McLaren Hart, Inc.

July 26, 1999

Mr. Joseph Jones
Remedial Section A.
Bureau of Eastern Remedial Action
Division of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

Re: 31 & 45A Sea Cliff Avenue, Glen Cove New York

Dear Mr. Jones:

On behalf of Photocircuits Corporation McLaren/Hart is enclosing three copies (one unbound) of the Draft Results Report for the pilot study of the air sparging/soil vapor extraction test. If you have any questions concerning this report please contact James Kerr of Photocircuits at (516) 609-1153.

Sincerely,

Bruce Mackie
Principal Geoscientist

Enclosure

cc: Mark Pennington, Esq.
Louis Stans
Jim Kerr
Jim Hadley
Chittibabu Vasudevan, Ph.D., P.E.
G. Anders Carlson, Ph.D.
Robert Becherer, P.E.
John F. Byrne, Esq.

RESULTS REPORT

PILOT STUDY OF AIR SPARGING/SOIL VAPOR EXTRACTION

AT

PHOTOCIRCUITS CORPORATION

GLEN COVE, NEW YORK

July 26, 1999

Prepared for:

Photocircuits Corporation

31 Sea Cliff Avenue

Glen Cove, New York 11542

Prepared by:

McLaren/Hart Environmental Services East, P.C.

25 Independence Boulevard

Warren, New Jersey 07059

ENVIRONMENTAL SERVICES EAST, P.C.

SCIENCE • STRATEGY • TECHNOLOGY • SOLUTIONS

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

LIST OF TABLES

Tables

LIST OF FIGURES

Figures

LIST OF APPENDICES

Appendix

1.0 INTRODUCTION

This report details McLaren/Hart Environmental Services East, P.C. (McLaren/Hart's) results from the Air Sparging/Soil Vapor Extraction (AS/SVE) pilot study conducted at Photocircuits Corporation Facility in Glen Cove, New York (the Site). The pilot study was conducted in accordance with an approved work plan submitted by McLaren/Hart to the New York State Department of Environmental Conservation (NYSDEC). This report details McLaren/Hart's implementation of the pilot-scale AS/SVE system, results generated from the pilot testing, and full-scale considerations.

Based on the Remedial Investigation (RI) conducted by McLaren/Hart in 1998, it was recommended that impacted soils and groundwater at two locations may be remediated using an AS/SVE system, coupled with natural attenuation. The first location is at the Photocircuits Site, near MW-7 and adjacent to the Photocircuits Main Building. The second location is at the 45A Site and is located near MW-4S beneath Building 7. The Photocircuits Site was the location of the pilot test because of ease of accessibility. Information obtained from the pilot test would then be used for the design and implementation of a full-scale AS/SVE system for both locations.

1.1 PURPOSE OF STUDY

The purpose of the pilot study was to technically evaluate the effectiveness of the AS/SVE technology to remediate the Compounds of Concern (COCs) and to obtain sufficient engineering design information for the subsequent design, installation and successful operation of a full-scale AS/SVE system at the site. As part of this evaluation, McLaren/Hart also examined parameters such as soil geotechnical properties to assist in the evaluation of enhancement/complementary techniques that may improve and/or supplement the efficiency of the AS/SVE process.

McLaren/Hart conducted a flexible, dynamic approach to the design, construction and operation of the pilot test system. This approach has cost-effectively yielded information necessary for the design and implementation of a full-scale treatment system.

The primary objective of the pilot study was to determine the viability, suitability and cost-effectiveness of using *in situ* AS/SVE technology to:

- Remediate unsaturated and saturated zone soils and groundwater impacted with the COCs at the Site; and
- Obtain the necessary design parameters for the design, construction and operation of a full-scale treatment system.

1.2 SITE LOCATION AND BACKGROUND

The Photocircuits Site and the 45A Site are located on the south side of Sea Cliff Avenue in Glen Cove, New York. The Photocircuits Site is the site of Photocircuits present operations. The 45A Site was owned by Pass & Seymour Inc., followed by Alpha Forty-Five L.L.C. and is currently owned by Photocircuits. *(For purposes of this document, this site will be referred to as the 45A Site.)* The Photocircuits Site, located at 31 Sea Cliff Avenue, is bordered by Pall Corporation to the north, Cedar Swamp Road to the east, the Glen Head Country Club to the south, and the 45A Site to the west. The 45A Site is bordered by the Associated Drapery site to the north, Photocircuits to the east and south, and Planet Waste Removal to the west. A Site location map is provided as **Figure 1-1**. A Site Plan showing details of both the 31 and 45A Sea Cliff Avenue Sites is provided as **Figure 1-2**. Note that only the location of the pilot test will be discussed in detail for this report.

The Photocircuits Site is an active facility that produces printed circuit boards. The facility is located at 31 Sea Cliff Avenue, in an industrialized area of Glen Cove, New York. The approximately eleven-acre site is located west of the Glen Cove - Massapequa Highway (Route 107), immediately south of Sea Cliff Avenue and north of the Glen Head Country Club. A fifty-foot County easement containing the Cedar Swamp Creek runs in a northwesterly direction through the center of the property. The northern portion of the facility is located within the boundaries of the city of Glen Cove, while the rest of the site is outside the City boundaries, located in the Town of Oyster Bay.

The facility has a number of on-site buildings, providing approximately 158,000 square feet of office and manufacturing space. The facility is comprised of the following: Main Building (offices, engineering and printed circuit board production); Butler Building I (machine shop, receiving, warehousing and material testing); Butler Building II (wastewater treatment); Butler Building III (offices, administration and storage); and a one-story complex located north of Butler Building II, occupied by utilities, chemical recovery and maintenance.

A chemical storage area, which was the location of the pilot test, is present on the Photocircuits Site in the vicinity of MW-7, which contains approximately 20 above ground storage tanks with capacities ranging from 1,000 to 8,000 gallons. Drums of new and spent chemicals and treated sludge from on-site waste water treatment are also staged in the chemical storage area. A 20,000 gallon above ground fuel oil tank is present in the parking area near the south side of the Photocircuits Site and an enclosed chemical storage building exists near the south perimeter.

1.3 GEOLOGY AND HYDROGEOLOGY

The 31 and 45A Sites are underlain by the following sequences, in descending order: the Upper Glacial Aquifer, the Port Washington confining unit, the Port Washington aquifer, the Lloyd Aquifer, and bedrock.

The Upper Glacial aquifer is composed of stratified beds of fine to coarse sand and gravel with some interbedded lenses of silt and clay and extends to a depth of approximately 200 feet below the Sites. The Port Washington confining unit, which extends approximately 100 feet below the Upper Glacial aquifer, consists of silt and clay with some interbedded sand and gravel lenses. The Port Washington aquifer is composed of sand and gravel with variable amounts of interbedded clay and silt. The Port Washington aquifer is approximately 50 feet thick. The Lloyd aquifer, which is approximately 200 feet thick, consists of discontinuous layers of gravel, sand, sandy clay, silt, and clay. It roughly parallels the crystalline bedrock, which is present at a depth of approximately 550 feet below the Site (Geraghty and Miller, 1989).

Essentially, both properties are underlain by the unconfined Upper Glacial Aquifer (roughly 200 feet in thickness); the aquifer generally consists of high permeability sediments. The aquifer is

underlain by the Port Washington Confining Unit. Localized lithology ranges from a very fine to fine silty sand to a fine to coarse sand with gravel.

As discussed above, the uppermost hydrogeological unit beneath the Photocircuits and 45A Sea Cliff Sites is the Upper Glacial aquifer. Depth to water measurements collected during groundwater sampling by McLaren/Hart indicate that groundwater is present at 4 to 10 feet below ground surface beneath the Photocircuits Site (McLaren/Hart Preliminary Site Investigation Report, November 11, 1996). Hydraulic conductivity generally ranges from 10 to 300 ft/day.

Groundwater contour maps have been generated from depth to water measurements collected from the monitoring wells at the 31 and 45A Sites on several occasions. Measurements from deep wells indicate that groundwater flow is to the northwest. Shallow groundwater also flows predominantly toward the northwest, however, precipitation events may influence the shallow groundwater and thus fluctuations may also be observable under certain precipitation and recharge conditions.

1.4 REPORT ORGANIZATION

This document reports on the activities and results of the AS/SVE pilot study, conclusions of the pilot testing, and future design considerations for the full-scale implementation of an AS/SVE system.

The report is divided into four major sections, which are identified below and are presented in subsequent chapters of this report.

- Section 2.0 discusses the Implementation of Air Sparging/Soil Vapor Extraction pilot testing, including the test plot layout, well construction, and pilot test implementation;
- Section 3.0 discusses the results and conclusions of the AS/SVE pilot tests; and
- Section 4.0 presents a summary of the conclusions and a discussion of future design considerations for full-scale design, installation and operation of an AS/SVE.

2.0 IMPLEMENTATION OF THE AS/SVE PILOT TESTS

This section presents a discussion of the objectives of the AS/SVE pilot testing, the design of the test plot and well construction, the implementation of the pilot test, and the results generated from the operation of the AS/SVE pilot test. McLaren/Hart, in conjunction with Photocircuits, has evaluated the AS/SVE pilot testing results to determine the viability, suitability and cost-effectiveness of the technologies to treat the area of dissolved phase COCs beneath the Site. The AS/SVE pilot test was conducted in accordance with the NYSDEC approved work plan to evaluate the technology's effectiveness prior to full-scale application to remediate the COCs in the affected medias. Any revisions/alterations from the work plan are documented and justified.

2.1 PURPOSE AND OBJECTIVE OF AS/SVE

Upon reviewing the existing site data, it is likely that the "source" area in the soil and the groundwater can be effectively addressed using an AS/SVE system. However, prior to installing and operating a full-scale system, a pilot test was necessary to confirm whether AS/SVE can effectively remediate the site. Furthermore, pilot testing helps determine the optimum conditions and necessary design parameters to implement an efficient and cost-effective operation of a full-scale system.

2.2 THEORY OF APPLICATION OF AIR SPARGING

AS/SVE is a proven technology that has been extensively used to remove COCs from groundwater. The remediation process involves the controlled injection of air in the saturated zone to:

- Strip the volatile compounds from the dissolved phase;
- Increase the dissolved oxygen concentration of the impacted saturated zone to enhance aerobic degradation through bio-sparging; and
- Enhance the partitioning of the compounds from the liquid phase to vapor phase for removal via vapor extraction.

2.3 DESIGN OF AIR SPARGING/SOIL VAPOR EXTRACTION PILOT TEST

This section describes the activities involved in the well installation and test plot layout as discussed in the approved work plan. The pilot test plot layout and well construction activities are described in detail below. Any variations from the work plan regarding well construction are documented and explained.

2.3.1 Test Plot Layout

This activity involved the construction of the test well network. The construction activities included drilling, groundwater sampling, and construction of AS/SVE well(s) and the monitoring points in accordance with the approved work plan. The pilot test work was conducted in the vicinity of the hazardous waste storage area between the main building and the maintenance shop on the Photocircuits Site. The entire test plot was distributed over a 45 foot by 20 foot area, south of MW-7, to provide a wider region for the demonstration and to obtain more site-specific information essential for the design and implementation of the full-scale system. MW-7 was incorporated in the pilot test as a monitoring point, which was monitored for AS effectiveness. **Figure 2-1** presents the aerial view of the wells and monitoring point locations. **Table 2-1** summarizes the details of the wells and monitoring points. The pilot test well network was installed with the anticipation that the pilot-scale could be incorporated into the full-scale system.

2.3.2 Pilot Test Well Construction

Pilot test plot activities involved the construction of the following:

- One (1) Shallow Air Sparge well (SAS)
- One (1) Deep Air Sparge well (DAS);
- One (1) horizontal SVE well;
- Four (4) Vapor Monitoring Points (VMP);
- Three (3) Shallow Depth Air Sparge Monitoring Points (SMP); and
- Three (3) Deep Depth Air Sparge Monitoring Points (DMP).

Details of the well installation are discussed below.

2.3.2.1 DAS/SAS Well Construction

The DAS well is within the SAS well in the same borehole, which was drilled to a depth of 32 feet below ground surface. The 1 ½-inch DAS well is within the three-inch SAS well and sealed at a ten-foot interval from the bottom of the DAS to the bottom of the SAS with a reducing bushing. The DAS well was installed to a depth of 32 feet bgs and is screened from 30 feet to 32 feet bgs. The SAS was, therefore, at a depth of 22 feet bgs and is screened from 20 feet to 22 feet bgs. The well depths were adjusted from the work plan based on conditions encountered during drilling activities. **Figure 2-2** presents the construction details of the DAS/SAS well.

Split spoon sampling was conducted during the installation of the SAS/DAS well. Split spoon samples were collected continuously throughout the borehole and visually inspected in accordance with American Standard Testing Methods (ASTM) standards. Subsurface soils were logged during the installation of the air sparging wells, documenting any changes in soil conditions that might affect the pattern of air flow during sparging. Additionally, head space analyses were conducted on the soil collected from the boring with a hand held PID to verity the vertical extent of the COCs in the soil. From one foot bgs to approximately ten feet bgs, the PID exhibited readings between 14 and 77 parts per million volume (ppmv) . From ten feet bgs to approximately 24 feet bgs, the PID indicated readings of 1000 ppmv or more. At 24 to 26 feet bgs, the readings decreased to approximately 300 ppmv. At 28.5 to 32 feet bgs, the readings decreased approximately 30 ppmv. Therefore, the well was set at this depth. **Appendix A** presents the well construction logs.

2.3.2.2 SVE Well Construction

A horizontal SVE well was placed in an excavation measuring five feet long, three feet wide, and 2.5 feet deep. The SVE well consisted of four-inch Sch 40 PVC piping. Because of the presence of a large boulder at one end of the excavation at 1.5 feet bgs, prohibiting the SVE well to lay

flush, the screen length was adjusted from four feet to two feet. Construction details of the SVE well is presented in **Figure 2-3.**

2.3.2.3 VMP Construction

Four (4) VMPs with two feet of screen were installed. The VMPs were installed at various distances from the SVE well: VMP-1 at 12 feet, VMP-2 at 25 feet, VMP-3 at seven feet, and VMP-4 at 18 feet. The monitoring points were constructed of 1 ¼-inch PVC piping screened at 1.5 feet to 3.5 feet bgs. Details of a typical vapor monitoring point are presented in **Figure 2-4**. [Note: Throughout this report, the VMPs were referred to as VMP-x, where x represents the location.]

2.3.2.4 SMP Construction

Three (3) SMPs were installed at various distances from the AS wells: SMP-1 at ten feet, SMP-3 at five feet, and SMP-4 at 15 feet. MW-7, which is screened from 15 to 25 feet bgs, was incorporated in the pilot test as a monitoring point and was located 20 feet from the AS wells. SMP-1 was drilled to ten feet bgs, and SMP-3 and SMP-4 were drilled to 15 feet bgs. The monitoring points were constructed of 1 ¼-inch PVC piping and had two-feet of screen. Details of a typical shallow monitoring point are presented in **Figure 2-5**. No sampling was conducted during the construction of these wells. [Note: Throughout this report, the SMPs were referred to as SMP-x, where x represents the location.]

2.3.2.5 DMP Construction

Three (3) DMPs were installed at various distances from the AS wells: DMP-1 at ten feet, DMP-3 at five feet, and DMP-4 at 15 feet. MW-7, which is screened from 15 to 25 feet bgs was incorporated in the pilot test as a monitoring point and was located 20 feet from the AS wells. DMP-1 was drilled to 20 feet bgs, DMP-3 was drilled to 25 feet bgs and DMP-4 was drilled to 22 feet bgs. The monitoring points were constructed of 1 ¼-inch PVC piping and had two-feet of screen. Details of a typical deep monitoring point are presented in **Figure 2-5**. No sampling

was conducted during the construction of these wells. [Note: Throughout this report, the DMPs were referred to as DMP-x, where x represents the location.]

The following field modifications were made to the approved work plan:

- The Deep Air Sparge (DAS) well screen depth was adjusted from 30 feet bgs to 32 feet below ground surface (bgs), based on vertical delineation of the borehole using a photoionization detector (PID) during drilling activities. The well was installed two-feet deeper to effectively target depths from 28 feet to the surface.
- The SVE well screen was shortened from four feet long to two feet long because of the presence of a large boulder in the excavation.
- The SVE excavation was changed from two feet bgs to 2.5 bgs based on the elevations of water level taken at MW-7. The work plan depth was referenced to the top of inner casing which is 0.5 feet bgs instead of ground surface.
- In response to lowering the depth of the SVE excavation, the Vapor Monitoring Points (VMPs) were changed in depth from 2.5 feet bgs to 3.5 feet bgs.
- The Shallow Monitoring Points (SMPs) and Deep Monitoring Points (DMPs) were changed in depth with respect to their proximity to the SAS/DAS wells to ensure the observations of any influences caused by the SAS/DAS wells.
- The work plan specified that groundwater samples will be obtained from all monitoring points hourly (i.e., SMPs/DMPs) for baseline field parameters. Collection of these samples was to be examined by McLaren/Hart to evaluate the applicability of other remedial alternatives. However, the monitoring points were not sampled this frequently for field parameters because sampling each monitoring point was not practical due to the amount of time it was taking to recover the proper volume of water and the data was not considered critical in evaluating the effectiveness of the AS/SVE technology.
- The individual SAS and DAS tests were implemented at two separate pressures each due to the permeability of the formation.
- All measured parameters and observations were used to determine the effectiveness of air sparging because the dissolved oxygen (D.O.) meter exhibited erratic readings during the start of the SAS/DAS step injection test.

2.4 PILOT TEST IMPLEMENTATION

This section describes pre-testing activities of the SAS and DAS pilot test, including the baseline field measurements. The individual tests are discussed as well as the testing conditions, measurements, configuration of testing equipment, and post-testing data collected. Three separate tests were to be conducted according to the work plan: SVE Test; DAS/SAS/SVE Test; and Combination or Constant Rate DAS/SAS/SVE Test. In addition, five tests were conducted to evaluate individual performance and the effectiveness of each of the air sparge wells. The eight (8) tests and their objectives included the following:

- SVE Test – to determine the effectiveness of vapor extraction via measurements of COCs on the skid and determine the radius of influence (ROI) by examining the monitoring points;
- SAS Test – to determine the effectiveness of air sparging at this depth and in this type of formation through pressures read from the monitoring points and to observe the effects of subsurface flow rates and pressures on the radius of influence of the AS well;
- DAS Test – to determine the effectiveness of air sparging at this depth and in this type of formation through pressures read from the monitoring points and to observe the effects of subsurface flow rates and pressures on the radius of influence of the AS well;
- DAS/SAS/SVE and SAS/SVE Tests – to determine the effects of operating both sparge wells simultaneously through pressures read from the monitoring points and the effects of subsurface flow rates and pressures on the radius of influence of the AS wells;
- Constant Rate DAS/SAS/SVE Test – to determine if the flow rate and pressure determined from the prior test was the optimal combination or if either sparge well is impeding the effectiveness of the other;
- SVE Test – to determine if the vacuum rate used throughout the testing process is the optimal rate;
- DAS/SVE Test – to determine the effect of sparging at the DAS versus the SAS (*i.e.* mass removal rates, interferences, etc.)

2.4.1 Baseline Measurements

The pilot testing activities commenced with the collection of baseline data, which were analyzed for the same parameters that were evaluated during the pilot study. Specifically, the baseline measurements included:

- Collection of one groundwater sample each from DAS, SAS, SMP-1, -3, -4 and DMP-1, -3, -4 wells and MW-7 for field parameters (pH, conductivity, turbidity, dissolved oxygen (D.O.), temperature);
- Collection of one groundwater sample from the DAS, SAS, SMP-1, -3, -4 and DMP-1, -3, -4 wells and MW-7 for laboratory analysis of aqueous phase VOC concentrations via EPA Method 8260A;
- Baseline soil-gas sampling and field analysis using a PID with a 11.8 eV lamp; and
- Depth to water measurements from all monitoring points and sparge wells.

2.4.2 Soil Vapor Extraction (SVE)

2.4.2.1 SVE Equipment

Prior to conducting pilot testing of the SAS well, the SVE well was tested to determine the effectiveness of vapor extraction. The key components of the SVE Pilot Testing System included:

- Collection Piping and Manifold;
- Air/Water Separator;
- Vapor-Phase Activated Carbon Adsorption Unit (Drum);
- Vacuum Pump; and
- Instrumentation including flow meters, pressure and vacuum gauges.

The skid-mounted SVE test unit (equipped with a control panel) included an air/water separator, vacuum gauges, a bleed valve, two (2) sample ports, an outlet temperature gauge, and a blower.

The blower was capable of operating at vacuum pressure of up to 5 inches of mercury and extracting a maximum of 90 scfm of air. The airflow was measured using an in-line pitot tube and was a function of the vacuum drawn from the formation. **Figure 2-6** presents a schematic of the SVE configuration.

Vacuum was measured directly at the SVE well head using a Magnehelic gauge. This same port was used to collect vapor samples to be measured with a PID. A flexible hose was used for connecting the well head of the SVE well to the vapor extraction skid prior to the air/water separator system. The air/water separator removed any moisture or free liquid extracted with the vapors. The air/water separator was connected to the vacuum pump. Another manifold connected the vacuum pump to the vapor-phase activated carbon unit to treat the extracted vapors. Following the completion of system hook up, the blower was turned on, and flow rate tests commenced.

2.4.2.2 SVE Pilot Test

The testing process was conducted in a feedback loop approach where the results from the tests were evaluated on-site to determine the next testing parameters. This feedback loop approach is described below.

Each test commenced with cursory optimization of the flow and vacuum parameters. This involved commencing the test at a pre-determined vacuum rate based on the site geology as observed during the well construction. Based on the radius of influence observed at the VMPs and the extraction effectiveness observed at this preliminary condition, the next set of testing conditions was determined. This included increasing/decreasing the vacuum and flow rates, as necessary.

Once the next testing conditions were achieved, the influence of vacuum rates on the radius of influence was monitored. Based on the results obtained, the extraction system was altered to evaluate the removal efficiency under the next set of operating conditions. This optimization

process continued until the optimal flow rate was determined based on the field test results and on the judgment of the field engineer.

Once the optimal conditions were determined, the testing process continued until the physical/chemical parameters had stabilized (i.e., no change in vacuum readings at monitoring points). During this period, the flow meters and vacuum gauges located at the VMPs and SVE well were monitored. Vapor samples were collected hourly from the sample port, using a Tedlar bag, to monitor the concentration levels using a PID.

The SVE pilot test was conducted at three (3) vacuum settings for approximately 2 hours each. The rationale of testing the SVE at three (3) separate vacuum settings was to examine the vapor extraction effectiveness through vacuum pressures observed at the VMPs with no obvious effect on the groundwater (i.e., mounding). The three (3) vacuum settings tested at the SVE well were the following: 30 inches water, 40 inches water, and 60 inches water. See **Table 2-2** for data collected during the SVE Test.

2.4.3 Shallow Depth Air Sparge (SAS) and Deep Depth Air Sparge (DAS)

Prior to implementing the integrated SAS/DAS/SVE test, a test was conducted on each of the air sparge wells. These tests were conducted to understand the pressures and flows required for sparging each zone effectively. A combination of flow rates and pressures were to be tested for each sparge well for approximately two (2) hours while the vacuum pump was not on. However, due to the permeability of the formation, only two separate pressures were necessary for each well in order to observe any flow entering the formation. The effects of subsurface flow rates on the radius of influence of the AS well and the effects of sparging as measured at the SMPs and DMPs were examined for each test.

2.4.3.1 AS Equipment

The air compressor was equipped with a coalescing filter. The compressor was capable of operating at pressures of 5 to 120 psi generating an airflow of 5 to 80 scfm. The manifold from

the compressor to the sparge point was fitted with a pressure regulator, a pressure gauge, and a gate valve (used for throttling the flow to the sparge points).

The manifold system following the air compressor served as the control for the pressure and flow to the SAS well. The pressure regulator was set at the required pressure for the test and the gate valve was throttled to adjust the flow to the SAS well. Another manifold system was connected to the DAS well head using a high pressure hose. The DAS well head was equipped with a pressure gauge, a bleed valve (i.e., ball valve), and a rotameter (i.e., airflow meter). **Figure 2-7** presents a schematic of the air sparge and SAS/DAS configuration.

2.4.3.2 SAS Pilot Test

The SAS well was tested at two separate pressures: 12 psi and 15 psi. In each case, 5 scfm was measured at the well head after approximately three hours. Once the flow was achieved, the pressure gauge at the well head was observed for back pressure and readings commenced at the surrounding wells or monitoring points. Depth to water readings, pressures, D.O., and PID readings were measured at the monitoring points during the test for each pressure and flow rate combination. See **Table 2-3** for data collected during the SAS Test.

2.4.3.3 DAS Pilot Test

Upon completion of the SAS test followed by the operation of the SVE in extracting vapors remaining from the SAS test, the DAS test commenced. The DAS well was also tested at two separate pressures: 15 psi and 19 psi. At 15 psi, 6.5 scfm was measured and at 19 psi, only 3.25 scfm was measured. Again, like the SAS test, flow was measured at the well head after approximately three hours. Once the flows were achieved, the pressure gauge at the well head was observed for back pressure and readings commenced at the surrounding wells or monitoring points. Depth to water readings, pressures, D.O., and PID readings were measured at the monitoring points during the test for each pressure and flow rate combination. See **Table 2-4** for data collected during the DAS Test.

2.4.4 DAS/SVE Test

The objective of this test was to determine the minimum pressure that can be introduced into the formation to obtain at least 3 scfm and to determine if the SVE was effective in capturing the vapors from sparging. The duration of the DAS/SVE test was approximately three hours. PID readings, vacuums, and depth to water measurements were taken at least three times during this test. See **Table 2-5** for data collected during the DAS/SVE Test.

2.4.5 SAS/SVE Test

Following the DAS/SVE test, the SAS/SVE test was started. The objective of this test was similar to the DAS/SVE test conducted prior. The duration of this test was approximately two hours. Again, PID readings, vacuums, and depth to water measurements were taken at least three times during this test. See **Table 2-5** for data collected during the SAS/SVE Test.

2.4.6 Combination SAS/DAS/SVE Pilot Test

2.4.6.1 SAS/DAS/SVE Step Injection Test

Following the completion of the aforementioned testing, the SAS/DAS/SVE test was implemented. The air compressor was connected to the well head of the SAS and DAS wells, while the vacuum pump operated on the SVE well to extract the stripped vapors for approximately one hour. A manifold system following the air compressor was configured to allow each well to be operated independently of the other. The manifold system was arranged for each well exactly as in the individual tests.

In order to understand the pressure and flow requirements for sparging, the pilot test was conducted in a step injection approach. Three different combinations of flow rates and pressures for each sparge well were tested. Therefore, based on the information collected from the previous tests, the following combinations of flow rates and pressures were tested.:

- DAS well at 17 psi / 7 scfm, SAS well at 10 psi / 5 scfm, and SVE at 40 inches water;
- DAS well at 18 psi / 7.5 scfm, SAS well at 18 psi / 7.5 scfm, and SVE at 40 inches water;
- DAS well at 20 psi / 2.75 scfm, SAS well at 21 psi / 3.75 scfm, and SVE at 30 inches water.

The pressure gauges at the well heads were observed for back pressure. PID readings and pressures were measured at the monitoring points to monitor changes between the various combinations. The depth to water was measured to document the effects of sparging and to examine mounding effects, if any. Aqueous samples were to be collected at the end of the test and analyzed for D.O. concentration in the SAS and DAS wells.

2.4.6.2 Evaluation of Data for 8 to 12 Hour AS/SVE Test

Following the completion of the combination SVE/SAS/DAS step injection test, an evaluation of the comprehensive field data was conducted. The data evaluation was conducted in accordance with the Quality Assurance Plan (QAP). The flow rate and pressure combination for the sparge wells was chosen based on the optimal combination exhibited in the prior SVE/SAS/DAS well pilot test: DAS well at 16 psi / 2.5 scfm, SAS well at 15 psi / 2.5 scfm, and SVE at 30 inches water.

2.4.6.3 Combination SAS/DAS/SVE Test for 8 to 12 Hours

Following system connection, the compressor and vacuum extraction pump were turned on, and flow rate tests commenced. The test was evaluated at one combination of flow rate and pressure for each sparge point for approximately ten hours. The test was conducted to determine any impedance that the shallow sparging well might have on the deep and vice versa.

During the test, the flow meters and vacuum/pressure gauges located at the VMPs, SMPs, DMPs, SVE, and AS wells were monitored. PID readings and depth to water table measurements were taken from each monitoring point. Vapor samples were collected every hour from the sample

port, using a Tedlar bag, for analysis using the PID. See **Table 2-6** for data collected during the SAS/DAS Test.

2.4.7 Post-Pilot Testing Measurements

The post-pilot testing activities were similar to the collection of the baseline data. Specifically, the post-pilot testing measurements included:

- Collection of one groundwater sample from the DAS, SAS, SMP-1, -3, -4 and DMP-1, -3, -4 wells and MW-7 for laboratory analysis of aqueous phase VOC concentrations via EPA Method 8260A;
- Soil-gas sampling and field analysis using a PID with a 11.8 eV lamp; and
- Depth to water measurements from all monitoring points and sparge wells.

The collection of a groundwater sample each from DAS, SAS, SMP-1, -3, -4 and DMP-1, -3, -4 wells and MW-7 for field parameters (pH, conductivity, turbidity, D.O., temperature) was not conducted because of the equipment failure.

2.5 DATA COLLECTION AND QUALITY ASSURANCE

The following section describes the methods of sampling and analysis conducted during the pilot testing activities, which are in accordance with the QAP included under Appendix A in the approved work plan.

2.5.1 Groundwater Sampling

Groundwater samples were collected and sent to a certified laboratory, Severn Trent Laboratories, Inc. (STL) (NY Certification No. 10997) for VOC analysis using EPA Method 8260A. Samples remained on ice until the scheduled pick-up and were analyzed within the seven-day holding time. Sampling was conducted after removing three (3) well volumes from the well by using a peristaltic pump.

A total of 18 water samples (one water sample collected at the beginning and end of each test) were collected from the SAS, DAS, SMP-1, -3, -4, DMP-1, -3, -4, and MW-7. Note that the baseline samples did not meet the required 4°C when the laboratory received them due to a delinquency in the delivery service. However, the samples were analyzed because of the minimal head space in the vials. See **Table 2-7** for groundwater sampling analytical results.

2.5.2 Vapor Sampling

Vapor samples were collected using a Tedlar bag. Tedlar bag samples were analyzed using a PID. The PID contained an 11.8 eV lamp and a pump that could pull 3-inch Hg vacuum. Tedlar bag samples were purged three (3) times with vapor from the sample port on the vapor extraction skid prior to analysis. Two vapor samples were collected using a Tedlar bag and were sent to a certified laboratory, Pace Analytical (NY Certification No. 11542) for VOC analysis using EPA Method TO-14. Each sample was collected from the sample port prior to the vapor extraction skid using a new Tedlar bag. The samples were analyzed within the 48 hour holding time. See **Table 2-8** for vapor sampling analytical results.

2.5.3 Field Parameter Measurements

Groundwater samples were collected to measure physical parameters of the samples by a flow through cell and read by a field measuring unit (i.e., Horiba). The Horiba measures the following parameters: pH, conductivity, turbidity, dissolved oxygen, and temperature. Samples were collected in the flow through cell, which provided a less turbulent condition and analyzed immediately for the aforementioned parameters. Note that the Horiba read erratically prior to the implementation of the combination DAS/SAS/SVE test. Therefore, dissolved oxygen was not used as an primary indicator of air sparging effectiveness.

2.5.4 Other Field Measurements

Depth to water readings were measured using a field measuring unit (i.e., M-scope). The M-scope was used to measure the depth to water levels in all of the wells. Vacuum and pressure

readings were measured during the entire testing. The readings were measured using four (4) different Magnehelic gauges at the following ranges: 0 to 0.25 inches water, 0 to 0.5 inches water, 0 to 2 inches water, and 0 to 50 inches water. The readings were measured to determine a vacuum or pressure influence exhibited during sparging or vapor extraction. See **Table 2-9** for depth to water measurements

3.0 RESULTS OF AS/SVE PILOT TESTS

3.1 RESULTS OF THE AS/SVE PILOT TESTS

The following section presents the results obtained from the AS/SVE pilot tests. Results obtained from the following individual pilot tests are presented:

- SVE Test;
- SAS Test;
- DAS Test;
- DAS/SVE Test;
- SAS/SVE Test; and
- Constant Rate DAS/SAS/SVE Test.

It is noted that although vacuum and pressure measurements are a primary indication of the effectiveness of the test being conducted, the measurements which were collected were analyzed in conjunction with other collected data (i.e., depth to water levels and vapor monitoring) by a series of evaluations.

3.2 SVE RESULTS

The first test conducted as part of the pilot testing program was on the SVE well. The following tests were conducted, measuring the VMPs for vacuum readings:

Initially, a vacuum of 40 inches water was applied at the SVE well head at a flow rate of 95 scfm. The vacuum was changed to 30 inches water at 92 scfm and again to 60 inches water at 108 scfm. VMP-3 and VMP-4 exhibited vacuum influence during the test, ranging from 0.005 inches water to 0.145 inches water. VMP-1 did not exhibit any vacuum and was slightly under pressure. Baseline VMP-2 readings indicated that the monitoring point was in a vacuum and changed to a pressure through the test. The highest vacuum influence was measured at VMP-4, located approximately 18 feet from the SVE well.

Depth to water measurements went unchanged from the baseline testing to the post-SVE test. The PID readings exhibited no significant changes from the baseline readings. However, as the vacuum was increased, the PID readings decreased. The COC concentrations were measured at the SVE well head using a PID. Measurements at the SVE well head ranged from 58 ppmv to 129 ppmv.

A second SVE pilot test was conducted two days following the initial test to determine if the vacuum rate used throughout the testing process was the optimal rate. These results are summarized below. The vacuum/pressure influences from this test were similar to the first SVE pilot test.

VMP-1 exhibited the highest pressure influence while VMP-4 showed the highest vacuum influence. The remaining two points remained unchanged at zero. The PID readings on all the monitoring points increased substantially from baseline readings. PID measurements at the SVE well head increased from 5 ppmv to 167 ppmv in two hours and then started decreasing gradually to 125 ppmv and stabilized. Conclusions of the SVE testing are discussed below.

Vapor monitoring of the vapor extraction skid was conducted throughout the SVE testing. Based on the observations of vacuum/pressure influences of the monitoring points, VMP-1 exhibited no vacuum influence at 12 feet and VMP-4 exhibited the highest influence at 18 feet. Therefore, the design of the horizontal well needs to be considered. VMP-1 was in line with the length of the screen where VMP-4 was perpendicular to the screen. COC concentrations ranged from 5 ppmv to 167 ppmv. After peaking at 167 ppmv, the concentrations stabilized at approximately 125 ppmv. Based on the results of the pilot testing and extrapolation of the data, the SVE testing determined that:

- The well cap of the horizontal well, if used in full-scale, must be notched to allow influence in that direction;
- At 30 to 40 inches water vacuum, the extracted air flow averaged approximately 92 scfm to 95 scfm; and
- The radius of influence of the vadose zone ranges from approximately 15 to 20 feet.

3.3 SAS RESULTS

All of the VMPs, except VMP-1, and DMPs exhibited no influence during the SAS test. VMP-1 exhibited 3.0 inches water pressure one time during the test and remained under pressure following the test. During this testing, most of the SMPs exhibited a pressure influence and returned to static conditions following the test.

During the testing, all of the SMPs had relatively constant PID readings throughout the test. The SMP readings ranged from 1.3 ppmv to 267 ppmv. The highest PID reading was measured in SMP-3 at five feet from the SAS well.

Conclusions of the SAS test are summarized below.

Only one of the VMPs exhibited pressure influence, VMP-1, at approximately 12 feet from the SAS well, and all of the SMPs exhibited pressure influence. No DMPs exhibited pressure influence during the test, which was expected. PID readings increased for the duration of the tests with SMP-3 at 5 feet exhibiting the highest readings.

3.4 DAS RESULTS

All of the VMPs, except VMP-1, and SMPs exhibited no influence during the DAS test. VMP-1 exhibited a maximum of 1.8 inches water pressure during the test and remained under pressure following the test. During this testing, most of the DMPs exhibited a pressure influence and returned to 0 inches water following the test. The highest pressure exhibited was at DMP-4 at 17 inches water.

During the testing, all of the SMPs had relatively constant PID readings throughout the test. The VMPs increased slightly in PID readings during the test. The highest reading was exhibited at VMP-4 at 344 ppmv. The DMP readings ranged from 1.5 ppmv to 31 ppmv. The highest PID reading was measured in DMP-3 at five feet from the SAS well.

Conclusions of the DAS test are summarized below.

Only one of the VMPs exhibited pressure influence, VMP-1, at approximately 12 feet from the DAS well, and all of the DMPs exhibited pressure influence. None of the SMPs indicated a pressure influence, which was expected. The highest influence was observed at DMP-4, 15 feet from the DAS well. PID readings increased for the duration of the tests with DMP-3 at 5 feet exhibiting the highest readings.

3.5 DAS/SVE RESULTS

A DAS/SVE pilot test was conducted at 16.5 psi and 3 scfm. Throughout the test, the SVE was run at approximately 30 inches water at a flow rate of approximately 92 scfm. The DAS/SVE testing resulted in a pressure influence at VMP-1 and VMP-4 with zero influence at the remaining two vapor points. MW-7 and SMP/DMP-1 indicated no influence while SMP/DMP-3 and SMP/DMP-4 exhibited a pressure influence. SMP-4 and DMP-3 had the highest pressure influences.

VOC measurements taken with the PID indicated that VMP-1 and VMP-4 had a significant increase from running SVE alone, whereas, VMP-2 and VMP-3 remained relatively constant and low at approximately 3.0 ppmv. The VOC readings at the SMPs all increased substantially when the DAS/SVE pilot test was initiated. However, the concentrations decreased as the test progressed. The PID readings of the DMPs behaved similarly to the SMPs.

The water level in DMP-4 rose to 1.38 feet bgs.

VOC concentrations were measured from the sample port on the vapor extraction skid using a PID. Readings ranged from increased from 125 ppmv during the SVE test to 147 ppmv when testing the DAS/SVE. The concentrations stabilized at approximately 106 ppmv. PID readings indicated an increase of approximately 20% when compared to readings obtained during previous SVE testing.

Post-pilot groundwater samples were collected at the conclusion of the integrated SAS/DAS/SVE pilot testing and compared to the baseline measurements. The results from the following wells indicated an increase in VOC concentrations: DAS, SMP-1, SMP-3, SMP-4, DMP-4, MW-7. However, the results of the remainder wells, SAS, DMP-1, and DMP-3, resulted in a decrease of total VOC concentrations. **Table 2-7** presents the results of the groundwater sampling for both pre- and post-pilot testing. **Appendix B** presents the analytical results for the groundwater sampling.

Conclusions of the DAS/SVE pilot test are summarized below.

DMP-3 at 5 feet away and DMP-4 at 15 feet away exhibited the highest pressure influence when combined with the SVE. PID readings increased for the duration of the test and then tapered off. The depth to water measurements initially increased following the start-up of the test, causing SMP-3 at 5 feet from DAS to increase from 7 feet to 12 feet bgs.

Extrapolation of the data and evaluation of the collected data resulted in the following:

- Near-optimum conditions for sparging the deep zone were at a pressure of 16.5 psi and a flow rate of 3 scfm;
- The radius of influence of the deep sparging zone ranges from approximately 10 to 12 feet at the depth of sparging; and
- Mass removal rates ranged from 0.2 lbs/hr. to 0.3 lbs/hr. Subsequently, mass removal rates were greater than those observed from SAS/SVE testing discussed below;

3.6 SAS/SVE RESULTS

Results of the SAS/SVE pilot test are summarized below.

A SAS/SVE pilot test was conducted at 14 psi and 3 scfm. Throughout the test, the SVE parameters (i.e., vacuum rate) remained unchanged from the previous DAS/SVE test. Initially, the VMPs, SMPs, and DMPs exhibited no significant difference from the previous test.

However, VMP-1 at 12 feet away began exhibiting a vacuum influence one hour following the implementation of the test. Also, DMP-3 (5 feet) and DMP-4 (15 feet) eventually exhibited zero influence by the completion of the test.

PID measurements indicated an overall increase in concentrations at the SMPs and VMPs and a decrease at the DMPs. Depth to water measurements indicate the DMPs remained relatively steady throughout the test. The SMPs initially decreased as the SAS test was initiated.

COC concentrations were measured utilizing a PID. Readings ranged from 87 ppmv to 106 ppmv. PID indicated an decrease of approximately 20% when compared to readings obtained during DAS/SVE testing and a decrease of 30% when compared to the independent SVE pilot test.

Post-pilot groundwater samples were collected at the conclusion of the integrated SAS/DAS/SVE pilot testing and compared to the baseline measurements. The results from the following wells indicated an increase in VOC concentrations: DAS, SMP-1, SMP-3, SMP-4, DMP-4, MW-7. However, the results of the remainder wells, SAS, DMP-1, and DMP-3, resulted in a decrease of total VOC concentrations. **Table 2-7** presents the results of the groundwater sampling for both pre- and post-pilot testing. **Appendix B** presents the analytical results for the groundwater sampling.

Conclusions of the SAS/SVE pilot test are summarized below.

SMP-3 (5 feet) and SMP-4 (15 feet) exhibited the highest pressure influence when combined with the SVE. PID readings increased for the duration of the test. The depth to water measurements initially decreased following the start-up of the test, but eventually stabilized.

Extrapolation of the data and evaluation of the collected data resulted in the following:

- Near-optimum conditions for sparging the shallow zone were at a pressure of 14 psi and a flow rate of 3 scfm;

- The radius of influence of the shallow sparging zone ranges from approximately 12 to 15 feet; and
- Mass removal rates ranged from approximately 0.17 lbs./hr. to 0.2 lbs./hr.

3.7 COMBINATION SAS/DAS/SVE RESULTS FOR 10 HOURS

The integrated SAS/DAS/SVE pilot test was conducted using 15 psi and 2.5 scfm at the SAS well head and 16 psi and 2.5 scfm at the DAS well head. The test was conducted for approximately ten (10)hours following the SAS and DAS tests. Throughout the test, the SVE was run at approximately 30 inches water with a flow rate of approximately 92 scfm. Initially the VMPs exhibited a pressure influence, after approximately eight hours of testing; the VMPs exhibited a vacuum influence, which was expected. The greatest pressure was exhibited in VMP-1, 12 feet from the SVE well. VMP-2, 25 feet from the SVE well, remained at 0 inches water throughout most of the test. The highest vacuum influence was observed at VMP-4, 18 feet away.

The PID readings of VMP-1 and VMP-4 increased by the end of the test while the remaining VMPs exhibited no change. The SMPs all decreased slightly and increased by the last measurement. The DMPs remained generally the same throughout the duration of the test.

The water levels in SMP/DMP-3 and SMP/DMP-4 both increased, which was an indication of mounding. However, noticeably, SMP-1 also increased slightly while DMP-1 decreased water elevation slightly. MW-7 decreased in water level elevation.

When conducting the SAS/DAS/SVE pilot test, the vapor monitoring readings were measured from the sample port on the vapor extraction skid. The PID readings were measured every hour and ranged from 0 ppmv to 2 ppmv.

In summary, the SAS/DAS/SVE pilot test determined that:

- Sparging at the shallow depth impeded the effectiveness of the deep air sparging. Air in the shallow depth hindered the vertical migration of the air sparging in the deep zone,

possibly causing the horizontal migration of the deep sparging. This conclusion was apparent by the low vapor concentrations measured at the sample port. Also, the SMPs did not exhibit a change in influence as more air was introduced into the formation, which in turn supports the conclusion that the air from the deep zone was being held down;

- Groundwater sampling results of the DAS well indicated a increase in VOCs between pre- and post-pilot testing, and a decrease in the SAS well. The decrease is indicative that during the combination test conducted prior to the DAS/SVE, the SAS is impeding on the DAS effectiveness; and
- Vacuum influence in the vadose zone was not inhibited when both zones were sparged simultaneously.

4.0 SUMMARY OF FULL-SCALE DESIGN CONSIDERATIONS

This section presents a summary of the findings resulting from the AS/SVE pilot testing. Full-scale design considerations are also presented such as well spacing and construction requirements, system requirements, vapor treatment, operation of the system, and enhancements.

4.1 SUMMARY OF RESULTS OF THE PILOT TESTING

The following is a summary of the relevant findings from the pilot test conducted from June 1 through 4, 1999 at the Photocircuits facility, in the vicinity of the hazardous waste storage area between the main building and the maintenance shop.

- Air Sparging/Soil Vapor Extraction (AS/SVE) was effective in both the shallow and deep treatment zones.
- Pulsing of shallow and deep air sparge wells appears to be an effective remedial approach since with both AS wells running simultaneously, the pressures in the shallow zone impede the effects of deep air sparging.
- Conventional SVE equipment can be used rather than high vacuum equipment.
- Mass removal rates via sparging for both the shallow and deep AS zones ranging from 0.17 lbs./hr to 0.31 lbs./hr.
- Sparging at the shallow depth impeded the effectiveness of the deep air sparging. Air in the shallow depth hindered the vertical migration of the sparge air in the deep zone, possibly causing the horizontal migration of the deep sparging. This conclusion is based on the low vapor concentrations measured at the sample port. Also, the SMPs did not exhibit a change in influence as more air was introduced into the formation, which in turn supports the conclusion that the air from the deep zone was being held down;
- Groundwater sampling results of the DAS well indicated a increase in VOCs between pre- and post-pilot testing, and a decrease in the SAS well. The decrease is indicative that during the combination test conducted prior to the DAS/SVE the SAS is impeding on the DAS effectiveness.

- Vacuum influence in the vadose zone was not inhibited when both zones were sparged simultaneously.
- Minimal perched water and mounding was encountered during AS/SVE testing.

Soil Vapor Extraction Only

- At 30 to 40 inches water vacuum, the extracted airflow of the vapor extraction system averaged approximately 92 to 95 scfm.
- The radius of influence (ROI) of the vadose zone ranges from approximately 15 to 20 feet.
- The design of any horizontal well system must be carefully considered in order to achieve the proper radial influence.

Shallow Air Sparging Only

- Near-optimum conditions for sparging the shallow zone were at a pressure of 14 psi and a flow rate of 3 cfm.
- The radius of influence of the shallow sparging zone ranges from approximately 12 to 15 feet.

Deep Air Sparging Only

- Near-optimum conditions for sparging the deep zone were at a pressure of 16.5 psi and a flow rate of 3 cfm.
- The radius of influence of the deep sparging zone ranges from approximately 10 to 12 feet.

Integrated Air Sparging/Soil Vapor Extraction

Sparging in the shallow zone impeded the effectiveness of the deep air sparging, which was apparent by the decrease in vapor concentrations measured at the sample port. Therefore, we

recommend either pulsing of the shallow and deep wells to increase the effectiveness of the deep sparging or only deep sparge wells should be considered.

- Vacuum influence in the vadose zone was not inhibited when both zones were sparged simultaneously.

4.2 FULL-SCALE DESIGN CONSIDERATIONS

This section discusses considerations for full-scale design of an AS/SVE system located in the vicinity of the hazardous waste storage area between the main building and the maintenance shop. Each of the following design considerations is discussed below:

- Well spacing and construction requirements of the SVE and AS points;
- System requirements;
- Vapor treatment;
- Operation of the AS/SVE; and
- Enhancements to the AS/SVE.

4.2.1 Well Spacing and Construction Requirements

The following ROI are recommended for full-scale design:

- Between 15 and 20 feet for the Soil Vapor Extraction wells;
- Between 12 and 15 feet for the Shallow Air Sparging wells; and
- Between 10 and 12 feet for the Deep Air Sparging wells.

It is our recommendation to design a horizontal SVE well system or install SVE wells no deeper than 3.5 feet bgs. The high groundwater table in the area of the pilot test must be carefully considered. Also, the well cap of the horizontal wells, if used in full-scale, must be notched to allow influence in that direction. The Shallow and Deep Air Sparging wells should be screened similarly to the SAS and DAS wells constructed for the pilot study. In addition the option of eliminating SAS wells should be considered, based on the pilot test and the geology.

4.2.2 System Requirements

A conventional SVE and air system is recommended for full-scale design of an AS/SVE system. A vacuum blower able to achieve 25 inches to 60" inches water and a flow rate ranging from 85 scfm to 100 scfm per well would be sufficient. A compressor system able to achieve pressures ranging from 5 psi to 25 psi and flow rates of 2 scfm to 10 scfm per well is recommended.

Reduction of relative humidity to less than 50% is an important consideration for full-scale design. This would increase the life expectancy of the vapor treatment system. An air/water separator, dehumidifier or off-gas heat exchanger is recommended for control of the relative humidity.

4.2.3 Vapor Treatment

Based on the mass removal, and the NYSDEC air discharge criteria, for treatment of the vapors extracted from the SVE system is recommended. The system design should evaluate estimated carbon usage for vapor treatment and the practicality of thermal oxidation.

4.2.4 Operation of the AS/SVE

After evaluating the results of the AS/SVE pilot testing, it is recommended that the Deep and Shallow AS wells either be pulsed during operation of a full-scale AS/SVE system or that the SAS wells are eliminated. Under the pulsing scenario the SAS wells would be sparged followed by the DAS well sparging. The pulse interval and interval between sparging each zone will be incorporated into the design of the full-scale AS/SVE. Another alternative is individual operation of each AS well (i.e., each AS well operating individually). This alternative allows for any variations in the operation of the wells and respective zones or areas.

An alternative scenario would be to eliminate the SAS well and just utilize the DAS wells. We therefore, recommend that either an alternative will be effective in decreasing the ground water concentrations enough to support natural attenuation.

4.2.5 Enhancements

The results of the AS/SVE pilot testing indicate no need for enhancements for full-scale design of an AS/SVE system.

Table 2-1. Summary of Well and Monitoring Point As-Built Details

Well Type	Depth (feet bgs)	Screen Interval (feet bgs)	Material of Construction	Design Reference
DAS Well	32	30 – 32	1 ½-inch Sch 40 PVC riser 2-feet Sch 40 20 Slot screen Bottom of well threaded by Sch 40 PVC cap	Figure 2-3
SAS Well	22	20-22	3-inch Sch 40 PVC riser 2-feet Sch 40 20 Slot screen Bottom of well threaded by Sch 40 PVC cap	Figure 2-3
SVE	2.5	2	4-inch Sch 40 PVC riser 2 ½-feet Sch 40 20 Slot screen	Figure 2-4
VMP1 VMP2 VMP3 VMP4	3.5	1.5 – 3.5	1 ¼-inch Sch 40 PVC riser 2-feet Sch 40 20 Slot screen	Figure 2-5
SMP1 SMP3 SMP4	10 15 15	8-10 13-15 13-15	1 ¼-inch Sch 40 PVC riser 2-feet Sch 40 20 Slot screen	Figures 2-6
DMP1 DMP3 DMP4	20 25 22	18-20 23-25 20-22	1 ¼-inch Sch 40 PVC riser 2-feet Sch 40 20 Slot screen	Figure 2-7

DAS: Deep Air Sparge Well
SAS: Shallow Air Sparge Well
SVE: Soil Vapor Extraction Well
VMP: Vapor Monitoring Point
SMP: Shallow-Depth Air Sparge Monitoring Point
DMP: Deep-Depth Air Sparge Monitoring Point

Sch: Schedule (determines thickness)
ID: Inner Diameter
Bgs: Below Ground Surface

Table 2-2
SVE Test

Vapor Monitoring Point Readings

Comment	Time	Well ID	OVM reading	Vacuum	Pos. Pressure
Pre-Test	1215	VMP1	5.0	not measured	0.000
		VPM2	4.4	<0.2	0.000
		VPM3	5.3	0.020	not meas
		VPM4	1372.0	0.005	not meas
40 " H2O	1251	VPM1	9.0	0.000	0.040
		VPM2	5.9	0.045	0.015
		VPM3	15.8	0.000	0.000
		VPM4	1017.0	0.075	not meas
	1327	VPM1	0.7	0.000	0.000
		VPM2	5.0	0.000	0.010
		VPM3	9.6	0.000	0.000
		VPM4	1004.0	0.055	not meas
	1400	VPM1	4.0	0.000	0.010
		VPM2	4.7	0.000	0.010
		VPM3	9.0	0.005	not meas
		VPM4	964.0	0.085	not meas
30 " H2O	1435	VPM1	1.6	0.000	0.010
		VPM2	4.7	0.000	0.020
		VPM3	12.7	0.005	not meas
		VPM4	181.0	0.070	not meas
	1517	VPM1	10.8	0.000	0.015
		VPM2	5.0	0.000	0.005
		VPM3	6.8	0.005	not meas
		VPM4	151.0	0.080	not meas
60 " H2O	1551	VPM1	2.5	0.000	0.005
		VPM2	4.4	0.000	0.003
		VPM3	6.5	0.003	not meas
		VPM4	140.0	0.145	not meas
	1635	VPM1	1.6	0.000	0.005
		VPM2	4.7	0.000	0.005
		VPM3	4.4	0.010	not meas
		VPM4	95.0	0.130	not meas
	1700	VPM1	not meas	0.000	0.010
		VPM2	not meas	0.000	0.005
		VPM3	not meas	0.010	0.000
		VPM4	not meas	0.130	0.000
	1735	VPM1	not meas	0.000	0.010
		VPM2	not meas	0.000	0.000
		VPM3	not meas	0.010	not meas
		VPM4	not meas	0.100	not meas
	1755	VPM1	not meas	0.000	0.005
		VPM2	not meas	0.000	0.000
		VPM3	not meas	0.010	not meas
		VPM4	not meas	0.100	not meas

Table 2-2 (continued)
SVE Test

SVE Skid Readings

Time	Qin	Vin	Pout	Qout	Tpipe	Tcarbon
	cfm	*inches H2O*	*inches H2O*	*cfm*	*F*	*F*
1241	166	40	gauge not working	not measured	160	101
1325	950	40	gauge not working	not measured	158	115
1335	700	38.5	15	not measured	160	132
1412	108	39.5	16	not measured	160	130
1422	not measured	32	18	92	154	134
1515	not measured	30	19	94	153	130
1553	not measured	60	4	108	212	129
1647	not measured	60	4	109	208	135
1738	not measured	60	4	99	204	138
1807	not measured	61	2	-	224	130

Table 2-3

Shallow Air Sparge Well Test

Comment	Time	Well ID	OVM reading	Vacuum	Pos. Pressure
Pre-Test	2137	VMP1	5.9	0.025	not meas
6/1/99		SMP1	2.9	0.000	0.060
		DMP1	3.0	0.000	0.000
		VMP2	4.4	0.000	0.000
		MW7	8.1	0.000	0.005
		VMP3	3.8	0.005	not meas
		SMP3	67.5	0.000	0.060
		DMP3	19.2	0.600	not meas
		VMP4	97.0	0.040	not meas
		SMP4	10.5	0.000	0.000
		DMP4	27.6	0.650	not meas
6/2/99	1042	VMP1	0.0	0.000	0.000
		SMP1	0.0	0.000	0.000
		DMP1	2.1	0.000	0.160
		VMP2	1.3	0.000	0.005
		MW7	2.9	0.000	0.005
		VMP3	0.0	0.000	0.003
		SMP3	20.9	0.000	0.100
		DMP3	9.7	0.000	0.090
		VMP4	>2000	0.000	0.300
		SMP4	2.7	0.800	not meas
		DMP4	5.5	0.000	0.005
Start Test	1300				
	1315	SMP1	0.0	not meas	0.055
		SMP3	267.0	not meas	0.060
		SMP4	5.5	not meas	0.000
	1345	SMP1	1.3	not meas	0.075
		SMP3	254.3	not meas	0.040
		SMP4	3.3	not meas	0.055
		MW7	8.5	not meas	0.000
	1403	SMP1	2.5	not meas	0.080
		SMP3	228.5	not meas	0.040
		SMP4	4.5	not meas	0.000
		MW7	5.3	not meas	0.000
		DMP1	not meas	not meas	0.000
		DMP3	not meas	not meas	0.000
		DMP4	not meas	not meas	0.000
	1420	VPM1	34.9	0.000	3.000
		VPM2	3.3	0.000	0.000
		VPM3	9.7	0.000	0.000
		VPM4	497.0	0.000	0.000
Stop Test	1510				
	1512	VMP1	27.5	not meas	1.800
		SMP1	0.9	0.000	0.000
		DMP1	0.9	0.750	0.000
		VMP2	0.3	0.000	0.000
		MW7	4.3	0.000	0.000
		VMP3	0.7	0.000	0.000
		SMP3	241.7	0.000	0.000
		DMP3	5.7	0.000	0.000
		VMP4	358.0	0.000	0.000
		SMP4	4.3	0.000	0.000
		DMP4	6.3	0.100	0.000
		SVE	19.5	not meas	not meas

Table 2-4

Deep Air Sparge Well Test

Comment	Time	Well ID	DTW	OVM reading	Vacuum	Pos. Pressure
June 2, 1999	1640	VMP1		20.5	0.000	0.080
Pre-Test/		SMP1		0.7	0.000	0.000
Post-SVE purge		DMP1		1.1	0.100	-
		VMP2		0.3	0.000	0.000
		MW7		4.7	0.010	0.000
		VMP3		2.1	0.000	0.000
		SMP3		108.5	0.000	0.000
		DMP3		7.0	0.000	3.000
		VMP4		154.2	0.000	0.000
		SMP4		17.9	0.000	0.230
		DMP4		3.9	0.000	1.100
	1727	DMP1		1.9	not meas	0.005
		DMP3		4.3	not meas	2.500
		DMP4		6.9	not meas	8.000
		MW7		4.0	not meas	0.005
	1800	DMP1		1.5	not meas	0.095
		DMP3		13.7	not meas	1.000
		DMP4		6.5	not meas	17.000
		MW7		3.3	not meas	0.000
	1825	VMP1		48.6	not meas	1.800
		SMP1		2.7	0.000	0.000
		DMP1		6.3	0.750	0.000
		VMP2		2.7	0.000	0.000
		MW7		3.0	0.000	0.000
		VMP3		2.1	0.000	0.000
		SMP3		61.2	0.000	0.000
		DMP3		31.3	0.000	0.000
		VMP4		344.0	0.000	0.000
		SMP4		52.1	0.000	0.000
		DMP4		5.5	0.100	0.000
Post-Test	1940	VMP1		47.5	>.5	0.340
		SMP1		1.3	0.470	not meas
		DMP1		0.7	0.020	not meas
		VMP2		2.0	0.000	0.000
		MW7		2.0	0.010	not meas
		VMP3		1.9	0.000	0.000
		SMP3		141.0	0.000	0.020
		DMP3		3.1	>.05	not meas
		VMP4		934.0	0.190	not meas
		SMP4		238.0	0.000	1.500
		DMP4		1.5	17.750	not meas
	2100	VMP1		15.7	not meas	not meas
		SMP1		0.9	not meas	not meas
June 3, 1999	0100	VMP1	DRY	16.3	>.5	0.340
Post-Test con't		SMP1	6.11	0.9	0.470	not meas
		DMP1	2.61	0.9	0.020	not meas
		VMP2	2.21	1.9	0.000	0.000
		MW7	2.58	2.9	0.010	not meas
		VMP3	2.37	0.5	0.000	0.000
		SMP3	6.34	21.9	0.000	0.020
		DMP3	not meas	not meas*	>.05	not meas
		VMP4	3.10	47.5	0.190	not meas
		SMP4	not meas	46.1	0.000	1.500
		DMP4	not meas	not meas*	17.750	not meas
	0200	DMP1	3.20			
		DMP3	not meas*			
		DMP4	not meas*			
		MW7	2.51			
		DMP1	2.36			
		MW7	2.67			

Table 2-5

Combination AS/SVE Test

Comment	Time	Well ID	DTW	OVM reading	Vacuum	Pos. Pressure
June 3, 1999	1542	VMP1		84.2		
SVE Only		SMP1		2.1		
		DMP1		1.7		
		VMP2		2.3		
		MW7		7.1		
		VMP3		0.5		
		SMP3		393.0		
		DMP3		22.0		
		VMP4		216.1		
		SMP4		56.7		
		DMP4		23.1		
	1815	VMP1	ND	285.0	0.000	0.600
		SMP1	2.52	8.3	0.000	0.000
		DMP1	3.00	7.3	0.000	0.000
		VMP2	3.28	12.0	0.000	0.000
		MW7	5.05	29.8	0.000	0.000
		VMP3	7.71	3.8	0.000	0.000
		SMP3	7.05	8270.0	0.000	0.300
		DMP3	4.92	2417.0	0.000	0.080
		VMP4	7.01	278.0	0.270	not meas
		SMP4	6.96	523.0	0.000	0.150
		DMP4	5.91	74.8	0.000	0.020
S/SVE	1955	VMP1	ND	340.0	0.000	1.500
		SMP1	4.80	7.3	0.000	0.000
		DMP1	4.55	4.6	0.000	0.000
		VMP2	2.48	13.0	0.000	0.000
		MW7	5.32	20.4	0.000	0.000
		VMP3	3.00	7.3	0.000	0.000
		SMP3	7.05	7323.0	0.000	68.000
		DMP3		7004.0	0.000	54.000
		VMP4	3.32	315.0	0.000	0.030
		SMP4		858.0	0.000	56.000
		DMP4	1.38	104.0	0.000	1.000
		SAS		17.0	not meas	not meas
		DAS		21.3	not meas	not meas
	2057	VMP1	ND	543.0	0.000	2.000
		SMP1	4.68	4.7	0.000	0.000
		DMP1	4.35	6.6	0.000	0.000
		VMP2	2.45	11.0	0.000	0.000
		MW7	5.85	15.7	0.000	0.000
		VMP3	3.01	5.5	0.000	0.000
		SMP3	12.61	3133.0	0.000	>100
		DMP3		3909.0	0.000	87.000
		VMP4	3.23	9966.0	0.000	0.450
		SMP4		86.6	0.000	75.000
		DMP4		100.0	0.000	5.500

Table 2-5 (continued)

Combination AS/SVE Test

Comment	Time	Well ID	DTW	OVM reading	Vacuum	Pos. Pressure
June 3, 1999 SAS/SVE Test	2240	VMP1	ND	454.0	0.000	8.000
		SMP1	3.18	4.6	0.000	0.000
		DMP1	4.22	2.7	0.000	0.000
		VMP2	2.40	8.3	0.000	0.000
		MW7	4.55	7.0	0.000	0.000
		VMP3	2.93	2.7	0.000	0.000
		SMP3	7.32	3316.0	0.000	4.000
		DMP3	4.69	7214.0	0.000	0.350
		VMP4	3.23	5260.0	1.850	3.500
		SMP4	3.18	255.0	0.000	0.250
		DMP4	4.67	50.7	0.000	2.000
	2341	VMP1	ND	327.0	1.750	not meas
		SMP1	4.41	1.8	not meas	0.000
		DMP1	4.42	1.8	0.000	0.000
		VMP2	2.39	4.6	0.000	0.000
		MW7	4.88	11.0	0.000	0.000
		VMP3	2.92	3.6	0.000	0.000
		SMP3	5.88	6966.0	0.000	0.010
		DMP3	5.35	2181.0	0.000	0.000
		VMP4	3.23	2939.0	not meas	0.150
		SMP4	3.53	868.0	not meas	1.000
		DMP4	5.18	57.4	0.000	0.000
June 4, 1999	0015	VMP1	DRY	399.0	1.750	not meas
		SMP1	4.53	2.7	0.000	0.000
		DMP1	4.43	1.8	0.000	0.000
		VMP2	2.44	2.7	0.000	0.000
		MW7	5.02	8.3	0.000	0.000
		VMP3	2.92	4.6	0.000	0.000
		SMP3	5.56	4140.0	0.000	0.010
		DMP3	3.33	1404.0	0.000	0.000
		VMP4	3.26	2216.0	not meas	0.650
		SMP4	3.85	608.0	not meas	0.200
		DMP4	5.23	26.9	0.000	0.000

Table 2-6

Combination SAS/DAS/SVE Test

Time	Well ID	OVM	DTW	Vacuum	Pos. Pressure
June 3, 1999	VMP1	13	DRY	0.000	6.000
0415	SMP1	2.5	4.46	0.005	0.000
	DMP1	0.3	3.08	0.005	0.000
	VMP2	1.5	2.14	0.000	0.000
	MW7	2.9	2.75	0.010	0.000
	VMP3	0.7	2.21	0.000	0.020
	SMP3	250	2.61	0.000	0.020
	DMP3	415	not meas	1.550	0.000
	VMP4	19.9	3.09	0.000	>120
	SMP4	65	not meas	1.650	not meas
	DMP4	20	not meas	0.000	>120
0510	VMP1	8.7	DRY	0.000	5.500
	SMP1	1.9	4.21	0.000	0.000
	DMP1	0.9	3.25	0.000	0.000
	VMP2	1.1	2.14	0.000	0.000
	MW7	3.1	2.92	0.000	0.000
	VMP3	0.7	2.22	0.000	0.015
	SMP3	56.6	2.05	0.000	0.010
	DMP3	129.5	not meas	1.650	>120
	VMP4	24.7	3.09	1.800	>120
	SMP4	36	not meas	1.700	>120
	DMP4	not meas	not meas	not meas	not meas
0615	VMP1	8	DRY	0.000	15.500
	SMP1	1.7	3.98	0.000	0.000
	DMP1	0.3	3.23	0.000	0.000
	VMP2	0.5	2.14	0.000	0.000
	MW7	1.3	3.09	0.000	0.000
	VMP3	0	2.17	0.000	0.010
	SMP3	57.4	1.66	0.000	0.060
	DMP3	385	not meas	1.650	>120
	VMP4	21.1	3.05	1.800	>120
	SMP4	38.1	not meas	1.700	>120
	DMP4	not meas	not meas	not meas	not meas
0715	VMP1	9.7	DRY	0.000	16.000
	SMP1	1.5	3.79	0.000	0.003
	DMP1	0.5	3.29	0.000	0.000
	VMP2	1.5	2.21	0.000	0.000
	MW7	1.5	3.31	0.000	0.000
	VMP3	0	2.17	0.000	0.015
	SMP3	58.5	1.48	0.000	0.250
	DMP3	530	not meas	1.650	>120
	VMP4	26.1	3.07	0.000	92.000
	SMP4	32.2	not meas	1.700	>120
	DMP4	29	not meas	1.750	>120

Table 2-6 (continued)

Combination SAS/DAS/SVE Test

Time	Well ID	OVM	DTW	Vacuum	Pos. Pressure
0815	VMP1	8.5	DRY	0.000	14.000
	SMP1	1.9	3.69	0.000	0.000
	DMP1	0.5	3.32	0.000	0.000
	VMP2	0.5	2.15	0.003	0.000
	MW7	1.3	3.37	0.000	0.003
	VMP3	0	2.18	0.000	0.020
	SMP3	42.4	1.41	0.000	0.000
	DMP3	875	not meas	1.600	>120
	VMP4	21.9	3.05	1.800	>120
	SMP4	23.7	not meas	1.700	>120
	DMP4	7.3	not meas	1.700	>120
915	VMP1	10.1	DRY	not meas	not meas
	SMP1	0.9	3.45	not meas	not meas
	DMP1	0.3	3.32	not meas	not meas
	VMP2	0.7	2.15	not meas	not meas
	MW7	0.5	3.38	not meas	not meas
	VMP3	0	2.15	not meas	not meas
	SMP3	37.1	1.27	not meas	not meas
	DMP3	1178	not meas	not meas	not meas
	VMP4	22.7	3.04	not meas	not meas
	SMP4	17.1	not meas	not meas	not meas
	DMP4	6.3	not meas	not meas	not meas
1015	VMP1	22.1	not meas	15.500	not meas
	SMP1	0.7	not meas	0.000	0.000
	DMP1	0.5	not meas	0.000	0.000
	VMP2	0.5	not meas	0.005	0.000
	MW7	1.5	not meas	0.003	0.005
	VMP3	0.3	not meas	0.000	0.010
	SMP3	39.5	not meas	0.000	0.100
	DMP3	1340	not meas	1.650	>120
	VMP4	29.2	not meas	1.800	>120
	SMP4	11.7	not meas	1.700	>120
	DMP4	5.1	not meas	1.655	>120
1210	VMP1	141.5	DRY	0.000	not meas
	SMP1	1.9	3.53	0.000	0.000
	DMP1	1.5	3.47	0.000	0.000
	VMP2	1.7	2.17	0.000	0.000
	MW7	4.9	3.64	0.005	0.000
	VMP3	3.9	2.12	0.000	0.020
	SMP3	505	1.42	0.000	0.000
	DMP3	205	not meas	1.605	>120
	VMP4	196.9	3.02	1.800	>120
	SMP4	60.1	not meas	1.605	>120
	DMP4	15.5	not meas	1.655	>120

Table 2-7

Photocircuits AS/SVE Pilot Test
Groundwater Baseline Analysis
May 28, 1999
Glen Cove, New York

Sample Name		DAS	SAS	SMP-1	SMP-1DL	DMP-1	DMP-1DL	SMP-3	DMP-3
Sample ID		92234001	92234002	92234003	92234003DL	92234004	92234004DL	92234005	92234006
Date		05/28/1999	05/28/1999	05/28/1999	05/28/1999	05/28/1999	05/28/1999	05/28/1999	05/28/1999
Dilution	1	100	50	1	2	1	20	1000	200
Volatile Organic Compounds (ug/L)	PQL*								
Acetone	10	380 J	200 J	230 E	240 D	640 E	540 D	U	U
Benzene	5.0	U	U	U	U	U	U	U	U
Bromodichloromethane	5.0	U	U	U	U	U	U	U	U
Bromoform	5.0	U	U	U	U	U	U	U	U
Bromomethane	10	U	U	U	U	U	U	U	U
2-Butanone	10	U	U	84	88 D	630 E	540 D	U	U
Carbon Disulfide	5.0	U	U	U	U	20	U	U	U
Carbon Tetrachloride	5.0	U	U	U	U	37	U	U	2600
Chlorobenzene	5.0	U	U	U	U	U	U	U	U
Chlorodibromomethane	5.0	U	U	U	U	U	U	U	U
Chloroethane	10	660 J	420 J	110	97 D	160	130 JD	U	890 J
Chloroform	5.0	600	660	20	18 D	88	71 JD	U	3200
Chloromethane	10	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5.0	7200	7900	240 E	220 D	1000 E	880 D	U	38000
1,2-Dichloroethane	5.0	U	U	U	U	U	U	U	U
1,1-Dichloroethene	5.0	U	U	U	U	U	U	U	U
Cis-1,2-Dichloroethene	5.0	U	U	U	U	U	U	U	U
Trans-1,2-Dichloroethene	5.0	U	U	U	U	U	U	U	U
1,2-Dichloropropane	5.0	U	U	U	U	U	U	U	U
Cis-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U	U
Ethylbenzene	5.0	U	U	U	U	U	U	U	U
2-Hexanone	10	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	10	U	U	U	U	U	U	U	U
Methylene Chloride	5.0	360 J	U	5	7 JD	U	U	3200 J	U
Styrene	5.0	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	5.0	U	U	U	U	U	U	U	U
Tetrachloroethene	5.0	U	U	30	25 D	4 J	U	U	U
Toluene	5.0	U	U	7	6 JD	73	U	U	U
1,1,1-Trichloroethane	5.0	9400	3400	48	40 D	280 E	240 D	U	20000
1,1,2-Trichloroethane	5.0	U	U	U	U	U	U	U	U
Trichloroethene	5.0	U	U	20	18 D	U	U	100000	U
Vinyl Chloride	10	U	U	29	20 D	10 J	U	U	1500 J
Xylenes (Total)	5.0	U	U	U	U	4 J	U	U	U

PQL: Method Practical Quantitation Limit
J: Estimated value.
U: Compound not detected.
D: Diluted result.
DL: Diluted sample.
E: Value exceeded calibration range.

Table 2-7 (continued)

Photocircuits AS/SVE Pilot Test
Groundwater Baseline Analysis
May 28, 1999
Glen Cove, New York

Sample Name		SMP-4	SMP-4DL	SMP-4DL	DMP-4	DMP-4DL	MW7	TB052899	FB052899
Sample ID		92234007	92234007DL	92234007DL	92234008	92234008DL	92234009	92234010	92234011
Date		05/28/1999	05/28/1999	05/28/1999	05/28/1999	05/28/1999	05/28/1999	05/28/1999	05/28/1999
Dilution	1	10	100	250	5	10	10	1	1000
Volatile Organic Compounds (ug/L)	PQL*								
Acetone	10	1000	2800 D	1200 JD	190	280 D	U	U	3 J
Benzene	5.0	U	U	U	U	U	U	U	U
Bromodichloromethane	5.0	U	U	U	U	U	U	U	U
Bromoform	5.0	U	U	U	U	U	U	U	U
Bromomethane	10	U	U	U	U	U	U	U	U
2-Butanone	10	U	U	U	U	U	U	U	U
Carbon Disulfide	5.0	U	U	U	U	U	U	U	U
Carbon Tetrachloride	5.0	U	U	U	U	U	U	U	U
Chlorobenzene	5.0	12 J	130 JD	U	U	9 JD	U	U	U
Chlorodibromomethane	5.0	U	U	U	U	U	U	U	U
Chloroethene	10	3400 E	7100 D	2300 JD	1200 E	1500 D	380	U	U
Chloroform	5.0	U	U	U	U	U	65	U	U
Chloromethane	10	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5.0	5900 E	12000 D	7800 D	110	190 D	790	U	U
1,2-Dichloroethane	5.0	U	U	U	U	U	U	U	U
1,1-Dichloroethene	5.0	250	360 JD	U	U	U	U	U	U
Cis-1,2-Dichloroethene	5.0	15 J	U	U	U	U	U	U	U
Trans-1,2-Dichloroethene	5.0	U	U	U	U	U	U	U	U
1,2-Dichloropropane	5.0	U	U	U	U	U	U	U	U
Cis-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U	U
Ethylbenzene	5.0	U	U	U	U	U	U	U	U
2-Hexanone	10	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	10	U	U	U	U	U	U	U	U
Methylene Chloride	5.0	21 J	65 JD	U	28	15 JD	36 J	U	3 J
Styrene	5.0	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	5.0	U	U	U	U	U	U	U	U
Tetrachloroethene	5.0	42 J	U	U	U	U	U	U	U
Toluene	5.0	98	160 JD	U	U	13 JD	U	U	U
1,1,1-Trichloroethane	5.0	18000 E	36000 ED	20000 D	22 J	310 D	U	U	U
1,1,2-Trichloroethane	5.0	U	U	U	U	U	U	U	U
Trichloroethene	5.0	13 J	U	U	U	U	U	U	U
Vinyl Chloride	10	110	200 JD	U	U	U	U	U	U
Xylenes (Total)	5.0	U	U	U	U	U	U	U	U

PQL: Method Practical Quantitation Limit
J: Estimated value.
U: Compound not detected.
D: Diluted result.
DL: Diluted sample.
E: Value exceeded calibration range.

Table 2-7 (continued)

Photocircuits AS/SVE Pilot Test
Groundwater Post-Test Analysis
June 4, 1999
Glen Cove, New York

Sample Name		DAS	SAS	MW7	SMP1	SMP3	SMP4	DMP1	DMP3	DMP4
Sample ID		92261001	92261002	92261003	92261004	92261005	92261006	92261007	92261008	92261009
Date		06/04/1999	06/04/1999	06/04/1999	06/04/1999	06/04/1999	06/04/1999	06/04/1999	06/04/1999	06/04/1999
Dilution	1	100	50	20	5	5000	100	10	250	20
Volatile Organic Compounds (ug/L)	PQL*									
Acetone	10	U	760	110 J	200	U	U	220	U	220
Benzene	5.0	U	U	U	U	U	U	U	U	U
Bromodichloromethane	5.0	U	U	U	U	U	U	U	U	U
Bromoform	5.0	U	U	U	U	U	U	U	U	U
Bromomethane	10	U	U	U	U	U	U	U	U	U
2-Butanone	10	U	U	U	U	U	U	U	U	U
Carbon Disulfide	5.0	U	U	U	U	U	U	U	U	U
Carbon Tetrachloride	5.0	U	U	U	U	66000	U	U	U	U
Chlorobenzene	5.0	U	U	U	U	U	U	U	U	U
Chlorodibromomethane	5.0	U	U	U	U	U	U	U	U	U
Chloroethane	10	1400	220 J	1100	260	U	830 J	120	U	1000
Chloroform	5.0	1200	440	300	49	U	620	75	2000	U
Chloromethane	10	U	U	U	U	U	U	U	U	U
1,1-Dichloroethane	5.0	14000	5200	3500	560	59000	7300	870	24000	310
1,2-Dichloroethane	5.0	U	U	U	U	U	U	U	U	U
1,1-Dichloroethene	5.0	1500	U	U	U	U	U	U	U	U
Cis-1,2-Dichloroethene	5.0	U	U	U	U	U	U	U	U	U
Trans-1,2-Dichloroethene	5.0	U	U	U	U	U	U	U	U	U
1,2-Dichloropropane	5.0	U	U	U	U	U	U	U	U	U
Cis-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U	U	U
Trans-1,3-Dichloropropene	5.0	U	U	U	U	U	U	U	U	U
Ethylbenzene	5.0	U	U	U	U	U	U	U	U	U
2-Hexanone	10	U	U	U	U	U	U	U	U	U
4-Methyl-2-Pentanone	10	U	U	U	U	U	U	U	U	U
Methylene Chloride	5.0	540	U	78 J	U	U	U	U	U	68 J
Styrene	5.0	U	U	U	U	U	U	U	U	U
1,1,2,2-Tetrachloroethane	5.0	U	U	U	U	U	U	U	U	U
Tetrachloroethene	5.0	U	U	U	U	U	U	U	U	U
Toluene	5.0	U	U	U	U	U	U	48 J	U	U
1,1,1-Trichloroethane	5.0	9000	2400	470	230	480000	18000	340	48000	700
1,1,2-Trichloroethane	5.0	U	U	U	U	U	U	U	U	U
Trichloroethene	5.0	U	U	U	82	U	U	U	U	U
Vinyl Chloride	10	U	U	U	92	U	U	U	U	U
Xylenes (Total)	5.0	U	U	U	U	U	U	U	U	U

PQL: Method Practical Quantitation Limit
J: Estimated value.
U: Compound not detected.

Table 2-8

Photocircuits AS/SVE Pilot Test
SVE Vapor Analysis
Glen Cove, New York
June 1999

GC/MS Volatiles - units ppmv	SVE-BASE	SVE-POST
Dichlorofluoromethane	ND	ND
Dichlorotetrafluoroethane	ND	ND
Trichlorofluoromethane	ND	ND
1,1,2-Trichlorofluoromethane	ND	ND
1,2-Dibromomethane	ND	ND
1,3,5-Trimethylbenzene	ND	ND
1,2,4-Trimethylbenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND
1,2,4-Trichlorobenzene	ND	ND
Hexachlorobutadiene	ND	ND
Benzene	ND	ND
Bromomethane	ND	ND
Carbon Tetrachloride	ND	ND
Chlorobenzene	ND	ND
Chloroethane	ND	ND
Chloroform	ND	ND
Chloromethane	ND	ND
1,1-Dichloroethane	0.16	2.4
1,2-Dichloroethane	ND	ND
1,1-Dichloroethene	ND	ND
Cis-1,2-Dichloroethene	ND	10
1,2-Dichloropropane	ND	ND
Cis-1,3-Dichloropropene	ND	ND
Trans-1,3-Dichloropropene	ND	ND
Ethylbenzene	ND	ND
Methylene Chloride	ND	ND
Styrene	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND
Tetrachloroethene	ND	11
Toluene	ND	ND
1,1,1-Trichloroethane	ND	2.8
1,1,2-Trichloroethane	ND	ND
Trichloroethene	ND	6
Vinyl Chloride	ND	15
m & p-xylenes	ND	ND
0-xylene	ND	ND

Table 2-9

DTW

Date	Time	Well ID	DTW	DO	Comment
5/26/99	945	SMP1	4.57	Not Measured	
	945	DMP1	4.53	Not Measured	
	850	SMP3	4.85	Not Measured	
	850	DMP3	4.81	Not Measured	
	945	SMP4	4.71	Not Measured	
	945	DMP4	4.30	Not Measured	
5/27/99	1000	SMP1	4.49	Not Measured	
		DMP1	4.42	Not Measured	
		SMP3	4.82	Not Measured	
		DMP3	4.83	Not Measured	
		SMP4	4.75	Not Measured	
		DMP4	4.64	Not Measured	
5/28/99	1000	SMP1	4.63	Not Measured	
		DMP1	4.45	Not Measured	
		SMP3	4.79	Not Measured	
		DMP3	4.92	Not Measured	
		MW7	5.00	Not Measured	
		SMP4	4.82	Not Measured	
		DMP4	4.72	Not Measured	
		SAS	4.93	Not Measured	
		DAS	4.86	Not Measured	
6/1/99	1000	VMP1	DRY	Not Measured	SVE Baseline DTW
		SMP1	4.73	Not Measured	
		DMP1	4.59	Not Measured	
		VMP2	2.20	Not Measured	
		MW7	5.17	Not Measured	
		VMP3	2.49	Not Measured	
		SMP3	4.98	Not Measured	
		DMP3	5.09	Not Measured	
		VMP4	3.20	Not Measured	
		SMP4	4.99	Not Measured	
		DMP4	4.89	Not Measured	
		SAS	5.05	Not Measured	
		DAS	5.10	Not Measured	
6/1/99	1815	VMP1	DRY	Not Measured	Post SVE test (stopped at 1815, 6/1)
		SMP1	4.77	Not Measured	
		DMP1	4.63	Not Measured	
		VMP2	2.27	Not Measured	
		MW7	5.14	Not Measured	
		VMP3	2.42	Not Measured	
		SMP3	4.92	Not Measured	
		DMP3	5.03	Not Measured	
		VMP4	3.19	Not Measured	
		SMP4	4.97	Not Measured	
		DMP4	4.88	Not Measured	
		SAS	4.85	Not Measured	
		DAS	4.89	Not Measured	

Table 2-9 (continued)

Date	Time	Well ID	DTW	DTW DO	Comment
6/1/99	2000	DMP1		0.16	SVE Baseline DO
		DMP3		0.15	
		DMP4		0.15	
		MW7		0.11	
		SMP1		2.56	
		SMP3		0.29	
		SMP4		0.41	
		SAS		3.23	
		DAS		0.43	
6/2/99	0100	VMP1	DRY	Not Measured	Post SAS test (stopped at 2400, 6/1)
		SMP1	5.78	Not Measured	
		DMP1	4.65	Not Measured	
		VMP2	2.19	Not Measured	
		MW7	5.17	Not Measured	
		VMP3	2.48	Not Measured	
		SMP3	7.13	Not Measured	
		DMP3	5.10	Not Measured	
		VMP4	3.20	Not Measured	
		SMP4	5.00	Not Measured	
		DMP4	4.90	Not Measured	
		SAS	5.10	Not Measured	
		DAS	5.04	Not Measured	
6/2/99	0900	VMP1	DRY	Not Measured	SAS Re-test Baseline
		SMP1	4.94	1.13	
		DMP1	4.68	0.16	
		VMP2	2.28	Not Measured	
		MW7	5.29	0.22	
		VMP3	2.43		
		SMP3	5.23	1.53	
		DMP3	5.15	0.36	
		VMP4	3.24	Not Measured	
		SMP4	5.03	0.38	
		DMP4	4.93	0.39	
		SAS	4.93	Not Measured	
		DAS	4.98	Not Measured	
6/2/99	1420	VMP1	DRY	Not Measured	
		SMP1	5.92	Not Measured	
		DMP1	4.24	Not Measured	
		VMP2	2.31	Not Measured	
		MW7	4.90	Not Measured	
		VMP3	2.41	Not Measured	
		SMP3	6.30	Not Measured	
		DMP3	4.15	Not Measured	
		VMP4	2.28	Not Measured	
		SMP4	2.86	Not Measured	
		DMP4	3.88	Not Measured	

Table 2-9 (continued)

Date	Time	Well ID	DTW	DTW DO	Comment
6/2/99	1520	SMP1	5.59	1.89	Post SAS Re-test (stopped test at 1510)
		DMP1	4.60	0.01	
		MW7	5.13	0.36	
		SMP3	5.45	0.33	
		DMP3	5.14	0.51	
		SMP4	5.16	0.34	
		DMP4	4.97	0.62	
6/2/99	1850	VMP1	DRY	Not Measured	
		SMP1	6.54	Not Measured	
		DMP1	4.25	Not Measured	
		VMP2	2.30	Not Measured	
		MW7	4.70	Not Measured	
		VMP3	2.38	Not Measured	
		SMP3	8.64	Not Measured	
		DMP3	1.25	Not Measured	bubbling in well
		VMP4	3.17	Not Measured	
		SMP4	0.81	Not Measured	bubbling in well
		DMP4	1.17	Not Measured	bubbling in well
6/2/99	2020	VMP1	DRY	Not Measured	Post DAS Test
		SMP1	5.89	Not Measured	
		DMP1	6.56	Not Measured	
		VMP2	2.28	Not Measured	
		MW7	5.11	Not Measured	
		VMP3	2.46	Not Measured	
		SMP3	7.24	Not Measured	
		DMP3	5.23	Not Measured	
		VMP4	3.19	Not Measured	
		SMP4	5.25	Not Measured	
		DMP4	5.10	Not Measured	
6/4/99	930	VMP1	DRY	Not Measured	
		SMP1	4.79	Not Measured	
		DMP1	5.93	Not Measured	
		VMP2	2.39	Not Measured	
		MW7	6.04	Not Measured	
		VMP3	2.87	Not Measured	
		SMP3	5.47	Not Measured	
		DMP3	5.57	Not Measured	
		VMP4	DRY	Not Measured	
		SMP4	5.63	Not Measured	
		DMP4	5.39	Not Measured	
		DAS	5.38	Not Measured	
		SAS	6.00	Not Measured	
		SVE	1.34	Not Measured	

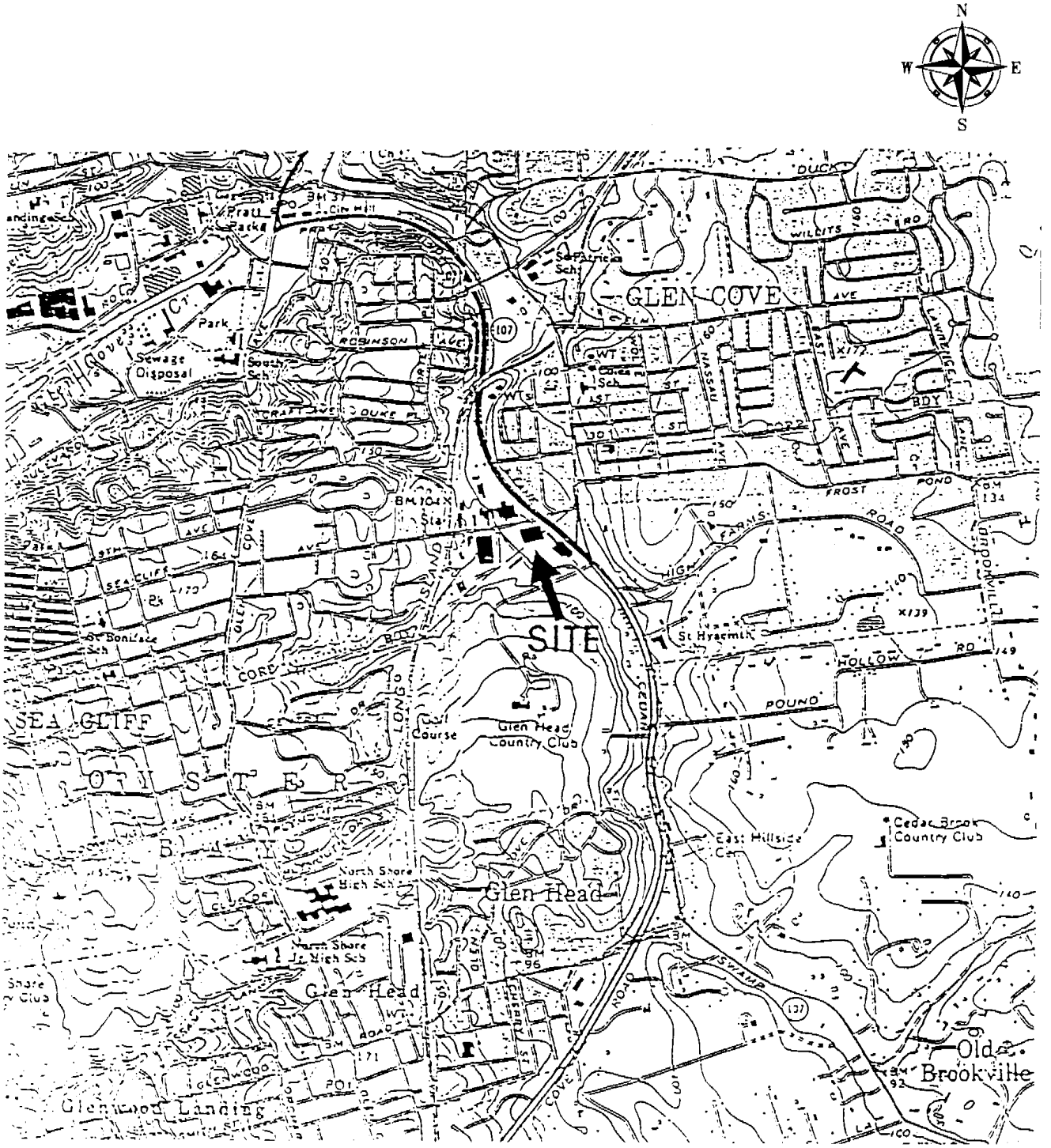


FIGURE 1-1

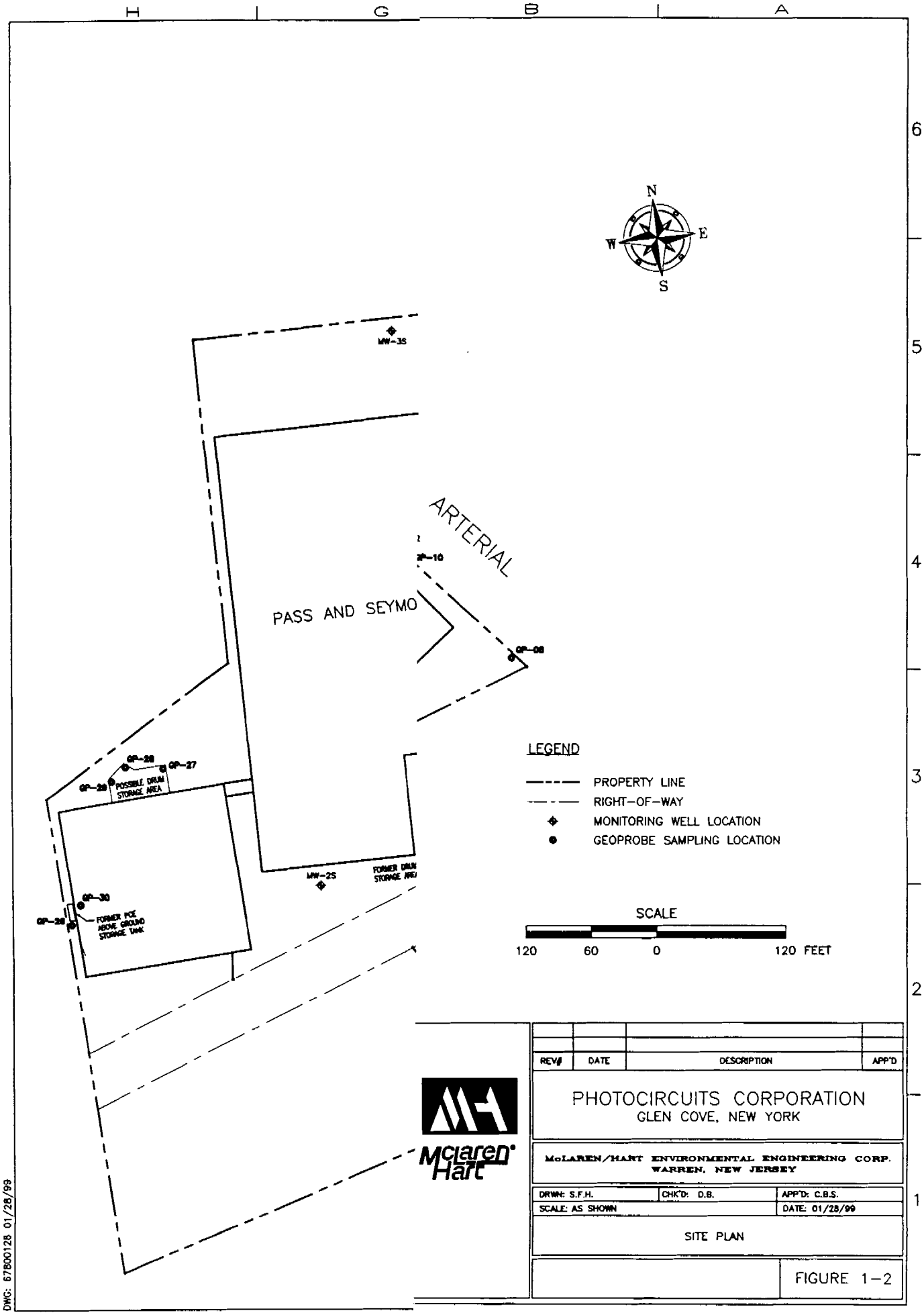
SITE LOCATION MAP

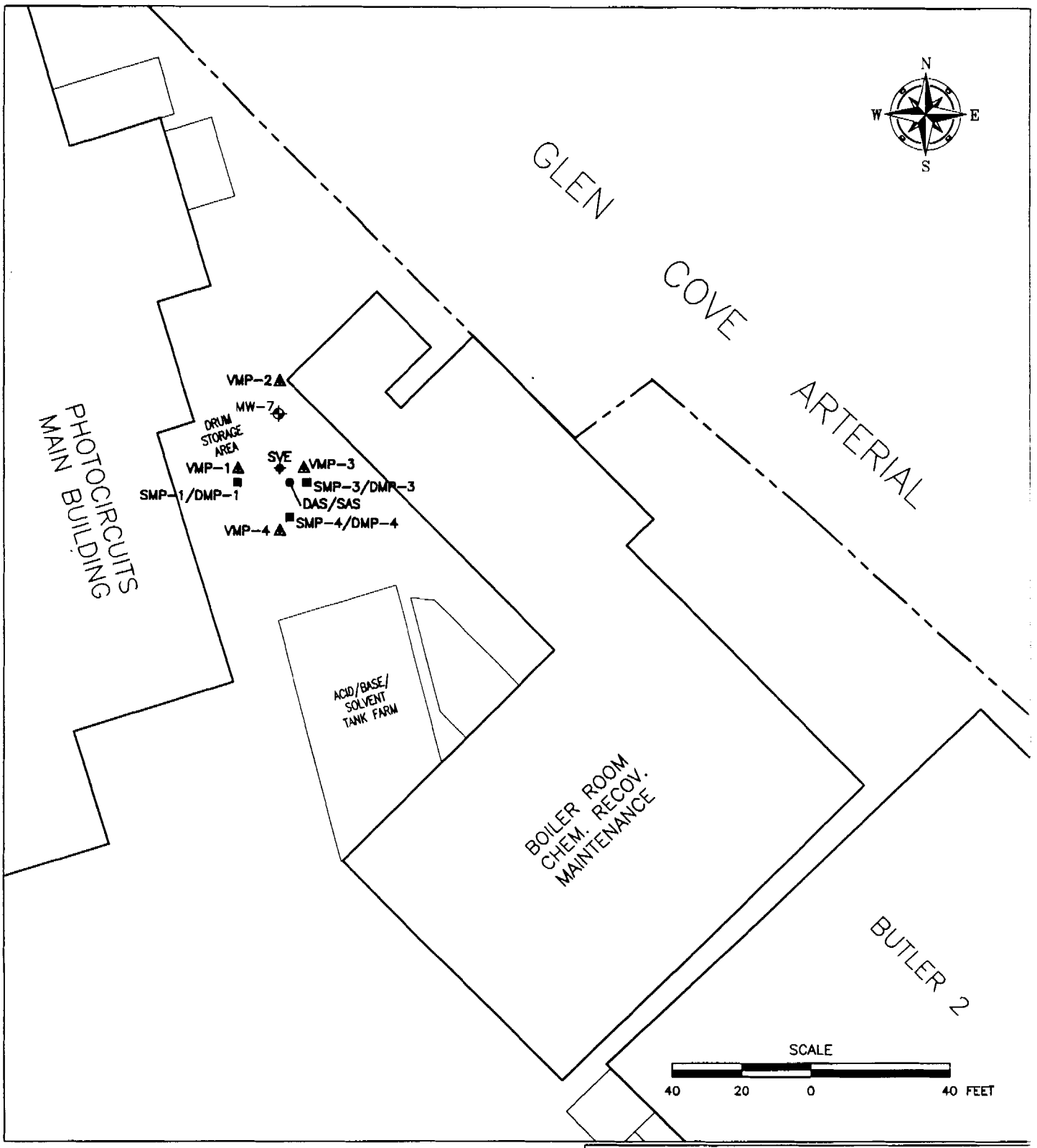
PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: D.B.	CHK'D: D.L.S.
SCALE: AS SHOWN	DATE: 10/08/96

DWG: 67800126 07/02/99


H
G
B
A
6
5
4
3
2
1
N
W
E
S
MW-3S
ARTERIAL
PASS AND SEYMO
GP-10
GP-08
GP-28
GP-27
GP-29
POSSIBLE DRUM STORAGE AREA
MW-2S
FORMER DRUM STORAGE AREA
GP-30
GP-26
FORMER POE ABOVE GROUND STORAGE TANK
LEGEND
PROPERTY LINE
RIGHT-OF-WAY
MONITORING WELL LOCATION
GEOPROBE SAMPLING LOCATION
SCALE
120 60 0 120 FEET
REV# DATE DESCRIPTION APP'D
PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK
McLAREN/HART ENVIRONMENTAL ENGINEERING CORP.
WARREN, NEW JERSEY
DRWN: S.F.H. CHK'D: D.B. APP'D: C.B.S.
SCALE: AS SHOWN DATE: 01/28/99
SITE PLAN
FIGURE 1-2
DWG: 67800128 01/28/99



LEGEND

- PROPERTY LINE
- RIGHT-OF-WAY
- MONITORING WELL LOCATION
- VAPOR MONITORING POINT
- SOIL VAPOR EXTRACTION WELL
- SHALLOW/DEEP AIR SPARGING WELL
- SHALLOW/DEEP AIR SPARGE MONITORING POINT
- DEEP AIR SPARGE MONITORING POINT

FIGURE 2-1

PILOT TEST LOCATION MAP

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart® ENVIRONMENTAL ENGINEERING CORPORATION

DRWN: J.R.F.	CHK'D: D.L.S.
SCALE: AS SHOWN	DATE: 07/02/99

DWG: 67800127 07/02/99

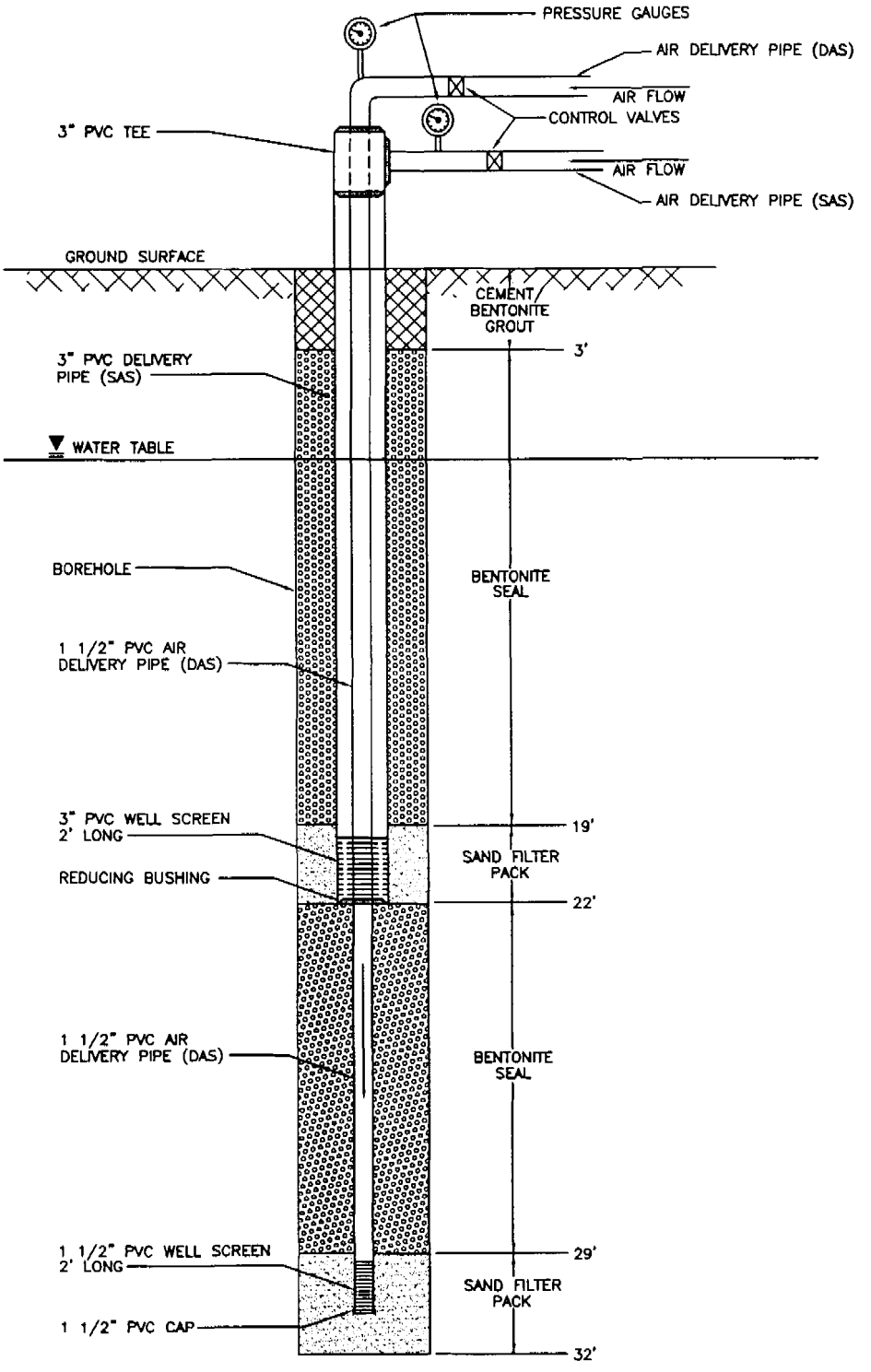


FIGURE 2-2

DEEP/SHALLOW
AIR SPARGE WELL (DAS/SAS)

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart INC.

DRWN: J.R.F.	CHK'D: D.L.S.
SCALE: NONE	DATE: 07/02/99

DWG: 67800132 07/02/99

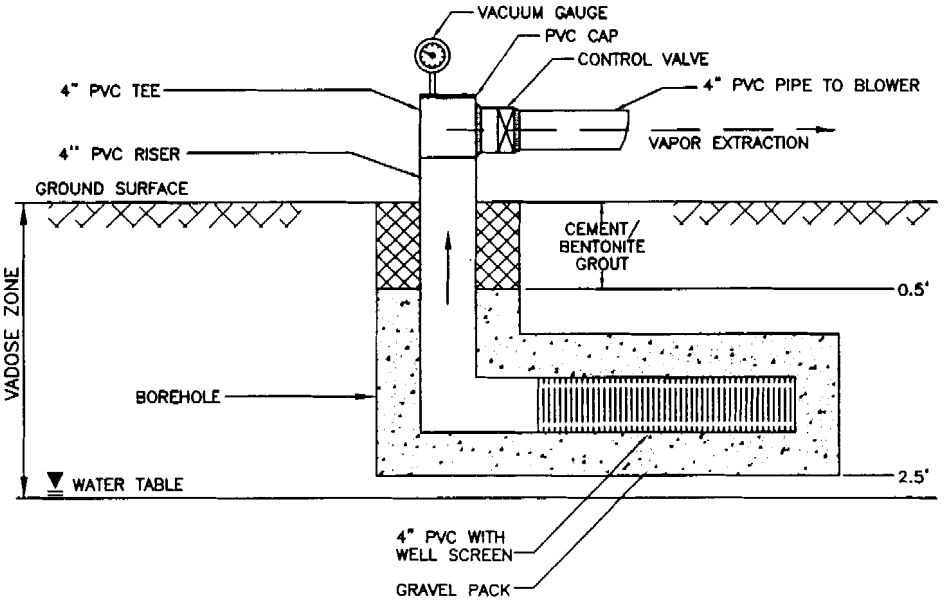


FIGURE 2-3

SOIL VAPOR
EXTRACTION WELL DESIGN (SVE)

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart INC.

DRWN: J.R.F.	CHK'D: D.L.S.
SCALE: NONE	DATE: 07/02/99

DWG: 67800129 07/02/99

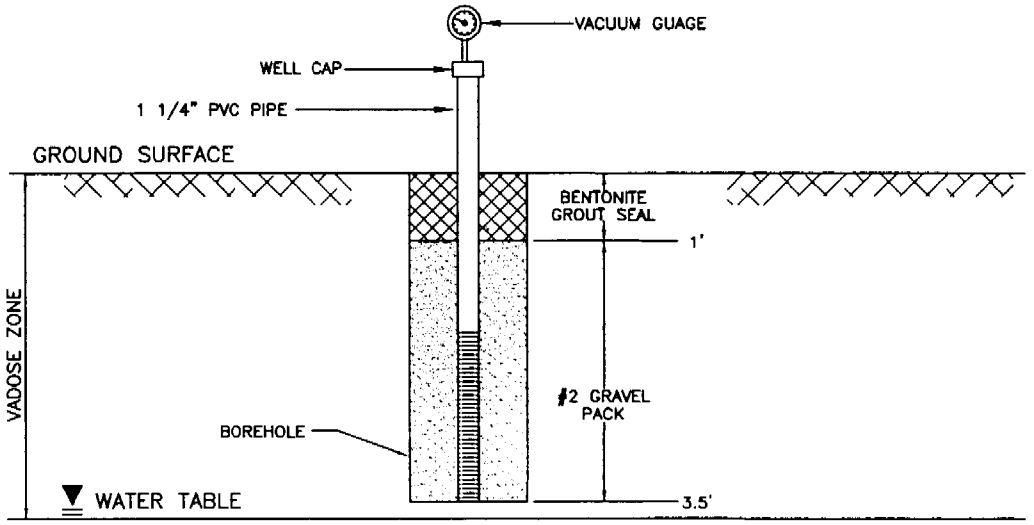


FIGURE 2-4

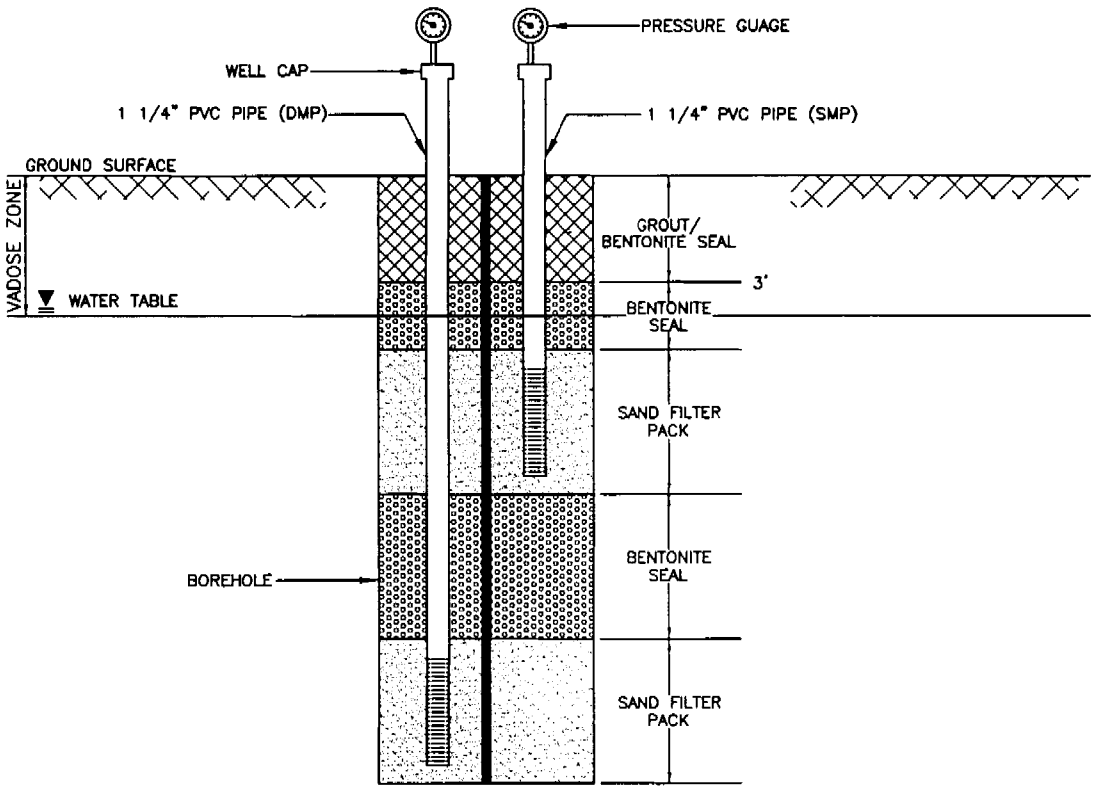
TYPICAL SOIL VAPOR MONITORING POINT CONSTRUCTION (VMP)

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart INC.

DRWN: J.R.F.	CHK'D: D.L.S.
SCALE: NONE	DATE: 07/02/99

DWG: 67800130 07/02/99



SCREEN DEPTHS	SAND PACK DEPTHS
SMP-1 - 8'-10'	7'-10'
DMP-1 - 18'-20'	17'-20'
SMP-3 - 13'-15'	12'-15'
DMP-3 - 23'-25'	22'-25'
SMP-4 - 13'-15'	12'-15'
DMP-4 - 20'-22'	19'-22'

FIGURE 2-5

TYPICAL SHALLOW AND DEEP AIR SPARGING MONITORING POINT CONSTRUCTION (SMP/DMP)

PHOTOCIRCUITS CORPORATION
GLEN COVE, NEW YORK

McLaren Hart INC.

DRWN: J.R.F.	CHK'D: D.L.S.
SCALE: NONE	DATE: 07/02/99

DWG: 678001.31 07/02/99

APPENDIX A
Monitoring Well Log for SAS/DAS

MONITORING WELL LOG

BORING NO.: SAS/DAS	PROJECT NO.: 120806115001	PROJECT NAME: Photocircuits, Inc.	LOCATION SKETCH
LOCATION: Glen Cove, New York		GEOLOGIST / OFFICE: Deborah Schnell/Warren	
DRILLING EQUIPMENT: Auger	DRILLING CONTRACTOR / DRILLER: Summit Drilling, Inc./Todd Naugle	COMPLETION DATE: 5/18/99-5/21/99	PERMIT NUMBER:
WELL INSTALLED? YES	DRILLING METHOD / BIT: 6 5/8" Hollow Stem Auger	SAMPLING METHOD: 4' Diameter MA and 2" Diameter Split Spoon (SS)	
GROUND SURFACE ELEVATION:	STATIC WATER LEVEL: 8 feet bgs	NOTE: PID readings with 11.8 eV lamp	

DEPTH (FT.)	SAMPLE INTERVAL	REC. (in.)	BLOWS /12"	DESCRIPTION	REMARKS
1				0"-10": Concrete	0 ppmv
				10"-14": Asphalt	
2	MA-1	18			
3					61 ppmv
				36"-42": F-m gray SAND, some silt, tr. gravel	14.4 ppmv
4				42"-48": F-m lt. brown SAND, some silt, tr. gravel	
5				6"-12": F-m black SAND, little f-m gravel	Damp, sheen present
				12"-30": F-m black SAND, little silt, tr gravel	
6	MA-2	42			35.2 ppmv
7				30"-31": Dk brown-black GRAVEL	64 ppmv, odor
				31"-48": F-m black SAND, little gravel, little silt	Saturated
8					
9					0"-12": Black colored WATER
				12"-24": F-m black SAND, little f-m gravel, tr silt	
10	MA-3	48			77 ppmv
				24"-30": M-c black SAND, some gravel	
11				30"-42": F-m black SAND, some silt	>1000 ppmv
12				42"-48": F-m black SAND, little gravel, little c sand	
13				0"-24": M-c black SAND and f gravel	Pebbles & cobbles (difficult drilling)
					>1000 ppmv
14	MA-4	48			>1000 ppmv
				24"-42": F-m black SAND, tr gravel	
15					>1000 ppmv
16				42"-48": F-m brown-black SAND, tr gravel	
17				8"-24": M-c black GRAVEL and c sand	
					>1000 ppmv
18	MA-5	28			
19				24"-30": F black SAND, tr c sand	Pebbles & cobbles (difficult drilling)
				30"-36": F black SAND, tr f-m gravel	
20					
21	X				OVM not measured (20' - 23')
					Changed to piston point on drill rig
22					No sample from 20'-23'
23					SAS
24				6"-36": F-m black SAND	30 ppmv
25					350 ppmv

NOTE: MA-1 ---> Macrocore Sample # 1

WELL CONSTRUCTION LEGEND

Bentonite
Plug
Screen
Cement/Bentonite
Sand Pack

MONITORING WELL LOG (cont.)

DEPTH (FT.)	SAMPLE INTERVAL	REC. (in.)	BLOWS /12"	DESCRIPTION	REMARKS	WELL CONSTRUCTION
26	MA-6	30			250 ppmv	
27				36"-46": F-m dk gray SAND, little silt, little m-c gravel 46"-48": F-m dk gray SAND, some gravel, little silt		
28						
29	SS-1	11	14		Medium dense 59 ppmv at 29' 2"	
30			48	12"-20": F-m black SAND, little c sand 20"-24": F-m lt brown-black SAND, little gravel	28 ppmv at 29' 6"/Dense 9 ppmv at 29' 10"	
31	SS-2	18	26	trace c. sand 6"-12": F-m black SAND with 1" gravel	27 ppmv at 30' 9"/Medium Dense 58.1 ppmv at 31'	
32			37	12"-21": F-m lt brown-brown SAND, little gravel 21"-24": F-m black SAND	49.4 ppmv at 31' 4"/Dense 7.8 ppmv at 31' 9"	
33				END OF BORING AT 32.0 ft		DAS
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
51						
52						
53						
54						
55						

NOTES: SS-1 ---> Split Spoon Sample # 1
MA-1 ---> Macrocore Sample # 1

WELL CONSTRUCTION LEGEND

Bentonite
Plug
Screen
Cement/Bentonite
Sand Pack

APPENDIX B
Groundwater Sampling Analytical Results

Severn Trent Laboratories
628 Route 10
Whippany, NJ 07981
Tel: (973) 428-8181
Fax: (973) 428-5222

NYSDEC CATEGORY A DATA PACKAGE

SAMPLING DATE JUNE 4, 1999

MCLAREN HART

PROJECT: PHOTOCIRCUITS

PREPARED BY:

SEVERN TRENT LABORATORIES, INC. (STL)

(CERTIFICATION NUMBER 10997)

STL JOB NO: 20990-92261

VOLUME I OF I

Committed To Your Success

JUNE 23, 1999

20990-92261
MCLAREN HART, INC.
25 INDEPENDENCE BLVD.
WARREN , NJ 07059

ATTENTION: DEB SCHNELL

The following samples were received for analysis by STL-NJ (NY Cert.#10997). These samples were received on and labeled as follows:

STL Sample No.:	Client ID:	Date Received
92261001	DAS	06/05/99
92261002	SAS	06/05/99
92261003	MW7	06/05/99
92261004	SMP1	06/05/99
92261005	SMP3	06/05/99
92261006	SMP4	06/05/99
92261007	DMP1	06/05/99
92261008	DMP3	06/05/99
92261009	DMP4	06/05/99
92261010	TB052899	06/05/99

DATA RELEASE AUTHORIZED BY:

Carl W. Armbruster
Director of Operations

Committed To *Your* Success

Severn Trent Laboratories
628 Route 10
Whippany NJ 07981

Tel: (973) 428-8181
Fax: (973) 428-5222

STL - NJ Lab Certifications

STL - NJ possesses the following regulatory certifications and is currently certified to perform analysis in accordance with regulations pertaining to these certifications. Certificates are on file at the laboratory.

State/Agency Certification	Lab ID Number
CLP Organics Contract	68D50011
Connecticut	PH0722
Maryland	195
New Jersey	14530
New York	10997
North Carolina	339
Pennsylvania	68-355
Rhode Island	178
West Virginia	258
USDA Permit	S-3295 Revised
Delaware	NJ323

Last Updated: 7/15/98

TABLE OF CONTENTS

CASE NARRATIVE

Client: MCLAREN HART

Job No: 20990-92261

CASE NARRATIVE

VOLATILES:

The Methylene Chloride and Acetone detected in some of the samples is believed to be due to laboratory con.

SEMIVOLATILES:

No analysis was performed.

GAS CHROMATOGRAPHY:

No analysis was performed.

METALS:

No analysis was performed.

WET CHEMISTRY:

No analysis was performed.

SUBCONTRACTING:

No analysis was performed.

Severn Trent Laboratories
628 Route 10
Whippany NJ 07981
Tel: (973) 428-8181
Fax: (973) 428-5222

ORGANICS ANALYSIS
DATA AND SAMPLE QUALIFIERS

DATA QUALIFIERS:

U - Indicates that the compound was analyzed for but not detected.

J - This qualifier indicates an estimated concentration. This qualifier is used (1) when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the CRQL or PQL but greater than zero, and (3) when the retention time data indicate the presence of a compound that meets the Pesticide/Aroclor identification criteria, and the result is less than the CRQL or PQL but greater than zero.

B - This qualifier is used when the analyte is found in a method blank as well as the sample. It indicates possible sample contamination and warns the user to use caution when applying the results of this analyte.

E - Exceeds calibration curve

A - Indicates that a tentatively identified compound is a suspected Aldol-condensation product.

N - Indicates presumptive evidence of a compound. This qualifier is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all tentatively identified compound results. For generic classification of a tentatively identified compound, such as chlorinated hydrocarbon, the N code is not used.

D - This qualifier identifies all compounds identified in an analysis at a secondary dilution factor.

P - Indicates that the quantitative results from the two GC columns differed by more than 25 percent.

SAMPLE QUALIFIERS:

DL - Indicates that the analysis was performed at a secondary dilution.

RE - Rerun - Indicates that the analysis is a reinjection or a reextraction and reanalysis, usually due to a failed QC element in the initial analysis.

METHODOLOGY SUMMARY

VOLATILE ORGANICS

EPA SW846 Method 8260B is used for the analysis of Volatile Organics. Helium is bubbled through a sample contained in a specifically designed purging chamber. The purgeables are efficiently transferred from the sample to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the sorbent column is heated and backflushed with Helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected with a mass spectrometer. The holding time for aqueous samples is fourteen (14) days from the date of collection, providing that the samples are preserved to pH <2 with HCl (seven (7) days otherwise). The holding time for soil samples is also fourteen (14) days from collection.

CHAIN OF CUSTODY

Severn Trent Laboratories
628 Route 10
Whippany NJ 07981
Tel: (973) 428-8181
Fax: (973) 428-5222

No. 56527

CHAIN OF CUSTODY

FIELD BOOK: _____ Pg 1 of 1

(1) Client: McLaren / Hart Inc.
(2) Project Name/no.: Photocircuits Inc.
(3) Client Contact: Deb Sehnell
(4) STL Contact: Dan Glenn
(5) TAT: 1wk, 2wk, 3wk, OTHER 2 wk
(6) Proj. Type: NJPDES, NPDES, ISRA, CLP, CERCLA, RCRA, UST, ACO, MOA, OTHER NJ
(7) Protocol: CLP, SW846, EPA 600, DW, OTHER
(8) Reporting Type: NJ Reg Format, NJ Reduced Format, CLP, Level III, Level IV (Data Sum), Other NJ CAT A + McLaren Disk

(14) Bill To: McLaren / Hart
25 Independence Blvd
Warren NJ 07059
PO# 120806115001081

(15) ANALYSIS REQUIRED

(9) Client ID (10 CHAR)	(10) Date	(11) Time	(12) Mtx	# OF CONTAINERS (13)	X VOC 8260B
DUP1	6/4/99	1430	AQ	3	X
SW1		1505	AQ		
MW1		1400	AQ		
SMP1		1605	AQ		
SMP2		1415	AQ		
SMP4		1340	AQ		
DMP1		1505	AQ		
DMP3		1250	AQ		
DMP4		1425	AQ		
FB060499			AQ		
TB060499			AQ		

For Lab Use Only
Job No: 97261
Quote No:
# of Coolers:
Cooler Temp(s):
Custody Seal # (s):
Date/Time:
NPM/NON-CONFORMANCE
Preserved: Temp:
Container: Volume:
Broken: Initials:
Holding Time:
Other:
Logged By:

DESCRIPTION
01 DUP1
02 SW1
03 MW1
04 SMP1
05 SMP2
06 SMP4
07 DMP1
08 DMP3
09 DMP4
10 TB060499

(16) COMMENTS: (Please include hazards on site.)
* Some vials contain bubbles

(17)

	Print Name and Company	Signature	Custody Seal # (s)	Date/Time
Sampled By:	Kerriann Schnell / McLaren / Hart	K Schnell	6013	6/4/99 1600
Received By:	Rachel Malgrati	R Malgrati		6/5/99 10:00
Relinquished By:				/
Received By:				/
Relinquished By:				/
Received By:				/

Mtx = Matrix of Sample. (AI=Air, AQ=Aqueous, LE=Leachate, ML=Misc Liquid, MS=Misc Solids, OIL, SE=Sediment, SL=Sludge, SO=Soil)

(Copies: White and yellow copies should accompany samples to STL. The pink copy should be retained by the client.) See reverse for directions.

SEVERN TRENT LABORATORIES, Inc. - NEW JERSEY
SAMPLE RECEIPT VERIFICATION FORM

JOB NUMBER: 52261 CLIENT McLaren/Hart DATE RECEIVED: 4/5/99

OF SAMPLES 10 # OF COOLERS 1
CUSTODY SEALS: PRESENT/ ABSENT INTACT/ BROKEN TEMPERATURE BLANK PRESENT: YES NO

COOLER TEMP/S ° C 4C ____ ____ ____ COOLER OUTSIDE 2- 6 ° C ___ PRESERVED ICE/BLUE ICE/ NONE
IF OUTSIDE TEMP RANGE - WERE SAMPLES RECEIVED LESS THAN 4 HOURS FROM COLLECTION ? ___ YES ___ NO

CHAIN OF CUSTODY PRESENT/ ABSENT PROPERLY SIGNED, DATED, TIME: YES NO
SAMPLE TAGS: PRESENT/ ABSENT RECEIVED BY: DRIVER ____ IF SHIPPED AIRBILL PRESENT ___ #812704607012

COOLER RADIOACT. SCREEN BELOW *0.50 uR/hr* YES ✓ NO ___ (INFORM SAFETY OFFICER IMMED.)

YES NO SAMPLE BOTTLES INTACT
YES NO PROPER CONTAINERS PER ANALYSIS USED
YES NO SAMPLE LABELS INTACT
YES NO LABELS COMPLETE AND LEGIBLE (ID, DATE,TIME,SIGNATURE,PRESERVATIVE)
YES NO SAMPLES RECEIVED WITHIN HOLDING TIME
YES NO SAMPLES PROPERLY PRESERVED
YES NO NO BUBBLES PRESENT VOA WATER MATRIX NA
YES NO SUFFICIENT SAMPLE VOLUME RECEIVED
YES NO DRINKING H20/TREATED H20 – CHECKED FOR RESIDUAL CHLORINE NA
(DOCUMENT ON pH VERIFICATION LOG FORM

____ INTIAL ____ DATE - RUSH REPORT ISSUED BY NA
____ INTIAL ____ DATE - pH ANALYSIS PERFORMED BY NA
____ INTIAL ____ DATE - % MOISTURE PERFORMED BY NA
____ INTIAL ____ DATE - SAMPLE COMPOSITE PERFORMED BY NA

NOTE AND ITEMIZE BY SAMPLE AFFECTED, DISCREPANCIES AND NONCONFORMANCES FOUND:
04,05,06 - Head Space in all 3 btls. 07 → Head space in 2 btls
Did Not recieve Field Blank

PROJECT MANAGER INFORMED OF DISCREPANCIES: ____ INTIALS ____ DATE ___ NA

SUBCONTRACTING OF ANALYSIS REQUIRED YES NO SUB COC COMPLETED YES NO NA
SUBCONTRACTED SAMPLES SHIPPED YES NO CARRIER USED ____

SAMPLE RECEIPT, LABELING AND STORAGE PROCEDURES PERFORMED BY: R. Mgtaniak

FINAL INSPECTION

BOTTLES CORRECTLY LABELED YES NO REVIEWED BY ____ DATE: 4/5/99
INTERNAL CHAIN OF CUSTODY INITIATED YES NO
ALL SIGNATURES AND DATES COMPLETE YES NO

CLIENT INFORMED OF DISCREPANCIES/NONCONFORMANCES BY PM ____ DATE ____ TIME ____

NAME CLIENT REPRESENTATIVE INFORMED ____ METHOD: PHONE ___ FAX ___

CORRECTIVE ACTION REQUESTED BY CLIENT: ____

CORRECTIVE ACTION TAKEN: ____

PROJECT MANAGER APPROVED VERIFICATION FORM COMPLETE: ____ DATE 4/6/99
Print name ____

SEVERN TRENT LABORATORIES, Inc. - NEW JERSEY PAGE 1 OF 1

SAMPLE PRESERVATION VERIFICATION LOG
SAMPLE CONTROL DEPARTMENT

JOB NUMBER: 92261 CLIENT: Integrien/Hart DATE RECEIVED: 6/5/99

OF SAMPLES: 10

If pH is not within acceptable range, document actual pH in OTHER column

VOA			METALS			PHC			OIL & GREASE		
ID #	pH <2	OTHER	ID #	pH <2	OTHER	ID #	pH <2	OTHER	ID #	pH <2	OTHER
01	✓										
02	✓										
03	✓										
04	✓										
05	✓										
06	✓										
07	✓										
08	✓										
09	✓										
10	✓										

CYANIDE			H2SO4 PRES. W.C.			H2SO4 PRES. W.C.			OTHER PRESERVATIVE		
ID #	pH >12	OTHER	ID #	pH <2	OTHER	ID #	pH<2	OTHER	ID #	pH ___	OTHER

COMMENTS: NOTE BY SAMPLE ID NUMBER - NON CONFORMANCES IN pH PRESERVATION:

pH PRESERVATION VERIFICATION PERFORMED BY: [signature] DATE 6/5/99

PROJECT MANAGER INFORMED OF NON CONFORMANCE: ____ YES INITIAL _____

Severn Trent Laboratories

INTERNAL CHAIN OF CUSTODY CHRONICLE
VOLATILES

Job/Case Number: 92161 Sample IDs: 01 - 10

Relinquished By: L. Malanick Date/Time: 6/7/99

Received By: [signature] Date/Time: 06/07/99 1115

I confirm that I have performed the analysis below following SOP quidelines:

ANALYST RETRIEVAL:

Sample No(s)	Analyst Signature	Date	Returned Date (Soil)
001 - 010	[signature]	6/11/99	

ANALYST RETRIEVAL: REANALYSIS:

Sample No(s)	Analyst Signature	Date	
001 - 004		6/15/99	

PERCENT SOLIDS:

Sample No(s)	Analyst Signature	Date	

I confirm that I have reviewed all associated data for this job:

REVIEWED BY: Signature [signature] Date 6/15/99

AUTHORIZATION: Data Release Authorized By: [signature] Group Leader/Lab Manager Date 6/23/99

STL - NEW JERSEY SIGNATURE PAGE

Employee Name	Signature	Initials
LABORATORY DIRECTOR		
Armbruster, Carl		CLA
LABORATORY MANAGER		
Hitt, Dewey		DDH.
QA/QC MANAGER		
Heath, Timothy		TMH
ADMINISTRATION		
Bartley, Katrina		KLB
Connelly, Joan		JMC
Davila, Nahir		N.D
Nadzan, Al		
Wood, Mary		MBW
REPORTS PRODUCTION		
Cignarella, Christine		CC.
Patel, Darshana		DP
Roman, Richard		R.R.
SYSTEMS		
Foti, Lisa		
Gorden, Roger		RBG
Molina, Maria		MCM

STL - NEW JERSEY SIGNATURE PAGE

Employee Name	Signature	Initials
PROJECT MANAGEMENT		
Brack, Joe		
Doster, Deanna		
Glenn, Dan		
Pryor, Kelly		
Trulick, Barbra		
SAMPLE CONTROL		
Doeffinger, John		
Droz, Efrain		
Malaniak, Rachel		
BOTTLE PREP		
D'Achille, Al		
Reynolds, Ed		
Sander, James		
GC/MS VOLATILES		
Acierno, Mark		
Klusey, Sylvanus		
Manlangit, Ferdie		
Waldron, Stacey		
GC/MS SEMIVOLATILES		
Hamernick, Richard		
Mauriello, Gregg		
Schulze, Stephen		
Seal, Sonia		
Wood, Brian		

STL - NEW JERSEY SIGNATURE PAGE

Employee Name	Signature	Initials
GAS CHROMATOGRAPHY		
Carlone, John		
Hankerson, Anthony		
Herrmann, Claus		
Hornberger, Kasie		
Lena, John		
Scott, Gordon		GDS
Tako, Lisa		
Wechsler, David		
METALS		
Chang, Grace		
Cousineau, Paul		
Herpen, Lori		
Nadzan, Tim		
Schwartz, Robert		
WET CHEMISTRY		
Bielski, Kevin		
Florance, Gerard		
Kenneweg, John		
Piatt, Ernest		
FIELD SERVICES		
Dippel, Edward		
Knudsen, Troy		
Murad, John		

STL - NEW JERSEY SIGNATURE PAGE

Employee Name	Signature	Initials
RADIOLOGICALS		
Fink, Daniel		
Komanduri, Sreenivas		
Nielsen, Erik		
Zareian-Fink, Nahid		

REVISED 6/4/99

VOLATILES

CLIENT : McLaren Hart

MATRIX: Water

JOB No.: 92261

VOLATILE ORGANIC ANALYSIS RESULTS

Units: ug/l

Quantitation Factor (QF)	1.00	1.00	1.00	100.00	50.00	Method Practical Quantitation Limits (PQL)*
Method Blank I.D.	J0668	J0668	A8433	A8433	A8433	
Lab I.D.	990609J1	92261010	990615A1	92261001	92261002	
Client I.D	METHOD BLANK	TB052899	METHOD BLANK	OAS	SAS	
Acetone	U	U	U	U	760	10.0
Benzene	U	U	U	U	U	5.0
Bromodichloromethane	U	U	U	U	U	5.0
Bromoform	U	U	U	U	U	5.0
Bromomethane	U	U	U	U	U	10.0
2-Butanone	U	U	U	U	U	10.0
Carbon Disulfide	U	U	U	U	U	5.0
Carbon Tetrachloride	U	U	U	U	U	5.0
Chlorobenzene	U	U	U	U	U	5.0
Chlorodibromomethane	U	U	U	U	U	5.0
Chloroethane	U	U	U	1400	220J	10.0
Chloroform	U	U	U	1200	440	5.0
Chloromethane	U	U	U	U	U	10.0
1,1-Dichloroethane	U	U	U	14000	5200	5.0
1,2-Dichloroethane	U	U	U	U	U	5.0
1,1-Dichloroethene	U	U	U	1500	U	5.0
Cis-1,2-Dichloroethene	U	U	U	U	U	5.0
Trans-1,2-Dichloroethene	U	U	U	U	U	5.0
1,2-Dichloropropane	U	U	U	U	U	5.0
Cis-1,3-Dichloropropene	U	U	U	U	U	5.0
Trans-1,3-Dichloropropene	U	U	U	U	U	5.0
Ethylbenzene	U	U	U	U	U	5.0
2-Hexanone	U	U	U	U	U	10.0
4-Methyl-2-Pentanone	U	U	U	U	U	10.0
Methylene Chloride	U	U	U	540	U	5.0
Styrene	U	U	U	U	U	5.0
1,1,2,2-Tetrachloroethane	U	U	U	U	U	5.0
Tetrachloroethene	U	U	U	U	U	5.0
Toluene	U	U	U	U	U	5.0
1,1,1-Trichloroethane	U	U	U	9000	2400	5.0
1,1,2-Trichloroethane	U	U	U	U	U	5.0
Trichloroethene	U	U	U	U	U	5.0
Vinyl Chloride	U	U	U	U	U	10.0
Xylenes (Total)	U	U	U	U	U	5.0

* Sample PQL (Practical Quantitation Limit) = Method PQL X QF

CLIENT : McLaren Hart

MATRIX: Water

JOB No.: 92261

VOLATILE ORGANIC ANALYSIS RESULTS

Units: ug/l

Quantitation Factor (QF)	20.00	5.00	100.00	250.00	20.00	Method Practical Quantitation Limits (PQL)*
Method Blank I.D.	A8433	A8433	A8433	A8433	A8433	
Lab I.D.	92261003	92261004	92261006	92261008	92261009	
Client I.D	MW7	SMP1	SMP4	DMP3	DMP4	
Acetone	110J	200	U	U	220	10.0
Benzene	U	U	U	U	U	5.0
Bromodichloromethane	U	U	U	U	U	5.0
Bromoform	U	U	U	U	U	5.0
Bromomethane	U	U	U	U	U	10.0
2-Butanone	U	U	U	U	U	10.0
Carbon Disulfide	U	U	U	U	U	5.0
Carbon Tetrachloride	U	U	U	U	U	5.0
Chlorobenzene	U	U	U	U	U	5.0
Chlorodibromomethane	U	U	U	U	U	5.0
Chloroethane	1100	260	830J	U	1000	10.0
Chloroform	300	49	620	2000	U	5.0
Chloromethane	U	U	U	U	U	10.0
1,1-Dichloroethane	3500	560	7300	24000	310	5.0
1,2-Dichloroethane	U	U	U	U	U	5.0
1,1-Dichloroethene	U	U	U	U	U	5.0
Cis-1,2-Dichloroethene	U	U	U	U	U	5.0
Trans-1,2-Dichloroethene	U	U	U	U	U	5.0
1,2-Dichloropropane	U	U	U	U	U	5.0
Cis-1,3-Dichloropropene	U	U	U	U	U	5.0
Trans-1,3-Dichloropropene	U	U	U	U	U	5.0
Ethylbenzene	U	U	U	U	U	5.0
2-Hexanone	U	U	U	U	U	10.0
4-Methyl-2-Pentanone	U	U	U	U	U	10.0
Methylene Chloride	78J	U	U	U	68J	5.0
Styrene	U	U	U	U	U	5.0
1,1,2,2-Tetrachloroethane	U	U	U	U	U	5.0
Tetrachloroethene	U	U	U	U	U	5.0
Toluene	U	U	U	U	U	5.0
1,1,1-Trichloroethane	470	230	18000	48000	700	5.0
1,1,2-Trichloroethane	U	U	U	U	U	5.0
Trichloroethene	U	82	U	U	U	5.0
Vinyl Chloride	U	92	U	U	U	10.0
Xylenes (Total)	U	U	U	U	U	5.0

* Sample PQL (Practical Quantitation Limit)= Method PQL X QF

CLIENT : McLaren Hart

MATRIX: Water

JOB No.: 92261

VOLATILE ORGANIC ANALYSIS RESULTS

Units: ug/l

Quantitation Factor (QF)	5000.00	10.00				Method Practical Quantitation Limits (PQL)*
Method Blank I.D.	A8433	A8433				
Lab I.D.	92261005	92261007				
Client I.D	SMP3	DMP1				
Acetone	U	220				10.0
Benzene	U	U				5.0
Bromodichloromethane	U	U				5.0
Bromoform	U	U				5.0
Bromomethane	U	U				10.0
2-Butanone	U	U				10.0
Carbon Disulfide	U	U				5.0
Carbon Tetrachloride	66000	U				5.0
Chlorobenzene	U	U				5.0
Chlorodibromomethane	U	U				5.0
Chloroethane	U	120				10.0
Chloroform	U	75				5.0
Chloromethane	U	U				10.0
1,1-Dichloroethane	59000	870				5.0
1,2-Dichloroethane	U	U				5.0
1,1-Dichloroethene	U	U				5.0
Cis-1,2-Dichloroethene	U	U				5.0
Trans-1,2-Dichloroethene	U	U				5.0
1,2-Dichloropropane	U	U				5.0
Cis-1,3-Dichloropropene	U	U				5.0
Trans-1,3-Dichloropropene	U	U				5.0
Ethylbenzene	U	U				5.0
2-Hexanone	U	U				10.0
4-Methyl-2-Pentanone	U	U				10.0
Methylene Chloride	U	U				5.0
Styrene	U	U				5.0
1,1,2,2-Tetrachloroethane	U	U				5.0
Tetrachloroethene	U	U				5.0
Toluene	U	48J				5.0
1,1,1-Trichloroethane	480000	340				5.0
1,1,2-Trichloroethane	U	U				5.0
Trichloroethene	U	U				5.0
Vinyl Chloride	U	U				10.0
Xylenes (Total)	U	U				5.0

* Sample PQL (Practical Quantitation Limit)= Method PQL X QF

Committed To *Your* Success

Severn Trent Laboratories
628 Route 10
Whippany, NJ 07981
Tel: (973) 428-8181
Fax: (973) 428-5222

NYSDEC CATEGORY A DATA PACKAGE

SAMPLING DATE MAY 28, 1999

MCLAREN HART

PROJECT: PHOTOCIRCUITS

PREPARED BY:

SEVERN TRENT LABORATORIES, INC. (STL)

(CERTIFICATION NUMBER 10997)

STL JOB NO: 20990-92234

VOLUME I OF I

Committed To *Your* Success

JUNE 23, 1999

20990-92234
MCLAREN HART, INC.
25 INDEPENDENCE BLVD.
WARREN , NJ 07059

ATTENTION: DEB SCHNELL

The following samples were received for analysis by STL-NJ (NY Cert.#10997). These samples were received on and labeled as follows:

STL Sample No.:	Client ID:	Date Received
92234001	DAS	06/03/99
92234002	SAS	06/03/99
92234003	SMP-1	06/03/99
92234004	DMP-1	06/03/99
92234005	SMP-3	06/03/99
92234006	DMP-3	06/03/99
92234007	SMP-4	06/03/99
92234008	DMP-4	06/03/99
92234009	MW7	06/03/99
92234010	TB052899	06/03/99
92234011	FB052899	06/03/99

DATA RELEASE AUTHORIZED BY:

Carl W. Armbruster
Director of Operations

TABLE OF CONTENTS

Committed To *Your* Success

Severn Trent Laboratories
628 Route 10
Whippany NJ 07981
Tel: (973) 428-8181
Fax: (973) 428-5222

STL - NJ Lab Certifications

STL - NJ possesses the following regulatory certifications and is currently certified to perform analysis in accordance with regulations pertaining to these certifications. Certificates are on file at the laboratory.

State/Agency Certification	Lab ID Number
CLP Organics Contract	68D50011
Connecticut	PH0722
Maryland	195
New Jersey	14530
New York	10997
North Carolina	339
Pennsylvania	68-355
Rhode Island	178
West Virginia	258
USDA Permit	S-3295 Revised
Delaware	NJ323

Last Updated: 7/15/98

CASE NARRATIVE

Client: McLAREN HART

Job No: 20990-92234

CASE NARRATIVE

VOLATILES:

Samples 92234003 (SMP-1), 92234004 (DMP-1), 92234007 (SMP-4) and 92234008 (DMP-4) have an initial analysis and dilution reported due to target compound concentrations exceeding the calibration range.

The Acetone and Methylene Chloride detected in samples 92234001 (DAS), 92234008 (DMP-4), 92234008DL (DMP-4) and 92234011 (FB052899) are believed to be due to laboratory contamination. The Acetone in samples 92234005 (SMP-3) and 92234009 (MW7) are believed to be due to laboratory contamination.

Sample 92234007 (SMP-4) has two dilutions reported, a one hundred and a two fifty fold. The one hundred fold dilution still has 1,1,1-trichloroethane exceeding calibration range. The two hundred and fifty fold dilution has no exceedences, but one internal standard area was outside of QC limits in the blank. This internal standard is not the internal used to quantitate 1,1,1-trichloroethane.

SEMIVOLATILES:

No analysis was performed.

GAS CHROMATOGRAPHY:

No analysis was performed.

METALS:

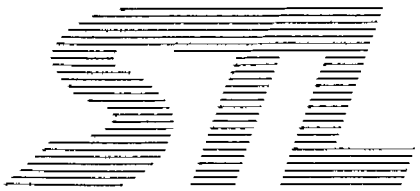
No analysis was performed.

WET CHEMISTRY:

No analysis was performed.

SUBCONTRACTING:

No analysis was performed.



Committed To *Your* Success

Severn Trent Laboratories
628 Route 10
Whippany NJ 07981
Tel: (973) 428-8181
Fax: (973) 428-5222

ORGANICS ANALYSIS
DATA AND SAMPLE QUALIFIERS

DATA QUALIFIERS:

U - Indicates that the compound was analyzed for but not detected.

J - This qualifier indicates an estimated concentration. This qualifier is used (1) when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, (2) when the mass spectral and retention time data indicate the presence of a compound that meets the volatile and semivolatile GC/MS identification criteria, and the result is less than the CRQL or PQL but greater than zero, and (3) when the retention time data indicate the presence of a compound that meets the Pesticide/Aroclor identification criteria, and the result is less than the CRQL or PQL but greater than zero.

B - This qualifier is used when the analyte is found in a method blank as well as the sample. It indicates possible sample contamination and warns the user to use caution when applying the results of this analyte.

E - Exceeds calibration curve

A - Indicates that a tentatively identified compound is a suspected Aldol-condensation product.

N - Indicates presumptive evidence of a compound. This qualifier is only used for tentatively identified compounds, where the identification is based on a mass spectral library search. It is applied to all tentatively identified compound results. For generic classification of a tentatively identified compound, such as chlorinated hydrocarbon, the N code is not used.

D - This qualifier identifies all compounds identified in an analysis at a secondary dilution factor.

P - Indicates that the quantitative results from the two GC columns differed by more than 25 percent.

SAMPLE QUALIFIERS:

DL - Indicates that the analysis was performed at a secondary dilution.

RE - Rerun - Indicates that the analysis is a reinjection or a reextraction and reanalysis, usually due to a failed QC element in the initial analysis.

METHODOLOGY SUMMARY

VOLATILE ORGANICS

EPA SW846 Method 8260B is used for the analysis of Volatile Organics. Helium is bubbled through a sample contained in a specifically designed purging chamber. The purgeables are efficiently transferred from the sample to the vapor phase. The vapor is swept through a sorbent column where the purgeables are trapped. After purging is completed, the sorbent column is heated and backflushed with Helium to desorb the purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeables which are then detected with a mass spectrometer. The holding time for aqueous samples is fourteen (14) days from the date of collection, providing that the samples are preserved to pH <2 with HCl (seven (7) days otherwise). The holding time for soil samples is also fourteen (14) days from collection.

CHAIN OF CUSTODY

Severn Trent Laboratories
628 Route 10
Whippany NJ 07981
Tel: (973) 428-8181
Fax: (973) 428-5222

STL Committed To Your Success

No. J0020

CHAIN OF CUSTODY

FIELD BOOK: ____ Pg 1 of 1

(1) Client: McLaren/Hart
(2) Project Name/no.: Photocircuits
(3) Client Contact: Deb Schnell
(4) STL Contact: Dan Glenn
(5) TAT: 1wk, 2wk, 3wk, OTHER 2WK
(6) Proj. Type: NJPDES, NPDES, ISRA, CLP, CERCLA, RCRA, UST, ACO, MOA, OTHER NY
(7) Protocol: CLP, SW846, EPA 600 (circled) DW, OTHER
(8) Reporting Type: NJ Reg Format, NJ Reduced Format, CLP, Level II, Level I (Data Sum), Other NY CAT A + McLaren Excel Disk

(14) Bill To: McLaren/Hart, 25 Independence Blvd, Warren, NJ 07059
PO# 12080611500I001

For Lab Use Only
Job No.: [illegible]
Quote No.: [illegible]
# of Coolers: [illegible]
Cooler Temp.(s): [illegible]
Custody Seal #(s): [illegible]
Date Due: [illegible]

PM NON-CONFORMANCE
Preserved: [illegible] Temp: [illegible]
Container: [illegible] Volume: [illegible]
Broken: [illegible] Initials: [illegible]
Holding Time: [illegible]
Other: [illegible]
Logged By: [illegible]

(15) ANALYSIS REQUIRED

(9) Client ID (10 CHAR)	(10) Date	(11) Time	(12) Mtx	(13) # OF CONTAINERS	VOC 8260B										LAB ID	DESCRIPTION
DAS	5/28/99	1250	AQ	3	X										01	2 btl head space
SAS	↓	1655	↓	↓	↓										02	[illegible]
SMP-1		1545													03	[illegible]
DMP-1		1535													04	[illegible]
SMP-3		1630													05	[illegible]
DMP-3		1555													06	[illegible]
SMP-4		1450													07	[illegible]
DMP-4		1430													08	[illegible]
MW7		1325													09	[illegible]
TB052899		1150													10	2 btl head space
FB052899	↓	1800	↓	↓	↓										11	[illegible]

(16) COMMENTS: (Please include hazards on site.)
* some vials contain bubbles.

(17)	Print Name and Company	Signature	Custody Seal # (s)	Date/Time
Sampled By:	Deborah Schnell	Deborah R. Schnell	6495	5/28/99 / 1810
Received By:				/
Relinquished By:				/
Received By:	Rachel Malaniak STL	R Malaniak		6/3/99 / 10:00
Relinquished By:				/
Received By:				/

Mtx = Matrix of Sample. (AI=Air, AQ=Aqueous, LE=Leachate, ML=Misc Liquid, MS=Misc Solids, OIL, SE=Sediment, SL=Sludge, SO=Soil)

(Copies: White and yellow copies should accompany samples to STL. The pink copy should be retained by the client.) See reverse for directions.

000095

000007

SEVERN TRENT LABORATORIES, Inc. - NEW JERSEY
SAMPLE RECEIPT VERIFICATION FORM

JOB NUMBER: ~~92235~~ 92234 (ev) CLIENT McLaren/Hart DATE RECEIVED: 6/3/99

OF SAMPLES 11 # OF COOLERS 1
CUSTODY SEALS PRESENT/ABSENT INTACT/ BROKEN TEMPERATURE BLANK PRESENT: ✓ YES _ NO

COOLER TEMP/S ° C 17° COOLER OUTSIDE 2- 6 ° C ___ PRESERVED: ICE/BLUE ICE/ NONE
IF OUTSIDE TEMP RANGE - WERE SAMPLES RECEIVED LESS THAN 4 HOURS FROM COLLECTION ? ___ YES ___ NO

CHAIN OF CUSTODY ~~PRESENT~~/ ABSENT PROPERLY SIGNED, DATED, TIME : ✓ YES _ NO
SAMPLE TAGS ~~PRESENT~~ / ABSENT RECEIVED BY: DRIVER ____ IF SHIPPED AIRBILL PRESENT ___ # 807124307250

COOLER RADIOACT. SCREEN BELOW *0.50 uR/hr* YES ___ NO ___ (INFORM SAFETY OFFICER IMMED.)
✓ YES __ NO SAMPLE BOTTLES INTACT
✓ YES __ NO PROPER CONTAINERS PER ANALYSIS USED
✓ YES __ NO SAMPLE LABELS INTACT
✓ YES __ NO LABELS COMPLETE AND LEGIBLE (ID, DATE,TIME,SIGNATURE,PRESERVATIVE)
✓ YES __ NO SAMPLES RECEIVED WITHIN HOLDING TIME
✓ YES __ NO SAMPLES PROPERLY PRESERVED
__ YES ✓ NO NO BUBBLES PRESENT VOA WATER MATRIX __ NA 01, 10 - 2 bt l. head space
✓ YES __ NO SUFFICIENT SAMPLE VOLUME RECEIVED
__ YES __ NO DRINKING H20/TREATED H20 – CHECKED FOR RESIDUAL CHLORINE ✓ NA
(DOCUMENT ON pH VERIFICATION LOG FORM

_____ INTIAL _____ DATE - RUSH REPORT ISSUED BY ✓ NA
_____ INTIAL _____ DATE - pH ANALYSIS PERFORMED BY ✓ NA
_____ INTIAL _____ DATE - % MOISTURE PERFORMED BY ✓ NA
_____ INTIAL _____ DATE - SAMPLE COMPOSITE PERFORMED BY ✓ NA

NOTE AND ITEMIZE BY SAMPLE AFFECTED, DISCREPANCIES AND NONCONFORMANCES FOUND:
Samples 01, + 10 2 bts have head space

PROJECT MANAGER INFORMED OF DISCREPANCIES : _____ INTIALS _____ DATE ___ NA

SUBCONTRACTING OF ANALYSIS REQUIRED __ YES __ NO SUB COC COMPLETED __ YES __ NO ✓ NA
SUBCONTRACTED SAMPLES SHIPPED __ YES __ NO CARRIER USED _____

SAMPLE RECEIPT , LABELING AND STORAGE PROCEDURES PERFORMED BY : R. Malanuk

FINAL INSPECTION

BOTTLES CORRECTLY LABELED ✓ YES __ NO REVIEWED BY _____ DATE: 6/4/99
INTERNAL CHAIN OF CUSTODY INITIATED ✓ YES __ NO
ALL SIGNATURES AND DATES COMPLETE ✓ YES __ NO

CLIENT INFORMED OF DISCREPANCIES/NONCONFORMANCES BY PM _____ DATE ____ TIME ___

NAME CLIENT REPRESENTATIVE INFORMED _____ METHOD : PHONE ___ FAX ___

CORRECTIVE ACTION REQUESTED BY CLIENT: _____

CORRECTIVE ACTION TAKEN: _____

PROJECT MANAGER APPROVED VERIFICATION FORM COMPLETE : _____ DATE 6/4
Print name _____

SEVERN TRENT LABORATORIES, Inc. - NEW JERSEY PAGE 1 OF 1

SAMPLE PRESERVATION VERIFICATION LOG
SAMPLE CONTROL DEPARTMENT

JOB NUMBER : T2234 ~~T2235~~ (en) CLIENT : McLaren/Hart DATE RECEIVED : 6/3/99

OF SAMPLES : 11

If pH is not within acceptable range, document actual pH in OTHER column

VOA			METALS			PHC			OIL & GREASE		
ID #	pH <2	OTHER	ID #	pH <2	OTHER	ID #	pH <2	OTHER	ID #	pH <2	OTHER
01	✓										
02	✓										
03	✓										
04	✓										
05	✓										
06	✓										
07	✓										
08	✓										
09	✓										
10	✓										
11	✓										

CYANIDE			H2SO4 PRES. W.C.			H2SO4 PRES. W.C.			OTHER PRESERVATIVE		
ID #	pH >12	OTHER	ID #	pH <2	OTHER	ID #	pH<2	OTHER	ID #	pH ___	OTHER

COMMENTS: NOTE BY SAMPLE ID NUMBER - NON CONFORMANCES IN pH PRESERVATION:

pH PRESERVATION VERIFICATION PERFORMED BY : R. Madat DATE 6/3/99

PROJECT MANAGER INFORMED OF NON CONFORMANCE : ____ YES INITIAL _____

Severn Trent Laboratories

INTERNAL CHAIN OF CUSTODY CHRONICLE
VOLATILES

Job/Case Number: 92234 Sample IDs: 001 – 011

Relinquished By: _____ Date/Time: _____

Received By: _____ Date/Time: _____

I confirm that I have performed the analysis below following SOP quidelines:

ANALYST RETRIEVAL:

Sample No(s)	Analyst Signature	Date	Returned Date (Soil)
010, 011	[signature]	06/10/99	
001	[signature]	06/10/99	
002 – 006, 008, 009, 007	[signature]	06/11/99	

ANALYST RETRIEVAL: REANALYSIS:

Sample No(s)	Analyst Signature	Date	
003, 004, 008, 007	[signature]	06/11/99	

PERCENT SOLIDS:

Sample No(s)	Analyst Signature	Date	

I confirm that I have reviewed all associated data for this job:

REVIEWED BY: Signature [signature] Date 06/14/99

Data Release Authorized By:

AUTHORIZATION: [signature] Group Leader/Lab Manager Date 6/17/99

STL - NEW JERSEY SIGNATURE PAGE

Employee Name	Signature	Initials
LABORATORY DIRECTOR		
Armbruster, Carl		CWA
LABORATORY MANAGER		
Hitt, Dewey		DDH.
QA/QC MANAGER		
Heath, Timothy		TMH
ADMINISTRATION		
Bartley, Katrina		KLB
Connelly, Joan		JMC
Davila, Nahir		N.D
Nadzan, Al		AN
Wood, Mary		MBW
REPORTS PRODUCTION		
Cignarella, Christine		CC.
Patel, Darshana		DP
Roman, Richard		R.R.
SYSTEMS		
Foti, Lisa		LF
Gorden, Roger		RBG
Molina, Maria		MCM

STL - NEW JERSEY SIGNATURE PAGE

Employee Name	Signature	Initials
PROJECT MANAGEMENT		
Brack, Joe		
Doster, Deanna		
Glenn, Dan		
Pryor, Kelly		
Trulick, Barbra		
SAMPLE CONTROL		
Doeffinger, John		
Droz, Efrain		
Malaniak, Rachel		
BOTTLE PREP		
D'Achille, Al		
Reynolds, Ed		
Sander, James		
GC/MS VOLATILES		
Acierno, Mark		
Klusey, Sylvanus		
Manlangit, Ferdie		
Waldron, Stacey		
GC/MS SEMIVOLATILES		
Hamernick, Richard		
Mauriello, Gregg		
Schulze, Stephen		
Seal, Sonia		
Wood, Brian		

STL - NEW JERSEY SIGNATURE PAGE

Employee Name	Signature	Initials
GAS CHROMATOGRAPHY		
Carlone, John		
Hankerson, Anthony		
Herrmann, Claus		
Hornberger, Kasie		
Lena, John		
Scott, Gordon		GDS
Tako, Lisa		
Wechsler, David		
METALS		
Chang, Grace		
Cousineau, Paul		
Herpen, Lori		
Nadzan, Tim		
Schwartz, Robert		
WET CHEMISTRY		
Bielski, Kevin		
Florance, Gerard		
Kenneweg, John		
Piatt, Ernest		
FIELD SERVICES		
Dippel, Edward		
Knudsen, Troy		
Murad, John		

STL - NEW JERSEY SIGNATURE PAGE

Employee Name	Signature	Initials
RADIOLOGICALS		
Fink, Daniel		
Komanduri, Sreenivas		
Nielsen, Erik		
Zareian-Fink, Nahid		

REVISED 6/4/99

VOLATILES

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

990609J1

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 990609J1

Sample wt/vol: 5 (g/mL) ml

Lab File ID: J0668

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: DB-624 ID: 0.32 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____(uL)

Soil Aliquot Volume: _____(uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	5	U
75-27-4	Bromodichloromethane	5	U
75-25-2	Bromoform	5	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon Disulfide	5	U
56-23-5	Carbon Tetrachloride	5	U
108-90-7	Chlorobenzene	5	U
124-48-1	Chlorodibromomethane	5	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	5	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	5	U
107-06-2	1,2-Dichloroethane	5	U
75-35-4	1,1-Dichloroethene	5	U
156-59-2	Cis-1,2-Dichloroethene	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	Cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
100-41-4	Ethylbenzene	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
75-09-2	Methylene Chloride	5	U
100-42-5	Styrene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
71-55-6	1,1,1-Trichloroethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
79-01-6	Trichloroethene	5	U
75-01-4	Vinyl Chloride	10	U
1330-20-7	Xylenes (Total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

~~000613~~
990610A1

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 990610A1

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8268

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 06/10/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	5	U
75-27-4	Bromodichloromethane	5	U
75-25-2	Bromoform	5	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon Disulfide	5	U
56-23-5	Carbon Tetrachloride	5	U
108-90-7	Chlorobenzene	5	U
124-48-1	Chlorodibromomethane	5	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	5	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	5	U
107-06-2	1,2-Dichloroethane	5	U
75-35-4	1,1-Dichloroethene	5	U
156-59-2	Cis-1,2-Dichloroethene	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	Cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
100-41-4	Ethylbenzene	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
75-09-2	Methylene Chloride	5	U
100-42-5	Styrene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
71-55-6	1,1,1-Trichloroethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
79-01-6	Trichloroethene	5	U
75-01-4	Vinyl Chloride	10	U
1330-20-7	Xylenes (Total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

990610A3

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 990610A3

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8306

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	5	U
75-27-4	Bromodichloromethane	5	U
75-25-2	Bromoform	5	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon Disulfide	5	U
56-23-5	Carbon Tetrachloride	5	U
108-90-7	Chlorobenzene	5	U
124-48-1	Chlorodibromomethane	5	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	5	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	5	U
107-06-2	1,2-Dichloroethane	5	U
75-35-4	1,1-Dichloroethene	5	U
156-59-2	Cis-1,2-Dichloroethene	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	Cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
100-41-4	Ethylbenzene	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
75-09-2	Methylene Chloride	5	U
100-42-5	Styrene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
71-55-6	1,1,1-Trichloroethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
79-01-6	Trichloroethene	5	U
75-01-4	Vinyl Chloride	10	U
1330-20-7	Xylenes (Total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

CCC018

990611A1

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 990611A1

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8322

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	5	U
75-27-4	Bromodichloromethane	5	U
75-25-2	Bromoform	5	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon Disulfide	5	U
56-23-5	Carbon Tetrachloride	5	U
108-90-7	Chlorobenzene	5	U
124-48-1	Chlorodibromomethane	5	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	5	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	5	U
107-06-2	1,2-Dichloroethane	5	U
75-35-4	1,1-Dichloroethene	5	U
156-59-2	Cis-1,2-Dichloroethene	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	Cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
100-41-4	Ethylbenzene	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
75-09-2	Methylene Chloride	5	U
100-42-5	Styrene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
71-55-6	1,1,1-Trichloroethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
79-01-6	Trichloroethene	5	U
75-01-4	Vinyl Chloride	10	U
1330-20-7	Xylenes (Total)	5	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

990611A4

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 990611A4

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8351

Level: (low/med) LOW

Date Received: _____

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	5	U
75-27-4	Bromodichloromethane	5	U
75-25-2	Bromoform	5	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon Disulfide	5	U
56-23-5	Carbon Tetrachloride	5	U
108-90-7	Chlorobenzene	5	U
124-48-1	Chlorodibromomethane	5	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	5	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	5	U
107-06-2	1,2-Dichloroethane	5	U
75-35-4	1,1-Dichloroethene	5	U
156-59-2	Cis-1,2-Dichloroethene	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	Cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
100-41-4	Ethylbenzene	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
75-09-2	Methylene Chloride	5	U
100-42-5	Styrene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
71-55-6	1,1,1-Trichloroethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
79-01-6	Trichloroethene	5	U
75-01-4	Vinyl Chloride	10	U
1330-20-7	Xylenes (Total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

DAS

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234001

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8318

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 100.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	380	J
71-43-2	Benzene	500	U
75-27-4	Bromodichloromethane	500	U
75-25-2	Bromoform	500	U
74-83-9	Bromomethane	1000	U
78-93-3	2-Butanone	1000	U
75-15-0	Carbon Disulfide	500	U
56-23-5	Carbon Tetrachloride	500	U
108-90-7	Chlorobenzene	500	U
124-48-1	Chlorodibromomethane	500	U
75-00-3	Chloroethane	660	J
67-66-3	Chloroform	600	
74-87-3	Chloromethane	1000	U
75-34-3	1,1-Dichloroethane	7200	
107-06-2	1,2-Dichloroethane	500	U
75-35-4	1,1-Dichloroethene	500	U
156-59-2	Cis-1,2-Dichloroethene	500	U
156-60-5	Trans-1,2-Dichloroethene	500	U
78-87-5	1,2-Dichloropropane	500	U
10061-01-5	Cis-1,3-Dichloropropene	500	U
10061-02-6	Trans-1,3-Dichloropropene	500	U
100-41-4	Ethylbenzene	500	U
591-78-6	2-Hexanone	1000	U
108-10-1	4-Methyl-2-Pentanone	1000	U
75-09-2	Methylene Chloride	360	J
100-42-5	Styrene	500	U
79-34-5	1,1,2,2-Tetrachloroethane	500	U
127-18-4	Tetrachloroethene	500	U
108-88-3	Toluene	500	U
71-55-6	1,1,1-Trichloroethane	9400	
79-00-5	1,1,2-Trichloroethane	500	U
79-01-6	Trichloroethene	500	U
75-01-4	Vinyl Chloride	1000	U
1330-20-7	Xylenes (Total)	500	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

SAS

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234002

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8333

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 50.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	200	J
71-43-2	Benzene	250	U
75-27-4	Bromodichloromethane	250	U
75-25-2	Bromoform	250	U
74-83-9	Bromomethane	500	U
78-93-3	2-Butanone	500	U
75-15-0	Carbon Disulfide	250	U
56-23-5	Carbon Tetrachloride	250	U
108-90-7	Chlorobenzene	250	U
124-48-1	Chlorodibromomethane	250	U
75-00-3	Chloroethane	420	J
67-66-3	Chloroform	660	
74-87-3	Chloromethane	500	U
75-34-3	1,1-Dichloroethane	7900	
107-06-2	1,2-Dichloroethane	250	U
75-35-4	1,1-Dichloroethene	250	U
156-59-2	Cis-1,2-Dichloroethene	250	U
156-60-5	Trans-1 2-Dichloroethene	250	U
78-87-5	1,2-Dichloropropane	250	U
10061-01-5	Cis-1,3-Dichloropropene	250	U
10061-02-6	Trans-1,3-Dichloropropene	250	U
100-41-4	Ethylbenzene	250	U
591-78-6	2-Hexanone	500	U
108-10-1	4-Methyl-2-Pentanone	500	U
75-09-2	Methylene Chloride	250	U
100-42-5	Styrene	250	U
79-34-5	1,1,2,2-Tetrachloroethane	250	U
127-18-4	Tetrachloroethene	250	U
108-88-3	Toluene	250	U
71-55-6	1,1,1-Trichloroethane	3400	
79-00-5	1,1,2-Trichloroethane	250	U
79-01-6	Trichloroethene	250	U
75-01-4	Vinyl Chloride	500	U
1330-20-7	Xylenes (Total)	250	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

SMP-1

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234003

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8334

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/l

CAS NO.	COMPOUND		Q
67-64-1	Acetone	230	E
71-43-2	Benzene	5	U
75-27-4	Bromodichloromethane	5	U
75-25-2	Bromoform	5	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	84	
75-15-0	Carbon Disulfide	5	U
56-23-5	Carbon Tetrachloride	5	U
108-90-7	Chlorobenzene	5	U
124-48-1	Chlorodibromomethane	5	U
75-00-3	Chloroethane	110	
67-66-3	Chloroform	20	
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	240	E
107-06-2	1,2-Dichloroethane	5	U
75-35-4	1,1-Dichloroethene	5	U
156-59-2	Cis-1,2-Dichloroethene	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	Cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
100-41-4	Ethylbenzene	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
75-09-2	Methylene Chloride	5	
100-42-5	Styrene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
127-18-4	Tetrachloroethene	30	
108-88-3	Toluene	7	
71-55-6	1,1,1-Trichloroethane	48	
79-00-5	1,1,2-Trichloroethane	5	U
79-01-6	Trichloroethene	20	
75-01-4	Vinyl Chloride	29	
1330-20-7	Xylenes (Total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

SMP-1DL

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234003DL

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8348

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 2.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	240	D
71-43-2	Benzene	10	U
75-27-4	Bromodichloromethane	10	U
75-25-2	Bromoform	10	U
74-83-9	Bromomethane	20	U
78-93-3	2-Butanone	88	D
75-15-0	Carbon Disulfide	10	U
56-23-5	Carbon Tetrachloride	10	U
108-90-7	Chlorobenzene	10	U
124-48-1	Chlorodibromomethane	10	U
75-00-3	Chloroethane	97	D
67-66-3	Chloroform	18	D
74-87-3	Chloromethane	20	U
75-34-3	1,1-Dichloroethane	220	D
107-06-2	1,2-Dichloroethane	10	U
75-35-4	1,1-Dichloroethene	10	U
156-59-2	Cis-1,2-Dichloroethene	10	U
156-60-5	Trans-1,2-Dichloroethene	10	U
78-87-5	1,2-Dichloropropane	10	U
10061-01-5	Cis-1,3-Dichloropropene	10	U
10061-02-6	Trans-1,3-Dichloropropene	10	U
100-41-4	Ethylbenzene	10	U
591-78-6	2-Hexanone	20	U
108-10-1	4-Methyl-2-Pentanone	20	U
75-09-2	Methylene Chloride	7	JD
100-42-5	Styrene	10	U
79-34-5	1,1,2,2-Tetrachloroethane	10	U
127-18-4	Tetrachloroethene	25	D
108-88-3	Toluene	6	JD
71-55-6	1,1,1-Trichloroethane	40	D
79-00-5	1,1,2-Trichloroethane	10	U
79-01-6	Trichloroethene	18	D
75-01-4	Vinyl Chloride	20	D
1330-20-7	Xylenes (Total)	10	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

000024

DMP-1

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234004

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8335

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	640	E
71-43-2	Benzene	5	U
75-27-4	Bromodichloromethane	5	U
75-25-2	Bromoform	5	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	630	E
75-15-0	Carbon Disulfide	20	
56-23-5	Carbon Tetrachloride	37	
108-90-7	Chlorobenzene	5	U
124-48-1	Chlorodibromomethane	5	U
75-00-3	Chloroethane	160	
67-66-3	Chloroform	88	
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	1000	E
107-06-2	1,2-Dichloroethane	5	U
75-35-4	1,1-Dichloroethene	5	U
156-59-2	Cis-1,2-Dichloroethene	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	Cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
100-41-4	Ethylbenzene	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
75-09-2	Methylene Chloride	5	U
100-42-5	Styrene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
127-18-4	Tetrachloroethene	4	J
108-88-3	Toluene	73	
71-55-6	1,1,1-Trichloroethane	280	E
79-00-5	1,1,2-Trichloroethane	5	U
79-01-6	Trichloroethene	5	U
75-01-4	Vinyl Chloride	10	J
1330-20-7	Xylenes (Total)	4	J

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

000025

DMP-1DL

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234004DL

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8347

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 20.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	540	D
71-43-2	Benzene	100	U
75-27-4	Bromodichloromethane	100	U
75-25-2	Bromoform	100	U
74-83-9	Bromomethane	200	U
78-93-3	2-Butanone	540	D
75-15-0	Carbon Disulfide	100	U
56-23-5	Carbon Tetrachloride	100	U
108-90-7	Chlorobenzene	100	U
124-48-1	Chlorodibromomethane	100	U
75-00-3	Chloroethane	130	JD
67-66-3	Chloroform	71	JD
74-87-3	Chloromethane	200	U
75-34-3	1,1-Dichloroethane	880	D
107-06-2	1,2-Dichloroethane	100	U
75-35-4	1,1-Dichloroethene	100	U
156-59-2	Cis-1,2-Dichloroethene	100	U
156-60-5	Trans-1,2-Dichloroethene	100	U
78-87-5	1,2-Dichloropropane	100	U
10061-01-5	Cis-1,3-Dichloropropene	100	U
10061-02-6	Trans-1,3-Dichloropropene	100	U
100-41-4	Ethylbenzene	100	U
591-78-6	2-Hexanone	200	U
108-10-1	4-Methyl-2-Pentanone	200	U
75-09-2	Methylene Chloride	100	U
100-42-5	Styrene	100	U
79-34-5	1,1,2,2-Tetrachloroethane	100	U
127-18-4	Tetrachloroethene	100	U
108-88-3	Toluene	100	U
71-55-6	1,1,1-Trichloroethane	240	D
79-00-5	1,1,2-Trichloroethane	100	U
79-01-6	Trichloroethene	100	U
75-01-4	Vinyl Chloride	200	U
1330-20-7	Xylenes (Total)	100	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

000026

SMP-3

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234005

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8336

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1000.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	10000	U
71-43-2	Benzene	5000	U
75-27-4	Bromodichloromethane	5000	U
75-25-2	Bromoform	5000	U
74-83-9	Bromomethane	10000	U
78-93-3	2-Butanone	10000	U
75-15-0	Carbon Disulfide	5000	U
56-23-5	Carbon Tetrachloride	5000	U
108-90-7	Chlorobenzene	5000	U
124-48-1	Chlorodibromomethane	5000	U
75-00-3	Chloroethane	10000	U
67-66-3	Chloroform	5000	U
74-87-3	Chloromethane	10000	U
75-34-3	1,1-Dichloroethane	5000	U
107-06-2	1,2-Dichloroethane	5000	U
75-35-4	1,1-Dichloroethene	5000	U
156-59-2	Cis-1,2-Dichloroethene	5000	U
156-60-5	Trans-1,2-Dichloroethene	5000	U
78-87-5	1,2-Dichloropropane	5000	U
10061-01-5	Cis-1,3-Dichloropropene	5000	U
10061-02-6	Trans-1,3-Dichloropropene	5000	U
100-41-4	Ethylbenzene	5000	U
591-78-6	2-Hexanone	10000	U
108-10-1	4-Methyl-2-Pentanone	10000	U
75-09-2	Methylene Chloride	3200	J
100-42-5	Styrene	5000	U
79-34-5	1,1,2,2-Tetrachloroethane	5000	U
127-18-4	Tetrachloroethene	5000	U
108-88-3	Toluene	5000	U
71-55-6	1,1,1-Trichloroethane	5000	U
79-00-5	1,1,2-Trichloroethane	5000	U
79-01-6	Trichloroethene	100000	
75-01-4	Vinyl Chloride	10000	U
1330-20-7	Xylenes (Total)	5000	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

000027

DMP-3

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234006

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8346

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 200.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	2000	U
71-43-2	Benzene	1000	U
75-27-4	Bromodichloromethane	1000	U
75-25-2	Bromoform	1000	U
74-83-9	Bromomethane	2000	U
78-93-3	2-Butanone	2000	U
75-15-0	Carbon Disulfide	1000	U
56-23-5	Carbon Tetrachloride	2600	
108-90-7	Chlorobenzene	1000	U
124-48-1	Chlorodibromomethane	1000	U
75-00-3	Chloroethane	890	J
67-66-3	Chloroform	3200	
74-87-3	Chloromethane	2000	U
75-34-3	1,1-Dichloroethane	38000	
107-06-2	1,2-Dichloroethane	1000	U
75-35-4	1,1-Dichloroethene	1000	U
156-59-2	Cis-1,2-Dichloroethene	1000	U
156-60-5	Trans-1,2-Dichloroethene	1000	U
78-87-5	1,2-Dichloropropane	1000	U
10061-01-5	Cis-1,3-Dichloropropene	1000	U
10061-02-6	Trans-1,3-Dichloropropene	1000	U
100-41-4	Ethylbenzene	1000	U
591-78-6	2-Hexanone	2000	U
108-10-1	4-Methyl-2-Pentanone	2000	U
75-09-2	Methylene Chloride	1000	U
100-42-5	Styrene	1000	U
79-34-5	1,1,2,2-Tetrachloroethane	1000	U
127-18-4	Tetrachloroethene	1000	U
108-88-3	Toluene	1000	U
71-55-6	1,1,1-Trichloroethane	20000	
79-00-5	1,1,2-Trichloroethane	1000	U
79-01-6	Trichloroethene	1000	U
75-01-4	Vinyl Chloride	1500	J
1330-20-7	Xylenes (Total)	1000	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

SMP-4

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234007

Sample wt/vol: 5 (g/mL) ml

Lab File ID: J0670

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: DB-624 ID: 0.32 (mm)

Dilution Factor: 10.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/l

CAS NO.	COMPOUND		Q
67-64-1	Acetone	1000	
71-43-2	Benzene	50	U
75-27-4	Bromodichloromethane	50	U
75-25-2	Bromoform	50	U
74-83-9	Bromomethane	100	U
78-93-3	2-Butanone	100	U
75-15-0	Carbon Disulfide	50	U
56-23-5	Carbon Tetrachloride	50	U
108-90-7	Chlorobenzene	12	J
124-48-1	Chlorodibromomethane	50	U
75-00-3	Chloroethane	3400	E
67-66-3	Chloroform	50	U
74-87-3	Chloromethane	100	U
75-34-3	1,1-Dichloroethane	5900	E
107-06-2	1,2-Dichloroethane	50	U
75-35-4	1,1-Dichloroethene	250	
156-59-2	Cis-1,2-Dichloroethene	15	J
156-60-5	Trans-1,2-Dichloroethene	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	Cis-1,3-Dichloropropene	50	U
10061-02-6	Trans-1,3-Dichloropropene	50	U
100-41-4	Ethylbenzene	50	U
591-78-6	2-Hexanone	100	U
108-10-1	4-Methyl-2-Pentanone	100	U
75-09-2	Methylene Chloride	21	J
100-42-5	Styrene	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
127-18-4	Tetrachloroethene	42	J
108-88-3	Toluene	98	
71-55-6	1,1,1-Trichloroethane	18000	E
79-00-5	1,1,2-Trichloroethane	50	U
79-01-6	Trichloroethene	13	J
75-01-4	Vinyl Chloride	110	
1330-20-7	Xylenes (Total)	50	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

000029

SMP-4DL

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234007DL

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8354

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 250.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	1200	JD
71-43-2	Benzene	1200	U
75-27-4	Bromodichloromethane	1200	U
75-25-2	Bromoform	1200	U
74-83-9	Bromomethane	2500	U
78-93-3	2-Butanone	2500	U
75-15-0	Carbon Disulfide	1200	U
56-23-5	Carbon Tetrachloride	2700	D
108-90-7	Chlorobenzene	1200	U
124-48-1	Chlorodibromomethane	1200	U
75-00-3	Chloroethane	2300	JD
67-66-3	Chloroform	1200	U
74-87-3	Chloromethane	2500	U
75-34-3	1,1-Dichloroethane	7800	D
107-06-2	1,2-Dichloroethane	1200	U
75-35-4	1,1-Dichloroethene	1200	U
156-59-2	Cis-1,2-Dichloroethene	1200	U
156-60-5	Trans-1,2-Dichloroethene	1200	U
78-87-5	1,2-Dichloropropane	1200	U
10061-01-5	Cis-1,3-Dichloropropene	1200	U
10061-02-6	Trans-1,3-Dichloropropene	1200	U
100-41-4	Ethylbenzene	1200	U
591-78-6	2-Hexanone	2500	U
108-10-1	4-Methyl-2-Pentanone	2500	U
75-09-2	Methylene Chloride	1200	U
100-42-5	Styrene	1200	U
79-34-5	1,1,2,2-Tetrachloroethane	1200	U
127-18-4	Tetrachloroethene	1200	U
108-88-3	Toluene	1200	U
71-55-6	1,1,1-Trichloroethane	20000	D
79-00-5	1,1,2-Trichloroethane	1200	U
79-01-6	Trichloroethene	1200	U
75-01-4	Vinyl Chloride	2500	U
1330-20-7	Xylenes (Total)	1200	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET 000080

SMP-4DL

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234007DL

Sample wt/vol: 5 (g/mL) ml

Lab File ID: J0672

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: DB-624 ID: 0.32 (mm)

Dilution Factor: 100.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	2800	D
71-43-2	Benzene	500	U
75-27-4	Bromodichloromethane	500	U
75-25-2	Bromoform	500	U
74-83-9	Bromomethane	1000	U
78-93-3	2-Butanone	1000	U
75-15-0	Carbon Disulfide	500	U
56-23-5	Carbon Tetrachloride	500	U
108-90-7	Chlorobenzene	130	JD
124-48-1	Chlorodibromomethane	500	U
75-00-3	Chloroethane	7100	D
67-66-3	Chloroform	500	U
74-87-3	Chloromethane	1000	U
75-34-3	1,1-Dichloroethane	12000	D
107-06-2	1,2-Dichloroethane	500	U
75-35-4	1,1-Dichloroethene	360	JD
156-59-2	Cis-1,2-Dichloroethene	500	U
156-60-5	Trans-1,2-Dichloroethene	500	U
78-87-5	1,2-Dichloropropane	500	U
10061-01-5	Cis-1,3-Dichloropropene	500	U
10061-02-6	Trans-1,3-Dichloropropene	500	U
100-41-4	Ethylbenzene	500	U
591-78-6	2-Hexanone	1000	U
108-10-1	4-Methyl-2-Pentanone	1000	U
75-09-2	Methylene Chloride	65	JD
100-42-5	Styrene	500	U
79-34-5	1,1,2,2-Tetrachloroethane	500	U
127-18-4	Tetrachloroethene	500	U
108-88-3	Toluene	160	JD
71-55-6	1,1,1-Trichloroethane	36000	ED
79-00-5	1,1,2-Trichloroethane	500	U
79-01-6	Trichloroethene	500	U
75-01-4	Vinyl Chloride	200	JD
1330-20-7	Xylenes (Total)	500	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

C00031

DMP-4

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234008

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8339

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 5.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/l

CAS NO.	COMPOUND		Q
67-64-1	Acetone	190	
71-43-2	Benzene	25	U
75-27-4	Bromodichloromethane	25	U
75-25-2	Bromoform	25	U
74-83-9	Bromomethane	50	U
78-93-3	2-Butanone	50	U
75-15-0	Carbon Disulfide	25	U
56-23-5	Carbon Tetrachloride	25	U
108-90-7	Chlorobenzene	25	U
124-48-1	Chlorodibromomethane	25	U
75-00-3	Chloroethane	1200	E
67-66-3	Chloroform	25	U
74-87-3	Chloromethane	50	U
75-34-3	1,1-Dichloroethane	110	
107-06-2	1,2-Dichloroethane	25	U
75-35-4	1,1-Dichloroethene	25	U
156-59-2	Cis-1,2-Dichloroethene	25	U
156-60-5	Trans-1,2-Dichloroethene	25	U
78-87-5	1,2-Dichloropropane	25	U
10061-01-5	Cis-1,3-Dichloropropene	25	U
10061-02-6	Trans-1,3-Dichloropropene	25	U
100-41-4	Ethylbenzene	25	U
591-78-6	2-Hexanone	50	U
108-10-1	4-Methyl-2-Pentanone	50	U
75-09-2	Methylene Chloride	28	
100-42-5	Styrene	25	U
79-34-5	1,1,2,2-Tetrachloroethane	25	U
127-18-4	Tetrachloroethene	25	U
108-88-3	Toluene	25	U
71-55-6	1,1,1-Trichloroethane	22	J
79-00-5	1,1,2-Trichloroethane	25	U
79-01-6	Trichloroethene	25	U
75-01-4	Vinyl Chloride	50	U
1330-20-7	Xylenes (Total)	25	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

DMP-4DL

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234008DL

Sample wt/vol: 5 (g/mL) ml

Lab File ID: J0671

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: DB-624 ID: 0.32 (mm)

Dilution Factor: 10.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	280	D
71-43-2	Benzene	50	U
75-27-4	Bromodichloromethane	50	U
75-25-2	Bromoform	50	U
74-83-9	Bromomethane	100	U
78-93-3	2-Butanone	100	U
75-15-0	Carbon Disulfide	50	U
56-23-5	Carbon Tetrachloride	50	U
108-90-7	Chlorobenzene	9	JD
124-48-1	Chlorodibromomethane	50	U
75-00-3	Chloroethane	1500	D
67-66-3	Chloroform	50	U
74-87-3	Chloromethane	100	U
75-34-3	1,1-Dichloroethane	190	D
107-06-2	1,2-Dichloroethane	50	U
75-35-4	1,1-Dichloroethene	50	U
156-59-2	Cis-1,2-Dichloroethene	50	U
156-60-5	Trans-1,2-Dichloroethene	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	Cis-1,3-Dichloropropene	50	U
10061-02-6	Trans-1,3-Dichloropropene	50	U
100-41-4	Ethylbenzene	50	U
591-78-6	2-Hexanone	100	U
108-10-1	4-Methyl-2-Pentanone	100	U
75-09-2	Methylene Chloride	15	JD
100-42-5	Styrene	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
127-18-4	Tetrachloroethene	50	U
108-88-3	Toluene	13	JD
71-55-6	1,1,1-Trichloroethane	310	D
79-00-5	1,1,2-Trichloroethane	50	U
79-01-6	Trichloroethene	50	U
75-01-4	Vinyl Chloride	100	U
1330-20-7	Xylenes (Total)	50	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

000033

MW7

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234009

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8340

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. _____

Date Analyzed: 06/11/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 10.0

Soil Extract Volume: _____ (uL)

Soil Aliquot Volume: _____ (uL)

CONCENTRATION UNITS:
(ug/L or ug/Kg) ug/l

CAS NO.	COMPOUND		Q
67-64-1	Acetone	100	U
71-43-2	Benzene	50	U
75-27-4	Bromodichloromethane	50	U
75-25-2	Bromoform	50	U
74-83-9	Bromomethane	100	U
78-93-3	2-Butanone	100	U
75-15-0	Carbon Disulfide	50	U
56-23-5	Carbon Tetrachloride	50	U
108-90-7	Chlorobenzene	50	U
124-48-1	Chlorodibromomethane	50	U
75-00-3	Chloroethane	380	
67-66-3	Chloroform	65	
74-87-3	Chloromethane	100	U
75-34-3	1,1-Dichloroethane	790	
107-06-2	1,2-Dichloroethane	50	U
75-35-4	1,1-Dichloroethene	50	U
156-59-2	Cis-1,2-Dichloroethene	50	U
156-60-5	Trans-1,2-Dichloroethene	50	U
78-87-5	1,2-Dichloropropane	50	U
10061-01-5	Cis-1,3-Dichloropropene	50	U
10061-02-6	Trans-1,3-Dichloropropene	50	U
100-41-4	Ethylbenzene	50	U
591-78-6	2-Hexanone	100	U
108-10-1	4-Methyl-2-Pentanone	100	U
75-09-2	Methylene Chloride	36	J
100-42-5	Styrene	50	U
79-34-5	1,1,2,2-Tetrachloroethane	50	U
127-18-4	Tetrachloroethene	50	U
108-88-3	Toluene	50	U
71-55-6	1,1,1-Trichloroethane	50	U
79-00-5	1,1,2-Trichloroethane	50	U
79-01-6	Trichloroethene	50	U
75-01-4	Vinyl Chloride	100	U
1330-20-7	Xylenes (Total)	50	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

TB052899

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234010

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8272

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec. ____

Date Analyzed: 06/10/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1.0

Soil Extract Volume: ____ (uL)

Soil Aliquot Volume: ____ (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	10	U
71-43-2	Benzene	5	U
75-27-4	Bromodichloromethane	5	U
75-25-2	Bromoform	5	U
74-83-9	Bromomethane	10	U
78-93-3	2-Butanone	10	U
75-15-0	Carbon Disulfide	5	U
56-23-5	Carbon Tetrachloride	5	U
108-90-7	Chlorobenzene	5	U
124-48-1	Chlorodibromomethane	5	U
75-00-3	Chloroethane	10	U
67-66-3	Chloroform	5	U
74-87-3	Chloromethane	10	U
75-34-3	1,1-Dichloroethane	5	U
107-06-2	1,2-Dichloroethane	5	U
75-35-4	1,1-Dichloroethene	5	U
156-59-2	Cis-1,2-Dichloroethene	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U
78-87-5	1,2-Dichloropropane	5	U
10061-01-5	Cis-1,3-Dichloropropene	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U
100-41-4	Ethylbenzene	5	U
591-78-6	2-Hexanone	10	U
108-10-1	4-Methyl-2-Pentanone	10	U
75-09-2	Methylene Chloride	5	U
100-42-5	Styrene	5	U
79-34-5	1,1,2,2-Tetrachloroethane	5	U
127-18-4	Tetrachloroethene	5	U
108-88-3	Toluene	5	U
71-55-6	1,1,1-Trichloroethane	5	U
79-00-5	1,1,2-Trichloroethane	5	U
79-01-6	Trichloroethene	5	U
75-01-4	Vinyl Chloride	10	U
1330-20-7	Xylenes (Total)	5	U

1A
VOLATILE ORGANICS ANALYSIS DATA SHEET

FB052899

Lab Name: STL-NJ

Job No. : 92234

Matrix: (soil/water) Water

Lab Sample ID: 92234011

Sample wt/vol: 5 (g/mL) ml

Lab File ID: A8285

Level: (low/med) LOW

Date Received: 06/03/99

% Moisture: not dec.

Date Analyzed: 06/10/99

GC Column: RTX-624 ID: 0.53 (mm)

Dilution Factor: 1000.0

Soil Extract Volume: (uL)

Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) ug/l	Q
67-64-1	Acetone	3	J
71-43-2	Benzene	5000	U
75-27-4	Bromodichloromethane	5000	U
75-25-2	Bromoform	5000	U
74-83-9	Bromomethane	10000	U
78-93-3	2-Butanone	10000	U
75-15-0	Carbon Disulfide	5000	U
56-23-5	Carbon Tetrachloride	5000	U
108-90-7	Chlorobenzene	5000	U
124-48-1	Chlorodibromomethane	5000	U
75-00-3	Chloroethane	10000	U
67-66-3	Chloroform	5000	U
74-87-3	Chloromethane	10000	U
75-34-3	1,1-Dichloroethane	5000	U
107-06-2	1,2-Dichloroethane	5000	U
75-35-4	1,1-Dichloroethene	5000	U
156-59-2	Cis-1,2-Dichloroethene	5000	U
156-60-5	Trans-1,2-Dichloroethene	5000	U
78-87-5	1,2-Dichloropropane	5000	U
10061-01-5	Cis-1,3-Dichloropropene	5000	U
10061-02-6	Trans-1,3-Dichloropropene	5000	U
100-41-4	Ethylbenzene	5000	U
591-78-6	2-Hexanone	10000	U
108-10-1	4-Methyl-2-Pentanone	10000	U
75-09-2	Methylene Chloride	3	J
100-42-5	Styrene	5000	U
79-34-5	1,1,2,2-Tetrachloroethane	5000	U
127-18-4	Tetrachloroethene	5000	U
108-88-3	Toluene	5000	U
71-55-6	1,1,1-Trichloroethane	5000	U
79-00-5	1,1,2-Trichloroethane	5000	U
79-01-6	Trichloroethene	5000	U
75-01-4	Vinyl Chloride	10000	U
1330-20-7	Xylenes (Total)	5000	U

APPENDIX C
Vapor Sampling Analytical Results

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

June 11, 1999

Ms. Deborah Schnell
Mc Laren / Hart
25 Independence Blvd.
Warren, NJ 07059

RE: Pace Project Number: 1015011
Client Project ID: Photo Circuits

Dear Ms. Schnell:

Enclosed are the results of analyses for sample(s) received on June 3, 1999. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Carolynne Trout

Carolynne Trout
Project Manager

Enclosures

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

DATE: 06/11/99
PAGE: 1

Mc Laren / Hart
25 Independence Blvd.
Warren, NJ 07059

Pace Project Number: 1015011
Client Project ID: Photo Circuits

Attn: Ms. Deborah Schnell
Phone: 908-647-8111

Solid results are reported on a wet weight basis

Pace Sample No: 101301497 Date Collected: 06/01/99 Matrix: Air
Client Sample ID: SVE-BASE Date Received: 06/03/99

Parameters	Results	Units	PRL	Analyzed	Analyst	CAS#	Footnotes
GC/MS Volatiles							
GC/MS VOCs, in Air	Method: TO-14 Source				Prep Method: TO-14 Source		
Dichlorodifluoromethane	ND	ppmv	0.1	06/03/99	RJS	75-71-8	
Chloromethane	ND	ppmv	0.1	06/03/99	RJS	74-87-3	
Dichlorotetrafluoroethane-F114	ND	ppmv	0.1	06/03/99	RJS	76-14-2	
Vinyl Chloride	ND	ppmv	0.5	06/03/99	RJS	75-01-4	
Bromomethane	ND	ppmv	0.5	06/03/99	RJS	74-83-9	
Chloroethane	ND	ppmv	0.5	06/03/99	RJS	75-00-3	
Trichlorofluoromethane	ND	ppmv	0.1	06/03/99	RJS	75-69-4	
1,1-Dichloroethene	ND	ppmv	0.1	06/03/99	RJS	75-35-4	
1,1,2-Trichlorotrifluoroethane	ND	ppmv	0.1	06/03/99	RJS	76-13-1	
Methylene Chloride	ND	ppmv	0.5	06/03/99	RJS	75-09-2	
1,1-Dichloroethane	0.16	ppmv	0.1	06/03/99	RJS	75-34-3	
cis-1,2-Dichloroethene	ND	ppmv	0.1	06/03/99	RJS	156-59-2	
Chloroform	ND	ppmv	0.1	06/03/99	RJS	67-66-3	
1,1,1-Trichloroethane	ND	ppmv	0.1	06/03/99	RJS	71-55-6	
1,2-Dichloroethane	ND	ppmv	0.1	06/03/99	RJS	107-06-2	
Benzene	ND	ppmv	0.1	06/03/99	RJS	71-43-2	
Carbon Tetrachloride	ND	ppmv	0.1	06/03/99	RJS	56-23-5	
1,2-Dichloropropane	ND	ppmv	0.1	06/03/99	RJS	78-87-5	
Trichloroethene	ND	ppmv	0.1	06/03/99	RJS	79-01-6	
cis-1,3-Dichloropropene	ND	ppmv	0.1	06/03/99	RJS	10061-01-5	
trans-1,3-Dichloropropene	ND	ppmv	0.5	06/03/99	RJS	10061-02-6	
Toluene	ND	ppmv	0.1	06/03/99	RJS	108-88-3	
1,1,2-Trichloroethane	ND	ppmv	0.1	06/03/99	RJS	79-00-5	
1,2-Dibromoethane	ND	ppmv	0.1	06/03/99	RJS	106-93-4	
Tetrachloroethene	ND	ppmv	0.1	06/03/99	RJS	127-18-4	
Chlorobenzene	ND	ppmv	0.1	06/03/99	RJS	108-90-7	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

Pace Project Number: 1015011
Client Project ID: Photo Circuits

Pace Sample No: 101301497 Date Collected: 06/01/99 Matrix: Air
Client Sample ID: SVE-BASE Date Received: 06/03/99

Parameters	Results	Units	PRL	Analyzed	Analyst	CAS#	Footnotes
Ethylbenzene	ND	ppmv	0.1	06/03/99	RJS	100-41-4	
M&P-Xylene	ND	ppmv	0.1	06/03/99	RJS	7816-60-0	
O-Xylene (1,2-Dimethylbenzene)	ND	ppmv	0.1	06/03/99	RJS	95-47-6	
Styrene	ND	ppmv	1	06/03/99	RJS	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ppmv	0.1	06/03/99	RJS	79-34-5	
1,3,5-Trimethylbenzene	ND	ppmv	0.1	06/03/99	RJS	108-67-8	
1,2,4-Trimethylbenzene	ND	ppmv	0.1	06/03/99	RJS	95-63-6	
1,3-Dichlorobenzene	ND	ppmv	0.1	06/03/99	RJS	541-73-1	
1,4-Dichlorobenzene	ND	ppmv	0.1	06/03/99	RJS	106-46-7	
1,2-Dichlorobenzene	ND	ppmv	0.1	06/03/99	RJS	95-50-1	
1,2,4-Trichlorobenzene	ND	ppmv	0.1	06/03/99	RJS	120-82-1	
Hexachlorobutadiene	ND	ppmv	0.1	06/03/99	RJS	87-68-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

Pace Project Number: 1015011
Client Project ID: Photo Circuits

Pace Sample No: 101301505 Date Collected: 06/01/99 Matrix: Air
Client Sample ID: SVE-POST Date Received: 06/03/99

Parameters	Results	Units	PRL	Analyzed	Analyst	CAS#	Footnotes
GC/MS Volatiles							
GC/MS VOCs, in Air	Method: TO-14 Source				Prep Method: TO-14 Source		
Dichlorodifluoromethane	ND	ppmv	2	06/03/99	RJS	75-71-8	
Chloromethane	ND	ppmv	2	06/03/99	RJS	74-87-3	
Dichlorotetrafluoroethane-F114	ND	ppmv	2	06/03/99	RJS	76-14-2	
Vinyl Chloride	15	ppmv	10	06/03/99	RJS	75-01-4	
Bromomethane	ND	ppmv	10	06/03/99	RJS	74-83-9	
Chloroethane	ND	ppmv	10	06/03/99	RJS	75-00-3	
Trichlorofluoromethane	ND	ppmv	2	06/03/99	RJS	75-69-4	
1,1-Dichloroethene	ND	ppmv	2	06/03/99	RJS	75-35-4	
1,1,2-Trichlorotrifluoroethane	ND	ppmv	2	06/03/99	RJS	76-13-1	
Methylene Chloride	ND	ppmv	10	06/03/99	RJS	75-09-2	
1,1-Dichloroethane	2.4	ppmv	2	06/03/99	RJS	75-34-3	
cis-1,2-Dichloroethene	10	ppmv	2	06/03/99	RJS	156-59-2	
Chloroform	ND	ppmv	2	06/03/99	RJS	67-66-3	
1,1,1-Trichloroethane	2.8	ppmv	2	06/03/99	RJS	71-55-6	
1,2-Dichloroethane	ND	ppmv	2	06/03/99	RJS	107-06-2	
Benzene	ND	ppmv	2	06/03/99	RJS	71-43-2	
Carbon Tetrachloride	ND	ppmv	2	06/03/99	RJS	56-23-5	
1,2-Dichloropropane	ND	ppmv	2	06/03/99	RJS	78-87-5	
Trichloroethene	6.0	ppmv	2	06/03/99	RJS	79-01-6	
cis-1,3-Dichloropropene	ND	ppmv	2	06/03/99	RJS	10061-01-5	
trans-1,3-Dichloropropene	ND	ppmv	10	06/03/99	RJS	10061-02-6	
Toluene	ND	ppmv	2	06/03/99	RJS	108-88-3	
1,1,2-Trichloroethane	ND	ppmv	2	06/03/99	RJS	79-00-5	
1,2-Dibromoethane	ND	ppmv	2	06/03/99	RJS	106-93-4	
Tetrachloroethene	11	ppmv	2	06/03/99	RJS	127-18-4	
Chlorobenzene	ND	ppmv	2	06/03/99	RJS	108-90-7	
Ethylbenzene	ND	ppmv	2	06/03/99	RJS	100-41-4	
M&P-Xylene	ND	ppmv	2	06/03/99	RJS	7816-60-0	
O-Xylene (1,2-Dimethylbenzene)	ND	ppmv	2	06/03/99	RJS	95-47-6	
Styrene	ND	ppmv	20	06/03/99	RJS	100-42-5	
1,1,2,2-Tetrachloroethane	ND	ppmv	2	06/03/99	RJS	79-34-5	
1,3,5-Trimethylbenzene	ND	ppmv	2	06/03/99	RJS	108-67-8	
1,2,4-Trimethylbenzene	ND	ppmv	2	06/03/99	RJS	95-63-6	
1,3-Dichlorobenzene	ND	ppmv	2	06/03/99	RJS	541-73-1	
1,4-Dichlorobenzene	ND	ppmv	2	06/03/99	RJS	106-46-7	
1,2-Dichlorobenzene	ND	ppmv	2	06/03/99	RJS	95-50-1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

Pace Project Number: 1015011
Client Project ID: Photo Circuits

Pace Sample No: 101301505 Date Collected: 06/01/99 Matrix: Air
Client Sample ID: SVE-POST Date Received: 06/03/99

Parameters	Results	Units	PRL	Analyzed	Analyst	CAS#	Footnotes
1,2,4-Trichlorobenzene	ND	ppmv	2	06/03/99	RJS	120-82-1	
Hexachlorobutadiene	ND	ppmv	2	06/03/99	RJS	87-68-3	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

Pace Project Number: 1015011
Client Project ID: Photo Circuits

PARAMETER FOOTNOTES

ND	Not Detected
NC	Not Calculable
PRL	Pace Reporting Limit

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

QUALITY CONTROL DATA

Mc Laren / Hart
25 Independence Blvd.
Warren, NJ 07059

Pace Project Number: 1015011
Client Project ID: Photo Circuits

Attn: Ms. Deborah Schnell
Phone: 908-647-8111

Batch ID: 25458 QC Batch Method: TO-14 Source
Analysis Method: TO-14 Source Analysis Description: GC/MS VOCs, in Air
Associated Pace Samples: 101301497 101301505

METHOD BLANK: 101303725
Associated Pace Samples:
101301497 101301505

Parameter	Units	Method Blank Result	PRL	Footnotes
Dichlorodifluoromethane	ppmv	ND	0.1	
Chloromethane	ppmv	ND	0.1	
Dichlorotetrafluoroethane-F114	ppmv	ND	0.1	
Vinyl Chloride	ppmv	ND	0.5	
Bromomethane	ppmv	ND	0.5	
Chloroethane	ppmv	ND	0.5	
Trichlorofluoromethane	ppmv	ND	0.1	
1,1-Dichloroethene	ppmv	ND	0.1	
1,1,2-Trichlorotrifluoroethane	ppmv	ND	0.1	
Methylene Chloride	ppmv	ND	0.5	
1,1-Dichloroethane	ppmv	ND	0.1	
cis-1,2-Dichloroethene	ppmv	ND	0.1	
Chloroform	ppmv	ND	0.1	
1,1,1-Trichloroethane	ppmv	ND	0.1	
1,2-Dichloroethane	ppmv	ND	0.1	
Benzene	ppmv	ND	0.1	
Carbon Tetrachloride	ppmv	ND	0.1	
1,2-Dichloropropane	ppmv	ND	0.1	
Trichloroethene	ppmv	ND	0.1	
cis-1,3-Dichloropropene	ppmv	ND	0.1	
trans-1,3-Dichloropropene	ppmv	ND	0.5	
Toluene	ppmv	ND	0.1	
1,1,2-Trichloroethane	ppmv	ND	0.1	
1,2-Dibromoethane	ppmv	ND	0.1	
Tetrachloroethene	ppmv	ND	0.1	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

QUALITY CONTROL DATA

Pace Project Number: 1015011
Client Project ID: Photo Circuits

METHOD BLANK: 101303725
Associated Pace Samples:
101301497 101301505

Parameter	Units	Method Blank Result	PRL	Footnotes
Chlorobenzene	ppmv	ND	0.1	
Ethylbenzene	ppmv	ND	0.1	
m&p-Xylene	ppmv	ND	0.1	
o-Xylene (1,2-Dimethylbenzene)	ppmv	ND	0.1	
Styrene	ppmv	ND	1	
1,1,2,2-Tetrachloroethane	ppmv	ND	0.1	
1,3,5-Trimethylbenzene	ppmv	ND	0.1	
1,2,4-Trimethylbenzene	ppmv	ND	0.1	
1,3-Dichlorobenzene	ppmv	ND	0.1	
1,4-Dichlorobenzene	ppmv	ND	0.1	
1,2-Dichlorobenzene	ppmv	ND	0.1	
1,2,4-Trichlorobenzene	ppmv	ND	0.1	
Hexachlorobutadiene	ppmv	ND	0.1	

LABORATORY CONTROL SAMPLE: 101303717

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	Footnotes
Dichlorodifluoromethane	ppmv	0.5250	0.6507	124	
Chloromethane	ppmv	0.5000	0.5562	111	
Dichlorotetrafluoroethane-F114	ppmv	0.5950	0.6618	111	
Vinyl Chloride	ppmv	0.5000	0.5303	106	
Bromomethane	ppmv	0.5000	0.5702	114	
Chloroethane	ppmv	0.5000	0.6000	120	
Trichlorofluoromethane	ppmv	0.5550	0.6186	111	
1,1-Dichloroethene	ppmv	0.5000	0.5549	111	
1,1,2-Trichlorotrifluoroethane	ppmv	0.5600	0.6246	112	
Methylene Chloride	ppmv	0.5650	0.6405	113	
1,1-Dichloroethane	ppmv	0.5000	0.5620	112	
cis-1,2-Dichloroethene	ppmv	0.5000	0.5806	116	
Chloroform	ppmv	0.5000	0.5550	111	
1,1,1-Trichloroethane	ppmv	0.4550	0.5082	112	
1,2-Dichloroethane	ppmv	0.4250	0.4657	110	
Benzene	ppmv	0.4500	0.5076	113	
Carbon Tetrachloride	ppmv	0.4450	0.4954	111	
1,2-Dichloropropane	ppmv	0.3900	0.4280	110	
Trichloroethene	ppmv	0.4400	0.4831	110	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

QUALITY CONTROL DATA

Pace Project Number: 1015011
Client Project ID: Photo Circuits

LABORATORY CONTROL SAMPLE: 101303717

Parameter	Units	Spike Conc.	LCS Result	Spike % Rec	Footnotes
cis-1,3-Dichloropropene	ppmv	0.5000	0.5816	116	
trans-1,3-Dichloropropene	ppmv	0.5000	0.5639	113	
Toluene	ppmv	0.5000	0.5539	111	
1,1,2-Trichloroethane	ppmv	0.4150	0.4987	120	
1,2-Dibromoethane	ppmv	0.4550	0.4950	109	
Tetrachloroethene	ppmv	0.5000	0.5483	110	
Chlorobenzene	ppmv	0.4400	0.4754	108	
Ethylbenzene	ppmv	0.4400	0.4757	108	
M&P-Xylene	ppmv	0.8000	0.8926	112	
O-Xylene (1,2-Dimethylbenzene)	ppmv	0.3950	0.4092	104	
1,1,2,2-Tetrachloroethane	ppmv	0.3950	0.3250	82.3	
1,3,5-Trimethylbenzene	ppmv	0.5000	0.4884	97.7	
1,2,4-Trimethylbenzene	ppmv	0.5000	0.4675	93.5	
1,3-Dichlorobenzene	ppmv	0.2650	0.2534	95.6	
1,4-Dichlorobenzene	ppmv	0.3200	0.2847	89.0	
1,2-Dichlorobenzene	ppmv	0.5000	0.4089	81.8	
1,2,4-Trichlorobenzene	ppmv	0.2250	0.2027	90.1	
Hexachlorobutadiene	ppmv	0.1400	0.1382	98.7	

SAMPLE DUPLICATE: 101303733

Parameter	Units	101301505	Dup. Result	RPD	Footnotes
Dichlorodifluoromethane	ppmv	ND	ND	NC	
Chloromethane	ppmv	ND	ND	NC	
Dichlorotetrafluoroethane-F114	ppmv	ND	ND	NC	
Vinyl Chloride	ppmv	15.00	15.00	1	
Bromomethane	ppmv	ND	ND	NC	
Chloroethane	ppmv	ND	ND	NC	
Trichlorofluoromethane	ppmv	ND	ND	NC	
1,1-Dichloroethene	ppmv	ND	ND	NC	
1,1,2-Trichlorotrifluoroethane	ppmv	ND	ND	NC	
Methylene Chloride	ppmv	ND	ND	NC	
1,1-Dichloroethane	ppmv	2.400	2.500	2	
cis-1,2-Dichloroethene	ppmv	10.00	7.300	32	1
Chloroform	ppmv	ND	ND	NC	
1,1,1-Trichloroethane	ppmv	2.800	2.500	10	
1,2-Dichloroethane	ppmv	ND	ND	NC	
Benzene	ppmv	ND	ND	NC	
Carbon Tetrachloride	ppmv	ND	ND	NC	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414
Tel: 612-607-1700
Fax: 612-607-6444

Pace Analytical

QUALITY CONTROL DATA

Pace Project Number: 1015011
Client Project ID: Photo Circuits

SAMPLE DUPLICATE: 101303733

Parameter	Units	101301505	Dup. Result	RPD	Footnotes
1,2-Dichloropropane	ppmv	ND	ND	NC	
Trichloroethene	ppmv	6.000	5.800	2	
cis-1,3-Dichloropropene	ppmv	ND	ND	NC	
trans-1,3-Dichloropropene	ppmv	ND	ND	NC	
Toluene	ppmv	ND	ND	NC	
1,1,2-Trichloroethane	ppmv	ND	ND	NC	
Dibromoethane	ppmv	ND	ND	NC	
Tetrachloroethene	ppmv	11.00	12.00	5	
Chlorobenzene	ppmv	ND	ND	NC	
Ethylbenzene	ppmv	ND	ND	NC	
M&P-Xylene	ppmv	ND	ND	NC	
O-Xylene (1,2-Dimethylbenzene)	ppmv	ND	ND	NC	
Styrene	ppmv	ND	ND	NC	
1,1,2,2-Tetrachloroethane	ppmv	ND	ND	NC	
1,3,5-Trimethylbenzene	ppmv	ND	ND	NC	
1,2,4-Trimethylbenzene	ppmv	ND	ND	NC	
1,3-Dichlorobenzene	ppmv	ND	ND	NC	
1,4-Dichlorobenzene	ppmv	ND	ND	NC	
1,2-Dichlorobenzene	ppmv	ND	ND	NC	
1,2,4-Trichlorobenzene	ppmv	ND	ND	NC	
Hexachlorobutadiene	ppmv	ND	ND	NC	

REPORT OF LABORATORY ANALYSIS

Pace Analytical

Pace Analytical Services, Inc.
1700 Elm Street - Suite 200
Minneapolis, MN 55414

Tel: 612-607-1700
Fax: 612-607-6444

Pace Project Number: 1015011
Client Project ID: Photo Circuits

QUALITY CONTROL DATA PARAMETER FOOTNOTES

Consistent with EPA guidelines unrounded concentrations are displayed and have been used to calculate % Rec and RPD values.

ND	Not Detected
NC	Not Calculable
PRL	Pace Reporting Limit
RPD	Relative Percent Difference
[1]	The calculated RPD was outside QC acceptance limits.

REPORT OF LABORATORY ANALYSIS

Severn Trent Laboratories
628 Route 10 Whippany NJ 07981
Tel: (973) 428-8181 Fax: (973) 428-9222

10150II No. 56526

CHAIN OF CUSTODY

FIELD BOOK: _____ Pg _____ of _____

(1) Client: Mcharen/Hart

(2) Project Name/no.: Photo Circuits

(3) Client Contact: Deb Schnell

(4) ~~SAE~~ Lab Contact: Julie Popple

(5) TAT: 1wk, (2wk) 3wk, OTHER _____

(6) Proj. Type: NJPDES, NPDES, ISRA, CLP, CERCLA, RCRA, UST, ACO, MOA, OTHER _____

(7) Protocol: CLP, SW846, EPA 600 DW, OTHER TO-14

(8) Reporting Type: NJ Reg Format, NJ Reduced Format, CLP, Level II, Level I (Data Sum), Other _____

(14) Bill To: Mcharen/Hart c/o Deb Schnell, 25 Independence Blvd., Warren NJ 07059

PO#: 120806115001001

(15) ANALYSIS REQUIRED

(9) Client ID (10 CHAR)	(10) Date	(11) Time	(12) Mtx	(13) # OF CONTAINERS	TO-14
SVE-BASE	6/1/99	1225	AI	1	✓
SVE-POST	6/1/99	1635	AI	1	✓

For Lab Use Only

LAB ID

Job No. _____
Quote No. _____
# of Coolers: _____
Cooler Temp.(s) _____
Custody Seal #(s) _____
Date Due: _____

PM NON-CONFORMANCE

Preserved: ____ Temp: ____
Container: ____ Volume: ____
Broken: ____ Initials: ____
Holding Time: _____
Other: _____

Logged By: _____

DESCRIPTION

10130I492
10130I505

(16) COMMENTS: **(Please include hazards on site.)**

(17)	Print Name and Company	Signature	Custody Seal # (s)	Date/Time
Sampled By:	Deb Schnell/Mcharen-Hart	Deborah R Schnell		6/1/99/1631
Received By:	Client Pack	Caroline Trost		6/3/99 0930
Relinquished By:				/
Received By:				/
Relinquished By:				/
Received By:				/

Mtx = Matrix of Sample. (AI=Air, AQ=Aqueous, LE=Leachate, ML=Misc Liquid, MS=Misc Solids, OIL, SE=Sediment, SL=Sludge, SO=Soil)

(Copies: White and yellow copies should accompany samples to STL. The pink copy should be retained by the client.) See reverse for directions.

APPENDIX D
Monitoring Well Logs

SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

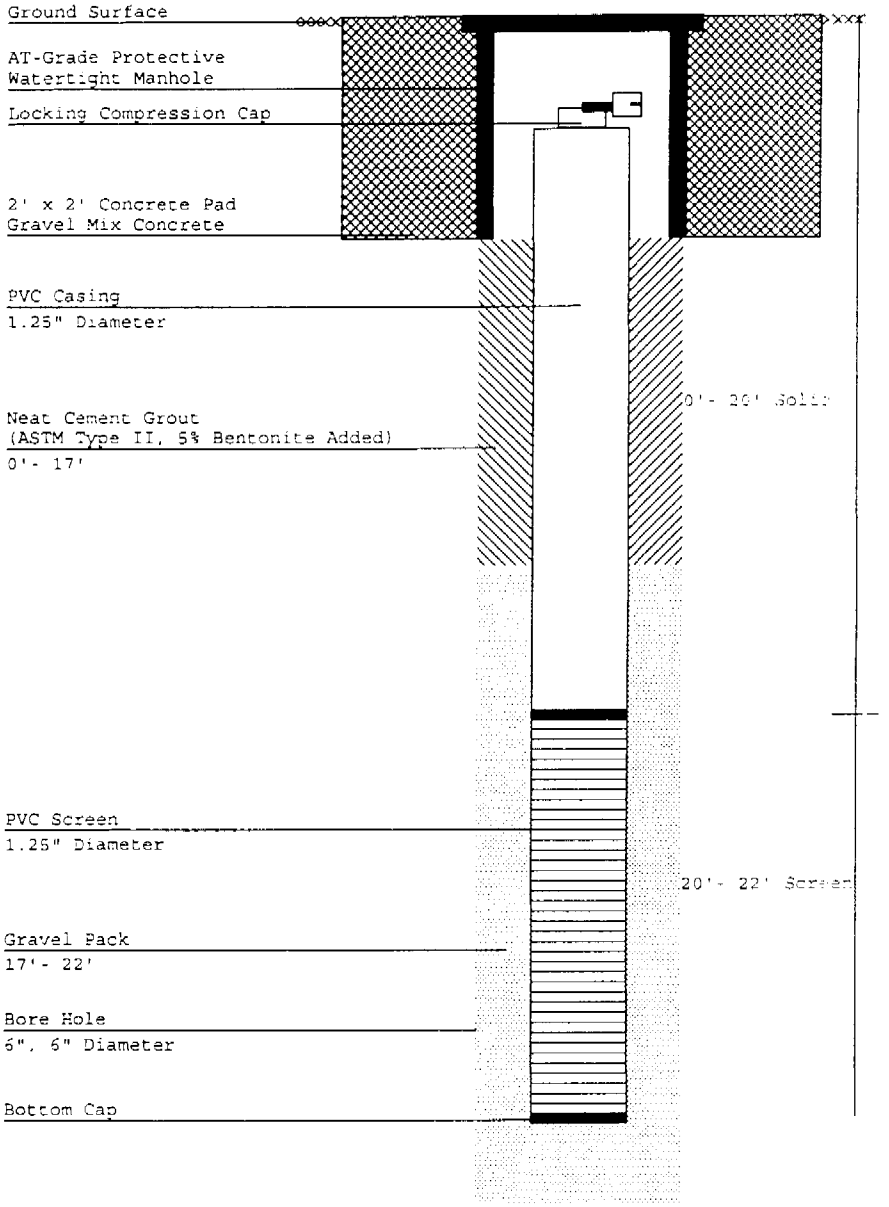
WELL: DMP4 DATE DRILLED: 05/24/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Monitor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	20'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 22'
SET WELL:	22'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 20'	SLOT SIZE:	.020	
DRILLER:	John Vogt	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'- 22' Black fine sand.



Summit DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

WELL: SAS/DAS DATE DRILLED: 05/21/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Monitor

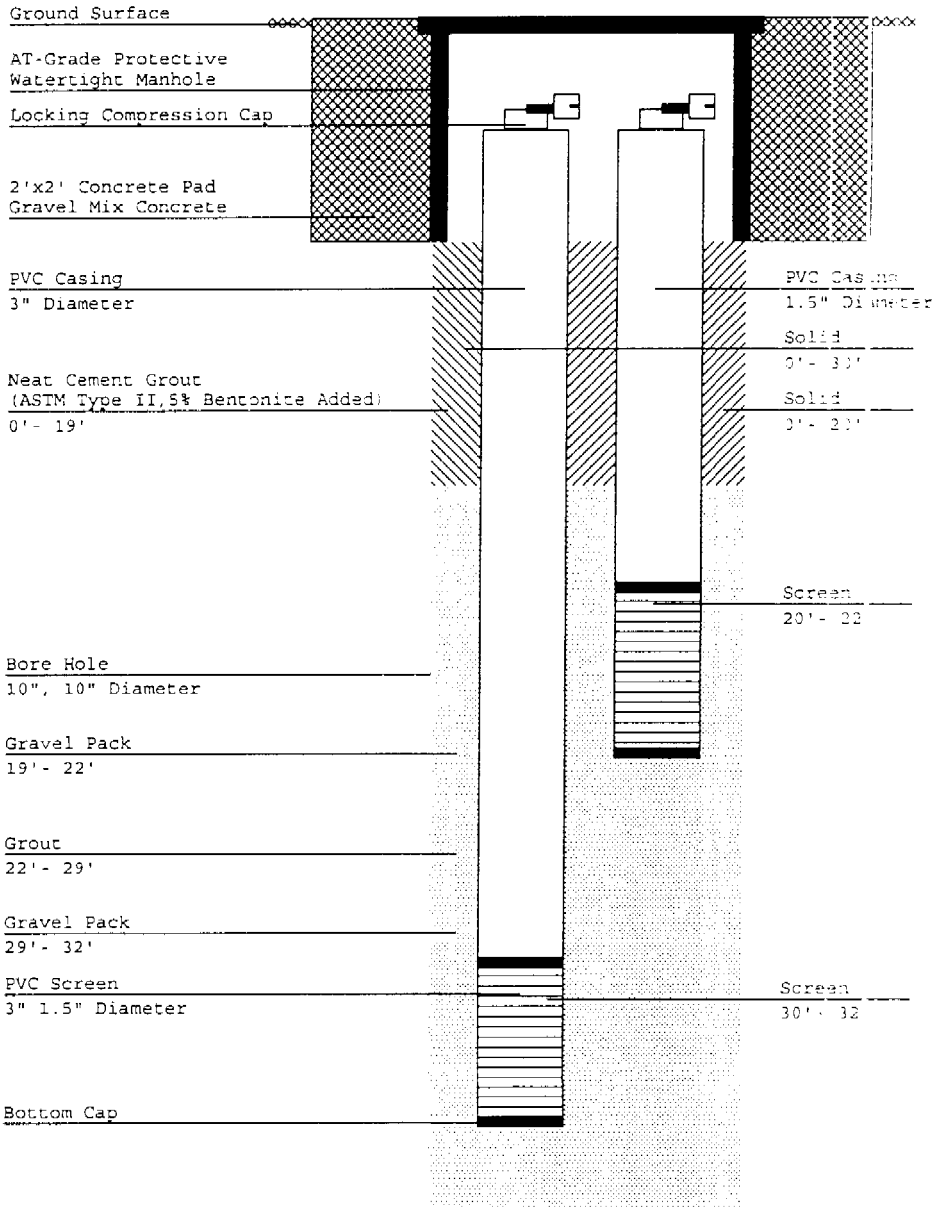
1st CASING:	PVC	2nd CASING:	PVC	SCREEN TYPE 1:	PVC	DRILLING METHOD:	Auger
DIAMETER:	3"	DIAMETER:	1.5"	SCREEN TYPE 2:	PVC	SAMPLING METHOD:	
LENGTH:	20'	LENGTH:	30'	DIAMETER:	3" 1.5"	HOLE DIA:	10", 10"
				LENGTH 1:	2'	TOTAL DEPTH:	32'
SET WELL:	32'	GAL PER MIN:	1/2	LENGTH 2:	2'		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL:	22'	SLOT SIZE:	.020		

DRILLER: Todd Naugle DEVELOPMENT METHOD: Pump CASING SEAL: Portland
SURFACE COMPLETION: M DEVELOPMENT TIME: 1/2 Hour OPEN HOLE:

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER

REMARKS / SOILS IDENTIFICATION

0'- 10" Concrete.
10"- 14" Asphalt.
14"- 16' M/c sand little gravel.
16'- 19' Coarse gravel.
19'- 26' M/c sand little gravel.
26'- 28' Gravel.
28'- 32' Fine sand.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

SUBSURFACE INVESTIGATION

WELL: SAS/DAS PERMIT #: START DATE: 05/18/1999 FINISH DATE: 05/18/1999 ABANDON DATE: 00/00/0000
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY COUNTY:

SAMPLE HAMMER WEIGHT: SAMPLE HAMMER FALL: I. D. CASING:
DRILLER: Jeff Marchesi HELPER: COORD #:

KEY TO SAMPLE CODES
SS - Split Spoon Sample
U - Undis, Shelby Tube
P - Piston Type Sample

CLASSIFICATION OF MATERIAL
F - Fine And - 35 - 50 %
M - Medium Some - 20 - 35 %
C - Course Little - 10 - 20 %
Trace - 0 - 10 %

SAMPLE NO.	DEPTH OF SAMPLE (FT) FROM	TO	TYPE SAMPLE	BLOWS ON SAMPLER PER 6" SAMPLER O.D.	REMARKS / SOILS IDENTIFICATION
1	0'	4'	MA	Geoprobe	
2	4'	8'	MA	Geoprobe	0'- 6' Brown f/m sand little c/f gravel.
3	8'	12'	MA	geoprobe	6'- 10' Dark grey grading.
4	12'	16'	MA	Geoprobe	10'- 15' Dark grey f/c sand some fine gravel.
5	16'	20'	MA	Geoprobe	15'- 17' Brown f/c sand some fine gravel little silt.
6	23'	27'	MA	Geoprobe	17'- 19' Dark brown f/c sand & gravel little silt.
					19'- 27' Brown f/c sand little fine gravel.

SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

WELL: SVE DATE DRILLED: 05/19/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Vapor

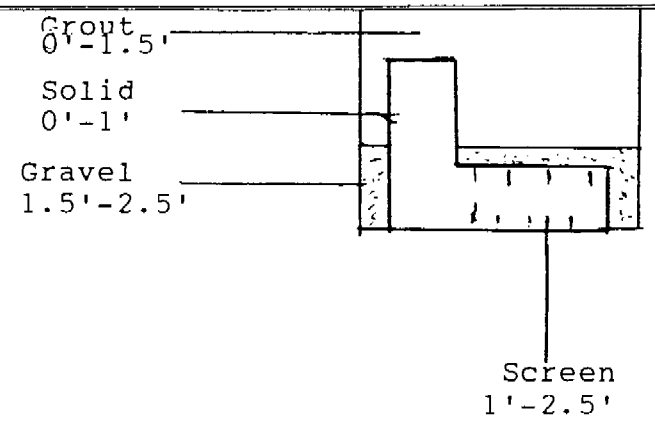
INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	4"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	1'	LENGTH:	DIAMETER:	4"	HOLE DIA: .
			LENGTH 1:	1.5'	TOTAL DEPTH: 2.5'
SET WELL:	2.5'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #1	STAT H2O LVL:	SLOT SIZE:	.010	
DRILLER:	Todd Naugle	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'-10" Concrete.
10"- 14" Asphalt.
14"- 2'6" Gravel some sand.

Horizontal Well



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

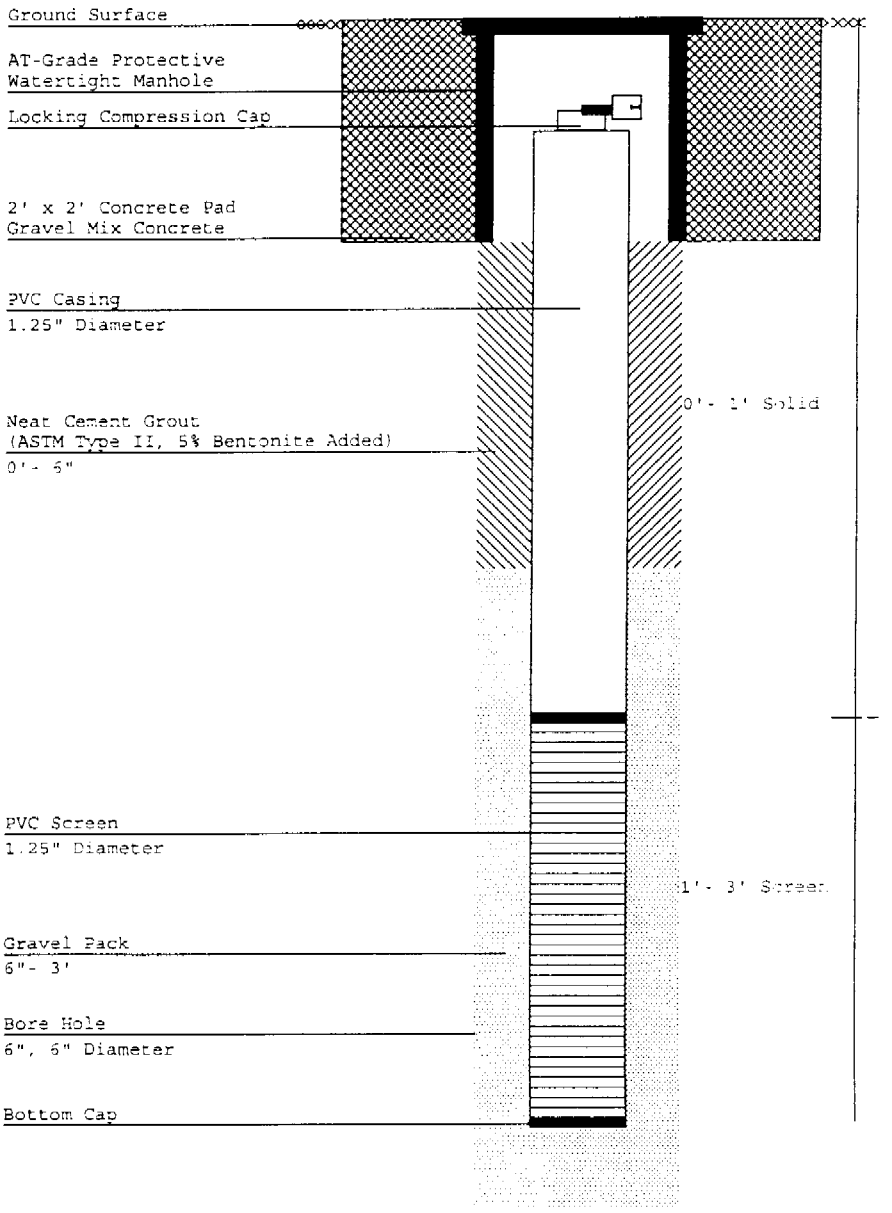
WELL: VMP1 DATE DRILLED: 05/24/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Monitor

INNER CASING: PVC	OUTER CASING:	SCREEN TYPE 1: PVC		DRILLING METHOD: Auger
DIAMETER: 1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH: 1'	LENGTH:	DIAMETER: 1.25"		HOLE DIA: 6", 6"
		LENGTH 1: 2'		TOTAL DEPTH: 3'
SET WELL: 3'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ: Morie #2	STAT H2O LVL: 3'	SLOT SIZE: .020		
DRILLER: John Vogt	DEVELOPMENT METHOD: Pump	CASING SEAL: Portland		
SURFACE COMPLETION: M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'- 3' Brown sand.



Summit DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

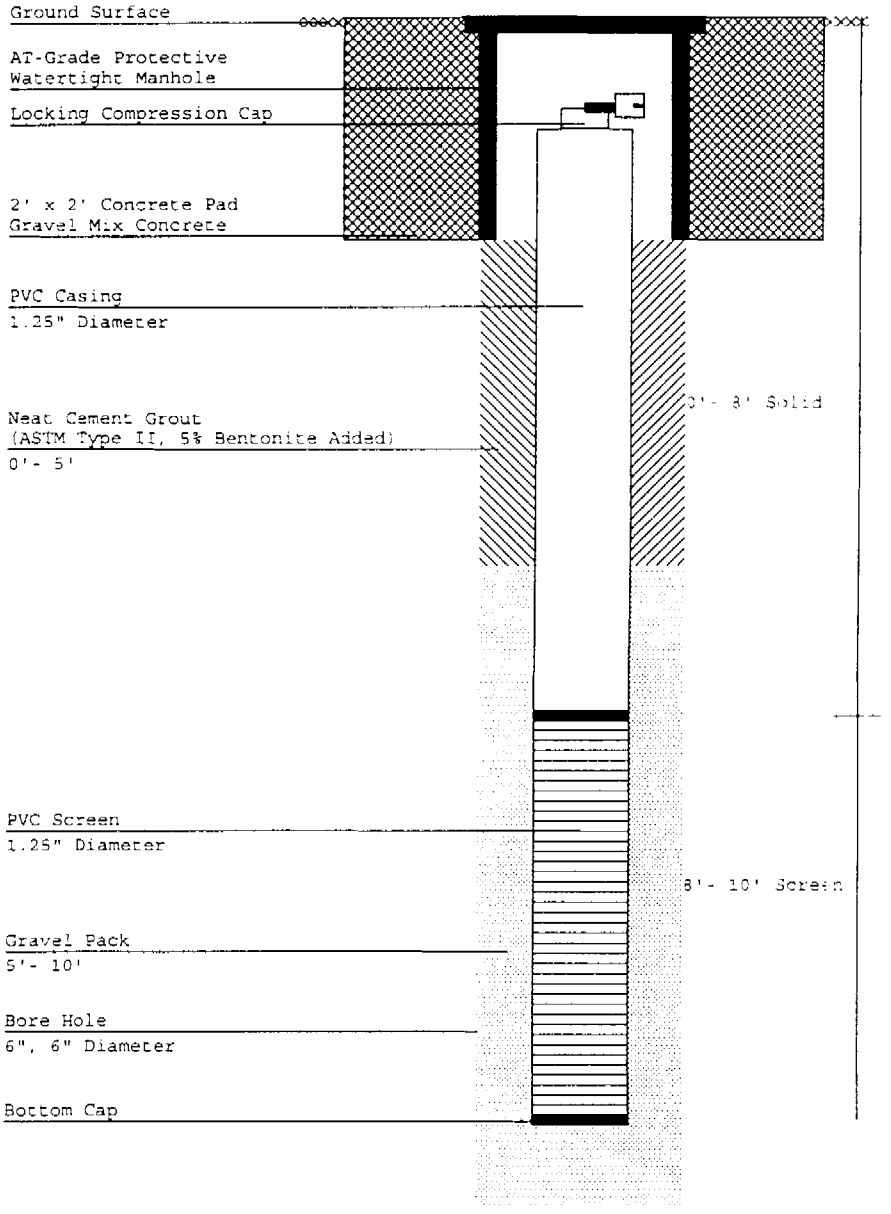
WELL: SMP1 DATE DRILLED: 05/24/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Monitor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	8'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 10'
SET WELL:	10'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 20'	SLOT SIZE:	.020	
DRILLER:	John Vogt	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'- 10' Black fine sand.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

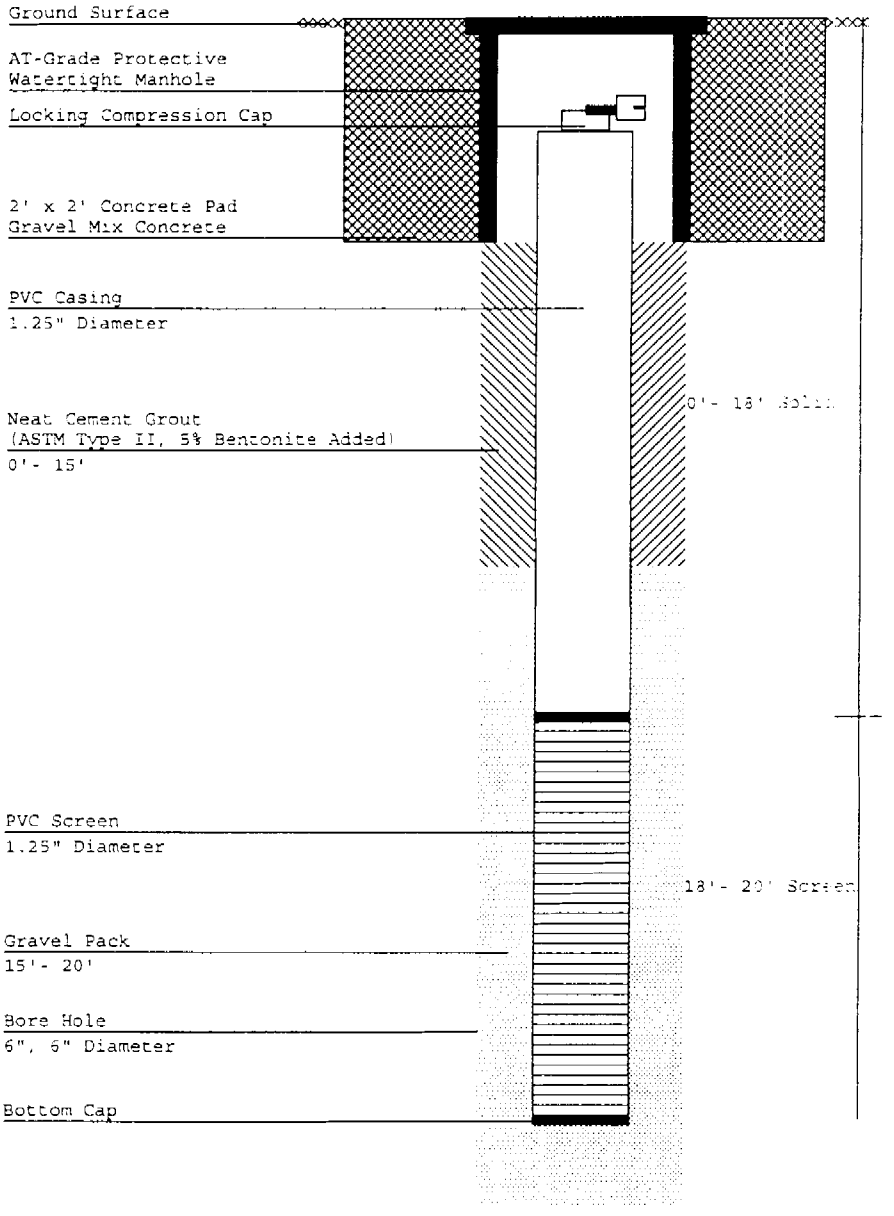
WELL: DMP1 DATE DRILLED: 05/24/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Monitor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	18'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 20'
SET WELL:	20'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 20'	SLOT SIZE:	.020	
DRILLER:	John Vogt	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER

REMARKS / SOILS IDENTIFICATION

0'- 20' Black fine sand.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

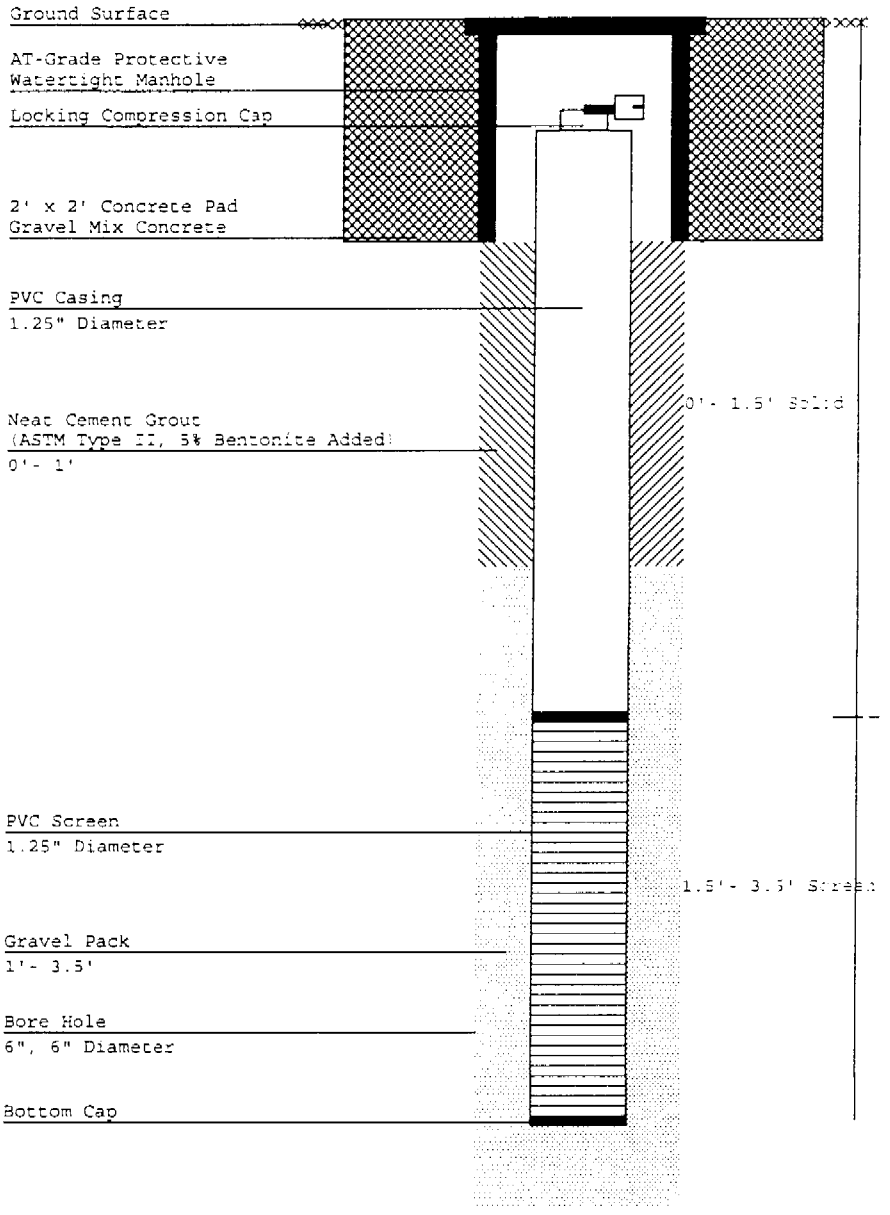
WELL: VMP2 DATE DRILLED: 05/18/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Vapor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	1.5'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 3.5'
SET WELL:	3.5'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 1'	SLOT SIZE:	.020	
DRILLER:	Jeff Marchesi	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER

REMARKS / SOILS IDENTIFICATION

0'- 3'6" Grey f/c sand some silt.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

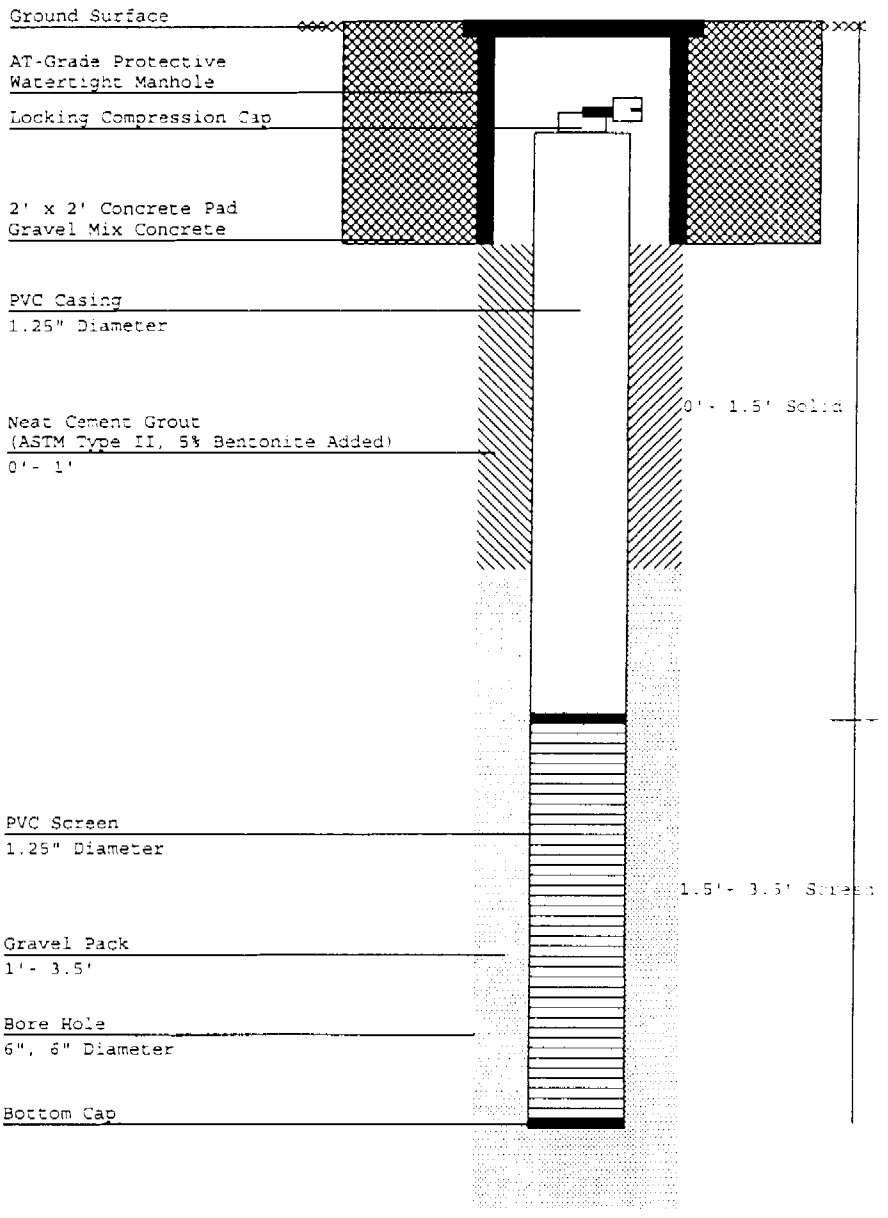
WELL: VMP3 DATE DRILLED: 05/18/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Vapor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	1.5'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 3.5'
SET WELL:	3.5'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 1'	SLOT SIZE:	.020	
DRILLER:	Jeff Marchesi	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'- 3'6" Grey f/c sand some silt.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

WELL: SMP3 DATE DRILLED: 05/18/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Vapor

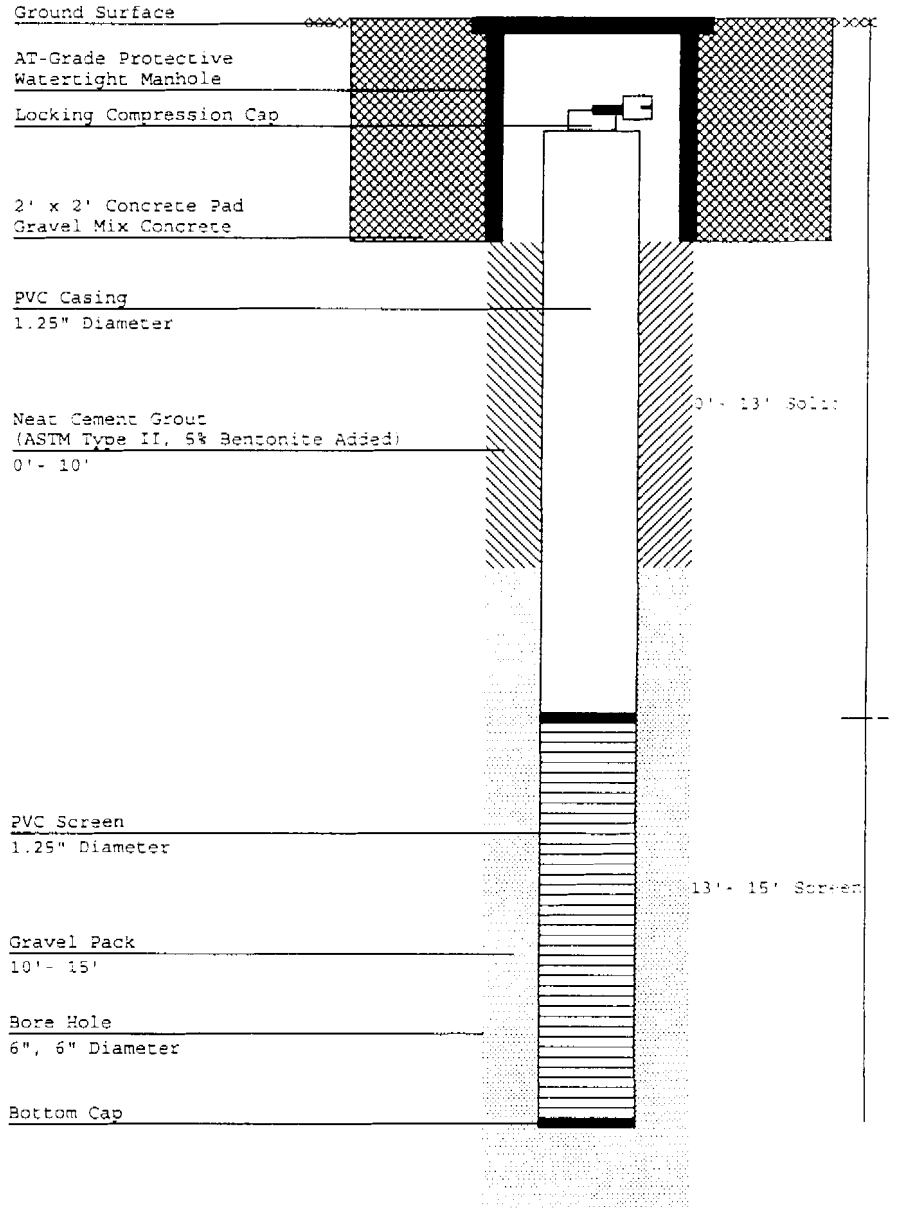
INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	13'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 15'
SET WELL:	15'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 13'	SLOT SIZE:	.020	

DRILLER: Jeff Marchesi DEVELOPMENT METHOD: Pump CASING SEAL: Portland
SURFACE COMPLETION: M DEVELOPMENT TIME: 1/2 Hour OPEN HOLE:

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'-15' Brown-grey f/c sand some silt embedded fine gravel.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

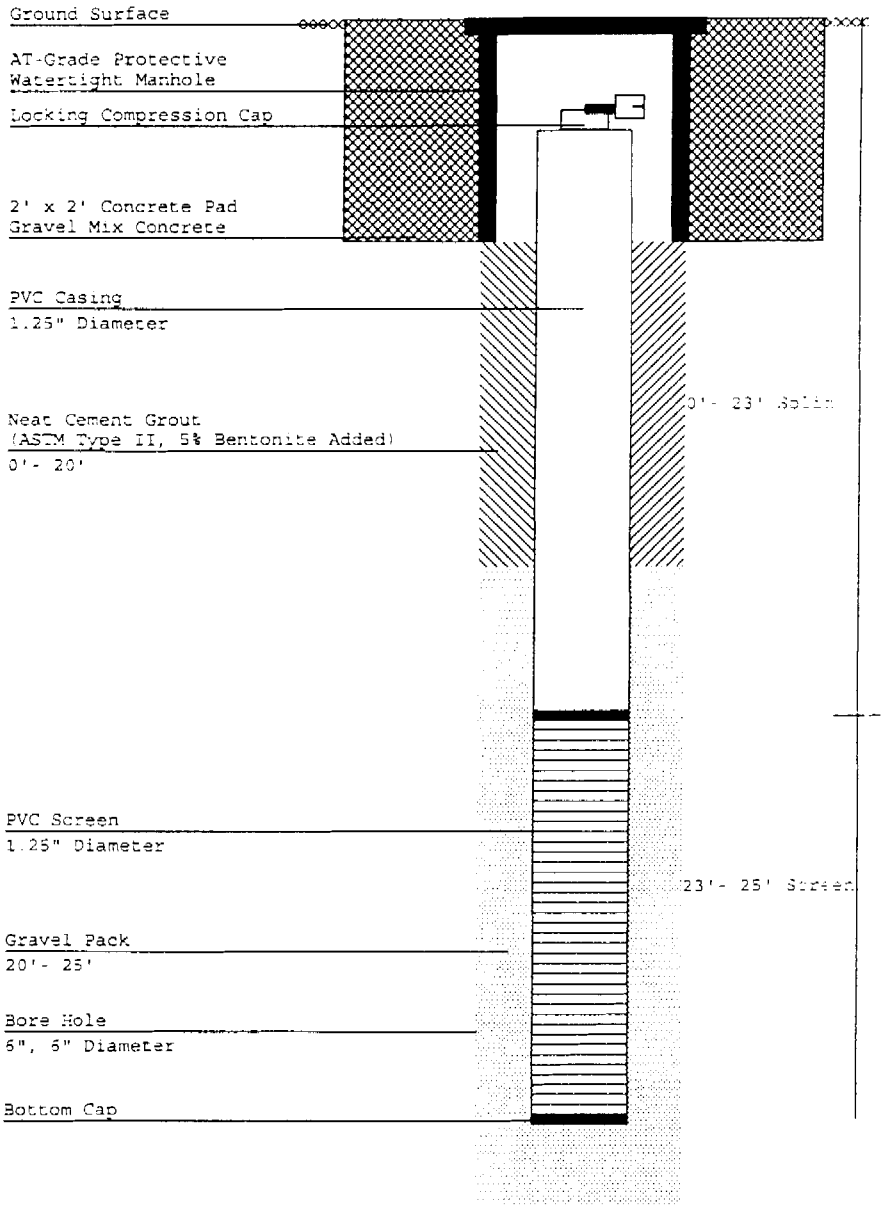
WELL: DMP3 DATE DRILLED: 05/18/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Vapor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	23'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 25'
SET WELL:	25'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 23'	SLOT SIZE:	.020	
DRILLER:	Jeff Marchesi	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'-25' Brown-grey f/c sand some silt embedded fine gravel.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

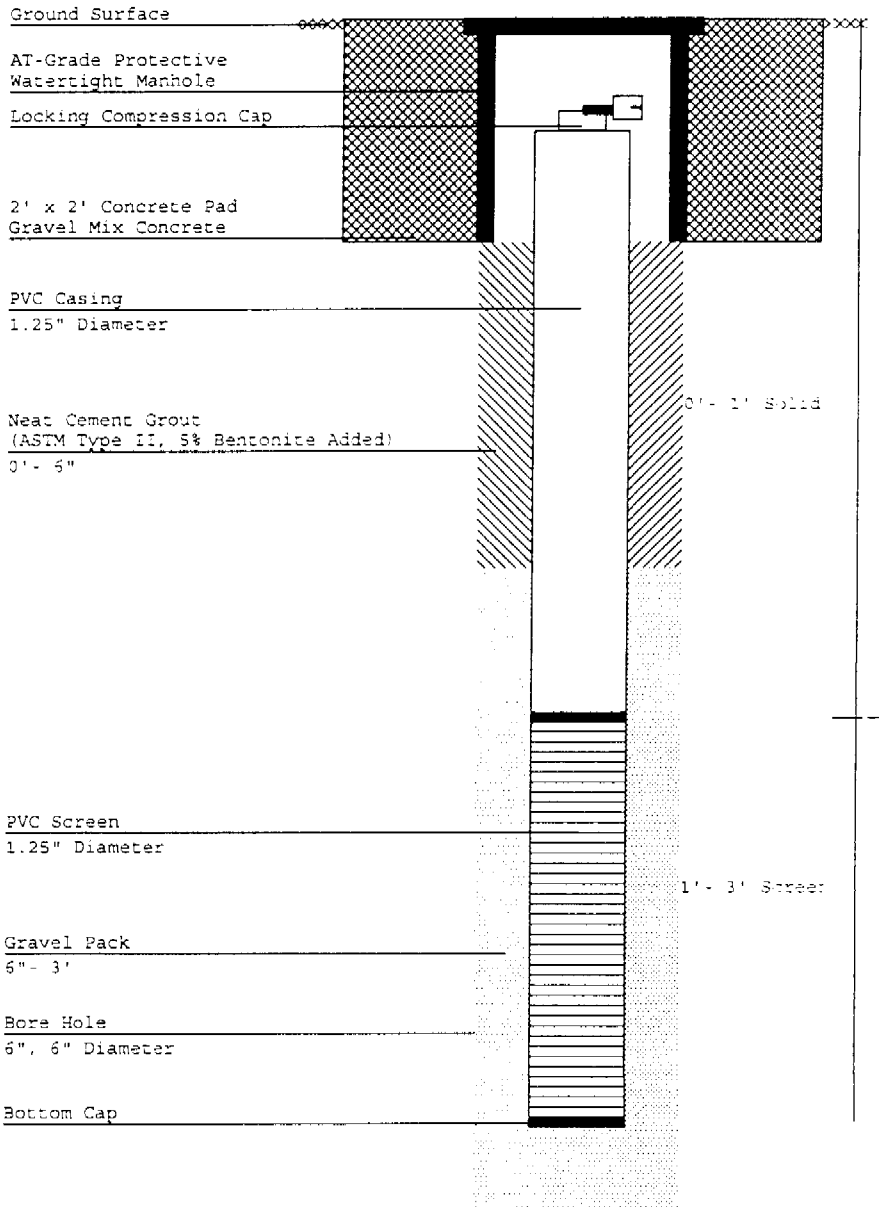
Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

WELL: VMP4 DATE DRILLED: 05/24/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Monitor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	1'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 3'
SET WELL:	3'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 3'	SLOT SIZE:	.020	
DRILLER:	John Vogt	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER	REMARKS / SOILS IDENTIFICATION
0'- 3'		Brown sand.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

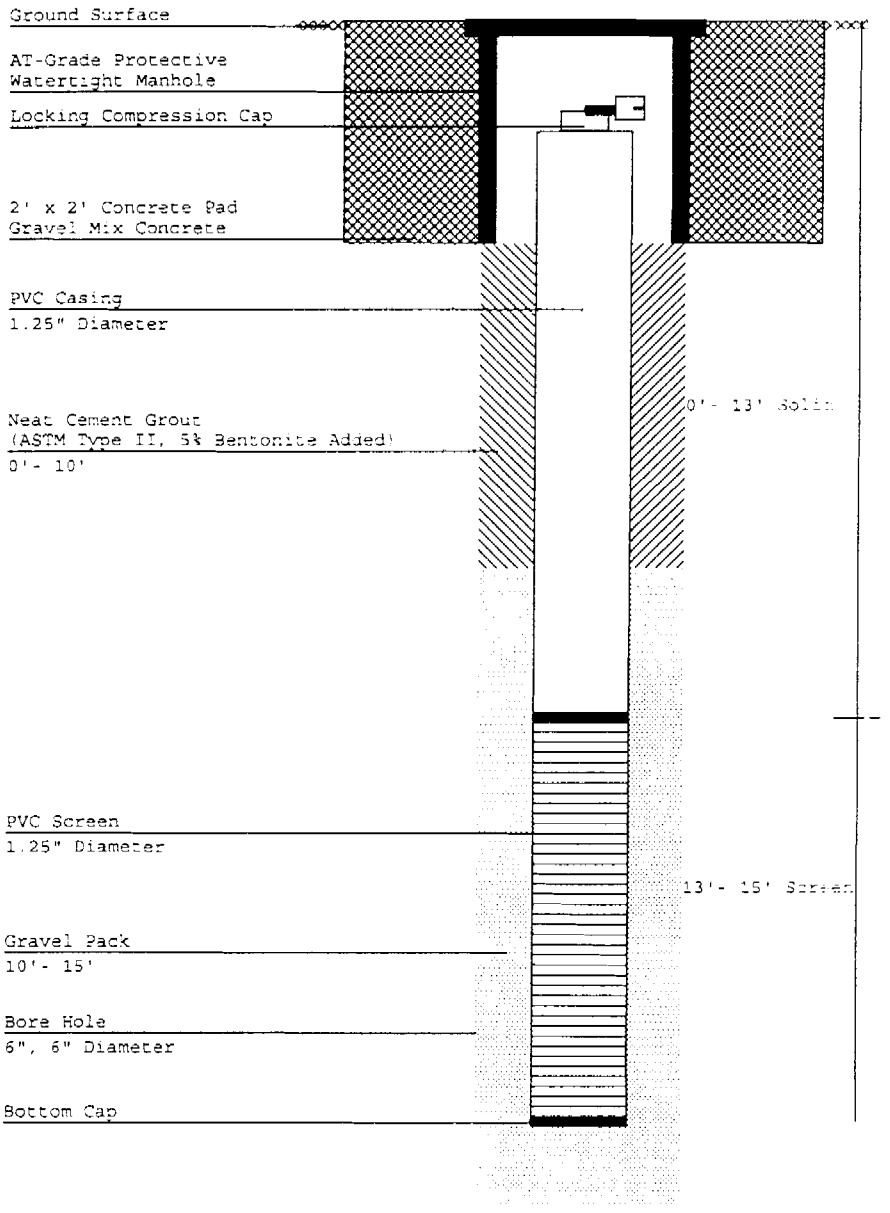
WELL: SMP4 DATE DRILLED: 05/24/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Monitor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	13'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 15'
SET WELL:	15'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 20'	SLOT SIZE:	.020	
DRILLER:	John Vogt	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'- 15' Black fine sand.



SUMMIT DRILLING CO., INC.
ENVIRONMENTAL SPECIALISTS

Chimney Rock Road, Bldg. 9W
Bound Brook, NJ 08805
Telephone: (908) 722-4266
Toll Free: (800) 242-6648
FAX: (732) 356-1009
http://www.summitdrilling.com
email: info@summitdrilling.com

WELL LOG

WELL: DMP4 DATE DRILLED: 05/24/1999 COORD #1: PERMIT #1:
COORD #2: PERMIT #2: COUNTY:
SITE: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY XSTREET:
OWNER: Photocircuits Corp, 31 Sea Cliff Avenue, , Glen Cove, NY USE: Monitor

INNER CASING:	PVC	OUTER CASING:	SCREEN TYPE 1:	PVC	DRILLING METHOD: Auger
DIAMETER:	1.25"	DIAMETER:	SCREEN TYPE 2:		SAMPLING METHOD:
LENGTH:	20'	LENGTH:	DIAMETER:	1.25"	HOLE DIA: 6", 6"
			LENGTH 1:	2'	TOTAL DEPTH: 22'
SET WELL:	22'	GAL PER MIN: 1/2	LENGTH 2:		
GRAVEL PK SZ:	Morie #2	STAT H2O LVL: 20'	SLOT SIZE:	.020	
DRILLER:	John Vogt	DEVELOPMENT METHOD: Pump	CASING SEAL:	Portland	
SURFACE COMPLETION:	M	DEVELOPMENT TIME: 1/2 Hour	OPEN HOLE:		

DEPTH BELOW SURFACE FROM - TO	BLOWS PER 6" ON SAMPLER
-	

REMARKS / SOILS IDENTIFICATION

0'- 22' Black fine sand.