REMEDIAL INVESTIGATION WORK PLAN
FORMER CAVALIER GAGE AND ELECTRONIC CO., INC. SITE
SALT POINT, NEW YORK

Prepared for:

Cavalier Gage and Electronic Co., Inc.
Salt Point, New York

Prepared by:

Groundwater Sciences Corporation
2601 Market Place Street, Suite 310
Harrisburg, Pennsylvania 17110

December 1, 1992

Table of Contents

Table of Tables

1 INTRODUCTION

This site remedial investigation work plan provides the framework for an evaluation of the former Cavalier Gage and Electronic Co., Inc. (Cavalier) site, which is currently occupied by Rainbow's End Daycare and Activity Center (RE). This site investigation work plan has been prepared to allow for the implementation of a phased series of tasks such that data obtained from performance of initial tasks can be used to refine the scope of work associated with subsequent tasks. The work plan should be modified as appropriate in light of any additional information that is developed during the performance of the described tasks. The nature of many of these refinements is discussed in this work plan.

This work plan was prepared in response to the request of the New York State Department of Environmental Conservation (NYSDEC) for the development of a remedial investigation/feasibility study for the subject site following the discovery of dissolved volatile organic compounds (VOCs) in site groundwater supply well samples. The site has recently been listed in the NYSDEC Inactive Hazardous Waste Disposal Sites Registry (Site No. 314092).

1.1 Purpose

The purpose of the site investigation is to:

1. Evaluate and characterize the nature and extent of potential soil contamination adjacent to the two site septic tanks which are believed to be the most likely source of groundwater contamination;

2. Evaluate and characterize the nature and extent of groundwater contamination on-site in both the soil and bedrock groundwater systems;

3. Evaluate the potential for off-site migration;

4. Evaluate and characterize possible impacts to on-site and adjacent downgradient surface water bodies; and

5. Obtain and evaluate necessary data to support the development and selection of a remediation plan, if necessary.

1.2 Scope of Work

The scope of work for the site investigation will consist of the following tasks.

1. Data review regarding adjacent property groundwater supply well

2. Field investigations

3. Site investigation analysis

4. Site investigation reporting

Site investigation tasks are presented in subsequent sections of this work plan.

1.3 Content and Organization of Work Plan

The site investigation work plan has been prepared to present, in a logical sequence, a description of site conditions and those steps necessary to address the objectives noted in Section 1.1 above. A description of the current site conditions, including site location and description, site history, conceptual geologic and hydrogeologic setting, and previous sampling results, is presented in Section 2. The site investigation scope of work is described in Section 3. Site investigation analysis and site investigation reporting are also described in Section 3. NYSDEC liaison is addressed in Section 4, while Section 5 contains a project schedule. Appendices contain information regarding previous sampling (laboratory data sheets, field data sheets, and chains of custody), a Quality Assurance Project Plan (QAPjP), and a Health and Safety Plan.

2 BACKGROUND

This section of the work plan presents a description of site conditions, operations, and history, which should not be considered a definitive statement of existing site conditions. Efforts to verify and expand the existing understanding of site conditions are a required task of the work plan.

2.1 Location and Site Description

The site is located in central Dutchess County, approximately 12 miles northeast of the city of Poughkeepsie. As Figure 1 shows, the site lies adjacent to Hibernia Road, approximately one-half mile east of Salt Point. Wappinger Creek passes within one quarter of a mile of the site to the southeast and southwest. Topography in the area is hilly, with approximately 200 feet of relief.

Figure 2 shows that the site consists of an approximately 15-acre parcel bounded to the south by Hibernia Road, to the east by a property line near Wappinger Creek, to the west by a property line approximately coincident with a tributary to Wappinger Creek, and to the north by a property line which runs across the south slope of an undeveloped hill.

The site has two buildings. The southernmost, larger main building is used for classrooms and administrative offices. This one-story building consists of what was originally a domestic dwelling which has been added to periodically over time. The eastern side of the building is the original and oldest part of the building. The northwestern portion of the original building (north-central portion of the existing building) is underlain by a full basement. The remainder of the original building (eastern and southern portion of the existing building) is underlain by a crawl space. The western portion of the main building was constructed circa 1980 and consists of both slab-on-grade and crawl space construction. The smaller, northern one-story building currently contains a classroom in the southern portion and an unheated shed in the northern portion. This slab-on-grade building is a converted garage/shed.

Public water and sewer service are not available to the site and so the site's water is provided by an on-site water supply well, and sanitary sewer needs are handled via a septic infiltration system. The site has three water supply wells. The oldest and original water supply well (WSW-1) is located beneath the newer northwestern portion of the main building. This portion of the building was constructed as slab-on-grade over WSW-1 and so the exact position of the well is unknown and the well is inaccessible. The depth and other construction details regarding this well are unknown. In 1980, a backup water supply well was drilled to the south of the main building. This well, WSW-2, was drilled by air rotary methods by Frank Sabarese, Inc. of Clintondale, New York. This well is presumed to be a six-inch diameter well with an open-hole completion. The total depth is 515 feet and 50 feet of six-inch diameter steel casing with a drive shoe was set. The initial well yield was reportedly 2 gallons per minute (gpm). In 1992, a third water supply well, WSW-3, was drilled approximately 300 feet to the north of the main building. Bedrock was encountered at a depth of 3.5 feet and competent dolostone bedrock was encountered at a depth of 12 feet. The total depth is 500 feet and 40 feet of six-inch diameter steel casing was set in a 12-inch borehole. A drive shoe was used and the casing was grouted in place with bentonite/Portland grout. No discrete, high-yield water-bearing zones were encountered and the well yield was approximately 1 gpm at a depth of 180 feet, and 2 gpm at a depth of 320 feet. The final estimated yield for WSW-3 is approximately 2 gpm.

As Figure 3 shows, the site has two septic tanks. The easternmost tank ("New Septic Tank" on Figure 3) is preformed concrete and has a capacity of 1,250 gallons. It was installed in 1987, and replaced an older tank of unknown age, construction, and capacity. The older, western tank ("Old Septic Tank" on Figure 3) has a capacity of 625 gallons and appears to be of bituminous, impregnated felt construction. The infiltration mechanism for the new tank is believed to be two large dry wells located in a generally northerly direction from the tank and under the parking lot. The location for the infiltration field of the western tank is not known.

The septic system is soon to be reconfigured such that most of the main building's wastes are conveyed to the new septic tank, and are in turn conveyed to a new septic infiltration field located approximately 100 feet to the north of the main building (Figure 3). The old septic tank and old infiltration fields/dry wells handle wastes from two main building bathrooms and the small amount generated in the small building to the north of the main building.

2.2 Site Operations History

The 7.5-Minute Topographic Map for the site is dated 1963. This map shows the main building to be present as well as the pond to the west of the building. This pond appears to be a man-made feature. It is adjacent to, but not connected with, a perennial tributary to Wappinger Creek. The eastern side of the pond consists of steeply sloping land. This pond may be the result of a sand and gravel quarry operation conducted on the site prior to 1963.

Based on interviews with Cavalier employees who are familiar with the site, the main building was originally constructed in the 1950's and was occupied as a residence from the 1950's to 1967. In 1967, light manufacturing of electronic and electrical components was conducted within the building. This operation consisted primarily of electrical/electronic component assembly. There were reportedly no plating activities conducted on-site. The principal chemicals of concern used on-site were halogenated solvents, particularly 1,1,1-trichloroethane (TCA) and 1,1,2-trichloro-2,2,1-trifluoroethane (Freon 113). For all but three years during this period the site was operated by Cavalier. For a three-year period in the mid-1970's, the same types of site activities were conducted by a different operator (Micri Corporation).

The building was unoccupied and there were no operations on-site from 1985 to 1988. In 1988, the site was occupied by RE, and RE has occupied the site continuously from 1988 to the present. The only chemicals on-site during RE's tenure would be those associated with housekeeping and children's arts and crafts supplies.

As discussed above, the site has three water supply wells. As Table 1 shows, WSW-1 was operated as the sole water supply source through January 3, 1992. Samples were collected from WSW-1 and WSW-2 as part of routine sampling activities on January 3, 1992. Following that sampling, WSW-1 was inadvertently shut off and WSW-2 left on such that for the period January 3 through January 25, WSW-2 provided the water supply for the site. Both WSW-1 and WSW-2 were resampled on January 25 and it was discovered that WSW-2 had inadvertently been left on. The system was returned to its original configuration on January 25 such that WSW-1 was again supplying water to the facility. WSW-1 continued to supply water until May 14, 1992 when down-hole mechanical problems developed in this well. Since this well is inaccessible, these down-hole mechanical problems associated with the well's jet pump could not be repaired and WSW-2 was activated. WSW-2 provided the water supply for the facility from May 14 through October 14, 1992 when WSW-3 was activated. WSW-3 is the current water supply well since it provides a water supply free of the VOCs which have impacted WSW-1 and WSW-2.

TABLE 1
Chronology of Site Water Supply Well Use

WSW-1 - Original water supply well, under building
WSW-2 - 1980 water supply well, 60 feet south of building
WSW-3 - Water supply well drilled in July 1992, 300 feet north of building

WSW-1 through January 3, 1992
WSW-2 January 3, 1992 through January 25, 1992
WSW-1 January 25, 1992 through May 14, 1992
WSW-2 May 14, 1992 through October 14, 1992
WSW-3 October 14, 1992 to present

Currently, WSW-1 contains mechanical equipment associated with a jet pump and is inaccessible beneath a concrete slab floor of the main building. WSW-2 contains an electric submersible pump with associated discharge line and power cables and is available for water quality monitoring. WSW-3 contains an electric submersible pump and is available for groundwater quality monitoring.

2.3 Geologic and Hydrogeologic Conceptual Model

As Figure 4 shows, the site is underlain by carbonate bedrock of the Wappinger Group. This group consists of several formations which, in aggregate, are up to approximately 3,000 feet thick and consist primarily of dolostone. The bedrock encountered during the installation of WSW-3 consisted primarily of medium to dark gray dolostone to slightly quartzose dolostone, with quartz and calcite healed fractures. The specific yield of WSW-2 and WSW-3 are both approximately 0.005 gallons per foot. Based on these low specific yields, it can be inferred that the Wappinger Group beneath the site does not have well-developed primary or secondary porosity and has low hydraulic conductivity.

The soil thickness beneath the site appears to be quite variable. Only three and a half feet of soil was encountered at WSW-3, yet the abandoned sand and gravel quarry operation suggests that a relatively thick section of soil was present beneath the western portion of the site. The amount of casing used during the installation of WSW-2 (50 feet) suggests that soil beneath this portion of the site may be up to approximately 40 feet thick. Trenching associated with the connection of WSW-3 to the main building indicated that the soil between WSW-3 and the main building consists of up to four or more feet of sand with fine gravel.

In developing a conceptual site hydrogeologic model, it is assumed that both Wappinger Creek and the tributary to Wappinger Creek along the western property boundary are gaining streams and, therefore, are groundwater flow discharge boundaries. Based on general recharge/discharge relationships, it is assumed that groundwater is recharged in the topographically high areas such as those occupied by the site buildings and is discharged (in the vicinity of the site) to perennial streams (Wappinger Creek and tributaries). Groundwater is, therefore, presumed to flow from the vicinity of the site's buildings toward Wappinger Creek and the tributary to Wappinger Creek in a sub-basin bounded by the two perennial water bodies and the hill to the north of RE. That is, groundwater beneath the eastern portion of the site would be expected to flow in a southerly direction toward Wappinger Creek, groundwater beneath the central portion of the site in a southwesterly direction toward Wappinger Creek, and the lower reach of the tributary, and groundwater beneath the western portion of the site in a westerly direction toward the pond and tributary. A downward vertical gradient would be expected beneath the site buildings such that there would be a downward component of head potential between the soil groundwater system and the bedrock groundwater system. This vertical gradient would be reversed in the vicinity of the discharge points (i.e., creeks).

These generalized flow directions could be strongly influenced by anisotropies in the soil beneath the site and anisotropies associated with fracture patterns in the bedrock beneath the site. As noted previously, the site relies on wells for its water supply. These pumping stresses will have induced groundwater flow toward the pumping centers at least locally.

2.4 Previous Sampling

In 1988 a groundwater sample was collected as part of the DCDOH approval process to use the site. This sample was analyzed for inorganic parameters, pesticides, and herbicides. A VOC sample was collected in January 1992 to meet DCDOH routine water analyses requirements. VOCs were detected. In an effort to address health and safety concerns as well as environmental impacts, a number of other VOC samples were collected on-site and one sample off-site in 1992. Untreated water samples have been collected from all three on-site water supply wells (WSW-1, WSW-2, and WSW-3), one downgradient off-site water supply well, six near-surface soil samples, and the liquid fraction of both septic tanks. Laboratory reports as well as field documentation and chains of custody are provided in Appendix A.

2.4.1 Groundwater Sampling Results

The 1988 sample was collected from the water supplied by WSW-1. This sample was analyzed for metals, other inorganic parameters, pesticides, and herbicides (Appendix A). No metals were detected above the New York State groundwater standard except zinc (0.55 mg/l). No pesticides or herbicides were detected.

As shown on Table 2, on-site groundwater quality samples were collected on January 3, January 25, January 28, February 14, June 2, and July 16. In early 1992, the site water supply plumbing was configured such that groundwater produced by WSW-1 or WSW-2 was conveyed to a junction so that either well could provide the water supply for the building. Valves and sampling ports were provided in the plumbing such that water produced by one well could not enter the other well and water produced by either well could be sampled discretely with an appropriate purge of piping.

The January 3 sample was collected by a local engineer (Smith) as part of routine sampling requested by the Dutchess County Department of Health (DCDOH). Sampling was attempted for both WSW-1 and WSW-2. Results of this sampling indicated that similar concentrations of TCA, 1,1-dichloroethane (1,1-DCA), and 1,1-dichloroethylene (DCE) were found in both wells. A confirmation sample was collected on January 25 by Groundwater Sciences Corporation (GSC). This sample confirmed the presence of TCA, 1,1-DCA, and DCE in both WSW-1 and WSW-2. The concentrations, however, were significantly different than those reported in the January 3 sampling. The average of the WSW-1 and WSW-2 concentrations detected in the January 25 samples is approximately equal to the concentrations found in each of the WSW-1 and WSW-2 samples collected on January 3. It is believed that the January 3 sample was collected such that the water produced from these two wells was inadvertently mixed prior to the collection of each sample. The results of the January 3 sampling are, therefore, suspect. Prior to sampling on

January 25, it was noted that WSW-2 was the active water supply well instead of WSW-1. This situation was corrected on January 25, when WSW-1 was returned to service and WSW-2 was shut off.

On January 28, one working day after WSW-1 was reactivated, DCDOH collected a sample from the kitchen tap. Since it was collected so soon after the change from WSW-2 to WSW-1 and the site's plumbing system contains a pressure tank and water softener with an approximate combined capacity of 250 gallons, it is believed that this sample is not representative of either water supply well, but rather a composite of the two. This sample detected TCA, 1,1-DCA, and DCE at concentrations greater than those believed to be representative of WSW-1 and lower than those believed to be representative of WSW-2. This sample also detected trichloroethylene (TCE) and 1,2-dichloroethane (1,2-DCA) at concentrations of less than 1 microgram per liter (µg/l).

A carbon treatment system was installed downstream from the pressure tank and water softener and operation began on February 14, 1992. As part of the start-up suite of samples, an untreated sample of the water produced by WSW-1 was collected. This sample contained TCA, 1,1-DCA, and DCE at concentrations similar to the January 25 sample collected by GSC.

In May, mechanical problems developed in WSW-1 and this well was no longer operable. WSW-2 became the water supply source for the site. On June 2, 1992 an untreated water sample was collected as part of the ongoing water treatment system monitoring at the site. This sample indicated the presence of TCA, 1,1-DCA, and DCE at concentrations similar to those detected in the January 25 sample. 1,2-DCA was also detected at a concentration of less than 1 µg/l.

The initial sample from WSW-3 was collected on July 16, 1992. This well was completed on July 15, 1992 and the water column evacuated by drilling rig air development. The sample was collected the next day from the midpoint of the recovered water column by a stainless steel bailer. No VOCs were detected in this sample at a detection limit of 0.5 µg/l.

TABLE 2
Detected Groundwater VOC Sampling Results (µg/l)

WSW-1 (On-site)

Date	Parameter					Collected By
	TCA	1,1-DCA	DCE	TCE	1,2-DCA	
1/3/92*	49	120	9	<0.5	<0.5	Smith
1/25/92	17	17	2.1	<1.0	<1.0	GSC
1/28/92**	65	130	12	0.5	0.9	DCDOH
2/14/92	16	34	0.5	<0.5	<0.5	GSC

* Believed to be inadvertent composite of WSW-1 and WSW-2

** Likely a composite of WSW-1 and WSW-2 due to switching system from WSW-2 to WSW-1 one business day prior to sample collection

WSW-2 (On-site)

Date	Parameter					Collected By
	TCA	1,1-DCA	DCE	TCE	1,2-DCA	
1/3/92*	45	109	3	<0.5	<0.5	Smith
1/25/92	130	200	18	<1.0	<1.0	GSC
6/2/92	110	220	13	<0.5	0.76	GSC

* Believed to be inadvertent composite of WSW-1 and WSW-2

WSW-3 (On-site)

Date	Parameter					Collected By
	TCA	1,1-DCA	DCE	TCE	1,2-DCA	
7/16/92	<0.5	<0.5	<0.5	<0.5	<0.5	GSC
11/16/92	<0.5	<0.5	<0.5	<0.5	<0.5	GSC

Off-site (30 Hibernia Road)

Date	Parameter					Collected By
	TCA	1,1-DCA	DCE	TCE	1,2-DCA	
2/14/92	<0.5	<0.5	<0.5	<0.5	<0.5	DCDOH

An off-site VOC sample was collected on February 14, 1992 by the DCDOH at 30 Hibernia Road. This sample did not contain VOCs at a detection limit of 0.5 µg/l.

2.4.2 Septic Tank Sampling Results

Samples were collected of the liquid fraction in each septic tank for VOC analyses. As shown on Table 3, the new septic tank was sampled on February 11, 1992 by the DCDOH and on April 7, 1992 by GSC. The February 11, 1992 result indicates the presence of TCA, 1,1-DCA, toluene, 1,2,4-trimethylbenzene (1,2,4-TMB), and 1,3,5-TMB. On February 11, 1992 the water supply treatment system had not yet been activated and so the TCA and 1,1-DCA present in the sample appear to be reflections of the water supply quality. Toluene, 1,2,4-TMB, and 1,3,5-TMB have not been detected in site groundwater. These compounds probably originated within the building and the use of any materials on-site which could possibly have contained these materials has been discontinued. The April 7, 1992 sample did not detect TCA or 1,1-DCA, detected a lower concentration of toluene, and detected 4-isopropyltoluene which coelutes with 1,2,4-TMB (4-isopropyltoluene). 1,3,5-TMB was not detected.

TABLE 3
Septic Tank Liquid VOC Sampling Results (µg/l)

New Tank (East Tank)							
	Parameter						Collected
Date	TCA	1,1-DCA	Toluene	1,2,4-TMB*	1,3,5-TMB	Chloroform	By
2/11/92	5.0	24	340	54	4	<0.5	DCDOH
4/7/92	<2.5	<2.5	89	49	<2.5	<2.5	GSC

* Coelutes with 4-isopropyltoluene

Old Tank (West Tank)							
	Parameter						Collected
Date	TCA	1,1-DCA	Toluene	1,2,4-TMB*	1,3,5-TMB	Chloroform	By
4/7/92	<2.5	<2.5	<2.5	<2.5	<2.5	2.7	GSC

The old septic tank was also sampled on April 7, 1992 by GSC. The only VOC detected in this sample was chloroform at a concentration near the detection limit.

2.4.3 Soil Sampling Results

Soil samples were collected and analyzed for VOCs in March and October 1992. Five samples were collected on March 19 from the outdoor recreation areas on-site. These samples were collected within a few inches of the surface with steam-cleaned trowels, were placed into laboratory-provided containers which were in turn placed into a laboratory-provided cooler with ice packs, and conveyed to the contract laboratory for analysis. As shown on Table 4, of these five samples, only one detected VOCs. Methylene chloride and chloroform were detected at low concentrations (2.1 µg/kg and 8.8 µg/kg, respectively). Neither of these compounds have been found in site groundwater samples. On October 7, 1992, a sample was collected from the trench associated with the WSW-3 water supply conveyance pipe and was analyzed for VOCs. None were detected.

TABLE 4
Soil VOC Sampling Results (µg/kg)

Location, Date	Parameter	
	Methylene Chloride	Chloroform
South Activity Area, 3/19/92	2.1	8.8
North Activity Area, 3/19/92	<1.2	<1.2
Sled Hill, 3/19/92	<1.2	<1.2
Stream Playground, 3/19/92	<1.2	<1.2
Play Yard Swings, 3/19/92	<1.4	<1.4
West of South Activity Area, 10/7/92	<1.1	<1.1

3 SITE INVESTIGATION SCOPE OF WORK

The site investigation scope of work has been divided into a phased series of tasks such that information developed during initial tasks can be incorporated into subsequent tasks as necessary. These tasks are 1) data review, 2) field investigations, 3) site investigation analysis, and 4) preparation of a site remedial investigation report.

The activities necessary to complete the four tasks are described in the following subsections of this section of the work plan. To the extent warranted, field investigation tasks described below will be revised and amended to reflect information gathered regarding the understanding of site conditions, which will develop as the field investigation tasks are implemented. Any major revisions, as well as the locations of later phase monitoring wells, will be discussed with NYSDEC prior to implementation.

3.1 Data Review

As part of the preparation for this scope of work, existing data for this site has been reviewed and is presented in Section 2. In addition to the preliminary and background information already gathered, the DCDOH will be contacted regarding well records for the water supply well on the downhill, adjacent property (30 Hibernia Road). This information will be valuable in interpreting data collected on-site and will be presented in the site report.

3.2 Field Investigations

Field investigations are designed to obtain the data necessary to characterize geologic, hydrogeologic and environmental conditions, and to evaluate the nature and extent of contamination at the site. This data will be supplemented by information gathered previously (discussed in Section 2) and any off-site information which can be obtained (Section 3.1). This task will include the installation of soil borings, soil groundwater monitoring wells, and bedrock groundwater monitoring wells; soil quality testing, groundwater quality testing, and surface water quality testing; as well as hydrogeologic studies.

3.2.1 Investigation Rationale

Bedrock groundwater is currently the only media known to be contaminated on-site. At small, light manufacturing facilities, septic systems are commonly the cause of groundwater impacts. The source area investigation portion of this study will, therefore, focus on the two septic systems located to the north of the main building (Figure 3).

When the site was re-occupied in 1988, there were two septic tanks. In 1987, the easternmost of these two septic tanks was removed and replaced with a new, preformed, concrete 1,250-gallon capacity tank. The age of the westernmost septic tank is not known, but it is believed to have been operational during at least part of the time that Cavalier occupied the site. As a matter of routine, both tanks are pumped out semi-annually by RE so that a conservative estimate of the number of times these tanks have been pumped out since the site was last occupied by Cavalier is six (twice in 1989, 1990, and 1991). The new septic tank, therefore, has not received any waste generated by Cavalier and the old septic tank has been pumped out at least six times since use by Cavalier. Both septic systems have been flushed out by over three years of use since wastewater originating with Cavalier's operations was discharged to them.

If a release occurred to the septic tanks, it would likely have been in one of two modes: an aqueous-phase release or a separate-phase release. In the case of an aqueous-phase release, no separate-phase material would be present and so there is no opportunity for separate-phase material to be present in adjacent soils. If a separate-phase release of halogenated hydrocarbons occurred, then these materials, which are dense, non-aqueous phase liquids (DNAPL) would likely sink to the bottom of the septic tank and remain there until dissolved, pumped out or released through the wall or floor of the tank. Since the invert of the piping connecting the septic tank to the infiltration field is generally several feet above the base of the septic tank, it is unlikely that DNAPL would have reached the infiltration field. Soil investigations will, therefore, focus on the area adjacent to and beneath the two septic tanks. Groundwater quality investigations will focus on the area beneath the two septic tanks and those areas downgradient from these two septic tanks. The downgradient surface water receptors of site groundwater will also be evaluated.

3.2.2 Bedrock Groundwater Monitoring Wells

Based on the conceptual model of the site geology and hydrogeology presented in Section 2.3, and the investigation rationale discussed above, the source of the groundwater plume is presumed to be near the northern side of the main building. The plume is believed to extend in a generally southwesterly direction toward WSW-2 and Hibernia Road. If this conceptual model proves valid, then existing bedrock well WSW-2 occupies a midplume location, WSW-3 occupies a position upgradient relative to the source, and the water supply well at 30 Hibernia Road occupies a distant downgradient location.

Three additional bedrock monitoring wells are proposed. These wells, shown on Figure 5, are MW-101, MW-102, and MW-103. MW-101 is located between the two septic tanks and is proposed as a well to evaluate bedrock groundwater conditions in the vicinity of the source. MW-102 and MW-103 are proposed as downgradient wells to bracket the lateral extent of the plume at a midplume or downgradient position. Monitoring wells MW-101 and MW-102 would be installed initially in the first phase of field work. Groundwater elevation data from WSW-3, MW-101, WSW-2, and MW-102, along with groundwater quality data from MW-101, MW-102, and WSW-2, would be used to determine the location of MW-103 in the second phase of field work.

Each of the three proposed bedrock groundwater monitoring wells would be installed using decontamination, drilling, and well construction protocols presented in Appendix B. These protocols indicate that each boring would be advanced to a depth of ten feet below the top of competent bedrock, at which point protective steel casing would be set. An open borehole would then be advanced to a depth five to ten feet below the point at which the well developed sufficient yield for monitoring (greater than 1/2 gpm). Drill cuttings will be placed in 55-gallon steel drums and stored on-site pending later proper disposal. Surface completion for all monitoring wells will be in manholes. Upon completion, the elevation of the casing would be determined by a licensed New York surveyor.

Following a two-week stabilization period, MW-101, MW-102, and MW-103 will each be purged, sampled, and analyzed following protocols presented in Appendix B. WSW-2 will be sampled using the existing pump and sample port. Each of these samples will be analyzed for VOCs. Since there is a site history of Freon 113 during Cavalier's operation, this parameter will also be analyzed for in all site samples.

3.2.3 Soil Borings

In the first phase of field work, the installation of MW-101 and MW-102 will be the first task performed. The installation of these two bedrock monitoring wells will provide information regarding gross soil type and soil thickness near the main building. This information will be valuable in planning for and installing the soil borings/monitoring wells adjacent to each septic tank.

Two soil borings are planned adjacent to each septic tank. Each boring will be installed by hollow-stem auger drilling methods described in Appendix B. Soil samples will be collected with decontaminated, two-inch diameter, split-spoon samplers. The shallower boring located at each septic tank (SB-1 and SB-2) will be advanced to a total depth of ten feet. Split-spoon samples will be collected continuously from four feet to ten feet. Each boring will be logged by a GSC geologist and each split-spoon sample will be screened with a flame ionization detector (FID) for VOC content using the headspace method described in Appendix B. The sample from each boring with the highest FID response will be conveyed to the contract laboratory for VOC analysis.

The two deeper soil borings at each septic tank location (MW-104 and MW-105) will be advanced to a depth of ten feet below the soil water table, assuming that saturated soil conditions are encountered before bedrock is reached and that there is at least ten feet of available saturated soil. Split-spoon samples will be collected at depths of four to six feet, six to eight feet, eight to ten feet, and every five feet thereafter. Soil samples will be logged and screened for VOCs in the same manner as samples from the shallower boring at each location. The sample from each of the two deeper borings with the highest FID response will be sent to the laboratory for VOC analysis.

The shallower boring at each location will be backfilled with bentonite grout or crushed bentonite, and the deeper boring at each location will be completed as a monitoring well. Soil cuttings will be placed in 55-gallon steel drums and stored on-site pending later proper disposal.

3.2.4 Soil Groundwater Monitoring Wells

The deeper soil borings described in Section 3.2.3 (MW-104 and MW-105) above will be completed as four-inch diameter monitoring wells. The wells will have a 15-foot long, PVC screened interval (ten feet below the water table, five feet above) and Schedule 40, flush-joint, PVC riser to the surface. The appropriate screen slot size and sand pack will be chosen based on an examination of the soil recovered from the screened interval during the installation of bedrock monitoring well MW-101. Each of these wells will be completed in a steel manhole as described in Appendix B.

During the same round of field activities in which MW-101, MW-102, SB-1, SB-2, MW-104, and MW-105 are installed, MW-106 will be installed (Figure 5). The boring for this monitoring well will be advanced to a depth of ten feet below the water table. Split-spoon samples will be collected every five feet. The soil samples will be described by a geologist and headspace VOC screening will be performed. This well will be completed as a four-inch diameter monitoring well with 15 feet of screen set such that there is ten feet of screen below the water table and five feet above (conditions permitting). This well will also be completed with a steel manhole.

Following the installation of MW-106, a round of groundwater samples (MW-104, MW-105, and MW-106) will be collected following a stabilization period of 14 days. These samples will be analyzed for VOCs. Based on the results of these groundwater quality samples and groundwater elevation data collected from MW-104, MW-105, and MW-106, the direction of soil groundwater flow will be determined. This information will be used in determining the location for soil groundwater monitoring well MW-10.

To eliminate the need to remobilize both a hollow-stem auger drill rig and an air rotary drill rig for the installation of only one well by each drill rig, MW-107 will be installed by air rotary methods. A six-inch borehole will be advanced to total depth by an air rotary drill rig and cuttings will be examined by the field geologist every five feet. Six-inch steel casing will be inserted and driven as necessary to keep the borehole open for monitoring well construction. The monitoring well will be constructed of two-inch PVC screen and riser. The six-inch casing will be withdrawn as the well is constructed in the same way that auger flights would be in a hollow-stem auger constructed well. This well will serve to delineate the downgradient extent of any soil groundwater VOC plume encountered by MW-104, MW-105 or MW-106. MW-107 and bedrock monitoring well MW-103 will be installed in the second round of field work.

3.2.5 Surface Water Quality Sampling

Surface water quality samples will be collected at five locations as shown on Figure 5. Location 1 represents upstream conditions in Wappinger Creek. Location 2 represents a downstream position in Wappinger Creek with respect to the site. Location 3 is a downstream position relative to the site along the tributary to Wappinger Creek, and Location 4 is an upstream water quality sample in that same tributary. Location 5 will be collected from the on-site pond located downhill from the main building. Elevations of sample locations will be determined by a licensed New York State surveyor.

The contract laboratory will be instructed to analyze surface water samples from Locations 2, 3 and 5 for VOCs. These results will be requested on an expedited basis so that a decision can be made regarding the analysis of upstream samples from Locations 1 and 4. If no VOCs are detected in downstream samples from Locations 2 or 3, then the upstream water quality is irrelevant with respect to the objectives of this study and samples from Locations 1 and 4 would not be analyzed. If, however, VOCs are detected in the sample from Location 2, then the sample from Location 1 would be analyzed to determine ambient conditions in Wappinger Creek. Similarly, if VOCs are detected in the sample from Location 3, then the sample from Location 4 will be analyzed in order to determine ambient conditions in the tributary to Wappinger Creek. These samples will be collected using protocols described in Appendix B.

3.2.6 Hydrogeologic Testing

During the course of groundwater sampling activities, groundwater elevations will be measured in all site wells (except inaccessible well WSW-1). This information will be used to determine groundwater flow under typical site conditions, i.e., when water is being withdrawn from WSW-3.

In addition to this routine hydrogeologic data gathering, two bedrock hydrogeologic data tests are planned. The first test is a shutdown test at WSW-3 and the second test is a constant rate pump test at either MW-101 or WSW-2.

A potential remediation scenario is one in which one site well (MW-101 or WSW-2) is used as a groundwater withdrawal well within the plume, with WSW-3 acting as the site water supply well. The impact of each of these production wells on site hydrogeologic conditions both individually and in combination must be understood. A shutdown test performed at WSW-3 will provide information regarding the impact of groundwater withdrawal at this location on the bedrock and soil groundwater systems. This well provides approximately 1,100 gallons per day to the site on weekdays and lesser amounts on weekends. The shutdown test is proposed to be performed at the end of one of these weekday-use periods so that it spans the 60-hour period from the close of business on Friday to the start of business the following Monday morning. During this test, groundwater elevations would be taken periodically at all site wells on Friday for the 12-hour period preceding shutdown of the site water supply well. From mid-afternoon on Friday to the initiation of the shutdown test Friday evening, one sink would be kept running within the building to ensure that WSW-3 does not shut-down before sufficient water level data has been collected. Early Friday evening, power to WSW-3 would be shut off. Frequent groundwater elevation measurements would be taken at all site wells for several hours after the start of the shutdown test. At least two rounds of water levels would be collected on both Saturday and Sunday. A round of water levels would be collected early Monday morning before the pump in WSW-3 was turned back on.

A 48-hour, constant rate drawdown test will be performed in WSW-2 or MW-101. In order to negate pumping effects at WSW-3 to the extent practical, this test will be conducted over a three-day weekend. WSW-3 will be turned off Friday evening and allowed to recover until Sunday morning when constant rate pumping at the test well will start. Sufficient water level monitoring will be conducted in all site wells so that this recovery period can be monitored. A step drawdown test will be performed in the pump test well on Saturday in order to determine an appropriate rate for the 48-hour pump test. The pump test will begin early Sunday morning following approximately 36 hours of recovery in WSW-3 and at least 12 hours of recovery following the step test in the pump test well. Frequent water level measurements will be made in the beginning of the pump test at all site wells. The frequency of water level measurement monitoring will decrease during the duration of the test, which will end early Tuesday morning.

Produced water from the pump test well will be conveyed to the carbon treatment system within the main building. This treated water will be conveyed via above-ground, temporary piping to the tributary on the western site boundary.

3.2.7 Decontamination Procedure

In order to reduce the risk of cross-contamination during drilling and sampling activities, decontamination procedures will be followed during the performance of the site investigation. Prior to initiating field activities and between field activities, the drill rig and sampling equipment will be steam-cleaned. Detailed decontamination protocols are presented in Appendix B.

3.2.8 Sampling, Sample Handling, and Laboratory Procedures

During implementation of the site investigation, procedures and protocols presented in the QAPjP will be followed (Appendix B). Laboratory analytical services and support will be provided by a New York State Department of Health certified environmental laboratory. This laboratory will provide all sample containers, labels, and shipping coolers. All samples will be placed in laboratory-provided containers, labeled in the field at the time of sampling, and conveyed in a cooler with ice packs directly to the laboratory for analysis within 48 hours of sample collection. Full chain of custody documentation will accompany all samples. The laboratory will provide analyte-free water for use as a trip blank during each round in which aqueous samples are collected.

Laboratory analysis will be completed in accordance with USEPA SW-846 8240 or 40 CFR Part 360 524 methods and the laboratory reporting package will conform to New York State ASP Level B requirements.

3.2.9 Health and Safety Plan

A site specific health and safety plan (HASP) has been developed for use during the site investigation. This plan describes all activities necessary for performing field activities in such a manner as to protect field crews from hazards associated with the work being performed. Since this site routinely has many children present, no drilling activities will be conducted near the main building during business hours. A 50-foot exclusion zone will be maintained for all other site activities. The HASP is presented in Appendix C.

3.3 Site Investigation Analysis

The purpose of this task is to assess whether the site investigation has produced data sufficient to meet the goals set forth in Section 1.1. A thorough analysis of all site investigation activities will be performed. This analysis will, at a minimum, include assessment of:

1. Soil and bedrock geologic conditions at the site;

2. Evaluation and characterization of contaminants in the vicinity of the two septic tanks;

3. Patterns and directions of groundwater flow in both the soil and bedrock groundwater systems;

4. Extent and nature of groundwater contamination; and

5. Development of suitable data to provide an evaluation of remedial measures, including an assessment of bedrock groundwater withdrawal and treatment.

Additional data concerning appropriate adjacent properties will be incorporated into the site investigation.

3.4 Reporting

The final remedial investigation report will contain a technical overview of the entire site investigation; a summary of all completed tasks; a discussion of findings with supporting tables, graphs, and figures; an assessment of site data with respect to the impact of identified contaminants; and a preliminary evaluation of potential remedial alternatives. This report will be submitted in preliminary form to NYSDEC for review. After receiving and responding to any commentors' remarks, a final report will be issued.

4 NYSDEC LIAISON

NYSDEC will be kept apprised as to the project status throughout the implementation of the site investigation. Cavalier and its representatives will be available to participate in periodic telephone conference calls and project meetings as appropriate and required. Such calls or meetings may be held to discuss the results of the investigation and the changes and refinements to the scope of work (e.g., refinement of monitoring well locations, unanticipated conditions, delays, etc.). NYSDEC will be notified ten days prior to the commencement of field activities in advance of each major phase of field investigation. In this manner, NYSDEC will be able to make arrangements to observe field work, obtain split samples, provide input to principal decisions, and approve refinements to the program in a timely manner.

5 SCHEDULE

Data review and evaluation activities have been initiated as part of the effort to prepare this work plan. The schedule for other planned activities is presented on Table 5. As this schedule shows, the first round of groundwater quality sampling will be conducted two weeks after the installation of the first round of monitoring wells. After a one-month period for the laboratory to perform analyses, data will be interpreted and well locations chosen for the second round of field activities. Two weeks following the installation of the second round monitoring wells, groundwater and surface water samples will be collected. After a one-month period for laboratory analyses, these data will be interpreted and the final planning details will be made for the aquifer tests. Aquifer tests will then be performed and the data analyzed along with other data collected as discussed in this work plan. The preliminary remedial investigation report will then be prepared and submitted to NYSDEC.

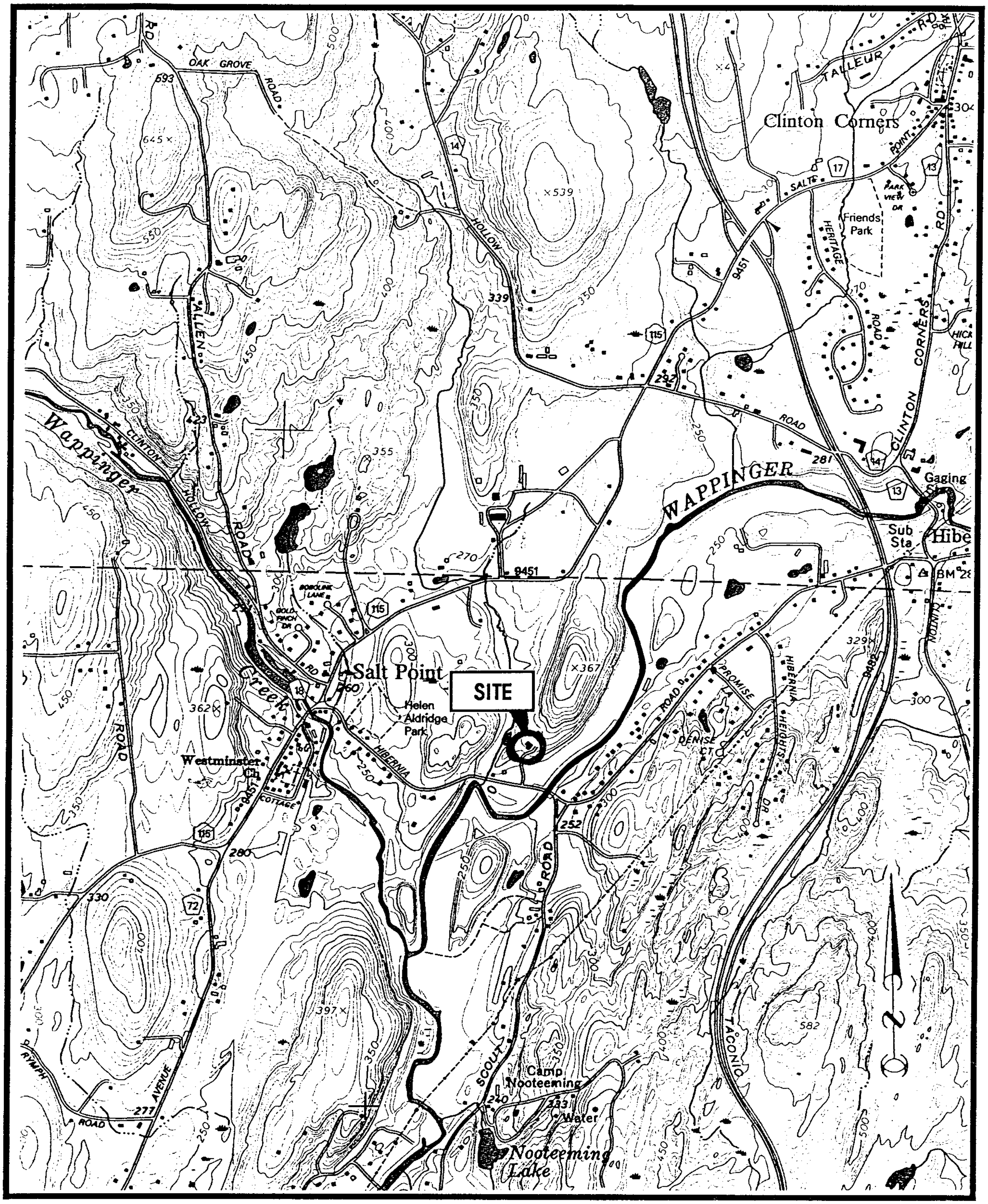
TABLE 5
Schedule Through Submission of the Preliminary RI Report

Activity	Month After Project Start							
	1	2	3	4	5	6	7	8
Start-up and Data Review	■							
Install First Round*	■	■						
Sample First Round*			■					
Survey Elevations			■		■			
Data Interpretation				■		■	■	
Install Second Round**				■				
Sample Second Round**					■			
Perform Aquifer Tests							■	
Report Preparation								■

* MW-101, MW-102, MW-104, MW-105, MW-106, SB-1, SB-2
** MW-103, MW-107, surface water sampling

Figures

Figures



2000 1000 0 2000

Scale: 1 inch = 2,000 feet

Figure 1

Site Location Map
A Portion of the U.S.G.S.
7 1/2 Minute Salt Point Quadrangle

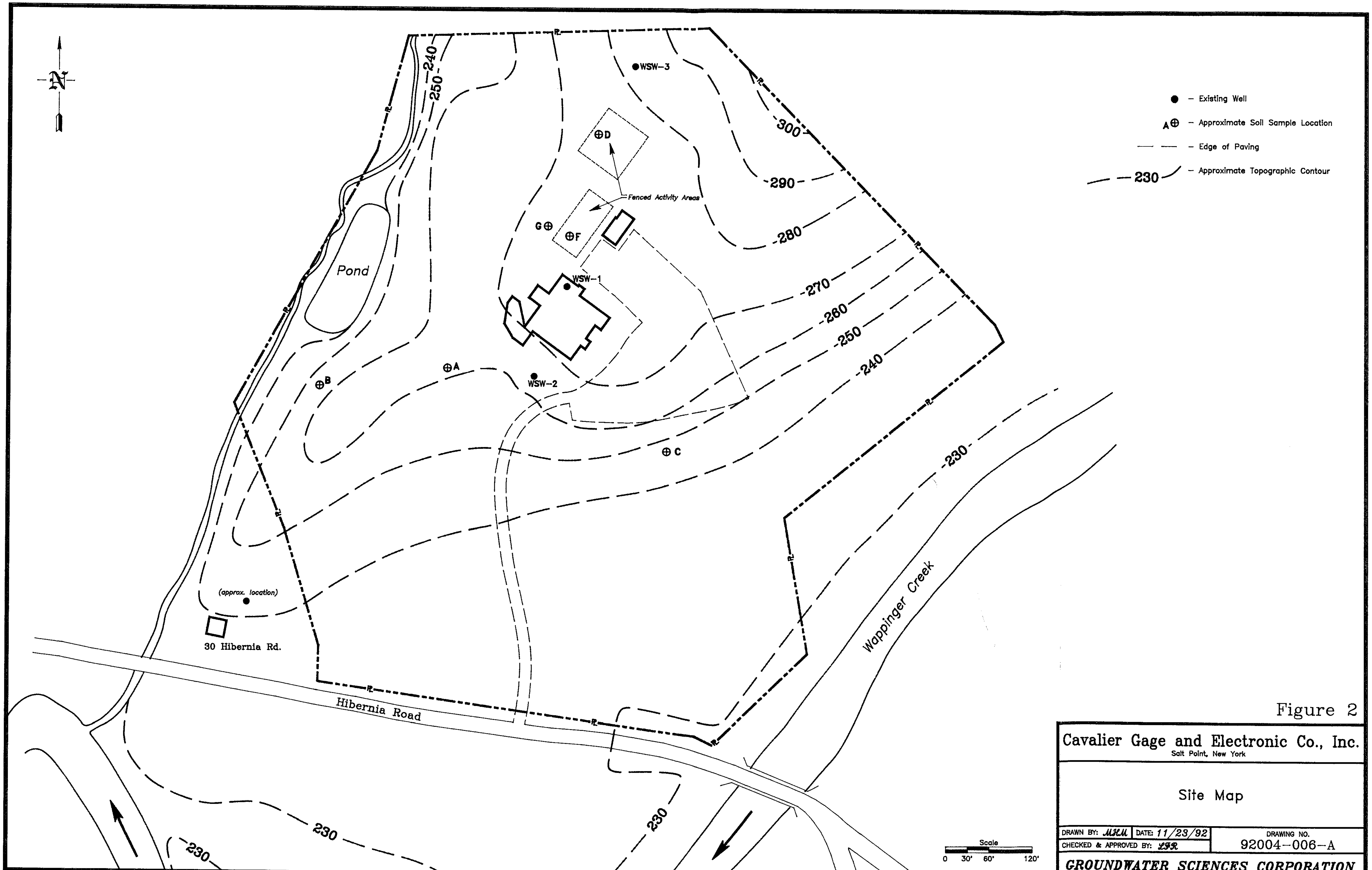


Figure 2

Cavalier Gage and Electronic Co., Inc.
Salt Point, New York

Site Map

DRAWN BY: DATE: 11/23/92
CHECKED & APPROVED BY:

DRAWING NO. 92004-006-A

GROUNDWATER SCIENCES CORPORATION

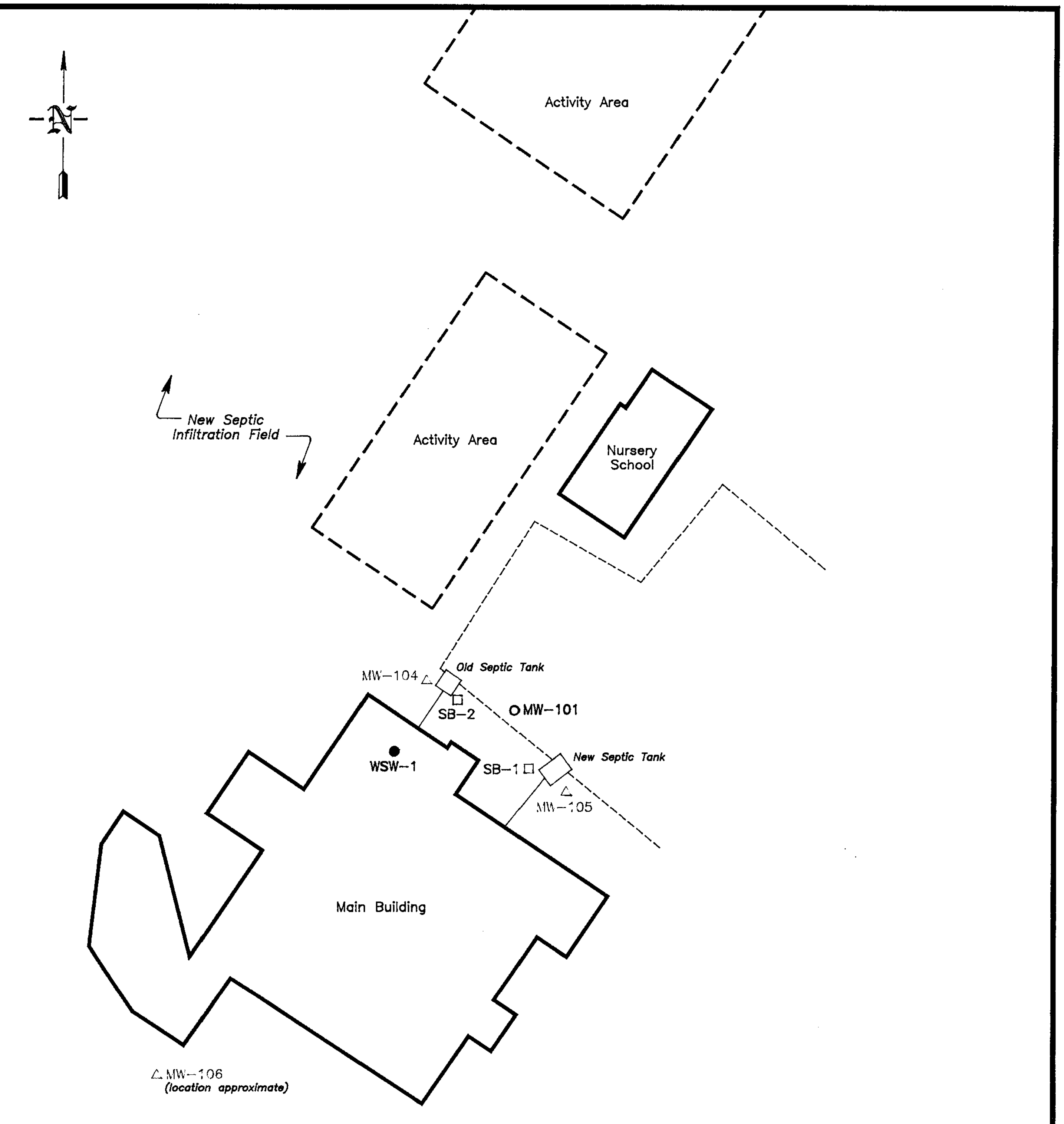
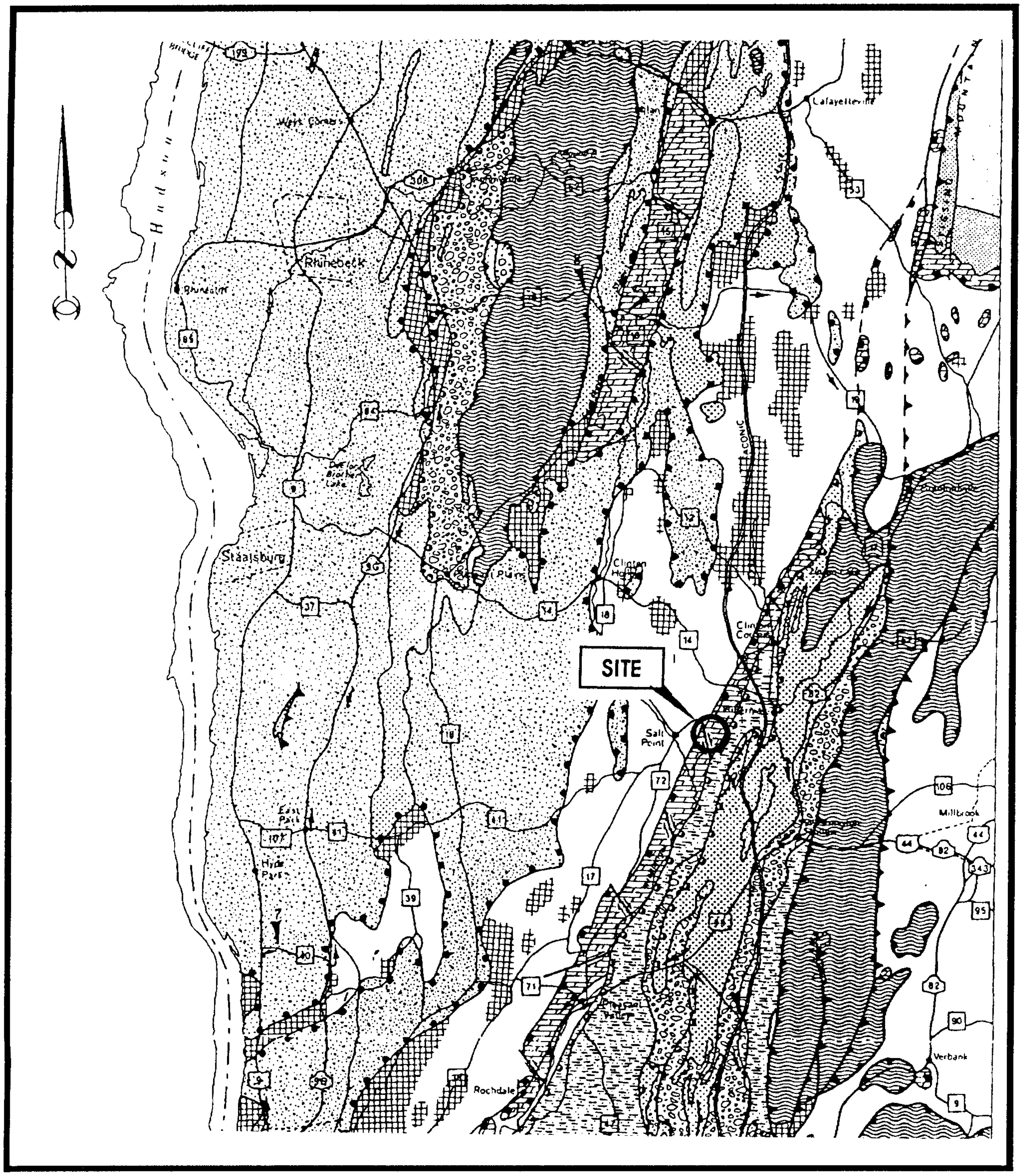


Figure 3

● – Existing Well
○ – Proposed Bedrock Monitoring Well
△ – Proposed Soil Monitoring Well
□ – Proposed Soil Boring
---- – Edge of Paving

Scale
0 20' 40'

Cavalier Gage and Electronic Co, Inc. Salt Point, New York	
Site Plan Detail	
DRAWN BY: MHM DATE: 11/12/92 CHECKED & APPROVED BY: LFR	DRAWING NO. 92004-005-A
GROUNDWATER SCIENCES CORPORATION	



1 inch equals approximately 3 miles

Figure 4a
Geologic Map

Fisher, D.W. and Warthin, A.S. Jr., taken from Field Guide Book, NYSGA 48th Annual Meeting, October 15-17, 1976

Map cartography by John B. Skiba, May 1976

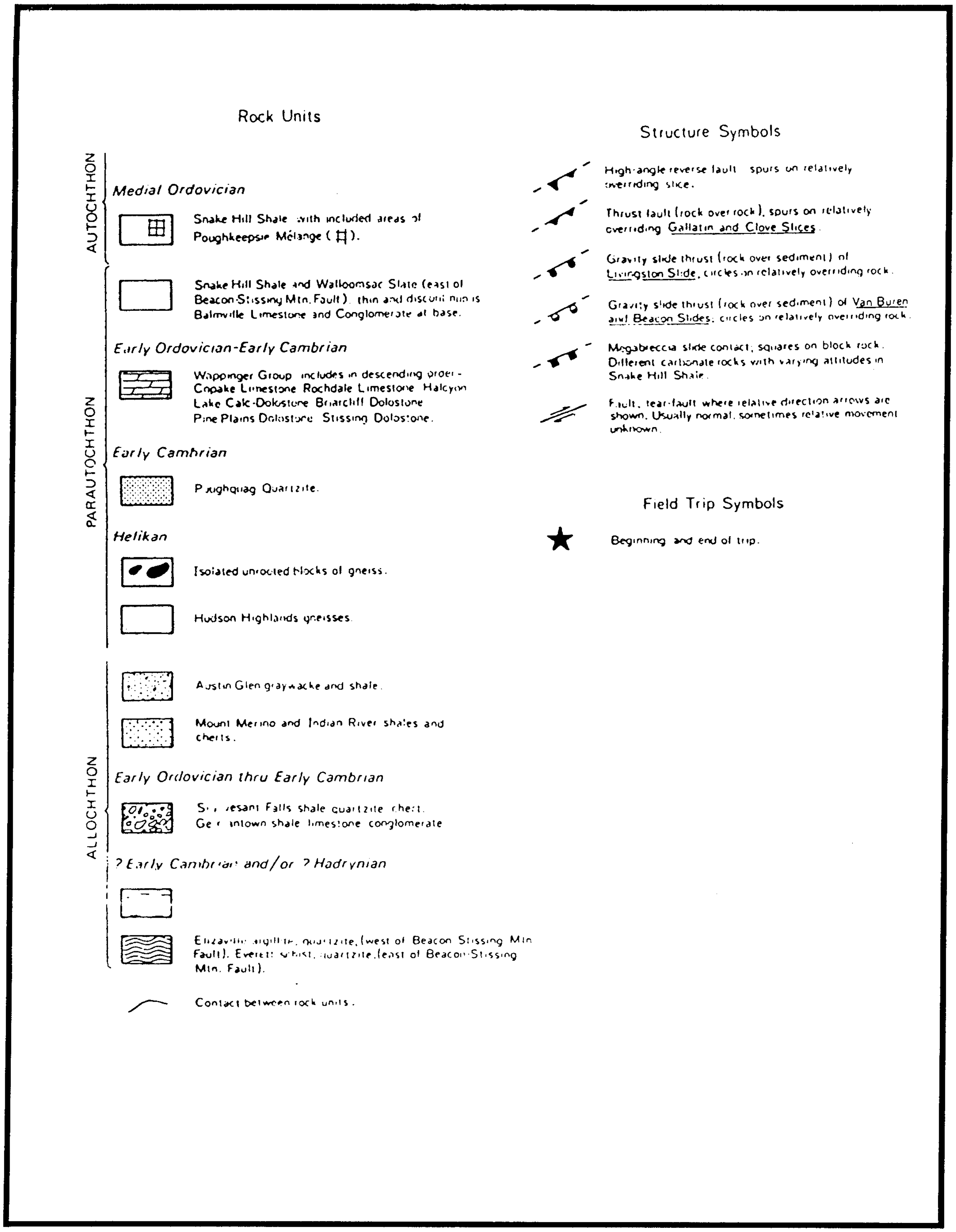


Figure 4b
Key to Geologic Map

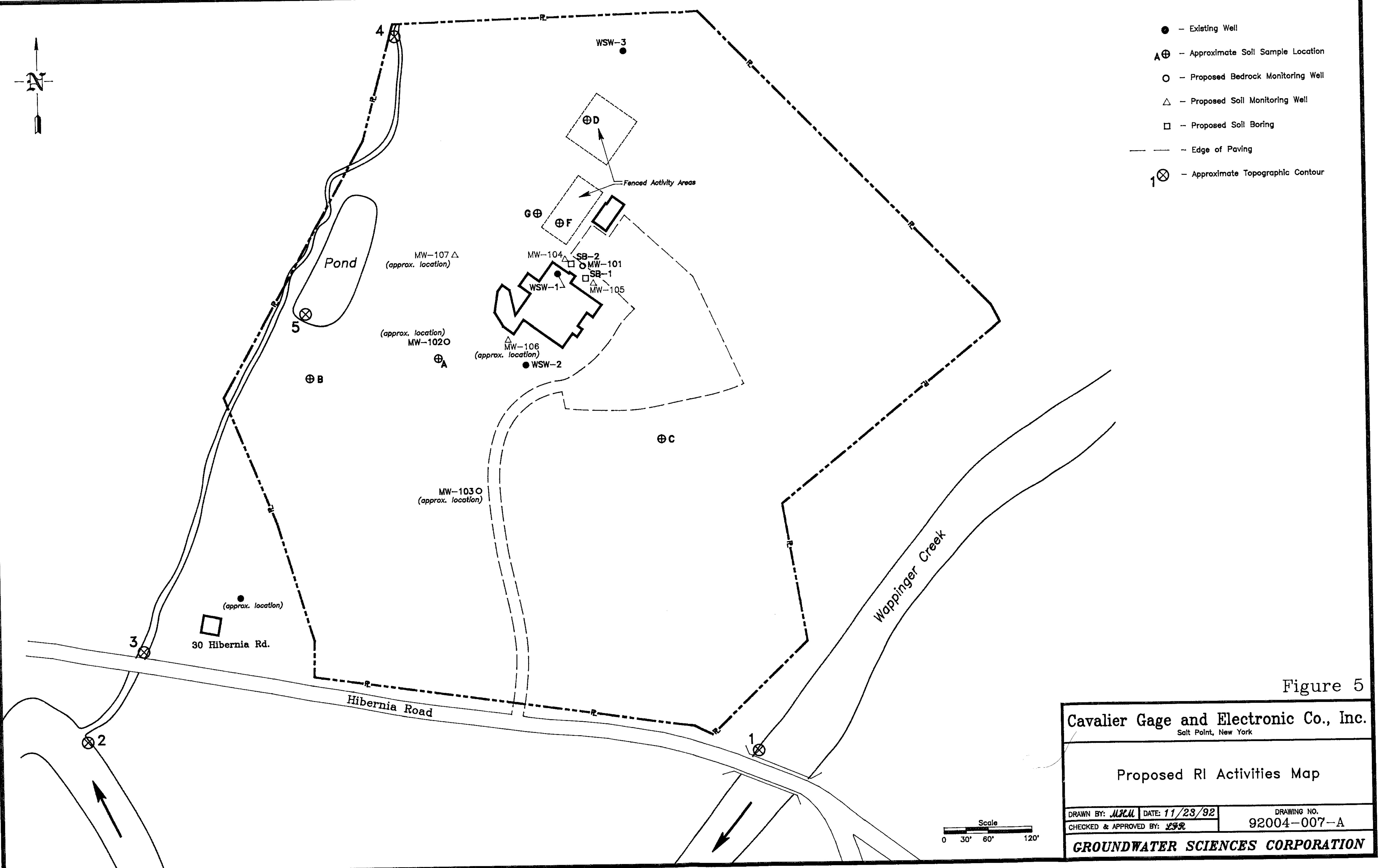


Figure 5

Cavalier Gage and Electronic Co., Inc.
Salt Point, New York

Proposed RI Activities Map

DRAWN BY: MKM	DATE: 11/23/92	DRAWING NO. 92004-007-A
CHECKED & APPROVED BY: LJR		

GROUNDWATER SCIENCES CORPORATION

Appendix A

APPENDIX A

Laboratory Reports
Chains of Custody
Field Data Sheets

olest
oratories Inc.
315 Fullerton Avenu
Newburgh, NY 125
(914) 562-0890

LAB#: 61743-001 DATE REC'D: 88/02/05 DATE COLL'D: 88/02/05 STATUS: Clo
LNAME: Rainbow's End Day Care FNAME:
STREET: Hibernia Road CITY: Pleasent Vly STATE: NYZIP:
SPL LOCATION: tap

REPORT TO: same
BILL TO: same

T COLI:	1/100 ml	Cr+6 :		COD :	
F COLI:		Phenol:		HARD-T :	260 (15 grains)
SPC :		CN :		Ca Hard:	150
F :	<0.2	B :		SO3 :	
NO3 :	0.4	Br :		Cl :	2.5
NO2 :		Color :	<2.5 PT-CO	Alk :	220
T-PO4 :		Odor :	1	BOD-Inf:	
O-PO4 :		Turb :	0.11 TU	BOD-Eff:	
SO4 :	45	pH :	7.7	BOD-S :	
MBAS :		LI :	0.14	TSS-Inf:	
SiO2 :		Cond :		TSS-Eff:	
H2S :		NH3-T :		MLSS :	
NH3-C :		TKN :		MLVSS :	
VSS :		Ca :		K :	
TS :		Cr :	<0.02	Se :	<2.0 ug/l
VS :		Co :		Ag :	<0.005
TDS :	460	Cu :	0.03	Na :	3.5
SS :		Au :		Tl :	
% SOL :		Fe :	<0.03	Sn :	
G & O :		Pb :	<0.01	Ti :	
Al :		Mg :		V :	
Sb :		Mn :	<0.01	Zn :	0.55
As :	<5.0 ug/l	Hg :	<0.4 ug/l	THM :	
Ba :	0.05	Mo :		TOC :	
Be :		Ni :			
Cd :	<0.002	Pd :			

Remarks: All results in mg/l unless otherwise indicated. All parameters tested were within the limitations of the NY State Drinking Water Stand when the sample was collected. Results also show the water to be very h

Ronald A. Bayer
Laboratory Director 2/22/88

61743-001

Client: Rainbow's End Day Care   Spl Location: tap

Spl Coll'd: 2/5/88   Sample Rec'd: 2/5/88

SDWA Pesticides

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #xxxxx 1st ug/l	2nd ug/l	QC MATRIX S. Lab #xxxx Spl ug/l	Conc. Added ug/l
1) Endrin	ND	0.05	ND	–	–	–	–
2) Lindane	ND	0.05	ND	–	–	–	–
3) Methoxychlor	ND	0.5	ND	–	–	–	–
4) Toxaphene	ND	0.1	ND	–	–	–	–

SDWA Herbicides

COMPOUND	RESULTS Sample Concen. ug/l	MDL ug/l	BLANK Conc. ug/l	QC REPLICATE Lab #xxxxx 1st ug/l	2nd ug/l	QC MATRIX S. Lab #xxxx Spl ug/l	Conc. Added ug/l
1) 2,4-D	ND	2.0	ND	–	–	–	–
2) 2,4,5-TP	ND	1.0	ND	–	–	–	–

For EnviroTest Laboratories, Inc. ______________
Ronald A. Boyer
President   3/7/88

VOLATILE ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CAMO Laboratories, Inc.
Client Name: Smith Lab
Project/Facility Name:
Sample Location: #C4-Old Well WSW 1
Matrix: Water
Method: EPA 502.2

Sample ID: 0044-01
Date Collected: 1-3-92
Date Received: 1-3-92
Date Analyzed: 1-9-92

Date Reported: 1-14-92

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
Benzene	0.5		U
* Bromobenzene	0.5		U
Bromochloromethane	0.5		U
Bromomethane	0.5		U
* n-Butylbenzene	0.5		U
sec-Butylbenzene	0.5		U
tert-Butylbenzene	0.5		U
Carbon tetrachloride	0.5		U
* Chlorobenzene	0.5		U
Chloroethane	0.5		U
Chloromethane	0.5		U
2-Chlorotoluene	0.5		U
4-Chlorotoluene	0.5		U
1,2-Dibromoethane	0.5		U
Dibromomethane	0.5		U
1,2-Dichlorobenzene	0.5		U
1,3-Dichlorobenzene	0.5		U
1,4-Dichlorobenzene	0.5		U
Dichlorodifluoromethane	0.5		U
1,1-Dichloroethane	0.5	120	D
1,2-Dichloroethane	0.5		U
2,2-Dichloropropane	0.5		U
1,1-Dichloroethene	0.5	9	
cis-1,2-Dichloroethene	0.5		U
trans-1,2-Dichloroethene	0.5		U
cis-1,3-Dichloropropene	0.5		U
trans-1,3-Dichloropropene	0.5		U

* Coelution Compounds

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
1,2-Dichloropropane	0.5		U
1,3-Dichloropropane	0.5		U
2,2-Dichloropropane	0.5		U
1,1-Dichloropropane	0.5		U
Ethylbenzene	0.5		U
Hexachlorobutadiene	0.5		U
Isopropyl benzene	0.5		U
* 4-Isopropyltoluene	0.5		U
Methylene chloride	0.5		U
Naphthalene	0.5		U
n-Propylbenzene	0.5		U
Styrene	0.5		U
1,1,1,2-Tetrachloroethane	0.5		U
1,2,3-Trichloropropane	0.5		U
1,1,2,2-Tetrachloroethane	0.5		U
Tetrachloroethene	0.5		U
Toluene	0.5		U
1,2,3-Trichlorobenzene	0.5		U
1,2,4-Trichlorobenzene	0.5		U
1,1,1-Trichloroethane	0.5	49	
1,1,2-Trichloroethane	0.5		U
Trichloroethene	0.5		U
Trichlorofluoromethane	0.5		U
1,2,3-Trichloropropane	0.5		U
* 1,2,4-Trimethylbenzene	0.5		U
1,3,5-Trimethylbenzene	0.5		U
Vinyl chloride	0.5		U
o-Xylene	0.5		U
* m-Xylene	0.5		U
* p-Xylene	0.5		U

* Coelution Compounds

VOLATILE ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CAMO Laboratories, Inc.
Client Name: Smith Lab
Project/Facility Name:
Sample Location: #C5-New Well   WSW 2
Matrix: Water
Method: EPA 502.2

Sample ID: 0044-02
Date Collected: 1-3-92
Date Received: 1-3-92
Date Analyzed: 1-9-92

Date Reported: 1-14-92

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
Benzene	0.5		U
* Bromobenzene	0.5		U
Bromochloromethane	0.5		U
Bromomethane	0.5		U
* n-Butylbenzene	0.5		U
sec-Butylbenzene	0.5		U
tert-Butylbenzene	0.5		U
Carbon tetrachloride	0.5		U
* Chlorobenzene	0.5		U
Chloroethane	0.5		U
Chloromethane	0.5		U
2-Chlorotoluene	0.5		U
4-Chlorotoluene	0.5		U
1,2-Dibromoethane	0.5		U
Dibromomethane	0.5		U
1,2-Dichlorobenzene	0.5		U
1,3-Dichlorobenzene	0.5		U
1,4-Dichlorobenzene	0.5		U
Dichlorodifluoromethane	0.5		U
1,1-Dichloroethane	0.5	109	D
1,2-Dichloroethane	0.5		U
2,2-Dichloropropane	0.5		U
1,1-Dichloroethene	0.5	3	
cis-1,2-Dichloroethene	0.5		U
trans-1,2-Dichloroethene	0.5		U
cis-1,3-Dichloropropene	0.5		U
trans-1,3-Dichloropropene	0.5		U

* Coelution Compounds

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
1,2-Dichloropropane	0.5		U
1,3-Dichloropropane	0.5		U
2,2-Dichloropropane	0.5		U
1,1-Dichloropropane	0.5		U
Ethylbenzene	0.5		U
Hexachlorobutadiene	0.5		U
Isopropyl benzene	0.5		U
* 4-Isopropyltoluene	0.5		U
Methylene chloride	0.5		U
Naphthalene	0.5		U
n-Propylbenzene	0.5		U
Styrene	0.5		U
1,1,1,2-Tetrachloroethane	0.5		U
1,2,3-Trichloropropane	0.5		U
1,1,2,2-Tetrachloroethane	0.5		U
Tetrachloroethene	0.5		U
Toluene	0.5		U
1,2,3-Trichlorobenzene	0.5		U
1,2,4-Trichlorobenzene	0.5		U
1,1,1-Trichloroethane	0.5	45	
1,1,2-Trichloroethane	0.5		U
Trichloroethene	0.5		U
Trichlorofluoromethane	0.5		U
1,2,3-Trichloropropane	0.5		U
* 1,2,4-Trimethylbenzene	0.5		U
1,3,5-Trimethylbenzene	0.5		U
Vinyl chloride	0.5		U
o-Xylene	0.5		U
* m-Xylene	0.5		U
* p-Xylene	0.5		U

* Coelution Compounds

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.
Project Name: STANDARD
ETL Sample Number: 107625-02
Client I.D.: WAG012592BB wsw 1
Date Collected: 25-JAN-92
Matrix: 2 GW/WW
Date Received: 28-JAN-92
Percent Solid: NA
Date Analyzed: 30-JAN-92
Method: VOA-601
Comments: 92004/RAINBOW CHILD DEVELOPEMENT CENTER

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
74-87-3	Chloromethane	1		U
74-83-9	Bromomethane	1		U
75-71-8	Dichlorodifluoromethane	1		U
75-01-4	Vinyl Chloride	1		U
75-00-3	Chloroethane	1		U
75-09-2	Methylene Chloride	1		U
75-69-4	Trichlorofluoromethane	1		U
75-35-4	1,1-Dichloroethene	1	2.1	
75-34-3	1,1-Dichloroethane	1	17	
540-59-0	Trans-1,2-Dichloroethene	1		U
67-66-3	Chloroform	1		U
107-02-2	1,2-Dichloroethane	1		U
71-55-6	1,1,1-Trichloroethane	1	17	
56-23-5	Carbon Tetrachloride	1		U
75-27-4	Bromodichloromethane	1		U
78-87-5	1,2-Dichloropropane	1		U
10061-01-5	Cis-1,3-Dichloropropene	1		U
79-01-6	Trichloroethene	1		U
124-48-1	Dibromochloromethane	1		U
10061-02-6	Trans-1,3-Dichloropropene	1		U
79-00-5	1,1,2-Trichloroethane	1		U
100-75-8	2-Chloroethylvinyl Ether	1		U
75-25-2	Bromoform	1		U
79-34-5	1,1,2,2-Tetrachloroethane	1		U
127-18-4	Tetrachloroethene	1		U
108-90-7	Chlorobenzene	1		U
541-73-1	1,3-Dichlorobenzene	1		U
95-50-1	1,2-Dichlorobenzene	1		U
106-46-7	1,4-Dichlorobenzene	1		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
MAR - 4 1992
GROUNDWATER SCIENCES
CORPORATION

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Sciences Corp.
Project Name: Rainbow Child Develop. Ctr.
Sample Location: WAG012592BB
Matrix: GW
Method: 601
Sample Wt/Vol:
Level: Low

wsw 1

Lab Number: 107625-02
Date Collected: 1/25/92
Date Received: 1/28/92
Date Analyzed: 1/30/92
Report Date: 2/28/92
Column: Pack
Lab File ID:
Dilution Factor: 1

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
76-13-1	Freon 113	1	U

FORM I - VOA

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
FEB 7 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp. | Project Name: STANDARD

ETL Sample Number: 107625-03

Client I.D.: TBWAGN920125 Trip Bl.

Date Collected: 25-JAN-92 | Matrix: 2 GW/WW

Date Received: 28-JAN-92 | Percent Solid: NA

Date Analyzed: 30-JAN-92 | Method: VOA-601

Comments: 92004/RAINBOW CHILD DEVELOPEMENT CENTER

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
74-87-3	Chloromethane	1		U
74-83-9	Bromomethane	1		U
75-71-8	Dichlorodifluoromethane	1		U
75-01-4	Vinyl Chloride	1		U
75-00-3	Chloroethane	1		U
75-09-2	Methylene Chloride	1		U
75-69-4	Trichlorofluoromethane	1		U
75-35-4	1,1-Dichloroethene	1		U
75-34-3	1,1-Dichloroethane	1		U
540-59-0	Trans-1,2-Dichloroethene	1		U
67-66-3	Chloroform	1		U
107-02-2	1,2-Dichloroethane	1		U
71-55-6	1,1,1-Trichloroethane	1		U
56-23-5	Carbon Tetrachloride	1		U
75-27-4	Bromodichloromethane	1		U
78-87-5	1,2-Dichloropropane	1		U
10061-01-5	Cis-1,3-Dichloropropene	1		U
79-01-6	Trichloroethene	1		U
124-48-1	Dibromochloromethane	1		U
10061-02-6	Trans-1,3-Dichloropropene	1		U
79-00-5	1,1,2-Trichloroethane	1		U
100-75-8	2-Chloroethylvinyl Ether	1		U
75-25-2	Bromoform	1		U
79-34-5	1,1,2,2-Tetrachloroethane	1		U
127-18-4	Tetrachloroethene	1		U
108-90-7	Chlorobenzene	1		U
541-73-1	1,3-Dichlorobenzene	1		U
95-50-1	1,2-Dichlorobenzene	1		U
106-46-7	1,4-Dichlorobenzene	1		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Sciences Corp.
Project Name: Rainbow Child Develop. Ctr.
Sample Location: TBWAGN920125
Matrix: GW   Trip Bl.
Method: 601
Sample Wt/Vol:
Level: Low

Lab Number: 107625-03
Date Collected: 1/25/92
Date Received: 1/28/92
Date Analyzed: 1/30/92
Report Date: 2/28/92
Column: Pack
Lab File ID:
Dilution Factor: 1

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
76-13-1	Freon 113	1	U

FORM I - VOA

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

VOLATILE ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CAMO Laboratories, Inc.
Client Name: Dutchess Co. Health Dept
Project/Facility Name: Rainbow End Child Dev. Center
Sample Location: Kitchen Sink wsw 1
Matrix: Water
Method: EPA 502.2

Sample ID: 0505-01
Date Collected: 1-28-92
Date Received: 1-28-92
Date Analyzed: 1-29-92

Date Reported: 2-10-92

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
Benzene	0.5		U
* Bromobenzene	0.5		U
Bromochloromethane	0.5		U
Bromomethane	0.5		U
* n-Butylbenzene	0.5		U
sec-Butylbenzene	0.5		U
tert-Butylbenzene	0.5		U
Carbon tetrachloride	0.5		U
* Chlorobenzene	0.5		U
Chloroethane	0.5		U
Chloromethane	0.5		U
2-Chlorotoluene	0.5		U
4-Chlorotoluene	0.5		U
1,2-Dibromoethane	0.5		U
Dibromomethane	0.5		U
1,2-Dichlorobenzene	0.5		U
1,3-Dichlorobenzene	0.5		U
1,4-Dichlorobenzene	0.5		U
Dichlorodifluoromethane	0.5		U
1,1-Dichloroethane	0.5	130	D
1,2-Dichloroethane	0.5	0.9	
2,2-Dichloropropane	0.5		U
1,1-Dichloroethene	0.5	[illegible]	
cis-1,2-Dichloroethene	0.5		U
trans-1,2-Dichloroethene	0.5		U
cis-1,3-Dichloropropene	0.5		U
trans-1,3-Dichloropropene	0.5		U
1,2-Dichloropropane	0.5		U
1,3-Dichloropropane	0.5		U
2,2-Dichloropropane	0.5		U
1,1-Dichloropropene	0.5		U
Ethylbenzene	0.5		U
Hexachlorobutadiene	0.5		U
Isopropyl benzene	0.5		U
* 4-Isopropyltoluene	0.5		U
Methylene chloride	0.5		U
Naphthalene	0.5		U
n-Propylbenzene	0.5		U
Styrene	0.5		U
1,1,1,2-Tetrachloroethane	0.5		U
1,2,3-Trichloropropane	0.5		U
1,1,2,2-Tetrachloroethane	0.5		U
Tetrachloroethene	0.5		U
Toluene	0.5		U
1,2,3-Trichlorobenzene	0.5		U
1,2,4-Trichlorobenzene	0.5		U
1,1,1-Trichloroethane	0.5	65	D
1,1,2-Trichloroethane	0.5		U
Trichloroethene	0.5	0.5	
Trichlorofluoromethane	0.5		U
1,2,3-Trichloropropane	0.5		U
* 1,2,4-Trimethylbenzene	0.5		U
1,3,5-Trimethylbenzene	0.5		U
Vinyl chloride	0.5		U
o-Xylene	0.5		U
* m-Xylene	0.5		U
* p-Xylene	0.5		U

* Coelution Compounds

11 DCE: 12.0

* Coelution Compounds

RECEIVED

MAR 0 6 1992

ENVIRONMENTAL HEALTH
DUTCHESS CO. HEALTH DEPT

VOLATILE ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CAMO Laboratories, Inc.
Client Name: DCHD
Project/Facility Name: Rainbows End
Sample Location: Septic Tank — Eastern Tank, New-1987-Tank, Septic Effluent
Matrix: Water
Method: EPA 502.2

Sample ID: 9760-01
Date Collected: 2-11-92
Date Received: 2-11-92
Date Analyzed: 2-14-92
Date Reported: 3-3-92

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
Benzene	0.5		U
* Bromobenzene	0.5		U
Bromochloromethane	0.5		U
Bromomethane	0.5		U
* n-Butylbenzene	0.5		U
sec-Butylbenzene	0.5		U
tert-Butylbenzene	0.5		U
Carbon tetrachloride	0.5		U
* Chlorobenzene	0.5		U
Chloroethane	0.5		U
Chloromethane	0.5		U
2-Chlorotoluene	0.5		U
4-Chlorotoluene	0.5		U
1,2-Dibromoethane	0.5		U
Dibromomethane	0.5		U
1,2-Dichlorobenzene	0.5		U
1,3-Dichlorobenzene	0.5		U
1,4-Dichlorobenzene	0.5		U
Dichlorodifluoromethane	0.5		U
1,1-Dichloroethane	0.5	24	
1,2-Dichloroethane	0.5		U
1,2-Dichloropropane	0.5		U
1,1-Dichloroethene	0.5		U
cis-1,2-Dichloroethene	0.5		U
trans-1,2-Dichloroethene	0.5		U
cis-1,3-Dichloropropene	0.5		U
trans-1,3-Dichloropropene	0.5		U

* Coelution Compounds

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
1,2-Dichloropropane	0.5		U
1,3-Dichloropropane	0.5		U
2,2-Dichloropropane	0.5		U
1,1-Dichloropropene	0.5		U
Ethylbenzene	0.5		U
Hexachlorobutadiene	0.5		U
Isopropyl benzene	0.5		U
* 4-Isopropyltoluene	0.5		U
Methylene chloride	0.5		U
Naphthalene	0.5		U
n-Propylbenzene	0.5		U
Styrene	0.5		U
1,1,1,2-Tetrachloroethane	0.5		U
1,2,3-Trichloropropane	0.5		U
1,1,2,2-Tetrachloroethane	0.5		U
Tetrachloroethene	0.5		U
Toluene	0.5	340	
1,2,3-Trichlorobenzene	0.5		U
1,2,4-Trichlorobenzene	0.5		U
1,1,1-Trichloroethane	0.5	5.0	
1,1,2-Trichloroethane	0.5		U
Trichloroethene	0.5		U
Trichlorofluoromethane	0.5		U
1,2,3-Trichloropropane	0.5		U
* 1,2,4-Trimethylbenzene	0.5	54	
1,3,5-Trimethylbenzene	0.5	4	
Vinyl chloride	0.5		U
o-Xylene	0.5		U
* m-Xylene	0.5		U
* p-Xylene	0.5		U

* Coelution Compounds

Nur

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.

Project Name: STANDARD

RECEIVED

ETL Sample Number: 108249-02

Client I.D.: RAIOSL20214G   WSW 1

FEB 24 1992

Date Collected: 14-FEB-92

Matrix: 1 DrinkH2O

GROUNDWATER SCIENCES CORPORATION

Date Received: 14-FEB-92

Percent Solid: NA

Date Analyzed: 15-FEB-92

Method: VOA-502.1

Comments: PO# 92004

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
74-87-3	Chloromethane	.5		U
74-83-9	Bromomethane	.5		U
75-71-8	Dichlorodifluoromethane	.5		U
75-01-4	Vinyl Chloride	.5		U
75-00-3	Chloroethane	.5		U
75-09-2	Methylene Chloride	.5		U
75-69-4	Trichlorofluoromethane	.5		U
75-35-4	1,1-Dichloroethene	.5	.5	
74-97-5	Bromochloromethane	.5		U
75-34-3	1,1-Dichloroethane	.5	34	
156-59-4	Trans-1,2-Dichloroethene	.5		U
156-59-4	cis-1,2-Dichloroethene	.5		U
67-66-3	Chloroform	.5		U
107-06-2	1,2-Dichloroethane	.5		U
590-20-7	2,2-Dichloropropane	.5		U
74-95-3	Dibromomethane	.5		U
71-55-6	1,1,1-Trichloroethane	.5	16	
56-23-5	Carbon Tetrachloride	.5		U
75-27-4	Bromodichloromethane	.5		U
78-87-5	1,2-Dichloropropane	.5		U
563-58-6	1,1-Dichloropropene	.5		U
79-01-6	Trichloroethene	.5		U
142-28-9	1,3-Dichloropropane	.5		U
124-48-1	Dibromochloromethane	.5		U
79-00-5	1,1,2-Trichloroethane	.5		U
106-93-4	1,2-Dibromoethane	.5		U
75-25-2	Bromoform	.5		U
630-20-6	1,1,1,2-Tetrachloroethane	.5		U
96-18-4	1,2,3-Trichloropropane	.5		U
79-34-5	1,1,2,2-Tetrachloroethane	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
108-86-1	Bromobenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
10061-01-5	cis-1,3-Dichloropropene	.5		U
10061-02-6	trans-1,3-Dichloropropene	.5		U

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.   Project Name: STANDARD

ETL Sample Number: 108249-02

RECEIVED
FEB 24 1992
GROUNDWATER SCIENCES CORPORATION

Client I.D.: RAIOSL20214G wsw △

Date Collected: 14-FEB-92   Matrix: 1 DrinkH2O

Date Received: 14-FEB-92   Percent Solid: NA

Date Analyzed: 15-FEB-92   Method: VOA-503.1

Comments: PO# 92004

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
71-43-2	Benzene	.5		U
79-01-6	Trichloroethene	.5		U
108-88-3	Toluene	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
100-41-4	Ethylbenzene	.5		U
106-42-3	p-Xylene	.5		U
108-38-3	m-Xylene	.5		U
95-47-6	o-Xylene	.5		U
98-82-8	Isopropylbenzene	.5		U
100-42-5	Styrene	.5		U
103-65-1	n-Propylbenzene	.5		U
98-06-6	tert-Butylbenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
108-86-1	Bromobenzene	.5		U
135-98-8	sec-Butylbenzene	.5		U
108-67-8	1,3,5-Trimethylbenzene	.5		U
99-87-6	4-Isopropyltoluene	.5		U
95-63-6	1,2,4-Trimethylbenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
104-51-8	n-Butylbenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
87-68-3	Hexachlorobutadiene	.5		U
91-20-3	Naphthalene	.5		U
120-82-1	1,2,4-Trichlorobenzene	.5		U
87-61-6	1,2,3-Trichlorobenzene	.5		U

MAR 18

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Sciences Corp.
Project Name: Rainbow Child Develop. Ctr.
Sample Location: RAIOSL20214G
Matrix: water
Method: 502
Sample Wt/Vol:
Level: Low

WSW 1

Lab Number: 108249-002
Date Collected: 2/14/92
Date Received: 2/14/92
Date Analyzed: 2/17/92
Report Date: 2/28/92
Column: Pack
Lab File ID:
Dilution Factor: 1

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
76-13-1	Freon 113	1	U

FORM I - VOA

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.

Project Name: STANDARD

ETL Sample Number: 108249-07

FEB 24 1992

Client I.D.: TBRAINB20214 Trip Bl.

GROUNDWATER SCIENCES CORPORATION

Date Collected: 14-FEB-92

Matrix: 1 DrinkH2O

Date Received: 14-FEB-92

Percent Solid: NA

Date Analyzed: 20-FEB-92

Method: VOA-502.1

Comments: PO# 92004

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
74-87-3	Chloromethane	.5		U
74-83-9	Bromomethane	.5		U
75-71-8	Dichlorodifluoromethane	.5		U
75-01-4	Vinyl Chloride	.5		U
75-00-3	Chloroethane	.5		U
75-09-2	Methylene Chloride	.5		U
75-69-4	Trichlorofluoromethane	.5		U
75-35-4	1,1-Dichloroethene	.5		U
74-97-5	Bromochloromethane	.5		U
75-34-3	1,1-Dichloroethane	.5		U
156-59-4	Trans-1,2-Dichloroethene	.5		U
156-59-4	cis-1,2-Dichloroethene	.5		U
67-66-3	Chloroform	.5		U
107-06-2	1,2-Dichloroethane	.5		U
590-20-7	2,2-Dichloropropane	.5		U
74-95-3	Dibromomethane	.5		U
71-55-6	1,1,1-Trichloroethane	.5		U
56-23-5	Carbon Tetrachloride	.5		U
75-27-4	Bromodichloromethane	.5		U
78-87-5	1,2-Dichloropropane	.5		U
563-58-6	1,1-Dichloropropene	.5		U
79-01-6	Trichloroethene	.5		U
142-28-9	1,3-Dichloropropane	.5		U
124-48-1	Dibromochloromethane	.5		U
79-00-5	1,1,2-Trichloroethane	.5		U
106-93-4	1,2-Dibromoethane	.5		U
75-25-2	Bromoform	.5		U
630-20-6	1,1,1,2-Tetrachloroethane	.5		U
96-18-4	1,2,3-Trichloropropane	.5		U
79-34-5	1,1,2,2-Tetrachloroethane	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
108-86-1	Bromobenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
10061-01-5	cis-1,3-Dichloropropene	.5		U
10061-02-6	trans-1,3-Dichloropropene	.5		U

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.
ETL Sample Number: 108249-07
Client I.D.: TBRAINB20214 Trip Bl.
Date Collected: 14-FEB-92
Date Received: 14-FEB-92
Date Analyzed: 20-FEB-92
Comments: PO# 92004

Project Name: STANDARD RECEIVED

FEB 24 1992
GROUNDWATER SCIENCES CORPORATION

Matrix: 1 DrinkH2O
Percent Solid: NA
Method: VOA-503.1

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
71-43-2	Benzene	.5		U
79-01-6	Trichloroethene	.5		U
108-88-3	Toluene	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
100-41-4	Ethylbenzene	.5		U
106-42-3	p-Xylene	.5		U
108-38-3	m-Xylene	.5		U
95-47-6	o-Xylene	.5		U
98-82-8	Isopropylbenzene	.5		U
100-42-5	Styrene	.5		U
103-65-1	n-Propylbenzene	.5		U
98-06-6	tert-Butylbenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
108-86-1	Bromobenzene	.5		U
135-98-8	sec-Butylbenzene	.5		U
108-67-8	1,3,5-Trimethylbenzene	.5		U
99-87-6	4-Isopropyltoluene	.5		U
95-63-6	1,2,4-Trimethylbenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
104-51-8	n-Butylbenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
87-68-3	Hexachlorobutadiene	.5		U
91-20-3	Naphthalene	.5		U
120-82-1	1,2,4-Trichlorobenzene	.5		U
87-61-6	1,2,3-Trichlorobenzene	.5		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
MAR - 4 1992
GROUNDWATER SCIENCES CORPORATION

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Sciences Corp.
Project Name: Rainbow Child Develop. Ctr.
Sample Location: TBRAINB20214
Matrix: water
Method: 502
Sample Wt/Vol:
Level: Low

Trip Bl.

Lab Number: 108249-007
Date Collected: 2/14/92
Date Received: 2/14/92
Date Analyzed: 2/20/92
Report Date: 2/28/92
Column: Pack
Lab File ID:
Dilution Factor: 1

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
76-13-1	Freon 113	1	U

FORM I - VOA

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name:	Groundwater Sciences Corp.	Project Name:	STANDARD
ETL Sample Number:	108249-06		
Client I.D.:	FBRAINB20214 Field Bl.		FEB 24 1992 GROUNDWATER SCIENCES CORPORATION
Date Collected:	14-FEB-92	Matrix:	1 DrinkH2O
Date Received:	14-FEB-92	Percent Solid:	NA
Date Analyzed:	15-FEB-92	Method:	VOA-502.1
Comments:	PO# 92004		

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
74-87-3	Chloromethane	.5		U
74-83-9	Bromomethane	.5		U
75-71-8	Dichlorodifluoromethane	.5		U
75-01-4	Vinyl Chloride	.5		U
75-00-3	Chloroethane	.5		U
75-09-2	Methylene Chloride	.5		U
75-69-4	Trichlorofluoromethane	.5		U
75-35-4	1,1-Dichloroethene	.5		U
74-97-5	Bromochloromethane	.5		U
75-34-3	1,1-Dichloroethane	.5		U
156-59-4	Trans-1,2-Dichloroethene	.5		U
156-59-4	cis-1,2-Dichloroethene	.5		U
67-66-3	Chloroform	.5		U
107-06-2	1,2-Dichloroethane	.5		U
590-20-7	2,2-Dichloropropane	.5		U
74-95-3	Dibromomethane	.5		U
71-55-6	1,1,1-Trichloroethane	.5		U
56-23-5	Carbon Tetrachloride	.5		U
75-27-4	Bromodichloromethane	.5		U
78-87-5	1,2-Dichloropropane	.5		U
563-58-6	1,1-Dichloropropene	.5		U
79-01-6	Trichloroethene	.5		U
142-28-9	1,3-Dichloropropane	.5		U
124-48-1	Dibromochloromethane	.5		U
79-00-5	1,1,2-Trichloroethane	.5		U
106-93-4	1,2-Dibromoethane	.5		U
75-25-2	Bromoform	.5		U
630-20-6	1,1,1,2-Tetrachloroethane	.5		U
96-18-4	1,2,3-Trichloropropane	.5		U
79-34-5	1,1,2,2-Tetrachloroethane	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
108-86-1	Bromobenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
10061-01-5	cis-1,3-Dichloropropene	.5		U
10061-02-6	trans-1,3-Dichloropropene	.5		U

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name:	Groundwater Sciences Corp.	Project Name:	STANDARD
ETL Sample Number:	108249-06		
Client I.D.:	FBRAINB20214 Field Bl.		
Date Collected:	14-FEB-92	Matrix:	1 DrinkH2O
Date Received:	14-FEB-92	Percent Solid:	NA
Date Analyzed:	15-FEB-92	Method:	VOA-503.1
Comments:	PO# 92004		

REC... FEB 24 1992
GROUNDWATER SCIENCES CORPORATION

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
71-43-2	Benzene	.5		U
79-01-6	Trichloroethene	.5		U
108-88-3	Toluene	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
100-41-4	Ethylbenzene	.5		U
106-42-3	p-Xylene	.5		U
108-38-3	m-Xylene	.5		U
95-47-6	o-Xylene	.5		U
98-82-8	Isopropylbenzene	.5		U
100-42-5	Styrene	.5		U
103-65-1	n-Propylbenzene	.5		U
98-06-6	tert-Butylbenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
108-86-1	Bromobenzene	.5		U
135-98-8	sec-Butylbenzene	.5		U
108-67-8	1,3,5-Trimethylbenzene	.5		U
99-87-6	4-Isopropyltoluene	.5		U
95-63-6	1,2,4-Trimethylbenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
104-51-8	n-Butylbenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
87-68-3	Hexachlorobutadiene	.5		U
91-20-3	Naphthalene	.5		U
120-82-1	1,2,4-Trichlorobenzene	.5		U
87-61-6	1,2,3-Trichlorobenzene	.5		U

RECEIVED
MAR - 4 1992
GROUNDWATER SCIENCES
CORPORATION

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Sciences Corp.
Project Name: Rainbow Child Develop. Ctr.
Sample Location: FBRAINB20214
Matrix: water
Method: 502
Sample Wt/Vol:
Level: Low

Field Bl.

Lab Number: 108249-006
Date Collected: 2/14/92
Date Received: 2/14/92
Date Analyzed: 2/17/92
Report Date: 2/28/92
Column: Pack
Lab File ID:
Dilution Factor: 1

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
76-13-1	Freon 113	1	U

FORM I - VOA

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

FEB 2 1 1992

ENVIRONMENTAL HEALTH
DUTCHESS CO. HEALTH DEPT.

VOLATILE ORGANICS ANALYSIS DATA SHEET

Laboratory Name: CAMO Laboratories, Inc.
Client Name: Dutchess Co. Health Dept
Project/Facility Name:
Sample Location: 30 Hibernia Road   Off-site
Matrix: Water
Method: EPA 502.2

Sample ID: 0345-05
Date Collected: 2-14-92
Date Received: 2-14-92
Date Analyzed: 2-19-92

Date Reported: 2-20-92

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
Benzene	0.5		U
* Bromobenzene	0.5		U
Bromochloromethane	0.5		U
Bromomethane	0.5		U
* n-Butylbenzene	0.5		U
sec-Butylbenzene	0.5		U
tert-Butylbenzene	0.5		U
Carbon tetrachloride	0.5		U
* Chlorobenzene	0.5		U
Chloroethane	0.5		U
Chloromethane	0.5		U
2-Chlorotoluene	0.5		U
4-Chlorotoluene	0.5		U
1,2-Dibromoethane	0.5		U
Dibromomethane	0.5		U
1,2-Dichlorobenzene	0.5		U
1,3-Dichlorobenzene	0.5		U
1,4-Dichlorobenzene	0.5		U
Dichlorodifluoromethane	0.5		U
1,1-Dichloroethane	0.5		U
1,2-Dichloroethane	0.5		U
2,2-Dichloropropane	0.5		U
1,1-Dichloroethene	0.5		U
cis-1,2-Dichloroethene	0.5		U
trans-1,2-Dichloroethene	0.5		U
cis-1,3-Dichloropropene	0.5		U
trans-1,3-Dichloropropene	0.5		U
Freon 113	0.5		U

* Coelution Compounds

COMPOUND	Detection Limit (ug/L)	Sample Conc. (ug/L)	Q
1,2-Dichloropropane	0.5		U
1,3-Dichloropropane	0.5		U
2,2-Dichloropropane	0.5		U
1,1-Dichloropropane	0.5		U
Ethylbenzene	0.5		U
Hexachlorobutadiene	0.5		U
Isopropyl benzene	0.5		U
* 4-Isopropyltoluene	0.5		U
Methylene chloride	0.5		U
Naphthalene	0.5		U
n-Propylbenzene	0.5		U
Styrene	0.5		U
1,1,1,2-Tetrachloroethane	0.5		U
1,2,3-Trichloropropane	0.5		U
1,1,2,2-Tetrachloroethane	0.5		U
Tetrachloroethene	0.5		U
Toluene	0.5		U
1,2,3-Trichlorobenzene	0.5		U
1,2,4-Trichlorobenzene	0.5		U
1,1,1-Trichloroethane	0.5		U
1,1,2-Trichloroethane	0.5		U
Trichloroethene	0.5		U
Trichlorofluoromethane	0.5		U
1,2,3-Trichloropropane	0.5		U
* 1,2,4-Trimethylbenzene	0.5		U
1,3,5-Trimethylbenzene	0.5		U
Vinyl chloride	0.5		U
o-Xylene	0.5		U
* m-Xylene	0.5		U
* p-Xylene	0.5		U

* Coelution Compounds

RECEIVED
APR 6 1992
~~GROUNDWATER SCIENCES~~
CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp. Project Name: STANDARD

ETL Sample Number: 109380-01

Client I.D.: RESAA920319S Soil - South Activity Area

Date Collected: 19-MAR-92 Matrix: 3 Soil/Sldg

Date Received: 19-MAR-92 Percent Solid: 60.5 %

Date Analyzed: 24-MAR-92 Method: 8010

Comments: 92004/RAINBOWS END

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	1.6		U
74-83-9	Bromomethane	1.6		U
75-71-8	Dichlorodifluoromethane	1.6		U
75-01-4	Vinyl Chloride	1.6		U
75-00-3	Chloroethane	1.6		U
75-09-2	Methylene Chloride	1.6	2.1	
75-69-4	Trichlorofluoromethane	1.6		U
75-35-4	1,1-Dichloroethene	1.6		U
75-34-3	1,1-Dichloroethane	1.6		U
540-59-0	1,2-Dichloroethene(Total)	1.6		U
67-66-3	Chloroform	1.6	8.8	
107-02-2	1,2-Dichloroethane	1.6		U
71-55-6	1,1,1-Trichloroethane	1.6		U
56-23-5	Carbon Tetrachloride	1.6		U
75-27-4	Bromodichloromethane	1.6		U
78-87-5	1,2-Dichloropropane	1.6		U
10061-01-5	Cis-1,3-Dichloropropene	1.6		U
79-01-6	Trichloroethene	1.6		U
124-48-1	Dibromochloromethane	1.6		U
10061-02-6	Trans-1,3-Dichloropropene	1.6		U
79-00-5	1,1,2-Trichloroethane	1.6		U
100-75-8	2-Chloroethylvinyl Ether	1.6		U
75-25-2	Bromoform	1.6		U
79-34-5	1,1,2,2-Tetrachloroethane	1.6		U
127-18-4	Tetrachloroethene	1.6		U
108-90-7	Chlorobenzene	1.6		U
541-73-1	1,3-Dichlorobenzene	1.6		U
95-50-1	1,2-Dichlorobenzene	1.6		U
106-46-7	1,4-Dichlorobenzene	1.6		U
107-30-2	Chloromethyl methyl ether	320		U
74-95-3	Dibromomethane	1.6		U
630-20-6	1,1,1,2-Tetrachloroethane	1.6		U
96-18-4	1,2,3-Trichloropropane	1.6		U
544-10-5	1-Chlorohexane	1.6		U
108-86-1	Bromobenzene	1.6		U
100-44-7	Benzyl chloride	1.6		U
95-49-8	2-Chlorotoluene	1.6		U
112-26-5	bis(2-Chloroethoxy) methane	1.6		U
76-13-1	Freon 113	1.6		U

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED

APR 6 1992

GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.
Project Name: STANDARD
ETL Sample Number: 109380-02
Client I.D.: RENAA920319S Soil - North Activity Area
Date Collected: 19-MAR-92
Matrix: 3 Soil/Sldg
Date Received: 19-MAR-92
Percent Solid: 86.2 %
Date Analyzed: 24-MAR-92
Method: 8010
Comments: 92004/RAINBOWS END

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	1.2		U
74-83-9	Bromomethane	1.2		U
75-71-8	Dichlorodifluoromethane	1.2		U
75-01-4	Vinyl Chloride	1.2		U
75-00-3	Chloroethane	1.2		U
75-09-2	Methylene Chloride	1.2		U
75-69-4	Trichlorofluoromethane	1.2		U
75-35-4	1,1-Dichloroethene	1.2		U
75-34-3	1,1-Dichloroethane	1.2		U
540-59-0	1,2-Dichloroethene(Total)	1.2		U
67-66-3	Chloroform	1.2		U
107-02-2	1,2-Dichloroethane	1.2		U
71-55-6	1,1,1-Trichloroethane	1.2		U
56-23-5	Carbon Tetrachloride	1.2		U
75-27-4	Bromodichloromethane	1.2		U
78-87-5	1,2-Dichloropropane	1.2		U
10061-01-5	Cis-1,3-Dichloropropene	1.2		U
79-01-6	Trichloroethene	1.2		U
124-48-1	Dibromochloromethane	1.2		U
10061-02-6	Trans-1,3-Dichloropropene	1.2		U
79-00-5	1,1,2-Trichloroethane	1.2		U
100-75-8	2-Chloroethylvinyl Ether	1.2		U
75-25-2	Bromoform	1.2		U
79-34-5	1,1,2,2-Tetrachloroethane	1.2		U
127-18-4	Tetrachloroethene	1.2		U
108-90-7	Chlorobenzene	1.2		U
541-73-1	1,3-Dichlorobenzene	1.2		U
95-50-1	1,2-Dichlorobenzene	1.2		U
106-46-7	1,4-Dichlorobenzene	1.2		U
107-30-2	Chloromethyl methyl ether	240		U
74-95-3	Dibromomethane	1.2		U
630-20-6	1,1,1,2-Tetrachloroethane	1.2		U
96-18-4	1,2,3-Trichloropropane	1.2		U
544-10-5	1-Chlorohexane	1.2		U
108-86-1	Bromobenzene	1.2		U
100-44-7	Benzyl chloride	1.2		U
95-49-8	2-Chlorotoluene	1.2		U
112-26-5	bis(2-Chloroethoxy) methane	1.2		U
76-13-1	Freon 113	1.2		U

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
APR 6 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.
Project Name: STANDARD
ETL Sample Number: 109380-03
Client I.D.: RESLH920319S Soil Sled Hill
Date Collected: 19-MAR-92
Matrix: 3 Soil/Sldg
Date Received: 19-MAR-92
Percent Solid: 84.2 %
Date Analyzed: 25-MAR-92
Method: 8010
Comments: 92004/RAINBOWS END

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	1.2		U
74-83-9	Bromomethane	1.2		U
75-71-8	Dichlorodifluoromethane	1.2		U
75-01-4	Vinyl Chloride	1.2		U
75-00-3	Chloroethane	1.2		U
75-09-2	Methylene Chloride	1.2		U
75-69-4	Trichlorofluoromethane	1.2		U
75-35-4	1,1-Dichloroethene	1.2		U
75-34-3	1,1-Dichloroethane	1.2		U
540-59-0	1,2-Dichloroethene(Total)	1.2		U
67-66-3	Chloroform	1.2		U
107-02-2	1,2-Dichloroethane	1.2		U
71-55-6	1,1,1-Trichloroethane	1.2		U
56-23-5	Carbon Tetrachloride	1.2		U
75-27-4	Bromodichloromethane	1.2		U
78-87-5	1,2-Dichloropropane	1.2		U
10061-01-5	Cis-1,3-Dichloropropene	1.2		U
79-01-6	Trichloroethene	1.2		U
124-48-1	Dibromochloromethane	1.2		U
10061-02-6	Trans-1,3-Dichloropropene	1.2		U
79-00-5	1,1,2-Trichloroethane	1.2		U
100-75-8	2-Chloroethylvinyl Ether	1.2		U
75-25-2	Bromoform	1.2		U
79-34-5	1,1,2,2-Tetrachloroethane	1.2		U
127-18-4	Tetrachloroethene	1.2		U
108-90-7	Chlorobenzene	1.2		U
541-73-1	1,3-Dichlorobenzene	1.2		U
95-50-1	1,2-Dichlorobenzene	1.2		U
106-46-7	1,4-Dichlorobenzene	1.2		U
107-30-2	Chloromethyl methyl ether	240		U
74-95-3	Dibromomethane	1.2		U
630-20-6	1,1,1,2-Tetrachloroethane	1.2		U
96-18-4	1,2,3-Trichloropropane	1.2		U
544-10-5	1-Chlorohexane	1.2		U
108-86-1	Bromobenzene	1.2		U
100-44-7	Benzyl chloride	1.2		U
95-49-8	2-Chlorotoluene	1.2		U
112-26-5	bis(2-Chloroethoxy) methane	1.2		U
76-13-1	Freon 113	1.2		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
APR 6 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.
Project Name: STANDARD

ETL Sample Number: 109380-04

Client I.D.: REPYS920319S Soil - Stream Playground

Date Collected: 19-MAR-92
Matrix: 3 Soil/Sldg

Date Received: 19-MAR-92
Percent Solid: 85.6 %

Date Analyzed: 25-MAR-92
Method: 8010

Comments: 92004/RAINBOWS END

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	1.2		U
74-83-9	Bromomethane	1.2		U
75-71-8	Dichlorodifluoromethane	1.2		U
75-01-4	Vinyl Chloride	1.2		U
75-00-3	Chloroethane	1.2		U
75-09-2	Methylene Chloride	1.2		U
75-69-4	Trichlorofluoromethane	1.2		U
75-35-4	1,1-Dichloroethene	1.2		U
75-34-3	1,1-Dichloroethane	1.2		U
540-59-0	1,2-Dichloroethene(Total)	1.2		U
67-66-3	Chloroform	1.2		U
107-02-2	1,2-Dichloroethane	1.2		U
71-55-6	1,1,1-Trichloroethane	1.2		U
56-23-5	Carbon Tetrachloride	1.2		U
75-27-4	Bromodichloromethane	1.2		U
78-87-5	1,2-Dichloropropane	1.2		U
10061-01-5	Cis-1,3-Dichloropropene	1.2		U
79-01-6	Trichloroethene	1.2		U
124-48-1	Dibromochloromethane	1.2		U
10061-02-6	Trans-1,3-Dichloropropene	1.2		U
79-00-5	1,1,2-Trichloroethane	1.2		U
100-75-8	2-Chloroethylvinyl Ether	1.2		U
75-25-2	Bromoform	1.2		U
79-34-5	1,1,2,2-Tetrachloroethane	1.2		U
127-18-4	Tetrachloroethene	1.2		U
108-90-7	Chlorobenzene	1.2		U
541-73-1	1,3-Dichlorobenzene	1.2		U
95-50-1	1,2-Dichlorobenzene	1.2		U
106-46-7	1,4-Dichlorobenzene	1.2		U
107-30-2	Chloromethyl methyl ether	240		U
74-95-3	Dibromomethane	1.2		U
630-20-6	1,1,1,2-Tetrachloroethane	1.2		U
96-18-4	1,2,3-Trichloropropane	1.2		U
544-10-5	1-Chlorohexane	1.2		U
108-86-1	Bromobenzene	1.2		U
100-44-7	Benzyl chloride	1.2		U
95-49-8	2-Chlorotoluene	1.2		U
112-26-5	bis(2-Chloroethoxy) methane	1.2		U
76-13-1	Freon 113	1.2		U

EnviroTest
Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
APR 6 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.

Project Name: STANDARD

ETL Sample Number: 109380-05

Client I.D.: RESPY920319S Soil - Play Yard Swings

Date Collected: 19-MAR-92

Matrix: 3 Soil/Sldg

Date Received: 19-MAR-92

Percent Solid: 68.8 %

Date Analyzed: 20-MAR-92

Method: 8010

Comments: 92004/RAINBOWS END

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	1.4		U
74-83-9	Bromomethane	1.4		U
75-71-8	Dichlorodifluoromethane	1.4		U
75-01-4	Vinyl Chloride	1.4		U
75-00-3	Chloroethane	1.4		U
75-09-2	Methylene Chloride	1.4		U
75-69-4	Trichlorofluoromethane	1.4		U
75-35-4	1,1-Dichloroethene	1.4		U
75-34-3	1,1-Dichloroethane	1.4		U
540-59-0	1,2-Dichloroethene(Total)	1.4		U
67-66-3	Chloroform	1.4		U
107-02-2	1,2-Dichloroethane	1.4		U
71-55-6	1,1,1-Trichloroethane	1.4		U
56-23-5	Carbon Tetrachloride	1.4		U
75-27-4	Bromodichloromethane	1.4		U
78-87-5	1,2-Dichloropropane	1.4		U
10061-01-5	Cis-1,3-Dichloropropene	1.4		U
79-01-6	Trichloroethene	1.4		U
124-48-1	Dibromochloromethane	1.4		U
10061-02-6	Trans-1,3-Dichloropropene	1.4		U
79-00-5	1,1,2-Trichloroethane	1.4		U
100-75-8	2-Chloroethylvinyl Ether	1.4		U
75-25-2	Bromoform	1.4		U
79-34-5	1,1,2,2-Tetrachloroethane	1.4		U
127-18-4	Tetrachloroethene	1.4		U
108-90-7	Chlorobenzene	1.4		U
541-73-1	1,3-Dichlorobenzene	1.4		U
95-50-1	1,2-Dichlorobenzene	1.4		U
106-46-7	1,4-Dichlorobenzene	1.4		U
107-30-2	Chloromethyl methyl ether	280		U
74-95-3	Dibromomethane	1.4		U
630-20-6	1,1,1,2-Tetrachloroethane	1.4		U
96-18-4	1,2,3-Trichloropropane	1.4		U
544-10-5	1-Chlorohexane	1.4		U
108-86-1	Bromobenzene	1.4		U
100-44-7	Benzyl chloride	1.4		U
95-49-8	2-Chlorotoluene	1.4		U
112-26-5	bis(2-Chloroethoxy) methane	1.4		U
76-13-1	Freon 113	1.4		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
APR 6 1992
GROUNDWATER SCIENCES
CORPORATION

Inorganics Analysis Data Sheet
Form I - IN

Client Name: Groundwater Sciences Corp.

Project Name: STANDARD

ETL Sample Number: 109380-01

Client I.D.: RESAA920319S

Date Collected: 19-MAR-92

Matrix: 3 Soil/Sldg

Date Received: 19-MAR-92

Comments: 92004/RAINBOWS END

Analysis	Result	Units	Method	Analyzed
Percent Solids	60.5	%	EPA 160.3	26-MAR-92

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
APR 6 1992
GROUNDWATER SCIENCES CORPORATION

Inorganics Analysis Data Sheet
Form I - IN

Client Name: Groundwater Sciences Corp.

Project Name: STANDARD

ETL Sample Number: 109380-02

Client I.D.: RENAA920319S

Date Collected: 19-MAR-92

Matrix: 3 Soil/Sldg

Date Received: 19-MAR-92

Comments: 92004/RAINBOWS END

Analysis	Result	Units	Method	Analyzed
Percent Solids	86.2	%	EPA 160.3	26-MAR-92

Remarks:

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED

APR 6 1992

GROUNDWATER SCIENCES CORPORATION

Inorganics Analysis Data Sheet
Form I - IN

Client Name: Groundwater Sciences Corp.

Project Name: STANDARD

ETL Sample Number: 109380-03

Client I.D.: RESLH920319S

Date Collected: 19-MAR-92

Matrix: 3 Soil/Sldg

Date Received: 19-MAR-92

Comments: 92004/RAINBOWS END

Analysis	Result	Units	Method	Analyzed
Percent Solids	84.2	%	EPA 160.3	26-MAR-92

Remarks:

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
APR 6 1992
GROUNDWATER SCIENCES CORPORATION

Inorganics Analysis Data Sheet
Form I - IN

Client Name: Groundwater Sciences Corp.

Project Name: STANDARD

ETL Sample Number: 109380-04

Client I.D.: REPYS920319S

Date Collected: 19-MAR-92

Matrix: 3 Soil/Sldg

Date Received: 19-MAR-92

Comments: 92004/RAINBOWS END

Analysis	Result	Units	Method	Analyzed
Percent Solids	85.6	%	EPA 160.3	26-MAR-92

Remarks:

RECEIVED
APR 6 1992
GROUNDWATER SCIENCES
CORPORATION

Inorganics Analysis Data Sheet
Form I - IN

Client Name: Groundwater Sciences Corp.
Project Name: STANDARD

ETL Sample Number: 109380-05

Client I.D.: RESPY920319S

Date Collected: 19-MAR-92
Matrix: 3 Soil/Sldg

Date Received: 19-MAR-92

Comments: 92004/RAINBOWS END

Analysis	Result	Units	Method	Analyzed
Percent Solids	68.8	%	EPA 160.3	26-MAR-92

Remarks:

EnviroTest
Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Science
Project Name: Rainbow's End
Sample Location: RENSEP920407
Matrix: water
Method: EPA 502.1 West or old tank
Sample Wt/Vol:
Level: Low
Column: Capillary

Lab Number: 109991-01
Date Collected: 4/7/92
Date Received: 4/7/92
Date Analyzed: 4/24/92
Report Date: 4/28/92
Lab File ID:
Dilution Factor: 5

RECEIVED
MAY 4 1992
GROUNDWATER SCIENCES CORPORATION

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
74-87-3	Chloromethane	2.5	U
74-83-9	Bromomethane	2.5	U
75-71-8	Dichlorodifluoromethane	2.5	U
75-01-4	Vinyl chloride	2.5	U
75-00-3	Chloroethane	2.5	U
75-09-2	Methylene chloride	2.5	U
75-69-4	Trichlorofluoromethane	2.5	U
75-35-4	1,1-Dichloroethene	2.5	U
74-97-5	Bromochloromethane	2.5	U
75-34-3	1,1-Dichloroethane	2.5	U
156-60-5	trans-1,2-Dichloroethene	2.5	U
156-59-2	cis-1,2-Dichloroethene	2.5	U
67-66-3	Chloroform	2.5	2.7
107-06-2	1,2-Dichloroethane	2.5	U
590-20-7	2,2-Dichloropropane	2.5	U
74-95-3	Dibromomethane	2.5	U
71-55-6	1,1,1-Trichloroethane	2.5	U
56-23-5	Carbon tetrachloride	2.5	U
75-27-4	Bromodichloromethane	2.5	U
78-87-5	1,2-Dichloropropane	2.5	U
563-58-6	1,1-Dichloropropene	2.5	U
79-01-6	Trichloroethene	2.5	U
142-28-9	1,3-Dichloropropane	2.5	U
124-48-1	Dibromochloromethane	2.5	U
79-00-5	1,1,2-Trichloroethane	2.5	U
106-93-4	1,2-Dibromoethane	2.5	U
75-25-2	Bromoform	2.5	U
630-20-6	1,1,1,2-Tetrachloroethane	2.5	U
96-18-4	1,2,3-Trichloropropane	2.5	U
79-34-5	1,1,2,2-Tetrachloroethane	2.5	U
127-18-4	Tetrachloroethene	2.5	U
108-90-7	Chlorobenzene	2.5	U
108-86-1	Bromobenzene	2.5	U
95-49-8	2-Chlorotoluene	2.5	U
106-43-4	4-Chlorotoluene	2.5	U
541-73-1	1,3-Dichlorobenzene	2.5	U
95-50-1	1,2-Dichlorobenzene	2.5	U
106-46-7	1,4-Dichlorobenzene	2.5	U
10061-01-5	cis-1,3-Dichloropropene	2.5	U
10061-02-6	trans-1,3-Dichloropropene	2.5	U
76-13-1	Freon 113	2.5	U

FORM I - VOA

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
MAY 4 1992
GROUNDWATER SCIENCES CORPORATION

VOLATILE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Science
Project Name: Rainbow's End 92004
Sample Location: RENSEP920407
Matrix: H20
Method: EPA 503.1 west or Old tank
Sample Wt/Vol:
Level: Low

Lab Number: 109991-01
Date Collected: 4/7/92
Date Received: 4/7/92
Date Analyzed: 4/24/92
Report Date: 4/28/92
Column: Capillary
Lab File ID:
Dilution Factor: 5

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
71-43-2	Benzene	2.5	U
79-01-6	Trichloroethene	2.5	U
108-88-3	Toluene	2.5	12
127-18-4	Tetrachloroethene	2.5	U
108-90-7	Chlorobenzene	2.5	U
100-41-4	Ethylbenzene	2.5	U
106-42-3	p-Xylene	2.5	U
108-38-3	m-Xylene	2.5	U
95-47-6	o-Xylene	2.5	U
98-82-8	Isopropylbenzene	2.5	U
100-42-5	Styrene	2.5	U
103-65-1	n-Propylbenzene	2.5	U
98-06-6	tert-Butylbenzene	2.5	U
95-49-8	2-Chlorotoluene	2.5	U
106-43-4	4-Chlorotoluene	2.5	U
108-86-1	Bromobenzene	2.5	U
135-98-8	sec-Butylbenzene (1)	2.5	U
108-67-8	1,3,5-Trimethylbenzene (1)	2.5	U
99-87-6	4-Isopropyltoluene (2)	2.5	U
95-63-6	1,2,4-Trimethylbenzene (2)	2.5	U
106-46-7	1,4-Dichlorobenzene	2.5	U
541-73-1	1,3-Dichlorobenzene	2.5	U
104-51-8	n-Butylbenzene	2.5	U
95-50-1	1,2-Dichlorobenzene	2.5	U
87-68-3	Hexachlorobutadiene	2.5	U
120-82-1	1,2,4-Trichlorobenzene	2.5	U
91-20-3	Naphthalene	2.5	U
87-61-6	1,2,3-Trichlorobenzene	2.5	U

(1) sec-Butylbenzene cannot be separated from 1,3,5-Trimethylbenzene.
(2) 4-Isopropyltoluene cannot be separated from 1,2,4-Trimethylbenzene.

FORM I - VOA

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
MAY 4 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp. Project Name: STANDARD

ETL Sample Number: 109991-02

Client I.D.: RESSEP920407 New or East tank

Date Collected: 07-APR-92 Matrix: 2 GW/WW

Date Received: 07-APR-92 Percent Solid: NA

Date Analyzed: 21-APR-92 Method: VOA-502.1

Comments: RAINBOWS END/92004

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
74-87-3	Chloromethane	2.5		U
74-83-9	Bromomethane	2.5		U
75-71-8	Dichlorodifluoromethane	2.5		U
75-01-4	Vinyl Chloride	2.5		U
75-00-3	Chloroethane	2.5		U
75-09-2	Methylene Chloride	2.5		U
75-69-4	Trichlorofluoromethane	2.5		U
75-35-4	1,1-Dichloroethene	2.5		U
74-97-5	Bromochloromethane	2.5		U
75-34-3	1,1-Dichloroethane	2.5		U
156-59-4	Trans-1,2-Dichloroethene	2.5		U
156-59-4	cis-1,2-Dichloroethene	2.5		U
67-66-3	Chloroform	2.5		U
107-06-2	1,2-Dichloroethane	2.5		U
590-20-7	2,2-Dichloropropane	2.5		U
74-95-3	Dibromomethane	2.5		U
71-55-6	1,1,1-Trichloroethane	2.5		U
56-23-5	Carbon Tetrachloride	2.5		U
75-27-4	Bromodichloromethane	2.5		U
78-87-5	1,2-Dichloropropane	2.5		U
563-58-6	1,1-Dichloropropene	2.5		U
79-01-6	Trichloroethene	2.5		U
142-28-9	1,3-Dichloropropane	2.5		U
124-48-1	Dibromochloromethane	2.5		U
79-00-5	1,1,2-Trichloroethane	2.5		U
106-93-4	1,2-Dibromoethane	2.5		U
75-25-2	Bromoform	2.5		U
630-20-6	1,1,1,2-Tetrachloroethane	2.5		U
96-18-4	1,2,3-Trichloropropane	2.5		U
79-34-5	1,1,2,2-Tetrachloroethane	2.5		U
127-18-4	Tetrachloroethene	2.5		U
108-90-7	Chlorobenzene	2.5		U
108-86-1	Bromobenzene	2.5		U
95-49-8	2-Chlorotoluene	2.5		U
106-43-4	4-Chlorotoluene	2.5		U
541-73-1	1,3-Dichlorobenzene	2.5		U
95-50-1	1,2-Dichlorobenzene	2.5		U
106-46-7	1,4-Dichlorobenzene	2.5		U
10061-01-5	cis-1,3-Dichloropropene	2.5		U
10061-02-6	trans-1,3-Dichloropropene	2.5		U
76-13-1	Freon 113	2.5		U

RECEIVED
MAY 4 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp. | Project Name: STANDARD

ETL Sample Number: 109991-02

Client I.D.: RESSEP920407 New or East Tank

Date Collected: 07-APR-92 | Matrix: 2 GW/WW

Date Received: 07-APR-92 | Percent Solid: NA

Date Analyzed: 21-APR-92 | Method: VOA-503.1

Comments: RAINBOWS END/92004

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
71-43-2	Benzene	2.5		U
79-01-6	Trichloroethene	2.5		U
108-88-3	Toluene	2.5	89	
127-18-4	Tetrachloroethene	2.5		U
108-90-7	Chlorobenzene	2.5		U
100-41-4	Ethylbenzene	2.5		U
106-42-3	p-Xylene	2.5		U
108-38-3	m-Xylene	2.5		U
95-47-6	o-Xylene	2.5		U
98-82-8	Isopropylbenzene	2.5		U
100-42-5	Styrene	2.5		U
103-65-1	n-Propylbenzene	2.5		U
98-06-6	tert-Butylbenzene	2.5		U
95-49-8	2-Chlorotoluene	2.5		U
106-43-4	4-Chlorotoluene	2.5		U
108-86-1	Bromobenzene	2.5		U
135-98-8	sec-Butylbenzene	2.5		U
108-67-8	1,3,5-Trimethylbenzene	2.5		U
99-87-6	4-Isopropyltoluene	2.5	47	
95-63-6	1,2,4-Trimethylbenzene	2.5		U
106-46-7	1,4-Dichlorobenzene	2.5		U
541-73-1	1,3-Dichlorobenzene	2.5		U
104-51-8	n-Butylbenzene	2.5		U
95-50-1	1,2-Dichlorobenzene	2.5		U
87-68-3	Hexachlorobutadiene	2.5		U
91-20-3	Naphthalene	2.5		U
120-82-1	1,2,4-Trichlorobenzene	2.5		U
87-61-6	1,2,3-Trichlorobenzene	2.5		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
JUN 24 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.   Project Name: STANDARD

ETL Sample Number: 111797-01

Client I.D.: RAIOS120602G Raw water, New well (WSW2)

Date Collected: 02-JUN-92   Matrix: 1 DrinkH2O

Date Received: 02-JUN-92   Percent Solid: NA

Date Analyzed: 05-JUN-92   Method: VOA-502.1

Comments: 92004, RAINBOWS END

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
74-87-3	Chloromethane	.5		U
74-83-9	Bromomethane	.5		U
75-71-8	Dichlorodifluoromethane	.5		U
75-01-4	Vinyl Chloride	.5		U
75-00-3	Chloroethane	.5		U
75-09-2	Methylene Chloride	.5		U
75-69-4	Trichlorofluoromethane	.5		U
75-35-4	1,1-Dichloroethene	.5	13	
74-97-5	Bromochloromethane	.5		U
75-34-3	1,1-Dichloroethane	.5	220	
156-59-4	Trans-1,2-Dichloroethene	.5		U
156-59-4	cis-1,2-Dichloroethene	.5		U
67-66-3	Chloroform	.5		U
107-06-2	1,2-Dichloroethane	.5	.76	
590-20-7	2,2-Dichloropropane	.5		U
74-95-3	Dibromomethane	.5		U
71-55-6	1,1,1-Trichloroethane	.5	110	
56-23-5	Carbon Tetrachloride	.5		U
75-27-4	Bromodichloromethane	.5		U
78-87-5	1,2-Dichloropropane	.5		U
563-58-6	1,1-Dichloropropene	.5		U
79-01-6	Trichloroethene	.5		U
142-28-9	1,3-Dichloropropane	.5		U
124-48-1	Dibromochloromethane	.5		U
79-00-5	1,1,2-Trichloroethane	.5		U
106-93-4	1,2-Dibromoethane	.5		U
75-25-2	Bromoform	.5		U
630-20-6	1,1,1,2-Tetrachloroethane	.5		U
96-18-4	1,2,3-Trichloropropane	.5		U
79-34-5	1,1,2,2-Tetrachloroethane	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
108-86-1	Bromobenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
10061-01-5	cis-1,3-Dichloropropene	.5		U
10061-02-6	trans-1,3-Dichloropropene	.5		U
76-13-1	Freon 113	.5		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
AUG 5 1992
GROUNDWATER SCIENCES CORPORATION

Inorganics Analysis Data Sheet
Form I - IN

Client Name: Groundwater Sciences Corp. Project Name: STANDARD

ETL Sample Number: 113317-01

Client I.D.: RENEW2920716 1992 replacement well - WSW 3

Date Collected: 16-JUL-92 Matrix: 1 DrinkH2O

Date Received: 16-JUL-92

Comments: 92004/RAINBOWS END

Analysis	Result	Units	Method	Analyzed	
Alkalinity	270	MG/L	EPA 340.2	17-JUL-92	
Arsenic	15	UG/L	EPA 206.2	31-JUL-92	
Barium	<0.05	MG/L	EPA 200.7	17-JUL-92	
Cadmium	<2.0	UG/L	EPA 213.2	16-JUL-92	
Calcium Hardness	170	MG/L	EPA 215.2	21-JUL-92	
Chlorides	<2.0	MG/L	EPA 300	17-JUL-92	
Chromium	<0.01	MG/L	EPA 200.7	17-JUL-92	
Color	30	PT-CO	EPA 110.2	17-JUL-92	*
Copper	<0.01	MG/L	EPA 200.7	17-JUL-92	
ECOLI	absent	/100ML	SM16909A	16-JUL-92	
Fluoride	<0.2	MG/L	EPA 340.2	20-JUL-92	
Iron	0.94	MG/L	EPA 200.7	17-JUL-92	*
Langlier Index	-0.45		SM16 203	22-JUL-92	
Lead	<1.0	UG/L	EPA 239.2	21-JUL-92	
Manganese	0.02	MG/L	EPA 200.7	17-JUL-92	
Mercury	<0.4	UG/L	EPA 245.1	21-JUL-92	
Nitrate (N)	<0.2	MG/L	EPA 300	17-JUL-92	
Odor	1		EPA 140.1	17-JUL-92	
Selenium	2.5	UG/L	EPA 270.2	28-JUL-92	
Silver	<0.01	MG/L	EPA 200.7	17-JUL-92	
Sodium	0.78	MG/L	EPA 200.7	17-JUL-92	
Sulfate	41	MG/L	EPA 300	17-JUL-92	
Total Coliform	<1	/100ML	SM16909A	16-JUL-92	
Total Dissolved Solids	270	MG/L	EPA 160.1	21-JUL-92	
Turbidity	9.5	TU	EPA 180.1	17-JUL-92	*
Zinc	<0.01	MG/L	EPA 200.7	17-JUL-92	
pH	6.9		EPA 150.1	17-JUL-92	

Remarks: (*)Parameter fails NYSDOH drinking water standards

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
AUG 5 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp.   Project Name: STANDARD

ETL Sample Number: 113317-01

Client I.D.: RENEW2920716   1992 replacement well - WSW 3

Date Collected: 16-JUL-92   Matrix: 1 DrinkH20

Date Received: 16-JUL-92   Percent Solid: NA

Date Analyzed: 21-JUL-92   Method: VOA-502.1

Comments: 92004/RAINBOWS END

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
74-87-3	Chloromethane	.5		U
74-83-9	Bromomethane	.5		U
75-71-8	Dichlorodifluoromethane	.5		U
75-01-4	Vinyl Chloride	.5		U
75-00-3	Chloroethane	.5		U
75-09-2	Methylene Chloride	.5		U
75-69-4	Trichlorofluoromethane	.5		U
75-35-4	1,1-Dichloroethene	.5		U
74-97-5	Bromochloromethane	.5		U
75-34-3	1,1-Dichloroethane	.5		U
156-59-4	Trans-1,2-Dichloroethene	.5		U
156-59-4	cis-1,2-Dichloroethene	.5		U
67-66-3	Chloroform	.5		U
107-06-2	1,2-Dichloroethane	.5		U
590-20-7	2,2-Dichloropropane	.5		U
74-95-3	Dibromomethane	.5		U
71-55-6	1,1,1-Trichloroethane	.5		U
56-23-5	Carbon Tetrachloride	.5		U
75-27-4	Bromodichloromethane	.5		U
78-87-5	1,2-Dichloropropane	.5		U
563-58-6	1,1-Dichloropropene	.5		U
79-01-6	Trichloroethene	.5		U
142-28-9	1,3-Dichloropropane	.5		U
124-48-1	Dibromochloromethane	.5		U
79-00-5	1,1,2-Trichloroethane	.5		U
106-93-4	1,2-Dibromoethane	.5		U
75-25-2	Bromoform	.5		U
630-20-6	1,1,1,2-Tetrachloroethane	.5		U
96-18-4	1,2,3-Trichloropropane	.5		U
79-34-5	1,1,2,2-Tetrachloroethane	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
108-86-1	Bromobenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
10061-01-5	cis-1,3-Dichloropropene	.5		U
10061-02-6	trans-1,3-Dichloropropene	.5		U
76-13-1	Freon 113	.5		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
AUG 5 1992
GROUNDWATER SCIENCES CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp. Project Name: STANDARD

ETL Sample Number: 113317-01

Client I.D.: RENEW2920716 1992 replacement well - WSW 3

Date Collected: 16-JUL-92 Matrix: 1 DrinkH2O

Date Received: 16-JUL-92 Percent Solid: NA

Date Analyzed: 21-JUL-92 Method: VOA-503.1

Comments: 92004/RAINBOWS END

CAS NO.	Compound	Detection Limit ug/l	Conc. ug/l	Data Qualifier
71-43-2	Benzene	.5		U
79-01-6	Trichloroethene	.5		U
108-88-3	Toluene	.5		U
127-18-4	Tetrachloroethene	.5		U
108-90-7	Chlorobenzene	.5		U
100-41-4	Ethylbenzene	.5		U
106-42-3	p-Xylene	.5		U
108-38-3	m-Xylene	.5		U
95-47-6	o-Xylene	.5		U
98-82-8	Isopropylbenzene	.5		U
100-42-5	Styrene	.5		U
103-65-1	n-Propylbenzene	.5		U
98-06-6	tert-Butylbenzene	.5		U
95-49-8	2-Chlorotoluene	.5		U
106-43-4	4-Chlorotoluene	.5		U
108-86-1	Bromobenzene	.5		U
135-98-8	sec-Butylbenzene	.5		U
108-67-8	1,3,5-Trimethylbenzene	.5		U
99-87-6	4-Isopropyltoluene	.5		U
95-63-6	1,2,4-Trimethylbenzene	.5		U
106-46-7	1,4-Dichlorobenzene	.5		U
541-73-1	1,3-Dichlorobenzene	.5		U
104-51-8	n-Butylbenzene	.5		U
95-50-1	1,2-Dichlorobenzene	.5		U
87-68-3	Hexachlorobutadiene	.5		U
91-20-3	Naphthalene	.5		U
120-82-1	1,2,4-Trichlorobenzene	.5		U
87-61-6	1,2,3-Trichlorobenzene	.5		U

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
AUG 5 1992
GROUNDWATER SCIENCES CORPORATION

HERBICIDE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Science
Project Name:
Sample Location: RENEW2920716
Matrix: Water   1992 replacement well
Method: Std Methods 509B   WSW 3
Sample Wt/Vol:
Level: Low
Column: Capillary

Lab Number: 113317-01
Date Collected: 7/16/92
Date Received: 7/16/92
Date Extracted: 7/20/92
Date Analyzed: 7/22/92
Report Date: 7/30/92
Lab File ID:
Dilution Factor: 1

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
94-75-7	2,4-D	0.05	U
93-72-1	2,4,5-TP (Silvex)	0.05	U

FORM I - HERB

RECEIVED
AUG 5 1992
GROUNDWATER SCIENCES CORPORATION

PESTICIDE ORGANICS ANALYSIS DATA SHEET

Client Name: Groundwater Science
Project Name: Rainbows End 92004
Sample Location: RENEW2920716
Matrix: Water 1992 replacement well
Method: SM509A
Sample Wt/Vol: WSW 3
Level: Low
Column: Capillary

Lab Number: 113317-01
Date Collected: 7/16/92
Date Received: 7/16/92
Date Extracted: 7/20/92
Date Analyzed: 7/24/92
Report Date: 7/29/92
Lab File ID:
Dilution Factor: 1

CAS NO.	COMPOUND	Detection Limit ug/l	Conc. ug/l
58-89-9	gamma-BHC (Lindane)	0.05	U
72-20-8	Endrin	0.05	U
72-43-5	Methoxychlor	0.50	U
8001-35-2	Toxaphene	1.0	U

FORM I - PEST

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
OCT 19 1992
GROUNDWATER SCIENCES
CORPORATION

Volatile Organics Analysis Data Sheet
Form I VOA

Client Name: Groundwater Sciences Corp. Project Name: STANDARD

ETL Sample Number: 116375-01

Client I.D.: RAINSS21007S Soil Sample WSW3 trench

Date Collected: 07-OCT-92 Matrix: 3 Soil/Sldg

Date Received: 07-OCT-92 Percent Solid: 92.4 %

Date Analyzed: 08-OCT-92 Method: 8010

Comments: RAINBOWS END / 92004

CAS NO.	Compound	Detection Limit ug/kg	Conc. ug/kg	Data Qualifier
74-87-3	Chloromethane	1.1		U
74-83-9	Bromomethane	1.1		U
75-71-8	Dichlorodifluoromethane	1.1		U
75-01-4	Vinyl Chloride	1.1		U
75-00-3	Chloroethane	1.1		U
75-09-2	Methylene Chloride	1.1		U
75-69-4	Trichlorofluoromethane	1.1		U
75-35-4	1,1-Dichloroethene	1.1		U
75-34-3	1,1-Dichloroethane	1.1		U
540-59-0	Trans-1,2-Dichloroethene	1.1		U
67-66-3	Chloroform	1.1		U
107-02-2	1,2-Dichloroethane	1.1		U
71-55-6	1,1,1-Trichloroethane	1.1		U
56-23-5	Carbon Tetrachloride	1.1		U
75-27-4	Bromodichloromethane	1.1		U
78-87-5	1,2-Dichloropropane	1.1		U
10061-01-5	Cis-1,3-Dichloropropene	1.1		U
79-01-6	Trichloroethene	1.1		U
124-48-1	Dibromochloromethane	1.1		U
10061-02-6	Trans-1,3-Dichloropropene	1.1		U
79-00-5	1,1,2-Trichloroethane	1.1		U
100-75-8	2-Chloroethylvinyl Ether	1.1		U
75-25-2	Bromoform	1.1		U
79-34-5	1,1,2,2-Tetrachloroethane	1.1		U
127-18-4	Tetrachloroethene	1.1		U
108-90-7	Chlorobenzene	1.1		U
541-73-1	1,3-Dichlorobenzene	1.1		U
95-50-1	1,2-Dichlorobenzene	1.1		U
106-46-7	1,4-Dichlorobenzene	1.1		U
107-30-2	Chloromethyl methyl ether	220		U
74-95-3	Dibromomethane	1.1		U
630-20-6	1,1,1,2-Tetrachloroethane	1.1		U
96-18-4	1,2,3-Trichloropropane	1.1		U
544-10-5	1-Chlorohexane	1.1		U
108-86-1	Bromobenzene	1.1		U
100-44-7	Benzyl chloride	1.1		U
95-49-8	4-Chlorotoluene	1.1		U
112-26-5	bis(2-Chloroethoxy) methane	1.1		U

CHAIN OF CUSTODY RECORD

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

Company Name	Site Location	Building Location	Project Name/P.O. Number
Groundwater Sciences Corp.	92004	Rainbow Child Development Center	Lawrence F Roach

Date	Time	COMP.	GRAB	Sample Identification No.	Number of Containers	40ml Glass	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	200ml Plastic	125ml Plastic Sterile	250ml Amber			REMARKS
1/25/92	10:42		✓	WAG012592WAA	3	3											601
1/25/92	11:06		✓	WAG012592WBB	3	3											601
1/25/92	10:34		✓	TBWAGN920125	1	1											601

One Week Turn Around Requested

Relinquished by EnviroTest Laboratories by	Custody Shipping Number	Date / Time	Received by	Date / Time
Print ____ Signature ____		Date: Time:	Print ____ Signature ____	Date: Time:

Relinquished by	Date / Time	Received by	Relinquished by	Date / Time	Recieved by
Print Mitchell Ruchin Signature Mitchell Ruchin	Date 1/26/92 Time 9:38	Print ____ Signature ____	Print ____ Signature ____	Date: Time:	Print ____ Signature ____

Returned to EnviroTest by	Custody Shipping Number	Date / Time	Received for EnviroTest by	Date / Time
Print ____ Signature ____		Date: Time:	Print James P. Murphy Signature J. P. Murphy	Date 1/28/92 Time 6:15

Sample Bottle Instructions On Reverse Side

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

CHAIN OF CUSTODY RECORD PO# 92004

Company Name, Location: Groundwater Sciences
Project Name/P.O. Number:
Project Coordiantor: Lawrence F. Roach
Air Bill No.
Carrier

Sampling Date	Time	Comp.	Grab	Sample I.D. No.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250 ml Amber	2 oz. Qorpak	Analysis
2/14/92	11:30		✓	RAINSP20214G	3	3											502.1 503.1
2/14/92	12:03		✓	RAIOSL20214G	3	3											502.1 503.1
2/14/92	12:16		✓	RAIS2A20214G	3	3											502.1 ~~503.1~~ MWR 2/14/92
2/14/92	12:31		✓	RAIS2B20214G	3	3											502.1 ~~503.1~~ MWR 2/14/92
2/14/92	12:46		✓	RAIOS320214G	3	3											502.1 503.1
2/14/92	12:58		✓	FBRAINB20214	2	2											502.1 503.1
2/14/92	11:20		✓	TBRAINB20214	1	1											502.1 503.1

Relinquished by EnviroTest Laboratories
Print: Richard [illegible]
Signature: [signature]
Custody Shipping Number:
Date: 2/13/92
Time: 1:20
Received by
Print: Mitchell Roachin
Signature: [signature]
Date: 2/14/92
Time: 9:30

Relinquished by
Print:
Signature:
Date:
Time:
Received by
Date:
Time:

Relinquished by
Print: Mitchell Roachin
Signature: [signature]
Date: 2/14/92
Time: 2:34
Received by ETL: James P. Murphy
[signature]
Date: 2/14/92
Time: 2:35

REMARKS

CAMO LABORATORIES

POUGHKEEPSIE AREA FACILITY:
CAMO LABORATORY
367 VIOLET AVENUE
POUGHKEEPSIE, N.Y. 12601
(914) 473-9200

Hours ________

CHAIN OF CUSTODY

CLIENT: Dutchess Co. Hlth. Dept.
387 Main Mall, Po'k. N.Y. 12601

SAMPLER: A. Bernhardt

SAMPLE NO./ID	LOCATION/CONTAINER	DATE	TIME	SAMPLE TYPE	COMP	GRAB	No. of CONT.	ANALYSIS REQUIRED
	Kitchen sink, single basin	1/28/92	3pm					EPA METHOD 502.2
	ⓢ Rainbows End Child Development Center, Hetruria Rd. T. Pleasant Valley.							

Relinquished by: X A. Bernhardt

Received by: | Date | Time

Relinquished:

Received by: | Date | Time

Dispatched by: | Date | Time

Received for Laboratory by: Janet McCarthy | Date 1/28/92 | Time 3:15P

Method of Shipment:

Comments:

CAMO Containers ☐

CAMO LABORATORIES

POUGHKEEPSIE AREA FACILITY:
CAMO LABORATORY
387 VIOLET AVENUE
POUGHKEEPSIE, N.Y. 12601
(914) 473-9200

Hours ____________

CHAIN OF CUSTODY

CLIENT: Dutchess County Health Dept.

SAMPLER: Tagliavia

SAMPLE NO./ID	LOCATION/CONTAINER	DATE	TIME	SAMPLE TYPE	COMP	GRAB	No. of CONT.	ANALYSIS REQUIRED
	Cavalier Gage & Electronics Co.							
00888 00889	Well # 1	2-14-92	12:35			X	2	502.2
00890 00891	Well #2	" "	12:25			X	2	502.2
00892 00893	Well # 3	" "	12:50			X	2	502.2
00920 }	Rainbow End (dry care)	2-14-92	11:30			X	2	502.2
00921 }								
00900 }	30 Hibernia Rd.	2-14-92	10:05			X	2	502.2
00901 }								

RECEIVED
FEB 21 1992
ENVIRONMENTAL HEALTH
DUTCHESS CO. HEALTH DEPT.

Relinquished by: Tagliavia	Received by:	Date	Time
Relinquished:	Received by:	Date	Time
Dispatched by: Date Time	Received for Laboratory by: Kathy Sullivan	Date 2/14/92	Time 3:50 pm

Method of Shipment:

Comments: + Freon 113

CAMO Containers ☐

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

CHAIN OF CUSTODY RECORD

Company Name, Location: Groundwater Sciences / Rainbow's End
Project Name/P.O. Number: 92004
Project Coordiantor: Chuck Rine
Air Bill No.:
Carrier:

SAMPLING DATE	TIME AM PM	COMP.	GRAB	SAMPLE I.D. No.	Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250 ml Amber	2 oz. Qorpak	ANALYSIS
3/19	11:40 AM		x	RESAA920319S	1										1		8010 + Freon 113
3/19	11:50 AM		x	RENAA920319S	1										1		8010 + Freon 113
3/19	11:55 AM		x	RESLH920319S	1										1		8010 + Freon 113
3/19	12:04 PM		x	REPYS920319S	1										1		8010 + Freon 113
3/19	12:15 PM		x	RESPY920319S	1										1		8010 + Freon 113
3/19	12:35 pm		x	RES2A920319F	2	2											502.1 + Freon 113
3/19	12:30 pm		x	RES2B920319F	2	2											502.1 + Freon 113
3/19	12:45 pm		x	REKIT920319G	1								1				Total Coliform bacteria
3/19	12:45 pm		x	REKIT920319G	2	2							[illegible]				Hold for instructions.
3/17				Trip Blank "A"	1	1											Hold for instructions.
3/17				Trip Blank "B"	1	1											Hold for instructions.

Relinquished by EnviroTest Laboratories	Custody Shipping Number	Date / Time	Received by	Date / Time
Print: James P. Murphy Signature: J. P. Murphy		Date: 3/17/92 Time:	Print: Signature:	Date: Time:

Relinquished by	Date / Time	Received by	Date / Time	Relinquished by	Date / Time	Received by ETL	Date / Time
Print: Charles Rine Signature: C A Rine	Date: 3/19/92 Time: 3:15		Date: Time:	Print: Signature:	Date: Time:	James P. Murphy J. P. Murphy	Date: 3/19/92 Time: 3:15

REMARKS: 1 WEEK TAT or as fast as possible without charging premium

CHAIN OF CUSTODY RECORD

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

Company Name, Location: Groundwater Sci
Project Name/P.O. Number: Rainbow's End/92004
Project Coordiantor: Larry Roach
Air Bill No.
Carrier

insert "P"

SAMPLING DATE	TIME AM PM	COMP.	GRAB	SAMPLE I.D. No.		Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250 ml Amber	2 oz. Corpak	ANALYSIS
4/7/92	PM		X	RENSE920407		2	2											~~502.1, 503.1, Freon 113~~ Hold
4/7/92	PM		X	RESSEP920407		2	2											502.1, 503.1, Freon 113
4/7/92	PM		X	Trip Blank		1	1											Hold for instructions.

Relinquished by EnviroTest Laboratories	Custody Shipping Number	Date / Time	Received by	Date / Time
Print: Joyce Ofeldt Signature: J Ofeldt		Date 4/7/92 Time 1:27pm	Print: Signature:	Date: Time:

Relinquished by	Date / Time	Received by	Date / Time	Relinquished by	Date / Time	~~Received~~ Received by ETL	Date / Time
Print: C. Rice Signature: CARice	Date 4/7/92 Time 16:48		Date: Time:	Print: Signature:	Date: Time:	Paul Pullar Paul Pullar	Date 4/7/92 Time 16:50

REMARKS

1-2 week TAT

EnviroTest
Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

CHAIN OF CUSTODY RECORD

Company Name, Location	Project Name/P.O. Number	Project Coordiantor	Air Bill No. / Carrier
Groundwater Sciences	12004	L. Roach	

SAMPLE BOTTLES

SAMPLING DATE	TIME AM PM	COMP	GRAB	SAMPLE I.D. No.		Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250 ml Amber	2 oz Oorpak		ANALYSIS
6/2/92	9:34		✓	RAIOS1206026		4	4												502.1 + Freon 113.
6/2/92	9:48		✓	RAIS2A20602G		4	4												502.1 + Freon 113.
6/2/92	10:00		✓	RAIS2B20602G		4	4												502.1 + Freon 113.
6/2/92	10:43		✓	RAINKS20602G		5	4								1				502.1 + Freon 113, 503.1, Total
																			Coliform Bacteria.
6/2/92	6/2/92		✓	RTB20602 0602		1	1												Lab to Hold for Instructions

RECEIVED
JUN 10 1992
GROUNDWATER SCIENCES CORPORATION

Relinquished by EnviroTest Laboratories	Custody Shipping Number	Date / Time	Received by	Date / Time
Print ______ Signature ______		Date: Time:	Print ______ Signature ______	Date: Time:

Relinquished by	Date / Time	Received by	Date / Time	Relinquished by	Date / Time	Received by ETL	Date / Time
Print: Andrea F. Nuddell; Signature: Andrea F. Nuddell	Date: 6-2-92; Time: 11:55		Date: Time:	Print ______ Signature ______	Date: Time:	Paul Pullar; Paul Pullar	Date: 6/2/92; Time: 11:55

REMARKS ______

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

CHAIN OF CUSTODY RECORD

Company Name, Location: CWS
Project No. / P.O. Number: Rainbow's End
Project Coordiantor: Chuck Rine
Air Bill No.
Carrier

92004

Sampling Date	Time AM PM	Comp.	Grab	Sample I.D. No.		Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250 ml Amber	2 oz. Oorpak		Analysis
7/16	10:30		x	RENEWZ920716			3		2	1		1			1				PRI/SEC TCOL/P
																			Herb/Pest - 3 weeks
																			502 503 fr 113
																			3 weeks

Relinquished by EnviroTest Laboratories	Custody Shipping Number	Date / Time	Received by	Date / Time
Print: Richard E. Barber Signature: [signature]		Date: 7/9/92 Time: 3:25	Print: Signature:	Date: Time:

Relinquished by	Date / Time	Received by	Date / Time	Relinquished by	Date / Time	Received by ETL	Date / Time
Print: Charles Rine Signature: C.A. Rine	Date: Time:		Date: Time:	Print: Signature:	Date: Time:	James P. Murphy J. P. Murphy	Date: 7/16/92 Time: 11:10

REMARKS

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

CHAIN OF CUSTODY RECORD

Company Name, Location: Groundwater Sciences
Project Name/P.O. Number: [illegible] 93C04
Project Coordiantor: Lawrence Roach
Air Bill No. ______
Carrier ______

SAMPLE BOTTLES

SAMPLING DATE	TIME AM PM	COMP.	GRAB	SAMPLE I.D. No.		Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250 ml Amber	2 oz. Qorpak		ANALYSIS
[illegible]	10:30		✓	RAIN SS21007S		2										2			8010

RECEIVED
OCT 16 1992
GROUNDWATER SCIENCES CORPORATION

Relinquished by EnviroTest Laboratories	Custody Shipping Number	Date / Time	Received by	Date / Time
Print N/A Signature N/A		Date N/A Time N/A	Print N/A Signature N/A	Date N/A Time N/A

Relinquished by	Date / Time	Received by	Date / Time	Relinquished by	Date / Time	Received by ETL	Date / Time
Print Mitchell Ruchin Signature Mitchell Ruchin	Date 10/7/92 Time 12:20	N/A	Date Time	Print Mitchell Ruchin Signature Mitchell Ruchin	Date 10/7/92 Time [illegible]	Paul Pillar Paul Pillar	Date 10/7/92 Time 1:3 A

REMARKS: 48 Hour TAT Requested

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

*GENERAL INFORMATION

Sample Location/Well ID North Activity Area Site Rainbow's End. (larger than south area)

Manhole/Standpipe/Other (circled) Soil

Physical Well/Location Condition 6" snow on ground.

*PURGING - N/A

~~Date 3-19-92 Personnel OAR Air Temp ____ Skies ____ Wnd Spd/Drctn ____~~

~~TD ____ SWL ____ TD - SWL ____ Required Purge Volume (from table) ____~~

~~Method ____ Start ____ Stop ____ Volume/Minutes ____~~

~~WL end of purge (WLEP) ____ Max WL end of Recovery = $\left(\frac{WLEP(\ \ )-SWL(\ \ )}{10}\right)+SWL(\ \ )=$ ____~~

*SAMPLING sample depth 0-2"

Sample ID: R E N A A 9 2 0 3 1 9 5 GW/Surface/Other (circled) Soil

Date 3-19-92 Personnel OAR Air Temp 30 Skies snow Wnd Spd/Drctn calm

WL Recovery (WL/time): NA / ; / ; / ; /

Sampled Depth Interval: NA to NA feet Sampling Method grab Start 11:40 Stop 11:50

Field Data (in well/ in line): N/A

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA						

*LAB INFO

Lab Enviro test Turnaround Time 1 week No. of Containers 1

Date Shipped 3-19-92 Method Shipped hand carried by GSC

Analyses Requested 8010 + Fr 113

*ADDITIONAL NOTES: Sample collected 7 feet west of lone 6x6 wooden post.

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

***GENERAL INFORMATION**

Sample Location/Well ID Sled Hill **Site** Rainbow's End.

Manhole/Standpipe/Other (circled) Soil (25' S of small + large Evergreen trees.) see below

Physical Well/Location Condition 6" snow on ground.

***PURGING** - N/A (section crossed out)

Date ______ **Personnel** ______ **Air Temp** ______ **Skies** ______ **Wnd Spd/Drctn** ______

TD ______ **SWL** ______ **TD - SWL** ______ **Required Purge Volume (from table)** ______

Method ______ **Start** ______ **Stop** ______ **Volume/Minutes** ______

WL end of purge (WLEP) ______ **Max WL end of Recovery** = $\left(\frac{WLEP(\ \ )-SWL(\ \ )}{10}\right)+SWL(\ \ )=$ ______

***SAMPLING** sample depth 0-2"

Sample ID:

R	E	S	L	H	9	2	0	3	1	9	S

GW/Surface/Other (circled) Soil

Date 3-19-92 **Personnel** CAR **Air Temp** 30 **Skies** snow **Wnd Spd/Drctn** calm

WL Recovery (WL/time): NA /____;____/____;____/____;____/____ →

Sampled Depth Interval: NA **to** NA **feet** **Sampling Method** grab **Start** 11:52 **Stop** 11:55

Field Data (in well/ in line): N/A

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA	—	—	—	—	—	→

***LAB INFO**

Lab Enviretest **Turnaround Time** 1 week **No. of Containers** 1

Date Shipped 3-19-92 **Method Shipped** hand carried by GSC

Analyses Requested 8010 + Fr 113

***ADDITIONAL NOTES:** line up small evergreen tree at top of sled hill with large evergreen in the parking lot, measure 25' down the hill (South) to sample point.

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

*GENERAL INFORMATION

Sample Location/Well ID stream playyard Site Rainbow's End.

Manhole/Standpipe/Other (circled) Soil, 10 feet from base of slide.

Physical Well/Location Condition 6" snow on ground.

*PURGING - N/A

Date ______ Personnel ______ Air Temp ______ Skies ______ Wnd Spd/Drctn ______

TD ______ SWL ______ TD - SWL ______ Required Purge Volume (from table) ______

Method ______ Start ______ Stop ______ Volume/Minutes ______

WL end of purge (WLEP) ______ Max WL end of Recovery = $\left(\frac{WLEP(\quad)-SWL(\quad)}{10}\right)+SWL(\quad)=$ ______

*SAMPLING sample 0-2" depth.

Sample ID:	R	E	S	P	Y	9	2	0	3	1	9	S

GW/Surface/Other (circled) Soil

Date 3-19-92 Personnel CAR Air Temp 30 Skies snow Wnd Spd/Drctn calm

WL Recovery (WL/time): NA / ; / ; / ; /

Sampled Depth Interval: NA to NA feet Sampling Method grab Start 12 10 Stop 12:15

Field Data (in well/ in line): N/A

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA						

*LAB INFO

Lab Envirotest Turnaround Time 1 week No. of Containers 1

Date Shipped 3-19-92 Method Shipped hand carried by GSC

Analyses Requested 8010 + Fr 113

*ADDITIONAL NOTES: Sample collected 10 feet straight out from base of large slide.

Used stainless steel sampler to break up frozen soil.

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

***GENERAL INFORMATION**

Sample Location/Well ID play yard swings Site Rainbow's End

Manhole/Standpipe/(Other) Soil

Physical Well/Location Condition 1st swing closest to driveway, under swing 6" snow on ground.

***PURGING** . N/A

Date ______ Personnel ______ Air Temp ______ Skies ______ Wnd Spd/Drctn ______

TD ______ SWL ______ TD - SWL ______ Required Purge Volume (from table) ______

Method ______ Start ______ Stop ______ Volume/Minutes ______

WL end of purge (WLEP) ______ Max WL end of Recovery = $\left(\frac{WLEP(\quad)-SWL(\quad)}{10}\right)+SWL(\quad)=$ ______

***SAMPLING** sample depth 0-2"

Sample ID: | R | E | P | Y | S | 9 | 2 | 0 | 3 | 1 | 9 | S | GW/Surface/(Other) Soil

Date 3-19-92 Personnel CAR Air Temp 30 Skies snow Wnd Spd/Drctn calm

WL Recovery (WL/time): NA / ______ ; ______ / ______ ; ______ / ______ ; ______ / ______

Sampled Depth Interval: NA to NA feet Sampling Method grab Start 12:00 Stop 12:04.

Field Data (in well/ in line): N/A

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA						

***LAB INFO**

Lab Envirotest Turnaround Time 1 week No. of Containers 1

Date Shipped 3-19-92 Method Shipped hand carried by GSC

Analyses Requested 8010 + Fr113

***ADDITIONAL NOTES:** Sample from underneath first swing sling seat ~~at~~ closest to driveway

~~[illegible]~~

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

***GENERAL INFORMATION**

Sample Location/Well ID South Septic (new) Site Rainbow's End.

Manhole/Standpipe/Other (circled: Other) septic tank

Physical Well/Location Condition "crust" on top - sampled from middle manhole - all three are connected to same holding tank

***PURGING** - NA

~~Date ____ Personnel ____ Air Temp ____ Skies ____ Wnd Spd/Drctn ____~~

~~TD ____ SWL ____ TD - SWL ____ Required Purge Volume (from table) ____~~

~~Method ____ Start ____ Stop ____ Volume/Minutes ____~~

~~WL end of purge (WLEP) ____ Max WL end of Recovery = $\left(\frac{WLEP(\ \ )-SWL(\ \ )}{10}\right)+SWL(\ \ )=$ ____~~

***SAMPLING**

Sample ID: R E S S E P 9 2 0 4 0 7 GW/Surface/Other septic

Date 4-7-92 Personnel CAR Air Temp 65 Skies S Wnd Spd/Drctn calm

WL Recovery (WL/time): NA

Sampled Depth Interval: 0 to 0.5 feet Sampling Method grab Start 14:10 Stop 14:15

Field Data (in well/ in line): NA

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA						

***LAB INFO**

Lab Enviro-test Turnaround Time 1-2 week No. of Containers 2

Date Shipped 4-7-92 Method Shipped hand carried by CAR

Analyses Requested 502.1, 503.1, Freon 113.

***ADDITIONAL NOTES:**

New or East tank JK

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

*GENERAL INFORMATION

Sample Location/Well ID North Septic (old) Site Rainbow's End.

Manhole/Standpipe/Other (circled) septic tank

Physical Well/Location Condition cloudy water, but no surface scum -

*PURGING - NA

Date ____ Personnel ____ Air Temp ____ Skies ____ Wnd Spd/Drctn ____

TD ____ SWL ____ TD - SWL ____ Required Purge Volume (from table) ____

Method ____ Start ____ Stop ____ Volume/Minutes ____

WL end of purge (WLEP) ____ Max WL end of Recovery = $\left(\frac{WLEP(\quad)-SWL(\quad)}{10}\right)+SWL(\quad)=$ ____

*SAMPLING

Sample ID: | R | E | N | S | E | P | 9 | 2 | 0 | 4 | 0 | 7 | GW/Surface/Other (circled) septic

Date 4-7-92 Personnel CAR Air Temp 65 Skies S Wnd Spd/Drctn calm

WL Recovery (WL/time): NA / ____ ; ____ / ____ ; ____ / ____ ; ____ / ____

Sampled Depth Interval: 0 to 0.5 feet Sampling Method grab Start 14:20 Stop 14:25

Field Data (in well/ in line): NA

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA						

*LAB INFO

Lab Envirotest Turnaround Time 1-2 weeks No. of Containers 2

Date Shipped 4-7-92 Method Shipped hand carried by CAR

Analyses Requested Hold for instructions

*ADDITIONAL NOTES:

Old or West Tank JR

RECEIVED
JUN 10 1992
GROUNDWATER SCIENCES CORPORATION

W

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

*GENERAL INFORMATION

Sample Location/Well ID S1 Site Rainbows End

Manhole/Standpipe/(Other) sample

Physical Well/Location Condition OK

*PURGING Not Applicable - Pumping Well

~~Date ____ Personnel ____ Air Temp ____ Skies ____ Wnd Spd/Drctn ____~~

~~TD ____ SWL ____ TD - SWL ____ Required Purge Volume (from table) ____~~

~~Method ____ Start ____ Stop ____ Volume/Minutes ____~~

~~WL end of purge (WLEP) ____ Max WL end of Recovery = $\left(\frac{WLEP(\quad)-SWL(\quad)}{10}\right)+SWL(\quad)=$ ____~~

*SAMPLING

Sample ID: R A I O S 1 2 Ø 6 Ø 2 G (GW)/Surface/Other ____

Date 6-2-92 Personnel AFN Air Temp 65 Skies indoors Wnd Spd/Drctn NA

WL Recovery (WL/time): NA / NA ; NA / NA ; NA / NA ; NA / NA

Sampled Depth Interval: NA to NA feet Sampling Method sample port Start 9:34 Stop 9:38

Field Data (in well/ in line):

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA	NA	NA	NA	NA	NA	clear

*LAB INFO

Lab Envirotest Turnaround Time normal No. of Containers 4

Date Shipped 6-2-92 Method Shipped Delivered to lab by GSC

Analyses Requested 502.1, Freon 113.

*ADDITIONAL NOTES:

WSW 2

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

***GENERAL INFORMATION** North well

Sample Location/Well ID New well Site Rainbow's End.

Manhole/Standpipe/Other (Standpipe circled)

Physical Well/Location Condition covered w/ plastic cap, but not locked

***PURGING**

Date 7-15-92 Personnel TLM/drillers Air Temp 85 Skies P/S Wnd Spd/Drctn

TD 500' SWL ? TD - SWL ? Required Purge Volume (from table)

Method air developed Start NA Stop NA Volume/Minutes 60 min.

WL end of purge (WLEP) svac. Max WL end of Recovery = $\left(\frac{WLEP(\quad)-SWL(\quad)}{10}\right)+SWL(\quad)=$

***SAMPLING**

Sample ID: R E N E W 2 9 2 0 7 1 6 GW/Surface/Other (GW circled)

Date 7-16-92 Personnel CAR Air Temp 75 Skies S Wnd Spd/Drctn calm

WL Recovery (WL/time): 25.8 / 9:30 ; NA / ; / ; /

Sampled Depth Interval: 200 to 225 feet Sampling Method bailer Start 10:20 Stop 11:00

Field Data (in well/ in line): NA

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA						

***LAB INFO**

Lab Envirotest Turnaround Time standard No. of Containers 8

Date Shipped 7-16-92 Method Shipped delivered by GSC

Analyses Requested Primary/Secondary drinking water params, bacteria, Pest/Herbicides, 502, 503, Freon 113.

***ADDITIONAL NOTES:**

2' stickup. WSW-3 inital sample JR

RECEIVED
OCT 16 1992
GROUNDWATER SCIENCES CORPORATION

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

***GENERAL INFORMATION**

Sample Location/Well ID Soil Pile Sample Point Site Rainbows End Child Development Center

Manhole/Standpipe/(Other) Soil Sample Point

Physical Well/Location Condition N/A

***PURGING** Not Required for a soil Sample

~~Date ____ Personnel ____ Air Temp ____ Skies ____ Wnd Spd/Drctn ____~~

~~TD ____ SWL ____ TD - SWL ____ Required Purge Volume (from table) ____~~

~~Method ____ Start ____ Stop ____ Volume/Minutes ____~~

~~WL end of purge (WLEP) ____ Max WL end of Recovery =~~ $\left(\frac{WLEP(\quad)-SWL(\quad)}{10}\right)+SWL(\quad)=$ ____

***SAMPLING**

Sample ID:	R	A	I	N	S	S	2	1	0	0	7	S

GW/Surface/(Other) Soil

Date 10/7/92 Personnel MWR Air Temp 60° Skies Sunny Wnd Spd/Drctn Calm

WL Recovery (WL/time): N/A / N/A ; N/A / N/A ; N/A / N/A ; N/A / N/A

Sampled Depth Interval: * 4' ~~to~~ ____ feet Sampling Method grab Start 10:30 Stop 10:35

Field Data (in well/ in line):

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
N/A	N/A	N/A	N/A	N/A	N/A	Dirt-Brown

***LAB INFO**

Lab EnviroTest Turnaround Time ~~Normal~~ 48 hour Per LFR No. of Containers 2

Date Shipped 10/7/92 Method Shipped Delivered to lab by GSC

Analyses Requested 8010

***ADDITIONAL NOTES:**

See attached Picture of Location

-* Sample Collected from Backhoe Bucket at 4' from grade

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

***GENERAL INFORMATION**

Sample Location/Well ID South Activity Area (infants' activity area) Site Rainbow's End.

Manhole/Standpipe/Other (circled) soil

Physical Well/Location Condition 6" snow on ground

***PURGING** – N/A

Date 3-19-92 Personnel CAR Air Temp ____ Skies ____ Wnd Spd/Drctn ____

TD ____ SWL ____ TD - SWL ____ Required Purge Volume (from table) ____

Method ____ Start ____ Stop ____ Volume/Minutes ____

WL end of purge (WLEP) ____ Max WL end of Recovery = $\left(\frac{WLEP(\ \ )-SWL(\ \ )}{10}\right)+SWL(\ \ )=$ ____

***SAMPLING** sample depth 0-2"

Sample ID: | R | E | S | A | A | 9 | 2 | 0 | 3 | 1 | 9 | S | GW/Surface/Other (circled) Soil

Date 3-19-92 Personnel CAR Air Temp 30 Skies snow Wnd Spd/Drctn calm

WL Recovery (WL/time): NA → ____/____; ____/____; ____/____; ____/____

Sampled Depth Interval: NA to NA feet Sampling Method grab Start 11:30 Stop 11:40

Field Data (in well/ in line): N/A

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
NA						

***LAB INFO**

Lab Envirotest Turnaround Time 1 week No. of Containers 1

Date Shipped 3-19-92 Method Shipped hand carried by GSC

Analyses Requested 8010 + Fr-113

***ADDITIONAL NOTES:** sample 10' South of South West corner of wooden sand box.
Used stainless steel sampler to break up frozen soil.

Trip Blank "B" with soil samples.

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

*GENERAL INFORMATION

Sample Location/Well ID ______ Site Rainbow Child Development

Manhole/Standpipe/(Other) Field Blank

Physical Well/Location Condition ______

*PURGING

Not Required

Date ______ Personnel ______ Air Temp ______ Skies ______ Wnd Spd/Drctn ______

TD ______ SWL ______ TD - SWL ______ Required Purge Volume (from table) ______

Method ______ Start ______ Stop ______ Volume/Minutes ______

WL end of purge (WLEP) ______ Max WL end of Recovery = $\left(\frac{WLEP(\ \ ) - SWL(\ \ )}{10}\right) + SWL(\ \ ) =$ ______

*SAMPLING

Sample ID: | F | B | R | A | I | N | B | 2 | 0 | 2 | 1 | 4 | GW/Surface/(Other) QAQC

Date 2/14/92 Personnel MWR Air Temp 68° Skies N/A Wnd Spd/Drctn N/A

WL Recovery (WL/time): ____/____; ____/____; ____/____; ____/____

Sampled Depth Interval: ____ to ____ feet Sampling Method ______ Start 12:00 Stop 12 58

Field Data (in well/ in line):

Depth	pH	Sp. Cond.	Temperature	DO	Eh	Clarity
N/A						N/A

*LAB INFO

Lab EnviroTest Turnaround Time Rapid No. of Containers 2

Date Shipped 2/14/92 Method Shipped Delivered By GSC

Analyses Requested 502.1 503.1

*ADDITIONAL NOTES: Sample Collected during S1 S2A S2B and S3 open at begining and closed at the end

[illegible]

APPENDIX B

Cavalier Site

Quality Assurance Project Plan
and
Sampling Plan

1 TITLE PAGE

Cavalier Site

Quality Assurance Project Plan
and
Sampling Plan

Lawrence F. Roach, PG
GSC Project Manager

Dorothy A. Bergmann
GSC Quality Assurance Officer

Table of Contents

2 PROJECT DESCRIPTION AND DATA QUALITY OBJECTIVES

Previous site work indicates that bedrock groundwater quality beneath the site has been impacted by dissolved halogenated solvents at concentrations up to 220 micrograms per liter (μg/l). These volatile organic compounds (VOCs) are 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-dichloroethylene, trichloroethylene, and 1,2-dichloroethane. The site septic tanks have been sampled and these samples indicate the presence of VOCs at concentrations up to 340 μg/l. The VOCs detected in the septic tanks are 1,1,1-trichloroethane, 1,1-dichloroethane, toluene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and chloroform. Several shallow soil samples have been collected on-site and one of these samples detected low concentrations (less than 10 micrograms per kilogram (μg/kg)) of methylene chloride and chloroform. The site investigation will, therefore, focus on the VOCs detected to date in groundwater, the septic tanks, and soil samples. Freon 113 was also used at this site and so this parameter will also be a target for investigation activities.

The conceptual model and work plan for site investigation are presented in detail in the body of the work plan. Investigation activities will include sampling for the determination of soil quality adjacent to the two septic tanks, and determination of groundwater quality in the soil groundwater system and bedrock groundwater system. Decisions will be made regarding the significance of impacts and the necessity for remediation by comparing soil VOC concentrations to risk-based action levels for soil, and by comparing groundwater concentrations to New York State groundwater quality standards, which embody USEPA drinking water standards and New York State drinking water standards.

Since one of the data quality objectives is to be able to compare aqueous phase sampling results to the New York State groundwater quality standards, an analytical method which provides both a high degree of certainty regarding VOC speciation and detection limits that will allow the comparison of results to New York State groundwater quality standards. A GC/MS method with relatively low detection limits is necessary. Although analysis by SW-846 method 8240 is desirable, this method does not provide detection limits low enough to meet the data quality objectives for aqueous-phase samples. These samples will, therefore, be collected, handled, and conveyed to the laboratory in accordance with SW-846 methods, but will be analyzed by 40 CFR Part 360 method 524. The GC/MS will provide detection limits which are appropriate for those parameters which have relatively low New York State groundwater quality standards (i.e., benzene - 0.7 µg/l, vinyl chloride - 2 µg/l, 1,2-dichloroethane - 0.8 µg/l, and 1,1,2-trichloroethane - 0.6 µg/l). The CRDLs for aqueous-phase samples will be appropriate for comparison to the New York State groundwater quality standard.

The data quality objective for non-aqueous phase samples (i.e., soil samples) is that results be useful with respect to risk based action levels for soil. These concentrations are higher than aqueous concentrations and so analysis of non-aqueous phase samples by SW-846 method 8240 is appropriate. Soil samples will, therefore, be analyzed by this method.

3 PROJECT ORGANIZATION AND RESPONSIBILITY

Lawrence F. Roach of GSC is the project manager and will be responsible for overall quality assurance. Mr. Roach has conducted numerous investigations, following rigorous USEPA and NYSDEC protocols, including a New York State RCRA facility RFI/CMS/CMI. Dorothy A. Bergmann (GSC) is the designated quality assurance officer. Ms. Bergmann current duties include management of several sampling projects, including RCRA compliance sampling. Ms. Bergmann has performed numerous field audits of both sampling activities and contract laboratories. Samples will be conveyed to EnviroTest Laboratories, Inc. (EnviroTest) in Newburgh, New York. This is a qualified laboratory (NYSDOH No. 10142) which has been field-audited on several occasions by GSC. EnviroTest internal QA has been found to be satisfactory during each of these audits. Information regarding EnviroTest's QA officer and QAPjP are attached.

Lawrence F. Roach, PG
Senior Hydrogeologist

Dorothy A. Bergmann
Hydrogeochemist

Ronald A. Bayer, Laboratory Director
EnviroTest Laboratories, Inc.
315 Fullerton Avenue
Newburgh, NY 12550

Groundwater Sciences Corporation
2601 Market Place Street, Suite 310
Harrisburg, PA 17110-9307
(717)652-6832

4 QUALITY ASSURANCE OBJECTIVES FOR DATA MEASUREMENT

The following sections address accuracy, precision, representativeness, completeness, comparability of data, and measurement parameters.

4.1 Accuracy

Laboratory accuracy is addressed in the attachment for EnviroTest. This laboratory participates in the NYSDOH certification program for environmental analysis/solid and hazardous waste. This laboratory is approved under this program and continued approval by NYSDOH will be a condition for continued use of this laboratory for analysis for this program.

Field accuracy will be achieved by strict adherence to the field sampling plan as presented in Sections 6 and 7. The field sampling plan follows guidance documents prepared by the USEPA and NYSDEC so that sampling in accordance with this protocol will provide data and adequate accuracy for this investigation.

4.2 Precision

Laboratory precision in discussed in the EnviroTest attachment. As noted above, the field sampling plan follows agency guidance and so sampling in accordance with this protocol will provide data of adequate precision for the investigation.

4.3 Representativeness

This data attribute is difficult to quantify. Following a carefully thought out investigation plan, well installation plan, and field sampling plan will help assure that the data collected are representative of site conditions. In order to attempt to quantify representativeness, a blind field duplicate will be collected at WSW-2, which is a monitoring well which has contained VOCs in past sampling events.

4.4 Completeness

Completeness is a measure of the amount of valid data obtained from a sampling event. The assessment of completeness is determined by data validation. The goal of the groundwater, surface water, and soil sampling programs is to obtain at least one set of validated data per location.

4.5 Comparability

In order to optimize comparability, only the specified procedures, methods, and protocols as presented in this plan will be used to collect and analyze samples. By using consistent sampling analysis and reporting procedures, all data collected for this investigation should be comparable. Results of previous sampling will also be considered in evaluating data and its comparability to previous collected results.

5 FIELD SAMPLING AND ACTIVITIES PLAN

The primary objective of this plan is to provide protocols, procedures, and to specify methods which shall allow for the collection and analysis of representative samples, and related field data. This plan reflects protocols which conform to the extent practical and appropriate to current USEPA and NYSDEC guidance and accepted practice.

5.1 Bedrock Monitoring Well Protocol

The following protocol specifies the procedures to be followed by the GSC geologist directing drilling for the installation of monitoring wells in competent bedrock. These wells will be constructed as open holes to monitor water-bearing zones (WBZs) in the bedrock.

1. The drill rig, drilling equipment, drilling tools, and steel casing to be used in drilling and completing these wells will be decontaminated upon arrival at the site and between drilling locations by high pressure steam-cleaning with super-heated (above 100°C) water.

2. The drilling contractor shall install an oil filter on the air compressor and will use only vegetable oils to lubricate the threaded couplings of the drill rods.

3. The contractor shall construct a containment box from two-inch by twelve-inch wood boards lined with 4-mil or thicker polyethylene plastic or equivalent for the purpose of containing and collecting soil cuttings from the well during air rotary drilling. All soil cuttings shall be placed in 55-gallon drums, and labeled with well number, date, and approximate depth. Bedrock cuttings will not be contained since the limestone bedrock in the area is tight and has essentially no adsorptive capacity. Produced water will not be contained since water produced by air rotary methods has a significantly reduced VOC content.

   Drilling will begin using an eight-inch diameter roller bit or air hammer. The geologist will log all soil and rock cuttings at ten-foot intervals.

   A nominal eight-inch diameter borehole will then be drilled approximately ten feet into competent bedrock. Five-inch diameter, welded, carbon steel casing with a steel drive shoe will be set and driven into the bottom of the eight-inch borehole.

4. The annulus formed by the five-inch casing inside the eight-inch borehole shall be sealed with bentonite slurry formulated following the manufacturer's specification and pumped from the bottom up using a tremie pipe and a high pressure grout pump.

5. The contractor shall then drill a nominal five-inch diameter borehole below the five-inch casing to an approximate depth of five feet below the occurrence of a monitorable well yield, defined as a blown yield of at least 0.5 gallons per minute (gpm).

6. When the well has been drilled to total depth, it will be developed with rig air until visual clarity is achieved at the depth of the target WBZ. The blown yield of each WBZ will be measured to the nearest 0.5 gpm.

7. Cleanup of each drill site will include placing all soil cuttings in drums as specified above in Step 2. All plastic and other non-earth debris will be placed in plastic garbage bags which will then be placed into containers for proper disposal.

8. Surface completions will consist of either a standpipe with a lockable aluminum cap and concrete surface seal with the well number noted, or as a manhole as shown on Figure B-1.

5.2 Soil Boring and Monitoring Well Installation Protocol

5.2.1 Drilling

A GSC geologist will be assigned to supervise the drilling crew. Hollow-stem augers will be used during the drilling procedure and split-spoon sampling of the overlying soils will be conducted with a two-inch O.D., two-foot long split-spoon sampler. Blow counts from the standard penetration test will be recorded for each six-inch depth interval. All soil waste generated during drilling will be contained in 55-gallon drums at the drill site for later disposal. All drums will be labeled with the date, well number, and depth interval of the soil cuttings, and will be sealed and moved to a staging area.

Each soil sample will be logged for pedology, texture, weathering, color, density, moisture, sample depth interval, penetration, and recovery.

5.2.2 Monitoring Well Construction

This basic soil monitoring well design includes the following elements:

- Two-inch or four-inch diameter, Schedule 40, threaded, flush-joint PVC factory slotted screen and riser pipe;

- Silica sand pack material graded to specifications for the screen slot size placed two to three feet above the top of the screen;

- Two feet of bentonite chips or pellets above the sand pack and bentonite grout, chips or pellets, as appropriate, to seal all specified remaining intervals of the borehole annulus;

- A four-inch or six-inch I.D. steel protector pipe with a locking cap extending to a height of approximately 2.5 feet above grade and encased in concrete to 2 feet below grade; or a monitoring well manhole (Morrison type) with water-tight locking cap, encased in concrete or asphalt at grade, with provisions for seepage water drainage (Figure B-1).

The first variation of this basic monitoring well design is the soil standpipe, which is used to monitor unconfined water table conditions. In this variation, the top of the screen extends above the static water level. The second variation in this investigation is the soil piezometer. In this variation, the well monitors a confined water-transmitting unit where the static water level is above both the top of the unit and the top of the screened interval.

5.3 Decontamination Protocol

In order to reduce the potential for contamination of groundwater samples from drilling equipment and well construction materials, several precautions will be taken as follows:

1. All materials used to construct monitoring wells will be new and will be supplied in appropriate containers (e.g., bagged sand, not bulk sand). Electronic equipment (e.g., electronic water level measuring devices, pressure transducers) shall be decontaminated by triple-rinsing with organic-free deionized (DI) water and placed into a steam-cleaned, decontaminated container (procedure described below) and shall only be handled by personnel wearing clean surgical gloves.

2. All other materials, except as described above, will be decontaminated prior to being introduced to the wellbore by the following procedure: Well screen and pipe, steel casing, bailers, pumps, discharge line, electrical cable, and any other materials introduced to the wellbore (except sand, bentonite pellets, and slurry materials) will be decontaminated by high pressure steam-cleaning with super-heated steam (above 100°C) derived from a potable water supply on-site or brought onto the site, and will be applied to equipment until equipment is hot to the touch and any visible contamination is removed. Following steam-cleaning, all well construction material and sampling equipment will be handled only by personnel wearing new, clean surgical latex or polymer gloves. After being decontaminated, equipment will be handled such that it is not recontaminated prior to being used. This may involve placing on plastic sheeting, wrapping in plastic, or placing in similarly decontaminated containers.

3. The drilling rigs and tools will be thoroughly steam-cleaned prior to mobilization and before drilling equipment is moved onto any drilling location.

5.4 Groundwater Sampling Protocol

This plan reflects protocols which conform to USEPA and NYSDEC regulatory guidance or accepted practice.

5.4.1 Purging

1. Prior to sampling, the static water level (SWL) shall be measured in each monitoring well to the nearest 0.01 foot from the top of casing or monitoring pipe using an electronic water level indicator (e.g., M-scope). The depth to the bottom of the well shall also be measured by sounding the open borehole well to the nearest foot. Equipment used to measure these depths shall be rinsed with DI water prior to being placed in each well.

2. Prior to sampling, three well volumes shall be purged in each monitoring well which has sufficient yield. The term "sufficient yield" means a yield sufficient to purge three well volumes in two hours or less of pumping. Those wells which do not have sufficient yield to support the removal of three well volumes in two hours or less shall be evacuated.

3. Purge water from each monitoring well shall be contained and pumped through two 1 cubic foot, granulated, activated carbon (GAC) filters in series and then will be discharged to the on-site pond. This carbon filtration procedure will also be followed for groundwater produced during the pump test. Based on the performance of GAC filters operated on-site between February and October 1992, this pair of GAC filters should be able to process approximately 15,000 gallons at concentrations similar to those in WSW-2 (360 µg/l total VOCs). Since the planned investigation activities will produce less than 10,000 gallons of water, this pair of GAC filters should be more than adequate to treat water produced during the investigation.

4. Bedrock monitoring wells will be purged using electric stainless steel submersible pump. The pump shall be decontaminated by pressure steam-cleaning and shall be handled with gloved hands after it has been decontaminated.

   The pump shall be positioned during purging at a shallow enough depth in high yield wells to permit the pump to cavitate to remove the upper portion of the water column before proceeding to purge three well volumes. The pump intake shall be set no more than three feet above the bottom of the well in low yield wells to permit removal of the entire water column.

5. Two-inch diameter soil monitoring wells may be purged with peristaltic pumps where the depth to the SWL is less than 25 feet. Where the depth to the SWL is greater than 25 feet, a WaTerra inertial pump with foot valve may be used.

   Decontaminated bailers may be used for purging soil monitoring wells as an alternative to the methods discussed above. These bailers shall have stainless steel bodies and Teflon or stainless steel check valves. The bailer cord will be 100-pound test monofilament nylon (replaced after each use). The bailer shall be used such that it extracts water from the screened interval of the monitoring well.

6. Four-inch diameter soil monitoring wells may be purged by the methods described in item 4 or item 5.

5.4.2 Groundwater Sampling Protocol

1. Sampling shall start within two hours after purging has been completed. The only exception to this requirement shall occur when a sufficient volume of water for the required samples is not present in the well at the end of two hours. In this instance, samples for VOC analysis shall be taken as soon as possible after two hours.

2. Samples shall be collected with properly steam-cleaned, non-dedicated, stainless steel or Teflon bailers equipped with Teflon or stainless steel check valves and bottom emptying devices. For screened monitoring wells, the sampling interval shall be considered to be the saturated portion of the screened interval. For bedrock wells with single, discrete WBZs, the sampling interval shall extend from five feet below to five feet above the discrete WBZ. For monitoring wells in which no discrete WBZ was identified or several minor WBZs were encountered, the sampling interval shall extend over a ten-foot interval positioned at the midpoint of the water column at the time the sample is recovered. The bailer cord will consist of non-dedicated, decontaminated, monofilament nylon (replaced after each use) or stranded stainless steel.

3. Samples with no headspace shall be placed in laboratory-prepared, preserved containers, prepared in accordance with SW-846. VOC containers will be 40-mil glass vials with Teflon coated silicone septa with plastic cap rings. These containers shall be filled in order of highest volatilization potential (e.g., VOCs, BNC, metals, Cn). Samples containers will be placed in a laboratory-provided cooler and cooled to 0° to 4°C.

4. Samples will be conveyed to the laboratory within 48 hours and VOC samples will be analyzed within the 14-day holding time.

5.5 Surface Water Sampling Protocol

Natural surface water samples will be collected according to the following protocol:

VOC samples will be collected in 40-ml vials filled by slowly submerging in the natural surface water and allowing the bottle to fill with a minimum of turbulence. The vial will be submerged at an angle and slowly righted as it is filled. The vial will then be lifted from the water with a proper meniscus intact, the Teflon septum cap will be screwed on slowly, and the vial will be turned upside down and jarred to check for bubbles. If any bubbles are visible, the vial will be emptied, and the preceding procedure will be repeated until no bubbles are present in the vial.

The vials will be held using gloved hands (latex or vinyl surgical type) with the sampler standing on the stream bank or downstream from the point where the vial is to be filled to minimize the possibility of contamination of the natural surface water at the point where the sample is collected. Each vial will be labeled after sample collection to minimize contamination of the sample by the label adhesive or labeling pen.

The samples will be stored, handled, documented, and analyzed in the same way as groundwater samples.

5.6 Soil Sampling Protocol

For each sample requiring chemical analysis, a soil sample will be carved out of the inner portion of the split-spoon sampler, which has not contacted the walls of the sampler, using a stainless steel soil spatula. The samples will be placed in specified bottles such that the bottles are completely filled and there is no obvious headspace. These bottles will then be labeled with the well number, date collected, depth interval, and analyses requested. Field sampling data sheets will be completed so that each soil sample submitted to the laboratory will have a unique field identification number. These soil samples will be retained in a laboratory-provided cooler with ice packs and delivered to the specified laboratory within 48 hours. Standard chain of custody procedures will be followed in the transport of these samples to the laboratory.

The remainder of each of these six-inch sample segments will be placed in an appropriate sized glass jar such that two thirds of the jar is filled with the soil sample, loosely packed, and the remainder is headspace. The top of the jar will then be covered with aluminum foil, secured by a rubber band around the neck of the bottle, and allowed to stand at ambient temperature (or room temperature if a temperature-controlled space is available) for a period of at least 15 minutes. The probe of the field survey instrument (FID) will be inserted through the aluminum foil to just above the surface of the soil. The initial reading on the FID would be noted and monitored for a period of not less than one minute, with the maximum concentration then noted on the field log at the appropriate sample depth.

5.7 Field Quality Assurance Samples

1. A trip blank shall be prepared for each aqueous media sampling round by the laboratory using organic-free DI water. This trip blank shall be analyzed for VOCs after accompanying the sampling technician from the laboratory to the field sampling locations and back to the laboratory.

3. A field duplicate shall be collected once per ten aqueous media samples and analyzed for VOCs.

4. One equipment rinse blank shall be collected from a decontaminated bailer during the first round of sampling and analyzed for VOCs.

6 DOCUMENTATION AND CHAIN OF CUSTODY

All field documentation will be the responsibility of the designated sample technicians or geologists who collect the samples. These documents will be reviewed by the project manager for completeness and accuracy.

Environmental Samples: All containers from one environmental sample shall be labeled with a unique sample ID which reflects the environmental sample location as follows: 999999YMMDDX; 999999 represents the site and well ID (e.g., CWSW02, CSW001, C71012), YMMDD is the date (e.g., 20109 is 1992, January 9), and X identifies the media (e.g., G is groundwater, W is surface water, S is soil). Each container shall further be marked with the site name, the sampler's initials, the time collected, the analysis to be performed (e.g., 8240 + Freon 113), and the preservatives used.

Trip Blanks: XTBYMMDDMMDD; where X designates the site (e.g., C for Cavalier), TB designates the sample as a trip blank, Y is the last digit of the year (e.g., 2 for 1992), and MMDDMMDD is the period of the trip blank (e.g., 12121213 is December 12 through December 13, inclusive).

Equipment Rinse Blanks: XEQYMMDDXXXX; where X designates the site (e.g., C for Cavalier), EQ designates the sample as an equipment blank, YMMDD is the date (e.g., 11223 is 1991, December 23), and XXXX is the equipment type (e.g., PUMP, BALR, WLID for pump, bailer, and water level indicator).

Duplicate Samples: Same as environmental sample, except ending in D, not G, S or W.

Field data sheets shall be completed at the time of purging and sampling of each well, and for all soil and QA samples. Every blank on the field data sheet must be filled in as shown on the attached sample. "NA" may be used only as appropriate.

Signed chain of custody forms shall accompany all bottles from the laboratory and stay with coolers until all samples are returned to the laboratory (including environmental and QA samples) and shall contain at least that information contained on the sample attached. Coolers will be hand-delivered by the samplers to the laboratories. Since the coolers will be in the samplers' custody until given to the laboratory, cooler seals will not be necessary.

Laboratory documentation is discussed in the EnviroTest attachment.

7 CALIBRATION PROCEDURES

Laboratory calibration procedures, methods, references, and frequencies will be in accordance with those procedures and protocols presented in the EnviroTest attachment.

8 SAMPLE PREPARATION AND ANALYTICAL PROCEDURES

Samples will be prepared and analyzed in accordance with NYSDEC ASP methods. Other information regarding this topic is presented in the EnviroTest attachment. CRDLs are discussed in Section 3 of the plan.

9 DATA REDUCTION, VALIDATION, AND REPORTING

The flow of analytical data will be from the laboratory to GSC. Data will be received by GSC from the laboratory in a format conforming to NYSDEC ASP Level A reporting requirements. These laboratory ASP B data packages will be included in the RI report as an appendix.

9.1 Data Reduction

Data reduction will be accomplished by the transfer of results from the raw data to the reporting format. This item is discussed in the EnviroTest attachment.

9.2 Data Validation

Data validation will be accomplished by the analytical laboratory QA officer who is independent of the project. The laboratory QA officer is fully qualified to perform this function as the attached resume indicates. The validation will be based on criteria specified in the EnviroTest attachment. This will include holding times, instrument tuning and performance, calibration, blanks, surrogate recoveries, matrix spike, and matrix spike duplicate recoveries. Problems with the data will be solved by corrective action specified in the EnviroTest attachment. A narrative describing how the data did or did not meet the validation criteria will be a part of the data deliverable.

9.3 Reporting

Data will be presented in summary tables in quarterly reports. These data will also be presented in summary form in the RI report and the full data reporting package will also be included in the RI report as appendices. As noted previously, the laboratory report will conform to ASP B protocols.

10 INTERNAL QUALITY CONTROL

Laboratory internal quality control will conform to appropriate protocols and is discussed in the EnviroTest attachment.

11 PERFORMANCE AND SYSTEMS AUDITS

Laboratory audits are performed on a regular basis by the laboratory QA officer. In addition, a blind replicate evaluation sample will be submitted as an auditing technique.

12 PREVENTIVE MAINTENANCE

Preventive maintenance of field measuring instruments is not applicable for this investigation since no chemical field parameter data is planned for collection. Preventive maintenance of laboratory instruments is discussed in the EnviroTest attachment.

13 DATA ASSESSMENT

Laboratory data assessment procedures are described in the EnviroTest attachment. Since the data set will be of limited size, it is inappropriate to apply statistical techniques outside of the laboratory context to evaluate this data.

14 CORRECTIVE ACTIONS

Laboratory corrective actions are discussed in the EnviroTest attachment.

15 QUALITY ASSURANCE REPORTS TO MANAGEMENT

The laboratory QA officer will inform laboratory management regarding the operation and effectiveness of the laboratory QA/QC program. Details regarding this reporting are included in the EnviroTest attachment.

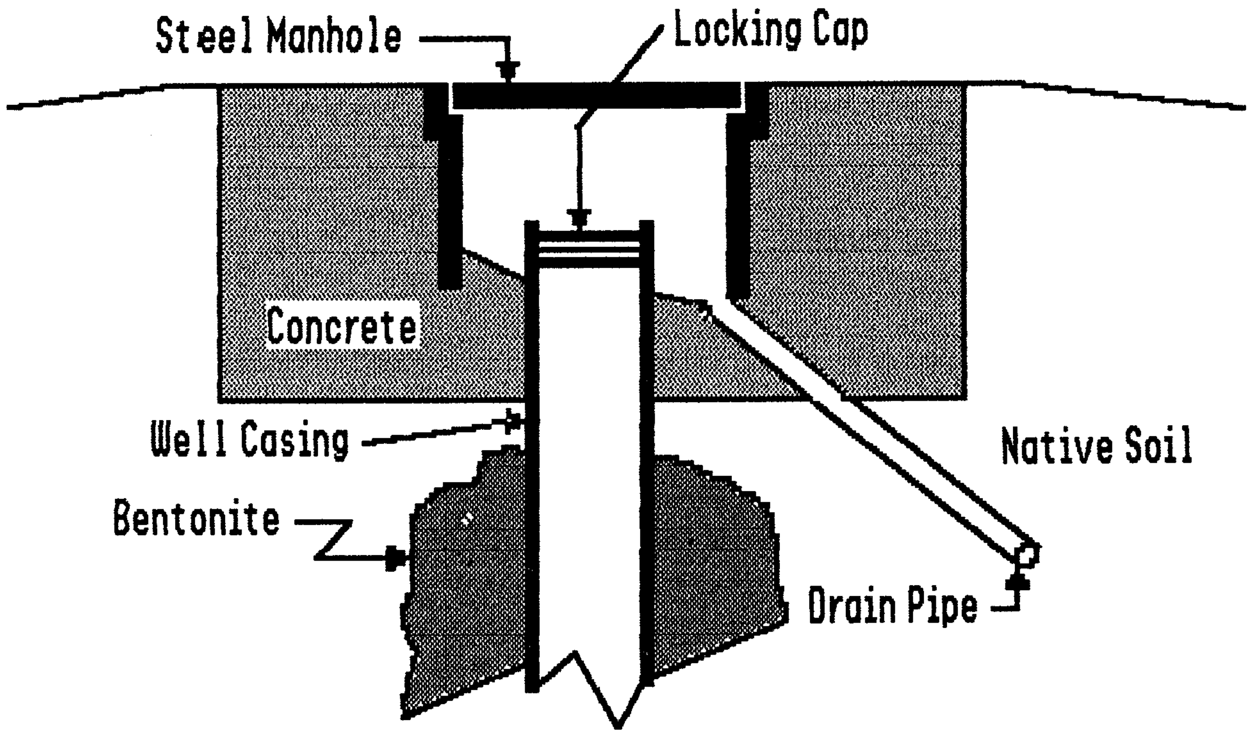


Figure B-1

Monitoring Well Manhole Completion

Resume

Dorothy A. Bergmann
Hydrogeochemist

Education

Ms. Bergmann received a Bachelor's Degree in Geology from Colgate University in Hamilton, New York where she was cited for academic excellence. Ms. Bergmann received a Master of Science Degree in Geology from Northern Arizona University upon completion of her thesis entitled "Effects of Artificial Deacidification on Aluminum Mobilization in Shallow Norwegian Soils, Project RAIN, Risdalsheia, Norway."

Professional Memberships

Soil Scientists of America
Association of Ground Water Scientists and Engineers

Experience

Ms. Bergmann has approximately three years of experience, including a wide range of projects involving multimedia investigations including soil, sediment, groundwater, surface water and soil gas. Her responsibilities include both management of budgets, contracts and personnel as well as study design, implementation and interpretation. Ms. Bergmann has developed a great deal of expertise in volatile organic compounds, soil gas collection and analysis, and metals. Part of Ms. Bergmann's experience and current responsibilities involve the design, construction, mobilization and operation of field laboratories for on-site analysis of environmental samples.

Skills used to conduct and implement these investigations include the installation of monitoring wells and EPA and State protocol sampling of groundwater, surface water, soil and tank contents. Ms. Bergmann is responsible for supervising the management and analysis of several clients' physical and chemical data base programs, including installation and training. Software she is experienced in using for data manipulation and interpretation include dBASE III+ and IV, Lotus Symphony, Surfer, Grapher, CSS and SPSS Statistical Packages, WQStat II and Capture.

Ms. Bergmann has studied the migration of metals, particularly aluminum and iron, in soils and the effects of acidic sources such as rain and manufacturing wastes on the desorption, mobility and uptake of metals in the soil. As a field scientist, she participated in an international project involving metals migration in Norwegian soils.

November 1992

Resume
Lawrence F. Roach, P.G.
Senior Hydrogeologist

Education

Mr. Roach received his undergraduate training in geology at Lehigh University in Bethlehem, Pennsylvania and at Skidmore College in Saratoga Springs, New York. In 1979 he graduated with All College Honors and Departmental Honors from Skidmore College and received a Bachelor's Degree. In 1986, Mr. Roach earned a Master's Degree in Business Administration from the University of Tulsa, Tulsa, Oklahoma.

Professional Registrations and Memberships

Registered Professional Geologist - Number 490 - State of Florida
Registered Professional Geologist - Number 330 - State of Arkansas
Registered Professional Geologist - Number 865 - State of Indiana
American Institute of Professional Geologists - Certified
Professional Geological Scientist - Number 7107
Member, Association of Ground Water Scientists and Engineers
Active Member, American Association of Petroleum Geologists

Experience

Mr. Roach has over twelve years of broad technical and management experience in groundwater investigations and property assessments; large groundwater and potable water monitoring programs; regional geologic investigations in many areas of the U.S. and abroad; resource exploration, evaluation, and development for petroleum, coal, uranium, metals and minerals; and landfill design, construction, and operation.

Mr. Roach joined Groundwater Sciences Corporation in February 1988. He serves as a project manager for groundwater investigations, environmental assessments, and groundwater monitoring programs. The projects which he manages range in size up to a major RCRA investigation, which included installing 120 soil and bedrock monitoring wells; multiple aquifer tests; sampling groundwater, surface water, storm water and soils; and maintaining physical and chemical databases.

Prior to joining Groundwater Sciences Corporation, he was employed by Chazen Environmental Services as the Hydrogeology Group Manager and was responsible for the direction and work product of 12 senior geologists, staff geologists and support staff. This group was managed as a stand-alone business and major projects included groundwater investigations at several inactive hazardous waste disposal sites in New York State; water resource investigations; large-scale groundwater sampling and database management; and landfill design, construction, and operation.

Prior to joining Chazen Environmental Services, Mr. Roach managed his own consulting firm and before that was employed by Geological Services of Tulsa. His work during this time included regional-scale geological investigations in over 15 geologic provinces throughout the world in order to determine structure, stratigraphy, lithology, history, formation water geochemistry and resource potential. He served as project manager for many of these studies directing technical, coordination and administrative activities. The other major activity of Mr. Roach during this time was resource exploration. Mr. Roach's duties included technical direction of exploration staff and coordination of landmen, attorneys, bankers, geophysical crews, drillers, well service contractors, suppliers, and landowners.

November 1992

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

CHAIN OF CUSTODY RECORD

Company Name, Location | Project Name/Number/State | Project Coordinator | Air Bill No. | Carrier

SAMPLING DATE	TIME AM PM	COMP	GRAB	SAMPLE I.D. No.		Total Number of Containers	40ml Glass HCL	Liter Amber Sulfuric Acid	Liter Amber Organic Washed	Liter Plastic Nitric Acid	Liter Plastic Sodium Hydroxide	Liter Plastic	Liter Plastic Sulfuric Acid	250ml Plastic	125ml Plastic Sterile	250 ml Amber	2 oz Oorpak		ANALYSIS
																			RE.. .. IVED
																			OCT 12 1992
																			GROUNDWATER SCIENCES CORPORATION

SAMPLE

Relinquished by EnviroTest Laboratories AS PER CONTENT SHEET
Print James P. Murphy
Signature J. P. Murphy

Custody Shipping Number

Date 10/9/92
Time

Received by
Print
Signature
Date
Time

Relinquished by
Print
Signature
Date
Time

Received by
Date
Time

Relinquished by
Print
Signature
Date
Time

Received by ETL
Date
Time

REMARKS

GROUNDWATER SCIENCES CORPORATION
SAMPLING FIELD DATA SHEET

*GENERAL INFORMATION

Sample Location/Well ID ____________ Site ____________

Manhole/Standpipe/Other ____________

Physical Well/Location Condition ____________

*PURGING

Date ______ Personnel ______ Air Temp ____ Skies ____ Wnd Spd/Drctn ______

TD _____ SWL _____ TD - SWL _____ Required Purge Volume ______

Method ______ Start ______ Stop ______ Volume/Minutes ______

WL end of purge (WLEP) _____

*SAMPLING

Sample ID: | | | | | | | | | | | | | GW/Surface/Other ______

Date ______ Personnel ______ Air Temp ____ Skies ____ Wnd Spd/Drctn ______

WL Recovery (WL/time):_____/_____; _____/_____; _____/_____; _____/_____

Sampled Depth Interval: ____ to ____ feet Sampling Method ______ Start ______ Stop ______

*LAB INFO

Lab ____________ Turnaround Time ______ No. of Containers ______

Date Shipped ______ Method Shipped ____________

Analyses Requested ____________

*ADDITIONAL NOTES:

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
Fax (914) 562-0841

November 30, 1992

Mr. Lawrence Roach
Groundwater Science
2601 Market Place Street
Harrisburg, PA 17110-9307

Dear Mr. Roach:

Attached you will find the Quality Assurance Project Plan (QAPP) for the Rainbows End Project.

Please do not hesitate to contact my office if there are any questions on the material presented.

Sincerely,

ENVIROTEST LABORATORIES, INC.

Patricia Chany

Patricia Chany
QA/QC Director

Quality Assurance Project Plan

for

Analytical Services in Support of
Cavalier Gage and Electronic Site, RI
Salt Point, New York

Prepared For:

Groundwater Sciences, Inc.
2601 Market Place Street
Harrisburg, PA 17110-9307

Prepared By:

EnviroTest Laboratories, Inc.
315 Fullerton Avenue
Newburgh, New York 12550

Approved: [signature] Date: 11/30/92
ETL Director
Ronald A. Bayer

Approved: [signature] Date: 11/30/92
ETL QA/QC Director
Patricia Chany

Approved: [signature] Date: 11/30/92
Groundwater Sciences, Inc.
Principal Engineer/
Project Manager
Lawrence Roach

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

TABLE OF CONTENTS

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

TABLE OF CONTENTS (con't)

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED

NOV 30 1992

GROUNDWATER SCIENCES CORPORATION

TABLE OF CONTENTS (con't)

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

TABLE OF CONTENTS (con't)

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

3. PROJECT DESCRIPTION

3.1 Introduction

This Quality Assurance Project Plan (QAPP), submitted by EnviroTest Laboratories, Inc. describes the Quality Assurance and Quality Control (QA/QC) procedures employed to ensure the integrity, validity and usability of the analytical results to be given in support of the Cavalier Gage and Electronic Site, RI in Salt Point, New York. These services will include sample analysis by the 9/91 revision of the NYSDEC Analytical Services Protocol for volatile organic parameters. A project analyte list for this project is given in Table 3.2. Analytical methods are outlined in Table 7.2.

This QAPP presents, in specific terms, the policies, organization, objectives, functional guidelines and specific Quality Assurance and Quality Control activities designed to achieve the data quality requirements of the client and meet all project objectives.

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

Table 3.2 Project Analyte List

SW846-8240 Target Compound List

CAS NO.	COMPOUND	Soil ug/kg
74-87-3	Chloromethane	10
74-83-9	Bromomethane	10
75-01-4	Vinyl chloride	10
75-00-3	Chloroethane	10
75-09-2	Methylene chloride	5
67-64-1	Acetone	10
75-15-0	Carbon disulfide	5
75-35-4	1,1-Dichloroethene	5
75-35-3	1,1-Dichloroethane	5
540-50-0	1,2-Dichloroethene(total)	5
67-66-3	Chloroform	5
107-06-2	1,2-Dichloroethane	5
78-93-3	2-Butanone	10
71-55-6	1,1,1-Trichloroethane	5
56-23-5	Carbon tetrachloride	5
108-05-4	Vinyl acetate	10
75-27-4	Bromodichloromethane	5
78-87-5	1,2-Dichloropropane	5
10061-01-5	cis-1,3-Dichloropropene	5
79-01-6	Trichloroethene	5
71-43-2	Benzene	5
124-48-1	Dibromochloromethane	5
10061-02-6	trans-1,3-Dichloropropene	5
79-00-5	1,1,2-Trichloroethane	5
75-25-2	Bromoform	5
108-10-1	4-Methyl-2-pentanone	10
591-78-6	2-Hexanone	10
79-34-5	1,1,2,2-Tetrachloroethane	5
127-18-4	Tetrachloroethene	5
108-88-3	Toluene	5
108-90-7	Chlorobenzene	5
100-41-4	Ethylbenzene	5
100-42-5	Styrene	5
133-02-7	m-Xylene	5
	o,p-Xylene	5
95-63-6	1,2,4-trimethylbenzene	5
108-67-8	1,3,5-trimethylbenzene	5
76-13-1	Freon-113	5

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841
EPA NY049

Table 3.2 Project Analyte List, con't.

524.2 Target Compound List

CAS NO.	COMPOUND	Water ug/l
71-43-2	Benzene	0.5
108-86-1	Bromobenzene	0.5
74-97-5	Bromochloromethane	0.5
75-27-4	Bromodichloromethane	0.5
75-25-2	Bromoform	0.5
74-83-9	Bromomethane	0.5
104-51-8	n-Butylbenzene	0.5
135-98-8	sec-Butylbenzene	0.5
98-06-6	tert-Butylbenzene	0.5
56-23-5	Carbon tetrachloride	0.5
108-90-7	Chlorobenzene	0.5
75-00-3	Chloroethane	0.5
67-66-3	Chloroform	0.5
74-87-3	Chloromethane	0.5
95-49-8	2-Chlorotoluene	0.5
106-43-4	4-Chlorotoluene	0.5
124-48-1	Dibromochloromethane	0.5
106-93-4	1,2-Dibromoethane	0.5
74-95-3	Dibromomethane	0.5
95-50-1	1,2-Dichlorobenzene	0.5
541-73-1	1,3-Dichlorobenzene	0.5
106-46-7	1,4-Dichlorobenzene	0.5
75-71-8	Dichlorodifluoromethane	0.5
75-34-3	1,1-Dichloroethane	0.5
107-06-2	1,2-Dichloroethane	0.5
75-35-4	1,1-Dichloroethene	0.5
156-59-4	cis-1,2-Dichloroethene	0.5
156-60-5	trans-1,2-Dichloroethene	0.5
10061-01-5	cis-1,3-Dichloropropene	0.5
10061-02-6	trans-1,3-Dichloropropene	0.5

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Table 3.2 Project Analyte List

524.2 Target Compound List, con't.

CAS NO.	COMPOUND	ug/l
78-87-5	1,2-Dichloropropane	0.5
142-28-9	1,3-Dichloropropane	0.5
590-20-7	2,2-Dichloropropane	0.5
563-58-6	1,1-Dichloropropene	0.5
100-41-4	Ethylbenzene	0.5
87-68-3	Hexachlorobutadiene	0.5
98-82-8	Isopropyl benzene	0.5
99-87-6	4-Isopropyltoluene	0.5
75-09-2	Methylene chloride	0.5
91-20-3	Naphthalene	0.5
103-65-1	n-Propylbenzene	0.5
100-42-5	Styrene	0.5
630-20-6	1,1,1,2-Tetrachloroethane	0.5
108-67-8	1,3,5-Trimethylbenzene	0.5
79-34-5	1,1,2,2-Tetrachloroethane	0.5
79-01-6	Tetrachloroethene	0.5
108-88-3	Toluene	0.5
87-61-6	1,2,3-Trichlorobenzene	0.5
120-82-1	1,2,4-Trichlorobenzene	0.5
71-55-6	1,1,1-Trichloroethane	0.5
79-00-5	1,1,2-Trichloroethane	0.5
79-01-6	Trichloroethene	0.5
75-69-4	Trichlorofluoromethane	0.5
96-18-4	1,2,3-Trichloropropane	0.5
95-63-6	1,2,4-Trimethylbenzene	0.5
75-01-4	Vinyl chloride	0.5
95-47-6	o-Xylene	0.5
	m,p-Xylene	0.5
96-12-8	1,2-Dibromo-3-chloropropane	0.5
76-13-1	Freon 113	0.5

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

4. ORGANIZATION AND PERSONNEL

4.1 QA Policy and Objectives

4.1.1 The primary objective of analytical Quality Assurance/Quality Control for this project is to ensure the integrity and usefulness of the analytical results. Data quality is assessed for precision, accuracy, completeness, representativeness and comparability.

4.1.2 The routine analysis of replicate and spiked samples will provide precision and accuracy data for assessing the validity of analytical results. These Quality Control measures, their control limits and frequency are summarized in Tables 7.4 and 7.5. The control limits listed in these tables are established by the NYSDEC CLP program or are experimentally determined criteria.

4.1.3 Strict quality control requirements are established to ensure the reliability and credibility of the analytical results. All sample analysis reports contain documentation of a series of QC operations that are performed to demonstrate that the laboratory has met these stringent requirements in the analysis of samples.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

4.2 QA Management

4.2.1 Organization and Responsibilities

The responsibilities of the individuals associated with this Quality Assurance Project Plan (QAPP) are described below and illustrated in Figure 4.3:

The Project Manager has overall responsibility for management of the analytical requirements of the project. The duties and responsibilities of the project manager are to:

A. Administer and supervise all requirements of the analytical tasks to ensure meeting project objectives on schedule.
B. Act as liason between the laboratory and Groundwater Sciences, Inc. to discuss and resolve any problems associated with the project.
C. Work with laboratory supervisors in planning and conducting project progress meetings.
D. Take part in corrective actions.

The Sample Management Supervisor acts as sample custodian for the laboratory. The duties and responsibilities of the sample management supervisor are to:

A. Sign for the incoming field samples and verify the data entered on the chain-of-custody forms.
B. Advise the project manager of discrepancies, omissions or inappropriate samples.
C. Prepare laboratory site sheet and internal chain-of-custody documents.
D. Oversee sample information entry into the laboratory sample data base.
E. Generate computerized sample tracking data entry forms.
F. Transfer samples and laboratory internal chain-of-custody documents to laboratory project analysts.

315 Fullerton Avenue
Newburgh, NY 12560
(914) 562-0890

4.2.1 Organization and Responsibilities (cont.)

The System Manager is responsible for:

A. The management and quality control of all computing systems.
B. The installation, operation and maintenance of software and programs.

The QA/QC Director is responsible for reviewing and advising on all aspects of QA/QC. The duties and responsibilities of the QA/QC Director are to:

A. Assist the Project Manager in specifying QA/QC procedures to be used during the project.
B. Implement quality control procedures and techniques to assure that the laboratory achieves established standards of quality.
C. Evaluate data quality and maintain records on related QC charts and other pertinent information.
D. Monitor laboratory activities to determine conformance with the authorized quality assurance policy, and to implement appropriate steps to ensure adherence to quality assurance programs.
E. Coordinate internal audits with the Project Manager.
F. Review performance evaluation results.
G. Administer intralaboratory and interlaboratory QA efforts.
H. Prepare quality assurance report to management.

The Laboratory Supervisors are responsible for meeting all the technical and analytical terms and conditions of the project. Their areas of responsibilities are to:

A. Organize the personnel, equipment and materials in a manner required to fulfill the analytical requirements of the project.
B. Oversee all aspects of laboratory analyses and provide technical support when necessary.
C. Review analytical data for validity and clarity.
D. Maintain contact with the Project Manager in areas of technical concern, and advise the Project Manager of analytical progress, needs and of potential problems that occur.

4.2.1 Organization and Responsibilities (cont.)

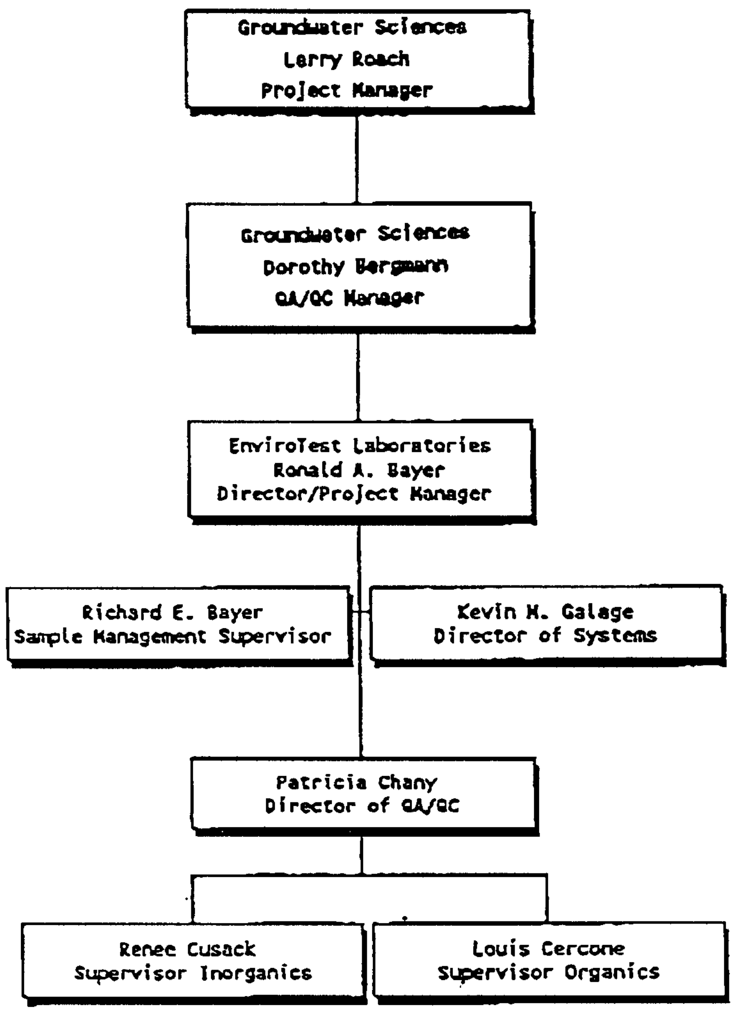
The Project Analysts are responsible for the analysis of samples as identified in the project contract. The analysts will:

A. Schedule, prepare and analyze samples according to the NYSDEC CLP requirements as defined in the contract.
B. Advise the laboratory supervisor of progress, needs and potential problems that occur.
C. Verify that the laboratory QC and analytical procedures are being followed as specified.
D. Review sample QC data, at least daily, including an inspection of raw chromatograms and calibration curves.
E. Inform laboratory supervisors if the daily review indicates a decline in data quality and implement actions.

4.2.2 QA Document Control Procedures

The goal of the program is to assure that all documents for a group of samples will be accounted for when the project is completed. Before releasing analytical results, the laboratory assembles and cross checks the information of custody records, lab bench sheets, analyst and instrument logs and other relevant data to ensure that data pertaining to each particular sample is consistent throughout the record.

Figure 4.3
Project Organizational Chart



315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

4.2.3 QA Program Assessment Procedures

A. Levels of QC Efforts - Every attempt will be made to have all data generated be valid data. The precision of laboratory analysis will be evaluated using sample duplicates and matrix spike duplicates. Analytical accuracy will be monitoring using recovery of analytes from system monitoring compounds, matrix spikes, blank spikes, EPA reference check standards and Performance Evaluation (PE) samples. These quality control measures and frequencies are summarized in Table 7.5. These QA efforts will assist in determining the reliability of the analytical data.

B. Accuracy and Precision - Accuracy is a measure of the degree of agreement between an analyzed value and the true or accepted reference value where it is known. Accuracy is usually expressed as a percent recovery. Precision is a measure of the mutual agreement among individual measurements of the same parameter under similar conditions, usually expressed as a relative percent difference or as standard deviation. Accuracy and precision in the laboratory are assessed by the regular analysis of known standards and duplicate samples.

C. Completeness - Completeness is a measure of the amount of valid data obtained from the analytical measurement system, expressed as a percentage of the number of valid measurements that should have been or were planned to be collected. EnviroTest will make every attempt to generate valid data from all samples received. However, realistically, some samples may be lost in laboratory accidents or some results may be deemed questionable based on internal QC procedures. Due to the variable nature of the completeness value, the objective will be to have data completeness for all samples received for analysis as high as possible to meet completeness objectives as described by the client.

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

4.2.3 QA Program Assessment Procedures (cont.)

D. Representativeness - Representativeness is a measure of how closely the measured results reflect the actual concentration or distribution of the chemical compounds in the sample. Sampling will be performed by the client. Sample handling protocols (e.g., storage, preservation and transportation) have been developed to preserve the representativeness of the collected samples. Proper documentation will establish that protocols have been followed and that sample identification and integrity have been assured.

E. Comparability - Comparability is a QA objective wherein all sample data is comparable with other representative measurements made by EnviroTest or another organization. EnviroTest Laboratories, Inc. will achieve comparability by operating within the instrument linear range and by strict adherence to analytical protocols. The use of published analytical methods, standard reporting units and thorough documentation will ensure meeting this objective.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

Table 4.2 CONTAINER TYPES & PRESERVATIVES

Analysis	Bottle Type	Preservative
Soil		
Volatile organics	Qorpak	Cool 4C
Water		
Volatile Organics	4 glass 40ml	hydrochloric acid Cool 4C

EnviroTest Laboratories Inc.
316 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

4.3 Personnel

4.3.1 Education and Experience Pertinent to This Protocol

Ronald A. Bayer - M.S., Environmental Science, Syracuse University, Syracuse, New York.
President, CEO, founder and laboratory director.
Experience: 18 years

Douglas O. Tawse - MBA, University of NH, Durham, NH.
Responsibilities: Vice President, Partner.
Experience: 5 years Xerox, 5 years Environmental Industry; 6 years EnviroTest

Louis J. Cercone III - B.S., Chemistry, Mount Saint Mary College, Newburgh, New York.
Responsibilities: Supervisor Organic Chemistry
Experience: 14 years

Renee M. Cusack - B.S., Biology, Mount Saint Mary College, Newburgh, New York.
Responsibilities: Supervisor Metals, Wet Chemistry and Microbiology.
Experience: 14 years

Richard E. Bayer - Certified Wastewater Treatment Plant Operator.
Responsibilities: Supervisor Sample Management and Field Service.
Experience: 13 years

Patricia V. Chany - B.S., Environmental Chemistry, Empire State College.
Responsibilities: Director Quality Assurance/ Quality Control
Experience: Environmental Industry: 3 years Organic Supervisor; 2 years QA/QC Manager; 5 years GC/MS Analyst; 3 years EnviroTest

Kevin M. Galage - B.S., Management Information Systems, Fairfield University, Fairfield, CT.
Responsibilities: Director, Systems and Finance
Experience: 4 years

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

5. FACILITIES AND EQUIPMENT

5.1 Instrumentation

Instrument	Number	Manufacturer	Model
Organics			
GC/MS	2	Hewlett-Packard	5996
GC/MSD	1	Hewlett-Packard	5890/5970B
GC/MSD w/7673 Autosampler	1	Hewlett-Packard	5890/5970B
Purge & Trap Equipment	1	Tekmar	LSC-2000
	4	Tekmar	LSC-2
	4	Tekmar	ALS
	1	Tekmar	ALS-2016
	1	O.I.	4460A
	1	O.I.	MPM16
HP 1000 Series E Computer	1	Hewlett-Packard	
HP 1000 Series A Computer	3	Hewlett-Packard	A400
Liquid Chromatograph (HPLC)	1	Varian	5060
Gas Chromatographs (GC)	2	Varian	3700
	1	Varian	Vista 6000
	2	Varian	3400/w 8000
	1	Hewlett-Packard	5890
Detectors			
Electron Capture (ECD)	3	Varian	
Flame Ionization (FID)	3	Varian	
Hall	2	Tracor	700A
Hall	1	O.I.	
Nitrogen Phosphorous	1	Varian	
Photoionization (PID)	2	Tracor	
Photoionization (PID)	1	h-NU Systems	
Variable Wavelength UV	1	Varian	5060

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

Instrument	Number	Manufacturer	Model
Organics (cont.)			
Gel Permeation Chromatography (GPC)	1	Zymark	Bench Mate
TOX Analyzer	1	Dohrmann	DX-20
Inorganics			
Inductively Coupled Plasma with ISCO Auto Sampler	1	Applied Research	3410
Inductively Coupled Plasma with Aim Auto Sampler and Ultrasonic Nebulizer	1	Applied Research	3560B
Atomic Absorption Spectrophotometer	1	Instrumentation Laboratories	Video 22 (dual element)
AVA Hydride Generator	1	Instrumentation Laboratories	440
Graphite Furnace	1	Varian	400Z
AA/GFAA/VGA	1	Varian	20
Ion Chromatograph	1	Dionex	4000I
Microwave Digester	2	CEM	MDS-81D
Infrared Spectrometer	1	Perkin Elmer	1310
Cold Vapor Mercury Analyzer	1	Spectro Products, Inc.	HG-4
Automated TOC Analyzer	1	Dohrmann	DC-80
Auto Analyzer	1	Orion Scientific	
TCLP/ZHE (4 Station)	2	Associated Design	
Closed Cup Flash Point	2	Pensky Marten	
Bomb Calorimeter	1	Parr	

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

Instrument	Number	Manufacturer	Model
Laboratory Information Management System			
Lab Management System Multi User (Seedpak I)	1	Automated Compliance Systems	
Lab Management System Multi User (Seedpak II)	2	Automated Compliance Systems	
Personal Computers	22	IBM	
Laser Printer	3	Hewlett-Packard	Series 2
Terminals	11	Wyse 60	

5.2 Maintenance Activities and Schedules

5.2.1 Instrument preventive maintenance and careful calibration help to assure accurate measurements from laboratory instruments. All laboratory instrumentation is on a service contract with the applicable instrument manufacturer or licensed service organization. The service contracts include regular preventative maintenance service calls on a scheduled basis.

5.2.2 Preventive maintenance procedures such as lubrication, source cleaning, detector cleaning and the frequency of such maintenance are performed according to the procedures delineated in the manufacturer's instrument manual.

5.2.3 Instrument logbooks are in the laboratory at all times. They contain records of usage, calibration, maintenance and repairs. Adequate supplies of spare parts such as GC columns, syringes, septa, injection port liners, and electronic parts are maintained in the laboratories so that they are available when needed.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

5.3 Waste Disposal Facilities

5.3.1 Laboratory hazardous waste products are properly disposed of according to the applicable local, state, and federal hazardous waste regulations by a NYSDEC and EPA Registered hazardous waste hauler.

5.3.2 Prior to disposal EnviroTest stores all hazardous waste samples separately from non-hazardous samples. Also, all waste solvents and standards are labelled, segregated and secured for lab packing according to specific laboratory SOP's.

316 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

6. DOCUMENT CONTROL

6.1 Laboratory Notebook Policy

6.1.1 All observations and results recorded by EnviroTest Laboratories are entered into the laboratory data entry system or into permanent laboratory logbooks. Data recorded are referenced with the project number, date and analyst's signature at the top of the page. All pertinent data are maintained in the project file.

6.1.2 All logbook and other document entries are made in ink. Any corrections made in a logbook will be made by crossing a line through the error and entering the correct information. The person will subsequently date and initial the correction. Corrections made to other data records are made by crossing a single line through the error, entering the correct information and initialing and dating the correction.

6.2 Samples Tracking/Custody Procedures

6.2.1 Samples are received at the laboratory by the sample custodian or designee who removes the samples from the shipping containers together with all accompanying documentation such as chain-of-custody forms, analysis request forms, etc. The samples are inspected for general condition and the letter or chain of custody received with any samples is examined for discrepancies between package contents and the enclosed documents.

6.2.2 Discrepancies, omissions, or inappropriate samples discovered will be noted and discussed with the Project Manager who will contact the client to resolve the problem. If the client cannot be reached, the samples will be assigned to cold storage until the problem is resolved. Samples delivered directly by the sample collector are received and inspected by the Sample Custodian or designee in the presence of the sample collector. Discrepancies, omissions, or inappropriate samples should be noted and discussed with the sample collector to resolve the problem.

EnviroTest
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED

NOV 30 1992

GROUNDWATER SCIENCES CORPORATION

6.2 Samples Tracking/Custody Procedures (cont.)

6.2.3 Samples receipted through chain of custody by the Sample Custodian or designee before 4PM will be assigned an EnviroTest (ETL) laboratory number. The individual samples will be identified by the laboratory number followed by 01, 02, etc., in the exact sequential order that the samples are entered on the chain-of-custody form. Samples receipted through chain-of-custody by the Sample Custodian or designee after 4 PM will be assigned an ETL project ID number and will be held at 4 degrees C until the following business day.

6.2.4 The Sample Custodian or designee will complete the ETL Sample Log with the ETL laboratory number and corresponding client ID number. The ETL laboratory number will be written on the client sample bottle. All documents will be reviewed a second time to ensure that there are no transposition errors. The project manager or designee will validate the accuracy of the sample log-in procedure.

6.2.5 The samples will be entered by sample entry into the laboratory sample data base upon successful completion of the sample log-in procedure. Sample entry will prepare a laboratory chronicle for all projects which will be used for regulatory purposes.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

6.3 Case File Organization, Preparation and Review Procedures

6.3.1 Case file folders will be created upon sample receipt by the sample custodian or designated person. One file folder will be assigned for each separate case. All documents, sample tags (if applicable), custody forms, and all other laboratory data pertaining to a particular case must be placed in the folder as they are generated. Documents will be arranged by type within the folder, in creation-order sequence, and in ascending sample number sequence. Case file folders will be stored in one secure area with access limited to authorized personnel. Authorized personnel are limited to Supervisors, Lab Director, QC Officer, Sample Custodian or designee.

6.4 Procedures for Preparation, Approval, Review, Revision and Distribution of SOP's

6.4.1 Standard Operation Procedures are prepared to provide direction for the step-by-step execution of an operation, analysis or action which is used as the method for performing laboratory routines and analyses. All EnviroTest SOP's reflect current laboratory operations. SOP's are prepared by the QA/QC Department with initial review conducted by the applicable Section Supervisor. Final review and approval is conducted by the Laboratory Director. All SOP's are reviewed regularly by the appropriate Section Supervisor and update as necessary when the laboratory procedural modifications are made. The SOP's are archived on disk for future reference and the appropriate SOP's are made available as a reference material for laboratory analysts.

EnviroTest

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

7. ANALYTICAL METHODOLOGY

7.1 Calibration Procedures and Frequency

7.1.1 Volatile Organics - GC/MS

A. GC/MS instruments are tuned to meet required mass spectral abundance criteria prior to both initial and continuing calibrations. This is accomplished via the analysis of p-bromofluorobenzene (BFB).

B. Initial calibration for GC/MS volatiles consists of a 5 calibration standards containing each target analyte plus surrogate and internal standard compounds. The validity of the initial calibration is verified by:
- % relative standard deviation (RSD) of the relative response factor (RRF) for target compound.
- minimum RRFs for each compound. - assessment of the relative retention time (RRT) shift for each compound between each standard run.

C. Continuing calibration is performed by analysis of a 50 ug/l standard at a frequency of once every 12 hours. The continuing calibration standard must be preceded by a successful instrument tune. The validity of the continuing calibration is verified by:
- assessment of % difference (%D) of the RRFs versus the initial calibration average RRF for each compound.
- minimum RRFs for each compound.
- RRT shift for each compound between successive calibration runs.

D. Standards Preparation Procedures

Calibration Standards
- Purchase commercially available certified stock solutions.
- Prepare working standards by dilution of the stock standards.
- Verify the working standards by analysis of a calibration check standard prepared independently from standards.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

7.1.2 Low Level Volatile Organics - GC/MS

A. GC/MS instruments are tuned to meet required mass spectral abundance criteria prior to both initial and continuing calibrations. This is accomplished via the analysis of p-bromofluorobenzene (BFB).

B. Initial calibration for GC/MS volatiles consists of a 5 calibration standards containing each target analyte plus surrogate and internal standard compounds. The validity of the initial calibration is verified by:
   - % relative standard deviation (RSD) of the relative response factor (RRF) for target compound.
   - minimum RRFs for each compound. - assessment of the relative retention time (RRT) shift for each compound between each standard run.

C. Continuing calibration is performed by analysis of a 5.0 ug/l standard at a frequency of once every 12 hours. The continuing calibration standard must be preceded by a successful instrument tune. The validity of the continuing calibration is verified by:
   - assessment of % difference (%D) of the RRFs versus the initial calibration average RRF for each compound.
   - minimum RRFs for each compound.
   - RRT shift for each compound between successive calibration runs.

D. Standards Preparation Procedures

   Calibration Standards
   - Purchase commercially available certified stock solutions.
   - Prepare working standards by dilution of the stock standards.
   - Verify the working standards by analysis of a calibration check standard prepared independently from standards.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Table 7.4 Quality Control Objectives

Volatile Organics - NYSDEC ASP Protocols

Sample Type	Parameter	Control Limit
Holding Blank (b)	Any project analyte	≤ 5 x CRQL
Method Blank (b)	Methylene Chloride	≤ 5 x CRQL
	Acetone	≤ 5 x CRQL
	Toluene	≤ 5 x CRQL
	2-Butanone	≤ 5 x CRQL
	any other project analyte	≤ CRQL
		Max. %Diff.
Continuing Calibration	All Compounds except the following	25
	Chloromethane	100
	Chloroethane	100
	Methylene Chloride	100
	Acetone	100
	Carbon Disulfide	100
	1,2-Dichloroethylene (total)	100
	2-Butanone	100
	1,2-Dichloropropane	100
	4-Methyl-2-pentanone	100
	2-Hexanone	100

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

Table 7.4 Quality Control Objectives (cont.)

Volatile Organics - NYSDEC ASP Protocols (cont.)

Sample Type	Parameter	Control Limit	
		aqueous	soils
System Monitoring Compounds	d4-1,2-Dichloro-ethane	76-114%	70-121%
	d8-Toluene	86-110%	84-138%
	4-Bromofluoro-benzene	86-115%	59-113%
		aqueous	
Matrix Spike/ Matrix Spike Duplicate	1,1-Dichloro ethylene	61-145% ≤ 14 RPD	
	Trichloroethylene	71-120% ≤ 14 RPD	
	Benzene	76-127% ≤ 11 RPD	
	Toluene	76-125% ≤ 13 RPD	
	Chlorobenzene	75-130% ≤ 13 RPD	
		soil	
Matrix Spike/ Matrix Spike Duplicate (cont.)	1,1-Dichloro ethylene	59-172% ≤ 22 RPD	
	Trichloroethylene	62-137% ≤ 24 RPD	
	Benzene	66-142% ≤ 22 RPD	
	Toluene	59-139% ≤ 24 RPD	
	Chlorobenzene	60-133% ≤ 21 RPD	

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

Table 7.4 Quality Control Objectives (cont.)

Volatile Organics - NYSDEC ASP Protocols (cont.)

Sample Type	Parameter	Control Limit
		aqueous
Blank Spike	1,1-Dichloroethylene	61-145%
	Trichloroethylene	71-120%
	Benzene	76-127%
	Toluene	76-125%
	Chlorobenzene	75-130%
Reference Standard	All compounds	Must be within the established control limits

CRQL - Contract Required Quantitaion Limit
RF - Response Factor
RPD - Relative Percent Difference

(b) - Unless otherwise requested the holding blank and method blank are aqueous samples prepared by EnviroTest Laboratories which are submitted for analysis by the laboratory.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

Table 7.4 Quality Control Objectives (cont.)

Volatile Organics - NYSDEC ASP Protocols
Low Concentration Organics

Sample Type	Parameter	Control Limit
Holding Blank (b)	Any target compound	≤ CRQL
	Non target compound	≤ 2 ug/l
Method Blank (b)	Any target compound	≤ CRQL
	Non target Compound	≤ CRQL
		Max. %Diff.
Continuing Calibration	All Compounds except the following	30
	Chloromethane	100
	Chloroethane	100
	Methylene Chloride	100
	Acetone	100
	2-Butanone	100
	1,2-Dichloropropane	100
	4-Methyl-2-pentanone	100
	2-Hexanone	100

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562 0841

Table 7.4 Quality Control Objectives (cont.)

Volatile Organics - NYSDEC ASP Protocols
Low Concentration Organics

Sample Type	Parameter	Control Limit
		aqueous
System Monitoring Compounds	d4-1,2-Dichloroethane	76-114%
	d8-Toluene	88-110%
	4-Bromofluorobenzene	86-115%
		aqueous
Matrix Spike/ Matrix Spike Duplicate	1,1-Dichloro ethylene	61-145% ≤ 14 RPD
	Trichloroethylene	71-120% ≤ 14 RPD
	Benzene	76-127% ≤ 11 RPD
	Toluene	76-125% ≤ 13 RPD
	Chlorobenzene	75-130% ≤ 13 RPD
		aqueous
Blank Spike	1,1-Dichloro ethylene	61-145%
	Trichloroethylene	71-120%
	Benzene	76-127%
	Toluene	76-125%
	Chlorobenzene	75-130%

CRQL - Contract Required Quantitaion Limit
RF - Response Factor
RPD - Relative Percent Difference

(b) - Unless otherwise requested the holding blank and method blank are aqueous samples prepared by EnviroTest Laboratories which are submitted for analysis by the laboratory.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

Table 7.5 Quality Control Measures and Frequency

Volatile Organics - NYSDEC ASP Protocols

Sample Type	Frequency
Holding Blank	One per bottle set
Laboratory Method Blank	One per 12 hour time period
Continuing Calibration	One per 12 hour time period
System Monitoring Compounds	Added to each sample, matrix spike, matrix spike duplicate, blank and standard.
Matrix Spike/Matrix Spike Duplicate, Blank Spike and Reference Standard	One per: each case of field samples received; each 20 field samples in a case; each group of samples of a similar concentration level (soils only); or each 14 calendar day period during which samples were received - whichever is more frequent.
GC/MS Tuning	Once per day or per 12 hour period, whichever is more frequent.
Performance Evaluation Samples	As required for State certifications and CLP

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED

NOV 30 1992

GROUNDWATER SCIENCES CORPORATION

7.2 Analytical Procedures

7.2.1 The analytical procedures to be used in this project are contained in the Test Methods for Evaluation Solid Waste, USEPA-SW846, Third Edition, September 1986 with all current revisions and the New York State Department of Environmental Conservation, Analytical Services Protocol, September 1989, 12/91 revisions. These methods are summarized in Table 7.2. The Project Compound List for these protocols is contained in Table 3.2.

EnviroTest Laboratories Inc.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562 0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

Table 7.2 Summary of Analytical Methods

Analysis	Aqueous	Ground Water Liquid/solid Matrices
Volatile Organics	EPA-624(5) EPA-524.2(8)	SW846-8240(2)

References
1. "Methods for Chemical Analysis of Water and Wastewater", EPA-600/4-79-020, March 1983.
2. "Test Methods for Evaluating Solid Waste", USEPA-SW846, Third Edition, September 1986 with all current revisions.
3. Atomic Absorption - Direct Aspiration
4. Atomic Absorption - Furnace Technique
5. Federal Register, V. 50 No. 3, January 4, 1985.
6. Federal Register, V. 49, No. 209, October 26, 1984.
7. "Standard Methods for the Examination of Water and Wastewater", 16th Edition, 1986.
8. "Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1988.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562 0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

8. DATA GENERATION

8.1 Data Reduction

8.1.1 Analysis results will be reduced to the concentration units specified in the analytical procedures using the equations provided in the analytical references listed in Section 7.2. All calculations will be independently checked by senior laboratory staff.

8.2 Data Validation

8.2.1 Data validation is the process by which analytical data are evaluated and accepted or rejected based on a set of criteria. EnviroTest personnel use the following criteria in the validation of laboratory data:
- use of published or approved analytical procedures
- use of properly operating and calibrated instrumentation
- precision and accuracy achieved comparable to that achieved in similar analytical programs
- precision, accuracy and blank contamination meeting project specific criteria is outlined in Table 7.4
- completeness of data set

8.2.2 All data will be validated by laboratory supervisors and QA/QC Director prior to being released for reporting purposes to the EnviroTest Project Manager. The persons validating the data will have sufficient knowledge of the technical work to identify questionable values. All analyses requiring EnviroTest protocols will be validated in accordance with the requirements of those protocols.

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

8.3 Data Reporting and Authorization Procedures

8.3.1 Figure 7.3 depicts the analytical data reduction, validation and reporting process. Key personnel who will handle data gathering and evaluation are shown in the Project Organization Chart (Figure 4.3). EnviroTest uses a computerized sample tracking system for routine tracking and reporting of analysis data.

Reports will include:

- sample results
- statement of methods for each parameter
- date of sample receipt
- initialed chain-of-custody form
- minimum detection limits for each method
- sample extraction and analysis dates

The reports issued will include a cover page/case narrative which will outline the case specifics and any problems or corrective actions.

8.3.2 EnviroTest uses a custom designed data management system for reporting NYSDEC CLP inorganics and organics data according to the protocol.

8.3.3 Data acceptance is based on the specific criteria contained within the specific analytical method protocols and requirements. The data must be adequate to meet the precision and accuracy requirements of the specific analytical project under which the samples are submitted. The data will be complete, in terms of the analytical work performed versus what was requested and be representative of the sampling site under consideration.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED

NOV 30 1992

GROUNDWATER SCIENCES CORPORATION

9. QUALITY CONTROL

9.1 Internal Quality Control

9.1.1 Quality Control is the routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process. Quality Control checks are the application of EnviroTest's Quality Control program for laboratory analysis in order to ensure the generation of valid analytical results on project samples. These checks are performed by project participants throughout the program under the guidance of the Director of Quality Assurance/ Quality Control.

9.1.2 EnviroTest makes use of a number of different types of QC samples to document the validity of the generated data. The following types of QC samples are used routinely:

A. Blank Samples - Blanks are used to assess contamination introduced in transit, storage or in the laboratory.
  - Preparation Blanks - For inorganic analyses, these deionized water blanks are prepared using the same reagents and analytical procedures as the samples, in order to assess possible laboratory contamination.
  - Laboratory Method Blanks - For organic analyses, these blanks are "clean" samples, prepared in the laboratory to include surrogates, and analyzed according to a prescribed method in order to assess possible laboratory contamination.
  - Laboratory Holding Blank - For organic analyses, these blanks are placed in cold storage with the volatile organics samples during the holding time to assess contamination which may be introduced in storage.
  - Calibration Blanks - For all analyses, these blanks are used in instrument calibration and contain all the reagents used in preparing instrument calibration standards except the parameters of interest.

B. Initial and Continuing Calibration Verification - Verification samples are analyzed during each analysis run to assure calibration accuracy for each analyte. For inorganic analysis, these are prepared from a source other than that used for calibration.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

9.1 Internal Quality Control (cont.)

C. System Monitoring Compound - For organic analyses, all samples are spiked with surrogate compounds prior to sample preparation in order to assess the behavior of actual components in individual samples during the entire preparative and analysis scheme. Surrogate standard compounds are chemically similar to compounds of interest (target compounds).

D. Matrix Spikes/Analytical Spikes - For all analyses at frequencies particular to each method, spiking solutions are added to samples in order to evaluate any matrix effect of the samples on the analytical method. Matrix spikes and analytical spikes are performed using actual elements of interest or target compounds.

E. Duplicate Samples - For all analyses, a second aliquot of a sample carried through all sample preparation and analysis procedures to verify the precision of the analytical method. At least one sample in each analysis batch of 20 or fewer samples is analyzed in duplicate.

F. Laboratory Control Samples - For inorganic analyses, at least one sample in each preparation batch of 20 or fewer samples is prepared and analyzed for each analyte of interest, in order to verify the preparation and analytical methods.

G. Blank Spikes - For organic analyses, reagent water is spiked with all the target analytes.

Reagents used in the laboratory are normally of analytical reagent grade or higher purity. Each lot of acid or solvent received is checked for acceptability prior to lab use. All reagents are labeled with the date received and date opened. The quality of the laboratory deionized water is continuously monitored through the use of an in-line conductivity meter.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

9.2 Internal Quality Assurance

9.2.1 To monitor quality, EnviroTest QA/QC Department conducts internal quality assurance audits including:

A. QC Blind Samples - Blind samples prepared by EnviroTest's QA/QC Department are sent to the laboratory for analysis. These duplicate and/or spiked samples or standards are submitted as "blind" QC samples, those which are not recognizable to the analyst. These blind samples are inserted into the sample flow at the time the samples are logged in. Each section receives blind QC samples at least once per quarter. Lab and/or Project Managers may request that samples be submitted more frequently.

B. Internal Data Audit - Once per month a representative set of data is chosen randomly from work completed the previous month for one or more of EnviroTest's commercial clients. This data review includes each laboratory section.

C. Internal laboratory Audits - The QA/QC Director will perform laboratory audits quarterly or as needed. This involves evaluation of:
- sample storage
- chain of custody
- instrument maintenance
- documentation
- precision
- accuracy

The results of the above procedures are distributed to laboratory and project personnel. In addition the QA/QC coordinators will meet periodically with the project manager and laboratory supervisor to review QA/QC data summaries and other pertinent information. Further, the Director of Quality Assurance Quality Control prepares quarterly reports summarizing the performance of measurement systems and data quality.

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

10. QUALITY ASSURANCE

10.1 System and Performance Audits

10.1.1 System Audits - A system audit is an evaluation of the various components of a laboratory's measurement system to assess proper selection and use. This audit will consist of an on-site review of a laboratory's quality assurance systems and physical facilities for sampling, calibration and measurements. System audits are performed on a regular basis by the NYSDEC. The audit may include several or all of the components listed below:

- Personnel, facilities and equipment
- Chain-of-custody procedures
- Instrument calibration and maintenance
- Standards preparation and verification
- Analytical procedures
- Quality control procedures
- Data handling procedures
- Documentation control procedures

10.1.2 Performance Audits - Performance audits provide a systematic check of laboratory operations and measurement systems by comparing independently obtained data with routinely obtained data. EnviroTest routinely participates in laboratory performance evaluations for the NYSDOH ELAP as part of the Non-potable and Potable Water Chemistry Programs. The laboratory also participates in the U.S. EPA laboratory performance evaluation as part of the Water Supply (WS) and Water Pollution (WP) programs. A schedule for EnviroTest's participation in these performance evaluations is detailed in Table 10.1.

RE EIVED

NOV 30 1992

GROUNDWATER SCIENCES CORPORATION

Table 10.1 Laboratory Performance Evaluation Schedule (1 yr)

Source	1st quarter	2nd quarter	3rd quarter	4th quarter
EPA WS		X		X
EPA WP	X		X	
NYSDEC Potable		X		X
- Non-potable	X		X	

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

10.2 Specific Routine Procedures To Assess Data Precision, Accuracy And Completeness

10.2.1 Precision - Precision is a measure of the degree of agreement between repeated measurements of the same parameter under prescribed, similar conditions. Analytical precision will be monitored using results from duplicate analyses. The program analytical precision goals, expressed as relative percent difference (RPD), are presented in Table 7.4. The RPD is expressed as follows:

$$RPD = \frac{D1-D2}{(D1 + D2)/2} \times 100$$

where RPD = Relative Percent Difference

D1 = First Duplicate Value (percent recovery)

D2 = Second Duplicate Value (percent recovery)

10.2.2 Accuracy - Accuracy is the degree of agreement between the true value of the parameter being measured and the observations made according to the test method. Accuracy will be evaluated by comparing the recovery of the parameters of interest against the goals established in Section 7 through the use of EPA Quality Control Samples or NBS Standard Reference Materials. The recovery of a compound will be defined as:

$$\text{Percent Recovery} = \frac{Qd}{Qa} \times 100\%$$

where Qd = quantity determined by analysis

Qa = true value

Accuracy criteria for this project are included in Table 7.4.

315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

10.2.3 Completeness - Completeness is a measure of the amount of valid data obtained from the analytical measurement system. The QA objective for this study is to obtain acceptable data for all of the samples received. The procedures in Section 8 of this QA Plan for validating data will be used to determine which data are acceptable.

10.3 Corrective Action

10.3.1 An important part of any quality assurance program is a well-defined effective policy for correcting quality problems. EnviroTest maintains a closed-loop corrective action system which operates under the direction of the QA/QC Director. While the entire quality assurance program is designed to avoid problems, it also serves to identify and correct those that may exist. Usually these quality problems fall into two categories, immediate corrective action or long-term corrective action.

Specific quality control procedures are designed to help analysts detect the need for corrective action. Often an analyst's experience will be most valuable in identifying suspicious data or malfunctioning equipment; immediate corrective action may then be taken. The actions should be noted in laboratory notebooks but no other formal documentation is required unless further corrective action is necessary.

The need for long-term action may be identified by standard QC procedures, control charts, performance or system audits. Any quality problem which cannot be solved by immediate corrective action falls into this long-term category. EnviroTest uses a system to insure that the condition is reported to a person who is part of the closed-loop action and follow up plan.

EnviroTest Laboratories Inc.
315 Fullerton Avenue
Newburgh, NY 12550
(914) 562-0890
FAX (914) 562-0841

RECEIVED
NOV 30 1992
GROUNDWATER SCIENCES CORPORATION

10.3 Corrective Action (cont.)

The essential steps in the closed-loop corrective action system are:

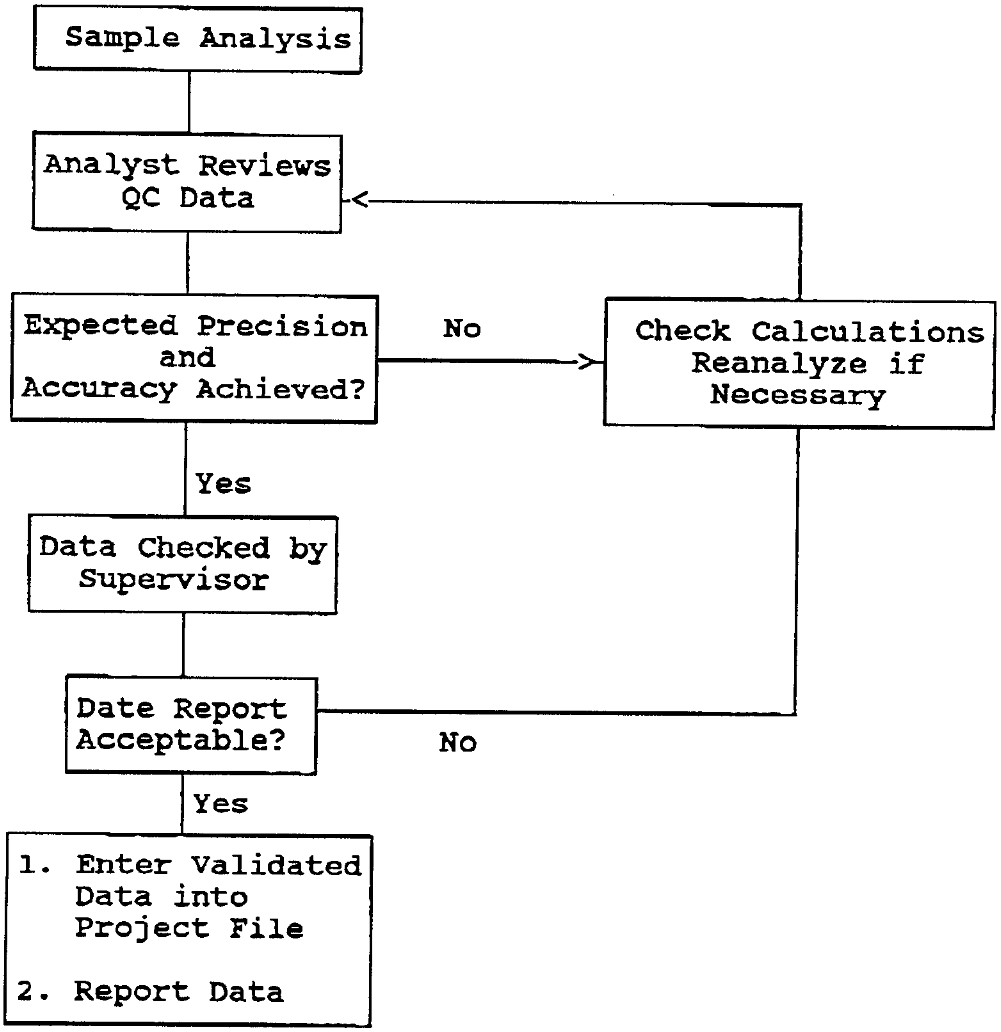
- The problem will be identified
- Responsiblity for investigating the problem will be assigned.
- The cause of the problem will be investigated and determined.
- A corrective action to eliminate the problem will be determined.
- Responsibility for implementing the corrective action will be assigned and accepted.
- The effectiveness of the corrective action will be established and the corrective action implemented.
- The fact that the corrective action has eliminated the problem will be verified.
- The complete process of establishing and implementing corrective action will be documented.

This process of corrective action will be used to make all corrections deemed necessary by the EnviroTest Project Manager or QA/QC Department, the client QA Coordinator, or the Client Project Officer. EnviroTest's QA/QC Coordinator assigned to the project will coordinate correspondence and ensure compliance with their request.

10.4 Quality Assurance Reporting Procedures

Data review is performed at three discrete levels after initial generation and calculation and prior to final report release: analytical Section Supervisor (Organics and Inorganics); QA/QC Officer; Laboratory Director. Data review encompasses the quality control elements detailed in the specific methods of analysis and also includes such items as holding time compliance, accuracy of calculations, transcription checks, and correct concentration units.

Figure 7.3 EnviroTest Laboratories Decision Processes, Procedures and Responsibility for Initiation of Corrective Action



APPENDIX C

Site Safety Plan

1 SITE DESCRIPTION

Date: *(Date plan was prepared)* November 12, 1992

Client: *(Company or individual name; refer to hereafter as "client")*
Cavalier Gage and Electronic Co., Inc.

Location: *(Facility name, town or city, state)*
Former Cavalier Gage and Electronic site (Rainbow's End Daycare Center), Salt Point, New York

Hazards: *(General description of hazards, including dissolved or free-phase organic chemicals and physical hazards, including buried utilities)*

- ❐ Chemical - Detail in Section 5 CHEMICAL HAZARD EVALUATION
- ❐ Physical
  - ❐ Utilities Buried septic tanks and piping
  - ❐ Confined space/excavation
  - ❐ Slipping/tripping Icy, wet conditions during winter
  - ❐ Uneven terrain Steep slopes on western side of site near pond
- ❐ Mechanical/Electrical
  - ❐ Drilling cables, chains, rods Drilling equipment
  - ❐ Generators
- ❐ Biological
  - ❐ Ticks (Lyme disease)
  - ❐ Other insects
  - ❐ Poison ivy
  - ❐ Landfill or sewage bacteria In septic tanks and drain fields
- ❐ Radiological
- ❐ Noise Drilling rig
- ❐ Eyes General field activities
- ❐ Stress/Fatigue
- ❐ Inhalation/Dust
- ❐ Other

Areas Affected: *(U.S.G.S. 7 1/2 minute quad if available, and attach 1"=50' sketch)*
U.S.G.S 7 1/2 minute quad map portion attached. Site sketch map:
Figure 2 in Work Plan.

Weather Conditions: Snow during months of December through February

Background Information:

Site is currently a daycare center. Site was previously occupied by a manufacturer of electronic and electrical components.

2 WORK OBJECTIVES

(State purpose such as drilling, groundwater sampling, site cleanup, pump installation or attach Scope of Work)

This plan covers soil and bedrock monitoring well installation, groundwater sampling, and soil and groundwater disposal activities as specified in the Scope of Work for the site investigation Work Plan.

3 ON-SITE ORGANIZATION AND COORDINATION

The following personnel are designated to carry out the stated job functions. (Note: One person may carry out more than one job function.)

Responsible Scientist (RS):
(required) Charles A. Rine

Project Manager:
(required) Lawrence F. Roach

Site Safety Officer:
(required) Teresa L. McCollum

Recordkeeper:
(optional) Teresa L. McCollum

Field Team Leader:
(optional) Teresa L. McCollum

Field Team Members: *(optional)*
Mitchell W. Ruchin
Andrew F. Nadell
John P. McCormack

Client Representatives: *(List project and/or field coordinators)*
Betty J. Wagner, Cavalier Gage and Electronic Co.

Contractors: *(List all field subcontractors, including drillers, surveyors, landscapers)*

Andrews Welldrilling or other air rotary contractor

Soiltesting, Inc. or other soil augering contractor

Hayward and Pakan Surveyors

All personnel arriving or departing the site should log in and out at the front desk. All activities on-site must be cleared through the client representative.

4 ON-SITE CONTROL

Client and Groundwater Sciences Corporation will coordinate access control and security on-site. A safe perimeter will be established at a distance of 50 feet from each drilling location requiring Level B protection. No unauthorized person should be within this area. At all Level D locations, no unauthorized individual will be permitted within a radius of 25 feet from drilling operations.

Control boundaries will be established, and the Exclusion Zone (the work area), hotline, Contamination Reduction Zone, and Support Zone (clean area) will be identified to site workers at each location. These boundaries are identified by: *(yellow/black plastic tape with "CAUTION DO NOT ENTER" displayed, orange plastic web fencing, traffic cones, etc.)*

Control boundaries defined by yellow/black plastic tape with "CAUTION - DO NOT ENTER" will be set up under Level D operations. No drilling activities will be conducted near entrances to the main building during business hours.

Describe the boundaries of the controlled area *(reference sketch map, if possible)*

Figures 3 and 5 in the Scope of Work show the locations of the proposed monitoring wells and soil borings.

5 CHEMICAL HAZARD EVALUATION

The following substances are known or suspected to be on-site. The primary hazards of each are identified.

Substances Involved *(List chemicals and abbreviations)*	**1992 - "Source Area" Maximum Reported Concentrations (μg/l)** *(if available)*	**Primary Hazards** *(from NIOSH Pocket Guide)*
1,1,1-trichloroethane (1,1,1-TCA)	130 (groundwater)	inhalation, ingestion, contact
1,1-dichloroethane (1,1-DCA)	220 (groundwater)	inhalation, ingestion
1,1-dichloroethene (1,1-DCE)	18 (groundwater)	
Toluene	340 μg/kg (wastewater)	inhalation, absorption, ingestion, contact

Hazardous substance information forms or Materials Safety Data Sheets (MSDS) for the involved substances are available. TLV-TWAs or PEL/RELs for site substances are listed in the Relative Response Table (attached).

6 PERSONAL PROTECTIVE EQUIPMENT

6.1 Levels of Protection

Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

Location or Task *(Refer to map)*	Job Function *(Drilling, decon, sampling, cleanup)*	Level of Protection *(B or D)*
All locations in Figures 3	drilling	D
and 5	decon	D
Scope of Work	sampling	D
	cleanup	D

Specific protective equipment for each level of protection is as follows:

Level B:

- ❒ Protective clothing and gloves as specified below
- ❒ Positive pressure demand airline respirator w/SCBA escape
- ❒ Full face and eye protection
- ❒ Saranex boot covers
- ❒ Duct tape seals at connections
- ❒ SCBA
- ❒ Steel toe and steel shank boots (preferably chemical resistant)
- ❒ Hearing protection
- ❒ Hard hat
- ❒ Other *(specify)*: ______

Level D:

- ❒ Hard hat
- ❒ Hearing protection (during loud machinery operation)
- ❒ Eye protection (when welding, coring)
- ❒ Steel toe and steel shank boots
- ❒ Vinyl gloves for sampling activities
- ❒ Other *(specify)*: ______

Steel toe and steel shank boots will be worn at all times. Approved hard hats will be worn at all times around drilling operations.

Each respirator and escape unit will be fit and pressure-tested prior to use. Each SCBA also will be fit and pressure-tested prior to use. The date and time of each inspection will be recorded on a separate log for each unit. The contact surfaces of all respiratory protection equipment will be cleaned with rubbing alcohol after each use.

6.2 Protective Clothing

The following protective clothing materials are required for the involved substances under Level B conditions:

Clothing	Gloves
T = Tyvek polyethylene	V = Viton
S = Tyvek saranex	S = Silver shield
C = Chemrel	N = Nitrile
O = Other *(specify)*:	O = Other *(specify)*: vinyl with leather overgloves

Substances *(list by group)*	Clothing Material *(circle)*	Glove Material *(circle)*
Chlorinated hydrocarbons:	T S C O	V S N O
(Level B only)	T S C O	V S N O

Vinyl or latex gloves alone are not acceptable during Level B operations; however, they may be used as undergloves. Leather work gloves should be worn over protective gloves when operating power equipment, when lifting heavy equipment, or when performing any task where the potential for abrasion or puncture exists. These work gloves must be disposed of during the site cleanup operations.

Chemical resistant suits should be hooded or of one-piece construction.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER.

7 EMERGENCY PROCEDURES AND EQUIPMENT

A. Emergency Medical Care

<u>Emergency phone numbers:</u>

AMBULANCE: 452-2414
FIRE: 452-2414
POLICE: 452-0400 (local)
HOSPITAL: 471-2000 (Emergency: 431-2000)

<u>Name of hospital:</u> St. Francis Hospital
<u>Address of hospital:</u> 35 North Road, Poughkeepsie

Directions to hospital: Take Hibernia Road west to Salt Point, turn left, proceed south on Route 115 (Salt Point Turnpike and Innis Avenue) approximately 12 miles to Route 44/55 West through Poughkeepsie to Route 9 North. Right onto Route 9 North 1/2 mile past mid-Hudson bridge, get into right lane, make right turn onto Route 9G, approximately 100 yards, sign on hill for St. Francis Hospital.

First aid equipment is available at the following locations: All GSC vehicles.

Fire Extinguisher:	with site safety officer, in GSC vehicles
First aid kit:	with site safety officer, in GSC vehicles
Emergency eye wash:	in GSC field vehicle *(optional)*
Emergency shower:	not applicable *(optional)*

Emergency medical information for selected substances present:

	Substance	Exposure Symptoms	First aid Instructions
1	1,1,1-TCA	CNS depression, headache, loss of balance, eye irritation, dermatitis, cardiac arrhythmias	Eye: Wash immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Medical attention
2	1,1-DCA	CNS depression, skin irritation liver, kidney damage	Eyes: Wash immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Medical attention

3	Toluene	Fatigue, weakness, confusion, dizziness, headache, pupil dilation, nervousness, muscular fatigue, insomnia, tearing, euphoria	Eyes: Wash immediately Skin: Soap wash promptly Breath: Respiratory support Swallow: Medical attention
4	1,1-DCE	Concentrations not significant, but exposure symptoms and first aid similar to 1,1-DCA, including skin irritation, narcotic effects at high concentrations and liver and kidney damage.	

Attach additional sheets as necessary.

B. Environmental Monitoring

1. Combustible Gas Indicator - use as needed in areas where some previously detected chemicals do not respond well on the HNu (PID) or OVA (FID). Also use where potentially explosive concentrations of gases are present and where oxygen levels may be deficient.

2. HNu monitoring should be performed in the breathing zone and, optionally, by jar headspace analysis of soil samples recovered during drilling operations.

3. OVA monitoring shall be performed together with or instead of HNu monitoring whenever chemicals previously detected or detected in ambient air samples exhibit a poor relative response on the HNu.

The relative response of each of these monitoring instruments to site chemicals is listed in the Relative Response Table.

If any of these instruments detects organic compounds above background in the ambient air within the breathing zone, all personnel working within the exclusions zone shall be required to leave the exclusion zone until the results of an ambient air sample are available to determine the appropriate level of protection. Work may resume in the exclusion zone prior to or in lieu of receiving such results only if all persons working within the exclusion zone are under Level B protection. Level B protection may also be required, at the discretion of the Responsible Scientist, based on soil headspace results or other site-specific considerations.

C. Emergency Procedures (should be modified as required for incident)

The following standard emergency procedures will be used by on-site personnel. The Site Safety Officer shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury in the Exclusion Zone: Upon notification of an injury in the Exclusion Zone, the designated emergency signal horn blast shall be sounded. All site personnel shall assemble at the decontamination line. The rescue team will enter the Exclusion Zone (if required) to remove the injured person to the hotline. The Site Safety Officer and Project Team Leader should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The on-site EMT shall initiate the appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms is determined.

Personnel Injury in the Support Zone: Upon notification of any injury in the Support Zone, the Project Manager and Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the on-site EMT initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, the designated emergency signal horn blast shall be sounded and all site personnel shall move to the decontamination line for further instructions. Activities on-site will stop until the added risk is removed or minimized.

Fire/Explosion: Upon notification of a fire or explosion on-site, the designated emergency signal horn blast shall be sounded and all site personnel shall assemble at the decontamination line. The fire department shall be alerted and all personnel moved to a safe distance from the affected area.

Personal Protective Equipment Failure: If any site worker experiences a failure of alteration of protective equipment that affects the protection factor, that person and his/her buddy shall immediately leave the Exclusion Zone. Reentry shall not be permitted until the equipment has been repaired or replaced. If >70° and saranex suits are needed, consider amount of time for work periods.

Other Equipment Failure: If any other equipment on-site fails to operate properly, the Project Team Leader and Site Safety Officer shall be notified and then shall determine the effect of this failure on continuing operations on-site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the Exclusion Zone until the situation is evaluated and appropriate actions are taken.

In all situations, when an on-site emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been re-assessed.
3. The Site Safety Plan has been reviewed.
4. Site personnel have been briefed on any changes in the Site Safety Plan.

D. Personal Monitoring

The following personal monitoring will be in effect on-site when appropriate:

Personal exposure sampling: HNu or OVA inspection of outerwear.

Medical monitoring: The expected air temperature will be 30° to 85°F. If it is determined that heat stress monitoring is required (mandatory if over 70°F), pulse rates will be monitored. Level B operations should be postponed if heat stress is likely to occur due to high daytime temperatures.

Eating, drinking, and smoking will be restricted during all drilling operations. No smoking is permitted at any time within the Exclusion Zone.

8 COMMUNICATION PROCEDURES

Personnel in the Exclusion Zone should remain within sight of the Project Team Leader.

Horn blast is the emergency signal to indicate that all personnel should leave the Exclusion Zone.

Hand gripping throat ---------------------------------- Out of air, can't breathe

Grip partner's wrist or both hands around waist ---- Leave area immediately

Hands on top of head --------------------------------- Need assistance

Thumbs up -- OK, I am all right, I understand

Thumbs down --- No, negative

THE SITE PHONE NUMBER IS: 266-4329

9 DECONTAMINATION PROCEDURES (Minimum Level B Measures)

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard Level B decontamination protocol shall be used with the following decontamination stations: *(describe procedure for each station and/or attach layout sheet)*

NO LEVEL B DECONTAMINATION PROCEDURES ARE ANTICIPATED

1. Equipment drop ______________________________

2. Decontaminate outer garments ______________________________

3. Remove boot covers/gloves ______________________________

4. Remove boots, gloves, outer garments ______________________________

5. Remove respirator ______________________________

6. Wash face and hands ______________________________

The location of the nearest emergency decontamination stations equipped with showers and eye washes are noted in Section 7 EMERGENCY PROCEDURES AND EQUIPMENT.

The following decontamination equipment is required: 10-gallon and 32-gallon plastic trash cans, buckets of detergent solution with brush and water, plastic drop cloth, plastic container liners.

Detergent and water will be used as the decontamination solution for protective clothing and equipment.

Specify disposal of decontaminated water and used personal protective clothing:

- Decontaminated water disposal to plastic holding tank.

- Personal protective clothing disposal in designated garbage bag.

10 ACKNOWLEDGEMENT OF PLAN

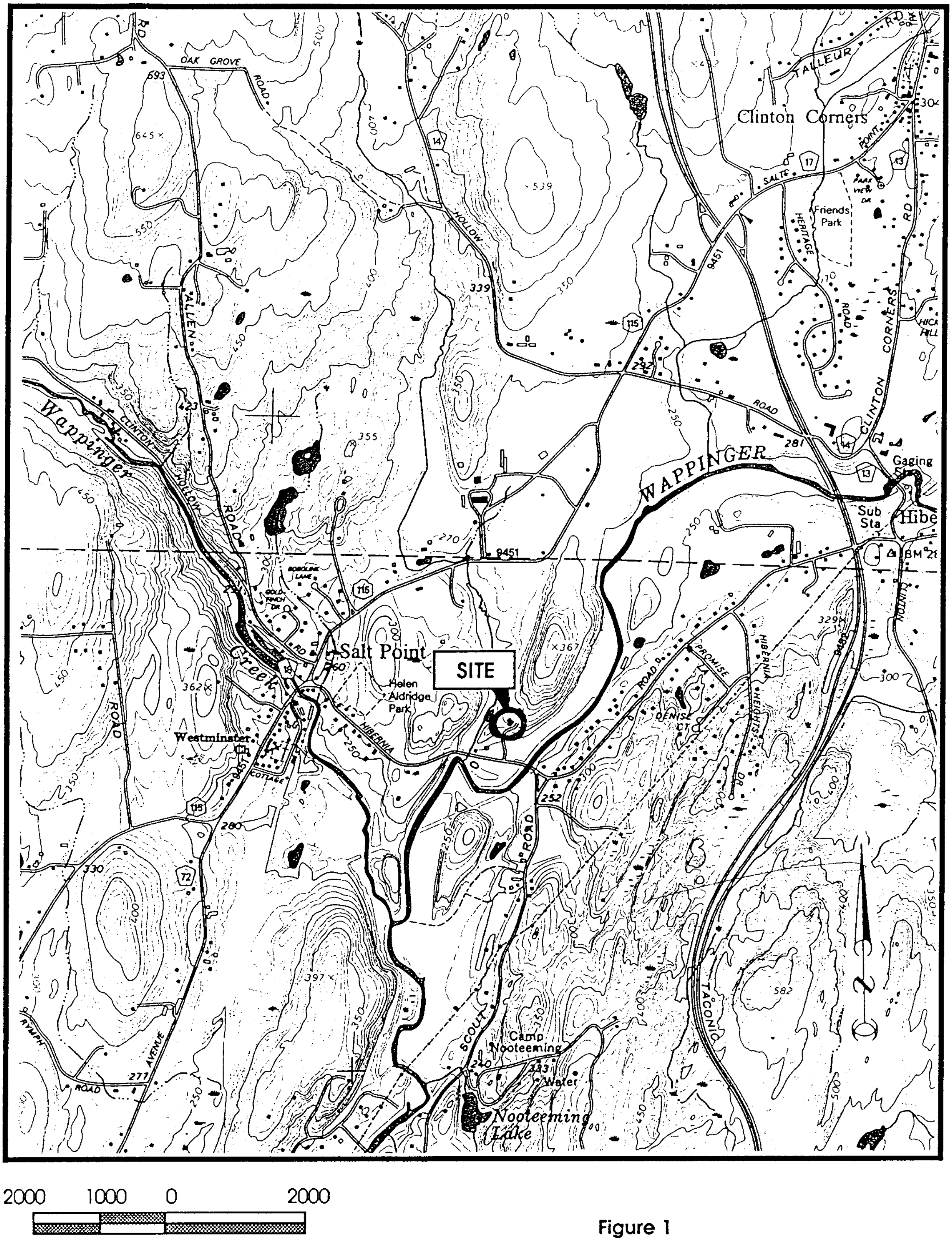
If a subcontractor does not have a site safety plan, they must accept and acknowledge the above plan with their modifications, if any, or prepare a plan at least as stringent as the above plan.

All site personnel have read the above plan and are familiar with its provisions.

	(Name)	*(Signature)*
Site Safety Officer	____________________	________________________
Project Manager	____________________	________________________
Other Site Personnel	____________________	________________________

Subcontractors certify that their workers have received 40 hours of safety training and 8-hour annual refresher training under the requirements of 29 CFR 1910.120 *(certificates should be supplied and kept on file):*

Contractor	Signature of Contractor Representative
______________________________	____________________________________
______________________________	____________________________________



Scale: 1 inch = 2,000 feet

Figure 1

Site Location Map
A Portion of the U.S.G.S.
7 1/2 Minute Salt Point Quadrangle

Relative Response of Field Monitoring Equipment to Selected Compounds

Species	IP (eV)	PID (<10.2eV)	FID (<15.4 eV)	CGI	TLV-TWA (ppm)	PEL/REL (ppm)	STEL (ppm)
p-xylene	8.44	+ (E) ✓	+ (E)	+	100		150
o,m-xylene	8.56	+ (E) ✓	+ (E)	+	100		150
ethylbenzene	8.76	+ ✓	+ (E)	+	100		125
toluene	8.82	+ (E) ✓	+ (E)	+	100		150
1,2-dichlorobenzene	9.06	+ (E) ✓	+	+	*C*50		
chlorobenzene	9.07	+ (E) ✓	+	+	*P*10		
benzene	9.24	+ ✓	+ (E)	+		*P*0.1	1
tetrachloroethylene	9.32	+ (G) ✓	+ (F)	o		25	
trichloroethylene	9.45	+ (G) ✓	+ (G)	+		25	200
methyl ethyl ketone	9.54	+ (G) ✓	+ (G)	+	200		
trans-1,2-dichloroethylene	9.64	+ (G) ✓	+	+	200		
cis-1,2-dichloroethylene	9.65	+ (G) ✓	+	+	200		
acetone	9.69	+ (G) ✓	+ (E)	+		250	1000
1,1-dichloroethylene	9.81	+ (G) ✓	+	+		1	20
vinyl chloride	9.996	+ ✓	+ (F)	+		*L*1	
chloroethane	10.97	o	+ (E) ✓	+	*P*10		
1,1,1-trichlorethane	11.00	o	+ (E) ✓	+		*C*350	450
1,1,2-trichloroethane	11.00	o	+ ✓	o		10	
1,2-dichloroethane	11.05	o	+ (G) ✓	+		1	2
1,1-dichloroethane	11.06	o	+ ✓	+		100	
methylene chloride	11.32	o	+ (G-E) ✓	+	50	*L*	
chloroform	11.42	o	+ (G) ✓	o		2	2
dichlorodifluoromethane (F12)	11.75	o	+ (F-P) ✓	o	1000		
trichlorofluoromethane (F11)	11.77	o	+ (F-P) ✓	o	*C*1000		
1,1,2-trichloro-1,2,2-trifluoroethane (F113)	11.99	o	+ (G) ✓	o	1000		1250
dichlorofluoromethane (F21)	12.39	o	+ (G) ✓	o	10		

IP = ionization potential
PID = photoionization detector (HNu)
FID = flame ionization detector or organic vapor analyzer (OVA)
CGI = combustible gas indicator
TLV-TWA = threshold limit value - 8 hour time-weighted average (ACGIH)
PEL/REL = permissible exposure limit (OSHA) or relative exposure limit (NIOSH), both 8 hour time-weighted averages, value listed is lowest of the two
C = ceiling value, do not exceed (no TWA)
P = proposed value
L = use of lowest reliably detectable concentration is preferable
\+ = positive response
o = no response, not detectable
E = excellent response (relative to methane standard)
G = good response (relative to methane standard)
F = fair response (relative to methane standard)
P = poor response (relative to methane standard)
✓ = primary detector