Poorly-graded SAND (medium to coarse) with trace clay; tan-pink	SP		
320	Poorly-graded SAND (fine to medium) with trace clay; light gray to brown	SP		
330	Poorly-graded SAND (fine to medium); light gray	SW		Micaceous Profile data gaps due to poor KPRO equilibration
340				
350				
360	Poorly-graded SAND (fine to medium) with trace clay; light gray	SP		
370	Poorly-graded SAND (fine to medium) with trace gravel (fine); light gray	SP		Profiler refusal at 364.63 ft, no penetration rate or IK data from 364.63 to 380.43 ft due to drilling activities
	Poorly-graded SAND (fine to medium); light gray	SP		
380	No Recovery of Cuttings			Lost circulation of drilling fluids from 380 to 410 ft. No recovery of cuttings. Profile data gap due to poor KPRO equilibration
390				

Boring ID:

MALCOLM PIRNIE, INC.

17 Route 208 North Fair Lawn, NJ 07401

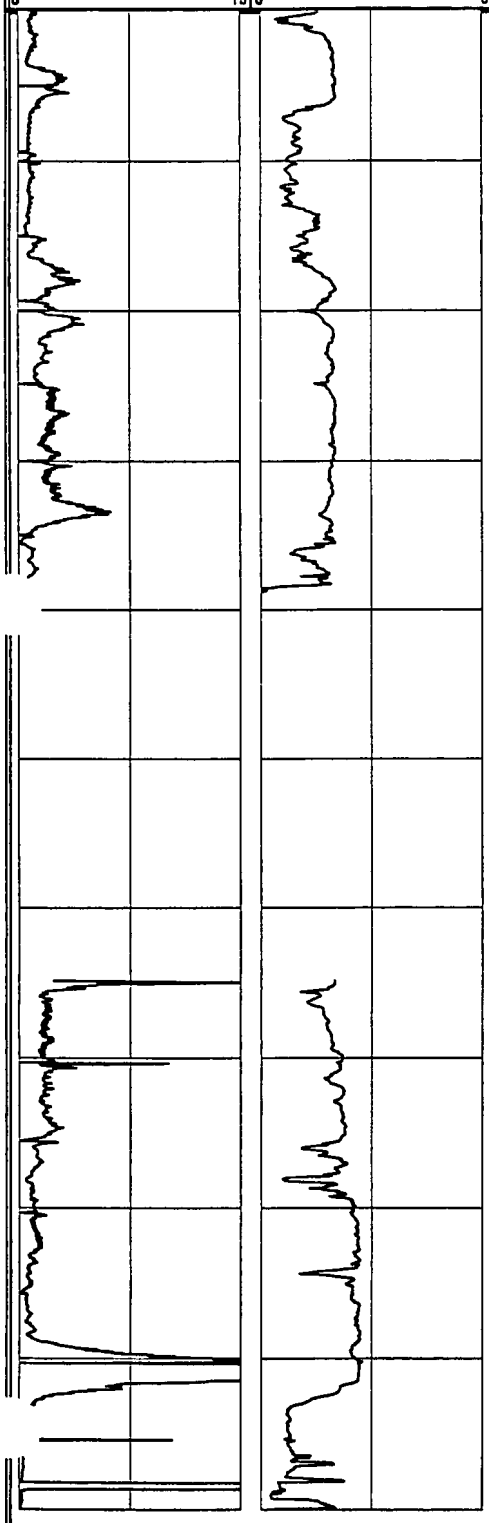
P-46

OJECT NAME:	GTEOSI-Hicksville	START DATE:	August 19, 2003
JOB NUMBER:	4563001	END DATE:	September 8, 2003
DRILLING FIRM:	CT&E	LOCATION:	On S side of W John St, between Cantiague Ln and Charlotte St
DRILLING METHOD:	Mud Rotary		
DRILLER:	Karri Carley	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 500.07 ft

Total depth of Boring: 465 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400				
410	Poorly-graded SAND (fine); gray	SP		
420				
430	Poorly-graded SAND (medium to coarse); red	SP		Clay lens at ~438 ft
440	SILT and CLAY	ML- CL		Profiler refusal at 438.81 ft, no penetration rate or IK data from 438.81 to 464.87 ft due to drilling activities
	Poorly-graded SAND (fine to medium); gray	SP		Little recovery of cuttings
450	Poorly-graded SAND (fine) and SILT, trace clay, trace lignite; gray	SM-ML		
460	Poorly-graded SAND (fine to medium); gray	SP		End of boring at 465 ft
470				
480				
490				
500				Profiler refusal at 500.07 ft, end of Profile

Boring ID:

`ALCOLM PIRNIE, INC.

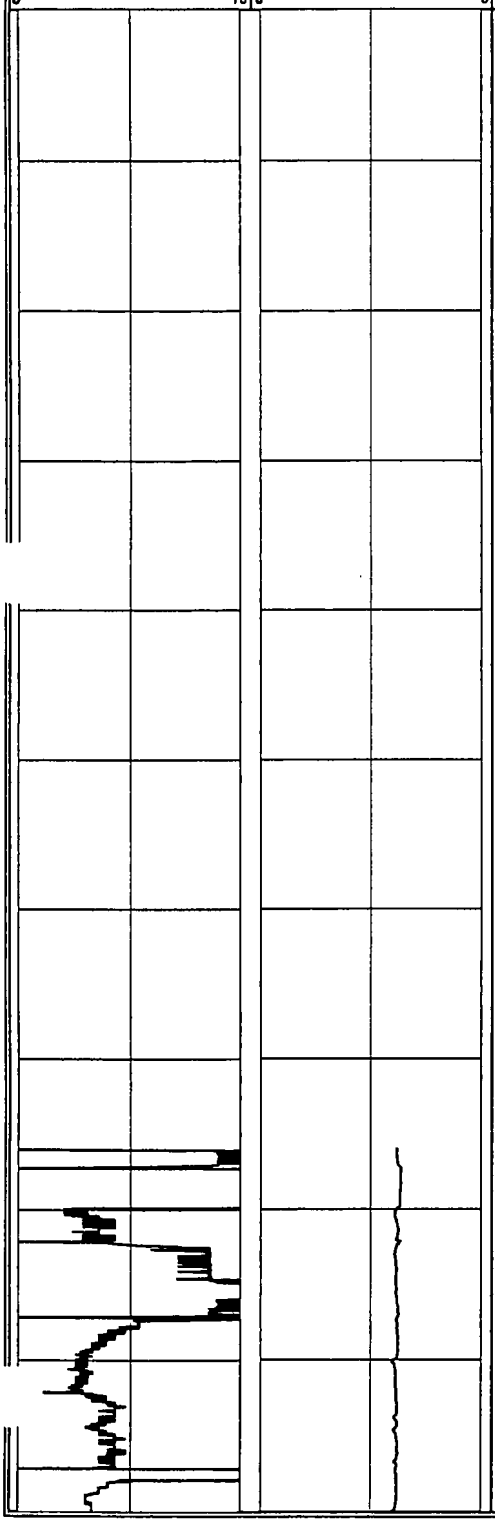
P-47

,7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 2, 2003
JOB NUMBER:	4563001	END DATE:	September 11, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of intersection of W John St, Cantiague Rock Rd, and Cantigue Ln
DRILLING METHOD:	Mud Rotary	WEATHER:	
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 397 ft Total depth of Boring: 370 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown	SP		
10	Poorly-graded SAND (medium to coarse) with little gravel (fine); light brown	SP		Hollow stem auger used from 0 to 20 ft. Begin mud rotary drilling at 20 ft.
20	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); white and tan	SP-GP		
30				
40				
	Poorly-graded SAND (medium to coarse) with little gravel (fine); white and tan	SP		
50				
60				
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); white and tan	SP-GP		Micaceous
70				Begin profiling at 76.01 ft.
80				
90				

Boring ID:

MALCOLM PIRNIE, INC.

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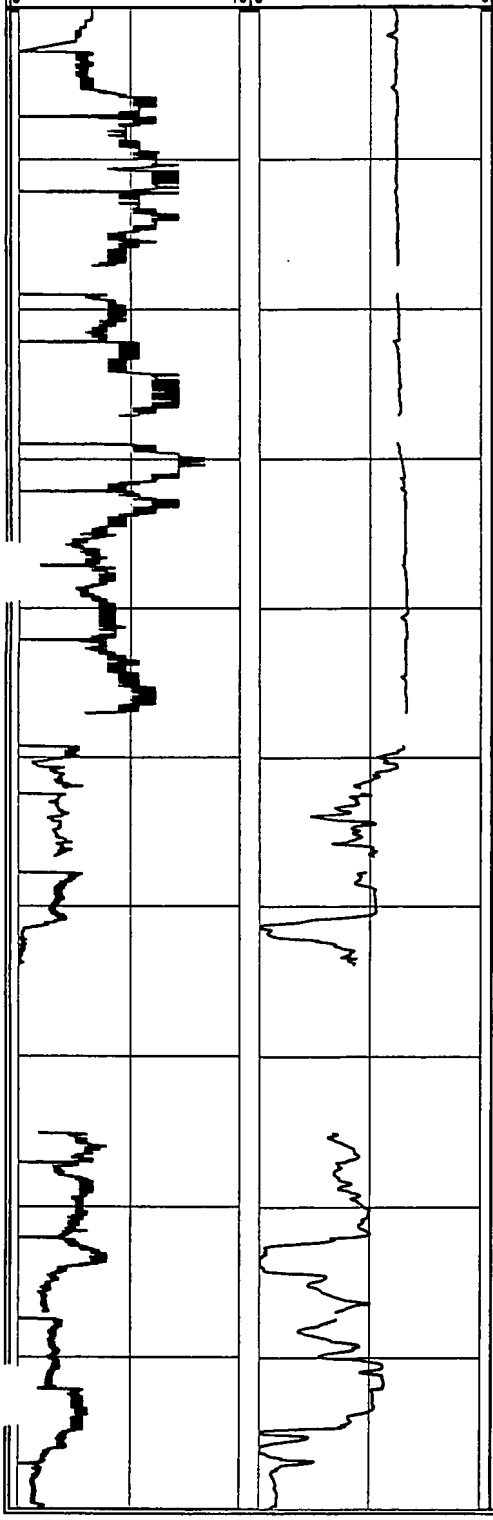
P-47

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 2, 2003
JOB NUMBER:	4563001	END DATE:	September 11, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of intersection of W John St, Cantiague Rock Rd, and Cantigue Ln
DRILLING METHOD:	Mud Rotary	WEATHER:	
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 397 ft Total depth of Boring: 370 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP-GP		
110	Well-graded SAND and GRAVEL (fine); white and tan	SW-GP		
120				Profile data gaps due to poor KPRO equilibration
130				
140				
	Poorly-graded SAND (medium to coarse) with little gravel (fine); white-tan	SP		
150				Profile data gaps due to poor KPRO equilibration
160				
	Poorly-graded GRAVEL (fine) and CLAY with some silt; white-tan	GC-CL		Profiler refusal at 163.96 ft, no penetration rate or IK data from 163.96 to 175.12 ft due to drilling activities
170	Poorly-graded SAND (medium to coarse) with trace gravel (fine); white-tan	SP		
	Poorly-graded SAND (medium to coarse) with trace gravel (fine) and trace silt; white and tan	SP		Micaceous
180				
	Poorly-graded SAND (medium to coarse) with little gravel (fine); white and tan	SP		Micaceous Profile data gaps due to poor KPRO equilibration
190				

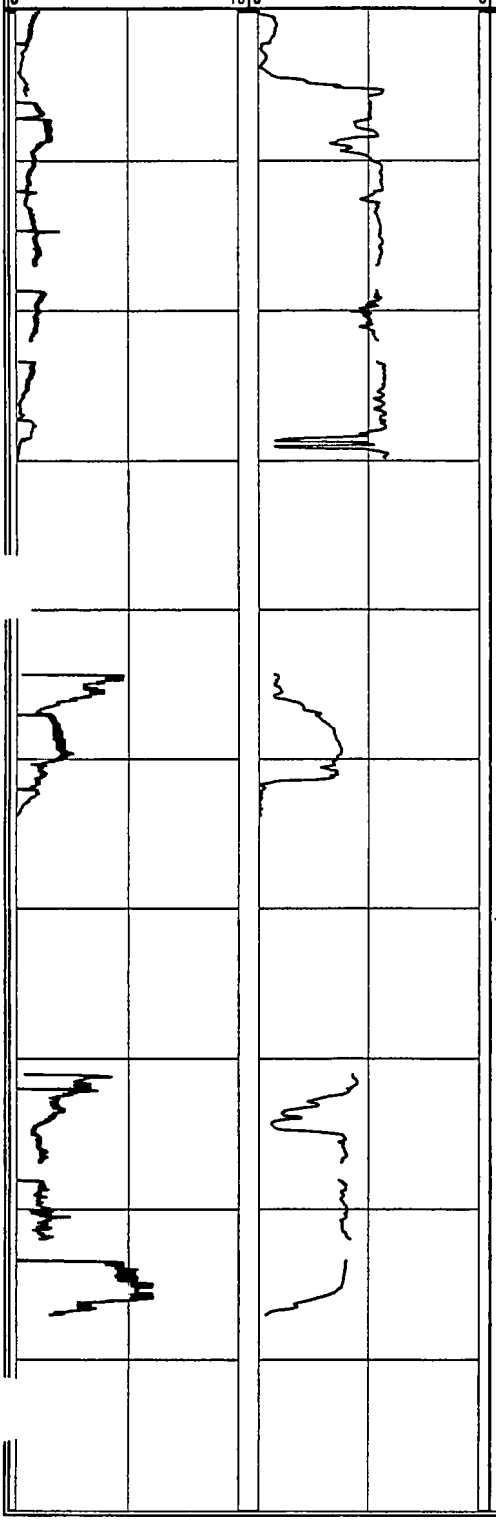
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-47**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	September 2, 2003
JOB NUMBER:	4563001	END DATE:	September 11, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of Intersection of W John St, Cantiague Rock Rd, and Cantigue Ln
DRILLING METHOD:	Mud Rotary	WEATHER:	
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 397 ft — Total depth of Boring: 370 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		SP		
	Silty SAND with some gravel, and trace clay; white-gray	SM		Micaceous
210				
220	Well-graded SAND and GRAVEL (fine) with some silt; white and gray	SM-GM		Profile data gaps due to poor KPRO equilibration
230	Silty SAND and CLAY with some gravel (fine); white to gray.	SM-CL		Interbedded clay Profiler refusal at 229.82 ft, no penetration rate or IK data from 229.82 to 244.35 ft due to drilling activities
240	Poorly-graded SAND (medium) with trace gravel (fine); white to tan	SP		
	CLAY with some silt; gray	CL		
250	CLAY and LIGNITE with some silt;	CL-PT		
	Poorly-graded GRAVEL (fine) with some silt and trace sand; dark gray	GM		Profiler refusal at 253.81 ft, no penetration rate or IK data from 253.81 to 271.05 ft due to drilling activities
260				
270	Poorly-graded SAND (medium) and GRAVEL (fine); white and tan	SP		Profile data gaps due to poor KPRO equilibration
280	PEAT with trace gravel (fine); brown	PT		Brown wood chips
	SILT and CLAY with trace sand (fine); gray	ML- CL		Micaceous Profiler refusal at 287 ft, no penetration rate or IK data from 287 to 304.61 ft due to drilling activities
290				

Boring ID:

MALCOLM PIRNIE, INC.

P-47

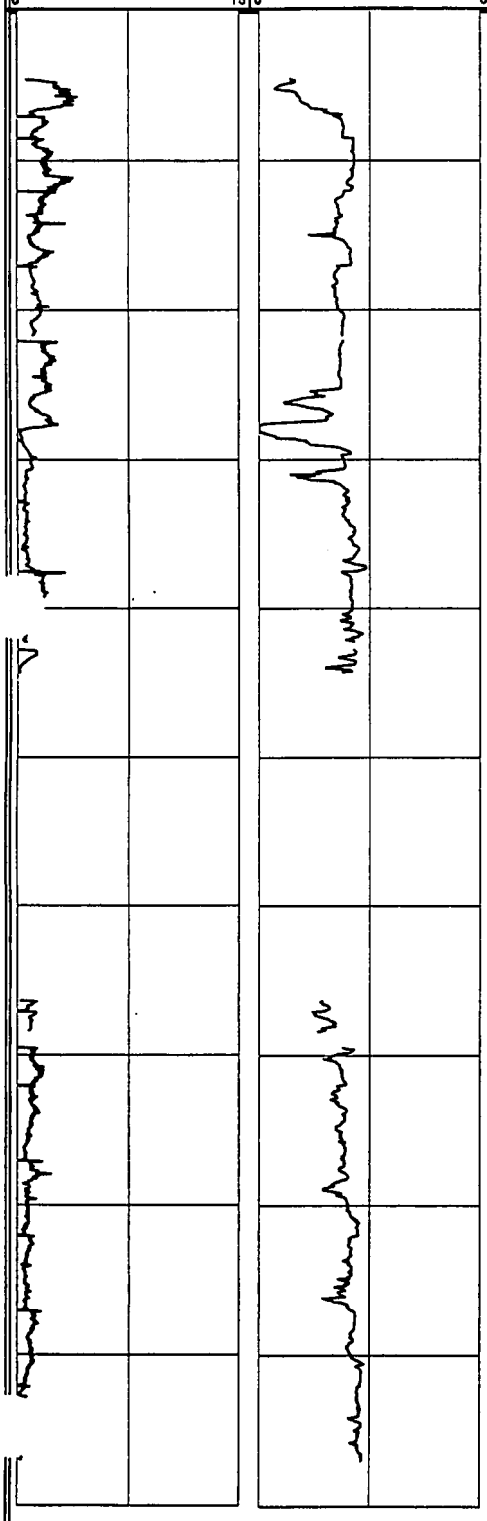
17 Route 208 North Fair Lawn, NJ 07401

JECT NAME:	GTEOSI-Hicksville	START DATE:	September 2, 2003
JOB NUMBER:	4563001	END DATE:	September 11, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of intersection of W John St,
DRILLING METHOD:	Mud Rotary	WEATHER:	Cantiague Rock Rd, and Cantigue Ln
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 397 ft

Total depth of Boring: 370 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		ML- CL		
	Poorly-graded SAND (medium) and GRAVEL (fine); white and tan	SP		
310				
320				Profile data gap due to poor KPRO equilibration
330				
340				Profiler refusal at 344.35 ft, no penetration rate or IK data from 344.35 to 366.38 ft due to drilling activities
350	SILT and SAND (fine to medium); white and tan	ML-SM		Interbedded silt and sand
	Poorly-graded SAND (medium to coarse) with some gravel (fine); white and tan	SP		
360				End of boring at 370 ft
370				Profile data gap to to equipment malfunctions
380				
390				End of profile at 397.0 ft
400				

Boring ID:

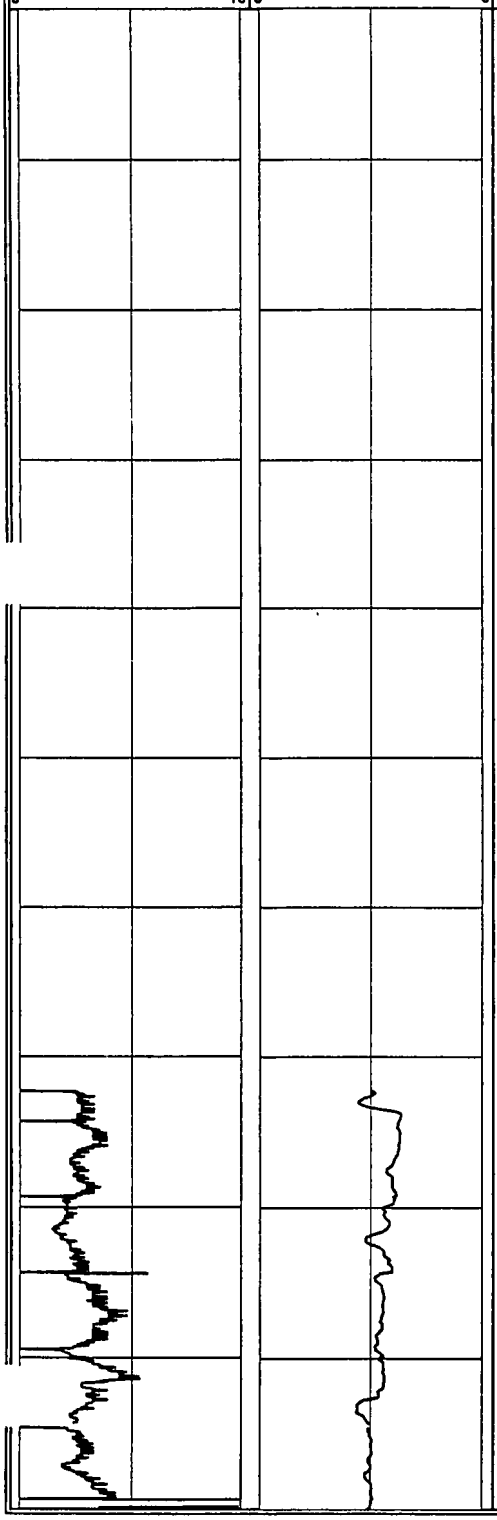
MALCOLM PIRNIE, INC.

P-49

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	On W side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Karl Carley	HYDROGEOLOGIST:	Emily Moshier
HELPER:	Larry Lynch		
Total depth of Profile:	465.6 ft	Total depth of Boring:	460 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND (fine to coarse) and GRAVEL (fine to coarse); dark brown	SW-GW		
10				Hollow stem auger used to drill for 0 to 15 ft, begin mud rotary drilling at 15 ft
	Poorly-graded GRAVEL (fine); light brown	GP		
20				
30	Poorly-graded SAND (coarse) with some gravel (fine); light brown	SP		
40				
50				
60				
				Begin profiling at 72.27 ft
70	Poorly-graded SAND (medium to coarse) and SILT; light brown	SM-ML		
	Poorly-graded SAND (fine) with trace gravel (fine); light brown	SP		
80	Well-graded SAND (fine to coarse) with trace gravel (fine); light brown	SW		
90				

Boring ID:

P-49

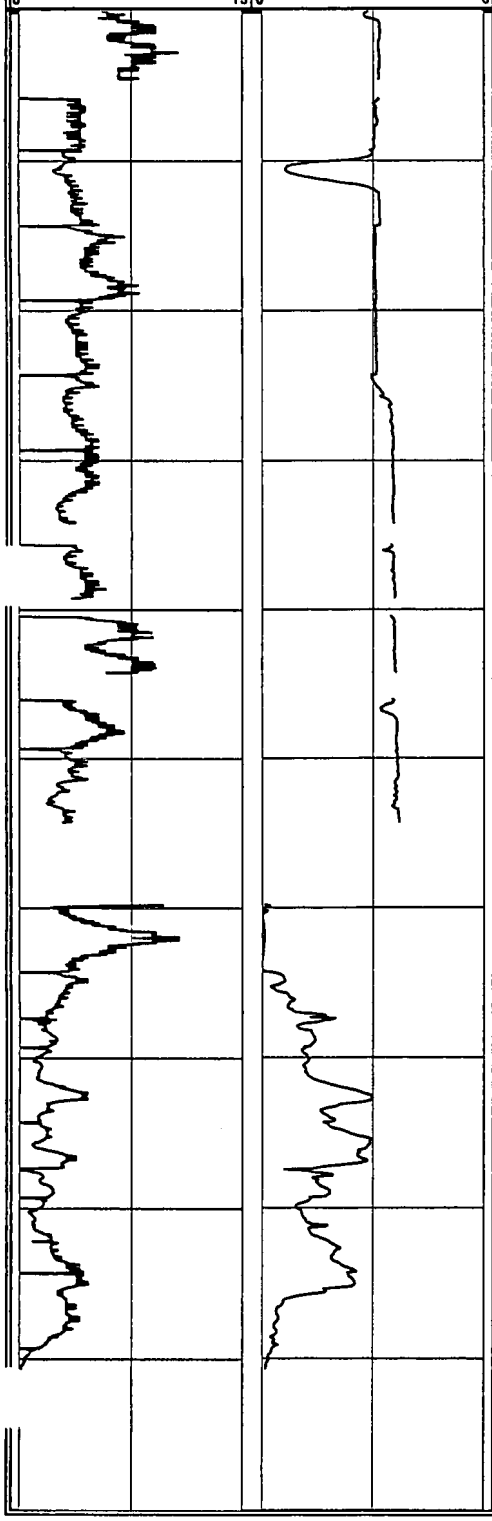
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	On W side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Kari Carley	HYDROGEOLOGIST:	Emily Moshier
HELPER:	Larry Lynch		

Total depth of Profile: 465.6 ft

Total depth of Boring: 460 ft

GEOLOGIC INFORMATION



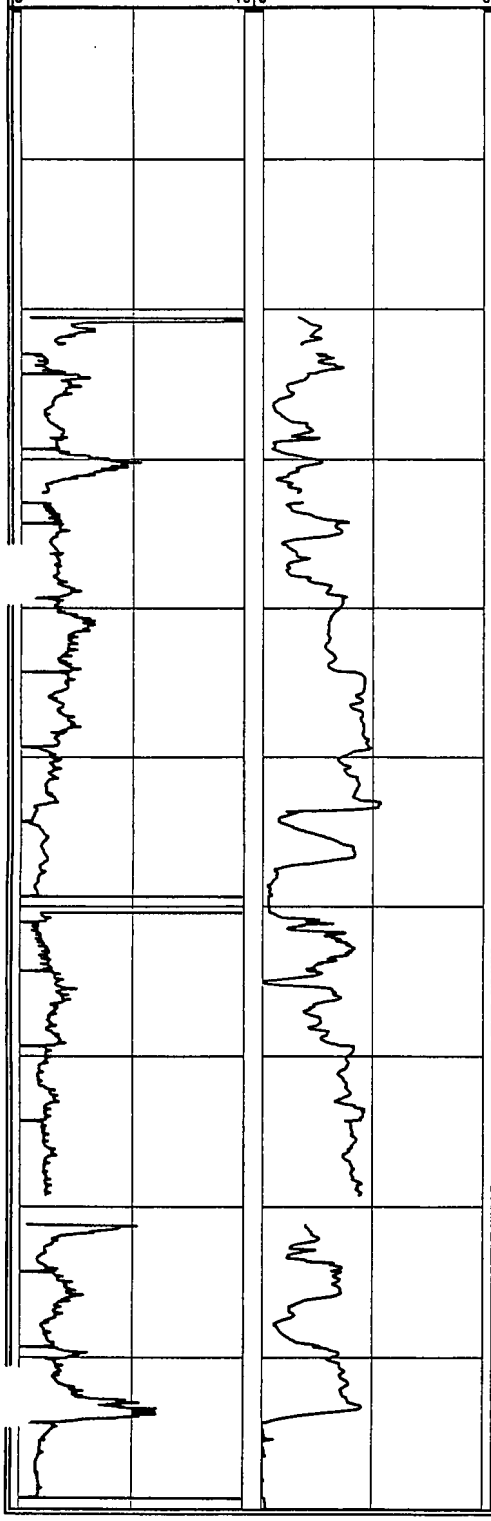
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SW		
				Profile data gap due to equipment malfunction
110				
120				
130	Well-graded GRAVEL (fine to coarse) with some sand (coarse); light brown	GW		Profile data gap due to equipment malfunction
140				Profile data gaps due to poor KPRO equilibration
150				No penetration rate or IK data from 154.34 to 159.81 ft due to drilling activities and malfunctioning Profiling equipment
160	Poorly-graded SAND (coarse) and GRAVEL (fine); brown	SP-GP		
170	CLAY and SAND (fine to medium); light brown	CL-SC		
180				
	CLAY and SAND (coarse); light brown	CL-SC		
190				Profiler refusal at 190.66 ft, no penetration rate or IK data form 190.66 to 220.56 ft due to drilling activities

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-49

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	On W side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Kari Carley	HYDROGEOLOGIST:	Emily Moshier
HELPER:	Larry Lynch		
Total depth of Profile:	465.6 ft	Total depth of Boring:	460 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Well-graded SAND (fine to coarse) with some silt; brown	SM		
210				
	CLAY; white to gray	CL		
220	Poorly-graded SAND (fine to medium) and CLAY; light brown to white	SC-CL		Profile data gap due to poor KPRO equilibration
230				Profile data gap due to poor KPRO equilibration
240				
	Well-graded SAND (fine to coarse) and CLAY; light brown to white	SC-CL		
250				
260				
	Poorly-graded SAND (fine) and CLAY; light brown to white	SC-CL		
270				
	Poorly-graded SAND (fine); light brown	SP		
280	Poorly-graded SAND (medium) and CLAY; light brown to white	SC-CL		Profile data gap due to equipment malfunction
290				
	CLAY; light brown to white	CL		

Boring ID:

MALCOLM PIRNIE, INC.

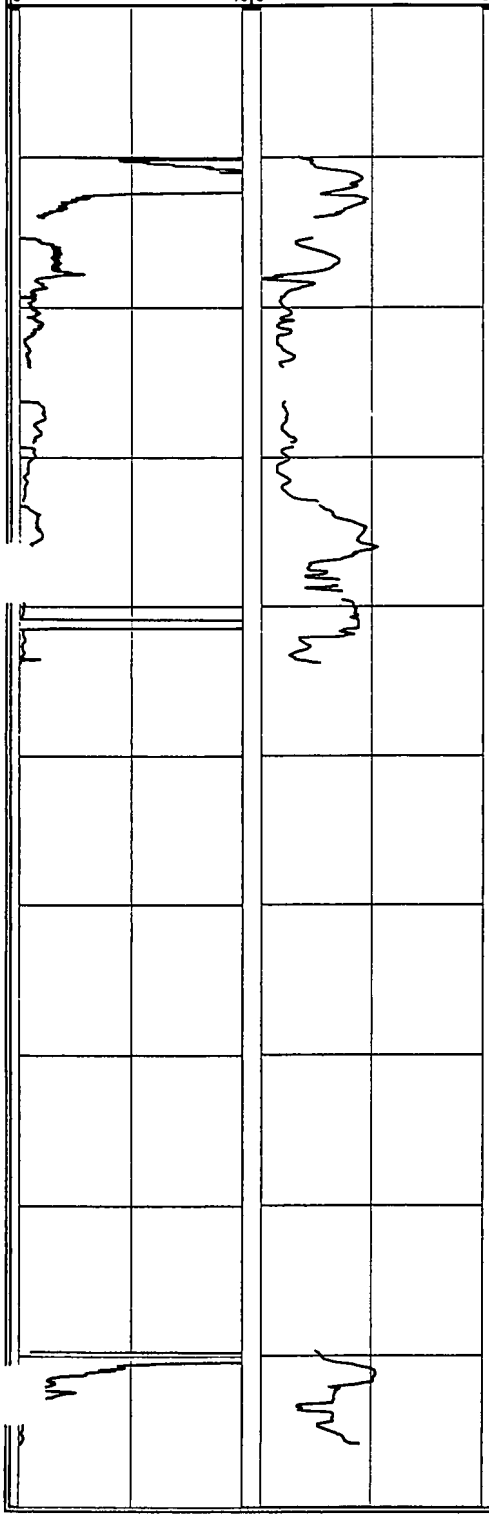
P-49

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	On W side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Kari Carley	DATUM:	Land Surface
HELPER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier

Total depth of Profile: 465.6 ft — Total depth of Boring: 460 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	Poorly-graded SAND (fine to medium) with some clay; brown	SC		Profiler refusal at 300.0 ft, no penetration rate or IK data from 300.0 to 309.98 ft due to drilling activities
310	Poorly-graded SAND (fine) with some silt; light brown to orange	SM		
320				Profile data gaps due to poor KPRO equilibration
330	Poorly-graded SAND (fine to medium) with trace silt; light brown	SP		
340	Poorly-graded SAND (fine to medium); white	SP		Profiler refusal at 343.79 ft, no penetration rate or IK data from 343.79 to 389.71 ft due to drilling activities
350				
360				
370				
380				
390	Poorly-graded SAND (medium to coarse); white	SP		Profiler efusal at 395.83 ft, no penetration rate or IK data from 395.83 to 419.66 ft due to drilling activities

Boring ID:

MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

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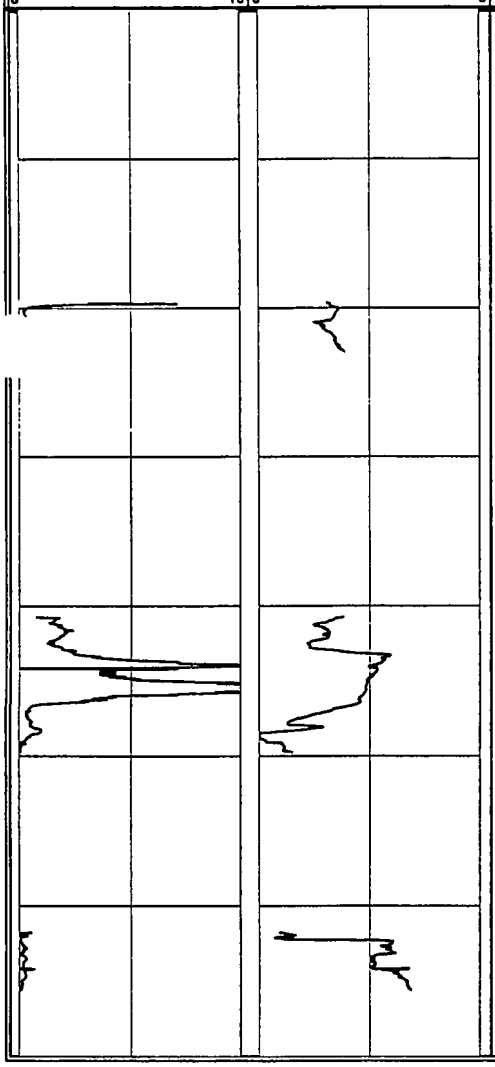
PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	On W side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Karl Carley	HYDROGEOLOGIST:	Emily Moshier
HELPER:	Larry Lynch		

Total depth of Profile: 465.6 ft

Total depth of Boring: 460 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400		SP		
410	Poorly-graded SAND (medium to coarse) with trace clay; white	SP		
420				Profiler refusal at 422.95 ft, no penetration rate or IK data from 422.95 to 440.72 ft due to drilling activities
430	Poorly-graded SAND (coarse), withtrace clay; orange	SP		
440	Well-graded SAND (fine to coarse) with trace clay; orange	SW		Profiler refusal at 449.75 ft, no penetration rate or IK data from 449.75 to 461.77 ft due to drilling activities
450	CLAY	CL		
	Poorly-graded SAND (fine)	SP		End of boring at 460 ft
460				Profiler refusal at 465.6 ft, end of Profile

Boring ID:

MALCOLM PIRNIE, INC.

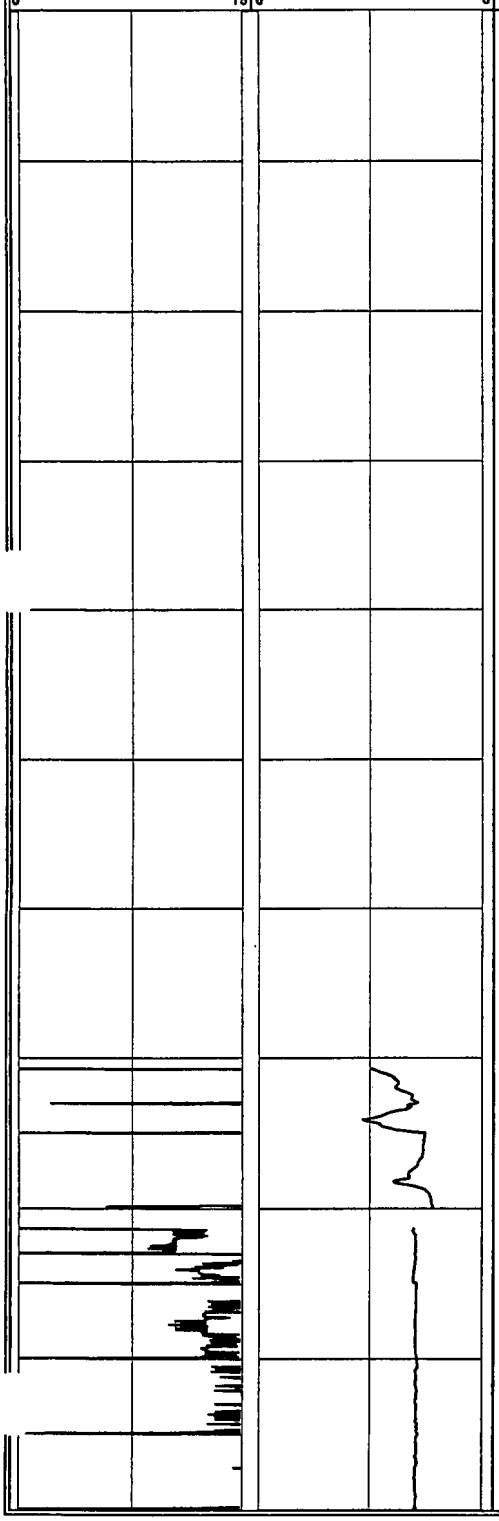
P-50

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 29, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-51
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Sieker	HYDROGEOLOGIST:	Colleen Sullivan, Arnas Nemikas

Total depth of Profile: 445.09 Total depth of Boring: 410

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium) with some gravel and brick fragments; dark brown	SP		Hollow stem augers used to drill from 0 to 15 ft.
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); brown	SP-GP		
10				Begin mud rotary drilling at 15 ft
20	Poorly-graded SAND (coarse); light brown to yellow-orange	SP		
30	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown to yellow-white	SP-GP		
40	Poorly-graded SAND (medium to coarse); brown-white	SP		
50	Poorly-graded SAND (coarse) and GRAVEL (fine); light brown to yellow-white	SP-GP		
60	Poorly-graded GRAVEL (fine) with some sand (medium)	GP		Begin profiling at 69.38 ft, problems with equipment. Removed profiler at 69.9 ft.
70	Poorly-graded SAND (medium to coarse); light brown	SP		Resume profiling at 70.71 ft
80				Profile data gap due to poor KPRO equilibration
90				

Boring ID:

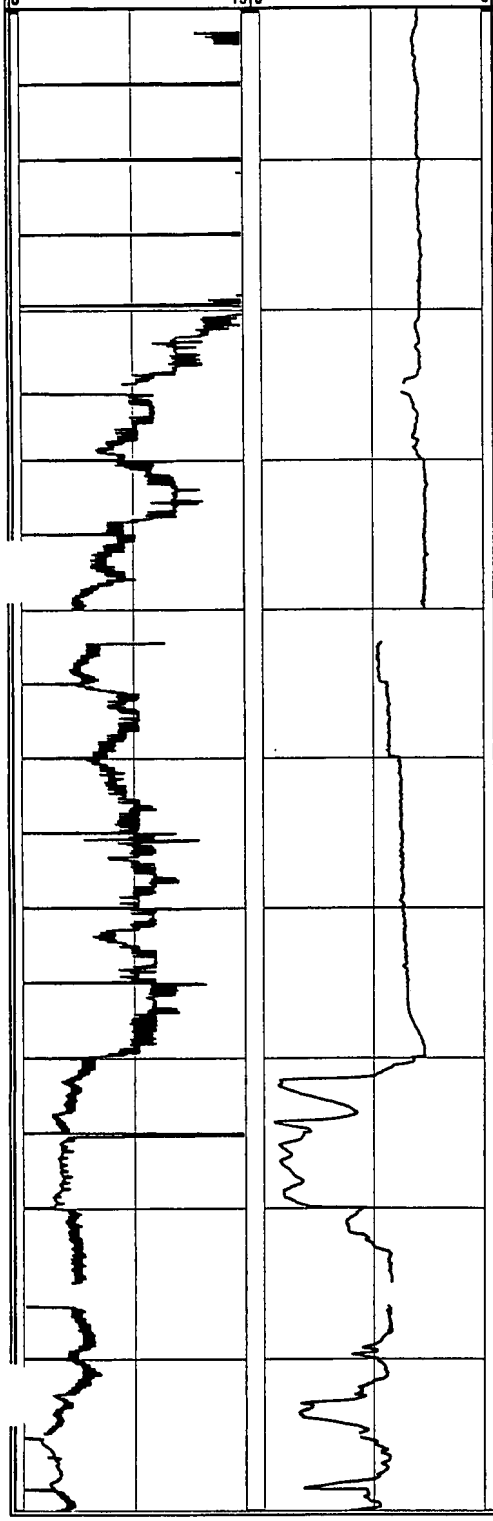
P-50

MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 29, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-51
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Colleen Sullivan, Arnas Nemikas
HELPER:	Brian Sieker		

Total depth of Profile: 445.09 Total depth of Boring: 410

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light brown	SP		
110	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown to white	SP-GP		
120	Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown	SP		
130	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown to yellowish-white	SP-GP		Profile data gaps due to poor KPRO equilibration
140				
150				
160				
170	Poorly-graded SAND (fine to medium) and SILT with trace clay; orange-brown	SM-ML		
180				
190				Profile data gaps due to poor KPRO equilibration

Boring ID:

MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

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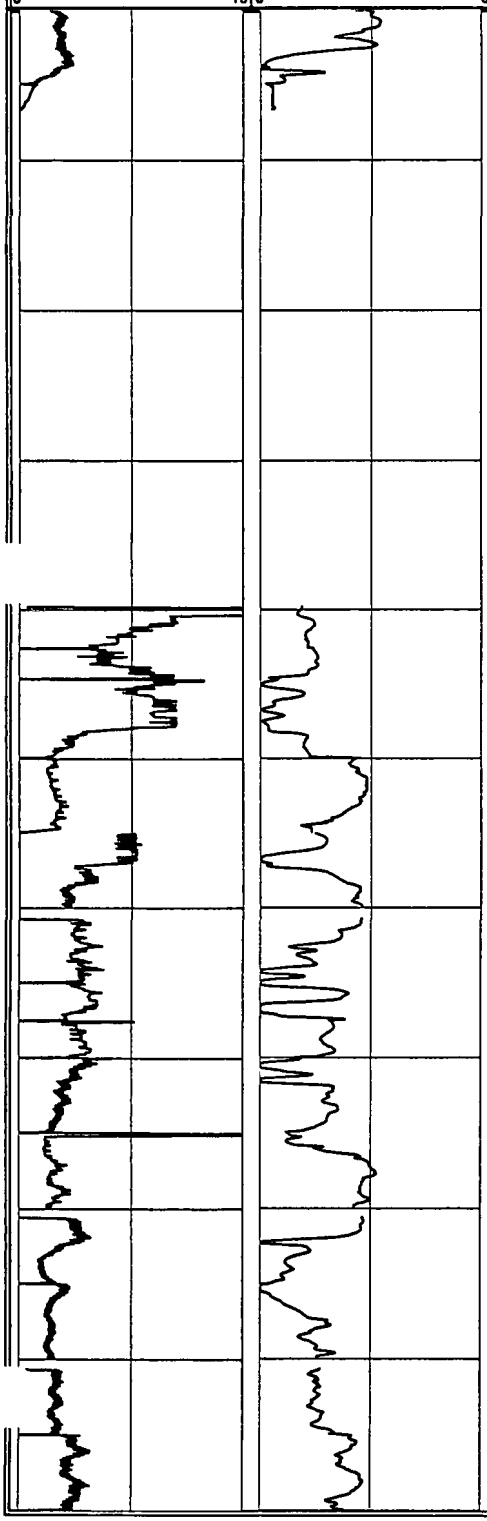
PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 29, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-51
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Colleen Sullivan, Arnas Nemikas
HELPER:	Brian Sieker		
Total depth of Profile:	445.09	Total depth of Boring:	410

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	SILT and CLAY; orange-white-brown	ML- CL		Profiler refusal at 206.64 ft, no penetration rate or IK data from 206.64 to 239.81 ft due to drilling activities
210				
220	Poorly-graded SAND and SILT with some clay; orange-white	SM-ML		
230	Well-graded SAND; brown	SW		
240	Poorly-graded SAND with trace clay and silt; light brown	SP		
250				Lost circulation of drilling fluids from 250 to 270 ft. No recovery of cuttings.
260				Profile data gaps due to poor KPRO equilibration
270	Poorly-graded SAND (medium to coarse) with trace clay; white to light brown	SP		
280				Lost circulation of drilling fluids from 280 to 410 ft. No recovery of cuttings.
290				

Boring ID:

ALCOLM PIRNIE, INC.

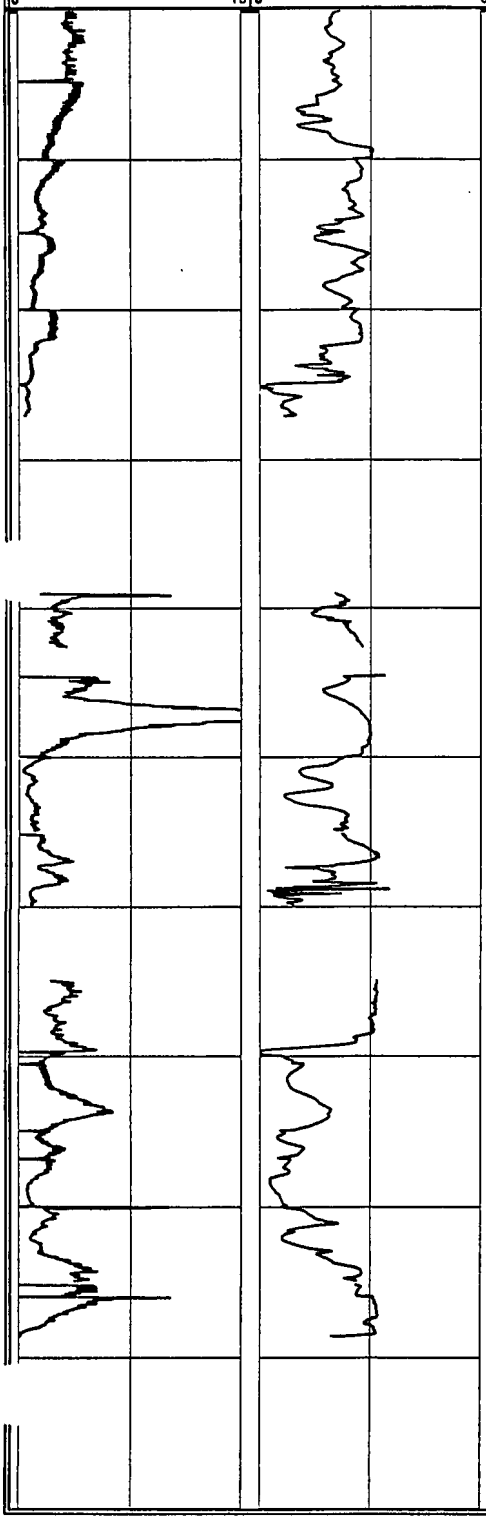
P-50

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 29, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-51
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Colleen Sullivan, Arnas Nemikas
HELPER:	Brian Sieker		

Total depth of Profile: 446.09 Total depth of Boring: 410

GEOLOGIC INFORMATION



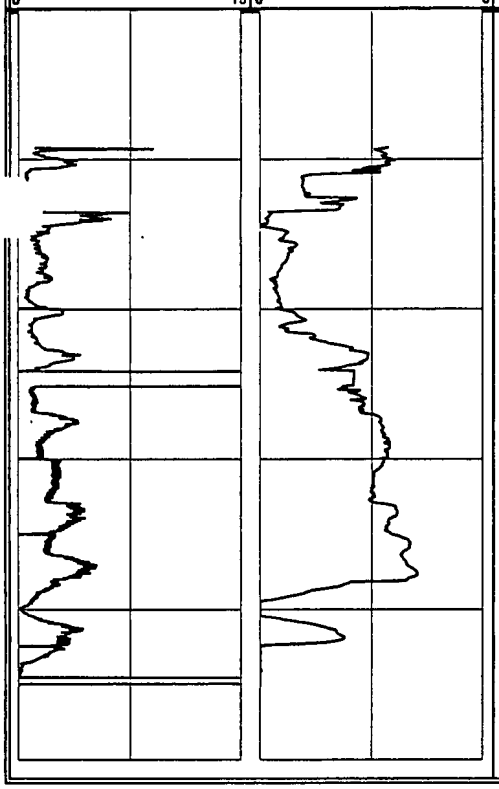
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
320				Drilling characteristics indicative of clay/silt layer at 323 ft
330				Profiler refusal at 327.07 ft, no penetration rate or IK data from 327.07 to 339.02 ft due to drilling activities
360				Profile data gap due to equipment malfunction
370				Drilling characteristics indicative of clay/silt layer at 368 ft
380				Drilling characteristics indicative of clay/silt layer at 388 ft. Profiler refusal at 388.61 ft, no penetration rate or IK data form 388.61 to 409.22 ft due to drilling activities

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-50

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 29, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, N of railroad tracks, and E of P-51
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Brian Sieker	HYDROGEOLOGIST:	Colleen Sullivan, Arnas Nemikas
Total depth of Profile:	445.09	Total depth of Boring:	410

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400				
410				End of boring at 410 ft
420				
430				
440				Profiler refusal at 445.09 ft end of profile
450				

Boring ID:

MALCOLM PIRNIE, INC.

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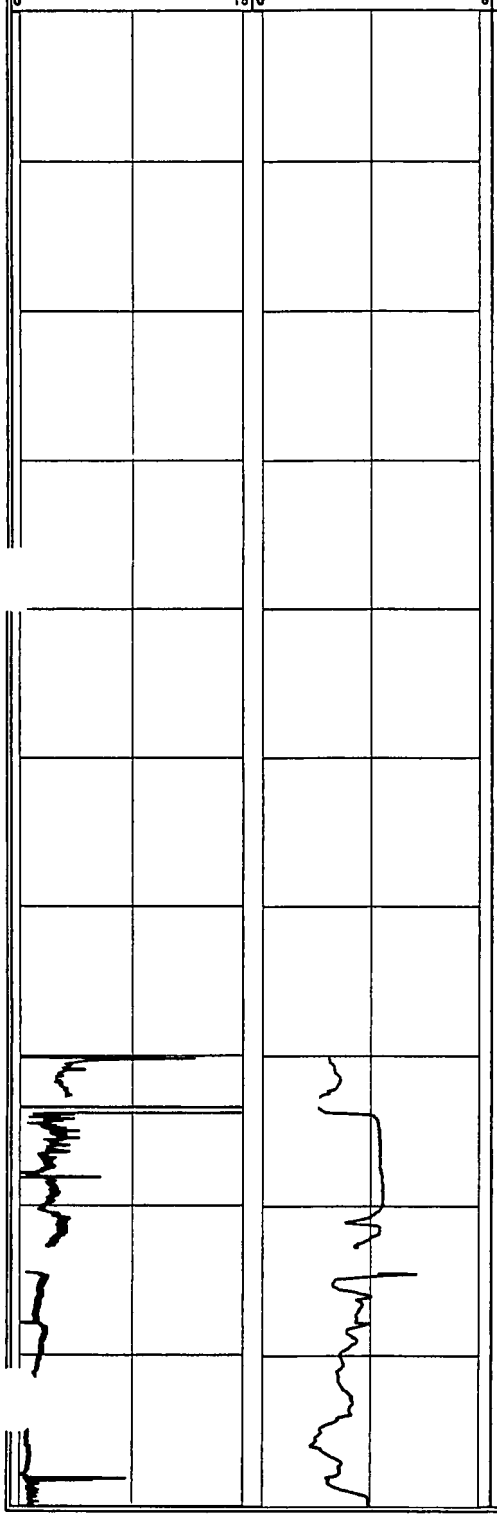
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 381.8 ft

Total depth of Boring: 360 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); white to tan	SP-GP		
10				Hollow stem auger used from 0 to 19 ft. Begin mud rotary drilling at 19 ft.
20	Poorly-graded SAND (medium to coarse) with some silt; white to tan	SM		
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); white to tan	SP-GP		
30				
40				
50				
60				
70	Poorly-graded SAND (medium to coarse) with some gravel (fine); white to tan	SP		Begin profiling at 70.13 ft
80	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); white to tan	SP-GP		Profile data gap due to poor KPRO equilibration
	Poorly-graded SAND (medium to coarse) with little gravel (fine); white to tan	SP		
90	Poorly-graded SAND (medium to coarse) with trace gravel (fine); white to tan	SP		
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); white to tan	SP-GP		

Boring ID:

P-51

MALCOLM PIRNIE, INC.

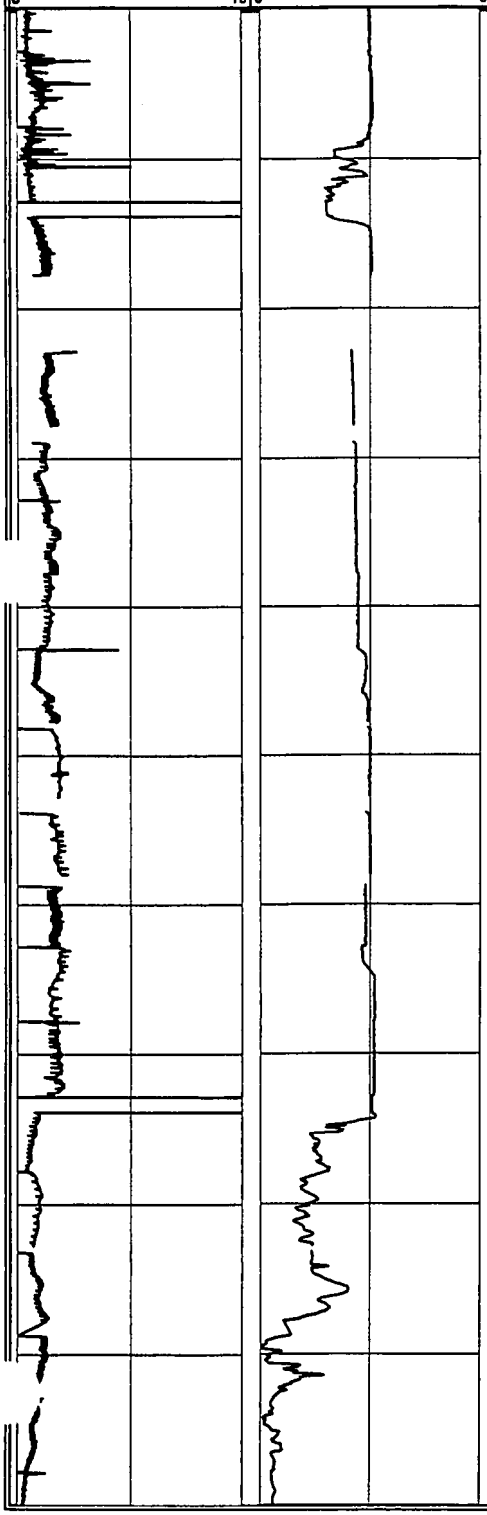
.7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Jeff Dekoskie

Total depth of Profile: 381.8 ft

Total depth of Boring: 360 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (medium to coarse) with some gravel (fine); white to tan	SP		
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); white to tan	SP-GP		
110				
				Profile data gap due to equipment malfunction
120				
	CLAY; gray to tan	CL		
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); brown to gray	SP-GP		Profile data gap due to poor KPRO equilibration
130				
140	Poorly-graded SAND (medium to coarse) with little gravel (fine); brown to gray	SP		
150				Profile data gaps due to poor KPRO equilibration
160				
170				
	CLAY with some silt and trace sand (medium); gray to tan	CL		Micaceous
180	Poorly-graded SAND (fine to medium) with some silt; light brown	SM		Micaceous
190				

Boring ID:

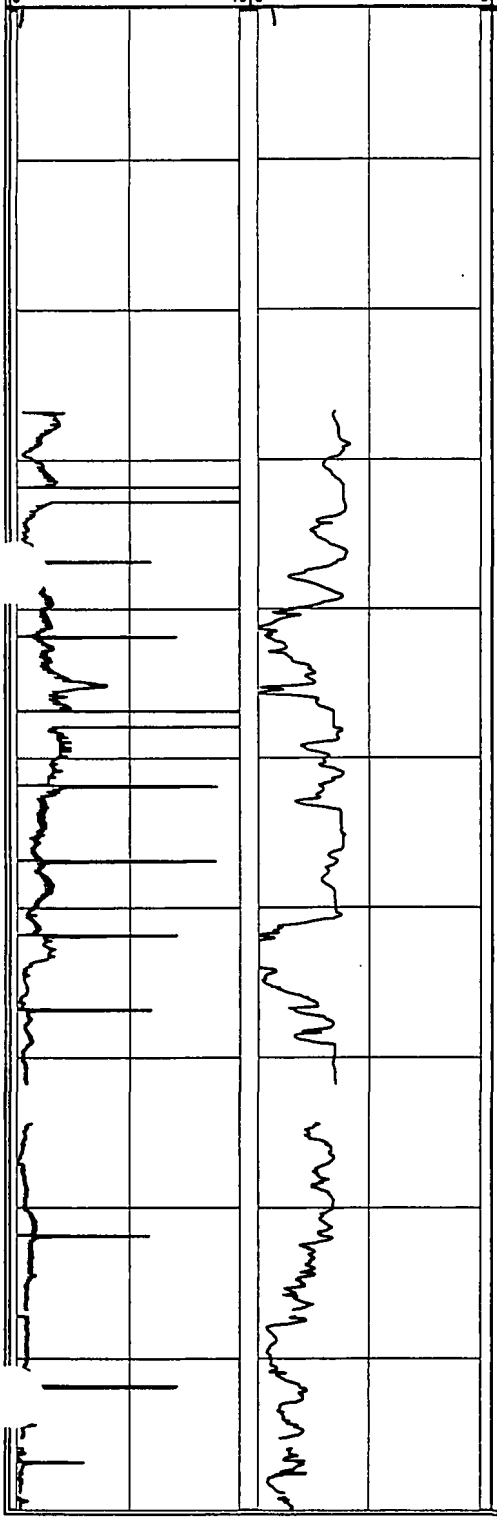
MALCOLM PIRNIE, INC.

P-51

7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	October 21, 2003
JOB NUMBER:	4563001	END DATE:	October 31, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Jeff Dekoskie
Total depth of Profile:	381.8 ft	Total depth of Boring:	360 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		SM		Profiler refusal at 201.2 ft, no penetration rate or IK data from 201.2 to 226.8 ft due to drilling activities
210				
	Poorly-graded SAND (fine); light brown	SP		
220	Poorly-graded SAND (fine to medium) with trace silt	SP		
230				
240				
	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); tan	SP-GP		
	Poorly-graded SAND (fine to medium) with some silt and trace gravel (fine); light tan	SM		
250				
260				
270				Profile data gap due to equipment malfunction
280	Poorly-graded SAND (fine to medium) with some silt; brown to tan	SM		
	Poorly-graded SAND (medium to coarse) with some gravel (fine); light tan	SP		
290				Profile data gap due to poor KPRO equilibration
	Poorly-graded SAND (fine to medium) with some silt and some lignite; light tan to brown	SM		

⁻ALCOLM PIRNIE, INC.

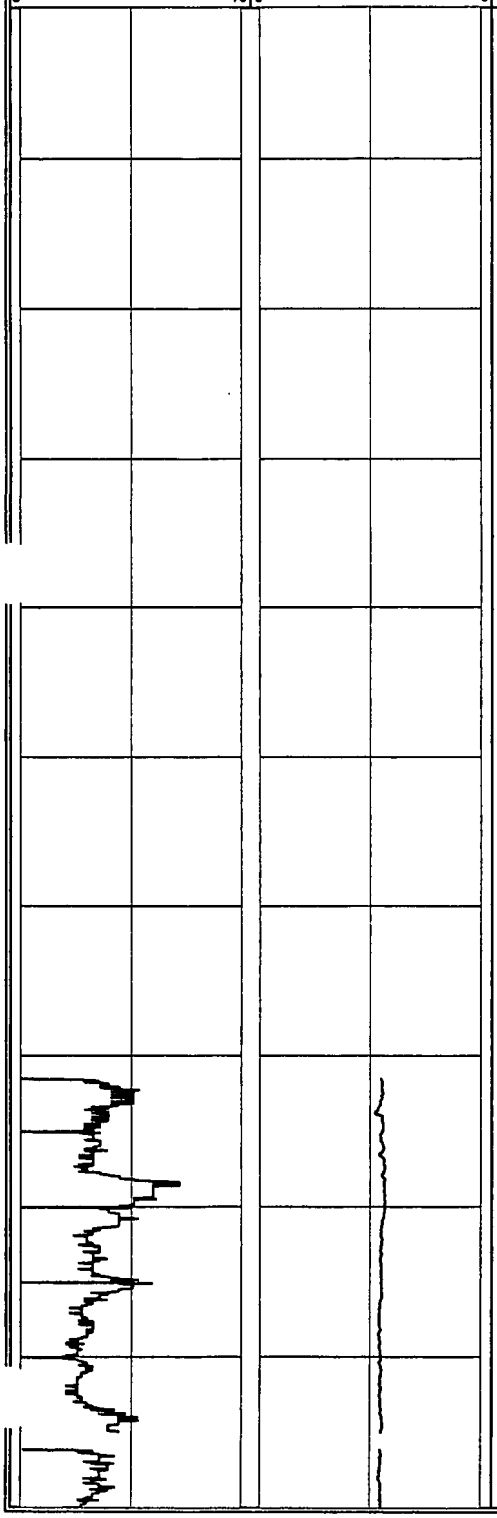
.7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-52**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 14, 2003
JOB NUMBER:	4563001	END DATE:	November 20, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Kari Carley	DATUM:	Land Surface
HELPER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier/Colleen Sullivan

Total depth of Profile: 486.06 ft Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium) and GRAVEL (fine); brown	SP-GP		
10				Auger to 15 ft bgs
	Poorly-graded SAND (coarse) with some gravel (fine); brown	SP		Begin mud rotary drilling at 15 ft
20				
30	Poorly-graded SAND (medium) and GRAVEL (fine); brown	SP-GP		
40	Poorly-graded SAND (coarse) with little gravel (fine); brown	SP		
50	Poorly-graded SAND (coarse) with some gravel (fine); brown	SP		
60	Poorly-graded SAND (medium) and GRAVEL (fine); brown	SP-GP		
70	Poorly-graded SAND (fine to medium); light brown to white	SP		Begin Profiling at 71.93 ft
80				
90				Profile data gap due to poor KPRO equilibration

Boring ID:

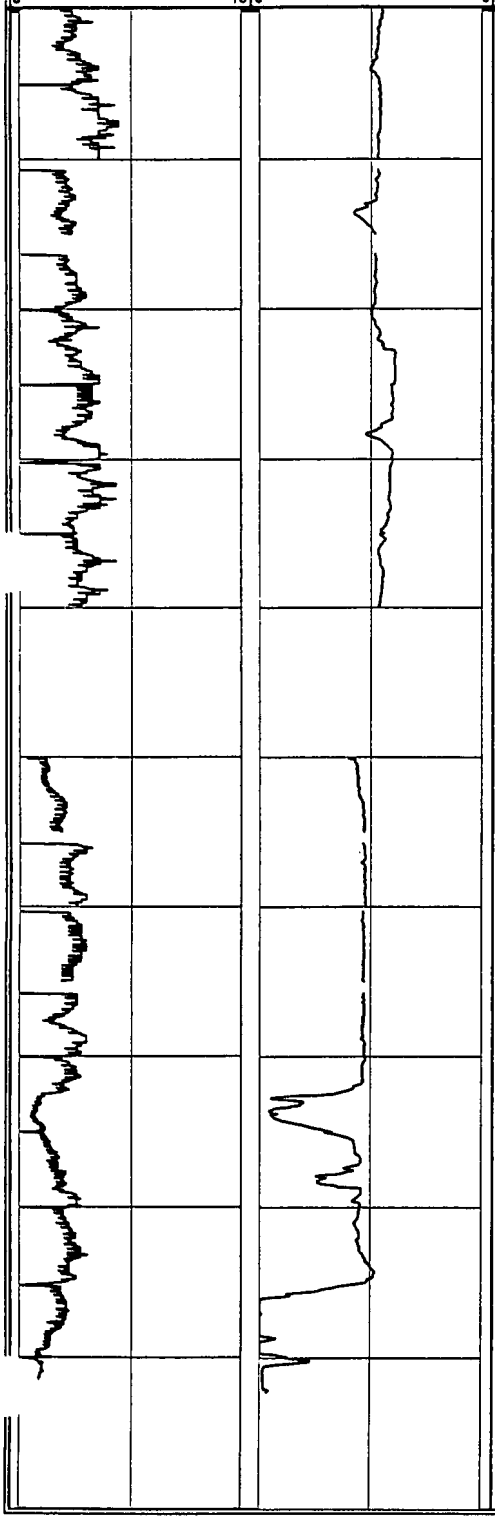
'ALCOLM PIRNIE, INC.

P-52

·17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 14, 2003
JOB NUMBER:	4563001	END DATE:	November 20, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Kari Carley	DATUM:	Land Surface
HELPER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier/Colleen Sullivan
Total depth of Profile:	486.06 ft	Total depth of Boring:	470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110	Poorly-graded SAND (fine to medium); light brown to white	SP		Profile data gaps due to poor KPRO equilibration
120				
130				
	Poorly-graded SAND (medium) with little gravel (fine); light brown to white	SP		
140				Profile data gap due to equipment malfunction
150				
160				Profile data gaps due to poor KPRO equilibration
170				
	Poorly-graded SAND (medium) with little gravel (fine) and trace silt; light brown	SP		
180	SILT; brown	ML		
190	Poorly-graded SAND (medium) with some clay; light brown	SC		Profiler refusal at 192.28 ft, no penetration rate or IK data form 192.28 to 219.45 ft due to drilling activities
	CLAY and LIGNITE; dark gray	CL-PT		

Boring ID:

MALCOLM PIRNIE, INC.

P-52

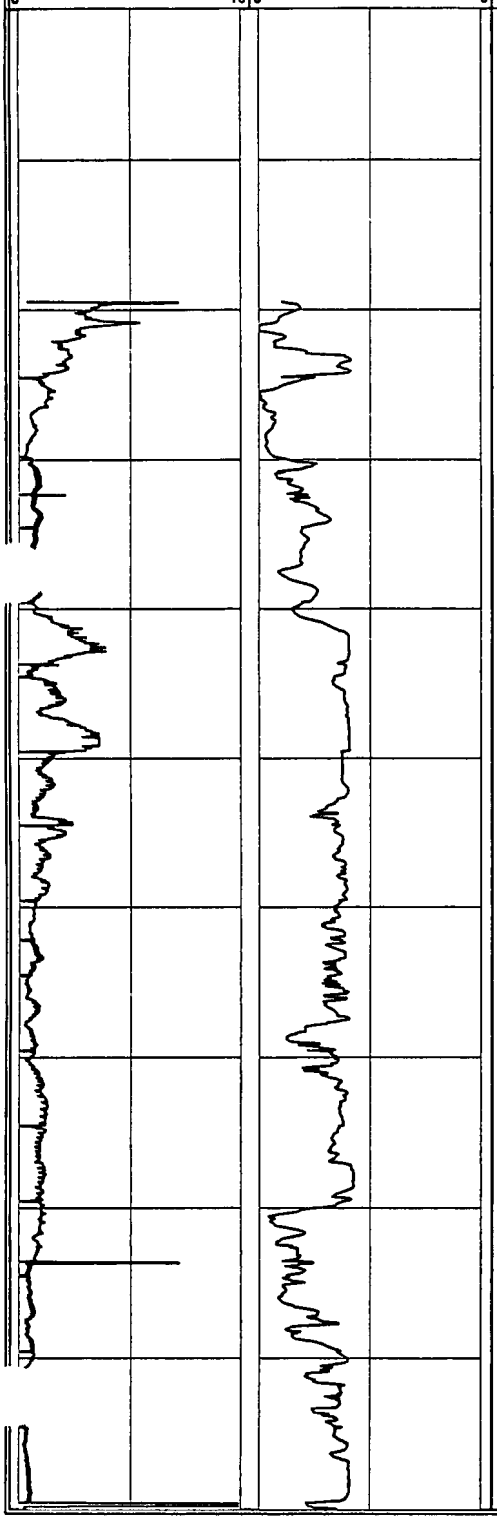
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 14, 2003
JOB NUMBER:	4563001	END DATE:	November 20, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Kari Carley	HYDROGEOLOGIST:	Emily Moshier/Colleen Sullivan
HELPER:	Larry Lynch		

Total depth of Profile: 486.06 ft

Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (medium); light brown	SP		Interbedded clay
210	Poorly-graded SAND (fine to medium) with trace clay; light brown	SP		
220	Poorly-graded SAND (fine to medium) with little clay; brown	SC		Micaceous
230				
240				
250	Poorly-graded SAND (fine to medium); brown	SP		
260				
270	Well-graded SAND (fine to coarse); brown	SW		
280	Poorly-graded SAND (fine to medium) and GRAVEL (fine); brown	SP-GP		
290	Poorly-graded SAND (medium); light brown to white	SP		

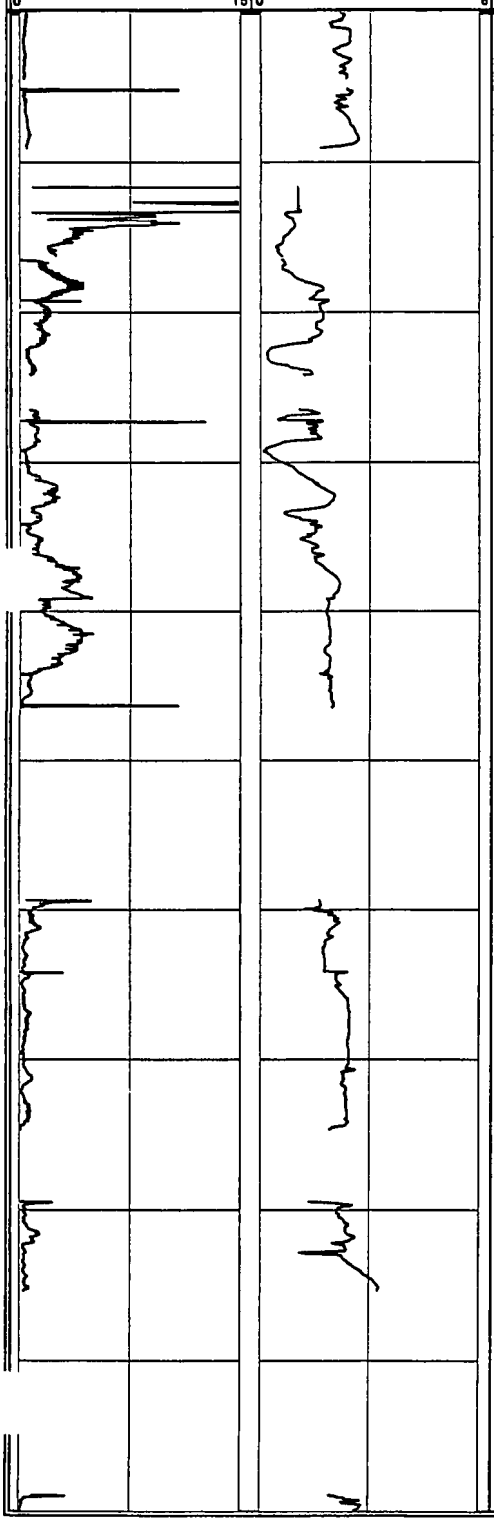
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-52

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 14, 2003
JOB NUMBER:	4563001	END DATE:	November 20, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Kari Carley	HYDROGEOLOGIST:	Emily Moshier/Colleen Sullivan
HELPER:	Larry Lynch		

Total depth of Profile: 486.06 ft
Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



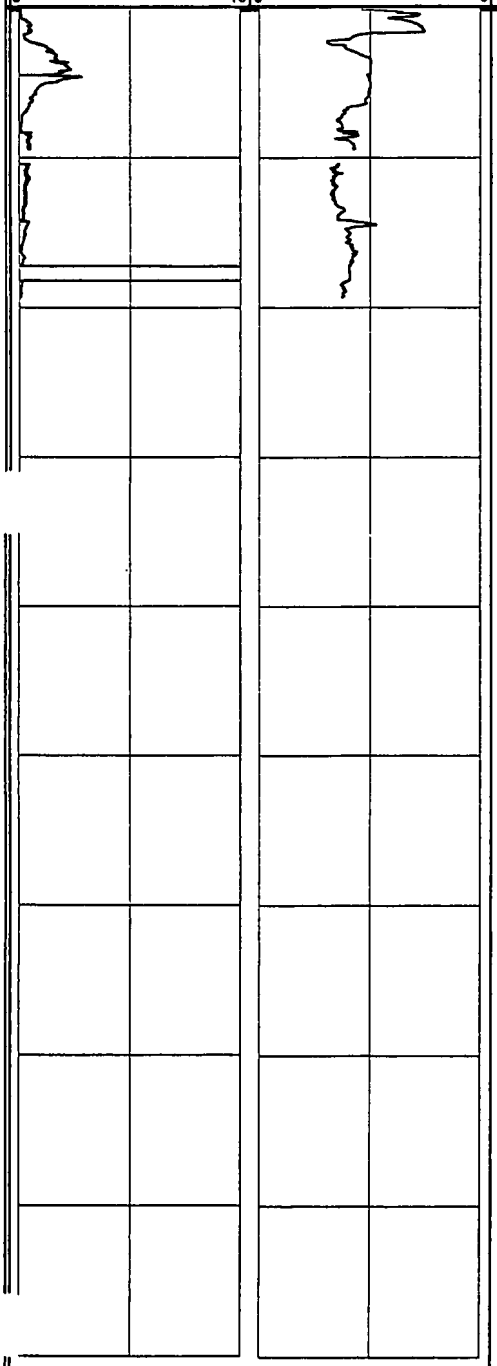
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		SP		Lignite and clay at 300 ft bgs
				Profile data gap due to poor KPRO equilibration
310				Profile data gap due to equipment malfunction
320	Poorly-graded SAND (fine to medium); with trace lignite; light brown	SP		Micaceous
				Profile data gap due to equipment malfunction
330				
340				
				Profiler refusal at 346.48 ft, no penetration rate or IK data from 346.48 to 359.35 ft due to drilling activities
350				
360	Poorly-graded SAND (medium) with trace gravel; white	SP		Micaceous
370				Profiler refusal at 374.65 ft, no penetration rate or IK data from 374.65 to 379.45 ft due to drilling activities
380				
				Profile data gap due to equipment malfuntion
390	Poorly-graded SAND (medium to coarse) with trace gravel (fine) and clay; white-gray	SP		Pulled profile rods at 395.4 ft bgs. End of work shift

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-52

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 14, 2003
JOB NUMBER:	4563001	END DATE:	November 20, 2003
DRILLING FIRM:	CT&E	LOCATION:	On E side of Charlotte St, S of W John St, and N of railroad tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Kari Carley	DATUM:	Land Surface
HELPER:	Larry Lynch	HYDROGEOLOGIST:	Emily Moshier/Colleen Sullivan
Total depth of Profile:	486.06 ft	Total depth of Boring:	470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400		SP		
410				Profile data gap due to poor KPRO equilibration
				Profiler refusal at 419.33 ft
420				
430				No profile dat from 419.33 to 486 ft due to equipment malfunction
440	Poorly-graded SAND (medium) with trace gravel (fine) and clay; white-gray	SP		Refusal at 447.8 ft bgs
450	Poorly-graded SAND (medium) and CLAY; white to gray	SC- CL		Micaceous
460	Poorly-graded SAND (medium) with trace clay; white	SP		Micaceous
470				End of boring at 470 ft bgs
480				Refusal at 486.06 ft bgs. End of profile
490				

Boring ID:

MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

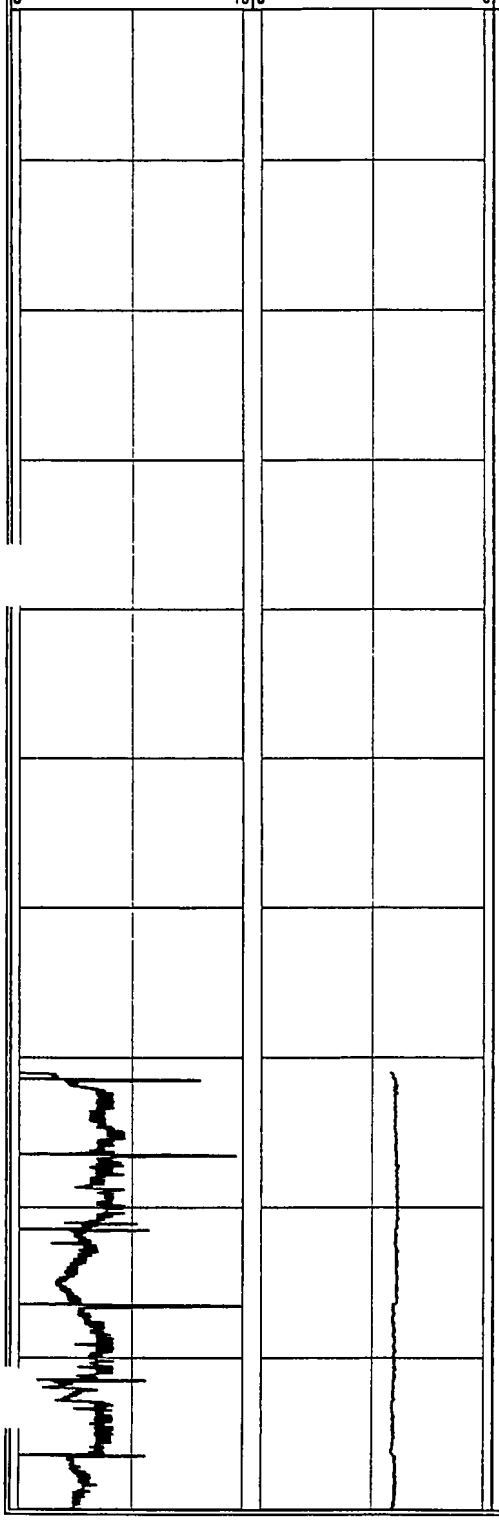
P-53

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 19, 2003
JOB NUMBER:	4563001	END DATE:	December 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, John Hilton

Total depth of Profile: 534.5 ft

Total depth of Boring: 530 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	SILT with trace sand (fine to medium) and gravel (fine); brown-yellow	ML		
10	Well-graded SAND (fine to coarse) with some gravel (fine to coarse) and some silt; light brown	SM		Auger to 20 ft bgs
20	Well-graded SAND (fine to coarse) and GRAVEL (fine); tan to brown	SW-GP		Begin mud rotary drilling - 3 inch hole
30	Well-graded SAND (fine to coarse) with few gravel (fine); tan to brown	SW		
40				
	Well-graded GRAVEL (fine to coarse) and SAND (fine to coarse); tan to brown	GW-SW		
50	Well-graded SAND (fine to coarse) with little gravel (fine); tan to brown	SW		
60				
	Well-graded SAND (fine to coarse) and GRAVEL (fine); tan to brown	SW-GP		
70	Poorly-graded SAND (medium to coarse) with trace gravel (fine); tan to brown	SP		Begin profiling at 71.06 ft
	Well-graded SAND (fine to coarse) with little gravel (fine); tan to brown	SW		
80	Well-graded SAND (fine to coarse) with trace gravel (fine); tan to brown	SW		
	Poorly-graded SAND (medium to coarse) with trace gravel (fine); tan to brown	SP		
90	Well-graded SAND (fine to coarse); tan to brown	SW		

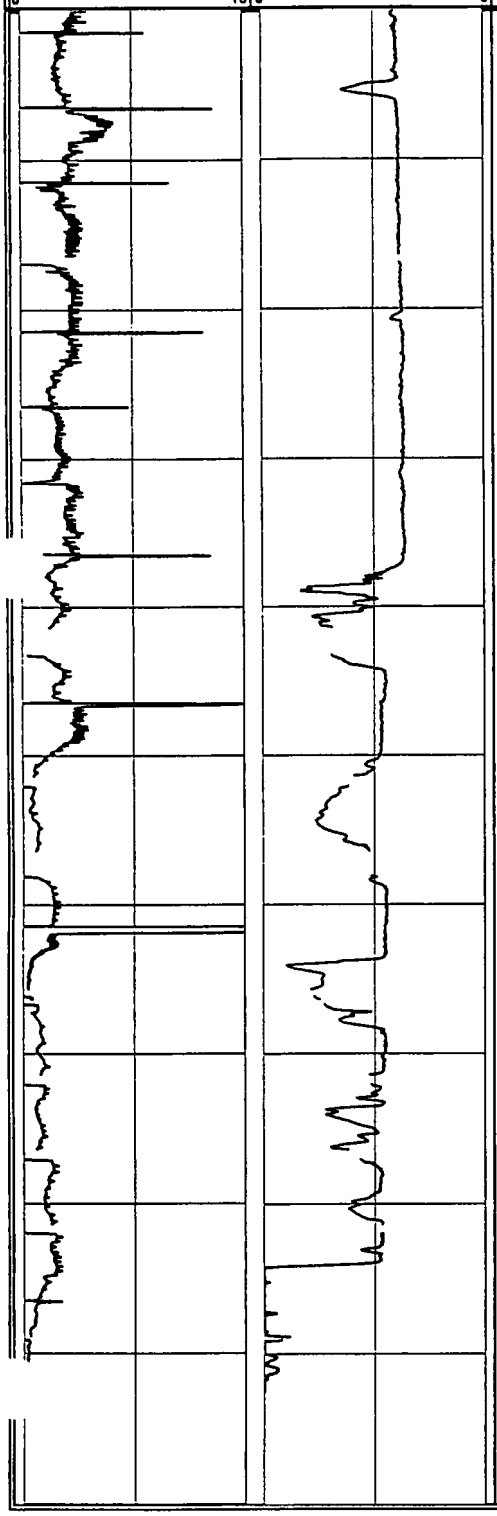
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-53**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 19, 2003
JOB NUMBER:	4563001	END DATE:	December 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, John Hilton

Total depth of Profile: 534.5 ft — Total depth of Boring: 530 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Well-graded SAND (fine to coarse) with little gravel (fine); tan to brown	SW		
110	Well-graded SAND (fine to coarse) with trace gravel (fine); tan to brown	SW		
	Poorly-graded GRAVEL (fine) with little sand (fine to coarse); brown to tan	GP		Profile data gap due to poor KPRO equilibration
120	Well-graded SAND (fine to coarse) with little gravel (fine); tan to brown	SW		
130				
	Poorly-graded GRAVEL (fine) with little sand (fine to medium); brown to tan	GP		
140				Profile data gap due to poor KPRO equilibration
	Poorly-graded SAND (fine to medium) with little gravel (fine); tan to brown	SP		
150	Poorly-graded GRAVEL (fine) with some sand (fine to coarse); brown to tan	GP		Profile data gaps due to poor KPRO equilibration
160				
	Well-graded SAND (fine to coarse) and GRAVEL (fine); tan to brown	SW-GP		
170	Well-graded SAND (fine to coarse) with some silt and little gravel (fine); brown	SM		Profile data gaps due to poor KPRO equilibration
180	Poorly-graded SAND (fine to medium) with some silt and trace gravel (fine): tan	SP		
	CLAY with trace sand (fine to medium); tan-white	CL		
190	CLAY with some silt and sand (fine to coarse); tan-white	CL		Profiler refusal at 192.52 ft, no penetration rate or IK data from 192.52 to 210.15 ft due to drilling activities

Boring ID:

MALCOLM PIRNIE, INC.

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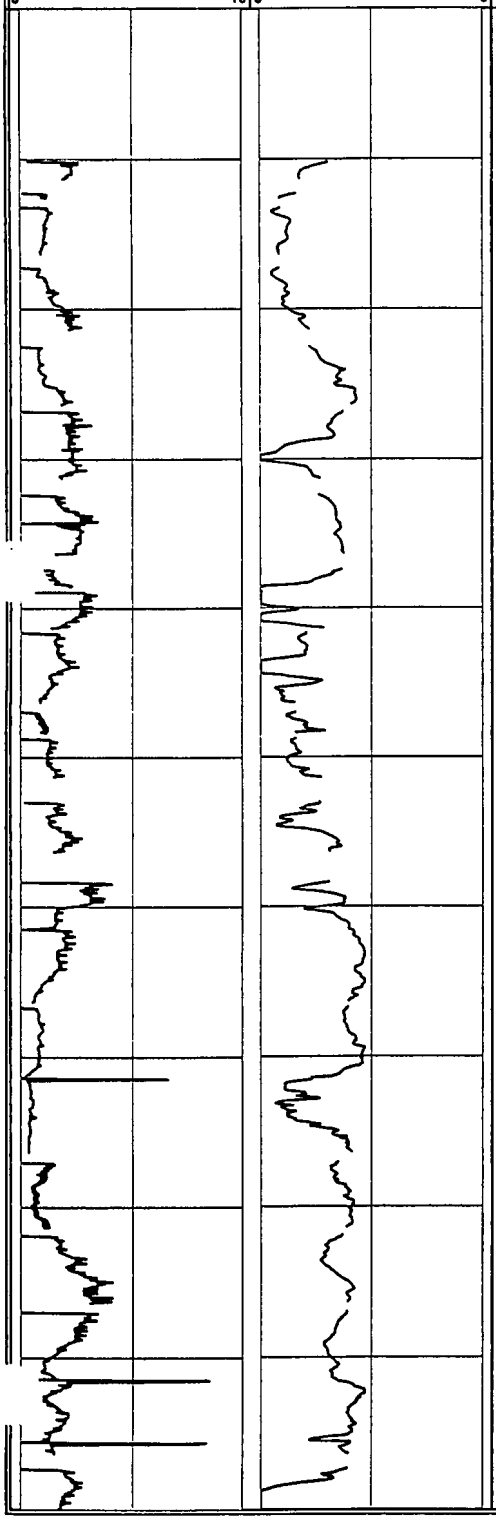
...7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 19, 2003
JOB NUMBER:	4563001	END DATE:	December 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, John Hilton

Total depth of Profile: 534.5 ft

Total depth of Boring: 530 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		CL		
	Poorly-graded SAND (fine to medium) with some clay and silt; gray	SC		
210	Well-graded SAND (fine to coarse) with some clay and silt and little gravel (fine); gray	SC		Profile data gaps due to poor KPRO equilibration
220				
230				
	Poorly-graded SAND (fine) with some silt; gray	SM		Micaceous
240	SILT with some sand (fine to coarse) and trace gravel (fine); gray	ML		Clay Interbeds
				Micaceous
250				Profile data gaps due to poor KPRO equilibration
260				
270				
280				Profile data gaps due to poor KPRO equilibration
290				
	Poorly-graded SAND (fine); gray	SP		

Boring ID:

'ALCOLM PIRNIE, INC.

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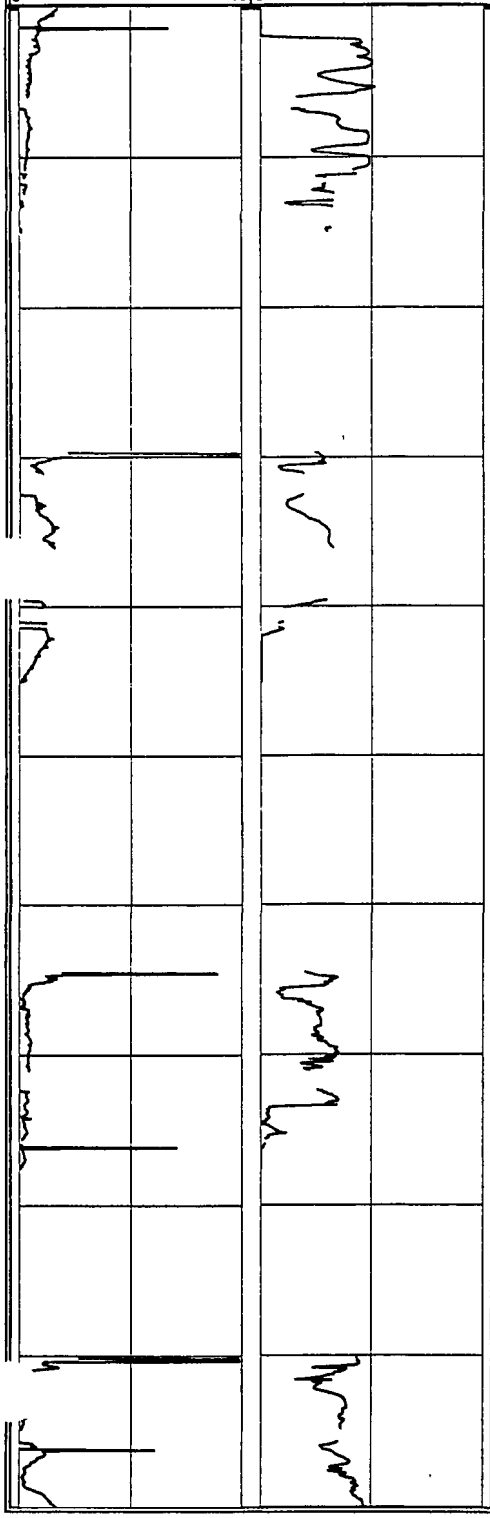
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 19, 2003
JOB NUMBER:	4563001	END DATE:	December 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, John Hilton
Total depth of Profile:	534.5 ft	Total depth of Boring:	530 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	CLAY with some silt; gray	CL		
	SILT with some clay and little sand (fine); gray	ML		
310	Poorly-graded SAND (fine) with some silt; gray	SM		Profiler refusal at 314.96 ft, no penetration rate or IK data from 314.96 to 329.7 ft due to drilling activities
320				
330	Poorly-graded SAND (fine); gray	SP		Profile data gaps due to poor KPRO equilibration
340	SILT and CLAY, trace sand (fine); gray	ML-CL		
	CLAY with trace silt; gray	CL		Profiler refusal at 345.10 ft, no penetration rate or IK data from 345.10 to 364.5 ft due to drilling activities
350	SILT and CLAY, some sand (fine); gray	ML-CL		
	SILT and SAND (medium); gray to tan	ML-SM		
360	Poorly-graded SAND (medium); gray to tan	SP		
	SAND and GRAVEL; white to gray	SW-GW		Based on rig response
370				Profile data gap due to poor KPRO equilibration
	SILT with some clay and trace sand (medium); gray to white	ML		Micaceous
380				Profiler refusal at 377.57 ft, no penetration rate or IK data form 377.57 to 390.15 ft due to drilling activities
	Poorly-graded SAND (coarse) with some silt; gray	SM		
	Poorly-graded SAND (medium to coarse) with trace silt; gray to tan	SP		
390				Profile data gap due to poor KPRO equilibration

Boring ID:

ALCOLM PIRNIE, INC.

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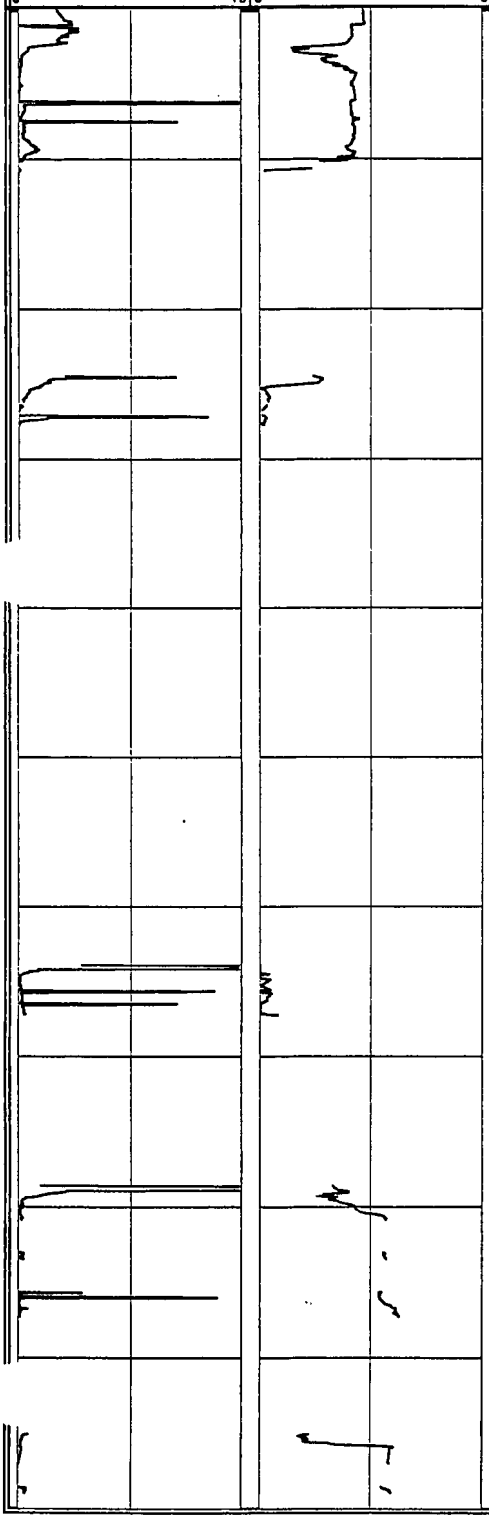
/ Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 19, 2003
JOB NUMBER:	4563001	END DATE:	December 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, John Hilton

Total depth of Profile: 534.5 ft Total depth of Boring: 530 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400		SP		Refusal at 405.21 ft bgs. Tried to pull rod back 3 feet and drive again. Refused again at 410.81 ft bgs. No penetration rate or IK data from 410.81 to 424.86 ft due to drilling activities
410	Poorly-graded SAND (medium to coarse) and GRAVEL; gray to tan	SP-GW		
420	Poorly-graded SAND (fine to medium) with some gravel (fine); gray to tan	SP		
	Poorly-graded GRAVEL (fine) with some silt, little sand, and little lignite; tan to white	GM		Profiler refusal at 427.72 ft, no penetration rate or IK data from 427.72 to 463.93 ft due to drilling activities
430	Poorly-graded SAND (fine to medium), some gravel (fine) and some silt; tan to white	SM		
440	SILT with some clay and little gravel (fine); gray to tan;	ML		
	Poorly-graded SAND (fine to medium) and LIGNITE with trace	SP-PT		
	Poorly-graded GRAVEL (fine) and SAND (fine to coarse); tan to red	GP-SW		
450	CLAY; gray	CL		
	Well-graded SAND (fine to coarse) with some gravel; tan to white	SW		
460	Poorly-graded SAND (fine to medium) with trace silt; gray	SP		Micaceous
	CLAY with some silt and sand (fine) and trace lignite; gray	CL		
	Well-graded SAND (fine to coarse) and CLAY with some silt; gray	SC-CL		Gravel zone from 468 to 469 ft, based on rig response
470	SILT and GRAVEL (fine) with some sand (fine); gray	ML-GM		Profiler refusal at 467.25 ft, no penetration rate or IK data from 467.25 to 478.61 ft due to drilling activities
	Poorly-graded SAND (fine to med.) with some gravel (fine); tan	SP		
480	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); tan	SP-GP		Profiler refusal at 487.31 ft, no penetration rate or IK data from 487.31 to 495.04 ft due to drilling activities
490	Poorly- graded SAND (fine to medium); tan to brown	SP		Clay layer from 493 to 493.5 ft
	Well-graded SAND (fine to coarse) with little gravel (fine); white to tan	SW		Micaceous

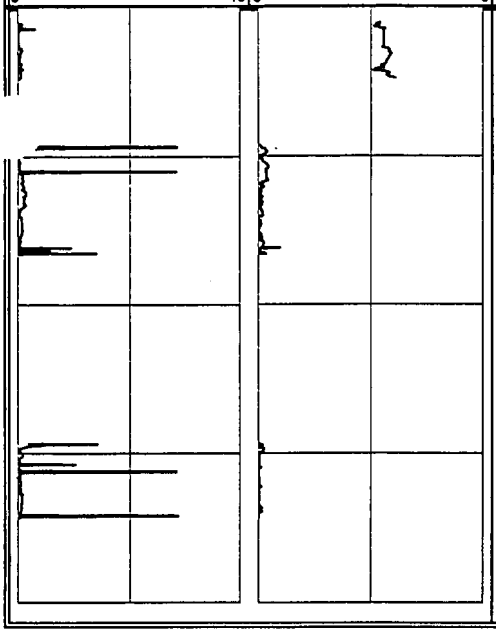
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-53**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 19, 2003
JOB NUMBER:	4563001	END DATE:	December 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, John Hilton

Total depth of Profile: 534.5 ft Total depth of Boring: 530 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
500		SW		Profiler refusal at 504.8 ft, no penetration rate or IK data from 504.8 to 509.3 ft due to drilling activities
				2 inch clay seam at 512 ft
510				
	Well-graded SAND (fine to coarse) with some silt and some gravel (fine); tan to brown	SM		Profiler refusal at 516.6 ft, no penetration rate or IK data from 516.6 to 529.34 ft due to drilling activities
520				
	Poorly-graded SAND (medium to coarse) with some gravel, trace silt	SP		
530				End of boring at 530 ft
				End of profile at 534.5
540				

Boring ID:

MALCOLM PIRNIE, INC.

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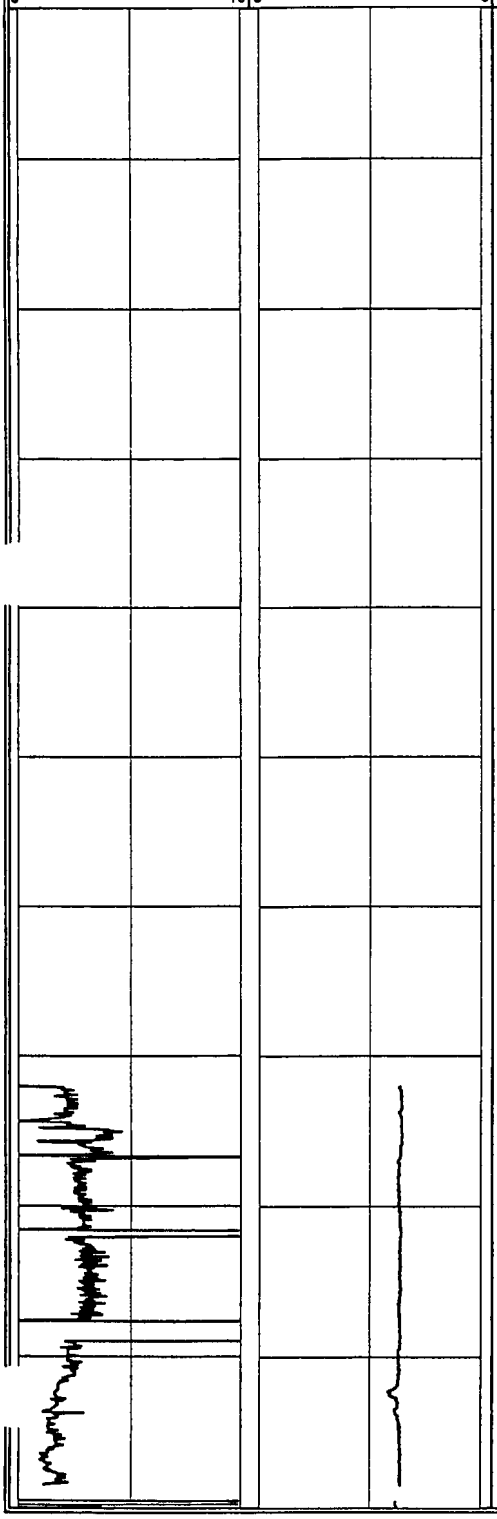
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, Jeff Dekoskie

Total depth of Profile: 437.5 ft

Total depth of Boring: 415 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium) and GRAVEL (fine); brown	SP		
10	Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown to tan	SP		Hollow stem auger used to drill from 0 to 19 ft
20	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); tan to brown	SP-GP		Begin mud rotary drilling at 19 ft
30				
40				
50	Poorly-graded SAND (medium to coarse) with some gravel (fine); tan to brown	SP		
60				
	Poorly-graded SAND (medium to coarse) with little gravel (fine) and trace silt; tan to brown	SP		
70	Well-graded SAND (fine to coarse) with little gravel (fine); tan to brown	SW		Begin Profiling at 72.02 ft
	Well-graded SAND (fine to coarse) with some gravel (fine); tan to brown	SW		
80	Well-graded SAND (fine to coarse); tan to brown	SW		
	Well-graded SAND (fine to coarse) with trace gravel (fine); tan to brown	SW		
90	Well-graded SAND (fine to coarse) and GRAVEL (fine); tan to brown	SW		No IK data from 98.5 to 99.57, string potentiometer disconnected from drill rig
	Well-graded SAND (fine to coarse) with few gravel (fine); tan to brown	SW		

Boring ID:

ALCOLM PIRNIE, INC.

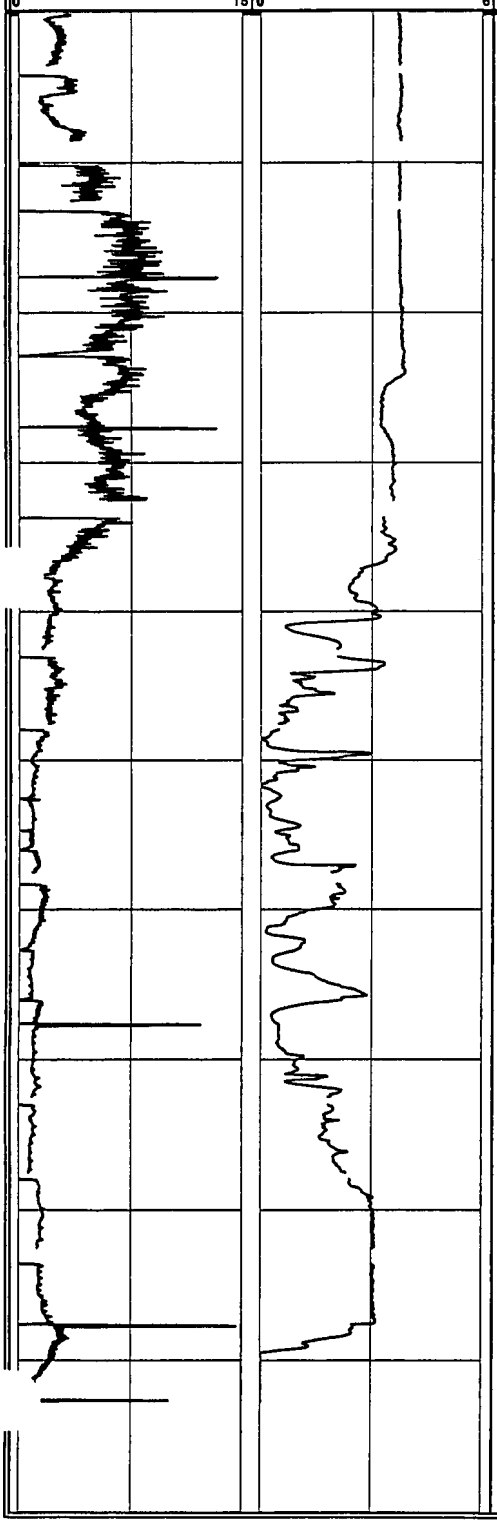
.7 Route 208 North Fair Lawn, NJ 07401

P-54

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Jim Lewis	HYDROGEOLOGIST:	Scott Niekamp, Jeff Dekoskie
HELPER:	Tony Alexander		

Total depth of Profile: 437.5 ft — Total depth of Boring: 415 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Well-graded SAND (fine to coarse) with little gravel (fine); tan to brown	SW		
	Well-graded SAND (fine to coarse); tan to brown	SW		Profile data gaps due to poor KPRO equilibration
110				
120	Well-graded GRAVEL (fine to coarse) with little sand (fine to medium); light tan to brown	GW		
	Poorly-graded SAND (fine to medium) with trace gravel (fine); tan to brown	SP		
130	SILT and SAND (fine to coarse) with trace gravel (fine); brown	ML-SM		
	SILT and SAND (fine to coarse) with some clay and trace gravel (fine); brown	ML-SM		Profile data gaps due to poor KPRO equilibration
140	SILT and SAND (fine) with some clay; brown	ML-SM		Thin clay layers at 145, 148, 150, and 153 ft bgs
	SILT and SAND (fine to coarse) with some clay and trace gravel (fine); brown	ML-SM		
150				Profile data gaps due to poor KPRO equilibration
160				
170				
	Well-graded SAND (fine to coarse) with some silt; brown	SM		
180	Well-graded SAND (fine to coarse) with some silt and trace gravel (fine); brown	SM		Profile data gaps due to poor KPRO equilibration
	Well-graded SAND (fine to coarse) and GRAVEL (fine to coarse); tan	SW-GW		
190	CLAY with some silt, some sand (fine to coarse) and gravel (fine) and little lignite; gray	CL		Profiler refusal at 192.76 ft, no penetration rate or IK data from 192.76 to 224.81 ft due to drilling activities

Boring ID:

MALCOLM PIRNIE, INC.

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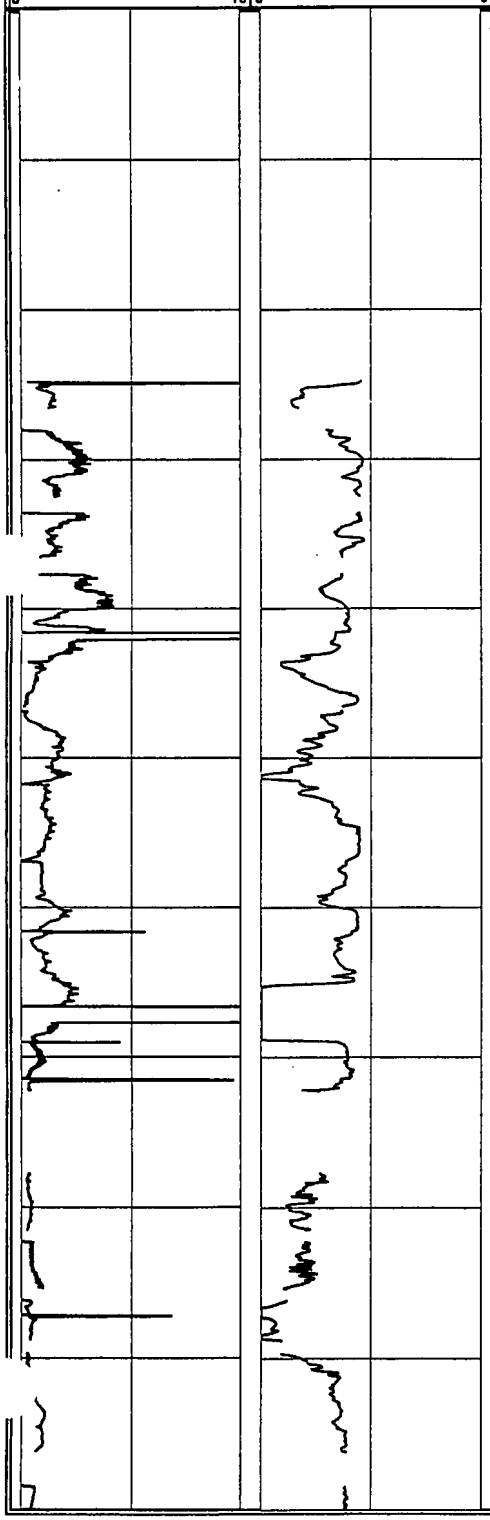
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, Jeff Dekoskie
Total depth of Profile:	437.5 ft	Total depth of Boring:	415 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200		CL		
210				
220	Poorly-graded SAND (fine to medium) and GRAVEL (fine to coarse); tan	SP-GW		
	Well-graded GRAVEL (fine to coarse) with some sand (fine to coarse) and clay; light tan to brown	GC		
230	Poorly-graded SAND (fine to medium) and GRAVEL (fine to coarse); tan	SP-GW		Profile data gaps due to poor KPRO equilibration
240	Well-graded GRAVEL (fine to coarse) with some sand (fine to coarse) and silt; light tan	GM		
	Well-graded SAND (fine to coarse) with some gravel (fine) and silt; light tan	SM		
250	Poorly-graded GRAVEL (fine) with some sand (fine to coarse) and silt; light tan	GM		
	Well-graded SAND (fine to coarse) with some gravel (fine) and trace clay; tan to brown	SW		
260	Poorly-graded SAND (medium); brown	SP		
	CLAY with trace lignite	CL		
	Poorly-graded SAND (medium) with some clay and trace lignite: brown	SC		Profile data gaps due to poor KPRO equilibration
270	Poorly-graded GRAVEL (fine) with some sand (medium), some clay and some silt; light tan	GC		
	Poorly-graded SAND (fine to medium), some clay and silt; light tan	SC		Profile data gaps due to equipment malfunction
280	Well-graded SAND (fine to coarse) and CLAY, with some silt;	SC- CL		
	CLAY; white	CL		Based on rig response
290	Well-graded SAND (fine to coarse) and some gravel (fine); tan	SW		Profile data gaps due to poor KPRO equilibration
	Well-graded SAND (fine to coarse) and little gravel (fine); tan	SW		

Boring ID:

ALCOLM PIRNIE, INC.

...7 Route 208 North Fair Lawn, NJ 07401

P-54

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, Jeff Dekoskie
Total depth of Profile:	437.5 ft	Total depth of Boring:	415 ft

GEOLOGIC INFORMATION

Penetration Rate (ft/min) 0 – 15 | Index of Hyd. Conductivity 0 – 6

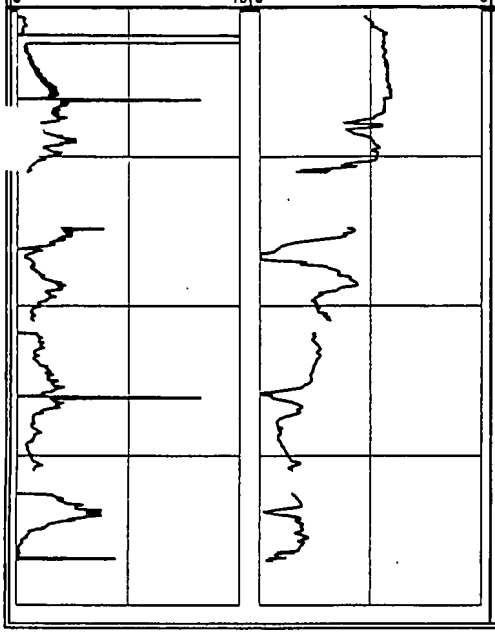
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		SW		Clay layer 304 to 305 ft
	Poorly-graded SAND (fine) and CLAY; gray	SC- CL		
310	Poorly-graded SAND (fine) with little clay and trace gravel (fine); gray	SC		Profiler refusal at 306.25 ft, no penetration rate or IK data from 306.25 to 319.8 ft due to drilling activities
	Poorly-graded SAND (fine); tan	SP		
320	Poorly-graded SAND (fine) with some silt and trace gravel (fine); tan	SM		
	Well-graded SAND (fine to coarse) with some silt and trace gravel (fine); tan	SM		Profile data gap due to incorrect pressure setting
330	Poorly-graded SAND (fine) with some silt and gravel (fine); tan	SM		Profile data gaps due to poor KPRO equilibration
340				
350	Poorly-graded SAND (fine); tan	SP		Micaceous Profile data gaps due to poor KPRO equilibration
360	Poorly-graded SAND (fine), trace gravel (fine)	SP		Profiler refusal at 361.57 ft, no penetration rate or IK data form 361.57 to 397.61 ft due to drilling activities
	SILT and SAND (fine) with little clay; tan	ML-SM		
370				Micaceous
380				
390	Poorly-graded SAND (fine to medium) with trace gravel (fine); tan to brown	SP		

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-54

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	South of W John St., West of Charlotte St., North of RR tracks
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Tony Alexander	HYDROGEOLOGIST:	Scott Niekamp, Jeff Dekoskie

Total depth of Profile: 437.5 ft
Total depth of Boring: 415 ft



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400				
		SP		
410	Well-graded SAND (fine to coarse) and GRAVEL (fine to coarse); tan	SW-GW		Profile data gap due to equipment malfunction End of boring at 415 ft
420				
430				Profile data gaps due to poor KPRO equilibration Profiler refusal at 437.5 ft, end of Profile
440				

Boring ID:

MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

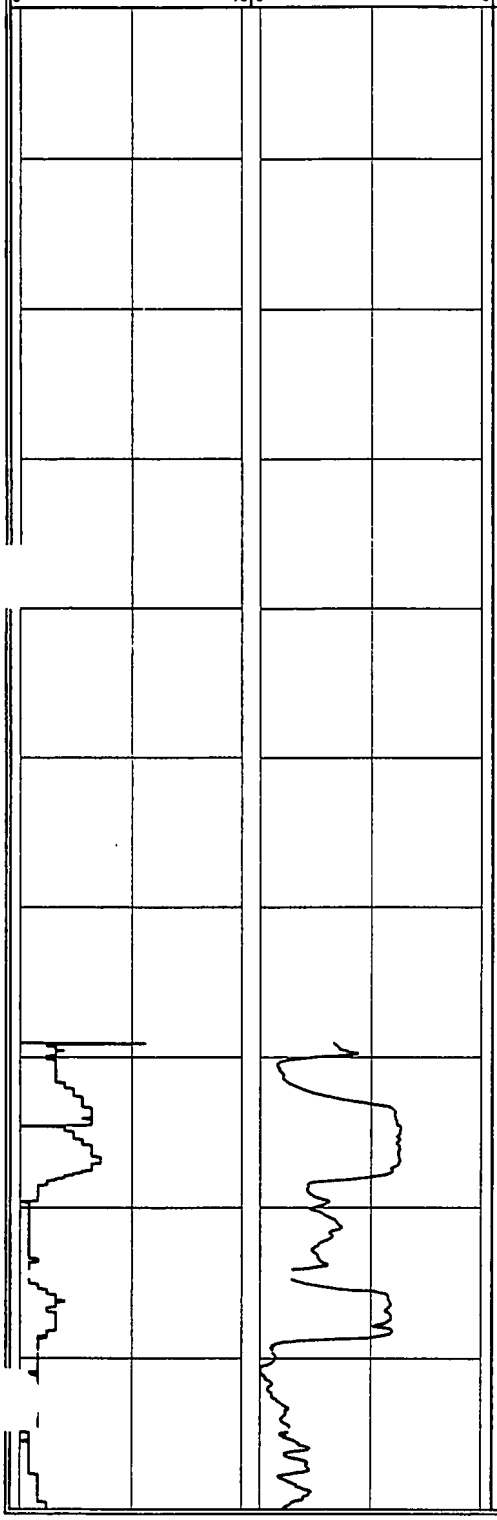
P-55

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 10, 2004
JOB NUMBER:	4563001	END DATE:	February 6, 2004
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, Approx. 500 feet east of the Wantagh Pkwy.
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Jim Lewis	HYDROGEOLOGIST:	C. Sullivan, J. Ifkovits, K. Wheeler
HELPER:	Kerri Carley		

Total depth of Profile: 480.73 ft

Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Sandy SILT with some gravel; dark brown	ML		
	Poorly-graded silty SAND (fine) with some gravel; brown	SM		6 1/4 hollow stem auger used from 0 to 20 ft
10				
	Poorly-graded SAND (fine) with some gravel and little silt; light brown	SM		Begin mud rotary drilling at 20 ft
20	Poorly-graded SAND (medium to coarse and GRAVEL (fine); light brown	SP-GP		
30				
	Well-graded SAND (fine to coarse) with trace gravel (fine); light brown	SW		
40	Poorly-graded SAND (fine) and GRAVEL (fine); brown	SP-GP		Some Iron oxides
	Sandy SILT with some gravel (fine to medium); brown	ML		
50				
	Poorly-graded SAND (fine) with little silt and little gravel; light brown	SM		
60				
	Poorly-graded SAND (fine to medium) with some clay; light brown to tan	SC		Begin Profiling at 69 ft
70	Poorly-graded SAND (fine) with little clay; tan	SC		
80	Poorly-graded SAND (fine to medium) with some clay and little gravel (fine); tan	SC		Profile data gap due to poor KPRO equilibriation
	Poorly-graded SAND (fine) with some clay and trace lignite; brown	SC		
90	Silty CLAY with little sand (fine) and little lignite; yellow to gray	CL		Profile data gaps due to poor KPRO equilibriation

Boring ID:

MALCOLM PIRNIE, INC.

P-55

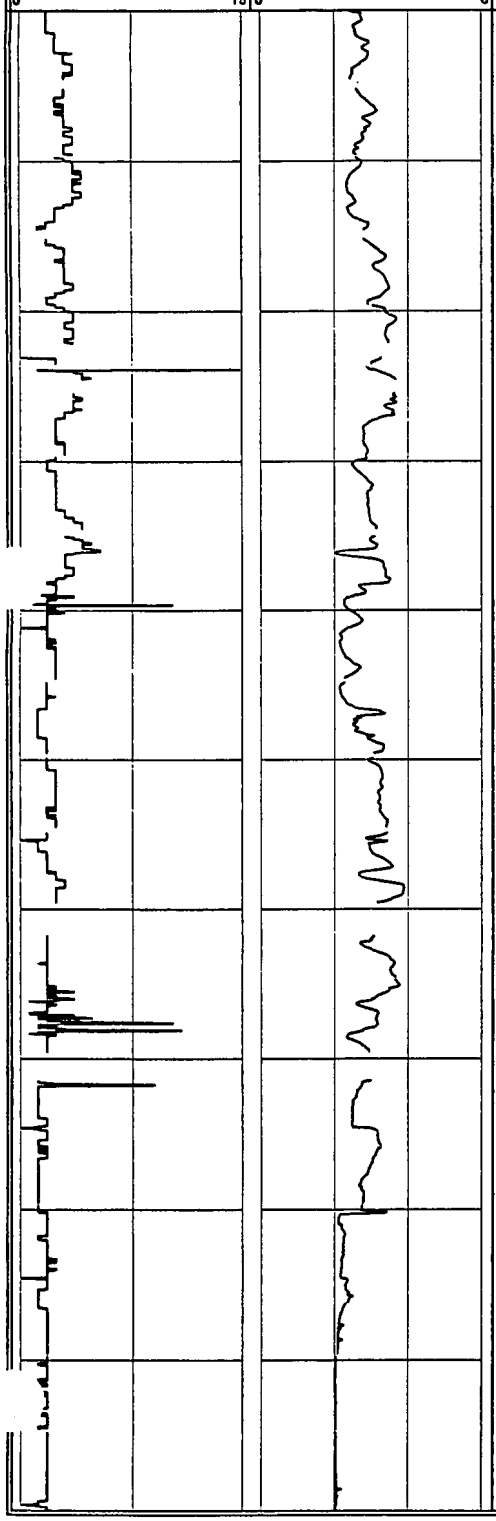
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 10, 2004
JOB NUMBER:	4563001	END DATE:	February 6, 2004
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, Approx. 500 feet east of the Wantagh Pkwy.
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Jim Lewis	HYDROGEOLOGIST:	C. Sullivan, J. Ifkovits, K. Wheeler
HELPER:	Kerri Carley		

Total depth of Profile: 480.73 ft

Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Sandy CLAY with trace lignite; tan	CL		Micaceous
				Profile data gap due to poor KPRO equilibriation
	Poorly-graded SAND (fine to medium) and CLAY with some gravel (fine); light brown	SC-CL		Iron oxides, Micaceous
110	Poorly-graded SAND (fine); light brown	SP		Poor Recovery of Cuttings
				Profile data gaps due to poor KPRO equilibriation
120				Temporary power losses. No penetration rate or IK data from 122.15 to 123.02 ft and 123.64 to 123.68 ft
	Poorly-graded SAND (fine to medium) with little gravel and trace clay; tan to light brown	SP		Micaceous
130				Profile data gaps due to poor KPRO equilibriation
	Poorly-graded SAND (fine) with some clay; tan	SC		Minor oxides
140				
	Sandy CLAY with some gravel (fine); tan to light brown	CL		Some Iron oxides
150				Profile data gaps due to poor KPRO equilibriation
160	Poorly-graded SAND (fine) with some gravel (fine) and little clay; orange to brown	SC		Some iron oxides
				Profile data gaps due to poor KPRO equilibriation
170				
	Sandy SILT with some clay, some lignite, and trace gravel (fine); brown	ML		Trace iron oxides
180				
	SILT with some clay and little lignite; brown	ML		
190				Profile data gaps due to poor KPRO equilibriation

Boring ID:

MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

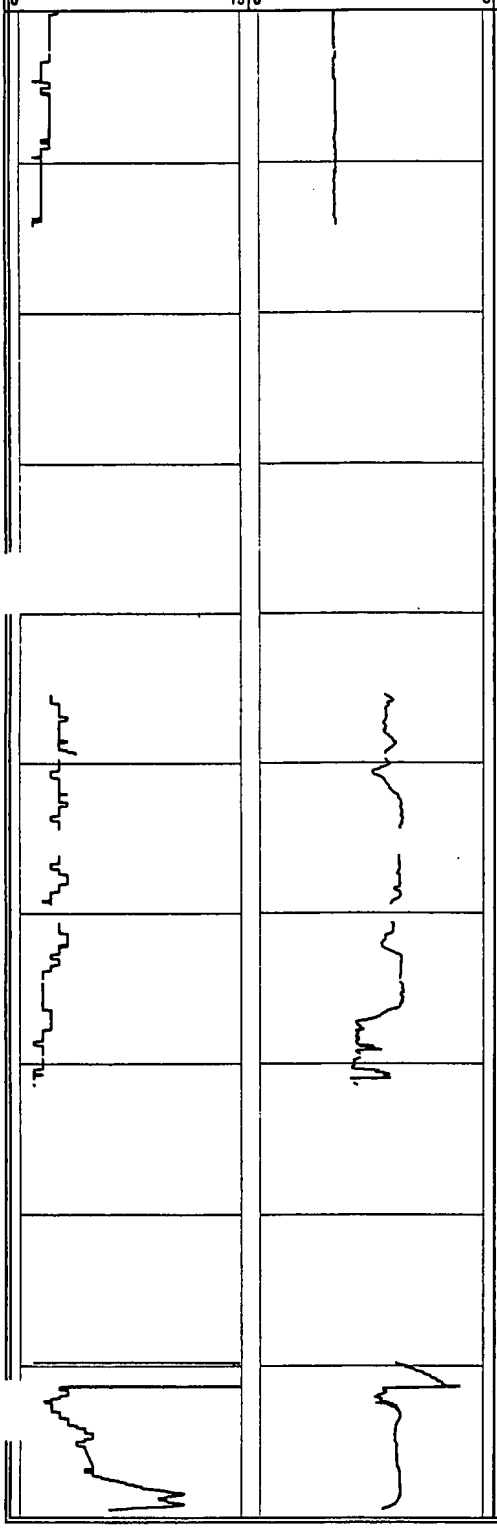
P-55

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 10, 2004
JOB NUMBER:	4563001	END DATE:	February 6, 2004
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, Approx. 500 feet east of the Wantagh Pkwy.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Kerri Carley	HYDROGEOLOGIST:	C. Sullivan, J. Ifkovits, K. Wheeler

Total depth of Profile: 480.73 ft

Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	SILT with some clay and little lignite; brown	ML		Temporary power losses. No penetration rate or IK data from 202.58 to 202.73.02 ft
	Poorly-graded GRAVEL (fine) with some some sand and clay and trace lignite; orange to brown	GC		
210	Silty CLAY; white	CL		Profiler refusal at 214.55 ft. No penetration rate or IK data from 214.55 to 238.85 due to drilling activities
220	CLAY; white to light gray	CL		210-220 ft, Interbedded sand lenses (<1 foot)
230	Poorly-graded SAND (medium); brown	SP		
240	Poorly-graded SAND (fine); tan to orange	SP		Micaceous No penetration rate or IK data from 238.85 to 244.40 ft due to frozen KPRO line.
250	Poorly-graded SAND (fine) with little clay and trace gravel; brown-orange-tan	SC		No penetration rate or IK data from 244.40 to 245.42 ft, profiler sock on during beginning of drive. Profile data gaps due to poor KPRO equilibriation
260	Poorly-graded SAND (fine) with trace clay; brown-tan to yellow	SP		Profile data gaps due to poor KPRO equilibriation
270	Poorly-graded SAND (fine to medium); tan	SP		Small gravel layer at 271 ft bgs Profiler refusal at 271.45 ft. No penetration rate or IK data from 271.45 to 289.65 due to drilling activities
	CLAY and SILT; white to gray	CL-ML		
280	Poorly-graded SAND (fine) with trace clay; tan-gray-white	SP		
290	Poorly-graded SAND (fine to medium) with little clay; tan-white-yellow	SC		Micaceous Profile data gaps due to poor KPRO equilibriation

Boring ID:

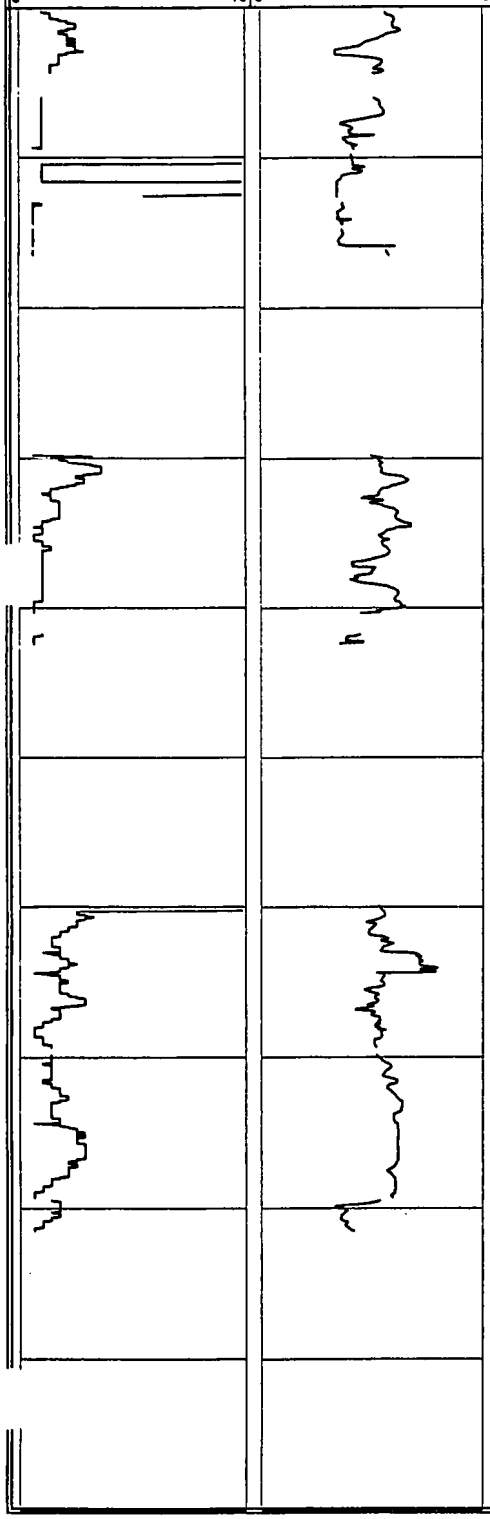
MALCOLM PIRNIE, INC.
17 Route 208 North Fair Lawn, NJ 07401

P-55

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 10, 2004
JOB NUMBER:	4563001	END DATE:	February 6, 2004
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, Approx. 500 feet east of the Wantagh Pkwy.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Kerri Carley	HYDROGEOLOGIST:	C. Sullivan, J. Ifkovits, K. Wheeler

Total depth of Profile: 480.73 ft
Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	Poorly-graded SAND (fine) with little silt and clay; tan to gray	SM		Profile data gaps due to poor KPRO equilibriation
310	Poorly-graded SAND (fine to medium) with little clay; tan-gray-white-yellow	SC		Profiler refusal at 316.5. No penetration rate or IK data from 316.5 to 329.75 due to drilling activities
320	Poorly-graded SAND (fine to medium) with trace clay and silt; tan-gray-white-yellow	SP		Micaceous
330	Poorly-graded SAND (fine to medium); tan to white	SP		Profile data gap due to poor KPRO equilibriation
340				Profiler refusal at 342.4 ft. No penetration rate or IK data from 342.4 to 359.89 due to drilling activities
350	Poorly-graded SAND (fine to medium) with trace silt; tan	SP		
360	Poorly-graded SAND (medium) with little clay; white to gray	SC		
370	Poorly-graded SAND (medium to coarse) with trace clay; tan-white-orange	SP		Profile data gaps due to poor KPRO equilibriation
380	Poorly-graded SAND (medium) and silty CLAY; tan-dark gray-white	SC-CL		Profiler refusal at 381.57 ft. No penetration rate or IK data from 381.57 to 400.2 ft due to drilling activities
390	Poorly-graded SAND (medium) and CLAY; orange to brown	SC-CL		Little recovery of cuttings

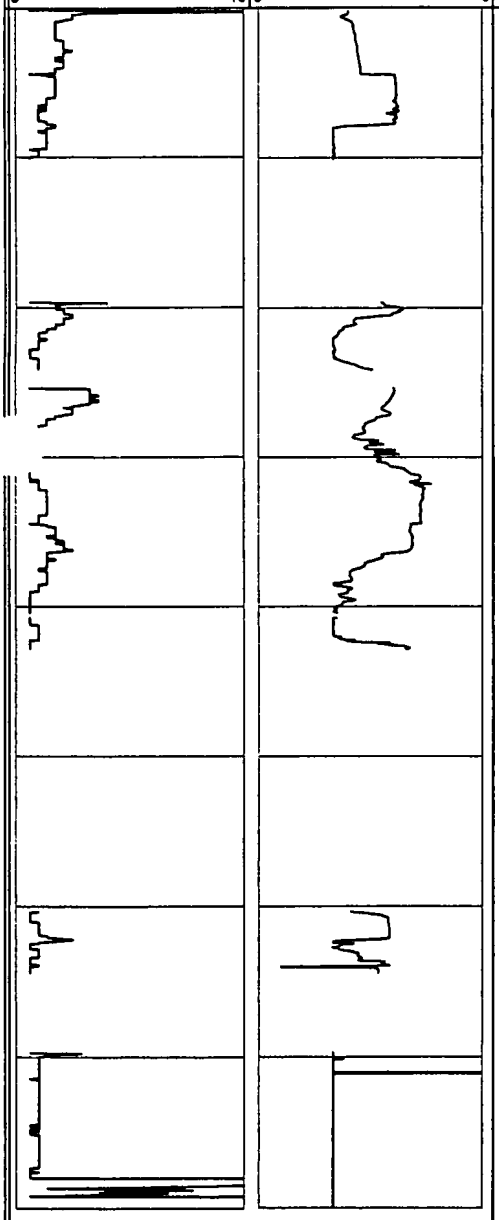
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-55**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 10, 2004
JOB NUMBER:	4563001	END DATE:	February 6, 2004
DRILLING FIRM:	CT&E	LOCATION:	Just N of RR tracks, Approx. 500 feet east of the Wantagh Pkwy.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Kerri Carley	HYDROGEOLOGIST:	C. Sullivan, J. Ifkovits, K. Wheeler

Total depth of Profile: 480.73 ft
Total depth of Boring: 470 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400	Poorly-graded SAND (medium to coarse); gray-white-light tan	SP		
				Silty clay layers at 408 ft
410	Poorly-graded SAND (fine to medium); tan to light brown	SP		Profiler refusal at 410.1 ft. No penetration rate or IK data from 410.1 to 419.6 ft due to drilling activities
420	No Recovery			No Recovery of cuttings from 420 to 450 ft
430				Profile data gap due to poor KPRO equilibriation
440				No penetration rate and IK data from 442.88 to 443.40 ft due to incorrect pressure reading
450	Poorly-graded SAND (fine); tan to gray	SP		Profiler refusal at 443.4 ft. No penetration rate or IK data from 443.4 to 460.36 ft due to drilling activities
460	No Recovery			No Recovery of Cuttings from 460 to 470 ft Profiler refusal at 464.45 ft. No penetration rate or IK data from 464.45 to 469.65 ft due to drilling activities
470				End of Boring at 470 ft End of Profile at 480.73 ft
480				

Boring ID:

MALCOLM PIRNIE, INC.

P-56

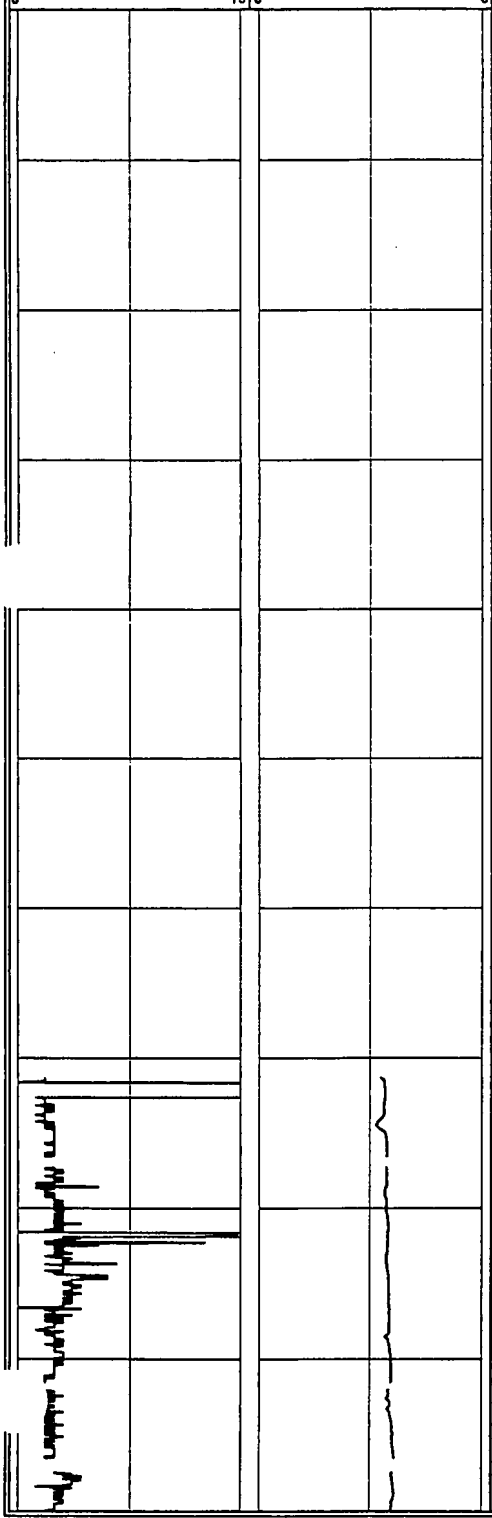
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 20, 2004
JOB NUMBER:	4563001	END DATE:	January 30, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on Nassau County Golf Course Driving Range
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Karrey Carley	HYDROGEOLOGIST:	Garret Furgeson

Total depth of Profile: 390.15 ft

Total depth of Boring: 385 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND (fine to coarse) with some gravel (fine to coarse); brown	SW		Hollow stem augers used form 0 to 20 ft
	Well-graded SAND (fine to coarse) with some gravel (fine); brown to tan-brown	SW		
10				
				Begin mud rotary drilling at 20 ft
20	Poorly-graded SAND (medium to coarse with gravel (fine); brown	SP		
30				
40				
50	Well-graded SAND (fine to coarse) with gravel; brown	SW		
60				
70	Well-graded SAND (fine to coarse) with some gravel; brown	SW		Begin profiling at 69.50 ft
	Well-graded SAND (fine to coarse) with trace gravel and trace silt; tan to gray	SW		Profile data gaps due to poor KPRO equilibriation
80				
	Well-graded SAND (fine to coarse) with trace silt; tan	SW		
90				Profile data gaps due to poor KPRO equilibriation

Boring ID:

'ALCOLM PIRNIE, INC.

P-56

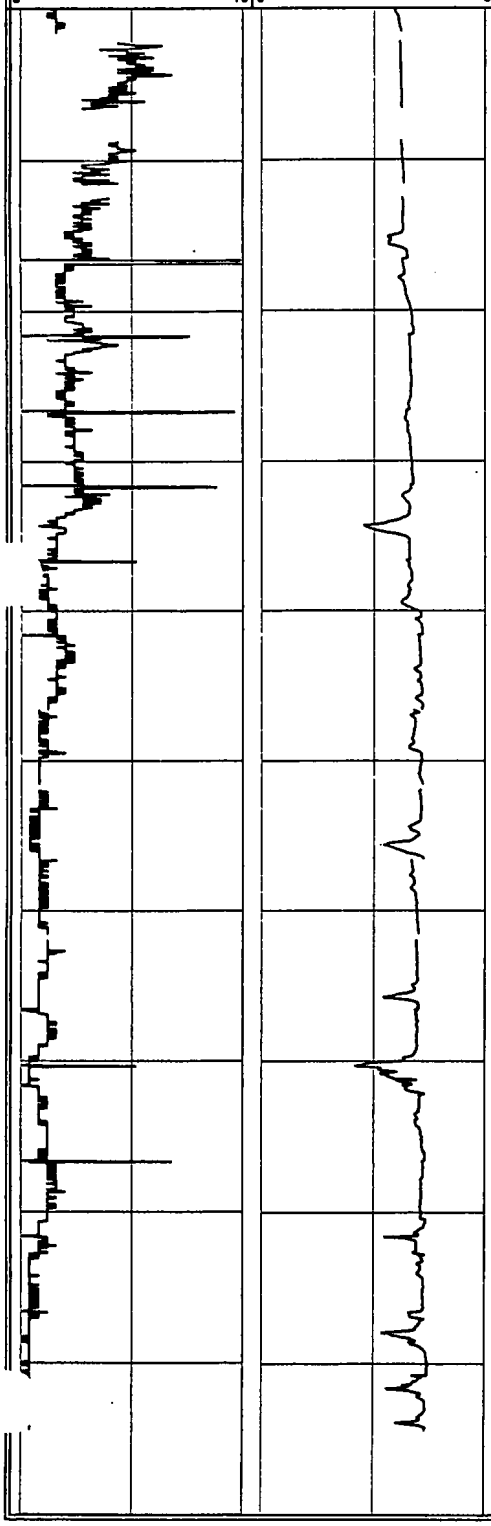
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 20, 2004
JOB NUMBER:	4563001	END DATE:	January 30, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on Nassau County Golf Course Driving Range
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Karrey Carley	HYDROGEOLOGIST:	Garret Furgeson

Total depth of Profile: 390.15 ft

Total depth of Boring: 385 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Well-graded SAND (fine to coarse) with trace silt; tan	SW		Profile data gaps due to poor KPRO equilibriation
	Poorly-graded SAND (fine to medium with trace silt; tan	SP		
110	Poorly-graded SAND (fine to medium) with trace silt and trace gravel; tan	SP		
120	Poorly-graded SAND (fine to medium) with trace silt; tan	SP		Micaceous
130	Poorly-graded SAND (fine to medium) with trace silt and trace gravel; tan	SP		Micaceous
140	Poorly-graded SAND (fine to medium) with trace silt; tan	SP		Micaceous
				Profile data gaps due to poor KPRO equilibriation
150				
160				
170				
	Well-graded SAND (fine to coarse) with trace gravel (fine) and trace silt; tan	SW		Micaceous
180				
	Well-graded SAND (fine to coarse) with gravel (fine); tan	SW		Micaceous
190				Profiler refusal at 194.4 ft. No penetration rate or IK data from 194.4 to 204.35 due to drilling activities

Boring ID:

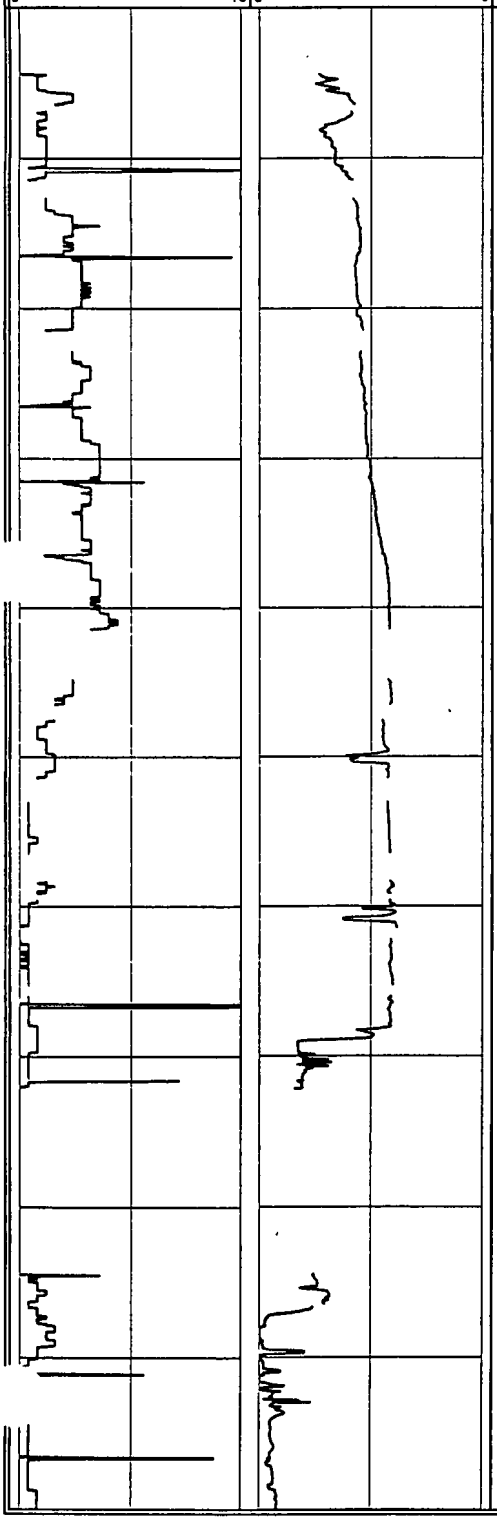
MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

P-56

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 20, 2004
JOB NUMBER:	4563001	END DATE:	January 30, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on Nassau County Golf Course Driving Range
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Karrey Carley	HYDROGEOLOGIST:	Garret Furgeson
Total depth of Profile:	390.15 ft	Total depth of Boring:	385 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Well-graded SAND (fine to coarse) with gravel (fine); tan	SW		Micaceous
	Poorly-graded SAND (fine to medium with some gravel (fine); tan	SP		Micaceous
210	Well-graded SAND (fine to coarse) with gravel (fine); tan	SW		
	Poorly-graded SAND (coarse) and GRAVEL (fine) with trace silt; tan	SP-GP		Profile data gaps due to poor KPRO equilibriation
220	Poorly-graded SAND (coarse) with gravel (fine) and trace silt	SP		
	Well-graded SAND (fine to coarse); dark red to white	SW		
230	Well-graded SAND (fine to coarse) with gravel (fine); dark red to white	SW		
240				
	Poorly-graded SAND (medium to coarse) with gravel (fine); tan-gray-white	SP		Profile data gaps due to poor KPRO equilibriation
250	Well-graded SAND (fine to coarse) with silt and clay and trace gravel; tan to gray	SW		
	No Recovery			Lost circulation, no return of cuttings
260				
270				Profiler refusal at 272.17 ft. No penetration rate or IK data from 272.17 to 284.40 due to drilling activities
280				
				Profile data gaps due to poor KPRO equilibriation
290				

Boring ID:

MALCOLM PIRNIE, INC.

P-56

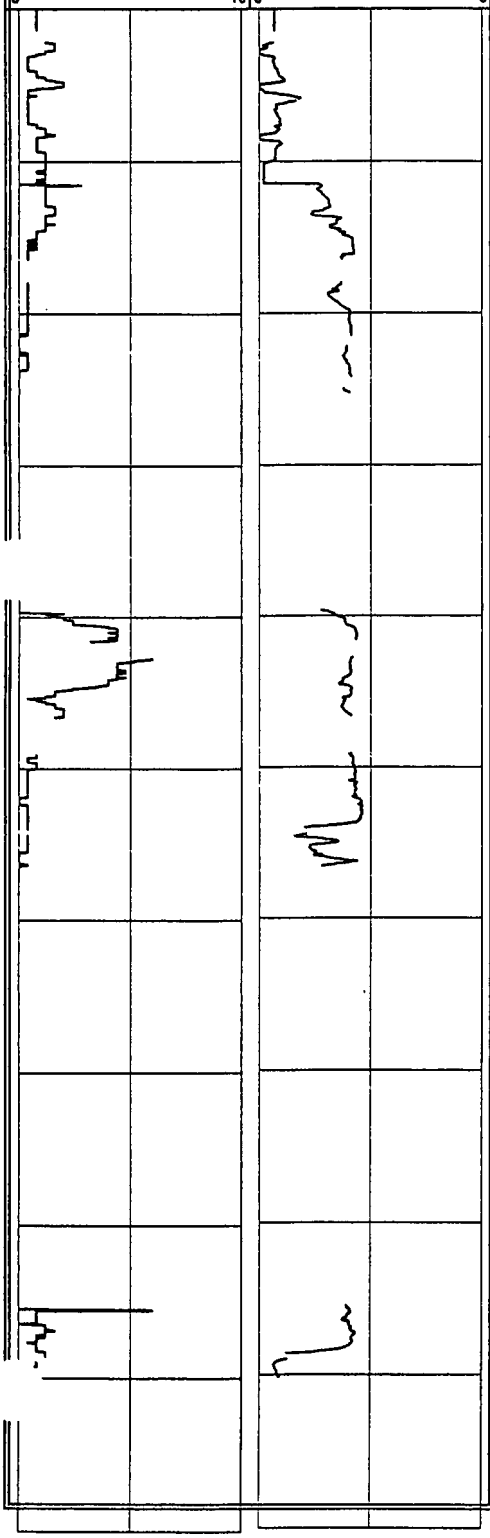
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	January 20, 2004
JOB NUMBER:	4563001	END DATE:	January 30, 2004
DRILLING FIRM:	CT&E	LOCATION:	East of Cantiage Rock Rd. on Nassau County Golf Course Driving Range
DRILLING METHOD:	Mud Rotary		
DRILLER:	Jim Lewis	DATUM:	Land Surface
HELPER:	Karrey Carley	HYDROGEOLOGIST:	Garret Furgeson

Total depth of Profile: 390.15 ft

Total depth of Boring: 385 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300				
310				Profile data gaps due to poor KPRO equilibriation
320				No penetration rate or IK data at 324.93 ft. KPRO flow shut off prior to termination of data acquisition
330				Profiler refusal at 325.24 ft. No penetration rate or IK data from 325.24 to 339.65 due to drilling activities
340				Profile data gaps due to poor KPRO equilibriation
350				Profiler refusal at 356.60 ft. No penetration rate or IK data from 356.60 to 384.85 due to drilling activities
360				Profiler rods fell to 385.45. No penetration rate or IK data from 384.80 to 385.45
		CL		Rig response indicated clay at 374 ft
370		SM		Rig response indicated primarily sand with some clay from 375 to 385 ft
380				End of boring at 385 ft
				Profile data gap due to poor KPRO equilibriation
390				End of profile at 390.15

Boring ID:

MALCOLM PIRNIE, INC.

P-58

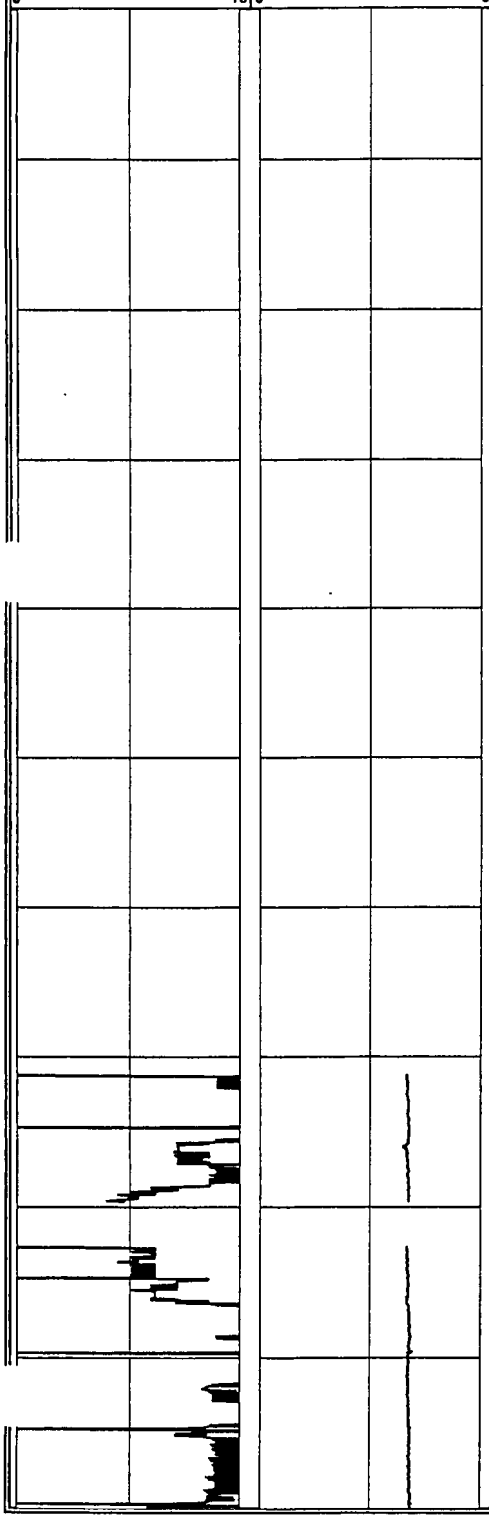
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of intersection of Charlotte St. and W. John St.
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Larry Lynch	HYDROGEOLOGIST:	Colleen Sullivan
HELPER:	Steve Somonski		

Total depth of Profile: 510.94 ft

Total depth of Boring: 510 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) and GRAVEL (fine to coarse); dark brown	SP-GW		
10	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		Hollow stem auger used from 0 to 15 ft, begin mud rotary drilling at 15 ft
	Poorly-graded GRAVEL (fine) and SAND (medium to coarse); light brown	GP-SP		Micaceous
20	Poorly-graded SAND (medium to coarse) and GRAVEL (coarse); light brown	SP-GP		
30				
40	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
50				
60				
70				Begin Profiling at 71.25 ft
80				Profile data gap due to poor KPRO equilibration
90	Poorly-graded SAND (coarse) and GRAVEL (fine to coarse); light brown	SP-GW		

Boring ID:

MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

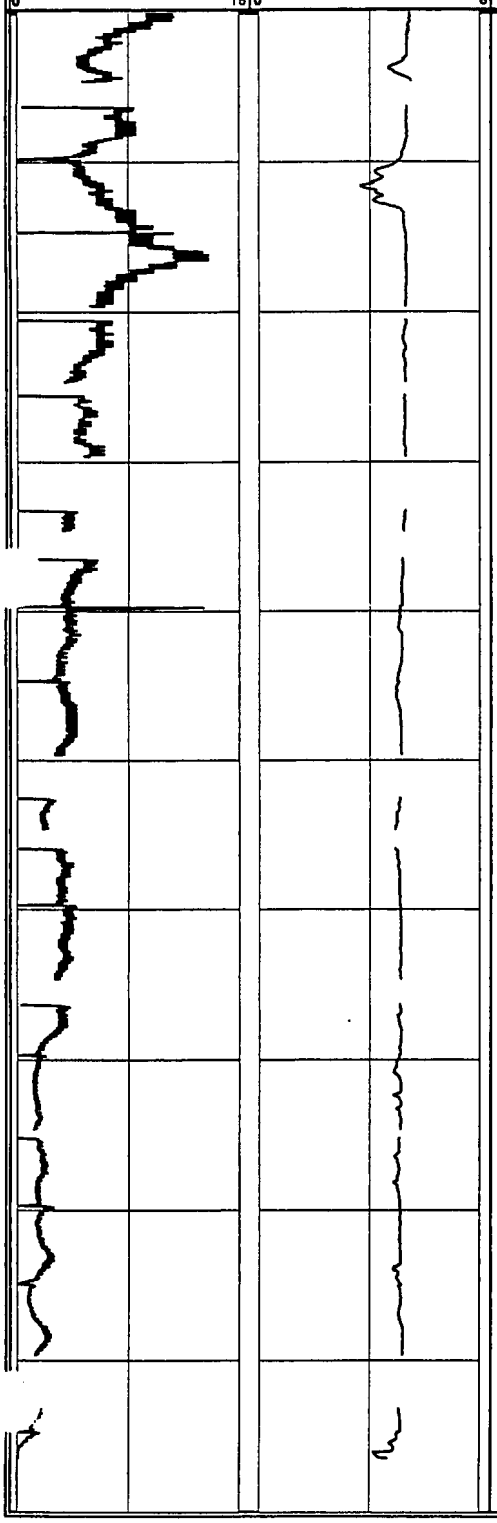
P-58

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of intersection of Charlotte St. and W. John St.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 510.94 ft

Total depth of Boring: 510 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Poorly-graded SAND (medium to coarse) with little gravel (fine to coarse) and trace lignite; light brown to gray	SP		Profile data gap due to poor KPRO equilibration
110	Poorly-graded SAND (medium to coarse) with some silt and clay and trace gravel (fine); brown to orange	SM		
120				
130	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		Profile data gaps due to poor KPRO equilibration
140	Poorly-graded SAND (coarse) and GRAVEL (fine); light brown	SP-GP		
150	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); light brown	SP-GP		
160	Poorly-graded SAND (medium to coarse) with little gravel (fine) and trace clay; light brown	SP		Profile data gaps due to poor KPRO equilibration
170	Poorly-graded SAND (medium to coarse) and GRAVEL (fine) and trace clay; light brown	SP-GP		
180				Profile data gaps due to poor KPRO equilibration
190	Poorly-graded SAND (medium to coarse) with some gravel (fine) and trace clay; light brown	SP		Profiler refusal at 196.42 ft, no penetration rate or IK data from 196.42 to 211.43 ft due to drilling activities

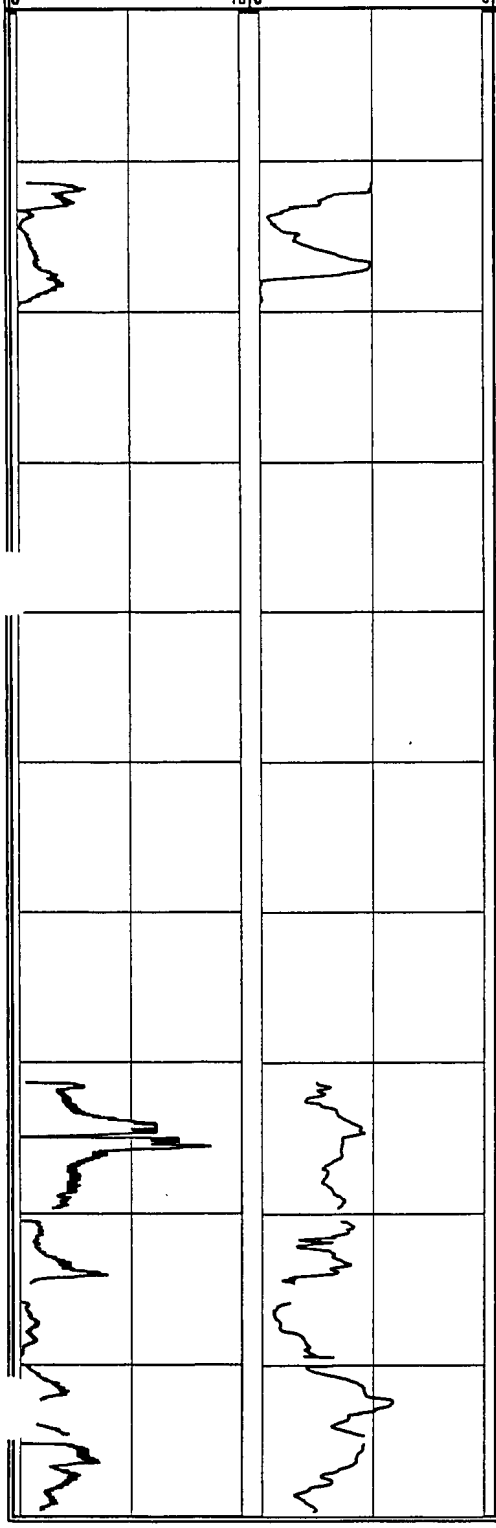
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-58**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of intersection of Charlotte St. and W. John St.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 510.84 ft — Total depth of Boring: 510 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (coarse) and GRAVEL (fine); light brown	SP-GP		
210	Poorly-graded SAND (medium to coarse) with trace gravel; brown to red	SP		
220	CLAY and SAND (fine to medium); gray to white to yellow	CL-SC		Profiler refusal at 219.58 ft, no penetration rate or IK data from 219.58 to 271.32 ft
230	CLAY and SAND (fine) with some silt; white to gray	CL-SC		
240				
250	Poorly-graded SAND (fine) and SILT with some clay; white to gray	SM-ML		
260	Poorly-graded SAND (fine) and SILT with some clay; white to gray	SM-ML		
270	Poorly-graded SAND (fine to medium) with trace lignite; white	SP		
280	Poorly-graded SAND (fine) and SILT with some clay; white to gray	SM-ML		Profile data gaps due to poor KPRO equilibration
290				

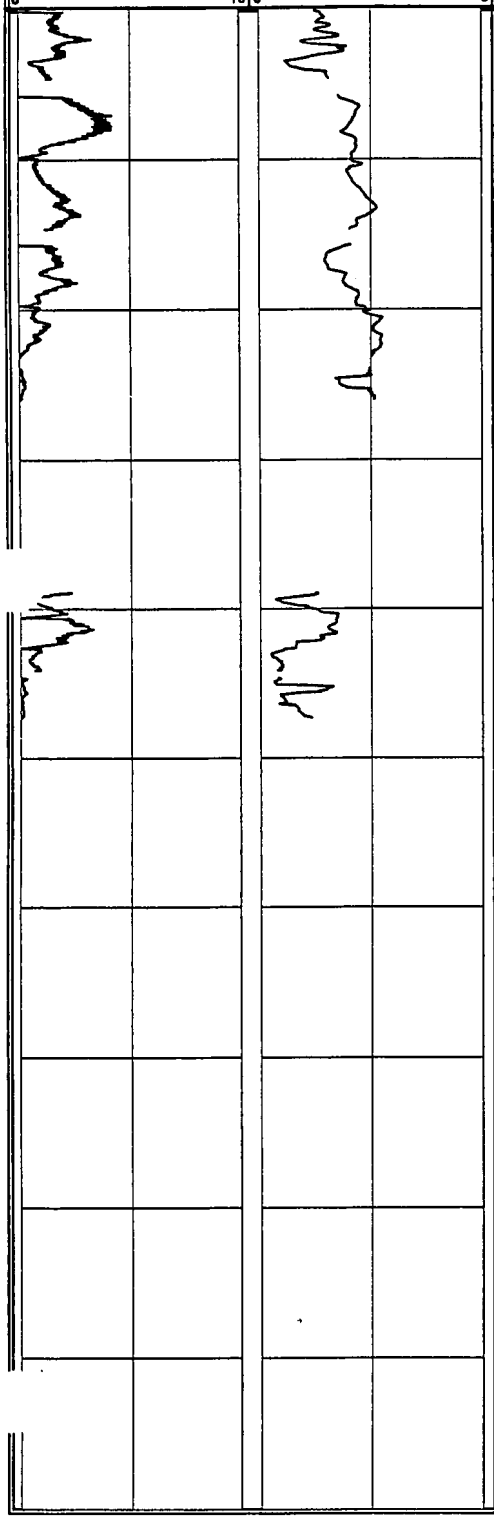
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-58

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of intersection of Charlotte St. and W. John St.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan

Total depth of Profile: 510.94 ft
Total depth of Boring: 510 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	No Recovery			Lost circulation, no recovery of cuttings
310				Profile data gaps due to poor KPRO equilibration
320	Poorly-graded SAND (fine to medium); gray to white	SP		Much water lost to formation
330	SILT and SAND (fine); gray to white	ML-SM		Profiler refusal at 326.0 ft, no penetration rate or IK data from 326.0 to 338.93 ft due to drilling activities
340	Poorly-graded SAND (fine) and SILT; gray to white	SM-ML		
350				Profiler refusal at 347.33 ft, no penetration rate or IK data from 347.33 to 402.45
360	Poorly-graded SAND (fine to medium) and SILT; white to light	SM-ML		
	CLAY and SAND; white to light brown	CL-SC		
370	Well-graded SAND (fine to coarse); white to light brown	SW		Micaceous
380	Poorly-graded SAND (fine to medium); white to light brown	SP		Refusal at 381.28 ft bgs Clay at 381, 383, and 387 ft bgs
390	Poorly-graded SAND (fine) with trace clay; white	SP		

Boring ID:

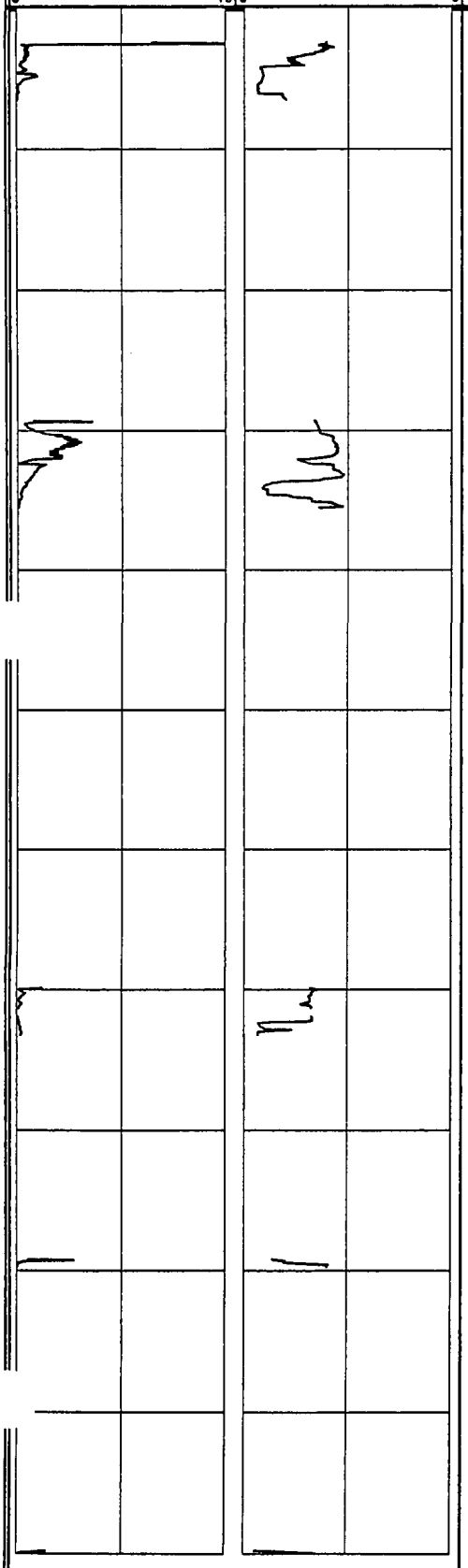
MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

P-58

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	November 4, 2003
JOB NUMBER:	4563001	END DATE:	November 13, 2003
DRILLING FIRM:	CT&E	LOCATION:	SW corner of intersection of Charlotte St. and W. John St.
DRILLING METHOD:	Mud Rotary		
DRILLER:	Larry Lynch	DATUM:	Land Surface
HELPER:	Steve Somonski	HYDROGEOLOGIST:	Colleen Sullivan
Total depth of Profile:	510.94 ft	Total depth of Boring:	510 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
400	Poorly-graded SAND (fine to medium) with some clay, silt, and lignite; gray to white	SC		Profiler refusal at 406.51 ft, no penetration rate or IK data from 406.51 to 429.3 ft due to drilling activities
410	Poorly-graded SAND (fine) and SILT with trace clay; gray to white	SM-ML		
420	Poorly-graded SAND (medium); white to gray	SP		
430	Poorly-graded SAND (medium to coarse) with little gravel (fine); white to gray	SP		Micaceous Profiler refusal at 435.5 ft, no penetration rate or IK data from 435.5 to 469.9 ft due to drilling activities
440	Poorly-graded SAND (medium to coarse and CLAY with some silt; white to gray	SC-CL		
450	Poorly-graded SAND (fine) and LIGNITE with some clay; dark gray	SC-PT		
460	Poorly-graded SAND (fine to medium) with little lignite and trace clay; white to gray	SP		Micaceous
470	SILT and SAND (fine to medium) with trace clay and lignite; gray to white	ML-SM		Profiler refusal at 473.25 ft, no penetration rate or IK data from 473.25 to 489.2 ft due to drilling activities
480	Poorly-graded SAND (fine to medium) with trace clay and lignite; white to gray	SP		Profiler refusal at 489.75, no penetration rate or IK data from 489.75 to 509.79 ft due to drilling activities
490	SILT with some sand (medium) and clay and trace lignite; white to gray	ML		
500	SILT with some sand (medium) and clay; white to gray	ML		End of boring at 510 ft bgs Refusal at 511.0 ft bgs. End of profile
510				

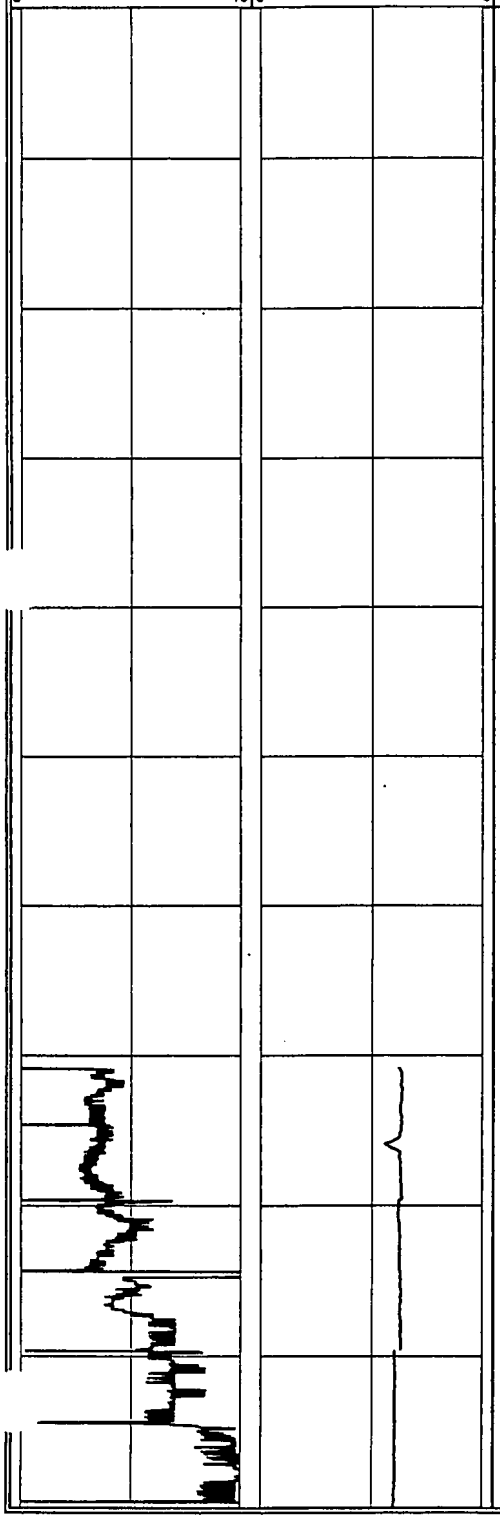
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-C**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 9, 2003
JOB NUMBER:	4563001	END DATE:	June 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, S of 70 Property, E of P-27
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	G. Ferguson/J. Hilton/J. Dekoskie

Total depth of Profile: 394.5 ft — Total depth of Boring: 350 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND with some silt and clay; brown	SW		Hollow stem auger used from 0 to 10 ft
10				Begin mud rotary drilling at 10 ft
20	Well-graded SAND with some gravel; brown to tan	SW		Loss of ~200 gal drilling fluid.
30				Loss of ~200 gal drilling fluid.
40				
50				Loss of ~200 gal drilling fluid.
60				
70	Poorly-graded SAND (medium to coarse) with some gravel (fine); tan	SP		Begin profiling at 70.87 ft Trace mica
80				
90				

Boring ID:

MALCOLM PIRNIE, INC.

P-C

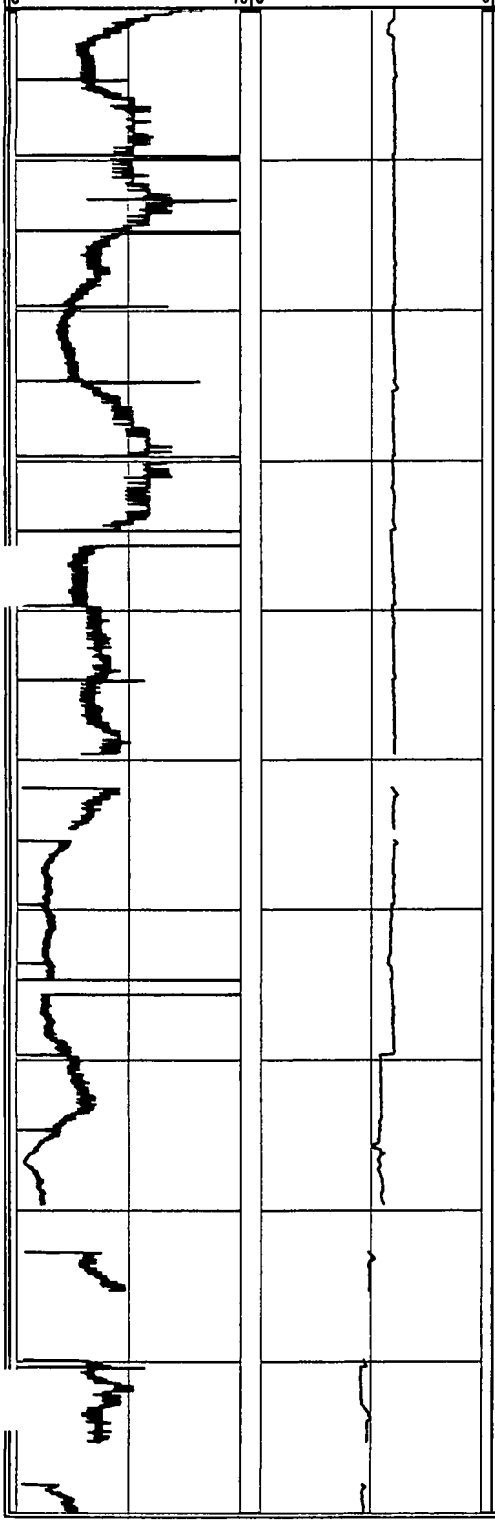
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 9, 2003
JOB NUMBER:	4563001	END DATE:	June 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, S of 70 Property, E of P-27
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	G. Ferguson/J. Hilton/J. Dekoskie

Total depth of Profile: 394.5 ft

Total depth of Boring: 350 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100	Well-graded SAND with trace gravel (fine); tan	SW		Trace lignite. Slight loss of drilling fluids
				Trace lignite
110				
				Trace mica
120				
				Gravel from 123 to 135 ft.
	Well-graded SAND and GRAVEL (fine); tan	SW-GP		
130				
140				
150				Profile data gaps due to poor KPRO equilibration
	Well-graded SAND with little gravel (fine); tan	SW		Trace mica
160				
170				
180				Profile data gap due to poor KPRO equilibration
	Poorly-graded GRAVEL (fine) with trace sand (medium); tan	GP		Profile data gap due to equipment problems
190				Profile data gap due to poor KPRO equilibration
	Poorly-graded SAND (fine to medium) with trace gravel (fine); tan to brown	SP		Micaceous

Boring ID:

MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

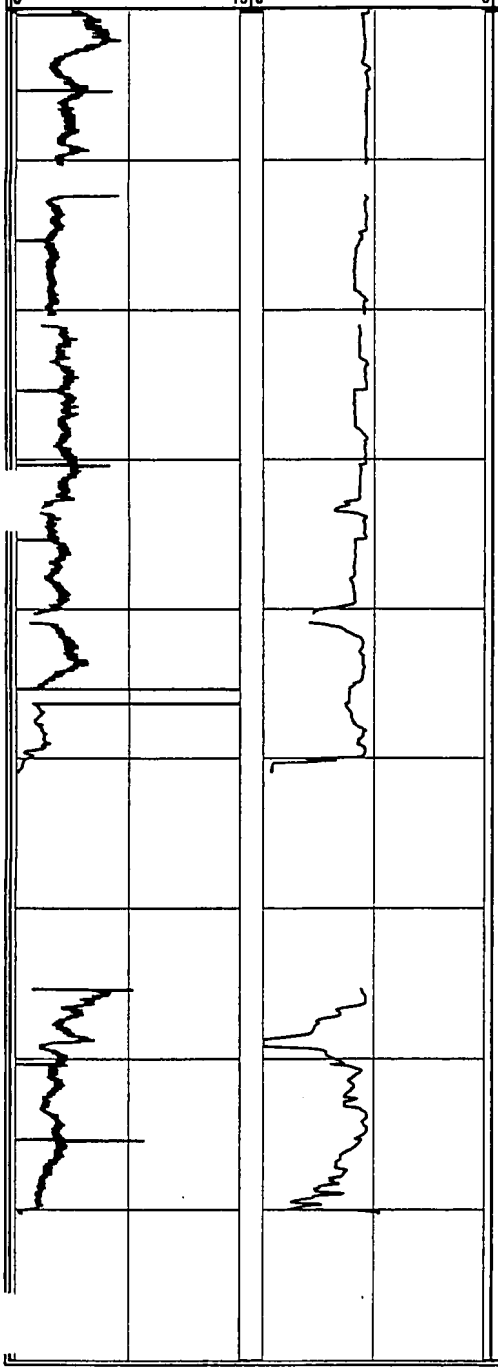
P-C

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 9, 2003
JOB NUMBER:	4563001	END DATE:	June 19, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, S of 70 Property, E of P-27
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	G. Ferguson/J. Hilton/J. Dekoskie

Total depth of Profile: 394.5 ft

Total depth of Boring: 350 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200				
210				Profile data gap due to poor KPRO equilibration
220				
230				Micaceous
	Poorly-graded SAND (fine to medium); light tan, white, and yellow	SP		Iron stained sediments from 245 to 250 ft
240				Profile data gap due to poor KPRO equilibration
250	CLAY with silt; light gray to white	CL		Profiler refusal at 250.1 ft, no penetration rate or IK data from 250.95 to 265.36 ft due to drilling activities
	Poorly-graded SAND (fine) with silt and clay	SM		
260	Poorly-graded SAND (fine); light gray	SP		
	Poorly-graded SAND (fine) and SILT; light brown	SM		Iron stained sediments from 275 to 280 ft
270				Trace organic material
	Poorly-graded SAND (fine to medium); yellow brown	SP		
280	CLAY; whitish-gray to brown-gray	CL		Profiler refusal at 280.3 ft, no penetration rate or IK data from 280.3 to 304.75 ft due to drilling activities

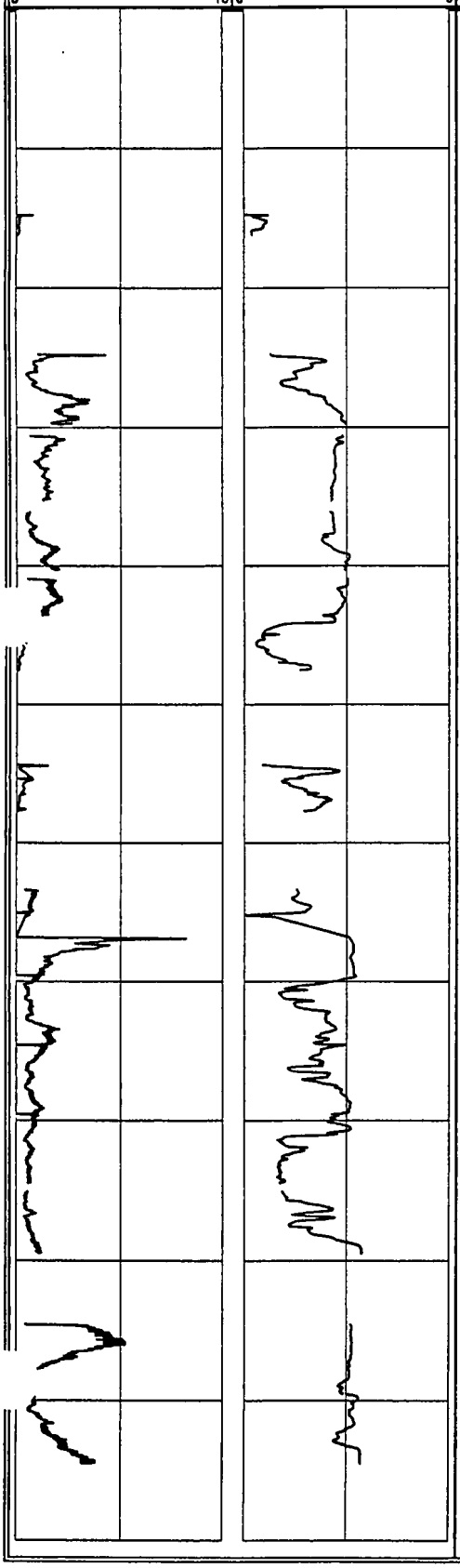
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-C**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	June 9, 2003
[illegible] NUMBER:	4563001	END DATE:	June 19, 2003
[illegible]LLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, S of 70 Property, E of P-27
[illegible]ILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	G. Ferguson/J. Hilton/J. Dekoskie

Total depth of Profile: 394.6 ft
Total depth of Boring: 350 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
290				
300	Poorly-graded SAND (fine); brown	SP		Lignite and organic material
	CLAY; dark brown	CL		Profiler refusal at 306.2 ft, no penetration rate or IK data from 306.2 to 314.76 ft due to drilling activities
310	Poorly-graded SAND (fine to medium); white to gray	SP		
320				
	Well-graded SAND (fine to coarse) with trace gravel (fine); white to gray	SW		Profile data gap due to poor KPRO equilibration
330				
	Well-graded SAND (fine to coarse) and GRAVEL (fine); white to gray	SW-GP		Profiler refusals at 337.56 ft and 347.72 ft, no penetration rate or IK data from 337.56 to 344.35 ft and from 347.72 to 353.4 ft due to drilling activities
340	Poorly-graded SAND (medium to coarse); white to gray	SP		
	Well-graded SAND (fine to coarse), trace gravel (fine); white to gray	SW		End of boring at 350 ft
350				
360				
370				
380				Profile data gap due to equipment problems
390				End of profile at 394.5 feet
400				

⁻ALCOLM PIRNIE, INC.

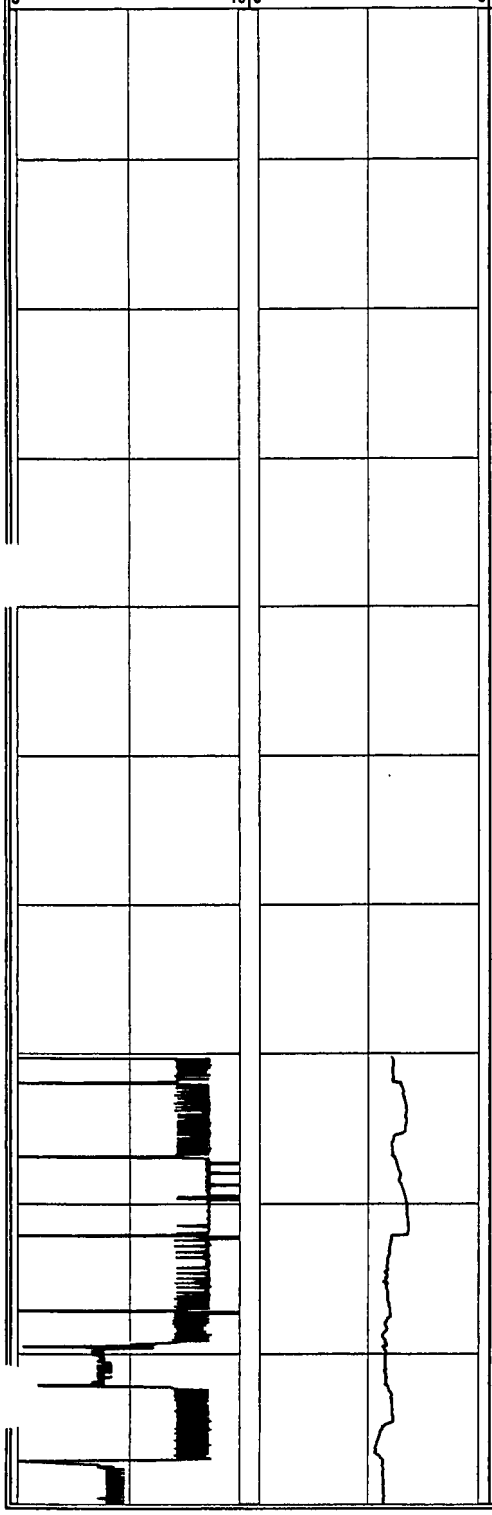
.7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-D**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 27, 2003
JOB NUMBER:	4563001	END DATE:	June 4, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, S
DRILLING METHOD:	Mud Rotary	WEATHER:	of 70 Property, E of P-11
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 351.95 ft Total depth of Boring: 315 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Well-graded SAND and GRAVEL	SW-GW		Hollow stem auger used from 0 to 8 ft. Begin mud rotary drilling at 8 ft.
10				
	Poorly-graded GRAVEL (fine) with some sand (fine to medium); brown	GP		
20				
	Poorly-graded GRAVEL (coarse)	GP		
30	Poorly-graded SAND (medium to coarse) with trace silt; light to medium brown	SP		
40				Lost circulation of drilling fluids from 45 to 65 ft, no recovery of cuttings, drilling character indicative of sand
50				
60				
	Poorly-graded SAND (medium to coarse), light brown	SP		Begin Profiling at 70.2 ft
70				Lost circulation of drilling fluids from 75 to 95 ft, no recovery of cuttings
80				
90				
	Poorly-graded SAND (fine to medium) with trace gravel; light tan to brown	SP		

Boring ID:

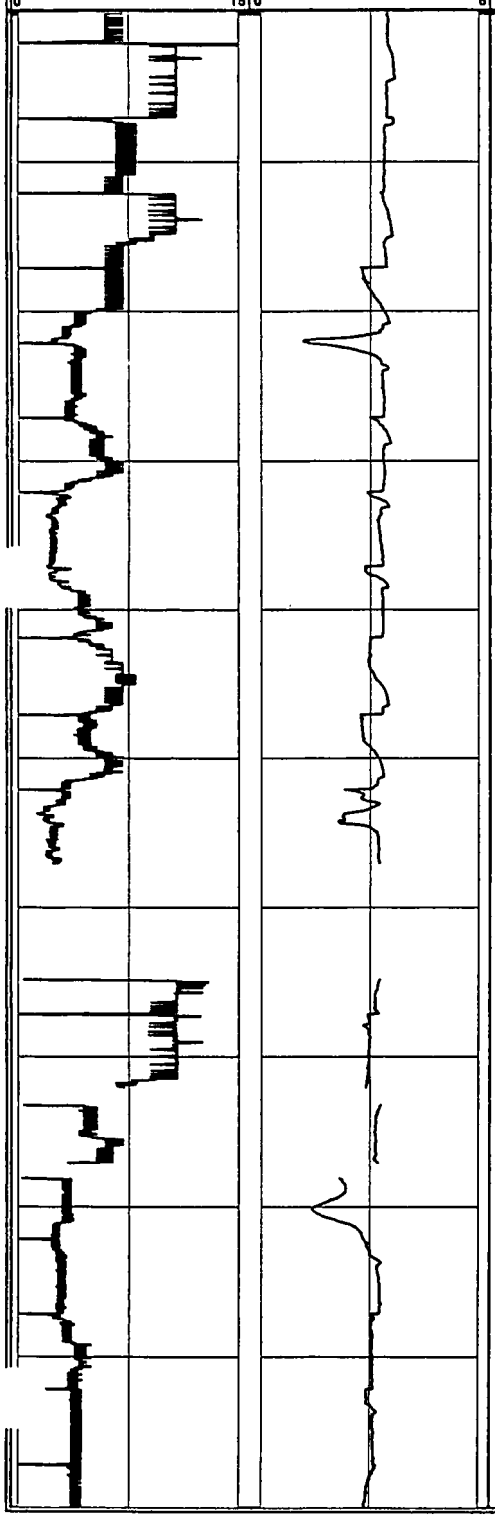
MALCOLM PIRNIE, INC.

7 Route 208 North Fair Lawn, NJ 07401

P-D

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 27, 2003
JOB NUMBER:	4563001	END DATE:	June 4, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, S
DRILLING METHOD:	Mud Rotary	WEATHER:	of 70 Property, E of P-11
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton
Total depth of Profile:	361.95 ft	Total depth of Boring:	315 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		
110				Micaceous
120				
130	Poorly-graded SAND (medium) with trace gravel (fine), light tan to white	SP		
140				Bad IK and drive rate data 141 - 145 ft, malfunctioning reed valve
	Poorly-graded SAND (coarse) and GRAVEL (fine); white	SP-GP		
150	Poorly-graded SAND (medium) with some gravel; light tan to brown	SP		
160				No IK data 157.05 - 164.88 ft due to malfunctioning Profiling equipment Lost circulation of drilling fluids from 160 to 180 ft, no recovery of cuttings
170				Profile data gaps due to poor KPRO equilibration
180	Poorly-graded SAND (medium to coarse) with trace gravel (fine); light tan to brown	SP		
190				

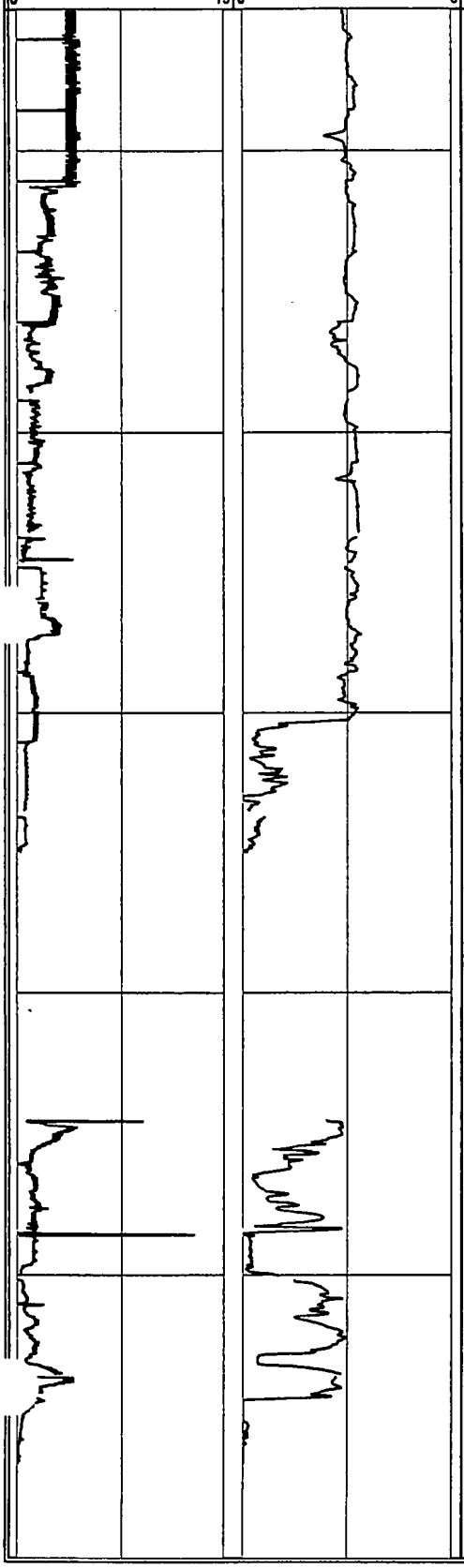
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-D**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 27, 2003
NUMBER:	4563001	END DATE:	June 4, 2003
LLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, S
DRILLING METHOD:	Mud Rotary	WEATHER:	of 70 Property, E of P-11
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 351.95 ft — Total depth of Boring: 315 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (medium to coarse) with little gravel (fine); light tan to white	SP		
210				
220	Poorly-graded SAND (fine to medium); light tan to white	SP		
230				
240				Profiler refusal at 238 ft Begin profiler advance at 239.5 ft
250	SAND and SILT	SM-ML		Lost circulation of drilling fluids, no recovery of cuttings from 250 to 280 ft. Log is based on drilling characteristics, penetration rate and IK data.
260	SAND and SILT with some clay	SM-ML		Profiler refusal at 259.97 ft, no penetration rate or IK data from 259.97 to 297.06 ft due to drilling activities
270				
280				
	CLAY and SILT with some sand	CL- ML		
290	SAND and SILT with some clay	SM-ML		
300	CLAY and SILT with some sand	CL- ML		Profiler refusal at 303.3 ft, no penetration rate or IK data from 303.3 to 313.91 ft due to drilling activities

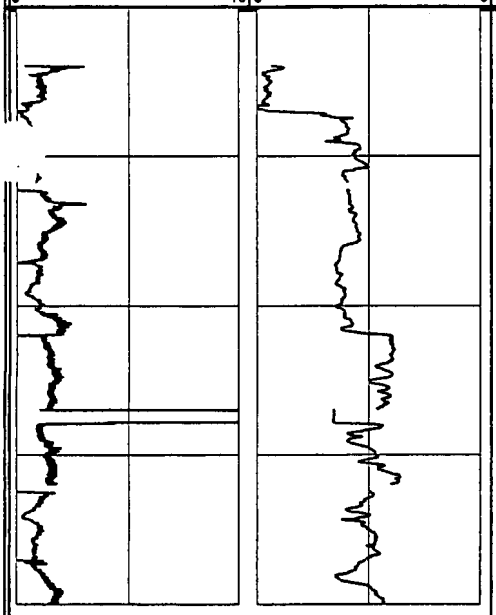
MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-D**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 27, 2003
JOB NUMBER:	4563001	END DATE:	June 4, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, S
DRILLING METHOD:	Mud Rotary	WEATHER:	of 70 Property, E of P-11
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 351.95 ft
Total depth of Boring: 315 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
310	SILT and SAND	ML-SM		End of boring 315 ft
320				
330				
340				Profile data gap due to poor KPRO equilibration
350				End of profile at 351.95 ft bgs

ALCOLM PIRNIE, INC.

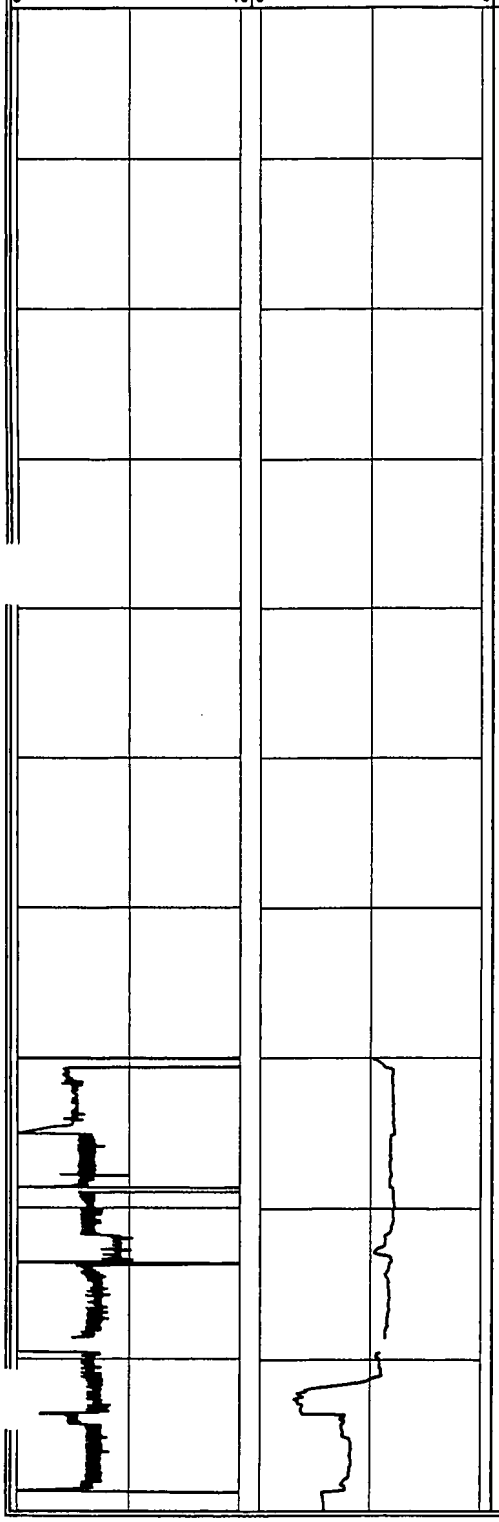
.7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-E**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 14, 2003
JOB NUMBER:	4563001	END DATE:	May 22, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, on E side of Cantiague Rock Rd, South of 70 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Garrett Ferguson

Total depth of Profile: 332.85 ft Total depth of Boring: 310 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (medium to coarse) and GRAVEL (fine to coarse); brown	SP-GP		
10	Poorly-graded SAND (medium to coarse) and GRAVEL (fine); brown	SP-GP		Hollow stem auger used from 0 to 10 ft. Begin mud rotary drilling at 10 ft.
20	Well-graded SAND with gravel (fine); brown	SW		Micaceous
30				
40				
50	Poorly-graded SAND (medium to coarse) with gravel (fine); brown	SP		
60				
70	Well-graded SAND with trace silt, clay, and gravel; brown to grayish brown	SW		Silt and clay fraction diminishes with depth
80				
	Poorly-graded SAND (fine) with trace silt; brown	SP		Profile data gap due to poor KPRO equilibration
90				
	Well-graded SAND with trace gravel (fine), and silt; brown	SP		Micaceous

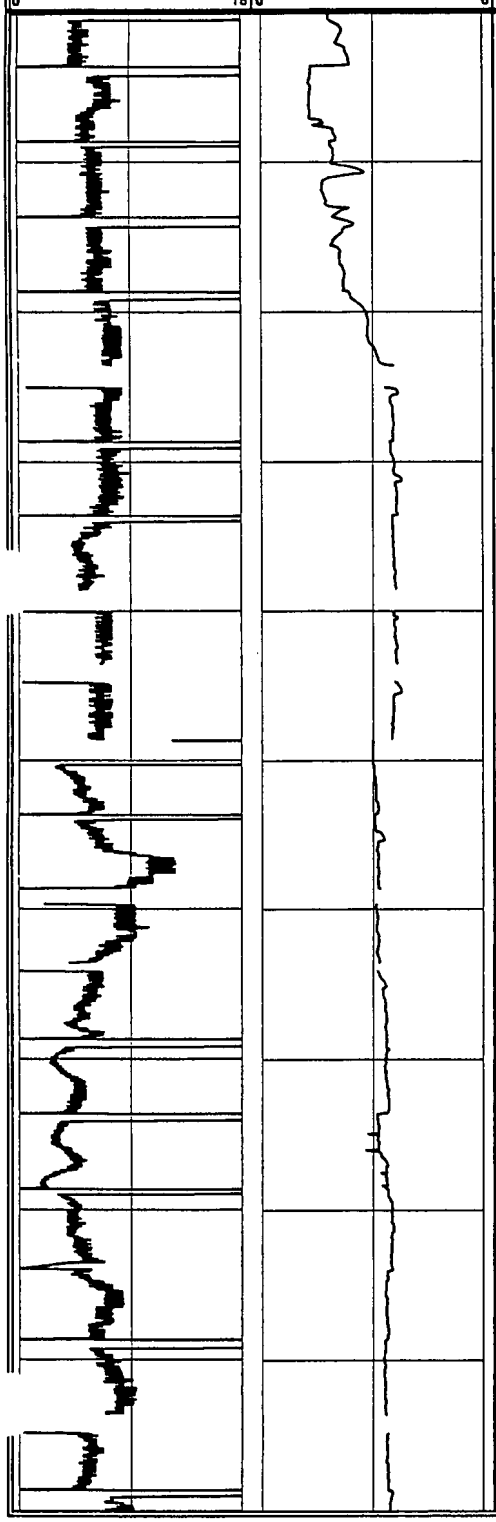
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-E**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 14, 2003
JOB NUMBER:	4563001	END DATE:	May 22, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, on E side of Cantiague Rock Rd, South of 70 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Garrett Ferguson

Total depth of Profile: 332.86 ft — Total depth of Boring: 310 ft

GEOLOGIC INFORMATION



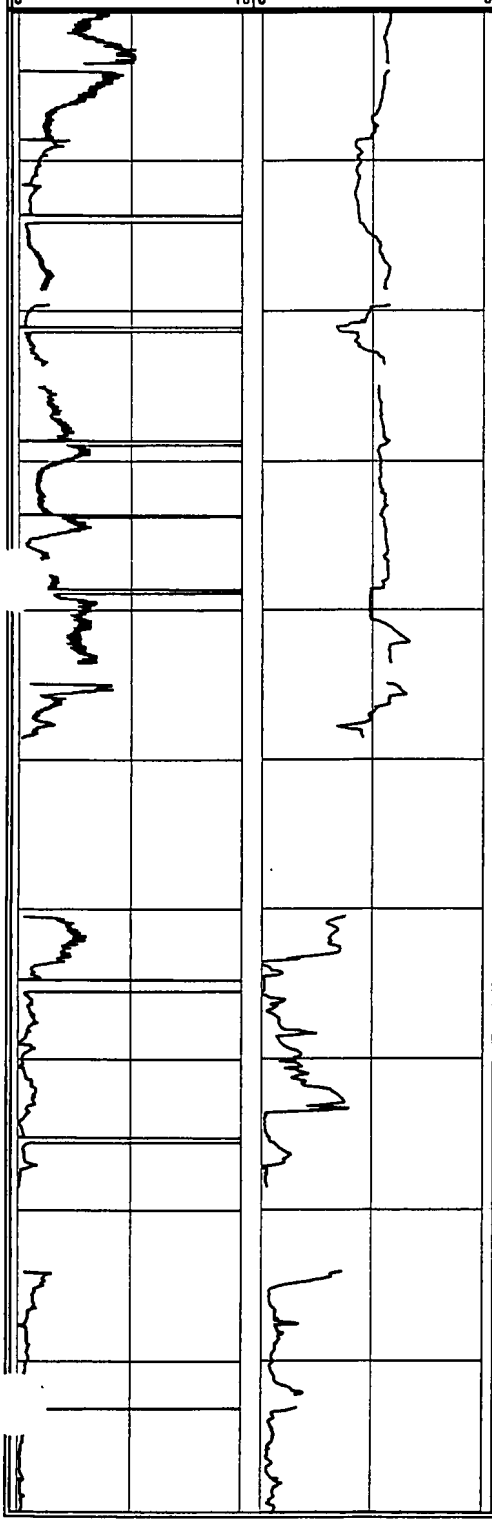
Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		Micaceous
110	Poorly-graded SAND (fine to medium); brown to grayish brown	SP		Trace mica
	Poorly-graded SAND (fine) with trace silt; brown to grayish brown	SP		Trace mica
120				Profile data gap due to poor KPRO equilibration
	Poorly-graded SAND (fine to medium); brown	SP		Micaceous
130				
140				Profile data gaps due to poor KPRO equilibration
	Well-graded SAND (fine to coarse); brown	SW		
150	Well-graded SAND with trace gravel (fine); brown	SW		
160	Poorly-graded SAND (fine to medium); brown	SP		
170	Poorly-graded SAND (fine, trace medium and coarse) with trace gravel (fine); brown	SP		
180	Poorly-graded SAND (fine, trace medium to coarse); brown	SP		
	Well-graded SAND (fine to coarse); brown	SW		
190	Well-graded SAND with little gravel (fine); brown	SW		
	Well-graded SAND with trace gravel (fine); brown	SW		Profile data gap due to poor KPRO equilibration

MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-E**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 14, 2003
JOB NUMBER:	4563001	END DATE:	May 22, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, on E side of Cantiague Rock Rd, South of 70 Property
DRILLING METHOD:	Mud Rotary	DATUM:	Land Surface
DRILLER:	Wes Eicfeld	HYDROGEOLOGIST:	Garrett Ferguson
HELPER:	Karri Carley		
Total depth of Profile:	332.85 ft	Total depth of Boring:	310 ft

GEOLOGIC INFORMATION

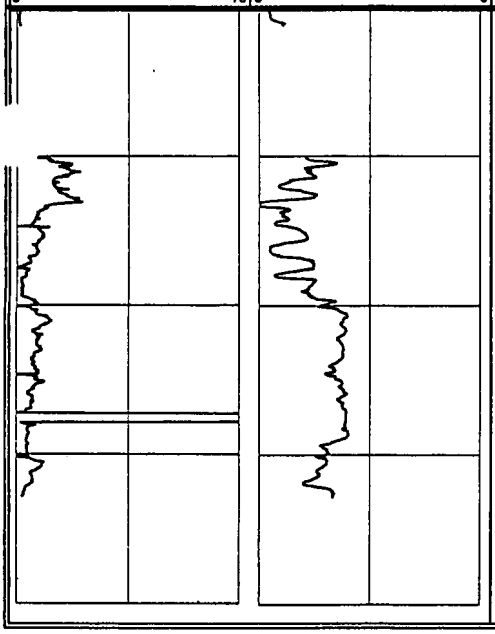


Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Well-graded SAND (fine to coarse); brown	SW		
210	Poorly-graded SAND (fine) with trace gravel; brown	SP		
220	Poorly-graded SAND (fine to medium) with trace gravel (fine); brown to orange	SP		Profile data gaps due to poor KPRO equilibration
230	Poorly-graded SAND (fine); orange	SP		
	Poorly-graded SAND (fine to medium); orange	SP		
240	Poorly-graded SAND (fine to medium) with some clay; orange	SC		Profiler refusal at 248.57 ft, no penetration rate or IK data from 248.57 to 260.52 ft due to drilling activities
250	Well-graded SAND (fine to coarse) and CLAY; orange	SC- CL		
260	Poorly-graded SAND (fine to medium) and CLAY; gray to black	SC- CL		
270				Profiler refusal at 278.5 ft, no penetration rate or IK data from 278.5 to 284.12 ft due to drilling activities
280	Poorly-graded SAND (fine to medium) with some clay and silt; gray	SC		
290				

MALCOLM PIRNIE, INC.
17-17 Route 208 North Fair Lawn, NJ 07401

Boring ID:
P-E

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	May 14, 2003
JOB NUMBER:	4563001	END DATE:	May 22, 2003
DRILLING FIRM:	CT&E	LOCATION:	N of W John St, on E side of Cantiague Rock Rd, South of 70 Property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Wes Eicfeld	DATUM:	Land Surface
HELPER:	Karri Carley	HYDROGEOLOGIST:	Garrett Ferguson
Total depth of Profile:	332.85 ft	Total depth of Boring:	310 ft



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300		SC		Profiler refusal at 301.23 ft, no penetration rate or IK data from 301.23 to 310.05 ft due to drilling activities
				End mud rotary boring at 310 ft
310				
320				
				Profiler refusal at 332.85 ft
330				End of profile at 332.85 ft
340				

Boring ID:

MALCOLM PIRNIE, INC.

P-F

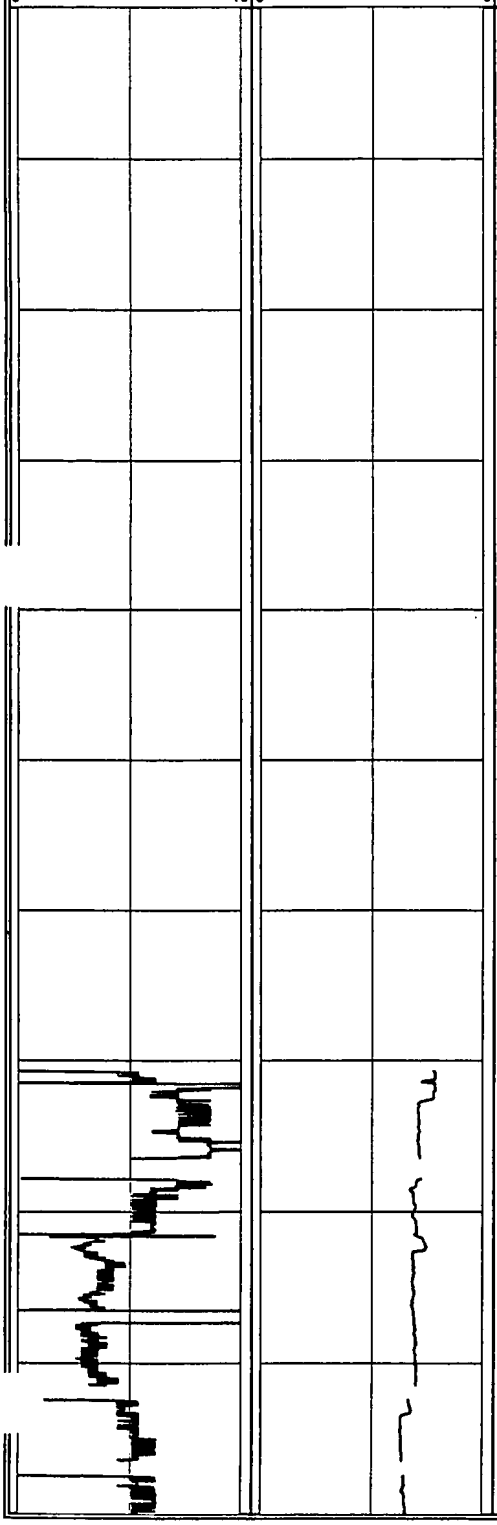
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	April 28, 2003
JOB NUMBER:	4563001	END DATE:	May 1, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, on
DRILLING METHOD:	Mud Rotary	WEATHER:	Nassau Co driving range
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton

Total depth of Profile: 170.87 ft

Total depth of Boring: 175 ft

GEOLOGIC INFORMATION



USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
Well-graded SAND and GRAVEL; light brown to tan	SW-GW		
Poorly-graded SAND (medium to coarse); brown	SP		Begin Profiling at 70.71 ft Gravel bed 71 - 72 ft bgs
Well-graded SAND with trace silt and gravel; light brown	SW		Gravel bed 77-78 ft bgs Gravel bed 81-82 ft bgs Profile data gaps due to poor KPRO equilibration
No geologic description recorded			

Boring ID:

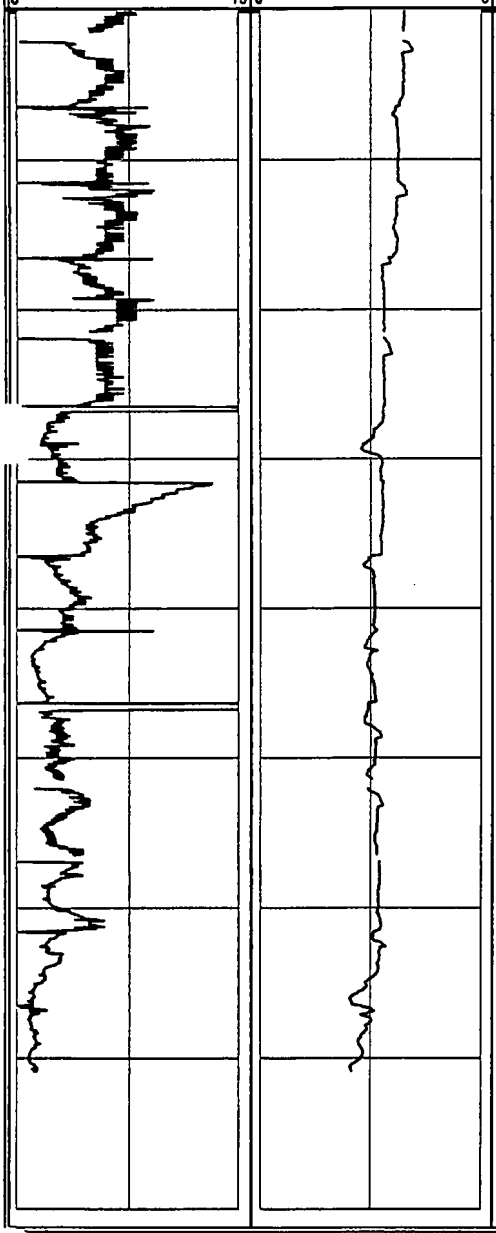
MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

P-F

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	April 28, 2003
JOB NUMBER:	4563001	END DATE:	May 1, 2003
DRILLING FIRM:	CT&E	LOCATION:	E of Cantiague Rock Rd, N of W John St, on
DRILLING METHOD:	Mud Rotary	WEATHER:	Nassau Co driving range
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Ken Heinz	HYDROGEOLOGIST:	John Hilton
Total depth of Profile:	170.87 ft	Total depth of Boring:	175 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100				Profile data gaps due to poor KPRO equilibration
110				
120				
130	GRAVEL			Description based on drilling characteristics
140	No geologic description recorded			
150				Profile data gaps due to poor KPRO equilibration
160				
170				End of profile at 170.87 ft. Profile rods broken, probe and some rods abandoned in hole.
180				End of mud rotary boring at 175 ft

Boring ID:

MALCOLM PIRNIE, INC.

P-H

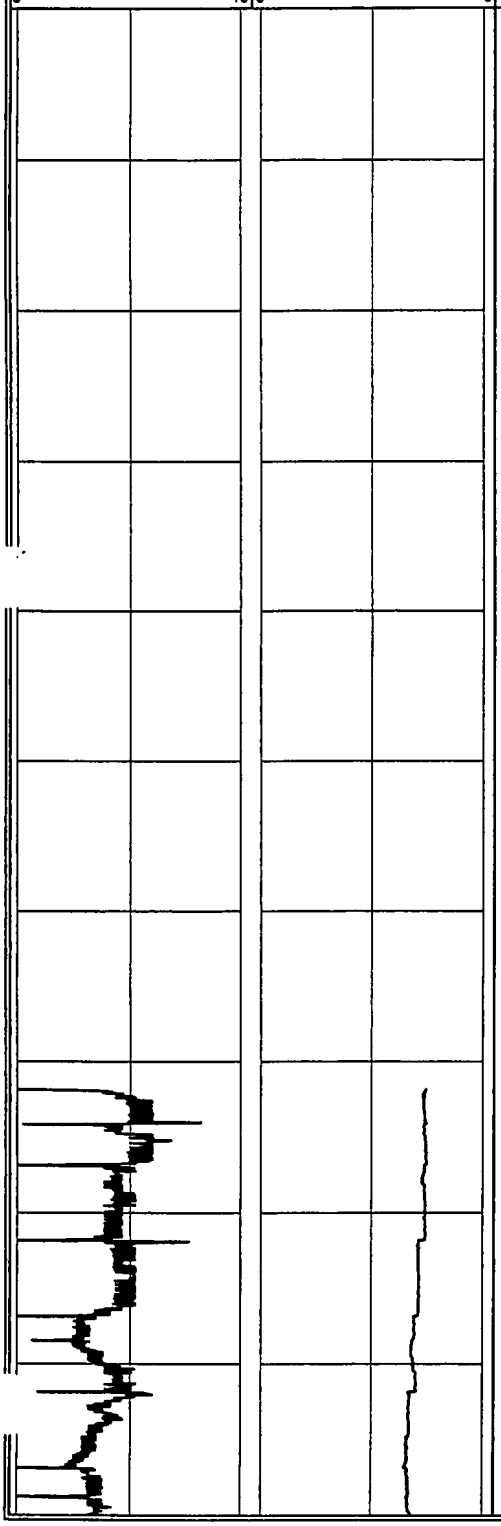
17 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 21, 2003
JOB NUMBER:	4563001	END DATE:	July 28, 2003
DRILLING FIRM:	CT&E	LOCATION:	E side of Cantiague Rock Rd, N of W John St, S of 70 property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Kenny Heinz	HYDROGEOLOGIST:	Kevin Wheeler, Jon Turk

Total depth of Profile: 404.15 ft

Total depth of boring: 370 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
0	Poorly-graded SAND (fine to medium) and GRAVEL (fine) with trace cobles; brown	SP-GP		
10				Hollow stem auger used from 0 to 14 ft. Begin mud rotary drilling at 14 ft.
	Poorly-graded SAND (fine to medium) with some gravel (fine)	SP		
20				
	Poorly-graded SAND (medium to coarse) with little gravel; light brown	SP		
30				Gravel fraction increases with depth
40				
	Poorly-graded SAND (fine to medium) and GRAVEL (fine); tan to light brown	SP-GP		
50				
	Poorly-graded SAND (fine to medium) with some to little gravel (fine); tan to light brown	SP		
60				
70	Poorly-graded SAND (medium to coarse) and GRAVEL (fine), trace clay; tan	SP-GP		Begin profiling at 71.86 ft
80	Poorly-graded SAND (fine to medium) with little clay; tan	SP		Thin brown clay lenses with lignite
90				

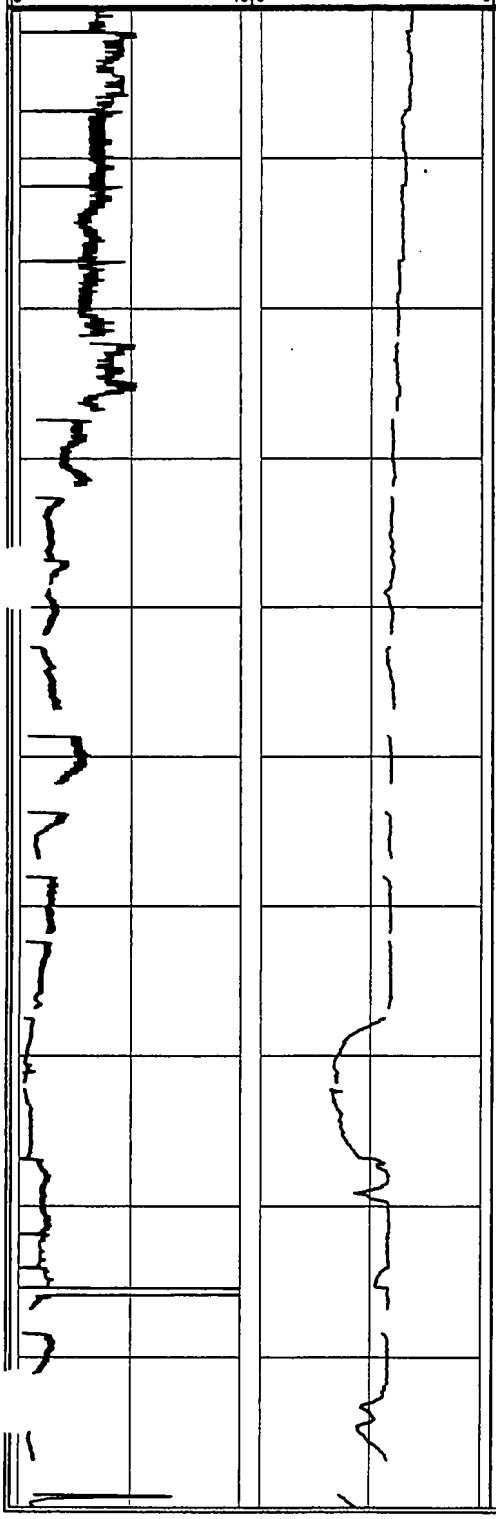
MALCOLM PIRNIE, INC.
7 Route 208 North Fair Lawn, NJ 07401

Boring ID: **P-H**

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 21, 2003
JOB NUMBER:	4563001	END DATE:	July 28, 2003
DRILLING FIRM:	CT&E	LOCATION:	E side of Cantiague Rock Rd, N of W John St, S of 70 property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Kenny Heinz	HYDROGEOLOGIST:	Kevin Wheeler, Jon Turk

Total depth of Profile: 404.15 ft — Total depth of boring: 370 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
100		SP		Thin brown clay lenses with lignite
110				
120	Well-graded SAND with some to little gravel (fine); tan	SW		Profile data gaps due to poor KPRO equilibration
130				
140				Profile data gaps due to poor KPRO equilibration
	Well-graded SAND (fine to coarse) and GRAVEL (fine); tan	SW-GP		
150				
	Poorly-graded SAND (medium to coarse) with some gravel (fine); light brown to tan	SP		
160				Profile data gaps due to poor KPRO equilibration
170	Poorly-graded SAND (fine to medium); light brown	SP		
180	Poorly-graded SAND (fine to medium); tan	SP		
190				Profile data gaps due to poor KPRO equilibration
	Well graded SAND (fine to coarse) with some gravel (fine); tan	SW		

Boring ID:

MALCOLM PIRNIE, INC.

P-H

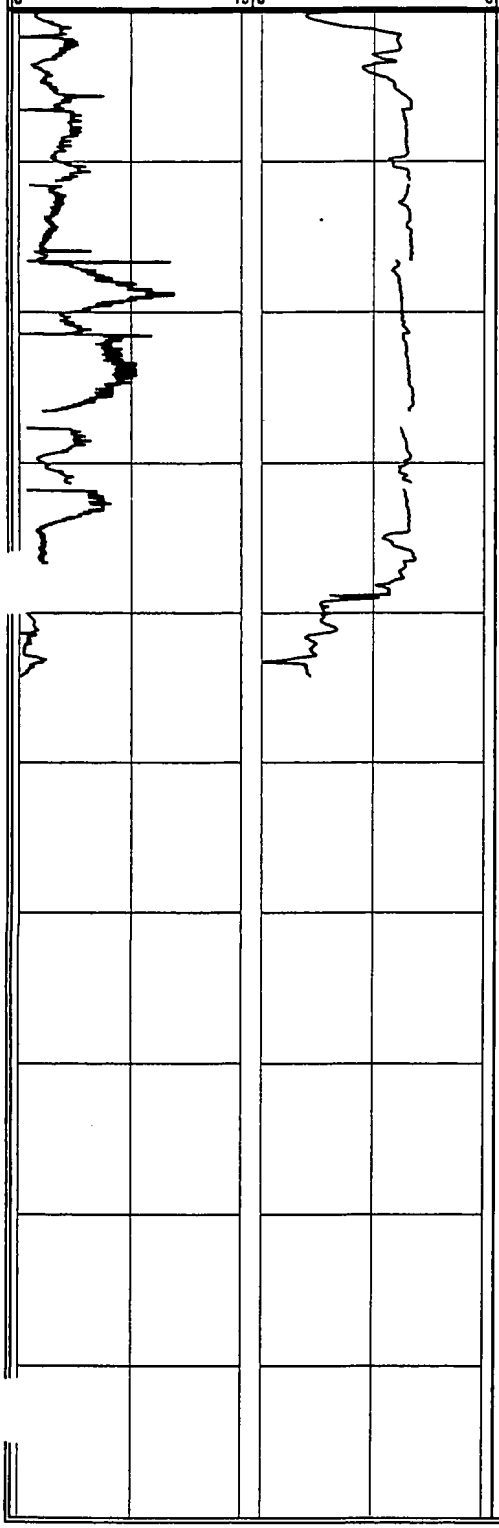
7 Route 208 North Fair Lawn, NJ 07401

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 21, 2003
JOB NUMBER:	4563001	END DATE:	July 28, 2003
DRILLING FIRM:	CT&E	LOCATION:	E side of Cantiague Rock Rd, N of W John St, S of 70 property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Kenny Heinz	HYDROGEOLOGIST:	Kevin Wheeler, Jon Turk

Total depth of Profile: 404.15 ft

Total depth of boring: 370 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
200	Poorly-graded SAND (medium to coarse) with trace gravel (fine); tan	SP		Poor Recovery of Cuttings
	Poorly-graded SAND (medium to coarse); tan	SP		
210	Poorly-graded SAND (fine to medium); tan	SP		Trace mica
220				Profile data gaps due to poor KPRO equilibration
	Poorly-graded SAND (fine) and GRAVEL (fine); light brown	SP-GP		
230	Poorly-graded SAND (coarse); light brown to tan	SP		Profile data gaps due to poor KPRO equilibration
	Poorly-graded SAND (fine to medium); tan	SP		
240	Silty SAND (fine) with little clay and trace gravel (fine); tan	SM		Hardpan present in cuttings Profiler refusal at 244.25 ft, no penetration rate or IK data from 244.25 to 324.31 ft due to drilling activities
250				Low recovery, trace mica
260				Trace hardpan in cuttings
	SILT and CLAY with trace sand (medium); tan	ML- CL		
270				Most cuttings pass through the strainer
	Silty CLAY with trace sand (fine to medium); tan	CL- ML		
280	Poorly-graded SAND (fine) and CLAY, some silt; tan	SC- CL		
	Well-graded SAND (fine to coarse) with trace gravel (fine), trace clay; tan	SW		
290				
	SILT and SAND; tan	ML-SM		

Boring ID:

MALCOLM PIRNIE, INC.

17-17 Route 208 North Fair Lawn, NJ 07401

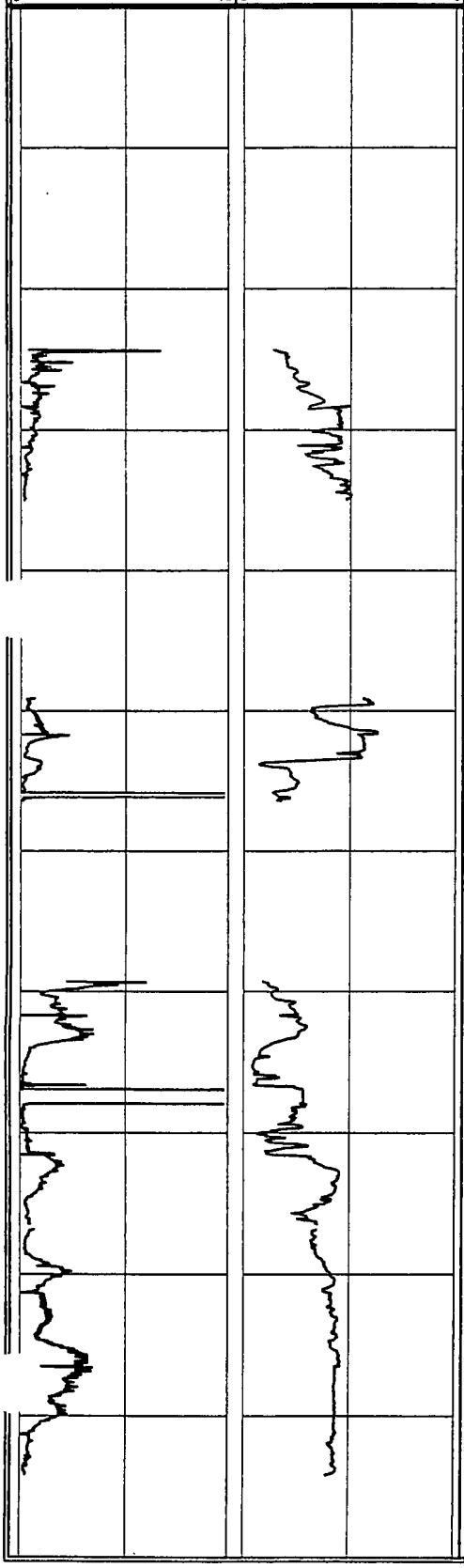
P-H

PROJECT NAME:	GTEOSI-Hicksville	START DATE:	July 21, 2003
NUMBER:	4563001	END DATE:	July 28, 2003
DRILLING FIRM:	CT&E	LOCATION:	E side of Cantiague Rock Rd, N of W John St, S of 70 property
DRILLING METHOD:	Mud Rotary		
DRILLER:	Bill Petley	DATUM:	Land Surface
HELPER:	Kenny Heinz	HYDROGEOLOGIST:	Kevin Wheeler, Jon Turk

Total depth of Profile: 404.15 ft

Total depth of boring: 370 ft

GEOLOGIC INFORMATION



Depth (ft bgs)	USCS Description	USCS Symbol	Stratigraphic Column	REMARKS
300	CLAY with little silt; black	CL		Very firm, silt fraction increases with depth
310				
	CLAY and SAND (fine to coarse) with some gravel (fine); dark gray	CL- SP		
320	Poorly-graded GRAVEL (fine) with trace sand, trace clay	GP		
	Poorly-graded GRAVEL (fine) and CLAY, some silt and sand; black to gray	GC-CL		Most cuttings pass through the strainer
330	CLAY with some sand (fine to medium); black to gray	CL		Profiler refusal at 334.97 ft, no penetration rate or IK data from 334.97 to 349.11 ft due to drilling activities
340	Poorly-graded SAND (medium to coarse) and GRAVEL with some silt and clay	SM-GM		
	Poorly-graded SAND (medium to coarse) with trace gravel; tan	SP		
350				
	Poorly-graded SAND (fine) and CLAY, some silt; tan	SC- CL		Profiler refusal at 356.41 ft, no penetration rate or IK data from 356.41 to 369.3 ft due to drilling activities
360				
	Poorly-graded SAND (coarse) with trace gravel (fine); tan	SP		End of boring at 370 ft
370				
380				
390				
				End of profile at 404.15 ft
400				

MALCOLM PIRNIE

Appendix D

Appendix D
Waterloo Profiler®

WATERLOO PROFILER®

The Waterloo Profiler® (Figure A-1) is capable of collecting groundwater samples in lower hydraulic conductivity settings; measuring hydraulic head (if the potentiometric surface is within the suction limit); measuring an index of hydraulic conductivity; and measuring physico-chemical properties such as pH, specific conductance, dissolved oxygen, oxidation/ reduction potential and temperature.

The current profiler tip is equipped with sixteen ports. The ports are arranged in four rows, resulting in an open interval of approximately 6 cm (2.4 inches) in length. This configuration increases the speed of sampling and minimizes the potential for the ports to become clogged while passing through geologic units with a high content of fine-grained sand, silt, and clay. To further minimize the potential for clogging, the screens are flush with the outer surface of the Profiler tip. This prevents the fine-grained material from entering the recessed ports and blocking groundwater flow into the unit. In addition, each port is fitted with a double screen: a coarse outer screen and a finer inner screen.

The stainless steel profiler tip is fitted with 1/4 inch outside diameter stainless steel tubing as shown on Figure A-1. The tube fits into the bottom of a gas drive pump and is sealed with "O"-rings. Water flows into the pump through the Viton reed valve, which prevents flow back out of the pump. Once the pump has filled with formation water, compressed nitrogen is pumped down the nitrogen line, forcing the water up the sample line to the surface. When the profiler is driven, the pump is filled with analyte free water and pressurized with nitrogen while water is pushed down the K-Pro line and out the ports on the profiler tip. Three sets of tubing are added in five-foot lengths using SwageLok couplings as the profiler is driven. The drive rod coupled to the profiler tip is 1.75-inch outside diameter direct push. This diameter is uniform along the length of the rod and profiler to minimize the potential for fluid movement along the rod to the tip.

The standard data acquisition configuration is shown in Figure A-2. This configuration includes the use of a peristaltic pump with in-line sample containers. These containers are standard glass Volatile Organic Analysis (VOA) sample bottles held in stainless steel bottle holders. The sample is collected directly into the bottles as it is pushed out of the downhole gas drive pump. The data is collected by a sophisticated data

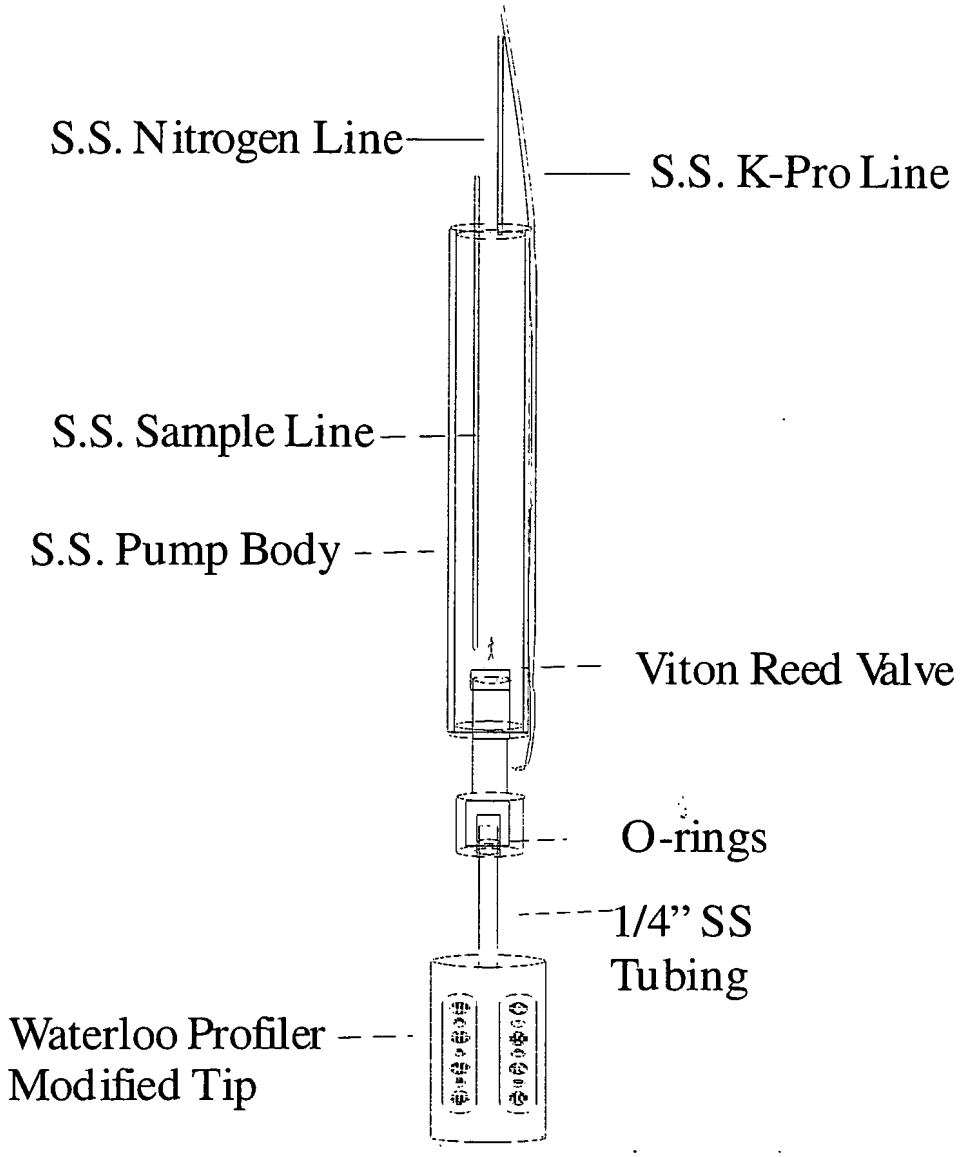
acquisition system. Various sensors are in the Profiler and are wired to a signal-conditioning device. The signal conditioning device outputs to a data acquisition board that in turn outputs to a Pentium notebook computer. Data are processed and viewed graphically in real time on the notebook computer screen and the data are written to files on disk.

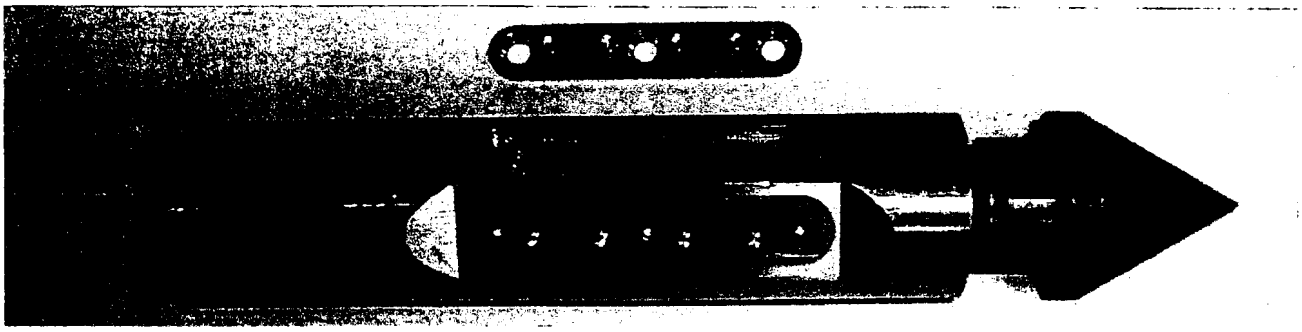
At approximately every ten feet and based on the real-time index of hydraulic conductivity record, driving ceases and a sample is collected after purging sufficient volume of water for the physico-chemical parameters to equilibrate. This volume is typically between 500 to 2000 milliliters.

The index of hydraulic conductivity is collected continuously in every hole during the sampling push. This data helps to better understand the hydrostratigraphy across the site. The index of hydraulic conductivity (I_k) is a tool for assessing hydrostratigraphy while advancing the profiler. The index of hydraulic conductivity is the flow rate of water pushed through the profiler into the formation using a compressed nitrogen pressure source, divided by the corrected head (measured pressure less head loss due to friction). This value is not a hydraulic conductivity value, but it provides an excellent indication of the areas of relatively high and low hydraulic conductivity. The flow and pressure are measured using an electronic pressure transducer and flow meter at the ground surface as water is pumped into the formation during driving. This data is logged on disk in the notebook computer and are plotted versus depth on the notebook screen.

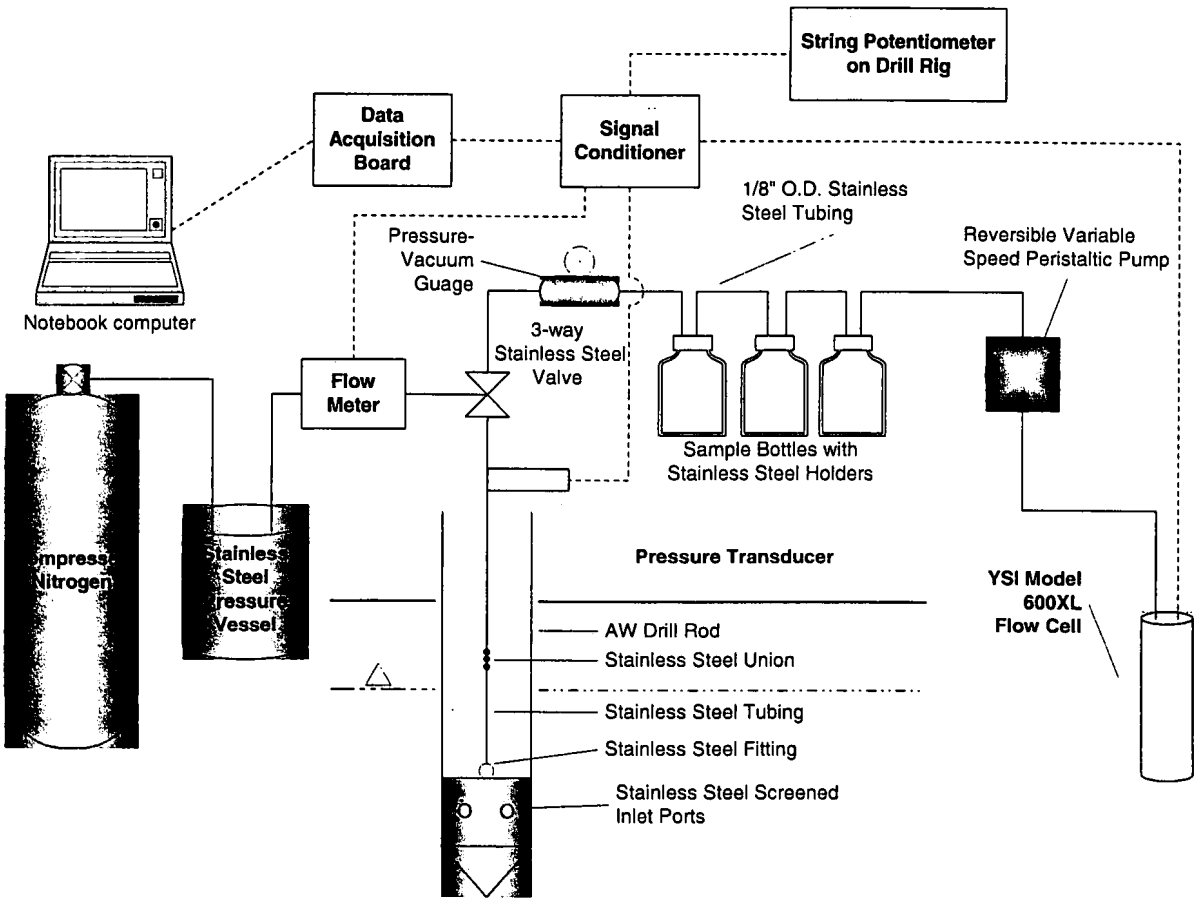
The rate of penetration shows stratigraphic changes that may affect contaminant transport or remedial design. Rate of penetration will be measured using a string potentiometer mounted on the direct push rig. This device electronically tracks the position of the hammer and the depth of the profiler tip. The depth is divided by elapsed time to provide a rate of penetration log, displayed in real time on the laptop computer.
Using flow cell parameters rather than a predetermined purge volume assures that formation water is sampled. In addition, the distribution of the flow cell parameters provides insight into the geochemical environment. A series of water quality probes in a YSI Model 600XL, equipped with a custom-built 50 mL volume flow cell, is placed in-line on the discharge side of the pump. This custom flow cell minimizes the volume of water that must be pumped to achieve equilibration of parameters. The YSI and flow cell

are integrated directly into the data acquisition system. These data are displayed on the notebook computer screen in the back of box truck. The YSI probes monitor pH, specific conductance, temperature, dissolved oxygen and oxidation/reduction potential. This data is used in real-time to determine when sufficient purging has occurred prior to sampling.





MALCOLM PIRNIE MALCOLM PIRNIE, INC FAIR LAWN, NJ	**Waterloo Profiler®**	**GTEOSI** **Former Sylvania Electric Products Facility** **Hicksville, NY**	**Figure A-1**



MALCOLM PIRNIE

MALCOLM PIRNIE, INC
FAIR LAWN, NJ

Waterloo Profiler®
Data Acquisition Configuration

GTEOSI
Former Sylvania Electric Products Facility
Hicksville, NY

Figure A-2

Appendix E E

Appendix E
Data Usability Summary Reports

REPORT

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Attachment A	Validated Data

Executive Summary

This report addresses data quality for groundwater samples collected at the former Sylvania Electric Products Incorporated facility in Hicksville, New York. Sample collection activities were conducted by URS Corporation (URS) from October 13, 2002 through December 11, 2002.

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for Volatile Organic Compound (VOC) analyses using United States Environmental Protection Agency (USEPA) guidance methods. The analytical data generated for this investigation were evaluated by URS using the quality assurance/quality control (QA/QC) criteria established in the methods as guidance. Non-conformances from the QA/QC criteria were qualified based on guidance provided in the following references:

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* (SW846) USEPA, Final Update IIIA, April 1998;
- *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review*, EPA 540-R-99-008, October 1999;
- *Analytical Services Protocol (ASP), New York State Department of Environmental Conservation* (NYSDEC). Guidance documents including Exhibits A, B, C, D, E, F, G, H, and I. (June 2000), and
- *United States Environmental Protection Agency Region II Contract Laboratory Program (CLP) Organics Data Review*, SOP No. HW-6, Revision #11 (USEPA 1996a)

Professional judgement was used to qualify results as estimated (J or UJ) in some cases where the overall quality of data was suspected due to commonly accepted or standardized practices employed by the laboratory. Since the guidance documents used as a source of reference for the validation somewhat differ in the type of qualification applied to data, URS applied qualifiers generally as a conservative approach. Method non-conformances included exceedances of the relative percent standard deviation for the initial calibrations, the percent differences of the continuing calibrations, the percent recoveries of the system monitoring compounds, the internal standard values, and matrix spike/matrix spike duplicate percent recoveries. Affected data, however, were not rejected if other supporting quality control data indicated acceptable quality control results.

Additionally, most laboratory method blanks contained low level contamination from common laboratory contaminants such as acetone and methylene chloride. The presence of these contaminants affected many project samples and qualification of associated results was performed to show the relationship between the laboratory contamination and the uncertainty of the actual project sample result. Similarly, the project trip blanks and field blanks contained low-levels of some of the same contaminants as were seen in the laboratory method blanks. Again, URS qualified the affected data to show the potential impact on the final sample results.

Other quality issues requiring data validation qualification included removal of results from the database that exceeded the laboratory calibration range (i.e., qualified with a "E" by the laboratory), and qualification of all tentatively identified compounds. Results from these data sets are qualitative only, and not considered usable for quantitative assessments, in particular risk screening evaluations.

None of the exceedances of method non-conformances were significant enough to jeopardize the usability of the data. Most analytical results summarized in Appendix A (with the exception of TIC results) are usable based on the findings listed in this Data Usability Summary Report (DUSR).

Overall, 100 percent of the VOC data retained in the database as final data, were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated (J and UJ) due to data validation QA/QC exceedances should be considered conditionally usable. Therefore, the completeness objective of 90 percent, as stated in the quality assurance project plan (QAPP), was met.

1. Introduction

1.1. Sample Identification

This report addresses the results of a data quality evaluation for groundwater samples collected at the former Sylvania Electric Products Incorporated facility in Hicksville, New York (the Site). Sample collection activities were conducted by URS Corporation (URS) from October 13, 2002 through December 11, 2002.

The SDG (laboratory package number), field identification, and laboratory identification of the samples that were submitted for data validation are presented in Table 1-1.

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Client ID***	***Laboratory ID***	***Analysis Requested***
F2J160194	DUP *Field Duplicate of MW-8*	F2J160194007	VOCs
	EB-101302 *Equipment Blank*	F2J160194014	VOCs
	MW-1	F2J160194010	VOCs
	MW-10	F2J160194005	VOCs
	MW-11	F2J160194011	VOCs
	MW-12	F2J160194006	VOCs
	MW-2	F2J160194008	VOCs
	MW-3	F2J160194001	VOCs
	MW-4	F2J160194002	VOCs
	MW-5	F2J160194012	VOCs
	MW-6	F2J160194009	VOCs
	MW-7	F2J160194013	VOCs
	MW-8	F2J160194003	VOCs
	MW-9	F2J160194004	VOCs
	TRIP BLANK *10-13-02*	F2J160194015	VOCs
F2J180121	P-1 (78.7)	F2J180121006	VOCs
	P-1 (98.7)	F2J180121008	VOCs
	P-2 (78.5)	F2J180121001	VOCs
	P-2 (98.8)	F2J180121009	VOCs
	P-2-DUP-01 *Field Duplicate of P-2 (78.5)*	F2J180121003	VOCs
	TRIP BLANK *10-16-02*	F2J180121011	VOCs

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Client ID***	***Laboratory ID***	***Analysis Requested***
F2J220241	P-1 (299.14)	F2J220241033	VOCs
	TRIP BLANK *10-19-02*	F2J220241001	VOCs
F2J250192	P-1(301.16)	F2J250192012	VOCs
	TRIP BLANK *10-23-02*	F2J250192015	VOCs
	P-4 (106.8)	F2J300166005	VOCs
F2J300166	P-4 (77.5)	F2J300166003	VOCs
	P-4 (97.2)	F2J300166004	VOCs
	P-5 (107.5)	F2J300166006	VOCs
	P-5 (77.5)	F2J300166001	VOCs
	P-5 (97.5)	F2J300166002	VOCs
F2K010208	P-4 (197.65)	F2K010208036	VOCs
	P-5 (207.4)	F2K010208035	VOCs
	TRIP BLANK *10-30-02*	F2K010208011	VOCs
F2K050144	P-10 (198.15)	F2K050144003	VOCs
	P-10 (97.9)	F2K050144002	VOCs
	P-11 (107.4)	F2K050144001	VOCs
F2K060153	P-10 (107.95)	F2K060153007	VOCs
	P-10 (77.6)	F2K060153005	VOCs
	P-11 (167.4)	F2K060153008	VOCs
	P-11 (87)	F2K060153003	VOCs
	P-5 (292.4)	F2K060153001	VOCs
	P-5 (299.02)	F2K060153002	VOCs
	TRIP BLANK *11-03-02*	F2K060153009	VOCs
F2K080105	P-10 (264.5)	F2K080105003	VOCs
	P-11 (247.4)	F2K080105001	VOCs
	P-11 (281.13)	F2K080105004	VOCs
	TRIP BLANK *11-05-02*	F2K080105002	VOCs
F2K150247	P-12 (108)	F2K150247012	VOCs
	P-12 (78.85)	F2K150247011	VOCs
	P-12 (87.89)	F2K150247009	VOCs

Table 1-1: Sample Cross-Reference List

Package Identification	Client ID	Laboratory ID	Analysis Requested
F2K150247	P-12 (97.92)	F2K150247005	VOCs
	P-6 (102.8)	F2K150247002	VOCs
	P-6 (122.8)	F2K150247013	VOCs
	P-6 (82.8)	F2K150247001	VOCs
	P-9 (102.61)	F2K150247015	VOCs
	P-9 (162.61)	F2K150247010	VOCs
	P-9 (82.61)	F2K150247008	VOCs
	TRIP BLANK *11-13-02*	F2K150247014	VOCs
F2K180219	P-9 (232.61)	F2K180219001	VOCs
	TRIP BLANK *11-15-02*	F2K180219003	VOCs
F2K190242	P-3 (107.40)	F2K190242004REA	VOCs*
	P-3 (87.40)	F2K190242001REA	VOCs*
	P-6 (252.4)	F2K190242007REA	VOCs*
	P-6 (291.5)	F2K190242008REA	VOCs*
	TRIP BLANK *11-18-02*	F2K190242009REA	VOCs*
F2K220291	P-12 (207.43)	F2K220291006	VOCs
	P-12 (287.42)	F2K220291009	VOCs
	P-12 (297.41)	F2K220291007	VOCs
	P-3 (167.40)	F2K220291005	VOCs
	P-3 (227.40)	F2K220291004	VOCs
	P-7 (102.4) -UNFILTERED	F2K220291010	VOCs
	P-7 (82.4)	F2K220291002	VOCs
	TRIP BLANK *11-19-02*	F2K220291008	VOCs
F2K230165	P-2 (258.14)	F2K230165002	VOCs
	P-3 (304.40)	F2K230165003	VOCs
	P-7 (242.4)	F2K230165001	VOCs
	TRIP BLANK *11-21-02*	F2K230165004	VOCs
F2L060132	P-7 (301)	F2L060132003	VOCs
	P-8 (77.55)	F2L060132001	VOCs
	P-8 (97.55)	F2L060132002	VOCs

Table 1-1: Sample Cross-Reference List

Package Identification	Client ID	Laboratory ID	Analysis Requested
F2L060132	TRIP BLANK *12-04-02*	F2L060132004	VOCs
F2L070156	P-13 (76.6)	F2L070156006	VOCs
	P-13 (86.6)	F2L070156007	VOCs
	P-13 (96.6)	F2L070156008	VOCs
	P-14 (77.82)	F2L070156009	VOCs
	P-14 (85.82)	F2L070156010	VOCs
	P-14 (95.17)	F2L070156011	VOCs
	P-2 (302.05)	F2L070156003	VOCs
	P-8 (167.55)	F2L070156004	VOCs
	P-8 (247.55)	F2L070156005	VOCs
	TRIP BLANK *12-06-02*	F2L070156013	VOCs
F2L120248	P-13 (237.30)	F2L120248002	VOCs
	P-16 (181.00)	F2L120248003	VOCs
	P-16 (231.00)	F2L120248004	VOCs
	P-16 (251.00)	F2L120248005	VOCs
	TRIP Blank *12-10-02*	F2L120248001	VOCs
F2L120270	P-13 (116.6)	F2L120270006	VOCs
	P-13 (176.6)	F2L120270007	VOCs
	P-14 (115.14)	F2L120270003	VOCs
	P-14 (204.7)	F2L120270009	VOCs
	P-16 (101)	F2L120270024	VOCs
	P-16 (121)	F2L120270025	VOCs
	P-16 (81)	F2L120270021	VOCs
	P-16 (91)	F2L120270023	VOCs
	P-8 (297.55)	F2L120270004	VOCs
	P-8 (302.55)	F2L120270005	VOCs
	TRIP BLANK *12-07-02*	F2L120270008	VOCs

Table Notes:

*The laboratory inadvertently performed SW846 Method 1311 (i.e., Toxicity Characteristic Leaching Procedure) on these samples. The actual results are reported using laboratory reporting limits that are above required practical quantitation limits specified in the QAPP. Re-sampling and re-analysis for these locations was not performed.

1.2. General Considerations

Validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, for the samples and analyses addressed herein, this report summarizes the findings of the review and outlines any deviations from the applicable QC criteria outlined in the following documents:

- GTE Operations Support Incorporated. (GTEOSI). 2002. *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002.

- O'Brien & Gere Engineers, Inc. 2000. *Supplement to the Approved Work Plan (QAPP – Appendix C), Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York.* Syracuse, New York.

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* (SW846) USEPA, Final Update IIIA, April 1998.

- *Analytical Services Protocol (ASP), New York State Department of Environmental Conservation* (NYSDEC). Guidance documents including Exhibits A, B, C, D, E, F, G, H, and I. (June 2000)

- *United States Environmental Protection Agency Region II Contract Laboratory Program (CLP) Organics Data Review*, SOP No. HW-6, Revision #11 (USEPA 1996a); and

- *USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review*, EPA 540-R-99-008, October 1999.

1.3. Analytical Methods

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for volatile organic compound (VOC) analyses. The laboratory used the following USEPA guidance methods for the analyses:

- SW846 Method 5030B Purge/Trap Analysis
- SW846 Method 8260B Gas Chromatography/Mass Spectrometry plus Tentatively Identified Compounds (TICs)

The laboratory assigned a sample delivery group (SDG) number to a group of samples during the sample log-in process. The SDG number is the means by which the laboratory tracks samples and controls QC analyses. A total of 18 SDGs contained one or more groundwater samples submitted for analysis. The SDG, field identification and laboratory identification for each sample are summarized in Table 1-1.

The following sections of this document address distinct aspects of the validation process. Section 2 lists the data QA/QC protocols used to validate the sample data. A summary of the findings associated with the validation and the specific QA/QC deviations and qualifications performed on the sample data are discussed in Section 3. Data completeness and usability are discussed in Section 4. Section 5 presents the Data Usability Summary Report (DUSR) Summary Information. A copy of the validated electronic deliverable data (EDD) is presented in Attachment A.

2. Data Validation Protocols

2.1. Sample Analysis Parameters

The validation of analyses for this project used guidance presented in the QAPP (GTEOSI, 2002), the analytical methodology, and the data validation guidelines referenced in Section 1.

URS performed a data review of all analytical results to assess data quality. A data review includes an assessment of sample handling protocols, supporting laboratory quality control (QC) parameters, and field QC. The following is a list of specific analytical information evaluated during the validation:

- Data package completeness review – per the NYSDEC ASP Category B or USEPA CLP deliverables requirements;
- Analytical methods performed and test method references;
- Sample condition - review of log-in records for cooler temperature, presence of headspace, chemical preservation, etc.;
- Holding times (comparison of collection, preparation, and analysis dates);
- Analytical results (units, values, significant figures, reporting limits, analyst, percent moisture);
- Sample traceability and comparison to raw data;
- Instrument tuning;
- Initial calibration – comparison to laboratory criteria;
- Continuing calibration – comparison to laboratory criteria;
- Method blank results and laboratory contamination;
- Laboratory control sample (LCS) results and comparison to laboratory control limits;
- Matrix spike/matrix spike duplicate (MS/MSD) results and comparison to laboratory control limits;
- Field replicate/duplicate results and comparison to data review criteria;
- Surrogate recoveries (where applicable) and comparison to laboratory control limits;
- Internal Standards (where applicable) and comparison to lab criteria;
- Tentatively Identified Compounds (TICs);
- Field QC sample (e.g., trip blanks, equipment blanks, etc.);
- Reporting limits and Dilutions; and
- Electronic Data Deliverables (EDDs) – comparison to the hardcopy analytical report (a 20% check of the data to confirm that the results in the hardcopy report matched the results in the electronic file).

The analytical reports were reviewed for completeness and the accompanying QC data were reviewed for acceptable performance. In case documentation was incomplete, the laboratory was required to provide the missing information. When QC results indicated poor performance, URS applied data qualifiers to the results to inform the data user of the possible performance problem. These qualifiers are in addition to or a revision of the qualifiers provided by the laboratory. A summary of the data qualifiers used for this review is presented in Section 2.2.

2.2. Data Qualifiers

The following qualifiers have been used by the laboratory:

"U" Non-detect result at the established laboratory reporting limit (adjusted for percent moisture, if applicable).

"B" Associated with a result if the compound was identified in the corresponding method blank.

"J" Indicates an estimated value or a value below the established reporting limit but above the method detection limit.

"E" This flag identifies compounds whose concentrations exceed the calibration range of the instrument for the specific analysis; data qualified with an "E" are qualitative only and not useable for quantitative purposes. All results qualified with an "E" were required to be re-analyzed using an applicable dilution and re-reported.

Laboratory qualifiers defined above, are retained in the final database unless revised during the data validation process to one of the following qualifiers:

"U" The chemical was not detected. Value shown is the reporting limit.

"J" Estimated concentration because the result was below the sample reporting limit or quality control criteria were not met.

"UJ" The chemical was not detected at or above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of reporting necessary to accurately and precisely measure the chemical in the sample.

2.3. Data Usability Summary Report Questions

The DUSR determines whether or not the data meets site-specific criteria for data quality and use. It was developed by reviewing and evaluating the analytical data packages. During the course of this review the following questions were addressed (where applicable):

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

2. Have all holding times been met?

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

4. Have all of the data been generated using established and agreed upon analytical protocols?

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

6. Have the correct data qualifiers been used?

The answers to the questions presented by the DUSR are presented in the following sections of the report and in the DUSR Summary Information Section, Section 5.

3. Data Quality Evaluation

3.1. Summary

This section summarizes whether the QA/QC parameters specified in Section 2.1 met validation criteria. A summary of the individual components of the review are described in the following sections.

3.2. Review of Validation Criteria

3.2.1. Completeness Review

The laboratory provided the analytical report in the New York State Department of Environmental Conservation (NYSDEC) format. Nearly all necessary documents were included in the report package including a case narrative summarizing the QC issues associated with the project analyses. In just a few isolated cases, the laboratory was asked to provide missing documentation, which included a run-log and an initial calibration run. The laboratory provided all information requested by URS.

3.2.2. Test Methods

The laboratory performed the analyses for most analyses using the analytical test methods listed in Section 1.3. These included SW846 Method 5030B (aqueous sample purge/trap analysis) followed by Method 8260B (gas chromatography/mass spectrometry). Most samples were analyzed using a 25-mL purge volume which allows lower reporting limits for each compound.

For five project samples, however, the laboratory inadvertently performed SW846 Method 1311 (i.e., Toxicity Characteristic Leaching Procedure). The analysis was performed using a dilution (20x) which caused reporting limits to be raised above the practical quantitation limits specified in the QAPP (GTEOSI, 2002). Re-analysis was not performed since sample holding times had expired before the error was noticed. Re-sampling and re-analysis for these locations was not performed due to the identification of some target compounds within the matrix at levels above the PQLs. No qualification of the results was performed since batch QC analyses were acceptable. Qualification is also not required by the guidance methods for a result associated with a diluted analysis. The affected project samples include:

Table 3-1: Samples Analyzed by an Inappropriate Test Method

Package Identification	*Client ID*	*Laboratory ID*
F2K190242	P-3(107.40)	F2K190242004REA
	P-3(87.40)	F2K190242001REA
F2K190242	P-6(252.4)	F2K190242007REA
	P-6(291.5)	F2K190242008REA
	TRIP BLANK *11-18-02*	F2K190242009REA

REA – Indicates a laboratory reanalysis or an analysis performed with a diluted sample.

3.2.3. Sample Receipt

The laboratory received 103 aqueous samples for VOC analysis between October 13, 2002 and December 11, 2002. The sample temperatures at the time of receipt were within the recommended temperature range

of 4°C±2°C for all SDGs. Field and laboratory personnel completed the Chain-of-Custody (COC) documents correctly recording the signature, date, and time of custody transfer.

The laboratory recorded the condition of the samples at the time of receipt on a "Conditions Upon Receipt Form." This Form identifies whether the containers were received undamaged, within the proper temperature range, at the proper pH, in a container that is sealed with a custody seal on the exterior, and with a completed COC enclosed to identify all samples submitted to the laboratory. For most SDGs, this form was completed properly. For one SDG, F2K150247, the laboratory did not record sufficient information on the form to assess the proper sample condition upon receipt. (The laboratory only recorded the sample temperature and the presence of a custody seal on the container). No qualification of data was required for this error. However, the laboratory was informed that all log-in forms must be completed appropriately for all future investigations. The samples associated with this SDG are as follows: P-12 (108), P-12 (78.85), P-12 (78.85), P-12 (87.89), P-12 (87.89), P-12 (97.92), P-6 (102.8), P-6 (102.8), P-6 (122.8), P-6 (82.8), P-9 (102.61), P-9 (102.61), P-9 (162.61), P-9 (82.61), and TRIP BLANK (11-13-02). Additionally, the laboratory identified the presence of headspace in the VOC sample containers for one project sample. Headspace in a VOC container can negatively bias the VOC results due to the loss of VIC compounds within that headspace. The VIC results for P-12 (207.43) were qualified as estimated ("J" or "UJ") to indicate the potential bias.

Table 3-2. *Evaluation of Sample Headspace*

Package Identification	*Client ID*	*Laboratory ID*	*Action*
F2K220291	P-12 (207.43)	F2K220291006	UJ – all non-detect results J – all positive results above the laboratory reporting limit.

3.2.4. Holding Times

The laboratory performed most VOC analyses within EPA-recommended holding time of 14-days for acid preserved samples. The Trip Blank collected on November 5, 2002 contained acetone at a concentration that exceeded the laboratory's calibration range. The laboratory did not identify the exceedance until the hold time for the VOC analysis had passed. The VOC results associated with the reanalysis (F2K080105002REA) were qualified as estimated ("J" or "UJ") to indicate the potential bias. With the exception of the acetone result, the initial results for the November 5th Trip Blank were retained in the final data set.

Table 3-3. *Evaluation of Holding Times*

Package Identification	*Client ID*	*Laboratory ID*	*Action*
F2K080105	Trip Blank	F2K080105002REA	UJ – all non-detect results J – all positive results above the laboratory reporting limit

REA – Laboratory reanalysis of the sample.

3.2.5. Analytical Results

For each sample tested, the laboratory provided the analytical test information using the Contract Laboratory Program (CLP) format. This format requires the use of stylized forms to present critical information pertaining to the analyses performed. For all analytical results, the laboratory provided a Form I with the reported analytical results for the requested analyses. The Form I format shows the following information for organic analyses: the laboratory name; laboratory code; matrix; sample weight

per volume; the gas chromatography (GC) column identification; the sample identification; the laboratory file identification; the date the sample was received; the date the sample was analyzed; the dilution factor; the chemical abstract service (CAS) number; the units of measure; and the laboratory qualifier (if any). Additional CLP forms were provided (e.g., II, III, etc.) to report applicable QC information for the analyses performed. The laboratory provided all the appropriate forms for the VOC method.

3.2.6. Traceability to Raw Data

Traceability of the VOC analyses is established by Form V (Instrument Performance Check). These forms list the project samples analyzed per laboratory batch processed and the corresponding QC samples performed with the project samples. All project samples for all SDGs were included on the applicable forms.

3.2.7. Instrument Tuning

The GC/MS instrument performance [i.e., "tuning data," or a check of mass spectral ion intensities using bromofluorobenzene (BFB)] met method criteria. The instrument performance was checked prior to calibration and once every 12-hour shift for all analytical QC batches.

3.2.8. Initial Calibration

The initial calibrations (ICALs) met data validation criteria (i.e., relative response factors (RRFs) were greater than method criteria for the System Performance Check Compounds (SPCCs), and the relative percent standard deviations (%RSDs) were less than 15% for Calibration Check Compounds (CCCs)). Additionally, for all target compounds, method requirements recommend that RRFs be greater than 0.05 and that compounds be quantitated using the average relative response factor (avgRRF) only if the %RSD is less than 15%. The guidance method recommends that all compounds with a %RSD greater than 15% be quantitated with a calibration curve rather than the avgRRF. The laboratory does not prepare a calibration curve for compounds with a %RSD greater than 15% as recommended within the guidance method. Rather, the laboratory uses an alternate approach to the ICAL evaluation by evaluating the avgRRF (for all compounds calibrated). If their avgRRF is less than 15% (across all compounds) then the laboratory considers this to mean that they have met method criteria for the ICAL. Since this evaluation approach is not widely used, a conservative approach was used for the validation process and all results were qualified as estimated ("J" or "UJ") that were associated with the laboratory ICALs that had a %RSD greater than 15%. Table 3-4 shows the samples and results qualified as estimated.

Table 3-4. *Evaluation of Initial Calibration Results*

Package Identification	*Sample ID*	*Compounds**	*Action*
F2J160194	DUP DUP (rea) EB-101302 MW-1 MW-10 MW-10 (rea) MW-11 MW-12 MW-2 MW-3 MW-3 (rea) MW-4 MW-4 (rea) MW-5 MW-6 MW-7 MW-7 (rea) MW-8 MW-9 MW-9 (rea) TRIP BLANK 10-13-02	%RSD: 2-butanone, acetone, methylene chloride, bromomethane	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2J180121	P-1 (78.7) P-1 (98.7) P-2 (78.5) P-2 (78.5) (rea) P-2 (98.8) P-2-DUP-01 P-2-DUP-01 (rea) TRIP BLANK 10-16-02	%RSD: acetone, methylene chloride, bromomethane, 4-methyl-2-pentanone	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2J220241	P-1 (299.14) TRIP BLANK 10-19-02	%RSD: acetone, methylene chloride, bromomethane RRF: 2-butanone, acetone, bromomethane, methylene chloride	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit RRF < 0.05 UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2J250192	P-1(301.16) TRIP BLANK 10-23-02	%RSD: methylene chloride, bromomethane RRF: 2-butanone, acetone	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit RRF < 0.05 UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2J300166	P-4 (106.8) P-4 (77.5) P-4 (97.2) P-5 (107.5) P-5 (107.5) (rea) P-5 (77.5) P-5 (77.5) (rea) P-5 (97.5) P-5 (97.5) (rea)	%RSD: 2-butanone, acetone, methylene chloride	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K010208	P-4 (197.65) P-5 (207.4) TRIP BLANK 10-30-02	%RSD: 2-butanone, acetone, methylene chloride	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit

Table 3-4. *Evaluation of Initial Calibration Results*

Package Identification	*Sample ID*	*Compounds**	*Action*
F2K050144	P-10 (198.15) P-10 (198.15) (rea) P-10 (97.9) P-10 (97.9) (rea) P-11-107.4	%RSD: 2-butanone, acetone, methylene chloride, bromomethane RRF: 2-butanone, bromomethane, methylene chloride	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit RRF < 0.05 UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K060153	P-10 (107.95) P-10 (107.95) (rea) P-10 (77.6) P-10 (77.6) (rea) P-11 (167.4) P-11 (87) P-5 (292.4) P-5 (299.02) P-5 (299.02) (rea) TRIP BLANK 11/03/02 TRIP BLANK 11/03/02 (rea)	%RSD: 2-butanone, acetone, methylene chloride, bromomethane	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K080105	P-10 (264.5) P-11 (247.4) P-11 (281.13) TRIP BLANK 11-05-02 TRIP BLANK 11-05-02 (rea)	%RSD: 2-butanone, acetone, methylene chloride, bromomethane	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K150247	P-12 (108) P-12 (78.85) P-12 (78.85) (rea) P-12 (87.89) P-12 (87.89) (rea) P-12 (97.92) P-6 (102.8) P-6 (102.8) (rea) P-6 (122.8) P-6 (82.8) P-9 (102.61) P-9 (102.61) (rea) P-9 (162.61) P-9 (82.61) TRIP BLANK 11-13-02	%RSD: 2-hexanone RRF: 2-butanone, acetone	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit RRF < 0.05 UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K180219	P-9 (232.61) TRIP BLANK 11-15-02	%RSD: bromomethane, chloroethane, methylene chloride, tetrachloroethene	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K190242	P-3 (107.40) P-3 (87.40) P-6 (252.4) P-6 (291.5) TRIP BLANK 11-18-02	%RSD: acetone, bromomethane, methylene chloride, chloromethane	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K220291	P-12 (207.43) P-12 (287.42) P-12 (287.42) (rea) P-12 (297.41) P-3 (167.40) P-3 (227.40) P-7 (102.4) –Unfiltered P-7 (82.4) TRIP BLANK 11-19-02	%RSD: 2-butanone, acetone, methylene chloride, bromomethane	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit

Table 3-4. *Evaluation of Initial Calibration Results*

Package Identification	*Sample ID*	*Compounds**	*Action*
F2K230165	P-2 (258.14) P-3 (304.40) P-7 (242.4) TRIP BLANK 11-21-02	%RSD: 2-butanone, acetone, methylene chloride, bromomethane	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2L060132	P-7 (301) P-8 (77.55) P-8 (97.55) TRIP BLANK 12-04-02	%RSD: 2-butanone, acetone	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2L070156	P-13 (76.6) P-13 (86.6) P-13 (96.6) P-14 (77.82) P-14 (77.82) (rea) P-14 (85.82) P-14 (85.82) (rea) P-14 (95.17) P-2 (302.05) P-8 (167.55) P-8 (247.55) TRIP BLANK 12-6-02	%RSD: 2-butanone, acetone, methylene chloride, bromomethane	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2L120248	P-13 (237.30) P-13 (237.30) (rea) P-16 (181.00) P-16 (231.00) P-16 (251.00) Trip Blank 12-10-02	%RSD: 2-butanone, acetone, methylene chloride, bromomethane	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2L120270	P-13 (116.6) P-13 (116.6) (rea) P-13 (176.6) P-14 (115.14) P-14 (204.7) P-16 (101) P-16 (101) (rea) P-16 (121) P-16 (81) P-16 (81) (rea) P-16 (91) P-16 (91) (rea) P-8 (297.55) P-8 (302.55) TRIP BLANK 12-07-02	%RSD: 2-butanone, acetone, methylene chloride, bromomethane RRF: 2-butanone, acetone	%RSD >15% UJ – all non-detect results J – all positive results above the laboratory reporting limit RRF < 0.05 UJ – all non-detect results J – all positive results above the laboratory reporting limit

Notes:
*Not all compounds listed are affected by exceedances of %RSD and avgRRF. The final EDD shows the final qualifiers for the project.
rea – Indicates a laboratory reanalysis.

3.2.9. Continuing Calibration

The continuing calibration (CCAL) verification analyses were performed with a mid-level standard immediately following the tuning check at the beginning of each 12-hour analytical sequence. The CCAL verification analyses met data validation criteria (i.e., RRFs were <0.05 for the SPCCs, and the percent differences (%Ds) from the avgRRF were < 20% for the CCCs) for all analytical QC batches. For the target compounds, the %Ds were greater than 20% for multiple compounds. Although method criteria were met, as a conservative approach the results associated with a CCAL that exceeded 20%D were qualified as estimated ("J" or "UJ"). Table 3-5 shows a summary of the samples and qualified parameters.

Table 3-5. *Evaluation of Continuing Calibration Results*

Package Identification	*Sample ID*	*Compounds**	*Action*
F2J160194	DUP DUP (rea), EB-101302 MW-1 MW-10 MW-10 (rea) MW-11 MW-12 MW-2 MW-3 MW-3 (rea) MW-4 MW-4 (rea) MW-5 MW-6 MW-7 MW-7 (rea) MW-8 MW-9 MW-9 (rea) TRIP BLANK 10-13-02	2-butanone, 2-hexanone	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2J220241	P-1 (299.14) TRIP BLANK 10-19-02	Acetone, methylene chloride	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2J250192	P-1(301.16) TRIP BLANK 10-23-02	2-hexanone, acetone, bromomethane, methylene chloride	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2J300166	P-4(106.8) P-4(77.5) P-4(97.2) P-5(107.5) P-5(107.5) (rea) P-5(77.5) P-5(77.5) (rea) P-5(97.5) P-5(97.5) (rea)	2-hexanone, methylene chloride, chloromethane, 4-methyl-2-pentanone, bromomethane	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K050144	P-10 (198.15), P-10 (198.15) (rea) P-10 (97.9) P-10 (97.9) (rea) P-11-107.4	2-hexanone, methylene chloride, chloromethane, bromomethane	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K060153	P-5 292.4	2-hexanone, methylene chloride, bromoform, 4-methyl-2-pentanone, bromomethane, chloroform	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K080105	P-10 (264.5) P-11 (247.4) P-11 (281.13) TRIP BLANK 11-05-02 TRIP BLANK 11-05-02 (rea)	2-hexanone, methylene chloride, 4-methyl-2-pentanone, bromomethane, chloroform	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit

Table 3-5. *Evaluation of Continuing Calibration Results*

Package Identification	*Sample ID*	*Compounds**	*Action*
F2K150247	P-12 (108) P-12 (78.85) P-12 (78.85) (rea) P-12 (87.89) P-12 (87.89) (rea) P-12 (97.92) P-6 (102.8) P-6 (102.8) (rea) P-6 (122.8) P-6 (82.8) P-9 (102.61) P-9 (102.61) (rea) P-9 (162.61) P-9 (82.61) TRIP BLANK 11-13-02	Acetone, 2-hexanone, bromomethane	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K180219	P-9 (232.61') TRIP BLK 11-15-02	2-butanone, acetone, bromoform, chloromethane,	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K190242	P-3 (107.40) P-3 (87.40) P-6 (252.4) P-6 (291.5) TRIP BLANK 11-18-02	acetone, chloromethane,	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K220291	P-12 (207.43) P-12 (287.42) P-12 (287.42) P-12 (297.41) P-3 (167.40) P-3 (227.40) P-7 (102.4) –UNFILTERED P-7 (82.4) TRIP BLANK 11-19-02	2-hexanone, 4-methyl-2-pentanone, bromomethane, chloromethane, trans-1,3-dichloropropene	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2K230165	P-2 (258.14) P-3 (304.40) P-7 (242.4) TRIP BLANK 11-21-02	2-hexanone, 4-methyl-2-pentanone, chloromethane, trans-1,3-dichloropropene	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2L060132	P-7 (301) P-8 (77.55) P-8 (97.55) TRIP BLANK 12-04-02	2-hexanone, 4-methyl-2-pentanone, bromomethane	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2L070156	P-13 (76.6) P-13 (86.6) P-13 (96.6) P-14 (77.82) P-14 (77.82) P-14 (85.82) P-14 (85.82) P-14 (95.17) P-2 (302.05) P-8 (167.55) P-8 (247.55) TRIP BLANK 12-6-02	2-hexanone, methylene chloride, 4-methyl-2-pentanone, bromomethane	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit

Table 3-5. *Evaluation of Continuing Calibration Results*

Package Identification	*Sample ID*	*Compounds**	*Action*
F2L120248	P-13 (237.30) P-13 (237.30) P-16 (181.00) P-16 (231.00) P-16 (251.00) Trip Blank 12-10-02	Carbon tetrachloride, acetone, bromomethane, methylene chloride	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit
F2L120270	P-13 (116.6) P-13 (116.6) P-13 (176.6) P-14 (115.14) P-14 (204.7) P-16 (101) P-16 (101) P-16 (121) P-16 (81) P-16 (81) P-16 (91) P-16 (91) P-8 (297.55) P-8 (302.55) TRIP BLANK 12-07-02	2-hexanone, acetone, carbon tetrachloride, 1,1-dichloroethane, 4-methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results above the laboratory reporting limit

*Not all compounds listed in column 3 affect all project samples shown. The attached EDD shows the final qualifiers assigned to the project sample results based on the validation criteria for all QC sample analyses.

3.2.10. Laboratory Method Blanks

In general, nearly all laboratory method blanks contained trace levels of one of more of laboratory contaminants including: acetone, methylene chloride, toluene, and chloromethane. The corresponding project sample results for the identified contaminants were revised to non-detect results if the associated sample results were less than 5 times the method blank results for laboratory contaminants in accordance with the QAPP (GTEOSI, 2002). Nearly all samples were affected by this qualification practice. A summary of the samples and compounds that were revised for the VOCs is presented in Table 3-6.

Table 3-6. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Client ID*	*Laboratory ID*	*Action*
F2J160194	MW-4 (rea)	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	MW-7	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
F2J300166	P-4 (106.8) P-4 (77.5) P-4 (97.2) P-5 (77.5) P-5 (107.5) (rea) P-5 (97.5) (rea)	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-5 (107.5)	Acetone, methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-5 (77.5)	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
F2K060153	P-10 (77.6)	Toluene	Revise "B" qualifier to "U" to indicate non-detect result
F2K050144	P-10 (97.9) (rea) P-10 (198.15) P-10 (198.15) (rea)	Acetone, methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result

Table 3-6. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Client ID*	*Laboratory ID*	*Action*
F2K150247	P-12 (87.89) P-12 (87.89) (rea) P-9 (82.61)	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F2K190242	P-3 (87.40) P-3 (107.4) P-6 (252.4) P-6 (291.5)	Carbon disulfide, methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F2L060132	P-7 (301) P-8 (77.55) P-8 (97.55)	Acetone, Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F2L120248	P-13 (237.00) P-13 (237.00) (rea) P-16 (181.00) P-16 (231.00) P-16 (251.00)	Acetone	Revise "B" qualifier to "U" to indicate non-detect result

(rea) – Indicates a laboratory reanalysis of the sample.

3.2.11. Laboratory Control Sample Results

The laboratory analyzed a laboratory control sample (LCS) for all QC batches. The percent recoveries were within laboratory control limits for almost all QC batches. Where recoveries exceeded laboratory control limits, the associated data were qualified as estimated ("J" or "UJ") using the following validation guidance: 1) if the percent recovery was greater than the upper control limit, positive results were qualified as estimated; non-detects were not qualified; 2) if the percent recovery was below the lower control limit, both positive and non-detect results were qualified ("J" or "UJ"). Table 3-7 shows the samples that were qualified as estimated due to LCS percent recoveries exceeding laboratory control limits. All results associated with LCS recoveries above the laboratory control limits were non-detect, and therefore, did not require qualification. Consequently, these samples are not listed in Table 3-7.

Table 3-7. *Evaluation of Laboratory Control Sample Results*

Package Identification	*Client ID*	*Compound*	*Action*
F2K010208	P-4 (197.65) P-5 (207.4) TRIP BLANK 10-30-02	Bromomethane	"UJ" (low %R)
F2K080105	P-11 (247.4)	Methylene chloride	"UJ" (low %R)

3.2.12. Matrix Spike/Matrix Spike Duplicate Analyses

Multiple project samples were submitted for MS/MSD analyses. Where recoveries exceeded laboratory control limits, the associated data were qualified as estimated ("J" or "UJ") using the following validation guidance: 1) if the percent recovery was greater than the upper control limit, positive results were qualified as estimated; 2) if the percent recovery was below the lower control limit, both positive and non-detect results were qualified ("J" or "UJ"). No qualification of data is required when percent recoveries are above the upper control limit and the VOC results are non-detect. Table 3-8 shows the samples that were qualified as estimated due to MS/MSD percent recoveries exceeding criteria. Table 3-8 does not list cases where the MS/MSD percent recoveries were greater than the upper control limit and the results were non-detect.

Table 3-8. *Evaluation of Matrix Spike/Matrix Spike Duplicate Sample Results*

Package Identification	*Client ID*	*Compound*	*Action*
F2J180121	P-2 (78.5)	Tetrachloroethene	"J" (high %R)
F2K050144	P-10 (198.15)	Carbon disulfide	"J" (high %R)
F2K060153	P-10 (77.6)	Methylene chloride Trans-1,3-dichloropropene Trichloroethene Tetrachloroethene	"UJ" (low %R)
F2L120248	P-16 (181.00)	Chloroform	"J" (low %R)

3.2.13. Field Duplicate Analyses

Two project samples were submitted as field duplicates. An evaluation of the precision of the field sampling procedure (as well as the laboratory analysis procedure) was made based on the relative percent difference (RPD) calculated for the original and duplicate sample results. RPD calculations were made only when both results were above the laboratory reporting limits. The RPD values for all compounds were less than 30% (aqueous data evaluation criteria).

It should be noted that QAPP requirements (GTEOSI, 2002) specified that a field duplicate sample be collected at a rate of one sample for every ten samples (collection rate of 10%). Nine field duplicates were required to be collected for the project since a total of 87 project samples were submitted for analysis. Although the precision objective for the two field duplicates submitted was achieved, an appropriate number of field duplicate samples were not collected to adequately assess precision. Therefore, precision is considered unknown because of the limited number of field duplicate samples collected.

3.2.14. Trip Blanks and Equipment Blanks

Multiple trip blanks and one equipment blank were submitted for the groundwater sampling project. Two sample delivery groups were submitted to the laboratory without a trip blank (F2J300166 and F2K050144). The reason for the oversight was not identified by field personnel. No assessment of the affect of sample cross-contamination during the shipping process could be made for these SDGs. Many of the trip blanks that were submitted contained common contaminants, including acetone, methylene chloride, and toluene. The equipment blank also contained acetone, methylene chloride, and chloromethane. Revisions to the affected target compounds were based on trip blank and equipment blank contamination, in accordance with practices described in the validation guidance documents listed in Sections 1.2 and 3.2.10 (method blank contamination). It should be noted that the results for the trip blanks and the equipment blank were not revised but the original result and laboratory qualifiers were retained to show data users the presence and concentrations of contamination that was used to qualify the project sample results. The contamination in the trip blanks and equipment blank, like the project samples, is potentially attributable to contamination from laboratory processing of samples, cross-contamination from samples during shipment, or contamination during the preparation of these QC samples (at the laboratory). Table 3-9 shows the samples and compounds that were qualified as non-detect ("U") or as estimated ("J") due to QC sample contamination.

Table 3-9. *Evaluation of Trip Blank and Equipment Blank Results*

Package Identification	Sample ID	Compound	Action
F2J160194	DUP (rea) MW-1 MW-10 MW-12 MW-3	Acetone, methylene chloride	Revised result to "U" (non-detect)
	MW-10 (rea) MW-11 MW-2 MW-3 (rea) MW-5 MW-7 (rea)	Methylene chloride	Revised result to "U" (non-detect)
	MW-4 MW-6 MW-7	Acetone	Revised result to "U" (non-detect)
	MW-4 (rea) MW-9	Acetone, chloromethane, methylene chloride	Revised result to "U" (non-detect)
	MW-8	Acetone, chloromethane	Revised result to "U" (non-detect)
F2J220241	P-1 (299.14)	Acetone	Revised result to "U" (non-detect)
F2J250192	P-1 (301.16)	Acetone	Revised result to "U" (non-detect)
F2K180219	P-9 (232.61)	Toluene	Revised result to "U" (non-detect)
F2J180121	P-2 (78.5)	Methylene chloride	Revised result to "U" (non-detect)

rea – indicates a laboratory re-analysis

3.2.15. System Monitoring Compounds

The percent recoveries for the VOC surrogates were within laboratory control limits for most project samples. Several project samples had one of a total of three surrogate recoveries outside laboratory control limits. When one of three surrogate recoveries is either above or below laboratory control limits, qualification of VOC results is not required per USEPA guidance documents. For this dataset, no qualification was required based on exceedances of the surrogate percent recoveries.

3.2.16. Internal Standards

The responses of most internal standards associated with target compounds were within the range of 50-200% of the associated calibration verification for all project samples. All internal standard retention times were within ± 30 seconds from that of the most recent calibration for all analyses. Table 3-10 shows the samples and compounds that were qualified as estimated due to internal standard value exceedances.

Table 3-10. *Evaluation of Internal Standard Values*

Package Identification	Sample ID	Compound	Action
F2J160194	DUP	1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene	"UJ" – non-detects
	DUP (rea)	1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,1,2,2-tetrachloroethane, 1,1,2-trichloroethane, 2-hexanone, bromoform, chlorobenzene, ethylbenzene, styrene, tetrachloroethene, toluene, trans-1,3-dichloropropene, total xylenes	"J" – positive results "UJ" – non-detects

rea – indicates a laboratory re-analysis

3.2.17. Compound Identification and Quantitation of Results

The laboratory's evaluations of the gas chromatographs and mass spectra for the identified compounds were acceptable for most project samples with one exception. The laboratory identified carbon tetrachloride in sample P-7 (102.4)-Unfiltered, but the result was revised to non-detect by the laboratory after a secondary QA review. The validation found that the retention time for the peak identified as carbon tetrachloride was not within the daily retention time window established by the CCAL. A revised analytical report for this compound was issued by the laboratory. However, rather than reissue the EDD, URS agreed to revise the electronic database to show carbon tetrachloride as a non-detect result (qualified "U" at the laboratory reporting limit) in accordance with the laboratory's revised report.

Additionally, the laboratory performed analysis on several samples (including MW-2, MW-5, MW-12, P-6 (82.8), P-9 (102.61), P-11 (167.4), P-13 (76.6), P-13 (86.6), P-13 (96.6), and P-14 (95.14)) using a dilution. There were no undiluted analyses reported for these results. All reporting limits for the target compounds are elevated due to the dilutions. The laboratory narrated this information, as required by the guidance documents, but was also informed that for future investigations, samples should be analyzed without a dilution (or with a small dilution, whenever possible) to provide the lowest reporting limits for the compounds of concern.

Additionally, many project samples contained elevated concentrations of some target compounds that exceeded the calibration range for the VOC analysis. The laboratory reported and qualified these results with an "E" qualifier. As part of the laboratory's corrective action, the affected samples were reanalyzed at a dilution to obtain usable results within the established calibration curve range. In two cases, however, the re-analyses resulted in non-detect results for two parameters which were originally detected in the undiluted sample. The samples are P-16 (81) and P-15 (91) and the affected compounds are cis-1,2-dichloroethene and trichloroethene. Since "E" qualified data are not used for quantitative purposes, the re-analysis results were required to be reported ("U"-qualified results). The "U" qualified results had elevated reporting limits due to the diluted analysis. The data user should be aware of the presence of these two chemicals in the subject samples. A list of the re-analyzed samples and the affected parameters are listed in Table 3-11.

Table 3-11: *Summary of Laboratory Re-Analyses*

Package Identification	***Client ID***	***Laboratory ID***	***Compound Reported From Re-Analysis***
F2J160194	MW-10	F2J160194005REA	Tetrachlorethene
	MW-3	F2J160194001REA	Tetrachlorethene
	MW-4	F2J160194002REA	Tetrachlorethene
	MW-7	F2J160194013REA	Tetrachlorethene
F2J160194	MW-9	F2J160194004REA	Tetrachlorethene
F2J180121	P-2 (78.5)	F2J180121001REA	Tetrachlorethene
	P-2-DUP-01	F2J180121003REA	Tetrachlorethene
F2J300166	P-5 (107.5)	F2J300166006REA	Tetrachlorethene
	P-5 (77.5)	F2J300166001REA	Tetrachlorethene
	P-5 (97.5)	F2J300166002REA	Tetrachlorethene

Table 3-11: Summary of Laboratory Re-Analyses

Package Identification	Client ID	Laboratory ID	Compound Reported From Re-Analysis
F2K050144	P-10 (97.9)	F2K050144002REA	Tetrachlorethene
F2K060153	P-10 (107.95)	F2K060153007REA	Tetrachlorethene
	P-10 (77.6)	F2K060153005REA	Tetrachlorethene
F2K080105	TRIP BLANK 11-05-02	F2K080105002REA	Acetone
F2K150247	P-12 (78.85)	F2K150247011REA	Tetrachlorethene Trichloroethene
	P-12 (87.89)	F2K150247009REA	Tetrachlorethene
	P-6 (102.8)	F2K150247002REA	Tetrachlorethene
F2K150247	P-9 (102.61)	F2K150247015REA	Tetrachlorethene
F2L070156	P-14 (85.82)	F2L070156010REA	Tetrachlorethene
F2L120248	P-13 (237.30)	F2L120248002REA	Trichlorethene
F2L120270	P-13 (116.6)	F2L120270006REA	Tetrachlorethene
	P-16 (101)	F2L120270024REA	Tetrachlorethene
	P-16 (81)	F2L120270021REA	Tetrachlorethene Cis-1,3-dichloroethene* Trichloroethene*
	P-16 (91)	F2L120270023REA	Tetrachlorethene Cis-1,3-dichloroethene* Trichloroethene*

*Results detected in an undiluted analysis but qualified with an "E" by the laboratory due to exceedances of the calibration curve range. Because of the large dilution performed to obtain results for another target compound (tetrachloroethene), these two compounds were reported as non-detect ("U"- qualified) at an elevated reporting limit. The compounds are present in the sample; however, an accurate quantity was not reported by the laboratory.

3.2.18. Tentatively Identified Compounds (TICs)

The laboratory was required to perform a library search for Tentatively Identified Compounds (TICs) present in the sample and QC matrices for the VOC analyses. TICs were identified most frequently in the laboratory method blanks and only in a few project samples. Since the TIC evaluation provides only the identity of a possible compound in the matrix and not the actual concentration of a compound, all TIC data should be considered qualitative (i.e., not usable for quantitative purposes). The "J" qualifier was added to all TIC results to indicate to the data user that the data are estimated. The TICs identified in the project and laboratory QC samples are shown in Attachment A.

4. Summary and Data Usability

This chapter summarizes the analytical data in terms of its completeness and usability. Data completeness is defined as the percentage of sample results that have been determined to be usable during the data validation process. Overall, 100 percent of the VOC data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated ("J" and "UJ") due to data validation QA/QC exceedances should be considered conditionally usable. TICs, qualified as "J," are not usable as there is only presumptive evidence of the compounds presence in the project sample.

The samples collected from the Site in Hicksville, New York were evaluated based on QA/QC criteria established by methods as listed in Section 1.3, by the data validation guidelines listed in Section 1.2, and by the QAPP (GTEOSI, 2002) established for this project. Major deficiencies in the data generation process would have resulted in data being rejected, indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor deficiencies in the data generation process resulted in some sample data being characterized as approximate or estimated. Identification of a data point as approximate indicates uncertainty in the reported concentration or detection limit of the chemical, but not its assigned identity.

The following paragraphs present the adherence of the data to the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) parameters.

Precision is measured through the evaluation of field duplicate samples and laboratory duplicate samples. For the VOC analyses, none of the data were rejected due to precision non-conformances.

LCS recoveries indicate the accuracy of the data. For the VOC analyses, none of the data were rejected due to accuracy non-conformances.

Holding times, sample preservation, blank analysis, and analyte identification and quantification are indicators of the representativeness of the analytical data. None of the VOC data were rejected due to representativeness non-conformances.

Comparability is not compromised, provided that the analytical methods do not change over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures were consistently used by the laboratory, the comparability criteria for the analytical data were met.

Sensitivity is established by reported detection limits that represent measurable concentrations of analytes that can be determined with a designated level of confidence. Sensitivity requirements were not met for several project samples due to the necessity of analyzing samples using significant dilutions. However, none of the VOC data were rejected due to sensitivity non-conformances.

5. Data Usability Summary Report Summary Information

The DUSR was performed to determine whether or not the data meets site-specific criteria for data quality and use. The DUSR is developed by reviewing and evaluating the analytical data package. The following questions were addressed:

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

The QAPP required that USEPA Level III deliverables be provided by the laboratory for each data package. This requirement was met as it applies to the methods used by the laboratory for sample analysis. The evaluation of the sample data was completed using the information provided in the data packages provided by the laboratory.

2. Have all holding times been met?

The holding times were met for the majority of VOC analyses. See Section 3.2.4 for sample and parameters qualified due to hold time exceedances.

3. Do all the QC data: blanks, standards, spike recoveries, replicate analyses, and sample data fall within the protocol-required limits and specifications?

The laboratory used the laboratory control limits during the analyses performed for this sampling event. QA/QC deviations and qualifications performed on the sample data are discussed in Chapter 3. Major non-conformances were not detected for the VOC data.

4. Have all of the data been generated using established and agreed upon analytical protocols?

The QAPP required that USEPA guidance methods be used in the analysis of samples collected for this sampling event. The laboratory used the required method protocols (with some minor modifications) for the analyses performed for this sampling event, which met data user and client needs.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

The evaluation of selected raw data confirmed most information provided in the data packages. In one instance, however, the laboratory result was revised to a non-detect result due to mis-identification during the evaluation of the chromatographic retention time.

6. Have the correct data qualifiers been used?

The laboratory applied the correct qualifiers to the sample data. The validation qualifiers were applied as required by validation guidelines listed in Section 1.

References

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O'Brien & Gere Engineers, Inc. 2000. *Supplement to the Approved Work Plan (QAPP – Appendix C), Former Sylvania Electric Products Incorporated Facility Cantiague Rock Road, Hicksville, New York.* Syracuse, New York.

United States Environmental Protection Agency (USEPA). 1992. *USEPA Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A),* 540/1-891002. Washington D.C.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (SW846) USEPA, Final Update IIIA, April 1998;

USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Data Review, EPA 540-R-99-008, October 1999;

Analytical Services Protocol (ASP), New York State Department of Environmental Conservation (NYSDEC). Guidance documents including Exhibits A, B, C, D, E, F, G, H, and I. (June 2000), and

United States Environmental Protection Agency Region II Contract Laboratory Program (CLP) Organics Data Review, SOP No. HW-6, Revision #11 (USEPA 1996a)

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Executive Summary

This report addresses data quality for groundwater samples collected at the former Sylvania Electric Products facility in Hicksville, New York (the Site). Sample collection activities were conducted by URS Corporation (URS) from October 13 through December 10, 2002.

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for radiochemistry analyses including gamma spectrometry and alpha spectrometry for isotopic thorium and isotopic uranium using United States Department of Energy (USDOE) Methods and laboratory standard operating procedures (SOP). The analytical data generated for this investigation were evaluated by URS using the quality assurance/quality control (QA/QC) criteria established in the methods as guidance. Non-conformances from the QA/QC criteria were qualified based on guidance provided in the Science Applications International Corporation (SAIC) *Laboratory Data Validation Guidelines For Evaluating Radionuclide Analyses*, 143-ARCS-00.08, Revision 06, June 2000 and USDOE *Guidance For Radiochemical Data Validation*, Draft RD4, October 4, 1995.

The non-detect gamma spectrometry results for several samples were qualified as estimated (UJ) because the net negative results have uncertainties less than their absolute values. This may be an indication of improper blank subtraction, per the data validation guidelines, but the laboratory believes this is due to negative slopes in the regions of interest. The associated method blanks exhibited similar results. There were no target gamma radionuclide peaks detected in the groundwater samples, except for lead-214 in sample P-14 (77.82'). Since the groundwater samples are not expected to exhibit gamma radionuclide contamination, and the algorithms used to calculate the sample results are different from the algorithms used to calculate the detection limits or minimum detected concentrations (MDC), this non-conformance does not adversely affect the usabilty of the data. Therefore, the affected data were not rejected, instead, the affected sample results were qualified as estimated (UJ) using professional judgement.

Other method non-conformances requiring data validation qualification (J and UJ) include radionuclide identication and quantitation, blank contamination, and insufficient sample size. None of these non-conformances were significant enough to jeopardize the usability of the data.

Overall, 100 percent of the radiochemistry data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated (J and UJ) due to data validation QA/QC exceedances should be considered conditionally usable. Therefore, the completeness objective of 90 percent, as stated in the quality assurance project plan (QAPP), was met.

1. Introduction

1.1. Sample Identification

This report addresses the results of a data quality evaluation for groundwater samples collected at the former Sylvania Electric Products facility in Hicksville, New York (the Site). Sample collection activities were conducted by URS Corporation (URS) from October 13, 2002 through December 10, 2002.

The quantity and types of samples that were submitted for data validation are presented in Table 1-1.

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Date Collected*	*Client ID*	*Laboratory ID*	*Analysis Requested*
F2J160194	10/13/02	MW-3	F2J160194001	Gamma
	10/13/02	MW-4	F2J160194002	Gamma
	10/13/02	MW-8	F2J160194003	Gamma
	10/13/02	MW-9	F2J160194004	Gamma
	10/13/02	MW-10	F2J160194005	Gamma
	10/13/02	MW-12	F2J160194006	Gamma
	10/13/02	MW-8-DUP*	F2J160194007	Gamma
	10/13/02	MW-2	F2J160194008	Gamma
	10/13/02	MW-6	F2J160194009	Gamma
	10/13/02	MW-1	F2J1601940010	Gamma
	10/13/02	MW-11	F2J1601940011	Gamma
	10/13/02	MW-5	F2J1601940012	Gamma
	10/13/02	MW-7, MS/MSD	F2J1601940013	Gamma
	10/13/02	EB-101302	F2J1601940014	Gamma
F2J180121	10/15/02	P-2 (78.5')	F2J180121001	Gamma, Alpha
	10/15/02	P-2 (78.5') Dissolved	F2J180121002	Gamma, Alpha
	10/15/02	P-1 (78.7')	F2J180121004	Gamma
F2J180121	10/15/02	P-1 (78.7') Dissolved	F2J180121005	Gamma
	10/16/02	P-1 (98.7')	F2J180121008	Gamma
	10/16/02	P-2 (98.8')	F2J180121009	Gamma, Alpha
	10/16/02	P-2 (98.8') Dissolved	F2J180121010	Gamma, Alpha
F2J300166	10/28/02	P-5 (77.5')	F2J300166001	Gamma

Table 1-1. *Sample Cross-Reference List*

Package Identification	Date Collected	Client ID	Laboratory ID	Analysis Requested
	10/28/02	P-5 (97.5')	F2J300166002	Gamma
	10/28/02	P-4 (77.5')	F2J300166003	Gamma
	10/28/02	P-4 (97.2')	F2J300166004	Gamma
F2K060153	11/03/02	P-11 (87')	F2K060153003	Gamma, Alpha
	11/03/02	P-11 (107.4')	F2K060153004	Gamma, Alpha
	11/03/02	P-10 (77.6')	F2K060153005	Gamma
	11/03/02	P-10 (97.9')	F2K060153006	Gamma
F2K150247	11/13/02	P-6 (82.8')	F2K150247001	Gamma, Alpha
	11/14/02	P-6 (102.8)-DUP*	F2K150247003	Gamma, Alpha
	11/13/02	P-12 (78.85')	F2K150247004	Gamma
	11/13/02	P-12 (97.92')	F2K150247005	Gamma
	11/14/02	P-6 (102.8')	F2K150247006	Gamma, Alpha
	11/13/02	P-9 (82.61')	F2K150247008	Gamma
	11/14/02	P-9 (162.61')	F2K150247010	Gamma
F2K190242	11/18/02	P-3 (87.4')	F2K190242002	Gamma
	11/18/02	P-3 (107.4')	F2K190242005	Gamma
	11/18/02	P-3 (107.4') Dissolved	F2K190242006	Gamma
F2K220291	11/19/02	P-7 (82.4')	F2K220291001	Gamma, Alpha
	11/19/02	P-7 (102.4') Dissolved	F2K220291002	Gamma, Alpha
	11/19/02	P-7 (102.4')	F2K220291010	Gamma, Alpha
F2L060132	12/03/02	P-8 (77.55')	F2L060132001	Gamma
	12/04/02	P-8 (97.55')	F2L060132002	Gamma
F2L070156	12/06/02	P-13 (96.6') Dissolved	F2L070156001	Gamma
	12/06/02	P-14 (77.82') Dissolved	F2L070156002	Gamma
	12/06/02	P-13 (76.6')	F2L070156006	Gamma
F2L070156	12/06/02	P-13 (96.6')	F2L070156008	Gamma
	12/06/02	P-14 (77.82')	F2L070156012	Gamma
F2L120270	12/07/02	P-14 (95.17')	F2L120270001	Gamma
	12/07/02	P-14 (95.17') Dissolved	F2L120270002	Gamma
	12/08/02	P-16 (81')	F2L120270021	Gamma

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Date Collected*	*Client ID*	*Laboratory ID*	*Analysis Requested*
	12/08/02	P-16 (81') Dissolved	F2L120270022	Gamma
	12/09/02	P-16 (101')	F2L120270024	Gamma

Notes:
Gamma indicates Gamma Spectrometry.
Alpha indicates Alpha Spectrometry of thorium (isotopic) and uranium (isotopic).
DUP indicates field duplicate.
MS/MSD indicates Matrix Spike/Matrix Spike Duplicate.
* Indicates that field sampler identified blind field duplicate sample.

1.2. General Considerations

Validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, for the samples and analyses addressed herein, this report outlines deviations from the applicable QC criteria outlined in the following documents:

- GTE Operations Support Incorporated. (GTEOSI). *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002.

- United States Department of Energy (USDOE). 1997. *Environmental Measurements Laboratory (EML) Procedures Manual, 28th Edition, Volume 1*. New York, New York.

Deviations from the QA/QC criteria were qualified based on guidance provided in the following documents:

- Science Applications International Corporation (SAIC). 2000. *Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyzes*, 143-ARCS-00.08, Revision 06. Oak Ridge, Tennessee.

- USDOE. 1995. *Guidance for Radiochemical Data Validation*, Draft RD4. Gaithersburg, Maryland.

1.3. Analytical Methods

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for radiochemistry analyses including gamma spectrometry (actinium-228, cesium-137, lead-212, lead-214, and potassium-40), and alpha spectrometry (thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, and uranium-238) using USDOE Methods and laboratory standard operating procedures (SOP). The methods used in this investigation are presented in Table 1-2.

Table 1-2. *Analytical Method References*

Parameter	***Method***	***Reference***
Gamma Spectrometry (Actinium-228, Cesium-137, Lead-212, Lead-214, Potassium-40)	Ga-01-R Modified	1
Alpha Spectrometry (Thorium-228, -230, -232 and Uranium-234, -235, -238)	RP-725 and Laboratory SOPs STL-RD-0201, STL-RD-0203, and STL-RC-0240	2, 3, 4, 5

Notes:

1. United States Department of Energy (USDOE). 1997. *Environmental Measurements Laboratory (EML) Procedures Manual (HASL-300)*, 28th Edition, Volume 1. New York, New York.
2. USDOE. 1994. *Group Actinide Screening Using Extraction Chromatography (Eichrom)*, Draft RP725, Pacific Northwest Laboratory, Richland, Washington.
3. STL. 2002. *Daily Operations of an Alpha Spectroscopy System.* STL-RD-0201, Revision No. 3.
4. STL. 2001. *Calibration and Maintenance of an Alpha Spectroscopy System.* STL-RD-0203, Revision No. 1.
5. STL. 2002. *Isotopic Americium, Curium, Plutonium, Thorium and Uranium in Various Matrices by EiChromM® Separation Resins.* STL-RC-0240, Revision No. 2.

The following sections of this document address distinct aspects of the validation process. Section 2 lists the data QA/QC protocols used to validate the sample data. Specific QA/QC deviations and qualifications performed on the sample data are discussed in Section 3. Data completeness and usability are discussed in Section 4. Section 5 presents the Data Usability Summary Report (DUSR) Summary Information. A copy of the validated electronic deliverable data are summarized in Attachment A.

2. Data Validation Protocols

2.1. Sample Analysis Parameters

The validation of analyses for this project used guidance presented in the QAPP (GTEOSI, 2002), the analytical methodology, and the data validation guidelines referenced in Section 1 herein.

The following QA/QC parameters were evaluated for the radiochemistry (gamma spectrometry, alpha spectrometry) analyses (where applicable):

- Holding times and sample preservation;
- Calibration;
- Blank analysis
- Tracer recovery (alpha spectrometry);
- Laboratory Control Sample (LCS);
- Duplicate analysis;
- Field duplicate analysis;
- Radionuclide quantitation and detection evaluation;
- Chemical separation specificity (alpha spectrometry);
- Target radionuclide list identification (gamma spectrometry);
- System performance; and
- Documentation completeness.

2.2. Data Validation Qualifiers

The following guidelines are used regarding the assignment of qualifiers and the use of qualified data:

- QA/QC exceedances which do not result in the qualification of an analyte, or which result in additional qualification of the analyte with the same qualifier, are not discussed.

- The use of estimated analytical data for quantitative uses is consistent with the guidance presented in the *USEPA Risk Assessment Guidance for Superfund* (USEPA 1992).

The following qualifiers have been used in this data validation.

"J" The associated numerical value in an estimated quantity, due to a QC or statistical exceedance.

"UJ" The associated non-detect value in an estimated quantity, due to a QC or statistical exceedance.

2.3. Data Usability Summary Report Questions

The DUSR determines whether or not the data meets site-specific criteria for data quality and use. It was developed by reviewing and evaluating the analytical data packages. During the course of this review the following questions were addressed (where applicable):

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

2. Have all holding times been met?

3. Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

4. Have all of the data been generated using established and agreed upon analytical protocols?

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

6. Have the correct data qualifiers been used?

The answers to the questions presented by the DUSR are presented in the following sections of the report and in the DUSR Summary Information Section, Section 5.

3. Data Quality Evaluation

3.1. Summary

This section summarizes which QA/QC parameters specified in Section 2.1 met validation criteria, and which QA/QC parameters did not meet validation criteria. Samples requiring qualification are described in the following sections, and are identified by the description documented on the sample chain-of-custody records.

3.2. Gamma Spectrometry Analyses

3.2.1. Criteria

The QA/QC parameters presented in Section 2.1 were applied to the environmental samples listed in Table 1-1. The following QA/QC parameters were found to meet validation criteria:

- Holding times and sample preservation;
- Calibration;
- Blank analysis;
- Laboratory Control Sample (LCS);
- Duplicate analysis;
- Field duplicate analysis;
- System performance; and
- Documentation completeness.

Only those QA/QC parameters not meeting validation criteria are discussed in subsequent sections.

3.2.2. Radionuclide Quantitation and Detection Limits

The net negative results for several samples have uncertainties less than their absolute values. This may be an indication of improper blank subtraction, per SAIC data validation guidelines, but the laboratory believes this is due to negative slopes in the regions of interest. The associated method blanks exhibited the same results. There were no target gamma radionuclide peaks detected in the groundwater samples. Since the algorithms used to calculate the sample results are different from the algorithms used to calculate the detection limits, this non-conformance does not compromise minimum detected concentrations (MDC). Therefore, the affected data was not rejected. Instead, using professional judgement the affected sample results were qualified as estimated (UJ) at the MDC, as summarized in Table 3-1.

Table 3-1. *Evaluation of Negative Results versus Uncertainties for Gamma Spectrometry Analyses*

Sample ID	*Affected Radionuclide Results*	*Action*
MW-3, MW-8, MW-10, MW-5, P-1 (98.7'), P-5 (97.5'), P-12 (97.92'), P-14 (77.82') Dissolved, P-14 (77.82')	Cesium-137, Lead-212	UJ
MW-4	Actinium-228, Cesium-137, Lead-212, Lead-214, Potassium-40	UJ
MW-9, MW-2, P-1 (78.7') Dissolved, P-2 (98.8'), P-5 (77.5'), P-9 (102.61'), P-7 (82.4'), P-8 (77.55')	Cesium-137, Lead-212, Lead-214	UJ
MW-12, MW-8-DUP, MW-7, P-2 (98.8') Dissolved, P-11 (107.4'), P-6 (102.8')-DUP, P-9 (82.61'), P-7 (102.4') Dissolved, P-14 (95.17'), P-14 (95.17') Dissolved, P-16 (101')	Lead-212, Lead-214	UJ
MW-6, P-2 (78.5') Dissolved, P-10 (77.6'), P-6 (82.8')	Cesium-137, Lead-212, Lead-214, Potassium-40	UJ
MW-1	Lead-214, Potassium-40	UJ
MW-11	Lead-212, Potassium-40	UJ
P-2 (78.5'), P-1 (78.7'), P-4 (77.5'), P-4 (97.2'), P-3 (87.40'), P-3 (107.40'), P-13 (76.6'), P-13 (96.6'), P-16 (81') Dissolved	Lead-212	UJ
P-11 (87'), P-8 (97.55')	Lead-212, Lead-214, Potassium-40	UJ
P-10 (97.9'), P-16 (81')	Actinium-228, Lead-212, Lead-214	UJ
P-12 (78.85'), P-3 (107.40') Dissolved, P-7 (102.4')	Actinium-228, Lead-212	UJ
P-6 (102.8')	Actinium-228, Potassium-40	UJ

3.2.3. Target Radionuclide List Identification

For sample P-6 (82.8') and matrix duplicate, the laboratory identified the non-target radionuclide lead-210. The energy line for lead-210 is 46.5 keV. However, the laboratory does not routinely calibrate the instrument detectors down to 46.6 keV, instead, the calibration range is 59.5 keV (americium-241) to 1,836 keV (yittrium-88). It should be noted that "Certificate of Calibration" indicates that lead-210 is included in the calibration standards. Therefore, the lead-210 result for sample P-6 (82.8') and matrix duplicate should be considered estimated and have been qualified "J".

3.2.4. Tentatively Identified Radionuclides

Gamma spectrometry peaks in radionuclide analyses that are not isotopes are potentially identified radionuclides. These radionuclides are qualitatively identified by a radionuclide spectrometry library computer search and the identifications assessed by the data reviewer. Potentially identified radionuclides were not required in this investigation.

3.3. Alpha Spectrometry Analyses

3.3.1. Criteria

The QA/QC parameters presented in Section 2.1 for radiochemistry were applied to the environmental samples listed in Table 1-1. The following QA/QC parameters were found to meet validation criteria:

- Holding times and sample preservation;
- Calibration;
- Tracer recovery;
- Laboratory Control Sample;
- Duplicate analysis;
- Chemical separation specificity;
- System performance; and
- Documentation completeness.

Only those QA/QC parameters not meeting validation criteria are discussed in subsequent sections.

3.3.2. Blank Analysis

The blank results were evaluated using the following statistical approach: if the sample result ± uncertainty was less than ten times the associated blank result ± uncertainty, the qualifier "J" was applied to the associated sample result. The statistical evaluation of the blank results are summarized in Table 3-2. The QAPP requires method blanks to be less than 5 times the minimum detected concentrations (MDC) and the lowest sample activity. The method blanks were not always less than the lowest sample activity. The QAPP requires the laboratory to reanalyze the affected batch. This was not done by the laboratory.

Table 3-2. *Blank Evaluation for Thorium/Uranium Analyses.*

Blank ID	*Radionuclide*	*Blank Concentration ± Uncertainty (pCi/L)*	*Affected Samples*	*Action*
F2J210000-280B	Thorium-230	0.80 ± 0.31	P-2 (78.5'), P-2 (78.5') Dissolved, P-2 (98.8')	J
F2K250000-134B	Thorium-230	0.21 ± 0.16	P-11 (87'), P-11 (107.4')	J
F2K250000-136B	Uranium-238	0.10 ± 0.12	P-11 (107.4')	J
F2L100000-150B	Thorium-230	0.37 ± 0.22	P-6 (82.8'), P-6 (102.8')-DUP, P-6 (102.8'), P-7 (82.4'), P-7 (102.4') Dissolved, P-7 (102.4')	J

Note:
pCi indicates picocurries
Uncertainty indicates total propagated uncertainty, which includes counting error and non-counting error.

3.3.3. Radionuclide Quantitation and Detection Evaluation

The net positive uranium-235 results for samples P-6 (82.8') and P-6 (102.8')-DUP were less than their uncertainties. This indicates that the sample counts were less than the critical values or less than 95% confidence of positive detection. The sample results were qualified as estimated (J), as summarized in Table 3-3.

Table 3-3. *Evaluation of Positive Results versus Uncertainties for Alpha Spectrometry Analyses*

Sample ID	Affected Radionuclide Results	Sample Concentration ± Uncertainty (pCi/L)	Action
P-6 (82.8')	Uranium-235	0.14 ± 0.16	J
P-6 (102.8')-DUP	Uranium-235	0.14 ± 0.16	J

Although the minimum sample size used to provide representative subsampling for alpha spectrometry is 0.5 liter for aqueous samples, the laboratory used slightly less than 0.5 liter for sample P-7 (82.4') due to insufficient sample volume available for thorium analysis. As a result of the smaller sample size, the results reported for sample P-7 (82.4') were qualified as estimated (J and UJ) as summarized in Table 3-4.

Table 3-4. *Sample Size Evaluation for Thorium Analyses.*

Sample ID	Affected Radionuclide Results	Sample Size	Action
P-7 (82.4')	Thorium-228 Thorium-230 Thorium-232	Less than 0.5 liter	UJ J UJ

4. Summary and Data Usability

This chapter summarizes the analytical data in terms of its completeness and usability. Data completeness is defined as the percentage of sample results that have been determined to be usable during the data validation process. Overall, 100 percent of the radiochemistry data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated (J and UJ) due to data validation QA/QC exceedances should be considered conditionally usable.

The samples collected from the Site in Hicksville, New York were evaluated based on QA/QC criteria established by methods as listed in Section 1.3, by the data validation guidelines listed in Section 1.2, and by the QAPP (GTEOSI, 2002) established for this project. Major deficiencies in the data generation process would have resulted in data being rejected, indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor deficiencies in the data generation process resulted in some sample data being characterized as approximate or estimated. Identification of a data point as approximate indicates uncertainty in the reported concentration of the chemical, but not its assigned identity.

The following paragraphs present the adherence of the data to the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PSARCC) parameters.

Precision is measured through the evaluation of field duplicate samples and laboratory duplicate samples. For the radiochemistry analyses, none of the data were rejected due to precision non-conformances.

LCS recoveries indicate the accuracy of the data. For the radiochemistry analyses, none of the data were rejected due to accuracy non-conformances.

Holding times, sample preservation, blank analysis, and analyte identification and quantification are indicators of the representativeness of the analytical data. None of the radiochemistry data were rejected due to representativeness non-conformances.

Comparability is not compromised, provided that the analytical methods do not change over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures were consistently used by the laboratory, the comparability criteria for the analytical data were met.

Sensitivity is established by reported detection limits that represent measurable concentrations of analytes that can be determined with a designated level of confidence. Sensitivity requirements were met for the sample data in this project, except for the following instances. The actinium-228 and potassium-40 sample MDCs for all samples were greater than the QAPP requirement (i.e., 20 pCi/L). The lead-214 MDC for samples MW-8, P-5 (97.5'), P-1 (78.7'), P-1 (98.7'), P-11 (87'), P-6 (102.8')-DUP, P-12 (78.85'), P-12 (97.92'), P-6 (102.8'), P-3 (87.40'), and P-3 (107.4') were slightly above 20 pCi/L. These gamma radionuclides typically have higher MDCs, but the laboratory modified the method (i.e., increased the sample count time to 2 hours) in order to achieve the reported MDCs. None of the radiochemistry data were rejected due to the sensitivity non-conformances.

5. Data Usability Summary Report Summary Information

The DUSR was performed to determine whether or not the data meets site-specific criteria for data quality and use. The DUSR is developed by reviewing and evaluating the analytical data package. The following questions were addressed:

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

The QAPP required that USEPA Level III deliverables be provided by the laboratory for each data package. This requirement was met as it applies to the methods used by the laboratory for sample analysis. The evaluation of the sample data was completed using the information provided in the data packages provided by the laboratory.

2. Have all holding times been met?

The holding times were met for the radiochemistry analyses.

3. Do all the QC data: blanks, standards, spike recoveries, replicate analyses, and sample data fall within the protocol-required limits and specifications?

The laboratory used the laboratory control limits during the analyses performed for this sampling event. QA/QC deviations and qualifications performed on the sample data are discussed in Chapter 3. Major non-conformances were not detected for the radiochemistry data.

4. Have all of the data been generated using established and agreed upon analytical protocols?

The QAPP required that USDOE methods are used in the analysis of samples collected for this sampling event. The laboratory used the required method protocols (with some minor modifications) for the analyses performed for this sampling event, which met data user and client needs.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

The evaluation of selected raw data confirmed information provided in the data packages.

6. Have the correct data qualifiers been used?

The laboratory applied the correct qualifiers to the sample data. The validation qualifiers were applied as required by validation guidelines as listed in Section 1

References

GTE Operations Support Incorporated. (GTEOSI). 2002. *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002.

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Science Applications International Corporation (SAIC). 1992. *Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyzes*, 143-ARCS-00.08, Revision 06. Oak Ridge, Tennessee.

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Executive Summary

This report addresses data quality for groundwater samples collected at the former Sylvania Electric Products Facility in Hicksville, New York (the Site). Sample collection activities were conducted by URS Corporation (URS) from October 13, 2002 through December 11, 2002.

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for metals analyses using United States Environmental Protection Agency (USEPA) guidance methods. The analytical data generated for this investigation were evaluated by URS using the quality assurance/quality control (QA/QC) criteria established in the methods as guidance. Non-conformances from the QA/QC criteria were qualified based on guidance provided in the following references:

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* (SW846) USEPA, Final Update IIIA, April 1998;
- *CLP National Functional Guidelines for Inorganic Data Review*, EPA 540-R-01-008, July 2002;
- *United States Environmental Protection Agency Region II Evaluation of Metals Data for the CLP 3/90*, USEPA 1992, and
- *Analytical Services Protocol (ASP), New York State Department of Environmental Conservation* (NYSDEC). Guidance documents including Exhibits A, B, C, D, E, F, G, H, and I. (June 2000).

Professional judgement was used to qualify results as estimated (UJ) in some cases where the overall quality of data was suspected due to commonly accepted or standardized practices employed by the laboratory. Since the guidance documents used as a source of reference for the validation somewhat differ in the type of qualification applied to data, URS applied qualifiers generally as a conservative approach. Affected data, however, were not rejected since other supporting quality control data indicated acceptable quality control results. Specifically, method non-conformances included only exceedances of the matrix spike/matrix spike duplicate percent recoveries or field duplicate relative percent difference values. All other QC analyses, including laboratory control samples, matrix spike analyses, serial dilution analysis, and interference check sample analyses, were acceptable for the samples.

A few laboratory method blanks (i.e., preparation blanks) and continuing calibration blanks (CCBs) contained low concentrations of the target elements. The presence of these elements in specific method blanks affected many project samples. Qualification of associated results was performed to show the relationship between the laboratory contamination and the uncertainty of the actual project sample results.

A review was also made of the "total metal" results versus the "dissolved metal" results to assess the accuracy of analytical tests for the groundwater matrix, as well as any impact the field filtration step may have had on the analysis. In several cases, the dissolved results were greater than the total results. Both sets of results were qualified as estimated due to highlight the uncertainty of the laboratory analysis, and/or the impact of the filtration step on the results.

The relative percent difference between field duplicate results were assessed, also. Several results were found to differ by more than 30% (validation criteria). None of the differences were significant enough to

reject data. Results were qualified as estimated to indicate the possibility of a non-homogenous sample matrix, laboratory imprecision during testing, and/or field imprecision during sampling.

None of the exceedances of method non-conformances were significant enough to jeopardize the usability of the data. All analytical results summarized in Appendix A are usable based on the findings listed in this Data Usability Summary Report (DUSR).

Overall, 100 percent of the metals data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated ("J" and "UJ") due to QC exceedances should be considered conditionally usable. Therefore, the completeness objective of 90 percent, as stated in the quality assurance project plan (QAPP), was met for the metals database.

1. Introduction

1.1. Sample Identification

This report addresses the results of a data quality evaluation for groundwater samples collected at the former Sylvania Electric Products Incorporated facility (the Site) in Hicksville, New York. Sample collection activities were conducted by URS Corporation (URS) from October 13, 2002 through December 11, 2002.

The quantity and types of samples that were submitted for data validation are presented in Table 1-1.

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Client ID***	***Laboratory ID***	***Analysis Requested***
F2J160194	DUP *Field Duplicate of MW-8*	F2J160194007	Total Be, Cr, Cu, Ni, and Tl
	EB-101302 *Equipment Blank*	F2J160194014	Total Be, Cr, Cu, Ni, and Tl
	MW-1	F2J160194010	Total Be, Cr, Cu, Ni, and Tl
	MW-10	F2J160194005	Total Be, Cr, Cu, Ni, and Tl
	MW-11	F2J160194011	Total Be, Cr, Cu, Ni, and Tl
	MW-12	F2J160194006	Total Be, Cr, Cu, Ni, and Tl
	MW-2	F2J160194008	Total Be, Cr, Cu, Ni, and Tl
	MW-3	F2J160194001	Total Be, Cr, Cu, Ni, and Tl
	MW-4	F2J160194002	Total Be, Cr, Cu, Ni, and Tl
	MW-5	F2J160194012	Total Be, Cr, Cu, Ni, and Tl
	MW-6	F2J160194009	Total Be, Cr, Cu, Ni, and Tl
	MW-7	F2J160194013	Total Be, Cr, Cu, Ni, and Tl
	MW-8	F2J160194003	Total Be, Cr, Cu, Ni, and Tl
	MW-9	F2J160194004	Total Be, Cr, Cu, Ni, and Tl
F2J180121	P-1 (78.7)	F2J180121004	Total Be, Cr, Cu, Ni, and Tl
	P-1 (78.7) - Dissolved	F2J180121007	Dissolved Be, Cr, Cu, Ni, and Tl
	P-1 (98.7)	F2J180121008	Total Be, Cr, Cu, Ni, and Tl
	P-2 (78.5)	F2J180121001	Total Be, Cr, Cu, Ni, and Tl
	P-2 (78.5) - Dissolved	F2J180121002	Dissolved Be, Cr, Cu, Ni, and Tl
	P-2 (98.8)	F2J180121009	Total Be, Cr, Cu, Ni, and Tl
	P-2 (98.8) - Dissolved	F2J180121010	Dissolved Be, Cr, Cu, Ni, and Tl

Table 1-1: *Sample Cross-Reference List*

Package Identification	*Client ID*	*Laboratory ID*	*Analysis Requested*
F2J300166	P-4 (77.5)	F2J300166003	Total Be, Cr, Cu, Ni, and Tl
	P-4 (97.2)	F2J300166004	Total Be, Cr, Cu, Ni, and Tl
	P-5 (77.5)	F2J300166001	Total Be, Cr, Cu, Ni, and Tl
	P-5 (97.5)	F2J300166002	Total Be, Cr, Cu, Ni, and Tl
F2K060153	P-10 (97.9)	F2K060153006	Total Be, Cr, Cu, Ni, and Tl
	P-10 (77.6)	F2K060153005	Total Be, Cr, Cu, Ni, and Tl
	P-11 (107.4)	F2K060153004	Total Be, Cr, Cu, Ni, and Tl
	P-11 (87)	F2K060153003	Total Be, Cr, Cu, Ni, and Tl
F2K150247	P-12 (78.85)	F2K150247004	Total Be, Cr, Cu, Ni, and Tl
	P-12 (78.85) DUP	F2K150247007	Total Be, Cr, Cu, Ni, and Tl
	P-12 (97.92)	F2K150247005	Total Be, Cr, Cu, Ni, and Tl
	P-6 (102.8)	F2K150247006	Total Be, Cr, Cu, Ni, and Tl
	P-6 (82.8)	F2K150247001	Total Be, Cr, Cu, Ni, and Tl
	P-9 (102.61)	F2K150247015	Total Be, Cr, Cu, Ni, and Tl
	P-9 (82.61)	F2K150247008	Total Be, Cr, Cu, Ni, and Tl
F2K190242	P-3 (107.40) – Dissolved	F2K190242006	Dissolved Be, Cr, Cu, Ni, and Tl
	P-3 (87.40) – Dissolved	F2K190242003	Dissolved Be, Cr, Cu, Ni, and Tl
	P-3 (107.40)	F2K190242005	Total Be, Cr, Cu, Ni, and Tl
	P-3 (87.40)	F2K190242002	Total Be, Cr, Cu, Ni, and Tl
F2K220291	P-7 (82.4)	F2K220291002	Total Be, Cr, Cu, Ni, and Tl
	P-7 (102.4) – Filtered	F2K220291003	Dissolved Be, Cr, Cu, Ni, and Tl
	P-7 (102.4) – Unfiltered	F2K220291010	Total Be, Cr, Cu, Ni, and Tl
F2L060132	P-8 (77.55)	F2L060132001	Total Be, Cr, Cu, Ni, and Tl
	P-8 (97.55)	F2L060132002	Total Be, Cr, Cu, Ni, and Tl
	P-8 (97.55) – Dup	F2L060132005	Total Be, Cr, Cu, Ni, and Tl
F2L070156	P-13 (76.6)	F2L070156006	Total Be, Cr, Cu, Ni, and Tl
	P-13 (96.6)	F2L070156008	Total Be, Cr, Cu, Ni, and Tl
	P-13 (96.6) – Dissolved	F2L070156001	Dissolved Be, Cr, Cu, Ni, and Tl
F2L070156	P-14 (77.82)	F2L070156012	Total Be, Cr, Cu, Ni, and Tl
	P-14 (77.82) - Dissolved	F2L070156002	Dissolved Be, Cr, Cu, Ni, and Tl

Table 1-1: Sample Cross-Reference List

Package Identification	Client ID	Laboratory ID	Analysis Requested
F2L120270	P-14 (95.17)	F2L120270001	Total Be, Cr, Cu, Ni, and Tl
	P-14 (95.17) - Filtered	F2L120270002	Dissolved Be, Cr, Cu, Ni, and Tl
	P-16 (101)	F2L120270024	Total Be, Cr, Cu, Ni, and Tl
	P-16 (81)	F2L120270021	Total Be, Cr, Cu, Ni, and Tl
	P-16 (81) - Filtered	F2L120270022	Dissolved Be, Cr, Cu, Ni, and Tl

1.2. General Considerations

Validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, for the samples and analyses addressed herein, this report summarizes the findings of the review and outlines any deviations from the applicable QC criteria outlined in the following documents:

- GTE Operations Support Incorporated. (GTEOSI). *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002.

- O'Brien & Gere Engineers, Inc. *Supplement to the Approved Work Plan (QAPP – Appendix C), Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, New York.* Syracuse, New York, 2000.

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* (SW846) USEPA, Final Update IIIA, April 1998;

- *United States Environmental Protection Agency Region II Evaluation of Metals Data for the CLP 3/90*, USEPA 1992,

- *Analytical Services Protocol (ASP), New York State Department of Environmental Conservation* (NYSDEC). Guidance documents including Exhibits A, B, C, D, E, F, G, H, and I. (June 2000); and

- *CLP National Functional Guidelines for Inorganic Data Review*, EPA 540-R-01-008, July 2002.

1.3. Analytical Methods

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for metals analyses. The laboratory used the following USEPA guidance methods for the analyses:

- SW846 Method 3010 Acid Digestion Preparation
- SW846 Method 6010B Inductively Coupled Plasma (ICP) Spectrometry by "Trace" Instrumentation

The laboratory assigned a sample delivery group (SDG) number to a group of samples during the sample log-in process. The SDG number is the means by which the laboratory tracks samples and controls QC analyses. A total of 10 SDGs composed the groundwater samples. The SDG, field identification and laboratory identification for each sample are summarized in Table 1-1.

The following sections of this document address distinct aspects of the validation process. Section 2 lists the data QA/QC protocols used to validate the sample data. A summary of the findings associated with the validation and the specific QA/QC deviations and qualifications performed on the sample data are discussed in Section 3. Data completeness and usability are discussed in Section 4. Section 5 presents the Data Usability Summary Report (DUSR) Summary Information. A copy of the validated electronic deliverable data (EDD) is presented in Attachment A.

2. Data Validation Protocols

2.1. Sample Analysis Parameters

The validation of analyses for this project used guidance presented in the QAPP (GTEOSI, 2002), the analytical methodology, and the data validation guidelines referenced in Section 1.

URS performed a data review of all analytical results to assess data quality. A data review includes an assessment of sample handling protocols, supporting laboratory quality control (QC) parameters, and field QC. The following is a list of specific analytical information evaluated during the validation:

- Data package completeness review – per the NYSDEC ASP Category B or USEPA CLP deliverables requirements
- Analytical methods performed and test method references
- Sample condition - review of log-in records for cooler temperature, presence of headspace, chemical preservation, etc.
- Holding times (comparison of collection, preparation, and analysis dates)
- Analytical results (units, values, significant figures, reporting limits, analyst, percent moisture)
- Sample traceability and comparison to raw data
- Initial calibration – comparison to laboratory criteria
- Continuing calibration – comparison to laboratory criteria
- Method blank results and laboratory contamination
- Laboratory control sample (LCS) results and comparison to laboratory control limits
- Matrix spike/matrix spike duplicate (MS/MSD) results and comparison to laboratory control limits
- Interference Check Samples
- Field replicate/duplicate results and comparison to data review criteria
- Field QC sample (e.g., equipment blanks)
- Reporting limits and Dilutions
- Electronic Data Deliverables (EDDs) – comparison to the hardcopy analytical report (a 20% check of the data to confirm that the results in the hardcopy report matched the results in the electronic file).

The analytical reports were reviewed for completeness and the accompanying QC data were reviewed for acceptable performance. In case documentation was incomplete, the laboratory was required to provide the missing information. When QC results indicated poor performance, URS applied data qualifiers to the results to inform the data user of the possible performance problem. These qualifiers are in addition to or a revision of the qualifiers provided by the laboratory. A summary of the data qualifiers used for this review is presented in Section 2.2.

2.2. Data Validation Qualifiers

The following qualifiers have been used by the laboratory for the metals analyses:

"U" Non-detect result at the established laboratory reporting limit (adjusted for percent moisture, if applicable).

"B" Indicates an estimated value or a value below the established reporting limit but above the method detection limit. Note: All "B" qualifiers for the metals analyses were revised to "J" to provide consistency between the organics and inorganics databases.

Laboratory qualifiers defined above, are retained in the final database unless revised during the data validation process to one of the following qualifiers:

"U" The chemical was not detected. Value shown is the reporting limit.

"J" Estimated concentration because the result was below the sample reporting limit or quality control criteria were not met.

"UJ" The chemical was not detected at or above the sample reporting limit. However, the reporting limit is approximate and may or may not represent the actual limit of reporting necessary to accurately and precisely measure the chemical in the sample.

The laboratory qualifiers were revised by URS during the data review process to simplify the presentation of data in the final report per the USEPA Region 2 Guidance (USEPA, 2001). Generally, all codes used by the laboratory to indicate results associated with quality control/performance problems were replaced in the electronic database with a "J" qualifier. Per the NYSDEC guidance, the "J" qualifier indicates estimated data. In addition, results associated with laboratory QC analyses that were beyond established control limits were evaluated on a case-by-case basis.

2.3. Data Usability Summary Report Questions

The DUSR determines whether or not the data meets site-specific criteria for data quality and use. It was developed by reviewing and evaluating the analytical data packages. During the course of this review the following questions were addressed (where applicable):

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

2. Have all holding times been met?

3. Do all the QC data: blanks, calibration standards, calibration verifications, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

4. Have all of the data been generated using established and agreed upon analytical protocols?

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

6. Have the correct data qualifiers been used?

The answers to the questions presented by the DUSR are presented in the following sections of the report and in the DUSR Summary Information Section, Section 5.

3. Data Quality Evaluation

3.1. Summary

This section summarizes which QA/QC parameters specified in Section 2.1 met validation criteria, and which QA/QC parameters did not meet validation criteria. A summary of the individual components of the review are described in the following sections.

3.2. Review of Validation Criteria

3.2.1. Completeness Review

The laboratory provided the analytical report in the New York State Department of Environmental Conservation (NYSDEC) format. Nearly all necessary documents were included in the report package including a case narrative summarizing the QC issues associated with the project analyses. In just a few isolated cases (e.g., log-in form for SDG 2FK150247), the laboratory was asked to provide missing documentation. The laboratory provided all information that was requested by URS.

3.2.2. Test Methods

The laboratory performed the analyses for most analyses using the analytical test methods listed in Section 1.3. These included SW846 Method 3010B (digestion of aqueous samples) followed by Method 6010B (ICP). No method anomalies were noted.

3.2.3. Sample Receipt

The laboratory received 57 aqueous samples for metals analysis between October 13, 2002 and December 11, 2002. The sample temperatures at the time of receipt were within the recommended temperature range of 4°C±2°C for all SDGs. Field and laboratory personnel completed the COC correctly recording the signature, date, and time of custody transfer.

The laboratory recorded the condition of the samples at the time of receipt on a "Conditions Upon Receipt Form." This Form identifies whether the containers were received undamaged, within the proper temperature range, at the proper pH, in a container that is sealed with a custody seal on the exterior, and with a completed COC enclosed to identify all samples submitted to the laboratory. For most SDGs, this form was completed properly. For one SDG, F2K150247, the laboratory did not record sufficient information on the form to assess the proper sample condition upon receipt. (The laboratory only recorded the sample temperature and the presence of a custody seal on the container). When requested, the laboratory provided an updated form denoting the sample condition for this SDG. No anomalies were identified.

3.2.4. Holding Times

The laboratory performed all metals analyses within EPA-recommended holding time of 180-days for acid preserved samples.

3.2.5. Analytical Results

For each sample tested, the laboratory provided the analytical test information using a laboratory standard format which shows critical information pertaining to the analyses performed. The information provided includes the following: the laboratory name; the project name; the analysis type (total versus dissolved);

the laboratory sample ID; matrix; date sampled; date received; preparation batch ID; the result; the reporting limit; the method detection limit (MDL); the units of measure; the laboratory method; dilution factor; analysis time; preparation date; analysis date; work order number, and laboratory qualifiers (if any). The laboratory provided all the appropriate forms for the requested methods.

3.2.6. Traceability to Raw Data

Traceability of the metals analyses is established by the digestion logs. These forms list the project samples analyzed per laboratory batch processed and the corresponding QC samples (e.g., preparation blank and laboratory control sample) performed with the project samples. All project samples for all SDGs were included on the applicable forms.

3.2.7. Initial Calibration

The laboratory prepared an initial calibration (ICAL) curve for each element in accordance with method criteria. Initial calibration verifications (ICVs) were analyzed immediately after each ICAL, with recoveries within ±10% of the true values for all elements.

3.2.8. Continuing Calibration Verification

The continuing calibration verification (CCV) standards were analyzed after the ICALs and after every 10 project samples as required by the reference test method. The percent recoveries were within ± 10% of the true values for all elements.

3.2.9. Initial and Continuing Calibration Blanks

The initial calibration blank (ICB) and continuing calibration blanks (CCB) were analyzed after the ICALs and after every 10 project samples as required by the reference test method. In general, all initial and continuing calibration blank results were less than the laboratory reporting limit, but in a few cases were greater than the laboratory MDL. If an element was detected above the MDL but less than the laboratory reporting limit, the validation process qualified the result to indicate the potential contamination associated with the analysis system. A summary of the samples and elements that were revised due to laboratory contamination are presented in Table 3-1.

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	*Client ID*	*Element*	*Action*
F2J160194	DUP *Field Duplicate of MW-8*	Chromium	Revise to "U" non-detect
	MW-1	Chromium	Revise to "U" non-detect
	MW-10	Chromium	Revise to "U" non-detect
	MW-11	Chromium	Revise to "U" non-detect
	MW-12	Chromium, thallium	Revise to "U" non-detect
	MW-2	Chromium	Revise to "U" non-detect
	MW-3	Chromium	Revise to "U" non-detect
	MW-4	Chromium	Revise to "U" non-detect
	MW-6	Chromium, thallium	Revise to "U" non-detect
	MW-7	Chromium	Revise to "U" non-detect

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	Client ID	Element	Action
	MW-8	Chromium	Revise to "U" non-detect
	MW-9	Chromium	Revise to "U" non-detect
F2J180121	P-2 (78.5)	Beryllium	Revise to "U" non-detect
F2K060153	P-10 (97.9)	Beryllium	Revise to "U" non-detect
	P-11 (107.4)	Chromium	Revise to "U" non-detect
	P-11 (87)	Chromium	Revise to "U" non-detect
F2J300166	P-4 (97.2)	Chromium	Revise to "U" non-detect
F2K220291	P-7 (82.4)	Beryllium	Revise to "U" non-detect
	P-7 (102.4) – Filtered	Beryllium	Revise to "U" non-detect
	P-7 (102.4) – Unfiltered	Beryllium	Revise to "U" non-detect
F2L120270	P-14 (95.17)	Beryllium	Revise to "U" non-detect
	P-14 (95.17) – Filtered	Chromium, beryllium	Revise to "U" non-detect
	P-16 (101)	Chromium, beryllium	Revise to "U" non-detect
	P-16 (81)	Beryllium	Revise to "U" non-detect
	P-16 (81) – Filtered	Beryllium	Revise to "U" non-detect

3.2.10. Laboratory Method Blanks (Preparation Blanks)

In general, most preparation blanks did not contain contamination from laboratory systems. Only in a few cases were the elements of concern, in particular, beryllium, identified in the preparation blanks. When this occurred, the corresponding project sample results for the identified contaminants were revised to non-detect results if the associated sample results were less than 5 times the method blank results in accordance with the QAPP (GTEOSI, 2002). Additionally, in a few cases, the laboratory reported a negative value for an element (thallium) which could indicate a bias for both positive and non-detect results. If a negative value was identified (i.e., greater than the negative MDL), the affected result was qualified as "J" or "UJ." A summary of the samples and elements that were revised due to laboratory contamination are presented in Table 3-2.

Table 3-2. *Evaluation of Laboratory Method Blanks*

Package Identification	Client ID	Element	Action
F2J180121	P-2 (78.5)	Beryllium	Revise result to "U" non-detect
F2L070156	P-13 (76.6)	Beryllium	Revise result to "U" non-detect
	P-13 (96.6)	Beryllium	Revise result to "U" non-detect
	P-13 (96.6) – Dissolved	Beryllium	Revise result to "U" non-detect
	P-14 (77.82)	Beryllium	Revise result to "U" non-detect

Table 3-2. *Evaluation of Laboratory Method Blanks*

Package Identification	*Client ID*	*Element*	*Action*
	P-14 (77.82) - Dissolved	Beryllium	Revise result to "U" non-detect
F2L060132	P-8 (77.55)	Beryllium	Revise result to "U" non-detect
	P-8 (97.55) – Dup	Beryllium, thallium	Revise result to "U" non-detect
F2K220291	P-7 (82.4)	Thallium	Revise result to "U" non-detect
	P-7 (102.4) – Filtered	Thallium	Revise result to "U" non-detect
	P-7 (102.4) – Unfiltered	Thallium	Revise result to "U" non-detect
F2J300166	P-5 (77.5)	Beryllium	Revise result to "U" non-detect

3.2.11. Laboratory Control Sample Results

The laboratory analyzed a laboratory control sample (LCS) for all QC batches. The percent recoveries were within laboratory control limits for all QC batches.

3.2.12. Matrix Spike/Matrix Spike Duplicate Analyses

Multiple project samples were submitted for MS/MSD analyses. No qualification of data was required based on percent recoveries exceedances. The laboratory also performed interference check sample analyses for each SDG for the groundwater project. The percent recoveries for the results were within method criteria for all analyses.

3.2.13. Field Duplicate Analyses

Three project samples were submitted as field duplicates. An evaluation of the precision of the field sampling procedure (as well as the laboratory analysis procedure) was made based on the relative percent difference (RPD) calculated for the original and duplicate sample results. Calculations were made only when both results were above the laboratory reporting limits. The RPD values for most elements were less than 30% (aqueous data evaluation criteria).

It should be noted that QAPP requirements (GTEOSI, 2002) specified that a field duplicate sample be collected at a rate of one sample for every ten samples (collection rate of 10%). Six field duplicates were required to be collected for the project since a total of 57 project samples were submitted for analysis. Since an adequate number of field duplicate samples were not collected, the precision objective for the project (which was acceptable at 100% for the three field duplicates submitted), is potentially inaccurate because of the limited number of field duplicate samples collected.

Table 3-3. *Evaluation of Field Duplicate Samples*

Package Identification	*Client ID*	*Qualified Compounds*	*Action*
F2K150247	P-12 (78.85)	Chromium, copper, nickel	"J" (RPD>30%)
	P-12 (78.85) Dup	Chromium, copper, nickel	"J" (RPD>30%)
F2L060132	P-8 (97.55)	Chromium, copper	"J" (RPD>30%)
	P-8 (97.55) – Dup	Chromium, copper	"J" (RPD>30%)

3.2.14. Equipment Blanks

One equipment blank was submitted for the groundwater sampling project. The equipment blank did not contain any of the elements of concern for the project

3.2.15. Quantitation of Results

The laboratory reporting limits for the metals were in accordance with the NYSDEC requirements (i.e., reporting at the Practical Quantitation Limits specified in the QAPP). The laboratory reported estimated data below the laboratory reporting limit but above the laboratory MDL, and qualified the estimated data with a "B" qualifier. In the EDD, URS revised the "B" qualifier to a "J" qualifier to provide consistency in review of the database.

3.2.16. Total Versus Dissolved Results

An evaluation of the total versus dissolved results was made to assess whether field filtration and/or laboratory analysis was

Table 3-4. *Total Metal Results Versus Dissolved Metal Results*

Package Identification	*Client ID*	*Compound*	*Action*
F2J180121	P-1 (78.7)	Nickel	"J"
	P-1 (78.7) – Dissolved	Nickel	"J"
	P-2 (78.5)	Chromium, copper, nickel	"J"
	P-2 (78.5) – Dissolved	Chromium, copper, nickel	"J"

3.2.17. Electronic Data Deliverables

The results in electronic database matched results listed on the hardcopy analytical report including laboratory qualifiers. The qualifiers and results were revised based on quality control issues, and changes are listed in previous comments made in this data usability summary report.

4. Summary and Data Usability

This chapter summarizes the analytical data in terms of its completeness and usability. Data completeness is defined as the percentage of sample results that have been determined to be usable during the data validation process. Overall, 100 percent of the metals data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated ("J" and "UJ") due to data validation QA/QC exceedances should be considered conditionally usable.

The samples collected from the Site in Hicksville, New York were evaluated based on QA/QC criteria established by methods as listed in Section 1.3, by the data validation guidelines listed in Section 1.2, and by the QAPP (GTEOSI, 2002) established for this project. Major deficiencies in the data generation process would have resulted in data being rejected, indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor deficiencies in the data generation process resulted in some sample data being characterized as approximate or estimated. Identification of a data point as approximate indicates uncertainty in the reported concentration of the chemical, but not its assigned identity.

The following paragraphs present the adherence of the data to the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PSARCC) parameters.

Precision is measured through the evaluation of field duplicate samples and laboratory duplicate samples. For the metals analyses, none of the data were rejected due to precision non-conformances.

LCS recoveries indicate the accuracy of the data. For the metals analyses, none of the data were rejected due to accuracy non-conformances.

Holding times, sample preservation, blank analysis, and analyte quantification are indicators of the representativeness of the analytical data. None of the metals data were rejected due to representativeness non-conformances.

Comparability is not compromised, provided that the analytical methods do not change over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures were consistently used by the laboratory, the comparability criteria for the analytical data were met.

Sensitivity is established by reported detection limits that represent measurable concentrations of elements that can be determined with a designated level of confidence. None of the metals data were rejected due to sensitivity non-conformances.

5. Data Usability Summary Report Summary Information

The DUSR was performed to determine whether or not the data meets site-specific criteria for data quality and use. The DUSR is developed by reviewing and evaluating the analytical data package. The following questions were addressed:

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

The QAPP required that USEPA Level III deliverables be provided by the laboratory for each data package. This requirement was met as it applies to the methods used by the laboratory for sample analysis. The evaluation of the sample data was completed using the information provided in the data packages provided by the laboratory.

2. Have all holding times been met?

The holding times were met for all the metal analyses were met.

3. Do all the QC data: blanks, standards, spike recoveries, replicate analyses, and sample data fall within the protocol-required limits and specifications?

The laboratory used the laboratory control limits during the analyses performed for this sampling event. QA/QC deviations and qualifications performed on the sample data are discussed in Chapter 3. Major non-conformances were not detected for the metals data.

4. Have all of the data been generated using established and agreed upon analytical protocols?

The QAPP required that USEPA guidance methods be used in the analysis of samples collected for this sampling event. The laboratory used the required method protocols for the analyses performed for this sampling event, which met data user and client needs.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

The evaluation of selected raw data confirmed all information provided in the data packages.

6. Have the correct data qualifiers been used?

The laboratory applied the correct qualifiers to the sample data. The laboratory qualifiers were revised and/or applied as required by validation guidelines listed in Section 1.

References

GTE Operations Support Incorporated. (GTEOSI). *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002

O'Brien & Gere Engineers, Inc. 2000. *Supplement to the Approved Work Plan (QAPP – Appendix C), Former Sylvania Electric Products Incorporated Facility Cantiague Rock Road, Hicksville, New York.* Syracuse, New York.

United States Environmental Protection Agency (USEPA). 1992. *USEPA Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A),* 540/1-891002. Washington, D.C.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, (SW846) USEPA, Final Update IIIA, April 1998.

CLP National Functional Guidelines for Inorganic Data Review, EPA 540-R-01-008, July 2002

United States Environmental Protection Agency Region II Evaluation of Metals Data for the CLP [Contract Laboratory Program] 3/90, USEPA 1992.

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Executive Summary

This report addresses data quality for groundwater samples collected at the former Sylvania Electric Products Incorporated facility in Hicksville, New York. This report is concerned with volatile samples collected by Malcolm Pirnie, Inc. (MPI) from March 15, 2003 through February 19, 2004.

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri, for Volatile Organic Compound (VOC) analysis using United States Environmental Protection Agency (USEPA) guidance methods. A total of 403 samples[1] were submitted, which resulted in 14,939 VOC results[2]. Of this number, 11,529 of them are actual sample results[3] and the remainders are field quality assurance/quality control (QA/QC) indicators[4] of the samples. The analytical data generated for this investigation were evaluated by MPI using the QA/QC criteria established in the methods and USEPA guidelines. Non-conformances from the QA/QC criteria were qualified based on guidance provided in the following references:

- New York State Department of Environmental Conservation. *Analytical Services Protocol.* Guidance documents including Exhibits A, B, C, D, E, F, G, and I. June 2000.
- United States Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* SW-846: Final Update IIIA. April 1998.
- United States Environmental Protection Agency. *Contract Laboratory Program National Functional Guidelines for Organic Data Review.* EPA 540-R-99-008. October 1999.
- United States Environmental Protection Agency, Region 2. *Contract Laboratory Program* Organics *Data Review.* SOP No. HW-6, Revision #12. March 2001.
- United States Environmental Protection Agency, Region 2. *Standard Operating Procedure for the Validation of Organic Data Acquired Using SW-846 Method 8260B.* SOP No. HW-24, Revision #1. June 1999.

In circumstances where the quality of the data or the accuracy of the results is suspect, the project's Quality Assurance Project Plan (QAPP) and professional judgment[5] were also used to determine if results should be qualified as estimated ("J" or "UJ"). Since the individual guidance documents used (as a source of reference for the validation) may differ slightly in the type of qualification applied to data, MPI applied qualifiers generally with an err to caution (conservstive). Method non-conformances included exceedances of the relative percent standard deviation for the initial calibrations, the percent differences of the continuing calibrations, the excessively low response factors in both the initial and continuing calibrations, and the percent recoveries of the laboratory control samples. Results rejected were due to initial and continuing calibration response factor non-conformances, VOA vial headspace, and high sample storage temperature.

[1] Total number of samples includes field samples, field duplicates, trip blanks, field blanks, and equipment blanks.
[2] Total number of results includes 14,911 results for targeted compounds and 28 results for tentatively identified compounds. This number includes some results, which were rejected.
[3] This is the total number of results minus trip blank, field blank, and equipment blank results.
[4] These indicators do not include Matrix Spike/Matrix Spike Duplicate or other internal laboratory QA/QC indicators.
[5] Professional judgment is performed by a USEPA certified data validator with over a decade of environmental laboratory experience.

Additionally, most laboratory method blanks contained low level contamination from common laboratory contaminants, including acetone and methylene chloride. The presence of these contaminants affected many project samples. Qualification of associated results was performed to show the relationship between the laboratory contamination and the uncertainty of the final sample result. Similarly, the project trip blanks, field blanks, and equipment blanks contained low-levels of the same contaminants as were seen in the laboratory method blanks, in addition to other contaminants due to cross-contamination during field sampling activities. Again, MPI qualified the affected data to show the potential impact on the final sample results.

Other quality issues requiring data validation qualification included replacement of results which exceeded the laboratory calibration range (i.e., qualified with an "E" by the laboratory) with re-analysis results, and qualification of all tentatively identified compounds (TIC). TIC results are qualitative only, and not considered usable for quantitative assessments, in particular risk screening evaluations.

Overall, 92.0 percent[6] of the VOC results retained in the database as final data were determined to be usable for qualitative and quantitative purposes. The other 8.0 percent were qualified as unusable, "R," – the presence or absence of the compounds cannot be verified. Sample results qualified as estimated, "J" and "UJ," due to quality control (QC) exceedances should be considered conditionally usable. Therefore, the completeness objective of 90 percent, as stated in the QAPP, was met for the volatiles in groundwater database.

[6] Value = (14,911 total target compound list data points – 1,192 rejected TCL data points) / 14,911 X 100

1. Introduction

1.1. Sample Identification

This report addresses the results of a data quality evaluation for groundwater samples collected at the former Sylvania Electric Products Incorporated facility in Hicksville, New York (the Site). This report pertains to volatile samples collected by Malcolm Pirnie, Inc. (MPI) from March 15, 2003 through February 19, 2004.

The sample delivery group (SDG) number (laboratory package identification number), field identification, and laboratory identification of the samples that were submitted for data validation are presented in Table 1-1.

Table 1-1. *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3C190235	TB-A	F3C190235001	VOCs
	TB-B	F3C190235002	VOCs
	MW-7	F3C190235003	VOCs
	MW-2	F3C190235004	VOCs
	MW-1	F3C190235005	VOCs
	MW-11	F3C190235006	VOCs
	MW-12	F3C190235007	VOCs
	MW-5	F3C190235008	VOCs
	MW-10 (also MS/MSD)	F3C190235009	VOCs
	MW-9	F3C190235010	VOCs
	MW-6 (also MS/MSD)	F3C190235011	VOCs
	MW-3	F3C190235012	VOCs
	MW-4	F3C190235013	VOCs
	MW-8	F3C190235014	VOCs
	FB	F3C190235015	VOCs
	MW-DUP (MW-3)	F3C190235016	VOCs
F3D290160	P-17-73.25	F3D290160001	VOCs
	P-17-92.25	F3D290160003	VOCs
	P-17-223.1	F3D290160005	VOCs
	P-FB-1	F3D290160006	VOCs
	P-F-86.48	F3D290160007	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3D290160 Cont'd	TB-1	F3D290160008	VOCs
	P-F-76.46	F3D290160009	VOCs
F3E060217	P-27-89.75	F3E060217001	VOCs
	P-27-DUP (P-27-99.75)	F3E060217002	VOCs
	P-27-99.75	F3E060217003	VOCs
	P-27-139.75	F3E060217004	VOCs
	P-27-199.75 (also MS/MSD)	F3E060217005	VOCs
	P-28-87.02	F3E060217006	VOCs
	P-28-97.02	F3E060217007	VOCs
	P-28-147.02	F3E060217008	VOCs
	P-28-207.02	F3E060217009	VOCs
	TB-2	F3E060217010	VOCs
F3E160130	P-26-231.25 (also MS/MSD)	F3E160130009	VOCs
	P-26-241.25	F3E160130010	VOCs
	P-E-78.57	F3E160130011	VOCs
	P-E-88.57	F3E160130012	VOCs
	P-E-98.57	F3E160130013	VOCs
	TRIP BLANK	F3E160130014	VOCs
F3E200165	P-26-257.2	F3E200165001	VOCs
	P-26-267.2	F3E200165002	VOCs
	P-26A-276.53	F3E200165003	VOCs
	P-26A-286.5	F3E200165004	VOCs
	P-26A-295.85	F3E200165005	VOCs
	TRIP BLANK	F3E200165006	VOCs
	P-E-128.57	F3E200165010	VOCs
	P-E-138.57	F3E200165011	VOCs
	P-E-148.57	F3E200165012	VOCs
	P-E-158.57	F3E200165013	VOCs
F3E230179	P-E-292.28	F3E230179003	VOCs
	P-E-301.23	F3E230179004	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3E230179 Cont'd	P-E-332.85	F3E230179006	VOCs
	P-E-327.15	F3E230179007	VOCs
	TB-051903B	F3E230179008	VOCs
F3E290170	P-D-87.05	F3E290170002	VOCs
	1EB-5/27	F3E290170003	VOCs
	P-D-97.05	F3E290170004	VOCs
	P-D-107.05 (also MS/MSD)	F3E290170005	VOCs
	TB-05-28-03	F3E290170010	VOCs
	P-15-79.65	F3E290170011	VOCs
	P-15-89.65	F3E290170012	VOCs
	P-15-99.65	F3E290170013	VOCs
	P-15-109.65	F3E290170014	VOCs
	P-15-119.65	F3E290170015	VOCs
F3F030298	P-15-179.65	F3F030298006	VOCs
	P-D-257.	F3F030298022	VOCs
	P-D-290.1	F3F030298023	VOCs
	P-D-77.05	F3F030298024	VOCs
	P-D-117.05	F3F030298025	VOCs
	P-D-127.05	F3F030298026	VOCs
	P-D-137.05	F3F030298027	VOCs
	P-D-147.05	F3F030298028	VOCs
	TB-06-02-03	F3F030298037	VOCs
F3F120220	P-C-89.6	F3F120220002	VOCs
	P-C-99.6	F3F120220003	VOCs
	P-C-DUP-1 (P-C-99.6)	F3F120220012	VOCs
	TRIP BLANK	F3F120220013	VOCs
F3F170126	P-C-320.3	F3F170126003	VOCs
	P-C-330.3	F3F170126004	VOCs
	P-C-337.5	F3F170126005	VOCs
	P-24-87.35	F3F170126006	VOCs
	P-24-77.35	F3F170126007	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3F170126 Cont'd	TB-612-616	F3F170126008	VOCs
	P-C-FB	F3F170126009	VOCs
	P-C-159.6	F3F170126010	VOCs
	P-C-169.6 (also MS/MSD)	F3F170126011	VOCs
F3F180192	TB-617	F3F180192001	VOCs
	P-24-127.3	F3F180192005	VOCs
	P-24-137.3	F3F180192006	VOCs
	P-C-347.7 (also MS/MSD)	F3F180192008	VOCs
F3F200145	P-24-157.3	F3F200145001	VOCs
	P-24-167.3	F3F200145002	VOCs
	P-24-177.3	F3F200145003	VOCs
	P-24-187.3	F3F200145004	VOCs
	P-24-197.3	F3F200145005	VOCs
	P-24-207.3	F3F200145006	VOCs
	P-24-217.3	F3F200145007	VOCs
	P-24-DUP-1 (P-24-167.3) (also MS/MSD)	F3F200145008	VOCs
	P-24-227.3	F3F200145009	VOCs
	P-24-237.3	F3F200145010	VOCs
	P-24-247.3	F3F200145011	VOCs
	P-24-257.3	F3F200145012	VOCs
	TB-619	F3F200145013	VOCs
	P-24-147.3	F3F200145014	VOCs
	P-24-267.3 (also MS/MSD)	F3F200145015	VOCs
	P-24-277.3	F3F200145016	VOCs
	P-24-287.3	F3F200145017	VOCs
	P-24-DUP-2 (P-24-287.3)	F3F200145018	VOCs
	P-C-364.5	F3F200145019	VOCs
	P-C-374.5	F3F200145020	VOCs
	P-C-394.5	F3F200145021	VOCs
	P-C-384.5	F3F200145022	VOCs
F3F260187	P-24-297.3	F3F260187001	VOCs
	P-23-FB-1	F3F260187002	VOCs
	P-23-180.1	F3F260187013	VOCs
	P-23-DUP-1 (P-23-180.1)	F3F260187014	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3F260187 Cont'd	TB-619625	F3F260187015	VOCs
F3F270132	TB-625626	F3F270132001	VOCs
	P-23-150.1	F3F270132007	VOCs
	P-23-160.1	F3F270132008	VOCs
F3G010309	P-23-239.8	F3G010309001	VOCs
	P-23-252.0	F3G010309002	VOCs
	P-23-262.0	F3G010309003	VOCs
	P-23A-286.96	F3G010309004	VOCs
	P-23A-293.50	F3G010309005	VOCs
	TB-627630	F3G010309006	VOCs
F3G030162	TB-701702	F3G030162001	VOCs
	P-23A-DUP-1 (P-23A-347.6)	F3G030162004	VOCs
	P-23A-347.6	F3G030162005	VOCs
F3G110205	P-25-EB-1	F3G110205001	VOCs
	P-25-169.7	F3G110205011	VOCs
	P-25-179.7	F3G110205012	VOCs
	P-25-DUP-1 (P-25-179.7)	F3G110205017	VOCs
	P-35-EB-1	F3G110205018	VOCs
	P-35-117.2	F3G110205023	VOCs
	P-35-177.2	F3G110205029	VOCs
	P-35-DUP-1 (P-35-177.2)	F3G110205030	VOCs
	TB-708710	F3G110205031	VOCs
F3G150156	P-25-275.8	F3G150156006	VOCs
	P-25-DUP-2 (P-25-275.8)	F3G150156007	VOCs
	P-25-349.4	F3G150156014	VOCs
	P-35-EB-2	F3G150156027	VOCs
	P-35-332.2	F3G150156030	VOCs
	P-35-DUP-2 (P-35-332.2)	F3G150156031	VOCs
	TB-710714	F3G150156032	VOCs
F3G230216	P-H-EB-1	F3G230216001	VOCs
	P-H-116.8	F3G230216006	VOCs
	TB721722	F3G230216007	VOCs
	P-42-EB-1	F3G230216008	VOCs
F3G250374	P-H-106.8	F3G250374001	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3G250374	P-H-136.8	F3G250374004	VOCs
	P-H-146.8	F3G250374005	VOCs
	P-H-156.8	F3G250374006	VOCs
	P-H-EB-2	F3G250374011	VOCs
	P-H-206.55	F3G250374012	VOCs
	P-42-202.7	F3G250374016	VOCs
	P-42-DUP-1 (P-42-202.7)	F3G250374017	VOCs
	P-H-DUP-2 (P-H-206.55)	F3G250374019	VOCs
	TB-722724	F3G250374020	VOCs
F3G290207	P-H-351.65	F3G290207006	VOCs
	P-42-217.2	F3G290207011	VOCs
	P-42-276.4	F3G290207014	VOCs
	P-42-329.8	F3G290207019	VOCs
	P-42-DUP-2 (P-42-329.8)	F3G290207020	VOCs
	P-42-354.6	F3G290207022	VOCs
	TB-724728	F3G290207023	VOCs
F3H060192	P-20-149.60	F3H060192008	VOCs
	P-20-159.60	F3H060192009	VOCs
	P-20-EB-1	F3H060192010	VOCs
	P-45-81.25	F3H060192011	VOCs
	TB-804805	F3H060192013	VOCs
	P-45-131.25	F3H060192017	VOCs
	P-45-DUP-1 (P-45-81.25)	F3H060192018	VOCs
F3H080219	P-20-220.76	F3H080219006	VOCs
	P-20-229.70	F3H080219007	VOCs
	TB-805807	F3H080219008	VOCs
	P-45-151.25	F3H080219010	VOCs
	P-45-207.25	F3H080219015	VOCs
F3H130195	P-45-281.65	F3H130195001	VOCs
	P-20-309.60	F3H130195010	VOCs
	P-20-319.60	F3H130195011	VOCs
	P-20-FB	F3H130195019	VOCs
	TB-8-12	F3H130195020	VOCs
	P-20-427.99	F3H130195021	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3H130195 Cont'd	P-20-DUP-2 (P-20-427.99)	F3H130195022	VOCs
F3H180106	P-45-366.39	F3H180106001	VOCs
	P-45-DUP-2 (P-45-366.39)	F3H180106002	VOCs
	P-20-476.68	F3H180106005	VOCs
	TB-0813	F3H180106006	VOCs
F3H210288	P-36-EB-1	F3H210288001	VOCs
	P-37-119.95	F3H210288019	VOCs
	P-37-DUP-1 (P-37-119.95)	F3H210288023	VOCs
	TB-819820	F3H210288024	VOCs
F3H220246	P-36-156.7	F3H220246002	VOCs
	P-36-DUP-1 (P-36-156.7)	F3H220246003	VOCs
	P-46-139.60	F3H220246011	VOCs
	P-46-DUP-1 (P-46-139.60) (also MS/MSD)	F3H220246012	VOCs
	P-37-EB-1	F3H220246023	VOCs
	TB-820821	F3H220246024	VOCs
F3H270230	P-46-275.42	F3H270230003	VOCs
	P-46-DUP-2 (P-46-275.42)	F3H270230004	VOCs
	P-36A-282.0	F3H270230010	VOCs
	P-36-136.7	F3H270230016	VOCs
	P-37-284.4	F3H270230020	VOCs
	P-37-304.8	F3H270230021	VOCs
	P-37-DUP-2 (P-37-304.8)	F3H270230022	VOCs
	TB-821-824	F3H270230024	VOCs
F3I040177	EB-1-44	F3I040177001	VOCs
	EB-2-P-44	F3I040177002	VOCs
	P-44-99.3	F3I040177004	VOCs
	P-44-DUP-1 (P-44-99.3)	F3I040177005	VOCs
	TB-90203	F3I040177009	VOCs
F3I050189	P-44-149.8	F3I050189003	VOCs
	TB-903904	F3I050189016	VOCs
F3I090305	P-44-215.5	F3I090305007	VOCs
	P-44-229.2	F3I090305008	VOCs
	P-44-239.85	F3I090305009	VOCs
	P-44-249.85	F3I090305010	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3I090305 Cont'd	P-44-257.1	F3I090305011	VOCs
	P-44-EB-3	F3I090305015	VOCs
	P-47-DUP-1 (P-47-147.1)	F3I090305025	VOCs
	P-47-147.1	F3I090305026	VOCs
	P-47-177.0 (also MS/MSD)	F3I090305030	VOCs
	P-47-205.7	F3I090305034	VOCs
	TB-904908	F3I090305039	VOCs
F3I120107	P-43-EB-1	F3I120107001	VOCs
	P-43-119.88	F3I120107006	VOCs
	P-43-DUP-1 (P-43-119.88)	F3I120107007	VOCs
	P-44-339.8	F3I120107016	VOCs
	TB-908910	F3I120107017	VOCs
F3I150101	P-43-129.88	F3I150101004	VOCs
	P-47-197.0	F3I150101005	VOCs
	TB-906911	F3I150101006	VOCs
F3I180259	P-29-109.5	F3I180259005	VOCs
	P-29-DUP-1 (P-29-109.5)	F3I180259006	VOCs
	TB-916917	F3I180259012	VOCs
	P-38-FB-1	F3I180259020	VOCs
	P-38-116.7	F3I180259027	VOCs
	P-38-DUP-1 (P-38-116.7)	F3I180259028	VOCs
	P-38-146.7	F3I180259031	VOCs
F3I230231	P-29-EB-1	F3I230231003	VOCs
	P-29-310.2	F3I230231014	VOCs
	P-29-329.85	F3I230231016	VOCs
	P-29-DUP-2 (P-29-329.85)	F3I230231017	VOCs
	P-29-EB-2	F3I230231019	VOCs
	P-29-360.0	F3I230231020	VOCs
	P-38-186.3	F3I230231024	VOCs
	P-38-207.5	F3I230231025	VOCs
	P-38-216.3	F3I230231026	VOCs
	P-38-260.7	F3I230231028	VOCs
	P-43-246.68	F3I230231035	VOCs
	P-43-DUP-2 (P-43-246.68)	F3I230231036	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3I230231 Cont'd	P-43-294.85	F3I230231041	VOCs
	TB-917922	F3I230231043	VOCs
	P-29-390.0	F3I230231044	VOCs
F3I250196	P-38-FB-2	F3I250196004	VOCs
	P-38-DUP-3 (P-38-381.3)	F3I250196005	VOCs
	TB-923924	F3I250196007	VOCs
F3J030259	P-30-89.50	F3J030259002	VOCs
	P-30-99.50	F3J030259003	VOCs
	P-30-204.55	F3J030259011	VOCs
	P-30-DUP-1 (P-30-204.55)	F3J030259013	VOCs
	TB1-930102	F3J030259015	VOCs
F3J070236	P-30A-298.6	F3J070236029	VOCs
	P-30A-DUP-2 (P-30A-298.6)	F3J070236030	VOCs
	P-18-EB-1	F3J070236033	VOCs
	P-18-156.65	F3J070236040	VOCs
	P-18-DUP-1 (P-18-156.65)	F3J070236041	VOCs
	TB-102106	F3J070236043	VOCs
F3J110172	P-30A-406.55	F3J110172020	VOCs
	P-30A-DUP-3 (P-30A-406.55)	F3J110172021	VOCs
	P-18-217.65	F3J110172023	VOCs
	P-18-247.65	F3J110172026	VOCs
	P-18-DUP-2 (P-18-247.65)	F3J110172027	VOCs
	P-18-257.65	F3J110172028	VOCs
	P-18-267.65	F3J110172029	VOCs
	P-18-277.65	F3J110172030	VOCs
	P-18-287.65	F3J110172031	VOCs
	P-18-302.66	F3J110172032	VOCs
	TB-106109	F3J110172033	VOCs
	P-18-335.80	F3J110172034	VOCs
F3J240204	P-50-109.90	F3J240204006	VOCs
	P-50-119.90	F3J240204007	VOCs
	P-50-129.90	F3J240204008	VOCs
	P-50-DUP-1 (P-50-129.90)	F3J240204009	VOCs
	P-50-139.90	F3J240204010	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F2J240204 Cont'd	P-50-149.90	F3J240204011	VOCs
	P-49-114.3 (also MS/MSD)	F3J240204020	VOCs
	P-49-124.3	F3J240204021	VOCs
	P-49-167.3	F3J240204024	VOCs
	P-49-DUP-1 (P-49-167.3)	F3J240204025	VOCs
	TB10211023	F3J240204027	VOCs
	P-51-117.78	F3J240204034	VOCs
	P-51-127.78	F3J240204035	VOCs
	P-49-EB-1	F3J240204040	VOCs
F3J290103	P-50-249.90	F3J290103003	VOCs
	P-50-267.44	F3J290103005	VOCs
	P-50-309.90	F3J290103009	VOCs
	P-50-EB-2	F3J290103012	VOCs
	P-50-342.60	F3J290103013	VOCs
	P-50-DUP-2 (P-50-342.60)	F3J290103014	VOCs
	TB-10231027	F3J290103019	VOCs
	P-49-269.3	F3J290103026	VOCs
	P-49-284.3	F3J290103027	VOCs
	P-49-340.8	F3J290103031	VOCs
	P-49-DUP-2 (P-49-340.8)	F3J290103032	VOCs
	P-51-187.78	F3J290103033	VOCs
	P-51-DUP-2 (P-51-246.75)	F3J290103037	VOCs
	P-51-246.75	F3J290103038	VOCs
F3J310287	P-51-301.12	F3J310287008	VOCs
	P-51-321.00	F3J310287009	VOCs
	P-51-327.85	F3J310287010	VOCs
	TB-10271030	F3J310287016	VOCs
F3K080109	P-54-107.55	F3K080109004	VOCs
	P-52-EB-1	F3K080109014	VOCs
	P-52-170.0	F3K080109024	VOCs
	P-52-DUP-1 (P-52-170.0)	F3K080109025	VOCs
	P-58-EB-1	F3K080109027	VOCs
	P-58-159.65	F3K080109036	VOCs
	P-58-DUP-1 (P-58-159.65)	F3K080109037	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3K080109 Cont'd	TB-114116	F3K080109044	VOCs
F3K110173	P-58-274.65	F3K110173001	VOCs
	P-58-DUP-2 (P-58-274.65)	F3K110173002	VOCs
	P-54-267.95	F3K110173017	VOCs
	P-54-DUP-2 (P-54-267.95)	F3K110173018	VOCs
	P-54-276.4	F3K110173019	VOCs
	TB-1171110	F3K110173031	VOCs
F3K140242	P-54-351.25	F3K140242005	VOCs
	P-54-DUP-3 (P-54-351.25)	F3K140242006	VOCs
	TB-11101113	F3K140242009	VOCs
F3K210372	P-52-EB-2	F3K210372005	VOCs
	TB-11171120	F3K210372006	VOCs
	EB-P-54-11-17	F3K210372007	VOCs
	P-53-EB-11-20	F3K210372012	VOCs
F3K280120	P-53-146.40	F3K280120006	VOCs
	P-53-DUP-1 (P-53-146.40)	F3K280120007	VOCs
	P-53-266.35 (also MS/MSD)	F3K280120018	VOCs
	P-53-DUP-2 (P-53-266.35)	F3K280120019	VOCs
	P-34-EB-1	F3K280120025	VOCs
	P-34-139.55	F3K280120032	VOCs
	P-34-DUP-1 (P-34-139.55)	F3K280120033	VOCs
	P-34-224.55	F3K280120041	VOCs
	P-34-234.55	F3K280120042	VOCs
	P-34-244.55	F3K280120043	VOCs
	P-34-DUP-2 (P-34-244.55)	F3K280120044	VOCs
	P-34-254.55	F3K280120045	VOCs
	P-34-264.55	F3K280120046	VOCs
	P-34-284.55	F3K280120047	VOCs
	P-34-294.55	F3K280120048	VOCs
	P-34-304.50 (also MS/MSD)	F3K280120049	VOCs
	TB-11201125	F3K280120050	VOCs
	P-53-331.10	F3K280120051	VOCs
	P-53-340.05	F3K280120052	VOCs
F3L050365	P-34-324.50	F3L050365001	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3L050365 Cont'd	P-34-334.50	F3L050365002	VOCs
	TB-121124	F3L050365007	VOCs
F3L090146	P-33-EB-1	F3L090146001	VOCs
	P-33-159.6	F3L090146010	VOCs
	P-33-169.6	F3L090146011	VOCs
	P-33-179.6	F3L090146012	VOCs
	P-33-DUP-1 (P-33-169.6)	F3L090146013	VOCs
	P-33-189.6	F3L090146014	VOCs
	P-33-198.1	F3L090146015	VOCs
	P-33-214.6	F3L090146016	VOCs
	P-33-224.6	F3L090146017	VOCs
	P-53-426.75	F3L090146018	VOCs
	P-53-480.90	F3L090146019	VOCs
	TB-125128	F3L090146020	VOCs
F4A130259	P-31-EB-1	F4A130259001	VOCs
	P-31-190.40	F4A130259011	VOCs
	P-31-DUP-1 (P-31-190.40)	F4A130259012	VOCs
	P-55-EB-1	F4A130259019	VOCs
	P-55-DUP-1 (P-55-154.55)	F4A130259025	VOCs
	P-55-154.55	F4A130259029	VOCs
	TB-0105/0112	F4A130259030	VOCs
F4A150320	P-31-344.25	F4A150320004	VOCs
	P-31-351.55	F4A150320005	VOCs
	P-31-DUP-2 (P-31-351.55)	F4A150320006	VOCs
	P-55-164.55	F4A150320007	VOCs
	P-55-174.55	F4A150320008	VOCs
	P-55-186.15	F4A150320009	VOCs
	P-55-EB-2	F4A150320010	VOCs
	P-55-264.40	F4A150320013	VOCs
	P-55-271.00	F4A150320014	VOCs
	TB-01120114	F4A150320015	VOCs
F4A300327	P-55-311.95	F4A300327004	VOCs
	P-55-DUP-2 (P-55-311.95)	F4A300327005	VOCs
	TB-01220129	F4A300327009	VOCs

Table 1-1. *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F4A300327 Cont'd	P-56-DUP-2 (P-56-126.55)	F4A300327023	VOCs
F4B130279	P-32-174.35	F4B130279001	VOCs
	P-32-DUP-1 (P-32-174.35)	F4B130279002	VOCs
	P-32-224.35	F4B130279005	VOCs
	P-32-234.35	F4B130279006	VOCs
	P-32-241.01	F4B130279007	VOCs
	P-32-251.77	F4B130279008	VOCs
	P-32-259.35	F4B130279009	VOCs
	P-32-269.35	F4B130279010	VOCs
	TB-02110212	F4B130279012	VOCs
F4B170134	P-32-279.35	F4B170134001	VOCs
	TB-020916	F4B170134011	VOCs
F4B200226	P-32-488.9	F4B200226006	VOCs
	P-32-DUP-3 (P-32-488.9)	F4B200226007	VOCs
	TB-02090219	F4B200226008	VOCs

1.2. General Considerations

Validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, for the samples and analyses addressed herein, this report summarizes the findings of the review and outlines any deviations from the applicable quality control (QC) criteria referenced in the following documents:

- New York State Department of Environmental Conservation. *Analytical Services Protocol.* Guidance documents including Exhibits A, B, C, D, E, F, G, and I. June 2000.

- United States Environmental Protection Agency. *Contract Laboratory Program National Functional Guidelines for Organic Data Review.* EPA 540-R-99-008. October 1999.

- United States Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* SW-846: Final Update IIIA. April 1998.

- United States Environmental Protection Agency, Region 2. *Contract Laboratory Program* Organics *Data Review.* SOP No. HW-6, Revision #12. March 2001.

- United States Environmental Protection Agency, Region 2. *Standard Operating Procedure for the Validation of Organic Data Acquired Using SW-846 Method 8260B.* SOP No. HW-24, Revision #1. June 1999.

- URS Corporation. *GTE Operations Support Incorporated - Groundwater Investigation Work Plan, Former Sylvania Electric Products Incorporated Facility, Hicksville, New York.* QAPP: Appendix C. September 2002.

1.3. Analytical Methods

The environmental samples presented in this report were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri, for volatile organic compound (VOC) analyses. The laboratory used the following USEPA guidance methods for the analyses:

- SW846 Method 5030B: Purge-and-Trap for Aqueous Samples
- SW846 Method 8260B: Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)

The laboratory assigned an SDG number to a group of samples during the sample log-in process. The SDG number is the means by which the laboratory tracks samples and QC analyses. A total of 403 samples in a total of 55 SDGs are included in this data validation report. The SDG, field identification, and laboratory identification for each sample are summarized in Table 1-1.

The following sections of this document address distinct aspects of the validation process. Section 2 lists the data QA/QC protocols used to validate the sample data. Section 3 presents a summary of the findings associated with the validation and a discussion of the specific QA/QC deviations and qualifications performed on the sample data. Section 4 presents a discussion of data completeness and usability. Section 5 presents the Data Usability Summary Report (DUSR) summary information.

2. Data Validation Protocols

2.1. Sample Analysis Parameters

The validation of analyses for this project used guidances presented in the QAPP (GTEOSI, 2002), the analytical methodologies, the data validation guidelines referenced in Section 1, and professional judgment[7]. MPI performed a data review of all analytical results to assess data quality. A data review includes an assessment of sample handling protocols and supporting laboratory and field QC parameters. The following is a list of specific analytical information evaluated during the validation:

- Data package completeness review – per the NYSDEC ASP Category B or USEPA CLP deliverables requirements
- Analytical methods performed and test method references
- Sample condition - review of log-in records for cooler temperature, presence of headspace, chemical preservation, etc.
- Holding times - comparison of collection, preparation, and analysis dates
- Analytical results - units, values, significant figures
- Sample traceability to raw data
- Instrument tuning
- Initial calibration – comparison to technical guideline criteria
- Continuing calibration – comparison to technical guideline criteria
- Method blank results and laboratory contamination
- Laboratory control sample (LCS) results and comparison to laboratory control limits
- Matrix spike/matrix spike duplicate (MS/MSD) results and comparison to laboratory control limits
- Field replicate/duplicate results and comparison to technical guideline criteria
- Field QC sample (i.e., trip blanks, field blanks, equipment blanks)
- Surrogate recoveries (where applicable) and comparison to laboratory control limits
- Internal Standards (where applicable) and comparison to technical guideline criteria
- Compound identifications, quantitations, dilutions, and reporting limits
- Tentatively Identified Compounds (TICs)

[7] Professional judgment is performed by a USEPA certified data validator with over a decade of environmental laboratory experience.

- Electronic Data Deliverables (EDDs) – comparison to the hardcopy analytical

The analytical reports were reviewed for completeness and the accompanying QC data were reviewed for acceptable performance. When QC results indicated poor performance, MPI applied data qualifiers to the results to inform the data user of the possible performance problem. These qualifiers are in addition to or a revision of the qualifiers provided by the laboratory. A summary of the data qualifiers used for this review is presented in Section 2.2.

2.2. Data Qualifiers

The following qualifiers have been used by the laboratory for organic analyses:

"U" Non-detect result at the laboratory established reporting limit.

"B" Associated with a result if the compound was also identified in the corresponding method blank.

"J" Indicates an estimated value or a value below the laboratory established reporting limit but above the method detection limit.

"E" This flag identifies compounds whose concentrations exceed the calibration range of the instrument for the specific analysis; data qualified with an "E" are qualitative only and not useable for quantitative purposes. All results qualified with an "E" were required to be re-analyzed using an applicable dilution and re-reported.

Laboratory qualifiers defined above, are retained in the final database unless revised during the data validation process to one of the following qualifiers:

"U" The compound was analyzed for, but was not detected above the reported quantitation limit.

"J" The compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample.

"N" The analysis indicates the presence of a compound for which there is presumptive evidence to make a "tentative identification".

"NJ" The analysis indicates the presence of a compound that has been "tentatively identified" and the associated numerical value represents its approximate concentration.

"UJ" The compound was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the compound in the sample.

"R" The sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

2.3. Data Usability Summary Report Questions

The DUSR determines whether or not the data meets Site-specific criteria for data quality and use. It was developed to review and evaluate the analytical data packages. During the course of this review the following questions were addressed (where applicable):

1. *Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?*

2. *Have all holding times been met?*

3. *Do all the QC data: blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?*

4. *Have all of the data been generated using established and agreed upon analytical protocols?*

5. *Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?*

6. *Have the correct data qualifiers been used?*

The answers to the questions presented by the DUSR are presented in the following sections of the report and in the DUSR Summary Information Section, Section 5.

3. Data Quality Evaluation

3.1. Summary

This section summarizes whether the QA/QC parameters reported, which were specified in Section 2.1, met validation criteria. Summaries of the individual components of the review are described in the following sections.

3.2. Review of Validation Criteria

3.2.1. Completeness Review

The laboratory provided the analytical results using Contract Laboratory Program (CLP) –like format. Most documents were included in the report packages including a case narrative summarizing the QC issues associated with the project analyses. Documents missing from the report packages are detailed in Section 3.2.5.

3.2.2. Test Methods

The laboratory performed the analyses using the analytical test methods listed in Section 1.3. They included USEPA SW-846 Method 5030B (purge and trap sample introduction) followed by Method 8260B (gas chromatography/mass spectrometry sample analysis). All samples were analyzed using a 25 mL (typical volume is 5 mL) purge volume, which offered lower reporting limits for each compound.

3.2.3. Sample Receipt

The laboratory received 403 water samples for VOC analysis between March 18, 2003 and February 20, 2004. The temperatures within most VOC sample shipment coolers at the time of laboratory receipt were within the recommended temperature range of 4°C ± 2°C. The exception was with SDG F3H180106 –see details below. Field and laboratory personnel completed the Chain-of-Custody (COC) documents recording the signature, date, and time of custody transfer. The laboratory recorded the condition of the samples at the time of receipt on a "Conditions Upon Receipt Form." This form identifies whether the containers were received undamaged, within the proper temperature range, at the proper pH, in a container that is sealed with a custody seal on the exterior, and with a completed COC enclosed to identify all samples submitted to the laboratory.

The following problems with sample receipt were found:

- SDG F3F030298: sample P-15-189.65 was not submitted but was on the COC; sample TB-06-02-03 was not written on the COC but was submitted – the lab made corrections after contacting MPI. Sample P-D-77.05 pH was not less than 2; however, the sample was analyzed on the 7th day from date of sample collection – no qualification actions are necessary.

- SDG F3F120220: samples P-C-159.6 and P-C-169.6 were not submitted but were on the COC; sample TRIP BLANK was submitted but was not on the COC. In addition, sample P-C-99.6 had headspace; however, the laboratory did not indicate if both or only one of the bottles were affected – with the assumption that only one of the bottles were affected, no qualification was performed.

- SDG F3F180192: sample P-24-97.35 was not submitted but was on the COC.

- SDG F3F260187: sample FB-6-24 was relabeled on the COC as P-23-FB1, but was not relabeled on one of the sample bottles.

- SDG F3G110256: samples P-35-DUP-1 and TB-708710 were mistakenly documented as P-35-DUP-2 and P-35-708710, respectively, during the laboratory's sample log-in process, resulting in the wrong sample IDs reported; IDs were manually corrected during the validation process. Also, one sample container for sample P-35-DUP-1 has headspace; however, no qualification is performed since the laboratory would have used the second vial. Both sample containers for sample P-35-117.2 have headspace; therefore, all detects are qualified as estimated, "J," biased low; and all non-detects are qualified as rejected, "R."

- SDG F3G150156: two samples were received at the laboratory with no sample ID: they were identified based on sampling time.

- SDG F3H060192: sample P-45-81.25 was received but was not listed on the COC. The laboratory added it onto the COC.

- SDG F3H180108: the sample cooler arrived at the laboratory with an internal temperature of 29 °C. All the ice had melted, as Federal Express delivered it after four days in transit. All detects for all field samples were qualified as estimated, "J," biased low; and all non-detects were qualified as rejected, "R."

- SDG F3H270230: sample P-37-304.8 was received but was not listed on the COC. The laboratory added it onto the COC.

- SDG F3I090305: sample P-47-147.1 was received but was not listed on the COC. The laboratory included it for analysis within the SDG.

- SDG F3J030259: samples P-30-89.50 and P-30-99.50 were mistakenly documented as P-30-89.55 and P-30-99.55, respectively, during the laboratory's sample log-in process, resulting in the wrong sample ID reported – the ID was manually corrected during the validation process.

- SDG F3J070236: samples P-30A-298.6, P-30A-DUP-2, P-18-EB-1, P-18-156.65, and P-18-DUP-1 were presumed to be preserved to a pH < 2 during sample receipt by the laboratory. Due to the potential loss of volatile constituents, the sample vials were not checked for pH preservation until the time of analysis. Sample pH was not less than 2. The samples were analyzed outside the 7-day un-preserved technical holding time. Therefore, all aromatic compound results for these samples were qualified as estimated, "J" or "UJ."

- SDG F3J290103: sample P-51-DUP-2 was received but was not listed on the COC. The laboratory included it for analysis within the SDG.

- SDG F3K080109: sample TB-114116 was received but was not listed on the COC. The laboratory added it onto the COC.

- SDG F3K110173: sample P-54-267.95 was mistakenly documented as P-54-268.95 during the laboratory's sample log-in process, resulting in the wrong sample ID reported; the ID is manually corrected during the validation process. Samples P-54-267.95 and P-54-DUP-2 were noted to have headspace. Therefore, all detects for these two samples were qualified as estimated, "J," biased low; and all non-detects were qualified as rejected, "R."

- SDG F4A130259: the laboratory documented that sample container for sample P-55-84.10 has headspace; however, this review assumes that only one of the two containers has headspace. No qualification was performed since the laboratory would have used the second vial.

- SDG F4A150320: the laboratory documented that there was headspace in one container in each of the following samples: P-31-351.55, P-55-186.15, and P-55-EB-2. No qualification was performed since the laboratory would have used the second vial.

- SDG F4A300327: the laboratory documented that there was headspace with samples P-55-DUP-2 and P-55-311.95; however, this review assumes that only one of the two containers for each sample has headspace. No qualification was performed since the laboratory would have used the second vial. Sample P-56-DUP-2 was submitted as a blind duplicate of sample P-56-126.55. However, sample P-56-126.55 was never submitter. Therefore, the duplicate sample will be considered as the original sample, and duplicate recovery criteria will not be evaluated with this sample.

- SDG F4B130279: two VOA vials were received by the laboratory for sample P-32-EB-1, which were not listed on the COC. There is no indication that the laboratory informed MPI, and the sample was not analyzed.

There were no custody seals attached to individual sample bottles. No qualification was necessary because the exterior of the shipment coolers had intact custody seals. However, some cooler exteriors were noted to have no custody seals: SDGs F3F120220, F3F170126, F3F260187, F3G150156, F3I150101, F3K110173, F3L090146, and F4B200226. Based on professional judgment, no qualification was performed because the custodies during shipment were maintained by Federal Express, and the coolers were shipped over-night with early morning arrival at the laboratory.

There were occasions where a VOC sample bottles broke during shipment; however, there was always a second aliquot sample bottle, which arrived at the laboratory intact.

3.2.4. Holding Times

The laboratory performed almost all VOC analyses within the technical holding time of 14 days from date of sample collection. Most samples were correctly preserved with acid to a pH of ≤ 2. The following were problems observed:

- SDG F3L090146: the reanalysis of sample P-53-480.90 was performed on the 18th day from the date of sample collection. The initial analysis was performed within holding time; however, one of the compounds was detected slightly above the calibration range. Based on professional judgment, the data from the initial analysis was reported, and the reanalysis is to be disregarded. The compound concentration, which exceeded the calibration range, is qualified as estimated, "J."

- SDG F4A150320: the following samples were re-analyzed outside holding time: P-31-351.55 RE, P-31-DUP-2 RE, P-55-164.55 DL, P-55-174.55 DL, P-55-186.15 DL, P-55-EB-2 RE, P-55-264.40 DL, and P-55-271.00 DL. They were re-analyzed due to QC deficiencies associated with the initial analysis or the need for additional dilutions. All results for the re-analyzed samples were qualified as estimated, "J," biased low. As part of this validation, specific compound results from the re-analysis were combined with the initial analysis results to form the final validated results. A list of the affected compounds is located in Table 3-7 of Section 3.2.17.

- SDG F4A300327: the following samples were analyzed outside holding time: P-55-311.95 RE and P-55-DUP-2. Sample P-55-311.95 RE was a re-analysis. All results for the re-analyzed sample were qualified as estimated, "J," biased low. As part of this validation, specific compound results from the re-analysis are combined with the initial analysis results to form the final validated results. A list of the affected compounds is located in Table 3-7 of Section 3.2.17. Sample P-55-DUP-2 was analyzed 11 minutes passed the holding time. No qualifications were necessary based on professional judgment.

3.2.5. Analytical Results

For each sample tested, the laboratory provided the analytical test information using the CLP -like format. This format requires the use of stylized forms to present critical information pertaining to the analyses performed. For all analytical results, the laboratory provided a "Form I" with the reported analytical results for the requested analyses. The Form I format presents the following information for organic analyses: the laboratory name; the laboratory code; the matrix; the sample volume to final purge volume; the sample identification; the laboratory file identification; the date the sample was received; the date the sample was analyzed; the dilution factor; the chemical abstract service (CAS) number; the units of measure; and the laboratory qualifier (if any). The laboratory did not always provide all CLP forms (or CLP-like forms); however, all information from the missing forms can be obtained within the raw data submitted.

The specific forms, which were not submitted, or not summarized in the CLP format, were associated with the following SDGs:

SDG F3C190235:

- Form IIA – Water Volatile System Monitoring Compound Recovery
- Form IV – Volatile Method Blank Summary
- Form V – Volatile Organic Instrument Performance Check

SDGs F3I040177, F3I120107, and F3K080109:

- Form IIA – Water Volatile System Monitoring Compound Recovery

SDG F3K280120:

- Form V – Volatile Organic Instrument Performance Check – not tabulated for seven samples
- Form VIII – Volatile Internal Standard Area and RT Summary - not tabulated for seven samples

SDG F4A130259:

- All QC summary forms were missing in the data package. However, they were submitted by the laboratory after requested.

For many of the later SDGs, the surrogate limits specified on Form II (Surrogate Recovery) were not consistent with the laboratory's report forms for results. The limits on the report forms for results (Form I) were used for this validation.

3.2.6. Traceability to Raw Data

Traceability of the VOC analyses is established by Form V (Instrument Performance Check). These forms list the project samples analyzed per laboratory batch processed and the corresponding QC samples performed with the project samples. Although Form V was not submitted in SDG F3C190235, the information was obtained within the raw data submitted.

3.2.7. Instrument Tuning

The GC/MS instrument performance (i.e., "tuning data," or a check of mass spectral ion intensities using bromofluorobenzene [BFB]) met method criteria. The instrument performance was checked prior to calibration and once every 12-hour shift for all analytical QC batches. The following deficiencies are noted:

- For SDG F3E230179, sample TB-051903B was analyzed 7 minutes pass the 12–hour instrument tune time. There was no additional sample aliquot to perform the analysis again since the second VOC bottle was broken during shipment to the laboratory. Based of professional judgment, no data qualifications are necessary for analyzing the sample slightly past the 12-hour tune time.

- SDG F3K280120: tabulations were not performed for seven samples on Form V. Information from the raw data was used to perform these checks during the data validation process. No data qualifications are necessary.

3.2.8. Initial Calibration

Initial Calibrations (ICALs) were performed at six levels with most compound concentrations from 1 ug/L to 40 ug/L. Some compounds in the ICALs did not meet data validation criteria [i.e., relative response factors (RRFs) technical criteria of ≥ 0.05, and the percent relative standard deviations (%RSDs) technical criteria of $\leq 15\%$]. Additionally, for all target compounds, method requirements recommended compounds to be quantitated using the average relative response factor (avgRRF) only, if the %RSD is less than 15%. The method recommended all compounds with a %RSD greater than 15% to be quantitated with a calibration curve rather than the avgRRF. The laboratory does not prepare calibration curves for compounds with %RSDs greater than 15% as recommended within the method. Rather, the laboratory uses an alternate approach to the ICAL evaluation by evaluating the average RRF (for all compounds calibrated). If their average RRF is less than 15% (across all compounds) then the laboratory considers this to mean that they have met method criteria for the ICAL. Since this evaluation approach is not widely used, a conservative approach was used for the validation process and all results were qualified as estimated ("J" or "UJ") that were associated with the laboratory ICALs that had a %RSD greater than 15%. Table 3-1 shows a summary of the samples and compounds qualified as estimated, "J," or not usable, "R," due to ICAL deficiencies.

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	***Initial Calibration Date***	***Sample ID***	***Compounds***	***Action***
F3C190235	01/15/03, 14:31	TB-A TB-B MW-7 MW-7 DL MW-2 MW-2 DL MW-1 MW-1 DL MW-11 MW-12 MW-12 DL MW-5 MW-5 DL MW-10 MW-10 DL MW-9 MW-6 MW-3 MW-3 DL MW-4 MW-4 DL MW-8 FB MW-DUP MW-DUP DL	%RSD: Bromomethane Methylene Chloride Acetone m,p-Xylene RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3D290160	04/15/03, 15:32	P-17-73.25 P-17-92.25 P-17-223.1 P-FB-1 P-F-86.48 TB-1 P-F-76.46	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3E060217	04/15/03, 15:32	P-27-89.75 P-27-DUP P-27-99.75 P-27-139.75 P-27-199.75 P-28-87.02 P-28-97.02 P-28-147.02 P-28-207.02 TB-2	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3E160130	05/16/03, 15:51	P-26-231.25 P-26-241.25 P-E-78.57 P-E-88.57 P-E-98.57 TRIP BLANK	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3E200165	05/16/03, 15:51	P-26-257.2 P-26-267.2 P-26A-276.53 P-26A-286.5 P-26A-295.85 TRIP BLANK P-E-128.57 P-E-138.57 P-E-148.57 P-E-158.57	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3E230175	05/16/03, 15:51	P-E-292.28 P-E-292.28 DL P-E-301.23 P-E-301.23 DL P-E-332.85 P-E-327.15 TB-051903B	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3E290170	05/16/03, 15:51	P-D-87.05 1EB-5/27 P-D-97.05 P-D-107.05 TB-05-28-03 TB-05-28-03 RE P-15-79.65 P-15-79.65 RE P-15-89.65 P-15-99.65 P-15-109.65 P-15-119.65	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F030298	05/16/03, 15:51	P-15-179.65 P-D-257. P-D-290.1 P-D-77.05 P-D-117.05 P-D-127.05 P-D-137.05 P-D-147.05 TB-06-02-03	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F120220	06/06/03, 01:01	P-C-89.6 P-C-99.6 P-C-DUP-1 TRIP BLANK	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F170126	06/06/03, 01:01	P-C-320.3 P-C-330.3 P-C-337.5 P-C-337.5 DL P-24-87.35 P-24-77.35 TB-612-616 P-C-FB P-C-159.6 P-C-169.6	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3F180192	06/06/03, 01:01	TB-617 P-24-127.3 P-24-137.3 P-24-137.3 RE P-C-347.7	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F200145	06/06/03, 01:01	P-24-157.3 P-24-167.3 P-24-177.3 P-24-187.3 P-24-197.3 P-24-207.3 P-24-207.3 DL P-24-217.3 P-24-DUP-1 P-24-227.3 P-24-237.3 P-24-247.3 P-24-257.3 TB-619 P-24-147.3 P-24-267.3 P-24-277.3 P-24-287.3 P-24-DUP-2 P-C-364.5 P-C-374.5 P-C-394.5 P-C-384.5	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F260187	06/06/03, 01:01	P-24-297.3 P-23-FB-1 P-23-180.1 P-23-DUP-1 P-23-DUP-1 DL TB-619625	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F270132	06/06/03, 01:01	TB-625626 P-23-150.1 P-23-160.1	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G010309	06/06/03, 01:01	P-23-239.8 P-23-252.0 P-23-262.0 P-23A-286.96 P-23A-293.50 TB-627630	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3G030162	06/06/03, 01:01	TB-701702 P-23A-DUP-1 P-23A-347.6	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G110256	06/06/03, 01:01	P-25-EB-1 P-25-169.7 P-25-179.7 P-25-DUP-1 P-35-EB-1 P-35-117.2 P-35-177.2 P-35-DUP-1 TB-708710	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G150156	06/06/03, 01:01	P-25-275.8 P-25-DUP-2 P-25-349.4 P-25-349.4 RE P-35-EB-2 P-35-332.2 P-35-DUP-2 TB-710714	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G230216	06/06/03, 01:01	P-H-EB-1 P-H-EB-1 RE P-H-116.8 TB721722 P-42-EB-1	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G250374	06/06/03, 01:01	P-H-106.8 P-H-136.8 P-H-146.8 P-H-156.8 P-H-EB-2 P-H-206.55 P-42-202.7 P-42-DUP-1 P-42-DUP-1 DL P-42-DUP-1 DL RE P-42-DUP-1 DL RE RE P-H-DUP-2 TB-722724	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3G290207	06/06/03, 01:01	P-H-351.65 P-42-217.2 P-42-276.4 P-42-329.8 P-42-DUP-2 P-42-354.6 TB-724728	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H060192	08/11/03, 15:34	P-20-149.60 P-20-159.60 P-20-EB-1 P-45-81.25 TB-804805 P-45-131.25 P-45-DUP-1 P-45-DUP-1 RE	%RSD: Bromomethane Methylene Chloride Acetone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H080219	08/11/03, 15:34	P-20-220.76 P-20-229.70 TB-805807 P-45-151.25 P-45-207.25	%RSD: Bromomethane Methylene Chloride Acetone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H080219	08/11/03, 15:34	P-45-281.65 P-20-309.60 P-20-319.60 P-20-FB TB-8-12 P-20-427.99 P-20-DUP-2	%RSD: Bromomethane Methylene Chloride Acetone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H080219	08/11/03, 15:34	P-45-366.39 P-45-DUP-2 P-20-476.68 TB-0813 TB-0813 RE	%RSD: Bromomethane Methylene Chloride Acetone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H080219	08/11/03, 15:34	P-36-EB-1 P-37-119.95 P-37-DUP-1 TB-819820	%RSD: Bromomethane Methylene Chloride Acetone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3H220246	08/27/03, 22:31	P-36-156.7 P-36-DUP-1 P-46-139.60 P-46-DUP-1 P-37-EB-1 TB-820821	%RSD: Bromomethane Chloroethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H270230	08/27/03, 22:31	P-46-275.42 P-46-DUP-2 P-36A-282.0 P-36-136.7 P-37-284.4 P-37-304.8 P-37-DUP-2 TB-821-824	%RSD: Bromomethane Chloroethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I040177	08/27/03, 22:31	EB-1-44 EB-2-P-44 P-44-99.3 P-44-DUP-1 TB-90203	%RSD: Bromomethane Chloroethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I050189	08/27/03, 22:31	P-44-149.8 TB-903904	%RSD: Bromomethane Chloroethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	09/08/03, 16:37	P-44-149.8 DL	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3I090305	09/08/03, 16:37	P-44-215.5 P-44-215.5 DL P-44-229.2 P-44-229.2 DL P-44-239.85 P-44-239.5 DL P-44-249.85 P-44-249.8 DL P-44-257.1 P-44-EB-3 P-47-DUP-1 P-47-147.1 P-47-177.0 P-47-205.7 TB-904908	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I120107	09/08/03, 16:37	P-43-EB-1 P-43-119.88 P-43-DUP-1 P-44-339.8 TB-908910	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I150101	09/17/03, 14:56	P-43-129.88 P-47-197.0 TB-906911	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I180259	09/17/03, 14:56	P-29-109.5 P-29-DUP-1 TB-916917 P-38-FB-1 P-38-116.7 P-38-DUP-1 P-38-146.7	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3I230231	09/17/03, 14:56	P-29-EB-1 P-29-310.2 P-29-329.85 P-29-DUP-2 P-29-EB-2 P-29-360.0 P-38-186.3 P-38-207.5 P-38-216.3 P-38-260.7 P-38-260.7 RE P-43-246.68 P-43-246.68 RE P-43-DUP-2 P-43-DUP-2 RE P-43-294.85 P-43-294.85 RE TB-917922 P-29-390.0	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I250196	09/17/03, 14:56	P-38-FB-2 P-38-DUP-3 (P-38-381.3) TB-923924	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3J030259	09/17/03, 14:56	P-30-89.50 P-30-99.50 P-30-204.55 P-30-DUP-1 TB1-930102	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3J070236	09/17/03, 14:56	P-30A-298.6 P-30A-DUP-2 P-18-EB-1 P-18-156.65 P-18-DUP-1 TB-102106	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3J110172	09/17/03, 14:56	P-30A-406.55 P-30A-DUP-3 P-18-217.65 P-18-247.65 P-18-DUP-2 P-18-257.65 P-18-267.65 P-18-277.65 P-18-287.65 P-18-302.66 TB-106109 P-18-335.80	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3J240204	09/17/03, 14:56	P-50-109.90 P-50-109.90 DL P-50-119.90 P-50-129.90 P-50-DUP-1 P-50-139.90 P-50-149.90 P-49-114.3 P-49-124.3 P-49-167.3 P-49-DUP-1 TB10211023 P-51-117.78 P-51-127.78 P-49-EB-1	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3J290103	09/17/03, 14:56	P-50-249.90 P-50-267.44 P-50-309.90 P-50-EB-2 P-50-342.60 P-50-DUP-2 P-50-DUP-2 RE TB-10231027 P-49-269.3 P-49-269.3 RE P-49-284.3 P-49-284.3 RE P-49-340.8 P-49-DUP-2 P-49-DUP-2 DL P-51-187.78 P-51-DUP-2 P-51-246.75	%RSD: Bromomethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3J310287	11/06/03, 23:17	P-51-301.12 P-51-321.00 P-51-327.85 TB-10271030	%RSD: Bromomethane Chloroethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3K080109	11/06/03, 23:17	P-54-107.55 P-54-107.55 DL P-52-EB-1 P-52-170.0 P-52-DUP-1 P-52-DUP-1 RE P-58-EB-1 P-58-159.65 P-58-DUP-1 TB-114116	%RSD: Bromomethane Chloroethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3K110173	11/06/03, 23:17	P-58-274.65 P-58-DUP-2 P-58-DUP-2 RE P-54-267.95 P-54-267.95 RE P-54-DUP-2 P-54-DUP-2 RE P-54-276.4 TB-1171110	%RSD: Bromomethane Chloroethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3K140242	11/19/03, 1622	P-54-351.25 P-54-351.25 DL P-54-DUP-3 P-54-DUP-3 DL TB-11101113	%RSD: Bromomethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3K210372	11/19/03, 1622	P-52-EB-2 TB-11171120 EB-P-54-11-17 P-53-EB-11-20	%RSD: Bromomethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3K280120	11/19/03, 1622	P-53-146.40 P-53-DUP-1 P-53-266.35 P-53-DUP-2 P-34-EB-1 P-34-139.55 P-34-DUP-1 P-34-224.55 P-34-234.55 P-34-244.55 P-34-DUP-2 P-34-254.55 P-34-264.55 P-34-284.55 P-34-294.55 P-34-304.50 TB-11201125 P-53-331.10 P-53-340.05 P-53-340.05 RE	%RSD: Bromomethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F3K280120	11/19/03, 1622	P-34-324.50 P-34-334.50 TB-121124	%RSD: Bromomethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3K280120	11/19/03, 1622	P-33-EB-1 P-33-159.6 P-33-169.6 P-33-179.6 P-33-DUP-1 P-33-189.6 P-33-198.1 P-33-214.6 P-33-224.6 P-53-426.75 P-53-480.90 TB-125128	%RSD: Bromomethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F4A130259	01/14/04, 1456	P-31-EB-1 P-31-EB-1 RE	%RSD: Bromomethane Carbon Disulfide Methylene Chloride Acetone 2-Butanone Bromoform RRF: Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	01/19/04, 1421	P-55-EB-1 P-55-EB-1 DL TB-01050112 P-31-190.40 P-31-190.40 RE P-31-DUP-1 P-31-DUP-1 RE P-55-DUP-1 P-55-DUP-1 RE P-55-154.55 P-55-154.55 RE	%RSD: Chloromethane Bromomethane Chloroethane Methylene Chloride 2-Butanone Dibromochloro-methane Bromoform RRF: Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F4A150320	01/19/04, 1421	P-55-164.55 P-55-174.55 P-55-186.15 P-55-EB-2 TB-01120114	%RSD: Chloromethane Bromomethane Chloroethane Methylene Chloride 2-Butanone Dibromochloro-methane Bromoform RRF: Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	01/28/04, 1225	P-31-344.25 P-31-351.55 P-31-DUP-2 P-31-344.25 RE P-55-264.40 P-55-271.00 TB-01120114 RE	%RSD: Chloromethane Vinyl chloride Bromomethane Chloroethane Methylene Chloride Acetone 2-Butanone Dibromochloro-methane 2-Hexanone Bromoform RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	02/02/04, 1153	P-31-351.55 RE P-31-DUP-2 RE P-55-264.40 DL	%RSD: Bromomethane Methylene Chloride Acetone Bromoform RRF: Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	02/02/04, 1636	P-55-EB-2 RE	%RSD: Bromomethane Chloroethane Acetone Methylene Chloride RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F4A150320 Cont'd	02/03/04, 0420	P-55-271.00 DL P-55-164.55 DL P-55-174.55 DL P-55-186.15 DL	%RSD: Bromomethane Methylene Chloride Acetone RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F4A300327	02/02/04, 1636	TB-01220129 P-56-126.55 P-55-311.95 P-55-311.95 RE	%RSD: Bromomethane Chloroethane Acetone Methylene Chloride RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	02/09/04, 1410	P-55-DUP-2	%RSD: Vinyl chloride Acetone Methylene Chloride 2-Butanone RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F4B130279	02/02/04, 1636	P-32-174.35 P-32-DUP-1 P-32-224.35 P-32-234.35 P-32-241.01 P-32-251.77 P-32-259.35 P-32-269.35 TB-02110212	%RSD: Bromomethane Chloroethane Acetone Methylene Chloride RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F4B170134	02/02/04, 1636	P-32-279.35 TB-020916	%RSD: Bromomethane Chloroethane Acetone Methylene Chloride RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-1. *Evaluation of Initial Calibration Results*

Package Identification	*Initial Calibration Date*	*Sample ID*	*Compounds*	*Action*
F4B200226	02/02/04, 1636	P-32-488.9	%RSD: Bromomethane Chloroethane Acetone Methylene Chloride RRF: Bromomethane Acetone 2-Butanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	02/27/04, 1327	P-32-DUP-3 TB-02090219	%RSD: Bromomethane Chloroethane 1,1-Dichloroethene Acetone Carbon disulfide 1,1,1-Trichloroethane Carbon Tetrachloride Tetrachloroethene Bromoform Xylenes (total) RRF: Bromomethane Chloroethane Acetone 2-Butanone 4-Methyl-2-pentanone	% RSD > 15% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Notes:
DL Suffix – Indicates a secondary diluted sample reanalysis
RE Suffix – Indicates a reanalysis at the same dilution

3.2.9. Continuing Calibration

The continuing calibration (CCAL) verification analyses were performed with a mid-level standard immediately following the tuning check at the beginning of each 12-hour analytical sequence. Some compounds in the CCAL verification analyses did not meet data validation criteria (i.e., RRFs technical criteria of ≥ 0.05, and the percent differences (%Ds) from the average RRF technical criteria of ≤ 20%. Table 3-2 shows a summary of the samples and compounds qualified as estimated, "J," or not usable, "R," due to CCAL deficiencies.

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3C190235	03/20/03, 15:15	TB-A TB-B MW-7 MW-2 MW-1 MW-11 MW-12 MW-5 MW-10 MW-3 MW-8	% D: Bromomethane Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	03/21/03, 15:32	MW-2 (rea) MW-1 (rea) MW-12 (rea) MW-5 (rea) MW-10 (rea) MW-9 MW-6 MW-3 (rea) MW-4 FB MW-DUP	% D: Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	03/25/03, 09:12	MW-7 (rea) MW-4 (rea) MW-DUP (rea)	% D: Bromomethane Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3D290160	05/05/03, 08:01	P-17-73.25 P-17-92.25 P-17-223.1 P-FB-1 P-F-86.48 TB-1 P-F-76.46	% D: Chloromethane Bromomethane RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3E060217	05/07/03, 08:58	P-27-89.75 P-27-DUP P-27-99.75 P-27-139.75 P-27-199.75 P-28-87.02 P-28-97.02 P-28-147.02 P-28-207.02 TB-2	% D: Bromomethane Acetone RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3E160130	05/21/03, 08:56	P-26-231.25 P-26-241.25 P-E-78.57 P-E-88.57 P-E-98.57 TRIP BLANK	% D: Acetone Methylene Chloride RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3E200165	05/21/03, 08:56	P-26-257.2 P-26-267.2 P-26A-276.53 P-26A-286.5 P-26A-295.85 TRIP BLANK	% D: Acetone Methylene Chloride RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	05/22/03, 09:42	P-E-128.57 P-E-138.57 P-E-148.57 P-E-158.57	% D: Chloromethane Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3E230179	05/27/03, 09:23	P-E-292.28 P-E-301.23 P-E-332.85 P-E-327.15 TB-051903B	% D: Acetone trans-1,3- Dichloropropene RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	05/28/03, 08:42	P-E-292.28 DL P-E-301.23 DL	% D: Chloromethane Methylene Chloride Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3E290170	06/02/03, 15:51	P-D-87.05 1EB-5/27 P-D-97.05 P-D-107.05 TB-05-28-03 TB-05-28-03 RE P-15-79.65 P-15-89.65 P-15-99.65 P-15-109.65 P-15-119.65	% D: Methylene Chloride Acetone RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3E290170 Cont'd	06/03/03, 09:19	P-15-79.65 RE	% D: Acetone 1,1,2,2-Tetrachloroethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F030298	06/04/03, 09:53	P-15-179.65 P-D-257. P-D-290.1 P-D-77.05 P-D-117.05 P-D-127.05 P-D-137.05 P-D-147.05 TB-06-02-03	% D: Acetone 2-Butanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F120220	06/13/03, 18:08	P-C-89.6 P-C-99.6 P-C-DUP-1 TRIP BLANK	% D: Chloromethane Bromomethane Methylene chloride Acetone RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F170126	06/19/03, 12:25	P-C-320.3 P-C-330.3 P-C-337.5 P-24-87.35 P-24-77.35 TB-612-616 P-C-FB P-C-159.6 P-C-169.6	% D: Vinyl chloride Bromomethane Carbon disulfide Methylene chloride Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	06/20/03, 11:05	P-C-337.5 DL	% D: Bromomethane Carbon disulfide Methylene chloride 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F180192	06/20/03, 11:05	TB-617 P-24-127.3 P-24-137.3 P-C-347.7	% D: Bromomethane Carbon disulfide Methylene chloride 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3F180192 Cont'd	06/23/03, 09:48	P-24-137.3 RE	% D: Chloroethane Bromomethane Carbon disulfide Methylene chloride 2-Butanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F200145	06/23/03, 09:48	P-24-157.3 P-24-167.3 P-24-177.3 P-24-187.3 P-24-197.3 P-24-207.3 P-24-217.3 P-24-DUP-1 P-24-227.3 P-24-237.3 P-24-247.3 P-24-257.3	% D: Chloroethane Bromomethane Carbon disulfide Methylene chloride 2-Butanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	06/24/03, 18:19	P-24-207.3 DL TB-619 P-24-147.3 P-24-267.3 P-24-277.3 P-24-287.3 P-24-DUP-2 P-C-364.5 P-C-374.5 P-C-394.5 P-C-384.5	% D: Bromomethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F260187	06/30/03, 09:32	P-24-297.3 P-23-FB-1 P-23-180.1 P-23-DUP-1 P-23-DUP-1 DL TB-619625	% D: Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3F270132	07/02/03, 08:33	TB-625626 P-23-150.1 P-23-160.1	% D: Bromomethane Methylene chloride 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3G010309	07/03/03, 09:32	P-23-239.8 P-23-252.0 P-23-262.0 P-23A-286.96 P-23A-293.50 TB-627630	% D: Chloromethane Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G030162	07/07/03, 15:37	TB-701702 P-23A-DUP-1 P-23A-347.6	% D: Bromomethane 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G110256	07/14/03, 12:40	P-25-EB-1 P-25-169.7 P-25-179.7 TB-708710	% D: Bromomethane 2-Butanone 2-Hexanone RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	07/15/03, 08:57	P-25-EB-1 DL P-25-DUP-1 P-35-EB-1 P-35-117.2 P-35-177.2 P-35-DUP-1	% D: Bromomethane Methylene chloride Bromoform RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G150156	07/15/03, 22:09	P-25-275.8 P-25-DUP-2 P-25-349.4 P-25-349.4 RE P-35-EB-2 P-35-332.2 P-35-DUP-2 TB-710714	% D: Bromomethane RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G230216	07/25/03, 08:39	P-H-EB-1 P-H-EB-1 RE P-H-116.8 TB721722 P-42-EB-1	% D: Bromomethane Bromoform RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3G250374	07/29/03, 08:52	P-H-106.8 P-H-136.8 P-H-146.8 P-H-156.8 P-H-EB-2 P-H-206.55 P-42-202.7 P-42-DUP-1 DL RE P-H-DUP-2 TB-722724	% D: Bromomethane 2-Butanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	07/30/03, 09:26	P-42-DUP-1 P-42-DUP-1 DL P-42-DUP-1 DL RE RE	% D: Bromomethane Methylene chloride 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3G290207	07/31/03, 08:37	P-H-351.65 P-42-217.2 P-42-276.4 P-42-329.8 P-42-DUP-2 P-42-354.6 TB-724728	% D: Bromomethane Acetone 1,1-Dichloroethane 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H060192	08/11/03, 16:57	P-20-149.60 P-20-159.60 P-20-EB-1 P-45-81.25 TB-804805	% D: Chloromethane Bromomethane 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	08/12/03, 09:13	P-45-131.25 P-45-DUP-1 P-45-DUP-1 RE	% D: Bromomethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H080219	08/11/03, 16:57	P-20-220.76 P-20-229.70 TB-805807 P-45-151.25 P-45-207.25	% D: Chloromethane Bromomethane 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3H130195	08/14/03, 08:41	P-45-281.65 P-20-309.60 P-20-319.60 P-20-FB TB-8-12 P-20-427.99 P-20-DUP-2	% D: Bromomethane Methylene chloride 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H180106	08/18/03, 14:08	P-45-366.39 P-45-DUP-2 P-20-476.68 TB-0813 TB-0813 RE	% D: Bromomethane Chloroethane Methylene chloride 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H210288	08/24/03, 09:06	P-36-EB-1 P-37-119.95 P-37-DUP-1 TB-819820	% D: Bromomethane Chloroethane Methylene chloride 2-Butanone 2-Hexanone Bromoform RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H220246	08/28/03, 09:07	P-36-156.7 P-36-DUP-1	% D: Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3H270230	08/28/03, 09:07	P-46-275.42 P-46-DUP-2 P-36A-282.0 P-36-136.7 P-37-284.4 P-37-304.8 P-37-DUP-2 TB-821-824	% D: Acetone 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3I040177	09/04/03, 12:05	EB-1-44 EB-2-P-44 P-44-99.3 P-44-DUP-1 TB-90203	% D: Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I050189	09/05/03, 08:45	P-44-149.8 TB-903904	% D: Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	09/09/03, 09:47	P-44-149.8 DL	% D: Methylene chloride RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I090305	09/11/03, 08:34	P-44-215.5 P-44-229.2 P-44-229.2 DL P-44-239.85 P-44-249.85 P-44-257.1 P-44-EB-3 P-47-DUP-1 P-47-147.1 P-47-177.0 P-47-205.7 TB-904908	% D: Acetone Bromoform RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	09/12/03, 08:47	P-44-215.5 DL P-44-239.5 DL P-44-249.8 DL	% D: Bromoform RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I120107	09/13/03, 13:57	P-43-EB-1 P-43-119.88 P-43-DUP-1 P-44-339.8 TB-908910	% D: Bromoform RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3I150101	09/18/03, 09:06	P-43-129.88 P-47-197.0 TB-906911	% D: Chloroethane Methylene chloride Acetone 2-Butanone Bromoform RRF: 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I180259	09/21/03, 11:30	P-29-109.5 P-29-DUP-1 TB-916917 P-38-FB-1 P-38-116.7 P-38-DUP-1 P-38-146.7	% D: Bromomethane Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I230231	09/29/03, 09:48	P-29-EB-1 P-29-310.2 P-29-329.85 P-29-DUP-2 P-29-EB-2 P-29-360.0 TB-917922	% D: Bromomethane Chloroethane Methylene chloride trans-1,3- Dichloropropene RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	09/30/03, 08:33	P-38-186.3 P-38-207.5 P-38-216.3 P-38-260.7 P-38-260.7 RE P-43-246.68 P-43-246.68 RE P-43-DUP-2 P-43-DUP-2 RE P-43-294.85 P-43-294.85 RE P-29-390.0	% D: Bromomethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3I250196	10/01/03, 09:13	P-38-FB-2 P-38-DUP-3 (P-38-381.3) TB-923924	% D: Bromomethane Methylene chloride RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3J030259	10/06/03, 09:34	P-30-89.50 P-30-99.50 P-30-204.55 P-30-DUP-1 TB1-930102	% D: Bromomethane 2-Butanone 4-Methyl-2- pentanone 2-Hexznone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3J070236	10/14/03, 09:22	P-30A-298.6 P-30A-DUP-2 P-18-EB-1 P-18-156.65 P-18-DUP-1 TB-102106	% D: 2-Butanone Cis-1,3-dichloropropene 4-Methyl-2-pentanone 1,1,2,2-Tetrachloroethane RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3J110172	10/16/03, 08:49	P-30A-406.55 P-30A-DUP-3 P-18-217.65 P-18-247.65 P-18-DUP-2	% D: Bromomethane Chloroethane Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	10/16/03, 21:27	P-18-257.65 P-18-267.65 P-18-277.65 P-18-287.65 P-18-302.66 TB-106109 P-18-335.80	% D: Chloromethane Methylene chloride Acetone 4-Methyl-2-pentanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3J240204	10/30/03, 19:11	P-50-109.90 P-50-119.90 P-50-129.90 P-50-DUP-1 P-50-139.90 P-50-149.90 P-49-114.3 P-49-124.3 P-49-167.3 P-49-DUP-1 TB10211023 P-51-117.78 P-51-127.78 P-49-EB-1	% D: Chloromethane Bromomethane 2-Butanone 4-Methyl-2-pentanone trans-1,3-Dichloropropene 1,1,2-Trichloroethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	11/04/03, 08:51	P-50-109.90 DL	Reviewed for Vinyl chloride only	None
F3J290103	11/04/03, 08:51	P-50-249.90 P-50-267.44 P-50-309.90 P-50-EB-2 TB-10231027	% D: Methylene chloride Acetone RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3J290103 Cont'd	11/04/03, 20:12	P-50-342.60 P-50-DUP-2 P-49-269.3 P-49-284.3 P-49-340.8 P-49-DUP-2 P-51-187.78 P-51-DUP-2 P-51-246.75 P-49-DUP-2 DL P-50-DUP-2 RE	% D: Bromomethane 2-Butanone 4-Methyl-2-pentanone trans-1,3-Dichloropropene 1,1,2-Trichloroethane 1,1,2,2-Tetrachloroethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	11/05/03, 10:17	P-49-269.3 RE P-49-284.3 RE	% D: Bromomethane 1,1-Dichloroethane 2-Butanone 4-Methyl-2-pentanone trans-1,3-Dichloropropene 1,1,2-Trichloroethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3K080109	11/14/03, 10:21	P-54-107.55 P-54-107.55 DL P-52-EB-1 P-52-170.0 P-52-DUP-1 P-58-EB-1 P-58-159.65 P-58-DUP-1 TB-114116	% D: Bromomethane Methylene chloride Acetone Carbon tetrachloride 2-Butanone Trichloroethene 4-Methyl-2-pentanone Tetrachloroethene 2-Hexanone 1,1,2,2-Tetrachloroethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	11/18/03, 09:33	P-52-DUP-1 RE	% D: Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3K110173	11/14/03, 10:21	P-58-274.65 P-58-DUP-2 P-54-267.95 P-54-DUP-2 TB-1171110	% D: Bromomethane Methylene chloride Acetone Carbon tetrachloride 2-Butanone Trichloroethene 4-Methyl-2-pentanone Tetrachloroethene 1,1,2,2-Tetrachloroethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	11/18/03, 09:20	P-58-DUP-2 RE P-54-267.95 RE P-54-DUP-2 RE P-54-276.4	% D: Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3K140242	11/20/03, 19:28	P-54-351.25 P-54-DUP-3 TB-11101113	% D: Bromomethane Methylene chloride Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	11/21/03, 09:28	P-54-351.25 DL P-54-DUP-3 DL	RRF: Bromomethane Acetone 2-Butanone	RRF < 0.05 R – all non-detect results J – all positive results
F3K210372	11/28/03, 19:01	P-52-EB-2 TB-11171120 EB-P-54-11-17 P-53-EB-11-20	% D: Bromomethane RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3K280120	12/03/03, 21:35	P-53-146.40 P-53-DUP-1 P-53-266.35 P-53-DUP-2 P-34-EB-1	% D: Bromomethane Methylene chloride RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F3K280120 Cont'd	12/06/03, 14:00	P-34-139.55 P-34-DUP-1 P-34-224.55 P-34-234.55 P-34-244.55 P-34-DUP-2 P-34-254.55 P-34-264.55 P-34-284.55 P-34-294.55 P-34-304.50 TB-11201125	% D: Bromomethane Methylene chloride 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	12/08/03, 10:15	P-53-331.10 P-53-340.05 P-53-340.05 RE	% D: Bromomethane Methylene chloride Acetone 2-Butanone 2-Hexanone RRF: Bromomethane Acetone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3L050365	12/08/03, 10:15	P-34-324.50 P-34-334.50 TB-121124	% D: Bromomethane Methylene chloride Acetone 2-Butanone 2-Hexanone RRF: Bromomethane Acetone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F3L090146	12/15/03, 09:08	P-33-EB-1 P-33-159.6 TB-125128	% D: Methylene chloride 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	12/19/03, 19:33	P-33-169.6 P-33-179.6 P-33-DUP-1 P-33-189.6 P-33-198.1 P-33-214.6 P-33-224.6 P-53-426.75 P-53-480.90	% D: Methylene chloride RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	12/23/03, 16:38	P-53-480.90 RE		Not evaluated. See Section 3.2.4

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F4A130259	01/20/04, 07:48	P-55-EB-1 P-55-EB-1 DL TB-01050112 P-31-190.40 P-31-190.40 RE P-31-DUP-1 P-31-DUP-1 RE P-55-DUP-1 P-55-154.55	% D: Methylene chloride Acetone 2-Butanone RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	01/21/04, 11:36	P-55-DUP-1 RE P-55-154.55 RE	% D: Bromomethane Chloroethane Carbon tetrachloride 1,1,1-Trichloroethane RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F4A150320	01/21/04, 11:36	P-55-164.55 P-55-174.55 P-55-186.15	% D: Bromomethane Chloroethane Carbon tetrachloride 1,1,1-Trichloroethane RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	01/22/04, 09:51	P-55-EB-2 TB-01120114	% D: 1,1,1-Trichloroethane 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	02/05/04, 11:12	P-55-EB-2 RE	% D: Chloromethane Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F4A300327	02/05/04, 11:12	TB-01220129 P-56-126.55 P-55-311.95	% D: Chloromethane Acetone RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	02/09/04, 19:16	P-55-DUP-2	% D: Methylene chloride Acetone trans-1,3-Dichloropropene RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	02/14/04, 19:25	P-55-311.95 RE	% D: Acetone Carbon tetrachloride 1,1,1-Trichloroethane 2-Butanone 4-Methyl-2-pentanone 2-Hexanone RRF: Bromomethane Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F4B130279	02/18/04, 08:20	P-32-174.35 P-32-DUP-1 P-32-224.35 P-32-234.35 P-32-241.01 P-32-251.77 P-32-259.35 P-32-269.35 TB-02110212	% D: Chloromethane Bromomethane Chloroethane Acetone Carbon tetrachloride 1,1,1-Trichloroethane 2-Butanone 4-Methyl-2-pentanone Xylenes 2-Hexanone RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	***CCAL Date***	***Sample ID***	***Compounds***	***Action***
F4B130279 Cont'd	02/19/04, 09:18	P-32-269.35	% D: Bromomethane Dibromochloro-methane Bromoform RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F4B170134	02/18/04, 08:20	TB-020916	% D: Chloromethane Bromomethane Chloroethane Acetone Carbon tetrachloride 1,1,1-Trichloroethane 2-Butanone 4-Methyl-2-pentanone Xylenes 2-Hexanone RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
	02/19/04, 09:18	P-32-279.35	% D: Bromomethane Dibromochloro-methane Bromoform RRF: Bromomethane Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results
F4B200226	02/26/04, 10:37	P-32-488.9	% D: Bromomethane Acetone Dibromochloro-methane Bromoform RRF: Acetone 2-Butanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Table 3-2. *Evaluation of Continuing Calibration Results*

Package Identification	*CCAL Date*	*Sample ID*	*Compounds*	*Action*
F4B200226 Cont'd	O3.01/04, 09:19	P-32-DUP-3 TB-02090219	% D: Acetone 2-Butanone 4-Methyl-2-pentanone Xylenes (total) 2-Hexanone RRF: Acetone 2-Butanone 4-Methyl-2-pentanone	%D > 20% UJ – all non-detect results J – all positive results RRF < 0.05 R – all non-detect results J – all positive results

Note:
DL Suffix – Indicates a secondary diluted sample reanalysis
RE Suffix – Indicates a reanalysis at the same dilution

3.2.10. Laboratory Method Blanks

In general, most laboratory method blanks contained trace levels of one or more common laboratory contaminants including acetone or methylene chloride. The corresponding sample results for the identified contaminants were revised to non-detect results if these results were "less than five times" (< 5 X) the method blank results for laboratory contaminants in accordance with the QAPP (GTEOSI, 2002). However, per National Functional Guidelines, common laboratory contaminants (methylene chloride, acetone, 2-butanone, and cyclohexane) criterion is "less than 10 times" (< 10 X) the method blank results. Most samples were affected by these qualification guidelines. A summary of the samples and compounds that were revised due to laboratory contamination are presented in Table 3-3.

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3C190235	TB-A	Acetone Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	TB-B	Acetone Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	MW-7	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	MW-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	MW-11	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	MW-10	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	MW-9	Acetone	Revised result to "U" (non-detect)
	MW-6	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	MW-4	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	MW-8	Acetone	Revised result to "U" (non-detect)
	MW-DUP	Acetone	Revised result to "U" (non-detect)

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3D290160	P-17-73.25	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-17-92.25	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-17-223.1	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-FB-1	Acetone	Removed "B" qualifier. No need to qualify FB with MB
	P-F-86.48	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-1	Acetone Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-F-76.46	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3E060217	P-27-89.75	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-27-DUP	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-27-99.75	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-27-139.75	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-28-87.02	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-28-97.02	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-28-147.02	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-28-207.02	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-2	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3E160130			None
F3E200165			None
F3E230179	P-E-292.28 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-E-292.28 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3E290170	P-D-97.05	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-15-79.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-15-79.65 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-15-89.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-15-99.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-15-109.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-15-119.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3F030298	P-D-77.05	Methylene chloride	Revise "B" qualifier to "U" to indicate non

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3F120220	P-C-89.6	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-C-99.6	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-C-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3F170126	P-C-320.3	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-C-330.3	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-C-337.5	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-C-337.5 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-24-87.35	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-24-77.35	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-612-616	Chloromethane Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-C-FB	Methylene chloride	Removed "B" qualifier. No need to qualify FB with MB
	P-C-159.6	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-C-169.6	Methylene chloride	Revised result to "U" (non-detect)
F3F180192	TB-617	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-24-127.3	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-24-137.3	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-C-347.7	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3F200145	P-24-207.3 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-619	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-24-267.3	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3F260187	P-24-297.3	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-23-FB-1	Methylene chloride	Removed "B" qualifier. No need to qualify FB with MB
	P-23-180.1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-23-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-23-DUP-1 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-619625	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3G010309	P-23-239.8	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-23-252.0	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-23-262.0	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3G010309 Cont'd	P-23A-286.96	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-23A-293.50	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-627630	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3G030162	TB-701702	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-23A-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-23A-347.6	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3G110205	P-25-EB-1 DL	Methylene chloride	Removed "B" qualifier. No need to qualify EB with MB
	P-25-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-35-EB-1	Methylene chloride	Removed "B" qualifier. No need to qualify EB with MB
	P-35-117.2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-35-177.2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-35-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-708710	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3G150156			None
F3G230216	P-H-EB-1	Methylene chloride	Removed "B" qualifier. No need to qualify EB with MB
	P-H-EB-1 RE	Methylene chloride	Removed "B" qualifier. No need to qualify EB with MB
	TB721722	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3G250374	P-H-106.8	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-202.7	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-DUP-1 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-DUP-1 DL RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-DUP-1 DL RE RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3G290207	P-H-351.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-217.2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-276.4	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-329.8	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-42-354.6	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-724728	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3H060192	P-45-131.25	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-45-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3H080219	TB-805807	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3H130195	P-45-281.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-20-309.60	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-20-319.60	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-20-FB	Methylene chloride	Removed "B" qualifier. No need to qualify FB with MB
	TB-8-12	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-20-427.99	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-20-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3H180106	P-45-366.39	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-20-476.68	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	TB-0813	Acetone	Removed "B" qualifier. No need to qualify TB with MB
	TB-0813 RE	Acetone	Removed "B" qualifier. No need to qualify TB with MB
F3H210288			None
F3H220246	P-36-156.7	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-36-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-46-139.60	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3H270230	P-46-275.42	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-46-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-36A-282.0	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-36-136.7	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-37-284.4	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-37-304.8	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-37-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-821-824	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3I040177	P-44-99.3	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-44-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3I050189	P-44-149.8	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3I050189 Cont'd	TB-903904	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3I090305	P-44-215.5	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-44-215.5 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-44-229.2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-44-229.2 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-44-239.85	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-44-239.85 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-44-249.85 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-47-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-47-147.1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3I120107	P-44-339.8	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3I150101			None
F3I180259			None
F3I230231	P-29-310.2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-29-329.85	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-29-360.0	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-38-207.5	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-38-260.7 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-43-246.68	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-43-246.68 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-43-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-43-DUP-2 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-43-294.85	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-43-294.85 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-29-390.0	Carbon disulfide	Revise "B" qualifier to "U" to indicate non-detect result
F3I250196			None
F3J030259	P-30-89.50	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-30-99.50	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-30-204.55	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3J030259 Cont'd	P-30-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB1-930102	Acetone Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3J070236			None
F3J110172			None
F3J240204	P-50-109.90	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-119.90	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-129.90	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-139.90	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-149.90	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-49-114.3	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-49-124.3	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-49-167.3	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-49-DUP-1	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	TB10211023	Acetone	Removed "B" qualifier. No need to qualify TB with MB
	P-51-117.78	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-51-127.78	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-49-EB-1	Acetone	Removed "B" qualifier. No need to qualify EB with MB
F3J290103	P-50-249.90	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-267.44	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-309.90	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-EB-2	Acetone Methylene chloride	Removed "B" qualifier. No need to qualify EB with MB
	P-50-342.60	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-50-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-10231027	Acetone Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-49-269.3	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-49-269.3 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-49-340.8	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-49-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3J290103 Cont'd	P-51-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-51-246.75	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F3J310287	P-51-301.12	Acetone Methylene chloride 1,4-Dichlorobenzene	Revise "B" qualifier to "U" to indicate non-detect result
	P-51-321.00	Acetone Methylene chloride 1,2-Dichlorobenzene	Revise "B" qualifier to "U" to indicate non-detect result
	P-51-327.85	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-10271030	Acetone Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3K080109	P-54-107.55	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-54-107.55 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-52-EB-1	Methylene chloride	Removed "B" qualifier. No need to qualify EB with MB
	P-52-170.0	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-52-DUP-1 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-58-EB-1	Methylene chloride	Removed "B" qualifier. No need to qualify EB with MB
	P-58-159.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-58-DUP-1	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-114116	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3K110173	P-58-274.65	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-58-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-58-DUP-2 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-54-267.95	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-54-267.95 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-54-DUP-2	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-54-DUP-2 RE	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-54-276.4	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-1171110	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F3K140242			None
F3K210372	P-52-EB-2	Acetone	Removed "B" qualifier. No need to qualify EB with MB
	TB-11171120	Acetone	Removed "B" qualifier. No need to qualify TB with MB
F3K280120	P-34-139.55	Acetone	Revise "B" qualifier to "U" to indicate non-detect result

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3K280120 Cont'd	P-34-DUP-1	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-224.55	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-234.55	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-244.55	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-DUP-2	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-254.55	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-264.55	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-284.55	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-294.55	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	P-34-304.50	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
	TB-11201125	Acetone	Removed "B" qualifier. No need to qualify TB with MB
F3L050365			None
F3L090146	P-33-EB-1	Chloromethane	Removed "B" qualifier. No need to qualify EB with MB
	P-33-159.6	Chloromethane	Revise "B" qualifier to "U" to indicate non-detect result
	TB-125128	Chloromethane	Removed "B" qualifier. No need to qualify TB with MB
F4A130259	P-55-DUP-1 RE	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-55-154.55 RE	Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
F4A150320	P-55-164.55	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-55-174.55	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-55-186.15	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-55-264.40 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-55-271.00 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-55-164.55 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-55-174.55 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-55-186.15 DL	Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
F4A300327	P-55-311.95	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	TB-01220129	Acetone Methylene chloride	Removed "B" qualifier. No need to qualify TB with MB
	P-56-126.55	Acetone Methylene chloride	Revise "B" qualifier to "U" to indicate non-detect result
	P-55-311.95 RE	Bromomethane	Revise "B" qualifier to "U" to indicate non-detect result

Table 3-3. *Evaluation of Laboratory Method Blank Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F4B130279	P-32-269.35	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
F4B170134	P-32-279.35	Acetone	Revise "B" qualifier to "U" to indicate non-detect result
F4B200226			None

Note:
DL Suffix – Indicates a secondary diluted sample reanalysis
RE Suffix – Indicates a reanalysis at the same dilution

3.2.11. Laboratory Control Sample Results

The laboratory analyzed a laboratory control sample (LCS) for each day of sample analysis. Most LCS percent recoveries were within the laboratory control limits for each of the batches. Generally, for recoveries substantially exceeding laboratory control limits, the associated data would be qualified as estimated ("J" or "UJ") using the following validation guidance: 1) if the percent recovery was greater than the upper control limit, positive results are qualified as estimated; non-detects are not qualified; 2) if the percent recovery was below the lower control limit, both positive and non-detect results are qualified as estimated. For compounds that were slightly out, but were within the method default range of 70% to 130%, they were not qualified based on professional judgment. Table 3-4 shows the evaluation of LCS samples.

Table 3-4. *Evaluation of Laboratory Control Sample Results*

Package Identification	*LCS Date and Time*	*Sample ID*	*Compound(s) Out*	*Action*
F3C190235	03/21/03, 16:56	N/A	Chloroform	None
	03/25/03, 11:00	N/A	1,2-Dichloroethane	None
F3D290160	05/05/03, 10:46	N/A	None	None
F3E060217	05/07/03, 10:29	N/A	1,2-Dichloroethane	None
		P-27-89.75 P-27-DUP P-27-99.75 P-27-139.75 P-28-87.02 P-28-97.02 P-28-147.02 P-28-207.02 TB-2	Methylene chloride	"J" (high %R) (result is biased high)
F3E160130 F3E200165	05/21/03, 10:37	N/A	None	None
F3E200165	05/22/03, 11:10	N/A	None	None
F3E230179	05/27/03, 11:04	N/A	None	None
	05/28/03, 10:12	N/A	None	None
F3E290170	06/02/03, 12:38	N/A	None	None
	06/03/03, 10:54	N/A	None	None

Table 3-4. *Evaluation of Laboratory Control Sample Results*

Package Identification	*LCS Date and Time*	*Sample ID*	*Compound(s) Out*	*Action*
F3F030298	06/60/03, 11:18	N/A	None	None
F3F120220	06/14/03, 01:13	P-C-89.6 P-C-99.6 P-C-DUP-1 TRIP BLANK	Toluene Tetrachloroethene	None
F3F170126	06/19/03, 13:54	N/A	None	None
	06/20/03, 12:24	P-C-337.5 DL	Chloromethane	None
F3F180192	06/20/03, 12:24	TB-617 P-24-127.3 P-24-137.3 P-C-347.7	Chloromethane	None
	06/23/03, 11:11	N/A	None	None
F3F200145	06/23/03, 11:11	N/A	None	None
	06/24/03, 19:57	N/A	None	None
F3F260187	06/30/03, 10:53	P-24-297.3 P-23-180.1 P-23-DUP-1	Acetone 1,2-Dichloroethane 1,1,2-Trichloroethane 1,1,2,2-Tetrachloroethane	None
		P-23-FB-1 P-23-DUP-1DL	Acetone 1,2-Dichloroethane 1,1,2-Trichloroethane 1,1,2,2-Tetrachloroethane	Acetone was detected, and therefore, is qualified as estimated, "J", with a high bias
		TB-619625	Acetone 1,2-Dichloroethane 1,1,2-Trichloroethane 1,1,2,2-Tetrachloroethane	Acetone and 1,2-Dichloroethane were detected, and therefore, are qualified as estimated, "J", with a high bias
F3F270132	07/02/03, 09:56	N/A	None	None
F3G010309	07/03/03, 11:15	P-23-239.8 P-23-252.0 P-23-262.0 P-23A-286.96 P-23A-293.50 TB-627630	Acetone trans-1,3-Dichloropropene Toluene	%R was above the recovery range. Acetone already qualified, where detected, and is biased high. Trans-1,3-Dichloropropene not detected, and not qualified. Toluene %R is high and is < 130, not qualified.
F3G030162	07/07/03, 17:22	N/A	None	None
F3G110256	07/14/03, 14:20	N/A	None	None
	07/15/03, 10:19	N/A	None	None
F3G150156	07/15/03, 23:30	N/A	None	None
F3G230216	07/21/03, 13:45	N/A	None	None
F3G250074	07/29/03, 10:14	N/A	None	None
	07/30/03, 11:55	N/A	None	None
F3G290207	07/31/03, 09:47	N/A	None	None

Table 3-4. *Evaluation of Laboratory Control Sample Results*

Package Identification	*LCS Date and Time*	*Sample ID*	*Compound(s) Out*	*Action*
F3H060192	08/11/03, 19:18	N/A	None	None
	08/12/03, 10:25	N/A	None	None
F3H080219	08/11/03, 19:18	N/A	None	None
F3H130195	08/14/03, 13:27	N/A	None	None
F3H180106	08/18/03, 15:29	N/A	None	None
F3H210288	08/24/03, 14:59	N/A	None	None
F3H220246	08/28/03, 00:15	N/A	None	None
	08/28/03, 10:36	N/A	None	None
F3H270230	08/28/03, 10:36	N/A	None	None
F3I040177	09/04/03, 13:29	N/A	None	None
	09/04/03, 20:22	N/A	None	None
F3I050189	09/05/03, 10:09	N/A	None	None
	09/09/03, 11:25	N/A	None	None
F3I090305	09/11/03, 10:02	N/A	None	None
	09/12/03, 10:23	N/A	None	None
F3I120107	09/13/03, 17:30	N/A	None	None
F3I150101	09/18/03, 10:40	N/A	None	None
	09/18/03, 19:27	N/A	None	None
F3I180259	09/21/03, 13:06	N/A	None	None
F3I230231	09/29/03, 11:42	P-29-EB-1 P-29-310.2 P-29-329.85 P-29-DUP-2 P-29-EB-2 P-29-360.0 TB-917922	Chloroethane 2-Butanone	"J" (low %R) (data are biased low). Note that chloroethane and 2-butanone have already been qualified by the initial and continuing calibrations.
	09/30/03, 09:59	P-38-186.3 P-38-207.5 P-38-216.3 P-38-260.7 P-38-260.7 RE P-43-246.68 P-43-246.68 RE P-43-DUP-2 P-43-DUP-2 RE P-43-294.85 P-43-294.85 RE P-29-390.0	Chloroethane	"J" (low %R) (data are biased low)
F3I250196	10/01/03, 10:45	N/A	None	None
	10/01/03, 19:35	N/A	None	None
F3J030259	10/06/03, 11:07	N/A	None	None
F3J070236	10/14/03, 11:10	N/A	None	None

Table 3-4. *Evaluation of Laboratory Control Sample Results*

Package Identification	*LCS Date and Time*	*Sample ID*	*Compound(s) Out*	*Action*
F3J110172	10/16/03, 10:37	N/A	None	None
	10/16/03, 22:45	N/A	None	None
F3J240204	10/31/03, 0656	N/A	None	None
	11/04/03, 1748	N/A	None	None
F3J290103	11/04/03, 17:48	N/A	None	None
	11/05/03, 03:49	N/A	None	None
	11/05/03, 11:43	N/A	None	None
F3J310287	11/07/03, 00:10	N/A	None	None
F3K080109	11/14/03, 12:16	N/A	None	None
	11/18/03, 11:07	N/A	None	None
F3K110173	11/14/03, 12:16	N/A	None	None
	11/18/03, 11:07	N/A	None	None
F3K140242	11/20/03, 20:57	N/A	None	None
	11/21/03, 10:50	N/A	None	None
F3K210372	11/28/03, 21:06	N/A	None	None
F3K280120	12/03/03, 23:56	N/A	None	None
	12/06/03, 15:34	P-34-139.55 P-34-DUP-1 P-34-224.55 P-34-234.55 P-34-244.55 P-34-DUP-2 P-34-254.55 P-34-264.55 P-34-284.55 P-34-294.55 P-34-304.50 TB-11201125	Acetone	"J" (high %R) (result is biased high)
	12/08/03, 12:01	N/A	None	None
F3L050365	12/08/03, 12:01	N/A	None	None
F3L090146	12/15/03, 11:17	N/A	None	None
	12/19/03, 23:19	N/A	None	None
F4A130259	01/14/04, 17:19	N/A	None	None
	01/20/04, 09:17	N/A	None	None
	01/21/04, 13:21	N/A	None	None
F4A150320	01/21/04, 13:21	N/A	None	None
	01/22/04, 11:32	N/A	Vinyl chloride	None (high %R but not detected in samples)
	01/28/04, 16:04	TB-01120114 RE	Acetone	"J" (high %R) (result is biased high)
	02/02/04, 15:10	N/A	None	None

Table 3-4. *Evaluation of Laboratory Control Sample Results*

Package Identification	*LCS Date and Time*	*Sample ID*	*Compound(s) Out*	*Action*
F4A150320 Cont'd	02/03/04, 08:19	N/A	None	None
	02/05/04, 11:35	N/A	None	None
F4A300327	02/05/04, 11:35	N/A	None	None
	02/10/04, 03:14	N/A	Chloromethane Vinyl chloride Bromomethane	None (high %R but not detected in associated samples)
	02/14/04, 20:08	N/A	None	None
F4B130279	02/18/04, 09:33	N/A	None	None
	02/19/04, 11:55	N/A	None	None
F4B170134	02/18/04, 09:33	N/A	None	None
	02/19/04, 11:55	N/A	None	None
F4B200226	02/26/04, 11:21	N/A	None	None
	03/01/04, 10:40	N/A	None	None

N/A = not applicable

3.2.12. Matrix Spike/Matrix Spike Duplicate Analyses

The MS/MSD analyses are designed to provide information about the effect of sample matrix on the sample preparation procedures and the measurement methodology. Data precision from the field sampling and the analytical techniques are also assessed. The following samples were analyzed for MS/MSD:

- SDG F3C190235: samples MW-6 and MW-10
- SDG F3E060217: sample P-27-199.75
- SDG F3E160130: sample P-26-231.25
- SDG F3E290170: sample P-D-107.05
- SDG F3F170126: sample P-C-169.6
- SDG F3F180192: sample P-C-347.7
- SDG F3F200145: samples P-24-DUP-1 and P-24-267.3
- SDG F3H220246: sample P-46-DUP-1
- SDG F3I090305: sample P-47-177.0
- SDG F3J240204: sample P-49-114.3
- SDG F3K280120: samples P-53-266.35 and P-34-304.50

Only the associated non-spiked MS/MSD samples were evaluated for qualification (unless a trend can be determined for all other samples within the SDG). Where recoveries exceeded laboratory control limits, the associated data were qualified as estimated ("J" or "UJ") using the following validation guidance: 1) if the percent recovery was greater than the upper control limit, positive results were qualified as estimated; 2) if the percent recovery was below the lower control limit, both positive and non-detect results were qualified as estimated. No qualification of data is required when percent recoveries are above the upper control limit and the VOC results are non-detect. The following are non-conformances associated with MS/MSD analyses:

- There were no MS/MSD analyzed with SDGs F3D290160, F3E230179, F3F030298, F3F260187, F3F120220, F3F270132, F3G010309, F3G030162, F3G110256, F3G150156, F3G230216, F3G290207, F3H060192, F3H080219, F3H130195, F3H180106, F3H210288, F3H270230, F3G250374, F3I040177, F3I050189, F3I150101, F3I180259, F3I230231, F3I250196, F3J030259, F3J070236, F3J110172, F3J290103, F3J310287, F3K080109, F3K110173, F3L050365, F3L090146, F4A130259, F4A150320, F4B170134, and F4B200226; therefore, matrix effects on accuracy and precision of the samples could not be evaluated.

- SDG F3G110256: the MD/MSD was performed on laboratory water, as the LCS and LCS duplicate; they offer no information on matrix effects of the actual field samples. However, since the RPDs for acetone and methylene chloride were not within acceptance criteria, these compounds were qualified as estimated (J) for all associated samples.

- SDGs F3G250374, F3I150101, F3I250196, F3K080109, F3K110173, F4A130259, F4B130279, and F4B170134: the MD/MSDs were performed on laboratory waters, as the LCSs and LCS duplicates; they offer no information on matrix effects of the actual field samples.

- SDGs F3K140242, F3K210372, and F4A300327: the MS/MSDs were performed on samples from other clients of the laboratory. Matrix effect of the samples for accuracy and precision was not evaluated because those MS/MSDs offer no pertinent information on matrix effects of field samples from this project.

- SDG F4A150320: the MD/MSDs were performed on laboratory water, as LCSs and LCS duplicates; they offer no information on matrix effects of the actual field samples. However, since the RPDs for acetone, bromomethane, and carbon disulfide for some LCS pairs were not within acceptance criteria, these compounds were qualified as estimated (J) for all associated samples.

Table 3-5 shows the samples that were qualified as estimated due to MS/MSD percent recoveries exceeding criteria.

Table 3-5. *Evaluation of Matrix Spike/Matrix Spike Duplicate Sample Results*

Package Identification	*Sample ID*	*Compounds*	*Action*
F3C190235	MW-10	Trans-1,3-Dichloropropene	"UJ" (low % R) (result is estimated and biased low)
		Tetrachloroethene	None: sample concentration is much greater than spiking concentration
		Trichloroethene	"J" (high %R) (result is biased high)
F3C190235 Cont'd	MW-6	Chloroform	"J" (high %R) (result is biased high)
		Tetrachloroethene	None: sample concentration is much greater than spiking concentration
F3E060217	P-27-199.75	None	None
F3E160130 F3E200165	P-26-231.25	Bromomethane	None
F3E290170	P-D-107.05	Tetrachloroethene	"J" (low % R) (result is estimated and biased low)
F3F170126	P-C-169.6	Bromomethane	None, compound had been qualified "R" due to other QC criteria failure
F3F180192	P-C-347.7	None	None
F3F200145	P-24-DUP-1	None	None
	P-24-267.3	None	None
F3G110256	P-25-EB-1 DL	Methylene chloride	"J" (high RPD)
	P-35-EB-1	Methylene chloride	"J" (high RPD)
	TB-708710	Methylene chloride	"J" (high RPD)
F3H220246	P-46-DUP-1	None	None
F3I090305	P-47-177.0	Tetrachloroethene	"J" (high %R) (result is biased high)
F3J240204	P-49-114.3	None	None
F3K280120	P-53-266.35	None	None
	P-34-304.50	None	None
F4A150320	P-31-344.25 P-31-351.55 P-31-DUP-2 P-31-344.25 RE P-55-264.40 P-55-271.00 TB-01120114 RE	Bromomethane Acetone Carbon disulfide	"J" (high RPD)
	P-31-DUP-2 RE	Acetone	"J" (high RPD)

3.2.13. Field Duplicate Analyses

Blind field duplicate samples were collected and analyzed to assess the overall sampling and analytical technique's precision. By design, the laboratory was never made aware of which field samples the blind duplicates were associated with. The following samples were analyzed for field duplicates:

- SDG F3C190325: sample MW-DUP as a blind field duplicate of sample MW-3.
- SDG F3E060217: sample P-27-DUP as a blind field duplicate of sample P-27-99.75.
- SDG F3F120220: sample P-C-DUP-1 as a blind field duplicate of sample P-C-99.60.
- SDG F3F200145: sample P-24-DUP-1 as a blind field duplicate of sample P-24-167.3 and sample P-24-DUP-2 as a blind field duplicate of sample P-24-287.3.
- SDG F3F260187: sample P-23-DUP-1 as a blind field duplicate of sample P-23-180.1.
- SDG F3G030162: sample P-23A-DUP-1 as a blind field duplicate of sample P-23A-347.6.
- SDG F3G110256: sample P-25-DUP-1 as a blind field duplicate of sample P-25-179.7 and sample P-35-DUP-1 as a blind field duplicate of sample P-35-177.2.
- SDG F3G150156: sample P-25-DUP-2 as a blind field duplicate of sample P-25-275.8 and sample P-35-DUP-2 as a blind field duplicate of sample P-35-332.2.
- SDG F3G250374: sample P-H-DUP-2 as a blind field duplicate of sample P-H-206.55 and sample P-42-DUP-1 as a blind field duplicate of sample P-42-202.7.
- SDG F3G290207: sample P-42-DUP-2 as a blind field duplicate of sample P-42-329.8.
- SDG F3H060192: sample P-45-DUP-1 as a blink field duplicate of sample P-45-81.25.
- SDG F3H130195: sample P-20-DUP-2 is a blind field duplicate of sample P-20-427.99.
- SDG F3H180106: sample P-45-DUP-2 is a blind field duplicate of sample P-45-366.39.
- SDG F3H210288: sample P-37-DUP-1 is a blind field duplicate of sample P-37-119.95.
- SDG F3H220246: sample P-36-DUP-1 is a blind field duplicate of sample P-36-156.7 and sample P-46-DUP-1 is a blind field duplicate of sample P-46-139.60.
- SDG F3H270230: sample P-46-DUP-2 is a blind field duplicate of sample P-46-275.42 and sample P-37-DUP-2 is a blind field duplicate of sample P-37-304.8.
- SDG F3I040177: sample P-44-DUP-1 is a blind field duplicate of sample P-44-99.3.
- SDG F3I090305: sample P-47-DUP-1 is a blind field duplicate of sample P-47-147.1.
- SDG F3I120107: sample P-43-DUP-1 is a blind field duplicate of sample P-43-119.88.

- SDG F3I180259: sample P-29-DUP-1 is a blind field duplicate of sample P-29-109.5 and sample P-38-DUP-1 is a blind field duplicate of sample P-38-116.7.

- SDG F3I250196: sample P-38-DUP-3 is a blind field duplicate of sample P-38-381.3; however, the original sample P-38-381.3 was not collected for analysis. Therefore, the duplicate will be considered as the original sample, and the duplicate sample not collected.

- SDG F3I230231: sample P-29-DUP-2 is a blind field duplicate of sample P-29-329.85 and sample P-43-DUP-2 is a blind field duplicate of sample P-43-246.68.

- SDG F3J030259: sample P-30-DUP-1 is a blind field duplicate of sample P-30-204.55.

- SDG F3J070236: sample P-30A-DUP-2 is a blind field duplicate of sample P-30A-298.6 and sample P-18-DUP-1 is a blind field duplicate of sample P-18-156.65.

- SDG F3J110172: sample P-30A-DUP-3 is a blind field duplicate of sample P-30A-406.55 and sample P-18-DUP-2 is a blind field duplicate of sample P-18-247.65.

- SDG F3J240204: sample P-50-DUP-1 is a blind field duplicate of sample P-50-129.90 and P-49-DUP-1 is a blind field duplicate of sample P-49-167.3.

- SDG F3J290103: sample P-50-DUP-2 is a blind field duplicate of sample P-50-342.60; P-49-DUP-2 is a blind field duplicate of sample P-49-340.8; and P-51-DUP-2 is a blind field duplicate of sample P-51-246.75.

- SDG F3K080109: sample P-52-DUP-1 is a blind field duplicate of sample P-52-170.0 and P-58-DUP-1 is a blind field duplicate of sample P-58-159.65.

- SDG F3K110173: sample P-58-DUP-2 is a blind field duplicate of sample P-58-274.65 and P-54-DUP-2 is a blind field duplicate of sample P-54-267.95.

- SDG F3K140242: sample P-54-DUP-3 is a blind field duplicate of sample P-54-351.25.

- SDG F3K280120: sample P-53-DUP-1 is a blind field duplicate of sample P-53-146.40; P-53-DUP-2 is a blind field duplicate of sample P-53-266.35; P-34-DUP-1 is a blind field duplicate of sample P-34-139.55; and P-34-DUP-2 is a blind field duplicate of sample P-34-244.55.

- SDG F3L090146: sample P-33-DUP-1 is a blind field duplicate of sample P-33-169.6.

- SDG F4A130256: sample P-31-DUP-1 is a blind field duplicate of sample P-31-190.40; P-55-DUP-1 is a blind field duplicate of sample P-55-154.55.

- SDG F4A150320: sample P-31-DUP-2 is a blind field duplicate of sample P-31-351.55.

- SDG F4A300327: sample P-55-DUP-2 is a blind field duplicate of sample P-55-311.95.

- SDG F4B130279: sample P-32-DUP-1 is a blind field duplicate of sample P-32-174.35.

- SDG F4B200226: sample P-32-DUP-3 is a blind field duplicate of sample P-32-488.9.

An evaluation of the precision of the field sampling procedure (as well as the laboratory analysis procedure) was made based on the relative percent difference (RPD) calculated for the original and duplicate sample results. RPD calculations were made only when the results were above the laboratory reporting limits. The RPD values for all compounds were less than 30% (aqueous data evaluation criteria) with the following exception:

- SDG F3F260187: the RPD for trichloroethene is 35.6%. Therefore, trichloroethene is qualified as estimated, "J" or "UJ," for all field samples (excluding blanks) in this SDG.

- SDG F3G030162: the RPDs for tetrachloroethene and trichloroethene are 45.6% and 41.9%, respectively. Therefore, tetrachloroethene and trichloroethene are qualified as estimated, "J" or "UJ," for all field samples (excluding blanks) in this SDG.

- SDG F3G150156: acetone was detected in P-35-332.2 at the estimated concentration of 2.4 ug/L, but not in its duplicate, P-35-DUP-2. Therefore all acetone detections are qualified as estimated, "J."

- SDG F3G250374: sample P-42-DUP-1 was analyzed four separate times. It was discovered that the concentrations from the first and second analyses (different containers) was not similar. Both containers were re-analyzed again with the same conclusion. The concentrations from the second container appeared to have degraded substantially. The results from the first container (diluted and undiluted results hybridized) are used for the duplicate pair (duplicate with P-42-202.7) comparison. The RPD for tetrachloroethene is 41%. Therefore, tetrachloroethene is qualified as estimated, "J" or "UJ," for all field samples (excluding blanks) in this SDG.

- SDG F3G290207: the RPD for trichloroethene is 34.5%. Therefore, trichloroethene is qualified as estimated, "J" or "UJ," for all field samples (excluding blanks) in this SDG.

- SDG F3H060196: the RPD for acetone could not be calculated as it was not detected in the original sample (subsequently qualified as rejected) and detected in the duplicate sample at 3.3 ug/L (subsequently qualified as estimated). Therefore, acetone is qualified as estimated, "J" or "UJ," in the all field samples.

- SDG F3H180106: the RPDs for tetrachloroethene and trichloroethene are 66.7% and 67.9%, respectively. Therefore, tetrachloroethene and trichloroethene are both qualified as estimated, "J" or "UJ," in all field samples. However, due to sample receipt temperature at the laboratory, all detections were already qualified as estimated, "J," and all non-detects were already qualified as rejected, "R."

- SDG F3H210288: the RPDs for tetrachloroethene and trichloroethene are 83.6% and 66.7%, respectively. Therefore, tetrachloroethene and trichloroethene are both qualified as estimated, "J" or "UJ," in all field samples.

- SDG F3H270230: the RPDs for chloroform, tetrachloroethene, and trichloroethene are 36.4%, 32.9%, and 33.0%, respectively, for the P-46-DUP-2 duplicate pair. Other than the P-37 samples within this SDG, all other samples for this SDG are qualified as estimated, "J" or "UJ," for these three compounds. The P-37 samples within this SDG had an acceptable duplicate pair.

- SDG F3I040177: the RPDs for tetrachloroethene and trichloroethene are 76.0% and 76.0%, respectively. Therefore, tetrachloroethene and trichloroethene are both qualified as estimated, "J" or "UJ," in all field samples.

- SDG F3I090305: the RPD for tetrachloroethene is 48.3%. Therefore, tetrachloroethene is qualified as estimated, "J" or "UJ," in all field samples.

- SDG F3I230231: for samples P-29-DUP-2 and P-43-DUP-2, the RPDs for tetrachloroethene were 37.6% and 36.7%, respectively. Therefore, tetrachloroethene is qualified as estimated, "J" or "UJ," in all field samples. For sample P-43-DUP-2, the RPD for cis-1,2-dichloroethene and trichloroethene were 44.8% and 44.1%, respectively. Therefore, cis-1,2-dichloroethene and trichloroethene are qualified as estimated, "J" or "UJ," in all field samples.

- SDG F3J240204: the RPD for chloroform in sample P-49-167.3 is 58.1%. Therefore, chloroform is qualified as estimated, "J" or "UJ," in all field samples.

- SDG F3J290103: the RPD for tetrachloroethene and trichloroethene in sample P-49-DUP-2 is 83.0% and 82.2%, respectively. Therefore, tetrachloroethene and trichloroethene are qualified as estimated, "J" or "UJ," in all field samples, with the following exceptions. Tetrachloroethene for sample P-50-DUP-2 do not need to be qualified because its RPD is acceptable. Tetrachloroethene for sample P-50-DUP-2 do not need to be qualified because its RPD is acceptable. Tetrachloroethene and trichloroethene for sample P-51-DUP-2 do not need to be qualified because its RPDs are acceptable.

- SDG F3K080109: the RPD for chloroform in sample P-58-DUP-1 is 89.4%. Therefore, chloroform is qualified as estimated, "J" or "UJ," in all field samples, with the exception of sample P-52-DUP-1. The RPD for sample P-52-DUP-1 is acceptable.

- SDG F3K110173: the RPD for chloroform and tetrachloroethene in sample P-48-DUP-2 is 43.8% and 38.9%, respectively. Therefore, chloroform and tetrachloroethene are qualified as estimated, "J" or "UJ," in all field samples. The RPD for tetrachloroethene in sample P-54-DUP-2 was acceptable; however, tetrachloroethene was already qualified as estimated in this sample due to sample receipt problems.

- SDG F3K280120: the RPD for 1,1,1-trichloroethane in sample P-34-DUP-2 is 32.6%. Therefore, 1,1,1-trichloroethane is qualified as estimated, "J" or "UJ," in all field samples.

There were no field duplicates submitted with SDGs F3D290160, F3E160130, F3E200165, F3E230179, F3E290170, F3F030298, F3F170126, F3F180192, F3F270132, F3G010309, F3G230216, F3H080219, F3I050189, F3I150101, F3I250196, F3J310287, F3K210372, F3L050365, and F4B170134. It should be noted that QAPP requirements (GTEOSI, 2002) specified that a field duplicate sample be collected at a rate of one sample for every ten samples (collection rate of 10%). There were 55 field duplicates collected for the 256 field samples submitted (not including blank samples collected as QCs) for analysis. Therefore, the frequency is satisfied and field precision is considered to have been evaluated to the QAPP's requirements.

3.2.14. Trip Blanks, Field Blanks, and Equipment Blanks

Fifty-six trip blanks, 7 field blanks, and 29 equipment blanks were submitted for analysis. Many of the trip blanks that were submitted contained common contaminants, including acetone, methylene chloride, and toluene. Frequently, the field blanks and equipment blanks also contained acetone and other compounds. Revisions made on the affected target compound results were based on trip blank, field blank, and equipment blank contamination, in accordance with practices described in the validation guidance documents listed in Sections 1.2 and 3.2.10 (method blank contamination). It should be noted that the results for the trip blanks, field blanks, and equipment blanks were not revised with respect to the method blank's contamination; but the original result were retained to show data users the presence and concentrations of contamination that was used to qualify the project sample results. The laboratory's "B"

qualifiers in the trip blanks, field blanks, and equipment blanks were removed. The contamination in the trip blanks, field blanks, and equipment blanks, like the project samples, is potentially attributable to contamination from sample collection techniques in the field, cross-contamination from samples during shipment, or contamination during the preparation and analysis of these QC samples (at the laboratory).

There was no field blank collected with SDGs F3E060217, F3E160130, F3E200165, F3E230179, F3E290170, and F3F030298; therefore, the field blank from SDG F3D290160 was used. There was no field blank collected with SDGs F3F120220, F3F180192, F3F200145, F3F270132, F3G010309, F3G030162, F3G110256, F3G150156, F3G230216, F3G290207, F3H060192, and F3H080219; therefore, the field blank from SDG F3F170126 was used. There was no field blank collected with SDGs F3H180106, F3H220246, F3H270230, F3I050189, F3I090305, and F3I150101; therefore, the field blank from SDG F3H130195 was used. There was no field blank collected with SDGs F3I230231; therefore, the field blank from SDG F3I180259 was used. There was no field blank collected with SDGs F3J030259, F3J070236, F3J110172, F3J240204, F3K080109, F3K110173, F3K140242, F3K280120, F3L050365, F3L090146, F4A150320, F4A300327, F4B130279, F4B170134, and F4B200226; therefore, the field blank from SDG F3I250196 was used.

Table 3-6 shows the samples and compounds that were qualified as non-detect, "U."

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	***Sample ID***	***Compound***	***Action***
F3C190235	MW-7	Acetone* Methylene Chloride*	Revised result to "U" (non-detect)
	MW-2	2-Butanone Methylene Chloride*	Revised result to "U" (non-detect)
	MW-11	2-Butanone Methylene Chloride* Toluene	Revised result to "U" (non-detect)
	MW-5	2-Butanone	Revised result to "U" (non-detect)
	MW-10	Methylene Chloride*	Revised result to "U" (non-detect)
	MW-9	Acetone*	Revised result to "U" (non-detect)
	MW-6	Acetone*	Revised result to "U" (non-detect)
	MW-4	Acetone*	Revised result to "U" (non-detect)
	MW-8	Acetone*	Revised result to "U" (non-detect)
	MW-DUP	Acetone*	Revised result to "U" (non-detect)
F3D290160	P-17-73.25	Acetone* 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-17-92.25	Acetone* Bromoform 1,2-Dichloroethane Toluene	Revised result to "U" (non-detect)
	P-17-233.1	Acetone* 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-F-86.48	Chloroform Methylene chloride*	Revised result to "U" (non-detect)
	P-F-76.46	Acetone* Methylene chloride*	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3E060217	P-27-89.75	Acetone 1,2-Dichloroethane Toluene Methylene chloride*	Revised result to "U" (non-detect)
	P-27-DUP	Acetone 1,2-Dichloroethane Toluene Methylene chloride*	Revised result to "U" (non-detect)
	P-27-99.75	Acetone 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-27-139.75	Acetone Chloroform 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-27-199.75	Acetone Bromoform 1,2-Dichloroethane Toluene	Revised result to "U" (non-detect)
	P-28-87.02	Acetone 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-28-97.02	Methylene chloride*	Revised result to "U" (non-detect)
	P-28-147.02	Acetone Bromoform Methylene chloride*	Revised result to "U" (non-detect)
	P-28-207.02	Methylene chloride*	Revised result to "U" (non-detect)
F3E160130	P-26-231.25	Acetone Toluene Bromoform	Revised result to "U" (non-detect)
	P-26-241.25	Bromoform	Revised result to "U" (non-detect)
	P-E-98.57	Methylene chloride	Revised result to "U" (non-detect)
F3E200165	P-26-257.2	Bromoform Toluene	Revised result to "U" (non-detect)
	P-26-267.2	Acetone Toluene	Revised result to "U" (non-detect)
	P-26A-276.53	Chloromethane	Revised result to "U" (non-detect)
	P-E-128.57	Methylene chloride	Revised result to "U" (non-detect)
	P-E-138.57	Methylene chloride	Revised result to "U" (non-detect)
	P-E-148.57	Chloromethane	Revised result to "U" (non-detect)
	P-E-158.57	Chloromethane	Revised result to "U" (non-detect)
F3E230179	P-E-292.28	Chloroform Chloromethane	Revised result to "U" (non-detect)
	P-E-292.28 DL	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-E-301.23	Chloroform	Revised result to "U" (non-detect)
	P-E-301.23 DL	Acetone Methylene chloride*	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3E230179 Cont'd	P-E-332.85	Chloroform	Revised result to "U" (non-detect)
	P-E-327.15	Chloroform	Revised result to "U" (non-detect)
F3E290170	P-D-87.05	Toluene Bromoform Carbon disulfide	Revised result to "U" (non-detect)
	P-D-97.05	Methylene chloride*	Revised result to "U" (non-detect)
	P-D-107.05	Carbon disulfide	Revised result to "U" (non-detect)
	P-15-79.65	Methylene chloride*	Revised result to "U" (non-detect)
	P-15-79.65 RE	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-15-89.65	Methylene chloride*	Revised result to "U" (non-detect)
	P-15-99.65	Methylene chloride*	Revised result to "U" (non-detect)
	P-15-109.65	Methylene chloride*	Revised result to "U" (non-detect)
	P-15-119.65	Methylene chloride*	Revised result to "U" (non-detect)
F3F030298	P-D-257.	Acetone 1,2-Dichlorobenzene	Revised result to "U" (non-detect)
	P-D-290.1	Acetone Chloroform 1,2-Dichlorobenzene	Revised result to "U" (non-detect)
	P-D-77.05	Methylene chloride*	Revised result to "U" (non-detect)
	P-D-117.05	Carbon disulfide	Revised result to "U" (non-detect)
	P-D-127.05	Bromoform Carbon disulfide	Revised result to "U" (non-detect)
	P-D-137.05	Acetone Toluene Carbon disulfide	Revised result to "U" (non-detect)
	P-D-147.05	Chloroform	Revised result to "U" (non-detect)
F3F120220	P-C-89.6	Methylene chloride*	Revised result to "U" (non-detect)
	P-C-99.6	Methylene chloride*	Revised result to "U" (non-detect)
	P-C-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
F3F170126	P-C-320.3	Methylene chloride*	Revised result to "U" (non-detect)
	P-C-330.3	Methylene chloride* Bromoform	Revised result to "U" (non-detect)
	P-C-337.5	Methylene chloride* Bromoform Carbon disulfide	Revised result to "U" (non-detect)
	P-C-337.5 DL	Methylene chloride*	Revised result to "U" (non-detect)
	P-24-87.35	Methylene chloride* Acetone	Revised result to "U" (non-detect)
	P-24-77.35	Methylene chloride* Carbon disulfide	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3F170126 Cont'd	P-C-159.6	Methylene chloride* Chloroform Carbon disulfide	Revised result to "U" (non-detect)
	P-C-169.6	Methylene chloride* Chloroform Carbon disulfide	Revised result to "U" (non-detect)
F3F180192	P-24-127.3	Methylene chloride* Chloroform	Revised result to "U" (non-detect)
	P-24-137.3	Chloromethane Methylene chloride* Acetone	Revised result to "U" (non-detect)
	P-24-137.3 RE	Methylene chloride Acetone	Revised result to "U" (non-detect)
	P-C-347.7	Methylene chloride* Chloroform Tetrachloroethene	Revised result to "U" (non-detect)
F3F200145	P-24-157.3	Acetone Methylene chloride Tetrachloroethene	Revised result to "U" (non-detect)
	P-24-167.3	Acetone	Revised result to "U" (non-detect)
	P-24-177.3	Tetrachloroethene	Revised result to "U" (non-detect)
	P-24-187.3	Tetrachloroethene 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-24-197.3	Tetrachloroethene 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-24-207.3	Chloroform Tetrachloroethene 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-24-207.3 DL	Methylene chloride* Tetrachloroethene 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-24-217.3	Methylene chloride Tetrachloroethene	Revised result to "U" (non-detect)
	P-24-DUP-1	Methylene chloride	Revised result to "U" (non-detect)
	P-24-227.3	Methylene chloride 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-24-237.3	Tetrachloroethene	Revised result to "U" (non-detect)
	P-24-247.3	Methylene chloride Tetrachloroethene 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-24-257.3	Methylene chloride Tetrachloroethene 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-24-147.3	Tetrachloroethene	Revised result to "U" (non-detect)
	P-24-267.3	Methylene chloride* Tetrachloroethene	Revised result to "U" (non-detect)
	P-24-287.3	Tetrachloroethene	Revised result to "U" (non-detect)
	P-24-DUP-2	Tetrachloroethene	Revised result to "U" (non-detect)
	P-C-364.5	Chloroform	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3F200145 Cont'd	P-C-374.5	Tetrachloroethene	Revised result to "U" (non-detect)
F3F260187	P-24-297.3	Methylene chloride* 1,1,1-Trichloroethane 4-Methyl-2-pentanone	Revised result to "U" (non-detect)
	P-23-180.1	Methylene chloride* Carbon disulfide	Revised result to "U" (non-detect)
	P-23-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
	P-23-DUP-1 DL	Methylene chloride* Acetone	Revised result to "U" (non-detect)
F3F270132	P-23-150.1	Methylene chloride Acetone Chloroform	Revised result to "U" (non-detect)
	P-23-160.1	Chloroform	Revised result to "U" (non-detect)
F3G010309	P-23-239.8	Carbon disulfide Methylene chloride* Tetrachloroethene Acetone	Revised result to "U" (non-detect)
	P-23-252.0	Bromoform Carbon disulfide Methylene chloride* Acetone	Revised result to "U" (non-detect)
	P-23-262.0	Carbon disulfide Methylene chloride*	Revised result to "U" (non-detect)
	P-23A-286.96	Carbon disulfide Methylene chloride* Chloroform	Revised result to "U" (non-detect)
	P-23A-293.50	Carbon disulfide Methylene chloride* Chloroform	Revised result to "U" (non-detect)
F3G030162	P-23A-DUP-1	Carbon disulfide Chloroform Methylene chloride*	Revised result to "U" (non-detect)
	P-23A-347.6	Chloroform Methylene chloride*	Revised result to "U" (non-detect)
F3G110256	P-25-169.7	Carbon disulfide Tetrachloroethene	Revised result to "U" (non-detect)
	P-25-179.7	Carbon disulfide Tetrachloroethene	Revised result to "U" (non-detect)
	P-25-DUP-1	Carbon disulfide Tetrachloroethene	Revised result to "U" (non-detect)
	P-35-117.2	Tetrachloroethene	Revised result to "U" (non-detect)
	P-35-177.2	Tetrachloroethene	Revised result to "U" (non-detect)
	P-35-DUP-1	Tetrachloroethene	Revised result to "U" (non-detect)
F3G150156	P-25-275.8	Trichloroethene	Revised result to "U" (non-detect)
	P-25-DUP-2	Carbon disulfide Trichloroethene	Revised result to "U" (non-detect)
	P-25-349.4	Tetrachloroethene	Revised result to "U" (non-detect)
	P-25-349.4 RE	Tetrachloroethene	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3G150156 Cont'd	P-35-332.2	Tetrachloroethene	Revised result to "U" (non-detect)
	P-35-DUP-2	Tetrachloroethene	Revised result to "U" (non-detect)
F3G230216	P-H-116.8	Carbon disulfide	Revised result to "U" (non-detect)
F3G250374	P-H-106.8	Methylene chloride*	Revised result to "U" (non-detect)
	P-H-136.8	Carbon disulfide	Revised result to "U" (non-detect)
	P-H-156.8	Acetone	Revised result to "U" (non-detect)
	P-H-206.55	Carbon disulfide Chloromethane Tetrachloroethene	Revised result to "U" (non-detect)
	P-42-202.7	1,2-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
	P-42-DUP-1	1,2-Dichlorobenzene	Revised result to "U" (non-detect)
	P-42-DUP-1	1,2-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
	P-42-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
	P-42-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
	P-H-DUP-2	Carbon disulfide Chloromethane Tetrachloroethene	Revised result to "U" (non-detect)
F3G290207	P-H-351.65	Chloromethane Methylene chloride* Tetrachloroethene	Revised result to "U" (non-detect)
	P-42-217.2	Methylene chloride*	Revised result to "U" (non-detect)
	P-42-276.4	Methylene chloride*	Revised result to "U" (non-detect)
	P-42-329.8	Methylene chloride*	Revised result to "U" (non-detect)
	P-42-DUP-2	Methylene chloride*	Revised result to "U" (non-detect)
	P-42-354.6	Methylene chloride*	Revised result to "U" (non-detect)
F3H060192	P-20-149.60	Acetone	Revised result to "U" (non-detect)
	P-20-159.60	Acetone Tetrachloroethene	Revised result to "U" (non-detect)
	P-45-81.25	Carbon disulfide Tetrachloroethene	Revised result to "U" (non-detect)
	P-45-131.25	Carbon disulfide 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-45-DUP-1	Acetone Carbon disulfide Methylene chloride* Tetrachloroethene	Revised result to "U" (non-detect)
	P-45-DUP-1 RE	Acetone Carbon disulfide Tetrachloroethene	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3H080219	P-20-229.70	Tetrachloroethene	Revised result to "U" (non-detect)
	P-45-151.25	Carbon disulfide 1,2-Dichlorobenzene	Revised result to "U" (non-detect)
	P-45-207.25	1,2-Dichlorobenzene	Revised result to "U" (non-detect)
F3H130195	P-45-281.65	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-20-309.60	Methylene chloride*	Revised result to "U" (non-detect)
	P-20-319.60	Acetone 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-20-427.99	Acetone Carbon disulfide Methylene chloride*	Revised result to "U" (non-detect)
	P-20-DUP-2	Carbon disulfide Methylene chloride*	Revised result to "U" (non-detect)
F3H180106	P-45-366.39	Acetone*	Revised result to "U" (non-detect)
	P-20-476.68	Acetone* 1,2-Dichloroethane	Revised result to "U" (non-detect)
F3H210288	P-37-119.95	Carbon disulfide	Revised result to "U" (non-detect)
	P-37-DUP-1	Carbon disulfide	Revised result to "U" (non-detect)
F3H220246	P-36-156.7	Methylene chloride*	Revised result to "U" (non-detect)
	P-36-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
	P-46-139.60	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-46-DUP-1	Acetone	Revised result to "U" (non-detect)
F3H270230	P-46-275.42	Methylene chloride*	Revised result to "U" (non-detect)
	P-46-DUP-2	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-36A-282.0	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-36-136.7	Carbon disulfide Methylene chloride*	Revised result to "U" (non-detect)
	P-37-284.4	Methylene chloride*	Revised result to "U" (non-detect)
	P-37-304.8	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-37-DUP-2	Methylene chloride*	Revised result to "U" (non-detect)
F3I040177	P-44-99.3	Acetone 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-44-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
F3I050189	P-44-149.8	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-44-149.8 DL	Acetone	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3I090305	P-44-215.5	Carbon disulfide Methylene chloride*	Revised result to "U" (non-detect)
	P-44-215.5 DL	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-44-229.2	Methylene chloride*	Revised result to "U" (non-detect)
	P-44-229.2 DL	Methylene chloride*	Revised result to "U" (non-detect)
	P-44-239.85	Methylene chloride*	Revised result to "U" (non-detect)
	P-44-239.85 DL	Methylene chloride*	Revised result to "U" (non-detect)
	P-44-249.85	Acetone Carbon disulfide 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-44-249.85 DL	Acetone Carbon disulfide Methylene chloride*	Revised result to "U" (non-detect)
	P-44-257.1	Acetone Carbon disulfide	Revised result to "U" (non-detect)
	P-47-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
	P-47-147.1	Methylene chloride*	Revised result to "U" (non-detect)
	P-47-177.0	Acetone 1,2-Dichlorobenzene cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-47-205.7	Acetone 1,2-Dichlorobenzene cis-1,2-Dichloroethene	Revised result to "U" (non-detect)
F3I120107	P-43-119.88	Acetone Styrene	Revised result to "U" (non-detect)
	P-44-339.8	Methylene chloride*	Revised result to "U" (non-detect)
F3I150101	P-43-129.88	Methylene chloride	Revised result to "U" (non-detect)
	P-47-197.0	Acetone Methylene chloride	Revised result to "U" (non-detect)
F3I180259	P-29-109.5	Acetone	Revised result to "U" (non-detect)
	P-29-DUP-1	Acetone	Revised result to "U" (non-detect)
	P-38-146.7	Acetone	Revised result to "U" (non-detect)
F3I230231	P-38-216.3	Acetone	Revised result to "U" (non-detect)
F3I250196	P-38-DUP-3	Acetone cis-1,2-Dichloroethene Methylene chloride	Revised result to "U" (non-detect)
F3J030259	P-30-89.50	Acetone* Chloromethane Methylene chloride* Trichloroethene	Revised result to "U" (non-detect)
	P-30-99.50	Methylene chloride*	Revised result to "U" (non-detect)
	P-30-204.55	Methylene chloride*	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3J030259 Cont'd	P-30-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
F3J070236	P-30A-298.6	Acetone 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-30A-DUP-2	1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-18-156.65	Acetone Trichloroethene	Revised result to "U" (non-detect)
	P-18-DUP-1	Acetone Trichloroethene	Revised result to "U" (non-detect)
F3J110172	P-30A-406.55	Acetone 1,2-Dichlorobenzene 1,3-Dichlorobenzene Methylene chloride	Revised result to "U" (non-detect)
	P-30A-DUP-3	Methylene chloride	Revised result to "U" (non-detect)
	P-18-217.65	Acetone Methylene chloride	Revised result to "U" (non-detect)
	P-18-247.65	Acetone Methylene chloride	Revised result to "U" (non-detect)
	P-18-DUP-2	Methylene chloride	Revised result to "U" (non-detect)
	P-18-257.65	Acetone	Revised result to "U" (non-detect)
	P-18-267.65	Acetone Trichloroethene	Revised result to "U" (non-detect)
	P-18-277.65	Acetone Trichloroethene	Revised result to "U" (non-detect)
	P-18-287.65	Acetone Trichloroethene	Revised result to "U" (non-detect)
	P-18-302.66	Acetone cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-18-335.80	Acetone	Revised result to "U" (non-detect)
F3J240204	P-50-109.90	1,2-Dichlorobenzene 1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-119.90	1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-129.90	1,2-Dichlorobenzene 1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-DUP-1	1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-139.90	1,2-Dichlorobenzene 1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-149.90	1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3J030259 Cont'd	P-30-DUP-1	Methylene chloride*	Revised result to "U" (non-detect)
F3J070236	P-30A-298.6	Acetone 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-30A-DUP-2	1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-18-156.65	Acetone Trichloroethene	Revised result to "U" (non-detect)
	P-18-DUP-1	Acetone Trichloroethene	Revised result to "U" (non-detect)
F3J110172	P-30A-406.55	Acetone 1,2-Dichlorobenzene 1,3-Dichlorobenzene Methylene chloride	Revised result to "U" (non-detect)
	P-30A-DUP-3	Methylene chloride	Revised result to "U" (non-detect)
	P-18-217.65	Acetone Methylene chloride	Revised result to "U" (non-detect)
	P-18-247.65	Acetone Methylene chloride	Revised result to "U" (non-detect)
	P-18-DUP-2	Methylene chloride	Revised result to "U" (non-detect)
	P-18-257.65	Acetone	Revised result to "U" (non-detect)
	P-18-267.65	Acetone Trichloroethene	Revised result to "U" (non-detect)
	P-18-277.65	Acetone Trichloroethene	Revised result to "U" (non-detect)
	P-18-287.65	Acetone Trichloroethene	Revised result to "U" (non-detect)
	P-18-302.66	Acetone cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-18-335.80	Acetone	Revised result to "U" (non-detect)
F3J240204	P-50-109.90	1,2-Dichlorobenzene 1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-119.90	1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-129.90	1,2-Dichlorobenzene 1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-DUP-1	1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-139.90	1,2-Dichlorobenzene 1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-50-149.90	1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3J240204 Cont'd	P-49-114.3	Acetone* 1,2-Dichlorobenzene 1,2-Dichloroethane cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-49-124.3	Acetone* 1,2-Dichlorobenzene 1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-49-167.3	Acetone* 1,2-Dichlorobenzene 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-49-DUP-1	Acetone* 1,2-Dichlorobenzene 1,2-Dichloroethane Toluene	Revised result to "U" (non-detect)
	P-51-117.78	1,2-Dichlorobenzene 1,2-Dichloroethane Trichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-51-127.78	Acetone* 1,2-Dichlorobenzene 1,2-Dichloroethane	Revised result to "U" (non-detect)
F3J290103	P-50-249.90	Acetone* Methylene chloride*	Revised result to "U" (non-detect)
	P-50-267.44	1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-50-309.90	cis-1,2-Dichloroehene Methylene chloride	Revised result to "U" (non-detect)
	P-50-342.60	1,2-Dichloroethane cis-1,2-Dichloroethene Methylene chloride* Trichloroethene	Revised result to "U" (non-detect)
	P-50-DUP-2	Acetone cis-1,2-Dichloroethene Methylene chloride* Trichloroethene	Revised result to "U" (non-detect)
	P-50-DUP-2 RE	cis-1,2-Dichloroethene	Revised result to "U" (non-detect)
	P-49-269.3	Acetone 1,2-Dichloroethane cis-1,2-Dichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-49-269.3 RE	Acetone cis-1,2-Dichloroethene Methylene chloride	Revised result to "U" (non-detect)
	P-49-284.3	Acetone	Revised result to "U" (non-detect)
	P-49-284.3 RE	Acetone	Revised result to "U" (non-detect)
	P-49-340.8	Methylene chloride*	Revised result to "U" (non-detect)
	P-49-DUP-2	Acetone 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-49-DUP-2 DL	Acetone cis-1,2-Dichloroethene	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3J290103 Cont'd	P-51-187.78	Acetone 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-51-DUP-2	Acetone 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-51-246.75	1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
F3J310287	P-51-301.12	Acetone* 1,2-Dichloroethane Methylene chloride*	Revised result to "U" (non-detect)
	P-51-321.00	Acetone* cis-1,2-Dichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-51-327.85	Acetone* cis-1,2-Dichloroethene Methylene chloride*	Revised result to "U" (non-detect)
F3K080109	P-54-107.55	Acetone 1,4-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
	P-54-107.55 DL	Acetone 1,4-Dichlorobenzene Methylene chloride* Trichloroethene	Revised result to "U" (non-detect)
	P-52-170.0	1,2-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
	P-52-DUP-1	Acetone	Revised result to "U" (non-detect)
	P-52-DUP-1 RE	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-58-159.65	Methylene chloride*	Revised result to "U" (non-detect)
	P-58-DUP-1	Acetone Methylene chloride*	Revised result to "U" (non-detect)
F3K110173	P-58-274.65	1,2-Dichlorobenzene Methylene chloride* Trichloroethene	Revised result to "U" (non-detect)
	P-58-DUP-2	Acetone Methylene chloride* Trichloroethene	Revised result to "U" (non-detect)
	P-58-DUP-2 RE	Methylene chloride* Trichloroethene	Revised result to "U" (non-detect)
	P-54-267.95	Acetone 1,2-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
	P-54-267.95 RE	Acetone 1,2-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
	P-54-DUP-2	1,2-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
	P-54-DUP-2 RE	Acetone 1,2-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
	P-54-276.4	Acetone Chloroform 1,2-Dichlorobenzene Methylene chloride*	Revised result to "U" (non-detect)
F3K140242	P-54-351.25	Chloroform	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3K140242 Cont'd	P-54-351.25 DL	cis-1,2-Dichloroethene Methylene chloride	Revised result to "U" (non-detect)
	P-54-DUP-3	Acetone Chloroform 1,2-Dichloroethane	Revised result to "U" (non-detect)
	P-54-DUP-3 DL	cis-1,2-Dichloroethene Methylene chloride	Revised result to "U" (non-detect)
F3K280120	P-53-146.40	Trichloroethene	Revised result to "U" (non-detect)
	P-53-DUP-1	Trichloroethene	Revised result to "U" (non-detect)
	P-53-266.35	cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-53-DUP-2	1,2-Dichloroethane cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-34-139.55	Acetone*	Revised result to "U" (non-detect)
	P-34-DUP-1	Acetone*	Revised result to "U" (non-detect)
	P-34-224.55	Acetone* Chloroform 1,2-Dichloroethane Trichloroethene	Revised result to "U" (non-detect)
	P-34-234.55	Acetone* Chloroform cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-34-244.55	Acetone* Chloroform cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-34-DUP-2	Acetone* Chloroform cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-34-254.55	Acetone* Chloroform cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-34-264.55	Acetone* Chloroform cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
	P-34-284.55	Acetone* Chloroform cis-1,2-Dichloroethene	Revised result to "U" (non-detect)
	P-34-294.55	Acetone* Chloroform cis-1,2-Dichloroethene	Revised result to "U" (non-detect)
	P-34-304.50	Acetone* Chloroform cis-1,2-Dichloroethene	Revised result to "U" (non-detect)
	P-53-331.10	cis-1,2-Dichloroethene	Revised result to "U" (non-detect)
	P-53-340.05	cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F3K280120 Cont'd	P-53-340.05 RE	cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
F3L050365	P-34-324.50	Acetone cis-1,2-Dichloroethene	Revised result to "U" (non-detect)
	P-34-334.50	Acetone cis-1,2-Dichloroethene Trichloroethene	Revised result to "U" (non-detect)
F3L090146	P-33-159.6	Chloromethane* Trichloroethene	Revised result to "U" (non-detect)
	P-33-169.6	Acetone Chloromethane Trichloroethene	Revised result to "U" (non-detect)
	P-33-179.6	Acetone Chloromethane Trichloroethene	Revised result to "U" (non-detect)
	P-33-DUP-1	Chloromethane Trichloroethene	Revised result to "U" (non-detect)
	P-33-189.6	Chloromethane Trichloroethene	Revised result to "U" (non-detect)
	P-33-198.1	Acetone Chloromethane Trichloroethene	Revised result to "U" (non-detect)
	P-33-214.6	Chloromethane	Revised result to "U" (non-detect)
	P-33-224.6	Chloromethane Trichloroethene	Revised result to "U" (non-detect)
	P-53-426.75	Acetone	Revised result to "U" (non-detect)
	P-53-480.90	Acetone Trichloroethene	Revised result to "U" (non-detect)
F4A130259	P-31-190.40	Acetone Chloroform Methylene chloride	Revised result to "U" (non-detect)
	P-31-190.40 RE	Chloroform Methylene chloride	Revised result to "U" (non-detect)
	P-31-DUP-1	Chloroform Toluene	Revised result to "U" (non-detect)
	P-31-DUP-1 RE	Chloroform Methylene chloride	Revised result to "U" (non-detect)
	P-55-DUP-1	1,4 Dichlorobenzene Tetrachloroethene	Revised result to "U" (non-detect)
	P-55-DUP-1 RE	Trans-1,2-Dichloroethene Methylene chloride* Tetrachloroethene	Revised result to "U" (non-detect)
	P-55-154.55	Trans-1,2-Dichloroethene Tetrachloroethene	Revised result to "U" (non-detect)
	P-55-154.55 RE	Methylene chloride* Tetrachloroethene	Revised result to "U" (non-detect)
F4A150320	P-31-344.25	Methylene chloride Toluene	Revised result to "U" (non-detect)
	P-31-344.25 RE	Methylene chloride Toluene	Revised result to "U" (non-detect)
	P-31-DUP-2 RE	Acetone	Revised result to "U" (non-detect)
	P-55-164.55	Acetone Methylene chloride* Toluene	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F4A150320 Cont'd	P-55-164.55 DL	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-55-174.55	Methylene chloride* Toluene	Revised result to "U" (non-detect)
	P-55-174.55 DL	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-55-186.15	Methylene chloride* Toluene	Revised result to "U" (non-detect)
	P-55-186.15 DL	Acetone Methylene chloride*	Revised result to "U" (non-detect)
	P-55-264.40	Methylene chloride	Revised result to "U" (non-detect)
	P-55-264.40 DL	Methylene chloride*	Revised result to "U" (non-detect)
	P-55-271.00	Methylene chloride	Revised result to "U" (non-detect)
	P-55-271.00 DL	Acetone Methylene chloride*	Revised result to "U" (non-detect)
F4A300327	P-55-311.95	Acetone* Chloromethane cis-1,2-Dichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-55-311.95 RE	Chloromethane cis-1,2-Dichloroethene	Revised result to "U" (non-detect)
	P-55-DUP-2	Acetone cis-1,2-Dichloroethene Methylene chloride*	Revised result to "U" (non-detect)
	P-56-126.55	Acetone* Chloroform Chloromethane Methylene chloride*	Revised result to "U" (non-detect)
F4B130279	P-32-174.35	Acetone 2-Butanone	Revised result to "U" (non-detect)
	P-32-DUP-1	Acetone 2-Butanone	Revised result to "U" (non-detect)
	P-32-224.35	Acetone 2-Butanone Chloroform	Revised result to "U" (non-detect)
	P-32-234.35	Acetone 2-Butanone Chloroform	Revised result to "U" (non-detect)
	P-32-241.01	Acetone 2-Butanone Chloroform Trichloroethene	Revised result to "U" (non-detect)
	P-32-251.77	Acetone 2-Butanone Chloroform Trichloroethene	Revised result to "U" (non-detect)
	P-32-259.35	Acetone 2-Butanone Chloroform Trichloroethene	Revised result to "U" (non-detect)
	P-32-269.35	Acetone* 2-Butanone Chloroform Trichloroethene	Revised result to "U" (non-detect)

Table 3-6. *Evaluation of Trip Blank, Field Blank, and Equipment Blank Results*

Package Identification	*Sample ID*	*Compound*	*Action*
F4B170134	P-32-279.35	2-Butanone Chloroform Trichloroethene	Revised result to "U" (non-detect)
F4B200226	P-32-488.9	Acetone 2-Butanone Chloromethane	Revised result to "U" (non-detect)
	P-32-DUP-3	Acetone Bromomethane 2-Butanone Chloromethane	Revised result to "U" (non-detect)

Note:
DL Suffix – Indicates a secondary diluted sample reanalysis
RE Suffix – Indicates a reanalysis at the same dilution
* - Also qualified due to method blank contamination

3.2.15. System Monitoring Compounds

All percent recoveries for the VOC surrogates were within laboratory control limits with the following exceptions:

- SDG F3C190235: the 1,2-dichloroethane-d4 recovery for the LCS analyzed on 03/25/03 was at 80%, which is slightly below the control limits of 83% to 119%. No qualifications are necessary based on professional judgment.

- SDG F3D290160: 1,2-Dichloroethane-d4 for sample P-17-92.25 was at 120%, which is slightly above the control limits of 83% to 119%. No qualifications are necessary based on professional judgment.

- SDG F3E290170: samples TB-05-28-03 and P-15-79.65 both have one surrogate outside of control limits. However, both samples were reanalyzed with acceptable recoveries. The laboratory had submitted both sets of data for these samples – the lab only needed to submit the analysis that was acceptable. The data from the initial analyses are to be ignored.

- SDG F3F180192: the toluene-d8 recovery for sample P-24-137.3 was above the control limits of 85% to 116%. The laboratory reanalyzed the sample on the next day. All surrogate recoveries were within the control limits in the reanalysis. Both analysis results were submitted. However, only the "good" analysis needed to be submitted. With this validation, the reanalysis will be considered the initial and only analysis reported. No qualifications are necessary.

- SDGs F3F260187, F3F260187, F3F270132, F3G010309, F3G030162, F3G150156, F3G250374, F3G290207, F3H060192, F3H080219, F3H130195, F3H180106, F3H210288, F3H270230, F3I050189, F3I150101, F3I180259, F3I230231, F3I250196, F3J070236, F3J110172, F3J290103, F3K110173, F3L050365, F3L090146, F4A130259, F4A150320, F4B130279, F4B170134, and F4B200226: the surrogate limits specified on Form II (Surrogate Recovery) are not consistent with other SDGs or the laboratory's report forms for results. The limits on the report forms for results Form I) are used for this validation.

- SDG F3G150156: surrogate 4-bromofluorobenzene recovery for sample P-25-349.4 was above the acceptance limit. However, the laboratory had reanalyzed the sample with acceptable recoveries. The laboratory reported both analyses; however, only the reanalysis is to be reported.

- SDG F3G230216: surrogate toluene-d8 recovery for sample P-H-EB-1 was above the acceptance limit. However, the laboratory had reanalyzed the sample with acceptable recoveries. The laboratory reported both analyses; however, only the reanalysis is to be reported.

- SDG F3G250374: surrogate toluene-d8 recovery for sample P-42-DUP-1 was above the acceptance limit. Therefore, all detected results in this sample, between the bracketing internal standards fluorobenzene and chlorobenzene-d5, are qualified as estimated (J) with a high bias. The compounds qualified are trichloroethene and tetrachloroethene.

- SDG F3H060192: surrogate toluene-d8 recovery for sample P-45-DUP-1 was above the acceptance limit. However, the laboratory had reanalyzed the sample with acceptable recoveries. The laboratory reported both analyses; however, only the reanalysis is to be reported.

- SDG F3H180106: surrogate 4-bromofluorobenzene recovery for sample TB-0813 was above the acceptance limit. However, the laboratory had reanalyzed the sample with acceptable recoveries. The laboratory reported both analyses; however, only the reanalysis is to be reported.

- SDG F3I040177: the surrogate recovery sheet (Form II) was not included in the data package. The surrogate recoveries for all samples were reviewed on the sample results form instead (Form I). All recoveries were acceptable.

- SDG F3I090305: the 4-bromofluorobenzene recovery for sample P-47-177.0 was at 79%, which is slightly below the control limits of 82% to 118%. No qualifications are necessary based on professional judgment.

- SDG F3I120107: the surrogate recovery sheet (Form II) was not included in the data package. The surrogate recoveries for all samples were reviewed on the sample results form instead (Form I). All recoveries were acceptable.

- SDG F3I230231: surrogate dibromofluoromethane recovery for the five samples P-38-260.7, P-43-246.68, P-43-DUP-2, P-43-294.85, and P-29-390.0 were slightly above the acceptance limit of 83 to 125 percent. The first four samples were reanalyzed with similar results. The fifth sample was not reanalyzed. Since the recoveries were above the limit and not below, and since they were only slightly above the limit, no qualification actions are performed based on professional judgment. The reanalyzed sample results are chosen as the more accurate results in this validation review since the recoveries were closer to the acceptance limit. The four initial analyses are not to be used.

- SDG F3J240204: surrogate dibromofluoromethane recovery for sample P-50-109.90 was at 129%, which is slightly above the acceptance limits of 83% to 125%. No qualifications are necessary based on professional judgment.

- SDG F3J290103: surrogate 1,2-dichloroethane-d4 recoveries for samples P-49-269.3 and P-49-284.3 were slightly above the acceptance limit. However, the laboratory had reanalyzed the sample with acceptable recoveries. The laboratory reported both analyses; however, only the reanalysis is to be reported.

  Surrogate 1,2-dichloroethane-d4 recovery for sample P-50-DUP-2 was at 124%, which is slightly above the acceptance limits of 81% to 122%. The sample was reanalyzed with a respective recovery of 128%. However, the associated duplicate sample recoveries were all within the acceptance limits. No qualifications are necessary based on professional judgment. The initial P-50-DUP-2 analysis is to be reported.

- SDG F3K080109: the surrogate recovery sheet (Form II) was not included in the data package. The surrogate recoveries for all samples were reviewed on the sample results form instead (Form I). Surrogate recovery for 4-bromofluorobenzene was slightly below the recovery limits for sample P-54-107.55 DL. Therefore, the only result hybridized onto the original analysis from this sample, 1,2-dichlorobenzene, is qualified as estimated (J), biased low. Sample P-52-DUP-1 was analyzed twice due to a low surrogate recovery. Surrogate recovery for 4-bromofluorobenzene was slightly low on the first analysis. Surrogate recovery for 1,2-dichloroethane-d4 was slightly low on the second analysis. Since the results for the two analyses and their respective duplicate sample (surrogate recoveries were acceptable) were all similar, no qualifications are deemed necessary.

- SDG F3K110173: three samples were analyzed twice due to surrogate recovery problems. They are samples P-58-DUP-2, P-54-267.95, and P-54-DUP-2. The reanalysis of samples P-58-DUP-2 and P-54-DUP-2 are to be the reported analyses because the surrogate recoveries were all acceptable in the reanalyzed samples. The original analysis of sample P-54-267.95 is to be the reported analysis because the recovery or the surrogate dibromofluoromethane is closer to the recovery range than that of the reanalysis. The dibromofluoromethane recovery for sample P-54-267.95 was at 129%, which is slightly above the control limits of 83% to 125%. No qualifications are necessary based on professional judgment.

- SDG F3K280120: surrogate toluene-d8 recovery for sample P-53-340.05 was slightly above the acceptance limit. Subsequently, the laboratory reanalyzed the sample resulting with acceptable recoveries. The laboratory reported both analyses; however, only the reanalysis is to be reported.

- SDG F4A130259: surrogate recovery for 1,2-dichloroethane-d4 for most samples were slightly above the acceptance limit. In addition, surrogate recovery for 4-bromofluorobenzene for samples P-31-190.40 RE and P-55-DUP-1 was slightly above the acceptance limit. Since these recoveries were above the acceptance limit, and not below, no qualifications are necessary based on professional judgment.

- SDG F4A150320: surrogate toluene-d8 recovery for sample P-31-344.25 was slightly above the acceptance limit. Surrogate 1,2-dichloroethane-d4 for the following samples were slightly above the acceptance limit: P-55-164.55, P-55-174.55, P-55-186.15, P-55-EB-2, P-55-271.00, TB-01120114, and TB-01120114 RE. Since these recoveries were above the acceptance limit, and not below, no qualifications are necessary based on professional judgment.

- SDG F4A300327: surrogate recovery for 1,2-dichloroethane-d4 for samples P-55-311.95 and P-55-311.95 were slightly above the acceptance limit. In addition, surrogate recovery for 4-bromofluorobenzene for sample P-55-311.95 was slightly above the acceptance limit. Since these recoveries were above the acceptance limit, and not below, no qualifications are necessary based on professional judgment.

3.2.16. Internal Standards

All internal standard retention times were within ± 0.5 minutes from that of the associated calibration for all analyses. The responses of all internal standards were within the range of 50-200% of the associated calibration verification for all samples, with the following exception:

- SDG F3I230231: sample P-43-DUP-2 internal standard area responses were all less than 50 percent of the associated calibration. However, the laboratory had reanalyzed the sample with acceptable responses. The laboratory reported both analyses; however, only the reanalysis is to be reported.

- SDG F3K280120: internal standard area and retention time tabulations were not performed for seven samples on Form VIII. Tabulations are always reviewed to determine if these quality criteria are within control limits. In this case, information from the raw data was used to perform these evaluations during the data validation process. No qualifications are necessary.

- SDG F4A130259: there were many samples analyzed on January 20, 2004, which had internal standard area deficiencies. The internal standard area responses for the following samples were less than 50 percent of the associated calibration for 1,4-dichlorobenzene-d4: P-55-EB-1, P-55-EB-1 DL, P-31-DUP-1, P-31-DUP-1 RE, P-31-190.40, and P-31-190.40 RE. Therefore, all compounds quantitated under 1,4-dichlorobenzene-d4 (1,3-dichlorobenzene, 1,4-dichlorobenzene, and 1,2-dichlorobenzene) for these samples are qualified as estimated (J). In addition, for sample P-55-EB-1 DL, the internal standard responses for fluorobenzene and chlorobenzene-d5 were also less than 50 percent of the associated calibration. Therefore, all compounds in sample P-55-EB-1 DL are qualified as estimated (J).

3.2.17. Compound Identification and Quantitation of Results / Dilutions

The laboratory's evaluations of the gas chromatographs and mass spectra for the identified compounds were acceptable. The identification of acetone was difficult in most cases; however, based on professional judgment, the identification is deferred to the laboratory analyst. The laboratory analyst is familiar with the behavior of the instrumentation that they work with.

The following deficiencies were found:

- SDG F3F260187: sample TB-619625, total xylene as m,p-xylene was detected with a positive spectral match. It was not reported and has been added to the reporting form through this validation.

- SDG F3F270132: sample TB-625625, total xylene as m,p-xylene was detected with a positive spectral match. It was not reported and has been added to the reporting form through this validation.

- SDG F3G290207: samples P-42-DUP-2 and P-42-329.8, total xylene as o-xylene was detected with a positive spectral match. It was not reported and has been added to the reporting form through this validation.

- SDG F3H210288: chlorobenzene was listed as detected in sample TB 819820 at 0.12 ug/L. However, there was no supporting evidence of it's detection in the raw data, and therefore, is qualified as non-detected (U).

- SDG F3I040177: sample TB-902903, total xylene as m,p-xylene was detected with a positive spectral match. It was not reported and has been added to the reporting form through this validation.

- SDG F3I120107: sample TB-908910, spectral search hardcopy for 1,3-dichlorobenzene was not included in the data deliverable package. This is assumed to be an oversight, and the compound is believed to be detected, as the laboratory had indicated.

- SDG F3I230231: sample P-43-DUP-2 RE, total xylene as o-xylene was detected with a positive spectral match. It was not reported and has been added to the reporting form through this validation.

- SDG F3J290103: samples P-49-284.3 and P-51-187.78, total xylene as o-xylene was detected with a positive spectral match. It was not reported and has been added to the reporting form through this validation.

- SDG F3K280120: sample P-53-331.10, total xylene as o-xylene was detected with a positive spectral match. It was not reported and has been added to the reporting form through this validation.

- SDG F4A150320: samples P-55-164.55 DL and P-55-186 DL, total xylene as o-xylene was detected with a positive spectral match. It was not reported and has been added to the reporting form through this validation.

- SDG F4B200226: there were no internal laboratory spectral searches submitted for the detected target compounds for sample P-32-DUP-3. However, it was not necessary to review them for this sample because all detected compounds were previously qualified as non-detects, "U," due to contamination.

Many samples contained elevated concentrations of some target compounds that exceeded the calibration range for the VOC analysis. The laboratory reported and qualified these results with an "E" qualifier. As part of the laboratory's corrective action, the affected samples were reanalyzed at a dilution to obtain usable results within the established calibration curve range. As part of this validation, specific compound results, which exceeded the calibration range in the original analysis, were replaced with the compound results from the secondary dilution analysis. In addition, due to calibration conditions, which may qualify compounds as rejected, "R," results from the secondary analysis are substituted, where appropriate. The sample results, in effect, are made whole when the initial and secondary analyses are "hybridized," into one. A list of the re-analyzed samples and the affected compounds are listed in Table 3-7.

Table 3-7. *Summary of Laboratory Re-Analyses*

Package Identification	***Sample ID***	***Compound Reported From Re-Analysis***
F3C190235	MW-7	Tetrachloroethene
	MW-2	Acetone Tetrachloroethene
	MW-1	Acetone Tetrachloroethene
	MW-12	Acetone Tetrachloroethene
	MW-5	Acetone Tetrachloroethene
	MW-10	Acetone Tetrachloroethene
	MW-3	Acetone Tetrachloroethene
	MW-4	Tetrachloroethene
	MW-DUP	Tetrachloroethene
F3E230179	P-E-292.28	Acetone Tetrachloroethene
	P-E-301.23	Acetone Tetrachloroethene

Table 3-7. *Summary of Laboratory Re-Analyses*

Package Identification	***Sample ID***	***Compound Reported From Re-Analysis***
F3F170126	P-C-337.5	Trichloroethene
F3F200145	P-24-207.3	1,1,1-Trichloroethane
F3F260187	P-23-DUP-1	Acetone Trichloroethene
F3G110256	P-25-EB-1	Carbon disulfide Methylene chloride
F3G250374	P-42-DUP-1	Tetrachloroethene
F3I050189	P-44-149.8	1,2-Dichlorobenzene cis-1,2-Dichloroethene Tetrachloroethene Trichloroethene
F3I090305	P-44-215.5	cis-1,2-Dichloroethene
	P-44-229.2	cis-1,2-Dichloroethene
	P-44-239.85	cis-1,2-Dichloroethene
	P-44-249.85	cis-1,2-Dichloroethene
F3J240204	P-50-109.90	Vinyl chloride
F3J290103	P-49-DUP-2	Tetrachloroethene Trichloroethene
F3K080109	P-54-107.55	1,2-Dichlorobenzene
F3K110173	P-58-DUP-2	Acetone
F3K140242	P-54-351.25	Tetrachloroethene
	P-54-DUP-3	Tetrachloroethene
F4A130259	P-31-EB-1	1,4-Dichlorobenzene 1,1-Dichloroethene
F4A150320	P-31-344.25	All compounds
	P-31-DUP-2	Acetone
	P-55-164.55	Bromomethane Chlorobenzene 1,2-Dichlorobenzene cis-1,2-Dichloroethene Trichloroethene Vinyl chloride
	P-55-174.55	Acetone Bromomethane Chlorobenzene 1,2-Dichlorobenzene cis-1,2-Dichloroethene Trichloroethene Vinyl chloride
	P-55-186.15	Acetone Bromomethane Chlorobenzene 1,2-Dichlorobenzene cis-1,2-Dichloroethene Tetrachloroethene Trichloroethene Vinyl chloride

Table 3-7. *Summary of Laboratory Re-Analyses*

Package Identification	*Sample ID*	*Compound Reported From Re-Analysis*
F4A150320 Cont'd	P-55-EB-2	2-Butanone Chloromethane cis-1,2-Dichloroethene 4-Methyl-2-Pentanone
	P-55-264.40	Tetrachloroethene Trichloroethene
	P-55-271.00	Acetone Tetrachloroethene Trichloroethene
	TB-01120114	Bromomethane 1,1,1-Trichloroethane

SDG: F3I090305: cis-1,2-dichloroethene in sample P-44-249.85 is also qualified as estimated ("J," biased low) because the secondary dilution value of 31 ug/L should not have required a dilution in the initial undiluted analysis. The initial calibration upper range for this compound is 40 ug/L.

The laboratory did not always perform initial analysis with no dilution. In many cases, the laboratory had diluted the samples without performing undiluted associated analysis. This has resulted in elevated detection limits for many samples. Table 3-8 lists the samples that were analyzed diluted without an undiluted analysis (X=times).

Table 3-8. *Summary of Samples Analyze Diluted Without an Undiluted Analysis*

Package Identification	*Sample ID*	*Initial Dilution*
F3D290160	P-F-86.48	20 X
	P-F-76.46	100 X
F3E060217	P-28-87.02	10 X
	P-28-97.02	5 X
F3E160130	P-E-98.57	2.5 X
F3E200165	P-E-128.57	100 X
	P-E-138.57	100 X
F3E290170	P-D-97.05	2 X
	P-15-79.65	10 X
	P-15-89.65	50 X
	P-15-99.65	500 X
	P-15-109.65	1000 X
	P-15-119.65	100 X
F3F030298	P-D-77.05	10 X
F3F120220	P-C-89.6	50 X
	P-C-99.6	5 X
	P-C-DUP-1	5 X

Table 3-8. *Summary of Samples Analyze Diluted Without an Undiluted Analysis*

Package Identification	***Sample ID***	***Initial Dilution***
F3F200145	P-24-217.3	5 X
	P-24-247.3	2.5 X
	P-24-257.3	2 X
F3F260187	P-23-180.1	2.5 X
	P-23-DUP-1	2 X
F3G110256	P-35-177.2	5 X
	P-35-DUP-1	2 X
F3G250374	P-H-106.8	10 X
	P-42-202.7	5 X
F3G290207	P-42-217.2	100 X
	P-42-276.4	20 X
	P-42-329.8	10 X
	P-42-DUP-2	5 X
	P-42-354.6	10 X
F3H060192	P-45-131.25	2 X
F3H130195	P-45-281.65	20 X
	P-20-309.60	50 X
	P-20-319.60	20 X
F3H220246	P-36-156.7	10 X
	P-36-DUP-1	10 X
F3H270230	P-46-275.42	2 X
	P-46-DUP-2	2 X
	P-36A-282.0	10 X
	P-37-284.4	50 X
	P-37-304.8	5 X
	P-37-DUP-2	5 X
F3I040177	P-44-99.3	20 X
	P-44-DUP-1	20 X
F3I050189	P-44-149.8	5 X
F3I090305	P-44-215.5	5 X
	P-44-229.2	10 X
	P-44-239.85	10 X
	P-47-DUP-1	5 X
	P-47-147.1	5 X
F3I120107	P-44-339.8	25 X
F3I150101	P-43-129.88	50 X

Table 3-8. *Summary of Samples Analyze Diluted Without an Undiluted Analysis*

Package Identification	***Sample ID***	***Initial Dilution***
F3I150101 Cont'd	P-47-197.0	5 X
F3I230231	P-29-310.2	2 X
	P-43-246.68	5 X
	P-43-DUP-2	5 X
	P-43-294.85	5 X
F3J030259	P-30-99.50	2.5 X
F3J240204	P-50-109.90	10 X
	P-50-119.90	100 X
	P-50-129.90	100 X
	P-50-DUP-1	100 X
	P-50-139.90	100 X
	P-50-149.90	100 X
	P-49-124.3	5 X
	P-51-117.78	5 X
	P-51-127.78	2.5 X
F3J290103	P-50-209.90	2.5 X
	P-50-342.60	10 X
	P-50-DUP-2	5 X
	P-49-269.3	2 X
	P-49-340.8	5 X
	P-49-DUP-2	2 X
	P-51-DUP-2	5 X
	P-51-246.75	10 X
F3J310287	P-51-321.00	10 X
	P-51-327.85	50 X
F3K080109	P-54-107.55	50 X
F3K110173	P-58-274.65	2.5 X
	P-58-DUP-2	2.5 X
	P-54-267.95	5 X
	P-54-DUP-2	5 X
	P-54-276.4	2.5 X
F3K280120	P-53-146.40	100 X
	P-53-DUP-1	100 X
	P-53-331.10	2 X

Table 3-8. *Summary of Samples Analyze Diluted Without an Undiluted Analysis*

Package Identification	*Sample ID*	*Initial Dilution*
F3K280120 Cont'd	P-53-340.05	10 X
F3L090146	P-53-480.90	2 X
F4A150320	P-55-264.40	10 X
	P-55-271.00	10 X
F4A300327	P-55-311.95 P-55-DUP-2	10 X 10 X

3.2.18. Tentatively Identified Compounds (TICs)

The laboratory was required to perform library searches for TICs present in the samples and QC matrices for the VOC analyses. Since the TIC evaluation provides only the identity of a possible compound in the matrix and not the actual concentration of a compound, all TIC data should be considered tentatively qualitative (i.e., not usable for quantitative purposes). The "N" qualifier was added to all TIC results to indicate to the data user that the compound identifications are tentative. The "J" qualifier was added to all TIC results to indicate to the data user that the values are estimated.

- SDG F3F180192: sample P-24-127.3, MTBE was detected with the target compounds (calibrated), but is not part of this project's compound list. Therefore, MTBE will be considered part of the TIC list; however, the identification is definitive (not tentative).

- SDG F3F272132: sample TB-625626, 1,1,2-trichlorofluoroethane was detected with the target compounds (calibrated) but is not part of this project's compound list. Therefore, 1,1,2-trichlorofluoroethane will be considered part of the TIC list; however, the identification is definitive (not tentative).

- SDG F3I050189: sample P-44-149.8, isopropylbenzene was detected with the target compounds (calibrated) but is not part of this project's compound list. Therefore, isopropylbenzene will be considered part of the TIC list; however, the identification is definitive (not tentative).

- SDG F3J290103: samples P-49-DUP-2, P-49-284.3, P-49-340.8, and P-51-187.78, 1,1,2-trichlorofluoroethane was detected with the target compound (calibrated) but is not part of this project's compound list. Therefore, 1,1,2-trichlorofluoroethane will be considered part of the TIC list; however, the identification is definitive (not tentative).

- SDG F3F310287: sample P-51-327.85, 1,1,2-trichlorofluoroethane was detected with the target compounds (calibrated) but is not part of this project's compound list. Therefore, 1,1,2-trichlorofluoroethane will be considered part of the TIC list; however, the identification is definitive (not tentative).

- SDG F3K280120: sample P-53-DUP-2, 1,2,4-trichlorobenzene was detected with the target compounds (calibrated) but is not part of this project's compound list. Therefore, 1,2,4-trichlorobenzene will be considered part of the TIC list; however, the identification is definitive (not tentative).

- SDG F4A150320: sample P-55-EB-2 RE, methyl-tert-butyl-ether was detected with the target compounds (calibrated) but is not part of this project's compound list. Therefore, methyl-tert-

butyl-ether will be considered part of the TIC list; however, the identification is definitive (not tentative).

There were two isomers of ethyldimethylbenzene TIC detected in sample P-55-164.55. For tabulation, the two isomer values are combined and the compounds are listed once. There were two unknown benzene TICs detected in sample P-55-174.55. For tabulation, the two unknown benzene values are combined and the compounds are listed once. There were two isomers of ethylmethylbenzene TIC detected in sample P-55-186.15. For tabulation, the two isomer values are combined and the compounds are listed once.

- SDG F4A300327: sample P-53-311.95 RE, iodomethane was detected with the target compounds (calibrated) but is not part of this project's compound list. Therefore, iodomethane will be considered part of the TIC list; however, the identification is definitive (not tentative).

The TICs identified in the project and laboratory QC samples are tabulated for inclusion in tables in the associated Groundwater Investigation Report.

3.2.19. Electronic Data Deliverables

The results in electronic database, for most samples, matched results listed on the hardcopy analytical report including laboratory qualifiers. Since the electronic deliverables were received in Microsoft Access database formats and was subsequently transferred to Microsoft Excel spreadsheet tables for presentation, it was not determined where the error was. However, all discrepancies have been corrected for the data tables in the Groundwater Investigation Report and the Access database. The qualifiers and results were revised based on quality control issues, and foundation for changes are listed in previous sections of this DUSR. The qualifiers were also placed onto the reporting forms located near the beginning of each deliverable package (i.e., SDG package).

4. Summary and Data Usability

This chapter summarizes the analytical data in terms of its completeness and usability. Data completeness is defined as the percentage of sample results that have been determined to be usable during the data validation process. Overall, 92.0 percent[8] of the VOC data (individual compound results) were determined to be usable for qualitative and quantitative purposes. The other 8.0 percent were qualified as rejected – the presence or absence of the compounds cannot be verified. Those sample results qualified as estimated, "J" and "UJ," due to data validation QC exceedances should be considered conditionally usable. TIC identifications are only presumptive evidence of the compound's presence, and are qualified with "N."

The samples collected from the Site were evaluated based on QA/QC criteria established by methods as listed in Section 1.3, in the data validation guidelines listed in Section 1.2, in the QAPP (GTEOSI, 2002) established for this project, and by professional judgment[9]. Major deficiencies in the data generation process have resulted in some sample data being rejected, indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor deficiencies in the data generation process have resulted in some sample data being characterized as approximate or estimated. Identification of a data point as approximate, "J," indicates uncertainty in the reported concentration or detection limit of the chemical, but not its assigned identity.

The following paragraphs present the adherence of the data to the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS) parameters. Completeness has been discussed above.

Precision is measured through the evaluation of field duplicate samples. For the VOC analyses, none of the data were rejected due to precision non-conformances. The frequency of duplicates analysis is at 21.5 percent[10], which is above the QAPP's minimum requirement of 10 percent.

LCS, MS, and MSD recoveries indicate the accuracy of the data. For the VOC analyses, none of the data were rejected due to accuracy non-conformances.

Holding times, sample preservation, blank analysis, and analyte identification and quantification are indicators of the representativeness of the analytical data. There were some VOC data rejected due to representativeness non-conformances. Details are summarized within Section 3.

Comparability is not compromised, provided that the analytical methods do not change over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures were consistently used by the laboratory, the comparability criteria for the analytical data were met.

Sensitivity is established by reported detection limits that represent measurable concentrations of analytes that can be determined with a designated level of confidence. Sensitivity requirements were not met for several project samples due to excessively poor compound responses in the initial and continuing calibrations performed. Most of the VOC data rejected were due to this sensitivity non-conformance.

[8] Value = (14,911 total target compound list data points – 1,192 rejected TCL data points) / 14,911 X 100
[9] Professional judgment is performed by a USEPA certified data validator with over a decade of environmental laboratory experience.
[10] Value = (55 duplicate samples / 256 non-QC samples) X 100

5. Data Usability Summary Report Summary Information

The DUSR was performed to determine whether or not the data meets Site-specific criteria for data quality and use. The DUSR is developed by reviewing and evaluating the analytical data packages. The following questions were addressed:

1. *Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?*

   The QAPP required that USEPA Level III deliverables be provided by the laboratory for each data package. This requirement was met as it applies to the methods used by the laboratory for sample analysis with the exception of some missing forms as discussed in Sections 3.2.1 and 3.2.5. The evaluation of the sample data was completed using the information provided in the data packages provided by the laboratory.

2. *Have all holding times been met?*

   The holding times were met for almost all VOC samples. For those samples which were analyzed passed the holding time, the exceedances were not excessive and the results were qualified as estimated values, biased low. Holding time exceedances are discussed in Section 3.2.4.

3. *Do all the QC data: blanks, standards, spike recoveries, replicate analyses, and sample data fall within the protocol-required limits and specifications?*

   The laboratory used laboratory control limits. QC deviations and qualifications performed on the sample data are discussed in Section 3. Major non-conformances were observed with initial and continuing calibrations and with sample conditions upon receipt – 8.0 percent of all data were qualified as not usable.

4. *Have all of the data been generated using established and agreed upon analytical protocols?*

   The QAPP required that USEPA guidance methods be used in the analysis of the samples. The laboratory used the required method. Some samples were diluted without first having performed undiluted analysis, thereby, increasing the reported detection limits.

5. *Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?*

   The evaluation of selected raw data confirmed all information provided in the data packages with the exception of minor errors. There were several samples where individual xylene compounds were identified in the raw data but the laboratory neglected to manually convert them to total-xylene, and therefore had not been reported. These errors were corrected in the data validation process.

6. *Have the correct data qualifiers been used?*

   The laboratory applied the correct qualifiers to the sample data. The validation qualifiers were applied as required by validation guidelines listed in Section 1. The validation qualifier definitions are listed in Section 2.2.

References

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Attachment A Validated Data

Executive Summary

This report addresses data quality for groundwater samples collected at the former Sylvania Electric Products facility in Hicksville, New York (the Site). Sample collection activities were conducted by Malcolm Pirnie, Inc. (MPI) on March 15th and 16th, 2003.

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for radiochemistry analyses including liquid scintillation counting for technetium-99 and alpha spectrometry for isotopic thorium and isotopic uranium using United States Department of Energy (USDOE) Methods and laboratory standard operating procedures (SOP's) and gas flow proportional counting for gross alpha, radium-226 and radium-228 using USEPA SW-846 Methods and laboratory SOP's. The analytical data generated for this investigation were evaluated by MPI using the quality assurance/quality control (QA/QC) criteria established in the methods as guidance. Non-conformances from the QA/QC criteria were qualified based on guidance provided in the Science Applications International Corporation (SAIC) *Laboratory Data Validation Guidelines For Evaluating Radionuclide Analyses*, 143.-ARCS-00.08, Revision 06, 04 June 2000 and USDOE *Guidance For Radiochemical Data Validation,* Draft RD4, October 4, 1995.

The non-detect liquid scintillation counting results for technetium-99 (Tc-99) for samples MW-1 and MW-12 were qualified as rejected (R) because the net negative results have uncertainties less than their absolute values. This may be an indication of improper blank subtraction, per the data validation guidelines. Tc-99 was not detected in any of the groundwater samples. The affected data listed above was rejected (R) and therefore considered not usable.

Other method non-conformances requiring data validation qualification (J and UJ) include holding time, laboratory control sample recovery, laboratory duplicate analysis, matrix spike sample recovery, radionuclide identification and quantitation and blank contamination. None of these non-conformances were significant enough to jeopardize the usability of the data.

Overall, about 99 percent of the radiochemistry data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated (J and UJ) due to data validation QA/QC exceedances should be considered conditionally usable and those sample results qualified as rejected (R) should be considered not usable. Therefore, the completeness objective of 90 percent, as stated in the quality assurance project plan (QAPP), was met.

1. Introduction

1.1. Sample Identification

This report addresses the results of a data quality evaluation for groundwater samples collected at the former Sylvania Electric Products facility in Hicksville, New York (the Site). Sample collection activities were conducted by Malcolm Pirnie, Inc. (MPI) on March 15th and March 16th, 2003.

The quantity and types of samples that were submitted for data validation are presented in Table 1-1.

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Date Collected*	*Client ID*	*Laboratory ID*	*Analysis Requested*
F3C190235	3/15/03	MW-7	F3C190235-003	Alpha, GFPC, LSC
	3/15/03	MW-2	F3C190235-004	Alpha, GFPC, LSC
	3/15/03	MW-1	F3C190235-005	Alpha, GFPC, LSC
	3/15/03	MW-11	F3C190235-006	Alpha, GFPC, LSC
	3/15/03	MW-12	F3C190235-007	Alpha, GFPC, LSC
	3/15/03	MW-5	F3C190235-008	Alpha, GFPC, LSC
	3/15/03	MW-10, MS/MSD	F3C190235-009	Alpha, GFPC, LSC
	3/15/03	MW-9	F3C190235-010	Alpha, GFPC, LSC
	3/16/03	MW-6	F3C190235-011	Alpha, GFPC, LSC
	3/16/03	MW-3 *	F3C190235-012	Alpha, GFPC, LSC
	3/16/03	MW-4	F3C190235-013	Alpha, GFPC, LSC
	3/16/03	MW-8	F3C190235-014	Alpha, GFPC, LSC
	3/15/03	MW-FB	F3C190235-015	Alpha, GFPC, LSC
	3/15/03	MW-DUP *	F3C190235-016	Alpha, GFPC, LSC

Notes:
Alpha indicates isotopic thorium or isotopic uranium by Alpha Spectroscopy GFPC indicates Gas-Flow Proportional Counting for gross alpha, radium-226 and radium -228.
LSC indicates Liquid Scintillation Analysis for technetium-99.
DUP indicates field duplicate, EB is equipment blank, and FB is field blank.
MS/MSD indicates Matrix Spike/Matrix Spike Duplicate.
* Indicates that field sampler identified blind field duplicate sample.

1.2. General Considerations

Validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, for the samples and analyses addressed herein, this report outlines deviations from the applicable QC criteria outlined in the following documents:

- GTE Operations Support Incorporated. (GTEOSI). *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002.

- United States Department of Energy (USDOE). 1997. *Environmental Measurements Laboratory (EML) Procedures Manual, 28th Edition, Volume 1(HASL 300).* New York, New York.

Deviations from the QA/QC criteria were qualified based on guidance provided in the following document:

- Science Applications International Corporation (SAIC). 2000. *Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyzes*, 143-ARCS-00.08, Revision 06. Oak Ridge, Tennessee.

- United States Department of Energy (USDOE), October 4, 1995, *Guidance for Radiochemical Data Validation,* Draft RD4, Gaithersburg, Maryland.

1.3. Analytical Methods

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for radiochemistry analyses including alpha spectrometry (thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, and uranium-238) and liquid scintillation (technetium-99) using USDOE Methods and laboratory SOP's and gas-flow proportional counting (gross alpha, radium-226 and radium228) using USEPA SW-846 methods and laboratory SOP's. The methods used in this investigation are presented in Table 1-2.

Table 1-2. *Analytical Method References*

Parameter	***Method***	***Reference***
Liquid Scintillation Counting (technetium-99)	DOE TC-02-RC MOD	1
Gross Alpha by Gas-Flow Proportional Counting	SW-846 9310 MOD	3
Radium-226	SW-846 9315 MOD	3
Radium-228	SW-846 9320 MOD	3
Alpha Spectrometry (Thorium-228, -230, -232)	NAS/DOE 3004/RP (DOE RP-725)*	1, 2
Alpha Spectrometry (Uranium-234, -235, -238)	NAS/DOE 3050/RP (DOE RP-725)*	1, 2

Table 1-2. *Analytical Method References*

Notes:
* Extraction Chromatography method used for analysis utilizes the same technology as the cited reference but includes proprietary techniques, more selective in separation of uranium and thorium from the matrix. Reference is for background information only.

1. United States Department of Energy (USDOE). October 1994. DOE Method for Evaluating Environmental and Waste Management Samples.
2. National Academy of Science (NAS).
3. USEPA SW-846. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, 3rd Edition, November 1986 and its updates.

The following sections of this document address distinct aspects of the validation process. Section 2 lists the data QA/QC protocols used to validate the sample data. Specific QA/QC deviations and qualifications performed on the sample data are discussed in Section 3. Data completeness and usability are discussed in Section 4. Section 5 presents the Data Usability Summary Report (DUSR) Summary Information. A copy of the validated electronic deliverable data is summarized in Attachment A.

2. Data Validation Protocols

2.1. Sample Analysis Parameters

The validation of analyses for this project used guidance presented in the QAPP (GTEOSI, 2002), the analytical methodology, and the data validation guidelines referenced in Section 1 herein.

The following QA/QC parameters were evaluated for the radiochemistry (liquid scintillation, alpha spectrometry and gas-flow proportional counting) analyses (where applicable):

- Holding times and sample preservation;
- Calibration;
- Blank analysis:
- Tracer recovery;
- Laboratory Control Sample (LCS);
- Matrix Spike Sample (MS);
- Duplicate analysis;
- Field duplicate analysis;
- Radionuclide quantitation and detection limit evaluation;
- Chemical separation specificity (alpha spectrometry);
- System performance; and
- Documentation completeness.

2.2. Data Validation Qualifiers

The following guidelines are used regarding the assignment of qualifiers and the use of qualified data:

- QA/QC exceedances which do not result in the qualification of an analyte, or which result in additional qualification of the analyte with the same qualifier, are not discussed.

- The use of estimated analytical data for quantitative uses is consistent with the guidance presented in the *USEPA Risk Assessment Guidance for Superfund* (USEPA 1992).

The following qualifiers have been used in this data validation.

"J" The associated numerical value is an estimated quantity, due to a QC or statistical exceedance.

"UJ" The associated non-detect value is an estimated quantity, due to a QC or statistical exceedance.

"U" The associated value is non-detect.

"R" The associated non-detect or numerical value is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

2.3. Data Usability Summary Report Questions

The DUSR determines whether or not the data meets site-specific criteria for data quality and use. It was developed by reviewing and evaluating the analytical data packages. During the course of this review the following questions were addressed (where applicable):

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

2. Have all holding times been met?

3. Do all the QC data (where applicable): blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

4. Have all of the data been generated using established and agreed upon analytical protocols?

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

6. Have the correct data qualifiers been used?

The answers to the questions presented by the DUSR are presented in the following sections of the report and in the DUSR Summary Information Section, Section 5.

3. Data Quality Evaluation

3.1. Summary

This section summarizes which QA/QC parameters specified in Section 2.1 met validation criteria, and which QA/QC parameters did not meet validation criteria. Samples requiring qualification are described in the following sections, and are identified by the description documented on the sample chain-of-custody records.

3.2. Liquid Scintillation Analyses (technetium-99)

3.2.1. Criteria

The QA/QC parameters presented in Section 2.1 were applied to the environmental samples listed in Table 1-1. The following QA/QC parameters were found to meet validation criteria:

- Holding times and sample preservation;
- Calibration;
- Blank analysis;
- Tracer Recovery;
- Duplicate analysis;
- Field duplicate analysis;
- System performance; and
- Documentation completeness.

Only those QA/QC parameters not meeting validation criteria are discussed in subsequent sections.

3.2.2. Radionuclide Quantitation and Detection Limits

The net negative results for several samples have uncertainties less than their absolute values. This may be an indication of improper blank subtraction, per SAIC data validation guidelines. Tc-99 was not detected in the groundwater samples. The affected data was rejected (R) as summarized in Table 3-1.

Table 3-1. *Evaluation of Negative Results versus Uncertainties for Liquid Scintillation Counting*

Sample ID	***Affected Radionuclide Results***	***Action***
MW-1, MW-12	Technetium-99	R

3.2.3. Laboratory Control Sample (LCS)

The percent recovery was greater than 120 percent for Tc-99 (151%) in the LCS, therefore the affected data was qualified estimated "J" as summarized in table 3-2.

Table 3-2. *Evaluation of Laboratory Control Sample for Tc-99*

Sample ID	*Affected Radionuclide Results*	*Action*
MW-7, MW-2, MW-1, MW-11, MW-12, MW-5, MW-10, MW-9, MW-6, MW-3, MW-4, MW-8, FB, MW-DUP	Technetium-99	J

3.2.4. Matrix Spike Sample (MS)

The percent recovery was greater than 120 percent for Tc-99 (144%) in the aqueous matrix spike sample, therefore the affected data was qualified estimated "J" as summarized in table 3-3. It should be noted that these results were previously qualified "J" due to LCS or rejected due to radionuclide quantitation and detection limits being out of criteria.

Table 3-3. *Evaluation of Matrix Spike Sample for Tc-99*

Sample ID	*Affected Radionuclide Results*	*Action*
MW-7, MW-2, MW-1, MW-11, MW-12, MW-5, MW-10, MW-9, MW-6, MW-3, MW-4, MW-8, FB, MW-DUP	Technetium-99	J

3.3. Alpha Spectrometry Analyses

3.3.1. Criteria

The QA/QC parameters presented in Section 2.1 for radiochemistry were applied to the environmental samples listed in Table 1-1. The following QA/QC parameters were found to meet validation criteria:

- Holding times and sample preservation;
- Calibration;
- Tracer recovery;
- Laboratory Control Sample (LCS);
- Matrix Spike Sample (MS);
- Duplicate analysis;
- Chemical separation specificity;
- System performance; and
- Documentation completeness.

Only those QA/QC parameters not meeting validation criteria are discussed in subsequent sections.

3.3.2. Blank Analysis

The field and laboratory blank results were evaluated using the following statistical approach: if the net blank result was not less than the associated uncertainty and if the sample result ± uncertainty was less than ten times the associated blank result ± uncertainty, the qualifier "J" was applied to the associated sample result. The statistical evaluation of the field and laboratory blank results is summarized in Table 3-4. The QAPP requires method blanks to be less than or equal to the minimum detected concentration (MDC) or less than 5 times the lowest sample activity. The method blanks were not always less than the lowest sample activity. The QAPP requires the laboratory to reanalyze the affected batch. This was not done by the laboratory.

Table 3-4. *Blank Evaluation for Thorium/Uranium Analyses.*

Blank ID	*Radionuclide*	*Blank Concentration ± Uncertainty (pCi/L)*	*Affected Samples*	*Action*
F3C200000-115B (laboratory blank)	Thorium-230	0.66 ± 0.27	MW-7, MW-2, MW-1, MW-11, MW-12, MW-5, MW-10, MW-9, MW-6, MW-3, MW-4, MW-8, MW-DUP	J
FB (Field Blank)	Thorium-230	1.14 ± 0.41	Same samples as laboratory blank (above)	J
FB (Field Blank)	Uranium-234	0.14 ± 0.14	MW-7, MW-11, MW-5, MW-10, MW-9, MW-6, MW-3, MW-4, MW-8, MW-DUP	J

Note:
pCi indicates picocurries
Uncertainty indicates total propagated uncertainty, which includes counting error and non-counting error.

3.3.3. Radionuclide Quantitation and Detection Limits

The net positive uranium-234 results for sample MW-7 and uranium-238 results for samples MW-DUP and FB were less than their uncertainties. This indicates that the sample counts were less than the critical values or less than 95% confidence of positive detection. The sample results were qualified as estimated (J), as summarized in Table 3-5.

Table 3-5. *Evaluation of Positive Results versus Uncertainties for Alpha Spectrometry Analyses*

Sample ID	*Affected Radionuclide Results*	*Sample Concentration ± Uncertainty (pCi/L)*	*Action*
MW-7	Uranium-234	0.10 ± 0.12	J
FB	Uranium-238	0.10 ± 0.12	J
MW-DUP	Uranium-238	0.11 ± 0.13	J

3.4. Gas-Flow Proportional Counting

3.4.1. Criteria

The QA/QC parameters presented in Section 2.1 were applied to the environmental samples listed in Table 1-1. The following QA/QC parameters were found to meet validation criteria:

- Holding times and sample preservation;
- Calibration;
- Blank analysis;
- Matrix Spike Sample (MS)
- Duplicate analysis;
- Field duplicate analysis;
- Radionuclide quantitation and detection limits
- System performance; and
- Documentation completeness.

Only those QA/QC parameters not meeting validation criteria are discussed in subsequent sections.

3.4.2. Laboratory Control Sample (LCS)

The percent recovery was less than 80 percent for radium 226 (73%) in the LCS, therefore the affected data was qualified estimated "J" as summarized in table 3-6.

Table 3-6. *Evaluation of Laboratory Control Sample*

Sample ID	*Affected Radionuclide Results*	*Action*
MW-7, MW-2, MW-1, MW-11, MW-12, MW-5, MW-10, MW-9, MW-6, MW-3, MW-4, MW-8, FB, MW-DUP	Radium-226	J

4. Summary and Data Usability

This chapter summarizes the analytical data in terms of its completeness and usability. Data completeness is defined as the percentage of sample results that have been determined to be usable during the data validation process. Overall, 98.5 percent of the radiochemistry data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated (J and UJ) due to data validation QA/QC exceedances should be considered conditionally usable and those results rejected (R) due to serious deficiencies in the ability to analyze the sample and meet quality control criteria whereas the presence or absence of the analyte cannot be verified should be considered unusable.

The samples collected from the Site in Hicksville, New York were evaluated based on QA/QC criteria established by methods as listed in Section 1.3, by the data validation guidelines listed in Section 1.2, and by the QAPP (GTEOSI, 2002) established for this project. Major deficiencies in the data generation process would have resulted in data being rejected, indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor deficiencies in the data generation process resulted in some sample data being characterized as approximate or estimated. Identification of a data point as approximate indicates uncertainty in the reported concentration of the radionuclide, but not its assigned identity.

The following paragraphs present the adherence of the data to the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PSARCC) parameters.

Precision is measured through the evaluation of field duplicate samples and laboratory duplicate samples. For the radiochemistry analyses, none of the data were rejected due to precision non-conformances.

LCS recoveries indicate the accuracy of the data. For the radiochemistry analyses, none of the data were rejected due to accuracy non-conformances.

Holding times, sample preservation, blank analysis, and analyte identification and quantification are indicators of the representativeness of the analytical data. Technetium-99 was rejected in two samples due to net negative results having uncertainties less than their absolute value, which may be an indication of improper blank subtraction therefore technetium-99 was rejected in these two samples due to representativeness non-conformance.

Comparability is not compromised, provided that the analytical methods do not change over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures were consistently used by the laboratory, the comparability criteria for the analytical data were met.

Sensitivity is established by reported detection limits that represent measurable concentrations of analytes that can be determined with a designated level of confidence. Sensitivity requirements were met for the sample data in this project. None of the radiochemistry data were rejected due to the sensitivity non-conformances.

5. Data Usability Summary Report Summary Information

The DUSR was performed to determine whether or not the data meets site-specific criteria for data quality and use. The DUSR is developed by reviewing and evaluating the analytical data package. The following questions were addressed:

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

The QAPP required that USEPA Level III deliverables be provided by the laboratory for each data package. This requirement was met as it applies to the methods used by the laboratory for sample analysis. The evaluation of the sample data was completed using the information provided in the data packages provided by the laboratory.

2. Have all holding times been met?

The holding times were met for the radiochemistry analyses.

3. Do all the QC data: blanks, standards, spike recoveries, replicate analyses, and sample data fall within the protocol-required limits and specifications?

The laboratory used the laboratory control limits during the analyses performed for this sampling event. QA/QC deviations and qualifications performed on the sample data are discussed in Chapter 3. Major non-conformances were not detected for the radiochemistry data.

4. Have all of the data been generated using established and agreed upon analytical protocols?

The QAPP required that USDOE methods are used in the analysis of samples collected for this sampling event. The laboratory used the required method protocols (with some minor modifications) for the analyses performed for this sampling event, which met data user and client needs.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

The evaluation of selected raw data confirmed information provided in the data packages.

6. Have the correct data qualifiers been used?

The laboratory applied the correct qualifiers to the sample data. The validation qualifiers were applied as required by validation guidelines as listed in Section 1

References

GTE Operations Support Incorporated. (GTEOSI). 2002. *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002.

O'Brien & Gere Engineers, Inc. 2000. *Supplement to the Approved Work Plan (QAPP – Appendix C), Former Sylvania Electric Products Incorporated Facility Cantiague Rock Road, Hicksville, New York.* Syracuse, New York.

Science Applications International Corporation (SAIC). 1992. *Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyzes*, 143.-
ARCS-00.08, Revision 06. Oak Ridge, Tennessee.

United States Department of Energy (USDOE).1997. *Environmental Measurements Laboratory (EML) Procedures Manual(HASL-300),* 28th Edition, Volume 1. New York, New York.

United States Department of Energy(USDOE) 1995. *Guidance for Radiochemical Data Validation,* Draft RD4, Gaithersburg, Maryland.

United States Environmental Protection Agency (USEPA). 1992. *USEPA Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A),* 540/1-891002. Washington D.C.

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Executive Summary

This report addresses data quality for groundwater samples collected at the former Sylvania Electric Products facility in Hicksville, New York (the Site). Sample collection activities were conducted by Malcolm Pirnie, Inc. (MPI) from April 24, 2003 through February 9, 2004.

The samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for radiochemistry analyses including alpha spectrometry for isotopic thorium and isotopic uranium using United States Department of Energy (USDOE) Methods and laboratory standard operating procedures (SOP's) and gas flow proportional counting for gross alpha, radium-226 and radium-228 using USEPA SW-846 Methods and laboratory SOP's. The analytical data generated for this investigation were evaluated by MPI using the quality assurance/quality control (QA/QC) criteria established in the methods as guidance. Non-conformances from the QA/QC criteria were qualified based on guidance provided in the Science Applications International Corporation (SAIC) *Laboratory Data Validation Guidelines For Evaluating Radionuclide Analyses*, 143-ARCS-00.08, Revision 06, June 2000 and the USDOE *Guidance for Radiochemical Data Balidation, Draft RD4, October 4, 1995.*

Method non-conformances requiring data validation qualification (J, U, or R) include holding time, laboratory control sample recovery, laboratory duplicate analysis, sample specific chemical recovery, radionuclide identification and quantitation and blank contamination. None of these non-conformances were significant enough to jeopardize the usability of the data.

Overall, 99 percent of the radiochemistry data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated (J and UJ) due to data validation QA/QC exceedances should be considered conditionally usable. Therefore, the completeness objective of 90 percent, as stated in the quality assurance project plan (QAPP), was met.

1. Introduction

1.1. Sample Identification

This report addresses the results of a data quality evaluation for groundwater samples collected at the former Sylvania Electric Products facility in Hicksville, New York (the Site). Sample collection activities were conducted by Malcolm Pirnie, Inc. (MPI) from April 24, 2003 through February 9, 2004.

The quantity and types of samples that were submitted for data validation are presented in Table 1-1.

Table 1-1. *Sample Cross-Reference List*

Package Identification	*Date Collected*	*Client ID*	*Laboratory ID*	*Analysis Requested*
F3D290160:	4/24/03	P-17-82.25	F3D290160-002	Alpha, GFPC
	4/25/03	P-17-92.25	F3D290160-003	Alpha, GFPC
	4/28/03	P-F-86.48	F3D290160-007	Alpha, GFPC
F3E020153:	4/29/03	P-F-96.48	F3E020153-001	Alpha, GFPC
F3E060217:	5/3/03	P-27-89.75	F3E060217-001X	Alpha, GFPC
	5/3/03	P-27-99.75	F3E060217-003	Alpha, GFPC
	5/3/03	P-28-87.02	F3E060217-007	Alpha, GFPC
	5/3/03	P-28-97.02	F3E060217-008	Alpha, GFPC
F3E140308:	5/12/03	P-26-86.8	F3E140308-002	Alpha, GFPC
	5/12/03	P-26-96.8	F3E140308-003	Alpha, GFPC
F3E160130:	5/15/03	P-E-88.57	F3E160130-012	Alpha, GFPC
F3E200165:	5/15/03	P-E-98.57	F3E200165-007	Alpha, GFPC
F3E290170:	5/27/03	P-D-87.05	F3E290170-002	Alpha, GFPC
	5/27/03	1EB-5/27	F3E290170-003	Alpha, GFPC
	5/28/03	P-D-97.05	F3E290170-004	Alpha, GFPC
	5/28/03	P-15-89.65	F3E290170-012	Alpha, GFPC
	5/28/03	P-15-99.65	F3E290170-013	Alpha, GFPC
F3F12022 0:	6/10/03	P-C-89.60	F3F120220-002	Alpha, GFPC
	6/10/03	P-C-99.60	F3F120220-003	Alpha, GFPC
	6/10/03	P-C-DUP1 #1	F3F120220-012	Alpha, GFPC
F3F170126:	6/16/03	P-24-87.35	F3F170126-006	Alpha, GFPC
F3F180192:	6/16/03	P-24-97.5	F3F180192-002	Alpha, GFPC

Table 1-1. *Sample Cross-Reference List*

Package Identification	Date Collected	Client ID	Laboratory ID	Analysis Requested
F3F260187:	6/24/03	P-23-FB1	F3F260187-002	Alpha, GFPC
	6/24/03	P-23-90.1	F3F260187-004	Alpha, GFOC
	6/24/03	P-23-100.1	F3F260187-005	Alpha, GFPC
F3G110256:	7/8/03	P-25-EB-1	F3G110256-001	Alpha, GFPC
	7/8/03	P-25-89.7	F3G110256-003	Alpha, GFPC
	7/9/03	P-25-99.7	F3G110256-004	Alpha, GFPC
	7/9/03	P-35-87.2	F3G110256-020	Alpha, GFPC
	7/9/03	P-35-97.2	F3G110256-021	Alpha, GFPC
F3G230216:	7/21/03	P-H-EB1	F3G230216-001	Alpha, GFPC
	7/21/03	P-H-86.8	F3G230216-003	Alpha, GFPC
	7/22/03	P-H-96.8	F3G230216-004	Alpha, GFPC
F3G250374:	7/23/03	P-42-89.6	F3G250374-022	Alpha, GFPC
	7/23/03	P-42-99.6	F3G250374-023	Alpha, GFPC
F3H060192:	8/4/03	P-20-89.60	F3H060192-002	Alpha, GFPC
	8/5/03	P-20-99.60	F3H060192-003	Alpha, GFPC
	8/4/03	P-45-81.25	F3H060192-011	Alpha, GFPC
	8/5/03	P-45-91.25	F3H060192-012	Alpha, GFPC
	8/4/03	P-45-DUP1	F3H060192-018	Alpha, GFPC
F3H210288:	8/19/03	P36-EB1	F3H210288-001	Alpha, GFPC
	8/19/03	P36-86.7	F3H210288-003	Alpha, GFPC
	8/19/03	P36-96.7	F3H210288-004	Alpha, GFPC
	8/19/03	P46-89.60	F3H210288-010	Alpha, GFPC
	8/20/03	P46-99.60	F3H210288-011	Alpha, GFPC
	8/19/03	P37-89.95	F3H210288-016	Alpha, GFPC
	8/19/03	P37-99.95	F3H210288-017	Alpha, GFPC
F3H280315:	8/26/03	P-46-330.21	F3H280315-008	Alpha, GFPC
	8/26/03	P-46-307.69	F3H280315-012	Alpha, GFPC
F3I040177:	9/2/03	P-44-89.8	F3I040177-003	Alpha, GFPC
	9/3/03	P-44-99.3	F3I040177-004	Alpha, GFPC
	9/3/03	P-44-DUP#1	F3I040177-005	Alpha, GFPC

Table 1-1. *Sample Cross-Reference List*

Package Identification	Date Collected	Client ID	Laboratory ID	Analysis Requested
	9/3/03	P-46-389.28	F3I040177-007	Alpha, GFPC
F3I050189:	9/4/03	P-47-87.08	F3I050189-010	Alpha, GFPC
F3I180259:	9/16/03	P-29-89.5	F3I180259-002	Alpha, GFPC
	9/16/03	P-29-99.5	F3I180259-004	Alpha, GFPC
	9/17/03	P-38-96.8	F3I180259-023	Alpha, GFPC
	9/17/03	P-38-86.7	F3I180259-024	Alpha, GFPC
F3I090305:	9/4/03	P-47-97.1	F3I090305-020	Alpha, GFPC
F3I120107:	9/9/03	P-43-89.88	F3I120107-003	Alpha, GFPC
	9/10/03	P-43-99.88	F3I120107-004	Alpha, GFPC
F3I230231:	9/20/03	P-29-310.2	F3I230231-014	Alpha, GFPC
	9/21/03	P-29-360.0	F3I230231-020	Alpha, GFPC
	9/22/03	P-29-390.0	F3I230231-044	Alpha, GFPC
F3J030259:	9/30/03	P-30-89.55	F3J030259-002	Alpha, GFPC
	10/1/03	P-30-99.55	F3J030259-003	Alpha, GFPC
F3J070236:	10/4/03	P-18-86.65	F3J070236-035	Alpha, GFPC
	10/5/03	P-18-96-65	F3J070236-036	Alpha, GFPC
F3J240204	10/21/03	P-50-89.90	F3J240204-004	Alpha, GFPC
	10/22/03	P-50-99.90	F3J240204-005	Alpha, GFPC
	10/21/03	P-49-84.25	F3J240204-017	Alpha, GFPC
	10/22/03	P-49-94.3	F3J240204-018	Alpha, GFPC
	10/22/03	P-51-87.78	F3J240204-030	Alpha, GFPC
	10/22/03	P-51-97.78	F3J240204-031	Alpha, GFPC
	10/22/03	P-51-DUP-1	F3J240204-032	Alpha, GFPC
F3K080109	11/4/03	P-54-87.55	F3K080109-002	Alpha, GFPC
	11/5/03	P-54-97.55	F3K080109-003	Alpha, GFPC
	11/5/03	P-52-90.0	F3K080109-016	Alpha, GFPC
	11/5/03	P-52-100.0	F3K080109-017	Alpha, GFPC
	11/4/03	P-58-89.65	F3K080109-029	Alpha, GFPC
	11/4/03	P-58-99.65	F3K080109-030	Alpha, GFPC
F3K110173:	11/7/03	P-58-304.65	F3K110173-005	Alpha, GFPC

Table 1-1. *Sample Cross-Reference List*

Package Identification	Date Collected	Client ID	Laboratory ID	Analysis Requested
	11/7/03	P-58-DUP-3	F3K110173-006	Alpha, GFPC
	11/9/03	P-58-402.40	F3K110173-010	Alpha, GFPC
	11/10/03	P-58-432.05	F3K110173-011	Alpha, GFPC
F3K210372:	11/18/03	P-53-86.40	F3K210372-011	Alpha, GFPC
	11/20/03	P-53-EB-11-20	F3K210372-012	Alpha, GFPC
F3K280120:	11/20/03	P-53-96.40	F3K280120-001	Alpha, GFPC
	11/21/03	P-34-89.55	F3K280120-027	Alpha, GFPC
	11/22/03	P-34-99.55	F3K280120-028	Alpha, GFPC
F3L090146:	12/05/03	P-33-89.6	F3L090146-003	Alpha, GFPC
	12/06/03	P-33-99.6	F3L090146-004	Alpha, GFPC
F4A130259:	1/5/04	P-31-89.25	F4A130259-003	Alpha, GFPC
	1/6/04	P-31-99.25	F4A130259-004	Alpha, GFPC
	1/11/04	P-55-84.10	F4A130259-021	Alpha, GFPC
	1/11/04	P-55-94.55	F4A130259-022	Alpha, GFPC
F4A230292:	1/21/04	P-56-86.55	F4A230292-006	Alpha, GFPC
	1/21/04	P-56-96.55	F4A230292-007	Alpha, GFPC
	1/22/04	P-56-DUP	F4A230292-019	Alpha, GFPC
F4B110140:	2/9/04	P-32-89.35	F4B110140-006	Alpha, GFPC
	2/9/04	P-32-99.35	F4B110140-007	Alpha, GFPC

Notes:
Alpha indicates Alpha Spectrometry of thorium (isotopic) and uranium (isotopic).
GFPC indicates Gas Flow Proportional Counting for gross alpha, radium 226 and radium 228.
Dup is duplicate, EB is equipment blank, and FB is field blank.

1.2. General Considerations

Validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, for the samples and analyses addressed herein, this report outlines deviations from the applicable QC criteria outlined in the following documents:

- GTE Operations Support Incorporated. (GTEOSI). *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002.

- United States Department of Energy (USDOE). 1997. *Environmental Measurements Laboratory (EML) Procedures Manual, 28th Edition, Volume 1(HASL-300)*. New York, New York.

Deviations from the QA/QC criteria were qualified based on guidance provided in the following documents:

- Science Applications International Corporation (SAIC). June 2000. *Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyses*, 143-ARCS-00.08, Revision 06. Oak Ridge, Tennessee.

- United States Department of Energy (USDOE). October 4, 1995, *Guidance for Radiochemical Data Validation*, Draft RD4, Gaithesrburg, Maryland.

1.3. Analytical Methods

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri for radiochemistry analyses including alpha spectrometry (thorium-228, thorium-230, thorium-232, uranium-234, uranium-235, and uranium-238) using USDOE Methods and laboratory SOP's and gas flow proportional counting (gross alpha, radium 226 and radium 228) using USEPA SW-846 methods and laboratory SOP's. The methods used in this investigation are presented in Table 1-2.

Table 1-2. *Analytical Method References*

Parameter	***Method***	***Reference***
Alpha Spectrometry (Uranium-234, Uranium-235 and Uranium –238)	DOE RP-725*	1
Radium-226 by GFPC	SW-846 9315 MOD	2
Radium-228 by GFPC	SW-846 9320 MOD	2
Alpha Spectrometry (Thorium-228, Thorium-230 and Thorium–232)	DOE RP-725*	1

Notes:
*Extraction Chromatography method used for analysis utilizes the same technology as the cited reference but includes proprietary techniques, more selective in separation of uranium and thorium from the matrix. Reference is for background information only.

1. United States Department of Energy (USDOE). October 1994. DOE Method for Evaluating Environmental and Waste Management Samples.
2. USEPA SW-846. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, 3rd Edition, November 1986 and its updates.

The following sections of this document address distinct aspects of the validation process. Section 2 lists the data QA/QC protocols used to validate the sample data. Specific QA/QC deviations and qualifications performed on the sample data are discussed in Section 3. Data completeness and usability are discussed in Section 4. Section 5 presents the Data Usability Summary Report (DUSR) Summary Information. A copy of the validated electronic deliverable data is summarized in Attachment A.

2. Data Validation Protocols

2.1. Sample Analysis Parameters

The validation of analyses for this project used guidance presented in the QAPP (GTEOSI, 2002), the analytical methodology, and the data validation guidelines referenced in Section 1 herein.

The following QA/QC parameters were evaluated for the radiochemistry (alpha spectrometry and gas flow proportional counting) analyses (where applicable):

- Holding times and sample preservation;
- Calibration;
- Blank analysis:
- Tracer recovery;
- Laboratory Control Sample (LCS);
- Matrix Spike Sample (MS)
- Duplicate analysis;
- Field duplicate analysis;
- Radionuclide quantitation and detection limit evaluation;
- Chemical separation specificity (alpha spectrometry);
- System performance; and
- Documentation completeness.

It should be noted that no Matrix Spike samples were associated with these data. The field blind duplicates associated with these data are PC-99.60 associated with P-C-DUP #1; P-45-81.25 associated with P-45-DUP1; P-44-99.3 associated with P-44-DUP#1; P-51-DUP-1 associated with P-51-97.78; P58-304.65 associated with P-58-DUP-3; and P-56-86.55 associated with P-56-DUP.

2.2. Data Validation Qualifiers

The following guidelines are used regarding the assignment of qualifiers and the use of qualified data:

- QA/QC exceedances which do not result in the qualification of an analyte, or which result in additional qualification of the analyte with the same qualifier, are not discussed.

- The use of estimated analytical data for quantitative uses is consistent with the guidance presented in the *USEPA Risk Assessment Guidance for Superfund* (USEPA 1992).

The following qualifiers have been used in this data validation.

"J" The associated numerical value is an estimated quantity, due to a QC or statistical exceedance.

"UJ" The associated non-detect value is an estimated quantity, due to a QC or statistical exceedance.

"U" The associated value is non-detect.

"R" The associated non-detect or numerical value is rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

2.3. Data Usability Summary Report Questions

The DUSR determines whether or not the data meets site-specific criteria for data quality and use. It was developed by reviewing and evaluating the analytical data packages. During the course of this review the following questions were addressed (where applicable):

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

2. Have all holding times been met?

3. Do all the QC data (where applicable): blanks, instrument tunings, calibration standards, calibration verifications, surrogate recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?

4. Have all of the data been generated using established and agreed upon analytical protocols?

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

6. Have the correct data qualifiers been used?

The answers to the questions presented by the DUSR are presented in the following sections of the report and in the DUSR Summary Information Section, Section 5.

3. Data Quality Evaluation

3.1. Summary

This section summarizes which QA/QC parameters specified in Section 2.1 met validation criteria, and which QA/QC parameters did not meet validation criteria. Samples requiring qualification are described in the following sections, and are identified by the description documented on the sample chain-of-custody records.

3.2. Alpha Spectrometry Analyses

3.2.1. Criteria

The QA/QC parameters presented in Section 2.1 for radiochemistry were applied to the environmental samples listed in Table 1-1. The following QA/QC parameters were found to meet validation criteria:

- Holding times and sample preservation;
- Calibration;
- Field Duplicate Analysis;
- Chemical separation specificity;
- System performance; and
- Documentation completeness.

Only those QA/QC parameters not meeting validation criteria are discussed in subsequent sections.

3.2.2. Blank Analysis

The field and laboratory blank results were evaluated using the following statistical approach: if the net blank result was not less than the associated uncertainty and if the sample result ± uncertainty was less than ten times the associated blank result ± uncertainty, the qualifier "J" was applied to the associated sample result. The statistical evaluation of the field and laboratory blank results is summarized in Table 3-1. The QAPP requires method blanks to be less than or equal to the minimum detected concentration (MDC) or less than 5 times the lowest sample activity. The method blanks were not always less than the lowest sample activity. The QAPP requires the laboratory to reanalyze the affected batch. The laboratory did not do this

Table 3-1. *Blank Evaluation for Thorium/Uranium Analyses.*

Blank ID	*Radionuclide*	*Blank Concentration ± Uncertainty (pCi/L)*	*Affected Samples*	*Action*
F3D290160:				
F3D0300000-110B	Thorium-230	0.48 ± 0.25	P-17-82.25, P-17-92.25, P-F-86.48	J
F3D300000-111B	Uranium-234	0.97 ± 0.50	P-17-82.25, P-17-92.25, P-F-86.48	J
F3E020153:				
F3E0200000-448B	Thorium-230	0.38 ± 0.22	P-F-96.48	J

Table 3-1. *Blank Evaluation for Thorium/Uranium Analyses.*

Blank ID	*Radionuclide*	*Blank Concentration ± Uncertainty (pCi/L)*	*Affected Samples*	*Action*
F3E0200000-452B	Uranium-234 Uranium-235	0.38 ±0.27 0.32 ±0.27	P-F-96.48	J
F3E60217:				
F3E070000-125B	Thorium-228 Thorium-230	0.13 ±0.12 0.94 ±0.37	P-27-89.75 P-27-99.75 P-28-87.02 P-28-97.02	J
F3E140308:				
F3E150000-239B	Thorium-228 Thorium-230	0.18±0.14 0.55 ± 0.27	P-26-86.8 P-26-96.8	J
F3E160130:				
F3E190000-133B	Thorium-230	0.45 ±0.25	P-E-88.57	J
F3E200165:				
F3E210000-111B	Thorium-230	0.22 ±0.16	P-E-98.57	J
F3E290170:				
F3E290000-420B 1EB-5/27	Thorium-230 Thorium-230	0.31 ±0.20 0.27 ± 0.20	P-D-87.05 P-D-97.05 P-15-89.65 P-15-99.65	J
F3E290000-421B	Uranium-234	0.12 ±0.12	P-D-87.05 P-D-97.05 P-15-89.65 P-15-99.65	J
F3F120220:				
F3F120220-139B	Thorium-230 Thorium-232	0.57 ± 0.28 0.14 ± 0.13	P-C-89.60, P-C-99.60, P-C-DUP1 #1	J
F3F170126				
F3F170126-371B F3F170126-369B	Thorium-230 Uranium-234	0.43 ± 0.25 0.25 ± 0.19	P-24-87.35	J
F3F180192:				
F3F190000-160B	Thorium-230	0.68 ± 0.32	P-24-97.35	J
F3F260187:				
F3F260000-381B	Thorium-230 Thorium-232	0.36 ± 0.21 0.084 ± 0.098	P-23-90.1 P-23-100.1	J
F3G110256:				
F3G140000-273B P-25-EB-1	Thorium-230 Thorium-230	0.20 ± 0.16 0.43 ± 0.23	P-25-89.7 P-25-99.7 P-35-87.2 P-35-97.2	J
F3G230216:				
F3G240000-557B P-H-EB1	Thorium-230 Thorium-230	0.62 ± 0.30 0.23 ± 0.17	P-H-86.8 P-H-96.8	J
F3G240374:				
F3G270000-105B	Thorium-230	0.40 ± 0.22	P-42-89.6 P-42-99.6	J
F3H060192:				

Table 3-1. *Blank Evaluation for Thorium/Uranium Analyses.*

Blank ID	*Radionuclide*	*Blank Concentration ± Uncertainty (pCi/L)*	*Affected Samples*	*Action*
F3H070000-257B	Thorium-230	0.39 ± 0.24	P-20-89.60 P-20-99.60 P-45-81.25 P-45-91.25 P-45-DUP1	J
F3H210288:				
F3H220000-114B	Thorium-230	0.57 ± 0.25	P36-86.7 P36-96.7 P46-89.60 P46-99.60 P37-89.95 P37-99.95	J
F3H280315:				
F3I020000-170B	Thorium-230	0.63 ± 0.33	P-46-330.21 P-46-307.69	J
F3I180259:				
F3I190000-260B F3I190000-259B	Uranium-234 Thorium-230	0.17 ± 0.13 0.64 ± 0.29	P-29-89.5 P-29-99.5 P-38-96.8 P-38-86.7	J
F3I090305:				
F3I120000-253B	Thorium-228	0.18 ± 0.15	P-47-97.1	J
F3I120107:				
F3I120000-253B	Thorium-228	0.18 ± 0.15	P-43-89.88 P-43-99.88	J
F3I230231:				
F3I240000-211B	Thorium-230	0.39 ± 0.23	P-29-310.2 P-29-360.0 P-29-390.0	J
F3J030259:				
F3J060000-164B	Thorium-230	0.43 ± 0.25	P-30-89.55 P-30-99.55	J
F3J060000-485B	Uranium-234	0.11 ± 0.10	P-30-89.55 P-30-99.55	J
F3J070236:				
F3J080000-223B	Thorium-230	0.57 ± 0.25	P-18-86.65 P-18-96.65	J
F3J240204:				
F3J270000-652B	Uranium-234 Uranium-238	0.21 ± 0.13 0.12 ± 0.10	P-50-89.90 P-50-99.90 P-49-84.25 P-49-94.3 P-51-87.78 P-51-97.78 P-51-DUP-1	J
F3K080109:				
F3K090000-092B	Thorium-230	0.17 ± 0.15	P-54-87.55 P-54-97.55 P-52-90.0 P-52-100.0 P-58-89.65 P-58-99.65	J
F3K110173:				

Table 3-1. *Blank Evaluation for Thorium/Uranium Analyses.*

Blank ID	*Radionuclide*	*Blank Concentration ± Uncertainty (pCi/L)*	*Affected Samples*	*Action*
F3K120000-272B	Thorium-230	0.17 ± 0.15	P-58-304.65 P-58-DUP-3 P-58-402.40 P-58-432.05	J
F3K210372:				
F3K20000-098B P53-EB-11-20	Thorium-230 Thorium-230 Uranium-234	0.17 ± 0.15 0.17 ± 0.14 0.17 ± 0.13	P-53-86.40	J
F3K280120:				
F3L040000-542B F3L010000-149B	Thorium-230 Uranium-238	0.31 ± 0.20 0.080 ± 0.093	P-53-96.40 P-34-89.55 P-34-99.55	J
F3L090146:				
F3L090000-348B	Thorium-230	0.22 ± 0.17	P-33-89.6 P-33-99.6	J
F4A230292:				
F4A240000-097B	Thorium-230	0.32 ± 0.21	P-56-86.55 P-56-96.55 P-56-DUP	J
F4B110140:	Thorium-230	0.27 ± 0.18	P-32-89.35 P-32-99.35	J

Note:
pCi indicates picocurries
Uncertainty indicates total propagated uncertainty, which includes counting error and non-counting error.

3.2.3. Sample Specific Chemical Recovery

If the tracer recovery is less than 50 percent or greater than 100 percent then the qualifier "J" was applied to the associated sample results, as summarized in table 3-2.

Table 3-2. *Sample Specific Chemical Recovery*

Sample ID	*Affected Radionuclide Results*	*Action*
F3D290160:		
P-17-82.25	Uranium 234, -235, -238	J
F3D290170:		
P-D-87.05	Uranium 234, -235, -238	J
F3G230216:		
P-H-EB1	Uranium-234 Uranium-235 Uranium-238	J
F3G250374:		
P-42-89.6 P-42-99.6	Uranium-234 Uranium-235 Uranium-238	J
F3I040177:		

Table 3-2. *Sample Specific Chemical Recovery*		
Sample ID	***Affected Radionuclide Results***	***Action***
P-44-99.3	Thorium-228 Thorium-230 Thorium-232	J

It should be noted that the laboratory mistakenly did not spike the original sample F3E060217-001 resulting in no tracer recovery, therefore the duplicate results (sample F3E060217-001X), which showed good tracer recovery were reported, however no laboratory duplicate results were available for QA /QC for the samples in group F3E060217.

It should be noted that Uranium-234 was also previously qualified "J" in sample P-D-87.05 due to method blank contamination.

It should be noted that Thorium-230 was also previously qualified "J" in sample P-44-99.3 due to high LCS recovery.

3.2.4. Laboratory Control Sample (LCS)

If the percent recovery is less than 80 percent or greater than 120 percent in the LCS then the qualifier "J" was applied to the associated sample results, as summarized in table 3-3.

Table 3-3. *Evaluation of Laboratory Control Sample*		
Sample ID	***Affected Radionuclide Results***	***Action***
F3D290160:		
P-17-82.25, P-17-92.25, P-F-86.48	Uranium-238	J
F3F120220:		
P-C-89.60, P-C-99.60, P-C-DUP1 #1	Thorium-230	J
F3F170126:		
P-24-87.35	Thorium-230	J
F3F180192:		
P-24-97.35	Thorium-230	J
F3F260187:		
P-23-FB1 P-23-90.1 P-23-100.1	Thorium-230	J
F3G110256:		
P-25-EB-1 P-25-89.7 P-25-99.7 P-35-87.2 P-35-97.2	Thorium-230	J

Table 3-3. *Evaluation of Laboratory Control Sample*		
Sample ID	***Affected Radionuclide Results***	***Action***
F3G230216:		
P-H-EB1 P-H-86.8 P-H-96.8	Thorium-230	J
F3G250374:		
P-42-89.6 P-42-99.6	Thorium-230 Uranium-234	J
F3H210288:		
36-EB1 P36-86.7 P36-96.7 P46-89.60 P46-99.60 P37-89.95 P37-99.95	Thorium-230	J
F3I040177:		
P-44-89.8 P-44-99.3 P-44-DUP#1 P-46-389.28	Thorium-230	J
F3I050189:		
P-47-87.08	Thorium-230	J
F3I180259:		
P-29-89.5 P-29-99.5 P-38-96.8 P-38-86.7	Thorium-230	J
F3I120107:		
P-43-89.88 P-43-99.88	Thorium-230	J
F3I230231:		
P-29-310.2 P-29-360.0 P-29-390.0	Thorium-230	J
F3J070236:		
P-18-86.65 P-18-96.65	Thorium-230	J
F3J240204:		
P-50-89.90 P-50-99.90 P-49-84.25 P-49-94.3 P-51-87.78 P-51-97.78 P-51-DUP-1	Thorium-230	J
F3K080109:		

Table 3-3. *Evaluation of Laboratory Control Sample*

Sample ID	***Affected Radionuclide Results***	***Action***
P-54-87.55 P-54-97.55 P-52-90.0 P-52.100.0 P-54-89.65 P-54-99.65	Thorium-230	J
F3K210372:		
P-53-86.40 P-53-EB-11-20	Thorium-230	J
F3K280120:		
P-53-96.40 P-34-89.55 P-34-99.55	Thorium-230	J
F3L090146:		
P-33-89.6 P-33-99.6	Thorium-230	J
F4A230292:		
P-56-86.55 P-56-96.55 P-56-DUP	Thorium-230	J
F4A130259:		
P-31-89.25 P-31-99.25 P-55-84.10 P-55-94-.55	Thorium-230	J
F4B110140:		
P-32.89.35 P-32-99.35	Throium-230	J

It should be noted that Thorium-230 was also previously qualified "J" in samples P-C-89.60, P-C-99.60, P-C-DUP1 #1, P-24-87.35, P-24-97.35, P-23-90.1, P-23-100.1, P-25-89.7, P-25-99.7, P-35-87.2, P-35-97.2, P-H-86.8, P-H-96.8, P-42-89.6, P-42-99.6, P36-86.7, P36-99.7, P46-89.60, P46-99.60, P37-89.95, P37-99.95, P-44-99.3, P-29.89.5, P-29-99.5, P-38-96.8, P-38-86.7, P-29-310.2, P-29-360.0, P-29-390.0, P-18-86.65, P-18-96.65, P-54-87.55, P-54-97.55, P-52-90.0, P-52-100.0, P-54-89.65, P-54-99.65, P-53-86.40, P-53-96.40, P-34-89.55, P-34-99.55, P-33-89.6, P-33-99.6, P-56-86.55, P-56-96.55, P56-DUP, P-32-89.35 and P-32-99.35 due to blank contamination.

It should be noted that Uranium-234 was previously qualified "J" in samples P-42-89.6 and P-42-99.6 due to poor tracer recovery.

3.2.5. Duplicate Analysis

If the Duplicate Error Ratio (DER) is greater than one (1) when comparing laboratory or field duplicate samples then the qualifier of "J" was applied to the associated sample results, as summarized in table 3-4.

Table 3-4. *Evaluation of Duplicate Analysis*		
Sample ID	***Affected Radionuclide Results***	***Action***
F3E160130:		
P-E-88.57	Thorium-228	J
F3F170126:		
P-24-87.35	Thorium-230	J
F3H060192:		
P-20-89.60 P-20-99.60 P-45-81.25 P-45-91.25 P-45-DUP1	Thorium-228 Uranium-234	J
F3H210288:		
P36-EB1 P36-86.7 P36-96.7 P46-89.60 P46-99.60 P37-89.95 P37-99.95	Thorium-230	J
F3I040177:		
P-44-89.8 P-44-DUP#1 P-46-389.28	Uranium-238	J
F3I050189:		
P-47-87.08	Uranium-238	J
F3I230231:		
P-29-310.2 P-29-360.0 P-29-390.0	Thorium-230 Uranium-238	J
F3K110173:		
P-58-304.65 P-58-DUP-3 P-58-402.40 P-58-432.05	Uranium-234	J
F4A230292:		
P-56-86.55 P-56-DUP	Thorium-232	J

It should be noted that the laboratory mistakenly did not spike the original sample F3E060217-001 resulting in no tracer recovery, therefore the duplicate results (sample F3E060217-001X), which showed good tracer recovery were reported, however no laboratory duplicate results were available for QA /QC for the samples in SDG F3E060217.

It should be noted that Thorium-230 was also previously qualified "J" in samples P-24.87.35, P36-EB1, P36-86.7, P36-99.7, P46-89.60, P46-99.60, P37-89.95, P37-99.95, P-29-310.2, P-29-360.0 and P-29-390.0 due to method blank contamination or poor LCS recovery.

It should be noted that an equipment blank was used to perform the laboratory duplicate analyses, therefore all of the QC data was carefully judged and professional judgment was exercised.

3.2.6. Radionuclide Quantitation and Detection Limits

If the net positive results are less than their uncertainties and the uncertainty multiplied by 1.65 is greater than the MDC, this would indicate that the sample counts were less than the critical values or less than 95% confidence of positive detection, therefore the sample results were qualified as estimated "J", as summarized in Table 3-5. It the net negative result has an uncertainty smaller than their absolute value, this is an indication of improper blank subtraction and the sample results were rejected "R", as summarized in Table 3-6.

Table 3-5. *Evaluation of Positive Results versus Uncertainties for Alpha Spectrometry Analyses*

Sample ID	*Affected Radionuclide Results*	*Sample Concentration ± Uncertainty (pCi/L)*	*Action*
F3D290160:			
P-17-82.25	Uranium-234	0.14 ± 0.16	J
P-F-86.48	Uranium-238	0.13 ± 0.15	J
F3D290170:			J
P-D-87.05	Uranium-234	0.12 ± 0.14	J
P-D-97.05	Thorium-228	0.077 ± 0.091	J
F3F120220:			
P-C-89.60	Thorium-232	0.09 ± 0.11	J
F3G110256:			
P-35-97.2	Thorium-228	0.1 ± 0.12	J
F3G250374:			
P-42-89.6 P-42-99.6	Uranium-234	0.11 ± 0.18 0.19 ± 0.22	J
F3I040177:			
P-46-389.28	Thorium-232	0.1 ± 0.12	J
F3J070236:			
P-18-96.65	Uranium-234	0.080 ± 0.092	J
F3K080109:			
P-52-100.0	Uranium-234	0.095 ± 0.097	J
F4B110140:			
P-32-89.35 P-32-99.35	Uranium-238 Uranium-238	0.073 ± 0.085 0.068 ± 0.078	J

It should be noted that Uranium-234 was previously qualified "J" in sample P-D-87.05 due to tracer recovery and method blank contamination; Thorium-232 was previously qualified "J" in sample P-C-89.60 due to method blank contamination; and Uranium-234 was previously qualified "J" in sample P-42-89.6 and P-42-99.6 due to tracer recovery and laboratory control sample being out of criteria.

Table 3-6. *Evaluation of Net Negative Results versus Uncertainties for Alpha Spectrometry Analyses*

Sample ID	*Affected Radionuclide Results*	*Sample Concentration ± Uncertainty (pCi/L)*	*Action*
F3G110256:			
P-25-EB-1	Uranium-235	-0.031 ± 0.028	R
P-25-89.7	Thorium-232	-0.030 ± 0.028	R
F3H210288:			
P37-99.95	Thorium-228	-0.039 ± 0.033	R
F4A230292:			
P-56-86.55	Thorium-232	-0.078 ± 0.043	R

3.3. Gas Proportional Counting

3.3.1. Criteria

The QA/QC parameters presented in Section 2.1 were applied to the environmental samples listed in Table 1-1. The following QA/QC parameters were found to meet validation criteria:

- Holding times and sample preservation;
- Calibration;
- Blank analysis;
- Field Duplicate Analysis;
- System performance; and
- Documentation completeness.

Only those QA/QC parameters not meeting validation criteria are discussed in subsequent sections.

3.3.2. Blank Analysis

The field and laboratory blank results were evaluated using the following statistical approach: if the net blank result was not less than the associated uncertainty and if the sample result ± uncertainty was less than ten times the associated blank result ± uncertainty, the qualifier "J" was applied to the associated sample result. The statistical evaluation of the field and laboratory blank results is summarized in Table 3-7. The QAPP requires method blanks to be less than 5 times the minimum detected concentrations (MDC) and the lowest sample activity. The method blanks were not always less than the lowest sample activity. The QAPP requires the laboratory to reanalyze the affected batch. The laboratory did not do this.

Table 3-7. *Blank Evaluation for Radium-226 Analyses.*

Blank ID	Radionuclide	Blank Concentration ± Uncertainty (pCi/L)	Affected Samples	Action
F3H210288:				
P36-EB1	Radium-226	0.37 ± 0.20	P36-86.7 P36-96.7 P46-89.60 P46-99.60 P37-89.95 P37-99.95	J
F3I090305:				
F3I120000-564B	Radium-226	0.229 ± 0.078	P-47-97.1	J

3.3.3. Laboratory Control Sample (LCS)

If the percent recovery is less than 80 or greater than 120 in the LCS then the qualifier "J" was applied to the associated sample results, as summarized in table 3-8.

Table 3-8. *Evaluation of Laboratory Control Sample*

Sample ID	Affected Radionuclide Results	Action
F3G230216:		
P-H-86.8, P-H-96.8, P-H-EB1	Radium-226	J
F3G250374:		
P-42-89.6, P-42-99.6	Radium-226	J
F3H060192:		
P-20-89.60 P-20-99.60 P-45-81.25 P-45-91.25 P-45-DUP1	Radium-226	J
F3H210288:		
P36-EB1 P36-86.7 P36-96.7 P46-89.60 P46-99.60 P37-89.95 P37-99.95	Radium-226	J
F3H280315:		
P-46-330.21 P-46-307.69	Radium-226	J
F3I040177:		
P-44-89.8 P-44-99.3 P-44-DUP#1 P-46-389.28	Radium-226	J
F3I050189:		

Table 3-8. *Evaluation of Laboratory Control Sample*

Sample ID	*Affected Radionuclide Results*	*Action*
P-47-87.08	Radium-228	J
F3I090305:		
P-47-97.1	Radium-226	J
F3I120107:		
P-43-89.88 P-43-99.88	Radium-226	J
F3J030259:		
P-30-89.55 P-30-99.55	Radium-226	J
F3J240204:		
P-50-89.90 P-50-99.90 P-49-84.25 P-49-94.3 P-51-87.78 P-51-97.78 P-51-DUP-1	Radium-226	J
F3K080109:		
P-54-87.55 P-54-97.55 P-52-90.0 P-52-100.0 P-54-89.65 P-54-99.65	Radium-228	J
F3K110173:		
P-58-304.65 P-58-DUP-3 P-58-402.40 P-58-432.05	Radium-226	J
F3L090146:		
P-33-89.6 P-33-99.6	Radium-226	J
F4A230292:		
P-56-86.55 P-56-96.55 P-56-DUP	Radium-228	J
F4B110140:		
P-32-89.35 P-32-99.35	Radium-226	J

It should be noted that Radium-226 was previously qualified "J" in samples P36-86.7, P36-96.7, P46-89.60, P46-99.60, P37-89.95, P37-99.95 and P-47-97.1 due to equipment or method blank contamination.

3.3.4. Duplicate Analysis

If the Duplicate Error Ration (DER) is greater than one (1) when comparing laboratory or field duplicate samples then the qualifier of "J" was applied to the associated sample results, as summarized in table 3-9.

Table 3-9. *Evaluation of Duplicate Analysis*

Sample ID	***Affected Radionuclide Results***	***Action***
F3D290160:		
P-17-82.25 P-17-92.25 P-F-86.48	Radium-228	J
F3E140308:		
P-86-86.8 P-26-96.8	Radium-226	J
F3I180259:		
P-29-89.5 P-29-99.5 P-38-96.8 P-38-86.7	Radium-228	J
F3I090305:		
P-47-97.1	Radium-226	J
F3J030259:		
P-30-89.55 P-30-99.55	Radium-226	J
F3K080109:		
P-54-87.77 P-54-97.55 P-52-90.0 P-52-100.0 P-54-89.65 P-54-99.65	Radium-226	J
F4B110140:		
P-32-89.35 P-32-99.35	Radium-226	J

It should be noted that Radium-226 was previously qualified "J" in sample P-47-97.1, P-30-89.55, P-30-99.55, P-32-89.35 and P-32-99.35 due to method blank contamination and/or poor LCS recovery.

It should be noted that the LCS results in SDG F3L090146 and F4B110140 were used for laboratory duplicate analyses.

3.3.5. Radionuclide Quantitation and Detection Limits

Detection limits specified in the specific procedures must be met unless other detection limits are specified in the Statement of Work (SOW). The detection limits were not met due to insufficient sample volume. The results were reported with the detection limits that were achieved and the qualifier "DL" was applied to the associated sample results, as summarized in table 3-10.

Table 3-10. *Detection Limits for Radium-228*

Sample ID	*Affected Radionuclide Results*	*Sample Concentration ± Uncertainty (pCi/L)*	*Action*
F3F120220:			
P-C-89.60	Radium-228	0.29 ± 0.79	DL
P-C-99.60	Radium-228	-0.03 ± 0.77	DL
P-C-DUP1 #1	Radium-228	0.48 ± 0.65	DL

It should be noted that the reporting limit for sample P-33-89.6 in SDG F3L090146 was not met for Radium-228 due to insufficient sample volume available for analysis. The results are reported with the MDC achieved.

4. Summary and Data Usability

This chapter summarizes the analytical data in terms of its completeness and usability. Data completeness is defined as the percentage of sample results that have been determined to be usable during the data validation process. Overall, 99 percent of the radiochemistry data were determined to be usable for qualitative and quantitative purposes. Those sample results qualified as estimated (J and UJ) due to data validation QA/QC exceedances should be considered conditionally usable and those results rejected (R) due to serious deficiencies in the ability to analyze the sample and meet quality control criteria whereas the presence or absence of the analyte cannot be verified should be considered unusable.

The samples collected from the Site in Hicksville, New York were evaluated based on QA/QC criteria established by methods as listed in Section 1.3, by the data validation guidelines listed in Section 1.2, and by the QAPP (GTEOSI, 2002) established for this project. Major deficiencies in the data generation process would have resulted in data being rejected, indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor deficiencies in the data generation process resulted in some sample data being characterized as approximate or estimated. Identification of a data point as approximate indicates uncertainty in the reported concentration of the chemical, but not its assigned identity.

The following paragraphs present the adherence of the data to the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PSARCC) parameters.

Precision is measured through the evaluation of field duplicate samples and laboratory duplicate samples. For the radiochemistry analyses, none of the data were rejected due to precision non-conformances.

LCS recoveries indicate the accuracy of the data. For the radiochemistry analyses, none of the data were rejected due to accuracy non-conformances.

Holding times, sample preservation, blank analysis, and analyte identification and quantification are indicators of the representativeness of the analytical data. For the radiochemistry analyses, none of the data were rejected due to accuracy non-conformances.

Comparability is not compromised, provided that the analytical methods do not change over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures were consistently used by the laboratory, the comparability criteria for the analytical data were met.

Sensitivity is established by reported detection limits that represent measurable concentrations of analytes that can be determined with a designated level of confidence. Sensitivity requirements were met for the sample data in this project. None of the radiochemistry data were rejected due to the sensitivity non-conformances.

5. Data Usability Summary Report Summary Information

The DUSR was performed to determine whether or not the data meets site-specific criteria for data quality and use. The DUSR is developed by reviewing and evaluating the analytical data package. The following questions were addressed:

1. Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?

The QAPP required that USEPA Level III deliverables be provided by the laboratory for each data package. This requirement was met as it applies to the methods used by the laboratory for sample analysis. The evaluation of the sample data was completed using the information provided in the data packages provided by the laboratory.

2. Have all holding times been met?

The holding times were met for the radiochemistry analyses.

3. Do all the QC data: blanks, standards, spike recoveries, replicate analyses, and sample data fall within the protocol-required limits and specifications?

The laboratory used the laboratory control limits during the analyses performed for this sampling event. QA/QC deviations and qualifications performed on the sample data are discussed in Chapter 3. Major non-conformances were not detected for the radiochemistry data.

4. Have all of the data been generated using established and agreed upon analytical protocols?

The QAPP required that USDOE methods are used in the analysis of samples collected for this sampling event. The laboratory used the required method protocols (with some minor modifications) for the analyses performed for this sampling event, which met data user and client needs.

5. Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?

The evaluation of selected raw data confirmed information provided in the data packages.

6. Have the correct data qualifiers been used?

The laboratory applied the correct qualifiers to the sample data. The validation qualifiers were applied as required by validation guidelines as listed in Section 1

References

GTE Operations Support Incorporated. (GTEOSI). 2002. *Soil Remediation Program Work Plan (QAPP: Appendix H), Former Sylvania Electric Products Facility, Hicksville, New York, Site Number V 00089-1*, Revision 2, October 2002.

O'Brien & Gere Engineers, Inc. 2000. *Supplement to the Approved Work Plan (QAPP – Appendix C), Former Sylvania Electric Products Incorporated Facility Cantiague Rock Road, Hicksville, New York.* Syracuse, New York.

Science Applications International Corporation (SAIC). 1992. *Laboratory Data Validation Guidelines for Evaluating Radionuclide Analyzes*, 143-ARCS-00.08, Revision 06. Oak Ridge, Tennessee.

United States Department of Energy (USDOE).1997. *Environmental Measurements Laboratory (EML) Procedures Manual,* 28th Edition, Volume 1. New York, New York.

United States Department of Energy (USDOE) 1995. *Guidance for Radiochemical Data Validation*, Draft RD4, Gaithersburg, Maryland.

United States Environmental Protection Agency (USEPA). 1992. *USEPA Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A),* 540/1-891002. Washington D.C.

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Executive Summary

This report addresses data quality for groundwater samples collected at the former Sylvania Electric Products Incorporated facility in Hicksville, New York. This report is concerned with metals in groundwater samples collected by Malcolm Pirnie, Inc. (MPI) from March 15, 2003 through February 19, 2004.

The environmental samples collected for this investigation were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri, for analyses of metals using United States Environmental Protection Agency (USEPA) guidance methods. A total of 1,123 samples[1] were submitted, which resulted in 1,399 total metal results[2]. Of this number, 1,350 of them are results[3] of actual samples and the remainders are field quality assurance/quality control (QA/QC) indicators[4] of these samples. The analytical data generated for this investigation were evaluated by MPI using the QA/QC criteria established in the methods and USEPA guidelines. Non-conformances from the QA/QC criteria were qualified based on guidance provided in the following references:

- New York State Department of Environmental Conservation. *Analytical Services Protocol.* Guidance documents including Exhibits A, B, C, D, E, F, G, and I. June 2000.

- United States Environmental Protection Agency. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* EPA 540-R-01-008. July 2002.

- United States Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* SW-846: Final Update IIIA. April 1998.

In circumstances where the quality of the data or the accuracy of the results is suspect, the project's Quality Assurance Project Plan (QAPP) and professional judgment[5] were also used to determine if results should be qualified as estimated ("J" or "UJ"). Since the individual guidance documents used (as a source of reference for the validation) differ somewhat in the type of qualification applied to data, MPI applied qualifiers generally with an err to caution (conservative). All instrument calibration analyses, laboratory control sample analyses, serial dilution analyses, and interference check sample analyses were acceptable.

There were some laboratory initial calibration blanks, continuing calibration blanks, and method blanks, which contained low concentrations of the target analytes. The presence of these analytes in specific blanks affected many project samples. Qualification of associated results was performed to show the relationship between the laboratory contamination and the uncertainty of the actual project sample results.

Matrix spike samples were not performed for all sample batches. In many instances, the matrix spikes were performed on field blank samples, which offered no information on the possible problems associated with the matrix of the actual samples. In many other instances, the matrix spikes were performed on samples, which were not associated with this project.

[1] Each sample may have been analyzed for more than one metal and may have included total recoverable and dissolved fractions.
[2] This is the number of results reported by the laboratory on their Sample Results reporting form (Form 1).
[3] This is the total number of well data points, which may include more than one metal and may include recoverable and dissolved fractions including duplicate sample results.
[4] These indicators do not include Matrix Spike/Matrix Spike Duplicate or other internal laboratory QA/QC indicators.
[5] Professional judgment is performed by a USEPA certified data validator with over a decade of environmental laboratory experience.

The relative percent differences (RPD) between field duplicate pair results were assessed. Eight (8) of the RPDs were significant enough to qualify some of the data. Ninety-five (95) duplicate pairs were collected. This is equivalent to a field duplicate sample collection rate of 7.6 percent[6]. Based on the QAPP, the rate should have been 10 percent. With 1,255 discrete field sample data[7], 126 field duplicate data should have been collected. Therefore, evaluation of precision has not been adequate.

None of the exceedances of method non-conformances were significant enough to jeopardize the usability of the data with the exception of four hexavalent chromium samples, which exceeded their short holding time criteria. With the exception of the four results, all analytical results are usable based on the findings listed in this Data Usability Summary Report (DUSR).

Overall, 99.7 percent[8] of the metals data were determined to be usable for qualitative and quantitative purposes. Four hexavalent chromium results were qualified as unusable, "R." Sample results, which were qualified as estimated, "J" and "UJ," due to quality control (QC) exceedances should be considered conditionally usable. Therefore, the completeness objective of 90 percent, as stated in the QAPP, has been met for the metals in groundwater database.

[6] Value = (95 duplicate data / 1,255 discrete sample data) X 100.
[7] This number represents 1,350 (non-field blank/equipment blank) total data points minus 95 duplicate sample data points.
[8] Value = ((1,399 all data points – 4 unusable data points) / 1,399 all data points) X 100.

1. Introduction

1.1. Sample Identification

This report addresses the results of a data quality evaluation for groundwater samples collected at the former Sylvania Electric Products Incorporated facility in Hicksville, New York (the Site). This report pertains to metals samples collected by Malcolm Pirnie, Inc. (MPI) from March 15, 2003 through February 19, 2004.

The sample delivery group (SDG) number (laboratory package identification number), field identification, and laboratory identification of the samples that were submitted for data validation are presented in Table 1-1.

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3C190235	MW-7	F3C190235003	Be, Cr, Cu, Ni, and Tl
	MW-2	F3C190235004	Be, Cr, Cu, Ni, and Tl
	MW-1	F3C190235005	Be, Cr, Cu, Ni, and Tl
	MW-11	F3C190235006	Be, Cr, Cu, Ni, and Tl
	MW-12	F3C190235007	Be, Cr, Cu, Ni, and Tl
	MW-5	F3C190235008	Be, Cr, Cu, Ni, and Tl
	MW-10 (also MS/MD)	F3C190235009	Be, Cr, Cu, Ni, and Tl
	MW-9	F3C190235010	Be, Cr, Cu, Ni, and Tl
	MW-6	F3C190235011	Be, Cr, Cu, Ni, and Tl
	MW-3	F3C190235012	Be, Cr, Cu, Ni, and Tl
	MW-4	F3C190235013	Be, Cr, Cu, Ni, and Tl
	MW-8	F3C190235014	Be, Cr, Cu, Ni, and Tl
	FB	F3C190235015	Be, Cr, Cu, Ni, and Tl
	MW-DUP (MW-3)	F3C190235016	Be, Cr, Cu, Ni, and Tl
F3D290160	P-17-82.25 (also MS/MSD)	F3D290160002	Ni Total
	P-17-102.27	F3D290160004	Ni N/A
	P-F-86.48	F3D290160007	Ni Dissolved
F3E020153	P-F-96.48 (also MS/MSD)	F3E020153001	Ni Dissolved
	P-F-106.46	F3E020153002	Ni Dissolved
	P-F-116.49	F3E020153003	Ni Dissolved
F3E090278	P27-79.75 (also MS/MSD)	F3E090278001	Ni Total
	P-27-89.75	F3E090278002	Ni Total
	P-27-99.75	F3E090278003	Ni Total
	P-27-109.75	F3E090278004	Ni Dissolved

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3E090278 Cont'd	P-27-119.75	F3E090278005	Ni Total
	P-27-DUP (P-27-99-75)	F3E090278006	Ni Total
	P-27-129.75	F3E090278007	Ni Dissolved
	P-27-139.75	F3E090278008	Ni Total
	P-27-149.75	F3E090278009	Ni Total
	P-27-159.75	F3E090278010	Ni Total
	P-27-169.75	F3E090278011	Ni Total
	P-27-179.75	F3E090278012	Ni Total
	P-27-189.75	F3E090278013	Ni Total
	P-27-199.75	F3E090278014	Ni Dissolved
	P-27-209.75	F3E090278015	Ni Total
	P-27-219.50	F3E090278016	Ni Dissolved
	P-27-229.50	F3E090278017	Ni Total
	P-27-239.50	F3E090278018	Ni Total
	P-27-267.02	F3E090278019	Ni Total
	P-27-277.02	F3E090278020	Ni Dissolved
	P-28-77.90	F3E090278021	Ni Total
	P-28-87.02	F3E090278022	Ni Dissolved
	P-28-97.02	F3E090278023	Ni Dissolved
	P-28-107.02	F3E090278024	Ni Dissolved
	P-28-117.02	F3E090278025	Ni Total
	P-28-127.02	F3E090278026	Ni Dissolved
	P-28-137.02	F3E090278027	Ni Dissolved
	P-28-147.02	F3E090278028	Ni Dissolved
	P-28-160.02	F3E090278029	Ni Dissolved
	P-28-167.02	F3E090278030	Ni Dissolved
	P-28-177.02	F3E090278031	Ni Dissolved
	P-28-187.02	F3E090278032	Ni Dissolved
	P-28-197.02	F3E090278033	Ni Total
	P-28-207.02	F3E090278034	Ni Total
	P-28-217.02	F3E090278035	Ni Dissolved
	P-28-227.02	F3E090278036	Ni Dissolved
	P-28-237.02	F3E090278037	Ni Dissolved
	P-28-247.02 (also MS/MSD)	F3E090278038	Ni Dissolved

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3E140308	P-26-76.86	F3E140308001	Ni Dissolved
	P-26-86.8	F3E140308002	Ni Dissolved
	P-26-96.8	F3E140308003	Ni Dissolved
	P-26-106.8	F3E140308004	Ni Dissolved
	P-26-116.8	F3E140308005	Ni Dissolved
	P-26-126.8	F3E140308006	Ni Dissolved
	P-26-136.8	F3E140308007	Ni Dissolved
	P-26-146.8 (also MS/MSD)	F3E140308008	Ni Dissolved
F3E160130	P-26-152.25	F3E160130001	Ni Dissolved
	P-26-162.25	F3E160130002	Ni Dissolved
	P-26-172.25	F3E160130003	Ni Dissolved
	P-26-182.25	F3E160130004	Ni Dissolved
	P-26-192.25	F3E160130005	Ni Dissolved
	P-26-202.25	F3E160130006	Ni Dissolved
	P-26-211.25	F3E160130007	Ni Dissolved
	P-26-221.25	F3E160130008	Ni Dissolved
	P-26-231.25	F3E160130009	Ni Dissolved
	P-26-241.25	F3E160130010	Ni Dissolved
	P-E-78.57	F3E160130011	Ni Total
	P-E-88.57	F3E160130012	Ni Total
F3E200165	P-26-257.2	F3E200165001	Ni Dissolved
	P-26A-276.53	F3E200165003	Ni Dissolved
	P-26A-286.5	F3E200165004	Ni Dissolved
	P-E-98.57	F3E200165007	Ni Dissolved
	P-E-108.57	F3E200165008	Ni Total
	P-E-118.57	F3E200165009	Ni Total
	P-E-128.57	F3E200165010	Ni Dissolved
	P-E-138.57	F3E200165011	Ni Dissolved
	P-E-148.57	F3E200165012	Ni Dissolved
	P-E-158.57	F3E200165013	Ni Dissolved
	P-E-168.57	F3E200165014	Ni Total
	P-E-178.57	F3E200165015	Ni Total
	P-E-198.57	F3E200165016	Ni Total
	P-E-208.57	F3E200165017	Ni Dissolved

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3E200165 Cont'd	P-E-218.57	F3E200165018	Ni Dissolved
	P-E-228.57	F3E200165019	Ni Dissolved
	P-E-238.57	F3E200165020	Ni Dissolved
F3E230179	P-26A-295.85	F3E230179001	Ni Dissolved
	P-E-268.57	F3E230179002	Ni Dissolved
	P-E-292.28	F3E230179003	Ni Total
	P-E-301.23	F3E230179004	Ni Dissolved
	P-E-317.15	F3E230179005	Ni Dissolved
	P-E-332.85	F3E230179006	Ni Dissolved
	P-E-327.15	F3E230179007	Ni Dissolved
F3E290170	P-D-77.05	F3E290170001	Ni Dissolved
	P-D-87.05	F3E290170002	Ni Total
	1EB-5/27	F3E290170003	Ni Total
	P-D-97.05	F3E290170004	Ni Dissolved
	P-D-107.05 (also MS/MSD)	F3E290170005	Ni Dissolved
	P-D-127.05	F3E290170006	Ni Total
	P-D-117.05	F3E290170007	Ni Total
	P-D-137.05	F3E290170008	Ni Dissolved
	P-D-147.05	F3E290170009	Ni Dissolved
	P-15-79.65	F3E290170011	Ni Dissolved
	P-15-89.65	F3E290170012	Ni Total
	P-15-99.65	F3E290170013	Ni Total
	P-15-109.65	F3E290170014	Ni Total
	P-15-119.65	F3E290170015	Ni Total
F3F030298	P-15-129.65	F3F030298001	Ni Total
	P-15-139.65	F3F030298002	Ni Total
	P-15-149.65	F3F030298003	Ni Total
	P-15-159.65	F3F030298004	Ni Total
	P-15-169.65	F3F030298005	Ni Total
	P-15-179.65	F3F030298006	Ni Total
	P-15-189.65	F3F030298007	Ni Total
	P-15-199.65	F3F030298008	Ni Total
	P-15-208.00	F3F030298009	Ni Dissolved
	P-15-218.00	F3F030298010	Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3F030298 Cont'd	P-15-DUP (P-15-218.00)	F3F030298011	Ni Total
	P-15-240.00	F3F030298012	Ni Dissolved
	P-15-290.05	F3F030298013	Ni Dissolved
	P-15-300.05	F3F030298014	Ni Dissolved
	P-15-310.05	F3F030298015	Ni Total
	P-15-329.10	F3F030298016	Ni Total
	P-15-339.10	F3F030298017	Ni Dissolved
	P-D-217.1	F3F030298018	Ni Dissolved
	P-D-227.1 (also MS/MSD)	F3F030298017	Ni Dissolved
	P-D-237.1	F3F030298020	Ni Dissolved
	P-D-247.05 (also MS/MSD)	F3F030298021	Ni Dissolved
	P-D-257.	F3F030298022	Ni Dissolved
	P-D-290.1	F3F030298023	Ni Dissolved
	P-D-157.05	F3F030298029	Ni Dissolved
	P-D-167.1	F3F030298030	Ni Dissolved
	P-D-177.1	F3F030298031	Ni Total
	P-D-DUP (P-D-217.1)	F3F030298032	Ni Dissolved
	P-D-187.1	F3F030298033	Ni Dissolved
	P-D-197.1	F3F030298034	Ni Dissolved
	P-D-207.1	F3F030298035	Ni Dissolved
	P-15-228.00	F3F030298036	Ni Dissolved
F3F050171	P-D-DUP#2 (P-D-321.95)	F3F050171001	Ni Dissolved
	P-D-321.95	F3F050171002	Ni Dissolved
	P-D-331.95	F3F050171003	Ni Dissolved
	P-D-341.95	F3F050171004	Ni Total
	P-D-351.95	F3F050171005	Ni Dissolved
F3F120220	P-C-79.60 (also MS/MSD)	F3F120220001	Ni Total
	P-C-89.6	F3F120220002	Ni Total
	P-C-99.6	F3F120220003	Ni Dissolved
	P-C-109.6	F3F120220004	Ni Dissolved
	P-C-119.6	F3F120220005	Ni Total
	P-C-129.6	F3F120220006	Ni Dissolved
	P-C-139.6	F3F120220007	Ni Dissolved
	P-C-149.6	F3F120220008	Ni Dissolved

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3F120220 Cont'd	P-C-159.6	F3F120220009	Ni Total
	P-C-169.6	F3F120220010	Ni Dissolved
	P-C-179.6	F3F120220011	Ni Total
	P-C-DUP #1 (P-C-99.6)	F3F120220012	Ni Dissolved
F3F170126	P-C-275.3 (also MS/MSD)	F3F170126001	Ni Dissolved
	P-C-DUP-2 (P-C-320.3)	F3F170126002	Ni Dissolved
	P-C-320.3	F3F170126003	Ni Dissolved
	P-C-330.3	F3F170126004	Ni Dissolved
	P-C-337.5	F3F170126005	Ni Dissolved
	P-24-87.35	F3F170126006	Ni Dissolved
	P-24-77.35	F3F170126007	Ni Dissolved
	P-C-FB	F3F170126009	Ni
	P-C-185.3	F3F170126012	Ni Total
	P-C-195.3	F3F170126013	Ni Total
	P-C-205.3	F3F170126014	Ni Dissolved
	P-C-215.3	F3F170126015	Ni Dissolved
	P-C-225.3	F3F170126016	Ni Total
	P-C-235.3	F3F170126017	Ni Total
	P-C-245.3	F3F170126018	Ni Total
	P-C-265.3	F3F170126019	Ni Total
F3F180192	P-24-97.35 (also MS/MSD)	F3F180192002	Ni Dissolved
	P-24-107.35	F3F180192003	Ni Dissolved
	P-24-115.35	F3F180192004	Ni Dissolved
	P-24-127.3	F3F180192005	Ni Total
	P-24-137.3	F3F180192006	Ni Dissolved
	P-24-147.3	F3F180192007	Ni Total
	P-C-347.7	F3F180192008	Ni Total
F3F200145	P-24-157.3 (also MS/MSD)	F3F200145001	Ni Total
	P-24-167.3	F3F200145002	Ni Total
	P-24-177.3	F3F200145003	Ni Dissolved
	P-24-187.3	F3F200145004	Ni Total
	P-24-197.3	F3F200145005	Ni Total
	P-24-207.3	F3F200145006	Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3F200145 Cont'd	P-24-217.3	F3F200145007	Ni Total
	P-24-DUP#1 (P-24-167.3)	F3F200145008	Ni Dissolved
	P-24-227.3	F3F200145009	Ni Total
	P-24-237.3	F3F200145010	Ni Total
	P-24-247.3	F3F200145011	Ni Total
	P-24-257.3	F3F200145012	Ni Total
	P-24-267.3	F3F200145015	Ni Dissolved
	P-24-277.3	F3F200145016	Ni Dissolved
	P-24-287.3	F3F200145017	Ni Dissolved
	P-24-DUP#2 (P-24-287.3)	F3F200145018	Ni Dissolved
	P-C-364.5	F3F200145019	Ni Dissolved
	P-C-374.5	F3F200145020	Ni Total
	P-C-394.5	F3F200145021	Ni Total
	P-C-384.5	F3F200145022	Ni Dissolved
F3F260187	P-24-297.3	F3F260187001	Ni Dissolved
	P-23-FB1 (also MS/MSD)	F3F260187002	Ni Total
	P-23-80.1	F3F260187003	Ni Total
	P-23-90.1	F3F260187004	Ni Dissolved
	P-23-100.1	F3F260187005	Ni Total
	P-23-110.1	F3F260187006	Ni Total
	P-23-120.1	F3F260187007	Ni Total
	P-23-130.1	F3F260187008	Ni Dissolved
	P-23-140.1	F3F260187009	Ni Dissolved
	P-23-150.1	F3F260187010	Ni Dissolved
	P-23-160.1	F3F260187011	Ni Dissolved
	P-23-170.1	F3F260187012	Ni Dissolved
	P-23-180.1	F3F260187013	Ni Dissolved
	P-23-DUP-1 (P-23-180.1)	F3F260187014	Ni Dissolved
F3F270132	P-23-190.1	F3F270132002	Ni Dissolved
	P-23-200.1	F3F270132003	Ni Dissolved
	P-23-210.1	F3F270132004	Ni Dissolved
	P-23-220.1	F3F270132005	Ni Total
	P-23-227.65	F3F270132006	Ni Dissolved
F3G010309	P-23-239.8	F3G010309001	Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3G010309 Cont'd	P-23-252.0	F3G010309002	Ni Dissolved
	P-23-262.0	F3G010309003	Ni Total
	P-23A-286.96	F3G010309004	Ni Dissolved
	P-23A-293.50	F3G010309005	Ni Dissolved
F3G030162	P-23A-334.1	F3G030162002	Ni Dissolved
	P-23A-343.4	F3G030162003	Ni Dissolved
	P-23A-DUP.1 (P-23A-347.6)	F3G030162004	Ni Total
	P-23A-347.6	F3G030162005	Ni Total
	P-23A-EB-2	F3G030162006	Ni
F3G110256	P-25-EB-1	F3G110256001	Ni
	P-25-79.7	F3G110256002	Ni Total
	P-25-89.7	F3G110256003	Ni Total
	P-25-99.1	F3G110256004	Ni Total
	P-25-109.7	F3G110256005	Ni Total
	P-25-119.7 (also MS/MSD)	F3G110256006	Ni Total
	P-25-129.7	F3G110256007	Ni Total
	P-25-139.7	F3G110256008	Ni Total
	P-25-149.7	F3G110256009	Ni Total
	P-25-159.7	F3G110256010	Ni Dissolved
	P-25-169.7	F3G110256011	Ni Dissolved
	P-25-179.7	F3G110256012	Ni Total
	P-25-189.7	F3G110256013	Ni Total
	P-25-199.7	F3G110256014	Ni Dissolved
	P-25-209.7	F3G110256015	Ni Dissolved
	P-25-219.7	F3G110256016	Ni Dissolved
	P-25-DUP-1 (P-25-179.7)	F3G110256017	Ni Total
	P-35-EB-1	F3G110256018	Ni
	P-35-77.2	F3G110256019	Ni Total
	P-35-87.2	F3G110256020	Ni Total
	P-35-97.2 (also MS/MSD)	F3G110256021	Ni Total
	P-35-107.2	F3G110256022	Ni Total
	P-35-117.2	F3G110256023	Ni Total
	P-35-127.2	F3G110256024	Ni Total
	P-35-137.2	F3G110256025	Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3G110256 Cont'd	P-35-147.2	F3G110256026	Ni Total
	P-35-157.2	F3G110256027	Ni Total
	P-35-167.2	F3G110256028	Ni Total
	P-35-177.2	F3G110256029	Ni Total
	P-35-DUP-1 (P-35-177.2)	F3G110256030	Ni Total
F3G150156	P-25-229.5	F3G150156001	Ni Total
	P-25-239.5	F3G150156002	Ni Dissolved
	P-25-249.5 (also MS/MSD)	F3G150156003	Ni Dissolved
	P-25-259.5	F3G150156004	Ni Dissolved
	P-25-269.5	F3G150156005	Ni Total
	P-25-275.8	F3G150156006	Ni Total
	P-25-DUP-2 (P-25-275.8)	F3G150156007	Ni Total
	P-25-290.0	F3G150156008	Ni Total
	P-25-300.0	F3G150156009	Ni Total
	P-25-310.0	F3G150156010	Ni Total
	P-25-320.0	F3G150156011	Ni Dissolved
	P-25-330.0	F3G150156012	Ni Dissolved
	P-25-340.0	F3G150156013	Ni Total
	P-25-349.4	F3G150156014	Ni Total
	P-25-370.0	F3G150156015	Ni Total
	P-25-379.2	F3G150156016	Ni Total
	P-35-187.2	F3G150156017	Ni Dissolved
	P-35-197.2	F3G150156018	Ni Dissolved
	P-35-207.2	F3G150156019	Ni Total
	P-35-217.2	F3G150156020	Ni Dissolved
	P-35-227.2	F3G150156021	Ni Dissolved
	P-35-237.2	F3G150156022	Ni Total
	P-35-247.2 (also MS/MSD)	F3G150156023	Ni Dissolved
	P-35-257.2	F3G150156024	Ni Dissolved
	P-35-267.2	F3G150156025	Ni Total
	P-35-277.2	F3G150156026	Ni Dissolved
	P-35-EB-2	F3G150156027	Ni Total
	P-35-292.2	F3G150156028	Ni Dissolved
	P-35-322.2	F3G150156029	Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3G150156 Cont'd	P-35-332.2	F3G150156030	Ni Dissolved
	P-35-DUP-2 (P-35-332.2)	F3G150156031	Ni Dissolved
	P-35-342.2	F3G150156033	Ni Dissolved
	P-35-347.2	F3G150156034	Ni Dissolved
F3G230216	P-H-EB1	F3G230216001	Ni
	P-H-76.8	F3G230216002	Ni Dissolved
	P-H-86.8	F3G230216003	Ni Dissolved
	P-H-96.8	F3G230216004	Ni Total
	P-H-106.8	F3G230216005	Ni Dissolved
	P-H-116.8	F3G230216006	Ni Dissolved
	P-42-EB1	F3G230216008	Ni
F3G250374	P-H-126.8 (also MS/MSD)	F3G250374002	Ni Dissolved
	P-H-DUP1 (P-H-126.8)	F3G250374003	Ni Dissolved
	P-H-136.8	F3G250374004	Ni Dissolved
	P-H-146.8	F3G250374005	Ni Dissolved
	P-H-156.8	F3G250374006	Ni Dissolved
	P-H-166.8	F3G250374007	Ni Dissolved
	P-H-176.8	F3G250374008	Ni Dissolved
	P-H-186.8	F3G250374009	Ni Dissolved
	P-H-196.8	F3G250374010	Ni Dissolved
	P-H-EB2	F3G250374011	Ni
	P-H-206.55	F3G250374012	Ni Total
	P-42-179.6	F3G250374013	Ni Total
	P-42-189.6	F3G250374014	Ni Total
	P-42-197.7	F3G250374015	Ni Total
	P-42-202.7	F3G250374016	Ni Total
	P-42-DUP-1 (P-42-202.7)	F3G250374017	Ni Total
	P-H-DUP2 (P-H-206.55)	F3G250374019	Ni Total
	P-42-79.6	F3G250374021	Ni Total
	P-42-89.6	F3G250374022	Ni Total
	P-42-99.6	F3G250374023	Ni Total
	P-42-109.6 (also MS/MSD)	F3G250374024	Ni Total
	P-42-119.6	F3G250374025	Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3G250374 Cont'd	P-42-129.6	F3G250374026	Ni Total
	P-42-139.6	F3G250374027	Ni Total
	P-42-149.6	F3G250374028	Ni Dissolved
	P-42-159.6	F3G250374029	Ni Dissolved
	P-42-169.4	F3G250374030	Ni Total
F3G290207	P-H-216.55	F3G290207001	Ni Total
	P-H-226.55	F3G290207002	Ni Total
	P-H-236.55	F3G290207003	Ni Total
	P-H-328.55	F3G290207004	Ni Total
	P-H-334.97	F3G290207005	Ni Total
	P-H-351.65	F3G290207006	Ni Dissolved
	P-H-376.85	F3G290207007	Ni Dissolved
	P-H-386.5	F3G290207008	Ni Dissolved
	P-H-396.5	F3G290207009	Ni Total
	P-42-EB-2	F3G290207010	Ni
	P-42-217.2	F3G290207011	Ni Total
	P-42-224.6	F3G290207012	Ni Total
	P-42-234.6 (also MS/MSD)	F3G290207013	Ni Dissolved
	P-42-276.4	F3G290207014	Ni Dissolved
	P-42-287.9	F3G290207015	Ni Dissolved
	P-42-298.0	F3G290207016	Ni Total
	P-42-308.6	F3G290207017	Ni Total
	P-42-319.8	F3G290207018	Ni Dissolved
	P-42-329.8	F3G290207019	Ni Total
	P-42-DUP-2 (P-42-329.8)	F3G290207020	Ni Total
	P-42-339.8	F3G290207021	Ni Total
	P-42-354.6	F3G290207022	Ni Total
F3H010243	P-42-389.50	F3H010243001	Ni Dissolved
	P-42-410.07	F3H010243002	Ni Total
	P-42-424.45	F3H010243003	Ni Total
F3H060192	P-20-79.60	F3H060192001	Ni Total
	P-20-89.60	F3H060192002	Ni Total
	P-20-99.60	F3H060192003	Ni Dissolved

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3H060192 Cont'd	P-20-109.60	F3H060192004	Ni Total
	P-20-119.60	F3H060192005	Ni Total
	P-20-129.60	F3H060192006	Ni Dissolved
	P-20-139.60	F3H060192007	Ni Dissolved
	P-20-149.60	F3H060192008	Ni Total
	P-20-159.60	F3H060192009	Ni Total
	P-45-81.25	F3H060192011	Ni Total
	P-45-91.25	F3H060192012	Ni Dissolved
	P-45-101.25	F3H060192014	Ni Total
	P-45-111.25	F3H060192015	Ni Total
	P-45-121.25	F3H060192016	Ni Total
	P-45-131.25	F3H060192017	Ni Dissolved
	P-45-DUP1 (P-45-81.25)	F3H060192018	Ni Total
	P-45-71.25	F3H060192019	Ni Total
F3H080219	P-20-169.60	F3H080219001	Ni Total
	P-20-179.60 (also MS/MSD)	F3H080219002	Ni Total
	P-20-189.60	F3H080219003	Ni Dissolved
	P-20-DUP1 (P-20-169.60)	F3H080219004	Ni Total
	P-20-209.70	F3H080219005	Ni Dissolved
	P-20-220.76	F3H080219006	Ni Total
	P-20-229.70	F3H080219007	Ni Dissolved
	P-20-269.55	F3H080219009	Ni Dissolved
	P-45-151.25	F3H080219010	Ni Dissolved
	P-45-167.25	F3H080219011	Ni Dissolved
	P-45-177.25	F3H080219012	Ni Total
	P-45-187.25	F3H080219013	Ni Total
	P-45-197.25	F3H080219014	Ni Dissolved
	P-45-207.25	F3H080219015	Ni Dissolved
	P-45-217.25	F3H080219016	Ni Dissolved
	P-45-227.25	F3H080219017	Ni Total
	P-45-237.25	F3H080219018	Ni Dissolved
F3H130195	P-45-281.65	F3H130195001	Ni Dissolved
	P-45-291.65	F3H130195002	Ni Total
	P-45-301.25	F3H130195003	Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3H130196 Cont'd	P-45-311.65	F3H130195004	Ni Dissolved
	P-45-321.65	F3H130195005	Ni Total
	P-45-340.11	F3H130195006	Ni Dissolved
	P-45-351.75	F3H130195007	Ni Total
	P-20-281.94	F3H130195008	Ni Dissolved
	P-20-289.55	F3H130195009	Ni Total
	P-20-309.60 (also MS/MSD)	F3H130195010	Ni Dissolved
	P-20-319.60	F3H130195011	Ni Total
	P-20-328.19	F3H130195012	Ni Total
	P-20-339.60	F3H130195013	Ni Total
	P-20-349.60	F3H130195014	Ni Total
	P-20-359.60	F3H130195015	Ni Dissolved
	P-20-379.60	F3H130195016	Ni Dissolved
	P-20-392.0	F3H130195017	Ni Dissolved
	P-20-369.60	F3H130195018	Ni Dissolved
	P-20-FB	F3H130195019	Ni
	P-20-427.99	F3H130195021	Ni Dissolved
	P-20-DUP-2 (P-20-427.99)	F3H130195022	Ni Dissolved
F3H180106	P-45-366.39	F3H180106001	Ni Dissolved
	P-45-DUP 2 (P-45-366.39)	F3H180106002	Ni Dissolved
	P-20-462.87	F3H180106003	Ni Dissolved
	P-20-469.15	F3H180106004	Ni Dissolved
	P-20-476.68	F3H180106005	Ni Total
F3H210288	P-36-EB1	F3H210288001	Ni
	P-36-76.7	F3H210288002	Ni Dissolved
	P-36-86.7	F3H210288003	Ni Dissolved
	P-36-96.7	F3H210288004	Ni Dissolved
	P-36-106.7	F3H210288005	Ni Dissolved
	P-36-116.7	F3H210288006	Ni Dissolved
	P-36-126.7	F3H210288007	Ni Dissolved
	P-36-136.7	F3H210288008	Ni Dissolved
	P-46-79.60 (also MS/MSD)	F3H210288009	Ni Dissolved
	P-46-89.60	F3H210288010	Ni Total
	P-46-99.60	F3H210288011	Ni Dissolved

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3H210288 Cont'd	P-46-109.60	F3H210288012	Ni Dissolved
	P-46-119.60	F3H210288013	Ni Total
	P-46-129.60	F3H210288014	Ni Dissolved
	P-37-79.3	F3H210288015	Ni Total
	P-37-89.95	F3H210288016	Ni Dissolved
	P-37-99.95	F3H210288017	Ni Dissolved
	P-37-109.95	F3H210288018	Ni Dissolved
	P-37-119.95	F3H210288019	Ni Dissolved
	P-37-129.95	F3H210288020	Ni Total
	P-37-139.95	F3H210288021	Ni Dissolved
	P-37-149.95	F3H210288022	Ni Total
	P-37-DUP 1 (P-37-119.95)	F3H210288023	Ni Dissolved
F3H220246	P-36-146.7	F3H220246001	Ni Dissolved
	P-36-156.7	F3H220246002	Ni Dissolved
	P-36-DUP-1 (P-36-15.7)	F3H220246003	Ni Dissolved
	P-36-166.7	F3H220246004	Ni Dissolved
	P-36-176.7	F3H220246005	Ni Dissolved
	P-36-186.7	F3H220246006	Ni Dissolved
	P-36-196.7	F3H220246007	Ni Dissolved
	P-36-206.7	F3H220246008	Ni Dissolved
	P-36-216.7	F3H220246009	Ni Dissolved
	P-36-226.7	F3H220246010	Ni Dissolved
	P-46-139.6	F3H220246011	Ni Total
	P-46-DUP-1 (P-46-139.60)	F3H220246012	Ni Total
	P-46-149.60	F3H220246013	Ni Dissolved
	P-46-159.60	F3H220246014	Ni Dissolved
	P-46-169.60 (also MS/MSD)	F3H220246015	Ni Dissolved
	P-46-179.60	F3H220246016	Ni Dissolved
	P-46-189.60	F3H220246017	Ni Total
	P-46-199.60	F3H220246018	Ni Dissolved
	P-37-159.95	F3H220246019	Ni Total
	P-37-169.95	F3H220246020	Ni Dissolved
	P-37-179.95	F3H220246021	Ni Dissolved
	P-37-189.95	F3H220246022	Ni Dissolved

Table 1-1: Sample Cross-Reference List

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3E090278 Cont'd	P-37-EB-1 (also MS/MSD)	F3H220246023	Ni
F3H220246	P-46-209.60 (also MS/MSD)	F3H270230001	Ni Dissolved
	P-46-215.15	F3H270230002	Ni Total
	P-46-275.42	F3H270230003	Ni Dissolved
	P-46-DUP-2 (P-46-275.42)	F3H270230004	Ni Dissolved
	P-46-284.32	F3H270230005	Ni Total
	P-46-291.69	F3H270230006	Ni Dissolved
	P-46-298.35	F3H270230007	Ni Total
	P-46-307.69	F3H270230008	Ni Dissolved
	P-36A-266.8	F3H270230009	Ni Total
	P-36A-282.0	F3H270230010	Ni Total
	P-36A-292.4	F3H270230011	Ni Total
	P-36-236.7	F3H270230012	Ni Dissolved
	P-36A-371.75	F3H270230013	Ni Dissolved
	P-36A-328.4	F3H270230014	Ni Dissolved
	P-36A-EB2 (also MS/MSD)	F3H270230015	Ni
	P-37-224.75	F3H270230017	Ni Dissolved
	P-37-264.85	F3H270230018	Ni Total
	P-37-274.85	F3H270230019	Ni Total
	P-37-284.4	F3H270230020	Ni Total
	P-37-304.8	F3H270230021	Ni Dissolved
	P-37-DUPL#2 (P-37-304.8)	F3H270230022	Ni Dissolved
	P-37-314.8	F3H270230023	Ni Total
F3H280315	P-37A-324.8	F3H280315001	Ni Dissolved
	P-27A-333.2	F3H280315002	Ni Total
	P-37A-356.15	F3H280315003	Ni Dissolved
	P-37A-385.0	F3H280315004	Ni Total
	P-37A-394.5	F3H280315005	Ni Total
	P-36A-475.2	F3H280315006	Ni Total
	P-46-318.42	F3H280315007	Ni Dissolved
	P-46-330.21	F3H280315008	Ni, Cr Dissolved
	P-46-340.21	F3H280315009	Ni Total
	P-46-348.32	F3H280315010	Ni Dissolved
	P-46-360.21	F3H280315011	Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3H280315 Cont'd	P-46-307.69 (also MS/MSD)	F3H280315012	Cr Dissolved
F3I040177	P-44-89.8 (also MS/MSD for Ni and Cr)	F3I040177003	Ni Dissolved
	P-44-99.3	F3I040177004	Ni Dissolved
	P-44-DUP 1 (P-44-99.3)	F3I040177005	Ni Dissolved
	P-44-109.8	F3I040177006	Ni Dissolved
	P-46-389.28 (also MS for Cr+6)	F3I040177007	Ni, Cr, Cr+6 Total
	P-44-121.55	F3I040177008	Ni Dissolved
	P-44-79.3	F3I040177010	Ni Dissolved
F3I050189	P-44-131.1	F3I050189001	Ni Dissolved
	P-44-139.8	F3I050189002	Ni Dissolved
	P-44-149.8	F3I050189003	Ni Dissolved
	P-44-159.8	F3I050189004	Ni Dissolved
	P-44-169.8	F3I050189005	Ni Dissolved
	P-44-179.8	F3I050189006	Ni Dissolved
	P-44-189.8	F3I050189007	Ni Dissolved
	P-44-199.8	F3I050189008	Ni Dissolved
	P-47-77.1	F3I050189009	Ni Total
	P-47-87.08	F3I050189010	Ni Total
	P-46-399.30	F3I050189011	Ni Dissolved
	P-46-409.34	F3I050189012	Ni Total
	P-46-DUP-3 (P-46-409.34)	F3I050189013	Ni Total
	P-46-419.27	F3I050189014	Ni Dissolved
	P-46-429.95	F3I050189015	Ni Dissolved
F3I090305	P-46-438.47	F3I090305001	Ni Dissolved
	P-46-470.25	F3I090305002	Ni Dissolved
	P-46-480.25	F3I090305003	Ni Dissolved
	P-46-490.25	F3I090305004	Ni Dissolved
	P-46-498.12 (also MS/MSD)	F3I090305005	Ni Dissolved
	P-44-DUP-2 (P-44-239.85)	F3I090305006	Ni Dissolved
	P-44-215.5	F3I090305007	Ni Total
	P-44-229.2	F3I090305008	Ni Total
	P-44-239.85	F3I090305009	Ni Dissolved
	P-44-249.85	F3I090305010	Ni Total
	P-44-257.1	F3I090305011	Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
Dissolved F3I090305 Cont'd	P-44-284.85	F3I090305012	Ni Total
	P-44-299.85	F3I090305013	Ni Total
	P-44-307.9	F3I090305014	Ni Dissolved
	P-44-EB-3	F3I090305015	Ni
	P-44-DUP-3 (P-44-339.8)	F3I090305016	Ni Dissolved
	P-44-339.8	F3I090305017	Ni Dissolved
	P-44-349.8	F3I090305018	Ni Dissolved
	P-44-356.1	F3I090305019	Ni Dissolved
	P-47-97.1	F3I090305020	Ni Total
	P-47-107.1	F3I090305021	Ni Total
	P-47-117.1	F3I090305022	Ni Total
	P-47-127.1	F3I090305023	Ni Total
	P-47-137.1	F3I090305024	Ni Dissolved
	P-47-147.1	F3I090305026	Ni Dissolved
	P-47-157.1	F3I090305027	Ni Dissolved
	P-47-DUP-2 (P-47-163.9)	F3I090305028	Ni Dissolved
	P-47-163.9	F3I090305029	Ni Dissolved
	P-47-177.0	F3I090305030	Ni Dissolved
	P-47-DUP-3 (P-47-187.0)	F3I090305031	Ni Dissolved
	P-47-187.0	F3I090305032	Ni Dissolved
	P-47-197.0	F3I090305033	Ni Dissolved
	P-47-205.7	F3I090305034	Ni Dissolved
	P-47-217.0	F3I090305035	Ni Dissolved
	P-47-227.0	F3I090305036	Ni Total
	P-47-247.0	F3I090305037	Ni Total
	P-47-272.0 (also MS/MSD)	F3I090305038	Ni Total
F3I120107	P-43-79.88	F3I120107002	Ni Total
	P-43-89.88	F3I120107003	Ni Total
	P-43-99.88	F3I120107004	Ni Dissolved
	P-43-109.88	F3I120107005	Ni Total
	P-43-119.88	F3I120107006	Ni Dissolved
	P-43-DUP-1 (P-43-119.88)	F3I120107007	Ni Dissolved
	P-43-129.88	F3I120107008	Ni Dissolved
	P-47-282.0 (also MS/MSD)	F3I120107009	Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3I120107 Cont'd	P-47-308.5	F3I120107010	Ni Total
	P-47-DUP-4 (P-47-317.0)	F3I120107011	Ni Total
	P-47-317.0	F3I120107012	Ni Total
	P-47-327.7	F3I120107013	Ni Dissolved
	P-47-337.0	F3I120107014	Ni Dissolved
	P-47-344.1	F3I120107015	Ni Dissolved
F3I150101	P-47-368.4	F3I150101001	Ni Dissolved
	P-47-377.0	F3I150101002	Ni Dissolved
	P-47-387.0	F3I150101003	Ni Dissolved
	P-47-397.00	F3I150101007	Ni Total
F3I180259	P-29-79.5	F3I180259001	Ni Total
	P-29-89.5	F3I180259002	Ni Dissolved
	P-29-99.5	F3I180259003	Ni Dissolved
	P-29-109.5	F3I180259005	Ni Dissolved
	P-29-DUP-1 (P-29-109.5)	F3I180259006	Ni Dissolved
	P-29-119.5 (also MS/MSD)	F3I180259007	Ni Total
	P-29-129.5	F3I180259008	Ni Total
	P-29-139.5	F3I180259009	Ni Total
	P-29-149.5	F3I180259010	Ni Total
	P-29-159.5	F3I180259011	Ni Total
	P-43-139.88	F3I180259013	Ni Dissolved
	P-43-153.05	F3I180259014	Ni Dissolved
	P-43-161.65	F3I180259015	Ni Dissolved
	P-43-169.88	F3I180259016	Ni Dissolved
	P-43-179.88	F3I180259017	Ni Dissolved
	P-43-189.88	F3I180259018	Ni Dissolved
	P-43-199.88	F3I180259019	Ni Total
	P-38-76.7	F3I180259021	Ni Total
	P-38-86.7	F3I180259022	Ni Dissolved
	P-38-96.8	F3I180259025	Ni Dissolved
	P-38-106.7	F3I180259026	Ni Total
	P-38-116.7	F3I180259027	Ni Dissolved
	P-38-DUP-1 (P-38-116.7)	F3I180259028	Ni Dissolved
	P-38-126.7	F3I180259029	Ni Dissolved

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3I180259 Cont'd	P-38-136.7	F3I180259030	Ni Dissolved
	P-38-146.7 (also MS/MSD)	F3I180259031	Ni Dissolved
	P-38-152.5	F3I180259032	Ni Total
F3I230231	P-29-169.35	F3I230231001	Ni Total
	P-29-176.7	F3I230231002	Ni Dissolved
	P-29-EB-1	F3I230231003	Ni
	P-29-191.33	F3I230231004	Ni Dissolved
	P-29-200.8	F3I230231005	Ni Total
	P-29-231.0	F3I230231006	Ni Total
	P-29-239.45	F3I230231007	Ni Dissolved
	P-29-249.85	F3I230231008	Ni Total
	P-29-259.5	F3I230231009	Ni Total
	P-29-268.4	F3I230231010	Ni Total
	P-29-278.4	F3I230231011	Ni Total
	P-29-289.85	F3I230231012	Ni Total
	P-29-299.85	F3I230231013	Ni Total
	P-29-310.2 (also MS/MSD)	F3I230231014	Ni, Cr, Cr+6 Total
	P-29-318.9	F3I230231015	Ni Total
	P-29-329.85	F3I230231016	Ni Total
	P-29-DUP-2 (P-29-329.85)	F3I230231017	Ni Total
	P-29-339.5	F3I230231018	Ni
	P-29-EB-2	F3I230231019	Ni
	P-29-360.0	F3I230231020	Ni, Cr, Cr+6 Total
	P-29-369.2 (also MS/MSD)	F3I230231021	Ni Total
	P-38-166.3	F3I230231022	Ni Total
	P-38-176.3	F3I230231023	Ni Total
	P-38-186.3	F3I230231024	Ni Total
	P-38-207.5	F3I230231025	Ni Total
	P-38-216.3	F3I230231026	Ni Dissolved
	P-38-226.3	F3I230231027	Ni Dissolved
	P-38-260.7	F3I230231028	Ni Dissolved
	P-38-312.9	F3I230231029	Ni Total
	P-38-322.9	F3I230231030	Ni Dissolved
	P-38-DUP-2 (P-38-322.9)	F3I230231031	Ni Dissolved

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3I230231 Cont'd	P-38-332.3	F3I230231032	Ni NA
	P-38-341.1	F3I230231033	Ni Dissolved
	P-43-233.85	F3I230231034	Ni Total
	P-43-246.68	F3I230231035	Ni Dissolved
	P-43-DUP-2 (P-43-246.68)	F3I230231036	Ni Dissolved
	P-43-254.85	F3I230231037	Ni Dissolved
	P-43-264.85	F3I230231038	Ni Dissolved
	P-43-274.85	F3I230231039	Ni Dissolved
	P-43-284.85	F3I230231040	Ni Dissolved
	P-43-294.85	F3I230231041	Ni Total
	P-43-304.85	F3I230231042	Ni Dissolved
	P-29-390.0 (also MS/MSD)	F3I230231044	Ni, Cr, Cr+6 Total
F3I250196	P-38-370.1	F3I250196001	Ni Dissolved
	P-38-381.3	F3I250196002	Ni NA
	P-38-391.3	F3I250196003	Ni NA
	P-38-FB-2	F3I250196004	Ni
	P-38-DUP-3 (P-38-381.3)	F3I250196005	Ni NA
	P-29-410.7	F3I250196006	Ni Total
F3J030259	P-30-79.55	F3J030259001	Ni Dissolved
	P-30-89.50 (also MS/MSD)	F3J030259002	Ni Dissolved
	P-30-99.50	F3J030259003	Ni Dissolved
	P-30-119.50	F3J030259004	Ni Dissolved
	P-30-128.80	F3J030259005	Ni Dissolved
	P-30-139.50	F3J030259006	Ni Dissolved
	P-30-149.50	F3J030259007	Ni Dissolved
	P-30-186.25	F3J030259008	Ni Dissolved
	P-30-194.35	F3J030259009, 010	Ni Dissolved, Ni Total
	P-30-204.55	F3J030259011, 012	Ni Dissolved, Ni Total
	P-30-DUP-1 (P-30-204.55)	F3J030259013, 014	Ni Dissolved, Ni Total
F3J070236	P-30-214.55		Ni Dissolved, Ni Total
	P-30-224.55		Ni Dissolved
	P-30-232.85 (also MS/MSD)		Ni Dissolved
	P-30-244.5		Ni Dissolved
	P-30A-260.85		Ni Dissolved

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3J070236 Cont'd	P-30A-269.00		Ni Dissolved
	P-30A-279.00		Ni Dissolved, Ni Total
	P-30A-289.0		Ni Dissolved, Ni Total
	P-30A-298.6		Ni Dissolved, Ni Total
	P-30A-DUP-2 (P30A-298.6)		Ni Dissolved, Ni Total
	P-30A-307.45		Ni Dissolved, Ni Total
	P-30-EB-2		Ni Total
	P-18-EB-1		Ni Dissolved
	P-18-76.65		Ni Dissolved, Ni Total
	P-18-86.65		Ni Dissolved, Ni Total
	P-18-96.65		Ni Dissolved, Ni Total
	P-18-106.65 (Total – also MS/MSD)		Ni Dissolved, Ni Total
	P-18-116.65		Ni Dissolved
	P-18-126.65		Ni Dissolved, Ni Total
	P-18-136.65		Ni Dissolved, Ni Total
	P-18-146.65		Ni Dissolved
	P-18-156.65 (Dissolved – also MS/MSD)		Ni Dissolved, Ni Total
	P-18-DUP-1 (P-18-156.65)		Ni Dissolved, Ni Total
	P-18-166.65		Ni Dissolved
	P-18-176.65		Ni Dissolved
	P-18-186.65		Ni Dissolved, Ni Total
F3J110172	P-30A-331.0 (Dissolved – also MS/MSD)	F3J110172001, 018	Ni Dissolved, Ni Total
	P-30A-340.0	F3J110172035	Ni Dissolved
	P-30A-345.25 (Total – also MS/MSD)	F3J110172002, 019	Ni Dissolved, Ni Total
	P-30A-390.8	F3J110172036	Ni Dissolved
	P-30A-399.2	F3J110172037	Ni Dissolved
	P-30A-406.55	F3J110172003, 020	Ni Dissolved, Ni Total
	P-30A-DUP-3 (P-30A-406.55)	F3J110172004, 021	Ni Dissolved, Ni Total
	P-18-207.65	F3J110172005	Ni Dissolved
	P-18-217.65	F3J110172006	Ni Dissolved, Ni Total
	P-18-227.65	F3J110172007	Ni Dissolved
	P-18-237.65	F3J110172008	Ni Dissolved
	P-18-247.65	F3J110172009, 026	Ni Dissolved, Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3J110172 Cont'd	P-18-DUP-2 (P-18-247.65)	F3J110172010, 027	Ni Dissolved, Ni Total
	P-18-257.65	F3J110172011	Ni Dissolved
	P-18-267.65	F3J110172012	Ni Dissolved
	P-18-277.65	F3J110172013	Ni Dissolved
	P-18-287.65	F3J110172014, 031	Ni Dissolved, Ni Total
	P-18-302.66	F3J110172015, 032	Ni Dissolved, Ni Total
	P-18-328.31	F3J110172016	Ni Dissolved
	P-18-335.80	F3J110172017, 034	Ni Dissolved, Ni Total
F3J240204	P18-343.96	F3J240204001	Ni Dissolved
	P-18-350.25	F3J240204002	Ni Dissolved
	P-50-82.90	F3J240204003	Ni Dissolved
	P-50-89.90	F3J240204004	Ni Dissolved
	P-50-99.90	F3J240204005	Ni Dissolved
	P-50-109.90	F3J240204006	Ni Dissolved
	P-50-119.90	F3J240204007	Ni Dissolved
	P-50-129.90	F3J240204008	Ni Dissolved
	P-50-DUP-1 (P-50-129.90)	F3J240204009	Ni Dissolved
	P-50-139.90	F3J240204010	Ni Dissolved
	P-50-149.90	F3J240204011	Ni Dissolved
	P-50-159.90	F3J240204012	Ni Dissolved
	P-50-169.90	F3J240204013	Ni Dissolved
	P-50-179.90	F3J240204014	Ni Dissolved
	P-50-189.90 (also MS/MSD)	F3J240204015	Ni Dissolved
	P-49-74.25	F3J240204016	Ni Dissolved, Ni Total
	P-49-84.25	F3J240204017	Ni Dissolved
	P-49-94.3	F3J240204018	Ni Dissolved
	P-49-104.6	F3J240204019	Ni Dissolved
	P-49-114.3	F3J240204020	Ni Dissolved
	P-49-124.3	F3J240204021	Ni Dissolved
	P-49-134.3	F3J240204022	Ni Dissolved, Ni Total
	P-49-144.3	F3J240204023	Ni Dissolved
	P-49-167.3	F3J240204024	Ni Dissolved
	P-49-DUP-1 (P-49-167.3)	F3J240204025	Ni Dissolved
	P-49-177.3	F3J240204026	Ni Dissolved, Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3J240204 Cont'd	P-50-198.55	F3J240204028	Ni Dissolved
	P-51-77.78	F3J240204029	Ni Dissolved
	P-51-87.78	F3J240204030	Ni Dissolved
	P-51-97.78	F3J240204031	Ni Dissolved
	P-51-DUP-1 (P-51-97.78)	F3J240204032	Ni Dissolved
	P-51-107.78	F3J240204033	Ni Dissolved, Ni Total
	P-51-117.78	F3J240204034	Ni Dissolved
	P-51-127.78	F3J240204035	Ni Dissolved
	P-51-137.78	F3J240204036	Ni Dissolved
	P-51-147.78	F3J240204037	Ni Dissolved, Ni Total
	P-51-158.02	F3J240204038	Ni Dissolved
	P-51-167.78	F3J240204039	Ni Dissolved
	P-49-EB-1	F3J240204040	Ni Dissolved
	P-51-177.78	F3J240204041	Ni Dissolved
	P-51-EB-1	F3J240204042	Ni Dissolved, Ni Total
	P-50-EB-1 (also MS/MSD)	F3J240204043	Ni Total
F3J290103	P-50-206.64	F3J290103001	Ni Dissolved
	P-50-242.55	F3J290103002	Ni Dissolved
	P-50-249.90	F3J290103003	Ni Dissolved
	P-50-259.90	F3J290103004	Ni Dissolved
	P-50-267.44	F3J290103005	Ni Dissolved, Ni Total
	P-50-279.90	F3J290103006	Ni Dissolved
	P-50-289.90	F3J290103007	Ni Dissolved, Ni Total
	P-50-299.90	F3J290103008	Ni Dissolved, Ni Total
	P-50-309.90	F3J290103009	Ni Dissolved, Ni Total
	P-50-319.90	F3J290103010	Ni Dissolved, Ni Total
	P-50-327.07	F3J290103011	Ni Dissolved, Ni Total
	P-50-EB-2	F3J290103012	Ni Dissolved, Ni Total
	P-50-342.60	F3J290103013	Ni Dissolved, Ni Total
	P-50-DUP-2 (P-50-342.60)	F3J290103014	Ni Dissolved, Ni Total
	P-50-349.90 (also MS/MSD)	F3J290103015	Ni Dissolved, Ni Total
	P-50-359.90	F3J290103016	Ni Dissolved, Ni Total
	P-50-370.45	F3J290103017	Ni Dissolved, Ni Total
	P-50-376.74	F3J290103018	Ni Dissolved, Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3J290103 Cont'd	P-50-385.90	F3J290103020	Ni Dissolved, Ni Total
	P-49-222.3	F3J290103021	Ni Dissolved
	P-49-232.3	F3J290103022	Ni Dissolved
	P-49-239.3	F3J290103023	Ni Dissolved
	P-49-249.3 (also MS/MSD)	F3J290103024	Ni Dissolved
	P-49-261	F3J290103025	Ni Dissolved
	P-49-284.3	F3J290103027	Ni Dissolved
	P-49-314.0 (also MS/MSD)	F3J290103028	Ni Dissolved
	P-49-333.0	F3J290103029	Ni Dissolved
	P-49-324.0	F3J290103030	Ni Dissolved
	P-49-340.8	F3J290103031	Ni Dissolved
	P-49-DUP-2 (P-49-340.8)	F3J290103032	Ni Dissolved
	P-51-201.20	F3J290103034	Ni Dissolved, Ni Total
	P-51-226.75	F3J290103035	Ni Dissolved
	P-51-236.75	F3J290103036	Ni Dissolved
	P-51-DUP-2 (P-51-246.75)	F3J290103037	Ni Dissolved
	P-51-246.75	F3J290103038	Ni Dissolved
	P-51-256.75	F3J290103039	Ni Dissolved
	P-51-266.71	F3J290103040	Ni Dissolved
	P-51-276.75	F3J290103041	Ni Dissolved
	P-51-286.75	F3J290103042	Ni Dissolved
	P-51-295.25	F3J290103043	Ni Dissolved, Ni Total
	P-51-301.12	F3J290103044	Ni Dissolved
F3J310287	P-50-413.43	F3J310287001	Ni Total
	P-50-424.08	F3J310287002	Ni Dissolved
	P-50-434.90	F3J310287003	Ni Dissolved, Ni Total
	P-49-394.1 (also MS/MSD)	F3J310287004	Ni Dissolved
	P-49-423.0	F3J310287005	Ni Dissolved, Ni Total
	P-49-444.1	F3J310287006	Ni Dissolved
	P-49-463.2	F3J310287007	Ni Dissolved
	P-51-321.00	F3J310287008	Ni Dissolved, Ni Total
	P-51-327.85	F3J310287010	Ni Dissolved, Ni Total
	P-51-336.85 (Total also MS/MSD)	F3J310287011	Ni Dissolved, Ni Total
	P-51-346.85	F3J310287012	Ni Dissolved, Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3J310287 Cont'd	P-51-363.30	F3J310287013	Ni Dissolved, Ni Total
	P-51-371.80	F3J310287014	Ni Dissolved, Ni Total
	P-51-381.80	F3J310287015	Ni Dissolved
F3K080109	P-54-74.15	F3K080109001	Ni Dissolved
	P-54-87.55	F3K080109002	Ni Dissolved
	P-54-97.55	F3K080109003	Ni Dissolved
	P-54-107.55 (also MS/MSD)	F3K080109004	Ni Dissolved
	P-54-117.55	F3K080109005	Ni Dissolved, Ni Total
	P-54-127.55	F3K080109006	Ni Dissolved, Ni Total
	P-54-137.55 (Total also MS/MSD)	F3K080109007	Ni Dissolved, Ni Total
	P-54-DUP-1 (P-54-137.55)	F3K080109008	Ni Dissolved, Ni Total
	P-54-147.55	F3K080109009	Ni Dissolved, Ni Total
	P-54-155.75	F3K080109010	Ni Dissolved, Ni Total
	P-54-165.85	F3K080109011	Ni Dissolved, Ni Total
	P-54-177.55	F3K080109012	Ni Dissolved
	P-54-187.55	F3K080109013	Ni Dissolved
	P-52-EB-1	F3K080109014	Ni Dissolved
	P-52-80.0	F3K080109015	Ni Dissolved, Ni Total
	P-52-90.0	F3K080109016	Ni Dissolved, Ni Total
	P-52-100.0	F3K080109017	Ni Dissolved, Ni Total
	P-52-110.0	F3K080109018	Ni Dissolved
	P-52-120.0	F3K080109019	Ni Dissolved
	P-52-130.0	F3K080109020	Ni Dissolved, Ni Total
	P-52-140.0	F3K080109021	Ni Dissolved, Ni Total
	P-52-150.0	F3K080109022	Ni Dissolved, Ni Total
	P-52-160.0 (Dissolved also MS/MSD)	F3K080109023	Ni Dissolved, Ni Total
	P-52-170.0	F3K080109024	Ni Dissolved, Ni Total
	P-52-DUP-1 (P-52-170.0)	F3K080109025	Ni Dissolved, Ni Total
	P-52-180.0	F3K080109026	Ni Dissolved
	P-58-EB-1	F3K080109027	Ni Total
	P-58-79.65	F3K080109028	Ni Dissolved, Ni Total
	P-58-89.65	F3K080109029	Ni Dissolved
	P-58-99.65	F3K080109030	Ni Dissolved
	P-58-109.65	F3K080109031	Ni Dissolved

Table 1-1: Sample Cross-Reference List

Package Identification	*Sample ID*	*Laboratory ID*	*Analysis Performed*
F3K080109 Cont'd	P-58-119.65	F3K080109032	Ni Dissolved
	P-58-129.65	F3K080109033	Ni Dissolved
	P-58-139.65 (also MS/MSD)	F3K080109034	Ni Dissolved
	P-58-149.65	F3K080109035	Ni Dissolved
	P-58-159.65	F3K080109036	Ni Dissolved
	P-58-DUP-1 (P-58-159.65)	F3K080109037	Ni Dissolved
	P-58-169.65	F3K080109038	Ni Dissolved, Ni Total
	P-58-179.65	F3K080109039	Ni Dissolved, Ni Total
	P-58-189.65	F3K080109040	Ni Dissolved, Ni Total
	P-58-196.02	F3K080109041	Ni Dissolved
	P-58-213.20	F3K080109042	Ni Dissolved
	P-54-EB-1	F3K080109043	Ni Dissolved, Ni Total
F3K110173	P-58-274.65	F3K110173001	Ni Dissolved, Ni Total
	P-58-DUP-2 (P-58-274.65)	F3K110173002	Ni Dissolved, Ni Total
	P-58-284.65	F3K110173003	Ni Dissolved
	P-58-294.65	F3K110173004	Ni Dissolved
	P-58-304.65	F3K110173005	Ni Dissolved, Cr, Cr+6
	P-58-314.65	F3K110173007	Ni Dissolved, Ni Total
	P-58-323.15	F3K110173008	Ni Dissolved, Ni Total
	P-58-342.25	F3K110173009	Ni Dissolved, Ni Total
	P-58-402.40	F3K110173010	Ni Dissolved, Cr, Cr+6
	P-58-432.05 (Ni Dissolved, Ni Total, Cr, and Cr+6 also MS/MSD)	F3K110173011	Ni Dissolved, Ni Total, Cr, Cr+6
	P-52-224.5	F3K110173012	Ni Dissolved, Ni Total
	P-54-226.55	F3K110173013	Ni Dissolved
	P-54-236.55	F3K110173014	Ni Dissolved
	P-54-246.55	F3K110173015	Ni Dissolved
	P-54-256.55	F3K110173016	Ni Dissolved, Ni Total
	P-54-267.95	F3K110173017	Ni Dissolved
	P-54-DUP-2 (P-54-267.95)	F3K110173018	Ni Dissolved
	P-54-276.4	F3K110173019	Ni Dissolved, Ni Total
	P-54-285.4	F3K110173020	Ni Dissolved, Ni Total
	P-54-296.25	F3K110173021	Ni Dissolved, Ni Total
	P-54-303.55	F3K110173022	Ni Dissolved, Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3K110173 Cont'd	P-52-232.3	F3K110173023	Ni Dissolved, Ni Total
	P-52-243.7	F3K110173024	Ni Dissolved
	P-52-254.5	F3K110173025	Ni Dissolved
	P-52-264.5	F3K110173026	Ni Dissolved
	P-52-274.5	F3K110173027	Ni Dissolved
	P-52-283.5	F3K110173028	Ni Dissolved, Ni Total
	P-52-291.7 (also MS/MSD)	F3K110173029	Ni Dissolved
	P-52-299.5	F3K110173030	Ni Dissolved
F3K140242	P-58-471.35	F3K140242001	Ni Dissolved, Ni Total
	P-54-326.25	F3K140242002	Ni Dissolved, Ni Total
	P-54-334.4	F3K140242003	Ni Dissolved, Ni Total
	P-54-342.95 (Total also MS/MSD)	F3K140242004	Ni Dissolved, Ni Total
	P-54-351.25	F3K140242005	Ni Dissolved
	P-54-DUP-3 (P-54-351.25)	F3K140242006	Ni Dissolved
	P-54-360.8	F3K140242007	Ni Dissolved
	P-54-400.5	F3K140242008	Ni Dissolved, Ni Total
	P-52-319.2	F3K140242010	Ni Dissolved, Ni Total
	P-52-327.2	F3K140242011	Ni Dissolved, Ni Total
	P-52-339.2 (also MS/MSD)	F3K140242012	Ni Dissolved
	P-52-364.2	F3K140242013	Ni Dissolved, Ni Total
	P-52-DUP-2 (P-52-364.2)	F3K140242014	Ni Dissolved, Ni Total
	P-52-374.4	F3K140242015	Ni Dissolved, Ni Total
	P-52-395.4	F3K140242016	Ni Dissolved
	P-54-411.05	F3K140242017	Ni Dissolved, Ni Total
F3K210372	P-52-404.45	F3K210372001	Ni Dissolved
	P-52-414.15	F3K210372002	Ni Dissolved, Ni Total
	P-52-444.35	F3K210372003	Ni Dissolved
	P-52-483.38	F3K210372004	Ni Dissolved
	P-52-EB-2	F3K210372005	Ni Total
	EB-P-54-11-17	F3K210372007	Ni Dissolved, Ni Total
	P-54-421.00	F3K210372008	Ni Dissolved
	P-54-431.00	F3K210372009	Ni Dissolved
	P-54-437.05	F3K210372010	Ni Dissolved
	P-53-86.40	F3K210372011	Ni Dissolved, Ni Total

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F3K210372 Cont'd	P-53-EB-11-20	F3K210372012	Ni Dissolved, Ni Total
	P-53-76.40	F3K210372013	Ni Dissolved, Ni Total
F3K280120	P-53-96.40	F3K280120001	Ni Dissolved, Ni Total
	P-53-106.40	F3K280120002	Ni Dissolved, Ni Total
	P-53-116.40	F3K280120003	Ni Dissolved, Ni Total
	P-53-126.40	F3K280120004	Ni Dissolved
	P-53-136.40	F3K280120005	Ni Dissolved
	P-53-146.40	F3K280120006	Ni Dissolved, Ni Total
	P-53-DUP-1 (P-53-146.40)	F3K280120007	Ni Dissolved, Ni Total
	P-53-156.40 (also MS/MSD)	F3K280120008	Ni Dissolved
	P-53-165.70	F3K280120009	Ni Dissolved, Ni Total
	P-53-176.40	F3K280120010	Ni Dissolved
	P-53-188.85	F3K280120011	Ni Dissolved, Ni Total
	P-53-212.60	F3K280120012	Ni Dissolved, Ni Total
	P-53-221.35	F3K280120013	Ni Dissolved
	P-53-231.35	F3K280120014	Ni Dissolved
	P-53-238.55	F3K280120015	Ni Dissolved
	P-53-248.35	F3K280120016	Ni Dissolved
	P-53-256.35	F3K280120017	Ni Dissolved
	P-53-266.35	F3K280120018	Ni Dissolved
	P-53-DUP-2 (P-53-266.35)	F3K280120019	Ni Dissolved
	P-53-276.35	F3K280120020	Ni Dissolved
	P-53-286.35	F3K280120021	Ni Dissolved
	P-53-295.50	F3K280120022	Ni Dissolved
	P-53-306.00	F3K280120023	Ni Dissolved
	P-53-313.30 (also MS/MSD)	F3K280120024	Ni Dissolved
	P-34-EB-1	F3K280120025	Ni Total
	P-34-79.55 (Total also MS/MSD)	F3K280120026	Ni Dissolved, Ni Total
	P-34-89.55	F3K280120027	Ni Dissolved, Ni Total
	P-34-99.55	F3K280120028	Ni Dissolved, Ni Total
	P-34-109.55	F3K280120029	Ni Dissolved
	P-34-119.55	F3K280120030	Ni Dissolved
	P-34-129.55	F3K280120031	Ni Dissolved, Ni Total
	P-34-139.55	F3K280120032	Ni Dissolved, Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3K280120 Cont'd	P-34-DUP-1 (P-34-139.55)	F3K280120033	Ni Dissolved, Ni Total
	P-34-164.55	F3K280120034	Ni Dissolved, Ni Total
	P-34-154.55	F3K280120035	Ni Dissolved, Ni Total
	P-34-174.55	F3K280120036	Ni Dissolved
	P-34-184.55 (Dissolved also MS/MSD)	F3K280120037	Ni Dissolved, Ni Total
	P-34-194.55	F3K280120038	Ni Dissolved, Ni Total
	P-34-204.55	F3K280120039	Ni Dissolved, Ni Total
	P-34-214.55	F3K280120040	Ni Dissolved, Ni Total
	P-34-224.55	F3K280120041	Ni Dissolved, Ni Total
	P-34-234.55	F3K280120042	Ni Dissolved, Ni Total
	P-34-244.55	F3K280120043	Ni Dissolved, Ni Total
	P-34-DUP-2 (P-34-244.55) (Total also MS/MSD)	F3K280120044	Ni Dissolved, Ni Total
	P-34-254.55	F3K280120045	Ni Dissolved, Ni Total
	P-34-264.55	F3K280120046	Ni Dissolved, Ni Total
	P-34-284.55	F3K280120047	Ni Dissolved
	P-34-294.55	F3K280120048	Ni Dissolved
	P-34-304.50	F3K280120049	Ni Dissolved, Ni Total
	P-53-331.10	F3K280120051	Ni Dissolved
	P-53-340.05	F3K280120052	Ni Dissolved, Ni Total
F3L050365	P-34-324.50	F3L050365001	Ni Dissolved, Ni Total
	P-34-334.50 (Total also MS/MSD)	F3L050365002	Ni Dissolved, Ni Total
	P-34-352.73	F3L050365003	Ni Dissolved, Ni Total
	P-34-384.35	F3L050365004	Ni Dissolved, Ni Total
	P-34-394.55 (also MS/MSD)	F3L050365005	Ni Dissolved
	P-34-401.58	F3L050365006	Ni Dissolved
	P-53-366.65	F3L050365008	Ni Dissolved
	P-53-391.6	F3L050365009	Ni Dissolved, Ni Total
	P-53-401.10	F3L050365010	Ni Dissolved
	P-53-410.15	F3L050365011	Ni Dissolved, Ni Total
F3L090146	P-33-EB-1	F3L090146001	Ni Total
	P-33-79.6	F3L090146002	Ni Dissolved
	P-33-89.6	F3L090146003	Ni Dissolved
	P-33-99.6	F3L090146004	Ni Dissolved
	P-33-109.6	F3L090146005	Ni Dissolved

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F3L090146 Cont'd	P-33-119.6	F3L090146006	Ni Dissolved
	P-33-129.6	F3L090146007	Ni Dissolved
	P-33-139.6	F3L090146008	Ni Dissolved
	P-33-149.6 (Total also MS/MSD)	F3L090146009	Ni Dissolved, Ni Total
	P-33-159.6	F3L090146010	Ni Dissolved, Ni Total
	P-33-169.6	F3L090146011	Ni Dissolved
	P-33-179.6	F3L090146012	Ni Dissolved, Ni Total
	P-33-DUP-1 (P-33-169.6)	F3L090146013	Ni Dissolved
	P-33-189.6	F3L090146014	Ni Dissolved, Ni Total
	P-33-198.1	F3L090146015	Ni Dissolved, Ni Total
	P-33-214.6	F3L090146016	Ni Dissolved
	P-33-224.6	F3L090146017	Ni Dissolved
	P-53-426.75	F3L090146018	Ni Total
	P-53-480.90 (Dissolved also MS/MSD)	F3L090146019	Ni Dissolved
F3L120339	P-53-487.40	F3L120339001	Ni Dissolved, Ni Total
	P-53-497.00	F3L120339002	Ni Dissolved
	P-53-504.80	F3L120339003	Ni Dissolved, Ni Total
	P-33-234.6	F3L120339004	Ni Dissolved
	P-33-244.6	F3L120339005	Ni Dissolved, Ni Total
	P-33-254.6	F3L120339006	Ni Dissolved, Ni Total
	P-33-264.6	F3L120339007	Ni Dissolved
	P-33-274.6 (Total also MS/MSD)	F3L120339008	Ni Dissolved, Ni Total
	P-33-284.6	F3L120339009	Ni Dissolved
	P-33-294.6	F3L120339010	Ni Dissolved, Ni Total
	P-33-304.6	F3L120339011	Ni Dissolved, Ni Total
	P-33-DUP-2 (P-33-304.6)	F3L120339012	Ni Dissolved, Ni Total
	P-33-344.3	F3L120339013	Ni Dissolved
	P-33-374.3 (Dissolved also MS/MSD)	F3L120339014	Ni Dissolved, Ni Total
	P-33-412.4	F3L120339015	Ni Dissolved, Ni Total
F3L160348	P-33-423.8	F3L160348001	Ni Dissolved
	P-33-432.6	F3L160348002	Ni Dissolved, Ni Total
	P-33-454.3	F3L160348003	Ni Dissolved
	P-33-481.1 (Dissolved also MS/MSD)	F3L160348004	Ni Dissolved, Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F4A130259	P-31-79.25	F4A130259002	Ni Dissolved
	P-31-89.25	F4A130259003	Ni Dissolved
	P-31-99.25	F4A130259004	Ni Dissolved
	P-31-111.67	F4A130259005	Ni Dissolved
	P-31-EB-2 (also MS/MSD)	F4A130259006	Ni Total
	P-31-124.25	F4A130259007	Ni Dissolved
	P-31-134.25	F4A130259008	Ni Dissolved
	P-31-143.30	F4A130259009	Ni Dissolved
	P-31-184.25	F4A130259010	Ni Total
	P-31-190.40	F4A130259011	Ni Dissolved
	P-31-DUP-1 (P-31-190.40)	F4A130259012	Ni Dissolved
	P-31-199.25 (also MS/MSD)	F4A130259013	Ni Dissolved
	P-31-223.75	F4A130259014	Ni Dissolved
	P-31-233.11	F4A130259015	Ni Dissolved, Ni Total
	P-31-244.25	F4A130259016	Ni Dissolved
	P-31-254.25	F4A130259017	Ni Dissolved
	P-31-263.70	F4A130259018	Ni Dissolved
	P-55-EB-1	F4A130259019	Ni Dissolved, Ni Total
	P-55-74.55	F4A130259020	Ni Dissolved
	P-55-84.10	F4A130259021	Ni Dissolved, Ni Total
	P-55-94.55	F4A130259022	Ni Dissolved, Ni Total
	P-55-104.55	F4A130259023	Ni Dissolved
	P-55-114.55	F4A130259024	Ni Dissolved, Ni Total
	P-55-DUP-1 (P-55-154.55)	F4A130259025	Ni Dissolved
	P-55-124.55	F4A130259026	Ni Dissolved
	P-55-134.55	F4A130259027	Ni Dissolved
	P-55-144.55	F4A130259028	Ni Dissolved, Ni Total
	P-55-154.55 (also MS/MSD)	F4A130259029	Ni Dissolved
	P-55-164.55	F4A130259031	Ni Dissolved
F4A150320	P-31-284.25	F4B150320001	Ni Dissolved, Ni Total
	P-31-294.25	F4B150320002	Ni Dissolved, Ni Total
	P-31-304.25	F4B150320003	Ni Dissolved
	P-31-344.25	F4B150320004	Ni Dissolved
	P-31-351.55	F4B150320005	Ni Dissolved
	P-31-DUP-2 (P-31-351.55)	F4B150320006	Ni Dissolved

Table 1-1: *Sample Cross-Reference List*

Package Identification	***Sample ID***	***Laboratory ID***	***Analysis Performed***
F4A150320 Cont'd	P-55-174.55	F4B150320008	Ni Dissolved, Ni Total
	P-55-186.15	F4B150320009	Ni Dissolved
	P-55-244.40	F4B150320011	Ni Dissolved
	P-55-254.40	F4B150320012	Ni Dissolved
	P-55-264.40	F4B150320013	Ni Dissolved, Ni Total
	P-55-271.00	F4B150320014	Ni Dissolved
F4A230292	P-31-363.2	F4A230292001	Ni Dissolved
	P-31-374.25	F4A230292002	Ni Dissolved
	P-31-404.25	F4A230292003	Ni Dissolved, Ni Total
	P-56-EB-1	F4A230292004	Ni Dissolved, Ni Total
	P-56-76-55	F4A230292005	Ni Dissolved
	P-56-86.55	F4A230292006	Ni Dissolved, Ni Total
	P-56-96.55	F4A230292007	Ni Dissolved, Ni Total
	P-56-106.55	F4A230292008	Ni Dissolved, Ni Total
	P-56-116.55	F4A230292009	Ni Dissolved, Ni Total
	P-56-126.55	F4A230292010	Ni Dissolved
	P-56-136.55 (also MS/MSD)	F4A230292011	Ni Dissolved
	P-56-146.55	F4A230292012	Ni Dissolved, Ni Total
	P-56-156.55	F4A230292013	Ni Dissolved
	P-56-166.55	F4A230292014	Ni Dissolved
	P-56-176.55	F4A230292015	Ni Dissolved
	P-56-186.55	F4A230292016	Ni Dissolved
	P-56-194.40	F4A230292017	Ni Dissolved
	P-31-414.25	F4A230292018	Ni Dissolved
	P-56-DUP (P-56-86.55)	F4A230292019	Ni Dissolved, Ni Total
F4A300327	P-31-444.25	F4A300327001	Ni Dissolved
	P-55-294.45	F4A300327002	Ni Dissolved
	P-55-304.45	F4A300327003	Ni Dissolved, Ni Total
	P-55-311.95	F4A300327004	Ni Dissolved, Ni Total
	P-55-DUP-2 (P-55-311.95)	F4A300327005	Ni Dissolved, Ni Total
	P-55-334.55 (Total also MS/MSD)	F4A300327006	Ni Dissolved, Ni Total
	P-55-340.35	F4A300327007	Ni Dissolved, Ni Total
	P-55-374.35	F4A300327008	Ni Dissolved
	P-56-388.60	F4A300327010	Ni Dissolved, Ni Total

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F4A300327 Cont'd	P-55-EB-3	F4A300327011	Ni Total
	P-56-211.45	F4A300327012	Ni Dissolved, Ni Total
	P-56-221.45	F4A300327013	Ni Dissolved, Ni Total
	P-56-231.45	F4A300327014	Ni Dissolved
	P-56-241.45	F4A300327015	Ni Dissolved
	P-56-251.45	F4A300327016	Ni Dissolved
	P-56-261.45	F4A300327017	Ni Dissolved
	P-56-305.90	F4A300327018	Ni Dissolved
	P-56-316.45	F4A300327019	Ni Dissolved, Ni Total
	P-56-324.20 (also MS/MSD)	F4A300327020	Ni Dissolved
	P-56-346.60	F4A300327060	Ni Dissolved
	P-56-354.00	F4A300327022	Ni Dissolved
F4B110140	P-55-404.45 (also MS/MSD)	F4B110140001	Ni Dissolved
	P-55-425.35	F4B110140002	Ni Dissolved
	P-55-434.45	F4B110140003	Ni Dissolved, Ni Total
	P-55-442.25	F4B110140004	Ni Dissolved, Ni Total
	P-32-79.95	F4B110140005	Ni Dissolved
	P-32-89.35	F4B110140006	Ni Dissolved
	P-32-99.35	F4B110140007	Ni Dissolved
	P-32-109.35	F4B110140008	Ni Dissolved
	P-32-119.35	F4B110140009	Ni Dissolved
	P-32-128.75	F4B110140010	Ni Dissolved
	P-32-139.35	F4B110140011	Ni Dissolved
F4B130279	P-32-174.35	F4B130279001	Ni Dissolved
	P-32-DUP-1 (P-32-174.35)	F4B130279002	Ni Dissolved
	P-32-184.35	F4B130279003	Ni Dissolved
	P-32-194.35	F4B130279004	Ni Dissolved
	P-32-224.35 (Total also MS/MSD)	F4B130279005	Ni Dissolved, Ni Total
	P-32-234.35	F4B130279006	Ni Dissolved, Ni Total
	P-32-241.01	F4B130279007	Ni Dissolved, Ni Total
	P-32-251.77	F4B130279008	Ni Dissolved
	P-32-259.35	F4B130279009	Ni Dissolved, Ni Total
	P-32-269.35	F4B130279010	Ni Dissolved, Ni Total
	P-32-279.35	F4B130279011	Ni Dissolved

Table 1-1: Sample Cross-Reference List

Package Identification	Sample ID	Laboratory ID	Analysis Performed
F4B170134	P-32-289.35 (Dissolved also MS/MSD)	F4B170134002	Ni Dissolved, Ni Total
	P-32-299.35	F4B170134003	Ni Dissolved
	P-32-309.35	F4B170134004	Ni Dissolved, Ni Total
	P-32-352.0	F4B170134005	Ni Dissolved, Ni Total
	P-32-359.25	F4B170134006	Ni Dissolved
	P-32-369.25	F4B170134007	Ni Dissolved
	P-32-379.25	F4B170134008	Ni Dissolved
	P-32-387.80	F4B170134009	Ni Dissolved
	P-32-DUP-2 (P-32-359.25)	F4B170134010	Ni Dissolved
F4B200226	P-32-411.3	F4B200226001	Ni Dissolved
	P-32-419.3	F4B200226002	Ni Dissolved, Ni Total
	P-32-426.7	F4B200226003	Ni Dissolved, Ni Total
	P-32-461.0	F4B200226004	Ni Dissolved, Ni Total
	P-32-481.0	F4B200226005	Ni Dissolved, Ni Total
	P-32-488.9	F4B200226006	Ni Dissolved, Ni Total
	P-32-DUP-3 (P-32-488.9) (Dissolved also MS/MSD)	F4B200226007	Ni Dissolved, Ni Total

1.2. General Considerations

Validation is a process of determining the suitability of a measurement system for providing useful analytical data. Although the term is frequently used in discussing methodologies, it applies to all aspects of the analytical system and especially to samples, their measurements, and the actual data output. Accordingly, for the samples and analyses addressed herein, this report summarizes the findings of the review and outlines any deviations from the applicable quality control (QC) criteria referenced in the following documents:

- *Analytical Services Protocol,* New York State Department of Environmental Conservation. Guidance documents including Exhibits A, B, C, D, E, F, G, and I. June 2000.

- GTE Operations Support Incorporated (GTEOSI). *Groundwater Investigation Work Plan (QAPP: Appendix C), Former Sylvania Electric Products Incorporated Facility, Hicksville, New York.* URS, September 2002.

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (SW-846) USEPA, Final Update IIIA. April 1998.

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* EPA 540-R-01-008. July 2002.

1.3. Analytical Methods

The environmental samples presented in this report were submitted to Severn Trent Laboratories, Inc. of Earth City, Missouri, for selected metals, including nickel, analyses. The laboratory used the following USEPA guidance methods for the analyses:

- SW-846 Method 3010A: Acid Digestion of Aqueous Samples and Extracts for Total Metals for Analysis by FLAA or ICP Spectroscopy
- SW-846 Method 6010B: Inductively Coupled Plasma-Atomic Emission Spectrometry
- SW-846 Method 7196A: Chromium, Hexavalent (Colorimetric)

The laboratory assigned an SDG number to a group of samples during the sample log-in process. The SDG number is the means by which the laboratory tracks samples and QC analyses. A total of 1,123[9] samples in a total of 64 SDGs are included in this data validation report. Of the 1,123 total number of samples, 14 were analyzed for total beryllium, 23 for total chromium, 7 for hexavalent chromium, 14 for total copper, 14 for total thallium, 499 for total nickel, 804 for dissolved nickel, and 24 for unspecified[10] nickel. The SDG, field identification, and laboratory identification for each sample are summarized in Table 1-1.

The following sections of this document address distinct aspects of the validation process. Section 2 lists the data QA/QC protocols used to validate the sample data. Section 3 presents a summary of the findings associated with the validation and a discussion of the specific QA/QC deviations and qualifications performed on the sample data. Section 4 presents a discussion of data completeness and usability. Section 5 presents the Data Usability Summary Report (DUSR) summary information.

[9] Each sample may have been analyzed for more than one metal and may have included total recoverable and dissolved fractions.
[10] It was not specified whether total or dissolved nickel was collected.

2. Data Validation Protocols

2.1. Sample Analysis Parameters

The validation of analyses for this project used guidance presented in the QAPP (GTEOSI, 2002), the analytical methodologies, the data validation guidelines referenced in Section 1, and professional judgment[11]. MPI performed a data review of all analytical results to assess data quality. A data review includes an assessment of sample handling protocols and supporting laboratory and field QC parameters. The following is a list of specific analytical information evaluated during the validation:

- Data package completeness review – per the NYSDEC ASP Category B or USEPA CLP deliverables requirements
- Analytical methods performed and test method references
- Sample condition - review of log-in records for cooler temperature, chemical preservation, etc.
- Holding times - comparison of collection, preparation, and analysis dates
- Analytical results - units, values, significant figures
- Sample traceability to raw data
- Initial calibration – comparison to technical guideline criteria
- Continuing calibration – comparison to technical guideline criteria
- Initial and continuing calibration blanks
- Method blank results and laboratory contamination
- Laboratory control sample (LCS) results and comparison to laboratory control limits
- Matrix spike/matrix spike duplicate (MS/MSD) results and comparison to laboratory control limits
- Matrix duplicate analyses
- Field replicate/duplicate results and comparison to technical guideline criteria
- Field QC sample (i.e., equipment blanks and field blanks)
- Reporting limits and Dilutions
- Electronic Data Deliverables (EDDs) – comparison to the hardcopy analytical report

The analytical reports were reviewed for completeness and the accompanying QC data were reviewed for acceptable performance. When QC results indicated poor performance, MPI applied data qualifiers to the

[11] Professional judgment is performed by a USEPA certified data validator with over a decade of environmental laboratory experience.

results to inform the data user of the possible performance problem. These qualifiers are in addition to or a revision of the qualifiers provided by the laboratory. A summary of the data qualifiers used for this review is presented in Section 2.2.

2.2. Data Qualifiers

The following qualifiers have been used by the laboratory for metals analyses:

"U" Non-detect result at the established laboratory reporting limit.

"B" Indicates an estimated value or a value below the established reporting limit but above the method detection limit.

Laboratory qualifiers defined above, are retained in the final database unless revised during the data validation process to one of the following qualifiers:

"U" The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

"J" The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

"UJ" The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

"R" The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

2.3. Data Usability Summary Report Questions

The DUSR determines whether or not the data meets Site-specific criteria for data quality and use. It was developed to review and evaluate the analytical data packages. During the course of this review the following questions were addressed (where applicable):

1. *Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?*

2. *Have all holding times been met?*

3. *Do all the QC data: blanks, calibration standards, calibration verifications, spike recoveries, replicate analyses, laboratory controls and sample data fall within the protocol required limits and specifications?*

4. *Have all of the data been generated using established and agreed upon analytical protocols?*

5. *Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?*

6. *Have the correct data qualifiers been used?*

The answers to the questions presented by the DUSR are presented in the following sections of the report and in the DUSR Summary Information Section, Section 5.

3. Data Quality Evaluation

3.1. Summary

This section summarizes whether the QA/QC parameters reported, which were specified in Section 2.1, met validation criteria. Summary of the individual components of the review are described in the following sub-sections.

3.2. Review of Validation Criteria

3.2.1. Completeness Review

The laboratory provided the analytical report using Contract Laboratory Program (CLP) –like format. With the exception of forms and raw data detailed in Section 3.2.5, all necessary documents were included in the report packages including a case narrative summarizing the QC issues associated with the project analyses.

3.2.2. Test Methods

The laboratory performed the analyses using the analytical test methods listed in Section 1.3. They included USEPA SW-846 Method 3010 (digestion of aqueous samples) followed by Method 6010B (ICP) for metals analysis, and Method 7196A for hexavalent chromium analysis. No method anomalies were noted.

3.2.3. Sample Receipt

The laboratory received 1,123 aqueous samples[12] for metals analysis between March 18, 2003 and February 20, 2003. Samples collected for different analysis from the same profile at the same depth are defined as the same sample within this data validation report. The sample temperatures at the time of receipt by the laboratory were within the recommended temperature range of 4°C ± 2°C for almost all SDGs. Field and laboratory personnel completed the chain-of-custody (COC) documents recording the signature, date, and time of custody transfer. The laboratory recorded the condition of the samples at the time of receipt on a "Conditions Upon Receipt Form." This form identifies whether the containers were received undamaged, within the proper temperature range, at the proper pH, in a container that is sealed with a custody seal on the exterior, and with a completed COC enclosed to identify all samples submitted to the laboratory.

The following problems with sample receipts were found:

- SDG F3E290170: there was a sample container, which was not labeled – the laboratory resolved the sample identity through a process of elimination and informed MPI.
- SDG F3F030298: sample P-15-230.00 was not submitted but was on the COC; sample P-15-228.00 was not written on the COC but was submitted – the laboratory made corrections after contacting MPI. Also, samples P-D-207.1 and P-D-197.1 were preserved at the laboratory subsequent to checking the pH – no data validation qualifications are necessary.
- SDG F3F120220: samples P-C-159.6 and P-C-169.6 were crossed off the COC by accident. The samples were received by the laboratory in good condition.

[12] Each sample may have been analyzed for more than one metal and may have included total recoverable and dissolved fractions.

- SDG F3F260187: sample FB-6-24 was relabeled on the COC as P-23-FB1, but was not relabeled on one of the sample bottles.

- SDG F3G110256: sample P-35-DUP-1 was mistakenly documented as P-35-DUP-2 during the laboratory's sample log-in process, resulting in the wrong sample ID reported – the ID was manually corrected during the validation process.

- SDG F3G150156: three samples were received at the laboratory with no sample ID: two were identified based on sampling time, the other one was matched based on what was left on the COC as P-25-320.0 (this bottle's sampling time did not match any samples on the COC).

- SDG F3G250374: sample P-42-79.6 on the COC was labeled as P-42-79.5 on the sample bottle. The COC designation was used. Also, bottle for sample P-42-EB-2 was not received by the laboratory; and therefore, could not be analyzed.

- SDG F3G290207: sample P-42-336.8 was labeled as P-42-339.8 on the sample bottle; the laboratory data are labeled as P-42-339.8 – the ID was manually corrected during the validation process. The COC also had sample TB-724728 included, which was not submitted for analysis.

- SDG F3H060192: a labeled bottle for sample P-45-71.25 was received by the laboratory but was not included in the COC. The laboratory added the sample for nickel analysis on the COC.

- SDG F3H130195: samples P-45-291.65 and P-45-311.65 were mistakenly documented as P-45-291.25 and P-45-311.25, respectively, during the laboratory's sample log-in process, resulting in the wrong sample ID reported – the ID was manually corrected during the validation process.

- SDG F3H180106: all samples were received at the laboratory at 29 degrees Celsius. All of the ice within the shipping cooler had melted as it took Federal Express four days to deliver the cooler. No qualification actions are performed because the concentration of nickel is not expected to be affected with this increase in temperature.

- SDG F3H270230: the sample bottle labeled as P-37-265.85 is labeled as P-37-264.85 on the COC. The correct ID is P-37-265.85 and was manually corrected on the reports during this validation process.

- SDG F3H280315: samples P-46-330.21 and P-46-307.69 had Cr+6 requested on the COC; however, the laboratory was unable to perform the analysis because the samples received were preserved with HNO3.

- SDG F3I040177: sample P-44-79.3 was not listed on the COC. Also, sample P-44-109.8 required pH adjustment to <2 at the laboratory as the pH was received at 5. No validation qualification is necessary.

- SDG F3I090305: sample P-47-DUP-1 was not submitted but was on the COC. The analysis was not performed.

- SDG F3I230231: sample P-29-318.9 was mistakenly documented as P-29-389.9 during the laboratory's sample log-in process, resulting in the wrong sample ID reported – the ID was manually corrected during the validation process. Samples P-29-310.2 and P-29-360.0 for hexavalent chromium had already exceeded the 24 hour holding time by the time they were shipped to the laboratory.

- SDG F3J030259: samples P-30-89.50 and P-30-99.50 were mistakenly documented as P-30-89.55 and P-30-99.55, respectively, during the laboratory's sample log-in process, resulting in the wrong sample ID reported – the ID was manually corrected during the validation process. This SDG had both total and dissolved nickel samples. The laboratory only identified some of the dissolved samples as dissolved. The IDs were manually corrected to reflect total and dissolved samples during the validation process to maintain consistency for this SDG.

- SDG F3J070236: samples P-30-224.55, P-30-232.85, P-30-244.5, P-30A-260.85, P-30A-269.00, and P-18-EB-1 were labeled for dissolved nickel on the COC; however, the bottles were not labeled for dissolved or filtered. The laboratory correctly identified the samples as for dissolved. Sample P-30A-307.4 was requested for both dissolved and total nickel. The laboratory performed both analyses but had identified on both reports as total. One of them was hand corrected as dissolved, through the validation process, based on time of analysis in association with other dissolved nickel analysis.

- SDG F3J110172: samples P-18-257.65 and P-18-267.65 were labeled for dissolved nickel on the COC; however, the bottles were not labeled for dissolved or filtered. The laboratory correctly identified the samples as for dissolved.

- SDG F3J290103: sample P-51-295-25 was submitted for total nickel, in addition to the dissolved nickel that was specified on the COC. Both analyses were performed.

- SDG F3K080109: sample P-54-EB-1 was received for total and dissolved nickel but was not listed on the COC. The laboratory added it onto the COC.

- SDG F3K110173: sample P-54-267.95 was mistakenly documented as P-54-268.95 during the laboratory's sample log-in process, resulting in the wrong sample ID reported; the ID is manually corrected during the validation process. Samples P-58-304.65 and P-58-402.40 were not at the correct pH when received at the laboratory; the laboratory preserved it at receipt. The laboratory did not document the specific fraction - no data validation qualifications are necessary.

- SDG F3K210372: sample P-53-86.40 was mistakenly documented as P-54-86.40 during the laboratory's sample log-in process, resulting in the wrong sample ID reported; the ID was manually corrected during the validation process.

- SDG F3L090146: sample P-53-426.75 was identified as total on the COC and as filtered on the sample container. The laboratory correctly identified it as total.

- SDG F4A230292: sample P-56-DUP was received for total and dissolved nickel but was not listed on the COC. The laboratory added it onto the COC.

- SDG F4A300327: sample P-56-388.60 was received for total and dissolved nickel and sample P-55-EB-3 was received for total nickel, but they were not listed on the COC. The laboratory added them onto the COC. Three samples were identified as for dissolved nickel on the COC but not on the sample bottles. The laboratory correctly identified them as dissolved for their analysis.

- SDG F4B110140: sample P-32-EB-1 for total nickel was submitted to the laboratory but was crossed off on the COC by mistake. The laboratory should have analyzed it but did not.

There were no custody seals attached to individual sample containers. No qualification is necessary because the exterior of the shipment coolers had intact custody seals. However, some cooler exteriors

were noted to have no custody seals: SDGs F3F120220, F3F170126, F3F260187, F3G150156, F3I150101, F3L090146, F3L160348, and F3B200226. Based on professional judgment, no qualifications are performed because the custodies during shipment were maintained by Federal Express and the coolers were shipped over-night with early morning arrival at the laboratory.

3.2.4. Holding Times

The laboratory performed all beryllium, copper, nickel, thallium, and total chromium analyses within the EPA-recommended holding time of 180 days for acid preserved samples.

The holding time for hexavalent chromium is 24 hours from time of sample collection. Holding time for the following hexavalent chromium samples were not met:

- SDG F3I230231: samples P-29-310.2 and P-29-360.0. The samples were received outside of holding time. Since the hexavalent chromium results for these two samples were non-detects, the results were qualified as unusable, "R."

- SDG F3K110173: samples P-58-304.65 and P-58-402.40. The samples were received outside of holding time. Since the hexavalent chromium results for these two samples were non-detects, the results were qualified as unusable, "R."

3.2.5. Analytical Results

For each sample tested, the laboratory provided the analytical test information using a laboratory standard format, which shows critical information pertaining to the analyses performed. The information provided includes the following: the laboratory name; the project name; the analysis type; the laboratory sample ID; matrix; date sampled; date received; preparation batch ID; the result; the reporting limit; the units of measure; the laboratory method; dilution factor; analysis time; preparation date; analysis date; work order number, and laboratory qualifiers (if any). The laboratory provided all the appropriate forms for the requested methods with the following exceptions.

- SDG F3I040177: chromium calibration forms were not included. The chromium information missing in the calibration forms were found within the raw data.

- SDG F3K110173: hexavalent chromium calibration forms and raw data were not included.

- SDG F3K210372: five results for total nickel and four results for dissolved nickel analyses were mistakenly reported with the wrong values on the reporting forms (Form 1). The results were corrected from the raw data during the validation process.

- SDG F3J240204: sample P-51-177.78 was mistakenly logged in at the laboratory as P-49-177.78. The ID was manually corrected on the report form (Form 1) during the validation process.

3.2.6. Traceability to Raw Data

Traceability of the metals analyses is established by the digestion (preparation) logs. These forms list the project samples analyzed per laboratory batch processed and the corresponding QC samples (e.g., preparation blank and laboratory control sample) performed with the project samples. All project samples analyzed, for all SDGs, were included on the applicable forms.

3.2.7. Initial Calibration

The laboratory prepared an initial calibration (ICAL) curve for each analyte in accordance with method criteria. All ICALs are acceptable. Initial calibration verification (ICV) standards were analyzed immediately after each ICAL, with recoveries all within ± 10% of the true values for all analytes. All ICVs are acceptable.

3.2.8. Continuing Calibration Verification

The continuing calibration verification (CCV) standards were analyzed after the ICALs and after every 10 project samples as required by the reference test method. The percent recoveries were all within ± 10% of the true values for all analytes. All CCVs are acceptable.

3.2.9. Initial and Continuing Calibration Blanks

The initial calibration blank (ICB) and continuing calibration blanks (CCB) were analyzed after the ICALs and after every 10 project samples as required by the reference test method. In general, most initial and continuing calibration blank results were less than the laboratory reporting limit, but in a few cases the blank results were greater than the laboratory MDL or (-MDL). For these cases, if an analyte in the associated field samples was detected at a concentration greater than the MDL but less than the laboratory reporting limit, the validation process qualified the result to account for the potential contamination associated with the analysis system. A summary of the samples and analytes that were revised due to laboratory contamination are presented in Table 3-1.

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3C190235	MW-10	Beryllium	Revise to "U" non-detect
F3D290160			None
F3E020153	P-F-96.48 P-F-106.46	Nickel	Revise to "U" non-detect
F3E090278			None
F3E140308	P-26-86.8 P-26-96.8 P-26-106.8 P-26-116.8 P-26-126.8 P-26-136.8 P-26-146.8	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3E160130			None
F3E230179			None
F3E200165			None
F3E290170			None
F3F030298			None
F3F050171			None
F3F120220			None
F3F170126			None
F3F180192			None

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3F200145			None
F3F260187	P-23-80.1 P-23-90.1 P-23-100.1 P-23-110.1 P-23-130.1 P-23-140.1 P-23-150.1 P-23-170.1 P-23-180.1 P-23-DUP-1	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3F270132			None
F3G010309	P-23-262.0 P-23A-293.50	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3G030162	P-23A-DUP.1 P-23A-347.6	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3G110256	P-25-79.7 P-25-89.7 P-25-99.1 P-25-139.7 P-25-149.7 P-25-159.7 P-25-169.7 P-25-179.7 P-25-189.7 P-25-199.7 P-25-209.7 P-25-219.7 P-25-DUP-1 P-35-77.2 P-35-87.2 P-35-137.2 P-35-147.2 P-35-157.2 P-35-167.2 P-35-177.2 P-35-DUP-1	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	*Sample ID*	*Analyte*	*Action*
F3G150156	P-25-229.5 P-25-239.5 P-25-249.5 P-25-259.5 P-25-269.5 P-25-275.8 P-25-DUP-2 P-25-290.0 P-25-300.0 P-25-310.0 P-25-320.0 P-25-330.0 P-25-340.0 P-25-349.4 P-25-379.2 P-35-187.2 P-35-197.2 P-35-207.2 P-35-227.2 P-35-237.2 P-35-247.2 P-35-257.2 P-35-267.2 P-35-277.2 P-35-322.2 P-35-332.2 P-35-DUP-2 P-35-342.2 P-35-347.2	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL (blanks were < (-MDL)).
F3G230216	P-H-76.8 P-H-86.8 P-H-106.8 P-H-116.8	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3G250374	P-H-126.8 P-H-DUP1 P-H-136.8 P-H-146.8 P-H-156.8 P-H-166.8 P-H-176.8 P-H-186.8 P-42-189.6 P-42-197.7 P-42-202.7 P-42-DUP-1 P-42-99.6 P-42-109.6 P-42-139.6 P-42-149.6 P-42-159.6 P-42-169.4	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3G290207	P-H-226.55	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3H010243			None

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	*Sample ID*	*Analyte*	*Action*
F3H060192	P-20-79.60 P-20-89.60 P-20-99.60 P-20-109.60 P-20-119.60 P-45-81.25 P-45-91.25 P-45-101.25 P-45-111.25 P-45-121.25 P-45-131.25 P-45-DUP1	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3H080219	P-20-189.60 P-20-DUP1 P-45-151.25 P-45-167.25 P-45-197.25 P-45-207.25 P-45-217.25 P-45-227.25 P-45-237.25	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3H130195	P-20-359.60 P-20-379.60 P-20-369.60	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3H180106			None
F3H210288			None
F3H220246			None
F3H270230			None
F3H280315			None
F3I040177	P-44-89.8 P-44-99.3 P-44-DUP 1 P-44-109.8 P-44-121.55 P-44-79.3	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
	P-46-389.28	Chromium	Revise to "U" non-detect at PQL, for all detects < PQL.
F3I050189	P-44-131.1 P-44-139.8 P-44-149.8 P-44-159.8 P-44-169.8 P-44-179.8 P-44-199.8 P-47-77.1 P-47-87.08	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3I090305			None
F3I120107			None
F3I150101			None
F3I180259			None

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3I230231	P-29-278.4 P-29-289.85 P-29-299.85 P-29-310.2 P-29-318.9 P-29-329.85 P-29-DUP-2 P-29-339.5 P-29-360.0 P-29-369.2 P-38-166.3 P-38-176.3 P-38-186.3 P-38-216.3 P-38-226.3 P-38-312.9 P-38-322.9 P-38-DUP-2 P-38-332.3 P-38-341.1 P-43-264.85 P-43-274.85 P-43-284.85	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
	P-29-310.2	Chromium	Revise to "U" non-detect at PQL, for all detects < PQL.
F3I250196	P-38-370.1 P-38-381.3 P-38-391.3 P-38-DUP-3 P-29-410.7	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL.
F3J030259	P-30-149.50	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL (blanks were < (-MDL)).
F3J070236	P-18-76.65 P-18-86.65 P-18-96.65 P-18-106.65 P-18-116.65 P-18-126.65 P-18-136.65 P-18-146.65 P-18-156.65 P-18-DUP-1 P-18-166.65 P-18-176.65 P-18-186.65	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL.
F3J110172			None
F3J240204	P-50-198.55 P-51-77.78 P-51-117.78 P-51-137.78 P-51-158.02	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL.
F3J290103			None
F3J310287	P-51-363.30 P-51-371.80	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL.

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3J310287 Cont'd	P-50-434.90 P-51-321.00 P-51-327.85 P-51-371.80 P-51-381.80	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL.
F3K080109	P-54-117.55 P-54-127.55 P-54-137.55 P-54-DUP-1 P-54-147.55 P-54-155.75 P-54-165.85 P-52-80.0 P-52-90.0 P-52-100.0 P-52-130.0 P-52-140.0 P-58-79.65	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL.
	P-52-80.0 P-52-90.0 P-52-100.0 P-52-110.0 P-52-120.0 P-52-130.0 P-52-140.0 P-58-79.65 P-58-89.65 P-58-99.65 P-58-109.65 P-58-119.65 P-58-189.65	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL.
F3K110173	P-58-304.65 P-58-402.40	Chromium	Revise to "U" non-detect at PQL, for all detects < PQL.
	P-58-314.65 P-58-323.15 P-54-256.55 P-54-276.4 P-54-285.4 P-54-296.25 P-54-303.55	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL.
F3K140242			None
F3K210372	P-52-404.45 P-52-483.38 P-54-421.00 P-54-431.00 P-54-437.05 P-53-86.40 P-53-76.40	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL.

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3K280120	P-53-96.40 P-53-106.40 P-53-116.40 P-53-126.40 P-53-136.40 P-53-146.40 P-53-DUP-1 P-53-156.40 P-53-165.70 P-53-176.40 P-53-188.85 P-53-212.60 P-53-221.35 P-53-231.35 P-53-238.55	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL.
F3L050365			None
F3L090146			None
F3L120339			None
F3L160348			None
F4A130259	P-55-94.55 P-55-114.55 P-55-144.55	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL.
	P-31-79.25 P-31-89.25 P-31-111.67 P-31-124.25 P-31-134.25 P-31-190.40 P-31-DUP-1 P-31-223.75 P-31-233.11 P-31-263.70 P-55-94.55 P-55-104.55 P-55-114.55 P-55-DUP-1 P-55-124.55 P-55-134.55 P-55-144.55 P-55-154.55 P-55-164.55	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL.
F4A150320	P-31-294.25 P-31-304.25 P-31-344.25 P-55-174.55 P-55-186.15	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL
F4A230292	P-31-404.25 P-56-116.55	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL.

Table 3-1. *Evaluation of Laboratory Initial and Continuing Calibration Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F4A230292 Cont'd	P-31-404.25 P-56-96.55 P-56-106.55 P-56-116.55 P-56-126.55 P-56-146.55 P-56-156.55 P-56-186.55 P-56-194.40 P-31-414.25	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL.
F4A300327	P-55-311.95 P-55-DUP-2 P-55-334.55 P-55-340.35 P-56-388.60	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL.
	P-55-304.45 P-55-311.95 P-55-DUP-2 P-55-334.55 P-55-340.35 P-55-374.35 P-56-388.60 P-56-211.45 P-56-221.45 P-56-241.45 P-56-251.45 P-56-316.45	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL
F4B110140	P-55-434.45 P-55-442.25	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL
F4B130279	P-32-224.35 P-32-234.35 P-32-241.01	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL
F4B170134			None
F4B200226	P-32-426.7	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL

3.2.10. Laboratory Method Blanks (Preparation Blanks)

There were contaminants detected in some preparation blanks. When contamination is detected, the corresponding project sample results for the identified contaminants were revised to non-detect if the associated sample results were less than five times the method blank results in accordance with the QAPP (GTEOSI, 2002). A summary of the samples and analytes that were revised due to laboratory contamination are presented in Table 3-2.

Table 3-2. *Evaluation of Laboratory Method Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3C190235			None
F3D290160			None
F3E020153			None
F3E090278			None
F3E140308			None
F3E160130			None
F3E230179			None
F3E200165			None
F3E290170			None
F3F030298			None
F3F050171			None
F3F120220			None
F3F170126			None
F3F180192			None
F3F200145			None
F3F260187			None
F3F270132			None
F3G010309			None
F3G030162			None
F3G110256	P-35-137.2* P-35-147.2* P-35-157.2* P-35-167.2* P-35-177.2* P-35-DUP-1*	Nickel	Revised to "U" (non-detect)

Table 3-2. *Evaluation of Laboratory Method Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3G150156	P-25-229.5* P-25-239.5* P-25-249.5* P-25-259.5* P-25-269.5* P-25-275.8* P-25-DUP-2* P-25-290.0* P-25-300.0* P-25-310.0* P-25-320.0* P-25-330.0* P-25-340.0* P-25-349.4* P-25-379.2* P-35-187.2* P-35-197.2* P-35-207.2* P-35-217.2 P-35-227.2* P-35-237.2* P-35-247.2* P-35-257.2* P-35-267.2* P-35-277.2* P-35-322.2* P-35-332.2* P-35-DUP-2* P-35-342.2* P-35-347.2*	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL (blanks were < (-MDL)).
F3G230216			None
F3G250374			None
F3G290207			None
F3H010243			None
F3H060192			None
F3H080219			None
F3H130195	P-20-359.60* P-20-379.60* P-20-369.60*	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL (blanks were < (-MDL)).
F3H180106			None
F3H210288			None
F3H220246			None
F3H270230			None
F3H280315			None
F3I040177			None
F3I050189			None

Table 3-2. *Evaluation of Laboratory Method Blanks*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3I090305	P-46-480.25 P-46-490.25 P-44-DUP-2 P-44-257.1 P-44-284.85 P-44-299.85 P-44-349.8 P-47-97.1	Nickel	Revise to "U" non-detect at PQL, for all detects < PQL (blanks were < (-MDL)).
F3I120107			None
F3I150101			None
F3I180259			None
F3I230231			None
F3I250196			None
F3J070236	P-18-76.65 P-18-96.65 P-18-106.65 P-18-126.65 P-18-136.65 P-18-156.65 P-18-DUP-1 P-18-186.65	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL (blanks were < (-MDL)).
F3J110172			None
F3J030259			None
F3J240204	P-49-74.25 P-49-177.3	Nickel Total	Revise to "U" non-detect at PQL, for all detects < PQL (blanks were < (-MDL)).
	P-50-189.90 P-49-74.25 P-49-104.6 P-49-134.3 P-50-198.55* P-51-77.78*	Nickel Dissolved	Revise to "U" non-detect at PQL, for all detects < PQL (blanks were < (-MDL)).
F3J290103			None
F3J310287	P-50-434.90* P-51-321.00* P-51-327.85* P-51-371.80* P-51-381.80*	Nickel Dissolved	Revised to "U" (non-detect)
F3K080109			None
F3K110173	P-58-304.65* P-58-402.40*	Chromium	Revised to "U" (non-detect)
F3K140242			None
F3K210372			None
F3K280120			None
F3L050365			None
F3L090146			None
F3L120339			None

Table 3-2. *Evaluation of Laboratory Method Blanks*

Package Identification	*Sample ID*	*Analyte*	*Action*
F3L160348			None
F4A130259			None
F4A150320			None
F4A230292			None
F4A300327			None
F4B110140			None
F4B130279			None
F4B170134			None
F4B200226			None

* - Also qualified due to other types of blank contamination

3.2.11. Laboratory Control Sample Results

The laboratory analyzed an LCS for each QC batch. The percent recoveries were within laboratory control limits for all QC batches.

3.2.12. Matrix Spike Analyses

Matrix Spike (MS) or MS/MSD samples were submitted to the laboratory for analysis. The MS sample analysis is designed to provide information about the effects of a sample matrix on the sample preparation procedures and the measurement methodology. When the MS/MSD pair is performed, precision can also be measured. All percent recoveries (%R) and relative percent differences (RPD) were within criteria ($75 \leq \%R \leq 125$; $RPD \leq 20\%$) - no qualifications were required.

The laboratory performed an MS and Matrix Duplicate (MS/MD) pair for the first SDG (F3C190235), see Section 3.2.13. For all subsequent SDGs, the laboratory performed MS/MSD pairs, when performed. Both techniques offered similar QC indicators of accuracy and precision with respect to the sample matrices. Table 1-1 specified what technique was performed, and on which samples.

For the following, matrix effect of the samples for accuracy and precision was not evaluated:

- For SDGs F3E160130, F3E200165, F3F050171, F3G230216, F3H010243, F3I050189, and F3I250196, MS/MSDs were performed only on samples from other clients of the laboratory.
- For SDGs F3E230179, SDG F3F270132, F3G010309, F3G030162, F3H060192, F3H180106, and F3K210372, no MS/MSDs were performed.
- For SDG F3F260187, the laboratory performed MS/MSD on the field blank sample; MS/MSD should never be performed on field blank samples, as they offer no information on matrix effects of the actual field samples.
- For SDGs F3H220246 F3H270230, F3J240204, and F4A130259, the laboratory performed MS/MSDs on the equipment blank samples; MS/MSD should never be performed on equipment blank samples, as they offer virtually no information on matrix effects of the actual field samples.

Of the 1,123 samples submitted to the laboratory, 82 of them were also analyzed for MS/MSD. This represented a rate of 7.2 percent which exceeds the QAPP's minimum required rate of 5 percent.

3.2.13. Matrix Duplicate Analyses

One matrix duplicate (MD) sample was analyzed by the laboratory. The MD sample was analyzed in conjunction with the MS sample in place of the MS/MSD pair (see Section 3.2.12). The objective of the duplicate sample analysis is to demonstrate acceptable method precision by the laboratory at the time of analysis. An evaluation of the precision of the laboratory analysis procedure was made based on RPDs calculated for the original and duplicate sample results. Calculations were made only when both results were above the laboratory reporting limits. All MD RPDs were within the criterion of ≤ 20% - no qualifications were required.

3.2.14. Field Duplicate Analyses

Seventy-four project samples were submitted as blind field duplicates. This represents 95 duplicate data points. By design, the laboratory was never made aware of which field samples the blind field duplicates were associated with. An evaluation of the precision of the field sampling procedure (as well as the laboratory analysis procedure) was made based on RPD calculated for the original and duplicate sample results. Blind field duplicate samples were collected and analyzed to assess the overall sampling and analytical precision. Evaluation calculations were made only when both results were above the laboratory reporting limits. The RPD values for most duplicates were within the criterion of ≤ 30%.

- For SDG F3G290207, the RPD for the duplicate set (P-42-329.8 and P-42-DUP-2) was 83.6%. Since the sample results were less than 5 times
- (5X) the laboratory's reporting limit, no qualification actions are taken, per the *National Functional Guidelines for Inorganic Data Review*. However, even though the associated batch samples are not qualified, the duplicate pair itself was qualified based on professional judgment.

- For SDG F3I050189, the RPD for the duplicate set (P-46-409.34 and P-46-DUP-3) was 42.8%. Since the sample results were less than 5X the laboratory's reporting limit, no qualification actions are taken, per the *National Functional Guidelines for Inorganic Data Review*. However, even though the associated batch samples are not qualified, the duplicate pair itself was qualified based on professional judgment.

- For SDG F3J290103, the RPD for the duplicate set (P-49-340.8 and P-49-DUP-2) was 38.6%. Since the sample results were less than 5X the laboratory's reporting limit, no qualification actions are taken, per the *National Functional Guidelines for Inorganic Data Review*. However, even though the associated batch samples are not qualified, the duplicate pair itself was qualified based on professional judgment.

- For SDG F3K140242, the RPD for the duplicate set (P-52-364.2 and P-52-DUP-2) for total nickel was 61.3%. Since the sample results were less than 5X the laboratory's reporting limit, no qualification actions are taken, per the *National Functional Guidelines for Inorganic Data Review*. However, even though the associated batch samples are not qualified, the duplicate pair itself was qualified based on professional judgment.

- For SDG F3L120339, the RPD for the duplicate set (P-33-304.6 and P-33-DUP-2) for total nickel was 83.7%. Since the sample results were less than 5X the laboratory's reporting limit, no qualification actions are taken, per the *National Functional Guidelines for Inorganic Data Review*. However, even though the associated batch samples are not qualified, the duplicate pair itself was qualified based on professional judgment.

- For SDG F4B170134, the RPD for the duplicate set (P-32-359.25 and P-32-DUP-2) for dissolved nickel was 53.0%. Since the sample results were less than 5X the laboratory's reporting limit, no qualification actions are taken, per the *National Functional Guidelines for Inorganic Data Review*. However, even though the associated batch samples are not qualified, the duplicate pair itself was qualified based on professional judgment.

- For SDG F4B200226, the RPD for the duplicate set (P-32-488.9 and P-32-DUP-3) for total nickel was 35.1%. Since the sample results were less than 5X the laboratory's reporting limit, no qualification actions are taken, per the *National Functional Guidelines for Inorganic Data Review*. However, even though the associated batch samples are not qualified, the duplicate pair itself was qualified based on professional judgment.

It should be noted that QAPP requirements (GTEOSI, 2002) specified that a field duplicate sample be collected at a rate of one sample for every ten samples (collection rate of 10%). One-hundred-twenty-six (126) field duplicates data points were required to be collected for the project since a total of 1,255[13] project samples were submitted (not including other field QC samples collected) for analysis. The actual collection rate performed was equivalent to 7.6 percent[14]. Since an adequate number of field duplicate samples were not collected, the precision objective for the project was not in compliance. Table 3-3 shows the evaluation of field duplicate samples submitted.

Table 3-3. *Evaluation of Field Duplicate Samples*

Package Identification	***Sample ID***	***Analytes***	***Action***
F3C190235	MW-3		None
F3E090278	P-27-99.75		None
F3F030298	P-15-218.00		None
	P-D-217.1		None
F3F050171	P-D-321.95		None
F3F120220	P-C-99.6		None
F3F170126	P-C-320.3		None
F3F200145	P-24-167.3		None
	P-24-287.3		None
F3F260187	P-23-180.1		None
F3G030162	P-23A-347.6		None
F3G110256	P-25-179.7		None
	P-35-177.2		None
F3G150156	P-25-275.8		None
	P-35-332.2		None
F3G250374	P-H-126.8		None
	P-42-202.7		None
	P-H-206.55		None

[13] This number represents 1,350 (non-field blank/equipment blank) total data points minus 95 duplicate sample data points.
[14] Value = (95 duplicate data / 1,255 discrete sample data) X 100.

Table 3-3. *Evaluation of Field Duplicate Samples*

Package Identification	*Sample ID*	*Analytes*	*Action*
F3G290207	P-42-329.8 P-42-DUP-2	Nickel	"J" (RPD > 30%)
F3H060192	P-45-81.25		None
F3H080219	P-20-169.60		None
F3H130195	P-20-427.99		None
F3H180106	P-45-366.39		None
F3H220246	P-36-15.7		None
	P-46-139.60		None
F3H270230	P-46-275.42		None
	P-37-304.8		None
F3I040177	P-44-99.3		None
F3I050189	P-46-409.34 P-46-DUP-3	Nickel	"J" (RPD > 30%)
F3I090305	P-44-239.85		None
	P-44-339.8		None
	P-47-163.9		None
	P-47-187.0		None
F3I120107	P-43-119.88		None
	P-47-317.0		None
F3I180259	P-29-109.5		None
	P-38-116.7		None
F3I230231	P29-329.85		None
	P-38-322.9		None
	P-43-246.68		None
F3I250196	P-38-381.3		None
F3J030259	P-30-204.55	Nickel Dissolved	None
	P-30-204.55	Nickel Total	None
F3J070236	P-30A-298.6	Nickel Dissolved	None
	P-30A-298.6	Nickel Total	None
	P-18-156.65	Nickel Dissolved	None
	P-18-156.65	Nickel Total	None
F3J110172	P-30A-406.55	Nickel Dissolved	None
	P-30A-406.55	Nickel Total	None
	P-18-247.65	Nickel Dissolved	None
	P-18-247.65	Nickel Total	None

Table 3-3. *Evaluation of Field Duplicate Samples*

Package Identification	*Sample ID*	*Analytes*	*Action*
F3J240204	P-50-129.90	Nickel Dissolved	None
	P-49-167.3	Nickel Dissolved	None
	P-51-97.78	Nickel Dissolved	None
F3J290103	P-50-342.60	Nickel Total	None
	P-50-342.60	Nickel Dissolved	None
	P-49-340.8 P-49-DUP-2	Nickel Dissolved	"J" (RPD > 30%)
	P-51-246.75	Nickel Dissolved	None
F3K080109	P-54-137.55	Nickel Total	None
	P-54-137.55	Nickel Dissolved	None
	P-52-170.0	Nickel Total	None
	P-52-170.0	Nickel Dissolved	None
	P-58-159.65	Nickel Dissolved	None
F3K110173	P-58-274.65	Nickel Total	None
	P-58-274.65	Nickel Dissolved	None
	P-54-267.95	Nickel Dissolved	None
F3K140242	P-54-351.25	Nickel Total	None
	P-52-364.2 P-52-DUP-2	Nickel Total	"J" (RPD > 30%)
	P-52-364.2	Nickel Dissolved	None
F3K280120	P-53-146.40	Nickel Total	None
	P-53-146.40	Nickel Dissolved	None
	P-53-266.35	Nickel Dissolved	None
	P-34-139.55	Nickel Total	None
	P-34-139.55	Nickel Dissolved	None
	P-34-244.55	Nickel Total	None
	P-34-244.55	Nickel Dissolved	None
F3L090146	P-33-169.6 P-33-DUP-1	Nickel Dissolved	"J" (RPD > 30%)
F3L120339	P-33-304.6 P-33-DUP-2	Nickel Total	"J" (RPD > 30%)
	P-33-304.6	Nickel Dissolved	None
F4A130259	P-31-190.40	Nickel Dissolved	None
	P-55-154.55	Nickel Dissolved	None
F4B150320	P-31-284.25	Nickel Dissolved	None
F4A230292	P-56-86.55	Nickel Total	None
	P-56-86.55	Nickel Dissolved	None

Table 3-3. *Evaluation of Field Duplicate Samples*

Package Identification	*Sample ID*	*Analytes*	*Action*
F4A300327	P-55-311.95	Nickel Total	None
	P-55-311.95	Nickel Dissolved	None
F4B130279	P-32-174.35	Nickel Dissolved	None
F4B170134	P-32-359.25	Nickel Dissolved	"J" (RPD > 30%)
F4B200226	P-32-488.9	Nickel Total	"J" (RPD > 30%)
	P-32-488.9	Nickel Dissolved	None

3.2.15. Field Blanks and Equipment Blanks

A total of 9 field blanks and 40 equipment blank data points were performed as part of the samples submitted for this data validation report. Although this limited number of blanks was in compliance with the QAPP, it was slightly insufficient to fully evaluate field contaminations (false positives). A more appropriate frequency of blank collections should have been at a 5 percent rate or each time the sampling equipment was cleaned. Based on the 5 percent rate, 63[15] field blanks and/or equipment blank data points should been performed. The actual rate performed is 3.9 percent[16].

If an analyte was detected in the field blank or equipment blank, the associated field sample results were revised to non-detect if they were less than 10 times the blank result (when blank result > PQL), or to non-detect at the PQL value (when blank result < PQL). A summary of the samples and analytes that were revised due to field sampling contamination are presented in Table 3-4.

Table 3-4. *Evaluation of Field Blank and Equipment Blank Results*

Package Identification	*Sample ID*	*Analyte*	*Action*
F3F260187	P-23-80.1* P-23-90.1* P-23-100.1* P-23-110.1* P-23-130.1* P-23-140.1* P-23-150.1* P-23-170.1* P-23-180.1* P-23-DUP-1*	Nickel	Revised to "U" (non-detect)

[15] Value = (1,350 (non-field blank/equipment blank) total data points minus 95 duplicate sample data points) X 0.05.
[16] Value = 49 / (1,350 (non-field blank/equipment blank) total data points minus 95 duplicate sample data points) X 100.

Table 3-4. *Evaluation of Field Blank and Equipment Blank Results*

Package Identification	*Sample ID*	*Analyte*	*Action*
F3G110256	P-25-79.7* P-25-89.7* P-25-99.1* P-25-139.7* P-25-149.7* P-25-159.7* P-25-169.7* P-25-179.7* P-25-189.7* P-25-199.7* P-25-209.7* P-25-219.7* P-25-DUP-1* P-35-77.2* P-35-87.2* P-35-137.2* P-35-147.2* P-35-157.2* P-35-167.2* P-35-177.2* P-35-DUP-1*	Nickel	Revised to "U" (non-detect)
F3G030162	P-23A-DUP.1* P-23A-347.6*	Nickel	Revised to "U" (non-detect)
F3G230216	P-H-76.8* P-H-86.8* P-H-106.8* P-H-116.8*	Nickel	Revised to "U" (non-detect)
F3G250374	P-H-126.8* P-H-DUP1* P-H-136.8* P-H-146.8* P-H-156.8* P-H-166.8* P-H-176.8* P-H-186.8* P-42-189.6* P-42-197.7* P-42-202.7* P-42-DUP-1* P-42-99.6* P-42-109.6* P-42-139.6* P-42-149.6* P-42-159.6* P-42-169.4*	Nickel	Revised to "U" (non-detect)
F3G290207	P-H-226.55*	Nickel	Revised to "U" (non-detect)
F3H130195	P-20-359.60* P-20-379.60* P-20-369.60*	Nickel	Revised to "U" (non-detect)

Table 3-4. *Evaluation of Field Blank and Equipment Blank Results*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3H210288	P-36-76.7 P-36-86.7 P-36-96.7 P-36-106.7 P-36-116.7 P-36-126.7 P-36-136.7 P-46-79.60 P-46-89.60 P-46-99.60 P-46-109.60 P-46-119.60 P-46-129.60 P-37-79.3 P-37-89.95 P-37-99.95 P-37-109.95 P-37-119.95 P-37-129.95 P-37-139.95 P-37-149.95 P-37-DUP 1	Nickel	Revised to "U" (non-detect)
F3H220246	P-36-146.7 P-36-186.7 P-36-206.7 P-37-159.95 P-37-179.95 P-37-189.95	Nickel	Revised to "U" (non-detect)
F3H270230	P-36A-266.8 P-36A-282.0 P-36-236.7 P-36A-371.75 P-36A-328.4 P-37-314.8	Nickel	Revised to "U" (non-detect)
F3I230231	P-29-278.4* P-29-289.85* P-29-299.85* P-29-310.2* P-29-318.9* P-29-329.85* P-29-DUP-2* P-29-339.5* P-29-360.0* P-29-369.2* P-38-166.3* P-38-176.3* P-38-186.3* P-38-216.3* P-38-226.3* P-38-312.9* P-38-322.9* P-38-DUP-2* P-38-332.3* P-38-341.1* P-43-264.85* P-43-274.85* P-43-284.85* P-43-294.85 P-43-304.85	Nickel	Revised to "U" (non-detect)

Table 3-4. *Evaluation of Field Blank and Equipment Blank Results*

Package Identification	*Sample ID*	*Analyte*	*Action*
F3J070236	P-18-76.65* P-18-86.65* P-18-96.65* P-18-106.65* P-18-116.65* P-18-126.65* P-18-136.65* P-18-146.65* P-18-156.65* P-18-DUP-1* P-18-166.65* P-18-176.65* P-18-186.65*	Nickel Dissolved	Revised to "U" (non-detect)
	P-18-76.65* P-18-96.65* P-18-106.65* P-18-126.65* P-18-136.65* P-18-156.65* P-18-DUP-1* P-18-186.65*	Nickel Total	Revised to "U" (non-detect)
F3K080109	P-54-117.55 * P-54-127.55 * P-54-137.55 * P-54-DUP-1 * P-54-147.55 * P-54-155.75 * P-54-165.85 * P-52-80.0 * P-52-90.0 * P-52-100.0 * P-52-130.0 * P-52-140.0 * P-58-79.65 *	Nickel Total	Revised to "U" (non-detect)
	P-54-97.55 P-54-127.55 P-54-137.55 P-54-155.75 P-54-165.85 P-52-80.0 * P-52-90.0 * P-52-100.0 * P-52-110.0 * P-52-120.0 * P-52-130.0 * P-52-140.0 * P-58-79.65 * P-58-89.65 * P-58-99.65 * P-58-109.65 * P-58-119.65 * P-58-189.65 *	Nickel Dissolved	Revised to "U" (non-detect)
F3K210372	P-53-86.40 P-53-76.40	Nickel Total	Revised to "U" (non-detect)

Table 3-4. *Evaluation of Field Blank and Equipment Blank Results*

Package Identification	***Sample ID***	***Analyte***	***Action***
F3K210372 Cont'd	P-52-404.45* P-52-483.38* P-54-421.00* P-54-431.00* P-54-437.05* P-53-86.40* P-53-76.40*	Nickel Dissolved	Revised to "U" (non-detect)
F3K280120	P-53-96.40 P-53-106.40 P-53-116.40 P-53-146.40 P-53-DUP-1 P-53-165.70 P-53-188.85 P-53-212.60 P-34-79.55 P-34-89.55 P-34-99.55 P-34-129.55 P-34-139.55 P-34-DUP-1 P-34-164.55 P-34-154.55 P-34-184.55 P-34-194.55 P-34-204.55 P-34-214.55 P-34-224.55 P-34-234.55 P-34-244.55 P-34-DUP-2 P-34-254.55 P-34-264.55 P-34-304.50 P-53-340.05	Nickel Total	Revised to "U" (non-detect)
F4A130259	P-55-94.55* P-55-114.55* P-55-144.55*	Nickel Total	Revised to "U" (non-detect)
	P-31-79.25* P-31-89.25* P-31-111.67* P-31-124.25* P-31-134.25* P-31-190.40* P-31-DUP-1* P-31-223.75* P-31-233.11* P-31-263.70* P-55-94.55* P-55-104.55* P-55-114.55* P-55-DUP-1* P-55-124.55* P-55-134.55* P-55-144.55* P-55-154.55* P-55-164.55*	Nickel Dissolved	Revised to "U" (non-detect)
F4A230292	P-31-404.25* P-56-116.55*	Nickel Total	Revised to "U" (non-detect)

Table 3-4. *Evaluation of Field Blank and Equipment Blank Results*

Package Identification	*Sample ID*	*Analyte*	*Action*
F4A230292 Cont'd	P-31-404.25* P-56-96.55* P-56-106.55* P-56-116.55* P-56-126.55* P-56-146.55* P-56-156.55* P-56-186.55* P-56-194.40* P-31-414.25*	Nickel Dissolved	Revised to "U" (non-detect)
F4A300327	P-55-311.95* P-55-DUP-2* P-55-334.55* P-55-340.35* P-56-388.60*	Nickel Total	Revised to "U" (non-detect)
	P-55-304.45* P-55-311.95* P-55-DUP-2* P-55-334.55* P-55-340.35* P-55-374.35* P-56-388.60* P-56-211.45* P-56-221.45* P-56-241.45* P-56-251.45* P-56-316.45*	Nickel Dissolved	Revised to "U" (non-detect)

* - Also qualified due to other types of blank contamination

3.2.16. Quantitation of Results

The laboratory reporting limits for the metals were in accordance with the NYSDEC requirements (i.e., reporting at the Practical Quantitation Limits specified in the QAPP). The laboratory reported estimated data below the laboratory reporting limit but above the laboratory MDL, and qualified the estimated data with a "B" qualifier. The validation process revised the "B" qualifier to a "J" qualifier to provide consistency for others in review of the validated database.

3.2.17. Electronic Data Deliverables

The results in electronic database, for most samples, matched results listed on the hardcopy analytical report including laboratory qualifiers. Since the electronic deliverables were received in Microsoft Access database formats and were subsequently transferred to Microsoft Excel spreadsheet tables for presentation, it was not determined where the error was. However, all discrepancies have been corrected for the data tables in the Groundwater Investigation Report and the Access database. The qualifiers and results were revised based on quality control issues, and foundation for changes are listed in previous sections of this DUSR. The qualifiers were also placed onto the hardcopy reporting forms located near the beginning of each deliverable package (i.e., SDG package).

4. Summary and Data Usability

This chapter summarizes the analytical data in terms of its completeness and usability. Data completeness is defined as the percentage of sample results that have been determined to be usable during the data validation process. Overall, 99.7 percent[17] of the metal data were determined to be usable. However, those sample results qualified as estimated, "J" and "UJ," due to data validation QC exceedances should be considered conditionally usable for qualitative and quantitative purposes.

The samples collected from the Site in Hicksville, New York were evaluated based on QA/QC criteria established by methods as listed in Section 1.3, in the data validation guidelines listed in Section 1.2, in the QAPP (GTEOSI, 2002) established for this project, and by professional judgment. Major deficiencies in the data generation process have resulted in the rejection of four hexavalent chromium data points, indicating that the data are considered unusable for either quantitative or qualitative purposes. Minor deficiencies in the data generation process resulted in some sample data being characterized as approximate or estimated. Identification of a data point as approximate indicates uncertainty in the reported concentration of the analyte, but not its assigned identity.

The following paragraphs present the adherence of the data to the precision, accuracy, representativeness, comparability, completeness, and sensitivity (PSARCC) parameters. Completeness has been discussed above.

Precision is measured through the evaluation of field duplicate samples and laboratory duplicate samples. For the metals analyses, none of the data were rejected due to precision non-conformances. However, the frequency of duplicate sample collection was insufficient, and therefore, evaluation of this criteria may not be adequate.

LCS, MS, and MSD recoveries indicate the accuracy of the data. For the metals analyses, none of the data were rejected due to accuracy non-conformances.

Holding times, sample preservation, blank analysis, and analyte quantification are indicators of the representativeness of the analytical data. Four of the hexavalent chromium data were rejected due to representativeness non-conformances.

Comparability is not compromised, provided that the analytical methods do not change over time. A major component of comparability is the use of standard reference materials for calibration and QC. These standards are compared to other unknowns to verify their concentrations. Since standard analytical methods and reporting procedures were consistently used by the laboratory, the comparability criteria for the analytical data were met.

Sensitivity is established by reported detection limits that represent measurable concentrations of analytes that can be determined with a designated level of confidence. None of the metals data were rejected due to sensitivity non-conformances.

[17] Value = ((1,399 all data points – 4 unusable data points) / 1,399 all data points) X 100.

5. Data Usability Summary Report Summary Information

The DUSR was performed to determine whether or not the data meets Site-specific criteria for data quality and use. The DUSR is developed by reviewing and evaluating the analytical data package. The following questions were addressed:

1. *Is the data package complete as defined under the requirements for the NYSDEC ASP Category B or USEPA CLP deliverables?*

   The QAPP required that USEPA Level III deliverables be provided by the laboratory for each data package. This requirement was met with the exception of some missing forms as discussed in Sections 3.2.1 and 3.2.5. The evaluation of the sample data was completed using the information provided in the data packages provided by the laboratory.

2. *Have all holding times been met?*

   The holding times were met for all with the exception of four analyses for hexavalent chromium. These results were qualified as unusable.

3. *Do all the QC data: blanks, standards, spike recoveries, replicate analyses, and sample data fall within the protocol-required limits and specifications?*

   The laboratory used laboratory control limits. QA/QC deviations and qualifications performed on the sample data are discussed in Chapter 3. With the exception of holding-time for four hexavalent chromium samples, major non-conformances were not detected for the data. However, the low frequency of replicate (duplicate) analyses was not in compliance with the QAPP.

4. *Have all of the data been generated using established and agreed upon analytical protocols?*

   The QAPP required that USEPA guidance methods be used in the analysis of the samples. The laboratory used the required method protocols for the analyses performed for this sampling event, which met data user and client needs.

5. *Does an evaluation of the raw data confirm the results provided in the data summary sheets and quality control verification forms?*

   The evaluation of selected raw data confirmed all information provided in the data packages with the exception of some minor discrepancies as discussed in Section 3.2.5. These discrepancies were corrected.

6. *Have the correct data qualifiers been used?*

   The laboratory applied the correct qualifiers to the sample data. The laboratory qualifiers were revised and/or new qualifiers applied as required by the validation guidelines listed in Section 1. The validation guideline qualifier definitions are listed in Section 2.2.

References

New York State Department of Environmental Conservation. *Analytical Services Protocol.* Guidance documents including Exhibits A, B, C, D, E, F, G, and I. June 2000.

United States Environmental Protection Agency. *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* 540-R-01-008. July 2002.

United States Environmental Protection Agency. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* SW-846: Final Update IIIA. April 1998.

URS Corporation. *GTE Operations Support Incorporated - Groundwater Investigation Work Plan, Former Sylvania Electric Products Incorporated Facility, Hicksville, New York.* QAPP: Appendix C. September 2002.

MALCOLM PIRNIE

Appendix F F

Appendix F
Well Completion Records

County Nassau

W-1951
N-6947D

ORIGINAL--TO COMMISSION

State of New York
Department of Conservation
Division of Water Power and Control

COMPLETION REPORT—LONG ISLAND WELL

Well No. N-6860 (on preliminary report)

LOG

Ground Surf., El.....ft. above sea

^
v .....ft. 9' G/S
Top of Well

Owner Edgecombe Const. Cor. (Formerly Jerry Spiegel Assocs.

Address 270 No. Broadway, Hicksville, N. Y.

Location of well n/e cor. Cantiague Rock Rd. & N. John St., Hicksville, N.Y.

Depth of well below surface 96'-4" feet

Depth to ground water from surface 57 feet

CASINGS:

Diameter	8 in.	in.	in.	in.
Length	86'-4" ft.	ft.	ft.	ft.
Sealing				
Casings removed				

SCREENS: Make Cook Co. Openings 30 slot

Diameter	8 in.	in.	in.	in.
Length	10 ft.	ft.	ft.	ft.
Depth to top from top of casing	86'-4" ft.			

PUMPING TEST: Date Apr. 4, 1960 Test or ~~permanent~~ pump?

Duration of Test ..... days 3 hours

Maximum Discharge 150 gallons per minute

Static level prior to test 57 ft. 0 in. below top of casing

Level during Max. Pumping 72 ft. 0 in. below top of casing

Maximum Drawdown 15 ft.

Approx. time of return to normal level after cessation of pumping not known hours ..... utes

PUMP INSTALLED: Not installed

Type S.C. Make Deming Model No. 6730-66

Motive power elec Make Deming H.P. 15

Capacity 150 g.p.m. against 135 ft. of discharge head

No. bowls or stages 3 210 ft. of total head

DROP LINE: Diameter 4 in. Length 80 ft.

SUCTION LINE: Diameter ..... in. Length ..... ft.

Use of water air conditioning

Work started Mar. 28, 1960 Completed Apr. 4, 1960

Date July 9, 1960 Driller Eastern Well & Equip. Co. Inc.

License No. 251

NOTE: Show log of well—materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job.

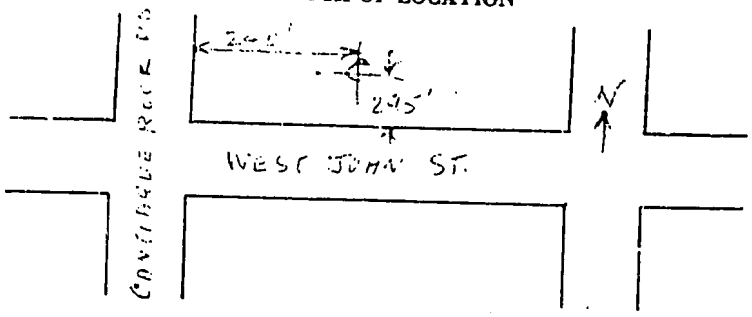
See Instructions as to Well Drillers' Licenses and Reports—pp. 5-7.

Loam and clay	3'
Clayey brown sand	5'
Clean coarse sand. Lots grits and gravel	10'
Med. to fine sand. Few grits and gravel	15'
Clean coarse sand. Lots grits and gravel	46'
Clean sharp med. to coarse sand. Lots grits & gravel	95'
Clean sharp med. sand. Lots grits and gravel	96'-6"

6/29/61 Information from Driller

STATE OF NEW YORK
WATER RESOURCES
JUL 11 1960
COMMISSION
RECEIVED

SKETCH OF LOCATION



Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.

Show North Point

County. Nassau

ORIGINAL—TO COMMISSION

Well No. N-6960 (on preliminary report)

State of New York
Department of Conservation
Division of Water Power and Control

LOG

Ground Surf., El. .....ft. above sea

COMPLETION REPORT—LONG ISLAND WELL

.....ft.
V 0' G/S
Top of Well

Owner .. Jerry Spiegel Associates Edgcombe Construction Corporation

Address 270 North Broadway, Hicksville, N. Y.

Location of well n/e cor. Cantiague Rock Rd. & John St., Hicksville, N.Y.

Depth of well below surface 96'-4" feet

Depth to ground water from surface 57' feet

CASINGS:

Diameter	8 in.	..... in.	..... in.	..... in.
Length	86'-4" ft.	..... ft.	..... ft.	..... ft.
Sealing				
Casings removed				

SCREENS: Make Cook Co. Openings 30 slot

Diameter	8 in.	..... in.	..... in.	..... in.
Length	10 ft.	..... ft.	..... ft.	..... ft.
Depth to top from top of casing	86'-4" ft.			

PUMPING TEST: Date April 4, 1960 Test or ~~permanent~~ pump?

Duration of Test ..... days 3 hours

Maximum Discharge 150 gallons per minute

Static level prior to test 57 ft. 0 in. below top of casing

Level during Max. Pumping 72 ft. 0 in. below top of casing

Maximum Drawdown 15 S/C 10 gal. ft.

Approx. time of return to normal level after cessation of pumping not known hours minutes

PUMP INSTALLED: Not installed

Type ..... Make ..... Model No. .....

Motive power ..... Make ..... H.P. .....

Capacity ..... g.p.m. against } ..... ft. of discharge head

No. bowls or stages ..... } ..... ft. of total head

STATE WATER RESOURCES JUL 7 1960 CONSERVATION

DROP LINE: SUCTION LINE:

Diameter ..... in. ..... in.

Length ..... ft. ..... ft.

Use of water air conditioning

Work started Mar. 28, 1960 Completed April 4, 1960

Date July 6, 1960 Driller Eastern Well - Equip. Co. Inc.

License No. 251

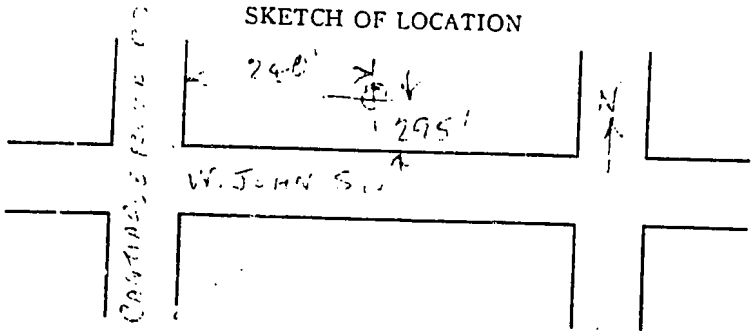
NOTE: Show log of well—materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job.

See Instructions as to Well Drillers' Licenses and Reports—pp. 5-7.

Loam and clay	3'
Clayey brown sand	5'
Clean coarse sand. Lots grits and gravel	10'
Med. to fine sand. Few grits and gravel	15'
Clean coarse sand. Lots grits and gravel	46'
Clean sharp Med. to coarse sand Lots grits. xxxxxxxxx	95'
Clean sharp medium sand. Lots grits	96'-6"

1514M

SKETCH OF LOCATION



Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.

Show North Point

County Nassau

ORIGINAL—TO COMMISSION

Replaced by N-9541

State of New York
Department of Conservation
Division of Water Power and Control

W-1671
RECHARGE BASIN (DISCUSSED)

Well No. N-6202 (on preliminary report)

LOG
Ground Surf., El.....ft. above sea
.....ft.
Top of Well

COMPLETION REPORT—LONG ISLAND WELL

PRD Electronics -

Owner Servomechanisms, Inc.

Address John St., New Cassel, L.I., N.Y.

Location of well same

Depth of well below surface 265' feet

Depth to ground water from surface 61' feet

Log on reverse side

Pump in 6' deep pit

CASINGS:

Diameter 8 in. ..... in. ..... in. ..... in.
Length 231 ft. ..... ft. ..... ft. ..... ft.
Sealing Welded joints
Casings removed

SCREENS: Make Johnson, Silicon RB Openings #30 slot
Diameter 5 in. Riser 4" in. ..... in. ..... in.
Length 28 ft. 30 ft. ..... ft. ..... ft.
Depth to top from top of casing 231 ft.

PUMPING TEST: Date 6-13-57 Test or permanent pump? Test
Duration of Test ..... days 4 hours
Maximum Discharge 210 gallons per minute
Static level prior to test 61 ft. ..... in. below top of casing
Level during Max. Pumping 73 ft. ..... in. below top of casing
Maximum Drawdown 12' ft.
Approx. time of return to normal level after cessation of pumping ..... hours ..... minutes
Water temp. 51°

PUMP INSTALLED:
Type DWT Make Johnston U.S. Pumps Model No. 8-DWT
Motive power El. Make U.S. Motors H.P. 15
Capacity 200 g.p.m. against 125 ft. of discharge head
No. bowls or stages 9 195 ft. of total head

DROP LINE: SUCTION LINE:
Diameter 5 in. 5 in.
Length 71 ft. 10 ft.

Use of water Cooling (A.C.)
Work started 5-28-57 Completed 11-15-57

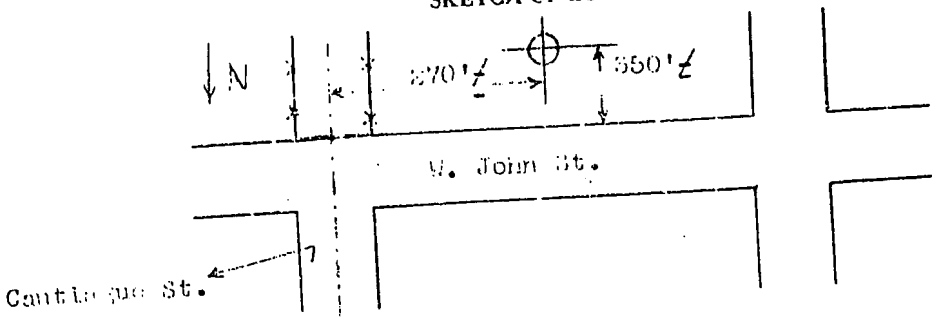
Date 1-2-58 Driller C.W. LAUMAN & CO., INC.
License No. 13

NOTE: Show log of well—materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job.

See Instructions as to Well Drillers' Licenses and Reports—pp. 5-7.

STATE OF NEW YORK
WATER POWER AND
JAN 7 - 1958
CONTROL COMMISSION
RECEIVED

SKETCH OF LOCATION



Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.

Show North Point

LOG

0-3'	Loam
3'-63'	Coarse brown sand, grits, gravel
63'-95'	Medium brown sand, some grits
95'-104'	Layers of fine br. sand and sandy clay
104'-115'	Fine br. sand, mica, some clay
115'-119'	Layers of fine gray sand and sandy clay
119'-124'	Fine multi-colored sandy clay, streaks of clay
124'-144'	Fine br. sand, streaks of clay
144'-149'	Fine multi-colored sandy clay
149'-155'	Very fine br. sand, streaks of sandy clay
155'-159'	Fine br. sand, some clay
159'-164'	Fine br. sand, streaks of sandy clay
164'-169'	Very fine br. sand, some clay, streaks of sandy clay
169'-175'	Fine br. sandy clay, mica
175'-179'	Fine br. sandy clay, streaks of clay
179'-199'	Fine br. sandy, mica, streaks of sandy clay
199'-210	Very fine br. sand, some clay, mica
210'-215'	Layers of gray clay and sandy clay
215'-219'	Fine br. sand, some clay
219'-235'	Layers of fine br. sand, some clay
235'-259'	Fine multi-colored sand, some clay
259'-264'	Fine brown sand
264'-----	Fine multi-colored sandy clay

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

NASSAU County

N-9341 Well No.

COMPLETION REPORT – LONG ISLAND WELL

OWNER	PRD Division – Harris Corp.
ADDRESS	6801 Jericho Tpke., Syosset 11791
LOCATION OF WELL	West John St. Westbury
DEPTH OF WELL BELOW SURFACE	264 ft.
DEPTH TO GROUND WATER FROM SURFACE	59 ft.

CASINGS

DIAMETER	8 in.	in.	in.	in.
LENGTH	235 ft.	ft.	ft.	ft.

SEALING	Threaded Joint
CASINGS REMOVED	

SCREENS

MAKE	Johnson Div. – UOP	OPENINGS	#30	
DIAMETER	8 in.	in.	in.	in.
LENGTH	29 ft.	ft.	ft.	ft.

DEPTH TO TOP FROM TOP OF CASING: 235'

PUMPING TEST

DATE	7/28/78
TEST OR PERMANENT PUMP?	Perm
DURATION OF TEST	days 4 hours
MAXIMUM DISCHARGE	200 gallons per min.
STATIC LEVEL PRIOR TO TEST	59 ft. in. below top of casing
LEVEL DURING MAXIMUM PUMPING	66 ft. in. below top of casing
MAXIMUM DRAWDOWN	7 ft.
Approximate time of return to normal level after cessation of pumping	2 hrs. min.

PUMP INSTALLED

TYPE: DWT	MAKE: U.S.	MODEL NO.: 8 DML
MOTIVE POWER: Electric	MAKE: U.S.	H.P.: 15

CAPACITY	200 g.p.m. against 125 ft. of discharge head
NUMBER BOWLS OR STAGES	9 125 ft. of total head

DROP LINE	SUCTION LINE
DIAMETER: 5" in.	DIAMETER: in.
LENGTH: 70' ft.	LENGTH: ft.

METHOD OF DRILLING	[X] rotary [ ] cable tool [ ] other
USE OF WATER	Cooling
WORK STARTED	6/27/78
COMPLETED	7/28/78
DATE	11/13/81
DRILLER	R. H. Lauman Associates, Inc.
REGISTRATION NO.	13

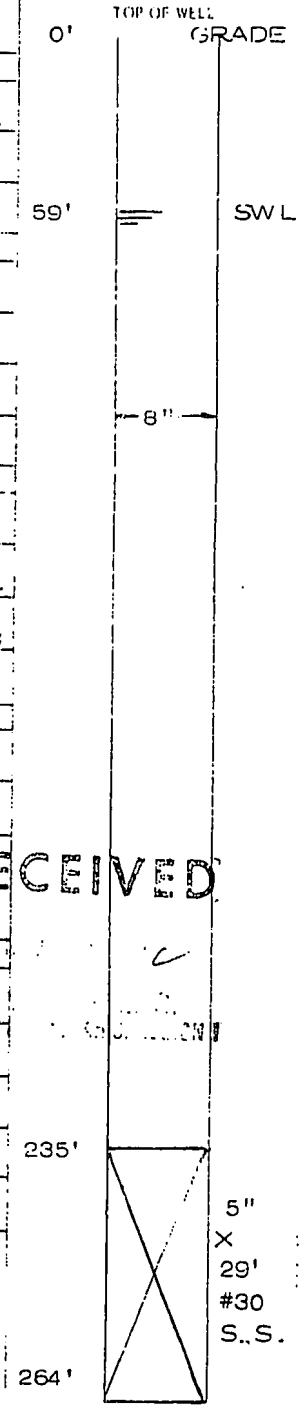
*NOTE: Show log of well - materials encountered, with depth below ground surface, water bearing beds and water levels in each, casings, screens, pump, additional pumping tests and other matters of interest. Describe repair job. See Instructions as to Well Drillers' Certificates of Registration and Reports, Pages 5 - 7.

* LOG

Ground Surface

Ft. _____ ft. above sea

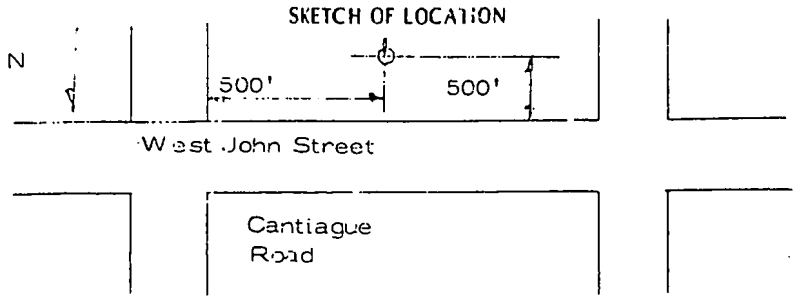
_____ ft.



RECEIVED

DUPLICATE – Retain Ion Copy

SKETCH OF LOCATION



Locate well with respect to at least two streets or roads, showing distance from corner and front of lot.

Show North Point

Check the Town in which the project is located:

Nassau County:

- ☒ Hempstead
- ☐ North Hempstead
- ☐ Oyster Bay

Suffolk County:

- ☐ Babylon
- ☐ Brookhaven
- ☐ East Hampton
- ☐ Huntington
- ☐ Islip
- ☐ Riverhead
- ☐ Shelter Island
- ☐ Smithtown
- ☐ Southampton
- ☐ Southold

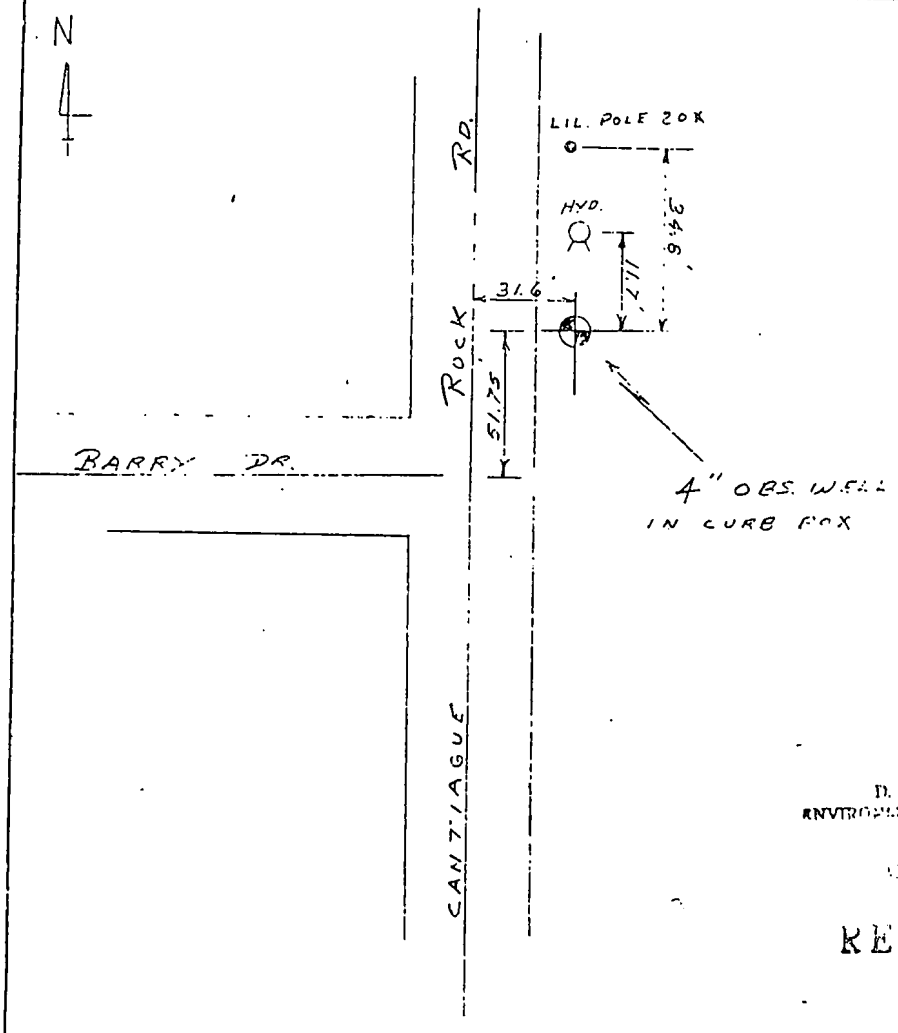
DRILLER'S LOG:

0' - 3'	Loam
3' - 63'	Coarse Brown Sand, Grits, Gravel
63' - 95'	Medium Brown Sand, Some Grit
95' - 104'	Layers Fine Brown Sand And Sandy Clay
104' - 115'	Fine Brown Sand, MICA And Some Clay
115' - 119'	Layers Fine Gray Sand And Sandy Clay
119' - 124'	Fine Multi-Colored Sandy Clay, Streaks of Solid Clay
124' - 144'	Fine Brown Sand, Streaks of Sandy And Solid Clay
144' - 149'	Fine Multi-Colored Sandy Clay
149' - 204'	Fine Brown Sand With Streaks of Sandy Clay, Some MICA

STOP

DEPARTMENT OF PUBLIC WORKS
Division of Sanitation & Water Supply
Nassau County, New York

NASSAU COUNTY WELL NO: O-9 LOCATION: HICKSVILLE
N.Y. STATE NO: N 1195 RE INSTALLED: 8-18-76
TOTAL DEPTH: 115.35' MEAS. POINT: TOP OF COUPLING
DIAMETER: 4" Dia. ELEV. MEAS. PT: 148.30'
DEPTH TO WATER: 63.70' (8/18/76) DRILLER: H. ULSHAFER



D. P. W. DIVISION 1
ENVIRONMENTAL ANALYSIS UNIT
OCT 1 1976
RECEIVED

REMARKS:
THIS WELL WAS REINSTALLED TO 4" DIA. PIPE.

Drawn By: [illegible] Date: 9/30/76
Checked By: Date:

MALCOLM PIRNIE

Appendix G G

Appendix G
PRD SPEDES Sampling

G

ENGINEERING REPORT

PRD ELECTRONICS

SPDES PERMIT NUMBER NY-010-7824

Presented to

Chief, Compliance Section
N.Y.S. Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

Presented by

WTM Management Corporation
420 Jericho Turnpike
Suite 207
Jericho, New York 11753

For

PRD Electronics
6801 Jericho Turnpike
Syosset, New York 11791

NYSDEC012872

April 26, 1982

Engineering Report

PRD Electronics

SPDES Permit Number NY-010-7824

APPROVED BY:

William T. Malloy 4-23-82

William T. Malloy
President
WTM Management Corporation

Donald J. Casey 4-23-82

Donald J. Casey
Professional Engineer
WTM Management Corporation

STATE OF NEW YORK
DONALD J. CASEY
LICENSED PROFESSIONAL ENGINEER
No. 050345

John W. Muenzen

John W. Muenzen
Facilities Service Manager
PRD Electronics

New York State Department
of Environmental Conservation

NYSDEC012873

2.2 Outfall 003

Outfall 003 receives blowdown discharge from the boiler. It empties to a sump on the plant's property. The water intake to the boiler is from a well at approximately the 265-foot level. The chilled water, hot water and steam systems are a closed loop system. No additives are introduced to the system. The piping diagrams covering the system can be found in Appendix A.

2.2 Outfall 003

Outfall 003 receives blowdown discharge from the boiler. It empties to a sump on the plant's property. The water intake to the boiler is from a well at approximately the 265-foot level. The chilled water, hot water and steam systems are a closed loop system. No additives are introduced to the system. The piping diagrams covering the system can be found in Appendix A.

Chemical	Formula
Sodium Hydroxide	NaOH
Stannic Chloride	$SnCl_4$
Stannous Fluoborate	---

A copy of the Industrial Chemical Survey Form submitted for outfall 001 can be found in Appendix B. Copies of laboratory analyses of the waste effluent in 001 can be reviewed in Appendix C. A review of this data indicates that a number of substances are being discharged at levels exceeding the SPDES standards.

3.2 Outfall 003

The 003 outfall is from a closed loop water system that has no chemicals added and receives its water from a 265-foot well. The intake and discharge water were sampled and analyzed and the results are found in Appendix C. The water is contaminated at the well and in general the levels of the contaminant at the discharge are slightly less then the levels at intake.

5.2 Outfall 003 *

WTM does not recommend that 003 be changed. Staff concludes that contaminants are not being introduced by the system, but rather from contaminated intake water from the well. This area is a known hot spot for ground water contamination.

Short Term, High Intensity Monitoring Program

Location: PRD Electronics
SPDES-NY-01070824

Sampling Conducted By: WTM Management Corporation
Sample Date: February 5, 1982
Lab Analysis Performed By: EcoTest Labs

Outfall Number	Effluent Parameters	Monitoring Rqmts. Measurement Frequency	Monitoring Rqmts. Sample Type	Sample Results (mg/l) 001 Discharge	003 Intake	003 Discharge *
001 Discharge, 003 Intake and 003 Discharge	C5-C10 Aliphatic Hydrocarbons	Once/day	Grab	<0.005	0.009	0.008
	Benzene	three consecutive days	"	<0.001	<0.001	<0.001
	Toluene		"	0.017	<0.002	<0.002
	P-xylene		"	0.39	<0.002	<0.002
	M-xylene	"	"	1.4	<0.002	<0.002
	O-xylene	"	"	0.64	0.025	0.02
	O-Dichlorobenzene	"	"	<0.01	0.010	0.032
	M-Dichlorobenzene	"	"	<0.01	<0.005	<0.005
	P-Dichlorobenzene	"	"	0.01	<0.005	<0.005
	1,1,2-Trichloro-1,2,2 Trifluoroethane	"	"	<0.001	0.02	0.055
	Methylene Chloride	"	"	0.5	<0.05	<0.05
	Trans-1,2-dichloroethene	"	"	<0.005	<0.05	<0.05
	1,1-Dichloroethane	"	"	<0.005	<0.05	<0.05
	Cis-1,2-dichloroethene	"	"	<0.005	0.11	0.25
	Chloroform	"	"	<0.001	<0.01	<0.01
	1,1,1-trichloroethane	"	"	<0.001	0.028	0.03
	Carbon Tetrachloride	"	"	<0.001	<0.01	<0.01
	1,2-Dichloroethane	"	"	<0.005	<0.05	<0.05
	Trichloroethylene	"	"	<0.001	1.7	1.7
	Dichloropropane	"	"	<0.005	<0.05	<0.05
	Bromodichloromethane	"	"	<0.001	<0.01	<0.01
	Tetrachloroethylene	"	"	<0.001	<0.43	<0.41
	Chlorodibromomethane	"	"	<0.001	<0.01	<0.01
	Bromoform	"	"	<0.001	<0.01	<0.01

Short Term, High Intensity Monitoring Program

Location: PRD Electronics
SPDES-NY-01070824

Sampling Conducted By: WTM Management Corporation
Sample Date: February 4, 1982
Lab Analysis Performed By: Ecotest Labs

Outfall Number	Effluent Parameter	Monitoring Rqmts. Measurement Frequency	Monitoring Rqmts. Sample Type	Sample Results (mg/l) 001 Discharge	003 Intake	003 Discharge
001 Discharge, 003 Intake and 003 Discharge	C5-C10 Aliphatic Hydrocarbons	Once/day	Grab	<0.05	0.01	0.008
	Benzene	three con-	"	0.005	<0.001	<0.001
	Toluene	secutive	"	0.1	<0.002	<0.002
	P-xylene	days	"	10.0	<0.002	<0.002
	M-xylene	"	"	35.0	<0.002	<0.002
	O-xylene	"	"	18.0	0.026	0.021
	O-Dichlorobenzene	"	"	0.01	0.015	0.022
	M-Dichlorobenzene	"	"	0.02	<0.005	<0.005
	P-Dichlorobenzene	"	"	0.01	<0.005	<0.005
	1,1,2-Trichloro-1,2,2 Trifluoroethane	"	"	<0.001	0.067	0.051
	Methylene Chloride	"	"	0.096	<0.05	<0.05
	Trans-1,2-dichloroethene	"	"	<0.005	<0.05	<0.05
	1,1-Dichloroethane	"	"	<0.005	<0.05	<0.05
	Cis-1,2-dichloroethene	"	"	<0.005	0.25	0.19
	Chloroform	"	"	<0.001	<0.01	<0.01
	1,1,1-trichloroethane	"	"	<0.001	0.028	0.036
	Carbon Tetrachloride	"	"	<0.001	<0.01	<0.01
	1,2-Dichloroethane	"	"	<0.005	<0.05	<0.05
	Trichloroethylene	"	"	<0.001	1.7	1.7
	Dichloropropane	"	"	<0.005	<0.05	<0.05
	Bromodichloromethane	"	"	<0.001	<0.01	<0.01
	Tetrachloroethylene	"	"	<0.001	0.4	0.42
	Chlorodibromomethane	"	"	<0.001	<0.01	<0.01
	Bromoform	"	"	<0.001	<0.01	<0.01

Short Term, High Intensity Monitoring Program

Location: PRD Electronics
SPDES-NY-01070824

Sampling Conducted By: WTM Management Corporation
Sample Date: February 3, 1982
Lab Analysis Performed By: Ecotest Labs

Outfall Number	Effluent Parameters	Monitoring Romts. Measurement Frequency	Monitoring Romts. Sample Type	Sample Results (mg/l) 001 Discharge	003 Intake	003 - Discharge
001 Discharge, 003 Intake and 003 Discharge	C5-C10 Aliphatic Hydrocarbons	Once/day	Grab	<0.05	0.02	0.012
	Benzene	three con-	"	<0.01	<0.001	<0.001
	Toluene	secutive	"	0.012	<0.002	<0.002
	P-xylene	days	"	0.8	0.002	<0.002
	M-xylene	"	"	2.8	0.007	0.005
	O-xylene	"	"	1.4	0.037	0.032
	O-Dichlorobenzene	"	"	<0.01	0.032	0.016
	M-Dichlorobenzene	"	"	<0.01	0.008	0.005
	P-Dichlorobenzene	"	"	<0.01	<0.005	<0.005
	1,1,2-Trichloro-1,2,2 Trifluoroethane	"	"	<0.001	0.055	0.057
	Methylene Chloride	"	"	0.08	<0.05	<0.05
	Trans-1,2-dichloroethene	"	"	<0.005	<0.05	<0.05
	1,1-Dichloroethane	"	"	<0.005	<0.05	<0.05
	Cis-1,2-dichloroethene	"	"	<0.005	0.2	0.5
	Chloroform	"	"	<0.001	<0.01	<0.01
	1,1,1-trichloroethane	"	"	<0.001	0.026	0.028
	Carbon Tetrachloride	"	"	<0.001	<0.01	<0.01
	1,2-Dichloroethane	"	"	<0.005	<0.05	<0.05
	Trichloroethylene	"	"	<0.001	1.7	1.7
	Dichloropropane	"	"	<0.005	<0.05	<0.05
	Bromodichloromethane	"	"	<0.001	<0.01	<0.01
	Tetrachloroethylene	"	"	0.003	0.35	0.34
	Chlorodibromomethane	"	"	<0.001	<0.01	<0.01
	Bromoform	"	"	<0.001	<0.01	<0.01

NYSDEC012880

verizon

GTE Operations Support Incorporated
600 Hidden Ridge Drive (HQE03E75)
Irving, Texas 75038
(972) 718-4806

March 18, 2004

Mr. Jerry Riggi
Division of Environmental Remediation
New York State Department of Environmental Conservation
Bureau of Hazardous Waste and Radiation Management
Radiation Section, Eighth Floor
625 Broadway
Albany, NY 12233-7255

Mr. Robert Stewart
Division of Environmental Remediation
New York State Department of Environmental Conservation
SUNY Campus Loop Bldg. 40
Stony Brook, New York 11790-2356

Re: **Voluntary Cleanup Agreement**
For: Former Sylvania Electric Products Incorporated Facility
By: GTE Operations Support Incorporated
Site #: V-00089-1 Index #: W1-0903-01-12

Cell 11: Analytical Results of the Tube

Dear Mr. Riggi:

As you recall, on November 7, 2003, during excavation in Enclosure II, Cell 11, a silver metal tube was uncovered in subcell N21 (Appendix A). On November 17, 2003, the silver metal tube and contents were shipped to BWX Technologies (BWXT) Services Inc. – Nuclear Environmental Laboratory Services (NELS), 2016 Mt. Athos Road, Lynchburg, Virginia 24504-5447, for analysis. The NELS is certified by the New York State Department of Health – Environmental Laboratory Approval Program (ELAP ID 11532) and the State of Utah Department of Health (Certificate ID BWNU). The tube was conservatively manifested and shipped under Department of Transportation (DOT) classification of Uranium Metal – Pyrophoric. Prior to shipping, the tube and its contents were transferred from the plastic wrap and container and repackaged in a metal container with positive closure. The container was filled with sand and the container atmosphere was made inert with argon gas. The shipment was received by BWXT on November 18, 2003.

Appendix B is the chain of custody and Appendix C is photographs of the tube and its contents while still in Enclosure II, Cell 11 and a photograph taken from BWXT.

At BWXT, uranium isotopic analysis was performed on the tube contents to assess if the material was enriched in Uranium-235 (U-235). The analytical results (Appendix D) indicate U-235 content was slightly below the content existing in natural uranium, indicating that the uranium was present in depleted form. As depleted uranium (DU), the material can be handled under the Site's existing New York State Department of Labor Radioactive Materials License Number 3095-4330.

To evaluate pyrophoricity, the chemical composition of the tube contents was analyzed using X-ray diffraction (XRD). The analyst separated the material into two, generally discrete samples. One represented the dark material, the other the yellow material. The analytical results (Appendix E) indicate that both the dark and yellow materials are oxides of uranium. The dark material is a uranium dioxide (UO_2) and the yellow material is uranium trioxide (UO_3), possibly with some hydration phases such as $UO_3 \cdot H_2O$. Neither of these oxides is pyrophoric.

The tube contents were also examined using Inductively-Coupled Plasma (ICP) Spectroscopy to assess metal constituents. The results (Appendix F) correlate with the XRD results. The primary constituent is uranium. Molybdenum is also present. Other metals, such as aluminum, iron, etc., are present at less than the laboratory reporting limits. The laboratory reporting limits for a majority of the metals are near or below approximately 0.01%.

The silver metal tube itself underwent ICP metals analysis to assess its chemical composition. The tube consists primarily of iron, chromium, and nickel with small amounts of cobalt and manganese (Appendix G). This analysis indicated the tube material is a stainless steel-type alloy.

If you have any questions, please feel free to contact me.

Sincerely,

Jean Agostinelli
Vice President and Controller

Attachments:

Appendix A – Cell and Subcell Locations
Appendix B – Chain of Custody
Appendix C – Photographs
Appendix D – Uranium Isotopic Results of Tube Contents
Appendix E – XRD of Tube Contents
Appendix F – ICP of Tube Contents
Appendix G – ICP of the Tube

NAEVA GEOPHYSICS INC.
THE LEADER IN SUBSURFACE DETECTION
Subsurface Geophysical Surveys

GPR
MAGNETICS
ELECTROMAGNETICS
SEISMICS
RESISTIVITY
UTILITY LOCATION
UXO DETECTION
BOREHOLE CAMERA
STAFF SUPPORT

November 30, 2004

Ms. Pam Cox, PG
Verizon
600 Hidden Ridge Drive (HQE03E69)
Irving, TX 75038
972-718-4733
972-719-0065 (fax)

Dear Ms. Cox:

This letter is written to inform you of the results of geophysical investigations NAEVA Geophysics, Inc. conducted between September 20-24 & 28, 2004 at GTE site located at 100-140 Cantiague Rock Road in Hicksville, New York. The purpose of the investigation was to delineate detectable subsurface utilities in the vicinity of 244 proposed exploratory boring sites (PEBSs). The areas of investigation were inside Building 100 and 140, parking lots located at the west side of the buildings, and the south side of Building 100.

The equipment used for this investigation included a Fisher TW-6 Pipe and Cable Locator (a type of electromagnetic metal-detector), a Subsite 950R/950T utility locator, a 3M Dynatel 2250 cable locator, and a Sensors & Software Smart Cart ground penetrating radar (GPR) system with a 500 MHz antenna.

The areas of investigation were visually inspected for evidence of subsurface utilities or other buried features. Whenever a metallic/electrically conductive utility was noted, a radio-frequency (RF) signal was conducted or induced onto the line using one of the utility locating instrument's transmitters. This signal was then used to trace out the utility.

The TW-6 was carried across the areas of investigation in a series of closely spaced traverses to look for indications of subsurface utilities and buried metallic objects. It should be noted that the instrument could not be used over reinforced concrete floor inside Building 100 and 140 and immediate vicinity of aboveground metallic objects, such as chain-link fence and vehicles. Bi-directional GPR data profiles were collected over significant metal-detector anomalies and PEBSs. The GPR data profiles were inspected for evidence of hyperbolic reflections that could be indicative of subsurface utilities and buried structures.

Underground lines carrying an electric current, as well as metallic lines to which electric lines are grounded, produce electromagnetic fields that may be detectable at the surface. In addition, buried metallic lines often pick up and radiate background vibrations and commercial radio signals. The site was checked for evidence of these passive signals using the Subsite receiver.

MARYLAND
4707 Benson Ave.
Suite 104
Baltimore
Maryland 21227
(410) 536-7600
(410) 536-7602 Fax

NEW YORK
50 N. Harrison Ave.
Suite 11
Congers
New York 10920
(845) 268-1800
(845) 268-1802 Fax

VIRGINIA
P.O. Box 7325
Charlottesville
Virginia 22906
(434) 978-3187
(434) 973-9791 Fax

To investigate non-metallic utilities such as ceramic or PVC sewers, a flexible steel antenna was inserted into the line and then energized with a radio frequency signal using one of the utility locator's transmitters. This technique was used to trace the lines as described above.

The Dynatel was used in the split-box mode to further examine the site. Two operators, one carrying the transmitter and one carrying the receiver, walked bi-directionally across the area at a fixed distance to one another, to detect increases in signal strength, which would suggest possible subsurface utilities. Where signal increases were noted, they were further investigated in an attempt to discern a signal propagating utility.

Each detected utility within 10 feet of the PEBS locations was marked-out on the ground with spray paint using the American Public Works Association color code (i.e. red for electric, blue for water, green for sewer, etc.). Underground utilities of undetermined usage and metal-detector anomalies were marked-out using pink paint. The final locations of 244 PEBSs were marked with 1-foot diameter white circle. Care should be taken when excavating in the vicinity of any marked utilities and features.

Thank you for the opportunity to work with you on this project. We look forward to providing subsurface locating services for you in the future. Please call me if I may answer any questions.

Sincerely,

H. Hamajima

Hiromi Hamajima
Project Manager
NAEVA Geophysics, Inc.

INVESTIGATION WORK PLAN
EXHIBIT B

Former Sylvania Electric Products Incorporated Facility Cantiague Rock Road Hicksville, New York

GTE Operations Support Incorporated

March 1998 (revised May 1998)

O'BRIEN & GERE
ENGINEERS, INC.

New York State Department of Environmental Conservation
Building 40 - SUNY, Stony Brook, New York 11790-2356
Division of Environmental Remediation
Telephone: (516) 444-0240
Facsimile: (516) 444-0248

John P. Cahill
Commissioner

Post-it® Fax Note 7671	Date 6/4/98	# of pages ▶ 6
To Jeff Banikowski	From Bob Stewart	
Co./Dept. O+G	Co. NYSDEC	
Phone # 315-437-6100	Phone # 516-444-0244	
Fax # 315-463-7554	Fax # 516-444-0248	

Certified Mail/R.R.R.

June 8, 1998

Jeffrey Banikowski
O'Brien & Gere Engineers, Inc.
5000 Brittonfield Parkway
PO Box 4873
Syracuse, N.Y. 13221

Re: Final Voluntary Investigation Work Plan, Revised May 1998
Former Sylvania Electric Products Incorporated Facility, Hicksville

Dear Mr. Banikowski:

The Department has reviewed the Revised Voluntary Investigation Work Plan dated May 1998. The Department has a few minor comments which will not necessitate the submission of another revision. This letter with the Department's comments, if agreeable to your client, will be attached and incorporated into the work plan entitled, "Investigation work Plan, Exhibit B, Revised May 1998". The revised May 1998 work plan as modified by this letter will be attached to the voluntary investigation agreement and will be approved concurrent with the Department's execution of the agreement.

The Department has the following comments which we have already discussed with you by telephone:

A. FSP, Page D-26, Borings to Investigate Former Leaching Pools

The work plan identifies borings 11, 12, and 30 to 38 as borings being utilized to investigate former leaching pools. I would like to note that the following borings are probably adjacent to former leaching pools:

Boring #5 - This location is being investigated "to evaluate the general area where radiation readings were 1.5 times background." However, NYSDEC's metal detector identified a possible leaching pool cover beneath the asphalt by boring #5. This may be the leaching pool shown on the 1960 site map, Figure #2, which is located west of the southern end of recharge basin #3.

Boring #50 - According to NYSDEC 4/10/98 comment B, this boring will be used to investigate the former sanitary system in front of Building #4. This boring should therefore be through or adjacent to a former leaching pool.

A TAL metals (including cyanide) sample should be collected for both of these borings at the depth assessed to be the bottom of these former leaching pools.

B. FSP, Page D-26, Recharge Basin Sample Locations

The recharge basin borings are identified as borings 1 to 3, 23 to 28, 41, and 42. The sample collected at the bottom of these structures should also be analyzed for PCBs. There are a total of 11 samples. However, under Table 6-1 of the FSP on page 32, it is stated that up to 10 samples will be analyzed for PCBs. All recharge basin sediment samples must be analyzed for PCBs.

C. FSP, Geoprobe Groundwater Samples

The FSP is unclear about the collection of the geoprobe groundwater samples. A limit of up to 5 geoprobe groundwater samples is set. The four proposed geoprobe groundwater samples as shown on Figure 4 must be collected at these locations unless the Department agrees to relocate these samples based on field observations or field screening. Additionally, as we discussed by telephone, if General Instrument well W-7 cannot be sampled due to access problems, a geoprobe groundwater sample will be collected near the location of soil boring #49. This groundwater sample is necessary to determine the groundwater quality downgradient of the former sanitary system for Building #4.

D. Soil Vapor Survey

As agreed previously, one of the soil vapor samples collected on the first day of sampling will also be sent to an off-site laboratory for analysis. The sample will be analyzed using a quick turnaround. This will help evaluate the performance of the field GC. Please provide verbal or written details on this sample.

E. Citizen Participation, Page 4

The Department agrees to take the lead on the citizen participation activities during the Voluntary Investigation Agreement. However, additional copies of the work plan and final reports will be needed. Please add the following people to the current distribution list contained within the agreement:

1. Timothy Kelly
   Nassau County Department of Public Works
   170 Cantiague Rock Road
   Hicksville, NY 11801

2. John Kiernan, Commissioner
Department of Recreation and Parks
Eisenhower Park
East Meadow, NY 11554

3. Mark C. Roberts
U.S. Nuclear Regulatory Commission
Region I
475 Allendale Road
King of Prussia, PA 19406

4. John Molloy, consultant for the Hicksville Water District
H2M Group
575 Broad Hollow Road
Melville, NY 11747

5. Thomas Casey, consultant for the Westbury Water District
Henderson & Casey
344 Madison Street
Westbury, NY 11590

6. Barry Ballen, President or his representative
Gilbert Displays, Inc. (GDI)
140 Cantiague Rock Road
Hicksville, NY 11801

7. Joseph Elm, Executive Vice President or his representative
Magazine Distributors, Inc. (MDI)
P.O. Box 9058
100 Cantiague Rock Road
Hicksville, NY 11802-9058

8. Harry Nagel, manager or his representative
Air Techniques, Inc. (ATI)
70 Cantiague Rock Road
Hicksville, NY 11801

9. A local repository near the site to be established by the Department. The Department will advise you of the address under separate cover.

Please note that the Department will also be sending a letter to the three operators at GDI, MDI, and ATI after the agreement has been executed by the Department and the final work plan has been received by them, but prior to the start of the investigation. In these letters, the Department will summarize the proposed voluntary investigation and recommend that the operators inform their employees about it.

Please distribute a copy of the final work plan with a copy of this letter to the rest of the people on the distribution list who have not yet received the revised work plan. Please provide me with my second copy of the revisions which will be used for the forthcoming public repository in the Stony Brook office.

If you have any objections to any of the above statements, please contact me as soon as possible at telephone number (516) 444-0244. If I have not heard from you within 10 days of your receipt of this letter, I will assume that the above changes are acceptable to your client and have been adopted into the work plan.

Sincerely,

Robert R. Stewart

Robert R. Stewart
Environmental Engineer I

cc: R. Cowen
R. Becherer
B. Youngberg
J. Kadlecek
R. Rusinko
S. Scharf
R. Dickenson
W. Varcasio
J. Epstein
A. Ludwig, GTE
D. York, GTE
G. Laccetti, NYSDOH
J. Lovejoy, NCDH

O'BRIEN & GERE
ENGINEERS, INC.

June 18, 1998

Mr. Robert Stewart
Environmental Engineer I
New York State Department of Environmental Conservation
Building 40 - SUNY
Stoneybrook, New York 11790-2356

Re: Response to Final Voluntary Investigation
Work Plan Comments - Former Sylvania
Electric Products Incorporated Facility,
Hicksville, New York

File: 5816.009 #2

Dear Mr. Stewart:

O'Brien & Gere, on behalf of GTE Operations Support Inc, has reviewed the comments presented in your letter of June 8, 1998 regarding the referenced work plan. In consultation with GTE Operations Support Incorporated, this letter documents agreement with each of the comments with the exception of Comment E entitled, "Citizen Participation".

Referencing the distribution list provided as part of comment E and as discussed on June 17, 1998, the Comment E distribution list does not match the access agreement list negotiated between GTE Operations Support Incorporated and current property owners. Therefore, in order to maintain access to the properties and meet our property access obligations, we will be unable to distribute copies of final documents to those individuals listed in Comment E with the exception of Barry Ballen and Tim Kelly. Both Mr. Ballen and Mr. Kelly are listed on the access agreements.

We, therefore, propose that the Department of Environmental Conservation (DEC) distribute the final documents compiled during the investigation to the remaining individuals listed in Comment E. O'Brien & Gere will submit sufficient, final document copies to DEC for this purpose. We would like you to note that Mr. Jeffrey Goldstein, Chief Financial Officer of Air Techniques, Inc. will receive a copy of final documents according to the access agreement with his firm and that Mr. Harry Nagel should be removed from your distribution list. In addition, Mr. Kelly has indicated that he will distribute final document copies within the Department of Recreation and Parks and it may not be necessary to distribute copies to Mr. Kiernan (Commissioner Department of Recreation and Parks) directly.

Lastly, should you be in agreement with the responses to your June 8 comments contained in this letter, it is our understanding that the June 8,1998 comments with minor revisions to Comment E will be attached to and become part of the May 1998 work plan. Should this be the case, we would appreciate final, written acceptance of the May 1998 work plan from DEC at your earliest convenience.

O'Brien & Gere Engineers, Inc. or O'Brien & Gere Company
5000 Brittonfield Parkway P.O. Box 4873 Syracuse, New York 13221-4873
(315) 437-5100 • FAX (315) 463-7554 • nitp www.obg.com
and offices in major U.S. cities

Please do not hesitate to contact either Al Ludwig of GTE Operations Support Incorporated (203-965-2250) or me if you have any questions regarding the responses presented in this letter.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Jeffrey E. Banikowski, CPG
Managing Scientist

i:div82\projects\jeb-pro\GTEhicks.wpd

cc: Jean Agostinelli - GTE Operations Support Incorporated
Al Ludwig - GTE Operations Support Incorporated
TM Eddy - O'Brien & Gere Engineers, Inc.
SW Kaczmar, Ph.D., C.I.H. - O'Brien & Gere Engineers, Inc.

New York State Department of Environmental Conservation
Building 40 - SUNY, Stony Brook, New York 11790-2356
Division of Environmental Remediation
Telephone: (516) 444-0240
Facsimile: (516) 444-0248

John P. Cahill
Commissioner

Certified Mail/R.R.R.

July 3, 1998

Jeffrey Banikowski
O'Brien & Gere Engineers, Inc.
5000 Brittonfield Parkway
PO Box 4873
Syracuse, N.Y. 13221

Re: Final Voluntary Investigation Work Plan, Revised May 1998
Former Sylvania Electric Products Incorporated Facility, Hicksville

Dear Mr. Banikowski:

According to our discussions on 6/29/98, I have revised the attachment to be attached and incorporated into the work plan entitled, "Investigation Work Plan, Exhibit B, Revised May 1998" for the Former Sylvania Electric Products Incorporated Facility in Hicksville. The revised May 1998 work plan, as modified by the 7/2/98 attachment, will be attached to the voluntary investigation agreement and will be approved concurrent with the Department's execution of the agreement.

Please distribute a copy of the final work plan with a copy of the 7/2/98 attachment to the rest of the people on the distribution list who have not yet received the revised work plan. Please provide me with my second copy of the revisions which will be used for the forthcoming public repository in the Stony Brook office.

Please provide details on the one soil vapor sample which will also be sent to an off-site laboratory for analysis.

If the 7/2/98 attachment does not address your concerns, please notify me immediately.

Sincerely,

Robert R. Stewart
Environmental Engineer I

FINAL

Attachment

cc: R. Becherer
R. Rusinko
W. Varcasio
A. Ludwig, GTE
D. York, GTE

 July 2, 1998

Revised Attachment to the Investigation Work Plan, Exhibit B, Revised May 1998

A. FSP, Page D-26, Borings to Investigate Former Leaching Pools

The work plan identifies borings 11, 12, and 30 to 38 as borings being utilized to investigate former leaching pools. I would like to note that the following borings are probably adjacent to former leaching pools:

Boring #5 - This location is being investigated "to evaluate the general area where radiation readings were 1.5 times background." However, NYSDEC's metal detector identified a possible leaching pool cover beneath the asphalt by boring #5. This may be the leaching pool shown on the 1960 site map, Figure #2, which is located west of the southern end of recharge basin #3.

Boring #50 - According to NYSDEC 4/10/98 comment B, this boring will be used to investigate the former sanitary system in front of Building #4. This boring should therefore be through or adjacent to a former leaching pool.

A TAL metals (including cyanide) sample should be collected for both of these borings at the depth assessed to be the bottom of these former leaching pools.

B. FSP, Page D-26, Recharge Basin Sample Locations

The recharge basin borings are identified as borings 1 to 3, 23 to 28, 41, and 42. The sample collected at the bottom of these structures should also be analyzed for PCBs. There are a total of 11 samples. However, under Table 6-1 of the FSP on page 32, it is stated that up to 10 samples will be analyzed for PCBs. All recharge basin sediment samples must be analyzed for PCBs.

C. FSP, Geoprobe Groundwater Samples

The FSP is unclear about the collection of the geoprobe groundwater samples. A limit of up to 5 geoprobe groundwater samples is set. The four proposed geoprobe groundwater samples as shown on Figure 4 must be collected at these locations unless the Department agrees to relocate these samples based on field observations or field screening. Additionally, as we discussed by telephone, if General Instrument well W-7 cannot be sampled due to access problems, a geoprobe groundwater sample will be collected near the location of soil boring #49. This groundwater sample is necessary to determine the groundwater quality downgradient of the former sanitary system for Building #4.

D. Soil Vapor Survey

As agreed previously, one of the soil vapor samples collected on the first day of sampling

will also be sent to an off-site laboratory for analysis. The sample will be analyzed using a quick turnaround. This will help evaluate the performance of the field GC.

E. Citizen Participation, Page 4

The Department agrees to take the lead on the citizen participation activities during the Voluntary Investigation Agreement. However, five additional copies of all **final** documents produced under the Voluntary Investigation Agreement will be needed. The Department will send one copy of each document to the following people:

1. Mark C. Roberts
   U.S. Nuclear Regulatory Commission
   Region I
   475 Allendale Road
   King of Prussia, PA 19406

2. John Molloy, consultant for the Hicksville Water District
   H2M Group
   575 Broad Hollow Road
   Melville, NY 11747

3. Thomas Casey, consultant for the Westbury Water District
   Henderson & Casey
   344 Madison Street
   Westbury, NY 11590

4. Joseph Elm, Executive Vice President or his representative
   Magazine Distributors, Inc.
   P.O. Box 9058
   100 Cantiague Rock Road
   Hicksville, NY 11802-9058

5. A local repository near the site to be established by the Department.

The Department understands that the volunteer will be providing one copy of all final documents for the Voluntary Investigation Agreement as part of your access agreements to the following people:

1. Timothy Kelly
   Nassau County Department of Public Works
   170 Cantiague Rock Road
   Hicksville, NY 11801

July 2, 1998

2. Barry Ballen, President or his representative
Gilbert Displays, Inc.
140 Cantiague Rock Road
Hicksville, NY 11801

3. Jeffrey Goldstein, Chief Financial Officer
Air Techniques, Inc.
70 Cantiague Rock Road
Hicksville, NY 11801

4. John Kiernan, Commissioner
Department of Recreation and Parks
Eisenhower Park
East Meadow, NY 11554

5. Kenneth Krause
Harbor Distributing
120 Bethpage Road
Hicksville, NY 11801

Please note that the Department will be sending a letter to Mr. Ballen, Mr. Elm, and Mr. Goldstein after the agreement has been executed by the Department and the final work plan has been received by them, but prior to the start of the investigation. In these letters, the Department will summarize the proposed voluntary investigation and recommend that these representatives inform their employees about it.

O'BRIEN & GERE
ENGINEERS, INC.

July 31, 1998

Robert R. Stewart
Environmental Engineer I
Division of Hazardous Waste Remediation
New York State Department of Environmental Conservation
SUNY - Building 40
Stoney Brook, NY 11790-2356

Re: Exhibit B - Investigation Work Plan Revisions
Former Sylvania Electric Products Inc. Facility
Hicksville, NY

File: 5816.009

Dear Mr. Stewart:

Enclosed are revisions to Exhibit B- Investigation Work Plan, Former Sylvania Electric Products Incorporated Facility, Cantiague Rock Road, Hicksville, NY dated March 1998 (Exhibit B-Work Plan). The revisions were finalized in May 1998 and approved by the New York State Department of Environmental Conservation (NYSDEC) on June 8, 1998. Please incorporate the revisions into your March 1998 Exhibit B-Work Plan as described below.

1. Exhibit B-Work Plan binder cover and spine - remove the old binder cardboard cover and cardboard spine with the March 1998 date and replace with the new binder cardboard cover and spine with the March 1998 (revised May 1998) date.

2. NYSDEC June 8, 1998 approval letter - place the NYSDEC June 8, 1998 approval letter in the binder on top of the work cover page so this is the first item read when the binder is opened.

3. Exhibit B-Work Plan cover sheet and text - remove the old Work Plan text and cover sheet, however, retain the existing tables and figures. Replace with the new cover sheet and text with the March 1998(revised May 1998) date.

   - Place existing Figure 1-1 at the end of Chapter 1
   - Place existing Figures 2-1, 2-2, and 2-3 at the end of Chapter 2.
   - Place existing Figure 3-1 at the end of Chapter 3
   - Place existing Figure 8-1 at the end of Chapter 8
   - Discard existing Figure 9-1 Project Schedule and replace with revised Figure 9-1

O'Brien & Gere Engineers, Inc., an O'Brien & Gere Company
5000 Brittonfield Parkway • P.O. Box 4873, Syracuse, New York 13221-4873
(315) 437-0100 FAX (315) 463-7554 • http://www.obg.com
and offices in major U.S. cities

4. Exhibit B-Appendix C- Health and Safety Plan- remove the old cover sheet with March 1998 date and replace with new cover sheet with the March 1998(revised May 1998) date. Remove the old page C-33 and C-34 dated March 13, 1998 (double-side page) and replace with the new page C-33 and C-34 dated May 28, 1998.

5. Exhibit B-Appendix D- Field Sampling Plan- remove the old Field Sampling Plan dated March 1998, however, retain the existing figures and attachments. Replace with the new cover sheet and text with the March 1998 (revised May 1998) date.

- Place existing Figures 1, 2, and 3 at the end of Chapter 6
- Discard existing Figures 4 and 5. Replace with new Figures 4 and 5
- Place existing Attachment A after Figure 5
- Discard existing Attachment B. Replace with new Attachment B
- Place existing Attachment C after Attachment B

6. Exhibit B-Appendix E- Quality Assurance Project Plan- remove the old Quality Assurance Project Plan dated March 1998. Replace with the new cover sheet and text with the March 1998 (revised May 1998) date.

Please do not to hesitate to contact me at your convenience if you have any questions.

Very truly yours,

O'BRIEN & GERE ENGINEERS, INC.

Jeffrey E. Banikowski, CPG
Managing Scientist

I:\DIV82\PROJECTS\58160092_CORRES\7_31LTR.WPD
Attachment

cc: Al Ludwig - GTE Operations Support Incorporated
Jean Agostinelli - GTE Operations Support Incorporated
Daniel A. York, Esq. - GTE Operations Support Incorporated
William Varcasio - NYSDEC
G. Anders Carlson - NYSDOH
Rosalie K. Rusinko - NYSDEC
Timothy M. Eddy - O'Brien & Gere Engineers, Inc.
Swiatoslav W. Kaczmar, CIH, Ph.D. - O'Brien & Gere Engineers, Inc.
James T. Mickam, CPG - O'Brien & Gere Engineers, Inc.

URS

DRAFT

REPORT FOR

ASBESTOS PROJECT/AIR MONITORING DURING ASBESTOS ABATEMENT - PHASE II

AT

GTEOSI – HICKSVILLE
140 CANTIAGUE ROCK ROAD
HICKSVILLE, NEW YORK - 11801

Prepared for:

GTE OPERATIONS SUPPORT INCORPORATED
600 Hidden Ridge Drive
Irving, Texas 75038

November 21, 2003

URS CORPORATION – NEW YORK
5 Penn Plaza, 13th Floor
New York, New York 10001
URS PROJECT NO: 27010-039

URS

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URS

Executive Summary

URS Corporation (URS) was retained by GTE Operations Support Incorporated (GTEOSI) to conduct asbestos abatement project monitoring, air monitoring and related abatement oversight services during the removal of asbestos-containing material (ACM) at 140 Cantiague Rock Road in Hicksville, New York 11801.

The work involved the abatement of asbestos-containing built-up roofing, roof flashing, and caulking from the eastern section of the roof of the 140 Building (140 Cantiague Rock Road). This was the second phase of roof abatement work conducted to allow the eastern portion of the building to be further renovated.

Specifically the work location, material description, quantities and dates of removal are listed below:

Building Address	ACM Description	ACM Quantity	Dates of Removal
140 Cantiague Rock Road	Built-up roof and roof flashing	2,500 SF	9/22/03 through 9/26/03
	Caulking around skylights	48 LF	

Note: SF denotes square feet; LF denotes linear feet.

Asbestos abatement was conducted by Fiber Control, Inc., of 3010 Burns Avenue, Wantagh, New York, 11793, acting as a subcontractor for Iron Eagle Environmental Services. Fiber Control is a licensed New York State Department of Labor (NYSDOL) asbestos removal contractor; License Number 99-0723.

Abatement operations, abatement project monitoring, and abatement oversight services were performed in accordance with New York State Department of Labor's (NYSDOL) Industrial Code Rule 56, (ICR 56) and the Applicable Variance (AV) No. 119. URS provided a licensed New York State Project Monitor on a daily basis throughout the duration of the abatement activities. The project monitoring services were provided from September 22, 2003 through September 26, 2003.

ACM was packaged in accordance with the Occupational Safety and Health Administration (OSHA) Standard 29 CFR 1926.1101, the United States Department of Transportation (USDOT) Standards 49 CFR 171,172, and 173, the Environmental Protection Agency (EPA) Standard 40 CFR Part 61 and New York State Department of Conservation (NYS-DEC) regulations in relation to the transport, storage, and disposal of ACM. The waste material was transported from the work Site by Blue Water Environmental a licensed New York State asbestos waste hauler (NYS/DEC Permit #1A-400). Documentation has been provided that waste material has been disposed at 110 Sand Company's Clean Fill Disposal site, located on Spagnoli Road, Melville, New York 11714.

Even though air monitoring was not required during the abatement work as per AV-119, URS collected ambient air samples at ground level beneath the roof (at ground level) during the abatement work. A total of 32 samples were collected during the work and sent for laboratory

analysis. The samples were analyzed via Phase Contrast Microscopy (PCM) at SciLab, Inc., located at 117 East 30th Street, New York, New York. The results of the analyses for the air samples indicated airborne concentrations of less than 0.01 fibers per cubic centimeter (<0.01f/cc) of air. This level is considered the benchmark level in the asbestos abatement industry to determine contaminated versus non-contaminated air. The abatement work was completed consistent with Federal and New York State regulatory requirements.

Two (2) inspectors from the NYS-DOL visited the project Site to perform a routine inspection. The inspectors cited the Contractor, Fiber Control, Inc. with two violations of ICR 56. The two violations included: 1) No lockers or bench in the clean room, and 2) No plastic sheeting covering the wheelbarrow used to transport the roofing waste to the chute.

No other incidents were reported during the asbestos abatement work.

URS

APPENDIX A

LABORATORY ANALYSIS REPORTS AND CHAIN OF CUSTODIES

SciLab Job #: **203092863**

Client Name: URS Corporation

Phase Contrast Microscopy (PCM) Fiber Results

27010-039-5050; GTE/OSI; 140 Cantiague Rock Road, Hicksville, NY - Abatement

SciLab Sample #	Client Sample # / Location	Date Collected	Flow Rate (liters/min.)	Duration (min.)	Air Filtered (liters)	Fields	Fibers	Fiber Density (Fibers/mm^2)	Fibers Conc. (Fibers/cc)	TWA
01	01 OWA North Side "Outside"	9/24/2003	10	270	2700	100	10	12.74	0.002	
02	02 OWA East Side "Outside"	9/24/2003	10	270	2700	100	8	10.19	0.001	
03	03 OWA Inside Bldg. By Garage Door	9/24/2003	10	260	2600	100	9	11.46	0.002	
04	04 OWA Inside Bldg. By South Entrance	9/24/2003	10	260	2600	100	7	8.92	0.001	
05	05 OWA By Lunch Area	9/24/2003	10	250	2500	100	4	5.10	< 0.001	
06	06 IWA On Roof	9/24/2003	10	225	2250	100	4	5.10	< 0.001	
07	07 Blank	9/24/2003	0	0	0	100	0.5	0.64	**Footnotes:** *1*	
08	08 Blank	9/24/2003	0	0	0	100	0.5	0.64	**Footnotes:** *1*	

Reporting Notes:

(1) Fibers/cc cannot be calculated for samples (or blanks) with no air volume.

Analyzed by: Fred A. Corirossi _____; Date Analyzed: 9/24/2003

Samples analyzed by NIOSH 7400(A) Method, Issue #2, 8/15/94: Limit of Detection= 5.5 fibers per 100 fields or 7 fibers/mm2: Blank analyses are reported when available, however are not used to adjust results of associated samples in this report. This report relates ONLY to the sample analysis expressed as fibers/sq mm of filter area: ND=No fibers observed: NA= Not Analyzed; Walton-Beckett graticle field area = 0.00785 mm2: TWA = 8 Hr TWA calculation assumes zero exposure for remainder of 8 hr period not sampled: Upper 95% Confidence limit (Employers Compliance Test)- Calculated as a one sided UCL to determine 95% certainty of compliance with the 0.01 fiber/cc standard: Estimated relative standard deviation: Intralab Sr=0.405, Interlab Sr=0.45, New York samples (NYSDOH ELAP Lab # 11480): National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. AIHA # 102843.

URS Corporation – New York,
5 Penn Plaza, 13th Floor, New York, NY 10001
Phone: 212-840-0595 / Facsimile: 212-921-0388

ASBESTOS PROJECT AIR SAMPLING FORM

Client Name:	Project Name & Location:	Laboratory Name & Address:	Turnaround Time
CLIENT NAME: GTE/OSI	**140 Cantiague Rock Road, Hicksville, New York**	**Scilab** **117 East 30th Street** **New York, New York**	☒ Immediate ☐ 3 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ Other _____

URS Project Manager:	URS Project/Air Monitor:	Rotometer Number:	☒ PCM (0.8) micron MCE Cassette Filter Manufacturer: _____ Lot _____	☐ TEM (0.45) micron MCE Cassette Filter Manufacturer: _____ Lot _____	Type
NAME: Mark Reed	Carmelo Altomonte				
URS Project Number:	Date:				☐ Background ☐ Pre-Abatement ☒ Abatement
27010-039-5050	9/24/03	023			☐ Post-Abatement ☐ OSHA ☐ Ambient
					☐ Other _____

Sample I.D. Number	Sample Data			Time (24 Hr. Clock)			Flow Rate (L/Min.)			Total Air Volume (liters)	Fiber Conc (f/cc or s/mm)
	IWA	OWA	Sample Location	Start	End	Total (Minutes)	Start	End	Average		
01		✓	North Side "outside"	1030	1500	270	10	10	10	2700	
02		✓	East side "outside"	1031	1501	270	10	10	10	2700	
03		✓	inside Bldg. by garage door	1045	1505	260	10	10	10	2600	
04		✓	inside Bldg. by South Entrance	1046	1506	260	10	10	10	2600	
05		✓	By Lunch area	1100	1510	250	10	10	10	2500	
06	✓		on roof	1130	1515	225	10	10	10	2250	
07			BLANK								
08											
									203092863		

CHAIN OF CUSTODY RECORD

Relinquished By:	Date	Time	Received By	Date	Time		Date	Time	Microscope Make/Serial No.
	16:30			9/24	1650	Lab ELAP No. 11480			
						Analyzed By	9/29/03		
						QC By			
						Lab Batch No.			

Results To:	Phone/Fax Number	Comments:	Analysis Methodology
NAME: Mark Reed (URS)	**(212) 609-8098 and (212) 921-0388**		PCM – NIOSH 7400A
NAME			TEM – AHERA

SCILAB

SCIENTIFIC LABORATORIES, INC.

117 EAST 30TH STREET
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-9392

September 24, 2003

URS Corporation
Attn: Mark Reed
5 Penn Plaza
13th Floor
New York, NY 10001

RE: URS Corporation
Job Number 203092863
P.O. #
27010-039-5050; GTE/OSI; 140 Cantiague Rock Road, Hicksville, NY - Abatement

Dear Mark Reed:

Enclosed are the results for PCM asbestos analysis of the following URS Corporation samples received at SCILAB on Wednesday, September 24, 2003, for a immediate turnaround:

01, 02, 03, 04, 05, 06, 07, 08

The 8 samples contained in Air Cassettes were shipped to SciLab via Hand Delivered. These samples were prepared according to PCM methodology as specified in NIOSH Method 7400, Issue #2, 8/15/94. The counting rules used are described in previous versions of this method as "A" rules unless otherwise noted within the report. The attached table represents a summary of the fiber count results which are not adjusted for blanks if analyzed.

This report relates ONLY to the sample analysis expressed as fibers/sq mm of filter area. SciLab assumes no responsibility for customer supplied data such as "sample location" or "air volume sampled". This report must not be used to claim product endorsement by SciLab or any SciLab certifying agency. Complete analytical documentation is archived and available upon written request. The National Institute of Standards and Technology Accreditation requirements, mandates that this report must not be reproduced, except in full without the approval of the laboratory.

SciLab appreciates this opportunity to serve your organization. Please contact us for any further assistance or with any questions.

Sincerely,

Lance Tuckruskye
QA/QC Compliance Officer

Client Name: URS Corporation

Phase Contrast Microscopy (PCM) Fiber Results

27010-039-5050; GTE/OSI; 140 Cantiague Rock Road, Hicksville, New York / Abatement

SciLab Sample #	Client Sample # / Location	Date Collected	Flow Rate (liters/min.)	Duration (min.)	Air Filtered (liters)	Fields	Fibers	Fiber Density (Fibers/mm ^{2})	Fibers Conc. (Fibers/cc)	TWA
01	09 OWA - North Side	9/25/2003	10	210	2100	100	4	5.10	< 0.001	
02	10 OWA - East Side	9/25/2003	10	210	2100	100	4	5.10	< 0.001	
03	11 OWA - South Side By Garage Door	9/25/2003	10	210	2100	100	3	3.82	< 0.001	
04	12 OWA - Inside Bldg. By Garage Center Door	9/25/2003	10	210	2100	100	2	2.55	< 0.001	
05	13 OWA - On Roof North Side	9/25/2003	10	220	2200	100	2	2.55	< 0.001	
06	14 OWA - On Roof South Side	9/25/2003	10	220	2200	100	3	3.82	< 0.001	
07	15 Field Blank	9/25/2003	0	0	0	100	0.5	0.64	**Footnotes:** *1*	
08	16 Field Blank	9/25/2003	0	0	0	100	0.5	0.64	**Footnotes:** *1*	
09	17 North Side	9/25/2003	10	270	2700	100	6	7.64	0.001	
10	18 East Side	9/25/2003	10	270	2700	100	3	3.82	< 0.001	
11	19 South Side By Garage Door	9/25/2003	10	270	2700	100	4	5.10	< 0.001	
12	20 Inside Bldg. By Center Garage Door	9/25/2003	10	270	2700	100	3	3.82	< 0.001	
13	21 On Roof North Side	9/25/2003	10	255	2550	100	3	3.82	< 0.001	
14	22 On Roof South Side	9/25/2003	10	255	2550	100	4	5.10	< 0.001	
15	23 Field Blank	9/25/2003	0	0	0	100	0.5	0.64	**Footnotes:** *1*	

See Reporting notes on last page

Client Name: URS Corporation

Phase Contrast Microscopy (PCM) Fiber Results

27010-039-5050; GTE/OSI; 140 Cantiague Rock Road, Hicksville, New York / Abatement

SciLab Sample #	Client Sample # / Location	Date Collected	Flow Rate (liters/min.)	Duration (min.)	Air Filtered (liters)	Fields	Fibers	Fiber Density (Fibers/mm^2)	Fibers Conc. (Fibers/cc)	TWA
16	24	9/25/2003	0	0	0	100	0.5	0.64		
	Field Blank									

Footnotes: *1*

Reporting Notes:

(1) Fibers/cc cannot be calculated for samples (or blanks) with no air volume.

Analyzed by: Fred A. Corirossi _____; Date Analyzed: 9/25/2003

Samples analyzed by NIOSH 7400(A) Method, Issue #2, 8/15/94: Limit of Detection= 5.5 fibers per 100 fields or 7 fibers/mm2: Blank analyses are reported when available, however are not used to adjust results of associated samples in this report. This report relates ONLY to the sample analysis expressed as fibers/sq mm of filter area: ND=No fibers observed: NA= Not Analyzed; Walton-Beckett graticle field area = 0.00785 mm2: TWA = 8 Hr TWA calculation assumes zero exposure for remainder of 8 hr period not sampled: Upper 95% Confidence limit (Employers Compliance Test)- Calculated as a one sided UCL to determine 95% certainty of compliance with the 0.01 fiber/cc standard: Estimated relative standard deviation: Intralab Sr=0.405, Interlab Sr=0.45, New York samples (NYSDOH ELAP Lab # 11480): National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. AIHA # 102843.

URS Corporation – New York,
5 Penn Plaza, 13th Floor, New York, NY 10001
Phone: 212-840-0595 / Facsimile: 212-921-0388

ASBESTOS PROJECT AIR SAMPLING FORM

Client Name: **CLIENT NAME: GTE/OSI**		Project Name & Location: **140 Cantiague Rock Road, Hicksville, New York**	Laboratory Name & Address: **Scilab 117 East 30th Street New York, New York**	Turnaround Time ☒Immediate ☐3 Hours ☐6 Hours ☐12 Hours ☐24 Hours ☐Other _____
URS Project Manager: **NAME: Mark Reed**	URS Project/Air Monitor: Carmelo Altomonte	Rotometer Number: 023	☒PCM (0.8) micron MCE Cassette Filter Manufacturer: _____ Lot _____	☐TEM (0.45) micron MCE Cassette Filter Manufacturer: _____ Lot _____
URS Project Number: **27010-039-5050**	Date: 9/25/03			Type ☐Background ☐Pre-Abatement ☒Abatement ☐Post-Abatement ☐OSHA ☐Ambient ☐Other _____

Sample I.D. Number	Sample Data IWA	OWA	Sample Location	Time (24 Hr. Clock) Start	End	Total (Minutes)	Flow Rate (L/Min.) Start	End	Average	Total Air Volume (liters)	Fiber Conc. (f/cc or s/mm)
09		V	North side	0730	1100	210	10	10	10	2100	
10		V	East side	0731	1101	210	10	10	10	2100	
11		V	South side by garage door	0735	1105	210	10	10	10	2100	
12		V	inside Bldg by garage door center	0740	1110	210	10	10	10	2100	
13		V	ON roof North side	0750	1130	220	10	10	10	2200	
14		V	ON roof South side	0751	1131	220	10	10	10	2200	
15			BLANKS								
16											

CHAIN OF CUSTODY RECORD

Relinquished By:	Date	Time	Received By	Date	Time		Date	Time	
Carmelo Altomonte	9/25/03		[illegible]	9/25/03	1705	Lab ELAP No. 11480			Microscope Make/Serial No.
						Analyzed By	9/25/2003		
						QC By			
						Lab Batch No.			

Results To:	Phone/Fax Number	Comments:	Analysis Methodology
NAME: Mark Reed (URS)	**(212) 609-8098 and (212) 921-0388**	203092966	PCM – NIOSH 7400A
NAME			TEM – AHERA

URS Corporation – New York,
5 Penn Plaza, 13th Floor, New York, NY 10001
Phone: 212-840-0595 / Facsimile: 212-921-0388

ASBESTOS PROJECT AIR SAMPLING FORM

Client Name: **CLIENT NAME: GTE/OSI**	Project Name & Location: **140 Cantiague Rock Road, Hicksville, New York**	Laboratory Name & Address: **Scilab 117 East 30th Street New York, New York**	Turnaround Time: ☒ Immediate ☐ 3 Hours ☐ 6 Hours ☐ 12 Hours ☐ 24 Hours ☐ Other _____
URS Project Manager: **NAME: Mark Reed**	URS Project/Air Monitor: Carmelo Altomonte		
URS Project Number: **27010-039-5050**	Date: 9/25/03	Rotometer Number: 023	☒ PCM (0.8) micron MCE Cassette Filter Manufacturer: _____ Lot _____ ☐ TEM (0.45) micron MCE Cassette Filter Manufacturer: _____ Lot _____

Type: ☐ Background ☐ Pre-Abatement ☒ Abatement ☐ Post-Abatement ☐ OSHA ☐ Ambient ☐ Other _____

Sample I.D. Number	Sample Data: IWA	OWA	Sample Location	Time (24 Hr. Clock): Start	End	Total (Minutes)	Flow Rate (L/Min.): Start	End	Average	Total Air Volume (liters)	Fiber Conc. (f/cc or s/mm)
17			North side	1100	1530	270	10	10	10	2700	
18			East side	1101	1531	270	10	10	10	2700	
19			South side by garage door	1105	1535	270	10	10	10	2700	
20			inside Bldg by Center garage door	1110	1540	270	10	10	10	2700	
21			on Roof North side	1130	1545	255	10	10	10	2550	
22			on Roof South side	1131	1546	255	10	10	10	2550	
23			BLANKS								
24											

CHAIN OF CUSTODY RECORD

Relinquished By:	Date	Time	Received By	Date	Time			Date	Time	
Carmelo Altomonte	9/25/03		L. Ramos	9/25/03	1705	Lab ELAP No.	11480			Microscope Make/Serial No.
						Analyzed By		9/25/2003		
						QC By				
						Lab Batch No.				

Results To:	Phone/Fax Number	Comments:	Analysis Methodology
NAME: Mark Reed (URS)	(212) 609-8098 and (212) 921-0388	203092966	PCM – NIOSH 7400A
NAME			TEM – AHERA

SCILAB

SCIENTIFIC LABORATORIES, INC.

117 EAST 30TH STREET
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-9392

September 25, 2003

URS Corporation
Attn: Mark Reed
5 Penn Plaza
13th Floor
New York, NY 10001

RE: URS Corporation
Job Number 203092966
P.O. #
27010-039-5050; GTE/OSI; 140 Cantiague Rock Road, Hicksville, New York / Abatement

Dear Mark Reed:

Enclosed are the results for PCM asbestos analysis of the following URS Corporation samples received at SCILAB on Thursday, September 25, 2003, for a immediate turnaround:

09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24

The 16 samples contained in Air Cassettes were shipped to SciLab via Hand Delivered. These samples were prepared according to PCM methodology as specified in NIOSH Method 7400, Issue #2, 8/15/94. The counting rules used are described in previous versions of this method as "A" rules unless otherwise noted within the report. The attached table represents a summary of the fiber count results which are not adjusted for blanks if analyzed.

This report relates ONLY to the sample analysis expressed as fibers/sq mm of filter area. SciLab assumes no responsibility for customer supplied data such as "sample location" or "air volume sampled". This report must not be used to claim product endorsement by SciLab or any SciLab certifying agency. Complete analytical documentation is archived and available upon written request. The National Institute of Standards and Technology Accreditation requirements, mandates that this report must not be reproduced, except in full without the approval of the laboratory.

SciLab appreciates this opportunity to serve your organization. Please contact us for any further assistance or with any questions.

Sincerely,

Lance Tuckruskye
QA/QC Compliance Officer

SciLab Job #: **203093062**

Client Name: URS Corporation

Phase Contrast Microscopy (PCM) Fiber Results

27010-039-5050; GTE/OSI; 140 Cantiague Rock Road; Hicksville, New York/Abatement

SciLab Sample #	Client Sample # / Location	Date Collected	Flow Rate (liters/min.)	Duration (min.)	Air Filtered (liters)	Fields	Fibers	Fiber Density (Fibers/mm^2)	Fibers Conc. (Fibers/cc)	TWA
01	25 OWA North Side	9/26/2003	10	300	3000	100	6	7.64	0.001	
02	26 OWA East Side	9/26/2003	10	300	3000	100	7	8.92	0.001	
03	27 OWA South Side By Garage Door	9/26/2003	10	300	3000	100	6	7.64	0.001	
04	28 OWA Inside Bldg. By Center Garage Door	9/26/2003	10	300	3000	100	8	10.19	0.001	
05	29 OWA On Roof North Side	9/26/2003	10	300	3000	100	10	12.74	0.002	
06	30 OWA On Roof South Side	9/26/2003	10	300	3000	100	7	8.92	0.001	
07	31 Blank	9/26/2003	0	0	0	100	0.5	0.64	**Footnotes:** *1*	
08	32 Blank	9/26/2003	0	0	0	100	0.5	0.64	**Footnotes:** *1*	

Reporting Notes:

(1) Fibers/cc cannot be calculated for samples (or blanks) with no air volume.

Analyzed by: Fred A. Corirossi _____; Date Analyzed: 9/26/2003

Samples analyzed by NIOSH 7400(A) Method, Issue #2, 8/15/94: Limit of Detection= 5.5 fibers per 100 fields or 7 fibers/mm2: Blank analyses are reported when available, however are not used to adjust results of associated samples in this report. This report relates ONLY to the sample analysis expressed as fibers/sq mm of filter area: ND=No fibers observed: NA= Not Analyzed; Walton-Beckett graticle field area = 0.00785 mm2: TWA = 8 Hr TWA calculation assumes zero exposure for remainder of 8 hr period not sampled: Upper 95% Confidence limit (Employers Compliance Test)- Calculated as a one sided UCL to determine 95% certainty of compliance with the 0.01 fiber/cc standard: Estimated relative standard deviation: Intralab Sr=0.405, Interlab Sr=0.45, New York samples (NYSDOH ELAP Lab # 11480): National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. AIHA # 102843.

URS Corporation – New York,
5 Penn Plaza, 13th Floor, New York, NY 10001
Phone: 212-840-0595 / Facsimile: 212-921-0388

ASBESTOS PROJECT AIR SAMPLING FORM

Client Name:	Project Name & Location:	Laboratory Name & Address:	Turnaround Time
CLIENT NAME: GTE/OSI	140 Cantiague Rock Road, Hicksville, New York	Scilab, 117 East 30th Street, New York, New York	☒Immediate ☐3 Hours ☐6 Hours ☐12 Hours ☐24 Hours ☐Other

URS Project Manager:	URS Project/Air Monitor:	Rotometer Number:	☒PCM (0.8) micron MCE Cassette Filter Manufacturer: Lot	☐TEM (0.45) micron MCE Cassette Filter Manufacturer: Lot	Type
NAME: Mark Reed	Carmelo Altomonte	023			☐Background ☐Pre-Abatement ☒Abatement ☐Post-Abatement ☐OSHA ☐Ambient ☐Other
URS Project Number: 27010-039-5050	Date: 9/26/03				

Sample I.D. Number	Sample Data: IWA	OWA	Sample Location	Time (24 Hr. Clock): Start	End	Total (Minutes)	Flow Rate (L/Min.): Start	End	Average	Total Air Volume (liters)	Fiber Conc. (f/cc or s/mm)
25		V	North side	0730	1230	300	10	10	10	3000	
26		V	East side	0731	1231	300	10	10	10	3000	
27		V	South side by garage door	0735	1235	300	10	10	10	3000	
28		V	inside Bldg by Center garage door	0740	1240	300	10	10	10	3000	
29		V	ON roof north side	0750	1250	300	10	10	10	3000	
30		V	ON roof South side	0751	1251	300	10	10	10	3000	
31			BLANKS								
32											

CHAIN OF CUSTODY RECORD

Relinquished By:	Date	Time	Received By	Date	Time		Date	Time	Microscope Make/Serial No.
Carmelo Altomonte	9/26/03		L. Clarke	9/26	15:05	Lab ELAP No. 11480			
						Analyzed By	9/26/03		
						QC By			
						Lab Batch No.			

Results To:	Phone/Fax Number	Comments:	Analysis Methodology
NAME: Mark Reed (URS)	(212) 609-8098 and (212) 921-0388	203093062	PCM – NIOSH 7400A
NAME			TEM – AHERA

SCILAB

SCIENTIFIC LABORATORIES, INC.

117 EAST 30TH STREET
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-9392

September 26, 2003

URS Corporation
Attn: Mark Reed
5 Penn Plaza
13th Floor
New York, NY 10001

RE: URS Corporation
Job Number 203093062
P.O. #
27010-039-5050; GTE/OSI; 140 Cantiague Rock Road; Hicksville, New York/Abatement

Dear Mark Reed:

Enclosed are the results for PCM asbestos analysis of the following URS Corporation samples received at SCILAB on Friday, September 26, 2003, for a immediate turnaround:

25, 26, 27, 28, 29, 30, 31, 32

The 8 samples contained in Air Cassettes were shipped to SciLab via Hand Delivered. These samples were prepared according to PCM methodology as specified in NIOSH Method 7400, Issue #2, 8/15/94. The counting rules used are described in previous versions of this method as "A" rules unless otherwise noted within the report. The attached table represents a summary of the fiber count results which are not adjusted for blanks if analyzed.

This report relates ONLY to the sample analysis expressed as fibers/sq mm of filter area. SciLab assumes no responsibility for customer supplied data such as "sample location" or "air volume sampled". This report must not be used to claim product endorsement by SciLab or any SciLab certifying agency. Complete analytical documentation is archived and available upon written request. The National Institute of Standards and Technology Accreditation requirements, mandates that this report must not be reproduced, except in full without the approval of the laboratory.

SciLab appreciates this opportunity to serve your organization. Please contact us for any further assistance or with any questions.

Sincerely,

Lance Tuckruskye
QA/QC Compliance Officer

URS

APPENDIX B

URS DAILY FIELD REPORTS

URS

5 Penn Plaza, 13th Floor * New York, NY 10001 * 212-840-0595

URS CORPORATION
SITE LOG

Date: 9/22/03 Time: _____ a.m./p.m. Location: 140 Cantiague Hicksville
Project No.: 5050 Project Name: GTE/OSI
Project Monitor: Carmelo Altomonte Contractor: Fiber Control
Contractor On-Site Supervisor: Matthew McCarson No. of Workers: 6

TIME	NOTES
0700	Arrive at site
0730	meet Mark Reed
0800	awaiting Contractor
0930	Contractor on site
1000	Begin set up shell - NO poly or asbestos work today
1030	Fibre Control has 2 Employs both supervisors
1100	The scope of work today is only decon shell.
1130	screwing wood together.
1200	lunch.
1230	Back from lunch.
1300	Finishing up shell
1330	shell Finished
1400	Fibre Control Cannot do any other Prep. Start date on Notification is 9/23/03
1430	Contractor off site - Carmelo off site

URS

5 Penn Plaza, 13th Floor * New York, NY 10001 * 212-840-0595

URS CORPORATION
SITE LOG

Date: 9/24/03 Time: _____ a.m./p.m. Location: 140 Cantiague
Project No.: 27010-039-5050 Project Name: GTE/OSI
Project Monitor: Carmelo Altomonte Contractor: Fibre Control
Contractor On-Site Supervisor: Matthew McCarson No. of Workers: 6

TIME	NOTES
0700	Arrive at site
0730	Contractor onsite
0800	Contractor "Fibre Control" has 6 people on site 1 Super and 5 Handlers - The scope of work today is Finish poly decon - set up chute Cut roof in 3' squares and if time allows remove.
0830	Continue Prep decon. Poly-ing inside
0900	Hot water Heater and filter added.
0930	drum in dirty room.
1000	inspect decon - Decon Functional
1030	awaiting o.k. to Poly w/A of Dumpster - "The Envirocon" people are removing a Storage tank from that area and are asking us to stay clear
1100	Poly-ing wall where chute goes - o.k. to access area
1130	Poly Floor under dumpster
1200	Contractor takes lunch.
1230	Contractor back from lunch.
1300	Poly dumpster 2 layers - Begin assembling chute
1330	Chute assembled - Begin Poly-ing chute
1400	Chute o.k. - placed inside dumpster
1430	O.K. to Begin removal - only cut roof in 3'sq.
1500	using motorized saw to cut roof in 3' sections
1515	done for today - workers Shower out.
1530	Contractor off site - Bring samples to Sc. - Lab.

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URS CORPORATION
SITE LOG

Date: 9/25/03 Time: _____ a.m./p.m. Location: 140 Cantiague rock rd.
Project No.: 27010-039-5050 Project Name: G.T.E/051
Project Monitor: Carmelo A. Contractor: Fibre Control
Contractor On-Site Supervisor: Matthew McCarson No. of Workers: 6

TIME	NOTES
0700	Arrive at site. Contractor on site - safety meeting
0730	Safety meeting over
0800	workers suited up. Begin roof removal
0830	Starting from North End and working their way south to where dumpster is.
0900	Contractor has 6 people on site 1 Super and 5 Handlers
0930	workers wearing 1/2 face - tyveks - gloves - hats - vests - Boots. .... also tell supervisor that he needs Lockers and Bench in Clean room of Decon - Super said he'll get right on it.
1000	Picking up roofing and Carrying it to chute
1030	5 workers - all on roof - picking up roof and dropping it down chute into dumpster.
1100	most of roof ripped up and into dumpster
1130	discussing with supervisor how to handle skylights and get rid of them.
1200	Contractor takes lunch
1220	State D.O.L. inspectors Eric Luteker and Barry Frazier visit site
1245	inspect site with with D.O.L. people - there is a discussion about "A.V. 119"
1300	The inspectors find 2 deficiencies ① no Lockers and Bench in clean Room ② wheelbarrow used to transport roofing Not Poly'd

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URS CORPORATION
SITE LOG

9/25/03

Date: [illegible] Time: _____ a.m./p.m. Location: 140 Cantiague rock rd.
Project No.: 27010-039-5050 Project Name: G.T.E./051
Project Monitor: Carmelo Altomonte Contractor: Fibre Control
Contractor On-Site Supervisor: Matthew McCarson No. of Workers: 6

TIME	NOTES
1330	inspectors go over site with a fine tooth comb and agree to let us Continue.
1400	inspectors off site
1430	workers cleaning up roofing not much left-it Look as if were not going to get to Skylights today.
1500	Hepa Vacuum area - drop Poly Curtain on East side of Roof
1530	Workers shower out
1600	Contractor off site - Bring samples to Lab.

URS

5 Penn Plaza, 13th Floor * New York, NY 10001 * 212-840-0595

URS CORPORATION
SITE LOG

Date: 9/26/03 Time: _____ a.m./p.m. Location: 140 Cantiague rock rd.
Project No.: 27010-039-5050 Project Name: GTE/OSi
Project Monitor: Carmelo Altomonte Contractor: Fibre Control
Contractor On-Site Supervisor: Matthew McCarson No. of Workers: _____

TIME	NOTES
0700	Arrive at site - Contractor on site
0730	The scope of work today is Finish Removal - pop up skylights - Cover dumpster - and Breakdown
0800	Fibre Control has 6 people on site 1 Super and 5 Handlers. - workers suited up and on roof
0830	removal Complete - Fine Cleaning roof.
0900	taking machines off roof "roof cutters"
0930	Hepa Vac roof
1000	Finishing up Hepa Vac roof
1030	done Hepa Vac roof inspect roof
11000	Roof Removal Complete -
1130	Cut Curtains on East side - take down chute
1200	Chute down - Curtain down
1230	inspect area - O.K.
1300	Break down decon
1330	Begin packing Equip. in truck.
1400	truck packed - Contractor off site - Bring Samples to Lab

URS Corporation
5 Penn Plaza, 13th Flr.
New York, New York 10001

ASBESTOS CONTRACTOR WORKER LOG SHEET

Abatement Contractor: **Fiber Control, Inc.**

Project Name: **GTE/OSI**

Project Location: **140 Cantiague Rock Road, Hicksville, New York**

Technician Name: Carmelo Actomonte

Contractor Shift: 7 AM

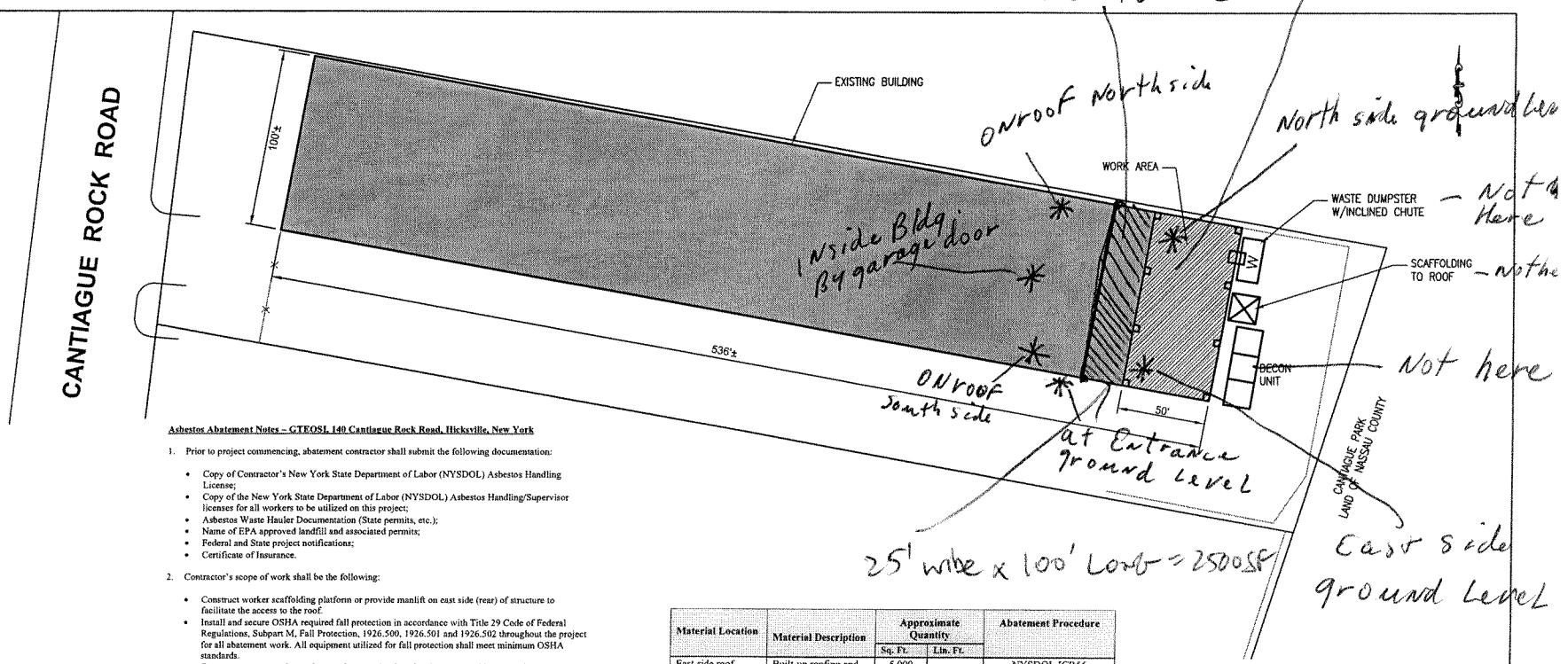
Date Started: 9/24/03

Date Completed: _____

URS Project No.: W.O. 5050

Name	NYCDEP	[redacted]	NYSDOL	Exp. Date	M	T	W	TH	FRI	SAT	SUN
* Matthew J. McCarson		Super	AH 88-0 3840	12/03	✓		✓	✓	✓		
Sergio Gallegos		Handler	AH 98-17175	3/04	✓		✓	✓	✓		
Lauro R. Cabrera		Handler	AH 97-02899	6/04			✓	✓	✓		
Alejandro Jimenez		Handler	AH 97-16364	4/04			✓	✓	✓		
Igor Ortiz		Handler	AH 01-15555	2/04			✓	✓	✓		
Fabian Ordonez		Handler	AH 98-15117	6/04			✓	✓	✓		
			AH								
			AH								
			AH								
			AH								

Pump Locations *



Asbestos Abatement Notes – GTEOSI, 140 Cantiague Rock Road, Hicksville, New York

1. Prior to project commencing, abatement contractor shall submit the following documentation:
   - Copy of Contractor's New York State Department of Labor (NYSDOL) Asbestos Handling License;
   - Copy of the New York State Department of Labor (NYSDOL) Asbestos Handling/Supervisor licenses for all workers to be utilized on this project;
   - Asbestos Waste Hauler Documentation (State permits, etc.);
   - Name of EPA approved landfill and associated permits;
   - Federal and State project notifications;
   - Certificate of Insurance.
2. Contractor's scope of work shall be the following:
   - Construct worker scaffolding platform or provide manlift on east side (rear) of structure to facilitate the access to the roof.
   - Install and secure OSHA required fall protection in accordance with Title 29 Code of Federal Regulations, Subpart M, Fall Protection, 1926.500, 1926.501 and 1926.502 throughout the project for all abatement work. All equipment utilized for fall protection shall meet minimum OSHA standards.
   - Construct remote worker and waste decontamination chamber on east side (rear) of building.
   - Install an air/dust tight inclined chute to waste dumpster below roof level on east side of building.
   - Removal of approximately 5,000 square feet (SF) of existing asbestos-containing built-up roofing and roof flashing from the far east section of the building; dispose of all materials as non-friable asbestos waste. All removal work shall be conducted in accordance with New York State Department of Labor's Industrial Code Rule 56 (NYSDOL ICR) Applicable Variance (AV) No. 119. Work shall be conducted in a single phase with weather permitting;
   - Removal of approximately 48 linear feet (LF) of existing asbestos-containing caulking from around the skylights within the roof abatement work area noted above; dispose of all materials as non-friable asbestos waste. All removal work shall be conducted in accordance with New York State Department of Labor's Industrial Code Rule 56 (NYSDOL ICR) Subpart 56-3.
3. A remote personal and waste decontamination chamber shall be required for this project and is shown on drawing (east side of building) for contractor's reference. Abatement work shall commence only after decontamination chamber is fully constructed and operational.
4. Contractor shall ensure that all electrical items within the roof work area (fans, electrical conduit, etc.) shall be disconnected. Electrical source is available from within the building for contractor's use or contractor may utilize gas powered generators for the project.
5. Water is available from within the existing men's and women's restrooms within the building (west side) for the contractor's use for the project. Contractor shall provide water heater for use for the decontamination chamber.
6. Waste shall be transported from the roof level to the east side of the building via enclosed inclined chute to sealed dumpster below. Sealed carts shall be used to transport ACM waste across roof to chute.
7. Contractor shall submit the following documentation prior to final payment on the project:
   - Original, fully executed waste manifests for all waste shipped off the site;
   - Copies of the Abatement supervisor's daily log book and sign-in sheets for each day of work;
   - A Letter of Compliance stating that all the work on this project was performed in accordance with the project specifications and all applicable Federal, State and Local regulations.

Material Location	Material Description	Approximate Quantity		Abatement Procedure
		Sq. Ft.	Lin. Ft.	
East side roof section	Built-up roofing and roof flashing	5,000		NYSDOL ICR56 Applicable Variance (AV) No. 119
Around skylights and vents on east side roof section	Caulking		48	NYSDOL ICR56 Subpart 56-3
	Total ACM	5,000 SF	48 LF	

SCALE: 1"=60'

IT IS A VIOLATION OF NEW YORK STATE LAW FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER AN ITEM ON THIS DRAWING IN ANY WAY. IF AN ITEM BEARING THE SEAL OF AN ENGINEER OR LAND SURVEYOR SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

REVISION	DESCRIPTION	DATE	APPROVED

GTEOSI
140 CANTIAGUE ROCK ROAD
HICKSVILLE, NEW YORK 11801

URS CORPORATION-NEW YORK
1515 BROADWAY 35th FL NEW YORK, N.Y. 10036
PHONE: (212) 845-6000
FAX: (212) 391-4965

ASBESTOS ABATEMENT DESIGN PLAN

SITE PLAN

DRAWN BY	C. VALLEJOS		DATE : 02/20/03
DESIGNED BY	M. REED		DRAWING NO. AD-02
CHECKED BY	R. BRATHOVDE		
APPROVED BY	R. BRATHOVDE		REVISION

URS

APPENDIX C

NEW YORK STATE DEPARTMENT OF LABOR (NYSDOL) APPLICABLE VARIANCE (AV) NO. 119

STATE OF NEW YORK
DEPARTMENT OF LABOR
STATE OFFICE BUILDING CAMPUS
ALBANY, NEW YORK 12240-0100

In the Matter of

Part 56 of Title 12 of the Official Compilation Of Codes, Rules and Regulations of the State of New York

(Cited as 12 NYCRR 56)
(As Amended Effective November 9, 1999)

ICR 56-6.1, 8.1(j), 8.1(k)(1-5), 9.1(a), 10.1(a), 11.1(b), 12.1(c), 15.2(c-e,h) and 17

COMMISSIONER'S DECISION

APPLICABLE VARIANCE 119
(AV 119)

Asbestos Containing Roofing/Flashing Removal

DATED: June 30, 2000

Pursuant to Section 30 of the Labor Law, the Commissioner of Labor has reviewed the above cited provisions of Industrial Code Rule 56, as they relate to the abatement of asbestos containing roofing and roof flashing material.

The Commissioner of Labor has also reviewed numerous petitions for variance or other relief relative to such materials and the decisions rendered relative to these petitions.

The Commissioner of Labor finds that the issuance of an Applicable Variance from the above cited provisions of Industrial Code Rule 56, as such pertain to the removal of asbestos containing roofing and flashing materials would not violate the spirit and purpose of said rules and would secure the public safety as contemplated by said rules.

APPLICABLE VARIANCE

A variance from the cited provisions of Industrial Code Rule 56 is hereby GRANTED subject to the following conditions.

THE CONDITIONS

1. The immediate work area shall be considered to be the roof area from which the asbestos containing roof flashing or roofing and miscellaneous materials are actively being removed. The asbestos work area shall extend twenty-five feet (25') from the perimeter of the immediate work area.

2. All openings (including operable windows, doors, ducts, grilles, communicating openings, etc.) one (1) story above and one (1) story below the roof level of the immediate work area and extending twenty-five (25') beyond, shall be sealed directly with two layers of at least six-mil flame-retardant plastic sheeting. All ven openings which can not be sealed shall be extended vertically a minimum of ei ght (8) feet and remain in operation.

3. A polyethylene drape or curtain may be used instead of plasticizing the windows individually. The drape may be removed once the roof system has been placed.

4. The drape or curtain, if used, shall be made of two layers of a continuous eighteen-foot curtain (drape) of at least six-mil plastic hung from the top of the wall or parapet. The plastic curtain shall be secured using nailer strips and ram set charges or other methods approved by the Project Engineer. The bo ttom of the plastic curtain shall be sufficiently weighted or anchored to prevent lifting due to winds. Curtain seams shall overlap at least twelve inches and be sealed with duct tape front and back. The curtain ends and each seal shall be reinforced by stapling furring strips to the plastic. The plastic curtain shall extend a minimum of fifteen feet beyond the last opening within twenty-five feet of the work area. When removed, the plastic curtain shall be disposed of as asbestos waste.

5. Any windows that must be plasticized from inside the building because of safety reasons or any fixed or non-operable windows on the floor below or above within 25 feet of the roof work area that are not to be plasticized shall be sealed using caulking or tape/plastic.

6. Upon completion of the roofing removal, within each work area, the caulk, plastic tape or interior plastic sheeting may be removed; however, subsequent to the removal the interior surfaces and trim of each window/opening shall be thoroughly HEPA vacuumed.

7. Where the work area extends outward 25 feet and extends downward one f encompass a passage or vehicular door which must be used for either a prim entrance or by an emergency vehicle thereby precluding sealing such door, a structure (with sides and roof) built of plywood sheeting, covered with at lea (2) layers of at least six mil plastic, shall extend outward 25 feet horizontally the line of vertical projection of the roof edge downward to grade level.

8. Removed flashing and/or roofing materials shall be transported across the roof enclosed containers lined with two (2) layers of 6-mil polyethylene.

9. A chute, if used, shall be air/dust tight along its lateral perimeter and at the terminal connection to the dumpster at ground level (solid wall and top contain The dumpster shall be lined with two (2) layers of six-mil plastic draped loosely over the sides so as to facilitate being wrapped over the top of the load and sea prior to transport from the site. The upper end of the chute shall be furnished w a hinged lid, to be closed when the chute is not being used. Prior to transport fr the work site, the dumpster will be disconnected from the chute and sealed air/dust tight utilizing six mil plastic and tape. The roof waste material will be transported as an asbestos containing material by appropriate legal methods.

10. Dumpsters shall have a hard cover and shall be lined with two (2) layers of six-mi fire-retardant polyethylene.

11. A personal decontamination enclosure system that complies with subpart 56-9 shall be utilized. This enclosure system can be remote, on the property and stationary and within 50 feet of the building. It shall be removed at the end of the project when all work is complete. The enclosure system shall be large enough to accommodate the number of people using it. The access area between the work area and the remote decontamination enclosure shall be restricted using tape barriers and warning signs.

12. If at any time a worker has to pass through an uncontaminated area to access a remote decontamination unit or the next work area, the worker shall don two suits of PPE, remove one suit while in the work area, wet wipe the inner suit, don a clean suit and proceed either to the next work area or the decontamination unit.

13. The asbestos work area, decontamination unit and dumpster shall be cordoned off at a distance of twenty-five (25) feet and shall remain vacated except for certified workers until condition 15 is met.

URS

APPENDIX D

PROJECT NOTIFICATIONS / CORRESPONDENCE

US EPA NOTIFICATION

SUBMITTED BY: Fiber Control Inc.
3010 Burns Ave
Wantagh, NY 11793
NYS DOL Asbestos License #99-0723

SUBMITTED TO: United States Environmental Protection Agency
Air Compliance Branch
290 Broadway; 21st Floor
New York, NY 10007-1866
Att: Bob Fitzpatrick (212-637-4042)

PROJECT PERFORMED FOR: IRON EAGLE ENVIRONMENTAL SERVICES INC.
3401 MERRICK ROAD, SUITE 2
WANTAGH, NY 11793

OWNER: GTE OPERATIONS SUPPORT
600 HIDDEN RIDGE DRIVE
IRVING, TX 75038

SITE: 140 CANTIAGUE RD
HICKSVILLE, NY 11801
MID ROOF

JOB INFORMATION

START DATE: 09-23-03

COMPLETION DATE: 10-07-03

TYPE: ASBESTOS ABATEMENT

DESCRIPTION PROVIDED: REMOVAL AND DISPOSAL OF ASBESTOS CONTAINING MATERIALS

SCOPE PROVIDED: REMOVAL

PROCEDURES SPECIFIED: WET DOWN PROCEDURES, CLEAN-UP TECHNIQUES, HEPA VACUUM

AMOUNTS: 2400 SQ FT NON FRIABLE ROOFING

LANDFILL: 110 Sand Company Clean Fill Disposal Site
Bethpage-Spagnoli Road
Melville, NY 11746

STATE OF NEW YORK - DEPARTMENT OF LABOR
DIVISION OF SAFETY AND HEALTH
ASBESTOS CONTROL BUREAU
State Office Campus
Building 12 - Room 157
Albany, N.Y. 12240

ASBESTOS PROJECT NOTIFICATION

AMENDED NOTIFICATION
a. ☐ Postponed ☐ Cancelled
b. New Start Date _____
c. New End Date _____
d. Submitted By

Refer to Information Sheet or Code Rule 56 for Time Deadlines

EMERGENCY NOTIFICATION REQUESTED
a. Date of Request | b. Time of Day
c. Name of Person Granting Request

WITHIN TWO WORKING DAYS OF THE EMERGENCY APPROVAL, you must submit duplicate copies of this form with the appropriate fee to the Asbestos Control Bureau at the address shown.

1. NAME AND ADDRESS OF CONTRACTOR
Fiber Control, Inc.
3010 Burns Ave.
Wantagh NY 11793

2. FEDERAL EMPLOYER IDENTIFICATION NO.: 11/2855741
3. ASBESTOS LICENSE NO.: 99-0723
4. MAILING ADDRESS, (If different than listed in ITEM 1)
5. NAME AND ADDRESS OF PARTY FOR WHOM THE PROJECT IS BEING PERFORMED: IRON EAGLE ENVIRON.; 3401 MERRICK RD, WANTAGH, NY 11793
6. a. NAME AND TITLE OF DULY AUTHORIZED REPRESENTATIVE: RALPH PANTONY, PRESIDENT
b. TELEPHONE NO.: (516) 781-3000

PROJECT INFORMATION

PROVIDE ALL INFORMATION REQUESTED FOR THE BUILDING/SITE AT WHICH THE ASBESTOS PROJECT WILL BE CONDUCTED.

7. ADDRESS (INCLUDE NAME OF BUILDING, ROOM NO., CITY, TOWN, VILLAGE): 140 CANTIAGUE RD, HICKSVILLE, NY 11801 - MID ROOF
8. NAME OF BUILDING OWNER: GTE OPERATIONS SUPPORT
9. COUNTY: NASSAU
10. CURRENT USE OF BUILDING: VACANT
11. AGE OF BUILDING: 50
12. TOTAL CONTRACT AMOUNT: T.B.D.
13. PROJECT DATE(S) - List phased project dates in **REMARKS** (Item 28)
a. ACTUAL STARTING DATE: 09/23/03
b. PROJECTED ENDING DATE: 10/07/03
14. TYPE OF ASBESTOS WORK (CHECK ALL WHICH APPLY)
☐ Pipe Related
☐ Sprayed on Insulation
☑ Roofing/Flashing
☐ Vessel Covering
☐ Siding
☐ VAT
☐ Demolition
☐ Other (Specify)
15. WILL WORK ON THE PROJECT BE CONDUCTED UNDER A VARIANCE? If yes, specify the type of variance:
☑ APPLICABLE VARIANCE - NO.: AV119
☐ INDIVIDUAL VARIANCE - PETITION NO.: _____
16. WILL SUBCONTRACTORS BE USED ON THE PROJECT? ☐ NO ☑ YES
If yes, please list name and federal employer identification number of each subcontractor in **REMARKS** (Item 28) on reverse of form.
17. ASBESTOS PROCEDURE(S) TO BE USED (CHECK ALL WHICH APPLY)
☑ REMOVAL ☐ DEMOLITION
☐ ENCLOSURE ☐ DISTURBANCE
☐ ENCAPSULATION ☐ HANDLING
☐ OTHER (Specify) _____
18. TYPE OF ASBESTOS MATERIAL
☐ FRIABLE
☑ NON-FRIABLE
19. AMOUNT OF ASBESTOS INVOLVED - CHECK ALL APPLICABLE BOX(ES)

LINEAR FEET	SQUARE FEET
☐ Less than 260 _____ (Specify)	☐ Less than 160 _____ (Specify)
☐ ($100) 260-429	☐ ($100) 160-259
☐ ($200) 430-824	☐ ($200) 260-499
☐ ($500) 826-1649	☐ ($500) 500-999
☐ ($1000) 1650 OR MORE _____ (Specify)	☑ ($1000) 1000 OR MORE 2400 (Specify)

20. METHODS TO BE USED AT PROJECT SITE TO PREVENT ASBESTOS DISSEMINATION (INCLUDING TYPE OF EQUIPMENT AND VENTILATION SYSTEMS USED)

21. I verify that the information specified on this notification is true and accurate and that the project will be conducted in compliance with the requirements of Code Rule 56.

a. *Signature of the Contractor or Duly Authorized Representative* — b. *Date*: 09/09/03

PREPARE THIS APPLICATION IN TRIPLICATE AND SUBMIT:
- An original and one copy (with an ink signature on both copies) to the New York State Department of Labor, Division of Safety and Health, Asbestos Control Bureau, State Office Campus, Building 12-Room 157, Albany, NY 12240; *retain one copy for your records.*
- A check or money order, made payable to the Commissioner of Labor, for the fee due based on the project size as shown in item 19.

This notification must be submitted at least 10 days prior to the starting date of the asbestos project.

SH 483 (3-99)

22. METHOD(S) TO BE USED AT PROJECT SITE TO TREAT OR DISPOSE OF CONTAMINATED WASTE WATER (IF APPLICABLE)

23. NAME AND ADDRESS OF WASTE DISPOSAL SITE, IF ANY	24. NAME AND ADDRESS OF WASTE HAULER/TRANSPORTER, IF ANY
110 Sand Company Clean Fill Disposal Site Bethpage-Spagnoli Road Melville, NY 11746	MARFRAX TRUCKING DEC 1A-170 516-843-6334

25. METHOD(S) TO BE USED AT WASTE DISPOSAL SITE (IF APPLICABLE)

26. LIST ALL EQUIPMENT TO BE USED FOR THIS ASBESTOS PROJECT, e.g. NEGATIVE AIR FILTRATION UNITS, RESPIRATORS, WETTING DEVICES, HEPA VACUUMS, ETC. DO NOT INCLUDE NON-ASBESTOS RELATED EQUIPMENT OR EXPENDABLE SUPPLIES. (ATTACH ADDITIONAL SHEETS IF NECESSARY)

DESCRIPTION OF EQUIPMENT	MANUFACTURER	MODEL NUMBER	QUANTITY
SEE ATTACHED			

27. LABORATORY ANALYSIS TO BE PERFORMED BY:

a. NAME	b. ELAP REGISTRATION NUMBER
TESTING MECHANICS CORP	11018

28. REMARKS

P.G. INDUSTRIAL CONTRACTING, INC. 11-3620694

November 3, 2003

Blue Water Environmental
140 Cantiague Rock Road
Hicksville, NY 11801

Attn: Anthony Schneider

Re: Asbestos Abatement Phase Two Roof Section 25' x 100' at 140 Cantiague Rock Rd.

This letter is to certify that Iron Eagle Environmental services, Inc. successfully completed removal of asbestos containing roofing materials from the above referenced project location. This project was accomplished in compliance with project specifications and all Local, Sate and Federal guidelines governing asbestos removal.

Sincerely,

Mike Amato V.P.

URS

APPENDIX E

PROJECT CERTIFICATIONS AND LICENSES

STATE OF NEW YORK - DEPARTMENT OF LABOR
DIVISION OF SAFETY AND HEALTH
License and Certificate Unit
BUILDING 12, Room 161
STATE CAMPUS
ALBANY, NY 12240

ASBESTOS HANDLING LICENSE

LICENSE NUMBER: 99-0723
DATE OF ISSUE: 7/31/03
EXPIRATION DATE: 8/31/04

Contractor: FIBER CONTROL, INC.

Address: 3010 Burns Avenue
Wantagh, NY 11793

Duly Authorized Representative: Ralph Pantony

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. The licensee verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Richard Cucolo, Director
FOR THE COMMISSIONER OF LABOR

SH 432 (10-00)

URS *New York State Asbestos Handling License*

STATE OF NEW YORK - DEPARTMENT OF LABOR
DIVISION OF SAFETY AND HEALTH
License and Certificate Unit
BUILDING 12, Room 161
STATE CAMPUS
ALBANY, NY 12240

ASBESTOS HANDLING LICENSE

RESTRICTED LICENSE - NO ASBESTOS REMOVAL PERMITTED

LICENSE NUMBER: 99-0085
DATE OF ISSUE: 4/23/03
EXPIRATION DATE: 4/30/04

Contractor: URS Corporation

Address: One Penn Plaza, Suite 610
New York, NY 10119

Duly Authorized Representative: Thomas J. Clancy

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. The licensee verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Richard Cucolo, Director
FOR THE COMMISSIONER OF LABOR

SH 432 (10-00)

This card certifies that

Carmelo Altomonte

has completed 40-Hour HAZWOPER Training

on

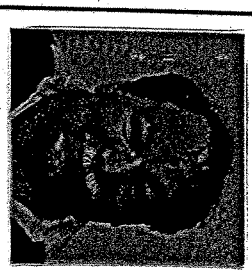
July 18, 2002

at Emilcott Associates, Inc.

for verification
call 973-765-0991

WALLET CARD
STATE OF CONNECTICUT
DEPARTMENT OF PUBLIC HEALTH
NAME
CARMELO ALTOMONTE
VALIDATION NO. 03-882207
LICENSE NO. 000374
CURRENT THROUGH 06/30/04
PROFESSION
ASBESTOS CONSULTANT-PROJECT MONITOR
SIGNATURE
COMMISSIONER DEPT. OF PUBLIC HEALTH

MUST BE CARRIED ON ASBESTOS PROJECTS



CERTIFICATE NUMBER
AH 94-01463
EXPIRES
SOCIAL SECURITY NUMBER
XXX-XX-6849
EYES BRO
HAIR BRO
WEIGHT 220lbs.
HEIGHT 5ft. 0in.
146432C

ADDRESS CORRESPONDENCE TO:
(include certificate number)
NYS Department of Labor
DOSH - License and Certificate Unit
PO Box 687, New York, NY 10014-0687

New Jersey Department of Health & Senior Services
Lead Certification Permit
CARMELO ALTOMONTE
3668 KENNEDY BLVD
JERSEY CITY, NJ 07307
SUPERVISOR
COMM. BLDGS. & SUPERSTRUCTURE
Permit Number: 011540
I.D. Number: 008396
Height: 5'08 Weight: 240
Expiration Date: 6/2/2004
Director

This PERMIT has been issued in accordance N.J.A.C. 8:62. You MUST have this permit with you on the job. This PERMIT may be revoked and/or penalties issued if you fail to follow established lead safety and health practices.

This PERMIT may be revoked and/or penalties issued if it is loaned or abandoned, or allowed to pass from the personal control of the owner, or if the owner fails to exercise proper control over it.

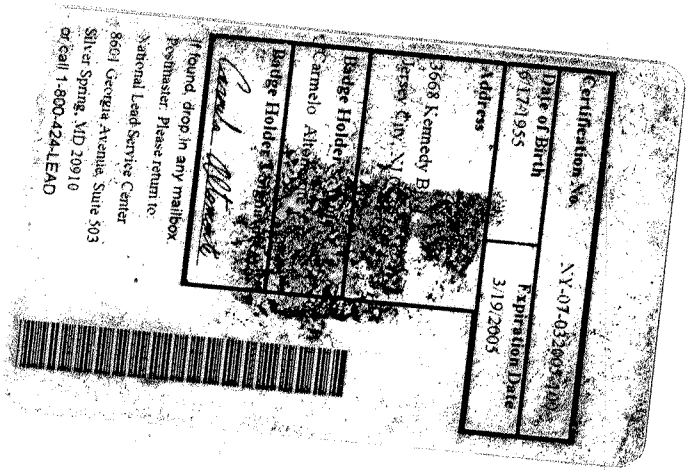
This PERMIT is invalid if it is altered, defaced, multilated, or tampered with in any manner. Any person performing lead activities after this permit has expired shall be subject to the penalty provisions of N.J.A.C. 8:62.

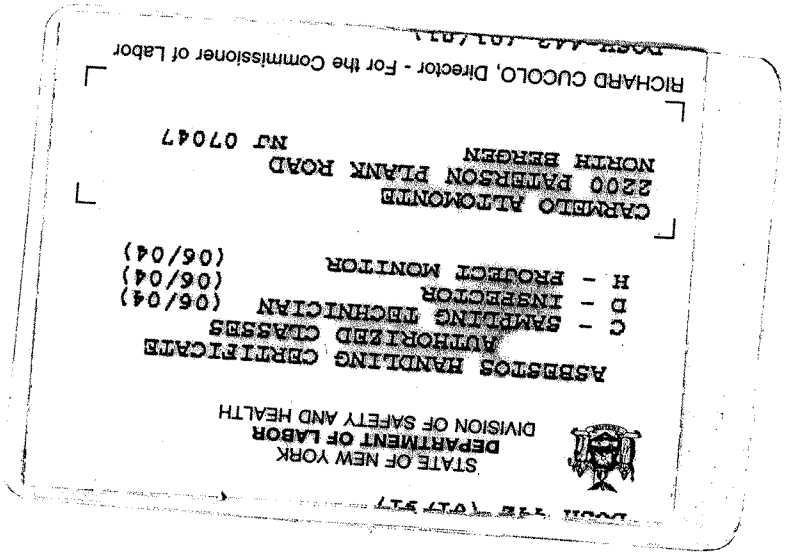
For information, corrections, or changes, direct all inquiries to the following:

New Jersey Department of Health and Senior Services
Consumer and Environmental Health Services
Lead and Asbestos Program
P.O. BOX 372
3635 Quakerbridge Road
Trenton, NJ 08625-0372

Telephone: (609) 588-4573 Fax: (609) 588-7618

This card, in and of itself, does not constitute verification of the identity of the bearer. Independent picture identification should also be checked when determining the validity of the licensure/certification of any individual.





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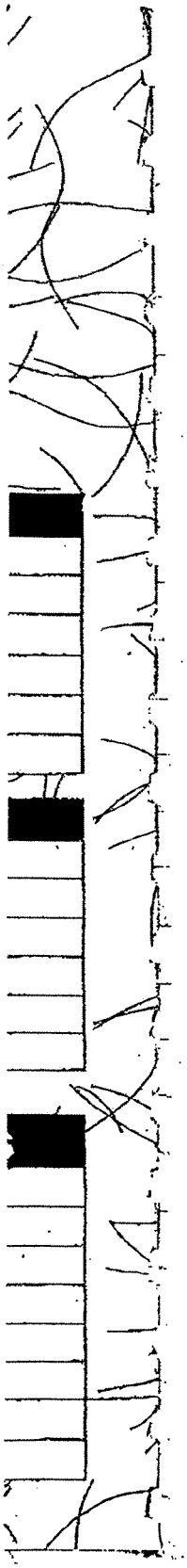
APPENDIX F

CONTRACTOR'S DAILY REPORT



wed (9/24/03)

7.00 arrive on site sign in
7.30 have safety meeting in office
7.45 escorted to area of work
8:00 men work on plastic on Deacon set up
8.30 finish decon go to set plastic on wall and floor ~~over~~ where dumpster is going to be men are told to clear area while hazardest tank is put into close container. takes about 45 min to load or more
10.00 tank loaded men proceed to work put plastic on wall men are stopped again. have to ~~stay~~ there
16.30 harness if closer than 6 ft from edge safety monitor over sees us to make sure TDP supplies us with harnesses.
11.00 men are setting up shoot have to cut holes in roof ~~floor~~ for into metal run cable to hold shoot
11.30 every thing is a project on this job men still working on shoot

OCT 30 03 09:01a

WED (9/24/03)

1200 lunch

1230 Back to work poly truck with plastic

1100 start to cut roof ~~[illegible]~~ Hold off on cutting Roof

want caution tape on cable around school. start cutting roof at 145

200 men start to remove +

230 same

300 same

315 come off roof go home

700

730

800

900

93

100

11:

113

120

12:

10

20

30

4(

5?

thurs (9/25/03)

700	Men are waiting to be escorted to work area
730	suit up go on top of roof start to remove
800	still removing
900	same
930	shoot jimmed clear debre apart. still removing last of first layer
1000	start removing 2 layer of roof
1100	same
1130	same
1200	Lunch
1230	lunch over Back to work
100	same
200	stop to put 100 ft curtain on east wall
300	still putting curtain finished curtain
to	start cleaning of roof again to 330
330	

used

Oct 30 03 09:02a

FRI (9/26/03)

700 arrive 700
715 wait for escort
730 men on roof start finishing roof
800 same take roof cutters off roof
830 same
9:00 start to remove skylights
same
1000 same
1100 skylights are in container little clean up on roof school cleaned and removed
11:30 air monitor and myself go to inspect every thing good
1200 covering container with Plywood and poly
100 cleaning around container
200 cleaning under section of roof outside of Building take decon down load up and leave
Job Done

URS

APPENDIX G

WASTE MANIFESTS

CUSTOMER COPY

110 Sand Company

170 Cabot Street
West Babylon, New York 11704

TELEPHONES
Office - 631-249-4108
Scalehouse - 631-694-2822
Landfill - 631-694-2848

CUSTOMER NO.	P.O. NUMBER	TRUCK NO.	TYPE OF SALE	JOB NO.	OUR ORDER NUMBER	TICKET NO.
11428	B10112	7205	LAND FILL			263786

CUSTOMER NAME:
BLUE WATER ENVIRONMENTAL

GROSS	TARE	NET	UNIT	WEIGHED BY
		36.00	CU. YD.	OLO

DATE	TAX PERCENTAGE	TRUCK CODE	MATERIAL CODE
9/29/03			931

MATERIAL DESCRIPTION
DEMOLITION (CR)

IN	OUT	CHECK NO./CHARGE TYPE	LICENSE NO.
8:11			AD46447

DELIVERY ADDRESS
BTE OPERTION SUPPORT
CANTIAGUE ROCK RD.
30*7.3*4.6=36YD WL

TOTAL TODAY
QUANTITY THIS ORDER TODAY
LOADS THIS ORDER TODAY

OFFICE USE ONLY
TRAILER / DON CUMBO

RECEIVED BY:

CARRIER SIGNATURE _____

CUSTOMER SIGNATURE _____

SEE REVERSE SIDE FOR COLLECTION TERMS

Iron Eagle Environmental Servi

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No. | 2. Page 1 of | CRR 140-5

3. Generator's Name and Mailing Address
GTE Operation Supprt Inc.
140 Cantiague Rock Road Hicksville NY
4. Generator's Phone (516) 932-9157

site: 140 Cantiague Roc
Road Hicksville, NY

5. Transporter 1 Company Name | 6. US EPA ID Number | A. Transporter's Phone
Bluewater Environmental Inc. | | 631-752-2145

7. Transporter 2 Company Name | 8. US EPA ID Number | B. Transporter's Phone

9. Designated Facility Name and Site Address | 10. US EPA ID Number | C. Facility's Phone
110 Sand Company Clean Fill Disposal Site
Bethpage-Spagnoli Road Melville NY 11714 | | 631-694-2822

GENERATOR

11. Waste Shipping Name and Description	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol
a. NON-Friable Asbestos Roofing	1	35	35 yds	
b.			36	
c.				
d.				

D. Additional Descriptions for Materials Listed Above

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

16. **GENERATOR'S CERTIFICATION:** I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name: Jean Agostinelli | Signature | Month 09 | Day 29 | Year 03

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: DONALD CUMBO | Signature | Month | Day | Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Month | Day | Year

FACILITY

19. Discrepancy Indication Space

263786

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Month 9 | Day 29 | Year 03

ORIGINAL - RETURN TO GENERATOR

VIBRA-TECH®
The Vibration Monitoring Experts
500A Campus Drive, Mount Holly, NJ 08060
609-261-7100 FAX 609-261-0701

December 3, 2004

Mr. Tom Stratafora
Blue Water Environmental
1610 New Highway
Farmingdale, NY 11735

Re: **Vibration Monitoring Report for**
600 West John Street, Hicksville, NY

Dear Mr. Stratafora:

The following report is based upon the vibration monitoring results obtained via remote seismograph systems during construction activities on June 20, 2003, through November 30, 2004, at the above referenced property.

The report contains the seismograph monitoring logs along with a comparison of the recorded vibrations to the criteria limit of 1.0 in./sec. recommended by Vibra-Tech's senior engineer Mohamad Sharifinassab, P.E.

The recorded ground vibrations were in conformance with the criteria limit recommended for this project. Please refer to our report and the seismograph records included in the appendixes for specific information and intensities.

Sincerely,

VIBRA-TECH ENGINEERS, INC.

Scott J. Kavalek
Area Manager

Douglas Rudenko
Vice President

SJK/rw/030070

Vibration Monitoring Report
for

600 West John Street
Re: 140 Cantiague Rock Road
Hicksville, NY
June 20, 2003, through November 30, 2004

Prepared for:

Mr. Tom Stratafora
Blue Water Environmental
1610 New Highway
Farmingdale, NY 11735

Prepared by:

Vibra-Tech Engineers, Inc.
500A Campus Drive
Mount Holly, NJ 08060
1-609-261-7100

December 3, 2004

Vibration Monitoring Report
for
140 Cantiague Rock Road
Hicksville, NY

Introduction

Vibration monitoring authorized by Blue Water Environmental, Inc., was carried out by Vibra-Tech Engineers, Inc., at the above referenced project. Ground vibrations were monitored during construction activity via a remote seismograph system from June 20, 2003, through November 30, 2004, and compared to the criteria limit of 1.0 in/sec. recommended by Vibra-Tech's senior engineer, Mohamad Sharifinassab, P.E.

Scope of Monitoring

Vibration Monitoring

A vibration monitoring seismograph equipped with a triaxial sensor was permanently installed at 600 W. John Street to record ground vibration produced by construction activities. The sensor was epoxyed to the pavement and weighted 15 ft. west of the Air Techniques annex side entrance.

The seismograph was programmed to continuously record the highest peak vibration level in 15-second intervals during the hours of 07:00 and 21:45.

Instrumentation

The seismograph used directly measures particle velocity in three mutually perpendicular planes of motion. The seismographs have a dynamic range up to 10 in/sec. The entire system is calibrated internally prior to each recording in addition to an annual shake table calibration.

Vibration and Vibration Measurements

The measurement of vibration involves quantifying the rate and amount of oscillation occurring in a vibrating body. The rate of motion, or the number of vibrations occurring in a given time frame, usually one second, is called the frequency of the motion, which is described as the number of cycles/second (cps) or Hertz (Hz).

The amount of movement associated with a vibration can be measured in terms of displacement, velocity, or acceleration. Displacement is a measure of the physical distance traveled from a position of equilibrium or baseline. Velocity is a measure of the speed at which the displacement occurred and acceleration is a measure of the change in velocity occurring during the vibration event. The relationships between displacement,

velocity, and acceleration are also dependent upon the frequency of the motions measured.

The seismograph used to record the conditions at this site measures in terms of velocity. Peak particle velocity was chosen as the descriptor of choice for this project rather than acceleration or displacement due to the fact that most vibration criterion related to cosmetic cracking in buildings is correlated to particle velocity.

In order to completely describe the ground motion, three perpendicular components of the motion must be measured. The longitudinal component (L) is a measurement in a direct line from the source to the monitoring location. The remaining components are vertical (V) and transverse (T), which is perpendicular to the longitudinal component.

Results of the Monitoring

The results of the vibration recorded are contained in the appendix of this report. The results are provided as monthly monitoring logs stating the peak particle velocity recorded on a daily basis for each plane of motion.

Conclusion

The recorded ground vibrations were in conformance with the criteria limit of 1.0 in/sec. recommended by Vibra-Tech's senior engineer, Mohamad Sharifinassab, P.E. for this project. Please refer to the seismograph records included in the appendix for specific information and intensities.

If you have any questions or we may be of further assistance, please advise.

Sincerely,

VIBRA-TECH ENGINEERS, INC.

Scott J. Kavalek
Area Manager

Douglas Rudenko
Vice President

SJK/rw/030070

Event Report: Event List - \vtevents\2003\bluewa~1\2003\8336\06-03

Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVS1 (in/s)	Description
H	BB8336	Jun 20 '03 07:00:14	3	Manual	0.0312	0.0344	0.0344	***	0.0457	Blue Water Environmental
H	BB8336	Jun 21 '03 07:00:14	3	Manual	0.101	0.0719	0.276	***	0.302	Blue Water Environmental
W	BB8336	Jun 21 '03 16:02:16	3	Long	0.101	0.0719	0.276	***	0.302	Blue Water Environmental
H	BB8336	Jun 22 '03 07:00:14	3	Manual	0.0550	0.0512	0.0506	***	0.0892	Blue Water Environmental
H	BB8336	Jun 23 '03 07:00:14	3	Manual	0.0419	0.0450	0.0419	***	0.0668	Blue Water Environmental

Event Report: Event List - \vtevents\2003\bluewa~1\2003\8493\06-03

Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVS1 (in/s)	Description
H	BB8493	Jun 23 '03 08:36:56	3	Manual	0.00687	0.0200	0.00750	***	0.0201	Blue Water Environmental
H	BB8493	Jun 24 '03 07:00:14	3	Manual	0.00562	0.0137	0.00687	***	0.0141	Blue Water Environmental
H	BB8493	Jun 24 '03 10:18:04	3	Manual	0.00562	0.0212	0.00812	***	0.0214	Blue Water Environmental
H	BB8493	Jun 25 '03 07:00:14	3	Manual	0.00937	0.0419	0.0162	***	0.0420	Blue Water Environmental
H	BB8493	Jun 25 '03 15:37:15	3	Manual	0.00437	0.0219	0.0106	***	0.0219	Blue Water Environmental
H	BB8493	Jun 26 '03 07:00:14	3	Manual	0.00812	0.0294	0.0137	***	0.0296	Blue Water Environmental
H	BB8493	Jun 27 '03 07:00:14	3	Manual	0.0231	0.0394	0.0281	***	0.0414	Blue Water Environmental
H	BB8493	Jun 28 '03 07:00:14	3	Manual	0.00437	0.0087	0.00500	***	0.00904	Blue Water Environmental
H	BB8493	Jun 29 '03 07:00:14	3	Manual	0.00437	0.0056	0.00437	***	0.00622	Blue Water Environmental
H	BB8493	Jun 30 '03 07:00:14	3	Manual	0.00625	0.0212	0.00875	***	0.0217	Blue Water Environmental
H	BB8493	Jul 1 '03 07:00:14	3	Manual	0.00750	0.0156	0.00562	***	0.0159	Blue Water Environmental
H	BB8493	Jul 2 '03 07:00:14	3	Manual	0.0106	0.0200	0.00687	***	0.0201	Blue Water Environmental
H	BB8493	Jul 3 '03 07:00:14	3	Manual	0.00875	0.0262	0.00875	***	0.0265	Blue Water Environmental
H	BB8493	Jul 4 '03 07:00:14	3	Manual	0.00437	0.0056	0.00437	***	0.00643	Blue Water Environmental
H	BB8493	Jul 5 '03 07:00:14	3	Manual	0.00437	0.0056	0.00437	***	0.00628	Blue Water Environmental
H	BB8493	Jul 6 '03 07:00:14	3	Manual	0.00437	0.0093	0.00437	***	0.00948	Blue Water Environmental
H	BB8493	Jul 7 '03 07:00:14	3	Manual	0.0156	0.0225	0.0244	***	0.0260	Blue Water Environmental
H	BB8493	Jul 8 '03 07:00:14	3	Manual	0.0112	0.0212	0.0137	***	0.0216	Blue Water Environmental
H	BB8493	Jul 9 '03 07:00:14	3	Manual	0.0219	0.0219	0.0194	***	0.0260	Blue Water Environmental
H	BB8493	Jul 10 '03 07:00:14	3	Manual	0.0162	0.0362	0.0175	***	0.0363	Blue Water Environmental
H	BB8493	Jul 11 '03 07:00:14	3	Manual	0.0194	0.0381	0.0169	***	0.0382	Blue Water Environmental
H	BB8493	Jul 12 '03 07:00:14	3	Manual	0.00500	0.0093	0.00625	***	0.0109	Blue Water Environmental
H	BB8493	Jul 13 '03 07:00:14	3	Manual	0.00437	0.0087	0.00500	***	0.00897	Blue Water Environmental
H	BB8493	Jul 14 '03 07:00:14	3	Manual	0.00562	0.0100	0.00562	***	0.0100	Blue Water Environmental
H	BB8493	Jul 15 '03 07:00:14	3	Manual	0.0194	0.0250	0.0287	***	0.0305	Blue Water Environmental
H	BB8493	Jul 16 '03 07:00:14	3	Manual	0.00875	0.0212	0.0119	***	0.0217	Blue Water Environmental
H	BB8493	Jul 17 '03 07:00:14	3	Manual	0.00687	0.0187	0.00875	***	0.0188	Blue Water Environmental
H	BB8493	Jul 18 '03 07:00:14	3	Manual	0.0125	0.0244	0.0169	***	0.0249	Blue Water Environmental
H	BB8493	Jul 19 '03 07:00:14	3	Manual	0.00562	0.0100	0.00562	***	0.0105	Blue Water Environmental
H	BB8493	Jul 20 '03 07:00:14	3	Manual	0.00437	0.0056	0.00437	***	0.00643	Blue Water Environmental
H	BB8493	Jul 21 '03 07:00:14	3	Manual	0.00750	0.0212	0.00750	***	0.0214	Blue Water Environmental
H	BB8493	Jul 22 '03 07:00:14	3	Manual	0.00812	0.0275	0.0119	***	0.0276	Blue Water Environmental
H	BB8493	Jul 23 '03 07:00:14	3	Manual	0.00625	0.0219	0.00687	***	0.0222	Blue Water Environmental
H	BB8493	Jul 24 '03 07:00:14	3	Manual	0.01000	0.0594	0.0144	***	0.0595	Blue Water Environmental
H	BB8493	Jul 25 '03 07:00:14	3	Manual	0.0156	0.0419	0.0137	***	0.0453	Blue Water Environmental
H	BB8493	Jul 26 '03 07:00:14	3	Manual	0.00500	0.0156	0.00875	***	0.0160	Blue Water Environmental
H	BB8493	Jul 27 '03 07:00:14	3	Manual	0.00437	0.0056	0.00437	***	0.00619	Blue Water Environmental
H	BB8493	Jul 28 '03 07:00:14	3	Manual	0.0112	0.0219	0.0137	***	0.0222	Blue Water Environmental
H	BB8493	Jul 29 '03 07:00:14	3	Manual	0.01000	0.0362	0.00687	***	0.0363	Blue Water Environmental
H	BB8493	Jul 29 '03 09:20:51	3	Manual	0.0150	0.0394	0.0137	***	0.0395	Blue Water Environmental
H	BB8493	Jul 30 '03 07:00:14	3	Manual	0.0144	0.0244	0.00750	***	0.0264	Blue Water Environmental
H	BB8493	Jul 31 '03 07:00:14	3	Manual	0.0106	0.0525	0.0150	***	0.0533	Blue Water Environmental
H	BB8493	Jul 31 '03 15:00:42	3	Manual	0.00625	0.0219	0.00687	***	0.0220	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVS1 (in/s)	Description
M	BB8493	Aug 1 '03 07:00:14	3	Manual	0.00625	0.0269	0.0112	***	0.0269	Blue Water Environmental
M	BB8493	Aug 2 '03 07:00:14	3	Manual	0.00562	0.01000	0.00437	***	0.0106	Blue Water Environmental
M	BB8493	Aug 3 '03 07:00:14	3	Manual	0.00437	0.0119	0.00812	***	0.0122	Blue Water Environmental
M	BB8493	Aug 4 '03 07:00:14	3	Manual	0.00937	0.0194	0.00625	***	0.0196	Blue Water Environmental
M	BB8493	Aug 5 '03 07:00:14	3	Manual	0.00875	0.0200	0.0119	***	0.0205	Blue Water Environmental
M	BB8493	Aug 6 '03 07:00:14	3	Manual	0.0106	0.0425	0.00937	***	0.0428	Blue Water Environmental
M	BB8493	Aug 7 '03 07:00:14	3	Manual	0.00875	0.0269	0.00937	***	0.0269	Blue Water Environmental
M	BB8493	Aug 8 '03 07:00:14	3	Manual	0.0169	0.0512	0.0112	***	0.0514	Blue Water Environmental
M	BB8493	Aug 9 '03 07:00:14	3	Manual	0.00687	0.0287	0.00875	***	0.0294	Blue Water Environmental
M	BB8493	Aug 10 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00622	Blue Water Environmental
M	BB8493	Aug 11 '03 07:00:14	3	Manual	0.0125	0.0287	0.00812	***	0.0301	Blue Water Environmental
M	BB8493	Aug 12 '03 07:00:14	3	Manual	0.0125	0.0375	0.00875	***	0.0378	Blue Water Environmental
M	BB8493	Aug 13 '03 07:00:14	3	Manual	0.00687	0.0325	0.00937	***	0.0327	Blue Water Environmental
M	BB8493	Aug 14 '03 07:00:14	3	Manual	0.0137	0.0331	0.01000	***	0.0332	Blue Water Environmental
M	BB8493	Aug 15 '03 07:00:14	3	Manual	0.00875	0.0200	0.00812	***	0.0201	Blue Water Environmental
M	BB8493	Aug 16 '03 07:00:14	3	Manual	0.00500	0.0187	0.00687	***	0.0188	Blue Water Environmental
M	BB8493	Aug 17 '03 07:00:14	3	Manual	0.00500	0.00687	0.00437	***	0.00710	Blue Water Environmental
M	BB8493	Aug 18 '03 07:00:14	3	Manual	0.01000	0.0250	0.00750	***	0.0253	Blue Water Environmental
M	BB8493	Aug 19 '03 07:00:14	3	Manual	0.01000	0.0275	0.0119	***	0.0288	Blue Water Environmental
M	BB8493	Aug 20 '03 07:00:14	3	Manual	0.00750	0.0200	0.00875	***	0.0202	Blue Water Environmental
M	BB8493	Aug 21 '03 07:00:14	3	Manual	0.0175	0.0469	0.0119	***	0.0471	Blue Water Environmental
M	BB8493	Aug 22 '03 07:00:14	3	Manual	0.0106	0.0519	0.0119	***	0.0520	Blue Water Environmental
M	BB8493	Aug 23 '03 07:00:14	3	Manual	0.00687	0.0200	0.00750	***	0.0202	Blue Water Environmental
M	BB8493	Aug 24 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00656	Blue Water Environmental
M	BB8493	Aug 25 '03 07:00:14	3	Manual	0.0162	0.0625	0.0106	***	0.0629	Blue Water Environmental
M	BB8493	Aug 26 '03 07:00:14	3	Manual	0.0112	0.0456	0.0144	***	0.0457	Blue Water Environmental
M	BB8493	Aug 27 '03 07:00:14	3	Manual	0.00562	0.0181	0.00937	***	0.0183	Blue Water Environmental
M	BB8493	Aug 28 '03 07:00:14	3	Manual	0.00687	0.0169	0.00937	***	0.0170	Blue Water Environmental
M	BB8493	Aug 29 '03 07:00:14	3	Manual	0.0137	0.0412	0.0300	***	0.0423	Blue Water Environmental
M	BB8493	Aug 30 '03 07:00:14	3	Manual	0.00437	0.0106	0.00500	***	0.0109	Blue Water Environmental
M	BB8493	Aug 31 '03 07:00:14	3	Manual	0.00437	0.00625	0.00437	***	0.00685	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVSI (in/s)	Description
H	BB8493	Sep 1 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00643	Blue Water Environmental
H	BB8493	Sep 2 '03 07:00:14	3	Manual	0.00750	0.0244	0.00812	***	0.0251	Blue Water Environmental
H	BB8493	Sep 3 '03 07:00:14	3	Manual	0.0125	0.0406	0.01000	***	0.0406	Blue Water Environmental
H	BB8493	Sep 4 '03 07:00:14	3	Manual	0.00750	0.0331	0.00812	***	0.0334	Blue Water Environmental
H	BB8493	Sep 5 '03 07:00:14	3	Manual	0.01000	0.0337	0.0119	***	0.0344	Blue Water Environmental
H	BB8493	Sep 6 '03 07:00:14	3	Manual	0.00562	0.0194	0.00687	***	0.0196	Blue Water Environmental
H	BB8493	Sep 7 '03 07:00:14	3	Manual	0.00437	0.00562	0.00500	***	0.00616	Blue Water Environmental
H	BB8493	Sep 8 '03 07:00:14	3	Manual	0.01000	0.0369	0.00875	***	0.0371	Blue Water Environmental
H	BB8493	Sep 9 '03 07:00:14	3	Manual	0.0106	0.0250	0.0119	***	0.0252	Blue Water Environmental
H	BB8493	Sep 10 '03 07:00:14	3	Manual	0.0112	0.0525	0.00875	***	0.0526	Blue Water Environmental
H	BB8493	Sep 11 '03 07:00:14	3	Manual	0.00625	0.0231	0.00750	***	0.0232	Blue Water Environmental
H	BB8493	Sep 12 '03 07:00:14	3	Manual	0.00687	0.0369	0.00750	***	0.0371	Blue Water Environmental
H	BB8493	Sep 13 '03 07:00:14	3	Manual	0.00562	0.0231	0.00812	***	0.0234	Blue Water Environmental
H	BB8493	Sep 14 '03 07:00:14	3	Manual	0.00500	0.00562	0.00437	***	0.00643	Blue Water Environmental
H	BB8493	Sep 15 '03 07:00:14	3	Manual	0.00937	0.0281	0.0112	***	0.0282	Blue Water Environmental
H	BB8493	Sep 16 '03 07:00:14	3	Manual	0.0106	0.0325	0.0119	***	0.0329	Blue Water Environmental
H	BB8493	Sep 17 '03 07:00:14	3	Manual	0.00937	0.0356	0.00750	***	0.0359	Blue Water Environmental
H	BB8493	Sep 18 '03 07:00:14	3	Manual	0.00687	0.0275	0.00687	***	0.0275	Blue Water Environmental
H	BB8493	Sep 19 '03 07:00:14	3	Manual	0.0112	0.0275	0.00687	***	0.0281	Blue Water Environmental
H	BB8493	Sep 20 '03 07:00:14	3	Manual	0.00562	0.0144	0.00625	***	0.0144	Blue Water Environmental
H	BB8493	Sep 21 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00628	Blue Water Environmental
H	BB8493	Sep 22 '03 07:00:14	3	Manual	0.00687	0.0262	0.00875	***	0.0263	Blue Water Environmental
H	BB8493	Sep 23 '03 07:00:14	3	Manual	0.00625	0.0225	0.00875	***	0.0226	Blue Water Environmental
H	BB8493	Sep 24 '03 07:00:14	3	Manual	0.0156	0.0462	0.00875	***	0.0466	Blue Water Environmental
H	BB8493	Sep 25 '03 07:00:14	3	Manual	0.0112	0.0537	0.00937	***	0.0541	Blue Water Environmental
H	BB8493	Sep 26 '03 07:00:14	3	Manual	0.0112	0.0256	0.00750	***	0.0270	Blue Water Environmental
H	BB8493	Sep 27 '03 07:00:14	3	Manual	0.0212	0.0219	0.0112	***	0.0232	Blue Water Environmental
H	BB8493	Sep 28 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00606	Blue Water Environmental
H	BB8493	Sep 29 '03 07:00:14	3	Manual	0.0231	0.0287	0.0144	***	0.0367	Blue Water Environmental
H	BB8493	Sep 29 '03 13:51:27	3	Manual	0.0112	0.0269	0.01000	***	0.0286	Blue Water Environmental
H	BB8493	Sep 30 '03 07:00:14	3	Manual	0.0125	0.0262	0.0131	***	0.0266	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVS1 (in/s)	Description
H	BB8493	Oct 1 '03 07:00:14	3	Manual	0.0125	0.0412	0.0131	***	0.0413	Blue Water Environmental
H	BB8493	Oct 2 '03 07:00:14	3	Manual	0.0169	0.0269	0.0175	***	0.0276	Blue Water Environmental
H	BB8493	Oct 3 '03 07:00:14	3	Manual	0.0150	0.0444	0.0131	***	0.0444	Blue Water Environmental
H	BB8493	Oct 4 '03 07:00:14	3	Manual	0.0200	0.0175	0.0194	***	0.0229	Blue Water Environmental
H	BB8493	Oct 5 '03 07:00:14	3	Manual	0.00500	0.00562	0.00500	***	0.00656	Blue Water Environmental
H	BB8493	Oct 6 '03 07:00:14	3	Manual	0.0187	0.0269	0.0137	***	0.0291	Blue Water Environmental
H	BB8493	Oct 7 '03 07:00:14	3	Manual	0.0131	0.0531	0.0144	***	0.0534	Blue Water Environmental
H	BB8493	Oct 8 '03 07:00:14	3	Manual	0.0137	0.0375	0.0150	***	0.0378	Blue Water Environmental
H	BB8493	Oct 9 '03 07:00:14	3	Manual	0.0375	0.243	0.0625	***	0.251	Blue Water Environmental
H	BB8493	Oct 10 '03 07:00:14	3	Manual	0.0244	0.0456	0.0175	***	0.0457	Blue Water Environmental
H	BB8493	Oct 11 '03 07:00:14	3	Manual	0.0137	0.0237	0.0137	***	0.0240	Blue Water Environmental
H	BB8493	Oct 12 '03 07:00:14	3	Manual	0.00500	0.00625	0.00437	***	0.00664	Blue Water Environmental
H	BB8493	Oct 13 '03 07:00:14	3	Manual	0.0150	0.0387	0.0194	***	0.0390	Blue Water Environmental
H	BB8493	Oct 14 '03 07:00:14	3	Manual	0.0219	0.0337	0.0219	***	0.0339	Blue Water Environmental
H	BB8493	Oct 15 '03 07:00:14	3	Manual	0.00625	0.0281	0.00750	***	0.0283	Blue Water Environmental
H	BB8493	Oct 16 '03 07:00:14	3	Manual	0.0150	0.0331	0.0131	***	0.0331	Blue Water Environmental
H	BB8493	Oct 17 '03 07:00:14	3	Manual	0.0200	0.0375	0.0187	***	0.0400	Blue Water Environmental
H	BB8493	Oct 18 '03 07:00:14	3	Manual	0.0137	0.0287	0.0156	***	0.0292	Blue Water Environmental
H	BB8493	Oct 19 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00643	Blue Water Environmental
H	BB8493	Oct 20 '03 07:00:14	3	Manual	0.0212	0.0350	0.0150	***	0.0351	Blue Water Environmental
H	BB8493	Oct 21 '03 07:00:14	3	Manual	0.0194	0.0381	0.0194	***	0.0385	Blue Water Environmental
H	BB8493	Oct 22 '03 07:00:14	3	Manual	0.0162	0.0331	0.0187	***	0.0335	Blue Water Environmental
H	BB8493	Oct 23 '03 07:00:14	3	Manual	0.00937	0.0256	0.01000	***	0.0257	Blue Water Environmental
H	BB8493	Oct 24 '03 07:00:14	3	Manual	0.01000	0.0287	0.0106	***	0.0297	Blue Water Environmental
H	BB8493	Oct 25 '03 07:00:14	3	Manual	0.0137	0.0306	0.0150	***	0.0312	Blue Water Environmental
H	BB8493	Oct 26 '03 07:00:14	3	Manual	0.00437	0.00500	0.00437	***	0.00622	Blue Water Environmental
H	BB8493	Oct 27 '03 07:00:14	3	Manual	0.0169	0.0200	0.0181	***	0.0236	Blue Water Environmental
H	BB8493	Oct 28 '03 07:00:14	3	Manual	0.0231	0.0244	0.0156	***	0.0271	Blue Water Environmental
H	BB8493	Oct 29 '03 07:00:14	3	Manual	0.00625	0.0262	0.0112	***	0.0269	Blue Water Environmental
H	BB8493	Oct 29 '03 21:02:41	3	Manual	0.00500	0.0187	0.00500	***	0.0193	Blue Water Environmental
H	BB8493	Oct 30 '03 07:00:14	3	Manual	0.0125	0.0287	0.0150	***	0.0304	Blue Water Environmental
H	BB8493	Oct 31 '03 07:00:14	3	Manual	0.0162	0.0312	0.0162	***	0.0324	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (psi)	PVS1 (in/s)	Description
H	BB8493	Nov 1 '03 07:00:14	3	Manual	0.00937	0.0219	0.00937	***	0.0223	Blue Water Environmenta
H	BB8493	Nov 2 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00643	Blue Water Environmenta
H	BB8493	Nov 3 '03 07:00:14	3	Manual	0.0137	0.0294	0.0156	***	0.0295	Blue Water Environmenta
H	BB8493	Nov 4 '03 07:00:14	3	Manual	0.0169	0.0256	0.0181	***	0.0268	Blue Water Environmenta
H	BB8493	Nov 5 '03 07:00:14	3	Manual	0.0156	0.0300	0.0156	***	0.0309	Blue Water Environmenta
H	BB8493	Nov 6 '03 07:00:14	3	Manual	0.0169	0.0269	0.0125	***	0.0299	Blue Water Environmenta
H	BB8493	Nov 7 '03 07:00:14	3	Manual	0.0119	0.0312	0.0106	***	0.0314	Blue Water Environmenta
H	BB8493	Nov 8 '03 07:00:14	3	Manual	0.00750	0.0319	0.00812	***	0.0324	Blue Water Environmenta
H	BB8493	Nov 9 '03 07:00:14	3	Manual	0.00437	0.00625	0.00437	***	0.00699	Blue Water Environmenta
H	BB8493	Nov 10 '03 07:00:14	3	Manual	0.00937	0.0369	0.00812	***	0.0373	Blue Water Environmenta
H	BB8493	Nov 11 '03 07:00:14	3	Manual	0.0144	0.0262	0.0112	***	0.0270	Blue Water Environmenta
H	BB8493	Nov 12 '03 07:00:14	3	Manual	0.0125	0.0312	0.00875	***	0.0314	Blue Water Environmenta
H	BB8493	Nov 13 '03 07:00:14	3	Manual	0.00937	0.0319	0.00687	***	0.0320	Blue Water Environmenta
H	BB8493	Nov 14 '03 07:00:14	3	Manual	0.00875	0.0287	0.00812	***	0.0291	Blue Water Environmenta
H	BB8493	Nov 15 '03 07:00:14	3	Manual	0.00625	0.00687	0.00687	***	0.00805	Blue Water Environmenta
H	BB8493	Nov 16 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00628	Blue Water Environmenta
H	BB8493	Nov 17 '03 07:00:14	3	Manual	0.0144	0.0269	0.0187	***	0.0273	Blue Water Environmenta

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVS1 (in/s)	Description
H	BB8493	Dec 1 '03 10:44:02	3	Manual	0.0150	0.0462	0.00750	***	0.468	Blue Water Environmental
H	BB8493	Dec 2 '03 07:00:14	3	Manual	0.0106	0.0856	0.0181	***	0.0860	Blue Water Environmental
H	BB8493	Dec 3 '03 07:00:14	3	Manual	0.00875	0.0306	0.01000	***	0.0314	Blue Water Environmental
H	BB8493	Dec 4 '03 07:00:14	3	Manual	0.0150	0.0406	0.0106	***	0.0407	Blue Water Environmental
H	BB8493	Dec 5 '03 07:00:14	3	Manual	0.00937	0.0256	0.00875	***	0.0265	Blue Water Environmental
H	BB8493	Dec 6 '03 07:00:14	3	Manual	0.00812	0.0137	0.00625	***	0.0144	Blue Water Environmental
H	BB8493	Dec 7 '03 07:00:14	3	Manual	0.00562	0.00625	0.00562	***	0.00721	Blue Water Environmental
H	BB8493	Dec 8 '03 07:00:14	3	Manual	0.00625	0.0256	0.00750	***	0.025 9	Blue Water Environmental
H	BB8493	Dec 9 '03 07:00:14	3	Manual	0.01000	0.0337	0.00812	***	0.0342	Blue Water Environmental
H	BB8493	Dec 10 '03 07:00:14	3	Manual	0.0112	0.0244	0.00812	***	0.0247	Blue Water Environmental
H	BB8493	Dec 11 '03 07:00:14	3	Manual	0.0187	0.0287	0.0219	***	0.0316	Blue Water Environmental
H	BB8493	Dec 12 '03 07:00:14	3	Manual	0.0119	0.0606	0.00937	***	0.0609	Blue Water Environmental
H	BB8493	Dec 13 '03 07:00:14	3	Manual	0.00500	0.0125	0.00562	***	0.0131	Blue Water Environmental
H	BB8493	Dec 14 '03 07:00:14	3	Manual	0.0150	0.112	0.0144	***	0.113	Blue Water Environmental
H	BB8493	Dec 15 '03 07:00:14	3	Manual	0.00875	0.0356	0.00750	***	0.0362	Blue Water Environmental
H	BB8493	Dec 16 '03 07:00:14	3	Manual	0.00875	0.0231	0.00687	***	0.0233	Blue Water Environmental
H	BB8493	Dec 17 '03 07:00:14	3	Manual	0.00687	0.0256	0.00875	***	0.0262	Blue Water Environmental
H	BB8493	Dec 18 '03 07:00:14	3	Manual	0.01000	0.0369	0.00812	***	0.0369	Blue Water Environmental
H	BB8493	Dec 19 '03 07:00:14	3	Manual	0.0112	0.0369	0.00812	***	0.0377	Blue Water Environmental
H	BB8493	Dec 20 '03 07:00:14	3	Manual	0.00625	0.0294	0.00687	***	0.0301	Blue Water Environmental
H	BB8493	Dec 21 '03 07:00:14	3	Manual	0.00437	0.00562	0.00500	***	0.00664	Blue Water Environmental
H	BB8493	Dec 22 '03 07:00:14	3	Manual	0.0125	0.0344	0.00687	***	0.0344	Blue Water Environmental
H	BB8493	Dec 23 '03 07:00:14	3	Manual	0.0206	0.0231	0.0325	***	0.0338	Blue Water Environmental
H	BB8493	Dec 24 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00628	Blue Water Environmental
H	BB8493	Dec 25 '03 07:00:14	3	Manual	0.00500	0.00500	0.00500	***	0.00650	Blue Water Environmental
H	BB8493	Dec 26 '03 07:00:14	3	Manual	0.00500	0.00687	0.00437	***	0.00778	Blue Water Environmental
H	BB8493	Dec 27 '03 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00650	Blue Water Environmental
H	BB8493	Dec 28 '03 07:00:14	3	Manual	0.00437	0.00500	0.00437	***	0.00622	Blue Water Environmental
H	BB8493	Dec 29 '03 07:00:14	3	Manual	0.00812	0.0269	0.00875	***	0.0275	Blue Water Environmental
H	BB8493	Dec 30 '03 07:00:14	3	Manual	0.01000	0.0212	0.0125	***	0.0220	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVS1 (in/s)	Description
H	BB8493	Jan 7 '04 11:39:21	3	Manual	0.00937	0.0325	0.00937	***	0.0332	Blue Water
H	BB8493	Jan 8 '04 07:00:14	3	Manual	0.00562	0.0281	0.00812	***	0.0289	Blue Water
H	BB8493	Jan 9 '04 07:00:14	3	Manual	0.00562	0.0362	0.00812	***	0.0369	Blue Water
H	BB8493	Jan 10 '04 07:00:14	3	Manual	0.00437	0.0162	0.00625	***	0.0166	Blue Water
H	BB8493	Jan 11 '04 07:00:14	3	Manual	0.00437	0.00687	0.00437	***	0.00765	Blue Water
H	BB8493	Jan 12 '04 07:00:14	3	Manual	0.00625	0.0200	0.00625	***	0.0202	Blue Water
H	BB8493	Jan 13 '04 07:00:14	3	Manual	0.00562	0.0231	0.00687	***	0.0234	Blue Water
H	BB8493	Jan 14 '04 07:00:14	3	Manual	0.00437	0.0125	0.00625	***	0.0132	Blue Water
H	BB8493	Jan 15 '04 07:00:14	3	Manual	0.00500	0.0256	0.00625	***	0.0262	Blue Water
H	BB8493	Jan 16 '04 07:00:14	3	Manual	0.00437	0.0519	0.00937	***	0.0524	Blue Water
H	BB8493	Jan 17 '04 07:00:14	3	Manual	0.00437	0.00812	0.00437	***	0.00832	Blue Water
H	BB8493	Jan 18 '04 07:00:14	3	Manual	0.00437	0.0125	0.00437	***	0.0126	Blue Water
H	BB8493	Jan 19 '04 07:00:14	3	Manual	0.00625	0.0262	0.00687	***	0.0266	Blue Water
H	BB8493	Jan 20 '04 07:00:14	3	Manual	0.00437	0.0294	0.00625	***	0.0298	Blue Water
H	BB8493	Jan 21 '04 07:00:14	3	Manual	0.00437	0.0212	0.00500	***	0.0215	Blue Water
H	BB8493	Jan 22 '04 07:00:14	3	Manual	0.00562	0.0300	0.00625	***	0.0301	Blue Water
H	BB8493	Jan 22 '04 10:33:21	3	Manual	0.00437	0.0212	0.00687	***	0.0224	Blue Water
H	BB8493	Jan 23 '04 07:00:14	3	Manual	0.00437	0.0219	0.00562	***	0.0220	Blue Water
H	BB8493	Jan 24 '04 07:00:14	3	Manual	0.00437	0.0144	0.00562	***	0.0144	Blue Water
H	BB8493	Jan 25 '04 07:00:14	3	Manual	0.00375	0.00750	0.00437	***	0.00783	Blue Water
H	BB8493	Jan 26 '04 07:00:14	3	Manual	0.00437	0.0119	0.00500	***	0.0123	Blue Water
H	BB8493	Jan 27 '04 07:00:14	3	Manual	0.00875	0.0187	0.00500	***	0.0191	Blue Water
H	BB8493	Jan 28 '04 07:00:14	3	Manual	0.00500	0.0206	0.00625	***	0.0211	Blue Water
H	BB8493	Jan 29 '04 07:00:14	3	Manual	0.00500	0.0194	0.00500	***	0.0198	Blue Water
H	BB8493	Jan 30 '04 07:00:14	3	Manual	0.00500	0.0212	0.00625	***	0.0214	Blue Water
H	BB8493	Jan 31 '04 07:00:14	3	Manual	0.00437	0.00875	0.00437	***	0.00929	Blue Water

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVS1 (in/s)	Description
H	BB8493	Feb 1 '04 07:00:14	3	Manual	0.00437	0.00625	0.00437	***	0.00685	Blue Water
H	BB8493	Feb 2 '04 07:00:14	3	Manual	0.00812	0.0212	0.00625	***	0.0214	Blue Water
H	BB8493	Feb 3 '04 07:00:14	3	Manual	0.00937	0.0187	0.00562	***	0.0190	Blue Water
H	BB8493	Feb 4 '04 07:00:14	3	Manual	0.00562	0.0206	0.00750	***	0.0209	Blue Water
H	BB8493	Feb 5 '04 07:00:14	3	Manual	0.00562	0.0337	0.00562	***	0.0338	Blue Water
H	BB8493	Feb 6 '04 07:00:14	3	Manual	0.00562	0.0237	0.00562	***	0.0242	Blue Water
H	BB8493	Feb 7 '04 07:00:14	3	Manual	0.00937	0.0281	0.00625	***	0.0286	Blue Water
H	BB8493	Feb 18 '04 07:00:14	3	Manual	0.00812	0.0200	0.00750	***	0.0203	Blue Water
H	BB8493	Feb 19 '04 07:00:14	3	Manual	0.00937	0.0519	0.00937	***	0.0521	Blue Water
H	BB8493	Feb 20 '04 07:00:14	3	Manual	0.00812	0.0181	0.00937	***	0.0185	Blue Water
H	BB8493	Feb 21 '04 07:00:14	3	Manual	0.00562	0.0194	0.00625	***	0.0194	Blue Water
H	BB8493	Feb 22 '04 07:00:14	3	Manual	0.00437	0.00562	0.00437	***	0.00670	Blue Water
H	BB8493	Feb 23 '04 07:00:14	3	Manual	0.0119	0.0306	0.0344	***	0.0347	Blue Water
H	BB8493	Feb 24 '04 07:00:14	3	Manual	0.00937	0.0287	0.00937	***	0.0289	Blue Water
H	BB8493	Feb 25 '04 07:00:14	3	Manual	0.0106	0.0325	0.0119	***	0.0326	Blue Water
H	BB8493	Feb 26 '04 07:00:14	3	Manual	0.00937	0.0237	0.01000	***	0.0245	Blue Water
H	BD8484	Feb 27 '04 08:14:14	3	Manual	0.0625	0.0562	0.0544	***	0.0998	Blue Water
H	BD8484	Feb 28 '04 07:00:14	3	Manual	0.00750	0.0200	0.00750	***	0.0203	Blue Water
H	BD8484	Feb 29 '04 07:00:14	3	Manual	0.00750	0.00750	0.00687	***	0.0107	Blue Water

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (dB)	PVS1 (in/s)	Description
H	BD8484	Mar 1 '04 07:00:14	3	Manual	0.0106	0.0206	0.00937	***	0.0208	Blue Water
H	BD8484	Mar 2 '04 07:00:14	3	Manual	0.0244	0.0237	0.0244	***	0.0394	Blue Water
H	BD8484	Mar 3 '04 07:00:14	3	Manual	0.0119	0.0231	0.0131	***	0.0243	Blue Water
H	BD8484	Mar 4 '04 07:00:14	3	Manual	0.0294	0.0350	0.0281	***	0.0456	Blue Water
H	BD8484	Mar 5 '04 07:00:14	3	Manual	0.0294	0.0275	0.0281	***	0.0451	Blue Water
H	BD8484	Mar 6 '04 07:00:14	3	Manual	0.0281	0.0281	0.0287	***	0.0443	Blue Water
H	BD8484	Mar 7 '04 07:00:14	3	Manual	0.0137	0.0119	0.0119	***	0.0192	Blue Water
H	BD8484	Mar 8 '04 07:00:14	3	Manual	0.0337	0.0387	0.0344	***	0.0595	Blue Water
H	BD8484	Mar 9 '04 07:00:14	3	Manual	0.0369	0.0456	0.0350	***	0.0598	Blue Water
H	BD8484	Mar 10 '04 07:00:14	3	Manual	0.0219	0.0431	0.0219	***	0.0460	Blue Water
H	BD8484	Mar 11 '04 07:00:14	3	Manual	0.0125	0.0219	0.0150	***	0.0238	Blue Water
H	BD8484	Mar 12 '04 07:00:14	3	Manual	0.0144	0.0237	0.0137	***	0.0256	Blue Water
H	BD8484	Mar 13 '04 07:00:14	3	Manual	0.00875	0.0256	0.0106	***	0.0258	Blue Water
H	BD8484	Mar 14 '04 07:00:14	3	Manual	0.0106	0.01000	0.01000	***	0.0149	Blue Water
H	BD8484	Mar 15 '04 07:00:14	3	Manual	0.0137	0.0250	0.0112	***	0.0252	Blue Water
H	BD8484	Mar 16 '04 07:00:14	3	Manual	0.0250	0.0237	0.0231	***	0.0412	Blue Water
H	BD8484	Mar 17 '04 07:00:14	3	Manual	0.0194	0.0300	0.0181	***	0.0311	Blue Water

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (psi/dB)	PVS1 (in/s)	Description
M	BD8484	Apr 7 '04 09:51:07	3	Manual	0.0156	0.0237	0.0131	***	0.0252	Blue Water Environmental
M	BD8484	Apr 8 '04 07:00:14	3	Manual	0.0269	0.0262	0.0256	***	0.0448	Blue Water Environmental
M	BD8484	Apr 9 '04 07:00:14	3	Manual	0.0150	0.0244	0.0150	***	0.0250	Blue Water Environmental
M	BD8484	Apr 10 '04 07:00:14	3	Manual	0.01000	0.00937	0.00937	***	0.0142	Blue Water Environmental
M	BD8484	Apr 11 '04 07:00:14	3	Manual	0.0212	0.0206	0.0206	***	0.0323	Blue Water Environmental
M	BD8484	Apr 12 '04 07:00:14	3	Manual	0.0281	0.0587	0.0269	***	0.0589	Blue Water Environmental
M	BD8484	Apr 13 '04 07:00:14	3	Manual	0.0319	0.0787	0.0756	***	0.109	Blue Water Environmental
M	BD8484	Apr 14 '04 07:00:14	3	Manual	0.0381	0.0437	0.0362	***	0.0586	Blue Water Environmental
M	BD8484	Apr 15 '04 07:00:14	3	Manual	0.0325	0.0394	0.0300	***	0.0488	Blue Water Environmental
M	BD8484	Apr 16 '04 07:00:14	3	Manual	0.01000	0.0256	0.0119	***	0.0257	Blue Water Environmental
M	BD8484	Apr 17 '04 07:00:14	3	Manual	0.0112	0.0275	0.0131	***	0.0289	Blue Water Environmental
M	BD8484	Apr 18 '04 07:00:14	3	Manual	0.0119	0.01000	0.0106	***	0.0170	Blue Water Environmental
M	BD8484	Apr 19 '04 07:00:14	3	Manual	0.0125	0.0269	0.0137	***	0.0271	Blue Water Environmental
M	BD8484	Apr 20 '04 07:00:14	3	Manual	0.0175	0.0594	0.0162	***	0.0608	Blue Water Environmental
M	BD8484	Apr 21 '04 07:00:14	3	Manual	0.0969	0.277	0.0625	***	0.299	Blue Water Environmental
M	BD8484	Apr 22 '04 07:00:14	3	Manual	0.0144	0.0431	0.0137	***	0.0433	Blue Water Environmental
M	BD8484	Apr 23 '04 07:00:14	3	Manual	0.0125	0.0294	0.0137	***	0.0294	Blue Water Environmental
M	BD8484	Apr 24 '04 07:00:14	3	Manual	0.0194	0.0244	0.0194	***	0.0302	Blue Water Environmental
M	BD8484	Apr 25 '04 07:00:14	3	Manual	0.0156	0.0156	0.0156	***	0.0237	Blue Water Environmental
M	BD8484	Apr 26 '04 07:00:14	3	Manual	0.0387	0.0600	0.0369	***	0.0623	Blue Water Environmental
M	BD8484	Apr 27 '04 07:00:14	3	Manual	0.0269	0.0275	0.0244	***	0.0417	Blue Water Environmental
M	BD8484	Apr 28 '04 07:00:14	3	Manual	0.0387	0.187	0.0762	***	0.205	Blue Water Environmental
M	BD8484	Apr 29 '04 07:00:14	3	Manual	0.0144	0.0262	0.0150	***	0.0282	Blue Water Environmental
M	BD8484	Apr 30 '04 07:00:14	3	Manual	0.0131	0.0637	0.0169	***	0.0645	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (psi/dB)	PVS1 (in/s)	Description
H	BD8484	May 1 '04 07:00:14	3	Manual	0.0131	0.0156	0.0119	***	0.0185	Blue Water Environmental
H	BD8484	May 2 '04 07:00:14	3	Manual	0.0244	0.0225	0.0237	***	0.0375	Blue Water Environmental
H	BD8484	May 3 '04 07:00:14	3	Manual	0.0294	0.0406	0.0287	***	0.0483	Blue Water Environmental
H	BD8484	May 4 '04 07:00:14	3	Manual	0.0169	0.0700	0.0181	***	0.0705	Blue Water Environmental
H	BD8484	May 5 '04 07:00:14	3	Manual	0.0444	0.0419	0.0419	***	0.0733	Blue Water Environmental
H	BD8484	May 6 '04 07:00:14	3	Manual	0.0425	0.0344	0.0331	***	0.0591	Blue Water Environmental
H	BD8484	May 7 '04 07:00:14	3	Manual	0.0294	0.0306	0.0269	***	0.0456	Blue Water Environmental
H	BD8484	May 8 '04 07:00:14	3	Manual	0.0187	0.0312	0.0194	***	0.0359	Blue Water Environmental
H	BD8484	May 9 '04 07:00:14	3	Manual	0.0187	0.0169	0.0156	***	0.0273	Blue Water Environmental
H	BD8484	May 10 '04 07:00:14	3	Manual	0.0181	0.0369	0.0181	***	0.0380	Blue Water Environmental
H	BD8484	May 11 '04 07:00:14	3	Manual	0.0356	0.0356	0.0431	***	0.0546	Blue Water Environmental
H	BD8484	May 12 '04 07:00:14	3	Manual	0.0306	0.0331	0.0300	***	0.0516	Blue Water Environmental
H	BD8484	May 13 '04 07:00:14	3	Manual	0.0300	0.0331	0.0294	***	0.0433	Blue Water Environmental
H	BD8484	May 14 '04 07:00:14	3	Manual	0.0219	0.0456	0.0212	***	0.0459	Blue Water Environmental
H	BD8484	May 15 '04 07:00:14	3	Manual	0.0219	0.0194	0.0200	***	0.0298	Blue Water Environmental
H	BD8484	May 16 '04 07:00:14	3	Manual	0.0256	0.0256	0.0250	***	0.0406	Blue Water Environmental
H	BD8484	May 17 '04 07:00:14	3	Manual	0.0187	0.0312	0.0200	***	0.0350	Blue Water Environmental
H	BD8484	May 18 '04 07:00:14	3	Manual	0.0275	0.0269	0.0244	***	0.0408	Blue Water Environmental
H	BD8484	May 19 '04 07:00:14	3	Manual	0.0394	0.0425	0.0319	***	0.0552	Blue Water Environmental
H	BD8484	May 20 '04 07:00:14	3	Manual	0.0287	0.0306	0.0275	***	0.0450	Blue Water Environmental
H	BD8484	May 21 '04 07:00:14	3	Manual	0.0212	0.0275	0.0200	***	0.0315	Blue Water Environmental
H	BD8484	May 22 '04 07:00:14	3	Manual	0.0237	0.0281	0.0219	***	0.0329	Blue Water Environmental
H	BD8484	May 23 '04 07:00:14	3	Manual	0.0225	0.0175	0.0212	***	0.0312	Blue Water Environmental
H	BD8484	May 24 '04 07:00:14	3	Manual	0.0394	0.0387	0.0381	***	0.0664	Blue Water Environmental
H	BD8484	May 25 '04 07:00:14	3	Manual	0.0300	0.0350	0.0294	***	0.0453	Blue Water Environmental
H	BD8484	May 26 '04 07:00:14	3	Manual	0.0369	0.0369	0.0281	***	0.0502	Blue Water Environmental
H	BD8484	May 27 '04 07:00:14	3	Manual	0.0325	0.0412	0.0306	***	0.0507	Blue Water Environmental
H	BD8484	May 28 '04 07:00:14	3	Manual	0.0569	0.0525	0.0537	***	0.0865	Blue Water Environmental
H	BD8484	May 29 '04 07:00:14	3	Manual	0.0237	0.0231	0.0219	***	0.0338	Blue Water Environmental
H	BD8484	May 30 '04 07:00:14	3	Manual	0.0175	0.0169	0.0169	***	0.0258	Blue Water Environmental
H	BD8484	May 31 '04 07:00:14	3	Manual	0.0287	0.0275	0.0269	***	0.0455	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (psi/dB)	PVS1 (in/s)	Description
H	BD8484	Jun 1 '04 07:00:14	3	Manual	0.0344	0.0362	0.0344	***	0.0588	Blue Water Environmental
H	BD8484	Jun 2 '04 07:00:14	3	Manual	0.0612	0.0556	0.0575	***	0.0899	Blue Water Environmental
H	BD8484	Jun 3 '04 07:00:14	3	Manual	0.0350	0.0481	0.0344	***	0.0603	Blue Water Environmental
H	BD8484	Jun 4 '04 07:00:14	3	Manual	0.0200	0.0306	0.0200	***	0.0348	Blue Water Environmental
H	BD8484	Jun 5 '04 07:00:14	3	Manual	0.0237	0.0231	0.0231	***	0.0369	Blue Water Environmental
H	BD8484	Jun 6 '04 07:00:14	3	Manual	0.0325	0.0331	0.0325	***	0.0521	Blue Water Environmental
H	BD8484	Jun 7 '04 07:00:14	3	Manual	0.0281	0.0356	0.0262	***	0.0417	Blue Water Environmental
H	BD8484	Jun 8 '04 07:00:14	3	Manual	0.0244	0.0231	0.0231	***	0.0349	Blue Water Environmental
H	BD8484	Jun 9 '04 07:00:14	3	Manual	0.0225	0.0306	0.0231	***	0.0358	Blue Water Environmental
H	BD8484	Jun 10 '04 07:00:14	3	Manual	0.0325	0.0369	0.0300	***	0.0493	Blue Water Environmental
H	BD8484	Jun 11 '04 07:00:14	3	Manual	0.0162	0.0250	0.0181	***	0.0281	Blue Water Environmental
H	BD8484	Jun 12 '04 07:00:14	3	Manual	0.0162	0.0162	0.0156	***	0.0240	Blue Water Environmental
H	BD8484	Jun 13 '04 07:00:14	3	Manual	0.0156	0.0150	0.0156	***	0.0229	Blue Water Environmental
H	BD8484	Jun 14 '04 07:00:14	3	Manual	0.0137	0.0237	0.0156	***	0.0266	Blue Water Environmental
H	BD8484	Jun 15 '04 07:00:14	3	Manual	0.0169	0.0206	0.0162	***	0.0254	Blue Water Environmental
H	BD8484	Jun 16 '04 07:00:14	3	Manual	0.0175	0.0331	0.0175	***	0.0339	Blue Water Environmental
H	BD8484	Jun 17 '04 07:00:14	3	Manual	0.0556	0.0769	0.0812	***	0.125	Blue Water Environmental
H	BD8484	Jun 18 '04 07:00:14	3	Manual	0.0325	0.0394	0.0300	***	0.0458	Blue Water Environmental
H	BD8484	Jun 19 '04 07:00:14	3	Manual	0.0212	0.0206	0.0200	***	0.0304	Blue Water Environmental
H	BD8484	Jun 20 '04 07:00:14	3	Manual	0.0175	0.0187	0.0175	***	0.0271	Blue Water Environmental
H	BD8484	Jun 21 '04 07:00:14	3	Manual	0.0162	0.0219	0.0175	***	0.0266	Blue Water Environmental
H	BD8484	Jun 22 '04 07:00:14	3	Manual	0.0356	0.0350	0.0337	***	0.0553	Blue Water Environmental
H	BD8484	Jun 23 '04 07:00:14	3	Manual	0.0244	0.0306	0.0237	***	0.0372	Blue Water Environmental
H	BD8484	Jun 24 '04 07:00:14	3	Manual	0.0212	0.0269	0.0206	***	0.0323	Blue Water Environmental
H	BD8484	Jun 25 '04 07:00:14	3	Manual	0.0275	0.0269	0.0262	***	0.0466	Blue Water Environmental
H	BD8484	Jun 26 '04 07:00:14	3	Manual	0.0237	0.0250	0.0231	***	0.0388	Blue Water Environmental
H	BD8484	Jun 27 '04 07:00:14	3	Manual	0.0187	0.0187	0.0187	***	0.0287	Blue Water Environmental
H	BD8484	Jun 28 '04 07:00:14	3	Manual	0.0200	0.0219	0.0181	***	0.0277	Blue Water Environmental
H	BD8484	Jun 29 '04 07:00:14	3	Manual	0.0344	0.0350	0.0331	***	0.0494	Blue Water Environmental
H	BD8484	Jun 30 '04 07:00:14	3	Manual	0.0231	0.0300	0.0200	***	0.0360	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (psi)	PVS1 (in/s)	Description
H	BD8484	Jul 1 '04 07:00:14	3	Manual	0.0181	0.0287	0.0200	***	0.0346	Blue Water Environmental
H	BD8484	Jul 2 '04 07:00:14	3	Manual	0.0337	0.0287	0.0650	***	0.0657	Blue Water Environmental
H	BD8484	Jul 3 '04 07:00:14	3	Manual	0.0256	0.0244	0.0237	***	0.0365	Blue Water Environmental
H	BD8484	Jul 4 '04 07:00:14	3	Manual	0.0181	0.0187	0.0181	***	0.0273	Blue Water Environmental
H	BD8484	Jul 5 '04 07:00:14	3	Manual	0.0244	0.0244	0.0225	***	0.0374	Blue Water Environmental
H	BD8484	Jul 6 '04 07:00:14	3	Manual	0.0250	0.0244	0.0237	***	0.0383	Blue Water Environmental
H	BD8484	Jul 7 '04 07:00:14	3	Manual	0.0219	0.0225	0.0206	***	0.0321	Blue Water Environmental
H	BD8484	Jul 8 '04 07:00:14	3	Manual	0.0362	0.0362	0.0337	***	0.0544	Blue Water Environmental
H	BD8484	Jul 9 '04 07:00:14	3	Manual	0.0194	0.0187	0.0181	***	0.0283	Blue Water Environmental
H	BD8484	Jul 10 '04 07:00:14	3	Manual	0.0181	0.0181	0.0175	***	0.0269	Blue Water Environmental
H	BD8484	Jul 11 '04 07:00:14	3	Manual	0.0181	0.0181	0.0181	***	0.0269	Blue Water Environmental
H	BD8484	Jul 12 '04 07:00:14	3	Manual	0.0294	0.0256	0.0256	***	0.0438	Blue Water Environmental
H	BD8484	Jul 13 '04 07:00:14	3	Manual	0.0450	0.0425	0.0412	***	0.0663	Blue Water Environmental
H	BD8484	Jul 14 '04 07:00:14	3	Manual	0.0594	0.0800	0.0844	***	0.130	Blue Water Environmental
H	BD8484	Jul 15 '04 07:00:14	3	Manual	0.0419	0.0406	0.0406	***	0.0629	Blue Water Environmental
H	BD8484	Jul 16 '04 07:00:14	3	Manual	0.0262	0.0256	0.0256	***	0.0392	Blue Water Environmental
H	BD8484	Jul 17 '04 07:00:14	3	Manual	0.0225	0.0212	0.0206	***	0.0319	Blue Water Environmental
H	BD8484	Jul 18 '04 07:00:14	3	Manual	0.0187	0.0206	0.0194	***	0.0336	Blue Water Environmental
H	BD8484	Jul 19 '04 07:00:14	3	Manual	0.0219	0.0294	0.0206	***	0.0332	Blue Water Environmental
H	BD8484	Jul 20 '04 07:00:14	3	Manual	0.0656	0.0606	0.0519	***	0.103	Blue Water Environmental
H	BD8484	Jul 21 '04 07:00:14	3	Manual	0.0275	0.0350	0.0237	***	0.0413	Blue Water Environmental
H	BD8484	Jul 22 '04 07:00:14	3	Manual	0.0244	0.0294	0.0231	***	0.0380	Blue Water Environmental
H	BD8484	Jul 23 '04 07:00:14	3	Manual	0.0600	0.0437	0.0325	***	0.0794	Blue Water Environmental
H	BD8484	Jul 24 '04 07:00:14	3	Manual	0.0456	0.0412	0.0431	***	0.0679	Blue Water Environmental
H	BD8484	Jul 25 '04 07:00:14	3	Manual	0.0219	0.0194	0.0200	***	0.0308	Blue Water Environmental
H	BD8484	Jul 26 '04 07:00:14	3	Manual	0.0287	0.0381	0.0275	***	0.0446	Blue Water Environmental
H	BD8484	Jul 27 '04 07:00:14	3	Manual	0.0300	0.0294	0.0287	***	0.0509	Blue Water Environmental
H	BD8484	Jul 28 '04 07:00:14	3	Manual	0.0400	0.0844	0.0394	***	0.0847	Blue Water Environmental
H	BD8484	Jul 29 '04 07:00:14	3	Manual	0.0519	0.0587	0.0481	***	0.0831	Blue Water Environmental
H	BD8484	Jul 30 '04 07:00:14	3	Manual	0.0269	0.0387	0.0275	***	0.0480	Blue Water Environmental
H	BD8484	Jul 31 '04 07:00:14	3	Manual	0.111	0.224	0.0850	***	0.228	Blue Water Environmental

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (psi/dB)	PVS1 (in/s)	Description
H	BD8484	Aug 1 '04 07:00:14	3	Manual	0.0387	0.0344	0.0356	***	0.0549	Blue Water
H	BD8484	Aug 2 '04 07:00:14	3	Manual	0.0300	0.0487	0.0294	***	0.0568	Blue Water
H	BD8484	Aug 3 '04 07:00:14	3	Manual	0.0294	0.0356	0.0294	***	0.0459	Blue Water
H	BD8484	Aug 4 '04 07:00:14	3	Manual	0.0244	0.0325	0.0250	***	0.0395	Blue Water
H	BD8484	Aug 5 '04 07:00:14	3	Manual	0.0225	0.0306	0.0206	***	0.0316	Blue Water
H	BD8484	Aug 6 '04 07:00:14	3	Manual	0.0206	0.0225	0.0156	***	0.0277	Blue Water
H	BD8484	Aug 7 '04 07:00:14	3	Manual	0.0187	0.0175	0.0169	***	0.0266	Blue Water
H	BD8484	Aug 8 '04 07:00:14	3	Manual	0.0162	0.0156	0.0150	***	0.0224	Blue Water
H	BD8484	Aug 9 '04 07:00:14	3	Manual	0.0156	0.0256	0.0144	***	0.0273	Blue Water
H	BD8484	Aug 10 '04 07:00:14	3	Manual	0.0156	0.0281	0.0162	***	0.0298	Blue Water
H	BD8484	Aug 11 '04 07:00:14	3	Manual	0.0444	0.0406	0.0406	***	0.0715	Blue Water
H	BD8484	Aug 12 '04 07:00:14	3	Manual	0.0394	0.0469	0.0406	***	0.0634	Blue Water
H	BD8484	Aug 13 '04 07:00:14	3	Manual	0.0462	0.0494	0.0444	***	0.0703	Blue Water
H	BD8484	Aug 14 '04 07:00:14	3	Manual	0.0394	0.137	0.0350	***	0.139	Blue Water
H	BD8484	Aug 15 '04 07:00:14	3	Manual	0.0412	0.0381	0.0400	***	0.0643	Blue Water
H	BD8484	Aug 16 '04 07:00:14	3	Manual	0.0381	0.0381	0.0356	***	0.0590	Blue Water
H	BD8484	Aug 17 '04 07:00:14	3	Manual	0.0312	0.0375	0.0262	***	0.0466	Blue Water
H	BD8484	Aug 18 '04 07:00:14	3	Manual	0.0306	0.0356	0.0294	***	0.0424	Blue Water
H	BD8484	Aug 19 '04 07:00:14	3	Manual	0.0325	0.0350	0.0287	***	0.0433	Blue Water
H	BD8484	Aug 20 '04 07:00:14	3	Manual	0.0294	0.0325	0.0269	***	0.0392	Blue Water
H	BD8484	Aug 21 '04 07:00:14	3	Manual	0.0375	0.0412	0.0350	***	0.0596	Blue Water
H	BD8484	Aug 22 '04 07:00:14	3	Manual	0.0169	0.0125	0.0131	***	0.0212	Blue Water
H	BD8484	Aug 23 '04 07:00:14	3	Manual	0.0194	0.0344	0.0175	***	0.0353	Blue Water
H	BD8484	Aug 24 '04 07:00:14	3	Manual	0.0231	0.0287	0.0200	***	0.0299	Blue Water
H	BD8484	Aug 25 '04 07:00:14	3	Manual	0.0150	0.0306	0.0106	***	0.0310	Blue Water
H	BD8484	Aug 26 '04 07:00:14	3	Manual	0.0144	0.0244	0.0125	***	0.0244	Blue Water
H	BD8484	Aug 27 '04 07:00:14	3	Manual	0.0281	0.0325	0.0262	***	0.0355	Blue Water
H	BD8484	Aug 28 '04 07:00:14	3	Manual	0.0306	0.0331	0.0300	***	0.0538	Blue Water
H	BD8484	Aug 29 '04 07:00:14	3	Manual	0.0150	0.0125	0.0137	***	0.0218	Blue Water
H	BD8484	Aug 30 '04 07:00:14	3	Manual	0.0512	0.0419	0.0437	***	0.0675	Blue Water
H	BD8484	Aug 31 '04 07:00:14	3	Manual	0.0281	0.0312	0.0269	***	0.0421	Blue Water

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Type	Serial No.	Date/Time	No. Chan	Trigger	Tran Peak (in/s)	Vert Peak (in/s)	Long Peak (in/s)	Mic Peak (psi)	PVS1 (in/s)	Description
H	BD8484	Sep 1 '04 07:00:14	3	Manual	0.0169	0.0337	0.0175	***	0.0338	Blue Water Environmental
H	BD8484	Sep 2 '04 07:00:14	3	Manual	0.0200	0.0275	0.0181	***	0.0275	Blue Water Environmental
H	BD8484	Sep 3 '04 07:00:14	3	Manual	0.0187	0.0225	0.0200	***	0.0244	Blue Water Environmental
H	BD8484	Sep 4 '04 07:00:14	3	Manual	0.0169	0.0156	0.0162	***	0.0267	Blue Water Environmental
H	BD8484	Sep 5 '04 07:00:14	3	Manual	0.0119	0.0131	0.0112	***	0.0179	Blue Water Environmental
H	BD8484	Sep 6 '04 07:00:14	3	Manual	0.0112	0.0125	0.0106	***	0.0167	Blue Water Environmental
H	BD8484	Sep 7 '04 07:00:14	3	Manual	0.0281	0.0281	0.0344	***	0.0388	Blue Water Environmental
H	BD8484	Sep 8 '04 07:00:14	3	Manual	0.0412	0.0512	0.0350	***	0.0595	Blue Water Environmental
H	BD8484	Sep 9 '04 07:00:14	3	Manual	0.0444	0.0431	0.0431	***	0.0684	Blue Water Environmental
H	BD8484	Sep 9 '04 10:26:34	3	Manual	0.0456	0.0531	0.0437	***	0.0683	Blue Water Environmental
H	BD8484	Sep 10 '04 07:00:14	3	Manual	0.0156	0.0262	0.0156	***	0.0263	Blue Water Environmental
H	BD8484	Sep 11 '04 07:00:14	3	Manual	0.0150	0.0175	0.0125	***	0.0205	Blue Water Environmental
H	BD8484	Sep 12 '04 07:00:14	3	Manual	0.0156	0.0137	0.0131	***	0.0222	Blue Water Environmental
H	BD8484	Sep 13 '04 07:00:14	3	Manual	0.0212	0.0225	0.0212	***	0.0278	Blue Water Environmental
H	BD8484	Sep 14 '04 07:00:14	3	Manual	0.0206	0.0362	0.0212	***	0.0378	Blue Water Environmental
H	BD8484	Sep 15 '04 07:00:14	3	Manual	0.0300	0.0756	0.0300	***	0.0757	Blue Water Environmental
H	BD8484	Sep 16 '04 07:00:14	3	Manual	0.0250	0.0606	0.0231	***	0.0611	Blue Water Environmental
H	BD8484	Sep 18 '04 07:00:14	3	Manual	0.0431	0.0387	0.0387	***	0.0642	Blue Water Environmental
H	BD8484	Sep 19 '04 07:00:14	3	Manual	0.0119	0.0106	0.0106	***	0.0167	Blue Water Environmental
H	BD8484	Sep 20 '04 07:00:14	3	Manual	0.0156	0.0369	0.0156	***	0.0370	Blue Water Environmental
H	BD8484	Sep 21 '04 07:00:14	3	Manual	0.0175	0.0275	0.0156	***	0.0277	Blue Water Environmental
H	BD8484	Sep 22 '04 07:00:14	3	Manual	0.0106	0.0225	0.0144	***	0.0235	Blue Water Environmental
H	BF9062	Sep 22 '04 12:33:16	3	Manual	0.01000	0.0337	0.0194	***	0.0353	Blue Water Environmental
H	BF9062	Sep 23 '04 07:00:14	3	Manual	0.0137	0.0200	0.0244	***	0.0249	Blue Water Environmental
H	BF9062	Sep 24 '04 07:00:14	3	Manual	0.0169	0.0419	0.0119	***	0.0431	Blue Water Environmental
H	BF9062	Sep 25 '04 07:00:14	3	Manual	0.00500	0.0250	0.00750	***	0.0251	Blue Water Environmental
H	BF9062	Sep 26 '04 07:00:14	3	Manual	0.00437	0.00500	0.00375	***	0.00534	Blue Water Environmental
H	BF9062	Sep 27 '04 07:00:14	3	Manual	0.0137	0.0275	0.0200	***	0.0279	Blue Water Environmental
H	BF9062	Sep 28 '04 07:00:14	3	Manual	0.00687	0.0406	0.0112	***	0.0407	Blue Water Environmental
H	BF9062	Sep 29 '04 07:00:14	3	Manual	0.0156	0.0437	0.0237	***	0.0440	Blue Water Environmental
H	BF9062	Sep 30 '04 07:00:14	3	Manual	0.0169	0.0325	0.0181	***	0.0327	Blue Water Environmental