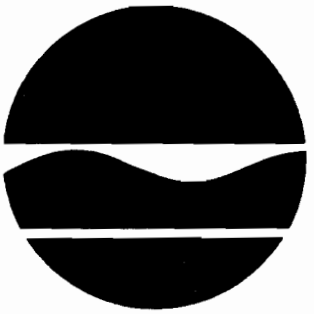
REMEDIAL INVESTIGATION REPORT

AVM-Gowanda Site

Gowanda, New York
Cattaraugus County
Site No. 9-05-025



July 1998

Prepared by
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL REMEDIATION

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AVM-GOWANDA INACTIVE HAZARDOUS WASTE SITE
Town of Persia, Cattaraugus County, N.Y.
Site No. 9-05-025

REMEDIAL INVESTIGATION

1.0 INTRODUCTION

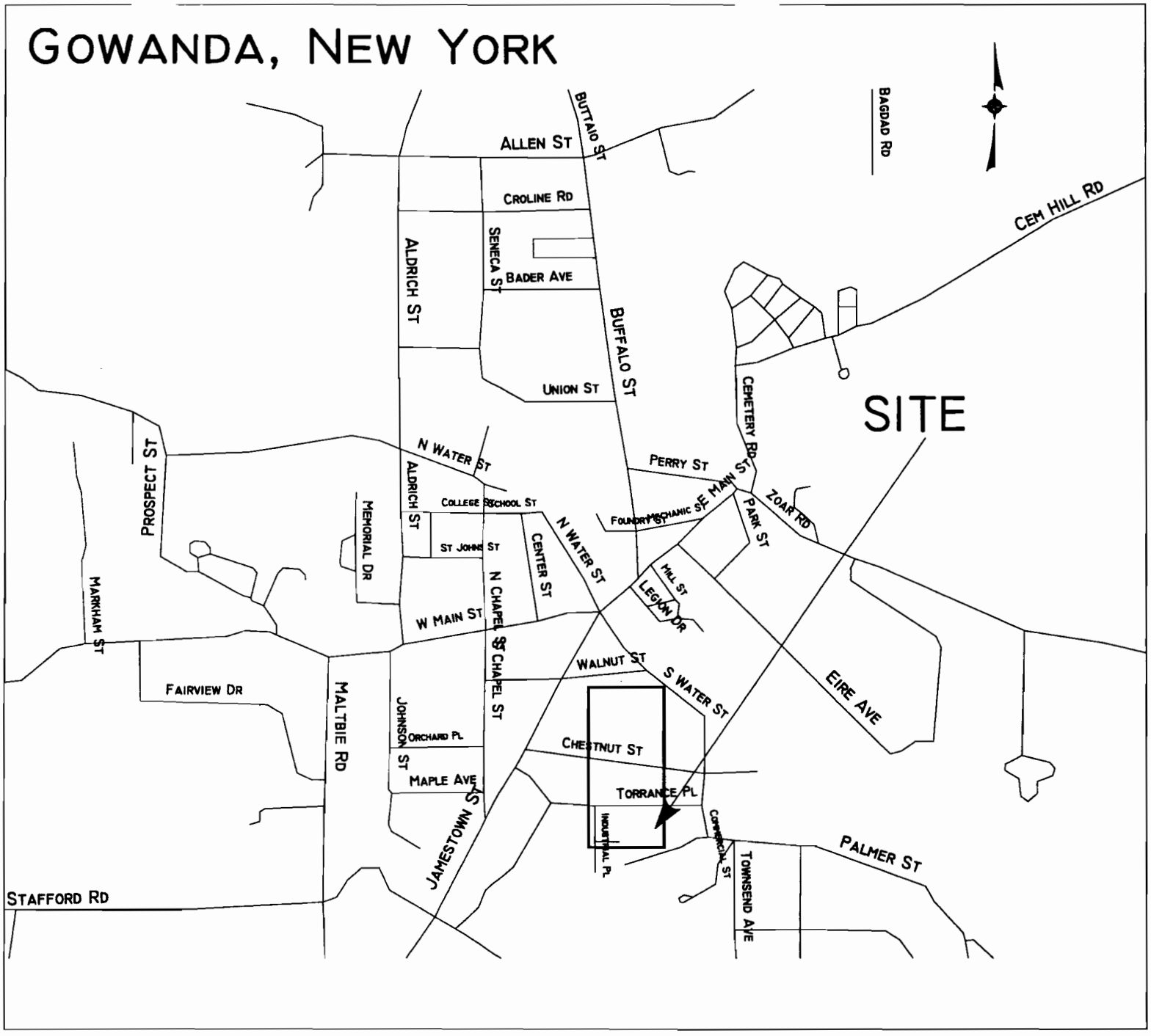
The AVM-Gowanda Site (Site No. 9-05-025), located at One Industrial Place in the Town of Persia, Cattaraugus County, New York, has been listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 Site. Figure 1 shows the location of the site and site features. A Class 2 site is defined as a site posing a significant threat to human health and/or the environment. Under the authority of the Environmental Conservation Law Section 27, the New York State Department of Environmental Conservation (NYSDEC) is performing an Off-Site Remedial Investigation/Feasibility Study (RI/FS) at the site. The primary purpose of the RI is to determine the nature and extent of contamination in sufficient detail for the development and analysis of remedial alternatives for the site. Remedial Investigation field activities were completed in two separate phases; the first phase April - June, 1997 and the second phase during December, 1997. This document presents the findings of the RI and recommendations for future work (FS).

1.1 OBJECTIVES

The objectives of this RI are to further define hydrogeologic conditions in the area of the source of contamination and to define the extent of the contaminant plume migrating from the One Industrial Place property. The RI includes a contaminant exposure pathway analysis to determine potential and/or completed exposure pathways by which receptors could be exposed to the contaminants.

1.2 SITE DESCRIPTION/HISTORY

The AVM-Gowanda site is located at One Industrial Place in the Town of Persia, Cattaraugus County, New York. The property is approximately 1.75 acres in area and includes two manufacturing buildings and two small storage sheds. The site is currently owned and occupied by the Gowanda Electronics Corporation, a small manufacturer of electrical components such as inductors. Situated in a mixed industrial/residential area the facility has been used for commercial operations since the early 1930's. From World War II until 1979 the facility was used as a metal stamping/machine shop. Gowanda Electronics purchased the facility in 1979 from Automatic Voting Machine Corporation (AVM) and has since used the facility for the manufacture of inductors. The NYSDEC received anonymous complaints of gasoline/solvent odors in the main



STUDY AREA

AVM-GOWANDA SITE
GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE No. 9-05-025

New York State Department of Environmental Conservation

FILE:

DRAWING:

FIGURE 1
SITE LOCATION

DATE: 5/21/98

building in July and November of 1989. Vent pipes were installed on the northwest side of the building to address the odors.

The site property is flat lying and largely covered with either paved parking areas or buildings. Surface drainage is provided via storm drains that ultimately empty into Cattaraugus Creek. The site is bordered by residential property to the north and east, railroad yard to the south, and commercial facilities to the west. The facility and the entire surrounding neighborhood is served with municipal water and sanitary sewer.

A Phase I and Phase II site investigation were completed in the spring of 1994 for Gowanda Electronics by Malcolm Pirnie, Inc. Analysis of surface soil samples showed elevated levels of various metals, total petroleum hydrocarbons (TPHs) and trace levels of volatile organic compounds (VOCs) at the east end of the main building, along the northern property boundary. The company chose to excavate the surface soils for off-site disposal. This surface soil excavation program continued to a depth of approximately seven feet, removing 568 tons of soil, and lead to the discovery of high levels of VOCs which increased in concentration as the depth of the excavation increased. VOCs from this area apparently have migrated to the groundwater table, resulting in significant groundwater contamination. At this point the excavation was backfilled and the company installed a groundwater extraction well, with an air stripper for treatment, that became operational in June 1996. This system continues to operate under a Voluntary Cleanup Agreement, Index Number B9-0507-96-05, effective January 13, 1998, (VCA) between the NYSDEC and the Gowanda Electronics Corp. The work completed by the company, which included the sampling, soil removal, and the operation of the groundwater extraction system, has provided valuable information for the completion of the off-site RI. References to the data generated by these activities are made throughout this report.

Based on the initial data collected during the above described on-site activities, the NYSDEC suspected groundwater contamination may be migrating away from the site. Therefore, a NYSDEC Immediate Investigation Work Assignment (IIWA) was issued to Parsons Engineering Science (ES) to further investigate existing subsurface and groundwater conditions near the source area and to identify any potential migration pathways from this source area. Field activities associated with the IIWA were conducted during late 1995 with the summary report issued by NYSDEC in January 1996. A significant groundwater contaminant plume was confirmed to be migrating from the source area northward to Torrance Place. The data further suggested that the plume likely extended beyond Torrance Place.

The IIWA provided the basis for the site to be listed on the New York State Registry of Inactive Hazardous Waste Disposal Sites as a Class 2 Site.

This Off-Site Remedial Investigation was then determined necessary to fully define the nature and extent of contamination and determine if any exposure pathways exist that pose a threat to human health or the environment. A copy of the Report on Activities for the IIWA prepared by the NYSDEC is included as Appendix A.

2.0 REMEDIAL INVESTIGATION FIELD ACTIVITIES

Parsons Engineering Science (ES) was issued a NYSDEC State Superfund Standby Contractor Work Assignment to perform the necessary field activities for the RI and to provide assistance with interpretation of the data. The RI consisted of a series of field activities employing a phased approach to efficiently generate the data and provide the information necessary to fully understand the nature and extent of contamination. Environmental samples were collected throughout the study area, initially at the known source area working outward, generally to the north, with the selection of sample locations based on analytical results as they became available. Samples of soil, soil gas, indoor air, and groundwater were collected and analyzed using a variety of techniques and tools. The task of collecting subsurface environmental samples in a residential setting presented challenges, from the standpoint of both equipment access and expediency for minimal disruption to the community. These challenges were met through the use of portable sampling equipment, on-site immediate sample analysis, and the use of experienced field personnel to make critical decisions as the work progressed. The approach and techniques used to accomplish the goals of the field investigation are described in the sections that follow.

2.1 GEOPROBE™ SAMPLING

The soil gas, soil, and groundwater sampling that ultimately provided the basis for defining the full extent of contamination was accomplished using a powered sampling tool and technique known as Geoprobe™. The Geoprobe™ system is an alternative to conventional drilling techniques for the collection of relatively shallow subsurface samples, employing smaller equipment that allows for quicker and easier sampling at locations that might not be accessible with a full size drill rig. The need for access in the residential setting of this study was a major deciding factor in selecting the Geoprobe™ method.

The basic method for Geoprobe™ involves pushing various sampling devices that are attached to hollow steel rods to the desired sampling depth using a hydraulic driving head. The hydraulic system is mounted on the back of a vehicle, in this case a small all-terrain utility cart known as a "Mule", which is about the size of a yard tractor. This specific unit afforded easy access to residential properties, avoiding obstacles such as buried utilities, landscaping, and buildings, allowing for the collection of samples at the desired locations. The method of pushing sampling devices into the soil resulted in much quicker and neater sample collection, since there was no need for the containment of the soils and groundwater that are typically brought to the surface using conventional drilling techniques.

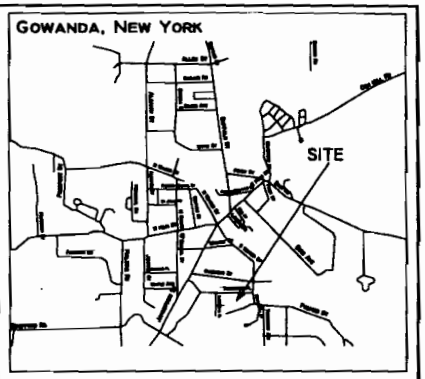
Several types of samples are possible with a Geoprobe™ unit. Samples collected as part of this study include soil gas, soil, and groundwater. Soil gas and groundwater samples were collected for immediate chemical analysis, as described below. Soil samples were collected for visual identification to delineate the overburden geology. Geoprobe™ sampling was conducted at 69 locations throughout the neighborhood from just south of Torrance Place northward to just south

of Walnut Avenue. Each location included at least one groundwater and in some cases two groundwater and one soil gas samples. The general sampling area measures approximately 1200 feet south to north by 500 feet east to west. Sampling depths were largely controlled by the site geology (described later in this report), with depths up to approximately 18 feet below ground surface commonly achieved using this method. All Geoprobe™ sampling was conducted during the first phase of the RI from May to June, 1997.

All soil gas and groundwater samples collected with the Geoprobe™ system for chemical analysis were analyzed on site by a mobile laboratory. Commonwealth Analytical mobilized to the site at the beginning of sampling activities to provide the on site analysis. Samples were analyzed using EPA Method 8010/8020, which includes the chlorinated organics and hydrocarbons associated with this site, specifically trichloroethylene and its breakdown products and compounds found in petroleum fuels such as benzene, toluene, and xylene. The mobile laboratory has the same precision capabilities as a standard off-site laboratory, with detection limits below 1 part per billion (ppb). Analysis of the samples was accomplished approximately 30 minutes from the time it was collected, enabling immediate interpretation of data from a sample location, thereby providing a basis for the selection of the next sampling location.

The general approach of the investigation was to start sampling both soil gas and groundwater in proximity to the source area identified during the previous studies at One Industrial Place. Initial sampling in this area duplicated sampling results from the earlier studies, confirming this area was the appropriate starting point for tracking the migration of contamination. Based on assumptions made with regard to groundwater flow direction, the next sample was collected further away from the source area in the direction of presumed groundwater flow. With the immediate analysis, it could be quickly determined if the contamination had migrated to that sample location. If contamination was detected, the next sample location was selected even further away from the source area in the direction of presumed groundwater flow, and so on. If little or no contamination was found at a particular sampling location, then the distance between that sample location and the last location to show contamination was split and a sample collected from that point. This approach was used throughout the study area to delineate the extent of the groundwater contamination plume. The sample locations that defined the edge of the plume, by exhibiting very minor or no contamination, were verified by selecting an additional location nearby, yet further away from the defined plume.

Samples were also collected up gradient of the known source area to determine if any other sources of contamination could be contributing to the plume. These samples were collected along the south side of the parking area for One Industrial Place and are considered to be background samples. These samples are part of the 69 total sample locations for this study. Geoprobe™ sampling locations are shown on Figure 2/Plate 1.



GEOPROBETM SAMPLING LOCATION

AVM-GOWANDA SITE

GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE NO. 9-05-025

New York State Department of Environmental Conservation

FILE: | DRAWING: Drawn from Hickman & Hickman, P.C. Base Map

FIGURE 2/PLATE 1
GEOPROBETM LOCATIONS

DATE: 5/21/98

The use of the Geoprobe™ system to quickly collect the soil gas and groundwater samples and the ability to have the analytical results of those samples within half an hour provided an efficient and highly effective method for the definition of the nature and extent of contamination. A detailed description of the type of samples and the rationale for the collection of those samples is provided below.

Soil Gas Sampling - Soil gas samples were conducted at 27 of the 69 Geoprobe™ locations, generally on site or along Torrance Avenue. Soil gas samples are air samples collected from the pore spaces of the subsurface soil, in this case from just above the groundwater table. Soil gas samples are collected at sites where volatile organics compounds (VOCs) are the predominate contaminants. VOCs all share a common characteristic, they volatilize (evaporate) into the air when exposed to the atmosphere. The analytical data is used as an indicator of either groundwater contamination or, in an area that may have had a spill, nearby soil contamination. Soil gas samples collected in an area of soil contamination will yield positive results even if the soil is not saturated with the chemical compounds, due to the residual that clings to the soil particles and volatilizes into the pore spaces of the soil. In the case of the data serving as a groundwater contamination indicator, the theory is that a portion of the VOCs within the groundwater, if at sufficient concentrations, will volatilize or evaporate into the pore spaces of the soil above the water table in measurable quantities. Under the proper geologic conditions, these results can serve as a screening tool in the decision process to sample, or not sample, the groundwater at those specific locations. As sampling progresses, a pattern usually becomes apparent when comparing soil gas and groundwater from the same sample location.

The geologic conditions within the study area proved to be unsuitable for soil gas sampling to be an effective screening tool. The clay and silt that make up the soil immediately above the water bearing unit are relatively impermeable, slowing or preventing any migration of vapors from the groundwater upward into the soil. This soil unit essentially retards migration of contaminants in the vapor phase. Early in the sampling program, it became evident there was no pattern that would suggest the soil gas results were an indication of groundwater contamination. In fact, some of the highest levels of groundwater contamination locations yielded the lowest levels of contaminants in the soil gas, therefore, it was decided to terminate the soil gas sampling.

Groundwater Sampling - Groundwater samples were collected from each of the 69 Geoprobe™ locations for chemical analysis. A shallow (8 - 12 feet below ground surface) and a deep (14-18 feet) groundwater sample were collected at many locations, especially those nearest the source area, for a total of 83 samples analyzed. Locations where only one groundwater sample was collected were generally from the deep interval, since the primary contaminant associated with this site, TCE, is heavier than water and tends to sink within the aquifer. All samples were analyzed on-site as described above and the data interpreted for the next sample location selection.

Samples were collected either through a small diameter PVC pipe with a slotted screen, which was pressed into an open borehole formed with a Geoprobe™ blind probe, or through a sampling

device known as screened point sampler, which is driven to the desired depth with the Geoprobe™ and a sampling port then opened to allow water to enter from that specific depth. Groundwater was then purged in either case to remove water that may have been agitated during the placement of the sampling device to insure that a representative sample of the aquifer was collected for analysis.

Soil Sampling - Soil samples for visual identification were collected with the Geoprobe™ unit utilizing a tool known as a macro core sampler, which is essentially a hollow tube attached to the steel rods and pushed or pounded into the ground by the Geoprobe™ unit. Soil enters the tube and is retained when the sampler is removed from the ground. The sample is then opened for visual identification of the soil types to provide an understanding of the subsurface geology. Observations were recorded in a boring log, with a description of the soil, moisture content, odors if any, and corresponding depth of the sample interval. Three soil samples were collected from three Geoprobe™ sample locations near the source area for chemical analysis. Boring logs for the Geoprobe™ bore holes are included as Appendix B.

Through the use of a network of recorded boreholes over the study area, an understanding of the regional geology and hydrogeology was developed. Features such as water bearing units, preferential flow paths, zones of higher contamination, and aquifer boundaries were identified.

Using the information from the sampling and chemical analysis, a comprehensive understanding of the hydrogeologic conditions and the nature and extent of contamination was developed. This information provided the basis for the selection of the permanent monitoring well locations and the selection of specific homes for indoor air sampling to assess potential routes of exposure. The monitoring well network, described in the following section, was designed to confirm the data from the Geoprobe™ efforts, to provide a means of measuring groundwater flow direction and velocity, and to monitor the groundwater chemistry over time.

2.2 MONITORING WELL INSTALLATION

Twelve monitoring wells were installed throughout the study area to evaluate the hydrogeologic conditions of the water table aquifer and to monitor the effects of the groundwater extraction well currently operating on the One Industrial Place property. All monitoring wells are located within the groundwater contamination plume defined during the Geoprobe™ efforts with the exception of MW-1, which is located on-site up gradient of the source area to serve as a background monitoring location. The monitoring wells were installed during two separate phases of RI activities, the first phase (Phase I) from May - June, 1997 and the second phase (Phase II) during December 1997. Boring logs and well construction details are included as Appendix C.

Phase I - Monitoring wells were installed at eight locations, including the background well, using hollow stem auger techniques. Selection of the locations were based on the understanding of the groundwater contaminant plume, ease of access for the drill rig and sampling equipment and

minimization of disruption to residential property. Therefore, monitoring wells installed during this phase were either located in the paved sections of Torrance Place and Chestnut Streets or on commercial property.

Boreholes were drilled with 4¼" hollow stem augers to the base of the shallow aquifer, identified by the top of glacial till. Wells ranged in depth from 8 to 22 feet below ground surface, depending upon location. Continuous split spoon samples were collected at each boring for visual identification and logging of the soil types encountered. This information has been integrated with the boring logs generated from the Geoprobe™ core sampling to develop a comprehensive understanding of the geology within the study area. Borings were extended beyond the base of the aquifer an additional 15 feet at two locations, MW-1 and MW-6, to confirm that sufficient thickness of glacial till exists across the study area to form a barrier to vertical groundwater migration.

Monitoring wells were constructed at the completion of each borehole. The wells were constructed of 2 inch inside diameter PVC .010 inch slot well screen, with 2 inch inside diameter PVC riser. Well screens are 5 to 15 feet in length, as necessary to intercept the saturated thickness of the aquifer. Wells constructed in the streets have been completed with flush mounted curb boxes, while those on commercial property were completed with an outer protective casing and approximately 30 inches of stickup.

All monitoring wells were developed by pumping and bailing, removing sufficient water to remove sediment from the filter pack. Wells were developed until turbidity levels decreased to 50 Nephelometric Turbidity Units (NTUs). Development is necessary to insure proper communication of the well screen with the aquifer for accurate measurements of hydrogeologic properties and for the collection of representative groundwater samples.

Phase II - Based on a review of the data generated during Phase I, it was determined additional monitoring wells were necessary to confirm earlier observations and fully understand the hydrogeologic conditions controlling contaminant migration. Three additional wells were installed in close proximity (17 to 60 feet) to the recovery well located on the One Industrial Place property to identify soils, determine if any waste remained in the subsurface at the source area, and to monitor the effectiveness of the pumping well. A fourth well, MW-10, was installed in the center of the identified groundwater plume, midway between Torrance Place and Chestnut Street as a confirmatory monitoring point.

All four wells installed during this phase were completed using the same drilling methods as during Phase I, with continuous split spoon sampling to the base of the aquifer. Construction methods were also consistent with the first phase, except that the three wells near the source area, MW-9, MW-11, and MW-12, were constructed of stainless steel well screen and riser pipe rather than PVC for higher chemical resistence. All wells were completed with a flush mount curb box. Wells were developed by pumping and bailing to remove sediment from the filter pack, as

described for Phase I. Well development logs for all wells installed during this RI are included as Appendix D.

A summary of the well construction details are presented in Table 1. Monitoring well locations are shown on Figure 3/Plate 2.

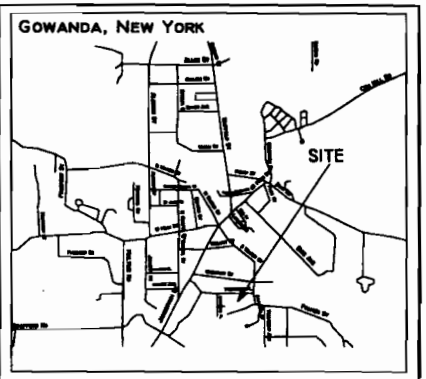
2.3 AQUIFER TESTING

Slug Testing - Following the development of the monitoring wells during Phase I, slug tests were performed to determine the hydraulic conductivity of the aquifer at each location. Slug tests involve either the addition or removal of a solid or water "slug" of known volume to the well, resulting in an instantaneous rise or fall in the water level. An electronic water level measuring device is in place prior to the addition or removal of the slug. The recovery of the water level back to static conditions is then recorded at specific time intervals. A graph of the water levels compared to time is generated and used to calculate the hydraulic conductivity. Hydraulic conductivity provides a measure of the ability of an aquifer to transmit water. Greater resistence to groundwater flow is indicated by lower values for hydraulic conductivity. The Bouwer and Rice, (1976) method for determining hydraulic conductivity in unconfined aquifers was used to analyze the data. The report containing the slug test data and analysis is included as Appendix E.

TABLE 1
WELL CONSTRUCTION SUMMARY

Monitoring Well ID	Well Construction Material	Ground Elevation (Feet Above Mean Sea Level)	Boring Depth (Feet Below Grade)	Screen Setting (Feet Below Grade)	Screen Interval (Feet Above Mean Sea Level)	Filter Pack Interval (Feet Above Mean Sea Level)
MW-1	PVC	777.5	30	6-16	771.5-761.5	772.5-761.0
MW-2	PVC	775.74	20.5	10-20	765.74-755.74	767.74-755.24
MW-3	PVC	775.92*	24	8-23	767.92-752.92	768.92-752.42
MW-4	PVC	775.66*	22.5	7-22	768.66-753.66	768.66-753.16
MW-5	PVC	775.28*	18.5	8-18	767.28-757.28	769.28-756.78
MW-6	PVC	771.23*	24	5.5-10.5	765.73-760.73	766.23-760.23
MW-7	PVC	763.7	16.5	11-16	752.7-747.7	753.7-747.2
MW-8	PVC	770.32*	12	5.5-10.5	764.82-759.82	765.82-759.32
MW-9	SS	775.97*	22	5-20	770.97-755.97	772.97-755.97
MW-10	PVC	774.13*	16	5-15	769.13-759.13	771.13-758.63
MW-11	SS	776.38*	16	4-14	772.38-762.38	773.38-761.88
MW-12	SS	776.11*	16	4.5-14.5	771.61-761.61	773.11-761.11

* Survey elevation of well cover installed flush with ground surface



Phase I/Phase II Monitoring Wells

Voluntary Cleanup Project Peizometers

Voluntary Cleanup Project Recovery Well

AVM-GOWANDA SITE
GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE NO. 9-05-025

New York State Department of Environmental Conservation

FILE: | DRAWING:

FIGURE 3/PLATE 2
MONITORING WELL LOCATIONS

DATE: 5/21/98

Determination of hydraulic conductivity is necessary for the calculation of groundwater velocity, generalized predictions of pumping influences on an aquifer, and evaluation of remedial options in the Feasibility Study.

Slug testing was not performed on the monitoring wells installed during Phase II, since sufficient information was generated from the initial Phase I slug testing.

Groundwater Elevations - The depth to groundwater has been routinely measured in all the monitoring wells since their installation. The data is converted to actual elevation based on surveyed points on the monitoring well and developed into a surface plot. This information indicates the direction of groundwater flow, with flow being from areas of higher water table elevation to lower elevation, or more correctly, from higher to lower potential. The difference in groundwater elevation between two points over a known distance is used to calculate the hydraulic gradient, which is then used with the hydraulic conductivity determined during the slug tests, to calculate the effective groundwater velocity between those two points. More frequent measurements of groundwater elevations have recently been recorded to monitor the effectiveness of the recovery well operating on site. The same principles apply, with the area of lowest potential, or groundwater elevation, expected to be at the recovery well if the system is working effectively.

2.4 GROUNDWATER SAMPLING

Phase I - Groundwater samples were collected from all monitoring wells installed during this phase for chemical analysis. Samples were analyzed for Target Compound List (TCL) VOCs and metals according to NYSDEC Analytical Services Protocol (ASP), Rev. 12/95. Monitoring wells were purged of at least three well volumes of water (the amount of water in the well under static conditions) using a bailer, prior to sampling to insure all stagnant water was removed. This is necessary to collect a sample that is representative of the aquifer. Field parameters of turbidity, conductivity, pH, and temperature were measured, with stability of those parameters used as an indication that the well was completely purged. Samples were then collected with the same bailer, sealed in the appropriate containers, and placed on ice for shipment to the laboratory, Mitchem Analytical, which performed the analysis.

DNAPL Investigation - Results from the first phase groundwater sampling showed concentrations of TCE far in excess of levels that are considered indicative of product, or an undissolved phase known as dense non-aqueous phase liquid (DNAPL). Levels of groundwater contamination that indicate the potential of the presence of DNAPL are calculated based on the chemical compound's water solubility (see section 6.3, Contaminant Migration). In the case of TCE, any sample containing more than 10,000 ppb or 10 parts per million (ppm) of TCE is cause to suspect DNAPL may be present in the environment (EPA, 1991).

Monitoring wells MW-4, and MW-5 contained significantly high concentrations of TCE, therefore additional field screening consisting of a hydrophobic dye test was conducted to check for the presence of DNAPL. The dye is necessary since TCE is a clear colorless liquid and is difficult to visually distinguish from water. TCE sinks in water (see section 6.3), so samples were collected from the very bottom of these wells, with care to minimize any mixing or agitation of the sample.. The theory is that if DNAPL is present in the area of the well, it will settle to the bottom of the well. Once the sample was placed in a container, a hydrophobic dye was added which will not dissolve in water but will dissolve in TCE. Therefore, if the dye dissolves, DNAPL is present. Monitoring well MW-2 was also sampled in this way since it is located in the source area.

Phase II - A second round of groundwater samples were collected as part of the Phase II field activities on December 17, 1997. All wells that were previously sampled during Phase I were analyzed for VOCs only, since a sufficient data base for metals analysis had already been established. Newly installed wells, MW-9 through MW-12, were also sampled and analyzed for metals and VOCs due to the fact that samples were not available at these locations during Phase I. Sampling and analytical procedures were the same as those utilized during the Phase I round of groundwater sampling. Mitchem Analytical again performed the analysis.

2.5 INDOOR AIR SAMPLING

The principle of VOCs volatilizing from the water table into the soil gas described in section 2.1 also leads to concerns over VOCs migrating into basements in areas where groundwater contaminant concentrations are sufficiently high. Initial evaluation of the groundwater data from the Geoprobe™ data indicated that 8 homes along Torrance Place were located above the area of significant groundwater contamination. It was therefore determined that samples of the indoor air should be collected from those homes and analyzed for VOCs to evaluate any potential impacts from the site due to exposure to the contaminants which exist in the groundwater. Samples were collected in June, 1997 by ES, according to protocols established by the NYSDOH. Two samples were collected from each home, one from the basement area and one from the main living area. Samples were collected using SUMMA canisters, which are small steel tanks which are provided under a vacuum. The canister is placed in the area of investigation and a valve is opened allowing air to be drawn into the tank, once full the canister is then sealed and sent to the laboratory for analysis.

A second round of indoor air sampling was conducted during March, 1998 including the eight homes sampled previously plus two others located within the contamination plume. Sampling was conducted during the winter since it is expected that contamination levels, if any, would be higher due to windows and doors being closed thereby minimizing any ventilation. Snow cover or frost can also contribute to elevated levels of air contamination by acting as a barrier to the migration of contaminants from the soil to the atmosphere.

Due to the sensitivity of the analytical instruments available, a critical component of indoor air sampling is an inventory of all products in the home that could contribute contaminants to the sample. Such products include cleaning compounds, air fresheners, fuel oil, gasoline, dry cleaning, and insecticides to name only a few. The presence of such products could lead to minute amounts of chemical compounds being present in the air, and ultimately showing up in the analytical data for the sample. It is then important to know whether such compounds are true impacts from the site or just in the ambient air of the building being sampled. The inventory of home products is conducted by the NYSDOH and retained for comparative purposes.

2.6 SURVEY

A survey has been completed of the entire study area to prepare a base map for the site. At the completion of each phase of field activities, all sampling points and monitoring wells were surveyed and added to the base map. Monitoring wells were also surveyed for elevation to establish a point from which to measure groundwater elevations (see section 2.3). It should be noted that all buildings shown on the base map were not precisely surveyed, but rather estimated to provide a frame of reference. The base map includes the site itself and will serve as the base drawing for the duration of the project.

3.0 VOLUNTARY CLEANUP

The current site owner, Gowanda Electronics, initiated a source removal and on-site groundwater containment effort once it was determined that contamination existed on the property. The company proceeded with the installation of a groundwater extraction and treatment system to achieve containment on site, which will operate over time, possibly several years, to remove and prevent further migration of contaminated groundwater from the site (see Section 3.2 below). The company then began negotiations to reach an agreement under the NYSDEC Voluntary Cleanup Program (VCP) on the continued operation and maintenance of this system. A Voluntary Cleanup Agreement (Index Number: B9-0507-96-05) was signed by the NYSDEC and became effective on January 13, 1998. This section provides a summary of the source removal and groundwater containment efforts, with emphasis on how these efforts were coordinated with RI activities, to maximize the understanding of the site and assist with the monitoring of the effectiveness of the VCP efforts.

3.1 SOIL REMOVAL

Beginning in January 1994, the first activity, conducted solely on the part of the company, was the removal of the contaminated soil identified in the area behind the buildings. Initial sampling (to a depth of 0 to 2 feet) indicated the soil was contaminated with total petroleum hydrocarbons, metals, and to a lesser extent VOCs. As excavation and confirmatory sampling proceeded to approximately 3 feet, it became apparent that the VOC contamination increased with depth.

Confirmatory sampling from the perimeter also indicated additional excavation to the north and west was necessary. Excavation continued through February 14, 1994 in a phased approach, until an area from the eastern edge of the main building extending approximately sixty feet further east was excavated to a depth of 5 to 7 feet, at which point groundwater was encountered. Soil removal continued based on visual identification of contamination, consisting of oil stained soil. As each portion of the excavation was completed, bank run sand and gravel from an unspecified source was placed as backfill. A total of 568 tons of soil were removed from the One Industrial Place property. A detailed description of the field activities and analytical data associated with the soil removal can be found in the Report of Field Activities at One Industrial Place, April 1994, prepared by Malcolm Pirnie, Inc. (MPI) for the Gowanda Electronics Corporation.

3.2 GROUNDWATER TREATMENT

Based on significant groundwater contamination identified beneath the area of excavation, it was determined that containment and treatment of the groundwater was necessary. A pump and treat system consisting of an extraction well and air stripper, with discharge of the treated water to the sanitary sewer, was installed to achieve these goals. The extraction well was installed to the base of the aquifer at a depth of approximately 18 feet, with a 6 inch diameter well screen across the saturated thickness of the aquifer. A shallow tray air stripper was utilized to remove VOCs from the groundwater after it is pumped from the ground, with the system designed to treat up to 15 gallons per minute. The system has undergone several modifications to maximize its effectiveness and is currently operating at approximately 7 gallons per minute, creating a zone of influence extending approximately 125 feet to the north. Contaminant concentrations have been decreasing in the area of the pumping well. In the Fall of 1997, between the first and second phase RI, non-aqueous phase liquid (NAPL) was drawn into the system after pumping rates were increased. This was evidence that some waste material had remained in the subsurface prior to expanding the area of influence of the well by means of increasing the pumping rates. Details on the operation and maintenance of the pumping system, including analytical results, are contained in the quarterly reports prepared by MPI.

3.3 COORDINATION OF THE VCP PROJECT WITH THE REMEDIAL INVESTIGATION ACTIVITIES

Although the work described above had been completed prior to the RI, a full understanding of the geologic and hydrogeologic conditions at the source area had not yet been adequately defined. To provide this information, Geoprobe™ samples were collected and one monitoring well, MW-2, installed during the first phase RI to characterize the geology, measure the level of contamination remaining in the area and to provide a long-term monitoring point in close proximity to the pumping well. Both groundwater chemistry and physical hydraulic conditions are monitored at MW-2.

An evaluation of all the data and information collected during the first phase RI indicated an aquifer pumping test would be beneficial to better understand the hydrogeologic conditions and the effects of pumping a well. Specific hydraulic parameters derived from the pump test could then be applied to other areas of the contaminant plume, as a prediction of whether a pump and treat system would be effective at a specific location. It was determined that the existing pumping well could serve as the aquifer test pumping well, with some additional monitoring points appropriately spaced from the well. The identification of the presence of NAPL, as described above after the first phase work was completed, indicated that there was a potential for significant contamination to still be in the subsurface soil.

Aquifer pumping tests involve first determining an optimum pumping rate for the aquifer through a series of short term pumping tests, known as a step drawdown test. Step drawdown tests consist of pumping the aquifer at a specific rate for a short period, usually 2 to 4 hours, then increasing that rate by a set amount. Rates are increased several times, observing the effects the pumping rates have on the aquifer. The goal is to determine the optimum pumping rate that will create enough stress (measured by water level drawdown at various distance from the pumping well) on the aquifer to yield meaningful data. The aquifer is then pumped at that optimum rate for an extended period of time, usually 24 to 72 hours, while observing the affects at various distances from the pumping well. An evaluation of the amount of draw down within the aquifer, compared to the distance and the time required to achieve that draw down, is performed to calculate the hydraulic parameters of the aquifer. Conducting such a test is labor intensive, requiring planning for the discharge of the water, placement of monitoring equipment, and numerous personnel to carry out the test.

During the planning of the aquifer pumping test, it was determined that the recovery well was currently being pumped at the maximum rate for the aquifer, and the necessary pump test information could be gained from that well. It was therefore decided to proceed with the installation of monitoring wells MW-9, MW-11, and MW-12 as observation points, collect draw down data over the course of normal operation, and then evaluate that data using an approach similar to a pump test, rather than conduct a full pump test as originally planned. This approach would allow for an evaluation of the potential presence of NAPL through split spoon sampling during the monitoring well installation, provide sufficient information for the estimation of hydraulic parameters of the aquifer, and provide long-term monitoring points near the pumping well to observe pumping influence and contaminant reduction trends. The pumping well was temporarily shut off during the installation and development of the monitoring wells, with the restarting of the pump on January 7, 1998 coordinated to monitor groundwater levels, just as would be done with a full aquifer pump test. The data collection efforts continued for several weeks after pumping resumed.

This data is being evaluated and will be presented in the FS. The hydraulic conductivity data generated from the slug tests has provided sufficient information for an understanding of the aquifer characteristics and distribution of contamination. The more precise information that can

be expected from the pumping data is typically more appropriate during the FS and will be discussed at that time.

4.0 FINDINGS OF THE REMEDIAL INVESTIGATION

The findings and interpretation of the data for the RI are discussed in this section. A description of the site geology and hydrogeology provide a basis to further understand the nature and extent of contamination across the study area. Contaminant distribution is discussed based on the site geology and hydrogeology and the analytical results of soil, soil gas, and groundwater samples, with an overall description of current conditions.

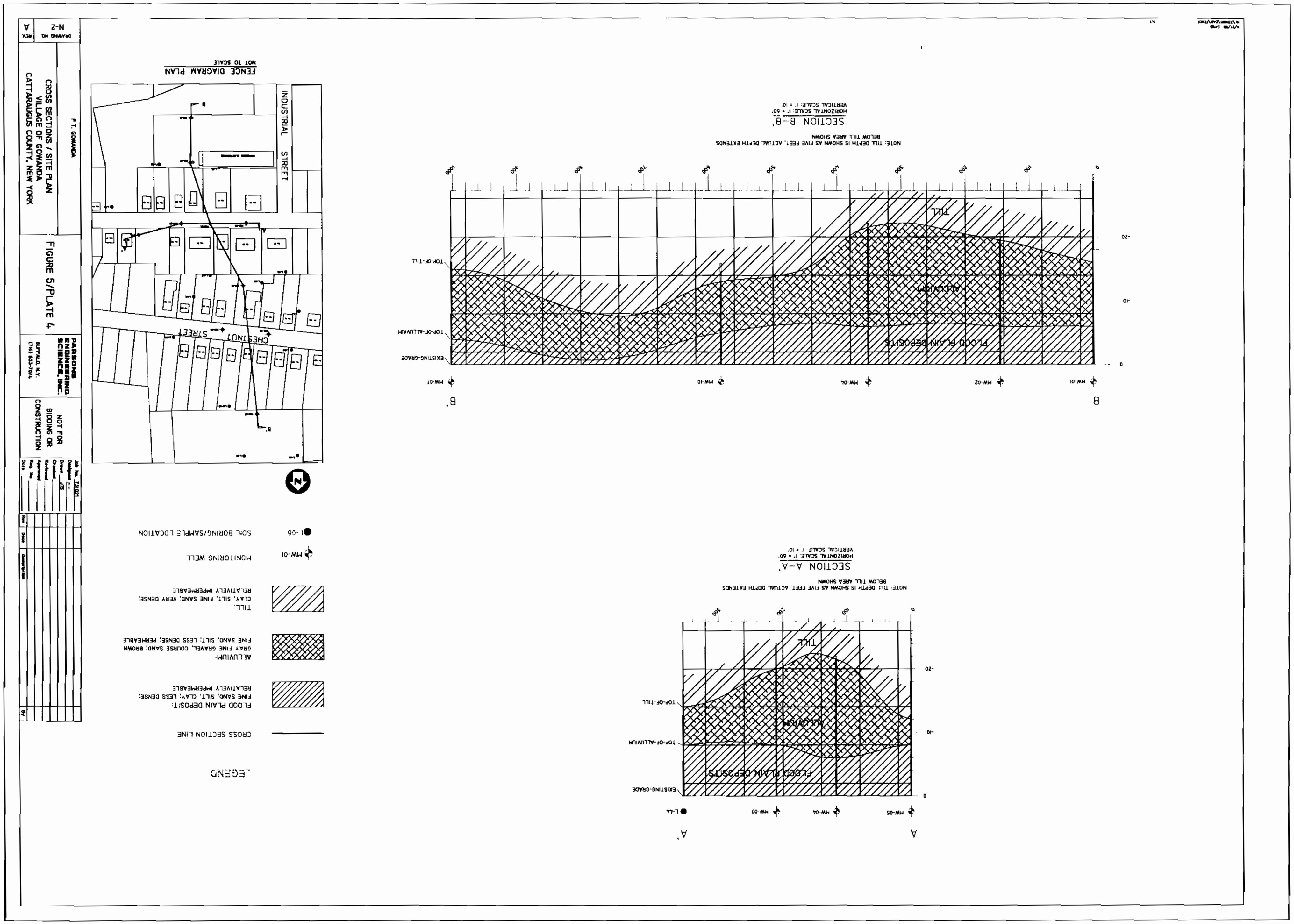
4.1 SITE GEOLOGY

Geologic units encountered during this RI consist of overburden material representing three distinct soil units. The lower most unit is glacial lodgement till, herein referred to as till. The till is comprised of clay, silt, and fine sand, is very dense and compact, and is relatively impermeable. The total thickness of the till unit was not identified during this study, however two borings were completed at least 15 feet into the till, suggesting the till is a continuous unit of significant thickness, providing a barrier to downward groundwater flow and contaminant migration.

The top of this till unit is found at depths of from 8 to 22 feet below ground surface, depending on location. The top of till is approximately 18 to 19.5 feet below ground surface on site in the source area, dipping downward to the north to a maximum encountered depth of 21.5 feet at MW-4 located in Torrance Place, then rising again steadily further to the north, reaching a depth of 8 feet at Chestnut Street. The top of the till unit also rises to the east and west along Torrance Place with MW-4 as the deepest encountered depth to till, more abruptly to the west at 12 feet at MW-5 and at 20 feet below ground surface at MW-3 to the east. Three dimensionally, as shown in the fence diagram Figure 4/Plate 3, the top of the till therefore forms a bowl in the area of Torrance Place. The accompanying cross sections in Figure 5/Plate 4 show two dimensionally the till surface from east to west and from south to north. This feature is critical to understanding the distribution of contamination, as will be discussed in Section 4.3.

The primary water bearing unit is immediately above the till, consisting of alluvial sand and gravel of varying composition. This unit is generally found at 6 to 8 feet below ground surface and extending to the top of till with total thickness ranging from 4 to 15 feet. This unit is a post glacial alluvial deposit as a result of streams flowing from the highlands over the till, carrying and depositing large quantities of sand and gravel over time. The streams continually changed course, cutting and subsequently filling channels with sediment of various grain size depending on the volume and rate of flow, resulting in the variability of material observed during the RI. The most


FENCE DIAGRAM PLAN
NOT TO SCALE
INDUSTRIAL STREET
CHESTNUT STREET
TORRANCE PLACE
TORRANCE
CREEK
JAMESTOWN
STREET
COMMERCE STREET
WALNUT
AVENUE
SOUTH WATER
LEGEND
FENCE CUT LINE
FLOOD PLAIN DEPOSIT:
FINE SAND, SILT, CLAY; LESS DENSE;
RELATIVELY IMPERMEABLE
ALLUVIUM:
GRAY FINE GRAVEL, COARSE SAND, BROWN
FINE SAND, SILT; LESS DENSE; PERMEABLE
TILL:
CLAY, SILT, FINE SAND; VERY DENSE;
RELATIVELY IMPERMEABLE
MONITORING WELL
SOIL BORING/SAMPLE LOCATION
NOT FOR BIDDING OR CONSTRUCTION
FENCE DIAGRAM / SITE PLAN
VILLAGE OF GOWANDA
CATTARAUGUS COUNTY, NEW YORK
FIGURE 4/PLATE 3


B
MW-01
MW-02
MW-04
MW-10
MW-07
B'
FLOOD PLAIN DEPOSITS
ALLUVIUM
TILL
EXISTING-GRADE
TOP-OF-ALLUVIUM
TOP-OF-TILL
NOTE: TILL DEPTH IS SHOWN AS FIVE FEET. ACTUAL DEPTH EXTENDS BELOW TILL AREA SHOWN
SECTION B–B'
HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 10'
A
MW-05
MW-04
MW-03
L-4
A'
SECTION A–A'
HORIZONTAL SCALE: 1" = 60'
VERTICAL SCALE: 1" = 10'
LEGEND
CROSS SECTION LINE
FLOOD PLAIN DEPOSIT: FINE SAND, SILT, CLAY; LESS DENSE; RELATIVELY IMPERMEABLE
ALLUVIUM: GRAY FINE GRAVEL, COURSE SAND; BROWN FINE SAND, SILT; LESS DENSE; PERMEABLE
TILL: CLAY, SILT, FINE SAND; VERY DENSE; RELATIVELY IMPERMEABLE
MONITORING WELL
SOIL BORING/SAMPLE LOCATION
INDUSTRIAL STREET
CHESTNUT STREET
FENCE DIAGRAM PLAN
NOT TO SCALE
P.T. GOWANDA
CROSS SECTIONS / SITE PLAN
VILLAGE OF GOWANDA
CATTARAUGUS COUNTY, NEW YORK
FIGURE 5/PLATE 4
PARSONS ENGINEERING SCIENCE, INC.
BUFFALO, N.Y.
(716) 633-7074
NOT FOR BIDDING OR CONSTRUCTION
Job No. 731021
DRAWING NO. N-2
REV. A

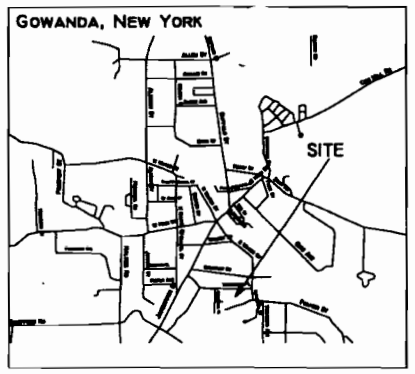
hydraulically conductive material, consisting primarily of grey fine gravel and coarse sand was encountered near the source area and extends in a narrow band to the north. This material is bound by brown fine sand and silt to the east and west and is indicative of a buried stream channel. The presence of the streams flowing over the till was also responsible for the contouring of the till surface through erosional processes. Surface features of the till, such as the bowl beneath Torrance Place, are a result of this erosion. Overall, the alluvial unit is a relatively permeable mix of sand and gravel, with channel deposits of coarser material (and therefore even more permeable) controlling, in part, groundwater flow pathways.

The uppermost unit within the study area are flood plain deposits consisting of fine sand, silt, and clay. This soil unit extends from the ground surface to the top of the alluvial sand and gravel unit, generally 1 to 8 feet in thickness. The path of the stream system responsible for the sand and gravel was displaced as the deposits filled the channels. Periodic flooding over the banks of the stream carried finer grained sediments, the fine sand, silt, and clay, in the quieter flood waters and deposited them on top of the sand and gravel. These sediments are significantly less permeable than the underlying sand and gravel unit, as demonstrated during the attempted soil gas sampling discussed in section 2.1. Localized reworking of the soil has taken place as a result of development over the years.

Bedrock, an upper Devonian shale of the Canadaway Group, was not encountered in any of the boreholes during the RI, and therefore the depth to bedrock was not confirmed. Bedrock can be observed locally along the stream bed of Cattaraugus Creek. Such general field observations suggest bedrock could be expected within another 10 feet of boring through the till, or about 35 feet below ground surface. However, due to the potential for bedrock erosion during glaciation, determination of the exact depth to bedrock, if necessary, would have to be confirmed with additional borings.

4.2 SITE HYDROGEOLOGY

Groundwater occurs within the alluvial sand and gravel unit under unconfined conditions. An unconfined aquifer is one where the groundwater surface, or water table, is free to rise and fall depending on aquifer recharge and artificial influences such as pumping wells or drainage systems. The saturated thickness of the aquifer ranges from 3 to 16 feet, with the thicker area being in the southern portion of the study area at approximately 10 to 16 feet, becoming thinner to the north with 3 to 6 feet of saturation near Chestnut Street. Recharge occurs to a water table aquifer through horizontal flow from an upgradient source and/or infiltration of precipitation. The study area is served with storm drains to Cattaraugus Creek for the paved areas including parking lots and village streets. Regionally, the area is bound by Thatcher Creek, a tributary to Cattaraugus Creek, to the east, and Cattaraugus Creek to the west. Locally, Thatcher Creek, exerts a minor influence on groundwater flow within the study area, as can be observed on Figure 6/Plate 5 and Figure 7/Plate 6 (Thatcher Creek is shown as "CREEK" in the lower left). Sanitary and storm sewers along Torrance Place and Chestnut Street are generally located above the water table and therefore do not effect groundwater flow.



GROUNDWATER ELEVATION CONTOUR LINE MEASURED DURING NON-PUMPING CONDITIONS JANUARY 7, 1998

GROUNDWATER FLOW DIRECTION

AVM-GOWANDA SITE
GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE NO. 9-05-025

New York State Department of Environmental Conservation

FILE:

DRAWING: BASED FROM HOLBERTSON & HOLBERTSON, P.C. BASE MAP 9/1998

FIGURE 6/PLATE 5
GROUNDWATER FLOW
(NON-PUMPING)

DATE: 5/21/98

Groundwater flow direction is determined by observing the elevation of the water table at various locations and calculating the slope (hydraulic gradient) of that surface, with flow being in the direction of high to low elevation, or potential. Groundwater flow velocity is determined using the hydraulic gradient, hydraulic conductivity, and the porosity of the material through which the flow is occurring. The calculated values of these parameters for the water table aquifer are discussed below.

The water table aquifer within the study area has been investigated through the installation of monitoring wells to measure aquifer parameters and observe the effects of pumping at the source area. All monitoring wells have had water levels recorded on a routine basis. The measured depth to water is converted to actual survey elevation and plotted on the site map. Figure 6/Plate 5 shows groundwater elevations and flow direction during a period while the on-site pumping well was not operating, with equipotential lines representing areas of equal water table elevation. Table 2 contains groundwater elevation data collected during non-pumping conditions on January 7 (immediately prior to starting the pump) and during pumping conditions on January 23, sixteen days after the recovery well began pumping. Groundwater flow is at right angles to the equipotential lines, as shown on Figure 6/Plate 5, indicating groundwater flow is generally to the north, northwest. Figure 7/Plate 6 illustrates a similar set of water level data collected during the operation of the pumping well, indicating flow to the well from as far north as Torrance Place.

The hydraulic gradients have been calculated for the study area. Hydraulic gradient is simply the difference in hydraulic head (in this case water table elevation) between two points, divided by the distance between those points, expressed as a percentage. It is necessary for the calculation of groundwater velocity and is an indicator of flow direction. Based on the geology and hydrogeology, the study area has be divided into three sections for average hydraulic gradient, hydraulic conductivity, and groundwater velocity calculations. Those sections are: 1) from the source area north to Torrance Place; 2) from Torrance Place north to Chestnut Street; and 3) from Chestnut Street north to midway between Walnut Avenue, in the vacant lumber yard. The average hydraulic gradient across section 1 is 1.88%, section 2 is .77%, and section 3 is 3.39%.

Hydraulic conductivity data generated from the slug tests are presented in Table 3. Values across the study area range from 4.74×10^{-4} to 2.32×10^{-1} cm/sec (centimeters per second), with an average hydraulic conductivity of 7.61×10^{-2} cm/sec. The slug test results indicate a relatively permeable aquifer capable of transmitting a moderate volume of groundwater. However, it should be noted that hydraulic conductivity values generated from slug tests are an estimation at best, especially in moderately to highly conductive aquifers with localized variability. More precise values, when necessary, can be obtained from aquifer pumping tests. As discussed in section 3.3, data has been collected in conjunction with the operation of the on-site recovery well and will be evaluated in the FS.

Groundwater velocity, has been calculated based on the information above and assuming a porosity of 30% for a sand and gravel mix (Fetter, 1988). Average velocity was calculated for each of the

three sections, however, again in must be noted that the values are averages and variability exists even within the defined section due to the variability in geology. Average groundwater velocity through section 1, under non-pumping conditions, is 2.52 ft/day (feet per day), section 2 is 4.72 ft/day, and section 3 is 63 ft/day. The surface of a water table typically resembles the ground surface. The reason for the high ground water velocity value in section 3 is the sharp drop in the ground surface and resulting drop in the water table measured between well MW-6 and MW-7. The drop of the ground surface can be observed north of Chestnut Street behind the homes, running east to west parallel to the street.

TABLE 2
GROUNDWATER ELEVATIONS

WELL NAME	ELEV.	Depth to Water 1/7/98	ELEV. (FEET)	Depth to Water 1/23/98	ELEV. (FEET)
RW-1	776.04	1.62	774.42	10.66	765.38
MW-1	779.75	4.02	775.73	5.9	773.85
MW-2	775.74	3.33	772.41	10.75	764.99
MW-3	775.92	5.5	770.42	7.73	768.19
MW-4	775.66	5.22	770.44	7.65	768.01
MW-5	775.28	8.42	766.86	9	766.28
MW-6	771.25	6.1	765.15	6.38	764.87
MW-7	766.38	10.04	756.34	10.04	756.34
MW-8	770.32	5.69	764.63		
MW-9	775.97	3.35	772.62	9.35	766.62
MW-10	774.13			8.39	765.74
MW-11	776.38	3.9	772.48	10.5	765.88
MW-12	776.11	3.65	772.46	10.27	765.84
MPI-1	775.83	3.28	772.55		
MPI-3	775.42	1.2	774.22	2.45	772.97
MPI-4	776.47	4.35	772.12	8.1	768.37
MPI-5	776.08	4.38	771.70	8.03	768.05
MPI-8	778.15	1.7	776.45	3.02	775.13

TABLE 3
HYDRAULIC CONDUCTIVITY (K)

WELL ID	K (CM/SEC)
MW-1	4.38E-03
MW-2	1.41E-02
MW-3	4.74E-03
MW-4	3.70E-03
MW-5	5.56E-02
MW-6	3.80E-02
MW-7	2.56E-01
MW-8	2.32E-01

Based on hydraulic properties measured at Chestnut Street, it is likely that groundwater velocity in Section 3 is closer to the value for Sections 1 and 2 except near the drop.

4.2.1 VOLUNTARY CLEANUP INFLUENCE

The recovery well currently operating at One Industrial Place has had significant influence, as intended, on the local hydrogeologic conditions, specifically between the site and Torrance Place. The well has been continually removing groundwater from the aquifer at a rate of approximately 6 to 7 gallons per minute. The pump is located at the bottom of the well screen to draw from the base of the aquifer. Figure 7/Plate 6 illustrates the effects of the pumping on the aquifer, with a measurable influence out to Torrance Place, as indicated by the closed equipotential lines around the well. As would be expected, the stronger influence is nearer the pumping well. A constant drawdown of 6 to 7 feet was accomplished after 16 days of pumping, and has been maintained since. The purpose of the well is to remove contaminated groundwater for treatment and to create an inward (toward the well) gradient to prevent further groundwater migration from the source area. The data indicates this is being accomplished and is expected to continue to improve conditions over time.

4.3 NATURE AND EXTENT OF CONTAMINATION

Significant VOC contamination has been identified and characterized over a widespread area, originating at the source area located at the east end of the main building on the One Industrial Place property and extending northward. Soil and groundwater contamination by VOCs initially identified in earlier studies, has been confirmed in the source area, with groundwater

contamination extending northward. The nature and extent of contamination is discussed in this section corresponding to the environmental media sampled; soil, soil gas, groundwater, and indoor air.

Soil Contamination - Three soil samples collected on the One Industrial Place property north of the recovery well and just outside the previously excavated source area were analyzed for VOCs, semi-volatiles (SVOCs) and metals. One sample, SB002, was collected from below the water table, the other two, SB001 and SB003, from just above. Low level VOC contamination was present in the samples from the unsaturated zone, primarily TCE at less than 1 ppm and lower levels of 1,1,1-trichloroethane (1,1,1-TCA) and 1,2-dichloroethene (total) (DCE), the three of which comprise the majority of the contaminants associated with the site. The saturated sample, SB002, contained approximately three times the amount of VOCs, likely due to direct contact with the highly contaminated groundwater.

Analysis for SVOCs detected three compounds at levels below the laboratory contract detection limit, levels sufficiently low that the compounds are not of any further concern.

Metals analysis of the three samples show concentrations to be within the Eastern US Background levels (NYSDEC TAGM HWR-94-4046) for all metals except zinc, which was slightly above the Background levels of 9 to 50 ppm at 84.6 ppm. Initial sampling conducted in the source area by MPI found elevated levels of metals contamination, which lead to the soil excavation. The lack of elevated levels of metals and relatively low concentrations of VOCs in the soil indicates the source area soil removal was effective.

Table 4 contains the analytical data for the three soil samples.

Soil Gas Contamination - Twenty seven soil gas samples collected on site and in the vicinity of Torrance Place were analyzed for VOCs, to serve as an indicator of soil and groundwater contamination. Samples collected in close proximity to the source area exhibited the highest levels of VOCs, with up to 7200 parts per billion (ppb) of TCE, 4900 ppb of 1,1,1-TCA, and 2300 ppb of DCE. Lower concentrations of 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), tetrachloroethene (PCE) were also detected. Petroleum related compounds were detected at low levels, primarily toluene and xylene. Soil gas samples collected in the residential area along Torrance Place yielded much lower concentrations of VOCs ranging from numerous non-detects to the highest level of TCE at 790 ppb.

As discussed in section 2.1, soil gas samples are used as either an indicator of groundwater contamination or nearby soil contamination. Soil gas results for this study were the highest near the source area, most likely to some residual contamination in the surrounding unsaturated soil. The lower levels detected in the residential area are the result of the low permeability characteristics of the flood plain deposits, and did not provide any reliable indication groundwater contamination pattern, as will be discussed below. It is for this reason soil gas sampling was discontinued early in the study.

Groundwater Contamination - A total of 102 groundwater samples were analyzed for VOCs during the two phases of the RI. The majority of the samples, 82, were collected from 69 Geoprobe™ locations and analyzed for VOCs on site during the first phase. The remaining 20 (8 first phase, 12 second phase) were collected from monitoring wells and analyzed at a contract laboratory for VOCs, SVOCs, and metals. The Geoprobe™ samples served to define the extent of the plume and provided the basis for the location of the monitoring wells. High levels of VOC contamination consisting of TCE and associated breakdown products, and lower concentrations of petroleum related compounds were identified in the groundwater. 1,1,1 TCA was also detected at several location near the source area and Torrance Place at significant concentrations. 1,1,1 TCA is not considered a breakdown product of TCE, however it does have similar industrial uses and can also be found mixed in industrial grade TCE. TCE is the predominant contaminant, both in terms of highest concentration and widespread distribution. Table 5 contains the Geoprobe™ analytical data, Table 6 and Table 7 present groundwater data generated from the June and December, 1997 monitoring well sampling.

Utilizing the Geoprobe™ data, a groundwater contamination plume has been defined extending from the known source area on site to the north approximately 1150 feet, with a maximum width of 450 feet as measured east to west along Chestnut Street. TCE concentrations range from non-detect (ND) to up to 23,000 ppb, with the highest levels found on the north side of Torrance Place to the northwest of the source area. Breakdown products, primarily cis-1,2-Dichloroethene (DCE), were found in all samples that contain TCE. 1,1,1 TCA was found at concentrations up to 1800 ppb near the source area. Analytical data confirmed that the source area is located at the east end of the main building on the One Industrial Place property with concentrations of total VOCs generally greater than 2500 ppb. Contaminant concentrations also taper off to the north, with the leading edge of the plume located approximately 275 feet north of Chestnut Street.

Analytical results from the area south of Torrance Place were similar to the results of the IIWA indicating conditions have essentially remained unchanged.

Samples were collected from the upper and lower portions of the aquifer near the source area and along Torrance Place during the initial stages of the RI, with higher concentrations of contaminants consistently being in the deeper samples. This is as would be expected since TCE and the breakdown products are more dense than water and sink in an aquifer when they exist as a separate phase. Based on this observation, samples were collected primarily from the lower portion of the aquifer further along in the study, as distance from the source area increased. Figure 8/Plate 7 illustrates the extent of the plume, shown as the concentration of total VOCs. The shaded area illustrates groundwater contamination at levels equal to or higher than 1000 ppb total VOCs. The outer isoconcentration line shows the 250 ppb extent of the plume. Samples were collected outward from the plume in all directions until total VOC concentrations which were significantly low enough, approximately 10 to 20 ppb, that they indicated the extent of the plume had been defined.

TABLE 4
AVM GOWANDA
Validated Soil Boring Sample Results - Detected Compound Summary

	Geoprobe Location	L-8	L-9	L-12
	SAMPLE ID:	SB001	SB002	SB003
	DEPTH:	4-8'	7-11'	5.5-6.2'
	MATRIX:	SOIL	SOIL	SOIL
	SAMPLED:	5/28/97	5/29/97	5/30/97
COMPOUND	UNITS:			
VOLATILES				
Carbon Disulfide	UG/KG	ND	4J	ND
1,1-Dichloroethane	UG/KG	ND	29	5J
1,1-Dichloroethene	UG/KG	ND	9J	ND
1,2-Dichloroethene (total)	UG/KG	30J	500	53
Ethylbenzene	UG/KG	ND	0.8J	ND
Methylene Chloride	UG/KG	2J	2J	2J
Tetrachloroethene	UG/KG	1J	5J	3J
Toluene	UG/KG	0.8J	1J	ND
1,1,1-Trichloroethane	UG/KG	16J	450	180
1,1,2-Trichloroethane	UG/KG	ND	2J	2J
Trichloroethene	UG/KG	220J	2200	950
Xylene (total)	UG/KG	ND	3J	ND
SEMIVOLATILES				
Fluorene	UG/KG	44J	ND	ND
2-Methylnaphthalene	UG/KG	ND	58J	ND
Phenanthrene	UG/KG	74J	38J	ND
METALS				
Aluminum	MG/KG	7680	6170	6160
Arsenic	MG/KG	6.4	3.5	4.7
Barium	MG/KG	80.9	39.2J	56.9
Beryllium	MG/KG	0.39J	0.3J	0.32J
Calcium	MG/KG	3900	20600	869J
Chromium	MG/KG	10.3	8.9	8.7
Cobalt	MG/KG	8.9J	5.7J	6.8J
Copper	MG/KG	20.1	18.6	18.7
Iron	MG/KG	19400	15400	17200
Lead	MG/KG	8.4	7.7	8.3
Magnesium	MG/KG	3360	3790	2570
Manganese	MG/KG	243	570	150
Nickel	MG/KG	20.5	14.6	16.3
Potassium	MG/KG	1950J	2250J	1590J
Selenium	MG/KG	1.2J	ND	ND
Sodium	MG/KG	348J	572J	242J
Thallium	MG/KG	1.1J	1.3J	0.89J
Vanadium	MG/KG	11	9.2J	10.9
Zinc	MG/KG	84.6	81.5	72.8

UG/KG - microgram per kilogram (ppb)
MG/KG - milligram per kilogram (ppm)
ND - Not detected
J - Value below contract detection limit

Monitoring well locations were selected within the defined plume to serve as points for long term monitoring of changing groundwater conditions. Samples collected represent the entire saturated thickness of overburden material at each location rather than specific zones as sampled during the Geoprobe™ efforts. Results for the VOCs analysis show a distribution pattern consistent with the Geoprobe™ data that was used to define the plume, however concentrations were significantly higher overall. This is likely due to the monitoring wells extending completely to the base of the aquifer, where the highest concentrations of contamination exist. It was not possible to reach these depths at several locations with the Geoprobe™ equipment. As expected, the highest levels of VOCs were found in the area of Torrance Place, with TCE concentrations up to 170,000 ppb and total VOCs up to 224,700 ppb at MW-4, which is the location of the "bowl" in the lodgement till described in Section 4.1. Concentrations of this magnitude strongly suggest that TCE exists as free product, also known as dense non-aqueous phase liquid (DNAPL), within the aquifer. Groundwater VOC concentrations are lower, yet still significant, near the source area suggesting that the recovery well operating on-site is effectively reducing contamination that remains at the source area. VOC results for each monitoring well sampled during the first phase are shown on Figure 9/Plate 8. Results from the second phase are shown on Figure 10/Plate 9.

Analysis of groundwater samples show there are no impacts to groundwater from SVOCs. Each monitoring well has had one analysis for SVOCs to establish a data base, and since no SVOCs were detected, no further analysis for these compounds will be performed on future sampling.

Each monitoring well was also analyzed once for metals contamination. Results were all within the NYSDEC Groundwater Standards, indicating no adverse impacts to groundwater. The metals detected in the groundwater are naturally occurring due to the mineral content of the local soil and bedrock.

DNAPL - Sampling efforts to identify DNAPL using the hydrophobic dye testing procedure were inconclusive. DNAPL was not apparent in any of the samples collected from the base of monitoring wells located within the area of highest contamination. This may be due to the sampling methodology, as all chemical analysis data strongly suggest that DNAPL is present in the aquifer.

Indoor Air - Indoor air sampling has been conducted along Torrance Place to determine if contamination has volatilized from the groundwater into the air in the basements of homes located over the plume. Samples were collected from both the basement and the primary living level at ten residences. Basements were sampled since that is the area where any vapors would enter the house and would be expected to be at the highest concentrations if found. The primary living area was sampled since that is where most of the time exposure would occur if contaminants had migrated into the house in vapor phase. Two sampling rounds were collected. The first round was taken June 17, 1997. The second round was taken March 19, 1998 when homes are sealed for

TABLE 5
GROUNDWATER ANALYTICAL DATA
GEOPROBE SAMPLING
Results in PPB

COMPOUNDS	GW-1	GW-2	GW-3	GW-4	GW-5	GW-6	GW-7	GW-8A	GW-8B	GW-9A	GW-9B
VINYL CHLORIDE	ND	ND	ND	ND	BQL	1.3	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	BQL	16	ND	1.1	ND	5.2	BQL	ND	ND	ND	ND
c-1,2-DOCHLOROETHENE	1.3	16	ND	3.5	320	10	260	530	760	2600	2700
111TRICHLOROETHANE	BQL	ND	ND	ND	ND	ND	ND	ND	ND	1400	1800
CARBON TET.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	BQL	ND	ND	BQL	2.3	52	730	2300	1700	2000
TETRACHLOROETHENE	ND	BQL	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	ND	89	ND	BQL	ND	BQL	ND	ND	ND	ND	ND
TOLUENE	BQL	12	ND	5.5	ND	1.3	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	17	ND	BQL	ND	ND	ND	ND	ND	ND	ND
M&P-XYLENE	BQL	20	BQL	2.7	ND	1.9	ND	ND	ND	ND	ND
O-XYLENE	ND	BQL	ND	BQL	ND	BQL	ND	ND	ND	ND	ND

TABLE 5 (Cont.)
GROUNDWATER ANALYTICAL DATA
GEOPROBE SAMPLING
Results in PPB

COMPOUNDS	GW-10A	GW-10B	GW-11A	GW-11B	GW-12A	GW-12B	GW-13A	GW-13B	GW-14	GW-16
VINYL CHLORIDE	ND	ND	ND	ND	16	ND	2	BQL	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	BQL	ND	BQL	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	BQL	BQL	BQL	280	70	400	7.4	18	1	ND
c-1,2-DOCHLOROETHENE	2400	2800	700	3800	240	1600	35	68	1..9	ND
111TRICHLOROETHANE	1700	560	360	1000	220	1500	3.7	15	ND	ND
CARBON TET.	ND	ND	ND	ND	ND	ND	ND	ND	BQL	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	1300	9900	1000	3100	140	720	6.9	25	BQL	ND
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	BQL
TOLUENE	ND	ND	ND	ND	ND	ND	BQL	ND	1.6	1.6
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M&P-XYLENE	ND	ND	ND	ND	BQL	BQL	BQL	BQL	BQL	1.6
O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	BQL

TABLE 5 (Cont.)
GROUNDWATER ANALYTICAL DATA
GEOPROBE SAMPLING
Results in PPB

COMPOUNDS	GW-18	GW-19A	GW-19B	GW-20A	GW-20B	GW-21	GW-22A	GW-22B	GW-23B	GW-24A	GW-24B
VINYL CHLORIDE	ND	ND	3.3	ND	BQL	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	BQL	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	BQL	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	BQL	ND	6.4	ND	380	BQL	BQL	BQL
c-1,2-DOCHLOROETHENE	ND	7.4	2.7	BQL	ND	2.6	57	860	4300	2.9	3300
111TRICHLOROETHANE	ND	BQL	ND	BQL	ND	ND	120	750	ND	2.6	ND
CARBON TET.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	71	2.9	4.8	BQL	ND	260	920	21000	42	12000
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	ND	ND	BQL	BQL	1.6	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M&P-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 5 (Cont.)
GROUNDWATER ANALYTICAL DATA
GEOPROBE SAMPLING
Results in PPB

COMPOUNDS	GW-25A	GW-25B	GW-26B	GW-27A	GW-27B	GW-28	GW-29B	GW-30	GW-31B	GW-32
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	BQL	ND	BQL	ND	44	BQL	36	BQL	BQL
c-1,2-DOCHLOROETHENE	25	3400	2400	160	BQL	92	5400	100	1500	2900
111TRICHLOROETHANE	BQL	ND	ND	16	ND	22	ND	32	ND	ND
CARBON TET.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	130	13000	4800	160	4500	140	23000	170	3500	10000
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M&P-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 5 (Cont.)
GROUNDWATER ANALYTICAL DATA
GEOPROBE SAMPLING
Results in PPB

COMPOUNDS	GW-33	GW-34	GW-35	GW-36A	GW-36B	GW-37	GW-39	GW-39	GW-40	GW-41
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	NDBQL	ND
1,1-DICHLOROETHANE	BQL	ND	ND	14	100	BQL	620	ND	2600	BQL
c-1,2-DOCHLOROETHENE	1300	ND	BQL	43	180	500	1900	960	ND	1600
111TRICHLOROETHANE	ND	ND	ND	50	BQL	ND	ND	ND	ND	ND
CARBON TET.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	6600	ND
TRICHLOROETHENE	4500	ND	6.1	130	350	960	3200	3400	ND	3600
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	ND	ND	BQL	ND	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M&P-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 5 (Cont.)
GROUNDWATER ANALYTICAL DATA
GEOPROBE SAMPLING
Results in PPB

COMPOUNDS	GW-42	GW-43	GW-44	GW-45	GW-46	GW-47	GW-48	GW-49	GW-50	GW-51
VINYL CHLORIDE	ND	ND	ND	BQL	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	BQL	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	480	ND	ND	15	1.1	BQL	130	100	120	130
c-1,2-DOCHLOROETHENE	2600	ND	ND	37	1.6	BQL	480	180	750	820
111TRICHLOROETHANE	ND	ND	ND	ND	ND	6.6	BQL	ND	ND	ND
CARBON TET.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	7400	83	ND	28	3	18	1100	130	2500	2300
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	14	ND	ND	ND	ND	ND	ND
TOLUENE	ND	ND	ND	BQL	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M&P-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 5 (Cont.)
GROUNDWATER ANALYTICAL DATA
GEOPROBE SAMPLING
Results in PPB

COMPOUNDS	GW-52	GW-53	GW-53	GW-55	GW-56	GW-57	GW-58	GW-58B	GW-59	GW-59B
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	140	160	62	78	BQL	85	BQL	9.5
c-1,2-DOCHLOROETHENE	2.9	3.7	670	1500	390	350	130	400	100	20
111TRICHLOROETHANE	ND	ND	BQL	ND	ND	BQL	ND	ND	ND	BQL
CARBON TET.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	18	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	4.2	1400	2300	1100	1000	500	1100	220	36
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M&P-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 5 (Cont.)
GROUNDWATER ANALYTICAL DATA
GEOPROBE SAMPLING
Results in PPB

COMPOUNDS	GW-60	GW-61	GW-62	GW-63	GW-64	GW-65	GW-66	GW-67	GW-68	GW-69
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	1.3	ND	BQL	18	18	ND	ND	ND	ND
c-1,2-DOCHLOROETHENE	BQL	1.3	ND	BQL	57	75	ND	ND	ND	2.7
111TRICHLOROETHANE	ND	ND	ND	ND	BQL	ND	ND	ND	ND	1.5
CARBON TET.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	ND	2.7	BQL	56	190	ND	ND	23	16
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOLUENE	BQL	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M&P-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

AVM GOWANDA - Validated Groundwater Sample Results - Detected Compound Summary
June 1997 - First Phase RI

							DUP of				
	SAMPLE	MW-1	MW-2	MW-3	MW-4	MW-5	BLIND DUP	MW-6	MW-7	MW-8	NYSDEC
	MATRIX:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	Grounwater
	SAMPLED:	6/27/97	6/26/97	6/26/97	6/26/97	6/26/97	6/26/97	6/27/97	6/27/97	6/27/97	Standards
COMPOUND	UNITS:										
VOLATILES											
Benzene	UG/L	ND	ND	ND	1J	ND	ND	ND	ND	ND	
Chloroethane	UG/L	ND	ND	2J	20J	5J	4J	ND	ND	ND	0.7
Chloroform	UG/L	ND	ND	ND	ND	ND	ND	ND	2J	ND	
1,1-Dichloroethane	UG/L	9J	22	310	6200J	780J	690J	160	57	230J	7
1,1-Dichloroethene	UG/L	ND	13	41	1100J	100J	96J	16	2J	24	5
1,2-Dichloroethene (total)	UG/L	ND	1200	3800	38000	3800	3300	940	220	1300	5
Methylene Chloride	UG/L	ND	ND	0.7J	2J	ND	ND	ND	ND	ND	5
Tetrachloroethene	UG/L	ND	0.8J	0.7J	ND	ND	ND	ND	ND	ND	
1,1,1-Trichloroethane	UG/L	ND	130	540	ND	270J	230J	2J	8J	53	
1,1,2-Trichloroethane	UG/L	ND	ND	2J	2J	6J	6J	ND	0.8J	2J	5
Trichloroethene	UG/L	ND	1900	4600	140000	12000	11000	2900	490	4000	5
Vinyl Chloride	UG/L	ND	28	36	130J	25J	25J	16	ND	ND	2
METALS											
Aluminum	UG/L	ND	ND	546J	9840J	1300J	4330J	364J	900J	879J	NS
Arsenic	UG/L	ND	ND	ND	4.2J	ND	ND	ND	ND	ND	25
Barium	UG/L	342	193J	148J	290	371	461	147J	106J	136J	1000
Calcium	UG/L	68900	70500	75400	110000	69800	75900	56100	71200	53300	NS
Chromium	UG/L	1.1J	1.2J	1.8J	16.2	2.7J	7.9J	1.5J	2.2J	1.3J	50
Cobalt	UG/L	ND	ND	ND	5.6J	1.8J	3.8J	ND	1J	ND	NS
Copper	UG/L	6J	ND	ND	19.1J	8.8J	20.2J	ND	4.1J	ND	200
Iron	UG/L	7540J	8780J	6000J	17500J	4870J	10900J	2760J	2150J	1770J	300
Lead	UG/L	6.3J	3.5J	4.6J	3.2J	3.4J	9.9J	ND	5.9J	2J	25
Magnesium	UG/L	9150	9670	10400	21300	10600	12200	9250	10400	8920	35000 (G)
Manganese	UG/L	435	1100	1200	527	864	1150	1520	316	148	300
Nickel	UG/L	ND	ND	ND	12.9J	ND	4.3J	ND	ND	ND	NS
Potassium	UG/L	3850J	3340J	5290	9280	4990J	5510	4470J	5670	4170J	NS
Selenium	UG/L	ND	5J	ND	10.3J	ND	ND	ND	ND	6.9J	10
Silver	UG/L	6J	2.2J	ND	ND	ND	ND	ND	ND	ND	
Sodium	UG/L	44100	26100	25500	17300	26000	25800	17400	13400	18900	20000
Thallium	UG/L	ND	ND	ND	ND	ND	2.9J	ND	ND	ND	4 (G)
Vanadium	UG/L	4.8J	4.5J	5.7J	26.2J	6.5J	11J	4.9J	6.4J	5.5J	NS
Zinc	UG/L	ND	ND	14.9J	45.8J	21.5J	43.2J	ND	15.4J	14.9J	300

UG/L - Microgram per liter (ppb) ND - Not detected J - Value below contract detection limit NS - No Standard

TABLE 7
AVM GOWANDA
Validated Groundwater Sample Results - Detected Compound Summary
December 1997 - Second Phase RI

	SAMPLE	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	
	MATRIX:	WATER	WATER	WATER	WATER	WATER	WATER	WATER	WATER	NYSDEC
	SAMPLED:	18-Dec-97	18-Dec-97	18-Dec-97	18-Dec-97	18-Dec-97	18-Dec-97	18-Dec-97	18-Dec-97	Groundwater
COMPOUND	UNITS:									Standard
VOLATILES										
Acetone	UG/L	ND	ND	ND	ND	ND	ND	ND	ND	50 (G)
Benzene	UG/L	ND	ND	ND	ND	ND	31J	ND	ND	0.7
Chloroform	UG/L	ND	ND	ND	ND	ND	ND	2J	ND	7
1,1-Dichloroethane	UG/L	11	42J	450J	8100	59J	170J	57	390	5
1,1-Dichloroethene	UG/L	ND	ND	62J	1600J	ND	21J	1J	40J	5
1,2-Dichloroethene (total)	UG/L	2J	1500	5300	45000	330	1000	260	2000	5
1,1,1-Trichloroethane	UG/L	ND	250	890	ND	ND	ND	8J	66J	5
1,1,2-Trichloroethane	UG/L	ND	ND	ND	ND	ND	ND	ND	250J	5
Trichloroethene	UG/L	ND	2100	5000J	170000	1100	3200	870	4800	5
Vinyl Chloride	UG/L	ND	26J	ND	ND	ND	ND	ND	ND	2
METALS										
Aluminum	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	NS
Arsenic	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	25
Barium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	1000
Calcium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	NS
Chromium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	50
Cobalt	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	NS
Copper	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	200
Iron	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	300
Lead	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	25
Magnesium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	35000 (G)
Manganese	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	300
Mercury	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	2
Nickel	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	NS
Potassium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	NS
Selenium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	10
Sodium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	20000
Thallium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	4 (G)
Vanadium	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	NS
Zinc	UG/L	NA	NA	NA	NA	NA	NA	NA	NA	300

TABLE 7 (Continued)
AVM GOWANDA
Validated Groundwater Sample Results - Detected Compound Summary
December 1997 - Second Phase RI

	SAMPLE ID:	MW-9	MW-10	MW-11	MW-11DUP	MW-12	
	MATRIX:	WATER	WATER	WATER	WATER	WATER	NYSDEC
	SAMPLED:	18-Dec-97	18-Dec-97	18-Dec-97	18-Dec-97	18-Dec-97	Groundwater
COMPOUND	UNITS:						STANDARD
VOLATILES							
Acetone	UG/L	ND	ND	ND		120J	50 (G)
Benzene	UG/L	ND	ND	ND		ND	0.7
Chloroform	UG/L	ND	ND	ND		ND	7
1,1-Dichloroethane	UG/L	10	100J	120J		ND	5
1,1-Dichloroethene	UG/L	6J	ND	ND		ND	5
1,2-Dichloroethene (total)	UG/L	750	720	4500		3000	5
1,1,1-Trichloroethane	UG/L	9J	ND	1700		880	5
1,1,2-Trichloroethane	UG/L	ND	ND	500J		ND	5
Trichloroethene	UG/L	610	2100	3000		1000	5
Vinyl Chloride	UG/L	27	ND	64J		ND	2
METALS							
Aluminum	UG/L	279J	508J	26300J	1080J	704J	NS
Arsenic	UG/L	3.2J	ND	31.2J	4.3J	13.2J	25
Barium	UG/L	298J	190J	543J	194J	256J	1000
Calcium	UG/L	63600J	62100J	133000J	74400J	74400J	NS
Chromium	UG/L	1.1J	0.5J	52.5J	3.2J	1.2J	50
Cobalt	UG/L	1.1J	2.2J	25.1J	2.9J	2.6J	NS
Copper	UG/L	ND	3.7J	87.4J	4.7J	ND	200
Iron	UG/L	7860J	1740J	55600J	4750J	8030J	300
Lead	UG/L	ND	3.6J	60.3J	3.5J	3.5J	25
Magnesium	UG/L	9400J	8410J	26800J	10200J	10300J	35000 (G)
Manganese	UG/L	964J	594J	2960J	1610J	1430J	300
Mercury	UG/L	ND	ND	0.11J	ND	ND	2
Nickel	UG/L	ND	4.2J	207J	86.2J	4.7J	NS
Potassium	UG/L	4650J	5410J	12600J	5720J	5480J	NS
Selenium	UG/L	ND	5.7J	5.2J	8.8J	ND	10
Sodium	UG/L	20900J	14900J	22600J	17400J	18300J	20000
Thallium	UG/L	ND	ND	9.3J	ND	ND	4 (G)
Vanadium	UG/L	8.9J	8.6J	65.1J	10.7J	10.4J	NS
Zinc	UG/L	11.5J	25J	271J	23.7J	29.2J	300

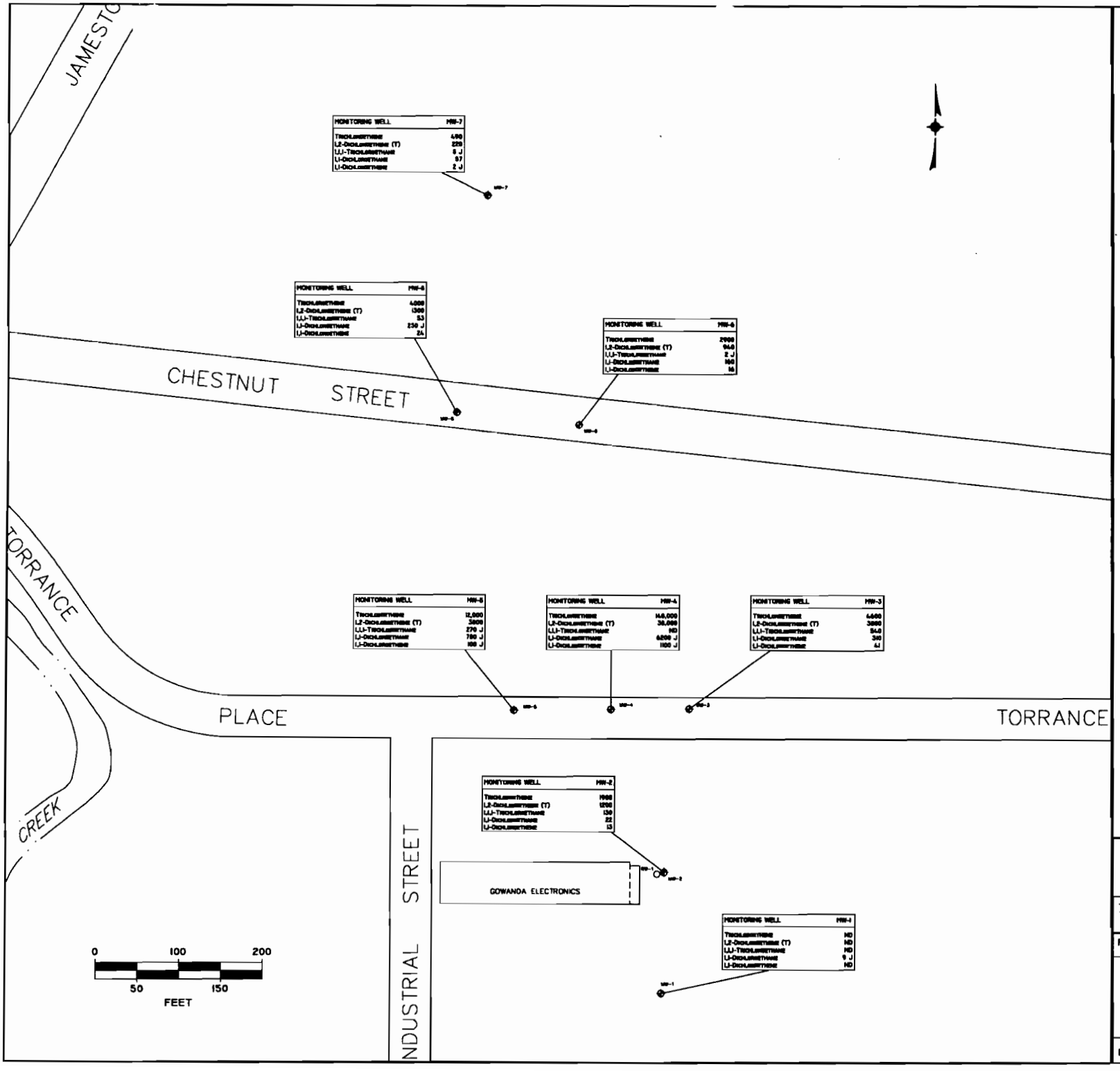
NA - Not analyzed **UG/L - microgram per lieter (ppb)** **ND - Not detected** **J - Value below contract detection limit** **NS - No Standard**

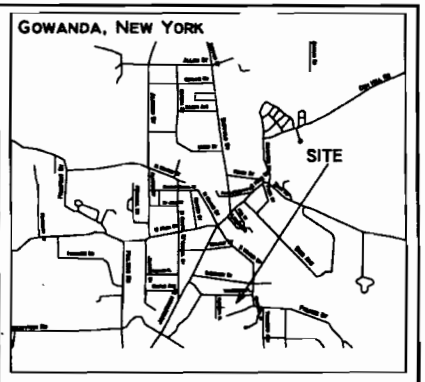
cold weather conditions and concentrations of any chemical compounds would tend to be at higher levels. Results were compared to the U.S. Environmental Protection Agency and the New York State Department of Health data bases for medium indoor air concentrations for residential homes. The medium concentrations are what would be commonly expected due to use of household products such as air fresheners, mothballs, disinfects and petroleum products.

Activities during the Remedial Investigation identified the chemicals of concern associated with the site as 1,1,1-trichloroethane (TCA), Trichloroethene (TCE), total 1,2-dichloroethene (DCE), 1,1-dichloroethene, and 1,1-dichloroethane. Results of the indoor air samples of six of eight sample locations taken on June 17, 1998 did not indicate concentrations of TCA, TCE or DCE above what would be normally expected to be found when compared to mean indoor air concentrations. 1,1-dichloroethene and 1,1-dichloroethane were not detected in the indoor air samples from either sampling event. The compounds that were found could be all associated with use of household products and are not a heath concern. For the June sampling round, one home located within the contaminated plume area had concentrations of TCA and TCE above the EPA indoor air mean in the basement sample and TCE in the living area sample. Another sampling point located outside of the plume (background) had elevated concentrations of TCA in the basement and living area sample. As this sampling point is away from the area impacted by the contaminated groundwater plume, it is likely that the source(s) of these compounds are from household uses.

Results of indoor air samples of four of nine samples location taken on March 19, 1998 did not indicate concentrations of chemical of concern above what would be normally expected to be found when compared to mean indoor air concentrations. Five samples locations exceeded the indoor air mean in both basement and upstairs samples. The results of the samples suggest that contaminants from the groundwater plume are impacting the indoor air quality in these homes. The levels are not at concentrations which would represent an immediate health concern.

The results of the indoor air sampling for the contaminates of concern are summarized in Table 8. The sample results are located in Appendix F.





PHASE I
GROUNDWATER ANALYTICAL RESULTS
FOR MONITORING WELL SAMPLES
COLLECTED JUNE, 1997
RESULTS IN PARTS PER BILLION (PPB)

AVM-GOWANDA SITE

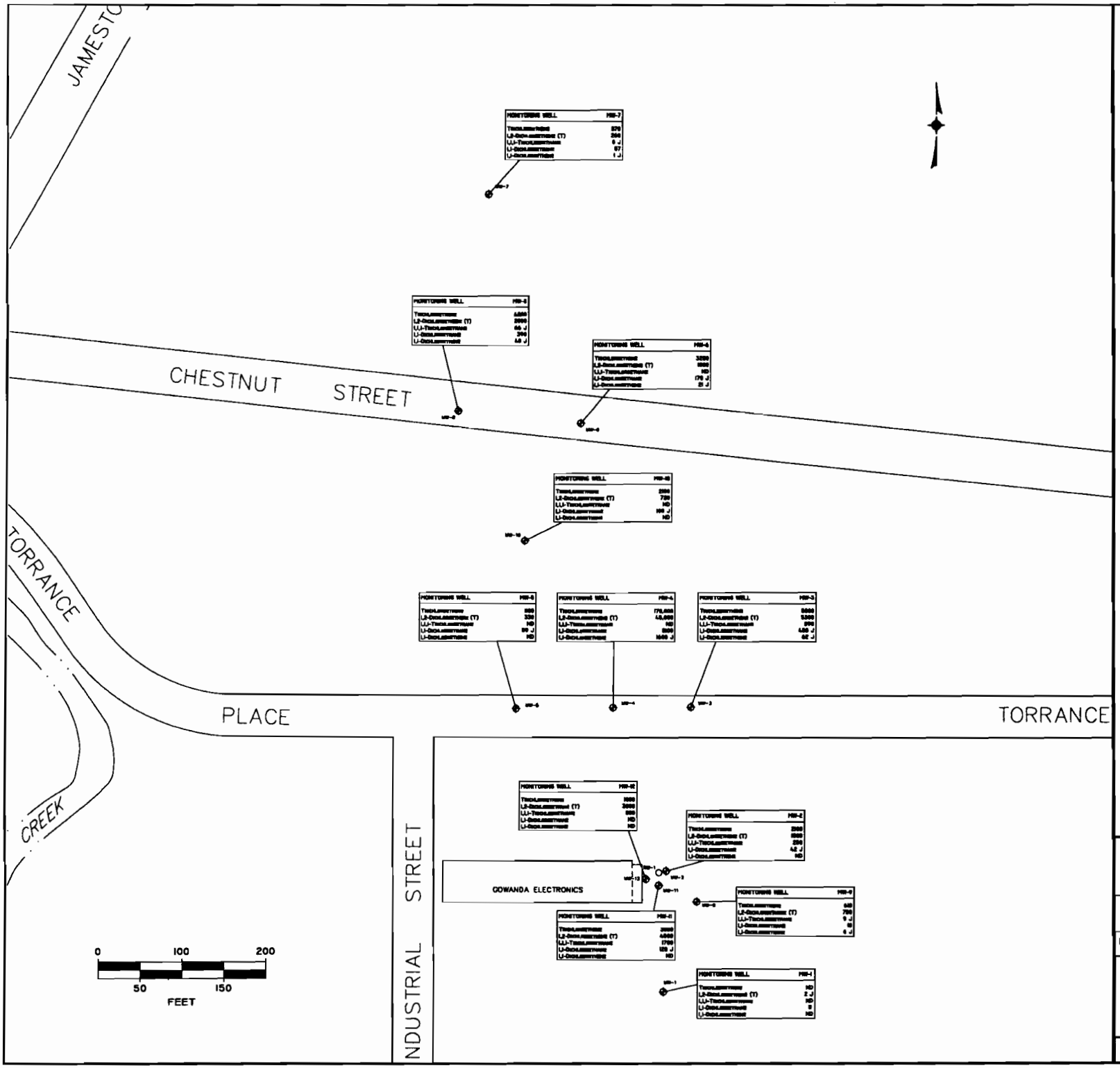
GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE NO. 9-05-025

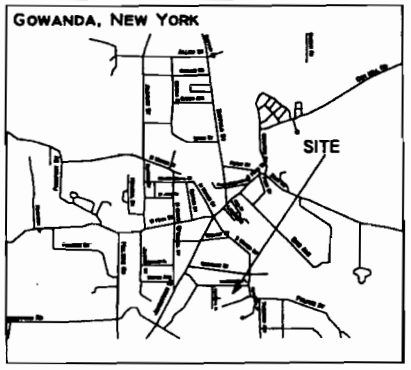
New York State Department of Environmental Conservation

FILE: | DRAWING:

FIGURE 9/PLATE 8
PHASE I
GROUNDWATER RESULTS

DATE: 5/21/98





PHASE II
GROUNDWATER ANALYTICAL RESULTS
FOR MONITORING WELL SAMPLES
COLLECTED DECEMBER, 1997
RESULTS IN PARTS PER BILLION (PPB)

AVM-GOWANDA SITE

GOWANDA, CATTARAUGUS COUNTY, NEW YORK
SITE NO. 9-05-025

New York State Department of Environmental Conservation

FILE:

DRAWING:

FIGURE 10/PLATE 9
PHASE II
GROUNDWATER RESULTS

DATE: 5/21/98

TABLE 8

AVM GOWANDA INDOOR AIR SAMPLE RESULTS
Results in parts per billion (ppb)

Media	Class	Contaminant of Concern	Concentration Range	EPA Median Indoor	NYSDOH Median Basement/ 1st Floor	
Indoor Air	Volatile Organic Compounds (VOCs)	1,1,1-trichloroethane trichloroethene cis-1,2-dichloroethene	ND - 11 ND - 25 ND - 6.0	1.8 1.4 NA	0.9 <0.2 <0.25	O.6 <1.0 <0.25

5.0 EXPOSURE PATHWAYS ANALYSIS

An Exposure Pathways Analysis has been completed for this site to evaluate potential routes by which humans or the environment may come into contact with the contamination associated with the site.

5.1 Applicable Standards, Criteria, and Guidance (SCGs)

In order to identify potential exposure pathways, applicable SCGs must be identified. 6 NYCRR Part 375-1.10(c)(1)(I) requires that remedial actions comply with SCGs "unless good cause exists why conformity should be dispensed with." Standards and Criteria are cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance. Guidance includes non-promulgated criteria and guidelines that are not legal requirements; however, the site's remedial program should be designed with consideration given to guidance that, based on professional judgement, is determined to be applicable to the site.

SCGs are categorized as chemical specific, location specific, or action specific. These categories are defined as the following:

Chemical Specific: These are health or risk based numerical values or methodologies which, when applied to site specific conditions, result in the establishment of numerical values for the chemicals of interest. These values establish the acceptable amount or concentration of a chemical that may be found in or discharged to the environment.

Location Specific: These are restrictions placed on the concentrations of hazardous substances or the conduct of activities solely because they occur in a specific location.

Action Specific: These are usually technology or activity based requirements or limitations on actions taken with respect to hazardous waste management and site cleanup.

The following SCGs have been found to be applicable to the AVM-Gowanda site:

Soil
- NYSDEC Division of Hazardous Waste Remediation Technical and Administrative Guidance Memorandum (TAGM) 4046, Determination of Soil Cleanup Objectives and Cleanup Levels
- 6 NYCRR Part 371, Identification and Listing of Hazardous Wastes
- NYSDEC Division of Hazardous Substance Regulation TAGM 3028, "Contained in Criteria for Environmental Media" (11/92)

Waste
- 6 NYCRR Part 371, Listing of Hazardous Waste
- NYSDEC Division of Hazardous Substance Regulation TAGM 3028, "Contained in Criteria for Environmental Media" (11/92)

Groundwater
- 6NYCRR Part 700-705, Water Quality Regulations for Surface Water and Groundwater
- NYSDEC Division of Water TOGS 1.1.1

The analytical data summary tables present SCGs for the contaminants analyzed for in each media (i.e., soil, sediments, water, etc.)

5.2 HUMAN EXPOSURE PATHWAYS ANALYSIS

This Human Exposure Pathway Analysis has been performed to qualitatively evaluate the potential for current or future adverse human health effects which might result from exposure to contaminants at or migrating from the AVM-Gowanda site. This analysis was performed assuming current site conditions, in the absence of any further action to control or remove the identified contamination. The analysis provides a discussion of potential exposure to site contaminants, identification of media of concern, and identification of potential receptors based on available data from this RI and previous studies. It has been prepared to assist in determining the need for remediation.

5.2.1 IDENTIFICATION OF MEDIA OF CONCERN

Based on the information developed during previous studies and this RI, chemical compounds of potential concern by environmental medium have been identified. Compounds of potential concern were selected based on frequency of detection, range of concentrations, and potential for migration.

Site Contamination - The AVM-Gowanda site is located at One Industrial Place in the Town of Persia, Cattaraugus County, New York. The property is approximately 1.75 acres in area and includes two manufacturing buildings and two small storage sheds. The site is currently owned and occupied by the Gowanda Electronics Corporation, a small manufacturer of electrical components such as inductors. Situated in a mixed industrial/residential area the facility has been used for commercial operations since the early 1930's. From World War II until 1979 the facility was used as a metal stamping/machine shop. Gowanda Electronics purchased the facility in 1979 from Automatic Voting Machine Corporation (AVM) and has since used the facility for the manufacture of inductors.

Based on past records, environmental studies, and observed contaminant distribution and migration patterns, there has not been any single major release of contamination identified from the facility. The main source of contamination is likely the result of long term disposal of waste solvents and metals on the ground surface from past operations at the facility. Metals contaminated wastes have been removed during the soil removal conducted by Gowanda Electronics, however the solvents have infiltrated downward to the water table and migrated northward throughout the residential area. Migration of the solvents has occurred both as dissolved constituents in the ground water and apparently as free product along the base of the aquifer. Some solvents remain in the soil above the water table in the vicinity of the source area within the influence of the recovery system currently operating at the site. This contamination exists as a residual that did not migrate to the base of the aquifer, but rather bound to individual soil particles as it passed through the unsaturated soil. As precipitation infiltrates through the soil, these contaminants will dissolve into the water. Once the contaminated water reaches water table, it will be recovered at the well and treated within the system. Analytical results of groundwater samples collected from the recovery well and monitoring wells in the immediate vicinity do not show concentrations of TCE that would suggest DNAPL remaining at the base of the aquifer on site.

The general category of chemical compounds that exist in the shallow aquifer system are VOCs. Despite efforts on site to contain contamination, migration of VOCs will continue due to the existence of DNAPL (product) outside the influence of the recovery system in the area of Torrance Place. The DNAPL will dissolve as groundwater passes over it, serving as a secondary source that will continue to maintain a plume of significant groundwater contamination.

Table 9 identifies potential release sources, release mechanisms, and receiving media for past, current, and future releases in the absence of any remedial action.

Selection of Chemicals of Potential Concern

As described in Section 4.3 of this report, significant concentrations of VOCs, have been detected in the groundwater over a widespread area north of the site. VOCs are migrating away from the site for the reasons mentioned in the previous section.

TABLE 9

IDENTIFICATION OF ENVIRONMENTAL MEDIA OF CONCERN

Medium of Concern	Release Mechanism	Receiving Medium
Contaminated Groundwater	Lateral and vertical movement through the sand and gravel alluvium.	The saturated section of the and the sand and gravel alluvial deposits. The hydraulic gradient identified at site indicates contaminants will continue to migrate northward.
	Pumping	Irrigation - if shallow GW is used in the immediate area and documented to be contaminated.
	Volatilization	Air beneath residential dwellings. Contaminant concentrations off site are high enough to cause indoor air impacts in the Torrance Place vicinity.

The contamination plume has been defined based on sampling during this and previous studies as extending from the One Industrial Place facility to the north. Chemicals of potential concern were selected based on concentration, frequency of detection, and distribution. Table 10 shows the selected chemical compounds for the site.

5.2.2 IDENTIFICATION OF COMPLETED PATHWAYS

The means by which people potentially could come into contact with the contaminants associated with the site, either now or in the future, are summarized in Table 11. The scenarios involving exposure to off-site surface water and sediments were eliminated due to the nature and extent of contamination. All available data indicates contaminants are subsurface and have not reached surface water bodies.

5.2.3 SUMMARY OF HUMAN EXPOSURE PATHWAY ANALYSIS

The groundwater in the area is classified by the NYSDEC as GA (best usage, drinking water), however, groundwater in the area is currently not used for drinking water. All residential dwellings are served with municipal water. Direct contact with groundwater will occur if shallow well points are used within the plume for irrigation or other non potable purposes.

Measurable impacts to indoor air that may be associated with the groundwater plume have been identified in some homes located over the highest groundwater contamination, causing potential direct exposure to VOCs through inhalation. Concentration of VOCs are currently not at levels that pose a health concern, however, continued monitoring will be necessary.

On-site/utility workers could be exposed during excavation or subsurface maintenance activities via dermal contact with waste materials, inhalation of vapors and airborne particulates when working in the area of wastes or the treatment system during operation, and incidental ingestion due to soiled hands.

TABLE 10

COMPOUNDS OF CONCERN

Media	Class	Contaminant of Concern	Concentration Range	Frequency of Exceeding SCGs	SCG (ppb)
Groundwater	Volatile Organic Compounds (VOCs)	Trichloroethene	6.1 - 170,000	75/102	5
		1,2-Dichloroethene (T)	7.4 - 45,000	71/102	5
		1,1,1-Trichloroethane	6.6 - 1800	30/102	5
		1,1-Dichloroethane	5.2 - 8100	48/102	5
		1,1-dichloroethene	6.6 - 1600	11/102	5

TABLE 11

REMEDIAL INVESTIGATION REPORT
EXPOSURE PATHWAY ANALYSIS

IDENTIFICATION OF PATHWAYS CONSIDERED COMPLETE

Exposure Medium/ Exposure Route	Site Occupants and Visitors	Utility Workers/ Construction Workers	Off-Site Population [1]
Groundwater:			
Ingestion	-	A	-
Dermal Contact	-	A	C, L
Inhalation of Vapor Phase Chemicals	A	A	C, L
Indoor Air:			
Inhalation of Vapor Phase Chemicals	-	A	C, L

Notes:
A = Exposure to adults only
C = Exposure in children may be significantly greater than in adults
L = Lifetime Exposure
(1) = Indicates adjacent commercial occupants, adjacent visitors and off-site residents
\- = Exposure in this population via this route is not likely to occur

5.3 HABITAT BASED ASSESSMENT

A habitat based assessment is performed during a RI when it is determined that an impact to wildlife may exist as a result of contamination from the site. Field observations were made in conjunction with environmental sampling towards determining if such an assessment was necessary for this RI.

The potential impacts or routes of exposure to wildlife that were considered include but are not limited to the following:

- Uptake of contaminants by plant life on or near the site.
- Consumption of contaminated plants by animals in the area.
- Direct contact with contaminants at the surface by animal life on or near the site. Surface storm runoff carrying contaminants or contaminated sediment to nearby surface water.
- Impacts to surface water via groundwater discharge.

Field observations at the source area and throughout the residential area did not find any waste material or contamination at the surface. Stressed vegetation on site or along the plume was not found to exist. Contamination identified at the site is subsurface and is not impacted by surface runoff during storm events. Analytical results combined with hydrogeologic observations indicate that any migration of contaminants is northward and does not reach surface water bodies or resurface in the form of springs. Groundwater discharge is ultimately to Cattaraugus Creek, however the extent of the contamination plume has be found to terminate well before it reaches the Creek. After consideration of the above mentioned potential impacts with the conditions defined for the site, it was determined that impacts to wildlife as a result of contamination from the site was not occurring. Therefore, the habitat based assessment was not carried any further.

6.0 INTERPRETATION OF RI DATA

The findings, conclusions, and recommendations based on the RI activities at the AVM-Gowanda Site are summarized below.

6.1 HYDROGEOLOGIC SETTING

Geologic units encountered during the RI include the following in ascending order:

- glacial lodgement till

- alluvium consisting of fine gravel, sand, and silt
- flood plain deposit consisting of fine sand, silt, and clay.

The till unit presumably lies directly on the bedrock, an upper Devonian shale of the Canadaway Group, although bedrock was not encountered in any of the borings during this RI.

The flood plain deposits are approximately 1 to 8 feet thick, the thicker deposits existing in the southern portion of the study area. The unit has a rather low permeability, forming somewhat of a barrier to the migration of contaminant vapors upward from the groundwater as evidenced during the soil gas sampling efforts. The flood plain deposits are unsaturated, although some infiltration of precipitation does occur through this unit providing recharge to groundwater.

The primary water bearing unit underlying the site consists of permeable alluvial sand and gravel of varying composition. This material was deposited by a post glacial stream system flowing from the highlands south of the site, northward over the glacial till, similar to present day Cattaraugus Creek. The alluvial deposits in the southern portion of the study area, from the site to midway between Torrance Place and Chestnut Street, generally consist of the more permeable, coarse sand and gravel, while the northern section is characterized by finer sand and silt of lower permeability fine sand and silt. Higher energy stream flow conditions deposited the coarse sand and gravel in the southern half of the site, but because the till surface rises northward, stream flow was dispersed and slowed, resulting in the deposition of the finer sand and silt found in the northern portion of the study area.

Channelization occurred during the formation of this unit, with the channels subsequently filled with coarser sands and gravel. These buried stream channels are in part the controlling features for current groundwater flow patterns due to the relatively higher hydraulic conductivity of the coarse sand and gravel compared to the finer sand and silt found outside the channels. Such a channel exists beneath the known source area on site, providing a preferential pathway for the contamination to migrate off site once it had infiltrated to the groundwater.

The lower most unit studied at the site is the dense lodgement till. The till is composed of very dense, compacted clay, silt, fine sand and very little fine gravel. Lodgement till is deposited under the extreme weight and pressure of a moving glacier, in this case smeared onto the bedrock surface. The thickness of this unit is unknown, however, borings of at least 15 feet into the till were advanced to confirm sufficient thickness existed to serve as a impermeable boundary to downward migration of contamination. It was determined that due to the high clay content, significant thickness, and the dense, compact nature of the till, that the unit likely provides an effective barrier.

The surface of the till was scoured during the post glacial erosional process that ultimately deposited the alluvial sand and gravel, as described above, leaving an uneven surface across the study area. The most notable feature of the till surface is the "bowl" that has been identified

beneath Torrance Place at monitoring well location MW-4. This feature is significant in that the contaminants associated with the site are heavier than water, and therefore sink in the aquifer and have settled in the bottom of this bowl. Details are discussed below in section 6.4 Contaminant Migration.

Groundwater occurs in the alluvial sand and gravel unit under unconfined (water table) conditions with saturated thickness of the aquifer ranging from 3 to 16 feet. Groundwater flow direction is to the north, except within approximately 100 feet of the source area, where flow is generally radially inward toward the recovery well currently in operation. Hydraulic conductivity measured at the monitoring wells ranges from $3.7x10^{-3}$ to $2.56x10^{-1}$ cm/sec ($1.05x10^{1}$ to $7.25x10^{2}$ ft/day). Groundwater flow velocity beyond the influence of the recovery well (Torrance Place and north), has been estimated at 2.5 to 4.7 feet per day based on aquifer testing at the monitoring wells. These values are only estimates, significant variations exist due to the heterogeneous nature of the aquifer.

Recharge to the aquifer occurs from upgradient sources to the south and through infiltration of precipitation locally. Surface waters include Thatcher Creek to the west and Cattaraugus Creek to the east. Thatcher Creek is a tributary to Cattaraugus Creek which empties into Lake Erie to the northwest. The water table aquifer likely discharges to the surface water bodies, although no measurable effect on groundwater flow direction within the study area was observed.

Residents in the study area are served with municipal water supply and connected to sanitary sewer, therefore groundwater is generally unaffected by domestic use. The entire area is also served with storm drains to accommodate excessive precipitation runoff. The property located at One Industrial Place is largely covered either with buildings or paved parking area, therefore most precipitation is diverted off site via the storm drains rather than infiltrate to the water table. Storm drain and sanitary sewer lines are located above the water table, except possibly during seasonal variations, and therefore do not influence the flow of groundwater by providing a preferential flow path in the bedding material.

6.2 CONTAMINANT CHARACTERIZATION

A total of 169 environmental media samples were collected and analyzed during this RI. Samples of groundwater, soil, soil gas, and indoor air were collected. A summary of the analytical results, grouped by environmental media, is presented below.

A total of 102 groundwater samples were collected and analyzed during this RI. Eighty two of the samples were collected with the Geoprobe™ sampling equipment and analyzed for VOCs only. The remaining 20 samples were collected from monitoring wells and analyzed for VOCs, SVOCs, and metals. The frequency comparison below includes all 102 samples for VOC analysis, and only the 20 monitoring well samples for SVOCs and metals. The following parameters were detected in the groundwater samples.

Parameter	Frequency	Concentration Range
Volatiles	**(Detects/Total Samples)**	**(ppb)**
Trichloroethene	81/102	2.3 - 170,000
1,2-Dichloroethene (Total)	83/102	1.3 - 45,000
1,1-Dichloroethane	52/102	1 - 8100
1,1,1-Trichloroethane	34/102	1.5 - 1800
1,1-Dichloroethene	13/102	1 - 1600

Three subsurface soil samples were collected near the source area. Locations were selected just north of the limits of the excavation that was completed for the soil removal at the source area. Analysis for VOCs, SVOCs, and metals were performed on all three samples. Metals are naturally occurring in soils, therefore only concentrations of metals that exceed the Eastern US Background levels (NYSDEC TAGM HWR-94-4046) are listed for comparison under frequency.

Parameter	Frequency	Concentration Range
Volatiles	**(Detects/Total Samples)**	**(ppb)**
Trichloroethene	3/3	222 - 2200
1,2-Dichloroethene (Total)	3/3	30 - 500
1,1-Dichloroethane	2/3	5 - 29
1,1,1-Trichloroethane	3/3	16 - 450
1,1-Dichloroethene	1/3	9
Semi-Volatiles		
Fluorene	1/3	44
2-Methylnaphthalene	1/3	58
Phenanthrene	2/3	38 - 74
Metals		
Zinc	3/3	72.8-84.6 ppm

Twenty seven soil gas samples were collected on or near the site and analyzed for VOCs.

Parameter	Frequency	Concentration Range
Volatiles	**(Detects/Total Samples)**	**(ppb)**
Trichloroethene	5/27	560 - 7200
1,1,1-Trichloroethane	8/27	34 - 4900
cis-1,2-Dichloroethene	8/27	46 - 2300
1,1-Dichloroethane	3/27	45 - 250
1,1-Dichloroethene	1/27	110
trans-1,2-Dichloroethene	2/27	46
Tetrachloroethene	2/27	40
Benzene	3/27	110
Toluene	17/27	24 - 320
Ethylbenzene	5/27	42 - 63
M&P-Xylene	10/27	110 - 270
O-Xylene	7/27	42 - 63

A total of 34 indoor air samples were collected to measure the impacts, if any, that the contamination from the site have on air inside the homes. The concern is based on the fact that the compounds associated with the site are volatile in nature, and at sufficient concentrations can volatilized from the groundwater into basements. Only compounds associated with the site and found in the groundwater are listed below. Numerous other chemical compound were detected (see Appendix F), however since they were not found in the groundwater, their source could be anything from household cleaners, to insecticides or fuels.

Parameter	Frequency	Concentration Range
Volatiles	**(Detects/Total Samples)**	**(ppb)**
Trichloroethene	21/34	.43 - 25
cis-1,2-Dichloroethene	8/34	1.1 - 6
1,1,1-Trichloroethane	25/34	.43 - 170

Although earlier studies have identified site contamination consisting of VOCs from waste solvents, petroleum related compounds (BTEX), and metals, sampling results from this RI indicate that only the VOCs remain at the site and have migrated off site to the north. Efforts to remove the contaminated soils and groundwater at the source area were apparently successful at preventing further impacts to groundwater.

6.3 CONTAMINANT MIGRATION

Waste disposal at the east end of the facility at One Industrial Place apparently has occurred for years, potentially since the property first became used for industrial/commercial purposes. Based on past studies and this RI, wastes included metal shavings, waste cutting oil, and liquid solvents (VOCs), all of which were disposed onto the ground surface. As stated above, the soil removal in the source area has effectively addressed all but the VOCs, which migrated downward into the groundwater and then to the north prior to these activities.

VOC contamination has migrated from the site by two separate mechanisms, under gravitational forces from the ground surface where it was disposed downward to the confining till layer and in solution with the natural flow of groundwater. The discussion that follows describes contaminant migration from the site prior to the installation and operation of the recovery well currently operated under the VCA.

Waste solvents consisting of primarily TCE that were used for industrial purposes such as degreasing metal were apparently dumped on the ground at the source area. The physical properties of TCE include having a density nearly one and a half times that of water (1.462 grams per cubic centimeter (g/cc) compared to 1 g/cc for water) and a dynamic viscosity nearly half that of water (0.57 centipoise (cp) compared to 1 cp for water), meaning that TCE will flow through the pore spaces in soil with less resistence than water, and once it reaches groundwater will continue to sink until it reaches a physical barrier (EPA, 1991). Another important physical property for understanding the behavior of TCE in groundwater is water solubility. The water solubility for TCE is 1,000,000 ppb or 1000 parts per million (ppm), meaning that, under laboratory conditions, if added to water TCE will dissolve only to the point that the water will contain 1000 ppm of TCE (EPA, 1991). Any additional TCE will remain as product and not dissolve any further. For the characteristic detailed above, TCE is considered relatively insoluble in water. The other VOCs identified as contaminants of concern for the site have similar physical properties and therefore behave similar in the environment. The contamination identified at the site exists as a mix of the compounds, with TCE being the predominant compound.

The waste solvents infiltrated downward as periodic spilling or dumping on the ground surface occurred, saturating the soil. Migration continued to the surface of the groundwater at a depth of 6 to 8 feet below grade, at which point some dissolved into the aquifer while most continued to sink through the aquifer to the top of the till unit located approximately 18 feet below ground surface. Over time, enough solvent, or dense non-aqueous phase liquid (DNAPL), accumulated on the surface of the till that it began to flow down the slope of the till surface under gravity, much in the way rain water would over a sloped paved parking lot. The surface of the till slopes to the north until approximately Torrance Place, where the bowl described in Section 4.1 exists (see Figures 4/Plate 3 and Figure 5/Plates 4) Since the DNAPL flows by gravity, once it reached the bowl it accumulated in a pool. The exact volume or aerial extent of DNAPL is not known, however groundwater results strongly indicate there is DNAPL present near MW-4.

Contaminant concentrations drop off both to the north and to the south (back towards the site), indicating an area of highest contamination corresponding to the bowl feature in the till. Sampling results down gradient (northward) of the DNAPL pool show concentrations of VOCs that, while they do not suggest DNAPL is present in close proximity to these specific sample locations, they do represent significant levels of VOCs dissolved in the groundwater. This is clear indication that the pool of DNAPL continues to dissolve as groundwater passes over it, serving as a source of contamination that has spread another 800 feet to the north. The location of the pool of DNAPL appears to be within the buried stream channel, where it is acting as a secondary source of groundwater contamination. Left untreated, the DNAPL pool, in this highly conductive area, will continue to contaminate groundwater indefinitely leading to further migration of contaminants in the groundwater.

The shape of the groundwater contaminant plume and the concentration distribution of dissolved VOCs are consistent with the understanding of the geologic conditions in the area developed from the RI data (see Figure 8/Plate 7). The highest concentrations of VOCs in the dissolved phase have migrated northward to Torrance Place, then meander somewhat to the west and then north again, generally following the buried stream channel. The plume broadens in aerial extent and lessens in concentration partially due to dispersion through the finer grained alluvium to the north and to the east and west outside of the buried stream channel. The plume extends approximately 1150 feet from the source area at One Industrial Place to the north and 450 feet across, at the widest point near Chestnut Street, covering an area of about 7.5 acres.

6.3.1 EFFECTS OF THE VOLUNTARY CLEANUP ON CONTAMINANT MIGRATION

Recovery well RW-1, currently operating under the Voluntary Cleanup Agreement (VCA), was designed to pump contaminated groundwater from the entire saturated thickness of the aquifer at the source area, with the goals of; 1) removing contaminated groundwater from the aquifer for treatment, and 2) creating a hydraulic gradient radially toward the well to prevent further migration of contaminants off site. As a result of recent refinements to the recovery system, subsequent monitoring has shown the system is effective at accomplishing both of these goals. Measurable influence on the aquifer has been observed as far north as Torrance Place. However, this system cannot recover the DNAPL located beneath Torrance Place due to the physical properties of TCE described above. Because the DNAPL flows under gravitational forces down the slope of the till surface, the only way it could be recovered would be to install an extraction point at the lowest point of the till surface within the DNAPL and pump from that point. Regardless of the rate of pumping at the recovery well, it is physically impossible for RW-1 to "pull" the DNAPL back up the slope of the till to the source area. Any DNAPL that remains within very close proximity of RW-1 could however be recovered by the well.

While any contamination remaining in the source area is being effectively contained and ultimately removed from the environment, the highest concentrations of contamination are found off site,

beyond the influence of the recovery system. Unless controlled, this contamination will continue to migrate northward.

7.0 CONCLUSIONS

The AVM-Gowanda site consists of an industrial facility located at One Industrial Place in the Town of Persia where hazardous wastes have been disposed on the ground surface at the east end of the facility during the course of its operational history. Wastes initially identified by the current owner, Gowanda Electronics, as having been disposed of at the site prior to their ownership, include various metal shavings, cutting oils, and degreasing solvents. Efforts to remove the waste material, contaminated soil, and containment of contaminated groundwater were initiated by the company in 1993. Excavation of the waste metal and contaminated soil effectively addressed the majority of an existing source of contamination above the water table, however significant groundwater contamination had occurred and migrated off site to the north. A recovery system consisting of a groundwater extraction well and air stripper treatment unit was installed to remove and treat contaminated groundwater from on site, and to address further migration of contaminants off site. The company signed a Voluntary Cleanup Agreement with the NYSDEC on January 13, 1998, specifying the operation and maintenance requirements for the system. This system is currently accomplishing the goals of on-site containment, however the majority of waste solvents and contaminated groundwater had migrated well beyond the influence of the recovery system prior to implementation, thus the system is not capable of addressing the off-site contamination.

The site and resulting area of impacted groundwater is underlain by moderately to highly permeable alluvium comprised of a varying mix of sand and gravel, with buried stream channels filled with coarser sand and gravel that serve as preferential flow paths and in part control groundwater flow. The thickness of the alluvium ranges from 4 to 15 feet. Groundwater occurs within the alluvium under unconfined, or water table, conditions. Below the alluvium, is a dense glacial till that serves as a barrier to further downward migration of contaminants. The surface of this till slopes downward from the source area to its deepest point beneath Torrance Place, where a bowl shaped feature has been eroded during post glacial stream flow. The water bearing alluvium is covered with up to 8 feet of flood plain silt and clay, that serves to retard any upward migration of contaminant vapors from the water table.

Waste solvents are the remaining contaminants of concern for the site, consisting primarily of TCE. The TCE has migrated downward at the source area on site, through the aquifer as a DNAPL to the top of the till unit, where it then flowed down slope and apparently accumulated (pooled) in the bowl beneath Torrance Place. Some TCE has dissolved in groundwater as it migrated through the aquifer, with the pool of DNAPL continuing to serve as a secondary source of contamination to the groundwater. The groundwater contamination plume extends from the source area at One Industrial Place, approximately 1150 feet north, to beyond Chestnut Street. The plume is approximately 450 feet across at its widest point, which is located along Chestnut

Street. Significant concentrations of VOCs exist within the plume, with exceptionally high levels, up to 224 ppm total VOC (170 ppm TCE) at MW-4, located in Torrance Place. The plume covers an area of approximately 7.5 acres.

The potential for human contact with contamination is through direct contact with groundwater and soil below the water table during activities such as utility maintenance, both on site and throughout the area of the plume. All residents in the area are served with municipal water, however, use of groundwater from sources such as private well points for gardening would provide direct exposure to contaminants, through both dermal contact and inhalation of vapors. Volatilization of contaminants associated with the groundwater plume into basements of homes along Torrance Place has been identified as a completed exposure pathway.

Despite efforts to pump and treat contaminated groundwater on site, significant groundwater contamination continues to migrate northward. Left untreated, the DNAPL pool suspected under Torrance Place will continue to dissolve into the groundwater, maintaining high levels of TCE throughout the aquifer. Without further controls, it is expected the plume will spread northward toward Walnut Avenue. Remediation of the aquifer is necessary for the full protection of human health and the environment.

8.0 RECOMMENDATIONS

The nature and extent of contamination has been fully defined with the previous studies and this two phase RI, no further investigative work is recommended. The next recommended component of the project is the Feasibility Study (FS), where a list of remedial alternatives to address the contamination will be developed and analyzed. The FS compares and evaluates the alternatives against criteria such as effectiveness, implementability, short term impacts (i.e. disruption to the community), compliance with applicable New York State Standards, and costs. This evaluation determines if remediation is feasible, and if so, which alternative will best serve the public and the environment. It is recognized that any remedial construction within a residential setting requires additional consideration regarding impacts to the daily activities of the community.

The recovery system operating on site should continue to operate for as long as it is effective at removing and containing contaminated groundwater. It may be possible to expand the existing system with additional wells or other groundwater collection methods to increase the area of effectiveness and to reduce to potential for impact to indoor air.

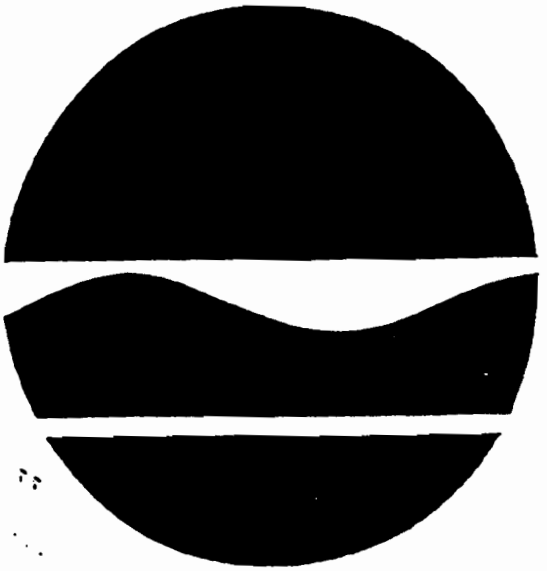
It is recommended that any groundwater use in the area of the plume be discontinued until further notice, with the use of municipal water as the alternative.

APPENDIX A

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GOWANDA ELECTRONICS SITE
(UNLISTED)
PERSIA (T), CATTARAUGUS COUNTY

REPORT ON ACTIVITIES
IMMEDIATE INVESTIGATIVE WORK ASSIGNMENT (IIWA)
WORK ASSIGNMENT #D002478-33



January 1996

New York State Department of Environmental Conservation
GEORGE E. PATAKI, *Governor* MICHAEL D. ZAGATA, *Commissioner*

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Test Bore Numbers - TB-7, TB-8, TB-9 & TB-10 . . . . . Page 11

ATTACHMENTS

ATTACHMENT 1 LETTER REPORT - PARSON'S ENGINEERING SCIENCE - DECEMBER 28, 1995

IMMEDIATE INVESTIGATIVE WORK ASSIGNMENT NO. D002478 - 33
GOWANDA ELECTRONICS, GOWANDA, NEW YORK
STATE SUPERFUND STANDBY CONTRACT

1.0 INTRODUCTION

Gowanda Electronics is a small manufacturer of electrical components such as inductors. The facility is located at One Industrial Place in the Village of Gowanda, Cattaraugus County, New York (see Fig. 1). Situated in a mix industrial/residential area the facility has been used for commercial operations since the early 1930's. During World War II until 1979 the facility was a metal stamping facility/machine shop. Gowanda Electronics purchased the facility from Automatic Voting Machine Corporation (AVM) in 1979 and has since used the facility exclusively for the manufacture of inductors. In July 1989 and November 1989 The New York State Department of Environmental Conservation (NYSDEC) received anonymous complaints of gasoline/solvent odors in the main building. Vent pipes were installed on the northwest side of the building to remove the odors. No further investigations occurred until November, 1993.

A Phase I study in April 1994 and a Phase II investigation in May 1994, were completed for Gowanda Electronics by Malcolm-Pirnie. Analysis of surface soil samples showed elevated levels of various metals, total petroleum hydrocarbons (TPHs) and trace levels of volatile organic compounds (VOCs). The company chose to excavate the surface soils which, in turn, lead to the discovery of higher levels of VOCs increasing in concentration as the depth of the excavation increased. A total of 568 tons of soils was removed and disposed of in a 6NYCRR Part 360 permitted landfill in Niagara Falls, New York. The environmental studies and reports were submitted to the NYSDEC on June 22, 1994. On March 8, 1995 the company submitted a plan to install a groundwater extraction well and a low profile air stripper to remediate the groundwater. Discharge of the water would be to the Village of Gowanda, Publicly Owned Treatment Works (POTW) for treatment. Any air emissions would be in accordance with an NYSDEC "Air Permit to Discharge."

1.1. SITE DESCRIPTION

Groundwater contamination exists extending from the Gowanda Electronics site northward toward Torrance Place for an undetermined distance. Past practices have contaminated the soil and groundwater with levels of Volatile Organic Compounds (VOCs) exceeding groundwater/drinking standards of five milligrams per liter (ug/l). A single monitoring well was installed at the Gowanda Electronics property. The results from this monitoring well have identified the following contaminants in the groundwater [1]:

trichloroethylene, (2,900 ug/l)
1,1,1 - trichloroethane, (2,300 ug/l)
cis - 1,2 - dichloroethene, (3,900 ug/l)
1,1 - dichloroethane, (240 ug/l)
1,1 - dichloroethene, (42 ug/l)
trans 1,2 dichloroethene, (41 ug/l)
vinyl chloride, (25 ug/l)
1,2,4 trimethylbenzene, (8.4 ug/l)

The source of the contamination is believed to be the area to the east of the Gowanda Electronics

[1] *Report of Field Activities at One Industrial Place:* Malcolm-Pirnie, April 1994

main building in the shed area. The company has already excavated 568 tons of soil from this area and disposed of it (see Fig. 1).

There are four residential properties immediately adjacent to the Gowanda Electronics facility. Lawns and gardens are seperated from the facility by a stockade fence and a eight foot, grass, buffer zone. Further investigatory work was considered necessary to determine whether or not a significant threat to the adjacent residences exists. In addition, there is insufficient data to allow for a proper site classification. Citing economic reasons and the belief that they are not responsible for the contamination, the company has expressed that it did not wish to do further investigatory work. The NYSDEC continued the off site investigation with an Immediate Investigation Work Assignment (IIWA) under a State Superfund Standby Contract. This IIWA project examined areas of concern proximate to the Gowanda Electronics contaminated groundwater plume.

1.2 TASK OBJECTIVES

The objectives of the IIWA project were to:

- Evaluate the existing subsurface and groundwater conditions proximate to the source area and investigate the nature and degree of any identified contamination within the area.
- Define and evaluate any potential migration pathways from the given source area.
- Attempt to quantify the amount of contamination requiring remediation.
- Affirm that the given "source" was the only source of contamination.
- To ensure whether or not the adjacent residences are being impacted by groundwater contaminant migration.
- To determine whether or not a significant threat exists.
- Determine a proper site classification for the site.
- Identify any required Interim Remedial Measures (IRMs) that may be needed to address specific problems recognized in the vicinity of the source area during the IIWA project.

The primary focus of the IIWA project was to determine the areal extent of the groundwater contamination proximate to the source area at the Gowanda Electronics site. To attain the information the Standby Work Assignment Contractor (SWAC) and their subcontractor installed and sampled ten (10) small diameter groundwater monitoring points. In addition, ten (10) subsurface soil samples were collected. The SWAC provided all equipment necessary for the collection of the samples. All sample bottles and laboratory analysis were provided by the NYSDEC. All data interpretations associated with the program, and its elements, were conducted using NYSDEC equipment and staff.

1.3 PROJECT SCOPE

The first task of the IIWA was the selection of a SWAC and a drilling sub-contractor. The SWAC for the project was Parson's Engineering Science (ES) who procured the services of Zebra Environmental Corporation (Zebra) to advance the Geoprobe® borings.

Field activities commenced on Monday December 4, 1995. NYSDEC project manager, Maurice Moore, met with ES geologist, Peter Harth, for a site walk through and to establish and mark eight of the ten boring locations (see Figure 1).

Zebra mobilized to the site at 7:30 am on December 5, 1995. A brief meeting was held to familiarize the drillers with the site and project requirements. Zebra constructed a temporary decontamination area to the east of the receiving door of Gowanda Electronics facility. The Geoprobe® unit was off loaded from the truck and the unit and tools were decontaminated utilizing a pressure washer with water obtained from Gowanda Electronics.

The Geoprobe® unit was mounted on a small all terrain vehicle for easy access to residential areas with the least amount interruption and damage to landscaping and yards. The first boring site was test bore number TB-3 located to the rear of the Steever property garage within the vegetable garden (See Figure 1). To access the location a small wire and stake fence was taken down and the unit was set up over the boring location. (For more detail of the borings and boring logs see attached letter report).

The borings were installed in the following order: TB-2, TB-1, TB-10 and TB-4. After TB - 4 the work of the day was ended due to darkness. On December 6, 1995 the remainder of the borings were completed in the following order: TB-5, TB-6, TB-7, TB-8 and TB-9.

All waste polyethylene, drill cuttings and other generated waste were segregated into one closed top 17 H drum labeled and stored behind the shed of Gowanda Electronics for eventual disposal by Zebra. All waste cleaning fluids were also collected for disposal.

The Geoprobe® unit was decontaminated and Zebra demobilized. A final walk through was taken by NYSDEC and ES to ascertain any restoration and final site condition. At this time it was noted that it would be necessary for Zebra to mobilize a larger Geoprobe® unit to attempt to retrieve the stuck tool in TB-3. On January 8, 1996 an attempt to retrieve the stuck tool achieved mixed results. A portion of the tool stem was removed but the macro core and approximately six feet of stem broke off in the borehole. The tool broke about eight feet below ground surface. Recovering this tool would require a large effort but leaving it in place should not present any problems.

1.4 SITE GEOLOGY

A review of the boring logs has indicated the presence of a sub-surface stream element extending north-south from the Gowanda Electronics property toward Torrance Place between the Steever and Gelia property. The boring log from TB-1 indicates the rounded gravel deposits at about eight feet in depth. The exact width of this element cannot be determined with the limited amount of information available. There is evidence of the sub-surface stream element in TB-2 and TB-4 and somewhat in TB-5 and TB-9. However, there is no

evidence of this element in TB-10 and TB-3 as well as no evidence in TB-6, TB-7 and TB-8. Although no groundwater elevations were collected, evidence from the boring logs indicate that the saturated zone is approximately 7 feet in depth. For more information on the site geology refer to the attached Parson's Engineering Science report.

1.5 SOIL AND GROUNDWATER SAMPLING

A Photovac Micro-Tip photoionization detector (PID) was utilized for field screening of the probe cores to determine grab sample location. To obtain a reading a core sleeve was placed on a piece of polyethylene and a knife was used to slice the core sleeve lengthwise the cut was then opened slightly and the tip of the PID was inserted and a sample was taken. The geology of the core was then logged. Grab samples were to be taken from the depth where there was a positive reading on the PID. It became apparent after the first boring that this selection method would not be effective as most of the PID readings had a positive response (see attachment). Core geology and the depth of residential basements became the overriding factor for sample location determination.

Soil samples were collected by a grab of various sub-samples of material within the sleeve of the core. The samples were then placed into two, labelled, 40 milliliter volatile organic compound (VOC) vials, placed on ice and transported to Ecology and Environment (a NYSDEC contract laboratory) for analysis. The samples were analyzed for VOCs according to Method 91-1 set forth in NYSDEC analytical protocol, September 1989, revision 12/91.

Groundwater samples were collected utilizing the sampling screen from the Geoprobe® unit. Siltation problems and the inability to collect a sample from TB-4 necessitated a change to a slotted, PVC screen. This screen proved to be more effective for obtaining a sample. All water samples were collected after purging the borehole of at least three volumes of water. The samples consisted of two 40 milliliter VOC vials filled to zero headspace. The sample were then iced and taken to Ecology and Environment for analysis in accordance to the above stated methods.

1.6 DISCUSSION OF RESULTS

There is evidence of soil contamination that exceeds cleanup guidelines established by the NYSDEC, Division of Hazardous Waste Remediation, Division Technical and Administrative Guidance Memorandum HWR-94-4046 "Determination of Soil Cleanup Objectives and Cleanup Levels" dated January 24, 1994. (see Tables 1 & 2)

TB-1 was the boring located nearest the "source" area. The values at this location noted contamination slightly above the cleanup guidelines at the four to eight foot depth. The sample taken at 14 to 16 foot depth noted the highest contamination found during the project. Total VOCs from this sample exceeded 226 mg/kg or 226 parts per million (ppm). There is evidence of slight contamination in most of the soil samples taken from the project but soil contamination, above guidance values, existed in only three other borings. TB-4 had values slightly above the guidance values at the four to eight foot depth. TB-9 had values about three times the guidance values at four to eight feet. TB-5 had the secondmost high values for the project with values

over 10 mg/kg (ppm) at a depth of eight to twelve feet. This evidence reveals that the suspected source was indeed the source and the majority of this material has already been removed by previous work.

Groundwater analyses determined that groundwater contamination exists collected above water quality standards and guidelines established by NYSDEC Water Quality Standards and Guidance Values, October 1993, Chapter I, NYS Sanitary Code, Sub-part 5-1, Principle Organic Contaminant in all nine of the groundwater samples taken (see Tables 3 & 4).

TB-4 was not able to be sampled for groundwater due to siltation as stated above. Total VOC values ranged from a high of 8062 ug/l in TB-9 to a low of 26 ug/l in TB-8. Principle contaminants are: 1,1-dichloroethene, 1,2-dichloroethane, 1,2-dichloroethane (total), 1,1,1-trichloroethane, trichloroethene and vinyl chloride. Higher concentrations of contaminants follow the course of the alluvial deposits noted in the site geology. The vertical extent of groundwater contamination extends to the glacial till material at a depth of 13 -16 feet. The dry, tight nature of this material prevents vertical migration of contaminants beyond this depth.

1.7 SUMMARY

General groundwater contamination exists in the vicinity of the Gowanda Electronics Site that exceeds the standards set forth in the New York State Groundwater Standards and Guidance Values, October 1993, and in Chapter I, of the NYS Sanitary Code, Subpart 5-1, Principle Organic Contaminants. Highest contamination exists in the vicinity of the subsurface stream deposit extending north-south from Gowanda Electronics to Torrance Place. The vertical extent of the contamination extends to the top of the confining glacial till layer at a depth of 13 to 16 feet.

Soil samples have determined that there is soil contamination in the excess of 226 mg/kg (ppm) near the suspected source area at a depth of 14 to 16 feet. In addition, there is contamination in three other borings that exceed guidance values. Values at TB-4 and TB-9 slightly exceed the guidance values and TB-5 has contamination sightly above 10 mg/kg (ppm) at eight to twelve feet in depth. These borings are in the general vicinity of the alluvial deposits.

The objectives set forth in the IIWA work plan were generally met. An evaluation of the subsurface and groundwater conditions proximate to the source area indicates that there is a preferential contaminant migration pathway following the underground stream element. This alluvial deposition extends north-south from Gowanda Electronics to Torrance Place between the Steever and Gelia properties. More data has been collected to quantify the amount of contamination at the sight but the project fell short of completely delineating the extent of migration. It was not in the scope of this investigation to determine if contamination exists beyond Torrance Place. Therefore, it is not known if groundwater contamination has extended beyond Torrance Place.

The project did yield sufficient information to determine that the suspect source area was indeed the source of the contamination in the area.

The findings of this study and consultation with the New York State Department of Health will be necessary to determine if a significant threat exists and this will allow for a proper site classification.

It was also an objective of this study to determine if any Interim Remedial Measures (IRMs) are necessary. The proposed groundwater extraction well and stripper unit would be a recommended IRM and would help mitigate contaminant migration from the source area.

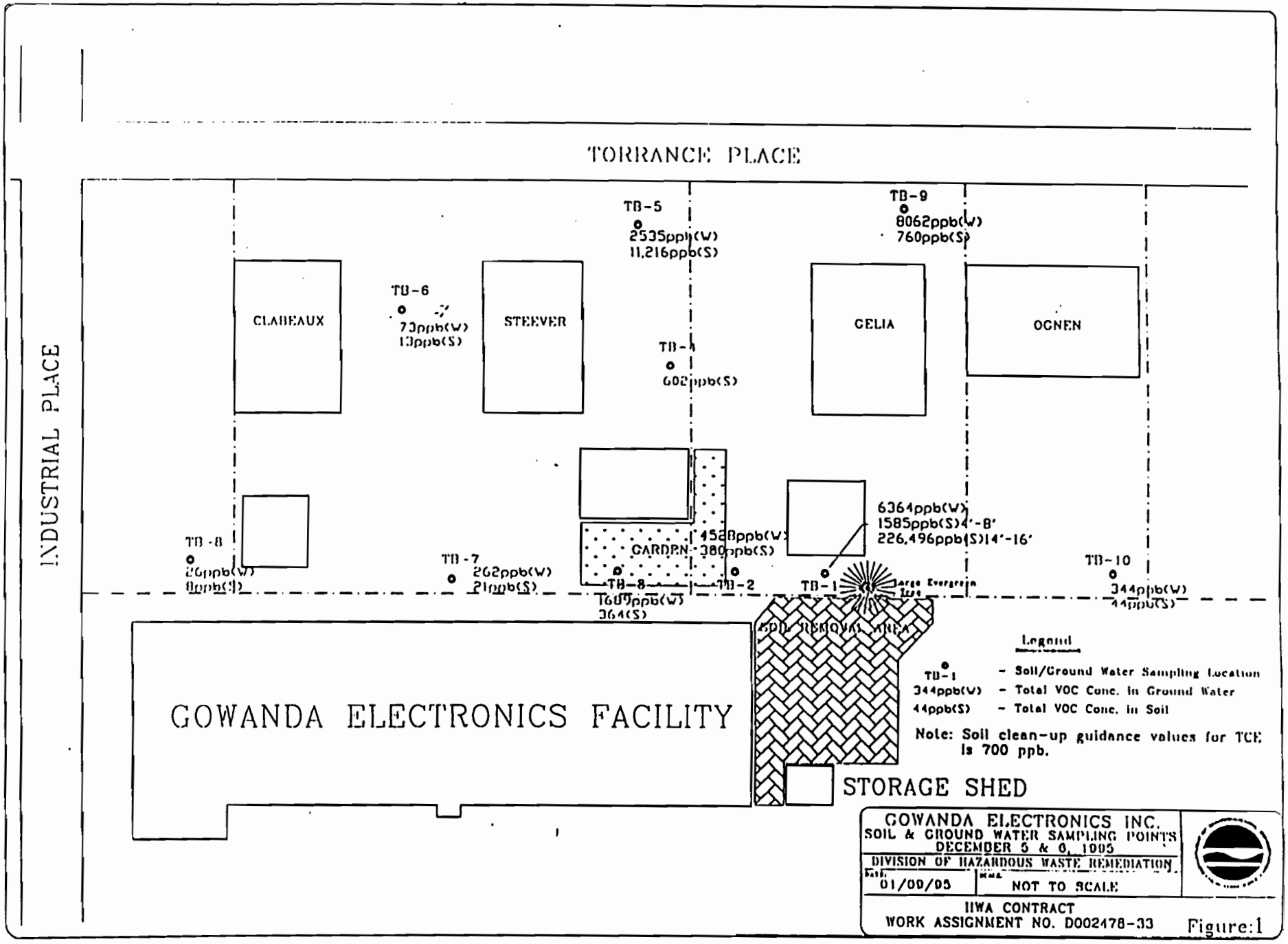

TORRANCE PLACE
INDUSTRIAL PLACE
CLABEAUX
STEEVER
CELIA
OGNEN
TB-5
2535ppb(W)
11,216ppb(S)
TB-9
8062ppb(W)
760ppb(S)
TB-6
73ppb(W)
13ppb(S)
TB-4
602ppb(S)
6364ppb(W)
1585ppb(S)4'-8'
226,496ppb(S)14'-16'
TB-8
26ppb(W)
8ppb(S)
TB-7
262ppb(W)
21ppb(S)
GARDEN
TB-8
TB-2
TB-1
TB-10
344ppb(W)
44ppb(S)
GOWANDA ELECTRONICS FACILITY
STORAGE SHED
Legend
TB-1 - Soil/Ground Water Sampling Location
344ppb(W) - Total VOC Conc. in Ground Water
44ppb(S) - Total VOC Conc. in Soil
Note: Soil clean-up guidance values for TCE is 700 ppb.
GOWANDA ELECTRONICS INC.
SOIL & GROUND WATER SAMPLING POINTS
DECEMBER 5 & 6, 1995
DIVISION OF HAZARDOUS WASTE REMEDIATION
Date 01/09/95
Scale NOT TO SCALE
NWA CONTRACT
WORK ASSIGNMENT NO. D002478-33
Figure:1

Table 1
GOWANDA ELECTRONICS SITE (UNLISTED)
Soil Sampling Results - Volatile Organic Compounds (VOCs)
Test Bore Numbers - TB-1, TB-2, TB-3, TB-4, & TB-5

PARAMETER	Soil SCG Value ug/kg (ppb)	GOEL08 TB-1 4' - 8' (12/5/95) ug/kg (ppb)	GOEL09 TB-1 14' - 16' (12/5/95) ug/kg (ppb)	GOEL07 TB-2 4' - 8' (12/5/95) ug/kg (ppb)	GOEL06 TB-3 8' - 12' (12/5.95) ug/kg (ppb)	GOEL11 TB-4 4' - 8' (12/5/95) ug/kg (ppb)	GOEL10 TB-5 8' - 12' (12/6/95) ug/kg (ppb)
Chloromethane							
Bromomethane							
Vinyl chloride	200		3J				5J
Chloroethane	1900						
Methylene Chloride	100			3DJ			
Acetone	200	21B	21B	9BJ	35B	8BJ	16B
Carbon disulfide			3J				
1,1-Dichloroethene	400	4J	8J	3J	2J	3J	29
1,1-Dichloroethane	200	24	49	19	23	31	200
1,2-Dichloroethene (total)	100	430D	6100D	73D	89	120D	780D
Chloroform	300						
1,2-Dichloroethane	100						
2-Butanone							
1,1,1-Trichloroethane	800	280D	310E	90D	18J	45D	480E
Carbon Tetrachloride							
Bromodichloromethane							
1,2-Dichloropropane							
cis-1,3-Dichloropropene							
Trichloroethene	700	790D	220,000D	180D	34	210D	9700D
Dibromochloromethane							
1,1,2-Trichloroethane	n/a		2J		1J		
Benzene		6DJ					
trans-1,3-Dichloropropene							
Bromoform							
4-Methyl-2-Pentanone							
2-Hexanone	n/a		3J		4J		
Tetrachloroethene		6DJ					
1,1,2,2-Tetrachloroethene							
Toluene							
Chlorobenzene							
Ethylbenzene							
Styrene							
Xylene (total)							

Soil SCG's obtained from New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation, Division Technical And Administrative Guidance Memorandum HWR-94-4046 "Determination of Soil Cleanup Objectives and Cleanup Levels" 1/24/94.

ALL VALUES expressed in ug/kg = Parts Per Billion (PPB). (SHADED EXCEED GUIDANCE VALUES)

A "J" is an estimated value. It denotes the presence of a compound at or below quantitation limits. A "B" denotes that the compound was also found in laboratory blanks. A "D" value denotes all compounds identified in an analysis of a diluted sample. A "E" identifies compounds whose concentrations exceed the calibration range of the instrument. The result should be considered an estimate.

Table 2
GOWANDA ELECTRONICS SITE (UNLISTED)
Soil Sampling Results - Volatile Organic Compounds (VOCs)
Test Bore Numbers - TB-6, TB-7, TB-8, TB-9 & TB-10

PARAMETER	Soil SCG Value ug/kg (ppb)	GOEL15 TB-6 8' - 12' (12/6/95) ug/kg (ppb)	GOEL17 TB-7 8' - 12' (12/6/95) ug/kg (ppb)	GOEL19 TB-8 4' - 8' (12/6/95) ug/kg (ppb)	GOEL21 TB-9 4' - 8' (12/6/95) ug/kg (ppb)	GOEL13 TB-10 4'-8' (12/5/95) ug/kg (ppb)	
Chloromethane							
Bromomethane							
Vinyl chloride	200						
Chloroethane	1900						
Methylene Chloride	100	1J	1J	1J	3J		
Acetone	200	8BJ	16B	6BJ	20BJ	22B	
Carbon disulfide							
1,1-Dichloroethene	400						
1,1-Dichloroethane	200				8J	1J	
1,2-Dichloroethene (total)	100		1J		290		
Chloroform	300		1J	1J			
1,2-Dichloroethane	100						
2-Butanone							
1,1,1-Trichloroethane	800				59		
Carbon Tetrachloride							
Bromodichloromethane							
1,2-Dichloropropane							
cis-1,3-Dichloropropene							
Trichloroethene	700	4J	2J		380	21	
Dibromochloromethane							
1,1,2-Trichloroethane	n/a						
Benzene	60						
trans-1,3-Dichloropropene							
Bromoform							
4-Methyl-2-Pentanone							
2-Hexanone	n/a						
Tetrachloroethene							
1,1,2,2-Tetrachloroethene							
Toluene							
Chlorobenzene							
Ethylbenzene							
Styrene							
Xylene (total)							

Soil SCG's obtained from New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation, Division Technical And Administrative Guidance Memorandum HWR-94-4046 "Determination of Soil Cleanup Objectives and Cleanup Levels" 1/24/94.

ALL VALUES expressed in ug/kg = Parts Per Billion (PPB). (SHADED EXCEED GUIDANCE VALUES)

A "J" is an estimated value. It denotes the presence of a compound at or below quantitation limits. A "B" denotes that the compound was also found in laboratory blanks. A "D" value denotes all compounds identified in an analysis of a diluted sample. A "E" identifies compounds whose concentrations exceed the calibration range of the instrument. The result should be considered an estimate.

Table 3
GOWANDA ELECTRONICS SITE (UNLISTED)
Groundwater Sampling Results - Volatile Organic Compounds (VOCs)
Test Bore Numbers - TB-1,TB-2, TB-3, TB-4, TB-5 & TB-6

PARAMETER	Groundwater SCG Value ug/l	Source	GOEL01 TB-1 8' - 10' (12/5/95) ug/l (ppb)	GOEL02 TB-2 8' - 10' (12/5/95) ug/l (ppb)	GOEL03 TB-3 11' -13' (12/5/95) ug/l (ppb)	GOEL11 TB-4 DRY	GOEL05 TB-5 12.5-14.5 (12/6/95) ug/l (ppb)	GOEL14 TB-6 8' - 10' (12/6/95) ug/l (ppb)
Chloromethane								
Bromomethane								
Vinyl chloride	2	A	24	28			5J	
Chloroethane	5			17	19			
Methylene Chloride	5	A						
Acetone	50	C	9J	6J			7J	
Carbon disulfide				1J				
1,1-Dichloroethene	5	A	37	37	15		17	
1,1-Dichloroethane	5	A	210DJ	540D	280D		200D	22
1,2-Dichloroethene (total)	50	B	3000D	1900D	620D		1200D	57
Chloroform	7	A						2J
1,2-Dichloroethane	5	A						
2-Butanone	50	B						
1,1,1-Trichloroethane	5	A	730D	1400D	640D		260D	21
Carbon Tetrachloride	5	A						
Bromodichloromethane								
1,2-Dichloropropane								
cis-1,3-Dichloropropene								
Trichloroethene	5	A	230D	330D	76D		840D	73
Dibromochloromethane								
1,1,2-Trichloroethane	5	A	3J	9J	5J		5J	
Benzene	0.7	A						
trans-1,3-Dichloropropene								
Bromoform								
4-Methyl-2-Pentanone								
2-Hexanone			1J		2J			
Tetrachloroethene	5							
1,1,2,2-Tetrachloroethene								
Toluene	5	A					1J	
Chlorobenzene								
Ethylbenzene	5	A						
Styrene								
Xylene (total)	5	A						

A - NYSDEC WATER QUALITY STANDARDS AND GUIDANCE VALUES, OCTOBER 1993
B - CHAPTER I NYS SANITARY CODE, SUBPART 5-1, PRINCIPLE ORGANIC CONTAMINANT
C - CHAPTER I, NYS SANITARY CODE, SUBPART 5-1, UNSPECIFIED ORGANIC CONTAMINANT

ALL VALUES expressed in ug/l = Parts Per Billion (PPB). (SHADED EXCEED STANDARDS)
A "J" indicates an estimated value. It denotes the presence of a compound at or below quantitation limits. A "D" value denotes all compounds identified in an analysis of a diluted sample.

Table 4
GOWANDA ELECTRONICS SITE (UNLISTED)
Groundwater Sampling Results - Volatile Organic Compounds (VOCs)
Test Bore Numbers - TB-7, TB-8, TB-9 & TB-10

PARAMETER	Groundwater SCG Value ug/l	Source	GOEL16 TB-7 8' - 10' (12/6/95) ug/l (ppb)	GOEL18 TB-8 8' - 10' (12/6/95) ug/l (ppb)	GOEL20 TB-9 8' - 10' (12/6/95) ug/l (ppb)	GOEL12 TB-10 11' - 12' (12/5/95) ug/l (ppb)
Chloromethane						
Bromomethane						
Vinyl chloride	2	A			99	9J
Chloroethane						
Methylene Chloride	5	A				
Acetone	50	C	8J			
Carbon disulfide						
1,1-Dichloroethene	5	A			49	2J
1,1-Dichloroethane	5	A	7J		300DJ	5J
1,2-Dichloroethene (total)	50	B	16		5200D	240D
Chloroform	7	A	65	23		
1,2-Dichloroethane	5	A				
2-Butanone	50	B				
1,1,1-Trichloroethane	5	A			910D	
Carbon Tetrachloride	5	A	48	3J		
Bromodichloromethane						
1,2-Dichloropropane						
cis-1,3-Dichloropropene						
Trichloroethene	5	A	16		1500D	88
Dibromochloromethane						
1,1,2-Trichloroethane	5	A			3J	
Benzene	0.7	A				
trans-1,3-Dichloropropene						
Bromoform						
4-Methyl-2-Pentanone						
2-Hexanone					1J	
Tetrachloroethene	5					
1,1,2,2-Tetrachloroethene						
Toluene	5	A				
Chlorobenzene						
Ethylbenzene	5	A				
Styrene						
Xylene (total)	5	A				

A - NYSDEC WATER QUALITY STANDARDS AND GUIDANCE VALUES, OCTOBER 1993
B - CHAPTER I, NYS SANITARY CODE, SUBPART 5-1, PRINCIPLE ORGANIC CONTAMINANT
C - CHAPTER I, NYS SANITARY CODE, SUBPART 5-1, UNSPECIFIED ORGANIC CONTAMINANT

ALL VALUES expressed in ug/l = Parts Per Billion (PPB). (SHADED EXCEED STANDARDS)

A "J" indicates an estimated value. It denotes the presence of a compound at or below the quantitation limits. A "D" value denotes all compounds identified in an analysis of a diluted sample.

PARSONS ENGINEERING SCIENCE, INC.

290 Elwood Davis Road, Suite 312 • Liverpool, New York 13088 • (315) 451-9560 • Fax (315) 451-9570

December 28, 1995

RECEIVED
JAN 2 1995
NYSDEC-REG 9

Mr. Maurice Moore
NYSDEC
Region 9 Office - DHWR
270 Michigan Avenue
Buffalo, New York 14023-2999

RE: Immediate Investigation
Work Assignment No. D002478-33
Gowanda Electronics, Gowanda, New York
State Superfund Standby Contract

Dear Mr. Moore:

This letter is to provide site investigation data and a summary of findings for the field investigation effort. Deliverables included as Attachments include:

Attachment A - Sample Summary Table and Field Data Forms;

Attachment B - Boring Logs;

Attachment C - Site Map with Sample Locations

PROJECT SCOPE

The field investigation effort was conducted to address groundwater contamination in the vicinity of the Gowanda Electronics facility. As directed by the NYSDEC, Parsons Engineering Science, Inc's (Parsons ES's) involvement in this project was limited primarily to coordination and performance of field activities under the direction of the NYSDEC. The NYSDEC developed the site work plan based on site information in their possession and will be conducting site report preparation. Parsons ES's project involvement included the following:

Subcontractor Procurement

Subcontractor procurement was conducted for the following services:

- Zebra Environmental Corporation for *Geoprobe* ™ sampling.

Health and Safety Plan (HASP)

A Health and Safety Plan (HASP) was prepared, consisting of a main text section addressing general health and safety issues and an appendix addressing site-specific health and safety issues.

Environmental Sampling

As directed by the NYSDEC, environmental sampling was conducted using the *Geoprobe* ™ system. The *Geoprobe* ™ is a hydraulically-powered probe capable of exerting 15,000 pounds of pressure. The pressure is used to drive 2-inch outside diameter steel rods into the subsurface to desired sample depths. This technique allows subsurface sampling without drilling and installation of wells. The soil and groundwater sampling units of the probes remain sealed until the desired sampling depths are reached.

The field activities commenced on Monday, December 4 1995. Maurice Moore (NYSDEC) and Peter Harth (Geologist, Parsons ES) met and chose the locations for the drilling program which began on Tuesday morning, December 5. All borings were on private properties to the north of Gowanda Electronics and south of Torrance Street. The borings were all within 200 feet of Gowanda Electronics. ZEBRA Environmental used an ATV Geoprobe rig to minimize surface damage to private property. Jared Plank was the Zebra Field Team Leader, assisted by Jack Harris (Tuesday only) and Michael Paul (Wednesday only). Drilling and sampling activities were completed on Wednesday, December 6.

A total of 39 subsurface soil samples were collected from ten locations, to a maximum depth of 16 feet. Eleven of the subsurface soil samples were submitted for laboratory analysis (one from each of the sample locations, and one extra sample from probe location TB-01) by the NYSDEC. Nine groundwater samples were collected (one from each of the ten probe locations, except TB-04, which was a dry hole) and submitted for laboratory analysis by the NYSDEC. Attachment C presents a site map with the sample locations.

As directed by the onsite NYSDEC representative, the permanent monitoring well described in the Work Plan was not installed during this round of field work.

Subsurface Soil Sample Collection

The *Geoprobe* ™ sampling method was used for collection of subsurface soil samples. Continuous sampling was conducted at all sample locations by use of a 48-inch long macro core sampler. The following procedures were also applied during *Geoprobe* ™ sampling:

- Soil samples retrieved from the probe hole were visually classified for texture, and screened for the evolution of organic vapors with a photoionization detector (PID).

- The probe samples were placed in labeled laboratory sample containers identified with the sample location number and interval sampled. After a minimum of 10 minutes the PID tip was inserted in the sample container for screening of organic vapors.

- Probe hole geology and field measurements were entered into the field log book.

A total of 39 subsurface soil samples were collected. As directed by the NYSDEC, eleven of the subsurface soil samples were placed in sample jars for laboratory analysis. Samples selected for laboratory analyses were collected as grab samples, with selection based on visual observations and PID readings. Attachment A presents a summary of samples collected and field data forms. Boring logs are presented as Attachment B.

The geology over the approximately two acre area investigated consists of 1 to 2 feet of topsoil overlying a 6 to 10 foot thick silt and gravel water table aquifer. Till samples were retrieved from borings TB-06 and TB-07 at 13.8 feet and 11.8 feet, respectively. Borings were terminated at first signs of refusal, ranging from 11.5 feet at TB-08 to 16 feet at borings TB-03 and TB-09, because of the probe retrieval problems at TB-03.

The topsoil layer consists of dark brown to black loose humic soil that had a moisture content of dry to damp. The underlying clay and silt layer had the following properties: firm, some orange mottling, occasional pebbles and varying clay content from 50% to less than 10% Moisture content ranged from moist to wet. Groundwater was typically encountered at 7 to 8 feet below ground surface, and as shallow as 4 feet in TB-03. Since the ground surface elevation was not measured and there was some topographic variation, the true groundwater depth was not measured.

The water table aquifer is a silt and gravel layer. The gravel is typically 1/4" to 1/2" diameter and rounded. Color variations were noted in this layer ranging from orange-brown, shallow, to gray in the deeper section. Silt content varied from 0% to 50%. Till was encountered immediately underlying the silt and gravel layer. The till encountered in borings TB-06 and TB-07 was stiff, very compact and dry, with a high clay content.

The highest PID readings for volatile organic compounds were found at location TB-01, immediately south of a small garage. This garage is located on private property north of the Gowanda Electronics shed, near the east end of the site. PID values in the topsoil layer registered 1100 ppm. A value of 6200 was measured at 6 feet below ground surface, and 7000 ppm near the bottom of the boring at 14.5 feet. Boring TB-04, approximately 100 feet to the northwest, had lower readings near the surface (260 ppm), but exhibited

high readings of 4500 ppm and 4800 ppm in a zone extending from 5 feet to 11 feet below ground surface.

Boring TB-05, 50 feet to the north of TB-04 had PID readings of 0 ppm from the surface to the 8-12 foot sample where the PID registered 1000 ppm. This increased to 2300 ppm in the 12-16 foot sample. The boring was terminated at a refusal depth of 16 feet. TB-03 had no PID response from the surface to the 8-12 foot sample interval, where a PID reading of 5000 ppm was encountered. TB-10, drilled near the eastern margin of the site, had a PID response at the surface of 328 ppm. This value increased to 1560 ppm at the 4-8 foot interval, then decreased to 260 ppm at 13 feet. The remainder of the borings had low responses, typically less than 200 ppm. No odor or staining was observed in any of the borings.

Groundwater Sampling

Groundwater samples were collected from temporary one-inch PVC piezometers, with 2- foot screens, installed in the probe holes used for collection of subsurface soil samples. Initial attempts to collect groundwater samples by driving the point sampler approximately 8 feet below the ground surface failed because of inadequate groundwater recharge. Purging consisted of removing three well volumes of groundwater prior to sample collection. pH, specific conductivity, and temperature measurements were taken at the time of sample collection. The turbidity meter did not function properly due to extreme cold temperatures, and therefore was not used. The water was turbid, light brown in color and had no odor or visible free-phase component.

Sample locations were identified on a copy of the site plan in the field log books. Sample locations were marked in the field with flagging. The geoprobe sample locations were not surveyed. Locations were marked by taking distance measurements relative to permanent structures.

As directed by the NYSDEC, nine groundwater samples were collected and submitted for laboratory analysis. An attempt at groundwater sampling at location TB-04 failed due to lack of recharge, and is classified as a dry hole. Attachment A presents a summary of field measurements. Slow recharge of the *Geoprobe* ™ point sampler prevented collection of groundwater samples using this method at all but two locations. One inch temporary PVC piezometers were installed at the remaining locations to allow for sufficient recharge for sample collection.

Sample Analysis

The NYSDEC submitted samples for analysis by their own laboratory.

If you should have questions or require additional information please feel free to contact us at (315) 451-9560. Zebra will attempt to remove the stuck probe within the next couple of weeks, subject to rig/personnel availability. Two waste drums (one containing used PVC screens, poly sheeting, and soil, and one containing purge and decon water) will be removed from the site by Zebra pending the results of the analytical tests.

Sincerely,

Peter Harth

Peter Harth
Project Geologist

Thomas H. Abrams

Thomas H. Abrams
Project Manager

cc: File/726343.01
PMP
Mr. William Shaw (NYSDEC - Albany) w/o Attachments

ATTACHMENT A

SAMPLE SUMMARY AND FIELD MEASUREMENTS

ATTACHMENT A.

LABORATORY SAMPLE SUMMARY
GOWANDA ELECTRONICS SITE

SAMPLE CATEGORY	SAMPLE ID	SAMPLE DEPTH (FT BGS)	SAMPLE DATE	PID READING (PPM)	DESCRIPTION OF SAMPLE LOCATION
Soil	GOEL-06	8-12	12/5/95	5000	Location TB-03
Soil	GOEL-07	4-8	12/5/95	515	Location TB-02
Soil	GOEL-08	4-8	12/5/95	6200	Location TB-01
Soil	GOEL-09	14-16	12/5/95	7000	Location TB-01
Soil	GOEL-13	4-8	12/5/95	1560	Location TB-10
Soil	GOEL-11	4-8	12/5/95	4500	Location TB-04
Soil	GOEL-10	8-12	12/6/95	1000	Location TB-05
Soil	GOEL-15	8-12	12/6/95	90	Location TB-06
Soil	GOEL-17	8-12	12/6/95	200	Location TB-07
Soil	GOEL-19	4-8	12/6/95	80	Location TB-08
Soil	GOEL-21	4-8	12/6/95	12	Location TB-09
Groundwater	GOEL-03	11-13	12/5/95	2000+	Location TB-03
Groundwater	GOEL-02	8-10	12/5/95	102	Location TB-02
Groundwater	GOEL-01	8-10	12/5/95	900	Location TB-01
Groundwater	GOEL-12	11-13	12/5/95	260	Location TB-10
Groundwater	GOEL-05	12.5-14.5	12/6/95	1000	Location TB-05
Groundwater	GOEL-14	8-10	12/6/95	90	Location TB-06
Groundwater	GOEL-16	8-10	12/6/95	200	Location TB-07
Groundwater	GOEL-18	8-10	12/6/95	70	Location TB-08
Groundwater	GOEL-20	8-10	12/6/95	6.2	Location TB-09

Note: No groundwater sample taken at Location TB-04; "dry hole".
PID readings for "groundwater samples" are from soil in screen interval. No PID response from groundwater samples.

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL-1 Site Name: Gowanda Electronics
Date: 12/5/95 Time: 1505
Samplers: PMH of Parsons ES
Weather: cold, 30°F

Sample Location: TB-01
Screen/Sample Depth: 12.5-14.5'
Sampling Method: Geoprobe

Groundwater Purging:

Initial Static Water Level: 7.0'
Well Volume: .26 cu/ft.
2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons
3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons
4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons
Volume of groundwater purged: .52 cu.ft.
Purging Device: tubing w/ check valve.
Purge Water Disposition (e.g., contained): drummed.

Sample Description:

Color: brown
Odor: none
Other:

Sample Analyzed for: CLP VOAs
QC Samples at this Location: none
QC Samples Analyzed for: none

Field Measurements:

Temperature (C/F): 44.3°F
pH: 8.6
Conductivity (µohms/cm): 303
Turbidity (NTU): —
PID (ambient): 0.0
Dissolved Oxygen —
Eh (Redox Potential) —

Comments

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL-02 Site Name: Gowanda Electronics

Date: 12/5/95 Time: 1250

Samplers: PMH of Parsons ES

Weather: cold, 30°F

Sample Location: TB-02

Screen/Sample Depth: 8-10'

Sampling Method: geoprobe, 2' screen.

Groundwater Purging:

Initial Static Water Level: 7.5

Well Volume: .26 cu/ft. (1" screen)

2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons

3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons

4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons

Volume of groundwater purged: .52 cu.ft

Purging Device: pvc tubing w/ check valve,

Purge Water Disposition (e.g., contained): drummed

Sample Description:

Color: brown

Odor: none

Other:

Sample Analyzed for: CLP - VOAs

QC Samples at this Location: —

QC Samples Analyzed for: —

Field Measurements:

Temperature (C/F): 42.9°F Dissolved Oxygen —

pH: 8.28 Eh (Redox Potential) —

Conductivity (µohms/cm): 223

Turbidity (NTU): —

PID (ambient): 0.0

Comments:

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL-03 Site Name: Gowanda Electronics

Date: 12/5/95 Time: 1010

Samplers: PMH of Parsons ES

Weather: cld, 30°F

Sample Location: TB-03

Screen/Sample Depth: 11-13'

Sampling Method: geoprobe

Groundwater Purging:

Initial Static Water Level: 7.0'

Well Volume: .2C cubic feet.

2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons

3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons

4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons

Volume of groundwater purged: .52 cubic ft.

Purging Device: tubing w/ check valve.

Purge Water Disposition (e.g., contained): drummed

Sample Description:

Color: brown

Odor: none

Other:

Sample Analyzed for: CLP VOAs

QC Samples at this Location: —

QC Samples Analyzed for: —

Field Measurements:

Temperature (C/F): 42.4°F

pH: 6.9

Conductivity (µohms/cm): 914

Turbidity (NTU): —

PID (ambient): 0.0

Dissolved Oxygen —

Eh (Redox Potential) —

Comments:

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL-04 Site Name: Gowanda Electronics

Date: 12/5/95 Time: 1630

Samplers: PMH of Parsons ES

Weather: cold, 25°C

Sample Location: TB-04

Screen/Sample Depth: Attempted 10-12'

Sampling Method: 1" pvc screen

Groundwater Purging:

Initial Static Water Level: 7.0'

Well Volume: .26 cubic feet.

2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons

3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons

4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons

Volume of groundwater purged: .52 cubic ft.

Purging Device: tubing w/ check valve.

Purge Water Disposition (e.g., contained): drummed.

Sample Description: No sample recovered. Insufficient flow.

Color:

Odor:

Other:

Sample Analyzed for:

QC Samples at this Location:

QC Samples Analyzed for:

Field Measurements:

Temperature (C/F): Dissolved Oxygen

pH: Eh (Redox Potential)

Conductivity (μohms/cm):

Turbidity (NTU):

PID (ambient):

Comments: No sample. Dry hole.

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL-5 Site Name: Gowanda Electronics

Date: 12/6/95 Time: 0900

Samplers: PMH of Parsons ES

Weather: cold, 20°F

Sample Location: TB-05

Screen/Sample Depth: 12.5 - 14.5'

Sampling Method: 1" PVC screen

Groundwater Purging:

Initial Static Water Level: 7.5'

Well Volume: .26 cu. ft.

2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons

3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons

4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons

Volume of groundwater purged: .52 cu. ft.

Purging Device: tubing w/ check valve.

Purge Water Disposition (e.g., contained): drummed

Sample Description:

Color: brown

Odor: none

Other:

Sample Analyzed for: CLP VOA's

QC Samples at this Location: none

QC Samples Analyzed for: none

Field Measurements:

Temperature (C/F): 33.7° F

pH: 8.24

Conductivity (µohms/cm): 180

Turbidity (NTU): —

PID (ambient): 0.0

Dissolved Oxygen —

Eh (Redox Potential) —

Comments:

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL - 14 Site Name: Gowanda Electronics

Date: 12/6/95 Time: 0945

Samplers: PMH of Parsons ES

Weather: cold, 20°F

Sample Location: TB-06

Screen/Sample Depth: 8-10'

Sampling Method: 1" PVC screen

Groundwater Purging:

Initial Static Water Level: 8.0'

Well Volume: .26 cu. ft.

2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons

3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons

4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons

Volume of groundwater purged: .52 cu ft.

Purging Device: tubing w/ check value.

Purge Water Disposition (e.g., contained): drummed

Sample Description:

Color: brown

Odor: none

Other:

Sample Analyzed for: CLP VOAs

QC Samples at this Location: none

QC Samples Analyzed for: none

Field Measurements:

Temperature (C/F): 34.2° F

pH: 2.8?

Conductivity (µohms/cm): 98

Turbidity (NTU): —

PID (ambient): 0.0

Dissolved Oxygen —

Eh (Redox Potential) —

Comments:

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL-16 Site Name: Gowanda Electronics

Date: 12/6/95 Time: 1045

Samplers: PMH of Parsons ES

Weather: cold 20°F

Sample Location: TB-07

Screen/Sample Depth: 8-10'

Sampling Method: 1" PVC screen

Groundwater Purging:

Initial Static Water Level: 7.5'

Well Volume: .26 cu ft.

2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons

3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons

4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons

Volume of groundwater purged: .52 cu. ft.

Purging Device: tubing w/ check valve.

Purge Water Disposition (e.g., contained): drummed.

Sample Description:

Color: brown

Odor: none

Other:

Sample Analyzed for: TCL VOAs

QC Samples at this Location: none

QC Samples Analyzed for: none

Field Measurements:

Temperature (C/F): 37°F

pH: 5.3

Conductivity (μohms/cm): 102

Turbidity (NTU): —

PID (ambient): 0.0

Dissolved Oxygen —

Eh (Redox Potential) —

Comments:

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL-18 Site Name: Gowanda Electronics

Date: 12/6/95 Time: 1120

Samplers: PMH of Parsons ES

Weather: Cold, 20°F

Sample Location: TB-08

Screen/Sample Depth: 8-10'

Sampling Method: 1" PVC screen

Groundwater Purging:

Initial Static Water Level: 7.5'

Well Volume: .26 cu. ft.

2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons

3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons

4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons

Volume of groundwater purged: .52 cu. ft.

Purging Device: tubing w/ check valve.

Purge Water Disposition (e.g., contained): drummed

Sample Description:

Color: brown

Odor: none

Other:

Sample Analyzed for: CLP VOAs

QC Samples at this Location: none

QC Samples Analyzed for: none

Field Measurements:

Temperature (C/F): 31.5°F

pH: 7.5

Conductivity (µohms/cm): 52

Turbidity (NTU):

PID (ambient):

Dissolved Oxygen

Eh (Redox Potential)

Comments:

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL-20 Site Name: Gowanda Electronics

Date: 12/6/95 Time: 1205

Samplers: PMH of Parsons ES

Weather: cold, 15°F

Sample Location: TB-09

Screen/Sample Depth: 8-10'

Sampling Method: 1" PVC screen

Groundwater Purging:

Initial Static Water Level: 8.0

Well Volume: .20 cu. ft.

2-Inch Casing: ____ Feet of Water x 0.16 Gallons/Foot = ____ Gallons

3-Inch Casing: ____ Feet of Water x 0.36 Gallons/Foot = ____ Gallons

4-Inch Casing: ____ Feet of Water x 0.65 Gallons/Foot = ____ Gallons

Volume of groundwater purged: .52 cu. ft.

Purging Device: tubing w/ check valve.

Purge Water Disposition (e.g., contained): drummed

Sample Description:

Color: brown

Odor: none

Other:

Sample Analyzed for: CLP VOAs

QC Samples at this Location: none

QC Samples Analyzed for: none

Field Measurements:

Temperature (C/F): 41.2° F

pH: 6.61

Conductivity (μohms/cm): 205

Turbidity (NTU):

PID (ambient):

Dissolved Oxygen

Eh (Redox Potential)

Comments:

GROUNDWATER SAMPLING RECORD

Sample Identifier: GOEL - 12 . Site Name: Gowanda Electronics
Date: 12/5/95 Time: 1600
Samplers: PMA of Parsons ES
Weather: cold, 25°F

Sample Location: TB-10
Screen/Sample Depth: 6-8'
Sampling Method: geoprobe

Groundwater Purging:

Initial Static Water Level: 7.5'
Well Volume: .26 cu. ft.
2-Inch Casing: ___ Feet of Water x 0.16 Gallons/Foot = ___ Gallons
3-Inch Casing: ___ Feet of Water x 0.36 Gallons/Foot = ___ Gallons
4-Inch Casing: ___ Feet of Water x 0.65 Gallons/Foot = ___ Gallons
Volume of groundwater purged: .52 cu. ft.
Purging Device: tubing w/ check valve.
Purge Water Disposition (e.g., contained):

Sample Description:
Color: brown
Odor: none
Other:

Sample Analyzed for: CLP VOAs
QC Samples at this Location: none
QC Samples Analyzed for: none

Field Measurements:
Temperature (C/F): 45.6° F
pH: 8.7
Conductivity (µohms/cm): 318
Turbidity (NTU): —
PID (ambient): 0.0
Dissolved Oxygen —
Eh (Redox Potential) —

Comments:

c:\users\49110\gwsam.wk3

ATTACHMENT B

BORING LOGS

Contractor: ZEBRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PMH
Rig Type: GEOPROBE ATV

ENGINEERING–SCIENCE
DRILLING RECORD

BORING/ WELL NO. TB-01

PROJECT NAME: GOWANDA ELECTRONICS
PROJECT NUMBER: 7263-03.01000

Sheet 1 of 1
Location Description: 6' South of Garage, North of NE Corner of Gowanda Electronics building.

Weather: Overcast, 40°F
Date/Time Start: 12/5/95 1420 hrs.
Date/Time Finish: 12/5/95 1600

Location Plan: Gar. × TB-01 N↑ Gow. El. ☐ shed

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0	90	NA		TopSoil			
1100					0-1' TOPSOIL - dry				
		2			1-4' SILT AND CLAY orange-brown, damp-dry orange mottling. No odor. firm. (SAA) to 7.0'	ML/CL			
		4							
			90						
6300		6							
					7.0'-8.0' ▽ WET 7.0'				
300					SILT AND GRAVEL gray, water saturated, loose	GM			
		8							
			80		8.0-13.0' C. GRAVEL AND SILT. Rounded gravel. Probable stream channel Sediments.				
900		10							
		12							
			80						
7000					C. SAND 13.0-13.5'	SP			
		14			C. GRAVEL AND SILT Refusal, 14.5' end of boring.	GM			
		16							
		18							
		20							

SS - SPLIT SPOON
A - AUGER CUTTINGS
C - CORED

COMMENTS: Geoprobe boring, Continuous sampling in 4' increments. LAB SOIL SAMPLE GOEL-08, 6.0' 2nd Lab Soil Sample GOEL-09, 14.0' GW lab Sample GOEL-1, Screened 11.5-14.5'

Contractor: ZERRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PMH
Rig Type: GEOPROBE ATV

ENGINEERING–SCIENCE
DRILLING RECORD

BORING/WELL NO. TB-02

PROJECT NAME GOWANDA ELECTRONICS
PROJECT NUMBER 7263-43.01000

Sheet 1 of 1
Location Description: East side of Steuer's garden, near fence, N. of Gowanda. El. property.
Location Plan: [GAR] TB-02 [GOW. ELECTR.] Parking lot.

Weather Overcast, 40°F
Date/Time Start 12/5/95 1200 hrs.
Date/Time Finish 12/5/95 1250

NT

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0	90	NA	TOPSOIL 0-2' – moist	Topsoil			
220									
		2			SILT, little clay, yellow-brown, orange mottling, moist.	ML			
		4							
			80						
515		6			▽ WET 7.5'				
		8			2.5' SILT AND GRAVEL C, gravel, loose, water saturated. Gray color. rounded streambed-type gravel.	GM			
			80						
102		10							
		12							
		14			Refusal at 13.5' End of boring.				
		16							
		18							
		20							

B – SPLIT SPOON
A – AUGER CUTTINGS
C – CORED

COMMENTS Geoprobe boring. Continuous sampling at 4' intervals.
Soil Sample GOEL-7 (Soil) 4-8'
GW Sample GOEL-2, Screen: 11.5' – 13.5'

ENGINEERING–SCIENCE
DRILLING RECORD

BORING/WELL NO. TB-03

Sheet 1 of 1

Contractor: ZEBRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: FMH
Rig Type: GEOPROBE ATV

PROJECT NAME GOWANDA ELECTRONICS
PROJECT NUMBER 726343.01000

Location Description: located in garden just North of site wooden fence.

Weather Overcast, 40°F
Date/Time Start 11/5/95 0940
Date/Time Finish 11/5/95 1030

Location Plan: garden TB-03 N↑ Gowanda. El.

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0	75	NA	0-2' TOPSOIL	TOPSOIL			
0.0		2			SILT, yellow-brown, damp-dry, orange mottling. No odor ▽ WET 4.0'	ML			
0.0		4	80		some clay, wet				
		6			5.0-6.0' some pebbles				
		8			SILT AND SAND gray, wet	SM			
		10	90		8.GRAVEL AND SILT faint odor? orange mottling.	GM			
5000		12							
		14							
		16			END OF Boring, 16.0' (refusal). No samples recovered 12-16.' See Notes below.				
		18							
		20							

S - SPLIT SPOON
A - AUGER CUTTINGS
C - CORED

COMMENTS Geoprobe boring. Continuous sampling at 4' increments. Soil SAMPLE GOEL-6, 8-12'; GW SAMPLE GOEL-03, 11-13' screen. Tool stuck 12-16' interval, not immediately recovered. No samples 12-16.0'

Contractor: ZEBRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PMH
Rig Type: GEOPROBE ATV

ENGINEERING–SCIENCE
DRILLING RECORD

BORING/WELL NO. TB-04

PROJECT NAME GOWANDA ELECTRONICS
PROJECT NUMBER 7163-43.01000

Sheet 1 of 1
Location Description: 75' N. of Gow. El. wooden fence, 16' west of NE corner of bldg.

Weather overcast, 35°F
Date/Time Start 12/5/95 1630 hrs.
Date/Time Finish 12/5/95 1730

Location Plan: TB-04 — 75' — 16' — Gow. El. — N

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0		NA	- 0-1' TOPSOIL	Topsoil			
700			80		- 1- SILT, some clay, damp, pebbles, light brown color no odor.	ML			
		2							
		4			- 4-5.5' SILT AND CLAY orange, wet.	ML/CL			
			80		- 5.5-13.0 SILT AND GRAVEL rounded gravel moist-wet. ▽ WET 7.0' gray-green color. no odor.	GM			
4500		6							
		8							
			80						
4800		10							
		12							
* 350									
		14			Refusal at 13.0', end of boring				
		16							
		18							
		20							

SS – SPLIT SPOON
A – AUGER CUTTINGS
C – CORED

COMMENTS Geoprobe boring. Continuous sampling at 4' intervals. GOEL-11, soil sample, 7.0'. Dry hole, no GW sample. * Heavy snow – PID not responding properly. Readings may be higher.

Contractor: ZEBRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PMH
Rig Type: GEOPROBE ATV

ENGINEERING-SCIENCE
DRILLING RECORD

BORING: TB-05
WELL NO.

PROJECT NAME: GOWANDA ELECTRONICS
PROJECT NUMBER: 726340.01000

Sheet : of 1
Location Description: 64' W. + 118' N of SE corner of Gow. Electr. building. 22' S. of Torrance ST.
Location Plan: Torrance St. x TB-05 NT Gow. El.

Weather: Overcast, 35°F
Date/Time Start: 12/6/95 0830hrs.
Date/Time Finish: 12/6/95 0900

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0		NA	0-1' TOPSOIL	Topsoil			
0.0			80						
		2			SILT AND CLAY yellow-brown, firm, dry.	ML/CL			
		4			- Some orange staining damp.				
0.0			80						
		6							
		8			7-8.0' wood pieces. ▽ WET 7.5' dk. brown.	PT			
			50		SILT AND GRAVEL gray color, wet.	GM			
1000		10							
		12							
			50						
2300		14			C. SAND wet.	SP			
		16			Refusal at 14.5', end of boring.				
		18							
		20							

COMMENTS: Geoprobe boring. Continuous sampling, 4' intervals
GOEL-10 Soil sample @ 10'
GOEL-05 GW sample, 12.5-14.5'

SS - SPLIT SPOON
A - AUGER CUTTINGS
C - CORED

Contractor: ZEBRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PMK
Rig Type: GEOPROBE ATV

ENGINEERING–SCIENCE
DRILLING RECORD

BORING/WELL NO. TB-06

PROJECT NAME GOWANDA ELECTRONICS
PROJECT NUMBER 726343.01000

Sheet 1 of 1
Location Description: 65' S. of Torrance St. 20' E. of NW corner of Gow. El. building.
Location Plan: Torrance St. x TB-06 Gow. El.

Weather Overcast, Snow, 25°F
Date/Time Start 12/6/95 0930 hrs.
Date/Time Finish 12/6/95 1000

NA

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0		NA	0-1' TOPSOIL	Topsoil			
550			90						
		2			SILT, some clay, firm pebbles, damp-moist	ML			
		4							
			90		SILT AND CLAY few pebbles. moist	ML/CL			
95		6							
		8			▽ WET				
			90		SILT AND GRAVEL 8.0' orange brown, wet	GM			
75		10							
		12			color change to gray.				
100			90						
0.0		14			13.8' TILL. dense, stiff dry. - gray-green color. Refusal @ 14.0' end of boring.	TILL			
		16							
		18							
		20							

COMMENTS Geoprobe boring. Continuous sampling at 4' intervals
GOEL-15 soil sample 8'
GOEL-14 GW sample. Screen: 8-10'

SS - SPLIT SPOON
A - AUGER CUTTINGS
C - CORED

ENGINEERING-SCIENCE
... DRILLING RECORD

BORING/WELL NO. TB-07

Sheet 1 of 1

Contractor: ZEBRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PMH
Rig Type: GEOPROBE ATV

PROJECT NAME GOWANDA ELECTRONICS
PROJECT NUMBER 726345.01000

Location Description: 25' N. of warden fence, Gow. El., 80' E. of NW corner of building

Weather Cold, snow, 25° F
Date/Time Start 12/6/95 1020 hrs.
Date/Time Finish 12/6/95 1100

Location Plan: x TB-07 — Fence — NF — Gow. El.

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0		NA	0-1.5' TOPSOIL	Topsoil			
50			100						
		2			SILT AND CLAY orange-yellow. damp-dry, firm. orange mottling, occasional pebbles.	ML/CL			
		4							
			100		4-4.5' wood pieces, brown	PT			
80		6			SILT AND CLAY, orange-green color.	ML/CL			
		8			▽ WET 7.5'				
			50		color change to gray.				
200		10							
		12			11.8' TILL. compact, dense, dry	TILL			
		14			Refusal @ 12.0' end of boring.				
		16							
		18							
		20							

SS - SPLIT SPOON
A - AUGER CUTTINGS
C - CORED

COMMENTS Geoprobe boring. Continuous sampling at 4' intervals.
GOEL-17 soil sample, 11.0'
GOEL-16 GW sample, screen 8-10'

Contractor: ZERRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PKH
Rig Type: GEOPROBE ATV

ENGINEERING-SCIENCE
DRILLING RECORD

BORING/WELL NO. TB-08

PROJECT NAME GOWANDA ELECTRONICS
PROJECT NUMBER 7263-01-01000

Sheet 1 of 1
Location Description: 25' N. of Gow. El. wood fence, 10' W. of NW corner of building
Location Plan: XTB-08 — Fence — Gow. El. — N

Weather Cold, snow, 20°F
Date/Time Start 12/6/95 1115 hrs.
Date/Time Finish 12/6/95 1140

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0		NA	0-1' TOPSOIL	Topsoil			
10			90						
		2			SILT AND CLAY orange-brown, moist-dry, firm. Orange mottling.	ML/CL			
		4			3.5-4.0' wood, dark brown.	PT			
			80		▽ WET				
50		6			SILT AND CLAY 5.5' orange-brown, loose, wet.	ML/CL			
		8							
			70		SILT AND GRAVEL orange-brown	GM			
30		10			SILT AND GRAVEL, gray				
		12			Refusal at 11.5', end of boring.				
		14							
		16							
		18							
		20							

SS - SPLIT SPOON
A - AUGER CUTTINGS
C - CORED

COMMENTS Geoprobe boring. Continuous sampling at 4' intervals.
GOEL-19 soil sample 6.0'
GOEL-18 GW sample, screen 10-12'

Contractor: ZERRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PMH
Rig Type: GEOPROBE ATV

ENGINEERING–SCIENCE
DRILLING RECORD

BORING/WELL NO. TB-09

PROJECT NAME GOWANDA ELECTRONICS
PROJECT NUMBER 726343.01000

Sheet 1 of 1
Location Description: 22' South of Torrance St., E. of NE corner Gowanda El. Building
Location Plan: Torrance St, x TB-09, Gow. El.

Weather Cold, 20°F
Date/Time Start 12/6/95 11. hrs
Date/Time Finish 12/6/95 1:30

NI

GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0		NA	0-1' TOPSOIL	Topsoil			
5.0			70						
		2			SILT AND CLAY orange mottling, firm, dry	ML/CL			
		4							
			100						
12.0		6							
		8			SILT, gray-green, moist, less firm, pebbles.	ML			
			90		SILT AND GRAVEL ▽WET 8.0' gray-green, wet	GM			
6.2		10							
		12							
			80						
8.0		14			more compact, wet				
		16			Refusal at 16.0', end of boring				
		18							
		20							

COMMENTS: Geoprobe boring. Continuous sampling at 4' intervals
GOEL-21 Soil Sample 4-8'
GOEL-20 GW Sample screen: 8-10'

S - SPLIT SPOON
A - AUGER CUTTINGS
C - CORED

Contractor: ZERRA ENVIRONMENTAL
Driller: JARED PLANK
Inspector: PMH
Rig Type: GEOPROBE ATV

ENGINEERING–SCIENCE
DRILLING RECORD

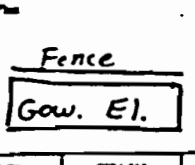
PROJECT NAME GOWANDA ELECTRONICS
PROJECT NUMBER 7263G.01000

BORING/WELL NO. TB-10

Sheet 1 of 1
Location Description: 90' E. of E. end of Gow. El. wooden fence

Weather Cold, 20°F
Date/Time Start 12/5/95 1510 hrs
Date/Time Finish 12/5/95 1600

Location Plan



GROUNDWATER OBSERVATIONS

Water Level				
Date				
Time				
Meas. From				

PID/FID Reading	Sample I.D.	Sample Depth	Percent Recovery	Blow Cts	FIELD IDENTIFICATION OF MATERIAL	USCS CLASSIF.	STAIN	SHEEN	FREE PHASE
	NA	0		NA	0-1' TOPSOIL	Topsoil			
328			70						
		2			SILT AND GRAVEL brown, rounded pebbles, dry	GM			
		4							
			60		C. SAND, SILT, GRAVEL loose, damp-dry, brown color.	GM/SP			
1560		6			▽ WET 7.5'				
		8							
			70		Color change to gray.				
238		10							
		12							
360					C. GRAVEL rounded gravel, brown, gray	GP			
		14			Refusal at 13.0', end of boring.				
		16							
		18							
		20							

SS - SPLIT SPOON
A - AUGER CUTTINGS
C - CORED

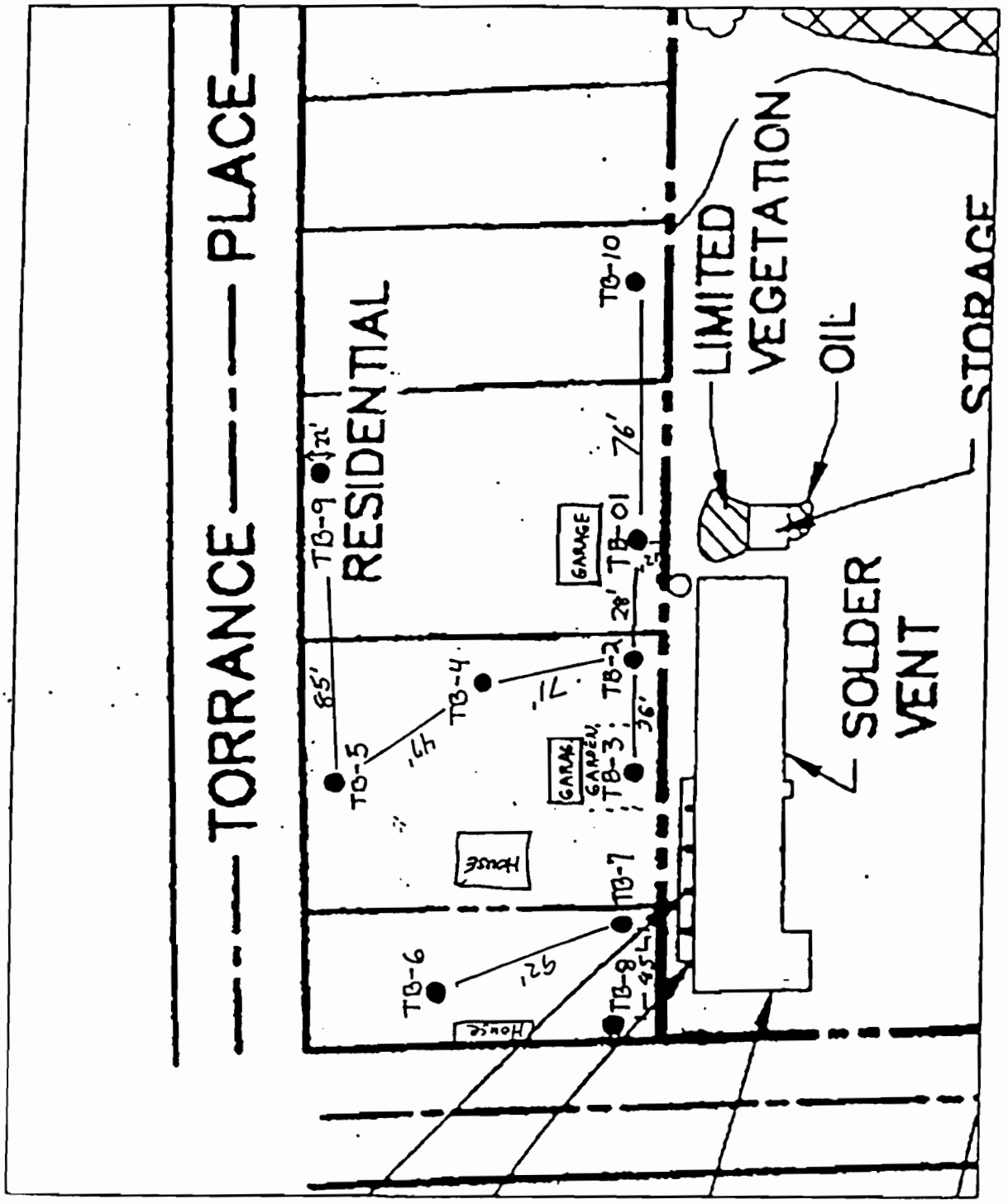
COMMENTS Geoprobe boring. Continuous sampling at 4' intervals
GOEL-13 soil sample 4-8'
GOEL-12 GW sample, screen 6-8'

ATTACHMENT C

SITE MAP WITH SAMPLE LOCATIONS

Attachment C

GOWANDA ELECTRONICS - IIWA
Scope of Work
Approximate Geoprobe Locations



After Malcolm-Pirnie (1994)
n.t.s (not to scale)

APPENDIX B

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-6

Contractor	ZEBRA Environmental
Driller	Michael Paul & Kris Williams
Inspector	George Hermance & Dan Lapp
Rig Type	ATV - mounted Geoprobe
Method	

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00
Sheet 1 of 1
Location: North side of Gowanda
Electronics

Weather: Sunny 70 F
Date/Time Start: 5/28/97 @ 1051
Date/Time Finish: 5/28/97 @ 1120

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
8 1	MC-1	1	2 8		0- 6' Brown topsoil . 6-1 3' brown Silty fine Sand, trace Clay. Moist. 1 3-2 8' Mottled brown gray Silty fine Sand. trace Clay. moist	Bentonite through native material
		2				
		3				
	MC-2	4	2 1		4 0-5 0' Mottled brown gray Silty fine Sand. trace (+) Gravel wet. 5 0-6 1' gray medium to fine Gravel. little fine Sand. trace (+) silt. wet	soil gas @ 4'
		5				soil gas @ 5'
		6				
		7				soil gas @ 7' (no sample)
	MC-3	8	2.3		8 0-10 3' Gray medium to fine Gravel and crouse to fine Sand. trace Silt. wet	Backfilled with soil cuttings to surface
		9				
		10				
		11				
	MC-4	12	2 2		12.0-14.25' Gray medium to fine Gravel. course fine Sand. trace (-) Silt. wet	ground water sample @ 10-14'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-7

Contractor	ZEBRA Environmental
Driller:	Michael Paul & Kris Williams
Inspector:	George Hermance & Dan Lapp
Rig Type:	ATV - mounted Geoprobe
Method:	

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00
Sheet 1 of 1
Location: North side of Gowanda
Electronics

Weather: Sunny 70 F
Date/Time Start: 5/28/97 @1331
Date/Time Finish: 5/28/97 @1440

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	2.6		0-0.6 Black topsoil 0.6-1.5' dark brown Silty fine sand trace (-) fine Gravel. trace (+) Clay. moist 1.5-2.0' mottled brown gray Silty fine Sand. trace (-) fine Gravel. trace Clay	Bentonite through native material
		2				
		3				
	MC-2	4	2.7		4-5' Mottled gray brown Silty fine Sand. trace (-) fine Gravel. trace Clay. 5.0-6.1' brown Silty fine Sand. trace Clay. moist to wet. 6.1-6.7' gray medium to fine Gravel. little medium to fine Sand. trace (-) Silt wet	soil gas @ 4'
		5				soil gas @ 5'
		6				
		7				
	MC-3	8	1.3		8-9.3' Gray course to fine Sand and medium to fine Gravel. wet. trace (+) Silt	Backfilled with soil cuttings to surface
		9				
		10				
		11				ground water sample @ 10-14'
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-8

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00
Sheet: 1 of 1
Location: North side of Gowanda Electronics

Weather: Sunny 70 F
Date/Time Start: 5/28/97 @ 1447
Date/Time Finish: 5/28/97 @ 1630

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-.5' Dark brown topsoil. 5-1 5' brown Silty fine Sand	Bentonite through native material
30	MC-1	1	2		trace Clay. moist. 1.5-2 0' mollted gray brown Silty fine Sand. trace (-) fine Gravel. trace Clay	
		2				
		3			Mottled brown gray Silty fine Sand. trace (+) Gravel	
5.8	MC-2	4	2 7		moist to 5 25' then gray medium to fine Sand trace very fine Gravel	
		5				soil gas @ 5'
		6				ground water sample @ 3-8'
		7				
					8-8 8' Gray fine Sand. Silt. very fine Gravel. wet	Backfilled with soil cuttings to surface
	MC-3	8	8			
		9				
		10				
		11				
					12-14.3' Gray medium to fine Gravel + course to fine	ground water sample @ 14 5-15'
	MC-4	12	2 3		Sand. wet	
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-9

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00
Sheet: 1 of 1
Location: North side of Gowanda Electronics

Weather: Sunny 70 F
Date/Time Start: 5/30/97 @0837
Date/Time Finish: 5/30/97 @0850

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1.2' Dark brown medium to fine Sand. trace very	Bentonite through native material
	MC-1	1	2.5		fine Gravel. moist loose. 1.2-2.5 mottled brown gray Sandy Silt. trace (-) Clay. trace (+) roots. moist	
		2				
		3				ground water sample @ 3-8'
					3-5.2' Mottled brown gray Sandy Silt. trace (-) Clay	
	MC-2	4	2.5		trace (-) very fine Gravel. moist. 5.2-5.5' gray medium to fine Sand. some (-) very fine Gravel. trace	
		5			(+) Silt. wet	soil gas @ 5'
		6				
		7				
					7-9.2' Gray course to fine Sand. trace (+) very fine	Backfilled with soil cuttings to surface
	MC-3	8	2.2		Gravel. trace Silt. wet	
		9				
		10				
		11				ground water sample @ 11-13'
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-12

Contractor	ZEBRA Environmental
Driller	Michael Paul & Kris Williams
Inspector	George Hermance & Dan Lipp
Rig Type	ATV - mounted Geoprobe
Method	
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.00
Sheet	1 of 1
Location	North side of Gowanda
	Electronics
Weather	Sunny 70 F
Date/Time Start	5/30/97 @ 0828
Date/Time Finish	5/30/97 @ 0900

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	3.2		0-1.2' Dark brown Sandy topsoil, moist. 1.2-3.2' brown gray mottled Silty fine Sand, some (-) Clay, moist	Bentonite through native material
		2				
		3			4-5.7' Mottled brown gray Silty fine Sand, moist to 5.0' then wet. 5.7-6.2' gray medium to fine Gravel, course to fine Sand, some Silt, wet	
	MC-2	4	2.2			soil gas @ 5'
		5				
		6				
		7			8-10.2' Gray medium to fine Gravel (+) course to fine Sand, trace (+) Silt, wet	Backfilled with soil cuttings to surface
	MC-3	8	2.2			
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-13

Contractor	ZEBRA Environmental
Driller	Michael Paul & Kris Williams
Inspector	George Hermance & Dan Lipp
Rig Type	ATV - mounted Geoprobe
Method	
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.00
Sheet	1 of 1
Location	North side of Gowanda
	Electronics
Weather	Sunny 70 F
Date/Time Start	5/30/97 @0940
Date/Time Finish	5/30/97 @1040

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	3		0-1' Dark brown topsoil. 1-3' mottled brown gray medium to fine Sand and Silt, moist to wet	Bentonite through native material
		2				
		3			4-6' Brown fine Sand and Silt, wet dilatint, rock in shoe of MC	
	MC-2	4	2			
		5				soil gas @ 5'
		6				
		7			8-8.5' Brown fine Sand and Silt, wet, 8.5-12' gray course Gravel, some Silt, little fine Gravel, wet	Backfilled with soil cuttings to surface
	MC-3	8	2			
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-14

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00
Sheet: 1 of 1
Location: North side of Gowanda Electronics

Weather: Sunny 70 F
Date/Time Start: 5/30/97 @ 1113
Date/Time Finish: 5/30/97 @ 1300

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
	MC-1	1	2.3		0-1' Topsoil 1-3' brown medium to fine Sand and Silt. little Gravel
		2			
		3			4-5.4' Brown tan and black course to fine Gravel. trace Silt. wet. 5.4-6.0' gray medium to fine Gravel course to fine Sand wet
	MC-2	4	2		
		5			
		6			
		7			
	MC-3	8	4		Same as 5.4-6.0'
		9			
		10			
		11			
		12			
		13			
		14			
		15			
		16			
		17			
		18			
		19			

COMMENTS

Bentonite through native material

soil gas @ 5'

Backfilled with soil cuttings to surface

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-18

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00
Sheet: 1 of 1
Location: Lot next to 34 Torrance Place

Weather: Sunny 70 F
Date/Time Start: 5/30/97 @ 1450
Date/Time Finish: 5/30/97 @ 1530

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
	MC-1	1	2.2		0-1' Grass and topsoil. 1-4' brown fine Sand. some course Gravel. little fine Gravel
		2			
		3			4-5' same as 1-4'. 5-8' brown and gray fine Sand. some fine Gravel. little Silt. little medium fine Gravel. wet
	MC-2	4	2.4		
		5			
		6			
		7			
	MC-3	8	2.4		8-9' Brown medium to fine Gravel. wet. 9-12' gray medium to fine Gravel shale like. wet
		9			
		10			
		11			
	MC-4	12	2.4		12-14.4'. Gray medium to fine Gravel rounded.trace (+) Sand and Silt. wet
		13			
		14			
		15			
	MC-5	16	1.9		Gray medium to fine Gravel rounded. trace Silt. trace sand. wet Blind probe to 24', refusal possible TOR
		17			
		18			
		19			

COMMENTS

Bentonite through native material

soil gas @ 5'

Backfilled with soil cuttings to surface

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-25

Contractor	ZEBRA Environmental
Driller	Michael Paul & Kris Williams
Inspector	George Hermance & Dan Lipp
Rig Type	ATV - mounted Geoprobe
Method	

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00
Sheet 1 of 1
Location: Front of 71 Torrance Place
Weather: Sunny 70 F
Date/Time Start: 6/3/97 @ 1153
Date/Time Finish: 6/3/97 @ 1327

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	2.5		0-1' Topsoil. 1-2' brown medium to fine Sand. 2-4'. brown medium to fine Sand. some medium to fine Gravel. trace Silt	Bentonite through native material
		2				
		3				ground water sample3-8'
	MC-2	4	2.9		4-6'. Brown medium to fine Sand. some Silt. trace (+) very fine Gravel. wet	
		5				soil gas @ 5'
		6				
		7				
	MC-3	8	2.7		8-10' Brown medium to fine Sand. little very fine Gravel. wet. loose. 10-11.5' gray course to fine Sand little fine Gravel. trace (+) Silt. wet. loose	Backfilled with soil cuttings to surface
		9				
		10				
		11				
158	MC-4	12	2.5		12-14.5' Gray medium to fine Sand. little fine Gravel washed rounded	ground water sample 14-16'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-27

Contractor	ZEBRA Environmental
Driller:	Michael Paul & Kris Williams
Inspector:	George Hermance & Dan Lipp
Rig Type	ATV - mounted Geoprobe
Method	

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00
Sheet 1 of 1
Location: Front of 69 Torrance Place
Weather: Sunny 70 F
Date/Time Start: 6/3/97 @ 1500
Date/Time Finish: 6/3/97 @ 1546

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	1.1		0-1' Topsoil. 2-4' brown medium to fine Sand. some medium to fine Gravel	Bentonite through native material
		2				
		3				ground water sample3-8'
	MC-2	4	3.0		4-7' Brown Silty fine Sand. little Clay. wet	
		5				soil gas @ 5'
		6				
		7				
	MC-3	8	4		8-12' Brown fine Sand. some medium course Gravel trace (+) Silt	Backfilled with soil cuttings to surface
		9				
		10				
		11				
	MC-4	12	2.3		12-14.3' Gray medium to fine Gravel (+) medium Sand. wet dilatint loose	ground water sample 14-16'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-28

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lupp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: East of 85 Torrance
Place

Weather: Sunny 70 F

Date/Time Start: 6/4/97 @ 0825

Date/Time Finish: 6/4/97 @ 0840

GROUNDWATER OBSERVATIONS

Date:
Time:
Depth:

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1' Topsoil. 1-4' brown medium to fine Sand. trace fine Gravel	Backfilled with soil cuttings to surface
	MC-1	1				
		2				
		3			Macro broke at 4'	
	MC-2	4	0			
		5				
		6				
		7				
		8				
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-30

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lupp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: East of 85 Torrance
Place

Weather: Sunny 70 F

Date/Time Start: 6/4/97 @0920

Date/Time Finish: 6/4/97 @1020

GROUNDWATER OBSERVATIONS

Date:
Time:
Depth:

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1' Topsoil 1-4' brown medium to fine Sand. trace fine Gravel	Bentonite through native material
	MC-1	1	2.8			
		2				
		3			4-6' Brown medium to fine Sand. trace fine Gravel	
	MC-2	4	4		6-8' brown medium to fine Sand. some medium course Gravel. trace Silt	
		5				
		6				
		7				
					8-12' Brown soupy fine Sand and Silt. trace (+) fine Gravel. wet	Backfilled with soil cuttings to surface
	MC-3	8	1			
		9				
		10				
		11				
					12-14' Brown course to fine Gravel. wet. some course to fine Sand. 14-15' gray sand. trace (-) fine Gravel. trace (+) Clay and Sand. last 6" wet Sandy till	ground water sample 11.5-14.5'
	MC-4	12	3			
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-31

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: East of 85 Torrance Place

Weather: Sunny 70 F

Date/Time Start: 6/4/97 @ 1122

Date/Time Finish: 6/4/97 @ 1207

GROUNDWATER OBSERVATIONS

Date
Time
Depth

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
	MC-1	1	2.7		0-0.3' topsoil. 0.3-2.7' brown fine Sand. little Silt. trace (+) fine Gravel. wet
		2			
		3			
					4-6' Brown gray course fine Sand. little fine Gravel trace (+) silt moist to wet. 6.0-6.6' brown gray course fine Sand. some fine Gravel. wet. trace (+) Silt
	MC-2	4	2.6		
		5			
		6			
		7			
					8-10' Brown gray medium fine Gravel. some Sand. trace (-) Silt. wet
	MC-3	8	2		
		9			
		10			
		11			
		12			
		13			
					12-14.5' Brown medium to fine Sand some fine Gravel. trace silt. course to fine Sand. 14.5-15' gray Silty Sand. little Clay. trace (-) fine Gravel. wet
	MC-4	14	2.6		
		15			
		16			
		17			
		18			
		19			

COMMENTS

Bentonite through native material

Backfilled with soil cuttings to surface

ground water sample 13-15'

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-32

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: Behinde 85 Torrance Place

Weather: Sunny 70 F

Date/Time Start: 6/4/97 @1315

Date/Time Finish: 6/4/97 @1403

GROUNDWATER OBSERVATIONS

Date
Time
Depth

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
	MC-1	1	2.9		0-1' Topsoil. 1-4' brown medium fin Sand. trace fine Gravel
		2			
		3			
	MC-2	4	2.3		4.0-4.5' Same as above. 4.5-8' brown medium fine Sand. little medium fine Gravel. some medium to course Gravel
		5			
		6			
		7			
	MC-3	8	2.0		8-12' Some brown medium fine Sand. mostly medium to course Gravel
		9			
		10			
		11			
	MC-4	12	.4		Some medium fine Sand. mostly medium to fine Gravel
		13			
		14			
		15			
	MC-5	16	1.4		Same as above
		17			
		18			
		19			

COMMENTS

Bentonite through native material

Backfilled with soil cuttings to surface

ground water sample 14-17'

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-33

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet: 1 of 1
Location: Behinde 85 Torrance
Place

Weather: Sunny 70 F

Date/Time Start: 6/4/97 @ 1420

Date/Time Finish: 6/4/97 @ 1505

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photoionization Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT
		0		
	MC-1	1	2.8	
		2		
		3		
	MC-2	4	3.1	
		5		
		6		
		7		
	MC-3	8	2.5	
		9		
		10		
		11		
		12		
		13		
	MC-4	14	2.5	
		15		
		16		
		17		
		18		
		19		

FIELD IDENTIFICATION OF MATERIAL

0-1' Topsoil 1-4' brown medium fine Sand. trace fine Gravel

4-6' same as above. 6-8' brown medium fine Sand. some medium to fine Gravel

8-9.4' Brown medium to fine Sand. some (-) fine Gravel. trace (+) Silt. wet 9.4-10.5' gray medium to fine Sand. fine Gravel little Silt. wet

12-12.5' gray medium fine Sand. fine Gravel. trace Silt. 12.5-16' gray medium fine Sand. some Silt trace gray Clay

COMMENTS

Bentonite through native material

Backfilled with soil cuttings to surface

ground water sample 11-13'

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-37

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet: 1 of 1
Location: Behinde 90 Chestnut
Street

Weather: Sunny 70 F

Date/Time Start: 6/5/97 @0901

Date/Time Finish: 6/5/97 @1015

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photoionization Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT
		0		
	MC-1	1	2.6	
		2		
		3		
	MC-2	4	2.5	
		5		
		6		
		7		
	MC-3	8	2.4	
		9		
		10		
		11		
	MC-4	12	.5	
		13		
		14		
		15		
		16		
		17		
		18		
		19		

FIELD IDENTIFICATION OF MATERIAL

0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel

4-5' Same as 1-4'. 5-8' brown medium fine Sand. some medium to course Gravel

8-12' some brown medium fine Sand. mostly medium to fine Gravel

12-12.5' very fine Gravel. 12.5-13' medium fine to Gravel

COMMENTS

Bentonite through native material

Backfilled with soil cuttings to surface

ground water sample 12-15'

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-38

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: Behande 84 Chestnut Street

Weather: Sunny 70 F

GROUNDWATER OBSERVATIONS
Date:
Time:
Depth:

Date/Time Start: 6/5/97 @ 1020
Date/Time Finish: 6/5/97 @ 1122

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	2.9		0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel	Bentonite through native material
		2				
		3				
	MC-2	4	3.9		4-6' Same as 1-4'. 6-8' brown and gray medium fine Sand	
		5				
		6				
		7				
	MC-3	8	2.6		8-9' Some brown medium to fine Sand. mostly very rineGravel 9-12' some brown medium fine Sand. mostly medium course Gravel	Backfilled with soil cuttings to surface
		9				
		10				
		11				
	MC-4	12	3		12-13' trace brown medium fine Sand. mostly very fine Gravel. 13-14' trace brown medium fine Sand mostly medium course Gravel. 14-16' gray very fine Sand. trace Silt	ground water sample 12-15'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-40

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: Behande 78 Chestnut Street

Weather: Sunny 70 F

GROUNDWATER OBSERVATIONS
Date:
Time:
Depth:

Date/Time Start: 6/5/97 @ 1300
Date/Time Finish: 6/5/97 @ 1340

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	2.5		0-1' Topsoil. 1-4' brown medium to fine Sand. trace fine Gravel	Bentonite through native material
		2				
		3				
	MC-2	4	4		4-6' Same as 1-4'. 6-8' brown medium to fine Sand some medium to course Gravel. trace very fine Gravel	
		5				
		6				
		7				
	MC-3	8	2.6		8-9'. brown medium to fine Sand. little course Gravel. 9-12' brown medium to fine Sand. some medium course Gravel. little medium to fine Gravel	Backfilled with soil cuttings to surface
		9				
		10				
		11				
	MC-4	12	3.9		12-12.5' Brown medium to fine Sand. mostly medium to course Gravel. 12.5-15' some gray medium to fine Sand. mostly medium to course Gravel	ground water sample 12-15'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-41

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: Behinde 78 Chestnut Street

Weather: Sunny 70 F

Date/Time Start: 6/5/97 @ 1345

Date/Time Finish: 6/5/97 @ 1440

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1' Topsoil. 1-4' brown medium to fine Sand. some medium to fine Gravel trace Silt	Bentonite through native material
	MC-1	1	2.7			
		2				
		3			4-5' Same as 1-4'. 5-8' brown medium to fine Sand some medium to course Gravel	
	MC-2	4	2.6			
		5				
		6				
		7			8-12' Some brown medium to fine Sand. mostly medium to course Gravel. very wet	Backfilled with soil cuttings to surface
	MC-3	8	1			
		9				
		10				
		11			12-15 Gray medium to fine Sand. trace medium to fine Gravel	ground water sample 12-15'
	MC-4	12	1			
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-42

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: Behinde 70 Chestnut Street

Weather: Sunny 70 F

Date/Time Start: 6/5/97 @ 1440

Date/Time Finish: 6/5/97 @ 1525

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel	Bentonite through native material
	MC-1	1	2.8			
		2				
		3			4-6' Same as 1-4'. 6-8' brown medium to fine Sand. little medium to course Gravel	
	MC-2	4	3.9			
		5				
		6				
		7			8-9' Same as 6-8'. 9-12' brown medium to fine Sand some medium course Gravel. trace medium fine Gravel trace Silt	Backfilled with soil cuttings to surface
	MC-3	8	2.2			
		9				
		10				
		11			12-16' Brown medium fine Sand. some medium course Gravel. very wet	ground water sample 12-15'
	MC-4	12	3			
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-43

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: Behinde 64 Chestnut Street

Weather: Sunny 70 F
Date/Time Start: 6/5/97 @ 1530
Date/Time Finish: 6/5/97 @ 1620

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	2.8		0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel	Bentonite through native material
		2				
		3				
	MC-2	4	2.9		4-6' Same as 1-4'. 6-8' brown medium fine Sand. some medium to course Gravel. trace Silt	
		5				
		6				
		7				
	MC-3	8	2.8		8-11.5' Same as 6-8'. 11.5-12' gray very fine Sand	Backfilled with soil cuttings to surface
		9				
		10				
		11				
	MC-4	12	3.5		12-16' Gray very fine Sand. trace fine Gravel	ground water sample 11-13'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-48

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: infront 96 Chestnut Street

Weather: Sunny 70 F
Date/Time Start: 6/6/97 @1000
Date/Time Finish: 6/6/97 @1220

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
	MC-1	1	2.5		0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel	Bentonite through native material
		2				
		3				
	MC-2	4	2.6		4-5' brown medium fine Sand. some medium to course Gravel. 5-7' brown medium fine Sand. trace medium to fine Gravel. 7-8' some brown medium fine Sand. trace wood. some medium fine Gravel	
		5				
		6				
		7				
	MC-3	8	3.8		8-9' Brown medium to fine Sand. trace Silt. 9-12' gray very fine Silt. trace very fine Gravel. dry	Backfilled with soil cuttings to surface
		9				
		10				
		11				
	MC-4	12			12-13' Same as 9-12'. refuseal at 13'	ground water sample 8.5-11.5'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-44

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: next to 34 Torrance Place

Weather: Sunny 70 F

Date/Time Start: 6/6/97 @ 1300

Date/Time Finish: 6/6/97 @ 1430

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
	MC-1	1	2.6		0-1' Topsoil. 1-4' brown medium to fine Sand. some medium to fine Gravel
		2			
		3			
	MC-2	4	2.6		4-8' brown medium to fine Sand. some medium course Gravel trace medium to fine Gravel
		5			
		6			
		7			
	MC-3	8	1.9		8-11' Some brown medium fine Sand. mostly medium to course Gravel. little medium fine Gravel. 11-12' gray medium to fine Sand. mostly medium to fine Gravel. wet
		9			
		10			
		11			
	MC-4	12	2		12-14' Gray medium fine Sand. some medium to fine Gravel. 14-16' gray medium to fine Silt
		13			
		14			
		15			
		16			
		17			
		18			
		19			

COMMENTS

Bentonite through native material

Backfilled with soil cuttings to surface

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-49

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: in driveway 96 Chestnut Street

Weather: Sunny 70 F

Date/Time Start: 6/6/97 @1436

Date/Time Finish: 6/6/97 @1540

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
	MC-1	1	2.5		0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel
		2			
		3			
	MC-2	4	2.6		4-5' Same as 1-4'. 5-7' some brown medium to fine Sand. mostly very fine Gravel. 7-8' brown and gray medium to fine Sand
		5			
		6			
		7			
	MC-3	8	3.8		8-9' Brown medium to fine Sand. 9-12' gray medium fine Silt. some medium to fine Gravel
		9			
		10			
		11			
	MC-4	12			12-13' Same as 9-12'. refuseal at 13'
		13			
		14			
		15			
		16			
		17			
		18			
		19			

COMMENTS

Bentonite through native material

Backfilled with soil cuttings to surface

ground water sample 11-15'

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-50

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: back 90 Chestnut Street

Weather: Sunny 70 F
Date/Time Start: 6/9/97 @ 0800
Date/Time Finish: 6/9/97 @ 0906

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT
		0		
	MC-1	1	2.8	
		2		
		3		
	MC-2	4	3.5	
		5		
		6		
		7		
	MC-3	8	3.5	
		9		
		10		
		11		
		12		
		13		
		14		
		15		
		16		
		17		
		18		
		19		

FIELD IDENTIFICATION OF MATERIAL

0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel

4-6' Same as 1-4' 6-8' brown medium to fine Sand. some medium to course Gravel

8-9' Same as 6-8' 9-12' gray very fine Silt. trace very fine Gravel. dry

COMMENTS

Bentonite through native material

ground water sample 5-10'

Backfilled with soil cuttings to surface

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-51

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: back 78 Chestnut Street

Weather: Sunny 70 F
Date/Time Start: 6/9/97 @0915
Date/Time Finish: 6/9/97 @0940

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT
		0		
	MC-1	1	2.8	
		2		
		3		
	MC-2	4	2.8	
		5		
		6		
		7		
	MC-3	8		
		9		
		10		
		11		
		12		
		13		
		14		
		15		
		16		
		17		
		18		
		19		

FIELD IDENTIFICATION OF MATERIAL

0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel

4-6' Brown medium fine Sand. little (-) Silt. moist to wet trace (-) Gravel. 6-7' brown fine Gravel. some course to fine sand. wet. trace (-) Silt

8-9' Same as 6-7'. 9-12' gray very fine Silt. some medium to fine Gravel

COMMENTS

Bentonite through native material

Backfilled with soil cuttings to surface

ground water sample 11-15'

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-52

Contractor	ZERRA Environmental
Driller	Michael Paul & Kris Williams
Inspector	George Hermance & Dan Lipp
Rig Type	ATV - mounted Geoprobe
Method	
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.00
Sheet	1 of 1
Location:	front 70 Chestnut Street
Weather	Sunny 70 F
Date/Time Start	6/9/97 @ 0945
Date/Time Finish	6/9/97 @ 1050

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel	Boring grouted through native material
	MC-1	1	2.6			
		2				
		3				
					4-6' Same as 1-4'. 6-8' brown medium to fine Sand. some medium to course Gravel. trace Silt	
	MC-2	4	2.8			
		5				ground water sample 6-11'
		6				
		7				
					8-12' Some brown medium fine Sand. mostly medium to course Gravel. wet	Backfilled with soil cuttings to surface
	MC-3	8	2			
		9				
		10				
		11				
					12-12.5' Same as 8-12'. 12.5-16' gray very fine Silt. trace very fine Gravel. dry	
	MC-4	12	2.5			
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-53

Contractor	ZERRA Environmental
Driller	Michael Paul & Kris Williams
Inspector	George Hermance & Dan Lipp
Rig Type	ATV - mounted Geoprobe
Method:	
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.00
Sheet	1 of 1
Location:	back 56 Chestnut Street
Weather	Sunny 70 F
Date/Time Start	6/9/97 @ 1055
Date/Time Finish	6/9/97 @ 1145

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel	Boring grouted through native material
	MC-1	1	2.8			
		2				
		3				
					4-8' Brown medium fine Sand. some medium to course Gravel trace medium to fine Gravel	
	MC-2	4	2.5			
		5				
		6				
		7				
					8-11' Brown medium to fine Sand. some medium to course Gravel. little medium fine Gravel. 11-12' gray medium fine Silt and Sand	Backfilled with soil cuttings to surface
	MC-3	8	1.8			
		9				
		10				
		11				
					12-16' Same as 11-12'	ground water sample 9.5-14.5'
	MC-4	12	2.5			
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-54

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lapp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: front 89 Chestnut Street

Weather: Sunny 70 F

Date/Time Start: 6/9/97 @ 1230

Date/Time Finish: 6/9/97 @ 1329

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0			Blind probe to 4'	Boring grouted through native material
	MC-1	1				
		2				
		3			4-8' brown medium to fine Sand. trace medium to fine Gravel	
	MC-2	4	3			ground water sample 5-10'
		5				
		6				
		7			8-9' Same as 4-8'. 9-12' gray very fine Silt. trace very fine Gravel. dry	Backfilled with soil cuttings to surface
	MC-3	8	3.2			
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-55

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lapp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: front 81 Chestnut Street

Weather: Sunny 70 F

Date/Time Start: 6/9/97 @ 1340

Date/Time Finish: 6/9/97 @ 1413

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0			Blind probe to 4'	Boring grouted through native material
	MC-1	1				
		2				
		3			4-7.5' Brown medium to fine Sand. little medium to course Gravel. 7.5-8' gray very fine silt. trace fine Gravel	
	MC-2	4	2			ground water sample 5-10'
		5				
		6				
		7			8-12' same as 7.5-8'	Backfilled with soil cuttings to surface
	MC-3	8	1.8			
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-56

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: front 71 Chestnut Street

Weather: Sunny 70 F
Date/Time Start: 6/9/97 @ 1420
Date/Time Finish: 6/9/97 @ 1450

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					Blind probe to 4'	Boring grouted through native material
	MC-1	1				
		2				
		3				
					4-8' brown medium to fine Sand, trace medium to fine Gravel	
	MC-2	4	1.8			
		5				ground water sample 5-10'
		6				
		7				
					8-11' trace brown medium to fine Sand, mostly medium to course Gravel. 11-12' gray very fine silt, trace very fine Gravel	Backfilled with soil cuttings to surface
	MC-3	8	1.8			
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE DRILLING RECORD

BORING NO. L-57

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: back 85 Chestnut Street

Weather: Sunny 70 F
Date/Time Start: 6/9/97 @ 1455
Date/Time Finish: 6/9/97 @ 1535

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					Blind probe to 4'	Boring grouted through native material
	MC-1	1				
		2				
		3				
					4-7' brown medium fine sand, trace medium to fine Gravel	
	MC-2	4	3		7-8' gray very fine Silt, trace very fine Gravel	
		5				
		6				
		7				
					8-12' Same as 7-8'	Backfilled with soil cuttings to surface
	MC-3	8	2			
		9				
		10				
		11				ground water sample 5-10'
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-58

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: behinde 85 Chestnut Street

Weather: Sunny 70 F

Date/Time Start: 6/9/97 @ 1540

Date/Time Finish: 6/9/97 @ 1620

GROUNDWATER OBSERVATIONS

Date					
Time					
Depth					

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0			Blind probe to 4'	Boring grouted through native material
	MC-1	1				
		2				
		3			4-8' Brown medium fine Sand. some medium to course Gravel	
	MC-2	4	1.5			
		5				ground water sample 5-10'
		6				
		7			8-11' Some brown medium fine Sand. mostly medium to course Gravel	Backfilled with soil cuttings to surface
	MC-3	8	8			
		9				
		10				
		11				
		12				
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-59

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: front 107 Chestnut Street

Weather: Sunny 70 F

Date/Time Start: 6/10/97 @ 0845

Date/Time Finish: 6/10/97 @ 0945

GROUNDWATER OBSERVATIONS

Date					
Time					
Depth					

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0			0-1' Topsoil. 1-4' brown medium fine Sand. trace medium fine Gravel	Boring grouted through native material
	MC-1	1	2.9			
		2				
		3			4-4.5' Same as 1-4'. 4.5-8' brown medium to fine Sand some medium to course Gravel. trace medium to fine Gravel	
	MC-2	4	2.8			
		5				
		6				
		7			8-10' Same as 4.5-8'. 10-12' gray medium to fine Sand. some very fine sand	Backfilled with soil cuttings to surface
	MC-3	8	3.5			
		9				
		10				
		11				
		12			12-13' Same as above. 13-16' gray medium fine Sand some medium fine Silt. trace medium to fine Gravel	ground water sample 6-11'
	MC-4	12	2.2			
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-60

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: lot next to 67 Chestnut Street

Weather: Sunny 70 F

GROUNDWATER OBSERVATIONS
Date:
Time:
Depth:

Date/Time Start: 6/10/97 @ 0950

Date/Time Finish: 6/10/97 @ 1115

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
	MC-1	1	3		0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel
		2			
		3			
	MC-2	4	3 3		4-8' Brown medium fine Sand. some medium to fine Gravel. trace medium to course Gravel
		5			
		6			
		7			
	MC-3	8	2		8-12' Some brown medium fine Sand. mostly medium to course Gravel
		9			
		10			
		11			
	MC-4	12	0		No recovery rock in shoe
		13			
		14			
		15			
	MC-5	16	2		16-17' same as 12-16' 17-18' Gray medium fine Silt. trace medium to fine Gravel (dry)
		17			
		18			
		19			

COMMENTS

Boring grouted through native material

Backfilled with soil cuttings to surface

ground water sample 14-17'

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-61

Contractor: ZEBRA Environmental
Driller: Michael Paul & Kris Williams
Inspector: George Hermance & Dan Lipp
Rig Type: ATV - mounted Geoprobe
Method:

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.00

Sheet 1 of 1
Location: lumberyard

Weather: Sunny 70 F

GROUNDWATER OBSERVATIONS
Date:
Time:
Depth:

Date/Time Start: 6/10/97 @ 1155

Date/Time Finish: 6/10/97 @ 1455

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
	MC-1	1	2		0-1' Topsoil. 1-4' brown medium fine Sand. trace medium to fine Gravel
		2			
		3			
	MC-2	4	3		4-8' Brown medium fine Sand. some medium to course Gravel. trace medium to fine Gravel
		5			
		6			
		7			
	MC-3	8	4		8-12' Same as above but more Gravel
		9			
		10			
		11			
		12			
		13			
		14			
		15			
		16			
		17			
		18			
		19			

COMMENTS

Boring grouted through native material

Backfilled with soil cuttings to surface

ground water sample 12-16'

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-62

Contractor	ZEBRA Environmental
Driller	Michael Paul & Kris Williams
Inspector	George Hermance & Dan Lipp
Rig Type	ATV - mounted Geoprobe
Method	
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.00
Sheet	1 of 1
Location	lumberyard
Weather	Sunny 70 F
Date/Time Start	6/10/97 @ 1500
Date/Time Finish	6/10/97 @ 1600

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel	Boring grouted through native material
	MC-1	1	2.5			
		2				
		3				
					4-6' same as 1-4'. 6-8' brown fine Sand. some medium course Gravel. trace medium fine Gravel	
	MC-2	4	2.6			
		5				
		6				
		7				
					8-12' Some brown medium fine Sand. mostly medium course Gravel	Backfilled with soil cuttings to surface
	MC-3	8	2			
		9				
		10				
		11				
					No recovery refuseal at 13'	
	MC-4	12	0			ground water sample 11-14'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. L-35

Contractor	ZEBRA Environmental
Driller	Michael Paul & Kris Williams
Inspector	George Hermance & Dan Lipp
Rig Type	ATV - mounted Geoprobe
Method	
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.00
Sheet	1 of 1
Location	next to 34 Torrance Place
Weather	Sunny 70 F
Date/Time Start	6/6/97 @ 1500
Date/Time Finish	6/6/97 @ 1530

GROUNDWATER OBSERVATIONS

Date				
Time				
Depth				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					0-1' Topsoil. 1-4' brown medium to fine Sand. trace medium to fine Gravel	Boring grouted through native material
	MC-1	1	2.5			
		2				
		3				
					4-5.5' same as 1-4'. 5.5-8' brown medium to fine Sand. some medium to course Gravel	
	MC-2	4	3.5			
		5				
		6				
		7				
					8-8.5' same as 5.5-8'. 8.5-12' gray medium to fine Sand. mostly medium to course Gravel. (wet)	Backfilled with soil cuttings to surface
	MC-3	8	1.5			
		9				
		10				
		11				
					12-14' some gray medium to fine Silt. 14-16' gray medium to fine Silt. some medium to course Gravel	
	MC-4	12	2.5			ground water sample 11-14'
		13				
		14				
		15				
		16				
		17				
		18				
		19				

STANDARD PENETRATION
SS = SPLIT SPOON
MC = MACRO CORE SAMPLE

SUMMARY:

APPENDIX C

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

Contractor:	SJB SERVICES
Driller:	Rodney Sheehan & Chis Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4 25" HSA

PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Weather	Sunny 70 F
Date/Time Start	6/9/97 @ 1015
Date/Time Finish	6/9/97 @ 1409

BORING NO. MW-1

Sheet 1 of 2

Location N 895599.59
E 1053568.12

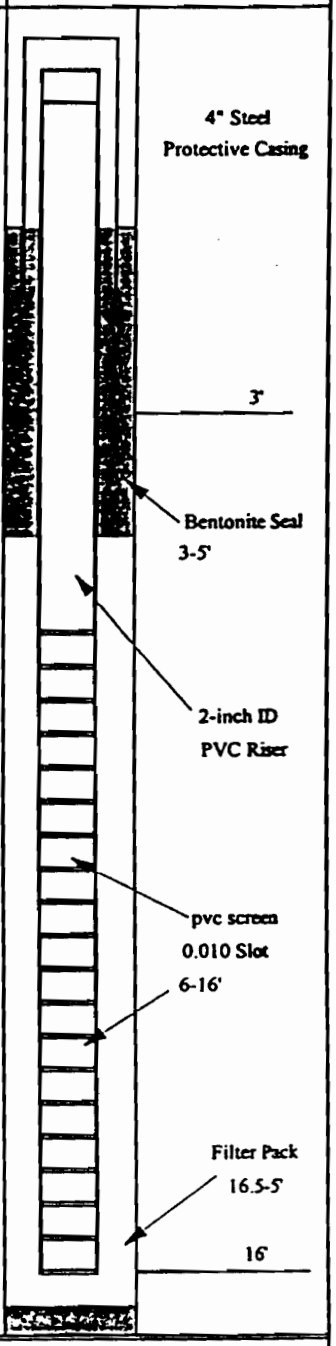
Elevations
Top outer casing 779.64
Top inner casing 779.75
Ground 777.5

GROUNDWATER OBSERVATIONS

Date			
From			
DTW			

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
				2	Dark brown silty fine Sand, little (-) clay, moist, roots,
0	SS-1	1	1.00	4	gravel, C & D fill, wood
				5	
		2		3	
				3	Mottled brown gray clayey Silt. moist, trace (-) fine sand
0	SS-2	3	1.10	3	
				3	
		4		3	
				woh	Gray silty Clay, trace wood and roots, wet
0	SS-3	5	1.50	2	
				2	
		6		1	
				5	
0	SS-4	7	1.00	10	Gray Gravel, wet
				17	
		8		27	
				16	Gray medium to fine Sand, fine gravel, trace (+) silt,
0	SS-5	9	1.00	21	wet, rock in shoe
				17	
		10		11	
				17	Gray medium to fine Gravel and course to fine Sand,
0	SS-6	11	0.50	50/.4	wet, trace (-) silt
		12			
				8	Gray medium to fine Gravel and course to fine Sand,
0	SS-7	13		9	wet, trace (-) Silt
				14	
		14		7	
				11	Gray medium to fine Gravel and course to fine Sand,
0	SS-8	15	0.50	16	wet, loose
				19	
		16		12	
				10	Gray clayey Silt, trace (-) fine sand, trace (-) very fine
0	SS-9	17	1.50	11	gravel, hard "Till"

COMMENTS



STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY: MW-1 installed in an adjacent borehole

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-1

Contractor:	SJB SERVICES
Driller:	Rodney Shanham & Chis Ackley
Inspector:	George Harmanos
Rig Type:	CME 850
Method:	4 25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Sheet	2 of 2
Location	N 895599.59
	E 1053568.12
Weather	Sunny 70 F
Date/Time Start	6/9/97 @ 1015
Date/Time Finish	6/9/97 @ 1409

Elevations
Top outer casing 779.64
Top inner casing 779.75
Ground 777.5

GROUNDWATER OBSERVATIONS

Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
				33		
		18		24		
				10	Same as 16'-18'	
0	SS-10	19	1.60	18		
				26		
		20		33		
				6	Same as 18'-20'	
0	SS-11	21	1.60	15		
				20		
		22		22		
				10	Gray clayey Silt, trace very fine sand, moist to wet in	
0	SS-12	23	2.00	25	spots, silt 23.5'-24'	
				49		
		24		50		
				9	Gray clayey Silt, trace very fine sand, moist	
0	SS-13	25	1.20	14		
				38		
		26		39		
				7	Same as 24'-26'	
0	SS-14	27	1.60	15		
				20		
		28		33		
				3	Same as 24'-26'	
0	SS-15	29	1.80	14		
				19		
		30		45		
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY: MW-1 installed in an adjacent borehole

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-2

Sheet 1 of 2

Contractor:	SJB SERVICES
Driller:	Rodney Shenham & Chas Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4 25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Location	N 895745.28
	E 1053571.77
Weather	Sunny 70 F
Date/Time Start	6/10/97 @ 0940
Date/Time Finish	6/10/97 @ 1102

Elevations
Top inner casing 775.14
Top I.D. plate 775.74

GROUNDWATER OBSERVATIONS

Date			
From			
DTW			

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
				4	Dark brown silty fine Sand, loose, moist	Curb Box
0	SS-1	1	0.50	4		1.5'
				4		
		2		4		Grout
				4	No recovery	5-1.5'
0	SS-2	3	0.00	3		
				2		
		4		2		
				woh	Gray black clayey Silt, little (-) fine sand, trace (-)	
0	SS-3	5	1.00	12	medium fine gravel, wet	5'
				1		
		6		1		Bentonite Seal
				3	Gray medium to fine Gravel and Silt, little sand, wet	8-5'
0	SS-4	7	0.90	5		
				10		
		8		17		8'
				9	Gray fine Gravel and course to fine Sand, trace (+) silt	
0	SS-5	9	1.30	15	wet	
				15		
		10		14		2-inch ID
				2	Gray fine Gravel and course to fine Sand, trace silt	PVC Riser
0	SS-6	11	1.00	9		
				14		
		12		17		
				10	Gray course to fine Sand, some fine gravel, trace (-)	
0	SS-7	13	1.50	16	silt, wet	RVC screen
				16		0.010 Slot
		14		16		10-20'
				1	Gray course to fine Sand, little fine gravel, trace (-)	
0	SS-8	15	1.20	8	silt, wet	
				10		
		16		12		
				2	Gray fine Gravel and course to fine Sand, wet loose	
0	SS-9	17	1.10	4		

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-2

Sheet 2 of 2

Location

Contractor:	S/B SERVICES
Driller:	Rodney Shenham & Chis Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4 25" HSA

PROJECT NAME AVM GOWANDA

PROJECT NUMBER 731021.02

Weather Sunny 70 F

Date/Time Start 6/10/97 @ 0940

Date/Time Finish 6/10/97 @ 1102

Elevations
Top inner casing 775.14
Top I.D. plate 775.74

GROUNDWATER OBSERVATIONS

Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
				10		
		18		12		
				13	Gray course to fine Sand, some fine gravel	
0	SS-10	19	1.50	14		Filter Pack 20.5-8'
				15		
		20		49		
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-3

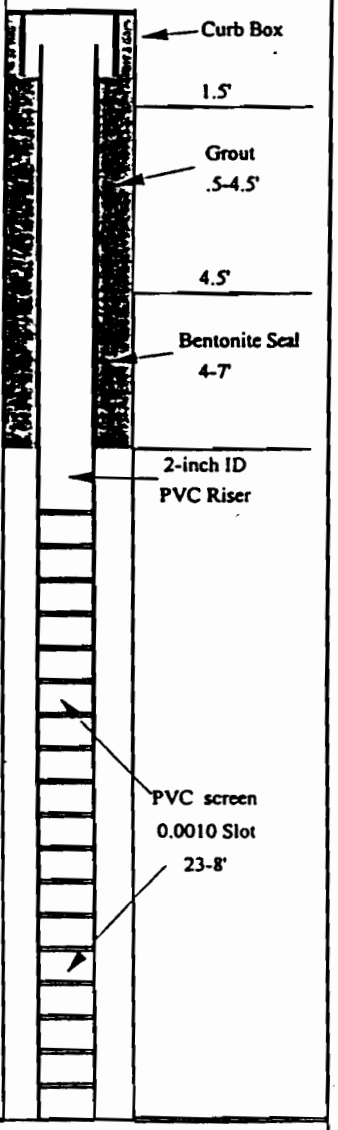
Contractor:	S/B SERVICES
Driller:	Rodney Stanham & Chis Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4 25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Sheet	1 of 2
Location	N 895941.90
	E 1053601.71
Weather	Sunny 70 F
Date/Time Start	6/10/97 @ 1420
Date/Time Finish	6/11/97 @ 0840

Elevations
Top inner casing 775.45
Top I.D. plate 775.92

GROUNDWATER OBSERVATIONS

Date			
From			
DTW			

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
0	SS-1	1	0.50	8	Brown silty fine Sand, moist, trace clay	
				7		
		2		5		
				2	Brown sandy Silt, trace (+) clay, trace (-) fine gravel,	
0	SS-2	3	1.20	2	soft, very moist	
				4		
		4		3		
				woh	Same as 2'-4'	
0	SS-3	5	1.00	12		
				1		
		6		7		
				2	Gray brown sandy Silt, little medium to fine gravel,	
0	SS-4	7	1.60	6	trace (-) clay, wet	
				7		
		8		8		
				6	Gray medium to fine Sand, little very fine gravel, some	
0	SS-5	9	1.00	5	silt, wet	
				7		
		10		7		
				2	Gray fine Gravel and course to fine Sand, trace (+)	
0	SS-6	11	1.00	3	silt, wet	
				2		
		12		7		
				23	Gray medium to fine Sand, trace (+) very fine gravel	
0	SS-7	13	1.30	4	trace silt, wet, dilatant, rock in shoe	
				6		
		14		20		
				54	Gray medium to fine Gravel, some course to fine sand,	
0	SS-8	15	1.20	34	wet	
				23		
		16		22		
				50/.2	No recovery	
0	SS-9	17	0.00			



STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-3

Sheet 2 of 2

Location

Contractor:	SJB SERVICES
Driller:	Rodney Shanham & Chis Ackley
Inspector:	George Hanuance
Rig Type:	CME 850
Method:	4 25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Weather	Sunny 70 F
Date/Time Start	6/10/97 @ 1420
Date/Time Finish	6/11/97 @ 0840

Elevations
Top inner casing 775.45
Top I.D. plate 775.92

GROUNDWATER OBSERVATIONS

Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		18				
				15	Gray course to fine Sand and fine Gravel, trace (+)	
0	SS-10	19	1.70	14	silt, wet	
				13		
		20		12		
				12	Gray course to fine Sand and fine Gravel, little (-)	
0	SS-11	21	1.00	21	silt, wet	
				26		Filter Pack 23.5-7
		22		38		
				11	Gray medium to fine Sand, trace (-) fine Gravel, trace	
0	SS-12	23	1.70	34	silt, wet	23'
				36		
		24		46		
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

Contractor:	S/B SERVICES
Driller:	Rodney Shenham & Chis Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4 25" HSA

PROJECT NAME: AVM GOWANDA
PROJECT NUMBER: 731021.02

BORING NO. MW-4

Sheet 1 of 2

Location: N 895941.52
E 1053508.25

Weather: Sunny 70 F

Date/Time Start: 6/11/97 @ 1529

Date/Time Finish: 6/12/97 @ 0840

Elevations
Top inner casing 775.17
Top I.D. plate 775.66

GROUNDWATER OBSERVATIONS

Date			
From			
DTW			

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
				3	Asphalt for 12 " then brown sandy Silt, moist	Curb Box
0	SS-1	1	1.00	5		
				1		
		2		0		2'
				4	Brown sandy Silt, trace fine gravel, trace (roots),	
0	SS-2	3	1.50	3	moist	Grout 2-4'
				3		4'
		4		2		
				2	Brown sandy Silt, trace clay, little (-) fine gravel, moist	
0	SS-3	5	1.00	7		Bentonite Seal 4-6'
				10		6'
		6		7		
				12	Brown sandy Silt, little fine gravel 6 to 6.5' then gray	
0	SS-4	7	0.90	14	Silt and fine Sand, trace gravel, wet	PVC Riser 2-inch ID
				7		
		8		11		
				28	Gray Silt and course to fine Sand, little less gravel, wet	
0	SS-5	9	1.00	10		
				21		
		10		17		
				31	Gray sandy Silt, little fine gravel, wet	
0	SS-6	11	1.10	16		
				26		
		12		20		
				26	No recovery	
0	SS-7	13	0.00	23		PVC screen 0.010 Slot 22-7'
				26		
		14		39		
				18	Gray fine Gravel and course to fine Sand, some silt, wet,	
0	SS-8	15	2.00	26	hard, odor	
				43		
		16		54		
				5	Gray medium to fine Sand, some fine gravel, trace silt,	
0	SS-9	17	1.30	27	wet, hard, odor	

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-4

Sheet 2 of 2

Location:

Contractor:	S/B SERVICES
Driller:	Rodney Shonham & Chis Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4 25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Weather	Sunny 70 F
Date/Time Start	6/11/97 @ 1529
Date/Time Finish	6/12/97 @ 0840

Elevations
Top inner casing 775.17
Top I.D. plate 775.66

GROUNDWATER OBSERVATIONS

Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
				30		
		18		30		
				2	Gray medium to fine Sand, little fine gravel, wet, odor	
0	SS-10	19	1.50	5		Filter Pack 22.5-7'
				11		
		20		20		
				5	Gray medium to fine Sand, some Gravel to 21.5'	
0	SS-11	21	2.00	11	then very fine Sand and Silt, top of till, odor	
				29		
		22		47		22'
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-5

Sheet 1 of 2

Contractor:	S/B SERVICES
Driller:	Rodney Shanham & Chis Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4 25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Location:	N 895940.38
	E 1053391.20
Weather	Sunny 70 F
Date/Time Start	6/12/97 @ 1349
Date/Time Finish	6/12/97 @ 1506

Elevations
Top inner casing 774.78
Top I.D. plate 775.28

GROUNDWATER OBSERVATIONS

Date			
From			
DTW			

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					Asphalt and brown sandy Silt, trace (+) gravel, loose, dry	Curb Box
0	SS-1	1	1.00	9		
				7		
		2		5		
				6	Brown silty fine Sand, loose	Grout 4-1.5'
0	SS-2	3	1.00	3		
				3		
		4		3		4'
				1	Brown sandy Silt, trace (-) fine gravel, trace (-) clay, wet, soft	
0	SS-3	5	1.00	1		Bentonite Seal 6-4'
				2		
		6		1		6'
				woh	Brown sandy Silt, trace clay, wet	
0	SS-4	7	1.20	1		
				2		
		8		1		2-inch ID PVC Riser
				3	Brown silty fine Sand, little (-) gravel, soft, wet	
0	SS-5	9	1.20	13		
				9		
		10		8		
				9	Brown Silty fine Sand, little fine gravel, wet, rock in shoe	
0	SS-6	11	0.60	7		
				7		
		12		9		
				9	Brown sandy fine Gravel, wet, trace silt, turns to gray fine	
0	SS-7	13	1.20	19	Sand and Silt, less gravel (13.5-14')	PVC screen 0.010 Slot 18-8'
				17		
		14		33		
				13	Gray sandy Silt, trace clay, trace (-) very fine sand	
0	SS-8	15	1.50	32		
				40		
		16		50		
				19	Gray Silt, trace (-) very fine sand, moist	
0	SS-9	17		32		

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-5

Sheet 2 of 2

Contractor: SJB SERVICES
Driller: Rodney Shanham & Chis Ackley
Inspector: George Hermance
Rig Type: CME 850
Method: 4 25" HSA

PROJECT NAME AVM GOWANDA
PROJECT NUMBER 731021.02
Location:

Weather Sunny 70 F
Date/Time Start 6/12/97 @ 1349
Date/Time Finish 6/12/97 @ 1506

Elevations
Top inner casing 774.78
Top I.D. plate 775.28

GROUNDWATER OBSERVATIONS

Date				
From				
TTW				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
				47		18'
		18		50/.3		Filter Pack 18.5-6'
		19				
		20				
		21				
		22				
		23				
		24				
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-6

Contractor:	SJB SERVICES
Driller:	Rodney Shanham & Chas Ackley
Inspector:	George Hermanez
Rig Type:	CME 850
Method:	4 25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Sheet	1 of 2
Location:	N896286.93
	E 1053468.77
Weather	Sunny 70 F
Date/Time Start	6/13/97 @ 0957
Date/Time Finish	6/13/97 @ 1140

Elevations
Top inner casing 770.63
Top I.D. plate 771.23

GROUNDWATER OBSERVATIONS

Date			
From			
DTW			

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					Brick and Gravel	Curb Box
0	SS-1	1	0.50	4		1.5'
				6		Grout
		2		4		2.5'
				4	Brown sandy Silt, some fine gravel, trace (-) clay, moist	
0	SS-2	3	1.20	5		Bentonite Seal
				6		4.5-2.5'
		4		6		4.5'
				6	Brown sandy Silt, some fine gravel, moist, loose	
0	SS-3	5	1.00	7		2-inch ID
				9		PVC Riser
		6		9		
				6	Brown dark brown silty fine Sand, little fine gravel, wet @ 6'	
0	SS-4	7	1.50	7		
				11		PVC screen
		8		13		0.010 Slot
				8	Gray Silt and fine Sand, trace fine gravel, wet clay to till @ 9'	10.5-5.5'
0	SS-5	9	1.00	8		Filter Pack
				18		11-5'
		10		10		10.50
				18	Gray Silt, trace fine gravel, till, hard and moist	
0	SS-6	11		21		1'
				43		
		12		34		
				10	Gray Silt, trace (-) course sand, trace (-) clay	
0	SS-7	13	2.00	21		Bentonite chips
				30		24-11'
		14		42		
				8	Gray Silt, trace (-) fine sand, trace (+) clay , trace (-) fine	
0	SS-8	15	2.00	13	gravel, damp	
				25		
		16		43		
				9	Same as 14-16'	
0	SS-9	17	2.00	19		

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-6

Sheet 2 of 2

Contractor:	SJB SERVICES
Driller:	Rodney Shonham & Chis Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4 25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Location:	
Weather	Sunny 70 F
Date/Time Start	6/13/97 @ 0957
Date/Time Finish	6/13/97 @ 1140

Elevations
Top inner casing 770.63
Top I.D. plate 771.23

GROUNDWATER OBSERVATIONS

Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
				28		
		18		34		
				12	Gray Silt, little (-) clay, trace (-) fine to medium sand,	
0	SS-10	19	2.00	18	damp, hard	
				25		
		20		36		
				27	Same as 18-20'	
0	SS-11	21	1.50	38		Bentonite chips
				47		
		22		56		
				43	Gray Silt, trace fine sand, trace (+) Clay	
0	SS-12	23	1.60	49	damp, hard	
				53		
		24		50		24'
		25				
		26				
		27				
		28				
		29				
		30				
		31				
		32				
		33				
		34				
		35				
		36				
		37				
		38				

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

Contractor:	SJB SERVICES
Driller:	Rodney Shanham & Chas Ackley
Inspector:	George Hennessee
Rig Type:	CME 850
Method:	4 25 HSA

BORING NO. MW-7

PROJECT NAME AVM GOWANDA

PROJECT NUMBER 731021.02

Sheet 1 of 1

Location: N 896563.84
E 1053357.38

Weather Sunny 70 F

Date/Time Start 6/13/97 @ 1455

Date/Time Finish 6/16/97 @ 0811

Elevations
Top outer casing 766.18
Top inner casing 766.38
Ground 763.7

GROUNDWATER OBSERVATIONS

Date			
From			
DTW			

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
						4" Steel Protective Casing
		0				
				1	Topsoil and brown medium to fine Sand	
0	SS-1	1	0.60	2		
				2		1.5'
		2		3		
				2	Brown medium to fine Sand, trace medium to fine gravel	Grout 7-1.5'
0	SS-2	3	1.00	4		
				6		
		4		7		
				5	Brown medium to fine Sand, trace medium to fine gravel,	
0	SS-3	5	2.00	2	trace gray very fine sand	
				5		
		6		7		2-inch ID PVC Riser 7'
				9	Brown medium to fine Sand, some course to fine	
0	SS-4	7	2.50	8	gravel	
				12		
		8		9		
				10	Same as 6 to 8'	Bentonite Seal 10-7'
0	SS-5	9	2.00	7		
				7		
		10		9		10'
				5	Brown medium to coarse Gravel, some medium to	
0	SS-6	11	1.80	7	fine sand	
				7		
		12		8		
				15	Gray very fine Sand, trace medium to fine gravel, some white	
0	SS-7	13	2.50	15	medium course sand	PVC screen 0.010 Slot 16-11'
				15		
		14		17		
				12	Gray fine Sand and Silt, trace clay, wet, trace (-) fine gravel	
0	SS-8	15	0.80	24	top of till at 15'	
				47		
		16		38		16'
						Filter Pack 16.5-10'
0	SS-9	17				

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-8

Sheet 1 of 1

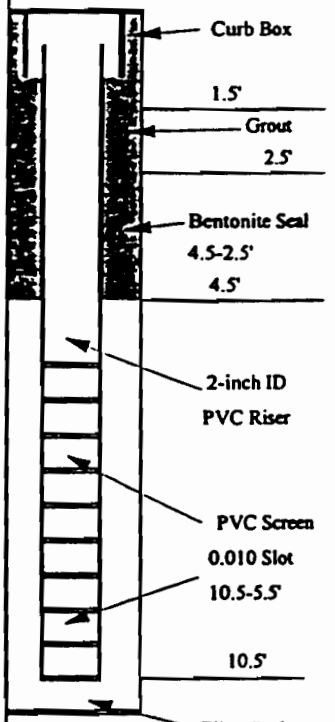
Contractor:	SJB SERVICES
Driller:	Rodney Shoaham & Chas Ackley
Inspector:	George Hermance
Rig Type:	CME 850
Method:	4.25" HSA
PROJECT NAME	AVM GOWANDA
PROJECT NUMBER	731021.02
Location:	N 896302.88
	E 1053320.17
Weather	Sunny 70 F
Date/Time Start	6/16/97 @ 1030
Date/Time Finish	6/16/97 @ 1107

Elevations
Top inner casing 770.02
Top I.D. plate 770.32

GROUNDWATER OBSERVATIONS

Date			
From			
DTW			

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
					Brick and medium to course Gravel	
0	SS-1	1	1.00			
				30		
		2		15		
				14	Brown medium to fine Sand, some medium to course	
0	SS-2	3	2.00	8	gravel	
				8		
		4		6		
				9	Same as 2-4'	
0	SS-3	5	1.80	9		
				14		
		6		9		
				6	Brown sandy Silt, trace (-) fine gravel, wet	
0	SS-4	7	1.00	9		
				10		
		8		11		
				14	Gray Silt, trace fine sand, trace (-) clay, trace (-) fine gravel	
0	SS-5	9	1.00	15		
				10		
		10		23		
				20	Same as 8-10'	
0	SS-6	11	1.00	41		
				53		
		12		50		
		13				
		14				
		15				
		16				
		17				



STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-9

Sheet 1 of 2

Contractor:	Nothnagle Drilling Company
Driller:	Neal Short
Inspector:	George Hermanson
Rig Type:	CME 75
Method:	4.25" HSAs
PROJECT NAME	AVM - GOWANDA
PROJECT NUMBER	731021.02
Location:	
Weather	CLOUDY 30 F
Date/Time Start	12/8/97 @ 1300
Date/Time Finish	12/8/97 @ 1445

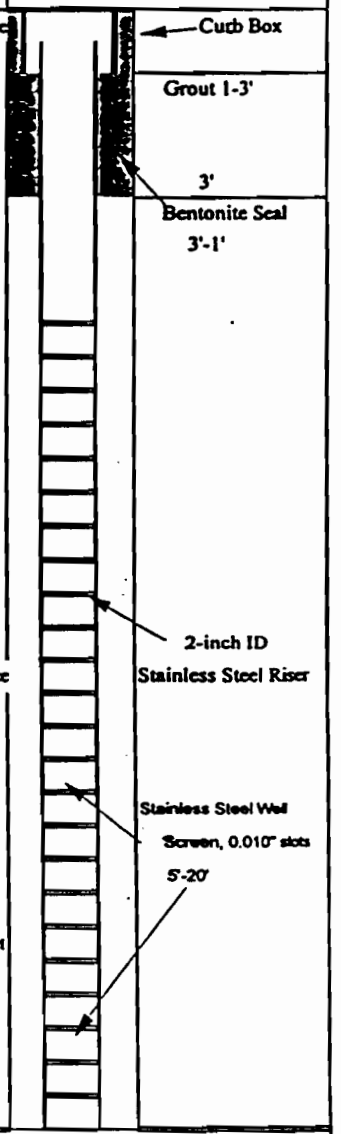
Elevations
Top Inner Casing = 775.54
Top Outer Casing = 775.97

GROUNDWATER OBSERVATIONS

Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL
		0			
				3	Grass and brown topsoil to 4" then dark brown Silty Clay, trace
0	SS-1	1	0.70	3	(-) fine Sand, trace fine Gravel, moist
				5	
		2		7	
				7	Brown, mottled Silty fine Sand, moist for 0.9' then gray,
2	SS-2	3	1.40	7	medium to fine Sand, moist
				8	
		4		7	
				2	Gray green, medium to fine Sand, trace (+) fine broken Gravel
0	SS-3	5	1.00	3	moist
				13	
		6		8	
				8	Gray fine Sand, trace (+) Silt, trace (+) fine Gravel, wet
0	SS-4	7	1.20	10	
				11	
		8		13	
				8	Gray fine Sand and Silt, trace (+) medium to fine Gravel, wet
0	SS-5	9	1.00	16	Sandstone and diorite in basket, wet
				46	
		10		27	
				16	Gray medium to fine Sand, trace (+) course to fine Gravel, trace
0	SS-6	11	0.90	24	Silt, wet
				17	
		12		17	
				15	Gray medium to fine Sand, trace (-) Silt, little fine Gravel, wet
0	SS-7	13	1.60	15	
				15	
		14		16	
				7	Gray medium to fine Sand, trace (+) fine Gravel, trace Silt, wet
0	SS-8	15	1.00	11	loose
				16	
		16		20	
				28	Same as 14'-16'
0	SS-9	17	1.40	28	

WELL DIAGRAM



STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

Contractor:	Nadeagle Drilling Company				
Driller:	Neal Short				
Inspector:	George Hermanos				
Rig Type:	CME 75				
Method:	4.25" HSAs				

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-9

Sheet 2 of 2

PROJECT NAME AVM - GOWANDA

PROJECT NUMBER 731021.02

Location:

Weather CLOUDY 30 F

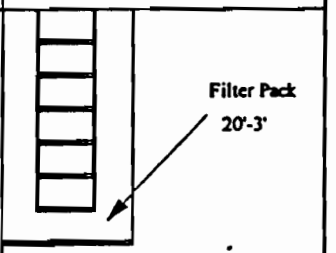
Date/Time Start 12/8/97 @ 1300

Date/Time Finish 12/8/97 @ 1445

Elevations
Top Inner Casing = 775.54
Top Outer Casing = 775.97

GROUNDWATER OBSERVATIONS				
Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Pen/Rec	SPT	FIELD IDENTIFICATION OF MATERIAL
				29	
		18		32	Top of till at 17.9'
				6	Gray silt, trace fine Sand, trace (-) fine Gravel
0	SS-10	19	1.60	12	
				79	
		20		85	
				13	Same as 18'-20'
0	SS-11	21	0.80	76	
				30	
		22		35	
		23			
		24			
		25			
		26			
		27			
		28			
		29			
		30			
		31			
		32			
		33			
		34			
		35			
		36			
		37			
		38			



STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-10

Sheet 1 of 1

Location: 84 Chestnut end of Driveway

Contractor:	Nothnagle Drilling Company
Driller:	Neal Short
Inspector:	George Hansmire
Rig Type:	CME 75
Method:	4.25" HSAs

PROJECT NAME: AVM - GOWANDA

PROJECT NUMBER: 731021.02

Weather: CLOUDY 30 F

Date/Time Start: 12/9/97 @ 0932

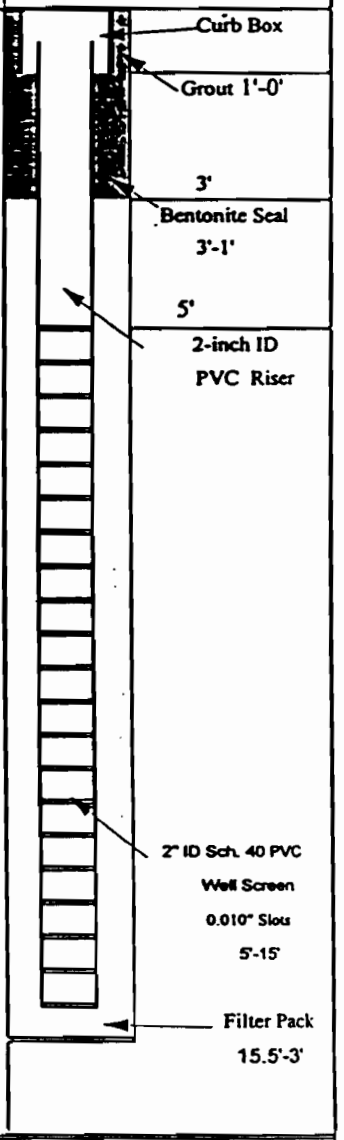
Date/Time Finish: 12/9/97 @ 1135

Elevations
Top Inner Casing = 773.68
Top Outer Casing = 774.13

GROUNDWATER OBSERVATIONS

Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
				1	Dark brown Sandy fine Gravel for 4" then light brown Sandy	
0	SS-1	1	1.20	4	Silt, trace Clay, trace (-) fine Gravel, moist	
				5		
		2		4		
				3	Light brown Sandy Silt, trace (-) Clay, trace (-) very fine	
0	SS-2	3	1.20	4	Gravel, trace roots, moist	
				3		
		4		4		
				1	Light brown Sandy Silt, trace (-) fine Gravel, moist to wet	
0	SS-3	5	1.20	4		
				4		
		6		5		
				8	Brown fine Sand, little medium to fine Gravel, trace (+) Silt,	
0	SS-4	7	1.40	16	loose, moist to wet	
				15		
		8		15		
				5	Same as 6'-8', wet	
0	SS-5	9	1.00	7		
				8		
		10		10		
				8	Brown medium to fine Sand, trace (+) fine Gravel, trace (-) Silt	
0	SS-6	11	1.20	11	wet	
				4		
		12		4		
				4	Brown medium fine Sand, trace (+) fine Gravel, trace (-) Silt	
0	SS-7	13	1.50	7	wet to 13' then brown to gray Clayey Silt, trace fine Sand, hard	
				11	till at 13 feet	
		14		20		
				7	Gray Silty Clay, trace (-) fine Sand, gray till to 16'	
0	SS-8	15	0.80	14		
				47		
		16		42		
0	SS-9	17				



STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING SCIENCE
DRILLING RECORD

BORING NO. MW-11

Sheet 1 of 1

Contractor:	Nothnagle Drilling Company
Driller:	Neal Short
Inspector:	George Hartmann
Rig Type:	CME 75
Method:	4.25 HSAs

PROJECT NAME: AVM - GOWANDA

PROJECT NUMBER: 731021.02

Location:

Weather: CLOUDY 30 F

Date/Time Start: 12/9/97 @ 1330

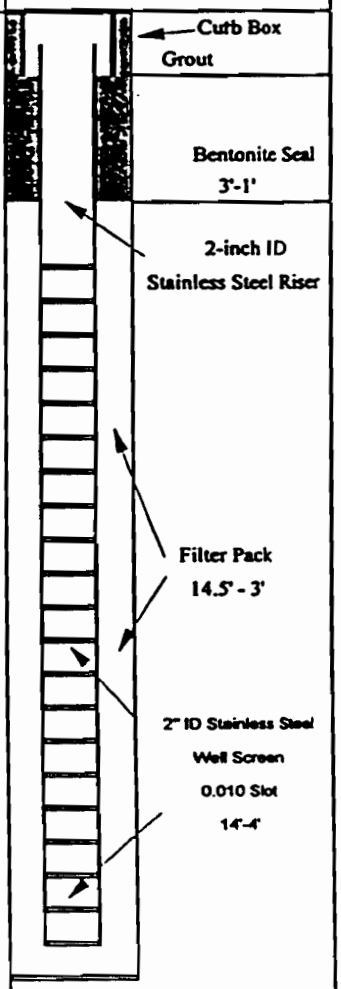
Date/Time Finish: 12/10/97 @1200

Elevations
Top Inner Casing = 775.80
Top Outer Casing = 776.38

GROUNDWATER OBSERVATIONS

Date				
Feet				
DTW				

Pid/over Reading	Sample I.D.	Sample Depth	Feet Recovery	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
				1	Brown medium to fine Sand, trace Gravel	Curb Box
0.0	SS-1	1	1.30	3		Grout
				3		
		2		3		
				2	Same as above	Bentonite Seal 3'-1'
1.3	SS-2	3	0.40	2		
				2		
		4		2		2-inch ID Stainless Steel Riser
				2	Brown medium to fine Sand, little Gravel	
1.5	SS-3	5	0.80	2		
				4		
		6		5		
				2	Brown course to fine Sand, course to fine Gravel, wet, loose	
2.4	SS-4	7	0.80	4		
				5		
		8		3		
				7	Gray Silty fine Sand, Sand, trace (-) Clay, trace (-) medium to	Filter Pack
2.3	SS-5	9	1.20	12	fine Gravel, wet	14.5' - 3'
				18		
		10		18		
				25	Same as above	
8.1	SS-6	11	1.50	21		2" ID Stainless Steel Well Screen 0.010 Slot 14'-4'
				15		
		12		13		
				10	Gray course to fine Sand, little (-) medium to fine Gravel, trace	
3.0	SS-7	13	1.80	11	Silt, wet, loose	
				23		
		14		27		
				20	Gray Silty Sand, trace fine Gravel, trace Clay, wet	
0.0	SS-8	15	1.50	15		
				20		
		16		57		
				25	Same as above	
0.0	SS-9	17	1.00	32	Blows from 17' to 18' - 50,55	



STANDARD PENETRATION

SS = SPLIT SPOON

A = AUGER CUTTINGS

SUMMARY:

PARSONS ENGINEERING-SCIENCE
DRILLING RECORD

BORING NO. MW-12

Sheet 1 of 2

Contractor:	Nothnagle Drilling Company
Driller:	Neal Short
Inspector:	George Hermanos
Rig Type:	CME 75
Method:	4.25" HSAs
PROJECT NAME	AVM - GOWANDA
PROJECT NUMBER	731021.02
Location:	
Weather	CLOUDY 30 F
Date/Time Start	12/10/97 @ 1236
Date/Time Finish	12/10/97 @ 1330

Elevations
Top of Inner Casing = 775.73
Top of Outer Casing = 776.11

GROUNDWATER OBSERVATIONS

Date				
From				
DTW				

Photovac Reading	Sample I.D.	Sample Depth	Pen/Rec	SPT	FIELD IDENTIFICATION OF MATERIAL	COMMENTS
		0				
				1	Brown medium to fine Sand, trace fine Gravel, loose wet	Curb Box
0.0	SS-1	1	1.00	1		Grout
				2		
		2		3		Bentonite Seal
				2	Same as above	3'-1'
0.0	SS-2	3	1.20	2		3
				2		
		4		3		2-inch ID
				1	Brown medium to fine Sand, trace fine Gravel, trace Silt, wet	Stainless steel Riser
0.0	SS-3	5	1.20	3		
				5		
		6		11		
				10	Brown gray course to fine Sand, trace medium to fine	
0.0	SS-4	7	0.60	5	Gravel, wet	
				9		
		8		11		
				14	Gray medium to fine Sand and Gravel, trace (-) Silt, wet, hard	
0.0	SS-5	9	1.30	14		
				18		
		10		19		
				17	Gray brown medium to fine Gravel and Sand, wet	
0.0	SS-6	11	0.50	12		
				9		
		12		6		
				4	Gray medium to fine Gravel and Sand, trace (-) Silt, wet	2" ID Stainless Steel
0.0	SS-7	13	0.80	17		Screen
				19		0.010" Slots
		14		28		14.5'-4.5'
				10	Top of till 14.5, gray medium to fine Sand and fine Gravel then	
0.0	SS-8	15	1.10	17	gray Clayey Silt, trace (-) fine Sand, trace (-) fine Gravel hard	Filter Pack
				14	till	15.0' - 3'
		16		39		
0.0	SS-9	17				

STANDARD PENETRATION
SS = SPLIT SPOON
A = AUGER CUTTINGS

SUMMARY:

APPENDIX D

MW-1
Re-develop

PROJECT TITLE: Gowanda Electronics

PROJECT NO.: EOW 97054

STAFF: Justin Kellogg-Watts & George+Dan PES Onsite

DATE: 7/1/97

WELL NO.:

(1) TOTAL CASING AND SCREEN LENGTH (FT.):	18.56
(2) CASING INTERNAL DIAMETER (in.):	2"
(3) WATER LEVEL BELOW TOP OF CASING (FT.)	6.41
(4) VOLUME OF WATER IN CASING (GAL.)	~2.1

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	50	100	150	200	250					
Temp	64.2	59.7	59.1	58.5	59.1	58.6					
Cond	596	537	534	556	561	564					
pH	7.09	7.02	7.05	7.00	7.03	7.04					
Turb	117.2	110.4	90.1	54.2	24.1	25.3					

COMMENTS:
Surged pump up and down intermittently To ~100gal

WATTS ENGINEERS

MW-1

PROJECT TITLE: Gowanda Electronics

PROJECT NO.: EOW 97054

STAFF: Justin Kellogg-Watts + Dan LiPP-PES

DATE: 6/18/97

WELL NO.:

		WELL I.D.	VOL. GAL/FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.38	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	5.87	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	2.1394	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

12.51

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	8	16	24	32	40	96	120	144	195	
Temp	57.2	54.7	53.6	53.1	53.6	51.6	53.5	53.4	55.3	55.1	
Cond	~~935~~	700	665	666	667	109	656	665 ~~693~~	646	645	
pH	8.35	7.69	7.43	7.34	7.26	7.36	8.6	7.57	X	7.5	
Turb	571	755	758	544	?	557	967	795	634	23	
										13:09	

Low flow pulled

COMMENTS:

Pump was surged up and down for 144 gal

WATTS ENGINEERS

MW-2

PROJECT TITLE: Gowanda Electronics

PROJECT NO.: EOW 97054

STAFF: Justin Kellogg - Watts + Dan Lipp PES

DATE: 6/19/97

WELL NO.: MW-2

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	17.66 (muck w/ bottom)	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	9.11	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	1.45	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	25	50	75	100	200	250				
Temp	58.9	55.4	55.6	56.3	56.2	58.4	57.8				
Cond	571	559	562	562	556	585	575				
pH	6.88	6.86	6.57	6.94	6.78	6.82	6.94				
Turb	71000	71000	71000	71000	71000	71000	706				

COMMENTS:
- Surged to 200 gal

WATTS ENGINEERS

MW-3

PROJECT TITLE: Crowanda Electronics

PROJECT NO.: EOW 97054

STAFF: Justin Kellogg - Watts, Dan Lipp - PES

DATE: 6/20/97 & 6/23/97

WELL NO.:

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	23.42	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
		3"	0.38
③ WATER LEVEL BELOW TOP OF CASING (FT.)	7.58'	4"	0.66
		5"	1.04
④ VOLUME OF WATER IN CASING (GAL.)	2.69	6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

6/20 & 6/23

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	50	100	125	150	175					
Temp	66.8	62.6	62.5	62.2	58.1	59.1					
Cond	791	728	698	700	683	688					
pH	6.77	7.27	7.69	7.78	6.89	6.52					
Turb	>1000	>1000	490	558	148	29.8					

COMMENTS:

Surged Pump up and down

WATTS ENGINEERS

MW-4

PROJECT TITLE: Crowanda Electronics

PROJECT NO.: EOW 970541

STAFF: Justin Kellogg - Watts, Dan Lipp PES

DATE: 6/23/97

WELL NO.:

		WELL I.D.	VOL. GAL./FT.
(1) TOTAL CASING AND SCREEN LENGTH (FT.):	21.90	1"	0.04
(2) CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
(3) WATER LEVEL BELOW TOP OF CASING (FT.)	7.46	3"	0.38
(4) VOLUME OF WATER IN CASING (GAL.)	2.45	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	50	100	150	200						
Temp	63.7	56.8	56.9	56.0	55.9						
Cond	608	740	728	723	711						
pH	6.73	6.98	7.18	7.54	7.37						
Turb	>1000	>1000	>1000	449	19.2						

COMMENTS:

Surged pump up and down to 125 gal

WATTS ENGINEERS

MW-5

PROJECT TITLE: Gowanda Electronics

PROJECT NO.: Eow 97054

STAFF: Justin Kellogg - Watts, Dan Lipp - PES

DATE: 6/23/97

WELL NO.:

① TOTAL CASING AND SCREEN LENGTH (FT.):	17.85
② CASING INTERNAL DIAMETER (in.):	2"
③ WATER LEVEL BELOW TOP OF CASING (FT.)	9.57
④ VOLUME OF WATER IN CASING (GAL.)	1.4

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	50	100	150	175						
Temp	60.7	61.9	61.9	61.8	61.1						
cond	660	698	686	691	686						
pH	7.40	7.45	6.70	6.75	6.77						
Turb	>1000	>1000	1064	89.1	14.8						

COMMENTS:

- Surged pump up and down on screen to 125 gal

WATTS ENGINEERS

MW-6

PROJECT TITLE: Gowanda Electronics

PROJECT NO.: EOW 970541

STAFF: Justin Kellogg Watts, Dan Libp PES

DATE: 6/20/97

WELL NO.:

		WELL I.D.	VOL. GAL/FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	10.02	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	6.64	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	0.57 gal	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)									
	0	25								
Temp	69.0	59.5								
Cond	994	603								
PH	6.64	6.96								
Turb.	>1000	>1000								

COMMENTS:

WATTS ENGINEERS

MW-7

PROJECT TITLE: Gowanda Electronics

PROJECT NO.: EOW 97054

STAFF: Justin Kellogg - Watts + Dan Lipp - PES

DATE: 6/18/97 - 6/19/97

WELL NO.:

		WELL I.D.	VOL. GAL/FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	18.38	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	10.73	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	1.27 gal	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 ((②)^2 \times ((①) - (③)) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	25	50	75	100	140	155				
Temp	56.5	55.9	55.6	56.1	55.6	55.9	53.3				
Cond	568	550	556	575	585	524	510				
pH	7.5	7.5	7.5	7.5	7.5	7.85	7.64				
Turb	>1000	>1000	>1000	951	480	678	123				

6/19 →

COMMENTS:

Surging pump up + Down to 140 gal

Dan called it @ 123 NTU

WATTS ENGINEERS

MW-8

PROJECT TITLE: Gowanda Electronics

PROJECT NO.: EOW 97054

STAFF: Justin Kellogg-Watts, Dan Lipp PES

DATE: 6/19/97

WELL NO.:

		WELL I.D.	VOL. GAL/FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	10.15	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	5.91	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	0.72	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	50	100	150							
Temp	64.9	58.5	57.7	56.6							
Cond	657	504	495	487							
pH	7.30	6.85	6.61	6.49							
Turb	>1000	1023	741	80							

COMMENTS:
- Surged pump up and down on screen to 100 gal

WATTS ENGINEERS

PROJECT TITLE: AVM Gowanda

PROJECT NO.: 97054

STAFF: Justin - Watts, Dan Lipp PES

DATE: 12/15/97

WELL NO.: MW-9

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	19.45'	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
③ WATER LEVEL BELOW TOP OF CASING (FT.)	3.8'	3"	0.38
④ VOLUME OF WATER IN CASING (GAL.)	2.7 gal	4"	0.66
		5"	1.04
		6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL

Brief Pump shutoff

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	25	50	75	100	125	150				
Turb	>200	>200	>200	>200	>200	>200	>200				
Temp	50.3	50.1	51.8	49.4	49.5	49.6	50.0				
PH	6.49	6.53	6.51	6.78	6.40	6.39	6.49				
Cond	646	645	635	634	645	654	667				

COMMENTS:

- Grundfos Pump used to develop

WATTS ENGINEERS

PROJECT TITLE: AVM Gowanda

PROJECT NO.: 97054

STAFF: Justin Kellogs-Watts

DATE: 12/16/97

WELL NO.: MW-10

① TOTAL CASING AND SCREEN LENGTH (FT.):	14.57
② CASING INTERNAL DIAMETER (in.):	2"
③ WATER LEVEL BELOW TOP OF CASING (FT.)	8.44
④ VOLUME OF WATER IN CASING (GAL.)	1.0 gal

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

WELL I.D.	VOL. GAL./FT.
1"	0.04
2"	0.17
3"	0.38
4"	0.66
5"	1.04
6"	1.50
8"	2.60

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	1	2	3	4	5	6	7			
Turb	7200	7200	7200	7200	7200	7200	7200	7200			
Temp	48.2	48.2	48.4	47.9	48.4	48.3	48.4	42.1			
pH	6.87	6.71	6.70	6.66	6.60	6.62	6.62	6.62			
Cond	460	435	419	387	392	390	382	377			

COMMENTS:

Bailer used to develop

WATTS ENGINEERS

PROJECT TITLE: AVM Gowanda

PROJECT NO.: 97054

STAFF: Justin Kellogg - Watts. Dan Lipp - PES

DATE: 12/16/97

WELL NO.: MW-11

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	15.06'	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
		3"	0.38
③ WATER LEVEL BELOW TOP OF CASING (FT.)	4.52'	4"	0.66
		5"	1.04
④ VOLUME OF WATER IN CASING (GAL.)	1.8 gal	6"	1.50
		8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	1.8	3.6	5.4	7.2	9	10.8				
Turb.	7200	7200	7200	7200	7200	7200	7200				
Temp	48.4	49.3	48.4	49.1	49.7	49.8	49.8				
pH	6.38	6.43	6.60	6.56	6.59	6.57	6.55				
Cond	434	415	385	392	411	402	407				

COMMENTS:

- Lip @ top of screen will not let pump pass down into hole
- Bailer used to develop

WATTS ENGINEERS

PROJECT TITLE: AVM Gowanda

PROJECT NO.: 97054

STAFF: Justin Kellogg-Watts, George H., Dan LIDD @ DES

DATE: 12/16/97

WELL NO.: MW-12

		WELL I.D.	VOL. GAL./FT.
① TOTAL CASING AND SCREEN LENGTH (FT.):	~14.55' Muck	1"	0.04
② CASING INTERNAL DIAMETER (in.):	2"	2"	0.17
		3"	0.38
		4"	0.66
③ WATER LEVEL BELOW TOP OF CASING (FT.)	3.83'	5"	1.04
		6"	1.50
④ VOLUME OF WATER IN CASING (GAL.)	1.82 gal	8"	2.60

$V = 0.0408 (②)^2 \times (① - ③) =$ _____ GAL.

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
	0	25	50	75	100	125	150				
Turb	7200	7200	7200	7200	7200	7200	7200				
Temp	48.5	49.8	50.8	50.2	50.3	51.1	50.5				
PH	6.05	6.23	6.37	6.41	6.43	6.53	6.48				
Cond	616	577	636	633	653	656	743				

COMMENTS:

- Grundfos 2" pump

WATTS ENGINEERS

APPENDIX E

Client NYSDEC

Project AVM Gowanda

Project No.: 731021

Well No : MW-1 test A

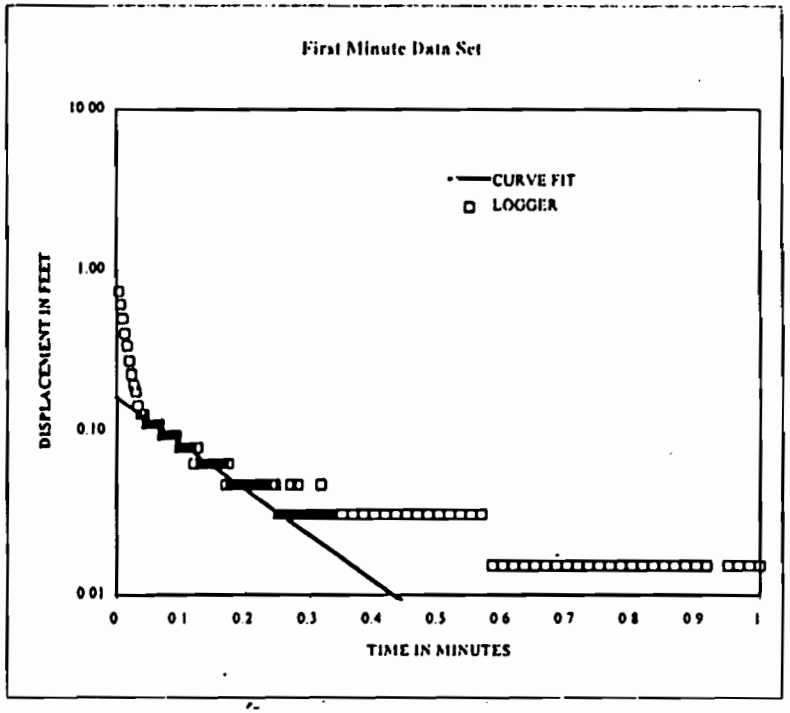
Test Date: 7/2/97

Formation Tested:

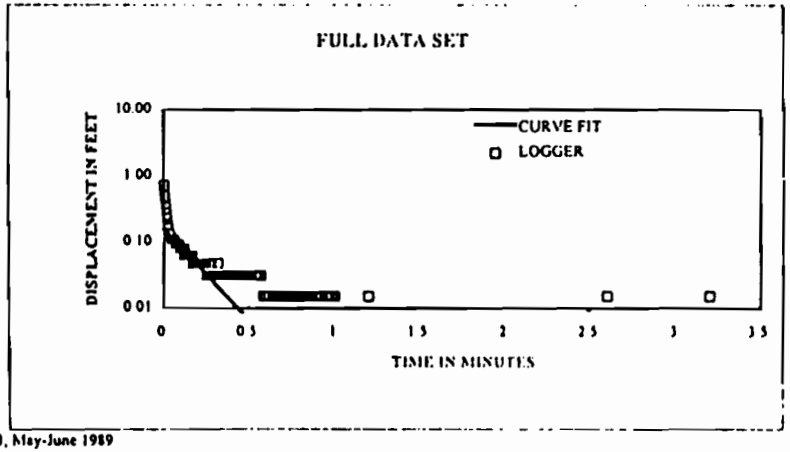
Rising (R) or Falling (F) Head Test: R

Hydraulic conductivity	4.38E-03	cm/sec
	8.62E-03	ft/min
	12.41	ft/day

Casing stickup	2.25	feet
Static water level (from top of casing)	6.41	feet
Depth to bottom of screen (from ground level)	16.00	feet
Boring diameter	8.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	17.00	feet
Estimated ratio of Kh/Kv	1	
Porosity of filter pack	0.42	
ΔH at time zero (Y_0)	0.16	feet
ΔH at time t (Y_t)	0.11	feet
Time	0.058	minutes



Bouwer-Rice Parameters				
feet	cm		cm	
4.16	120.80	*SW*		
11.84	360.88	*H*	120.00	*L/Rw*
6	182.88	*Ts*	0.92	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.083	2.54	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	2.48	*Ln[(D-H)/Rw]'*
12.84	391.36	*D*	2.48	*Ln[(D-H)/Rw]*
0.16	4.88	Y_0	3.63	equation (8)
0.11	3.35	Y_t	3.84	equation (9)
	3.48	*t (seconds)*	3.84	*Ln(Re/Rw)*
	1.00	*M*	4.4E-03	equation (5)
	0.42	*n*		



Bouwer, Herman 1989 "The Bouwer and Rice Slug Test - An Update" Ground Water vol. 27, no. 3, May-June 1989

Bouwer, H. and R.C. Rice 1976 A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells" Water Resources Research, vol 12, no. 3, June 1976

Gowanda Electronics Slug Test Raw Data

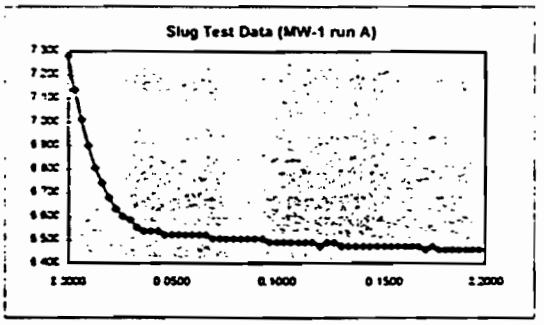
MW- 1: Run A
Page 1 of I

SEIOOOC
Environmental Logger
07/02 17.32

Unit# 11572 Test 0

INPUT 1: Level (F) TOC

Reference	6.410
Linearity	-0.03
Scale factor	50.110
Offset	-0.16
Delay MSEC	50.000



Step 0 07/02 08 48 58

Elapsed Time INPUT 1

0.0000	7.280	0.2000	6.457	0.6666	6.425
0.0033	7.137	0.2033	6.457	0.6833	6.425
0.0066	7.011	0.2066	6.457	0.7000	6.425
0.0100	6.900	0.2100	6.457	0.7166	6.425
0.0133	6.805	0.2133	6.457	0.7333	6.425
0.0166	6.742	0.2166	6.457	0.7500	6.425
0.0200	6.678	0.2200	6.457	0.7666	6.425
0.0233	6.631	0.2233	6.457	0.7833	6.425
0.0266	6.599	0.2266	6.457	0.8000	6.425
0.0300	6.584	0.2300	6.457	0.8166	6.425
0.0333	6.552	0.2333	6.457	0.8333	6.425
0.0366	6.536	0.2366	6.457	0.8500	6.425
0.0400	6.536	0.2400	6.457	0.8666	6.425
0.0433	6.536	0.2433	6.457	0.8833	6.425
0.0466	6.520	0.2466	6.457	0.9000	6.425
0.0500	6.520	0.2500	6.441	0.9166	6.425
0.0533	6.520	0.2533	6.441	0.9333	6.410
0.0566	6.520	0.2566	6.441	0.9500	6.425
0.0600	6.520	0.2600	6.441	0.9666	6.425
0.0633	6.520	0.2633	6.441	0.9833	6.425
0.0666	6.520	0.2666	6.441	1.0000	6.425
0.0700	6.504	0.2700	6.457	1.2000	6.425
0.0733	6.504	0.2733	6.441	1.4000	6.410
0.0766	6.504	0.2766	6.441	1.6000	6.410
0.0800	6.504	0.2800	6.457	1.8000	6.410
0.0833	6.504	0.2833	6.441	2.0000	6.410
0.0866	6.504	0.2866	6.441	2.2000	6.410
0.0900	6.504	0.2900	6.441	2.4000	6.410
0.0933	6.504	0.2933	6.441	2.6000	6.425
0.0966	6.489	0.2966	6.441	2.8000	6.410
0.1000	6.489	0.3000	6.441	3.0000	6.410
0.1033	6.489	0.3033	6.441	3.2000	6.425
0.1066	6.489	0.3066	6.441	3.4000	6.410
0.1100	6.489	0.3100	6.441		
0.1133	6.489	0.3133	6.441		
0.1166	6.489	0.3166	6.457		
0.1200	6.473	0.3200	6.441		
0.1233	6.489	0.3233	6.441		
0.1266	6.489	0.3266	6.441		
0.1300	6.473	0.3300	6.441		
0.1333	6.473	0.3333	6.441		
0.1366	6.473	0.3500	6.441		
0.1400	6.473	0.3666	6.441		
0.1433	6.473	0.3833	6.441		
0.1466	6.473	0.4000	6.441		
0.1500	6.473	0.4166	6.441		
0.1533	6.473	0.4333	6.441		
0.1566	6.473	0.4500	6.441		
0.1600	6.473	0.4666	6.441		
0.1633	6.473	0.4833	6.441		
0.1666	6.473	0.5000	6.441		
0.1700	6.457	0.5166	6.441		
0.1733	6.473	0.5333	6.441		
0.1766	6.457	0.5500	6.441		
0.1800	6.457	0.5666	6.441		
0.1833	6.457	0.5833	6.425		
0.1866	6.457	0.6000	6.425		
0.1900	6.457	0.6166	6.425		
0.1933	6.457	0.6333	6.425		
0.1966	6.457	0.6500	6.425		

Client NYSDEC

Project AVM Gowanda

Project No.: 731021

Well No.: MW-2 test A

Test Date 7/2/97

Formation Tested:

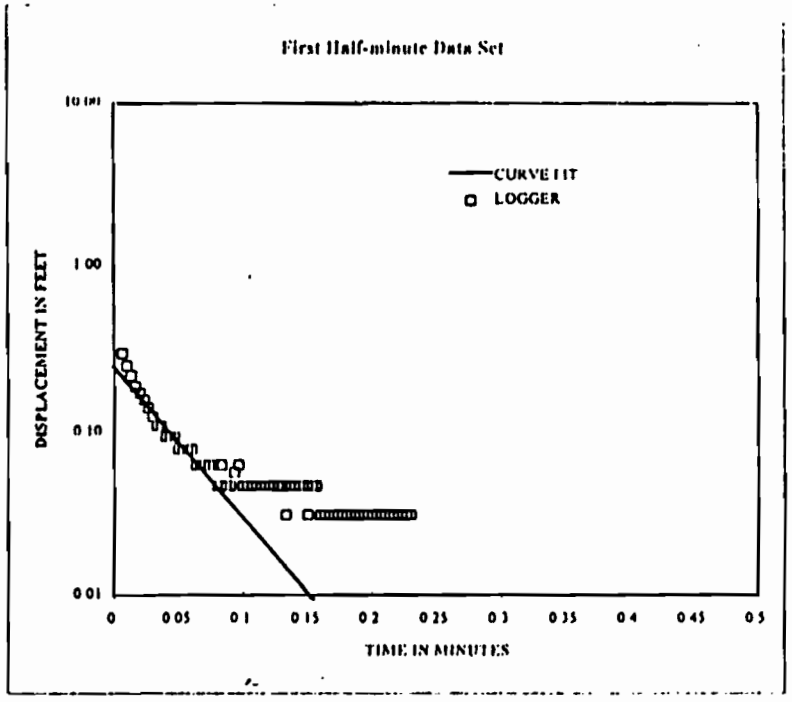
Rising (R) or Falling (F) Head Test: R

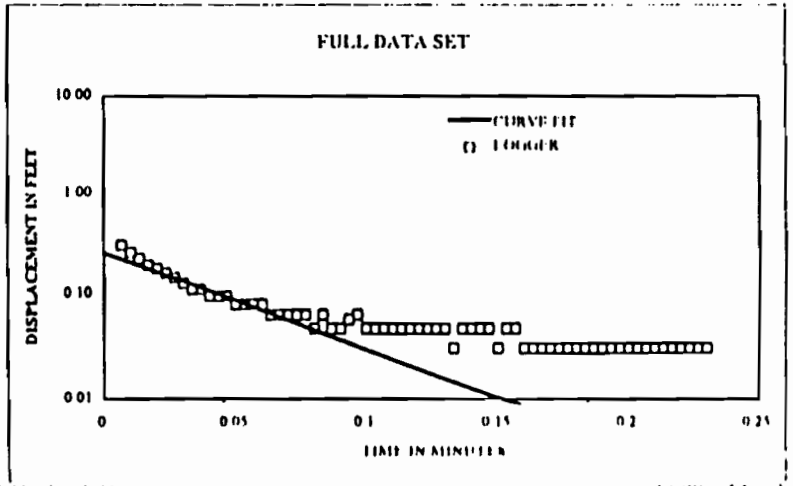
Hydraulic conductivity	1.41E-02	cm/sec
	2.78E-02	ft/min
	40.08	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	9.44	feet
Depth to bottom of screen (from ground level)	20.00	feet
Boring diameter	8.00	inches
Casing diamotor	2.00	inchos
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	20.00	feet
Estimated ratio of Kh/Kv	1	
Porosity of filter pack	0.42	
ΔH at time zero (Y_0)	0.25	feet
ΔH at time t (Y_t)	0.15	feet
Time	0.024	minutes

Bouwer-Rice Parameters

feet	cm		cm	
0.44	287.73	*SW*		
10.56	321.87	*H*	120.00	*L/Rw*
10	304.80	*Ta*	1.00	*H/D*
0.083	2.54	*Rw*	4.60	*A*
0.083	2.54	*Rc*	0.75	*B*
0.167	5.08	*DS*	4.60	*C*
10.00	304.80	*L*	#NUMI	*Ln[(D-H)/Rw]'*
10.56	321.87	*D*	#NUMI	*Ln[(D-H)/Rw]*
0.25	7.62	Y_0	#NUMI	equation (8)
0.15	4.57	Y_t	3.77	equation (9)
	1.44	*t (seconds)*	3.77	*Ln(Re/Rw)*
	1.00	*M*	1.4E-02	equation (8)
	0.42	*n*		





Bouwer, Herman 1989 "The Bouwer and Rice Slug Test - An Update", Ground Water vol 27, no 3, May-June 1989

Bouwer, H and R C Rice 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research vol 12, no. 3, June 1976.

AVM Gowanda
MW-2: Run A
Page 1 of 1

SEIOOOC
Environmental Logger
7/2/97 17:44

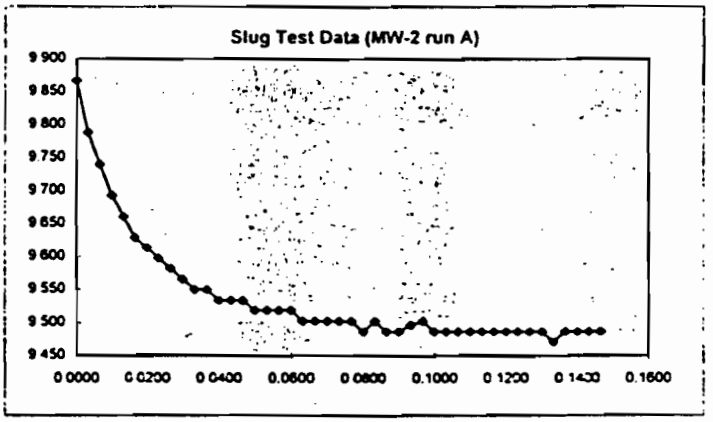
Unit# 11572 Test 2

INPUT 1: Level (F) TOC

Reference	9.440
Linearity	-0.03
Scale factor	50.110
Offset	-0.16
Delay MSEC	50.000

Step 0 07/02 09:40:50

Elapsed Time INPUT 1



0.0000	9.867	0.1500	9.471
0.0033	9.788	0.1533	9.487
0.0066	9.740	0.1566	9.487
0.0100	9.693	0.1600	9.471
0.0133	9.661	0.1633	9.471
0.0166	9.629	0.1666	9.471
0.0200	9.614	0.1700	9.471
0.0233	9.598	0.1733	9.471
0.0266	9.582	0.1766	9.471
0.0300	9.566	0.1800	9.471
0.0333	9.550	0.1833	9.471
0.0366	9.550	0.1866	9.471
0.0400	9.534	0.1900	9.471
0.0433	9.534	0.1933	9.471
0.0466	9.534	0.1966	9.471
0.0500	9.519	0.2000	9.471
0.0533	9.519	0.2033	9.471
0.0566	9.519	0.2066	9.471
0.0600	9.519	0.2100	9.471
0.0633	9.503	0.2133	9.471
0.0666	9.503	0.2166	9.471
0.0700	9.503	0.2200	9.471
0.0733	9.503	0.2233	9.471
0.0766	9.503	0.2266	9.471
0.0800	9.487	0.2300	9.471
0.0833	9.503		
0.0866	9.487		
0.0900	9.487		
0.0933	9.497		
0.0966	9.503		
0.1000	9.487		
0.1033	9.487		
0.1066	9.487		
0.1100	9.487		
0.1133	9.487		
0.1166	9.487		
0.1200	9.487		
0.1233	9.487		
0.1266	9.487		
0.1300	9.487		
0.1333	9.471		
0.1366	9.487		
0.1400	9.487		
0.1433	9.487		
0.1466	9.487		

Client NYSDEC

Project AVM Gowanda

Project No.: 731021

Well No: MW-3 test A

Test Date: 7/2/97

Formation Tested:

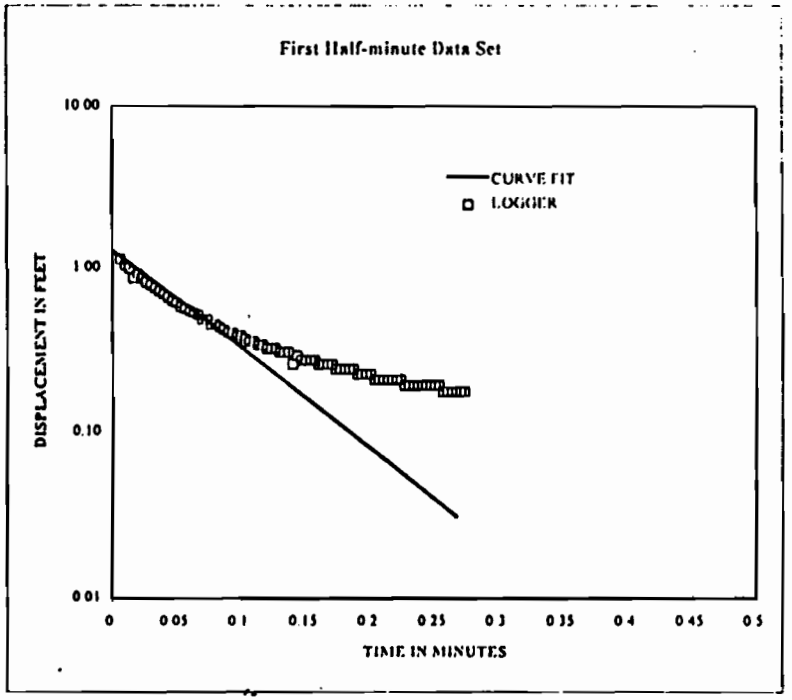
Rising (R) or Falling (F) Head Test: R

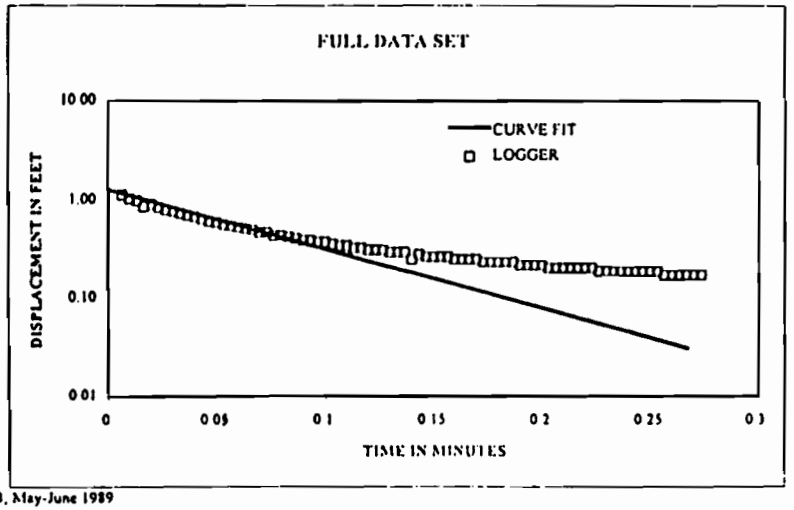
Hydraulic conductivity	4.74E-03	cm/sec
	9.34E-03	ft/min
	13.44	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	8.00	feet
Depth to bottom of screen (from ground level)	23.00	feet
Boring diameter	8.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	15.00	feet
Depth to "impermeable boundary"	23.00	feet
Estimated ratio of Kh/Kv	1	
Porosity of filter pack	0.42	
ΔH at time zero (Y_0)	1.30	feet
ΔH at time t (Y_t)	0.08	feet
Time	0.200	minutes

Bouwer-Rice Parameters

feet	cm		cm	
8	243.84	*SW*		
15	457.20	*H*	45.00	*L/Rw*
8	243.84	*Ts*	1.00	*H/D*
0.333	10.16	*Rw*	2.80	*A*
0.083	2.54	*Rc*	0.42	*B*
0.167	5.08	*DS*	2.55	*C*
15.00	457.20	*L*	#NUM!	*Ln[(D-H)/Rw]*
15	457.20	*D*	#NUM!	*Ln[(D-H)/Rw]*
1.3	39.62	Y_0	#NUM!	equation (8)
0.08	2.44	Y_t	2.89	equation (9)
	12.00	*t (seconds)*	2.89	*Ln(Re/Rw)*
	1.00	*M*	4.7E-03	equation (5)
	0.42	*n*		





Bouwer, Herman 1989 "The Bouwer and Rice Slug Test - An Update", Ground Water vol 27, no 3, May-June 1989

Bouwer, H and R C Rice 1976 A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells", Water Resources Research vol 12, no 3, June 1976

Gowanda Electronics Slug Test Raw Data
MW-3: Run A

SEIOOOC
Environmental Logger
07/02 18:07

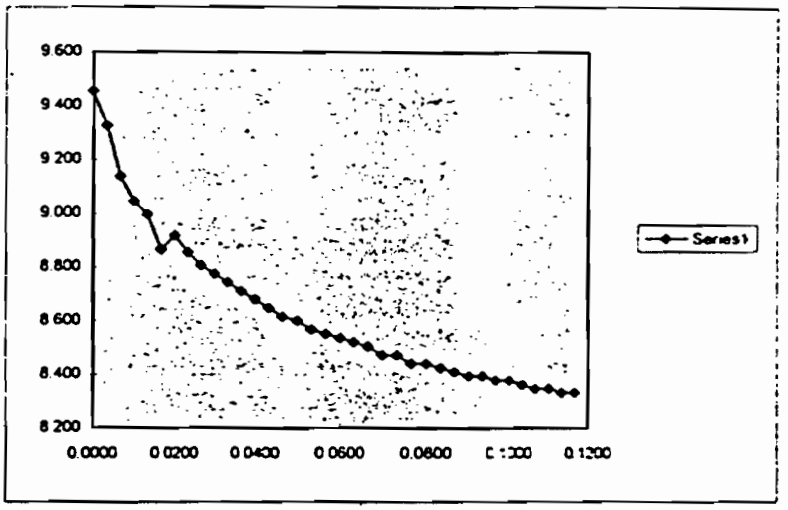
Unit# 11572 Test 10

INPUT 1: Level (F) TOC

Referen	8.000
Linearity	-0.03
Scalefac	50.110
Offset	-0.16
Delay M	50.000

Step 0 07/02 14:33:03

Elapsed 1



0.0000	9.455	0.1200	8.315	0.2400	8.189	0.4666	8.094
0.0033	9.328	0.1233	8.316	0.2433	8.189	0.4833	8.094
0.0066	9.138	0.1266	8.316	0.2466	8.189	0.5000	8.094
0.0100	9.044	0.1300	8.300	0.2500	8.189	0.5166	8.110
0.0133	8.996	0.1333	8.300	0.2533	8.189	0.5333	8.159
0.0166	8.864	0.1366	8.300	0.2566	8.174	0.5500	8.142
0.0200	8.917	0.1400	8.254	0.2600	8.174	0.5666	8.079
0.0233	8.854	0.1433	8.234	0.2633	8.174	0.5833	8.142
0.0266	8.806	0.1466	8.259	0.2666	8.174	0.6000	8.126
0.0300	8.775	0.1500	8.258	0.2700	8.174	0.6166	8.094
0.0333	8.743	0.1533	8.258	0.2733	8.174	0.6333	8.110
0.0366	8.711	0.1566	8.258	0.2766	8.174	0.6500	8.110
0.0400	8.680	0.1500	8.253	0.2800	8.174	0.6666	8.110
0.0433	8.648	0.1633	8.253	0.2833	8.174	0.6933	8.110
0.0466	8.616	0.1566	8.253	0.2866	8.174	0.7000	8.094
0.0500	8.601	0.1700	8.253	0.2900	8.158	0.7166	8.094
0.0533	8.569	0.1733	8.237	0.2933	8.158	0.7333	8.094
0.0566	8.553	0.1766	8.237	0.2966	8.158	0.7500	8.094
0.0600	8.537	0.1800	8.237	0.3000	8.158	0.7666	8.094
0.0633	8.522	0.1833	8.237	0.3033	8.158	0.7833	8.094
0.0666	8.506	0.1866	8.237	0.3066	8.158	0.8000	8.094
0.0700	8.474	0.1900	8.221	0.3100	8.158	0.8166	8.079
0.0733	8.474	0.1933	8.221	0.3133	8.158	0.8333	8.094
0.0766	8.442	0.1966	8.221	0.3166	8.158	0.8500	8.079
0.0800	8.442	0.2000	8.221	0.3200	8.158	0.8666	8.079
0.0833	8.427	0.2033	8.205	0.3233	8.158	0.9833	8.079
0.0866	8.411	0.2066	8.205	0.3266	8.142	0.9000	8.079
0.0900	8.395	0.2100	8.205	0.3300	8.142	0.9166	8.079
0.0933	8.395	0.2133	8.205	0.3333	8.158	0.9333	8.079
0.0966	8.379	0.2166	8.205	0.3500	8.158	0.9500	8.079
0.1000	8.379	0.2200	8.205	0.3666	8.142	0.9666	8.079
0.1033	8.363	0.2233	8.205	0.3833	8.126	0.9833	8.063
0.1066	8.348	0.2266	8.189	0.4000	8.126	1.0000	8.079
0.1100	8.348	0.2300	8.189	0.4166	8.126		
0.1133	8.332	0.2333	8.189	0.4333	8.110		
0.1166	8.332	0.2366	8.189	0.4500	8.094		

Client NYSDEC

Project AVM Gowanda

Project No.: 731021

Well No.: MW-4 test A

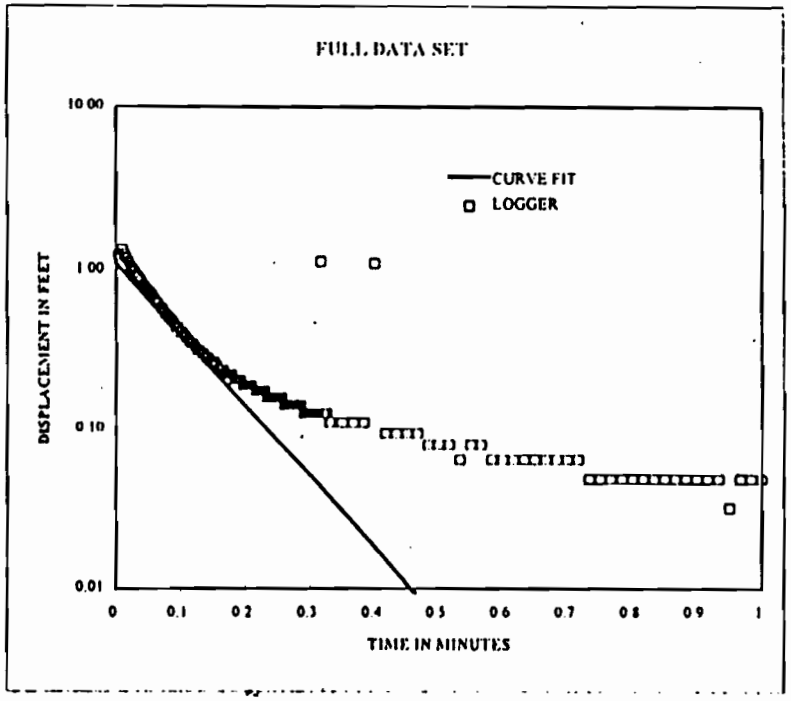
Test Date: 7/3/97

Formation Tested:

Rising (R) or Falling (F) Head Test: R

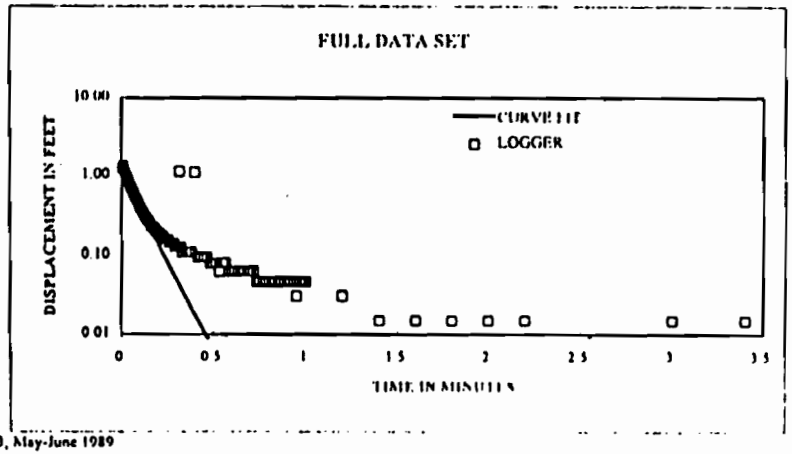
Hydraulic conductivity 3.70E-03 cm/sec
7.28E-03 ft/min
10.49 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	8.04	feet
Depth to bottom of screen (from ground level)	22.00	feet
Boring diameter	8.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	15.00	feet
Depth to "impermeable boundary"	21.50	feet
Estimated ratio of Kh/Kv	1	
Porosity of filter pack	0.42	
ΔH at time zero (Y_0)	1.10	feet
ΔH at time t (Y_t)	0.05	feet
Time	0.3	minutes



Bouwer-Rice Parameters

feet	cm		cm	
8.04	245.00	*SW*		
13.96	425.50	*H*	41.88	*L/Rw*
7	213.36	*Ta*	1.04	*H/D*
0.333	10.16	*Rw*	2.80	*A*
0.083	2.54	*Rc*	0.40	*B*
0.167	5.08	*DS*	2.40	*C*
13.96	425.50	*L*	#NUM!	*Ln[(D-H)/Rw]*
13.46	410.26	*D*	#NUM!	*Ln[(D-H)/Rw]*
1.1	33.53	Y_0	#NUM!	equation (8)
0.05	1.52	Y_t	2.84	equation (9)
	18.00	*t (seconds)*	2.84	*Ln(Re/Rw)*
	1.00	*M*	3.7E-03	equation (8)
	0.42	*n*		



Bouwer, Herman 1989 "The Bouwer and Rice Slug Test - An Update". Ground Water vol 27, no 3, May-June 1989

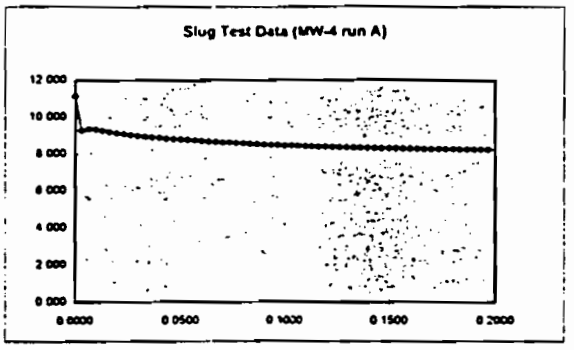
Bouwer, H and R C Rice 1976 A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research vol 12, no 3, June 1976.

Gowanda Electzonics Slug Test Raw Data
MW- 4: Run A

Page 1 of 1

SE I OOOC
Environmental Logaer

07/03 13 35	0
Unit 11572 Test	12
INPUT 1: Level (F) TOC	0 1666
	0 1700
Reference	9 040
Linearity	-0 03
Scale factor	50.110
Offset	-0 16
Delay MSEC	50



Step 0 07/03 08 40.49

Elapsed Time INPUT 1

0.0000	11.140	0.2000	8.229	0 5000	8.119	5.0000	8.040
0 0033	9.273	0.2033	8.229	0 5166	8.119	5.2000	8.040
0 0066	9.384	0.2066	8.229	0 5333	8.103	5.4000	8.040
0 0100	9 368	0 2100	8 229	0 5500	8.119	5.6000	8.040
0.0133	9 289	0 2133	8 214	0.5666	8 119	5.8000	8 040
0.0166	9 226	0.2166	8 214	0 5833	8 103	6.0000	8.055
0 0200	9 163	0.2200	8.214	0 6000	8 103	6.2000	8 040
0.0233	9.099	0.2233	8 214	0 6166	8.103	6.4000	8.055
0 0266	9 052	0.2266	8 214	0.6333	8 103	6.6000	8 040
0 0300	9 004	0.2300	8 214	0 6500	8 103	6.8000	8.040
0.0333	8.957	0.2333	8.198	0 6666	8 103	7.0000	8.040
0.0366	8 925	0.2366	8 198	0.6833	8.103	7.2000	8.040
0.0400	8 894	0.2400	8 198	0 7000	8.103	7.4000	8.040
0.0433	8 846	0.2433	8.198	0 7166	8.103	7.6000	8.040
0.0466	8 815	0.2466	8.198	0 7333	8 087	7.8000	8.040
0.0500	8.783	0.2500	8.198	0.7500	8.087	8.0000	8.040
0.0533	8 767	0.2533	8.198	0 7666	8 087	8.2000	8.040
0.0566	8.736	0.2566	8.198	0.7833	8.087	8.4000	8 040
0 0600	8 704	0.2600	8.182	0 8000	8.087	8.6000	8.040
0 0633	8 672	0.2633	8 182	0.8166	8 087	8.8000	8.040
0.0666	8 656	0.2666	8.182	0 8333	8 087	9.0000	8.040
0.0700	8 625	0.2700	8.182	0 8500	8 087	9.2000	8.040
0.0733	8 609	0.2733	8.182	0 8666	8 087	9.4000	8.040
0 0766	8.577	0.2766	8.182	0 8833	8 087	9.6000	8.040
0 0800	8 561	0 2800	8 182	0 9000	8 087	9.8000	8.040
0 0833	8 546	0.2833	8.182	0.9166	8 087	######	8 040
0 0866	8 530	0.2866	8.182	0 9333	8 087		
0 0900	8 514	0.2900	8.166	0.9500	8 071		
0 0933	8 482	0.2933	8.166	0 9666	8 087		
0 0966	8 482	0.2966	8 166	0.9833	8 087		
0 1000	8 451	0.3000	8 166	1.0000	8 087		
0 1033	8 451	0.3033	8.166	1.2000	8 071		
0.1066	8 435	0 3066	8 166	1 4000	8 055		
0 1100	8 419	0 3100	8 166	1 6000	8 055		
0 1133	8 403	0 3133	8 166	1.8000	8 055		
0 1166	8 388	0 3166	8 166	2 0000	8 055		
0 1200	8 388	0.3200	8 166	2.2000	8 055		
0 1233	8 372	0.3233	8 166	2.4000	8 040		
0 1266	8 356	0.3266	8 166	2.6000	8 040		
0 1300	8 356	0 3300	8.150	2 8000	8 040		
0 1333	8 340	0 3333	8 150	3 0000	8 055		
0 1366	8 340	0 3500	8 150	3 2000	8 040		
0 1400	8 324	0 3666	8 150	3 4000	8 055		
0 1433	8 324	0 3833	8 150	3 6000	8 040		
0 1466	8 308	0 4000	8 134	3 8000	8 055		
0 1500	8 308	0.4166	8 134	4 0000	8 040		
0 1533	8 308	0 4333	8 134	4.2000	8 040		
0 1566	8 293	0 4500	8 134	4 4000	8 055		
0 1600	8 277	0 4666	8 134	4 6000	8 040		
0 1633	8 277	0 4833	8 119	4 8000	8 040		
0 1666	8 260						
0 1700	8 261						
0 1733	8 261						
0 1766	8 261						
0 1800	8 261						
0 1833	8 245						
0 1866	8 245						
0 1900	8 245						
0 1933	8 245						
0 1966	8 229						

Client NYSDEC

Project: AVM Gowanda

Project No.: 731021

Well No.. MW-5 test A

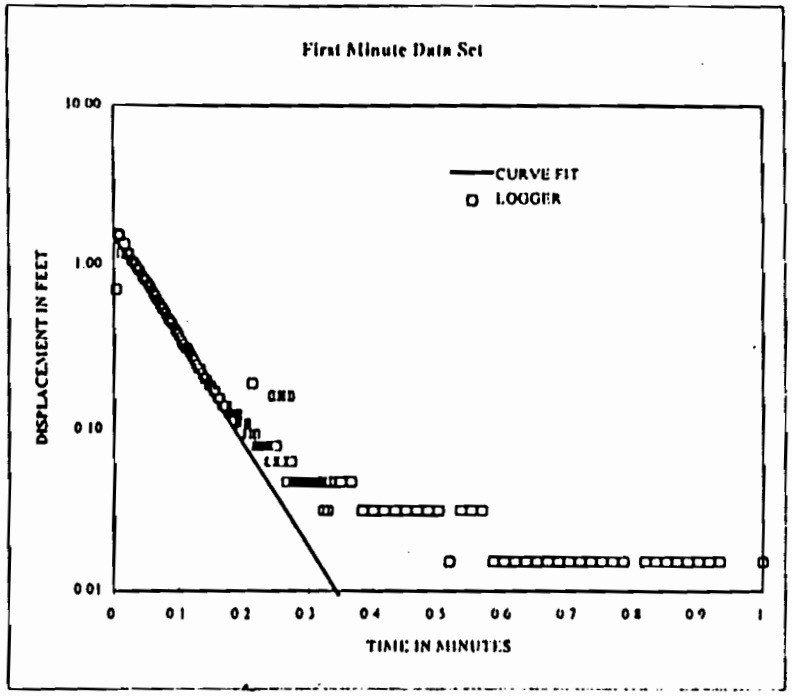
Test Date: 7/3/97

Formation Tested:

Rising (R) or Falling (F) Head Test: R

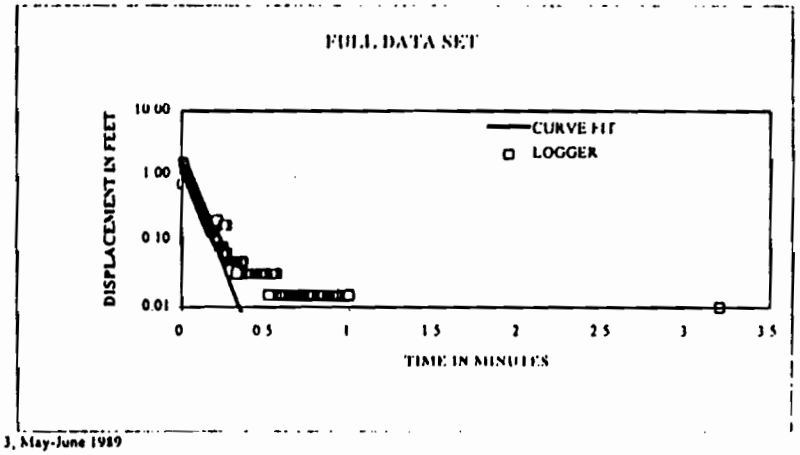
Hydraulic conductivity	5.56E-02	cm/sec
	1.09E-01	ft/min
	157.55	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	9.78	feet
Depth to bottom of screen (from ground level)	18.00	feet
Boring diameter	8.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	10.00	feet
Depth to "impermeable boundary"	18.00	feet
Estimated ratio of Kh/Kv	1	
Porosity of filter pack	0.42	
ΔH at time zero (Y_0)	1.50	feet
ΔH at time t (Y_t)	0.03	feet
Time	0.28	minutes



Bouwer-Rice Parameters

feet	cm		cm	
0.78	200.00	*SW*		
8.22	250.55	*H*	24.66	*L/Rw*
8	243.84	*Ts*	1.00	*H/D*
0.333	10.16	*Rw*	2.25	*A*
0.225	6.86	*Rc*	0.32	*B*
0.167	5.08	*DS*	1.70	*C*
8.22	250.55	*L*	#NUMI	*Ln[(D-H)/Rw]*
8.22	250.55	*D*	#NUMI	*Ln[(D-H)/Rw]*
1.5	45.72	Y_0	#NUMI	equation (8)
0.025	0.76	Y_t	2.43	equation (9)
	16.80	*t (seconds)*	2.43	*Ln(Re/Rw)*
	1.00	*M*	5.6E-02	equation (8)
	0.42	*n*		



Bouwer, Herman 1989. "The Bouwer and Rice Slug Test - An Update". Ground Water vol 27, no. 3, May-June 1989

Bouwer, H and R C Rice 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells" Water Resources Research vol 12, no 3, June 1976

Gowanda Electronics Slug Test Raw Data

MW-5: Run A

SEI0000C
Environmental Log-.er
07/03 13:40

Unit# 11572 Test 14

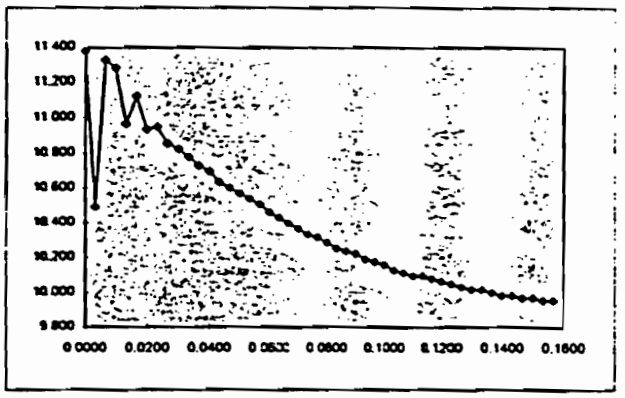
INPUT 1: Level (F) TOC

Reference 9-780
Linearity -0@030

Scale fa *50.110*
Offset -0.16
Delay M *50.000*

Step 0 07/03 09:39:08

Elapsed 1



0.0000	11.377				
0.0033	10.491				
0.0066	11.330				
0.0100	11.282				
0.0133	10.966				
0.0166	11.124				
0.0200	10.934				
0.0233	10.950				
0.0266	10.855				
0.0300	10.824				
0.0333	10.776				
0.0366	10.729				
0.0400	10.697	0.1600	9.938	0.2800	9.827
0.0433	10.634	0.1633	9.938	0.2833	9.827
0.0466	10.602	0.1666	9.922	0.2866	9.827
0.0500	10.571	0.1700	9.922	0.2900	9.827
0.0533	10.539	0.1733	9.922	0.2933	9.827
0.0566	10.507	0.1766	9.906	0.2966	9.827
0.0600	10.460	0.1800	9.906	0.3000	9.827
0.0633	10.428	0.1833	9.906	0.3033	9.827
0.0666	10.397	0.1866	9.906	0.3066	9.827
0.0700	10.365	0.1900	9.906	0.3100	9.827
0.0733	10.333	0.1933	9.890	0.3133	9.827
0.0766	10.317	0.1966	9.890	0.3166	9.827
0.0800	10.286	0.2000	9.890	0.3200	9.827
0.0833	10.254	0.2033	9.890	0.3233	9.811
0.0866	10.238	0.2066	9.874	0.3266	9.827
0.0900	10.223	0.2100	9.874	0.3300	9.811
0.0933	10.191	0.2133	9.974	0.3333	9.827
0.0966	10.175	0.2166	9.874	0.3500	9.827
0.1000	10.159	0.2200	9.859	0.3666	9.827
0.1033	10.128	0.2233	9.859	0.3833	9.811
0.1066	10.112	0.2266	9.859	0.4000	9.811
0.1100	10.096	0.2300	9.859	0.4166	9.811
0.1133	10.096	0.2333	9.859	0.4333	9.811
0.1166	10.080	0.2366	9.859	0.4500	9.811
0.1200	10.064	0.2400	9.843	0.4666	9.811
0.1233	10.049	0.2433	9.843	0.4833	9.811
0.1266	10.033	0.2466	9.943	0.5000	9.811
0.1300	10.017	0.2500	9.859	0.5166	9.795
0.1333	10.017	0.2533	9.943	0.5333	9.811
0.1366	10.001	0.2566	9.843	0.5500	9.811
0.1400	9.985	0.2600	9.843	0.5666	9.811
0.1433	9.985	0.2633	9.943	0.5833	9.795
0.1466	9.969	0.2666	9.827	0.6000	9.795
0.1500	9.969	0.2700	9.943	0.6166	9.795
0.1533	9.954	0.2733	9.843	0.6333	9.795
0.1566	9.954	0.2766	9.827	0.6500	9.795
				0.6666	9.795
				0.6833	9.795

Client NYSDEC

Project: AVM Gowanda

Project No.: 731021

Well No.: MW-6 test A

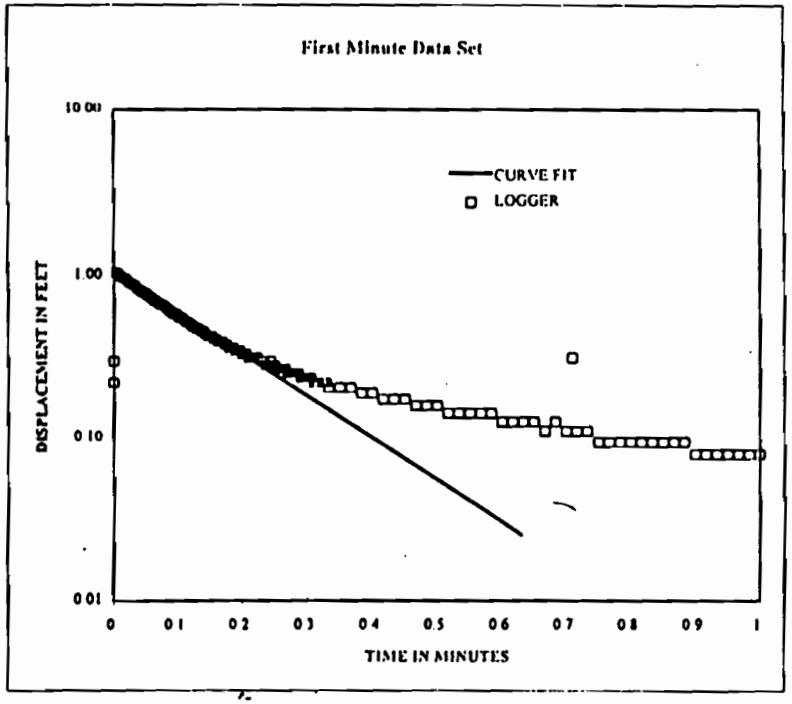
Test Date. 7/2/97

Formation Tested:

Rising (R) or Falling (F) Head Test: R

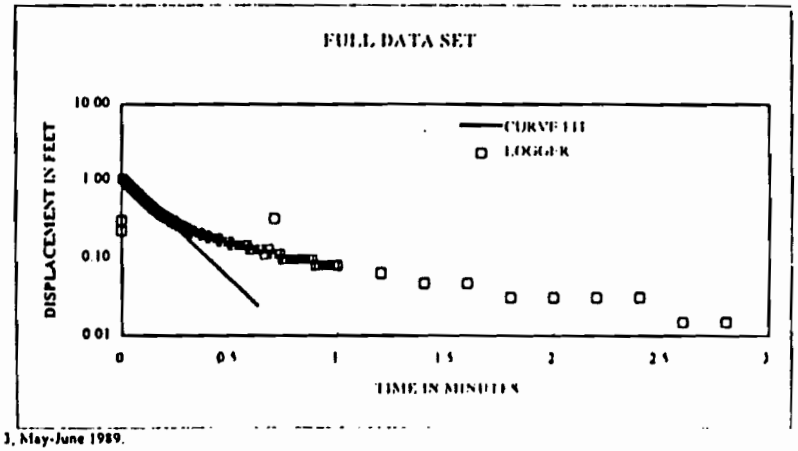
Hydraulic conductivity 3.80E-02 cm/sec
7.49E-02 ft/min
107.84 ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	6.84	feet
Depth to bottom of screen (from ground level)	10.50	feet
Boring diameter	8.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	5.00	feet
Depth to "impermeable boundary"	10.50	feet
Estimated ratio of Kh/Kv	1	
Porosity of filter pack	0.42	
ΔH at time zero (Y_0)	1.12	feet
ΔH at time t (Y_t)	0.03	feet
Time	0.629	minutes



Bouwer-Rice Parameters

feet	cm		cm	
6.84	208.48	*SW*		
3.66	111.56	*H*	10.98	*L/Rw*
5.5	167.64	*Ts*	1.00	*H/D*
0.333	10.16	*Rw*	1.80	*A*
0.225	6.86	*Rc*	0.25	*B*
0.167	5.08	*DS*	1.10	*C*
3.66	111.56	*L*	#NUM!	*Ln[(D-H)/Rw]'*
3.66	111.56	*D*	#NUM!	*Ln[(D-H)/Rw]*
1.12201845	34.20	Y_0	#NUM!	equation (8)
0.025	0.76	Y_t	1.79	equation (9)
	37.74	*t (seconds)*	1.79	*Ln(Re/Rw)*
	1.00	*M*	3.8E-02	equation (8)
	0.42	*n*		



Bouwer, Herman 1989 "The Bouwer and Rice Slug Test - An Update". Ground Water vol 27, no 3, May-June 1989.

Bouwer, H and R.C Rice 1976 A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells". Water Resources Research vol 12, no. 3, June 1976.

Gowanda Electronics Slug Test
MW- 6 Run A
Page 1 of I

SEIOOOC
Environmental Logger
07/02 17 57

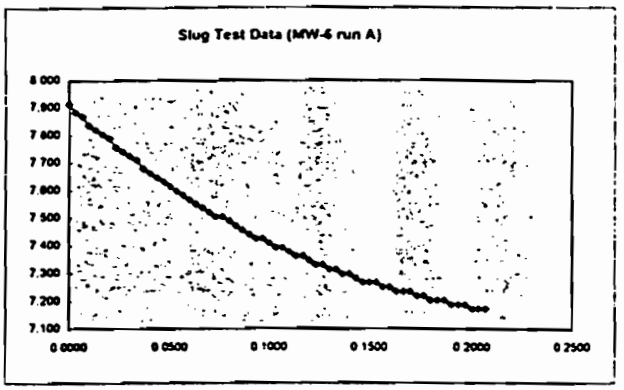
Unit# 5 72 Test 6

INPUT 1: Level (F) TOC

Reference	6.840
Linearity	-0 03
Scalefacto	50.110
Offset	-0.16
Delay MS	50.000

Slop 0 07/02 11:46:32

Elapsed Ti 1



0 0000	7.915	0 2100	7.156	0.7666	6 934
0 0033	7.884	0 2133	7.156	0.7833	6 934
0 0066	7.869	0.2166	7.156	0 8000	6.934
0 0100	7.836	0.2166	7.156	0.8166	6.934
0 0133	7.820	0 2233	7.156	0.8333	6 934
0 0166	7.805	0 2266	7.140	0 8500	6.934
0 0200	7.789	0.2300	7.140	0 8666	6 934
0 0233	7.757	0 2333	7.140	0 8833	6 934
0 0266	7.741	0.2366	7.124	0 9000	6.919
0 0300	7.725	0 2400	7.124	0 9166	6.919
0 0333	7.710	0 2433	7.140	0.9333	6 919
0 0366	7.678	0 2466	7.124	0 9500	6.919
0 0400	7 662	0 2500	7.124	0.9666	6.919
0 0433	7.646	0 2533	7.108	0 9833	6 919
0 0466	7.631	0.2566	7.108	1 0000	6.919
0 0500	7.615	0.2600	7.108	1.2000	6 903
0 0533	7.599	0 2633	7.108	1.4000	6.887
0 0566	7.583	0.2666	7.108	1 6000	6 887
0 0600	7.567	0 2700	7.093	1.8000	6 871
0 0633	7.551	0.2733	7.093	2.0000	6 871
0 0666	7.536	0 2766	7.093	2.2000	6 871
0 0700	7.520	0 2800	7.093	2.4000	6 871
0 0733	7.504	0 2833	7.093	2 6000	6.855
0 0766	7.504	0 2866	7.093	2 8000	6 855
0 0800	7.488	0 2900	7.077		
0 0833	7.472	0 2933	7.077		
0 0866	7.456	0 2966	7.077		
0 0900	7.441	0 3000	7.077		
0 0933	7.425	0 3033	7.077		
0 0966	7.425	0 3066	7.077		
0 1000	7.409	0 3100	7.061		
0 1033	7.393	0 3133	7.061		
0 1066	7.393	0.3166	7.061		
0 1100	7.377	0.3200	7.061		
0 1133	7.362	0 3233	7.061		
0 1166	7 362	0 3266	7.061		
0 1200	7 346	0 3300	7.061		
0 1233	7 330	0 3333	7.045		
0 1266	7 330	0 3500	7.045		
0 1300	7 314	0 3666	7.045		
0 1333	7 314	0 3833	7.029		
0 1366	7 298	0 4000	7.029		
0 1400	7 298	0 4166	7.014		
0 1433	7 282	0 4333	7.014		
0 1466	7 267	0 4500	7.014		
0 1500	7 267	0 4666	6.998		
0 1533	7.267	0 4833	6 998		
0 1566	7 251	0 5000	6.998		
0 1600	7.251	0 5166	6.982		
0 1633	7.235	0.5333	6.982		
0 1666	7.235	0 5500	6.982		
0 1700	7 235	0 5666	6.982		
0 1733	7 219	0 5833	6.982		
0 1766	7 219	0 6000	6.966		
0 1800	7 203	0 6166	6 966		
0 1833	7 203	0 6333	6 966		
0 1866	7 203	0 6500	6 966		
0 1900	7 188	0 6666	6 950		
0 1933	7 188	0 6833	6 966		
0 1966	7 188	0 7000	6 950		
0 2000	7 172	0 7166	6 950		
0 2033	7 172	0 7333	6 950		
0 2066	7.172	0 7500	6 934		

Client NYSDEC

Project AVM Gowanda

Project No : 731021

Well No : MW-7 test A

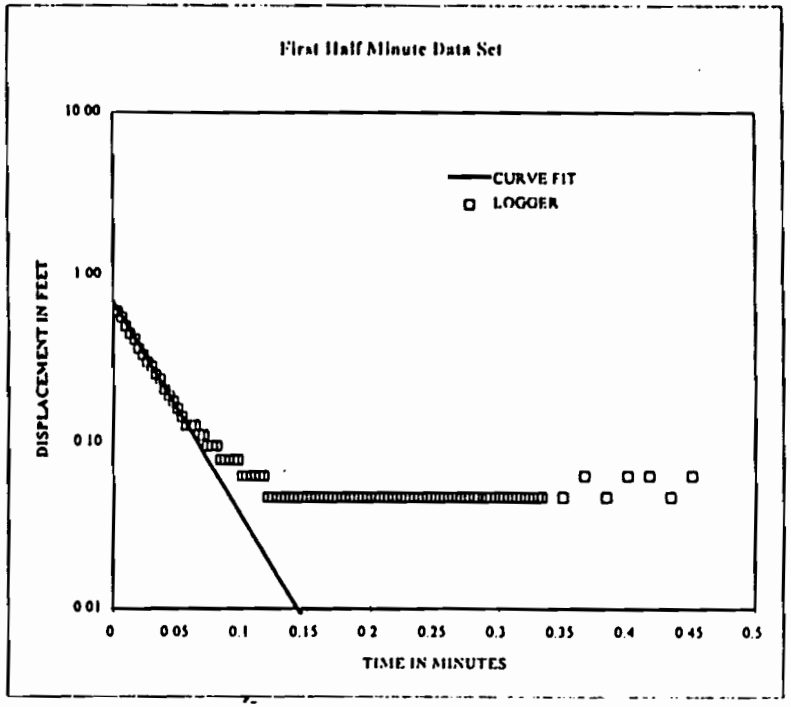
Test Date 7/2/97

Formation Tested:

Rising (R) or Falling (F) Head Test: R

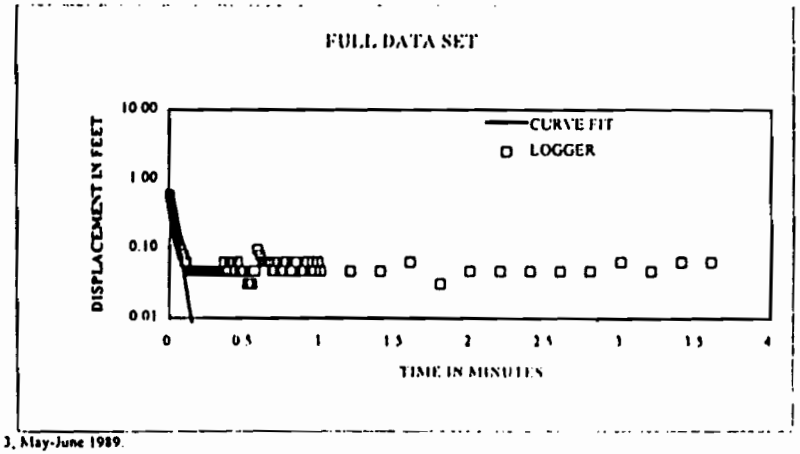
Hydraulic conductivity	2.56E-01	cm/sec
	5.05E-01	ft/min
	727.09	ft/day

Casing stickup	2.68	feet
Static water level (from top of casing)	11.57	feet
Depth to bottom of screen (from ground level)	16.00	feet
Boring diameter	8.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	5.00	feet
Depth to "impermeable boundary"	16.00	feet
Estimated ratio of Kh/Kv	1	
Porosity of filter pack	0.42	
ΔH at time zero (Y_0)	0.68	feet
ΔH at time t (Y_t)	0.05	feet
Time	0.09	minutes



Bouwer-Rice Parameters

feet	cm		cm	
8.89	270.97	*SW*		
7.11	216.71	*H*	60.00	*L/Rw*
11	335.28	*Ts*	1.00	*H/D*
0.083	2.54	*Rw*	3.30	*A*
0.225	6.86	*Rc*	0.50	*B*
0.107	5.08	*DS*	2.90	*C*
5.00	152.40	*L*	#NUMI	*Ln[(D-H)/Rw]'*
7.11	216.71	*D*	#NUMI	*Ln[(D-H)/Rw]*
0.68	20.73	Y_0	#NUMI	equation (8)
0.048	1.46	Y_t	3.38	equation (9)
	5.40	*t (seconds)*	3.38	*Ln(Re/Rw)*
	1.00	*M*	2.6E-01	equation (6)
	0.42	*n*		



Bouwer, Herman 1989 "The Bouwer and Rice Slug Test - An Update", Ground Water vol 27, no 3, May-June 1989.

Bouwer, H and R C Rice 1976 A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells" Water Resources Research vol 12, no 3, June 1976

Gowanda Electronics Slug Test Raw Data
MW- 7: Run A

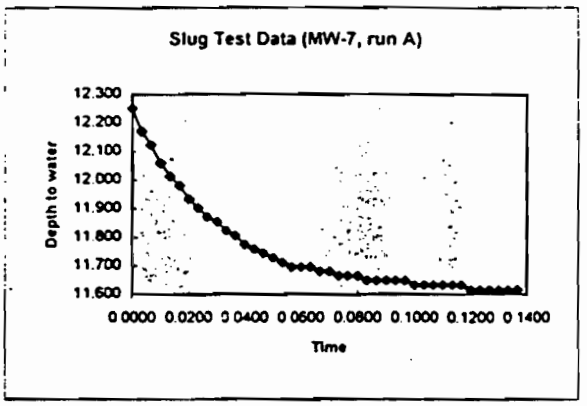
Page 1 of 1

SEIOOOC
Environmental Logger
07/02 18:02

Unit# II 572 Test 3

INPUT 1: Level (F) TOC

Referenc 11.570
Linearity -0.03
Scalefact 50.110
Offset -0.16
Delay M *50.000*



Step 0 07/02 13:37:19

Elapsed 1

0.0000	12.250	0.1400	11.617	0.2800	11.617	0.7666	11.633
0.0033	12.171	0.1433	11.617	0.2833	11.617	0.7833	11.633
0.0066	12.123	0.1466	11.617	0.2866	11.617	0.8000	11.617
0.0100	12.060	0.1500	11.617	0.2900	11.617	0.8166	11.617
0.0133	12.013	0.1533	11.617	0.2933	11.617	0.8333	11.633
0.0166	11.981	0.1566	11.617	0.2966	11.617	0.8500	11.633
0.0200	11.933	0.1600	11.617	0.3000	11.617	0.8666	11.617
0.0233	11.902	0.1633	11.617	0.3033	11.617	0.8833	11.617
0.0266	11.870	0.1666	11.617	0.3066	11.617	0.9000	11.617
0.0300	11.854	0.1700	11.617	0.3100	11.617	0.9166	11.633
0.0333	11.823	0.1733	11.617	0.3133	11.617	0.9333	11.617
0.0366	11.807	0.1766	11.617	0.3166	11.617	0.9500	11.633
0.0400	11.775	0.1800	11.617	0.3200	11.617	0.9666	11.617
0.0433	11.759	0.1833	11.617	0.3233	11.617	0.9833	11.633
0.0466	11.744	0.1866	11.617	0.3266	11.617	1.0000	11.617
0.0500	11.728	0.1900	11.617	0.3300	11.617	1.2000	11.617
0.0533	11.712	0.1933	11.617	0.3333	11.617	1.4000	11.617
0.0566	11.696	0.1966	11.617	0.3500	11.617	1.6000	11.633
0.0600	11.695	0.2000	11.617	0.3666	11.633	1.8000	11.601
0.0633	11.695	0.2033	11.617	0.3833	11.617	2.0000	11.617
0.0666	11.680	0.2066	11.617	0.4000	11.633	2.2000	11.617
0.0700	11.680	0.2100	11.617	0.4166	11.633	2.4000	11.617
0.0733	11.665	0.2133	11.617	0.4333	11.617	2.6000	11.617
0.0766	11.665	0.2166	11.617	0.4500	11.633	2.8000	11.617
0.0800	11.665	0.2200	11.617	0.4666	11.617	3.0000	11.633
0.0833	11.649	0.2233	11.617	0.4833	11.617	3.2000	11.617
0.0866	11.649	0.2266	11.617	0.5000	11.617	3.4000	11.633
0.0900	11.649	0.2300	11.617	0.5166	11.601	3.6000	11.633
0.0933	11.649	0.2333	11.617	0.5333	11.601	3.8000	11.633
0.0966	11.649	0.2366	11.617	0.5500	11.601	4.0000	11.617
0.1000	11.633	0.2400	11.617	0.5666	11.617	4.2000	11.617
0.1033	11.633	0.2433	11.617	0.5833	11.665	4.4000	11.617
0.1066	11.633	0.2466	11.617	0.6000	11.649	4.6000	11.617
0.1100	11.633	0.2500	11.617	0.6166	11.633	4.8000	11.617
0.1133	11.633	0.2533	11.617	0.6333	11.633	5.0000	11.633
0.1166	11.633	0.2566	11.617	0.6500	11.633		
0.1200	11.617	0.2600	11.617	0.6666	11.633		
0.1233	11.617	0.2633	11.617	0.6833	11.617		
0.1266	11.617	0.2666	11.617	0.7000	11.617		
0.1300	11.617	0.2700	11.617	0.7166	11.633		
0.1333	11.617	0.2733	11.617	0.7333	11.617		
0.1366	11.617	0.2766	11.617	0.7500	11.633		

Gowanda Electronics Slug Test Raw Data
MW- 7: Run A

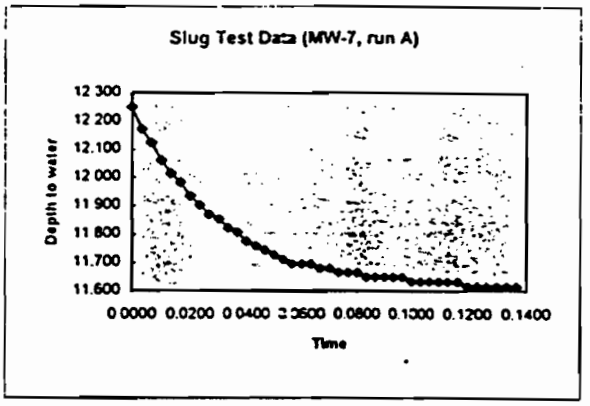
Page 1 of 1

SEIOOOC
Environmental Logger
07/02 18:02

Unit# II 572 Test 3

INPUT 1: Level (F) TOC

Referenc 11.570
Linearity -0.03
Scalefact 50.110
Offset -0.16
Delay M *50.000*



Step 0 07/02 13:37:19

Elapsed 1

0.0000 12.250	0.1400 11.617	0.2800 11.617	0.7666 11.633
0.0033 12.171	0.1433 11.617	0.2833 11.617	0.7833 11.633
0.0066 12.123	0.1466 11.617	0.2966 11.617	0.8000 11.617
0.0100 12.060	0.1500 11.617	0.2900 11.617	0.8166 11.617
0.0133 12.013	0.1533 11.617	0.2933 11.617	0.8333 11.633
0.0166 11.981	0.1566 11.617	0.2966 11.617	0.8500 11.633
0.0200 11.933	0.1600 11.617	0.3000 11.617	0.8666 11.617
0.0233 11.902	0.1633 11.617	0.3033 11.617	0.8833 11.617
0.0266 11.870	0.1666 11.617	0.3066 11.617	0.9000 11.617
0.0300 11.854	0.1700 11.617	0.3100 11.617	0.9166 11.633
0.0333 11.823	0.1733 11.617	0.3133 11.617	0.9333 11.617
0.0366 11.807	0.1766 11.617	0.3166 11.617	0.9500 11.633
0.0400 11.775	0.1800 11.617	0.3200 11.617	0.9666 11.617
0.0433 11.759	0.1833 11.617	0.3233 11.617	0.9833 11.633
0.0466 11.744	0.1866 11.617	0.3266 11.617	1.0000 11.617
0.0500 11.728	0.1900 11.617	0.3300 11.617	1.2000 11.617
0.0533 11.712	0.1933 11.617	0.3333 11.617	1.4000 11.617
0.0566 11.696	0.1966 11.617	0.3500 11.617	1.6000 11.633
0.0600 11.696	0.2000 11.617	0.3666 11.633	1.8000 11.601
0.0633 11.696	0.2033 11.617	0.3833 11.617	2.0000 11.617
0.0666 11.680	0.2066 11.617	0.4000 11.633	2.2000 11.617
0.0700 11.680	0.2100 11.617	0.4166 11.633	2.4000 11.617
0.0733 11.665	0.2133 11.617	0.4333 11.617	2.6000 11.617
0.0766 11.665	0.2166 11.617	0.4500 11.633	2.8000 11.617
0.0800 11.665	0.2200 11.617	0.4666 11.617	3.0000 11.633
0.0833 11.649	0.2233 11.617	0.4833 11.617	3.2000 11.617
0.0866 11.649	0.2266 11.617	0.5000 11.617	3.4000 11.633
0.0900 11.649	0.2300 11.617	0.5166 11.601	3.6000 11.633
0.0933 11.649	0.2333 11.617	0.5333 11.601	3.8000 11.633
0.0966 11.649	0.2366 11.617	0.5500 11.601	4.0000 11.617
0.1000 11.633	0.2400 11.617	0.5666 11.617	4.2000 11.617
0.1033 11.633	0.2433 11.617	0.5833 11.565	4.4000 11.617
0.1066 11.633	0.2466 11.617	0.6000 11.649	4.6000 11.617
0.1100 11.633	0.2500 11.617	0.6166 11.633	4.8000 11.617
0.1133 11.633	0.2533 11.617	0.6333 11.633	5.0000 11.633
0.1166 11.633	0.2566 11.617	0.6500 11.633	
0.1200 11.617	0.2600 11.617	0.6666 11.633	
0.1233 11.617	0.2633 11.617	0.6833 11.617	
0.1266 11.617	0.2666 11.617	0.7000 11.617	
0.1300 11.617	0.2700 11.617	0.7166 11.633	
0.1333 11.617	0.2733 11.617	0.7333 11.617	
0.1366 11.617	0.2766 11.617	0.7500 11.633	

Client NYSDEC

Project AVM Gowanda

Project No.: 731021

Well No.: MW-8 test A

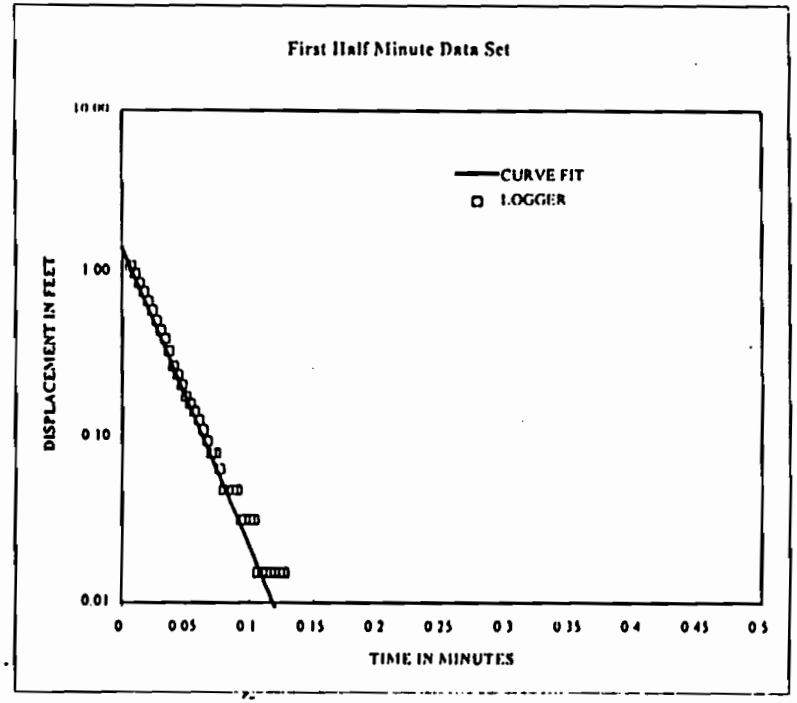
Test Date 7/2/97

Formation Tested

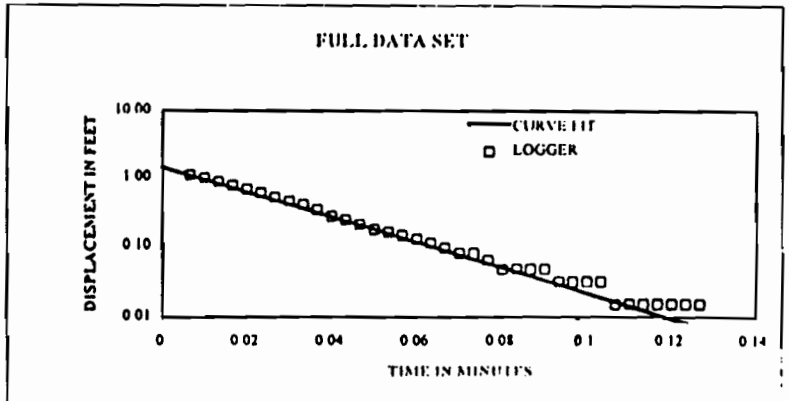
Rising (R) or Falling (F) Head Test. R

Hydraulic conductivity	2.32E-01	cm/sec
	4.57E-01	ft/min
	658.18	ft/day

Casing stickup	0.00	feet
Static water level (from top of casing)	6.06	feet
Depth to bottom of screen (from ground level)	10.50	feet
Boring diameter	8.00	inches
Casing diameter	2.00	inches
Screen diameter	2.00	inches
Screen length	5.00	feet
Depth to "impermeable boundary"	10.50	feet
Estimated ratio of Kh/Kv	1	
Porosity of filter pack	0.42	
ΔH at time zero (Y_0)	1.40	feet
ΔH at time t (Y_t)	0.04	feet
Time	0.085	minutes



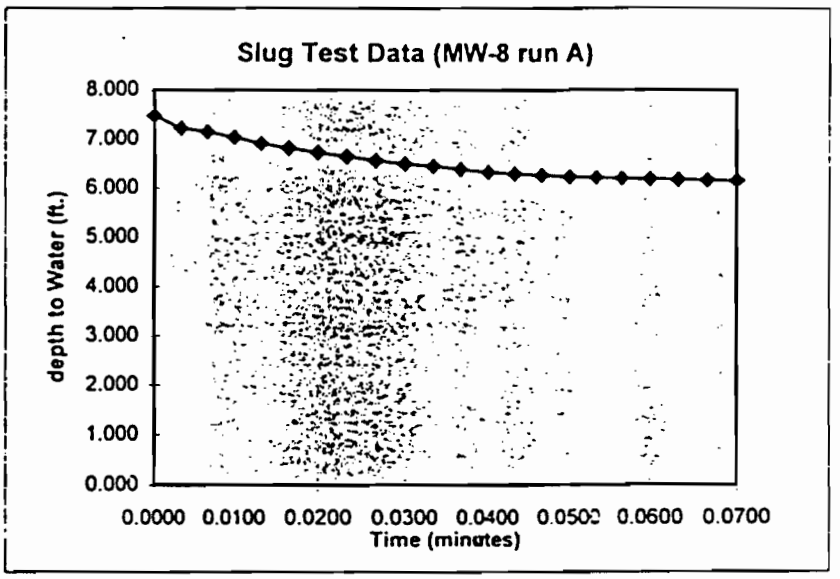
Bouwer-Rice Parameters				
feet	cm		cm	
6.06	184.71	*SW*		
4.44	135.33	*H*	13.32	*L/Rw*
5.5	167.64	*Ts*	1.00	*H/D*
0.333	10.16	*Rw*	1.93	*A*
0.225	6.86	*Rc*	0.26	*B*
0.167	5.08	*DS*	1.30	*C*
4.44	135.33	*L*	#NUM!	*Ln[(D-H)/Rw]*
4.44	135.33	*D*	#NUM!	*Ln[(D-H)/Rw]*
1.4	42.67	Y_0	#NUM!	equation (8)
0.04	1.22	Y_t	1.91	equation (9)
	5.10	*t (seconds)*	1.91	*Ln(Re/Rw)*
	1.00	*M*	2.3E-01	equation (5)
	0.42	*n*		



Bouwer, Herman 1989 "The Bouwer and Rice Slug Test - An Update" Ground Water vol 27, no 3, May-June 1989

Bouwer, H and R C Rice 1976 A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells", Water Resources Research vol 12, no 3, June 1976

Gowanda Ele'ctronics Slug Test Raw Data
MW- 8: Run A



0.1433
SEIOOOC
Enviromnenmi Logger
(Y7102 17:51

Unit# 11572 Test 4

INPUT 1: Level (F) TOC

Referenc	6.060
Linearity	-0.03
Scale fac	*50.110*
Offset	-0.16
Delay M	*50.000*

Step 0 07/02 10:54:12

Elapsed 1

0.0000	7.483	0.0733	6.139
0.0033	7.230	0.0766	6.123
0.0066	7.151	0.0800	6.107
0.0100	7.040	0.0833	6.107
0.0133	6.914	0.0866	6.107
0.0166	6.819	0.0900	6.107
0.0200	6.724	0.0933	6.091
0.0233	6.645	0.0966	6.091
0.0266	6.566	0.1000	6.091
0.0300	6.502	0.1033	6.091
0.0333	6.455	0.1066	6.075
0.0366	6.392	0.1100	6.075
0.0400	6.328	0.1133	6.075
0.0433	6.297	0.1166	6.075
0.0466	6.265	0.1200	6.075
0.0500	6.234	0.1233	6.075
0.0533	6.218	0.1266	6.075
0.0566	6.202	0.1300	6.060
0.0600	6.186	0.1333	6.060
0.0633	6.170	0.1366	6.060
0.0666	6.154	0.1400	6.060
0.0700	6.139		

APPENDIX F

Indoor Air Sampling Locations

Sample ID	Date	Address	Location
0091	6/12/97	74 Torrance Place	Basement
0138	6/12/97	74 Torrance Place	Living Area
04729	6/11/97	85 Torrance Place	Living Area
12539	6/11/97	85 Torrance Place	Basement
04749	6/11/97	70 Torrance Place	Basement
12147	6/11/97	70 Torrance Place	Basement/Blank
12149	6/11/97	70 Torrance Place	Living Area
11159	6/11/97	64 Torrance Place	Living Area
11352	6/11/97	64 Torrance Place	Basement
12188	6/11/97	34 Torrance Place	Basement
93146	6/11/97	34 Torrance Place	Living Area
12593	6/11/97	34 Torrance Place	Outside Yard
12274	6/11/97	84 Torrance Place	Living Area
93170	6/11/97	84 Torrance Place	Basement
12398	6/11/97	69 Torrance Place	Basement
93022	6/11/97	69 Torrance Place	Living Area
93005	6/11/97	75 Torrance Place	Living Area
92030	6/11/97	75 Torrance Place	Basement
12484	3/19/98	85 Torrance Place	Living Area
11351	3/19/98	85 Torrance Place	Basement
11411	3/19/98	74 Torrance Place	Living Area
12872	3/19/98	74 Torrance Place	Outside Yard
04409	3/19/98	74 Torrance Place	Basement
04734	3/19/98	75 Torrance Place	Living Area
11287	3/19/98	75 Torrance Place	Basement
02698	3/19/98	64 Torrance Place	Basement
04737	3/19/98	64 Torrance Place	Living Area
93034	3/19/98	87 Torrance Place	Basement
12174	3/19/98	87 Torrance Place	Living Area
12470	3/19/98	69 Torrance Place	Living Area
11425	3/19/98	69 Torrance Place	Basement
12835	3/19/98	84 Torrance Place	Basement
12438	3/19/98	84 Torrance Place	Living Area
04399	3/19/98	70 Torrance Place	Living Area
12209	3/19/98	70 Torrance Place	Basement
12452	3/19/98	71 Torrance Place	Living Area
04422	3/19/98	71 Torrance Place	Basement
04392	3/19/98	58 Torrance Place	Outside Yard

AVM GOWANDA AIR SAMPLE RESULTS SDG #: H8C230130		SAMPLE ID: LAB ID: SOURCE: SDG: MATRIX: SAMPLED: VALIDATED:	12484 CG1M1001 Quanterra H8C230130 Air 3/19/98 6/10/98	11351 CG1M4002 Quanterra H8C230130 Air 3/19/98 6/10/98	12872 CG1M5003 Quanterra H8C230130 Air 3/19/98 6/10/98	04392 CG1M6004 Quanterra H8C230130 Air 3/19/98 6/10/98	11411 CG1M7005 Quanterra H8C230130 Air 3/19/98 6/10/98	04409 CG1MA006 Quanterra H8C230130 Air 3/19/98 6/10/98	04734 CG1MK008 Quanterra H8C230130 Air 3/19/98 6/10/98
CAS NO.	COMPOUND	UNITS:							
	VOLATILES								
75-71-8	Dichlorodifluoromethane	PPB(V/V)	2.5	18	0.57 J	0.60 U	0.69 U	0.57 J	0.62 J
76-14-2	1,2-Dichloro-1,1,2,2-tetrafl	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
74-87-3	Chloromethane	PPB(V/V)	1.20 U	1.20 U	1.1 U	1.5 U	1.7 U	1.1 U	1.7 J
75-01-4	Vinyl chloride	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
74-83-9	Bromomethane	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
75-00-3	Chloroethane	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
75-69-4	Trichlorofluoromethane	PPB(V/V)	0.69 J	0.65 J	0.42 U	0.60 U	0.69 U	0.74 J	0.55 J
75-35-4	1,1-Dichloroethene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
76-13-1	1,1,2-Trichloro-1,2,2-triflu	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
75-09-2	Methylene chloride	PPB(V/V)	0.47 U	0.72 J	0.42 U	0.60 U	1.3 J	1.3 J	0.52 U
75-34-3	1,1-Dichloroethane	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
156-59-2	cis-1,2-Dichloroethene	PPB(V/V)	1.1 J	2.1 J	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
67-66-3	Chloroform	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
71-55-6	1,1,1-Trichloroethane	PPB(V/V)	1.3 J	7.5	0.42 U	0.60 U	0.91 J	1.3 J	0.83 J
56-23-5	Carbon tetrachloride	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
71-43-2	Benzene	PPB(V/V)	3.3	2.5	0.42 U	0.60 U	1.1 J	1.2 J	1.4 UJ
107-06-2	1,2-Dichloroethane	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
79-01-6	Trichloroethene	PPB(V/V)	12	25	0.42 U	0.60 U	1.0 J	1.1 J	0.75 J
78-87-5	1,2-Dichloropropane	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
10061-01-5	cis-1,3-Dichloropropene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
108-88-3	Toluene	PPB(V/V)	11	9.1	0.55 J	0.62 J	3.5	2.9	7.8
10061-02-6	trans-1,3-Dichloropropene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
79-00-5	1,1,2-Trichloroethane	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
127-18-4	Tetrachloroethene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
106-93-4	1,2-Dibromoethane (EDB)	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
108-90-7	Chlorobenzene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
100-41-4	Ethylbenzene	PPB(V/V)	1.0 J	1.2 J	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
136777-61-2	m-Xylene & p-Xylene	PPB(V/V)	4.2	4.6	0.42 U	0.60 U	0.78 J	0.73 J	0.97 J
95-47-6	o-Xylene	PPB(V/V)	1.3 J	1.4 J	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
100-42-5	Styrene	PPB(V/V)	0.47 U	1.3 J	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
79-34-5	1,1,2,2-Tetrachloroethane	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
108-67-8	1,3,5-Trimethylbenzene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
95-63-6	1,2,4-Trimethylbenzene	PPB(V/V)	0.90 J	0.90 J	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
541-73-1	1,3-Dichlorobenzene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
106-46-7	1,4-Dichlorobenzene	PPB(V/V)	2.0 J	19	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
95-50-1	1,2-Dichlorobenzene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
100-44-7	Benzyl chloride	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
120-82-1	1,2,4-Trichlorobenzene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U
87-68-3	Hexachlorobutadiene	PPB(V/V)	0.47 U	0.47 U	0.42 U	0.60 U	0.69 U	0.44 U	0.52 U

7M GOWANDA R SAMPLE RESULTS)G #: H8C230130		SAMPLE ID: LAB ID: SOURCE: SDG: MATRIX: SAMPLED: VALIDATED:	11287 CG1MM009 Quanterra H8C230130 Air 3/19/98 6/10/98	02698 CG1MN010 Quanterra H8C230130 Air 3/19/98 6/10/98	04737 CG1MP011 Quanterra H8C230130 Air 3/19/98 6/10/98	93034 CG1MQ012 Quanterra H8C230130 Air 3/19/98 6/10/98	12174 CG1MR013 Quanterra H8C230130 Air 3/19/98 6/10/98	12470 CG1MT014 Quanterra H8C230130 Air 3/19/98 6/10/98	11425 CG1MV015 Quanterra H8C230130 Air 3/19/98 6/10/98
AS NO.	COMPOUND	UNITS:							
	VOLATILES								
i-71-8	Dichlorodifluoromethane	PPB(V/V)	0.72 U	0.56 J	0.53 J	0.63 J	0.88 J	3.8	4.3
5-14-2	1,2-Dichloro-1,1,2,2-tetrafl	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
1-87-3	Chloromethane	PPB(V/V)	1.8 U	3.5	1.7 J	1.4 U	3.9 U	1.2 J	1.3 J
5-01-4	Vinyl chloride	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
1-83-9	Bromomethane	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
5-00-3	Chloroethane	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
5-69-4	Trichlorofluoromethane	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	1.2 J	0.78 J
5-35-4	1,1-Dichloroethene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
5-13-1	1,1,2-Trichloro-1,2,2-triflu	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
5-09-2	Methylene chloride	PPB(V/V)	0.86 J	0.55 U	0.50 U	0.54 U	0.58 J	1.0 J	1.1 J
5-34-3	1,1-Dichloroethane	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
56-59-2	cis-1,2-Dichloroethene	PPB(V/V)	0.72 U	1.7 J	0.50 U	0.65 J	0.56 U	0.47 U	0.53 U
7-66-3	Chloroform	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
1-55-6	1,1,1-Trichloroethane	PPB(V/V)	0.96 J	2.3 J	0.58 J	1.7 J	1.3 J	0.47 U	0.53 U
6-23-5	Carbon tetrachloride	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
1-43-2	Benzene	PPB(V/V)	0.75 UJ	1.4 J	0.91 J	1.1 J	3.3	0.79 UJ	0.70 UJ
07-06-2	1,2-Dichloroethane	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
9-01-6	Trichloroethene	PPB(V/V)	1.6 J	9.4	2.0 J	6.7	3.3	0.47 U	1.1 J
8-87-5	1,2-Dichloropropane	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
0061-01-5	cis-1,3-Dichloropropene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
08-88-3	Toluene	PPB(V/V)	3.7	22	13	2.4 J	10	3.1	2.5 J
0061-02-6	trans-1,3-Dichloropropene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
9-00-5	1,1,2-Trichloroethane	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
27-18-4	Tetrachloroethene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	1.6 J	0.91 J
06-93-4	1,2-Dibromoethane (EDB)	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
08-90-7	Chlorobenzene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
00-41-4	Ethylbenzene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	1.2 J	0.50 J	0.53 J
36777-61-2	m-Xylene & p-Xylene	PPB(V/V)	0.72 U	1.4 J	0.90 J	0.88 J	3.7	1.6 J	1.7 J
5-47-6	o-Xylene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	1.3 J	0.47 U	0.53 U
00-42-5	Styrene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
9-34-5	1,1,2,2-Tetrachloroethane	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
08-67-8	1,3,5-Trimethylbenzene	PPB(V/V)	0.72 U	0.66 J	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
5-63-6	1,2,4-Trimethylbenzene	PPB(V/V)	0.85 J	2.2 J	0.75 J	0.54 U	0.95 J	0.47 U	0.53 U
41-73-1	1,3-Dichlorobenzene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
06-46-7	1,4-Dichlorobenzene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
5-50-1	1,2-Dichlorobenzene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
00-44-7	Benzyl chloride	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
20-82-1	1,2,4-Trichlorobenzene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U
7-68-3	Hexachlorobutadiene	PPB(V/V)	0.72 U	0.55 U	0.50 U	0.54 U	0.56 U	0.47 U	0.53 U

AVM GOWANDA AIR SAMPLE RESULTS SDG #: H8C230130		SAMPLE ID: LAB ID: SOURCE: SDG: MATRIX: SAMPLED: VALIDATED:	12835 CG1MW016 Quanterra H8C230130 Air 3/19/98 6/10/98		12438 CG1MX017 Quanterra H8C230130 Air 3/19/98 6/10/98		04399 CG1N0018 Quanterra H8C230130 Air 3/19/98 6/10/98		12209 CG1N1019 Quanterra H8C230130 Air 3/19/98 6/10/98		12452 CG1N2020 Quanterra H8C230130 Air 3/19/98 6/10/98		04422 CG1N4021 Quanterra H8C230130 Air 3/19/98 6/10/98	
CAS NO.	COMPOUND	UNITS:												
	VOLATILES													
75-71-8	Dichlorodifluoromethane	PPB(V/V)	0.90	J	0.80	J	0.59	J	0.60	J	3.1		4.2	
76-14-2	1,2-Dichloro-1,1,2,2-tetrafl	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
74-87-3	Chloromethane	PPB(V/V)	1.2	U	1.1	U	1.3	U	1.3	U	2.0	J	1.4	U
75-01-4	Vinyl chloride	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
74-83-9	Bromomethane	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
75-00-3	Chloroethane	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
75-69-4	Trichlorofluoromethane	PPB(V/V)	0.53	J	0.45	J	0.53	U	0.52	U	0.87	J	0.55	U
75-35-4	1,1-Dichloroethene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
76-13-1	1,1,2-Trichloro-1,2,2-triflu	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
75-09-2	Methylene chloride	PPB(V/V)	0.50	U	0.43	U	1.5	J	2.6		0.46	U	0.55	U
75-34-3	1,1-Dichloroethane	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.69	J	0.46	U	0.55	U
156-59-2	cis-1,2-Dichloroethene	PPB(V/V)	0.50	U	0.43	U	3.9		6.0		0.46	U	0.69	J
67-66-3	Chloroform	PPB(V/V)	0.65	J	0.57	J	0.53	U	0.52	U	0.46	U	0.55	U
71-55-6	1,1,1-Trichloroethane	PPB(V/V)	0.77	J	0.66	J	6.5		11		0.64	J	0.88	J
56-23-5	Carbon tetrachloride	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
71-43-2	Benzene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	4.9		6.5	
107-06-2	1,2-Dichloroethane	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
79-01-6	Trichloroethene	PPB(V/V)	0.50	J	0.43	J	8.7		13		2.6		5.0	
78-87-5	1,2-Dichloropropane	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
10061-01-5	cis-1,3-Dichloropropene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
108-88-3	Toluene	PPB(V/V)	1.8	J	1.6	J	2.2	J	1.8	J	22		31	
10061-02-6	trans-1,3-Dichloropropene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
79-00-5	1,1,2-Trichloroethane	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
127-18-4	Tetrachloroethene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
106-93-4	1,2-Dibromoethane (EDB)	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
108-90-7	Chlorobenzene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
100-41-4	Ethylbenzene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	2.7		4.0	
136777-61-2	m-Xylene & p-Xylene	PPB(V/V)	0.56	J	0.50	J	0.53	U	0.52	U	8.5		13	
95-47-6	o-Xylene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	2.9		4.4	
100-42-5	Styrene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
79-34-5	1,1,2,2-Tetrachloroethane	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
108-67-8	1,3,5-Trimethylbenzene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.54	J	0.82	J
95-63-6	1,2,4-Trimethylbenzene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	1.8	J	2.8	
541-73-1	1,3-Dichlorobenzene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
106-46-7	1,4-Dichlorobenzene	PPB(V/V)	6.4		5.6		0.53	U	0.52	U	0.93	J	1.4	J
95-50-1	1,2-Dichlorobenzene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
100-44-7	Benzyl chloride	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
120-82-1	1,2,4-Trichlorobenzene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U
87-68-3	Hexachlorobutadiene	PPB(V/V)	0.50	U	0.43	U	0.53	U	0.52	U	0.46	U	0.55	U

AVM GOWANDA VALIDATED AIR SAMPLE RESULTS WORKORDER #: H7F130187 and H7F160		SAMPLE ID: LAB ID: SOURCE: SDG: MATRIX: DILUTION: SAMPLED: VALIDATED:	0091 CA60E101 MITKEM H7F160111 AIR 2.03 6/12/97 8/29/97	0138 CA60G101 MITKEM H7F160111 AIR 2.03 6/12/97 8/29/97	04729 CA5ED101 MITKEM H7F130187 AIR 2.13 6/11/97 8/29/97	04749 CA5E8101 MITKEM H7F130187 AIR 2.17 6/11/97 8/29/97	11159 CA5EE101 MITKEM H7F130187 AIR 2.16 6/11/97 8/29/97	11352 CA5EF101 MITKEM H7F130187 AIR 2.27 6/11/97 8/29/97	12147 CA5E9101 MITKEM H7F130187 AIR 1 6/11/97 8/29/97	12149 CA5EA101 MITKEM H7F130187 AIR 3.43 6/11/97 8/29/97	12188 CA5EL101 MITKEM H7F130187 AIR 10.45 6/11/97 8/29/97
CAS NO.	COMPOUND	UNITS:									
	VOLATILES										
75-71-8	Dichlorodifluoromethane	PPB(V/V)	0.49	0.51	6.2	0.52	0.55	0.56	0.2 U	0.69 U	2.1 U
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluo	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
74-87-3	Chloromethane	PPB(V/V)	0.44	0.41 U	0.43	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
75-01-4	Vinyl chloride	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
74-83-9	Bromomethane	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
75-00-3	Chloroethane	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
75-69-4	Trichlorofluoromethane	PPB(V/V)	0.5	0.41 U	2.3	0.51	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
75-35-4	1,1-Dichloroethene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluor	PPB(V/V)	0.61 U	0.61 U	0.64 U	0.65 U	0.65 U	0.68 U	0.3 U	1 U	3.1 U
75-09-2	Methylene chloride	PPB(V/V)	1.1	0.61 U	0.64 U	11	0.65 U	0.68 U	0.3 U	1 U	13
75-34-3	1,1-Dichloroethane	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
156-59-2	cis-1,2-Dichloroethene	PPB(V/V)	0.41 U	0.41 U	0.43 U	1.5	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
67-66-3	Chloroform	PPB(V/V)	0.41 U	0.41 U	0.43 U	1.4	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
71-55-6	1,1,1-Trichloroethane	PPB(V/V)	0.41 U	0.41 U	0.43	1.5	0.43 U	0.86	0.2 U	0.69 U	170
56-23-5	Carbon tetrachloride	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
71-43-2	Benzene	PPB(V/V)	1.4	0.41 U	0.66	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
107-06-2	1,2-Dichloroethane	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
79-01-6	Trichloroethene	PPB(V/V)	0.41 U	0.41 U	1.9	2.8	0.43 U	1.1	0.2 U	0.69 U	2.1 U
78-87-5	1,2-Dichloropropane	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
10061-01-5	cis-1,3-Dichloropropene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
108-88-3	Toluene	PPB(V/V)	3.1	2.1	2.4	4.7	1.5	6.7	0.2 U	12	6.6
10061-02-6	trans-1,3-Dichloropropene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
79-00-5	1,1,2-Trichloroethane	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
127-18-4	Tetrachloroethene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
106-93-4	1,2-Dibromoethane (EDB)	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
108-90-7	Chlorobenzene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
100-41-4	Ethylbenzene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
136777-61-2	m-Xylene & p-Xylene	PPB(V/V)	0.98	0.41 U	0.78	0.89	0.48	1.3	0.2 U	0.7	2.9
95-47-6	o-Xylene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.63	0.2 U	0.69 U	2.1 U
100-42-5	Styrene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
79-34-5	1,1,2,2-Tetrachloroethane	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
108-67-8	1,3,5-Trimethylbenzene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	1.3	0.2 U	0.69 U	2.1 U
95-63-6	1,2,4-Trimethylbenzene	PPB(V/V)	0.43	0.41 U	0.43 U	0.59	0.43 U	4.5	0.2 U	0.69 U	2.1 U
541-73-1	1,3-Dichlorobenzene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
106-46-7	1,4-Dichlorobenzene	PPB(V/V)	0.55	0.41 U	6.6	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
95-50-1	1,2-Dichlorobenzene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
100-44-7	Benzyl chloride	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
120-82-1	1,2,4-Trichlorobenzene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U
87-68-3	Hexachlorobutadiene	PPB(V/V)	0.41 U	0.41 U	0.43 U	0.43 U	0.43 U	0.45 U	0.2 U	0.69 U	2.1 U

AVM GOWANDA VALIDATED AIR SAMPLE RESULTS WORKORDER #: H7F130187 and H7F160		SAMPLE ID: LAB ID: SOURCE: SDG: MATRIX: DILUTION: SAMPLED: VALIDATED:	12274 CA5E7101 MITKEM H7F130187 AIR 2.32 6/11/97 8/29/97	12398 CA5EK101 MITKEM H7F130187 AIR 2.43 6/11/97 8/29/97	12539 CA5EC101 MITKEM H7F130187 AIR 11.8 6/11/97 8/29/97	12593 CA5EN101 MITKEM H7F130187 AIR 2.67 6/11/97 8/29/97	92030 CA5EG101 MITKEM H7F130187 AIR 2.37 6/11/97 8/29/97	93005 CA5EH101 MITKEM H7F130187 AIR 2.47 6/11/97 8/29/97	93022 CA5EJ101 MITKEM H7F130187 AIR 2.2 6/11/97 8/29/97	93146 CA5EM101 MITKEM H7F130187 AIR 2.38 6/11/97 8/29/97	93170 CA5E5101 MITKEM H7F130187 AIR 11.95 6/11/97 8/29/97
CAS NO.	COMPOUND	UNITS:									
	VOLATILES										
75-71-8	Dichlorodifluoromethane	PPB(V/V)	0.59	0.57	6.4	0.55	0.72	0.59	0.63	0.56	2.4 U
76-14-2	1,2-Dichloro-1,1,2,2-tetrafluo	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
74-87-3	Chloromethane	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	1	2.4 U
75-01-4	Vinyl chloride	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
74-83-9	Bromomethane	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
75-00-3	Chloroethane	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
75-69-4	Trichlorofluoromethane	PPB(V/V)	0.46 U	0.73	2.5	0.53 U	0.47 U	0.49 U	1.1	0.48 U	2.4 U
75-35-4	1,1-Dichloroethene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluor	PPB(V/V)	0.7 U	0.73 U	3.5 U	0.8 U	0.71 U	0.74 U	0.66 U	0.71 U	3.6 U
75-09-2	Methylene chloride	PPB(V/V)	0.7 U	0.73 U	3.5 U	0.8 U	0.71 U	0.74 U	0.66 U	0.71 U	3.6 U
75-34-3	1,1-Dichloroethane	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
156-59-2	cis-1,2-Dichloroethene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
67-66-3	Chloroform	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
71-55-6	1,1,1-Trichloroethane	PPB(V/V)	0.46 U	0.93	20	0.53 U	0.95	0.49 U	1.3	3.9	2.4 U
56-23-5	Carbon tetrachloride	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
71-43-2	Benzene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.69	0.49 U	0.44 U	0.56	2.4 U
107-06-2	1,2-Dichloroethane	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
79-01-6	Trichloroethene	PPB(V/V)	0.46 U	0.49 U	16	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
78-87-5	1,2-Dichloropropane	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
10061-01-5	cis-1,3-Dichloropropene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
108-88-3	Toluene	PPB(V/V)	1.6	1.3	14	0.91	2.4	0.89	1.9	2.6	4.2
10061-02-6	trans-1,3-Dichloropropene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
79-00-5	1,1,2-Trichloroethane	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
127-18-4	Tetrachloroethene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
106-93-4	1,2-Dibromoethane (EDB)	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
108-90-7	Chlorobenzene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
100-41-4	Ethylbenzene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
136777-61-2	m-Xylene & p-Xylene	PPB(V/V)	0.66	0.49 U	3.9	0.53 U	0.97	0.49 U	0.44 U	0.64	2.4 U
95-47-6	o-Xylene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
100-42-5	Styrene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
79-34-5	1,1,2,2-Tetrachloroethane	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
108-67-8	1,3,5-Trimethylbenzene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
95-63-6	1,2,4-Trimethylbenzene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.99	0.49 U	0.44 U	0.48 U	2.4 U
541-73-1	1,3-Dichlorobenzene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
106-46-7	1,4-Dichlorobenzene	PPB(V/V)	14	0.49 U	240	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	350
95-50-1	1,2-Dichlorobenzene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
100-44-7	Benzyl chloride	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
120-82-1	1,2,4-Trichlorobenzene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U
87-68-3	Hexachlorobutadiene	PPB(V/V)	0.46 U	0.49 U	2.4 U	0.53 U	0.47 U	0.49 U	0.44 U	0.48 U	2.4 U