FOCUSED GROUNDWATER REMEDIATION REPORT

(Volume I of V)

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For The:
570 MAIN STREET PROPERTY
WESTBURY NEW YORK
(NYSDEC SITE CODE # 130043A)

Prepared For:
IMC EASTERN CORP.
C/O SUE GORNICK
9730 INDEPENDENCE AVENUE
CHATSWORTH, CA 91311

MAY 2002

Hull
& associates, inc.

FOCUSED GROUNDWATER REMEDIATION

FOR THE
570 MAIN STREET
MANUFACTURING FACILITY
WESTBURY, NEW YORK

NYSDEC SITE CODE #130043A

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1.0 EXECUTIVE SUMMARY

Hull & Associates, Inc. (Hull) was retained by IMC Eastern Corp. (IMC) to prepare a Focused Groundwater Remediation Report for the former IMC Magnetics facility at 570 Main Street in Westbury, New York; New York State Department of Environmental Conservation (NYSDEC) Code #130043A (Site). The Site is within the New Cassel Industrial Area (NCIA), a Class 2 inactive hazardous waste site as designated by the NYSDEC.

Activities conducted during the remedial effort described herein were directed toward completing the preferred alternative of *in-situ* chemical oxidation of groundwater contamination, as identified in the September 1999 Focused Groundwater Feasibility Study (Revised September 1999 – Hull Document # NMB007.200.0019). The NYSDEC issued a Record of Decision (ROD) in March 2000 that identified *in-situ* chemical oxidation as the selected remedy for on-Site groundwater contamination. Preparation of this document and all activities performed at the Site have been, to the maximum extent practicable, in accordance with the provisions of Consent Order Index # 1-W1-0750-00-03 effective April 26, 2001 (the Order).

This Focused Groundwater Remediation Report has been prepared for IMC and the NYSDEC to describe the procedures and findings of the pilot system installation, treatability study and in-situ chemical oxidation pilot study, conducted between August 27, 2001 and January 4, 2002. The report also references operation and monitoring of a soil vapor extraction (SVE) system to the extent that it was influenced by the groundwater pilot study and influences groundwater quality at the Site.

The primary objective of the work was to identify the effectiveness of the remedial system in attaining Site-specific cleanup goals. The primary cleanup goal was, to the extent practicable, to affect significant reduction (i.e., two or more orders of magnitude) in volatile organic compound (VOC) concentrations beneath the source area in Area 2. An additional Site-specific goal was, to the extent practicable, to reduce on-Site VOC concentrations surrounding and downgradient of the source area to concentrations approximating those detected in upgradient (background) monitoring wells.

Upon obtaining right-of-way access permits and utility clearance, two monitoring well couplets were installed near to and downgradient of the source area at Leaching Pool LP2-B, where VOC concentrations in soil and groundwater have historically been the highest Site-wide. A well nest was installed upgradient of the source area to identify concentrations of VOCs entering the Site from upgradient sources. Three application well couplets were installed in Area 2 to provide access for injection of chemical oxidation reagents as well as to allow for groundwater monitoring within and immediately surrounding the source area. Each couplet consisted of: a well that was screened across the water table (approximately 55 ft. below the ground surface (bgs)) to a depth of 64 ft. bgs; and a well that extended from approximately 66 ft. bgs to 81 ft.

During and shortly after installation of the application wells, saturated soil and groundwater samples were collected for use by ISOTEC in chemical oxidation treatability studies. Samples were also collected from new and existing groundwater monitoring wells and tested for VOCs to form a baseline by which to compare post pilot study analytical data.

Treatability studies were successful in that VOCs concentrations in groundwater collected at the Site were significantly lowered or completely eliminated. The studies determined that injection of an iron-based catalyst solution would be required due to a paucity of available iron and manganese in the aquifer to support the Fenton reaction. The treatability studies also indicated that following chemical oxidation, the aquifer in the treatment area would have a near neutral pH.

Four rounds of chemical oxidation reagent application were completed from December 3 through December 11, 2001. Reagent formulations and application volumes were designed by ISOTEC to maximize oxidation of VOCs in the treatment area. Post-treatment groundwater monitoring was conducted at selected wells during a December 19, 2001 event and a January 4, 2002 event. Monitoring of soil vapor extracted by the SVE system was conducted before, during and after the pilot study, in part to evaluate changes in VOC concentrations related to chemical oxidation activities.

Post-treatment monitoring revealed that VOC concentrations beneath Leaching Pool LB2-B were significantly reduced. For example, the PCE concentration at application well AW-2U was reduced from a baseline of 4,000 ug/L to approximately 10 ug/L. Concentrations of PCE in downgradient MW-5U increased in the initial post-treatment sampling event followed by a substantial reduction in concentration in the second post-treatment monitoring event.

While concentrations of VOCs at some of the monitoring wells exceeded background concentrations, as determined by monitoring of an upgradient well nest, post-treatment trends have not been established. Hull therefore recommends that semi-annual groundwater monitoring be initiated to provide trend data suitable to identify whether additional chemical oxidation applications are warranted. To the extent that VOC concentrations do not show a downward trend and/or approximate concentrations seen in the background wells, Hull will recommend additional chemical oxidation treatments. If treatments are determined to be ineffective, Hull will evaluate and design an alternative remedial approach that addresses known Site conditions.

Based on data indicating near-asymptotic VOC removal trends, and considering the property owner's need for space presently occupied by the system, Hull recommends that above-ground components of the SVE system be removed. The SVE wells would remain in place for treatment by a mobile SVE unit as warranted. In general, SVE would be conducted over a period of several days per treatment interval in the event that VOC concentrations in groundwater increase significantly and to the extent that these increases may be attributable to VOCs in unsaturated soils.

2.0 INTRODUCTION

2.1 General

Hull & Associates, Inc. (Hull) was retained by IMC Eastern Corp. (IMC) to prepare a Focused Groundwater Remediation Report for the former IMC Magnetics facility at 570 Main Street in Westbury, New York; New York State Department of Environmental Conservation (NYSDEC) Code #130043A (Site). The Site is within the New Cassel Industrial Area (NCIA), a Class 2 inactive hazardous waste site as designated by the NYSDEC.

Preparation of this document and all activities performed at the Site have been, to the maximum extent practicable, in accordance with the provisions of Consent Order Index # 1-W1-0750-00-03 effective April 26, 2001 (the Order).[1] To date, fieldwork and reporting have also been, to the maximum extent practicable, consistent with the April 2001 Focused Groundwater Remediation Work Plan (Work Plan; Hull Document # NMB007.200.0035) and supporting documents contained therein.

Activities conducted in the remedial effort described herein were directed toward completing the preferred alternative of *in-situ* chemical oxidation of groundwater contamination, as identified in the September 1999 Focused Groundwater Feasibility Study (Revised September 1999 – Hull Document # NMB007.200.0019). The NYSDEC issued a Record of Decision in March 2000 that identified *in-situ* chemical oxidation as the selected remedy for on-Site groundwater contamination.

2.2 Site Description

The Site is located at 570 Main Street in Westbury, New York, and is within the 170-acre NCIA. The NCIA contains approximately 200 industrial or commercial enterprises. A Site Location Map is presented on Figure 1. The Site was occupied by IMC from the early 1950s until 1992. The property is slightly over two acres with one manufacturing building and a paved parking lot covering most of the area. The Site is currently owned and occupied by Castle Collision, an entity unrelated to IMC.

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[1] The Order addresses "Development and Implementation of a Remedial Program for Operable Unit 2 of an Inactive Hazardous Waste Disposal Site, Under Article 27, Title 13, and Article 71, Title 27 of the Environmental Conservation Law of the State of New York."

2.3 Site History and Operations

Products made during IMC's occupation of the Site included, among others, induction motors, fans and blowers, stepper motors and other rotating machines. Upon cessation of IMC's operation in 1992, Anson Environmental, Ltd. (Anson) developed a Closure Plan pursuant to NYCRR Part 373. Sampling and analyses conducted by Anson during closure activities identified chlorinated hydrocarbons, petroleum hydrocarbons and metals in unsaturated soils in several locations.

An investigation lead by the NYSDEC preliminarily concluded that the Site is one of at least two potential source areas contributing to the groundwater contamination described as the "570 Main Street Plume."[2] This conclusion was based on limited data and had not been confirmed by investigations performed by Lawler, Matusky and Skelly Engineers or Anson. The investigation report also recommended that an Interim Remedial Measure (IRM) be implemented to remove source areas in Operable Unit 1 (OU-1, soils, as defined by the NYSDEC) that may be impacting the groundwater.

2.4 Previous Investigations

2.4.1 Anson Environmental, Ltd.

Anson performed preliminary investigative activities related to the closure of the IMC manufacturing operation at the Site. Anson reportedly developed a closure plan for the IMC facility in 1992; however, this closure plan was not available for review. Implementation of this closure plan began in March 1993, and consisted of exposing abandoned leaching pools and septic tanks from three areas of the Site, designated as Area 1, Area 2, and Area 3 (refer to Plate 1). Sediment and soil samples were collected from these locations for laboratory testing of volatile organic compounds (VOCs). Sediment samples were also collected from four floor drains in the building for laboratory VOC analyses. Finally, a composite sample of water was collected during power washing of floors in the building and samples of concrete floors were submitted for laboratory analyses.

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[2] *Site Investigation Report, New Cassel Industrial Area Site, North Hempstead, Nassau County*, Lawler, Matusky & Skelly Engineers, February 1995, p. 6-4 and 6-5.

Laboratory analyses revealed the presence of VOCs in soils and floor drain sediment samples. The highest concentrations were detected beneath Area 2.

Based upon findings from the field activities, Anson identified the following three main potential source areas:

1. Area 1, located outside the building in the Site's northeast corner;
2. Area 2, located outside the building in the Site's northwest corner; and
3. Area 3, located outside the building near the Site's southwest corner.

In addition to these areas, Anson identified five probable floor drains that were also considered potential source areas.

Anson installed and sampled three groundwater monitoring wells in 1994. The monitoring wells were apparently screened from above the water table to a depth of approximately ten ft. below the water table. VOCs were detected in all monitoring wells.

2.4.2 Lawler, Matusky & Skelly Engineers, February 1995

Lawler, Matusky & Skelly Engineers (LMS) were contracted by NYSDEC to conduct a site investigation of the NCIA. The investigation consisted of a file review, groundwater sampling and analysis from 56 existing monitoring wells, and groundwater sampling and analysis from direct-push soil boring locations installed during the investigation. The Site was identified as a potential source of groundwater contamination in the VOC plume designated as the "570 Main Street plume;" however, this was never confirmed by investigations conducted by LMS or Anson.

2.4.3 Interim Remedial Measure (Soils), February 1997

Hull and Land Tech Remedial, Inc. (LTR – presently Handex of New York) conducted an Interim Remedial Measure (IRM) Investigation of soils at the Site from May to July 1996. Investigative activities were conducted per an approved Work Plan and included: completion of a detailed file review and source and release identification study; collection of unsaturated soil samples at various depths in eighty-eight direct-push borings; collection of five shallow groundwater samples; and completion of a soil vapor extraction (SVE) pilot test. The Final Investigation Report documents the results of the IRM.

Based on a file review and source and release identification study, four general areas of concern were evaluated including Areas 1, 2, and 3 and several dry well-type floor drains identified by previous investigations.

The primary contaminants detected in soils were VOCs, with tetrachloroethene (PCE) found at the highest concentrations. The highest concentration of PCE detected at the Site was almost 40,000,000 ug/kg, located at a depth of ten to twelve ft. beneath a former leaching pool in Area 2. Identification of PCE in excess of 1% of the soil mass provides strong indication of the presence of residual dense nonaqueous phase liquid (DNAPL) beneath Area 2.[3] With the exception of PCE, no VOCs exceeded 100 ug/kg in soils outside of Area 2. Furthermore, no VOCs other than PCE were detected below a depth of 10 ft. outside Area 2.

The highest VOC concentrations detected in Site groundwater were collected from direct-push boring SB-25 at a depth interval of 60-62 ft. below the ground surface. SB-25 was installed through the leaching pool in Area 2. Concentrations ranged up to 2,680 ug/L for tetrachloroethene (PCE - mobile lab) and trichloroethene (TCE - fixed lab), respectively. Combined with the distribution of VOCs in unsaturated soils, the relatively high concentrations of VOCs in SB-25 indicated that Area 2 is a likely source of groundwater contamination.

The IRM Investigation determined that heavy metals in soils did not require remediation based on their concentrations and distribution. Based on pathway completeness evaluations for VOCs, the IRM Investigation indicated that active intervention would be required in Area 2. Considering the volatility of VOCs detected in Area 2 and the results of a pilot study, Hull and LTR selected soil vapor extraction (SVE) as the interim remedial measure and prepared a plan to describe operation, monitoring and maintenance of the system.

Hull and LTR installed a SVE system in August 1997 by connecting it to nested vapor extraction wells in Area 2 that were used for the pilot test. The system began continuous operation in

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[3] Cohen, Robert M. and J.W. Mercer. 1993. *DNAPL Site Evaluation.* CRC Press, Inc. Boca Raton, FL.

October 1997. The SVE system continues to operate in accordance with the approved Soil Vapor Extraction Operation, Monitoring and Maintenance Plan.

2.4.4 Focused Groundwater Investigation, September 1998

Hull and LTR conducted a Focused Groundwater Investigation at the Site. Field investigations were conducted between June 18, 1998 through July 30, 1998. The objective of the work was to gather data for evaluating the fate and vertical and horizontal distribution of selected VOCs and metals in groundwater upgradient and downgradient of Area 2, as described in the revised Work Plan for the Focused Groundwater Investigation and Focused Groundwater Feasibility Study (Hull Document # NMB004.300.0074).

Major field activities for the Focused Groundwater Investigation included:

1. installation of twelve monitoring wells in four three-well clusters (MW-4s, MW-5s, MW-6s and MW-7s);
2. measurement of static water levels in the wells to confirm the direction of groundwater flow;
3. sampling of wells and testing for VOCs and selected heavy metals; and
4. completion of biodegradation studies.

There was no evidence of dense phase nonaqueous liquid (DNAPL) during drilling activities. Unsaturated soils encountered consist primarily of a heterogeneous mixture of brown to fine sands with lesser amounts of silt, medium sands, coarse sands and gravels. Saturated soils were encountered at approximately 50 feet below grade, and were found to consist primarily of brown to tan, fine to medium and fine to coarse sand. Lenses of fine sandy and silty soils were found with clayey seams in the northwestern portion of the Site. Relatively fine-grained lenses appeared to grade into homogeneous deposits south of the MW-5 cluster.

Water level measurements showed minimal variations in heads within clustered wells, indicating that groundwater flow within the upper 90 feet of the aquifer was essentially horizontal. Evaluation of lateral head distributions in upper wells indicated an apparent southwestern direction of groundwater flow.

Existing monitoring wells MW-1 and MW-3 and new well clusters were sampled in July 1998 for analysis of VOCs and selected metals. Existing well MW-2 could not be sampled as the building's tenant had apparently covered it over during landscaping activities. Monitoring wells MW-4U, MW-5U, MW-6U and MW-7U were also sampled for groundwater characterization and microbial studies.

Analytical results showed that chlorinated VOCs made up the primary VOCs in most of the wells at the Site; toluene was prevalent in middle and lower wells in downgradient portions of the Site. Of the chlorinated VOCs detected, PCE was found at the highest concentrations (up to 160 µg/L in MW-5U, located near to and downgradient of Area 2). TCE and 1,1,1-trichloroethane (1,1,1-TCA) were detected at concentrations of up to 34 ug/L and 60 ug/L, respectively, in the MW-5 well cluster. At least one of the typical biodegradation daughter products 1,1-dichloroethene (1,1-DCE), 1,1-dichloroethane (1,1-DCA) and cis 1,2-dichloroethene (cis 1,2-DCE) was detected in all wells except MW-1.

Evaluation of the distribution of VOCs indicates that chlorinated VOCs, primarily made up of 1,1,1-TCA and TCE, were entering the Site from one or more upgradient sources and combining with VOCs in Area 2 groundwater. Chlorinated VOC concentrations showed marked reduction as they migrated away from Area 2.

Metals analyses showed that total cadmium and mercury were not present above method detection limits in groundwater. The highest total barium concentration was detected in the most downgradient well (0.25 mg/L at MW-7U). The highest concentrations of lead and chromium were upgradient of Area 2 in MW-4U (0.054 mg/L and 0.223 mg/L, respectively) and downgradient of the Site in MW-7U (0.09 mg/L and 0.155 mg/L, respectively). The lowest concentrations of lead and chromium detected in the upper portion of the aquifer are in MW-5U and MW-6U. The distribution of metals suggested that contribution to groundwater occurred largely from off-Site sources.

Detection of daughter products in groundwater indicated that biodegradation of chlorinated VOCs has occurred. In particular, detection of cis 1,2-DCE showed degradation of PCE and

TCE. Taken together with the above observations, groundwater characterization results indicated that conditions in the aquifer system were moderately favorable for anaerobic degradation of PCE and TCE.

Microbial studies showed that at all wells sampled bacterial strains exist that were capable of biodegrading chlorinated VOCs. The strain most adaptable to VOC concentrations found at the Site was identified in groundwater collected from MW-5U, providing strong evidence of active biodegradation in the vicinity of Area 2, where nutrient sources were likely to be the most abundant.

2.4.5 Groundwater Sampling Subsequent to the Focused Groundwater Investigation

During October 1998, IMC identified two monitoring wells, UN-22 and UN-24 (NYSDEC designations), located west of the Site. These were sampled to more completely define the distribution of VOCs downgradient of Area 2. The locations of UN-22 and UN-24 are shown on Plate 1.

Well soundings indicated that UN-22 and UN-24 are screened at or just below the water table. Based on results of sampling completed in November 1998, UN-22 contained TCE and PCE at concentrations of 230 ug/L and 11 ug/L, respectively. UN-24 contained TCE and PCE at concentrations of 68 ug/L and 11 ug/L, respectively. Ratios of TCE to PCE concentrations in these wells were not consistent with ratios observed in samples near Area 2 (e.g. the MW-5 cluster and SB-25), where PCE predominates. This indicated that at least a portion of the contamination found in UN-22 and UN-24 had migrated from a source other than Area 2.

2.4.6 Focused Groundwater Feasibility Study, September 1999

The Focused Groundwater Feasibility Study examined the nature and distribution of contaminants in groundwater, as determined by previous studies, and presented a groundwater model that evaluated current impacts to existing groundwater supply wells. The study concluded that contaminants originating at the Site are unlikely to be captured by Bowling Green or Westbury Water District Wells, and that the most realistic exposures to contamination would be ingestion of water from a future water supply well.

The study described probable VOC contamination entering the Site from one or more upgradient sources. The study concluded that continued migration of these VOCs onto the Site would make attainment of State Drinking Water maximum contaminant limits technically impracticable. The study therefore recommended identifying alternative cleanup standards, to be established during Remedial Design. Furthermore, the study evaluated remedial technologies with a focus on removing source material, to the extent possible, and allowing intrinsic remediation to reduce concentrations downgradient of the Site.

As a product of screening of numerous remedial technologies, Hull selected *in-situ* chemical oxidation in conjunction with intrinsic remediation as the preferred alternative for addressing groundwater contamination at the Site. *In-situ* chemical oxidation was determined to be more suited to achieving remedial goals than other technologies as it is capable of destroying source-concentration VOCs without producing toxic by-products. Given the size of the apparent source area and other Site-specific conditions, costs for employment of *in-situ* chemical oxidation were also found to be reasonable relative to other screened technologies.

2.5 Geology/Hydrogeology Summary

2.5.1 Regional Geology/Hydrogeology

The majority of the groundwater underlying NCIA is in unconsolidated glacial deposits of Pleistocene age and coastal-plain deposits, of both continental and marine origin, of late Cretaceous age. These unconsolidated deposits consist of gravel, sand, silt, and clay and are underlain by bedrock of lower Paleozoic and/or Precambrian age. The bedrock, which is virtually impermeable, forms the base of the groundwater reservoir. The two primary aquifers in the area of the Site are the Upper Glacial Aquifer and the Magothy aquifer. The Magothy aquifer is underlain by the Raritan clay.

The Upper Glacial Aquifer consists of outwash deposits of late Pleistocene age. The Upper Glacial Aquifer overlies the Magothy aquifer in the investigation area, and its deposits form the present land surface. The upper Pleistocene glacial outwash deposits consist of stratified deposits of sand and gravel with some cobbles and may locally contain thin clay beds. These deposits are highly permeable and allow recharge water to percolate downward with relative ease to the water table and, subsequently, to the underlying aquifers.

The Upper Glacial Aquifer, as defined and used by the USGS on Long Island, includes both the unsaturated and saturated portions of the upper Pleistocene deposits. USGS maps indicate that the thickness of the Upper Glacial Aquifer in the area of the Site is approximately 50 ft.[4] Data collected by Hull during investigation of the Site and by the NYSDEC during investigations in the NCIA indicate that the upper Pleistocene deposits in the NCIA are unsaturated; therefore, the water table may locally occur in the underlying Magothy aquifer approximately 55 ft. below grade. Regional groundwater flow direction local to the NCIA, as determined by the USGS and the Nassau County Department of Public Works, is towards the southwest.

The Magothy aquifer is the principal aquifer underlying Long Island and is the island's main source of potable water. The aquifer is composed of upper Cretaceous sediments that overlie the Raritan clay. Its deposits consist primarily of lenticular and discontinuous beds of very fine to medium sand, commonly clayey or containing thin clay lenses that are interbedded with clay and sandy clay silt, and some sand and gravel. Coarse beds of sand and gravel commonly occur in the lower 100 to 150 ft. of the aquifer. Previous investigations have indicated that the aquifer sediments appear to grade upward from coarser grained at the base to finer grained at the top. The greater proportion of the clay and sandy clay occurs in the upper half of the aquifer. Beds of clay occur locally towards the top of the aquifer and seem to be distributed irregularly throughout the Town of North Hempstead. This is evident in the well completion logs generated for public supply well numbers N-8956 and N-8957 in the Westbury Water District (Bowling Green Wells), which are located approximately 3,000 ft. southeast of the Site. A solid brown clay layer was logged during the drilling of well number N-8956 at 95 ft. below grade. This same clay layer was not encountered during the drilling of well number N-8957, which was installed only 140 ft. to the southeast of N-8956.

The Magothy aquifer is approximately 500 ft. thick beneath the NCIA, and is encountered at a depth of approximately 50 ft. below grade. According to the USGS it is quite possible that the uppermost part of the Magothy contains deposits of Pleistocene age, or, conversely, that the lower part of the upper glacial aquifer contains deposits of Cretaceous age. The boundary

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[4] U.S. Geological Survey, in cooperation with the Nassau County Department of Public Works, *Geology of the Town of North Hempstead, Nassau County, Long Island, New York*. 1979.

between the Cretaceous and Pleistocene deposits is often indistinguishable in Nassau County because the sediments are of similar composition and show no significant lithological difference.

2.5.2 Site Geology/Hydrogeology

Unsaturated soils at the Site consist primarily of a heterogeneous mixture of brown to tan fine sands with lesser amounts of silt, medium sands, coarse sands and gravels. A discontinuous layer with increased silt content exists in the interval between grade and approximately 10 ft. below grade. Below this silty layer, soil composition remains generally constant with a slight fining-downward trend (progressively less coarse sands and gravels with depth) to approximately 50 ft. below grade. No clay lenses, or other impermeable features were encountered at the unsaturated deposits.

Saturated deposits were encountered at approximately 50 ft. below grade. These deposits consist primarily of brown to tan, fine to medium and fine to coarse sands. In the northwestern portion of the Site, extending to Main Street's north right-of-way, lenses of fine sand, silty fine and silty fine to medium sand, and clayey, silty fine to medium sand were encountered at depths between approximately 57 and 120 ft. below grade. Occasional thin silty clay seams were encountered during drilling of the MW-4 cluster in the north right-of-way for Main Street. These seams appear to pinch out toward the south. Saturated deposits are relatively homogeneous south of the MW-5 well cluster along the western boundary of the Site.

Soil organic carbon content at the Site was tested during the IRM Investigation and found to average approximately 0.2 percent total organic carbon (TOC). Higher TOC values were detected in the silty layer encountered in the near-surface sediments, with values as high as approximately 0.8 percent.

Water level measurements during the IRM Investigation and the Focused Groundwater Investigation indicated a groundwater flow at the Site to be toward the southwest, consistent with the regional groundwater flow direction in the NCIA. The average groundwater gradient was determined to be approximately 0.0015 ft/ft.

Minimal variations in heads were identified in clustered wells during the Focused Groundwater Investigation. This indicates that groundwater flow within the upper ninety ft. of the aquifer is essentially horizontal.

3.0 REMEDIAL ACTION OBJECTIVES

The ROD described remediation goals for groundwater as follows:

> "At a minimum, the remedy selected should eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles."

The ROD further listed selected goals for the Site as follows:

ξ Eliminate, to the extent practicable, contamination in on-site groundwater which may eventually contribute to the contaminant plumes migrating from the NCIA;

ξ Eliminate, to the extent practicable, ingestion of groundwater affected by the site that does not attain NYSDEC Class GA Ambient Water Quality Criteria

ξ Eliminate, to the extent practicable, off-site groundwater that does not attain NYSDEC Class GA Ambient Water Quality Criteria.

As described in the Focused Feasibility Study, the Site did not pose a significant threat to public health and/or the environment prior to implementation of the remedy. However, VOCs originating at one or more uncontrolled sources located upgradient of the Site appeared to be migrating onto the Site, creating "background" conditions with elevated VOC concentrations. Moreover, the Focused Groundwater Investigation presented evidence that DNAPL may have existed in groundwater beneath Area 2, posing potential difficulties with respect to attaining cleanup within a reasonable time frame.

For the above reasons, attainment of NYSDEC Class GA Ambient Water Quality Criteria was anticipated to be technically impracticable until:

1. contaminant sources upgradient of the Site are contained; and
2. potential DNAPL beneath Area 2 is removed.

Hull therefore proposed Site-specific cleanup targets in the Feasibility Study report and during subsequent discussions with the NYSDEC. Hull designed the remedial approach to achieve a general Site-specific goal of significantly reducing VOC concentrations in the apparent source area (i.e., more than one order of magnitude reduction). Hull also requested that VOC concentrations be compared with background concentrations, as determined by ongoing groundwater monitoring.

4.0 REMEDIAL SYSTEM INSTALLATION

4.1 Monitoring Well and Application Well Installation

A total of seven monitoring wells (MW-8U, MW-8M, MW-8L, MW-9U, MW-9L, MW-10U and MW-10L) and six application wells (AW-1U, AW-1L, AW-2U, AW-2L, AW-3U, and AW-3L) were installed in and around Area 2 between September 7 and September 13, 2001. The "U", "M", and "L" designations stand for upper, middle, and lower, respectively, depending on the relative depth of the screened interval. Well installation and soil sampling activities were conducted consistent with the procedures outlined in the Work Plan and associated Field Sampling and Analysis Plan (FSAP) and Quality Assurance Project Plan (QAPP). The locations of the newly installed monitoring and application wells are shown on Figure 2.

4.1.1 Soil Boring Installation

Drilling and sampling activities were performed by Total Quality Drilling with a tuck mounted auger rig and 6.25-inch inside diameter hollow stem augers (HSAs). All drilling operations were performed under the direct supervision of a geologist from Hull. Prior to the start of drilling, the New York City & Long Island One Call Center was contacted to determine the locations of buried utilities. In addition, the Long Island Power Authority (LIPA) visited the Site and de-energized overhead electric lines.

4.1.2 Soil Sample Collection

Soil samples were collected at five-foot intervals utilizing two-inch inside diameter by two-foot long split-spoon soil samplers. Samples were collected continuously from the AW-2 couplet boring below a depth of 50 feet below ground surface (bgs). Soil samples were logged in the field by a geologist from Hull and field screened with a photoionization detector (PID) in a manner consistent with that described in the FSAP. Soil boring logs and well construction diagrams are included in Appendix A.

Saturated soil samples were collected between 60 and 66 feet bgs from AW-2U. The AW-2U samples were used in a laboratory treatability study conducted to test the effectiveness of ISOTEC's chemical oxidation process on Site-specific soil samples. The samples were divided into three representative splits, two of which were containerized in laboratory-supplied sample jars, properly labeled, and immediately placed on ice in a cooler. The other split was placed in a *Ziploc* bag for headspace screening. One set of the containerized samples was submitted to American Analytical Laboratories (American Labs) and analyzed for VOCs by U.S. EPA Method 8260 and TOC by U.S. EPA Method 9060.[5] The other set of containerized samples was submitted to ISOTEC and used for bench testing as part of the laboratory treatability study.

4.1.3 Decontamination of Drilling and Soil Sampling Equipment

Decontamination of drilling and sampling equipment was performed to minimize the potential for cross contamination and ensure the validity of the laboratory results. Split spoons were decontaminated between each sampling interval by washing in a non-phosphate detergent/potable water solution and then rinsed with potable water. Between each soil boring location, all down-hole drilling equipment (e.g., rods, augers, and sampling spoons) was decontaminated by washing with a pressurized steam cleaning unit. All decontamination procedures were completed on-Site under the observation of a geologist from Hull. Decontamination water was containerized in Department of Transportation (DOT)-approved 55-gallon steel drums and staged on-Site pending proper disposal.

4.1.4 Well Construction

Monitoring and application well construction activities were conducted consistent with the procedures outlined in the FSAP. Completion depths and screened intervals for the wells were consistent with those specified in the FSAP. All wells were constructed of two-inch inside diameter Schedule 40 PVC riser and 0.010-inch machine-slotted screen. Clean latex or nitrile gloves were worn by all personnel handling the well screen and riser during installation to prevent contamination of these materials. Details of well construction including screened interval, sand pack interval, etc. are summarized in Table 1. Well construction diagrams are included on the soil boring logs in Appendix A.

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[5] The Work Plan specified that soil analyses would be conducted by Lancaster Labs. However, the samples were collected the day of the World Trade Center disaster and could not be shipped to Lancaster Labs within the 48-hour holding time. Hull contacted Joe Jones of NYSDEC for approval to have the samples driven to and analyzed by American Analytical Laboratories. Due to the extraordinary circumstances at the time, Mr. Jones approved of the proposed change to the scope of work.

4.2 Baseline Groundwater Monitoring Event

Personnel from Handex of New York (Handex), under the direction of Hull, collected groundwater samples from all Site monitoring well couplets/nests and application well couplets between September 28 and October 1, 2001. The purpose of the sampling event was to determine baseline groundwater conditions at the Site prior to application of ISOTEC's chemical oxidation reagents. All groundwater sampling and handling activities were conducted consistent with those outlined in the FSAP and QAPP.

Prior to sampling, the wells were purged by removing a minimum of three well volumes of groundwater. Purging was performed utilizing a submersible, stainless-steel *Grundfos* pump. Field forms documenting purging efforts are contained in Appendix B-1. All purge water was containerized in DOT-approved 55-gallon steel drums and staged on-Site pending proper disposal.

Groundwater samples were collected with dedicated, disposable, polyethylene bailers and nylon strings. Duplicate samples were collected from MW-3, MW-4L, and AW-1U. All samples were immediately place in laboratory-supplied containers and then preserved on ice in a cooler. In addition to groundwater samples, field blanks were also prepared for quality assurance/quality control (QA/QC) procedures. Field blanks were prepared with laboratory supplied distilled water. The appropriate chain-of-custody records accompanied the samples during transport to the laboratory.

Lancaster Laboratories analyzed groundwater samples collected from all Site monitoring and application wells for VOCs by U.S. EPA Method 8021. In addition, samples collected from the MW-5 well nest, along with samples collected from the newly installed monitoring and application wells, were analyzed for iron by U.S. EPA Method 7380, sulfate by U.S. EPA Method 375.4, TOC by U.S. EPA Method 9060, and total dissolved solids (TDS) by U.S. EPA Method 160.1.

5.0 LABORATORY TREATABILITY STUDY

5.1 Study Objectives

As described in ISOTEC's November 2001 report, contained in Appendix C, objectives of the treatability study were to:

1. determine for each ISOTEC catalyst under evaluation the amount of catalyst/oxidant mix (reagent) required to oxidize the measured VOCs at the Site (i.e., the Site-specific stoichiometry per catalyst);
2. evaluate the effectiveness of ISOTEC's Fenton-based chemical oxidation on Site groundwater samples;
3. evaluate the effectiveness of ISOTEC's Fenton-based chemical oxidation in the presence of Site aquifer soils; and
4. determine the most effective reagent for the pilot scale application at the Site.

Findings from the laboratory treatability study were applied during the remedial effort that was completed at the Site in December 2001.

5.2 Study Approach

ISOTEC composited saturated soil samples collected by Hull during installation of reagent application well AW-2 (depth interval of 60.0' to 66.0') on September 11, 2001. The aquifer material was mixed with a portion of a five-liter groundwater sample collected from AW-2U by Handex on October 1, 2002. The mixture formed a soil-slurry mix. Aliquots of the groundwater sample were tested for VOCs, iron and manganese (initial conditions) by Integrated Analytical Laboratories, LLC of Randolph, New Jersey and the remainder of the groundwater was reserved for treatability testing.

ISOTEC conducted testing on Site groundwater to determine the optimum catalyst/oxidant (reagent) mix and reagent to use in order to oxidize VOCs within the groundwater (GW-test VOC experiment). ISOTEC also conducted experiments on a soil-slurry mix made up of a 1:1 ratio (by weight) mixture of soil and groundwater collected at the Site to determine the optimum reagent formulation and volume in order to oxidize VOCs in a simulated aquifer (SL-test VOC experiment).

As part of the GW-test VOC experiment, Site groundwater was placed in four pairs of 140 mL sealed batch reactors, leaving sufficient headspace for injection of predetermined reagent volumes. Additional reactor pairs were prepared for use as controls. Each of the batch reactor pairs received variable reagent mixtures and/or reagent volumes. In the case of control samples, distilled water was injected. One container in a given reactor pair served as a treatment reactor while the other served as a monitoring reactor. During testing, small volumes of sample were periodically collected from the monitoring reactor to measure hydrogen peroxide concentrations. Sampled volumes were replaced with distilled water.

The SL-test VOC experiment required placement of soil-slurry mix in five pairs of 120 mL sealed batch reactors. Additional reactors were set up for controls. Sufficient headspace was created in each reactor to allow for injection of predetermined volumes of reagent, or distilled water in the case of the control reactors. An additional reactor was set up and stored at 4°C to represent initial conditions. One container in a given reactor pair served as a treatment reactor while the other served as a monitoring reactor. During testing, small volumes of aqueous sample were periodically collected from the monitoring reactor to measure hydrogen peroxide concentrations. Sampled volumes were replaced with distilled water.

Groundwater and soil-slurry reactors were treated using patented ISOTEC Catalyst 4260 and ISOTEC Catalyst 6260 (reagent mixes). One set of reactors was treated with up to two dosages of Catalyst 4260 and another set was treated with up to two dosages of Catalyst 4260. One set of soil-slurry reactors was treated with up to three doses of Catalyst 4260 and another set was treated with up to two doses of Catalyst 4260.

At the conclusion of the GW-test and SL-test VOC experiments, oxidation reactions were quenched using catalase. Replicate volumes of catalase were also injected into control reactors to demonstrate an absence of influence on VOC concentration by the catalase injection. Following quenching, water samples from for the GW-test reactors and control vessels were decanted into 40 mL glass vials and submitted to Integrated Analytical Laboratories, LLC for analysis of VOCs. Slurry samples from reactors and control vessels for the SL-test were also collected and tested for VOCs. Final pH values were determined for material within each of the reactors.

6.0 CHEMICAL OXIDATION PILOT STUDY

6.1 Reagent Applications

ISOTEC, under the direction of Hull, completed four rounds of chemical oxidation reagent application at the Site from December 3 to December 5, 2001 and December 10 to December 11, 2001. The number of application rounds and the volume of reagents injected during each round were determined by ISTOEC following review of the laboratory treatability study, and were designed to maximize oxidation of VOCs in the treatment area. Each round consisted of injecting a proprietary iron-based catalyst solution and stabilized hydrogen peroxide at application wells AW-1U, AW-1L, AW-2U, AW-2L, AW-3U, and AW-3L. The injection series utilized at each well during an individual application included the following:

1. 180 gallons of hydrogen peroxide;
2. 60 gallons of water;
3. 120 gallons of iron-based catalyst solution;
4. 30 gallons of water;
5. 60 gallons of hydrogen peroxide; and
6. 30 gallons of water.

A total of 2,880 gallons of catalyst (i.e., 120 gallons x six wells x four applications) and 5,760 gallons of hydrogen peroxide (i.e., 240 gallons x six wells x four applications) were injected into the treatment area during the four rounds. Field notes pertaining to the reagent application activities are included in Appendix B-2.

6.2 Post-Treatment Monitoring Events

Two post-treatment groundwater sampling events were conducted in order to determine the effect of the chemical oxidation reagent applications on VOC concentrations in Site groundwater. Monitoring of soil vapors extracted by the Site SVE system was also conducted.

6.2.1 Groundwater

Handex, under the direction of Hull, conducted post treatment groundwater sampling events at the Site on December 19, 2001 and January 4, 2002. Groundwater samples were collected from the wells located in and around Area 2 (i.e., the MW-5 nest and the newly installed monitoring and application wells). Well purging and sampling procedures were the same as those utilized during the baseline groundwater sampling event discussed in Section 4.2. Field data sheets for the December 19, 2001 and January 4, 2002 post-treatment sampling events are included in Appendices B-3 and B-4, respectively.

Samples collected during both events were submitted to Lancaster Labs and analyzed for VOCs by U.S. EPA Method 8021, iron by U.S. EPA Method 7380, sulfate by U.S. EPA Method 375.4, TOC by U.S. EPA Method 9060, and TDS by U.S. EPA Method 160.1. The results of the analyses were compared to those obtained from the baseline sampling event in order to determine the effect of the reagent applications on VOC concentrations in Site groundwater.

6.2.2 Soil Vapor

In anticipation of probable liberation of VOCs from groundwater during the chemical oxidation pilot study, the SVE system continued to operate. Monthly sampling of and analysis of soil vapors extracted by the SVE system was conducted before, during and after the pilot study.

7.0 FINDINGS

7.1 Saturated Soil analyses

Results obtained from analysis of saturated soil samples collected from AW-2U are summarized in Table 2. As indicated in Table 2, PCE was detected at 240 ug/kg in the sample from 60 to 62 feet bgs and 49 ug/kg in the sample from 64 to 66 feet bgs. No other VOC concentrations were detected above laboratory detection limits. Results of the analyses for inorganic analytes (i.e., TOC, iron, and manganese) are discussed in Section 7.3. A copy of the laboratory report for the soil sample analyses is included in Appendix E-1.

7.2 Baseline Groundwater Monitoring

Analytical results from the baseline groundwater sampling event are summarized in Table 3. Several VOCs were detected at measurable concentrations in Site monitoring and application wells. As indicated in Table 3, PCE was detected at the highest concentrations, particularly in wells located within Area 2. Concentrations of PCE upgradient of Area 2 ranged from 3.2 to 11 ug/L, as indicated by the results from MW-8U, MW-8M, and MW-8L. PCE concentrations from AW-2U and AW-2L, both of which are located in Area 2, were 4,000 and 460 ug/L respectively. Concentrations of PCE downgradient of Area 2 ranged from <1.0 to 19 ug/L, as indicated by the analytical results for samples collected from MW-5U, MW-5M, and MW-5L. A laboratory analytical report for the baseline groundwater samples is included in Appendix E-2.

7.3 Laboratory Treatability Study

Analysis of Site soil samples indicated that iron and manganese concentrations are not sufficient to catalyze the aqueous phase Fenton reaction. Injection of an iron catalyst solution would therefore be required as part of the pilot study. TOC concentrations in Site soils were below method detection limits. Iron, manganese and TOC analytical results are presented in Table 4-1 of ISOTEC's Laboratory Treatability Study Report (Appendix C).

Treatability testing for groundwater revealed that when compared with control samples both Catalyst 4260 and Catalyst 6260 provided greater than 99% destruction of total targeted VOCs following an initial reagent dosage. Analytical results of control samples and treated samples are presented in Table 5-1 of ISOTEC'S Laboratory Treatability Report (Appendix C).

VOCs were completely destroyed following treatability testing of soil-slurry mixtures using both Catalyst 4260 and Catalyst 6260. Analytical results of control samples and treated samples are presented in Table 5-2 of ISOTEC'S Laboratory Treatability Report (Appendix C).

Final pH values for groundwater and soil-slurry treatability tests were at or near neutral. The pH values were found to be desirable with respect to maintaining natural subsurface conditions.

7.4 Post-Treatment Monitoring

7.4.1 Groundwater

Analytical results for the December 19, 2001 and January 4, 2002 post-treatment groundwater sampling events are summarized in Tables 4 and 5, respectively. Concentration versus time plots for PCE and TCE detected in the AW-2 application well couplet and MW-5 and MW-8 monitoring well nests are shown on Figures 3 through 10. The AW-2 couplet was selected for data presentation because it exhibited the highest pre-treatment concentrations of VOCs. In addition, AW-2U displayed the most significant reduction in VOC concentrations following application of the chemical oxidation reagents. The MW-5 monitoring well nest was selected for data presentation because the wells are immediately downgradient of the source area and beyond the expected radius of treatment. The MW-8 monitoring well nest was selected because it is upgradient of the source area, and indicative of VOCs migrating onto the Site from upgradient sources.

As indicated on Figure 3, application of chemical oxidation reagents reduced PCE concentrations by over two orders of magnitude in AW-2U (within Area 2). Concentrations of PCE in downgradient MW-5U increased in the initial post-treatment sampling event followed by a substantial reduction in PCE concentration in the second post-treatment monitoring event (Figure 5).

7.4.2 Soil Vapor

Appendix D contains a memorandum describing operation of a soil vapor extraction system in Area 2 since October 1997. The memorandum also presents monthly monitoring results for extracted soil vapor that have been collected during the duration of system operation. Target analytes PCE, TCE and 1,1,1-TCA approached asymptotic concentrations in April 2000, after approximately 2.5 years of operation. Concentrations remained asymptotic for over one year until June 2001, when concentrations of PCE began to increase. The timing of the increase in PCE concentrations generally coincides with a lowering of the water table caused by unusually low rainfall in Long Island. It is reasonable to expect that elevated VOC concentrations that had previously been beneath the water table were exposed to vacuum from the SVE system after the water table lowered, thereby increasing concentrations observed in extracted soil vapors. Concentrations began to go down between October and November 2001, but increased in December following reagent application as part of the groundwater remedial effort. The December concentration increase was expected due to short-term volatilization from groundwater during the initial phases of reagent application. The SVE system was effective in reducing PCE concentrations after December 2001, and concentrations appear to be approaching pre-October 2001 levels.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The in-situ chemical oxidation pilot study was effective in significantly reducing VOC concentrations within the source area (i.e., over two orders of magnitude PCE reduction beneath Leaching Pool LP-2B, where concentrations have historically been the highest Site-wide). While concentrations of VOCs at some of the monitoring wells exceeded background concentrations, as determined by monitoring of the MW-8 nest, post-treatment trends have not been established. Hull therefore recommends that monitoring be initiated as described below to provide trend data suitable to identify whether additional chemical oxidation applications are warranted.

As described in the memorandum in Appendix D, the SVE system has been an ongoing burden to the property owner and his tenants, as aboveground components take up needed parking area. In consideration of this burden and based on the effectiveness of the SVE system in significantly reducing target VOC concentrations in soils, Hull requests that the SVE system be shut down and aboveground components decommissioned. As noted above, Hull will conduct groundwater monitoring beneath the area where SVE has been conducted. To the extent that VOC concentrations in groundwater increase significantly and to the extent that these increases may be attributable to VOCs in unsaturated soils, Handex will conduct SVE at selected wells using a mobile extraction and carbon treatment system. The period of operation for the mobile system may be defined based on the magnitude of VOC concentration increases seen in groundwater. Hull anticipates that the system will operate continuously for several days per event.

Pursuant to the ROD, semiannual groundwater monitoring will be conducted for a period of five years. Wells to be sampled initially will include:

- MW-1
- MW-3
- MW-4U
- MW-4M
- MW-4L
- MW-5U
- MW-6M
- MW-6L
- MW-7U
- MW-7M
- MW-7L
- MW-8U
- MW-9L
- MW-10U
- MW-10L
- AW-1U
- AW-1L
- AW-2U

MW-5M
MW-5L
MW-6U
MW-8M
MW-8L
MW-9U
AW-2L
AW-3U
AW-3L

Following initial monitoring events, Hull will evaluate the continuing need to sample all of the wells and, as appropriate, present justification for eliminating selected wells from the monitoring list.

Each monitoring event will consist of:

1. measurement of static water levels;
2. purging of a minimum of three volumes of water from each well;
3. collection of water samples; and
4. submittal of water samples to a laboratory for chemical analyses.

Groundwater samples will be collected and handled as described in the Focused Groundwater Remediation Work Plan (Hull Document #NMB007.200.0035) and supporting documents. Samples will be shipped to Lancaster Laboratories in Lancaster, Pennsylvania and tested for VOCs by Method 8021.

Hull will compare VOC concentrations in wells within and downgradient of the source area with concentrations detected in the MW-8 well nest (i.e., the background wells). Data and comparisons will be presented along with a narrative of sampling activities and laboratory analytical documentation in semiannual letter reports. To the extent that VOC concentrations do not show a downward trend and/or approximate concentrations seen in the background wells, Hull will recommend additional chemical oxidation treatments. If treatments are determined to be ineffective, Hull will evaluate and design an alternative remedial approach that addresses known Site conditions.

9.0 REFERENCES

A variety of technical documents and publications were referred to during the course of this project. Some of the references consulted are presented below. Referenced documents and publications may or may not have been reviewed in their entirety. The guidelines and procedures presented in the referenced documents and publications have not been strictly adhered to unless otherwise stated.

Anson Environmental Ltd., *Geologic logs for MW-1, MW-2 and MW-3*, April 26, 1994.

Anson Environmental Ltd., *Untitled report to representatives of IMC Magnetics Corp.*, July 21, 1993.

Anson Environmental Ltd., *Closure Plan Implementation, Volume 1*, IMC Magnetics Corp., July 21, 1993.

Anson Environmental Ltd., *Closure Plan, IMC Magnetics Corp.*, December 3, 1993.

Cohen, Robert M. and James W. Mercer, *DNAPL Site Evaluation*, C.K. Smoley, 1993.

Hull & Associates, Inc., *Work Plan for the Investigation and Design of the Interim Remedial Measure for the Vadose Zone*, March 1996.

Hull & Associates, Inc., *Focused Ground-Water Investigation Report*, September1998.

Hull & Associates, Inc., *Focused Ground-Water Feasibility Study*, September 1999 (Revised November 1999).

Hull & Associates, Inc., *Focused Ground-Water Investigation and Focused Ground-Water Feasibility Study Work Plan (Addendum 1)*, April 1998.

Hull & Associates, Inc., *Final Investigation Report for the Investigation and Design of the Interim Remedial Measure for the Vadose Zone*, February 1997.

Hull & Associates, Inc., *Focused Ground-water Remediation Work Plan for the 570 Main Street Manufacturing Facility, Westbury, New York*, April 2001.

Hull & Associates, Inc., Quality Assurance Project Plan for the *Focused Ground-water Remediation for the 570 Main Street Manufacturing Facility, Westbury, New York*, April 2001.

Hull & Associates, Inc., *Field Sampling and Analysis Plan for Focused Ground-Water Remediation for the 570 Main Street Manufacturing Facility, Westbury, New York*, April 2001.

Hull & Associates, Inc., *Health and Safety Plan for the Focused Ground-Water Remediation for the 570 Main Street Manufacturing Facility, Westbury, New York*, April 2001.

Lawler Matusky & Skelly Engineers, *Revised Draft Preliminary Assessment Report*, New Cassel Industrial Area, October, 1994.

Lawler Matusky & Skelly Engineers, *Site Investigation Report*, New Cassel Industrial Area Site, North Hempstead, Nassau County, February 1995.

McDonald, M.G., and A.W. Harbaugh, *A Modular Three-Dimensional Finite Difference Ground-water Flow Model*, U.S. Geological Survey Open-File Report 83-875, 1988.

New York Department of Environmental Conservation, *Order on Consent Index #1-W1-0750-96-02, Site Code #1-30-0434*, Signed on May 6, 1998.

New York Department of Environmental Conservation, *Record of Decision for Atlas Graphics Site, Site Code #1-30-043B*, February 2000.

New York Department of Environmental Conservation, *Record of Decision for IMC Magnetics Site, Site Code #1-30-043A*, March 2000.

New York State Statutes, *Article 27, Title 13 - Inactive Hazardous Waste Disposal Sites.*

New York State Regulations, *Title 6, Chapter IV, Subchapter B, Part 375 - Inactive Hazardous Waste Disposal Site Remedial Program.*

U.S. Geological Survey, in cooperation with the Nassau County Department of Public Works, *Geology of the Town of North Hempstead, Nassau County, Long Island, New York.* 1979.

Wiedemeier, M.A., et al., *Overview of the Technical Protocol for Natural Attenuation of Chlorinated Aliphatic Hydrocarbons in Ground Water, Under Development for the U.S. Air Force Center for Environmental Excellence*. Proceedings from the Symposium on Natural Attention of Chlorinated Organics in Ground Water, 1996.

TABLES

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 1

SUMMARY OF MONITORING WELL AND APPLICATION WELL CONSTRUCTION

Well I.D.	Location Relative to LP2-B[1.]	Date of Installation	Drilling Method	Screened Interval (feet bgs)	Sand Pack Interval (feet bgs)	Bentonite Seal Interval (feet bgs)	Native Backfill Interval (feet bgs)	Concrete Interval (feet bgs)
GROUNDWATER MONITORING WELLS								
MW-5U	Downgradient	6/20/98	8.25" HSA	45 to 60	42 to 86	4 to 6; 40 to 42	6 to 40	0 to 1
MW-5M	Downgradient	6/20/98	8.25" HSA	90 to 100	88 to 126	86 to 88	6 to 40	0 to 1
MW-5L	Downgradient	6/20/98	8.25" HSA	130 to 140	128 to 141	126 to 128	6 to 40	0 to 1
MW-8U	Upgradient	9/7/01	6.25" HSA	45 to 60	43 to 61	1 to 43	NA	0 to 1
MW-8M	Upgradient	9/7/01	6.25" HSA	65 to 75	63 to 75.5	61 to 63	NA	0 to 1
MW-8L	Upgradient	9/7/01	6.25" HSA	78 to 88	77.5 to 90	75.5 to 77.5	NA	0 to 1
MW-9U	Downgradient	9/14/01	6.25" HSA	45 to 60	43 to 61	1 to 43	NA	0 to 1
MW-9L	Downgradient	9/14/01	6.25" HSA	65 to 80	63 to 81	61 to 63	NA	0 to 1
MW-10U	Side/downgradient	9/13/01	6.25" HSA	45 to 60	43 to 61	1 to 43	NA	0 to 1
MW-10L	Side/downgradient	9/13/01	6.25" HSA	65 to 80	63 to 81	61 to 63	NA	0 to 1
REAGENT APPLICATION WELLS								
AW-1U	Side-gradient	9/11/01	6.25" HSA	48 to 63	46 to 64	1 to 46	NA	0 to 1
AW-1L	Side-gradient	9/11/01	6.25" HSA	68 to 83	66 to 84	64 to 66	NA	0 to 1
AW-2U	Centered within LP2-B	9/11/01	6.25" HSA	48 to 63	46 to 63.5	1 to 46	NA	0 to 1
AW-2L	Centered within LP2-B	9/11/01	6.25" HSA	66 to 81	65.5 to 84	63.5 to 65.5	NA	0 to 1
AW-3U	Side/Upgradient	9/12/01	6.25" HSA	48 to 63	46 to 64	1 to 46	NA	0 to 1
AW-3L	Side/Upgradient	9/12/01	6.25" HSA	68 to 83	66 to 84	64 to 66	NA	0 to 1

(1.) LP2-B - Leach Pit 2-B (Source Area)

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 2

SUMMARY OF SATURATED SOIL SAMPLE ANALYTICAL RESULTS
DETECTED COMPOUNDS ONLY

ANALYTE / WELL I.D.	AW-2	AW-2	AW-2	AW-2	AW-2[(1.)]
Sample Date	9/12/02	9/12/02	9/12/02	9/12/02	9/12/02
Sample Depth (feet below ground surface)	60.0 to 62.0	62.0 to 64.0	64.0 to 66.0	60.0 to 66.0	60.0 to 66.0
VOLATILE ORGANIC COMPOUNDS (ug/kg)					
Tetrachloroethene (U.S. EPA Method 8260)	240	<5	49	NT	NT
INORGANIC ANALYTES (mg/kg)					
Total Organic Carbon (U.S. EPA Method 9060)	NT[(2.)]	NT	NT	<1.13	<339
Iron (U.S. EPA Method 6010)	NT	NT	NT	NT	6,920
Manganese (U.S. EPA Method 6010)	NT	NT	NT	NT	8.37

(1.) Sample analyzed by Integrated Analytical Laboratories as part of ISOTEC's laboratory treatability study.

(2.) NT - Not Tested.

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 3

SUMMARY OF BASELINE GROUNDWATER ANALYTICAL RESULTS (DETECTED ANALYTES ONLY)
SEPTEMBER 29, 2001 SAMPLING EVENT

ANALYTE	ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8021B						
	GROUNDWATER MONITORING WELLS						
	MW-1	MW-3	MW-3 (Dup)	MW-4U	MW-4M	MW-4L	MW-4L (Dup)
1,1,1-TRICHLOROETHANE	<1.0	<1.0	<1.0	<1.0	<1.0	**9.5**	**12**
1,1-DICHLOROETHENE	<1.0	<1.0	<1.0	<1.0	<1.0	**1.7**	**2.2**
1,1-DICHLOROETHANE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.0**
CHLOROFORM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CIS-1,2-DICHLOROETHENE	<1.0	**16**	**17**	<1.0	<1.0	<1.0	<1.0
TETRACHLOROETHENE	**2.8**	**26**	**27**	**4.5**	<1.0	<1.0	<1.0
TOLUENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TRICHLOROETHENE	<1.0	**19**	**19**	**2.5**	<1.0	<1.0	<1.0
ANALYTE	**ANALYTICAL RESULTS FOR INORGANIC ANALYTES (mg/L)**						
IRON(1.)	NT(5.)	NT	NT	NT	NT	NT	NT
TOTAL DISSOLVED SOLIDS(2.)	NT	NT	NT	NT	NT	NT	NT
TOTAL ORGANIC CARBON(3.)	NT	NT	NT	NT	NT	NT	NT
SULFATE(4.)	NT	NT	NT	NT	NT	NT	NT

Table Continues

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 3 (continued)

SUMMARY OF BASELINE GROUNDWATER ANALYTICAL RESULTS (DETECTED ANALYTES ONLY)
SEPTEMBER 29, 2001 SAMPLING EVENT

ANALYTE	ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8021B								
	GROUNDWATER MONITORING WELLS								
	MW-5U	MW-5M	MW-5L	MW-6U	MW-6M	MW-6L	MW-7U	MW-7M	MW-7L
1,1,1-TRICHLOROETHANE	<1.0	**19**	**21**	<1.0	**14**	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHENE	<1.0	**3.3**	**4.6**	<1.0	**4.3**	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHANE	<1.0	**1.1**	**1.6**	<1.0	**3.4**	<1.0	<1.0	<1.0	<1.0
CHLOROFORM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CIS-1,2-DICHLOROETHENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.5**
TETRACHLOROETHENE	**19**	<1.0	<1.0	**31**	**1.1**	<1.0	**1.4**	**1.1**	**13**
TOLUENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**2.9**	**5.8**	**4.4**
TRICHLOROETHENE	**7.5**	<1.0	<1.0	**3.9**	**1.0**	<1.0	<1.0	<1.0	**6.0**
ANALYTE	**ANALYTICAL RESULTS FOR INORGANIC ANALYTES (mg/L)**								
IRON(1.)	NT(5.)	NT	NT	NT	NT	NT	NT	NT	NT
TOTAL DISSOLVED SOLIDS(2.)	NT	NT	NT	NT	NT	NT	NT	NT	NT
TOTAL ORGANIC CARBON(3.)	NT	NT	NT	NT	NT	NT	NT	NT	NT
SULFATE(4.)	NT	NT	NT	NT	NT	NT	NT	NT	NT

Table Continues

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 3 (continued)

SUMMARY OF BASELINE GROUNDWATER ANALYTICAL RESULTS (DETECTED ANALYTES ONLY)
SEPTEMBER 29, 2001 SAMPLING EVENT

ANALYTE	ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8021B						
	GROUNDWATER MONITORING WELLS						
	MW-8U	MW-8M	MW-8L	MW-9U	MW-9L	MW-10U	MW-10L
1,1,1-TRICHLOROETHANE	<1.0	1.1	25	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHENE	<1.0	<1.0	5.0	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHANE	<1.0	<1.0	1.3	<1.0	<1.0	<1.0	<1.0
CHLOROFORM	<1.0	5.3	4.3	<1.0	<1.0	<1.0	<1.0
CIS-1,2-DICHLOROETHENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TETRACHLOROETHENE	11	3.5	3.2	29	17	76	17
TOLUENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TRICHLOROETHENE	2.5	1.1	<1.0	1.9	1.8	<1.0	<1.0
ANALYTE	**ANALYTICAL RESULTS FOR INORGANIC ANALYTES (mg/L)**						
IRON(1.)	NT(5.)	1.31	1.6	5.78	0.434	578	0.423
TOTAL DISSOLVED SOLIDS(2.)	NT	220	269	445	279	850	257
TOTAL ORGANIC CARBON(3.)	NT	2.4	3.0	3.6	3.0	7.4	3.2
SULFATE(4.)	NT	64	68	<250	76	<2,500	76

Table Continues

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 3 (continued)

SUMMARY OF BASELINE GROUNDWATER ANALYTICAL RESULTS (DETECTED ANALYTES ONLY)
SEPTEMBER 29, 2001 SAMPLING EVENT

ANALYTE	**ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8021B**						
	REAGENT APPLICATION WELLS						
	AW-1U	**AW-1U (Dup)**	**AW-1L**	**AW-2U**	**AW-2L**	**AW-3U**	**AW-3L**
1,1,1-TRICHLOROETHANE	**1.6**	**1.6**	**11**	<100	<10	<1.0	<1.0
1,1-DICHLOROETHENE	<1.0	<1.0	**2.4**	<100	<10	<1.0	<1.0
1,1-DICHLOROETHANE	<1.0	<1.0	<1.0	<100	<10	<1.0	<1.0
CHLOROFORM	<1.0	<1.0	<1.0	<100	<10	<1.0	<1.0
CIS-1,2-DICHLOROETHENE	**1.5**	**2.4**	<1.0	<100	<10	**4.3**	**1.3**
TETRACHLOROETHENE	**10**	**16**	**16**	**4,000**	**460**	**22**	**14**
TOLUENE	<1.0	<1.0	<1.0	<100	<10	<1.0	<1.0
TRICHLOROETHENE	**2.2**	**2.8**	<1.0	<100	<10	**2.5**	<1.0
ANALYTE	**ANALYTICAL RESULTS FOR INORGANIC ANALYTES (mg/L)**						
IRON(1.)	NT(5.)	**103**	**0.464**	**4.84**	**1.62**	**0.765**	**0.974**
TOTAL DISSOLVED SOLIDS(2.)	NT	**321**	**213**	**592**	**212**	**335**	**252**
TOTAL ORGANIC CARBON(3.)	NT	**2.5**	**2.2**	**3.4**	**2.2**	**4.3**	**2.6**
SULFATE(4.)	NT	<170	**50**	**190**	**53**	**180**	**56**

Notes:

(1.) Analyzed using SW0846 Method 7380
(2.) Analyzed using EPA Method 160.1
(3.) Analyzed using WE-846 Method 9060
(4.) Analyzed using EPA Method 375.4 (turbidimetric)
(5.) NT - Not Tested.

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 4

SUMMARY OF INITIAL POST-TREATMENT GROUNDWATER ANALYTICAL RESULTS (DETECTED ANALYTES ONLY)
DECEMBER 19, 2001 SAMPLING EVENT

ANALYTE	**ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8021B**									
	GROUNDWATER MONITORING WELLS									
	MW-5U	**MW-5M**	**MW-5L**	**MW-8U**	**MW-8M**	**MW-8L**	**MW-9U**	**MW-9L**	**MW-10U**	**MW-10L**
1,1,1-TRICHLOROETHANE	<10	**8.4**	**21**	<1.0	<1.0	**35**	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHENE	<10	**1.8**	**5.3**	<1.0	<1.0	**8.8**	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHANE	<10	<1.0	**1.9**	<1.0	<1.0	**2.5**	<1.0	<1.0	<1.0	<1.0
CHLOROFORM	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CIS-1,2-DICHLOROETHENE	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TETRACHLOROETHENE	**310**	**1.7**	**1.4**	**24**	**4.2**	**6.7**	**11**	**18**	**83**	**9.2**
TOLUENE	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TRICHLOROETHENE	**11**	<1.0	<1.0	**2.6**	<1.0	<1.0	**1.2**	**1.0**	**2.6**	<1.0
ANALYTE	**ANALYTICAL RESULTS FOR INORGANIC ANALYTES (mg/L)**									
IRON(1.)	**253**	**8.7**	**0.821**	**397**	**1.68**	**1.39**	**278**	**1.54**	**79.6**	**62.9**
TOTAL DISSOLVED SOLIDS(2.)	**247**	**156**	**188**	**407**	**305**	**252**	**1,370**	**440**	**915**	**2,530**
TOTAL ORGANIC CARBON(3.)	**3.3**	**2.3**	<2.0	**6.9**	**2.7**	<2.0	**95**	**12.1**	**11.5**	**277**
SULFATE(4.)	<500	**22**	**31**	<1,000	**100**	**36**	<1,000	**166**	<1,000	**1,130**

Table Continues

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 4 (Continued)

SUMMARY OF INITIAL POST-TREATMENT GROUNDWATER ANALYTICAL RESULTS (DETECTED ANALYTES ONLY)
DECEMBER 19, 2001 SAMPLING EVENT

ANALYTE	ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8021B						
	REAGENT APPLICATION WELLS						
	AW-1U	AW-1U (Dup)	AW-1L	AW-2U	AW-2L	AW-3U	AW-3L
1,1,1-TRICHLOROETHANE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHANE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CHLOROFORM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CIS-1,2-DICHLOROETHENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TETRACHLOROETHENE	<1.0	<1.0	<1.0	**8.5**	**2.6**	<1.0	<1.0
TOLUENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TRICHLOROETHENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
ANALYTE	**ANALYTICAL RESULTS FOR INORGANIC ANALYTES (mg/L)**						
IRON$^{(1.)}$	**111**	**176**	**65.9**	**131**	**174**	**127**	**125**
TOTAL DISSOLVED SOLIDS$^{(2.)}$	**4,260**	**3,990**	**3,330**	**2,980**	**5,120**	**3,660**	**5,350**
TOTAL ORGANIC CARBON$^{(3.)}$	**3.2**	**407**	**265**	**106**	**546**	**222**	**374**
SULFATE$^{(4.)}$	<100	**1,790**	**1,090**	**570**	**2,070**	**1,220**	**1,410**

Notes:

(1.) Analyzed using SW0846 Method 7380
(2.) Analyzed using EPA Method 160.1
(3.) Analyzed using WE-846 Method 9060
(4.) Analyzed using EPA Method 375.4 (turbidimetric)

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 5

SUMMARY OF SECOND POST-TREATMENT GROUNDWATER ANALYTICAL RESULTS (DETECTED ANALYTES ONLY)
JANUARY 4, 2002 SAMPLING EVENT

ANALYTE	**ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8021B**									
	GROUNDWATER MONITORING WELLS									
	MW-5U	**MW-5M**	**MW-5L**	**MW-8U**	**MW-8M**	**MW-8L**	**MW-9U**	**MW-9L**	**MW-10U**	**MW-10L**
1,1,1-TRICHLOROETHANE	<10	**11**	**31**	<1.0	<1.0	**27**	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHENE	<10	**2.2**	**8**	<1.0	<1.0	**6.3**	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHANE	<10	<1.0	**2.6**	<1.0	<1.0	**2.1**	<1.0	<1.0	<1.0	<1.0
CHLOROFORM	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CIS-1,2-DICHLOROETHENE	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TETRACHLOROETHENE	**110**	<1.0	**1.3**	**12**	**3.2**	**5.6**	**6.5**	**17**	**74**	**11**
TOLUENE	<10	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TRICHLOROETHENE	**7.1**	<1.0	<1.0	**2.8**	<1.0	<1.0	**1.2**	**3.4**	**3**	<1.0
ANALYTE	**ANALYTICAL RESULTS FOR INORGANIC ANALYTES (mg/L)**									
IRON(1.)	NT(5.)	**8.7**	**0.821**	**64.6**	**3.91**	**5**	**150**	**20.7**	**35.6**	**56.3**
TOTAL DISSOLVED SOLIDS(2.)	NT	**156**	**188**	**355**	**378**	**246**	**1,690**	**560**	**784**	**2,020**
TOTAL ORGANIC CARBON(3.)	NT	**2.3**	<2.0	**3**	<2.0	<2.0	**103**	**15.8**	**5.2**	**157**
SULFATE(4.)	NT	**22**	**31**	<500	**98**	**33**	<1,000	**225**	<1,000	**910**

Table Continues

FOCUSED GROUNDWATER REMEDIATION
FORMER IMC MAGNETICS FACILITY
WESTBURY, NEW YORK

TABLE 5 (Continued)

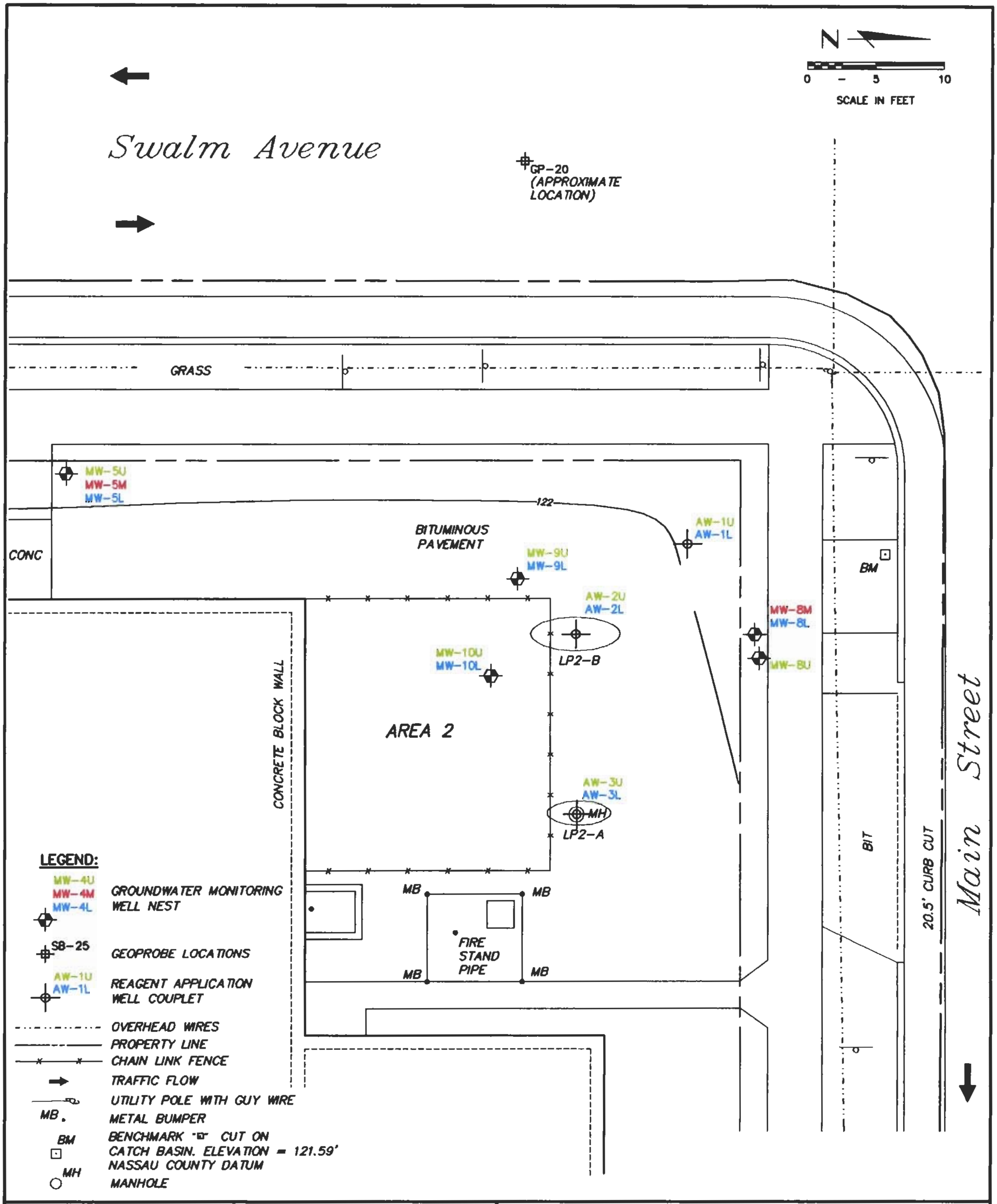
SUMMARY OF SECOND POST-TREATMENT GROUNDWATER ANALYTICAL RESULTS (DETECTED ANALYTES ONLY)
JANUARY 4, 2002 SAMPLING EVENT

ANALYTE	**ANALYTICAL RESULTS FOR VOCs (ug/L) - SW-846 Method 8021B**							
	REAGENT APPLICATION WELLS							
	AW-1U	**AW-1U (Dup)**	**AW-1L**	**AW-2U**	**AW-2U (Dup)**	**AW-2L**	**AW-3U**	**AW-3L**
1,1,1-TRICHLOROETHANE	<1.0	<1.0	**1.3**	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
1,1-DICHLOROETHANE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CHLOROFORM	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CIS-1,2-DICHLOROETHENE	**1.4**	**1.4**	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TETRACHLOROETHENE	**1.3**	**1.3**	**4.9**	**14**	**16**	**3.9**	<1.0	<1.0
TOLUENE	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
TRICHLOROETHENE	**1.6**	**1.6**	<1.0	**1.1**	**1.2**	<1.0	**1.4**	<1.0
ANALYTE	**ANALYTICAL RESULTS FOR INORGANIC ANALYTES (mg/L)**							
IRON(1.)	**47.4**	**49.9**	**24.8**	**164**	**100**	**67.1**	**19.3**	**83.2**
TOTAL DISSOLVED SOLIDS(2.)	**1,270**	**1,230**	**1,350**	**2,540**	**2,500**	**3,340**	**1,830**	**4,420**
TOTAL ORGANIC CARBON(3.)	**43**	**43**	**96**	**28**	**25.6**	**245**	**27.6**	**324**
SULFATE(4.)	**380**	**370**	**500**	**950**	**880**	**1,340**	**450**	**1,780**

Notes:

(1.) Analyzed using SW0846 Method 7380
(2.) Analyzed using EPA Method 160.1
(3.) Analyzed using WE-846 Method 9060
(4.) Analyzed using EPA Method 375.4 (turbidimetric)
(5.) NT - Not Tested.

FIGURES



Hull & associates, inc.

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FOCUSED GROUNDWATER REMEDIATION REPORT

FIGURE 2

GROUNDWATER REMEDIAL SYSTEM LAYOUT

570 MAIN STREET
WESTBURY, NEW YORK

PROJECT NO.:	NMB008	SUBMITTAL DATE:	MAY 2002
CAD DWG FILE:	NMB008.200.0003	PLOT DATE:	5/21/02

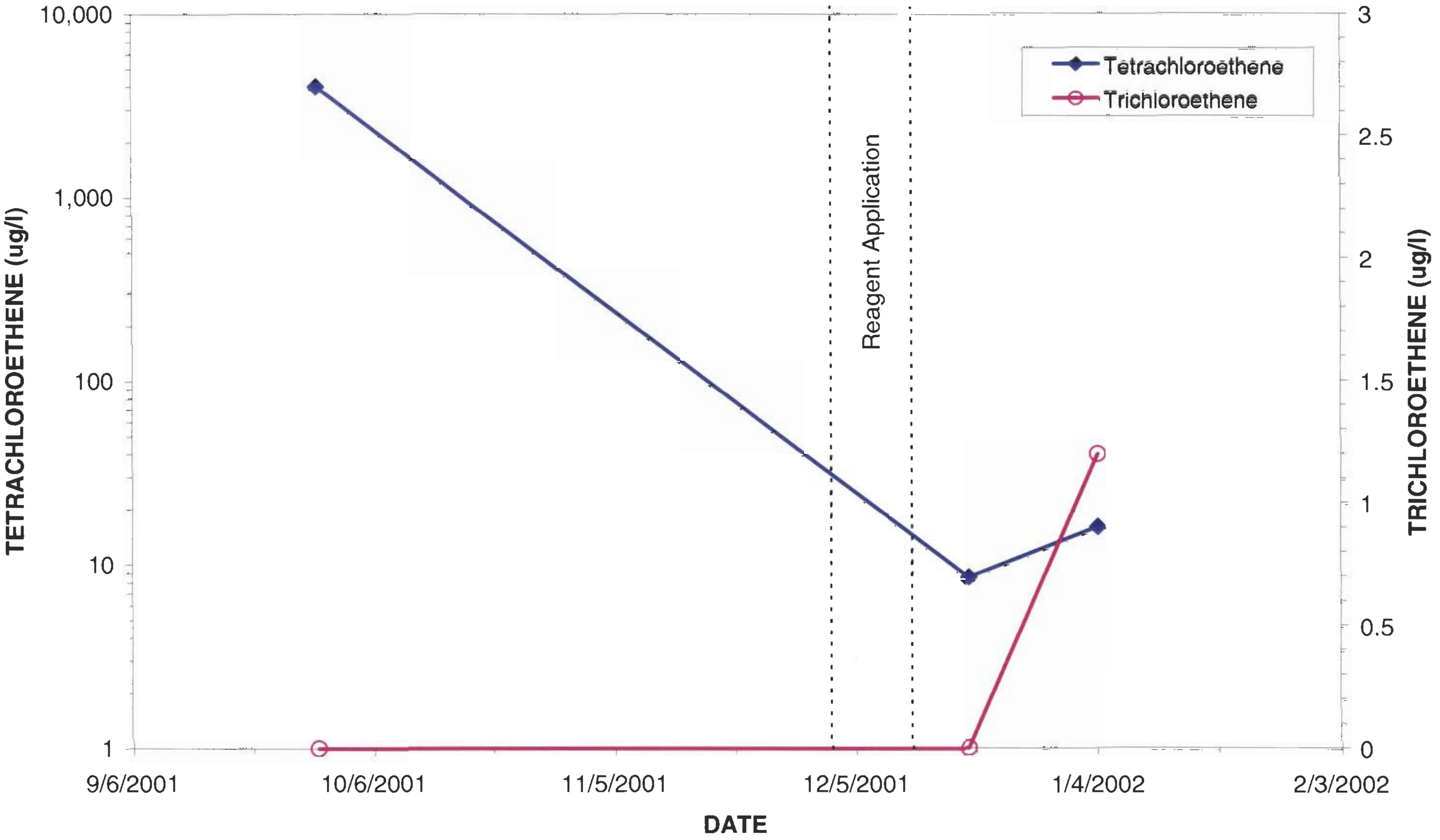

FIGURE 3

Hull & Associates, Inc.
MASON, OHIO

FOCUSED GROUNDWATER REMEDIATION REPORT

PCE AND TCE CONCENTRATIONS VERSUS TIME FOR AW-2U

570 MAIN STREET
WESTBURY, NEW YORK

MAY 2002 NMB008

NMB008.200.0006.XLS

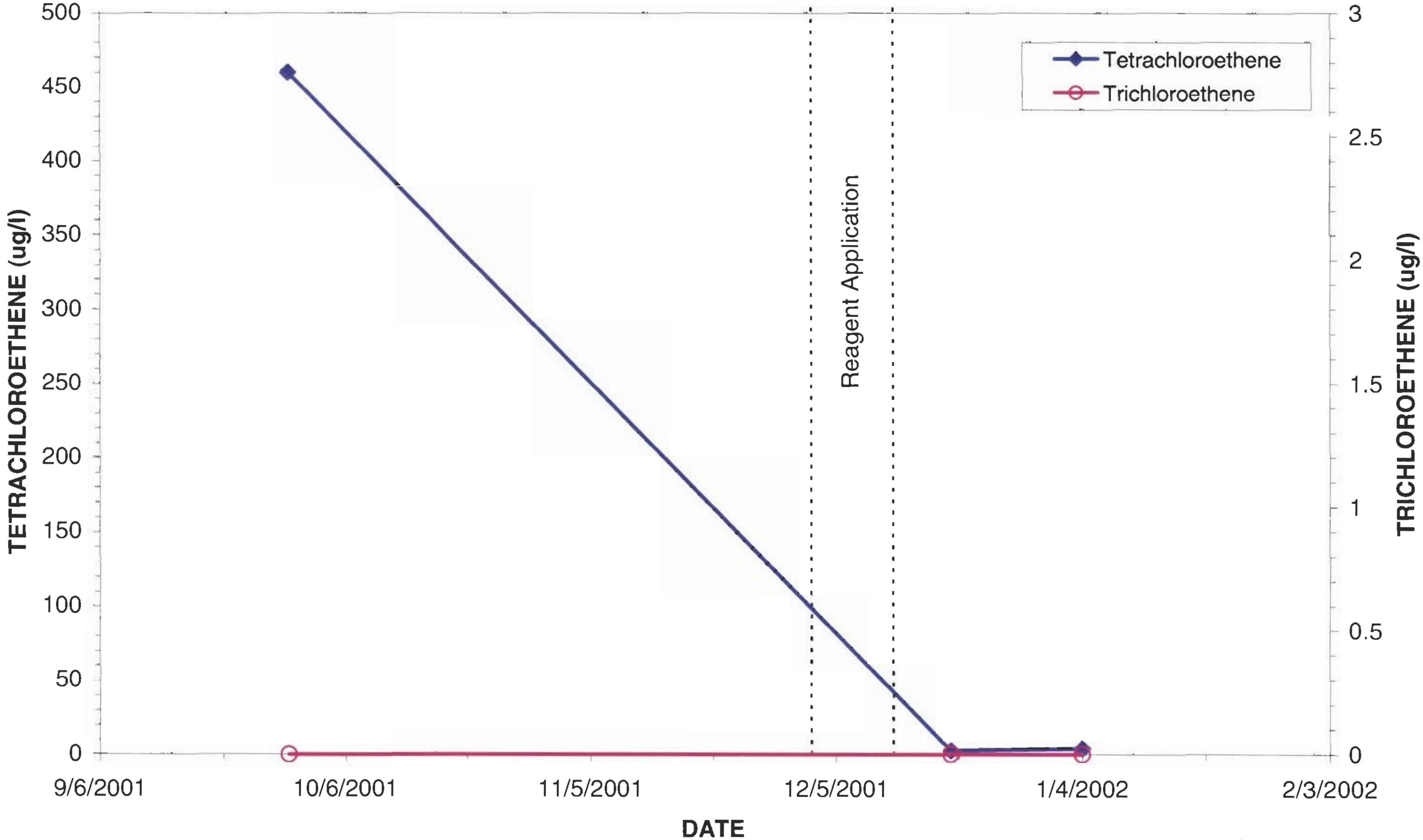

FIGURE 4

Hull & Associates, Inc.
MASON, OHIO

FOCUSED GROUNDWATER REMEDIATION REPORT

PCE AND TCE CONCENTRATIONS VERSUS TIME FOR AW-2L

570 MAIN STREET
WESTBURY, NEW YORK

MAY 2002 NMB008

NMB008.200.0006.XLS

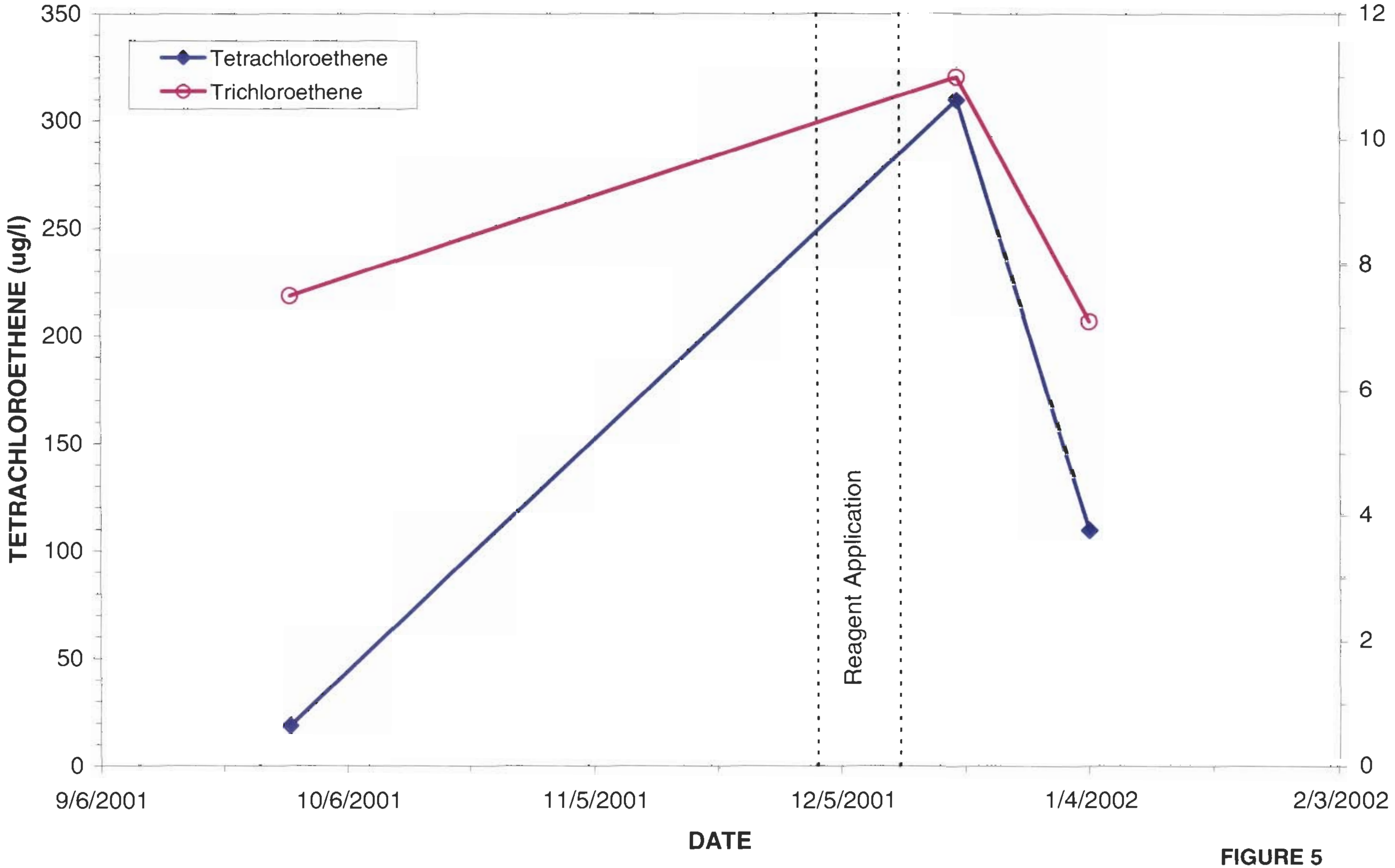

FIGURE 5

Hull & Associates, Inc.
MASON, OHIO

FOCUSED GROUNDWATER REMEDIATION REPORT

PCE AND TCE CONCENTRATIONS VERSUS TIME FOR MW-5U

570 MAIN STREET
WESTBURY, NEW YORK

MAY 2002 NMB008

NMB008.200.0006.XLS

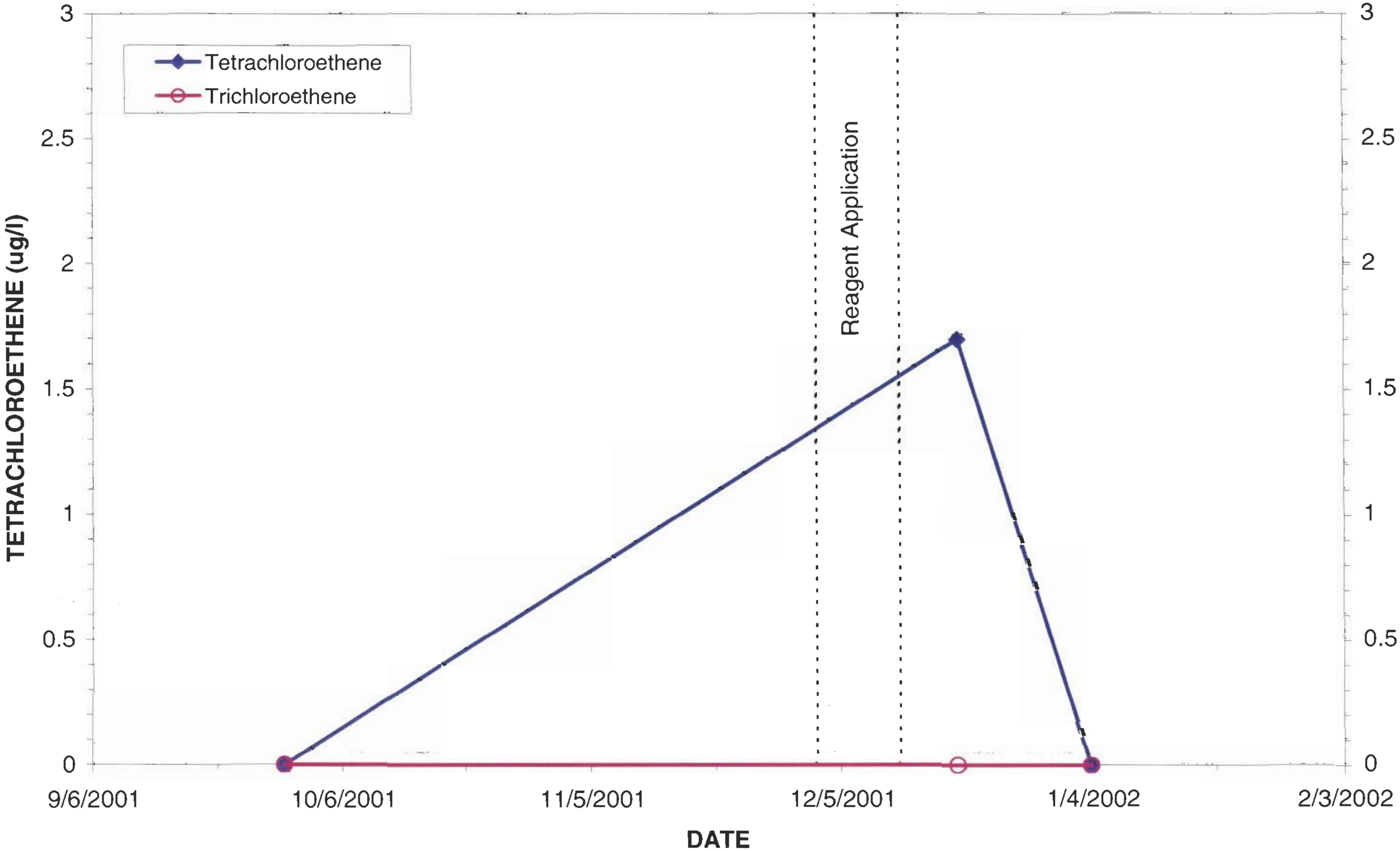

FIGURE 6

Hull & Associates, Inc.
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FOCUSED GROUNDWATER REMEDIATION REPORT

PCE AND TCE CONCENTRATIONS VERSUS TIME FOR MW-5M

570 MAIN STREET
WESTBURY, NEW YORK

MAY 2002 NMB008

NMB008.200.0006.XLS

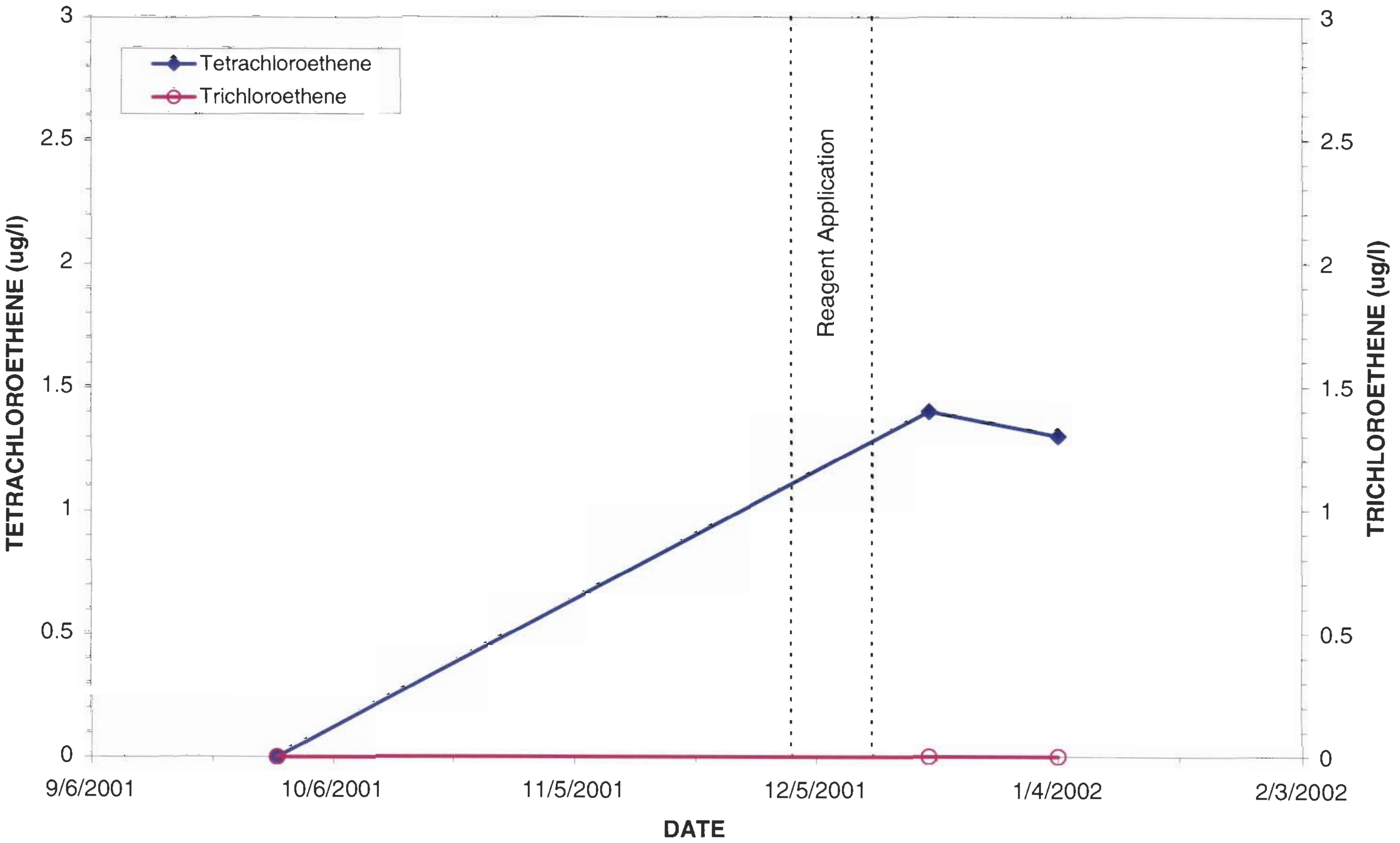

FIGURE 7

Hull & Associates, Inc.
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FOCUSED GROUNDWATER REMEDIATION REPORT

PCE AND TCE CONCENTRATIONS VERSUS TIME FOR MW-5L

570 MAIN STREET
WESTBURY, NEW YORK

MAY 2002 NMB008

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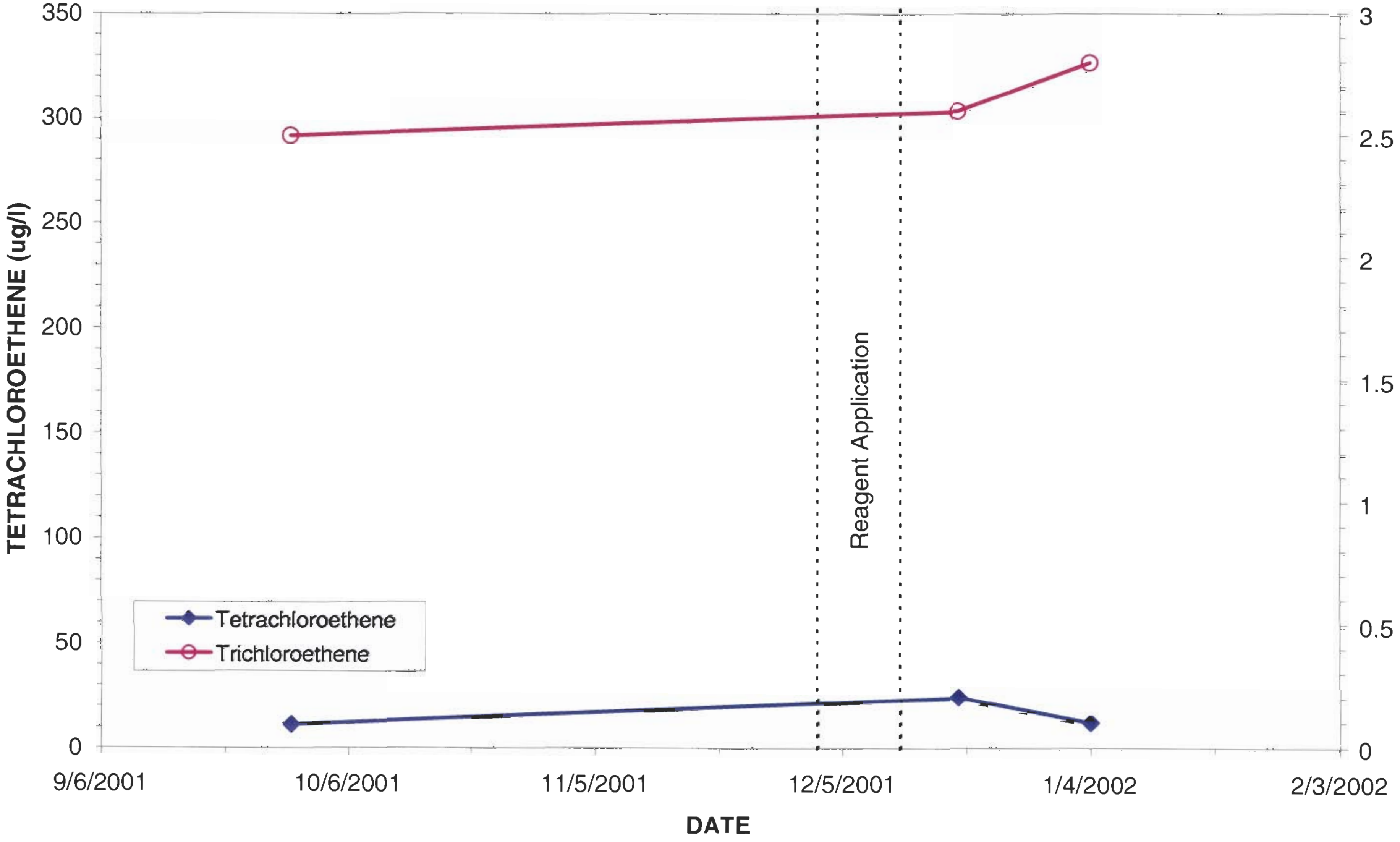


FIGURE 8

Hull & Associates, Inc.
MASON, OHIO

FOCUSED GROUNDWATER REMEDIATION REPORT

PCE AND TCE CONCENTRATIONS VERSUS TIME FOR MW-8U

570 MAIN STREET
WESTBURY, NEW YORK

MAY 2002 NMB008

NMB008.200.0006.XLS

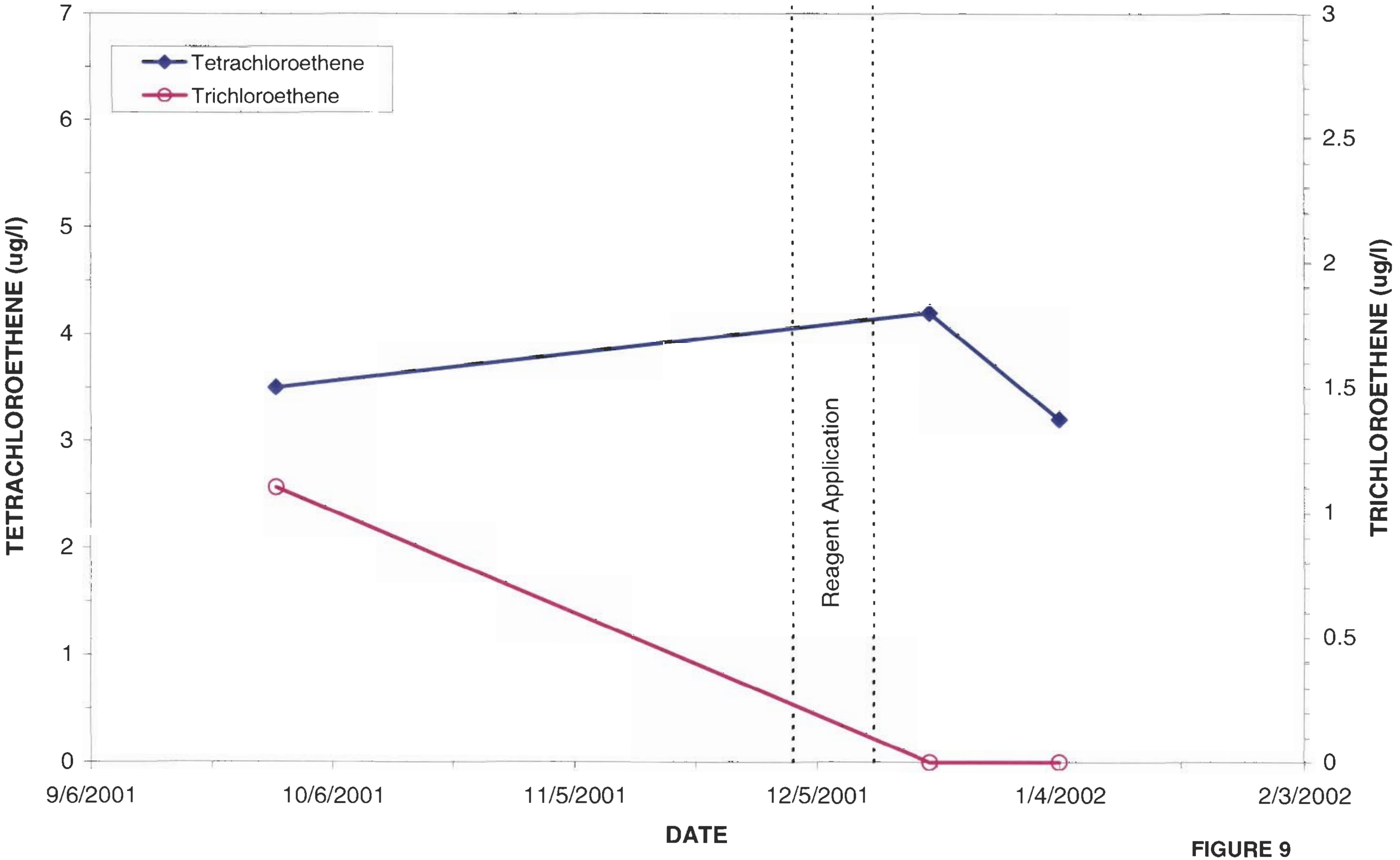


FIGURE 9

Hull & Associates, Inc.
MASON, OHIO

FOCUSED GROUNDWATER REMEDIATION REPORT

PCE AND TCE CONCENTRATIONS VERSUS TIME FOR MW-8M

570 MAIN STREET
WESTBURY, NEW YORK

MAY 2002 NMB008

NMB008.200.0006.XLS

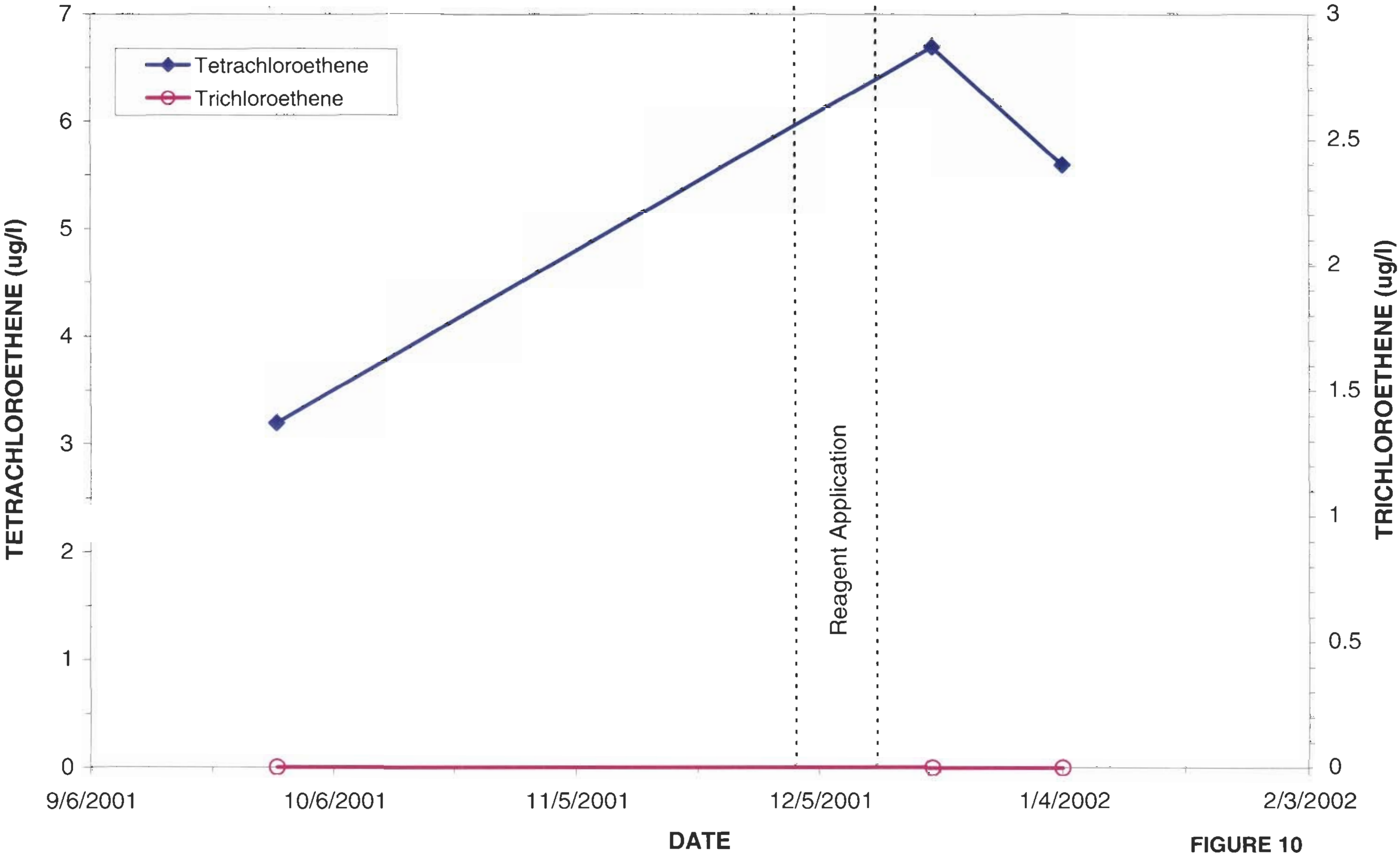


FIGURE 10

Hull & Associates, Inc.
MASON, OHIO

FOCUSED GROUNDWATER REMEDIATION REPORT

PCE AND TCE CONCENTRATIONS VERSUS TIME FOR MW-8L

570 MAIN STREET
WESTBURY, NEW YORK

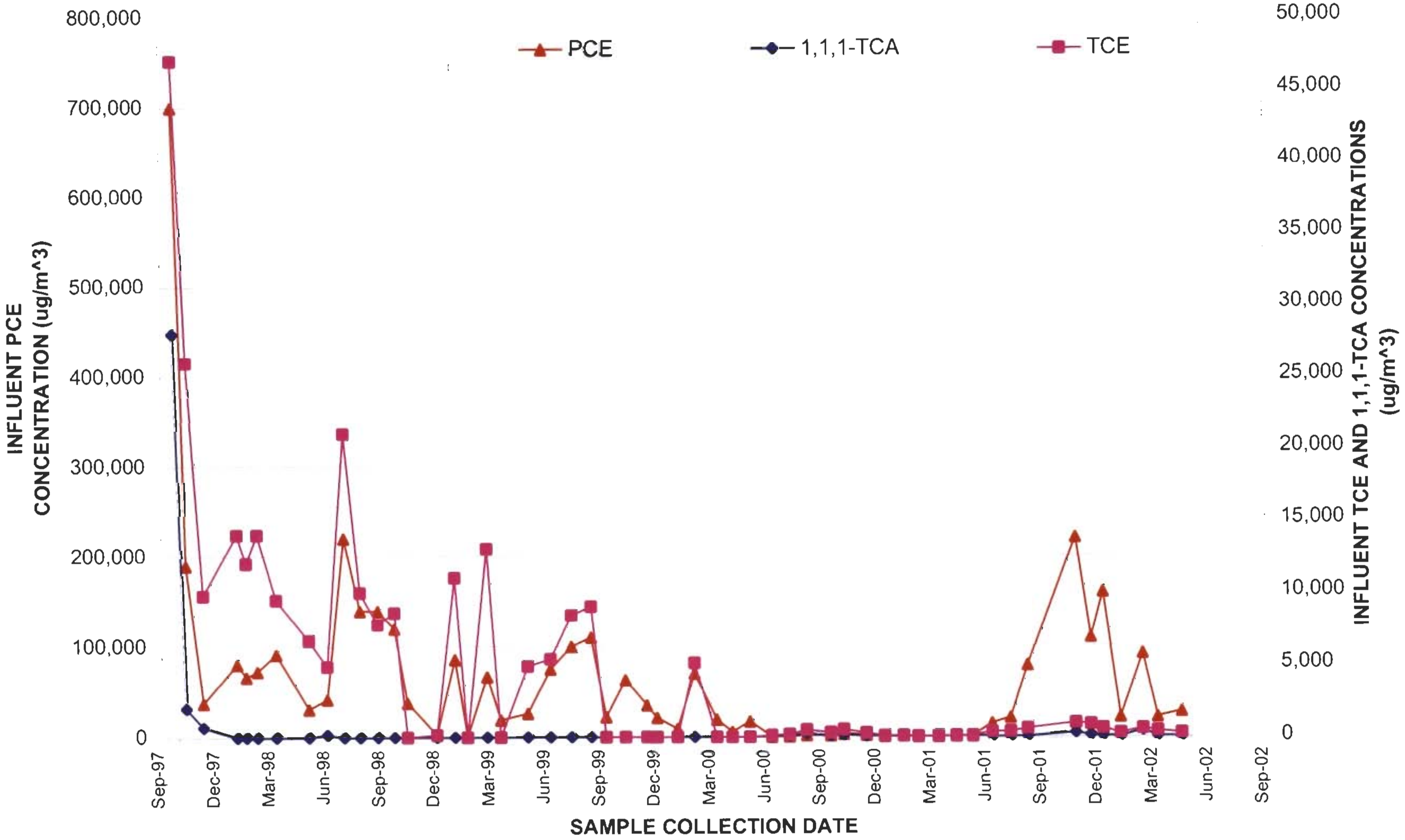
MAY 2002 NMB008

NMB008.200.0006.XLS

OPERATION AND MONITORING SUMMARY
570 MAIN STREET
WESTBURY, NEW YORK

CHART 1

SYSTEM COC INFLUENT CONCENTRATION SUMMARY



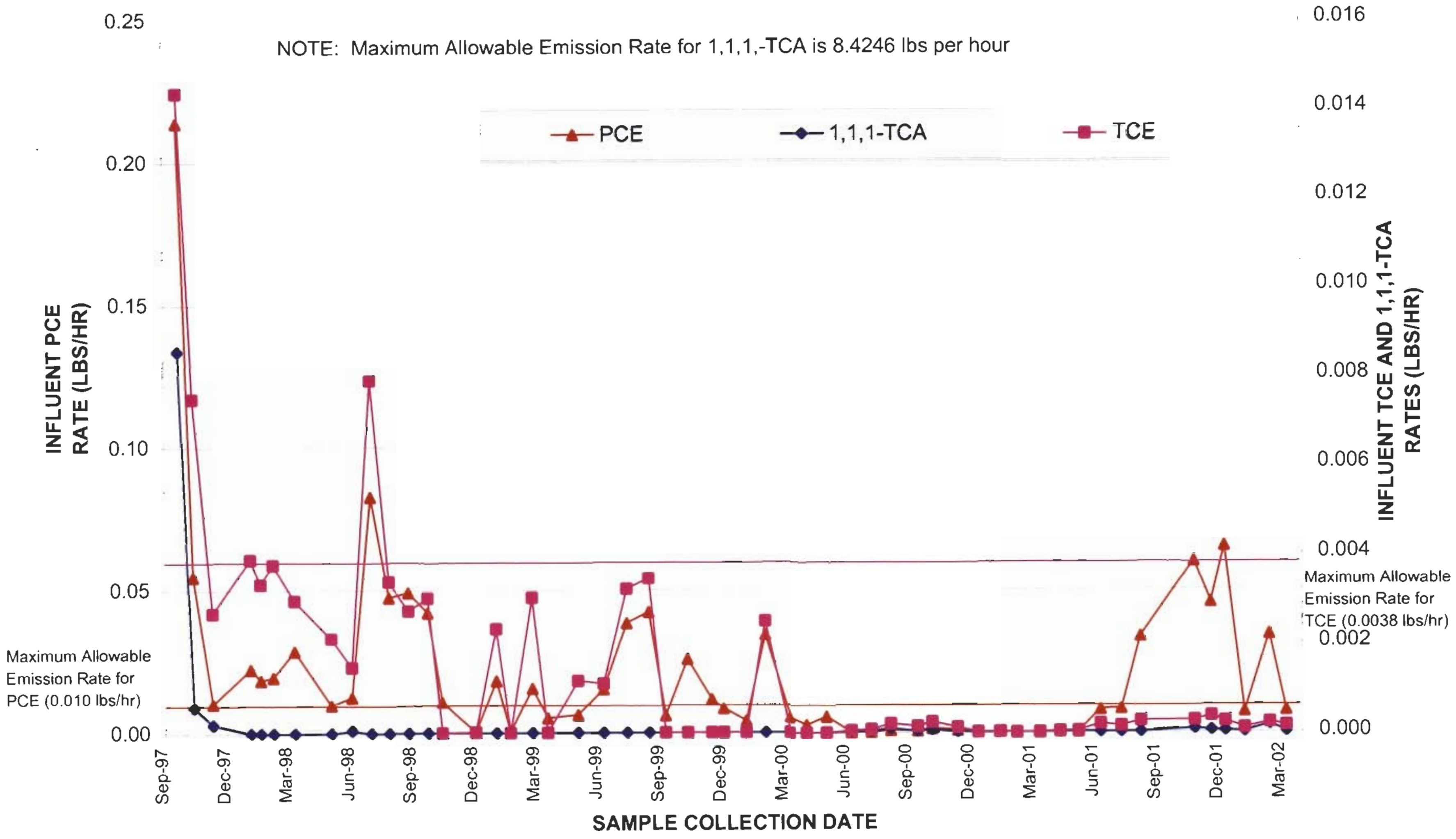
HULL & ASSOCIATES, INC.
DUBLIN, OHIO

MAY 2002
NMB004.300.0002.XLS

OPERATION AND MONITORING SUMMARY
570 MAIN STREET
WESTBURY, NEW YORK

CHART 2

SYSTEM COC INFLUENT REMOVAL RATE SUMMARY



HULL & ASSOCIATES, INC.
DUBLIN OHIO

MAY 2002
NMB004.300.0004.XLS

PLATE

APPENDIX A

Boring Logs and Monitoring Well Construction Diagrams

APPENDIX A-1

New Groundwater Monitoring Wells

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LOG OF BORING MW-8

(Page 1 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

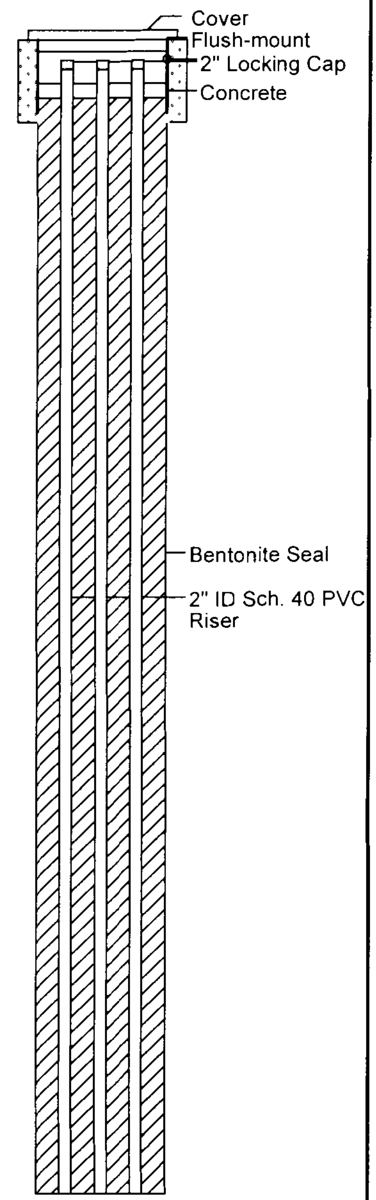
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/6/01	Drilling Method	: 4.25" and 6.25" HSA
Date Completed	: 9/7/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 91.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
0							0.0 to 0.3 - BLACKTOP / ASPHALT.
1	1.0/1.0	HA1/SS1	1.3	NA	☒		0.3 to 1.5 - Loose orange-brown clayey SAND, few gravel, slightly moist.
2							
3							
4	2.0/1.0	SP1/SS2	0.7		☒		4.0 to 5.0 - Same As Above (SAA); increase in gravel, slightly moist to moist.
5							
6							
7							
8							
9	2.0/0.4	SP2/SS3	0.0	5-30-25	☒		9.0 to 9.4 - SAA; 1"-thick silt seam at ~9.0.
10							
11							
12							
13							
14	2.0/1.3	SP3/SS4	6.6	6-10-6	☒		14.0 to 14.6 - SAA.
15							14.6 to 15.3 - Loose beige-white medium to coarse SAND, broken quartz and rock fragments, slightly moist.
16							
17							
18							
19	2.0/1.3	SP4/SS5	12.3	6-7-10	☒		19.0 to 20.3 - Loose orange-brown becoming beige silty SAND, slightly moist; rock fragment at ~19.7.
20							

Well1: MW-8L
Well2: MW-8M
Well3: MW-8U



REMARKS:

1. Lost a steel wrench in boring during sealing activities. Wrench contained within bentonite grout and not near sand pack or well screen.
2. Advanced a separate boring approximately 3 feet to the east with 4.25-inch HSAs to install MW-8U.

Hull
& associates, inc.

LOG OF BORING MW-8

Focused Groundwater Remediation
570 Main Street
Westbury, New York

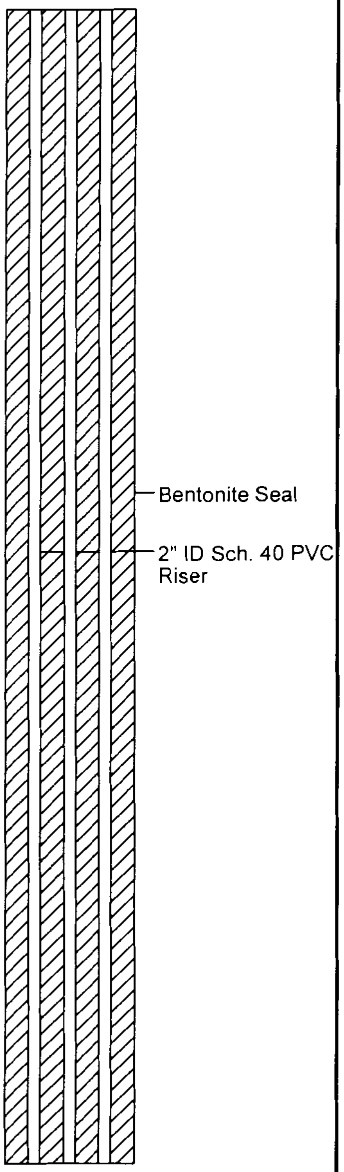
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/6/01	Drilling Method	: 4.25" and 6.25" HSA
Date Completed	: 9/7/01	Sampling Method	: 2" • 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 91.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
20					☒		
24	2.0/1.3	SP5/SS6	0.0	6-9-5	☒		24.0 to 25.3 - Loose orange-brown and beige SAND, some gravel and coarse sand, few silt, slightly moist.
29	2.0/1.0	SP6/SS7	3.8	7-12-6	☒		29.0 to 30.0 - Loose orange-brown and beige SAND, some coarse sand and gravel, few broken pebbles, slightly moist.
34	2.0/1.0	SP7/SS8	0.0	5-15-9	☒		34.0 to 35.0 - Loose beige to white very fine to fine SAND, moist, faint mm-scale laminae.
39	2.0/1.2	SP8/SS9	0.0	6-8-6	☒		39.0 to 40.2 - SAA.
40							

Well1: MW-8L
Well2: MW-8M
Well3: MW-8U



REMARKS:
1. Lost a steel wrench in boring during sealing activities. Wrench contained within bentonite grout and not near sand pack or well screen.
2. Advanced a separate boring approximately 3 feet to the east with 4.25-inch HSAs to install MW-8U.

Hull & associates, inc.

LOG OF BORING MW-8

(Page 3 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

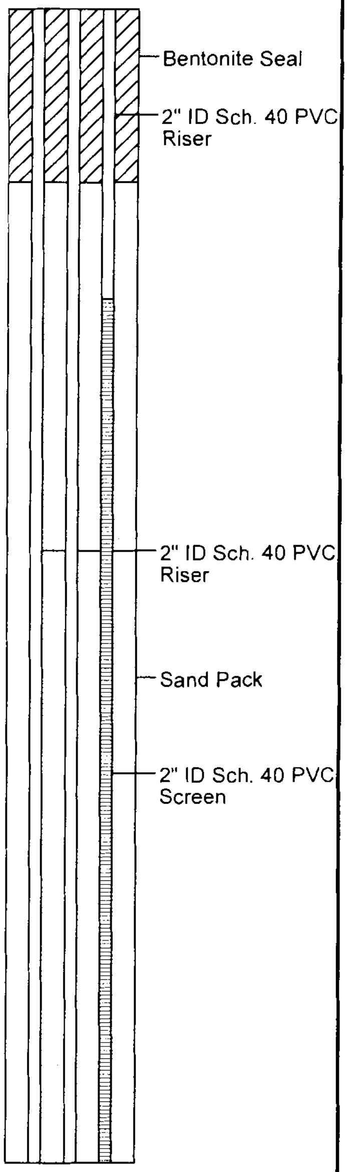
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/6/01	Drilling Method	: 4.25" and 6.25" HSA
Date Completed	: 9/7/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 91.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
40					☒		
44	2.0/1.1	SP9/SS10	0.0	6-24-15	☒		44.0 to 45.1 - Loose white-beige fine to medium SAND, trace orange iron-oxide stain, faint mm-scale laminae observed in spots, moist
46	2.0/2.0	SP10/SS11	0.0	5-17-15	☒		46.0 to 48.0 - SAA; fine grained, little medium grained.
48	2.0/1.4	SP11/SS12	0.0	6-27-19	☒		48.0 to 49.4 - SAA; all fine grained
50	2.0/1.4	SP12/SS13	0.0	6-19-12	☒		50.0 to 51.4 - SAA; mostly fine grained, some medium grained.
52	2.0/1.1	SP13/SS14	0.0	9-25-13	☒		52.0 to 53.1 - SAA; mostly fine grained, some medium grained.
54	2.0/1.4	SP14/SS15	0.0	7-17-9	☒		54.0 to 55.4 - SAA; lower 0.2' is very moist to wet.
56	2.0/1.5	SP15/SS16	0.0	5-10-7	☒		56.0 to 57.5 - Loose beige to brown fine to coarse SAND, little round gravel, wet.
58	2.0/1.6	SP16/SS17	0.0	5-17-11	☒		58.0 to 59.6 - Loose beige to brown medium to coarse SAND, some fine sand, wet.
60							

Well1: MW-8L
Well2: MW-8M
Well3: MW-8U



REMARKS:
1. Lost a steel wrench in boring during sealing activities. Wrench contained within bentonite grout and not near sand pack or well screen.
2. Advanced a separate boring approximately 3 feet to the east with 4.25-inch HSAs to install MW-8U.

Hull
& associates, inc.

LOG OF BORING MW-8

(Page 4 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

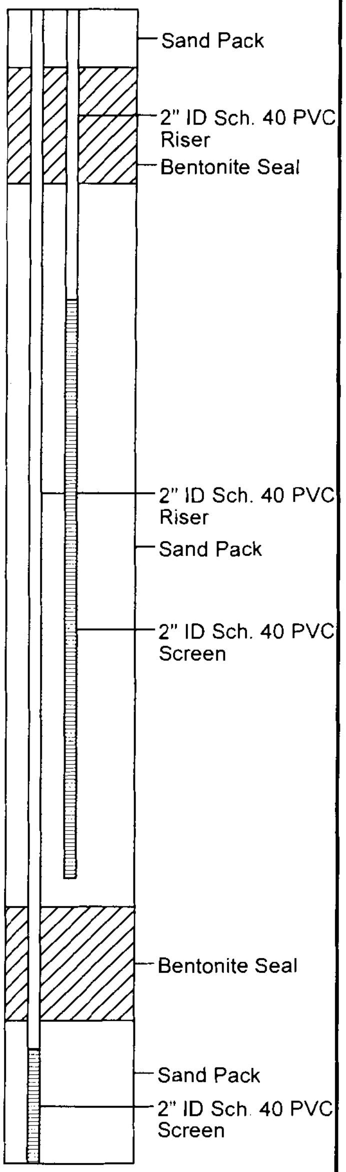
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/6/01	Drilling Method	: 4.25" and 6.25" HSA
Date Completed	: 9/7/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 91.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Well1: MW-8L
Well2: MW-8M
Well3: MW-8U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
65	2.0/1.3	SP17/SS18	0.0	5-6-4	☒		65.0 to 66.3 - Loose orange-brown fine to coarse SAND, little gravel, wet.
67	2.0/1.1	SP18/SS19	0.0	6-7-3	☒		67.0 to 68.1 - SAA; beige to light brown, few gravel.
69	2.0/1.0	SP19/SS20	0.0		☒		69.0 to 69.7 - SAA; beige to light gray, trace gravel.
						▥	69.7 to 70.0 - Medium dense (loose) gray SILT, wet.
71	2.0/0.8	SP20/SS21	0.0	5-12-5	☒		71.0 to 71.8 - Loose beige to light gray fine SAND, little medium to coarse sand, wet; bottom of spoon contains light brown-gray silt with 2-mm thick pink color seam.
73	2.0/0.3	SP21/SS22	0.0		☒	▥	73.0 to 74.3 - Medium dense (loose) light gray-brown SILT, wet.



REMARKS:
1. Lost a steel wrench in boring during sealing activities. Wrench contained within bentonite grout and not near sand pack or well screen.
2. Advanced a separate boring approximately 3 feet to the east with 4.25-inch HSAs to install MW-8U.

Hull & associates, inc.

LOG OF BORING MW-8

(Page 5 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

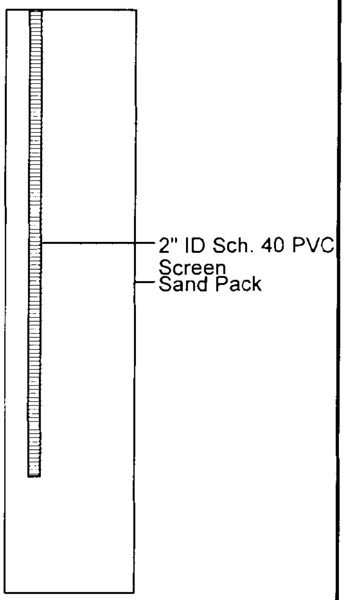
Well Location: See Site Plan

Date Started	: 9/6/01	Drilling Method	: 4.25" and 6.25" HSA
Date Completed	: 9/7/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 91.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Well1: MW-8L
Well2: MW-8M
Well3: MW-8U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
80	2.0/1.2	SP22/SS23	0.0	6-17-10	☒		80.0 to 81.2 - Loose light brown fine to coarse SAND, few gravel, wet.
84	2.0/1.2	SP23/SS24	0.0	6-30-14	☒		84.0 to 85.2 - Loose light brown to light gray medium SAND, little fine and coarse sand, few gravel, wet; gray broken shale fragment around 84.4' bgs.
90	2.0/1.3	SP24/SS25	0.0	13-35-19	☒		90.0 to 91.3 - SAA; trace gravel. Advanced Augers to 91' bgs.

Depth scale: 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100



REMARKS:
1. Lost a steel wrench in boring during sealing activities. Wrench contained within bentonite grout and not near sand pack or well screen.
2. Advanced a separate boring approximately 3 feet to the east with 4.25-inch HSAs to install MW-8U.

Hull & associates, inc.

LOG OF BORING MW-9

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

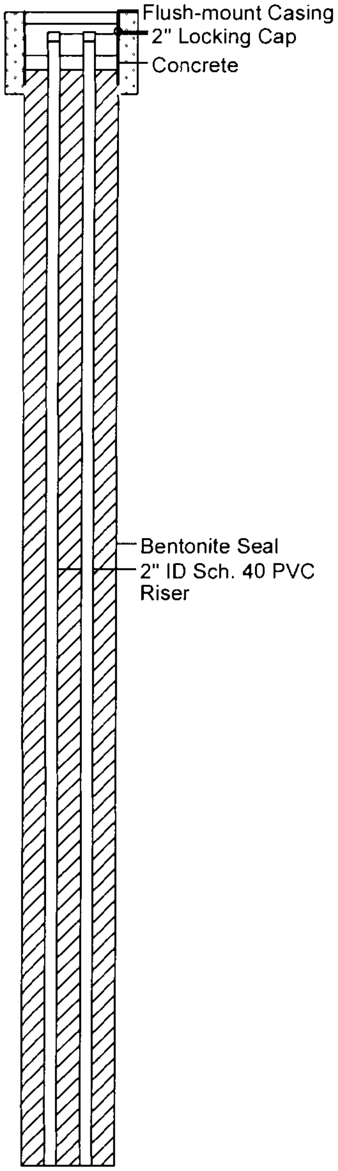
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/13/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/14/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
0							0.0 to 0.3 - BLACKTOP / ASPHALT.
1	1.0/1.0	HA1/SS1	5.1	NA	☒		0.3 to 1.0 - Loose dark brown sandy SILT (fill), some gravel, asphalt frags, very slightly moist, concrete fragments, etc. (backfill material).
5	2.0/1.0	SP1/SS2	0.5	2-4-2	☒		5.0 to 6.0 - Same as above (SAA); sand in bottom of spoon.
9	2.0/1.1	SP2/SS3	1.3	8-33-20	☒		9.0 to 10.1 - Loose orange poorly sorted SAND, some round gravel, few pebbles, slightly moist; intervals from 9.5' to 9.6' and 9.7' to 10.0' are white.
14	2.0/0.8	SP3/SS4	0.6	6-11-6	☒		14.0 to 14.8 - SAA; trace pebbles.
19	2.0/0.7	SP4/SS5	0.0	2-6-3	☒		19.0 to 19.7 - Loose orange-beige fine SAND, slightly moist; coarseing with depth to fine and medium sand.
20							

Well1: MW-9L
Well2: MW-9U



REMARKS:

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LOG OF BORING MW-9

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

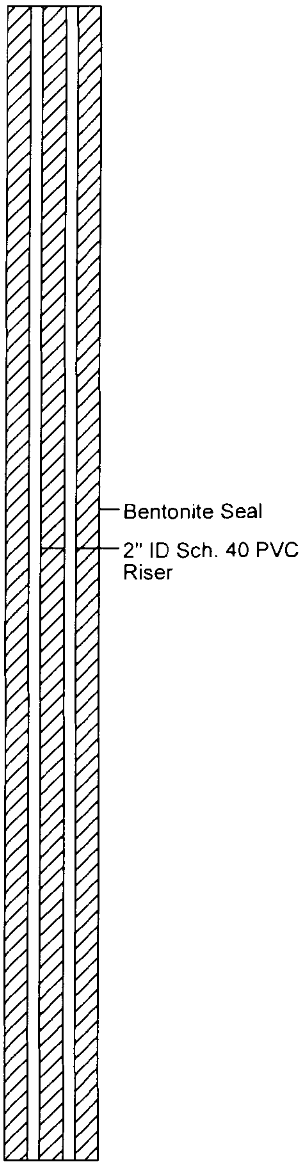
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/13/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/14/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
20							
21							
22							
23							
24							NO RECOVERY - may have hit a cobble, pebbles and gravel in cuttings.
25							
26							
27							
28							
29	2.0/0.8	SP6/SS6	0.0	7-13-7	☒		29.0 to 29.8 - Loose orange-beige becoming beige-white (at 29.5) fine SAND, some medium and coarse sand, little round gravel, slightly moist.
30							
31							
32							
33							
34	2.0/0.9	SP7/SS7	5.0	3-8-4	☒		34.0 to 34.9 - Loose orange-beige fine SAND, few medium sand, trace coarse sand, slightly moist, sugary.
35							
36							
37							
38							
39	2.0/0.8	SP8/SS8	0.0	8-16-9	☒		
40							

Well1: MW-9L
Well2: MW-9U



REMARKS:

Hull & associates, inc.

LOG OF BORING MW-9

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

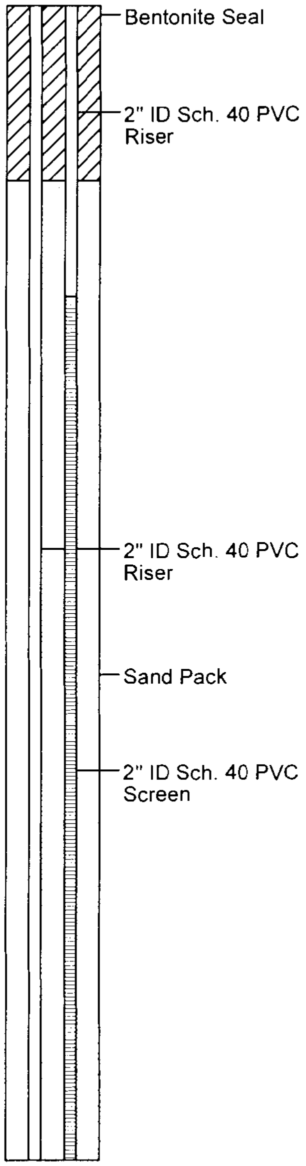
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/13/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/14/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
40							39.0 to 39.8 - Loose orange-beige fine SAND, few to little medium sand, slightly moist, sugary, scattered dark orange iron-oxide stain.
41							
42							
43							
44	2.0/0.7	SP9/SS9	0.0	5-12-6	☒		44.0 to 44.7 - SAA; orange beige becoming beige-white at 44.3'.
45							
46							
47							
48							
49	2.0/0.7	SP10/SS10		5-20-11	☒		49.0 to 49.7 - SAA; beige-white, slightly moist to moist.
50							
51							
52							
53							
54	2.0/1.3	SP11/SS11	0.0	11-27-12	☒		54.0 to 55.3 - SAA; coarsening slightly with depth to include few coarse sand, little medium sand, moist; 55.2' to 55.3' is very moist to wet.
55							
56							
57							
58							
59	2.0/1.6	SP12/SS12	0.8	3-7-3	☒		
60							

Well1: MW-9L
Well2: MW-9U



REMARKS:

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LOG OF BORING MW-9

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

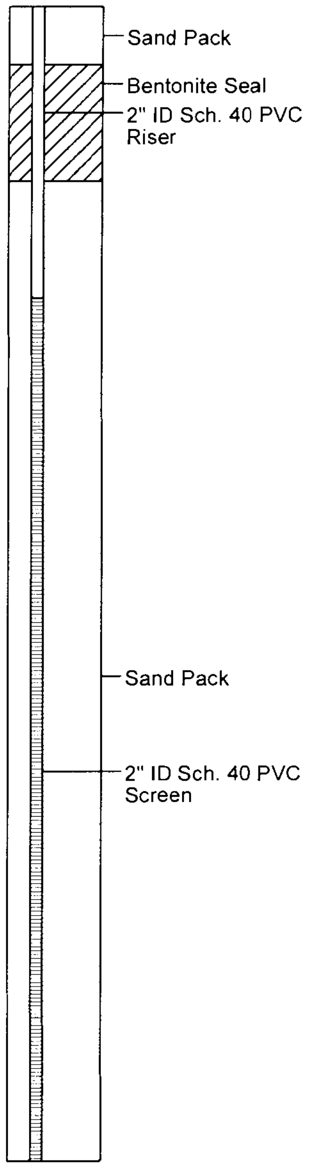
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/13/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/14/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
60					☒		59.0 to 60.6 - Loose beige to beige-white fine SAND, little medium and coarse sand, wet; scattered trace orange stain.
64	2.0/1.3	SP13/SS13	0.0	3-7-3	☒		64.0 to 65.3 - SAA.
69	2.0/2.0	SP14/SS14	0.4	4-10-5	☒		69.0 to 70.7 - Loose orange-beige to beige-white fine SAND, few medium sand, wet, sugary.
						▥	70.7 to 71.0 - Medium dense orange-beige SILT, wet.
74	2.0/1.3	SP15/SS15	0.0	7-19-9	☒		74.0 to 75.3 - Loose orange-beige to beige-white fine SAND, few medium sand, wet, sugary.
79	2.0/0.8	SP16/SS16	0.0	5-11-6	☒		79.0 to 79.8 - SAA.
80							

Well1: MW-9L
Well2: MW-9U



REMARKS:

Hull & associates, inc.

LOG OF BORING MW-9

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/13/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/14/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Well1: MW-9L
Well2: MW-9U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
80							ADVANCED AUGERS TO 81 feet.
81							
82							
83							
84							
85							
86							
87							
88							
89							
90							
91							
92							
93							
94							
95							
96							
97							
98							
99							
100							

☐ Sand Pack

REMARKS:

Hull & associates, inc.

LOG OF BORING MW-10

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

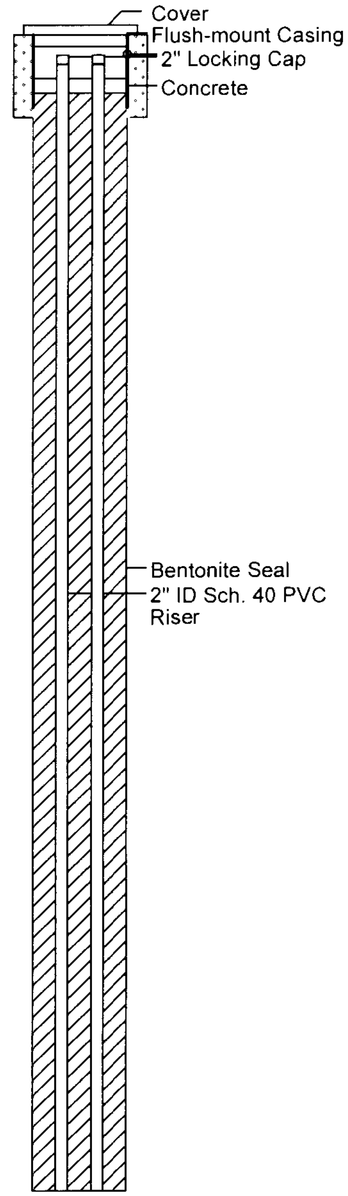
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/13/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
0	1.0/1.0	HA1/SS1	0.0	NA	☒		0.0 to 0.3 - BLACKTOP / ASPHALT. 0.3 to 1.0 - Loose dark brown sandy SILT (fill), few to little gravel, slightly moist.
4	2.0/1.0	SP1/SS2	19.3	5-20-5	☒		4.0 to 5.0 - Same as above (SAA); orange to orange-brown; asphalt fragment in shoe.
9	2.0/0.3	SP2/SS3	19.4	5-11-13	☒		9.0 to 9.3 - SAA; asphalt fragments, pvc fragments, rounded pebbles.
14	2.0/1.0	SP3/SS4	17.4	4-13-6	☒		14.0 to 15.0 - Loose orange to orange-brown poorly sorted SAND & GRAVEL, slightly moist.
19	2.0/1.7	SP4/SS5	6.2	4-10-5	☒		19.0 to 20.7 - Loose orange to beige poorly sorted SAND, some gravel, slightly moist to moist.

Well1: MW-10L
Well2: MW-10U



REMARKS:

Hull & associates, inc.

LOG OF BORING MW-10

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

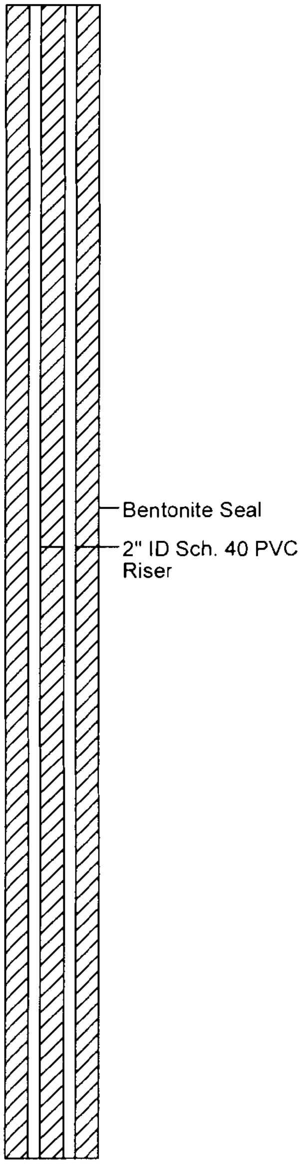
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/13/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
20					☒		
21							
22							
23							
24	2.0/0.7	SP5/SS6	25.8		☒		24.0 to 24.7 - Loose orange to beige fine to medium SAND, to coarse sand, trace red coloring, slightly moist to moist; 24.4' to 24.5' coarse grained with gravel.
25							
26							
27							
28							
29	2.0/1.2	SP6/SS7	0.2	6-15-8	☒		29.0 to 30.2 - Loose beige-white fine to medium SAND, few to little coarse sand, slightly moist to moist, little orange coloration.
30							
31							
32							
33							
34	2.0/1.2	SP7/SS8	0.0	6-9-5	☒		34.0 to 35.2 - Loose orange-beige fine SAND, little to some medium sand, slightly moist to moist, sugary.
35							
36							
37							
38							
39	2.0/1.0	SP8/SS9	0.0	7-12-7	☒		
40							

Well1: MW-10L
Well2: MW-10U



REMARKS:

Hull & associates, inc.

LOG OF BORING MW-10

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

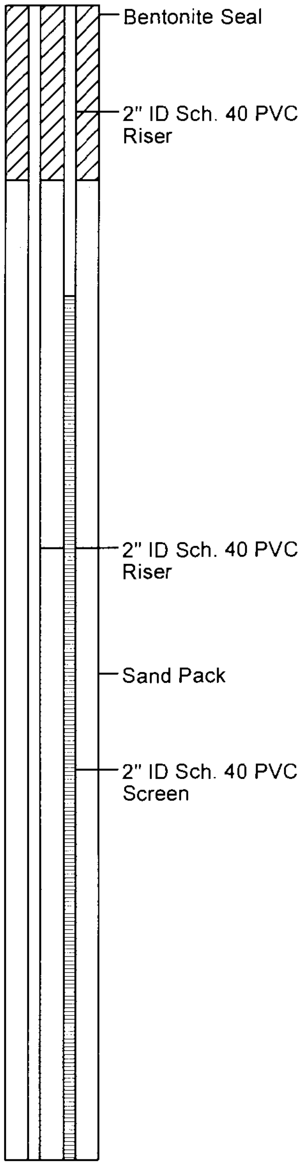
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/13/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
40							39.0 to 40.0 - Loose beige-white fine SAND, little to some medium sand, slightly moist to moist, sugary, scattered orange iron-oxide staining.
44	2.0/1.4	SP9/SS10	0.0	11-19-7	☒		44.0 to 45.4 - SAA.
49	2.0/1.5	SP10/SS11	0.0	6-22-15	☒		49.0 to 50.5 - SAA; moist.
54	2.0/1.5	SP11/SS12	0.0	7-15-7	☒		54.0 to 55.5 - SAA; moist.
59	2.0/1.0	SP12/SS13	0.7	7-18-16	☒		59.0 to 60.0 - Loose orange-beige poorly sorted SAND, wet.
60							

Well1: MW-10L
Well2: MW-10U



REMARKS:

Hull
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LOG OF BORING MW-10

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

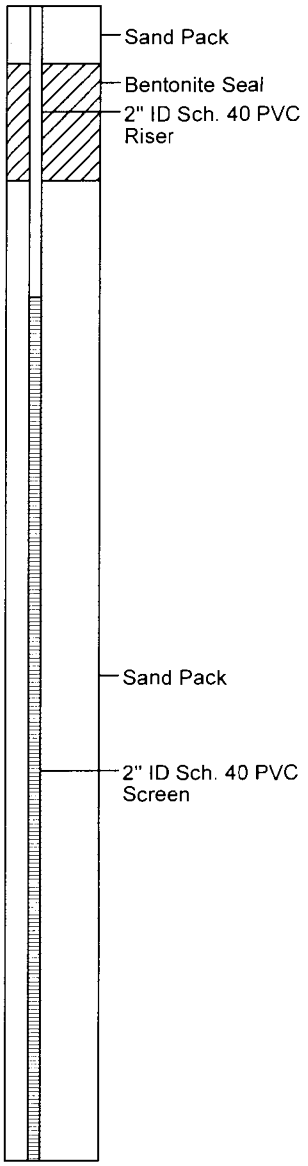
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/13/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
64	2.0/1.4	SP13/SS14	0.4	7-17-8	☒		64.0 to 64.5 - SAA. 64.5 to 64.8 - Medium dense to dense orange-beige layered with light gray clayey SILT, mm scale laminae, wet. 64.8 to 65.4 - Loose beige to beige-white fine SAND, little to some medium coarse sand, wet, trace orange iron-oxide stain.
69	2.0/1.4	SP14/SS15	0.3	5-11-5	☒		69.0 to 69.7 - SAA; orange-beige.
69.7							69.7 to 70.4 - Soft to medium dense orange-beige SILT, wet, faint mm-scale laminae.
74	2.0/1.7	SP15/SS16	1.3	6-16-7	☒		74.0 to 74.8 - Loose beige to beige-white fine SAND, wet, coarsening with depth to coarse sand with fine gravel at 74.7' to 74.8'. 74.8 to 74.9 - Medium dense to dense orange-beige SILT, wet. 74.9 to 75.7 - Loose orange-beige to beige-white fine to medium SAND, wet, sugary.
79	2.0/0.9	SP16/SS17	0.3	5-12-5	☒		79.0 to 79.9 - SAA.

Well1: MW-10L
Well2: MW-10U



REMARKS:

Hull & associates, inc.

LOG OF BORING MW-10

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

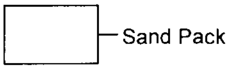
Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/13/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 81.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Well1: MW-10L
Well2: MW-10U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
80–81							ADVANCED AUGERS TO 81 feet.



80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

REMARKS:

APPENDIX A-2

New Reagent Application Wells

Hull
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LOG OF BORING AW-1

(Page 1 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

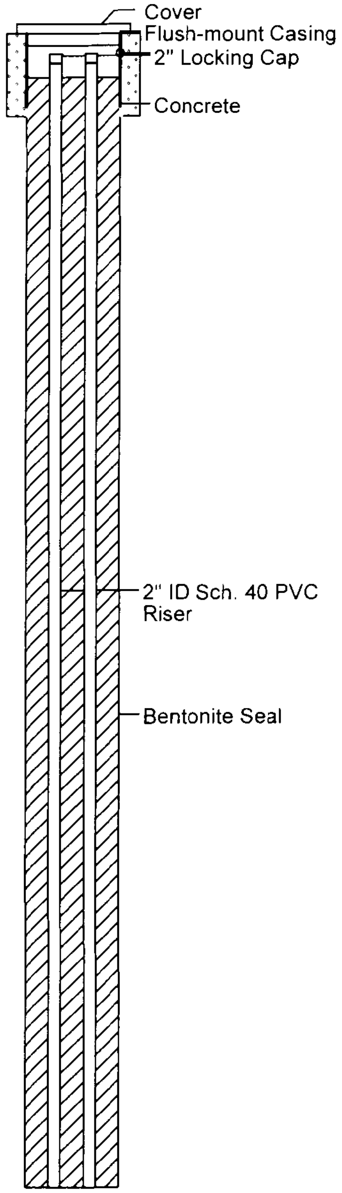
Well Location: See Site Plan

Date Started	: 9/7/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-1L
Well2: AW-1U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
0							0.0 to 0.3 - BLACKTOP / ASPHALT.
	1.0/1.0	HA1/SS1	1.1	NA	☒		loose, 0.3 to 1.0 - Loose red-brown clayey SAND / sandy CLAY, moist.
4	2.0/1.0	SP1/SS2	1.6	6-33-30	☒		4.0 to 4.5 - Medium dense to dense gray-brown silty CLAY, few gravel, slightly moist.
							4.5 to 5.0 - Loose poorly sorted SAND, some gravel, broken pebbles, dry.
9	2.0/0.7	SP2/SS3	1.3	6-18-13	☒		9.0 to 9.7 - Loose orange to beige poorly sorted SAND, some gravel and broken rock fragments, very slightly moist.
14	2.0/1.1	SP3/SS4	0.6	6-18-11	☒		14.0 to 15.1 - Same as above (SAA); with rounded pebbles, slightly moist.
19	2.0/0.9	SP4/SS5	0.5		☒		19.0 to 19.9 - Loose orange to beige fine SAND, some medium sand, little gravel (rounded), very sl. moist.
20							



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-1

(Page 2 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

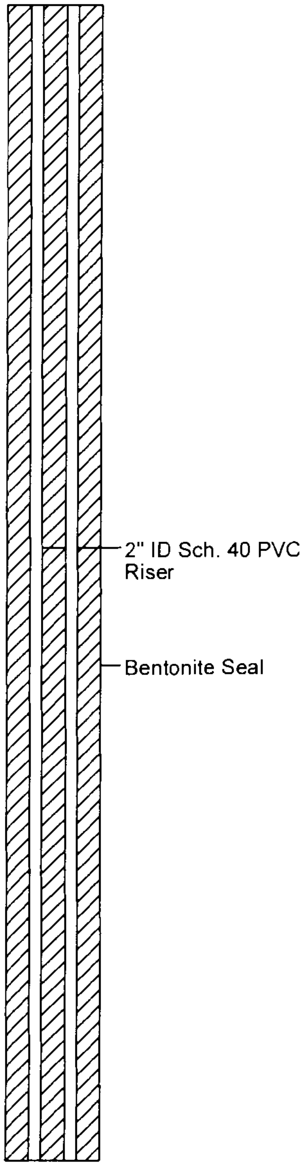
Well Location: See Site Plan

Date Started	: 9/7/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-1L
Well2: AW-1U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
24	2.0/1.4	SP5/SS6	0.2	4-11-7	☒		24.0 to 25.4 - SAA; little coarse sand, trace rounded pebbles, dry to very slightly moist.
29	2.0/0.7	SP6/SS7	0.0	3-7-3	☒		29.0 to 29.7 - Loose orange to beige-white medium SAND, little fines and coarse sand, few rounded gravel, very slightly moist.
34	2.0/1.3	SP7/SS8	0.0	6-13-7	☒		34.0 to 35.3 - Loose orange-beige very fine to fine SAND, slightly moist, sugary.
39	2.0/1.8	SP8/SS9	0.0	6-13-8	☒		39.0 to 40.8 - Loose orange-beige fine SAND, little medium sand, slightly moist, sugary.



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-1

(Page 3 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

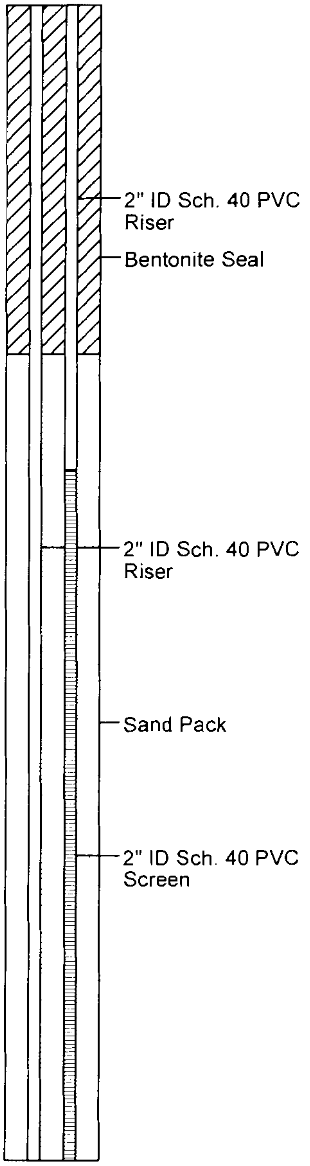
Well Location: See Site Plan

Date Started	: 9/7/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-1L
Well2: AW-1U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
40					☒		
44	2.0/1.1	SP9/SS10	0.0	3-10-4	☒		44.0 to 45.1 - SAA; slightly moist to moist.
49	2.0/1.8	SP10/SS11	0.0	8-23-14	☒		49.0 to 50.8 - Loose beige-white fine SAND, little medium sand, trace coarse sand, occassional orange iron-oxide staining, slightly moist to moist.
54	2.0/1.5	SP11/SS12	0.0	5-17-8	☒		54.0 to 55.5 - Loose beige-white fine SAND, little medium and coarse sand, occassional orange iron-oxide staining, wet.
59	2.0/1.3	SP12/SS13	0.0	3-10-8	☒		59.0 to 60.3 - SAA; increase in grain size, occassional pink coloration.
60							



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-1

(Page 4 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

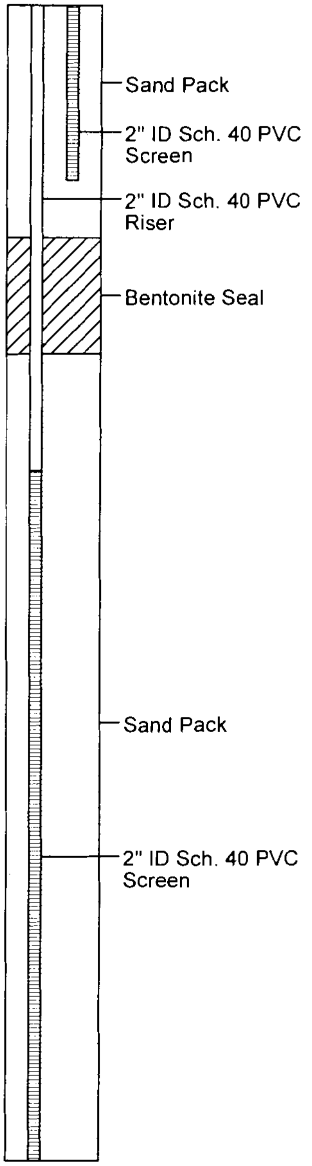
Well Location: See Site Plan

Date Started	: 9/7/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-1L
Well2: AW-1U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
60					☒		
64	2.0/2.0	SP13/SS14	0.0	3-7-6	☒		64.0 to 64.9 - SAA.
64.9						▥	64.9 to 66.0 - Medium dense light gray-brown SILT, few very fine sand, wet.
69	2.0/1.7	SP14/SS15	0.0	3-11-10	☒		69.0 to 70.7 - Loose light brown fine to medium SAND, Little coarse sand, occassional orange stain, wet.
74	2.0/1.6	SP15/SS16		4-12-8	☒		74.0 to 75.6 - Loose orange-brown to light brown fine SAND, little medium sand, wet.
79	2.0/0.9	SP16/SS17			☒		79.0 to 79.9 - SAA; finer grained; wet, SILT in shoe.
80							



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-1

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/7/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

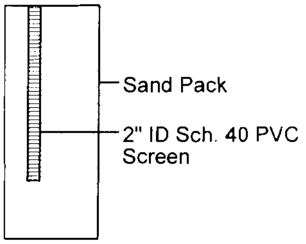
Soil Samples:

☒ Sample Recovered

■ Sample Sent to Lab

Well1: AW-1L
Well2: AW-1U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
80							ADVANCED AUGERS TO 84 feet
81							
82							
83							
84							
85							
86							
87							
88							
89							
90							
91							
92							
93							
94							
95							
96							
97							
98							
99							
100							



REMARKS:

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LOG OF BORING AW-2

(Page 1 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

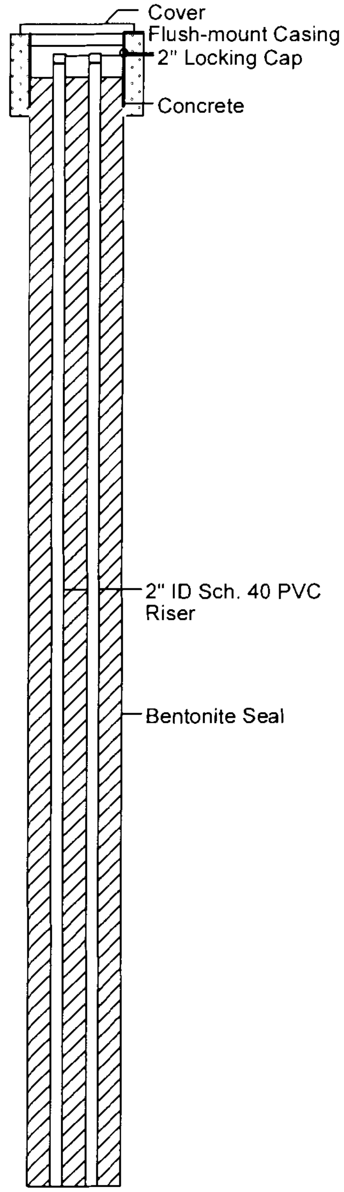
Well Location: See Site Plan

Date Started	: 9/11/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 84
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-2L
Well2: AW-2U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
0	1.0/1.0	HA1/SS1	0.0	NA	☒		0.0 to 0.3 - BLACKTOP / ASPHALT. 0.3 to 1.0 - Loose dark brown sandy SILT, little gravel, sl moist.
3							3.0 to 4.0 - Same As Above (SAA); with pea gravel.
4	2.0/1.0	SP1/SS2	0.3	2-5-1	☒		4.0 to 5.0 - SAA; with pea gravel and asphalt fragments.
9	2.0/1.4	SP2/SS3	>2000	12-15-8	☒		9.0 to 10.4 - Loose brown to gray silty SAND (poorly sorted), some gravel and rounded pebbles, moist; 9.7 to 9.9 is olive-green to gray. PERC Odor Coming From Cuttings.
14	2.0/0.2	SP3/SS4	407	8-8-3	☒		14.0 to 14.2 - Loose orange-beige SAND; poor recovery due to cobble in spoon.
19	2.0/1.3	SP4/SS5	71.8	NA	☒		19.0 to 20.3 - Loose orange-brown poorly sorted SAND, trace rounded gravel, moist.
20							



REMARKS:

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LOG OF BORING AW-2

(Page 2 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

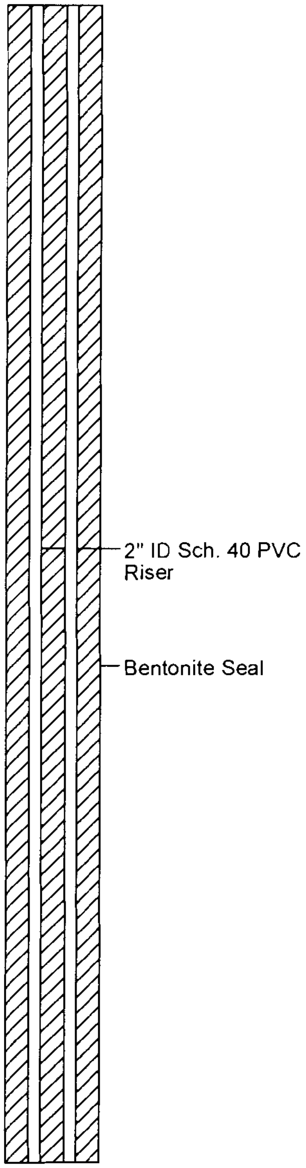
Well Location: See Site Plan

Date Started	: 9/11/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-2L
Well2: AW-2U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
20					☒		
24	2.0/2.0	SP5/SS6	54.7	5-9-5	☒		24.0 to 25.5 - SAA.
25.5							25.5 to 26.0 - Loose beige-white fine to medium SAND, moist, sugary.
29	2.0/1.3	SP6/SS7	2.9	NA	☒		29.0 to 30.3 - SAA.
34	2.0/1.2	SP7/SS8	4.0	5-12-6	☒		34.0 to 35.2 - Loose orange-beige fine SAND, slightlyl moist to moist, sugary.
39	2.0/1.7	SP8/SS9	0.0	NA	☒		39.0 to loose orange-beige fine SAND, few medium sand, slightly moist to moist, sugary.
40							



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-2

(Page 3 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

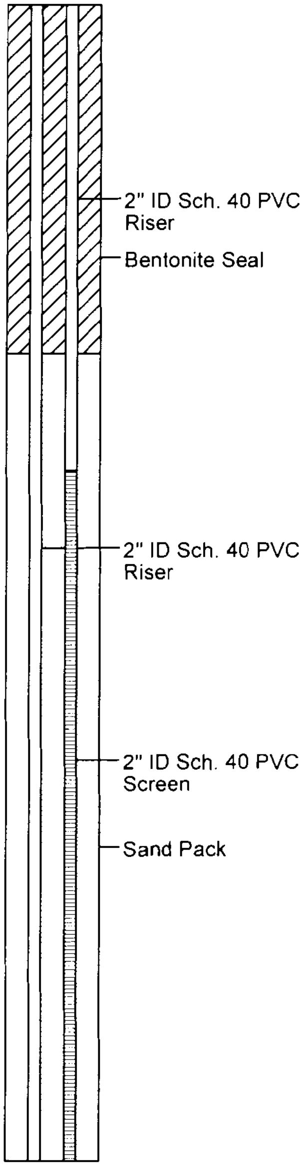
Well Location: See Site Plan

Date Started	: 9/11/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-2L
Well2: AW-2U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
40					☒		
44	2.0/1.3	SP9/SS10	0.5	NA	☒		44.0 to 45.3 - SAA.
49	2.0/1.6	SP10/SS11	61.6	7-21-16	☒		49.0 to 50.6 - Loose beige-white fine SAND, few to little medium sand, occassional orange iron-oxide stain, moist.
54	2.0/1.8	SP11/SS12	2.1	11-29-14	☒		54.0 to 55.8 - Loose beige-orange-white fine to medium SAND, trace coarse sand, moist, occassional orange iron oxide-stain.
56	2.0/1.5	SP12/SS13	0.0	NA	☒		56.0 to 57.5 - SAA.
58	2.0/1.6	SP13/SS14	0.0	3-25-13	☒		58.0 to 59.6 - SAA; bottom 0.5' is wet.
60							



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-2

(Page 4 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

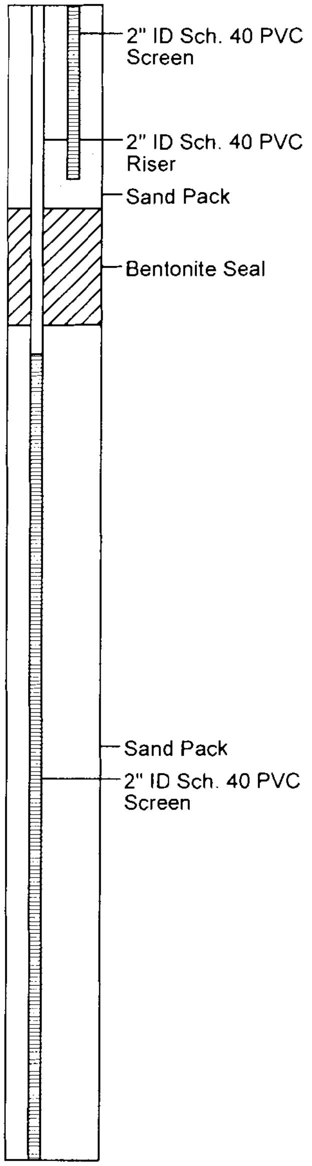
Well Location: See Site Plan

Date Started	: 9/11/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 84
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-2L
Well2: AW-2U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
60	2.0/2.0	SP14/SS15	31.0	8-18-6	■		60.0 to 62.0 - Loose brown-beige to orange-brown fine SAND, little medium to coarse sand, trace gravel, wet.
62	2.0/2.0	SP15/SS16	13.0	3-10-5	■		62.0 to 64.0 - Loose brown-beige to orange-brown fine to medium SAND, little to some coarse sand, wet, trace pink-red staining.
64	2.0/2.0	SP16/SS17	10.5	3-8-5	■		64.0 to 66.0 - SAA.
66	2.0/1.0	SP17/SS18	16.2	13-13-7	☒		66.0 to 67.0 - SAA; beige to beige-white, little orange coloring.
68	2.0/0.9	SP18/SS19	32.1	4-20-12			
69					☒		69.0 to 69.9 - Loose orange-beige silty fine SAND, little medium sand, wet.
74	2.0/2.0	SP19/SS20	7.6	6-18-8	☒		74.0 to 75.2 - Loose orange-beige silty fine SAND, little medium sand, wet.
75.2							75.2 to 76.0 - Medium dense beige SILT, few very fine sand, wet.
79	2.0/1.3	SP20/SS21	5.8	9-26-14	☒		



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-2

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/11/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/11/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-2L
Well2: AW-2U

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
80					☒		79.0 to 80.3 - Loose orange-beige to beige fine SAND, little to some medium sand, few to little coarse sand, wet.
81							
82							ADVANCED AUGERS TO 84 feet. Sandstone fragments in cuttings. Could not advance AW-2L beyond 81 feet bgs during well installation.
83							
84							
85							
86							
87							
88							
89							
90							
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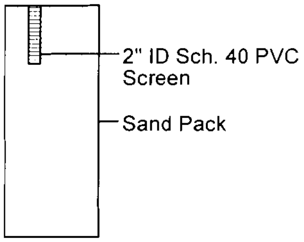
92							
93							
94							
95							
96							
97							
98							
99							
100							



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-3

(Page 1 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

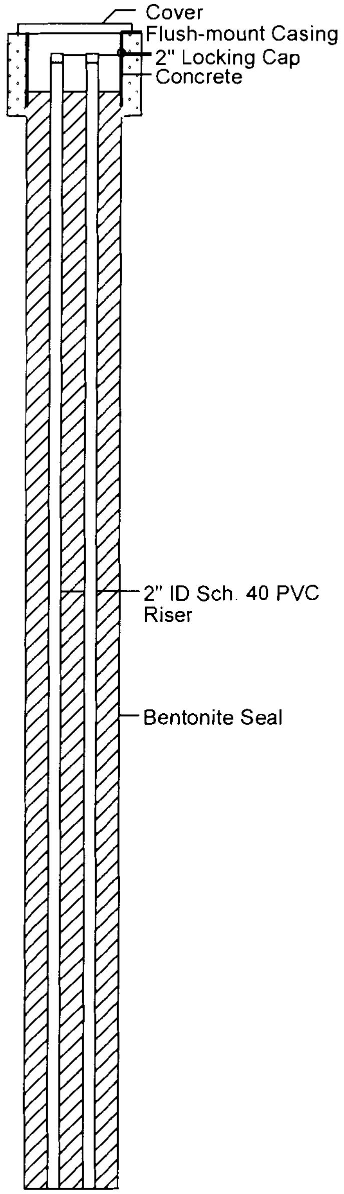
Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/12/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-3U
Well2: AW-3L

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
0							Boring installed within large man-hole in front of SVE building. Sampling started at 4 feet.
4	2.0/0.5	SP1/SS1	0.0	3-4-3	☒		4.0 to 4.5 - Soft dark brown SAND & SILT (fill), some gravel, sl moist.
9	2.0/1.4	SP2/SS2	2.0	1-2-2	☒		9.0 to 10.4 - Soft dark brown clayey SILT (fill), little fine sand, sl moist.
14	2.0/0.4	SP3/SS3	0.7	2-3-2	☒		14.0 to 14.4 - Same As Above (SAA).
19	2.0/0.5	SP4/SS4	11.8		☒		19.0 to 19.5 - Loose orange-beige poorly sorted SAND, little rounded gravel, moist.
20							



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-3

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Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

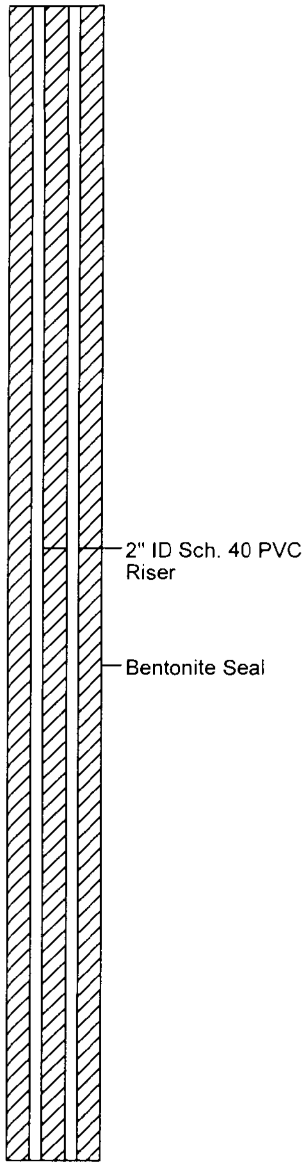
Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/12/01	Sampling Method	: 2" * 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-3U
Well2: AW-3L

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
20							
21							
22							
23							
24	2.0/0.7	SP5/SS5	2.3	5-11-8	☒		24.0 to 24.7 - Loose orange-beige fine to medium SAND, moist, mm scale laminae; 24.3 to 24.4 is darker orange and coarse grained with gravel.
25							
26							
27							
28							
29	2.0/0.7	SP6/SS6	4.4	8-24-7	☒		29.0 to 29.9 - Loose orange-beige poorly sorted SAND, little to some rounded gravel, slightly moist to moist.
30							
31							
32							
33							
34	2.0/1.1	SP7/SS7	0.0	7-20-13	☒		34.0 to 35.1 - Loose orange fine SAND, few to little medium sand, moist, sugary.
35							
36							
37							
38							
39	2.0/1.2	SP8/SS8	0.0	4-13-7	☒		39.0 to 40.2 - SAA.
40							



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-3

(Page 3 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/12/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

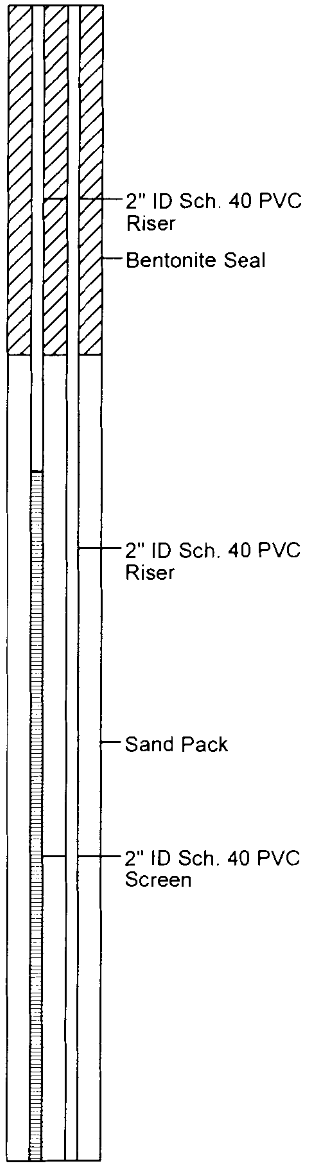
Soil Samples:

☒ Sample Recovered

■ Sample Sent to Lab

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
40					☒		
41							
42							
43							
44	2.0/1.2	SP9/SS9	0.0	6-17-9	☒		44.0 to 45.2 - SAA; orange-beige becoming beige-white at ~44.7'.
45							
46							
47							
48							
49	2.0/1.3	SP10/SS10	0.0	9-26-13	☒		49.0 to 50.3 - Loose beige-white fine SAND, trace to few medium sand, slightly moist to moist, sugary, occassional orange iron-oxide stain.
50							
51							
52							
53							
54	2.0/1.4	SP11/SS11	0.0	7-15-7	☒		54.0 to 55.4 - SAA; becoming very moist at ~55.2
55							
56							
57							
58							
59	2.0/1.3	SP12/SS12	0.0	3-7-3	☒		59.0 to 60.3 - Loose beige-white poorly sorted SAND, few round gravel, wet, little orange coloration.
60							

Well1: AW-3U
Well2: AW-3L



REMARKS:

Hull & associates, inc.

LOG OF BORING AW-3

(Page 4 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

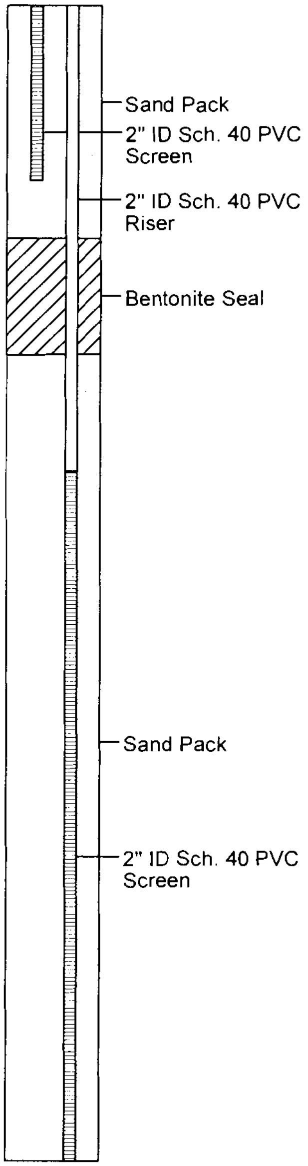
Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/12/01	Sampling Method	: 2" * 2' Split Spoon
Logged by.	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-3U
Well2: AW-3L

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
60					☒		
64	2.0/1.1	SP13/SS13	0.0	7-13-7	☒		64.0 to 65.1 - Loose beige-white fine SAND, little to some medium coarse sand, wet.
69	2.0/0.1	SP14/SS14	3.3	4-9-4	☒		69.30 to 69.1 - SAA; most of the spoon contains cavings from above.
74	2.0/0.7	SP15/SS15	0.0	6-10-6	☒		74.0 to 74.3 - SAA.
						▨	74.3 to 74.7 - Medium dense light gray CLAY, orange iron-oxide stain in places, moist, plastic.
76	2.0/1.3	SP16/SS16	0.0		☒		76.0 to 76.4 - SAA.
							76.4 to 77.3 - Loose orange to beige-white fine SAND, few medium sand, wet.
80							



REMARKS:

Hull
& associates, inc.

LOG OF BORING AW-3

(Page 5 of 5)

Focused Groundwater Remediation
570 Main Street
Westbury, New York

Project No. NMB008

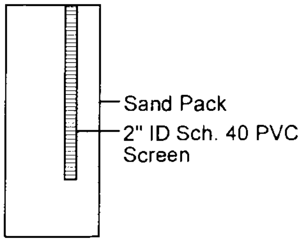
Well Location: See Site Plan

Date Started	: 9/12/01	Drilling Method	: 6.25" HSA
Date Completed	: 9/12/01	Sampling Method	: 2" • 2' Split Spoon
Logged by	: Bill Dennis	Total Depth (ft.)	: 84.0
Reviewed by	: Lance Turley	S. Water Level Date	:
Drilling Contractor	: Total Quality Drilling	S. Water Level (ft.)	:

Soil Samples:
☒ Sample Recovered
■ Sample Sent to Lab

Well1: AW-3U
Well2: AW-3L

Depth in Feet	Sample Interval/ Sample Recovery	Sampler Type/ Sample Number	PID / FID (ppm)	Blow Count (6"-12"-6")	Samples	GRAPHIC	DESCRIPTION
80	2.0/1.0	SP17/SS17	0.0	7-17-7	☒		80.0 to 81.0 - SAA; little silt, trace medium sand.
81							ADVANCED AUGERS TO 84 feet.
82							
83							
84							
85							
86							
87							
88							
89							
90							
91							
92							
93							
94							
95							
96							
97							
98							
99							
100							



REMARKS:

APPENDIX B

Field Data Sheets

APPENDIX B-1

Field Data Sheets for the Baseline Groundwater Sampling Event
September 29, 2001

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-1

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.10
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	64.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	20 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	clear	14.96	0.191	6.92	2.08	331.4
	" "	14.80	0.186	6.92	1.98	331.2
	" "	14.76	0.185	6.92	1.96	331.1

Samples Collected: ✓

Sample ID: NMB007: MW-1:G100101

TIME: 11:30

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-3

Hydro/Tech: AF/HB

Date: 9/26/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.5
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	64.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	22gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		15.47	0.169	6.98		
		15.39	0.170	6.99		
		15.20	0.173	7.04	9.50	380.8
		15.77	0.101	6.94	9.20	332.8
		15.81	0.105	6.93	9.22	336.3
		15.83	0.112	6.93	9.28	342.2
		15.83	0.117	6.93	9.33	344.1
		15.82	0.116	6.93	9.33	344.4

Samples Collected: ✓

Sample ID: NMB007:MW-3:G092601A
// \\ B

TIME: 9:30

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-1U

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.85
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	62.60

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	TAN CLOUDY	15.40	0.140	6.99	4.49	414.8
	clear	15.36	0.136	6.98	4.37	415.0
	" "	15.37	0.133	6.98	4.38	415.0

Samples Collected: ✓

Sample ID: NMB007: AW-1U :G100101 A TIME: 12:15

" " B

Duplicate A

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: AW-1L

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.88
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	80.90

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	15 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	TAN CLOUDY	15.30	0.143	6.99	4.87	415.7
	clear	15.27	0.137	6.98	4.51	416.0
	" "	15.26	0.133	" "	4.48	415.9
	" "	15.29	0.144	" "	4.49	416.0

Samples Collected: /

Sample ID: NMB007: AW-1L:G100101 TIME: 12:00

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-20

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.22
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	61.8

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	10 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Tan cloudy	15.03	0.144	6.97	3.60	412.2
	clear	15.0	0.144	6.97	3.62	413.6
	" "	14.96	0.138	6.97	3.58	413.8

Samples Collected: ✓

Sample ID: NMB007: AW-20; G100101 TIME: 4:00

Field Blank – 4:10

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: AW-2L

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.19
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	76

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	13gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Clear	14.95	0.133	6.93	4.12	409.1
	" "	14.94	0.130	6.92	4.17	411.0
	" "	14.95	0.127	6.92	4.16	411.0

Samples Collected: ✓

Sample ID: NMB007: AW-2L: G100101 TIME: 3:45

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-3U

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.28
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	62.35

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	TAN CLOUDY	15.38	0.090	6.94	4.33	417.2
	Clear	15.35	0.088	6.94	4.30	417.9
	" "	15.34	0.085	6.93	4.35	418.0

Samples Collected: ✓

Sample ID: NMB007: AW-3U:G100101 TIME: 1:00

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: AW-3L

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.26
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	79.15

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	12gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	TAN CLOUDY	15.24	0.074	6.93	4.55	418.1
	Clear	15.21	0.070	6.93	4.56	418.9
	clear	15.20	0.081	6.94	4.60	418.2

Samples Collected: ✓

Sample ID: NMB007: AW-3L:G100101

TIME: 12:45

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-4U

Hydro/Tech: AF

Date: 10/1/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.82
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	63.70

Well Purging/Development

Method	sub. pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

P ~ 4 gal

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	clear	14.86	0.242	6.99	1.44	[illegible]
	" "	14.80	0.266	6.99	1.41	339.1
	" "	14.78	0.255	6.98	1.33	340.4
	" "	14.79	0.254	6.97	1.37	342.2

3365

Samples Collected: ✓

Sample ID: NMB007:MW-4U: 9100101

TIME: 10:30

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-4M

Hydro/Tech: AF

Date: 10|1|01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.86
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	110

Well Purging/Development

Method	sub. pump
Duration	
Volume Pumped	~ 28 gal
Headspace (ppmv)	0.0

P ~ 26 gal

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Clear	14.51	0.220	6.97	0.98	414.9
	" "	14.48	0.221	6.98	0.95	415.1
	Tan slightly cloudy	14.48	0.218	6.98	0.93	415.4

Samples Collected: ✓

Sample ID: NMB007: MW-4M: G100101 TIME: 10:15

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-4L

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.89
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	130

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	40gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	clear	14.65	0.237	6.99	2.08	410.8
	" "	14.58	0.242	6.98	1.33	412.0
	" "	14.57	0.240	6.98	1.29	412.4
	" "	14.55	0.245	6.98	1.25	412.9

Samples Collected: ✓

Sample ID: NMB007: MW-4L: G100101 A TIME: 10:00

" " B

Duplicate

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: ~~AWMC~~ MW-5U

Hydro/Tech: AF

Date: 9/28/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.95
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	60'

Well Purging/Development

Method	Sub. Pump
Duration	
Volume Pumped	[illegible] – 5gal
Headspace (ppmv)	0.0

P- 2.5 gal

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	clear	15.19	0.208	7.01	3.82	330.7
	" "	15.15	0.218	7.02	3.78	333.0
	" "	15.14	0.214	7.02	3.77	333.4
	" "	15.14	0.216	7.02	3.68	333.6

Samples Collected: Y

Sample ID: NMB007: MW-5U: G092801

TIME-3:45

4:00 Field Blank – 3voa's

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-5M

Hydro/Tech:

Date: 9/28/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.98
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	110

Well Purging/Development

Method	sub. pump
Duration	
Volume Pumped	~ 30
Headspace (ppmv)	0.0

~26

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Tan slightly cloudy	15.31	0.127	7.12	5.37	327.4
	clear	15.12	0.146	7.10	5.18	329.9
	" "	15.12	0.151	7.09	5.15	330.5
	" "	15.11	0.155	7.09	5.14	330.8

Samples Collected: Y

Sample ID: NMB007:MW-5M:G092801

TIME 3:30

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-5L

Hydro/Tech: AF

Date: 9/28/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.88
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	130'

Well Purging/Development

Method	Sub. pump
Duration	
Volume Pumped	~40gal
Headspace (ppmv)	0.0

Purge – 36 gal

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		15.27	0.158	7.04	4.03	304.6
		15.18	0.160	7.04	3.87	305.6
		15.14	0.162	7.03	3.79	305.8
		15.10	0.160	7.03	3.71	304.6
		15.08	0.160	7.03	3.76	304.7

Samples Collected: Y

Sample ID: NMB007:MW-5L:G092801 TIME 3:00

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-6U

Hydro/Tech: AF

Date: 9/28/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.20
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	65.70

Well Purging/Development

Method	Sub. pump
Duration	
Volume Pumped	9.0 gals.
Headspace (ppmv)	0.0

Purge ~ 5 gals

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	slightly tan cloudy	16.70	0.020	6.90	8.16	331.4
	clear	16.40	0.019	6.90	8.09	331.6
	" "	16.37	0.022	6.90	8.04	331.6
	" "	16.45	0.028	6.90	8.03	331.6
	" "	16.49	0.023	6.90	8.03	331.6

Samples Collected: Y

Sample ID: NMB007:MW-6U:G092801 TIME: 1:30

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-6M

Hydro/Tech: AF

Date: 9/28/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.94
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	110

Purge ~ 24 gals

Well Purging/Development

Method	sub. pump
Duration	
Volume Pumped	~30 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Clear	15.79	0.128	6.93	2.21	327.6
	" "	15.77	0.136	6.93	1.95	327.7
	" "	15.76	0.122	6.93	1.87	328.4
	" "	15.76	0.125	6.93	1.79	328.6

Samples Collected: ✓

Sample ID: NMB007:MW-6M.G092801 TIME: 1:00

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-6L

Hydro/Tech: AF

Date: 9/28/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.20
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	130'

Well Purging/Development

Method	Sub. Pump
Duration	
Volume Pumped	~40 gals
Headspace (ppmv)	0.0

Purge ~ 36 gals

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	clear	15.20	0.110	7.05	3.98	314.9
	" "	15.01	0.121	7.05	3.79	316.7
	" "	14.92	0.120	7.04	3.70	317.8
	" "	14.87	0.123	7.04	3.66	318.4
	" "	14.90	0.125	7.04	3.62	318.8

Samples Collected: Y

Sample ID: NMB007:MW-6L:G092801 TIME: 12:30

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-7U

Hydro/Tech: AF

Date: 9-28-01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	53.04
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	58.91

Purge ~ 2.8 gal

Well Purging/Development

Method	sub pump
Duration	
Volume Pumped	~ 8 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	cloudy tan	15.83	0.33	6.95	9.88	248.8
	clear	15.91	0.32	6.94	9.90	254.1
	" "	15.98	0.33	6.95	9.93	255.4

Samples Collected: Y

Sample ID: NMB007:MW-7U:G092801 Time: 12:00

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-7M

Hydro/Tech: AF

Date: 9-28-01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	53.08
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	110

Purge ~ 27 gal

Well Purging/Development

Method	sub pump
Duration	
Volume Pumped	~33 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
11:20	Clear	15.63	0.279	6.87	1.89	315.6
11:25	"	15.50	0.311	6.86	1.65	280.1
11:30	"	15.46	0.314	6.85	1.48	272.0
11:35	"	15.45	0.317	6.85	1.46	271.8
11:40	"	15.44	0.318	6.85	1.45	270.3

Samples Collected: Y

Sample ID: NMB007:MW-7M:G092801 Time: 11:45

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-7L

Hydro/Tech: AF

Date: 9-28-01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	53.14
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	130

Well Purging/Development

Method	sub pump
Duration	
Volume Pumped	~40gal
Headspace (ppmv)	0.0

purge ~ 37gal

Measured Parameters

Time	Turbidity	°C Temperature	Conductivity	pH	DO	ORP
10:54	clear	14.79	0.397	6.82	0.95	351.6
10:59	" "	14.81	0.403	6.83	0.94	353.0
11:04	" "	14.83	0.404	6.83	0.97	361.2

Samples Collected: Y

Sample ID: NMB007:MW-7L:G092801 Time: 11:30

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-8U

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.83
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	59.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	3gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		17.80	0.502	6.99	10.19	365.8
		17.70	0.406	6.92	9.96	363.2
		17.72	0.410	6.92	9.95	364.0

Samples Collected: ✓

Sample ID: NMB007: MW-8U: G100101

TIME: 2:00

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW- 8M

Hydro/Tech:

Date: 10/1/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.83
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	75.

Well Purging/Development

Method	sub pump
Duration	
Volume Pumped	15 gal.
Headspace (ppmv)	0.0

~10 gal -Purge

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Cloudy	16.02	0.450	6.90	5.81	333.1
	Clear	15.98	0.448	6.89	5.83	334.2
	clear	15.96	0.447	6.89	5.80	334.2

Samples Collected: ✓

Sample ID: NMB007:MW-8M: 100101 TIME: 1:45

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-8L

Hydro/Tech:

Date: 10/1/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	54.83
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	85

Well Purging/Development

Method	sub pump
Duration	
Volume Pumped	20gal.
Headspace (ppmv)	0.0

P - 14gal

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.42	0.462	6.88	6.62	340.5
		16.03	0.249	6.87	6.69	322.1
		16.07	0.253	6.90	6.71	331.8
		15.81	0.252	6.90	6.89	329.9

Samples Collected: Brooks ✓

Sample ID: NMB007: MW-8L: ~~[illegible]~~ 10901 ~~[illegible]~~ 1:30 pm

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well:

~~MW-9u~~

MW-9U

Hydro/Tech:

Date: 10/1/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.90
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	59.80

Well Purging/Development

Method	Sub pump
Duration	
Volume Pumped	~ 4 gal
Headspace (ppmv)	0.0

P – 2 gal

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Tan, cloudy	15.99	0.161	6.98	4.85	313.1
	clear	15.99	0.158	6.98	4.84	315.2
	clear	15.97	0.162	6.98	4.84	317.0

Samples Collected: ✓

Sample ID: NMB007: MW-9U: G100101

TIME: 2:45

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: ~~MW-8L~~ MW-9L

Hydro/Tech:

Date: 10/1/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.89
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	78.30

2"

P~11gal

Well Purging/Development

Method	Sub pump
Duration	
Volume Pumped	~ 13 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	clear	16.31	0.140	6.99	4.89	327.7
	clear	16.29	0.142	6.99	4.86	331.1
	clear	16.25	0.145	6.98	4.87	330.0

Samples Collected: ✓

Sample ID: NMB007:MW-9L:G100101 TIME: 2:30

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-10U

Hydro/Tech:

Date: 10/1/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.40
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	59.30

2''

P~ 2gal

Well Purging/Development

Method	Sub pump
Duration	
Volume Pumped	~ 4gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Clear	15.33	0.091	6.95	4.44	415.1
	" "	15.33	0.093	6.94	4.46	415.4
	" "	15.30	0.093	6.94	4.40	415.2

Samples Collected: ✓

Sample ID: NMB007:MW-10U:G100101

TIME: 3:15

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-10L

Hydro/Tech: AF/HB

Date: 10/01/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	55.41
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	80.20

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	15 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	Clear	15.41	0.081	6.94	4.61	416.1
	" "	15.38	0.077	6.93	4.55	416.5
	" "	15.31	0.078	6.94	4.54	417.0

Samples Collected: ✓

Sample ID: NMB007: MW-10L: G100101 TIME: 3:00

APPENDIX B-2

Field Data Sheets for the Reagent Application Activities

Hull & Associates, Inc. C.
4700 Duke Drive
Suite 172
Mason, Ohio 45040
Telephone (513) 459-9677
Fax (513) 459-9869

PROJECT ISOTEC REAGENT APPLICATION

SHEET __ OF __
CALC. BY WHK DATE 12/3/01
CHECKED BY _____ DATE _____

12/3/01

- arrived on-site at 12:30; Isotec personnel present
  - KEVIN O'NEAL } ISOTEC PERSONNEL
  - BRET HUNGER }
- spoke w/ SAF-T-SWIM personnel about isolating work area, parking, etc.
- isolated work area w/ caution tape
- left a message for Syl Lamarca w/ secretary at Castle Collision
- worked out logistics for obtaining water
  - site faucet not working
  - called Jed Meyers at Handex. Jed indicated hydrant permit still valid from Aug./Sept. drilling activities
- H_2O_2 (peroxide) delivered to the site. 60 gal drums of 35% technical grade - diluted to 12% before application
- locked drums inside SVE fenced area
- secured wells for the night.
- drove to Handex office to pick up permit and back-flow device for hydrant.
- stopped back at site to make sure ISOTEC secured site properly.
- left site at 15:45.

PROJECT ______________________

SHEET ___ OF ___
CALC. BY ________ DATE ________
CHECKED BY ________ DATE ________

12/4/01 CONTINUED

- catalyst mixed in 120-gal poly tanks on trailer and pumped to drums at each well
- started injection in lower wells at 13:45 (injection in upper wells complete).
- ISOTEC sampled GW from MW-9U and MW-10U
- ISOTEC tested for Fe and H_2O_2 with HACH test kits.

H_2O_2		Fe	
MW-9U	>1000 mg/L	MW-9U	0.5 to 0.9 mg/L
MW-10U	>1000 mg/L	MW-10U	

- completed injection in lower wells
- collected samples from MW-9L and 10L

H_2O_2		Fe	
MW-9L	0.4 mg/L	MW-9L	0.6 mg/L
MW-10L	<0.2 mg/L	MW-10L	0.9 mg/L

- secured site for the night
- left site at 16:00.

Misc. (MW-5, 8, 9, 10 AW-1, 2, 3)

- scheduled GW sampling w/ fed for 12/12
- ordered glassware for 12/12 sampling from Lanc. Labs (Marianne Bragg) - will be delivered 12/7 or 12/10 to Handex.

Hull & Associates, Inc. C.
4700 Duke Drive
Suite 172
Mason, Ohio 45040
Telephone (513) 459-9677
Fax (513) 459-9869

PROJECT Isotec Reagent Application

SHEET ___ OF ___
CALC. BY WHD DATE 12/5/01
CHECKED BY _____ DATE _____

12/5/01 - Second Round of Injection At AW-1, AW-2, AW-3

- arrived on-site at 8:00
- set up site while waiting for H_2O_2 delivery.
- Isotec collected samples from MW-9 + MW-10 couplets

H_2O_2		Fe	
MW-9L	>1000 mg/L	MW-9L	0.5 mg/L
MW-9U	> 1000 mg/L	MW-9U	0.7 mg/L
MW-10L	< 0.2 mg/L	MW-10L	0.5 mg/L
MW-10U	> 1000 mg/L	MW-10U	0.6 mg/L

- bought a lock for SVE fence gate.
- H_2O_2 delivered at 10 30.
- started injection (2nd Round) in upper wells. Used same injection series as 12/4/01.
- bubbling noted in outlet hose at AW-2U (12:00) Bubbling indicates reaction - liberation of CO_2.
- 13:15 collected GW samples from MW-9U and MW-10U

H_2O_2		Fe	
MW-9U	>1000 mg/L	MW-9U	0.8 mg/L
MW-10U	>1000 mg/L	MW-10U	0.9 mg/L

- 15:00 collected samples from MW-9L and MW-10L

H_2O_2		Fe	
MW-9L	> 1000 mg/L	MW-9L	1.2 mg/L
MW-10L	< 0.2 mg/L	MW-10L	0.9 mg/L

- second round complete at 15:20
- secured site and departed at 15:45

(OVER)

Hull & Associates, Inc.
4700 Duke Drive
Suite 172
Mason, Ohio 45040
Telephone (513) 459-9677
Fax (513) 459-9869

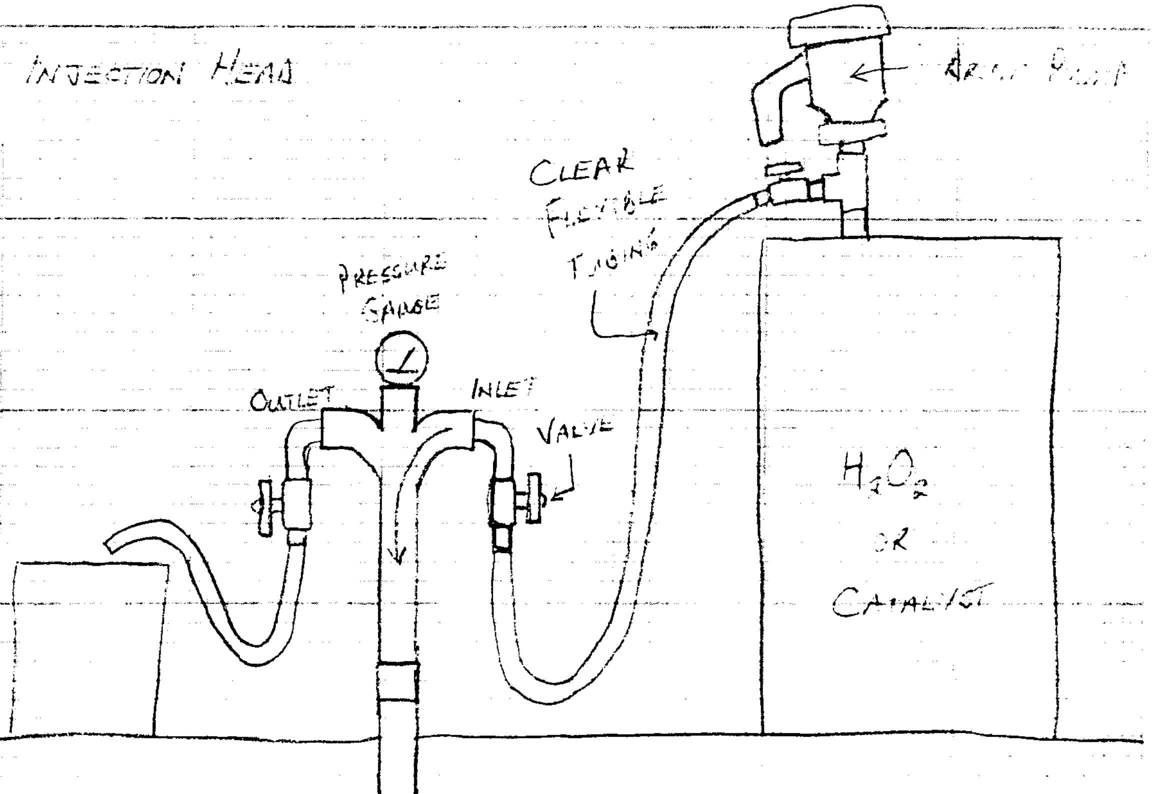
PROJECT ______________________

SHEET __ OF __

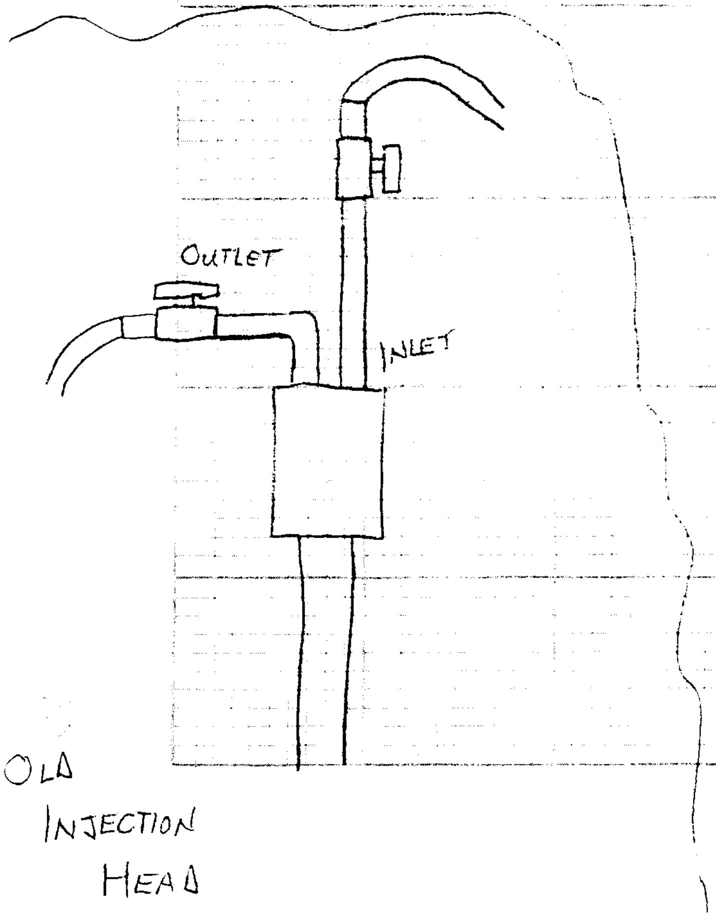
CALC. BY ________ DATE ________

CHECKED BY ______ DATE ________

NEW INJECTION HEAD



START FLOW W/ DRUM PUMP THEN USE GRAVITY DRAINAGE (SYPHON EFFECT).



OLD INJECTION HEAD

- ISOTEC will be returning to perform 3 additional rounds of application week of 12/10/01.

- called Jed and moved 12/12 sampling to 12/19.

APPENDIX B-3

Field Data Sheets for the Initial Post-Treatment Groundwater Sampling Event December 19, 2001

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: AW-3U

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.51
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	62.35

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	841	7.77	0.002	5.8	3.18	106
	847	9.93	0.002	5.66	3.20	107

Samples Collected: ✓

Sample ID: NMB008: AW-3U:G121901 TIME: 9:00

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: AW-3L

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.51
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	79.15

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	12 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		14.3	0.001	5.45	1.57	111
		14.6	0.002	5.58	1.75	110
		15.29	0.002	5.40	1.59	118

Samples Collected: ✓

Sample ID: NMB008: AW-3L: G121901 TIME: 9:15

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well:

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.20
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	59.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	3 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.70	4.22	5.50	6.38	280
		16.80	4.30	5.50	6.41	280
		16.76	4.26	5.50	6.38	284

Samples Collected: ✓

Sample ID: NMB008: MW-8U:G121901 TIME: 9:30

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-8M

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.08
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	75

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	13gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.72	4.24	5.45	6.31	295
		16.8	4.23	5.47	6.90	295
		16.83	4.22	5.47	7.2	295

Samples Collected: ✓

Sample ID: NMB008: MW-8M:G121901 TIME: 945

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-8L

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.05
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	85

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	15 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.89	4.17	5.47	6.95	295
		16.86	4.17	5.5	6.99	295
		16.84	4.17	5.49	7.01	295

Samples Collected: ✓

Sample ID: NMB008: MW-8L-G121901 TIME: 1000

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: Aw-1U

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.13
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	62.6

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		15.68	4.27	5.65	12.2	294
		16.07	4.28	5.43	9.43	293
		16.8	4.3	5.43	8.7	293
		16.31	4.31	5.43	8.8	293

Samples Collected: ✓ Dup.

Sample ID: NMB008: AW-1U: G121901 A TIME: 10.15

// '' B

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-1L

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.11
Depth to LNAPL (ft.)	
Depth to DNAPL (ft):	
Total well depth (ft.)	80.9

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	14gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		19.68	4.19	5.66	7.91	290
		19.80	4.19	5.67	7.37	289
		19.81	4.19	5.67	7.85	289

Samples Collected: ✓

Sample ID: NMB008: AW-1U:G121901 TIME: 10:45

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-2U

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.24
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	61.8

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	7gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		21.22	4.17	5.75	7.46	237
		21.23	4.17	5.73	7.25	236
		21.28	4.17	5.75	7.03	237

Samples Collected:

Sample ID: NMB008: AW-2U: G121901 TIME: 1100

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: AW-2L

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.45
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	76

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	13 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		21.75	4.16	5.78	6.39	236
		21.75	4.17	5.79	6.17	236
		21.78	4.18	5.78	6.94	236

Samples Collected: ✓

Sample ID: NMB008: AW-2L: G121901

TIME: 1115

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-9U

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.02
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	59.3

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		21.22	4.19	5.61	7.15	280
		21.25	4.19	5.62	7.12	230
		21.25	4.19	5.61	7.12	230

Samples Collected: ✓

Sample ID: NMB008: MW-9U: 9121901 TIME: 1130

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-9L

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.12
Depth to LNAPL (ft.)	
Depth to DNAPL (ft):	
Total well depth (ft.)	78.3

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	13 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		23.21	4.22	5.61	7.16	285
		23.25	4.21	5.59	7.16	285
		23.29	4.23	5.59	7.16	285

Samples Collected: ✓

Sample ID: NMB008: MW-9L: G121901

TIME: 1145

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-10U

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.55
Depth to LNAPL (ft.)	
Depth to DNAPL (ft):	
Total well depth (ft.)	59.30

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	3 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		20.29	4.33	5.71	6.81	285
		20.31	4.36	5.70	6.81	286
		20.30	4.35	5.70	6.83	286

Samples Collected: ✓

Sample ID: NMB008: MW-10U: G121901 TIME: 1200

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-10L

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.62
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	80.2

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	15 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		21.30	4.11	6.02	6.70	279
		21.30	4.15	6.00	6.70	280
		21.32	4.15	6.03	6.70	280

Samples Collected: ✓

Sample ID: NMB008:MW-10L:G121901 TIME: 1215

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-5U

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.15
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	60

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		17.26	4.20	5.75	5.78	291
		17.20	4.20	5.74	5.83	291
		17.18	4.20	5.77	5.85	291

Samples Collected: ✓

Sample ID: NMB008: MW-5U: G121901

TIME: 12:30

Field Blank – 1:30

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-5M

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.19
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	110

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	30gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.92	4.19	5.71	5.94	290
		16.94	4.18	5.71	5.96	290
		16.95	4.18	5.71	6.01	290
		16.95	4.18	5.72	6.0	290

Samples Collected: ✓

Sample ID: NMB008: MW-5M: G121901 TIME: 1245

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-5L

Hydro/Tech: AF/HB

Date: 12/19/01

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.17
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	130

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	40gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.91	4.31	5.75	6.02	295
		16.91	4.30	5.75	6.03	295
		16.94	4.30	5.75	6.03	295
		16.94	4.30	5.75	6.02	295

Samples Collected: ✓

Sample ID: NMB008: MW-5L: G121901

TIME: 1:00

APPENDIX B-4

Field Data Sheets for the Second Post-Treatment Groundwater Sampling Event
January 4, 2002

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-3U

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.71
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	62.35

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
	840	7.90	0.002	5.8	3.11	106
	840	7.91	0.002	5.9	3.11	107

Samples Collected: ✓

Sample ID: NMB008: AW-3U:G010402 TIME: 800

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-3L

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.74
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	79.15

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	13gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		14.0	0.001	5.49	1.60	110
		14.1	0.001	5.48	1.60	110

Samples Collected: ✓

Sample ID: NMB008: AW-3L: G010402 TIME: 815

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-8U

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.37
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	59.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	3gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.55	4.20	5.30	7.71	285
		16.54	4.21	5.30	7.71	285
		16.54	4.22	5.31	7.71	285

Samples Collected: ✓

Sample ID: NMB008: MW-8U:G010402 TIME: 8:30

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-8M

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.24
Depth to LNAPL (ft.)	
Depth to DNAPL (ft):	
Total well depth (ft.)	75.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	12 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.70	4.19	5.47	7.81	285
		16.70	4.18	5.46	7.77	285
		16.71	4.21	5.47	7.78	235

Samples Collected:

Sample ID: NMB008: MW-8M. G010402 TIME: 845

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-8L

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.21
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	85

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	15 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.80	4.20	5.50	6.99	295
		16.82	4.20	5.50	6.98	295
		16.83	4.22	5.50	6.96	295

Samples Collected: ✓

Sample ID: NMB008: MW-8L: 9010402 TIME: 9^{00}

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-1U

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.32
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	62.6

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.10	4.11	5.49	9.08	293
		16.11	4.12	5.49	9.08	293
		16.12	4.11	5.49	9.07	293

Samples Collected: ✓

Sample ID: NMB008: AW-1U: G010402 TIME: 915

" " D 9:20

6voa's ← " "
for
MS
MSD

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-1L

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.32
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	80.9

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	15 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		18.82	4.18	5.67	7.90	239
		13.81	4.18	5.66	7.91	239
		13.80	418	5.66	7.91	239

Samples Collected: ✓

Sample ID: NMB008: AW-1L: G010402 TIME: 945

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: AW-2U

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.53
Depth to LNAPL (ft.)	
Depth to DNAPL (ft):	
Total well depth (ft.)	61.8

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	6 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		19.23	4.13	5.75	7.21	286
		19.22	4.13	5.77	7.22	286
		19.22	4.18	5.71	7.23	286

Samples Collected: ✓ DUPS MS/MSD

Sample ID: NMB008: AW-2U: G010402 TIME: 10:00

" " " D 10:05

6voa's ← " " "

for

MS/MSP

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: AW-2L

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.59
Depth to LNAPL (ft.)	
Depth to DNAPL (ft):	
Total well depth (ft.)	76

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	13 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		20.75	4.17	5.80	6.41	236
		20.71	4.16	5.80	6.40	236
		20.70	4.14	5.80	6.40	236

Samples Collected: ✓

Sample ID: NMB008: AW-2L:G010402 TIME: 1015

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-9U

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.32
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	59.8

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	3gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		20.60	4.70	5.99	5.60	285
		20.61	4.66	5.98	5.61	285
		20.59	4.67	5.98	5.63	285

Samples Collected: ✓

Sample ID: NMB008: MW-9U. G010402 TIME: 1030

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-9L

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.32
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	–
Total well depth (ft.)	78.3

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	13gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		22.21	4.30	5.68	7.11	285
		22.17	4.29	5.70	7.12	285
		22.19	4.29	5.71	7.11	285

Samples Collected: ✓

Sample ID: NMB008: MW-9L: G010402 TIME: 1045

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-104

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.72
Depth to LNAPL (ft.)	—
Depth to DNAPL (ft):	—
Total well depth (ft.)	59.30

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	4gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		22.19	4.47	5.81	5.90	289
		22.15	4.45	5.31	5.92	289
		22.14	4.49	5.31	5.93	289

Samples Collected: ✓

Sample ID: NMB008: MW-104: G010402 TIME: 1100

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well:

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	
Well casing:	

Water Level Measurements:

Depth to WT (ft.):	
Depth to LNAPL (ft.)	
Depth to DNAPL (ft):	
Total well depth (ft.)	

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	
Headspace (ppmv)	

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		22.70	4.86	5.99	5.60	235
		22.70	4.86	5.97	5.60	235
		22.68	4.89	5.96	5.58	235

Samples Collected: ✓

Sample ID: NMB008: MW-10L: G010402 TIME: 1115

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-5U

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.33
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	60.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	5 gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		17.13	4.30	5.78	5.30	291
		17.14	4.31	5.77	5.30	291
		17.12	4.32	5.78	5.81	291

Samples Collected: VOC'S only

Sample ID: NMB008: MW-5U: G010402 TIME: 1130

IMC Magnetics, 570 Main Street, Westbury, New York
Groundwater Monitoring Data Sheet

Monitoring Well: MW-5M

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.33
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	110.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	30gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.92	4.20	5.75	5.99	289
		16.89	4.21	5.74	5.99	239
		16.88	4.21	5.73	5.98	289

Samples Collected: VOC'S only

Sample ID: NMB008: MW-5M: G010402 TIME: 1145

IMC Magnetics, 570 Main Street, Westbury, New York

Groundwater Monitoring Data Sheet

Monitoring Well: MW-5L

Hydro/Tech: AF/PG

Date: 01/04/02

PID readings (ppmv):

Ambient air:	0.0
Well casing:	0.0

Water Level Measurements:

Depth to WT (ft.):	56.37
Depth to LNAPL (ft.)	–
Depth to DNAPL (ft):	–
Total well depth (ft.)	130.0

Well Purging/Development

Method	submersible pump
Duration	
Volume Pumped	40gal
Headspace (ppmv)	0.0

Measured Parameters

Time	Turbidity	Temperature	Conductivity	pH	DO	ORP
		16.72	4.50	5.75	6.08	290
		16.70	4.50	5.74	6.09	290
		16.70	4.49	5.74	6.08	290

Samples Collected: voc's only

Sample ID: NMB008: MW-5L: G010402 TIME: 12^{00}

APPENDIX C

ISOTEC Laboratory Treatability Report

COPY

LABORATORY TREATABILITY REPORT

IMC EASTERN FACILITY
WESTBURY, NY

NOVEMBER 7, 2001

PREPARED FOR

HULL & ASSOCIATES INC.
4700 DUKE DRIVE
SUITE 172
MASON, OHIO

PREPARED BY

IN-SITU OXIDATIVE TECHNOLOGIES, INC.
51 EVERETT DRIVE, SUITE A-10
WEST WINDSOR, NEW JERSEY 08550

ISOTEC CASE NO. 800394

TABLE OF CONTENTS

TABLES

APPENDICES

Section 1 Executive Summary

In-Situ Oxidative Technologies, Inc. (ISOTEC^{SM}) was retained by IMC Eastern Corporation through Hull & Associates, Inc. to conduct a laboratory treatability study (study) on soil and groundwater samples collected at the IMC Eastern Facility in Westbury, New York (the site). The purpose of the study was to determine the potential effectiveness of ISOTEC's in situ chemical oxidation process to oxidize site contaminants of concern in soil and groundwater at the site.

The ISOTEC process is based on Fenton's chemistry using a proprietary catalyst to produce hydroxyl radicals that oxidize chemical bonds. The target contaminants of concern for the study were volatile organic compounds (VOCs) including Tetrachloroethene (PCE). Experiments were conducted on samples of site groundwater and on a mixture of site groundwater and site soil (soil-slurry) that was prepared by ISOTEC at their facility. Results of the groundwater test (GW-test) indicated a greater than 99% destruction of targeted VOCs for the treatments evaluated. Results of the soil-slurry test (SL-test) also indicated greater than 99% destruction of targeted VOCs. The study results can be used to design a pilot scale application of the ISOTEC process for the site from which the study samples were collected. A full-scale process can be designed for the site following successful completion of the pilot scale application.

Section 2 Study Objectives

The objectives of the study were as follows:

- For each ISOTEC catalyst under evaluation, determine the amount of catalyst/oxidant mix (reagent) required to oxidize the measured contaminants at the site (i.e., the site-specific stoichiometry per catalyst);
- Evaluate the effectiveness of ISOTEC's Fenton-based chemical oxidation on site groundwater samples;
- Evaluate the effectiveness of ISOTEC's Fenton-based chemical oxidation in the presence of site aquifer solids (i.e. soil); and
- Determine the most effective reagent for a potential pilot scale application at the site.

Section 3 Sample Collection

Hull & Associates Inc. subcontracted Handex Environmental to collect soil and groundwater samples from the site. The samples were collected and shipped to the ISOTEC facility for the study. The soil was collected on September 11, 2001 in multiple clear plastic sleeves and was identified as "AW-2". The soil from sleeves 60-62', 62-64' and 64-66' were composited by ISOTEC personnel for the study. The soil was stored at 4 degrees Celsius (°C) until mixed at the laboratory with the site groundwater sample to form the soil-slurry mix used during the study. A portion of the composited soil was also submitted for initial iron, manganese, and total organic carbon (TOC) analysis.

The groundwater was collected on October 1, 2001 in five unpreserved 1-liter glass containers and was identified as "AW-2U". A portion of the unpreserved groundwater sample was used by ISOTEC for iron and manganese analysis. Additionally, a portion of the groundwater sample was decanted into 40-ml VOA vials preserved in HCl for initial VOC analysis. The groundwater was stored at 4 °C until used during the study.

Section 4 Laboratory Treatability Study

The study consisted of the experimental setup, establishing initial conditions and experimental controls, conducting the experiments through application of various catalysts and oxidants, and then submitting the treated samples for chemical analysis.

4.1 Experimental Setup

Two sets of laboratory experiments were performed: one set on the groundwater sample and one set on a soil-slurry mix. The groundwater experiments are hereinafter referred to as Groundwater Test (GW-test) and consisted of one experiment to determine the optimum catalyst/oxidant mix (reagent) and reagent volume, as evidenced by VOC oxidation in groundwater.

The soil-slurry experiments are hereinafter referred to as Soil-Slurry Test (SL-test) and consisted of one experiment to determine the optimum reagent and reagent volume as evidenced by VOC oxidation in the soil-slurry.

4.1.1 GW-test VOC Experiment

The GW-test VOC experiment was performed in four (4) pairs of 140 ml sealed batch reactors (reactors). Groundwater was introduced into each reactor, leaving enough headspace for predetermined reagent volumes to be injected. The reactors were sealed with aluminum caps fitted with Teflon®-lined rubber septa to facilitate reagent injections.

Each pair received either a different reagent, or a different volume of a particular reagent. One reactor of each pair served as the "treatment reactor" while the other served as the "monitoring reactor". Both reactors of each pair received identical reagent doses. The treatment reactor was not opened or sampled until the end of the experiment. The monitoring reactor was used to monitor the extent of the oxidation reaction of the pair, by periodically extracting small samples for hydrogen peroxide analysis. Additional reactors were set up for control purposes. Control reactors are discussed later in Section 4.3.

4.1.2 SL-test VOC Experiment

The SL-test VOC experiment was performed in five (5) pairs of 120 ml sealed batch reactors (reactors). The soil-slurry mix was prepared from a one to one ratio by weight (1:1 w/w) of soil and groundwater. The soil-slurry was introduced into each reactor, leaving enough headspace for predetermined reagent volumes to be injected. The reactors were sealed with screw-top caps fitted with Teflon®-lined rubber septa to facilitate reagent injections. One additional reactor was setup and stored at 4^0C to represent initial conditions (Section 4.2).

Each pair received either a different reagent, or a different volume of a particular reagent, with one reactor serving as the "treatment reactor" and the other as the "monitoring reactor". Both reactors of each pair received identical reagent doses. The treatment reactor was not opened or sampled until the end of the experiment. The monitoring reactor was used to monitor the extent of the oxidation reaction of the pair, by periodically extracting small samples for hydrogen peroxide analysis. Additional reactors were set up for control purposes. Control reactors are discussed later in Section 4.3.

4.2 Initial Conditions

The initial conditions of each matrix (soil, groundwater and soil-slurry) were established prior to initiating the experiments.

Soil was analyzed for iron and manganese by EPA method 6010 and total organic carbon (TOC) by EPA method 9060.

Groundwater was analyzed for iron and manganese by EPA method 6010 and VOCs by EPA method 624 +10.

Soil-slurry was analyzed for VOCs by EPA method 8260B +10.

The results of the initial condition analyses are presented in Table 4-1. The analytical laboratory reports, including chains of custody, are presented in Appendix 2.

4.3 Experimental Control

Experimental control samples (Control) were set up during the study to document the following:

- reduction in contaminant concentrations due to sample dilution by reagent volumes injected, and
- reduction in contaminant concentrations due to volatilization caused by room temperature test conditions.

The control sample was set up in a treatment reactor but was injected with distilled water instead of catalyst and oxidant. The volume of distilled water injected was identical to the volumes of reagent injected into treatment reactors. The control sample remained at and was subject to the same conditions as the treatment and monitoring reactors.

Control samples were used during the following experiments:

- GW-test VOC experiment, and
- SL-test VOC experiment.

4.4 Application of Reagents

The study experiments were performed on each matrix. Where multiple pairs of reactors were prepared for a given matrix, a series of different reagents or different volumes of the same reagent were injected into each pair of reactors (treatment and monitoring). Each monitoring reactor received an identical dose as it's paired treatment reactor. Samples were periodically withdrawn from the monitoring reactors for hydrogen peroxide analysis, the results of which may have led to additional treatment dosages of the reagent under study, for its paired treatment reactor. Distilled water was used to equalize the total volume of reagent used between reactor pair.

Following the last application of reagent, all reactors remained undisturbed at room temperature for a minimum of 24 hours or until the oxidizer was completely consumed as determined by Hach H_2O_2 testing equipment. The reaction was quenched using catalase, which is an organic enzyme catalyst naturally present in most soils that decomposes hydrogen peroxide directly to oxygen without generating hydroxyl radicals as shown below.

$$H_2O_2 \rightarrow H_2O + \tfrac{1}{2} O_2$$

After the resting period, excess catalase was injected into each reactor to decompose residual hydrogen peroxide and terminate the study. The use of catalase for quenching purposes is a standard practice in Fenton's chemistry and does not interfere with laboratory analysis. However, for control purposes, the exact volume of excess catalase injected into each treatment reactor was also injected into control reactors. The treatment effectiveness was evaluated by calculating the percent VOC reduction in each treatment reactor relative to the control reactors.

The type of catalyst tested, and the number of treatment dosages evaluated is discussed below.

4.4.1 ISOTEC Catalyst 4260

ISOTEC's patented Catalyst 4260 is a circum-neutral pH (e.g. 5-8) organometallic complex with high mobility within the subsurface. Based on historical contaminant levels noted at the site and previous experience with treatment of the compounds of concern, ISOTEC selected this catalyst for most of the experiments. The stoichiometric molar ratio of Catalyst 4260 to measured site contaminants was determined and then used to prepare the Catalyst 4260 reagent. One, two and three treatment dosages of the

Catalyst 4260 reagent were evaluated on the soil-slurry matrix for VOC oxidation. One and two treatment dosages were evaluated on the groundwater matrix for VOC oxidation.

4.4.2 ISOTEC Catalyst 6260

ISOTEC's proprietary Catalyst 6260 is a circum-neutral pH organometallic complex catalyst with high mobility that was also evaluated during this study. This catalyst is an experimental catalyst that is currently being researched by ISOTEC. The stoichiometric molar ratio of Catalyst 6260 to measured site contaminants was determined and then used to prepare the Catalyst 6260 reagent. One and two treatment dosages of the Catalyst 6260 reagent were evaluated on the soil-slurry matrix for VOC oxidation. One and two treatment dosages were evaluated on the groundwater matrix for VOC oxidation.

4.5 Sample Collection and Analysis

After the study was terminated by injecting excess catalase into the reactors, water from each of the GW-test VOC experiment treatment and control reactors was decanted into 40-ml glass vials preserved in HCl for VOC analysis by EPA method 624 + 10. Likewise, a sample of slurry from each SL-test VOC experiment treatment and control reactor was homogenized in the 120-ml reactor vessels and analyzed for VOCs by EPA method 8260B+10. Final values of pH were determined from each reactor.

All study samples were submitted to a New Jersey certified analytical laboratory for analysis.

Table 4-1: Initial Conditions

Sample **Matrix**	**UNITS**	**AW-2U** Aqueous	**AW-2** Soil	**SL/INITIAL** Slurry
VO Compound				
Cis-1,2-Dichloroethene	µg/L or µg/Kg	ND <25.5	NA	ND <35.9
Trichloroethene	µg/L or µg/Kg	ND<28	NA	31 J
Tetrachloroethene	µg/L or µg/Kg	4040	NA	225
1,1,1-Trichloroethane	µg/L or µg/Kg	ND <19.5	NA	ND <35.9
Total target VO's	**µg/L or µg/Kg**	**4040**	**NA**	**256 J**
Total TIC's	µg/L or µg/Kg	ND	NA	505.9
Additional Parameters				
Iron	mg/L or mg/Kg	0.341	6920	NA
Manganese	mg/L or mg/Kg	0.0527	8.37	NA
Total Organic Carbon	mg/L or mg/Kg	NA	ND <339	NA

Note:
- The above list includes only selected 4 VO compounds that were detected in at least one sample from SL-test or GW-test. The entire list of 37 targeted VOC's analyzed, plus TICs or non-target compounds, can be found in Appendix #1.
- "AW-2U" and "AW-2" are field-collected samples.
- SL/ INITIAL is a laboratory prepared soil-slurry sample prepared in a 1:1 ratio of "AW-2U" aqueous and "AW-2" soil samples.
- ND = Analyzed for but not detected at the method detection limit (MDL) indicated.
- NA = Parameter not analyzed for
- J = The concentration was detected at a value below the MDL.
- VO's = Volatile organic compounds
- TIC's = Tentatively Identified Compounds or non-target compounds
- mg/Kg = milligrams per kilogram; µg/Kg = micrograms per kilogram
- mg/L = milligrams per liter; µg/L = micrograms per liter

Section 5 Treatability Study Results

5.1 GW-test

Results of the GW-test experiment are discussed below, with analytical results tabulated in Table 5-1. The analytical data package is provided in Appendix 1. For the purpose of data evaluation, all treated sample results were compared to control sample data with non-detect (ND) values assumed to be equal to zero.

The treated sample data when compared to control sample indicate a greater than 99% destruction of the total targeted VOCs detected in the groundwater sample after only one treatment dosage of the Catalyst 4260 reagent. Catalyst 6260 was equally effective on the target contaminants also achieving a greater than 99% reduction after only one treatment dosage. As may be noted from the final pH values, the treatment occurred in the circum-neutral pH range 6.59-6.76, which is desirable for maintaining natural subsurface conditions.

5.2 SL-test

Results of the SL-test experiments are discussed below, with analytical results tabulated in Tables 5-2. Analytical data packages are presented in Appendix 1. For the purpose of data evaluation, all treated sample results were compared to control sample data with non-detect (ND) values assumed to be equal to zero.

The treated sample data when compared to control sample indicate that all of the samples were treated to non-detectable levels using both the Catalyst 4260 and Catalyst 6260.

As may be observed from the final pH values, treatments with all the catalysts tested occurred under circum-neutral pH conditions (i.e. pH = 6.84-7.03) and are suitable for field application under natural subsurface conditions.

Table 5-1: Results of GW-test VOC Experiment

	UNITS	Control	Treated #1	Treated #2	Treated #4	Treated #5
Catalyst Used		None	Cat-4260	Cat-4260	Cat-6260	Cat-6260
Oxidant Used		None	Stab. H_2O_2	Stab. H_2O_2	Stab. H_2O_2	Stab. H_2O_2
No. of Treatments		0	1	2	1	2
VO Compound						
Cis-1,2-Dichloroethene	µg/L	ND<51	ND<0.51	ND<0.51	ND<0.51	ND<0.51
Trichloroethene	µg/L	ND<56	ND<0.56	ND<0.56	ND<0.56	ND<0.56
Tetrachloroethene	µg/L	4060	ND<0.45	ND<0.45	2.24	0.809
1,1,1-Trichloroethane	µg/L	ND<39	ND<0.39	2.87	4.01	2.94
Total target VO's	**µg/L**	**4060**	**ND**	**2.87**	**6.25**	**3.749**
Total TIC's	µg/L	ND	7.3	21.2	9.4	25.7
% Reduction (Total target VO's)	-		**>99.9%**	**>99.9%**	**>99.8%**	**>99.9%**
Final pH of GW	-	**7.72**	**6.69**	**6.67**	**6.76**	**6.59**

<u>Note:</u>

- The above list includes only selected 4 VO compounds that were detected in at least one sample from SL-test or GW-test. The entire list of 37 targeted VOC's analyzed, plus TICs or non-target compounds, can be found in Appendix #1.
- ND = Analyzed for but not detected at the method detection limit (MDL) indicated.
- VO's = Volatile organic compounds
- TIC's = Tentatively Identified Compounds or non-target compounds (includes only the top ten compounds or peaks detected in a forward library search)
- µg/L = micrograms per liter
- Percent reduction calculations are relative to control sample and assume ND values as equivalent to zero.

Table 5-2: Results of SL-test VOC Experiment

	UNITS	Control	Treated #1	Treated #2	Treated #3	Treated #4	Treated #5
Catalyst Used		None	Cat-4260	Cat-4260	Cat-4260	Cat-6260	Cat-6260
Oxidant Used		None	Stab. H_2O_2	Stab. H_2O_2	Stab. H_2O_2	Stab. H_2O_2	Stab. H_2O_2
No. of Treatments		0	1	2	3	1	2
VO Compound							
Cis-1,2-Dichloroethene	µg/Kg	ND<14.9	ND<7.5	ND<6.85	ND<7.7	ND<7.25	ND<7.2
Trichloroethene	µg/Kg	ND<14.9	ND<7.5	ND<6.85	ND<7.7	ND<7.25	ND<7.2
Tetrachloroethene	µg/Kg	115	ND<7.5	ND<6.85	ND<7.7	ND<7.25	ND<7.2
1,1,1-Trichloroethane		ND<14.9	ND<7.5	ND<6.85	ND<7.7	ND<7.25	ND<7.2
Total target VO's	**µg/Kg**	**115**	**ND**	**ND**	**ND**	**ND**	**ND**
Total TIC's	µg/Kg	ND	ND	ND	ND	ND<7.2	ND
% Reduction (Total target VO's)			>99.9%	>99.9%	>99.9%	>99.9%	>99.9%
Final pH of GW	-	**7.57**	**6.99**	**7.03**	**6.84**	**7.02**	**7.04**

Note:

- The above list includes only selected 4 VO compounds that were detected in at least one sample from SL-test or GW-test. The entire list of 37 targeted VOC's analyzed, plus TICs or non-target compounds, can be found in Appendix #1.
- ND = Analyzed for but not detected at the method detection limit (MDL) indicated.
- VO's = Volatile organic compounds
- TIC's = Tentatively Identified Compounds or non-target compounds (includes only the top ten compounds or peaks detected in a forward library search)
- µg/kg = micrograms per kilogram

Section 6 Conclusions

The laboratory study results indicate that the ISOTEC process is effective in significantly reducing the concentration of targeted VOC compounds in site soils and groundwater. The data indicate that both the catalysts tested (i.e. Catalysts 4260 and 6260) achieved maximum contaminant reduction under close to natural subsurface pH conditions.

A preliminary assessment of site-specific factors that could affect the ISOTEC process was performed on the content of iron, manganese and total organic carbon (TOC) in site soil. Iron was detected in site soil at a concentration of 6,920 mg/Kg (Table 4-1). Much of this iron is bound to the soil matrix and unavailable to catalyze the Fenton reaction that occurs in the aqueous phase. The aqueous concentration was found to be low at 0.341 mg/L. The soil manganese concentration of 8.37 mg/Kg is too low to function as a natural catalyst for Fenton process. The aqueous concentration was also found to be low at 0.0527 mg/L. The concentration of total organic carbon (TOC) was found to be at non-detectable levels.

The ISOTEC study results suggest that a pilot application of the ISOTEC process should be completed at the site to gather additional data on the effectiveness of this remedial alternative on a large-scale basis. A pilot application would also serve as an initial step toward remediating the site; data obtained from the study indicate that the ISOTEC process could substantially reduce VOC concentrations in the treated areas.

APPENDIX #1

LAB STUDY ANALYTICAL PACKAGE

Integrated Analytical Laboratories, LLC.

273 Franklin Road
Randolph, N.J. 07869

Phone: 973 361-4252
Fax: 973 989-5288

ANALYTICAL DATA REPORT

for

Isotec
51 Everett Drive
Suite A-10
West Windsor,NJ 08550

Project: IMC MAGNETICS/WESTBURY NY - 800394
Lab Case Number: E01-6929
Date Report Prepared: October 31, 2001

CLIENT SAMPLE ID	LABORATORY SAMPLE ID
SL/INITIAL	6929-001
SL/CONTROL	6929-002
SL/T-A	6929-003
SL/T-B	6929-004
SL/T-C	6929-005
SL/T-D	6929-006
SL/T-E	6929-007
AW2- COMPOSITE	6929-008
GW/INITIAL	6929-009
GW/CONTROL	6929-010
GW/T-A	6929-011
GW/T-B	6929-012
GW/T-C	6929-013
GW/T-D	6929-014

All required protocols were followed during analyses. These data have been reviewed and accepted by

Michael H. Leftin, Ph.D.
Laboratory Director

IAL is a NELAC Certified Lab # 14751 and maintains certification in Connecticut # PH-0699, New York # 11402 and Florida # E87670

INTEGRATED ANALYTICAL LABORATORIES, LLC.

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INTEGRATED ANALYTICAL LABORATORIES, LLC.

MATRIX QUALIFIERS

A - Indicates the sample is an Aqueous matrix.

O - Indicates the sample is an Oil matrix.

S - Indicates the sample is a Soil, Sludge or Sediment matrix.

X - Indicates the sample is an Other matrix as indicated by Client Chain of Custody.

DATA QUALIFIERS

B - Indicates the analyte was found in the Blank and in the sample. It indicates possible sample contamination and warns the data user to use caution when applying the results of the analyte.

C - Common Laboratory Contaminant.

D - The compound was reported from the Diluted analysis.

D.F. - Dilution Factor.

E - Estimated concentration, reported results are outside the calibrated range of the instrument.

J - Indicates an estimated value. The compound was detected at a value below the method detection limit but greater than zero. For GC/MS procedures, the mass spectral data meets the criteria required to identify the target compound.

MDL - Method Detection Limit.

MI - Indicates compound concentration could not be determined due to Matrix Interferences.

NA - Not Applicable.

ND - Indicates the compound was analyzed for but Not Detected at the MDL.

REPORT QUALIFIERS

All solid sample analyses are reported on a dry weight basis.

All solid sample values are corrected for original sample size and percent solids.

INTEGRATED ANALYTICAL LABORATORIES
CONFORMANCE/NONCONFORMANCE SUMMARY
GC/MS VOLATILE ANALYSIS

Lab Case Number: E01 - 6929

	No	Yes
1. Chromatograms Labeled/Compounds Identified (Field Samples and Method Blanks).		✓
2. GC/MS Tuning Specifications: a. BFB Passed		✓
3. GC/MS Tuning Frequency - Performed every 24 hours for 600 series, 12 hours for 8000 series and 8 hours for 500 series.		✓
4. GC/MS Calibration - Initial calibration performed within 30 days before sample analysis and continuing calibration performed within 24 hours before sample analysis for 600 series, 12 hours for 8000 series		✓
5. GC/MS Calibration Requirements: a. Calibration Check Compounds		/
b. System Performance Check Compounds		/
6. Blank Contamination - If yes, list compounds and concentrations in each blank:	✓	
7. Surrogate Recoveries Meet Criteria (If not met, list those compounds and their recoveries which fall outside the acceptable range)		✓
If not met, were the calculations checked and the results qualified as "estimated"?		na
8. Matrix Spike/Matrix Spike Duplicate meet criteria (if not, list those compounds and their recoveries/% differences which fall outside the acceptable range)		/
9. Internal Standard Area/Retention Time Shift meet criteria		✓
10. Extraction Holding Time Met If not met, list number of days exceeded for each sample:		N/A
11. Analysis Holding Time Met If not met, list number of days exceeded for each sample:		✓
12. Sample Dilution Performed		/

High Target Compounds ☐

High Nontarget Compounds ☑

Matrix Interference ☐

Other ☐

13. Comments:

Organics Manager

Date 10/24/01

rev 12/00

INTEGRATED ANALYTICAL LABORATORIES, LLC.

SUMMARY REPORT

Client: Isotec
Project: IMC MAGNETICS/WESTBURY NY - 800394
Lab Case No.: E01-6929

Lab ID:	6929-001			6929-002			6929-003			6929-004		
Client ID:	SL/INITIAL			SL/CONTROL			SL/T-A			SL/T-B		
Matrix:	Soil			Soil			Soil			Soil		
Sampled Date:	9/27/2001			10/8/2001			10/8/2001			10/8/2001		
PARAMETER(Units)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Volatiles (ppb) (Including Cis 1-2-DCE,MTBE & TBA)												
t-Butyl Alcohol(TBA)	ND		71.8	ND		29.7	ND		15	ND		13.7
Methyl-t-Butyl Ether(MTBE)	ND		35.9	ND		14.9	ND		7.5	ND		6.85
cis-1,2-Dichloroethene	ND		35.9	ND		14.9	ND		7.5	ND		6.85
Trichloroethene	31	J	35.9	ND		14.9	ND		7.5	ND		6.85
Tetrachloroethene	225		35.9	115		14.9	ND		7.5	ND		6.85
TOTAL VO's:	256	J		115			ND			ND		
TOTAL TIC's:	505.9			ND			ND			ND		
TOTAL VO's & TIC's:	761.9	J		115			ND			ND		

Lab ID:	6929-005			6929-006			6929-007			6929-008		
Client ID:	SL/T-C			SL/T-D			SL/T-E			AW2-		
Client ID Cont.:										COMPOSITE		
Matrix:	Soil			Soil			Soil			Soil		
Sampled Date:	10/8/2001			10/8/2001			10/8/2001			9/11/2001		
PARAMETER(Units)	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL	Conc	Q	MDL
Volatiles (ppb) (Including Cis 1-2-DCE,MTBE & TBA)												
t-Butyl Alcohol(TBA)	ND		15.4	ND		14.5	ND		14.4	~		
Methyl-t-Butyl Ether(MTBE)	ND		7.7	ND		7.25	ND		7.2	~		
cis-1,2-Dichloroethene	ND		7.7	ND		7.25	ND		7.2	~		
TOTAL VO's:	ND			ND			ND			~		
TOTAL TIC's:	ND			ND			ND			~		
TOTAL VO's & TIC's:	ND			ND			ND			~		
Metals (ppm)												
Iron	~			~			~			6920		31.1
Manganese	~			~			~			8.37		6.22
General Analytical												
Total Organic Carbons (ppm)	~			~			~			ND		339

~ = Sample not analyzed for
ND = Analyzed for but Not Detected at the MDL
J = The concentration was detected at a value below the MDL
All qualifiers on individual Volatiles are carried down through summation.

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-001
Client ID: SL/INITIAL
Date Received: 10/09/2001
Date Analyzed: 10/23/2001
Data file: I2153.D

GC/MS Column: DB-624
Sample wt/vol: 1.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 5
% Moisture: 30.4

Compound	Concentration	Q	MDL
Chloromethane	ND		35.9
Vinyl Chloride	ND		35.9
Bromomethane	ND		35.9
Chloroethane	ND		35.9
Trichlorofluoromethane	ND		35.9
Acrolein	ND		71.8
1,1-Dichloroethene	ND		35.9
Methylene Chloride	ND		35.9
Acrylonitrile	ND		71.8
t-Butyl Alcohol(TBA)	ND		71.8
trans-1,2-Dichloroethene	ND		35.9
Methyl-t-Butyl Ether(MTBE)	ND		35.9
1,1-Dichloroethane	ND		35.9
cis-1,2-Dichloroethene	ND		35.9
Chloroform	ND		35.9
1,1,1-Trichloroethane	ND		35.9
Carbon Tetrachloride	ND		35.9
1,2-Dichloroethane(EDC)	ND		35.9
Benzene	ND		35.9
Trichloroethene	31	J	35.9
1,2-Dichloropropane	ND		35.9
Bromodichloromethane	ND		35.9
2-Chloroethylvinyl Ether	ND		35.9
cis-1,3-Dichloropropene	ND		35.9
Toluene	ND		35.9
trans-1,3-Dichloropropene	ND		35.9
1,1,2-Trichloroethane	ND		35.9
Tetrachloroethene	225		35.9
Dibromochloromethane	ND		35.9
Chlorobenzene	ND		35.9
Ethylbenzene	ND		35.9
Total Xylenes	ND		35.9
Bromoform	ND		35.9
1,1,2,2-Tetrachloroethane	ND		35.9
1,3-Dichlorobenzene	ND		35.9
1,4-Dichlorobenzene	ND		35.9
1,2-Dichlorobenzene	ND		35.9
Total Target Compounds:	256	J	

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-001	GC/MS Column: DB-624
Client ID: SL/INITIAL	Sample wt/vol: 1.0g
Date Received: 10/09/2001	Matrix-Units: Soil-µg/Kg (ppb)
Date Analyzed: 10/23/2001	Dilution Factor: 5
Date File: I2153.D	% Moisture: 30.4

CAS #	Compound	Estimated Concentration	Retention Time
	Substituted benzene	83.3	22.97
	Unknown alkane	45.2	23.18
	Unknown alkane	169	24.31
	Unknown aromatic	75.4	26.05
	Unknown aromatic	133	26.50

Total TICs = 505.9

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-002	GC/MS Column: DB-624
Client ID: SL/CONTROL	Sample wt/vol: 2.5g
Date Received: 10/15/2001	Matrix-Units: Soil-µg/Kg (ppb)
Date Analyzed: 10/12/2001	Dilution Factor: 2
Data file: F3264.D	% Moisture: 32.6

Compound	Concentration	Q	MDL
Chloromethane	ND		14.9
Vinyl Chloride	ND		14.9
Bromomethane	ND		14.9
Chloroethane	ND		14.9
Trichlorofluoromethane	ND		14.9
Acrolein	ND		29.7
1,1-Dichloroethene	ND		14.9
Methylene Chloride	ND		14.9
Acrylonitrile	ND		29.7
t-Butyl Alcohol(TBA)	ND		29.7
trans-1,2-Dichloroethene	ND		14.9
Methyl-t-Butyl Ether(MTBE)	ND		14.9
1,1-Dichloroethane	ND		14.9
cis-1,2-Dichloroethene	ND		14.9
Chloroform	ND		14.9
1,1,1-Trichloroethane	ND		14.9
Carbon Tetrachloride	ND		14.9
1,2-Dichloroethane(EDC)	ND		14.9
Benzene	ND		14.9
Trichloroethene	ND		14.9
1,2-Dichloropropane	ND		14.9
Bromodichloromethane	ND		14.9
2-Chloroethylvinyl Ether	ND		14.9
cis-1,3-Dichloropropene	ND		14.9
Toluene	ND		14.9
trans-1,3-Dichloropropene	ND		14.9
1,1,2-Trichloroethane	ND		14.9
Tetrachloroethene	115		14.9
Dibromochloromethane	ND		14.9
Chlorobenzene	ND		14.9
Ethylbenzene	ND		14.9
Total Xylenes	ND		14.9
Bromoform	ND		14.9
1,1,2,2-Tetrachloroethane	ND		14.9
1,3-Dichlorobenzene	ND		14.9
1,4-Dichlorobenzene	ND		14.9
1,2-Dichlorobenzene	ND		14.9

Total Target Compounds: 115

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-002
Client ID: SL/CONTROL
Date Received: 10/15/2001
Date Analyzed: 10/12/2001
Data file: F3264.D

GC/MS Column: DB-624
Sample wt/vol: 2.5g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 2
% Moisture: 32.6

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-003	GC/MS Column: DB-624
Client ID: SL/T-A	Sample wt/vol: 5.0g
Date Received: 10/09/2001	Matrix-Units: Soil-μg/Kg (ppb)
Date Analyzed: 10/23/2001	Dilution Factor: 1
Data file: I2154.D	% Moisture: 33.4

Compound	**Concentration**	**Q**	**MDL**
Chloromethane	ND		7.5
Vinyl Chloride	ND		7.5
Bromomethane	ND		7.5
Chloroethane	ND		7.5
Trichlorofluoromethane	ND		7.5
Acrolein	ND		15
1,1-Dichloroethene	ND		7.5
Methylene Chloride	ND		7.5
Acrylonitrile	ND		15
t-Butyl Alcohol(TBA)	ND		15
trans-1,2-Dichloroethene	ND		7.5
Methyl-t-Butyl Ether(MTBE)	ND		7.5
1,1-Dichloroethane	ND		7.5
cis-1,2-Dichloroethene	ND		7.5
Chloroform	ND		7.5
1,1,1-Trichloroethane	ND		7.5
Carbon Tetrachloride	ND		7.5
1,2-Dichloroethane(EDC)	ND		7.5
Benzene	ND		7.5
Trichloroethene	ND		7.5
1,2-Dichloropropane	ND		7.5
Bromodichloromethane	ND		7.5
2-Chloroethylvinyl Ether	ND		7.5
cis-1,3-Dichloropropene	ND		7.5
Toluene	ND		7.5
trans-1,3-Dichloropropene	ND		7.5
1,1,2-Trichloroethane	ND		7.5
Tetrachloroethene	ND		7.5
Dibromochloromethane	ND		7.5
Chlorobenzene	ND		7.5
Ethylbenzene	ND		7.5
Total Xylenes	ND		7.5
Bromoform	ND		7.5
1,1,2,2-Tetrachloroethane	ND		7.5
1,3-Dichlorobenzene	ND		7.5
1,4-Dichlorobenzene	ND		7.5
1,2-Dichlorobenzene	ND		7.5

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-003	GC/MS Column: DB-624
Client ID: SL/T-A	Sample wt/vol: 5.0g
Date Received: 10/09/2001	Matrix-Units: Soil-μg/Kg (ppb)
Date Analyzed: 10/23/2001	Dilution Factor: 1
Date File: I2154.D	% Moisture: 33.4

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-004
Client ID: SL/T-B
Date Received: 10/09/2001
Date Analyzed: 10/23/2001
Data file: I2155.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 27.1

Compound	Concentration	Q	MDL
Chloromethane	ND		6.85
Vinyl Chloride	ND		6.85
Bromomethane	ND		6.85
Chloroethane	ND		6.85
Trichlorofluoromethane	ND		6.85
Acrolein	ND		13.7
1,1-Dichloroethene	ND		6.85
Methylene Chloride	ND		6.85
Acrylonitrile	ND		13.7
t-Butyl Alcohol(TBA)	ND		13.7
trans-1,2-Dichloroethene	ND		6.85
Methyl-t-Butyl Ether(MTBE)	ND		6.85
1,1-Dichloroethane	ND		6.85
cis-1,2-Dichloroethene	ND		6.85
Chloroform	ND		6.85
1,1,1-Trichloroethane	ND		6.85
Carbon Tetrachloride	ND		6.85
1,2-Dichloroethane(EDC)	ND		6.85
Benzene	ND		6.85
Trichloroethene	ND		6.85
1,2-Dichloropropane	ND		6.85
Bromodichloromethane	ND		6.85
2-Chloroethylvinyl Ether	ND		6.85
cis-1,3-Dichloropropene	ND		6.85
Toluene	ND		6.85
trans-1,3-Dichloropropene	ND		6.85
1,1,2-Trichloroethane	ND		6.85
Tetrachloroethene	ND		6.85
Dibromochloromethane	ND		6.85
Chlorobenzene	ND		6.85
Ethylbenzene	ND		6.85
Total Xylenes	ND		6.85
Bromoform	ND		6.85
1,1,2,2-Tetrachloroethane	ND		6.85
1,3-Dichlorobenzene	ND		6.85
1,4-Dichlorobenzene	ND		6.85
1,2-Dichlorobenzene	ND		6.85

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-004	GC/MS Column: DB-624
Client ID: SL/T-B	Sample wt/vol: 5.0g
Date Received: 10/09/2001	Matrix-Units: Soil-μg/Kg (ppb)
Date Analyzed: 10/23/2001	Dilution Factor: 1
Data file: I2155.D	% Moisture: 27.1

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-005
Client ID: SL/T-C
Date Received: 10/09/2001
Date Analyzed: 10/23/2001
Data file: I2156.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-µg/Kg (ppb)
Dilution Factor: 1
% Moisture: 35

Compound	Concentration	Q	MDL
Chloromethane	ND		7.7
Vinyl Chloride	ND		7.7
Bromomethane	ND		7.7
Chloroethane	ND		7.7
Trichlorofluoromethane	ND		7.7
Acrolein	ND		15.4
1,1-Dichloroethene	ND		7.7
Methylene Chloride	ND		7.7
Acrylonitrile	ND		15.4
t-Butyl Alcohol(TBA)	ND		15.4
trans-1,2-Dichloroethene	ND		7.7
Methyl-t-Butyl Ether(MTBE)	ND		7.7
1,1-Dichloroethane	ND		7.7
cis-1,2-Dichloroethene	ND		7.7
Chloroform	ND		7.7
1,1,1-Trichloroethane	ND		7.7
Carbon Tetrachloride	ND		7.7
1,2-Dichloroethane(EDC)	ND		7.7
Benzene	ND		7.7
Trichloroethene	ND		7.7
1,2-Dichloropropane	ND		7.7
Bromodichloromethane	ND		7.7
2-Chloroethylvinyl Ether	ND		7.7
cis-1,3-Dichloropropene	ND		7.7
Toluene	ND		7.7
trans-1,3-Dichloropropene	ND		7.7
1,1,2-Trichloroethane	ND		7.7
Tetrachloroethene	ND		7.7
Dibromochloromethane	ND		7.7
Chlorobenzene	ND		7.7
Ethylbenzene	ND		7.7
Total Xylenes	ND		7.7
Bromoform	ND		7.7
1,1,2,2-Tetrachloroethane	ND		7.7
1,3-Dichlorobenzene	ND		7.7
1,4-Dichlorobenzene	ND		7.7
1,2-Dichlorobenzene	ND		7.7

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-005
Client ID: SL/T-C
Date Received: 10/09/2001
Date Analyzed: 10/23/2001
Data file: I2156.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 35

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-006
Client ID: SL/T-D
Date Received: 10/09/2001
Date Analyzed: 10/23/2001
Data file: I2157.D

GC/MS Column: DB-624
Sample wt/vol: 5.0g
Matrix-Units: Soil-μg/Kg (ppb)
Dilution Factor: 1
% Moisture: 31.1

Compound	Concentration	Q	MDL
Chloromethane	ND		7.25
Vinyl Chloride	ND		7.25
Bromomethane	ND		7.25
Chloroethane	ND		7.25
Trichlorofluoromethane	ND		7.25
Acrolein	ND		14.5
1,1-Dichloroethene	ND		7.25
Methylene Chloride	ND		7.25
Acrylonitrile	ND		14.5
t-Butyl Alcohol(TBA)	ND		14.5
trans-1,2-Dichloroethene	ND		7.25
Methyl-t-Butyl Ether(MTBE)	ND		7.25
1,1-Dichloroethane	ND		7.25
cis-1,2-Dichloroethene	ND		7.25
Chloroform	ND		7.25
1,1,1-Trichloroethane	ND		7.25
Carbon Tetrachloride	ND		7.25
1,2-Dichloroethane(EDC)	ND		7.25
Benzene	ND		7.25
Trichloroethene	ND		7.25
1,2-Dichloropropane	ND		7.25
Bromodichloromethane	ND		7.25
2-Chloroethylvinyl Ether	ND		7.25
cis-1,3-Dichloropropene	ND		7.25
Toluene	ND		7.25
trans-1,3-Dichloropropene	ND		7.25
1,1,2-Trichloroethane	ND		7.25
Tetrachloroethene	ND		7.25
Dibromochloromethane	ND		7.25
Chlorobenzene	ND		7.25
Ethylbenzene	ND		7.25
Total Xylenes	ND		7.25
Bromoform	ND		7.25
1,1,2,2-Tetrachloroethane	ND		7.25
1,3-Dichlorobenzene	ND		7.25
1,4-Dichlorobenzene	ND		7.25
1,2-Dichlorobenzene	ND		7.25

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-006	GC/MS Column: DB-624
Client ID: SL/T-D	Sample wt/vol: 5.0g
Date Received: 10/09/2001	Matrix-Units: Soil-μg/Kg (ppb)
Date Analyzed: 10/23/2001	Dilution Factor: 1
Data file: I2157.D	% Moisture: 31.1

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-007	GC/MS Column: DB-624
Client ID: SL/T-E	Sample wt/vol: 5.0g
Date Received: 10/09/2001	Matrix-Units: Soil-μg/Kg (ppb)
Date Analyzed: 10/23/2001	Dilution Factor: 1
Data file: I2158.D	% Moisture: 30.6

Compound	Concentration	Q	MDL
Chloromethane	ND		7.2
Vinyl Chloride	ND		7.2
Bromomethane	ND		7.2
Chloroethane	ND		7.2
Trichlorofluoromethane	ND		7.2
Acrolein	ND		14.4
1,1-Dichloroethene	ND		7.2
Methylene Chloride	ND		7.2
Acrylonitrile	ND		14.4
t-Butyl Alcohol(TBA)	ND		14.4
trans-1,2-Dichloroethene	ND		7.2
Methyl-t-Butyl Ether(MTBE)	ND		7.2
1,1-Dichloroethane	ND		7.2
cis-1,2-Dichloroethene	ND		7.2
Chloroform	ND		7.2
1,1,1-Trichloroethane	ND		7.2
Carbon Tetrachloride	ND		7.2
1,2-Dichloroethane(EDC)	ND		7.2
Benzene	ND		7.2
Trichloroethene	ND		7.2
1,2-Dichloropropane	ND		7.2
Bromodichloromethane	ND		7.2
2-Chloroethylvinyl Ether	ND		7.2
cis-1,3-Dichloropropene	ND		7.2
Toluene	ND		7.2
trans-1,3-Dichloropropene	ND		7.2
1,1,2-Trichloroethane	ND		7.2
Tetrachloroethene	ND		7.2
Dibromochloromethane	ND		7.2
Chlorobenzene	ND		7.2
Ethylbenzene	ND		7.2
Total Xylenes	ND		7.2
Bromoform	ND		7.2
1,1,2,2-Tetrachloroethane	ND		7.2
1,3-Dichlorobenzene	ND		7.2
1,4-Dichlorobenzene	ND		7.2
1,2-Dichlorobenzene	ND		7.2

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-007	GC/MS Column: DB-624
Client ID: SL/T-E	Sample wt/vol: 5.0g
Date Received: 10/09/2001	Matrix-Units: Soil-µg/Kg (ppb)
Date Analyzed: 10/23/2001	Dilution Factor: 1
Data file: I2158.D	% Moisture: 30.6

CAS #	Compound	Estimated Concentration	Retention Time
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-009	GC/MS Column: DB-624
Client ID: GW/INITIAL	Sample wt/vol: 0.1mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/30/2001	Dilution Factor: 50
Data file: G3803.D	% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		39.5
Vinyl Chloride	ND		46.5
Bromomethane	ND		39.5
Chloroethane	ND		52.5
Trichlorofluoromethane	ND		47
Acrolein	ND		663
1,1-Dichloroethene	ND		51
Methylene Chloride	ND		36.5
Acrylonitrile	ND		326
t-Butyl Alcohol(TBA)	ND		97.5
trans-1,2-Dichloroethene	ND		21
Methyl-t-Butyl Ether(MTBE)	ND		21
1,1-Dichloroethane	ND		24
cis-1,2-Dichloroethene	ND		25.5
Chloroform	ND		26
1,1,1-Trichloroethane	ND		19.5
Carbon Tetrachloride	ND		24.5
1,2-Dichloroethane(EDC)	ND		28
Benzene	ND		17.5
Trichloroethene	ND		28
1,2-Dichloropropane	ND		24
Bromodichloromethane	ND		24
2-Chloroethylvinyl Ether	ND		25.5
cis-1,3-Dichloropropene	ND		25.5
Toluene	ND		21
trans-1,3-Dichloropropene	ND		15.5
1,1,2-Trichloroethane	ND		21
Tetrachloroethene	4040		22.5
Dibromochloromethane	ND		27
Chlorobenzene	ND		34
Ethylbenzene	ND		20.5
Total Xylenes	ND		41
Bromoform	ND		21
1,1,2,2-Tetrachloroethane	ND		24
1,3-Dichlorobenzene	ND		20.5
1,4-Dichlorobenzene	ND		19
1,2-Dichlorobenzene	ND		25

Total Target Compounds: 4040

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-009	GC/MS Column: DB-624
Client ID: GW/INITIAL	Sample wt/vol: 0.1mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/30/2001	Dilution Factor: 50
Data file: G3803.D	% Moisture: 100

CAS #	**Compound**	**Estimated Concentration**	**Retention Time**
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-010	GC/MS Column: DB-624
Client ID: GW/CONTROL	Sample wt/vol: 0.05mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/10/2001	Dilution Factor: 100
Data file: G3218.D	% Moisture: 100

Compound	**Concentration**	**Q**	**MDL**
Chloromethane	ND		79
Vinyl Chloride	ND		93
Bromomethane	ND		79
Chloroethane	ND		105
Trichlorofluoromethane	ND		94
Acrolein	ND		1330
1,1-Dichloroethene	ND		102
Methylene Chloride	ND		73
Acrylonitrile	ND		652
t-Butyl Alcohol(TBA)	ND		195
trans-1,2-Dichloroethene	ND		42
Methyl-t-Butyl Ether(MTBE)	ND		42
1,1-Dichloroethane	ND		48
cis-1,2-Dichloroethene	ND		51
Chloroform	ND		52
1,1,1-Trichloroethane	ND		39
Carbon Tetrachloride	ND		49
1,2-Dichloroethane(EDC)	ND		56
Benzene	ND		35
Trichloroethene	ND		56
1,2-Dichloropropane	ND		48
Bromodichloromethane	ND		48
2-Chloroethylvinyl Ether	ND		51
cis-1,3-Dichloropropene	ND		51
Toluene	ND		42
trans-1,3-Dichloropropene	ND		31
1,1,2-Trichloroethane	ND		42
Tetrachloroethene	4060		45
Dibromochloromethane	ND		54
Chlorobenzene	ND		68
Ethylbenzene	ND		41
Total Xylenes	ND		82
Bromoform	ND		42
1,1,2,2-Tetrachloroethane	ND		48
1,3-Dichlorobenzene	ND		41
1,4-Dichlorobenzene	ND		38
1,2-Dichlorobenzene	ND		50

Total Target Compounds: 4060

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-010	GC/MS Column: DB-624
Client ID: GW/CONTROL	Sample wt/vol: 0.05mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/10/2001	Dilution Factor: 100
Data file: G3218.D	% Moisture: 100

CAS #	**Compound**	**Estimated Concentration**	**Retention Time**
	No peaks detected		

Total TICs = 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-011	GC/MS Column: DB-624
Client ID: GW/T-A	Sample wt/vol: 5mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-µg/L (ppb)
Date Analyzed: 10/30/2001	Dilution Factor: 1
Data file: G3802.D	% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		0.79
Vinyl Chloride	ND		0.93
Bromomethane	ND		0.79
Chloroethane	ND		1.05
Trichlorofluoromethane	ND		0.94
Acrolein	ND		13.3
1,1-Dichloroethene	ND		1.02
Methylene Chloride	ND		0.73
Acrylonitrile	ND		6.52
t-Butyl Alcohol(TBA)	ND		1.95
trans-1,2-Dichloroethene	ND		0.42
Methyl-t-Butyl Ether(MTBE)	ND		0.42
1,1-Dichloroethane	ND		0.48
cis-1,2-Dichloroethene	ND		0.51
Chloroform	ND		0.52
1,1,1-Trichloroethane	ND		0.39
Carbon Tetrachloride	ND		0.49
1,2-Dichloroethane(EDC)	ND		0.56
Benzene	ND		0.35
Trichloroethene	ND		0.56
1,2-Dichloropropane	ND		0.48
Bromodichloromethane	ND		0.48
2-Chloroethylvinyl Ether	ND		0.51
cis-1,3-Dichloropropene	ND		0.51
Toluene	ND		0.42
trans-1,3-Dichloropropene	ND		0.31
1,1,2-Trichloroethane	ND		0.42
Tetrachloroethene	ND		0.45
Dibromochloromethane	ND		0.54
Chlorobenzene	ND		0.68
Ethylbenzene	ND		0.41
Total Xylenes	ND		0.82
Bromoform	ND		0.42
1,1,2,2-Tetrachloroethane	ND		0.48
1,3-Dichlorobenzene	ND		0.41
1,4-Dichlorobenzene	ND		0.38
1,2-Dichlorobenzene	ND		0.5

Total Target Compounds: 0

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-011	GC/MS Column: DB-624
Client ID: GW/T-A	Sample wt/vol: 5mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/30/2001	Dilution Factor: 1
Date File: G3802.D	% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
	Acetone	7.3	3.93

Total TICs = 7.3

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-012	GC/MS Column: DB-624
Client ID: GW/T-B	Sample wt/vol: 5mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/30/2001	Dilution Factor: 1
Data file: G3801.D	% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		0.79
Vinyl Chloride	ND		0.93
Bromomethane	ND		0.79
Chloroethane	ND		1.05
Trichlorofluoromethane	ND		0.94
Acrolein	ND		13.3
1,1-Dichloroethene	ND		1.02
Methylene Chloride	ND		0.73
Acrylonitrile	ND		6.52
t-Butyl Alcohol(TBA)	ND		1.95
trans-1,2-Dichloroethene	ND		0.42
Methyl-t-Butyl Ether(MTBE)	ND		0.42
1,1-Dichloroethane	ND		0.48
cis-1,2-Dichloroethene	ND		0.51
Chloroform	ND		0.52
1,1,1-Trichloroethane	2.87		0.39
Carbon Tetrachloride	ND		0.49
1,2-Dichloroethane(EDC)	ND		0.56
Benzene	ND		0.35
Trichloroethene	ND		0.56
1,2-Dichloropropane	ND		0.48
Bromodichloromethane	ND		0.48
2-Chloroethylvinyl Ether	ND		0.51
cis-1,3-Dichloropropene	ND		0.51
Toluene	ND		0.42
trans-1,3-Dichloropropene	ND		0.31
1,1,2-Trichloroethane	ND		0.42
Tetrachloroethene	ND		0.45
Dibromochloromethane	ND		0.54
Chlorobenzene	ND		0.68
Ethylbenzene	ND		0.41
Total Xylenes	ND		0.82
Bromoform	ND		0.42
1,1,2,2-Tetrachloroethane	ND		0.48
1,3-Dichlorobenzene	ND		0.41
1,4-Dichlorobenzene	ND		0.38
1,2-Dichlorobenzene	ND		0.5

Total Target Compounds: 2.87

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-012	GC/MS Column: DB-624
Client ID: GW/T-B	Sample wt/vol: 5mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/30/2001	Dilution Factor: 1
Date File: G3801.D	% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
	Acetone	8.3	3.92
	Unknown	12.9	5.69

Total TICs = 21.2

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-013
Client ID: GW/T-C
Date Received: 10/09/2001
Date Analyzed: 10/30/2001
Data file: G3800.D

GC/MS Column: DB-624
Sample wt/vol: 5mL
Matrix-Units: Aqueous-μg/L (ppb)
Dilution Factor: 1
% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		0.79
Vinyl Chloride	ND		0.93
Bromomethane	ND		0.79
Chloroethane	ND		1.05
Trichlorofluoromethane	ND		0.94
Acrolein	ND		13.3
1,1-Dichloroethene	ND		1.02
Methylene Chloride	ND		0.73
Acrylonitrile	ND		6.52
t-Butyl Alcohol(TBA)	ND		1.95
trans-1,2-Dichloroethene	ND		0.42
Methyl-t-Butyl Ether(MTBE)	ND		0.42
1,1-Dichloroethane	ND		0.48
cis-1,2-Dichloroethene	ND		0.51
Chloroform	ND		0.52
1,1,1-Trichloroethane	4.01		0.39
Carbon Tetrachloride	ND		0.49
1,2-Dichloroethane(EDC)	ND		0.56
Benzene	ND		0.35
Trichloroethene	ND		0.56
1,2-Dichloropropane	ND		0.48
Bromodichloromethane	ND		0.48
2-Chloroethylvinyl Ether	ND		0.51
cis-1,3-Dichloropropene	ND		0.51
Toluene	ND		0.42
trans-1,3-Dichloropropene	ND		0.31
1,1,2-Trichloroethane	ND		0.42
Tetrachloroethene	2.24		0.45
Dibromochloromethane	ND		0.54
Chlorobenzene	ND		0.68
Ethylbenzene	ND		0.41
Total Xylenes	ND		0.82
Bromoform	ND		0.42
1,1,2,2-Tetrachloroethane	ND		0.48
1,3-Dichlorobenzene	ND		0.41
1,4-Dichlorobenzene	ND		0.38
1,2-Dichlorobenzene	ND		0.5

Total Target Compounds: 6.25

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS
Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-013	GC/MS Column: DB-624
Client ID: GW/T-C	Sample wt/vol: 5mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/30/2001	Dilution Factor: 1
Date File: G3800.D	% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
	Acetone	9.4	3.92

Total TICs = 9.4

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-014	GC/MS Column: DB-624
Client ID: GW/T-D	Sample wt/vol: 5mL
Date Received: 10/09/2001	Matrix-Units: Aqueous-μg/L (ppb)
Date Analyzed: 10/30/2001	Dilution Factor: 1
Data file: G3799.D	% Moisture: 100

Compound	Concentration	Q	MDL
Chloromethane	ND		0.79
Vinyl Chloride	ND		0.93
Bromomethane	ND		0.79
Chloroethane	ND		1.05
Trichlorofluoromethane	ND		0.94
Acrolein	ND		13.3
1,1-Dichloroethene	ND		1.02
Methylene Chloride	ND		0.73
Acrylonitrile	ND		6.52
t-Butyl Alcohol(TBA)	ND		1.95
trans-1,2-Dichloroethene	ND		0.42
Methyl-t-Butyl Ether(MTBE)	ND		0.42
1,1-Dichloroethane	ND		0.48
cis-1,2-Dichloroethene	ND		0.51
Chloroform	ND		0.52
1,1,1-Trichloroethane	2.94		0.39
Carbon Tetrachloride	ND		0.49
1,2-Dichloroethane(EDC)	ND		0.56
Benzene	ND		0.35
Trichloroethene	ND		0.56
1,2-Dichloropropane	ND		0.48
Bromodichloromethane	ND		0.48
2-Chloroethylvinyl Ether	ND		0.51
cis-1,3-Dichloropropene	ND		0.51
Toluene	ND		0.42
trans-1,3-Dichloropropene	ND		0.31
1,1,2-Trichloroethane	ND		0.42
Tetrachloroethene	0.809		0.45
Dibromochloromethane	ND		0.54
Chlorobenzene	ND		0.68
Ethylbenzene	ND		0.41
Total Xylenes	ND		0.82
Bromoform	ND		0.42
1,1,2,2-Tetrachloroethane	ND		0.48
1,3-Dichlorobenzene	ND		0.41
1,4-Dichlorobenzene	ND		0.38
1,2-Dichlorobenzene	ND		0.5

Total Target Compounds: 3.749

INTEGRATED ANALYTICAL LABORATORIES

VOLATILE ORGANICS

Tentatively Identified Compounds

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-014
Client ID: GW/T-D
Date Received: 10/09/2001
Date Analyzed: 10/30/2001
Date File: G3799.D

GC/MS Column: DB-624
Sample wt/vol: 5mL
Matrix-Units: Aqueous-μg/L (ppb)
Dilution Factor: 1
% Moisture: 100

CAS #	Compound	Estimated Concentration	Retention Time
	Unknown	3.1	2.58
000067-64-1	Acetone	7.7	3.92
	Unknown	14.9	5.68

Total TICs = 25.7

INTEGRATED ANALYTICAL LABORATORIES, LLC.

METALS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-008
Client ID: AW2-COMPOSITE
Date Received: 10/9/01
Matrix-Units: Soil-mg/Kg (ppm)
% Moisture: 19.5

Compound	Result	Q	DF	MDL	Date Analyzed	Method
Iron	6920		1	31.1	10/11/01	6020
Manganese	8.37		1	6.22	10/11/01	6020

INTEGRATED ANALYTICAL LABORATORIES, LLC.

METALS

Client/Project: ISOTEC/IMC MAGNETICS

Lab ID: 6929-009
Client ID: GW/INITIAL
Date Received: 10/9/01
Matrix-Units: Aqueous-mg/L (ppm)
% Moisture: 100

Compound	Result	Q	DF	MDL	Date Analyzed	Method
Iron	0.341		1	0.100	10/10/01	200.7
Manganese	0.0527		1	0.020	10/10/01	200.8

INTEGRATED ANALYTICAL LABORATORIES, LLC.

TOC

Client/Project: ISOTEC/IMC MAGNETICS

Date Received: 10/9/01

Lab ID	Client ID	Result	Q	DF	Matrix-Units	MDL	% Solids	Date Analyzed
6929-008	AW2-COMPOSITE	ND		1	S-mg/Kg	339	80.5	10/09/2001

Phone # (973) 361-4252
Fax # (973) 989-5288

INTEGRATED ANALYTI L LABORATORIES
CHAIN OF C TODY

nklin Rd
Ra ph, NJ 07869

CLIENT & PROJECT

Company Name: ISOTEC
Address: 51 Everett Dr.
Suite A10
West Windsor NJ
Telephone #: (609)275-8500
Fax #: (609)275-9608
Project Name: TRC Magnetics/Westbury, NY
Project Manager: Prasad Kakarla
Reference ID#: 800394 PO#: 1852

REPORTING

Fax to: Prasad Kakarla
Fax #:
Report to:
Address: Same
Invoice to:
Address: Same

Turnaround Time

Conditional / TPHC
24 hr* 48 hr 72 hr 1 wk NA Other:

Verbal/Fax
24 hr* 48 hr* 72 hr* 1 wk* [✓ 2 wk] Other:

Hard Copy
72 hr* 1 wk* [✓ 2 wk*] 3 wk Other:

*Prior to sample arrival, Lab notification is required.

Report Format

[✓ Results Only]
Reduced
Regulatory
SRP Disk**: dbf or wk1
Other:

ANALYTICAL PARAMETERS / PRESERVATIVES

** Circle format required

Preservatives
1. HCL 3. HNO_3
2. NaOH 4. H_2SO_4
5. MeOH 6. Other

COOLER TEMP. 4 °C

SAMPLE MATRIX
W - Waste SL - Sludge A - Aqueous
O - Oil X - Other S - Soil
GW - Groundwater SOL - Solid

SAMPLE INFORMATION

		Sampling																	
Sample ID	Sample Description	Date	Time	am	pm	Matrix	# of Containers	Lab ID	1 2 3 4 5 6 VO+10	1 2 3 4 5 6 Iron	1 2 3 4 5 6 Manganese	1 2 3 4 5 6 TOC	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	Comments
SL/Initial	Initial	9/27/01	9	x		SL	1	1	x										
SL/Control	Control	10/8/01	9	x		SL	1	2	x										
SL/T-A	Treated	↓	9	x		SL	1	3	x										
SL/T-B	↓	↓	9	x		SL	1	4	x										~~AT~~
SL/T-C	↓	↓	9	x		SL	1	5	x										missing
SL/T-D	↓	↓	9	x		SL	1	6	x										
SL/T-E	↓	↓	9	x		SL	1	7	x										
AVO-Composite	Field	9/11/01	3		x	SL	2	8		x	x	x							

Please print legibly and fill out completely. Samples cannot be processed and the turnaround time will not start until any ambiguities have been resolved.

Concentrations Expected
LOW [✓ MED] HIGH

Known Hazard: ~~yes~~ no
Describe:

CUSTODY LOG

	Signature	Date	Time		Signature
Relinquished by:		10-8-01	1200	Received by:	
Relinquished by:		10-8-0		Received by:	I. FRIDGE
Relinquished by:	I. FRIDGE	10/9/01	8:00	Received by:	
Relinquished by:				Received by:	
Relinquished by:				Received by:	

Comments: Run Control first. Then run remaining samples only if target VOCs are > ND. PCE at 2680 ug/l and TCE at 110 ug/l.

Lab Case #
6929

PAGE: 1 OF 2

LAB COPIES - WHITE & YELLOW; CLIENT COPY - PINK

Phone # (973) 361-4252
Fax # (973) 989-5288

INTEGRATED ANALYTI LABORATORIES
CHAIN OF C TODY

nklin Rd
Randolph, NJ 07869

CLIENT & PROJECT

Company Name: ISOTEC

Address: 51 Everett Dr
Suite A10
West Windsor NJ

Telephone #: (609) 275-8500
Fax #: (609) 275-9608
Project Name: TMC Magnetics/Westbury NY
Project Manager: Prasad Kakarla
Reference ID#: 800394 PO#: 1852

REPORTING

Fax to: Prasad Kakarla
Fax #:
Report to:
Address: Same
Invoice to:
Address: Same

Turnaround Time

Conditional / TPHC
24 hr* 48 hr 72 hr 1 wk NA Other:

Verbal/Fax
24 hr* 48 hr* 72 hr* 1 wk* [✓ 2 wk] Other:

Hard Copy
72 hr* 1 wk* [✓ 2 wk*] 3 wk Other:

*Prior to sample arrival, Lab notification is required.

Report Format

[✓ Results Only]
Reduced
Regulatory
SRP Disk**: dbf or wk1
Other:

** Circle format required

ANALYTICAL PARAMETERS / PRESERVATIVES

Preservatives
1. HCL 3. HNO₃
2. NaOH 4. H₂SO₄
5. MeOH 6. Other

COOLER TEMP. 4 °C

SAMPLE INFORMATION

SAMPLE MATRIX
W - Waste SL - Sludge A - Aqueous
O - Oil X - Other S - Soil
GW - Groundwater SOL - Solid

Sample ID	Sample Description	Sampling Date	Sampling Time	am	pm	Matrix	# of Containers	Lab ID	(VO+10) [✓ 1] 2 3 4 5 6	Dissolved Fe 1 2 3 4 5 6	Dissolved Mn 1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	1 2 3 4 5 6	Comments
GW/Initial	Field	10/1/01	4		x	GW	3	9	x	x	x								
GW/Control	Control	10/1/01	9	x		GW	2	10	x										
GW/T-A	Treated	10/8/01	9	x		GW	2	11	x										
GW/T-B	↓	↓	9	x		GW	2	12	x										
GW/T-C			9	x		GW	2	13	x										
GW/T-D			9	x		GW	2	14	x										

Please print legibly and fill out completely. Samples cannot be processed and the turnaround time will not start until any ambiguities have been resolved.

Concentrations Expected
LOW [✓ MED] HIGH

Known Hazard: [✓ yes] no
Describe:

CUSTODY LOG

	Signature	Date	Time		Signature
Relinquished by:		10-8-01	12 00	Received by:	
Relinquished by:		10-8-01	8:00	Received by:	I. FRIDGE
Relinquished by:	I. FRIDGE	10/9/01	8:00	Received by:	
Relinquished by:				Received by:	
Relinquished by:				Received by:	

Comments: Run control first. Then run remaining samples only if target VOCs are >ND.

Lab Case # 6929

PAGE: 2 OF 2

LAB COPIES - WHITE & YELLOW; CLIENT COPY - PINK

Rev 01

CHAIN OF CUSTODY

Case No.: E01-6929
P.O. #: 1852
Project : IMC MAGNETICS/WESTBURY NY - 800394
Client/Project: ISOTEC/IMC MAGNETICS

Client Address:
Isotec
51 Everett Drive
Suite A-10
West Windsor, NJ 08550

Billing Address:
Isotec
51 Everett Drive
Suite A-10
West Windsor, NJ 08550

Date Received: 10/09/01
Time Received: 08:00
Report Format: Standard
Verbal Due: Oct 15
Report Due: Oct 30

# of Containers	3	2	2	2	2	2
IAL ID #	6929-009	6929-010	6929-011	6929-012	6929-013	6929-014
Client ID #	GW/INITI	GW/CONTR	GW/T-A	GW/T-B	GW/T-C	GW/T-D
	AL	OL				
Matrix	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous	Aqueous
Sample Date	10/01/01	10/01/01	10/08/01	10/08/01	10/08/01	10/08/01
Sample Time	16:00	09:00	09:00	09:00	09:00	09:00
MTBE + TBA	√	√	√	√	√	√
VO+10, PP LIST	√	√	√	√	√	√
Cis 1,2-DCE	√	√	√	√	√	√
Fe-Iron	√					
Mn-Manganese	√					
200 Series	√					
Spl Filtration	√					

Comments: NOTE 1: SAMPLES #1 & #3 - #7, #9 & #11 - #14 ON HOLD FOR VO ANALYSIS PENDING RESULTS OF SAMPLES #2 & #10.
NOTE 2: SAMPLE FOR DISSOLVED FE & MN TO BE FILTERED AT LAB.
NOTE 3: AS PER COC, EXPECT CONCENTRATIONS AS FOLLOWS: PCE = 2680 ppb & TCE = 110 ppb.
REV 01: PER TOM A., RUN ALL ANALYSIS ON SAMPLES #1, #3 - #7, #9 & #11 - #14 10/17/01. RESULTS DUE 10/26/01. dgk

CHAIN OF CUSTODY

Case No.: E01-6929 P.O. #: 1852
Project : IMC MAGNETICS/WESTBURY NY - 800394
Client/Project: ISOTEC/IMC MAGNETICS

Client Address:	Billing Address:
Isotec	Isotec
51 Everett Drive	51 Everett Drive
Suite A-10	Suite A-10
West Windsor, NJ 08550	West Windsor, NJ 08550

Date Received: 10/09/01
Time Received: 08:00
Report Format: Standard
Verbal Due: Oct 15
Report Due: Oct 30

# of Containers	1	1	1	1	1	1
IAL ID #	6929-001	6929-002	6929-003	6929-004	6929-005	6929-006
Client ID #	SL/INITI	SL/CONTR	SL/T-A	SL/T-B	SL/T-C	SL/T-D
	AL	OL				
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Sample Date	09/27/01	10/08/01	10/08/01	10/08/01	10/08/01	10/08/01
Sample Time	09:00	09:00	09:00	09:00	09:00	09:00
MTBE + TBA	√	√	√	√	√	√
VO+10, PP LIST	√	√	√	√	√	√
Cis 1,2-DCE	√	√	√	√	√	√
% Solids	√	√	√	√	√	√

Comments: NOTE 1: SAMPLES #1 & #3 - #7, #9 & #11 - #14 ON HOLD FOR VO ANALYSIS PENDING RESULTS OF SAMPLES #2 & #10.
NOTE 2: SAMPLE FOR DISSOLVED FE & MN TO BE FILTERED AT LAB.
NOTE 3: AS PER COC, EXPECT CONCENTRATIONS AS FOLLOWS: PCE = 2680 ppb & TCE = 110 ppb.
REV 01: PER TOM A., RUN ALL ANALYSIS ON SAMPLES #1, #3 - #7, #9 & #11 - #14 10/17/01. RESULTS DUE 10/26/01. dgk

CHAIN OF CUSTODY

Case No.: E01-6929 P.O. #: 1852
Project : IMC MAGNETICS/WESTBURY NY - 800394
Client/Project: ISOTEC/IMC MAGNETICS

Client Address:
Isotec
51 Everett Drive
Suite A-10
West Windsor, NJ 08550

Billing Address:
Isotec
51 Everett Drive
Suite A-10
West Windsor, NJ 08550

Date Received: 10/09/01
Time Received: 08:00
Report Format: Standard
Verbal Due: Oct 15
Report Due: Oct 30

# of Containers	1	2
IAL ID #	6929-007	6929-008
Client ID #	SL/T-E	AW2-COMPOSITE
Matrix	Soil	Soil
Sample Date	10/08/01	09/11/01
Sample Time	09:00	15:00
MTBE + TBA	√	
VO+10, PP LIST	√	
Cis 1,2-DCE	√	
Fe-Iron		√
Mn-Manganese		√
6000 Series		√
% Solids	√	√
TOC		√

Comments: NOTE 1: SAMPLES #1 & #3 - #7, #9 & #11 - #14 ON HOLD FOR VO ANALYSIS PENDING RESULTS OF SAMPLES #2 & #10.
NOTE 2: SAMPLE FOR DISSOLVED FE & MN TO BE FILTERED AT LAB.
NOTE 3: AS PER COC, EXPECT CONCENTRATIONS AS FOLLOWS: PCE = 2680 ppb & TCE = 110 ppb.
REV 01: PER TOM A., RUN ALL ANALYSIS ON SAMPLES #1, #3 - #7, #9 & #11 - #14 10/17/01. RESULTS DUE 10/26/01. dgk

Integrated Analytical Laboratories, LLC.

Laboratory Custody Chronicle

Case No : E01-6929
Client : Isotec
Project : IMC MAGNETICS/WESTBURY NY - 800394

	GC/MS V		EXTRACT DATE	EXTRACT TIME	EXTRACT INITIAL	ANALYSIS DATE	ANALYSIS TIME	ANALYSIS INITIAL
MTBE + TBA	6929-001	S				~~10/09~~ 10/09-10/23/01		
	6929-002	S						
	6929 003	S						
	6929 004	S						
	6929 005	S						
	6929 006	S						
	6929 007	S						
	6929 009	A						
	6929-010	A				10-9	900	DSD
	6929 011	A				10/30/01		10
	6929 012	A						
	6929 013	A						
	6929 014	A						
VO+10, PP LIST	6929 001	S				~~10/09~~ 10/09-10/23/01		
	6929-002	S						
	6929 003	S						
	6929 004	S						
	6929 005	S						
	6929 006	S						
	6929 007	S						
	6929 009	A						
	6929-010	A				10-9	900	DSD
	6929 011	A				10/30/01		10
	6929 012	A						
	6929 013	A						
	6929 014	A						
Cis 1,2-DCE	6929 001	S						
	6929-002	S				10/9-10/23/01		
	6929 003	S						
	6929 004	S						
	6929 005	S						
	6929 006	S						
	6929 007	S						
	6929 009	A						
	6929-010	A				10-9-	900	DSD
	6929 011	A				10/30/01		10
	6929 012	A						
	6929 013	A						
	6929 014	A						

	METALS		EXTRACT DATE	EXTRACT TIME	EXTRACT INITIAL	ANALYSIS DATE	ANALYSIS TIME	ANALYSIS INITIAL
Fe-Iron	6929-008	S	10/11/01			10/11	1400	
	6929-009	A	10/10/01			10/10	1200	
Mn-Manganese	6929-008	S	10/11/01			10/11	1400	
	6929-009	A	10/10/01			10/10	1200	
200 Series	6929-009	A						
6000 Series	6929-008	S						

Integrated Analytical Laboratories, LLC.

Laboratory Custody Chronicle

Case No : E01-6929
Client : Isotec
Project : IMC MAGNETICS/WESTBURY NY - 800394

	WETCHEM		EXTRACT			ANALYSIS		
			DATE	TIME	INITIAL	DATE	TIME	INITIAL
% Solids	6929-001	S						
	6929-002	S	10/9	10^{00}	KC			
	6929 003	S						
	6929 004	S						
	6929 005	S						
	6929 006	S						
	6929 007	S						
	6929-008	S						
Spl Filtration	6929-009	A						
TOC	6929-008	S		—		10/9		edc

REVIEW & APPROVAL:
REMARKS :

APPENDIX D

Hull & Associates, Inc. Memorandum Describing Soil Vacuum System Monitoring Results

Hull
& associates, inc.

6130 Wilcox Road • Dublin, Ohio 43016-1265 • (614) 793-8777 • (614) 793-9070 fax

Memorandum

TO: Lance Turley

FROM: Jason Finan

DATE: May 15, 2002

RE: Operation of the Remedial System for the Interim Remedial Measure Program (IRM Program) at the NYSDEC Site Code # 130043A in Westbury, New York NMB004.300.0131

Hull & Associates, Inc. (Hull) prepared this letter to discuss the past and future operation of the soil vapor extraction (SVE) system at the referenced Site. The SVE system, shown on Figure 1, is operating pursuant to the March 26, 1996 Consent Order, Index # 1-W1-0750-96-02 (the Order) at the former IMC Magnetics Corp. facility at 570 Main Street, Westbury New York (Site). The system has operated continuously (excluding temporary maintenance shut-downs) since October 1997, and has been monitored monthly throughout this time.

Table 1 summarizes the laboratory analytical results of vapor samples that have been collected monthly from the SVE system prior to granular activated carbon (GAC) treatment, and after GAC treatment. Chart 1 illustrates the influent concentrations of the chemicals of concern (COCs), including 1,1,1-trichloroethane (1,1,1-TCA), trichloroethene (TCE) and tetrachloroethene (PCE), that were extracted from soils prior to GAC treatment. Chart 1 illustrates declining trends in COC influent concentrations and shows that 1,1,1-TCA and TCE concentration trends are asymptotic. The influent concentration trend for PCE is again approaching asymptotic after a relatively short duration increase preceding and following intrusive groundwater response activities conducted at the Site in September 2001. The timing of the increase in PCE concentrations generally coincides with a lowering of the water table caused by unusually low rainfall in Long Island. It is reasonable to expect that elevated VOC concentrations that had previously been beneath the water table were exposed to vacuum from the SVE system after the water table lowered, thereby increasing concentrations observed in extracted soil vapors.

Chart 2 illustrates the calculated influent rates of the COCs extracted from soils based on the laboratory analytical data and the system monitoring data (flow rates). Chart 2 also includes the maximum allowable discharge rate of the individual chemicals of concern as determined in accordance with the NYSDEC DAR 1 (Air Guide 1) requirements. All of the final discharges of COCs from the system have been below these regulated rates for the life of the system due to GAC treatment. In addition, Chart 2 shows that the influent rates of removal for 1,1,1-trichloroethane and trichloroethene from the extraction wells have been consistently below the regulatory limits since August 1998. Furthermore, Chart 2 shows that the influent rate of removal for tetrachloroethene has been consistently below the regulatory limits since March 2000 (with the exception of the spike that occurred after the aforementioned groundwater response activities).

In conclusion, Chart 1 illustrates the initial rapid decline of influent concentrations followed by near-asymptotic declines. Chart 2 shows that the influent COC rates of removal from the extraction wells have been consistently below the regulatory limits since August 1998 (excepting tetrachloroethene). As shown of Figure 1, the system and associated enclosure are located in a critical parking area at the Site. Consequently, the system creates a logistics hardship for the building tenants. Based on the results of the monitoring data and the hardship to the building tenants, Hull requests cessation of SVE operations and decommissioning of the system.

OPERATION AND MONITORING SUMMARY
570 MAIN STREET
WESTBURY, NEW YORK

TABLE 1

SYSTEM EFFECTIVENESS SUMMARY

				Influent Concentration						Effluent Concentration					
Sample Date			Air Flow	1,1,1-TCA		TCE		PCE		1,1,1-TCA		TCE		PCE	
From	To	Days	(cfm)	(ug/m^3)	(lbs./hr)	(ug/m^3)	(lbs./hr)	(ug/m^3)	(lbs./hr)	(ug/m^3)	(lbs./hr)	(ug/m^3)	(lbs./hr)	(ug/m^3)	(lbs./hr)
10/10/97	10/17/97	7	81.6	28000	0.0086	47000	0.0144	700000	0.2140	<200	NC[1]	<200	NC	2100	0.0006
10/17/97[2]	11/7/97	14	76.9	2000	0.0006	26000	0.0075	190000	0.0547	<200	NC	310	0.0001	2200	0.0006
11/17/97	12/5/97	18	73.1	700	0.0002	9800	0.0027	38000	0.0104	<200	NC	<200	NC	320	0.0001
12/05/97	1/29/98	55	74.2	<3100	NC	14000	0.0039	81000	0.0225	<3100	NC	<3100	NC	<3100	NC
01/29/98	2/13/98	15	74.2	<3100	NC	12000	0.0033	67000	0.0186	<3100	NC	<3100	NC	<3100	NC
02/18/98[3]	3/3/98	13	72.0	<3100	NC	14000	0.0038	73000	0.0197	<3100	NC	<3100	NC	<3100	NC
03/03/98	4/3/98	31	83.4	<1600	NC	9500	0.0030	92000	0.0287	<1600	NC	<1600	NC	<1600	NC
04/03/98	5/26/98	53	84.5	<3100	NC	6700	0.0021	31000	0.0098	<3100	NC	<3100	NC	<3100	NC
05/26/98	6/25/98	30	80.5	190	0.0001	4900	0.0015	42000	0.0127	<200	NC	<200	NC	450	0.0001
06/25/98[4]	7/23/98	18	100.4	<3100	NC	21000	0.0079	220000	0.0827	<3100	NC	<3100	NC	<3100	NC
07/23/98	8/18/98	26	90.5	<3100	NC	10000	0.0034	140000	0.0475	<3100	NC	<3100	NC	<3100	NC
08/18/98	9/16/98	29	93.8	<3100	NC	7800	0.0027	140000	0.0492	<3100	NC	<3100	NC	<3100	NC
09/16/98	10/14/98	28	93.8	<2500	NC	8600	0.0030	120000	0.0422	<2500	NC	<2500	NC	<2500	NC
10/14/98	11/4/98	21	76.4	<3000	NC	<3000	NC	38000	0.0109	<3000	NC	8400	0.0024	<3000	NC
11/04/98[5]	12/23/98	37	30.5	<62	NC	160	0.0000	2500	0.0003	<62	NC	<62	NC	<62	NC
12/23/98	1/22/99	30	56.7	<3100	NC	11000	0.0023	86000	0.0183	<3100	NC	<3100	NC	<3100	NC
01/22/99	2/11/99	20	69.8	<250	NC	<250	NC	1300	0.0003	<250	NC	<250	NC	<250	NC
02/11/99	3/15/99	32	62.2	<3100	NC	13000	0.0030	67000	0.0156	<3100	NC	<3100	NC	<3100	NC
03/15/99	4/6/99	22	72.5	<3	NC	<3	NC	19000	0.0052	<3	NC	<3	NC	<3	NC
4/6/1999[6]	5/20/99	44	63.3	<1600	NC	4900	0.0012	26000	0.0062	<1600	NC	<1600	NC	<1600	NC
05/20/99	6/26/99	37	54.5	<3100	NC	5400	0.0011	75000	0.0153	<3100	NC	<3100	NC	<3100	NC
06/26/99	7/30/99	34	102.5	<3100	NC	8400	0.0032	100000	0.0384	<3100	NC	<3100	NC	3400	0.0013
7/30/99[7]	8/31/99	32	102.5	<3100	NC	9000	0.0035	110000	0.0422	<3100	NC	13000	0.0050	6000	0.0023
08/31/99	9/24/99	24	72.8	<2500	NC	<2500	NC	22000	0.0060	<2500	NC	<2500	NC	<2500	NC
9/24/99[8]	10/26/99	32	109.0	<2500	NC	<2500	NC	63000	0.0257	<6100	NC	<6100	NC	<6100	NC
10/26/99	11/30/99	35	88.9	<6300	NC	<6300	NC	35000	0.0117	<6300	NC	<6300	NC	<6300	NC
11/30/99	12/17/99	17	106.8	<6300	NC	<6300	NC	21000	0.0084	<6300	NC	<6300	NC	<6300	NC
12/17/99	1/19/00	33	119.9	<6300	NC	<6300	NC	8900	0.0040	<6300	NC	<6300	NC	<6300	NC
01/19/00	2/16/00	28	130.8	<1300	NC	5100	0.0025	70000	0.0343	<1300	NC	<1300	NC	<1300	NC
02/16/00	3/23/00	36	76.3	<6000	NC	<6000	NC	19000	0.0054	<6000	NC	<6000	NC	<6000	NC
03/23/00	4/17/00	25	130.8	<6100	NC	<6100	NC	5500	0.0027	<6100	NC	<6100	NC	18000	0.0088
4/17/00[9]	5/16/00	29	87.2	<6100	NC	<6100	NC	17000	0.0056	<6100	NC	<6100	NC	<6100	NC
5/16/00[10]	6/21/00	36	119.9	36	0.0000	110	0.0000	390	0.0002	<3.1	NC	<3.1	NC	4	0.0000
6/21/00[11]	7/20/00	29	111.2	78	0.0000	170	0.0001	690	0.0003	<6.1	NC	<6.1	NC	<6.1	NC
7/20/00[12]	8/17/00	28	115.5	200	0.0001	450	0.0002	1900	0.0008	<6.1	NC	<6.1	NC	<6.1	NC
8/17/00[13]	9/25/00	39	130.8	61	0.0000	270	0.0001	1400	0.0007	<6	NC	<6	NC	<6	NC
9/25/00[14]	10/16/00	21	128.6	120	0.0001	480	0.0002	2800	0.0013	<6.1	NC	<6.1	NC	<6.1	NC
10/16/00[15]	11/22/00	37	126.4	38	0.0000	240	0.0001	1700	0.0008	8	0.0000	<6.1	NC	<6.1	NC
11/22/00[16]	12/22/00	30	106.8	14	0.0000	31	0.0000	390	0.0002	71	0.0000	7.3	0.0000	<6.1	NC
12/22/00[17]	1/22/01	31	74.1	25	0.0000	57	0.0000	870	0.0002	<6.1	NC	<6.1	NC	<6.1	NC
1/22/01[18]	2/15/01	24	93.7	<6.1	NC	<6.1	NC	<6.1	NC	<6.1	NC	7.3	0.0000	80	0.0000
2/15/01[19]	3/20/01	24	126.4	11	0.0000	17	0.0000	82	0.0000	<6.1	NC	<6.1	NC	<6.1	NC
03/20/01[20]	4/18/01	29	136.3	21	0.0000	57	0.0000	710	0.0004	<6.1	NC	<6.1	NC	<6.1	NC
4/18/01[21]	5/15/01	27	152.6	31	0.0000	58	0.0000	560	0.0003	<6.1	NC	<6.1	NC	<6.1	NC
05/15/01	6/16/01	32	141.7	20	0.0000	350	0.0002	15000	0.0080	<6.1	NC	<6.1	NC	<6.1	NC
06/16/01	7/16/01	30	104.6	26	0.0000	360	0.0001	21000	0.0082	<6.1	NC	<61	NC	340	0.0001
07/16/01	8/13/01	28	113.4	34	0.0000	590	0.0003	79000	0.0335	<12	NC	<12	NC	200	0.0001
08/13/01	10/30/01	78	72.5	290	0.0001	970	0.0003	220000	0.0598	<24	NC	<122	NC	12000	0.0033
10/30/2001[22]	11/23/01	24	110.3	120	0.0000	880	0.0004	110000	0.0455	<24	NC	<120	NC	14000	0.0058
11/23/01	12/13/01	20	108.6	93	0.0000	600	0.0002	160000	0.0651	<24	NC	<120	NC	11000	0.0045
12/13/01	1/10/02	28	88.2	43	0.0000	280	0.0001	22000	0.0073	<24	NC	<24	NC	940	0.0003
1/10/2002[23]	2/15/02	36	99.5	460	0.0002	590	0.0002	92000	0.0343	<24	NC	<24	NC	<24	NC
02/15/02	3/11/02	24	92.1	46	0.0000	420	0.0001	22000	0.0076	<24	NC	<24	NC	<24	NC
03/11/02	4/19/02	39	115.4	32	0.0000	280	0.0001	28000	0.0121	52	0.0000	600	0.0003	50000	0.0216
Maximum Allowable Emmisions*											8.4246		0.0038		0.0101 0.0084

* Maximum allowable emissions calculated using an effective stack height of 15 feet and an annual guideline concentration (ug/m3) of 1000 (1, 1, 1- Trichloroethane), and 0.45 (Trichloroethene) from the 1997 NYSDEC DAR 1 (Air Guide 1). The two allowable emission limits for tetrachloroethene are using the 1991 AGC (1.2 ug/m^3) with a result of 0.0101 lb/hr, and the July, 2000 updated AGC (1.0 ug/m^3) with a result of 0.0084 lb/hr.

1: NC - Not Calculated

2. Note: System off from 10/24/97 to 10/31/97 due to carbon change-out.
3. Note: System off from 2/13/98 to 2/18/98 due to carbon change-out.
4. Note: System off from 6/29/98 to 7/8/98 due to carbon change-out.
5. Note: System off from 11/5/98 to 11/17/98 due to carbon change-out.
6. Note: Cabon Changed Out, 4/6/99.
7. Note: Laboratory analytical results of influent vapors detected 4600 ug/m^3, total-1,2-Dichloroethene, and laboratory analytical results of effluent vapors detected 4100 ug/m3, total-1,2-Dichloroethene on 8/31/99.
8. Note: Cabon Changed Out, 9/24/99.
9. Following the receipt of laboratory data from the April sampling event with detections of PCE in the effluent Vapors, the carbon was changed out on 05/16/00 prior to sampling. Following recipt of the May data for the effluent vapors, the second carbon filter was changed out again on 06/06/00.
10. Note: Laboratory analytical results of influent vapors detected 420 ug/m^3, total c-1,2-Dichloroethene, and 20 ug/m^3 Chloroform on 6/21/00.
11. Note: Laboratory analytical results of 7/20/00 vapor samples detected 240 ug/m^3, total c-1,2-Dichloroethene, and 60 ug/m^3 Chloroform in influent vapors, and 250 ug/m^3 total c-1,2-dichloroethene and 19 ug/m^3 in mid-carbon vapors.
12. Note: Laboratory analytical results of 8/17/00 vapor samples detected 590 ug/m^3, total c-1,2-Dichloroethene, and 72 ug/m^3 Chloroform in influent vapors.
13. Note: Laboratory analytical results of 9/25/00 vapor samples detected 330 ug/m^3 total c-1,2-Dichloroethene, 75 ug/m^3 Chloroform, and 20 ug/m^3 Bromodichloromethane in influent vapors; and 250 ug/m3 total c-1,2-Dichloroethene and 20 ug/m3 Chloroform in effluent vapors.
14. Note: Laboratory analytical results of 10/16/00 vapor samples detected 7.4 ug/m^3 1,1 Dichloroethane, 620 ug/m^3 c-1,2-Dichloroethene, 190 ug/m^3 Chloroform, and 28 ug/m^3 Bromodichloromethane in influent vapors; and 260 ug/m^3 c-1,2-Dichloroethene and 36 ug/m^3 Chloroform in effluent vapors.
15. Note: Laboratory analytical results of 11/22/00 vapor samples detected 240 ug/m^3 c-1,2-Dichloroethene, and 37 ug/m^3 Chloroformin influent vapors; and 93 ug/m^3 c-1,2-Dichloroethene and 30 ug/m^3 Chloroform in effluent vapors.
16. Note: Laboratory analytical results of 12/22/00 vapor samples detected 130 ug/m^3 c-1,2-Dichloroethene, and 27 ug/m^3 Chloroformin influent vapors; and 210 ug/m^3 c-1,2-Dichloroethene and 60 ug/m^3 Chloroform in effluent vapors.
17. Note: Laboratory analytical results of 1/22/01 vapor samples detected 14 ug/m^3 Chloromethane, 200 ug/m^3 c-1,2 dichloroethene, 130 ug/m^3 Chlorofom, and 8 ug/m^3 bromodichloromethane in influent vapors.
18. Note: Laboratory analytical results of 02/15/01 vapor samples detected 7.1 ug/m^3 Chloromethane, 10 ug/m^3 c-1,2-Dichloroethene, 590 ug/m^3 Acetone, and 5000 ug/m^3 2-butanone in effluent vapors. Handex confirmed that the samples were collected from the effluent sample port although the concentration and parameter list are consistent with historice influent detections.
19. Note: Laboratory analytical results of 3/20/01 vapor samples detected 78 ug/m^3 c-1,2 dichloroethene, and 37 ug/m^3 Chloroform in influent vapors.
20. Note: Laboratory analytical results of 4/18/01 vapor samples detected 130 ug/m^3 c-1,2-Dichloroethene, and 51 ug/m^3 Chloroform in influent vapors.
21. Note: Laboratory analytical results of 5/15/01 vapor samples detected 200 ug/m^3 c-1,2-Dichloroethene, and 170 ug/m^3 Chloroform in influent vapors.

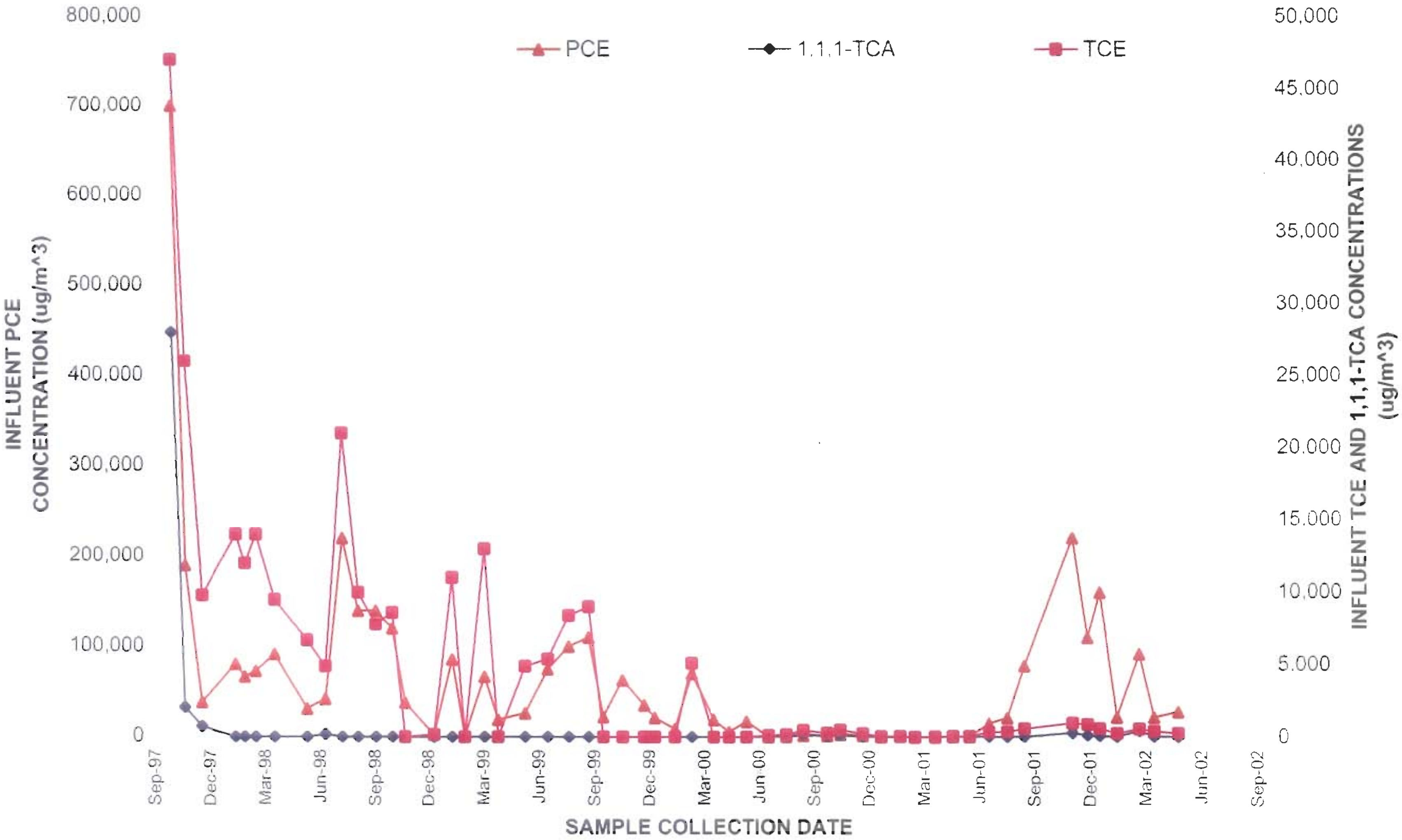
Note: Laboratory analytical results of 6/16/01 vapor samples detected 320 ug/m^3 c-1,2-Dichloroethene, and 56 ug/m^3 Chloroform in influent vapors

22. Note: September 2001 samples were not collected due to power disconnection.
.23. System off O/A due to high knock-out tank fault, system restarted and sampled.

OPERATION AND MONITORING SUMMARY
570 MAIN STREET
WESTBURY, NEW YORK

CHART 1

SYSTEM COC INFLUENT CONCENTRATION SUMMARY



HULL & ASSOCIATES, INC.
DUBLIN, OHIO

MAY 2002
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OPERATION AND MONITORING SUMMARY
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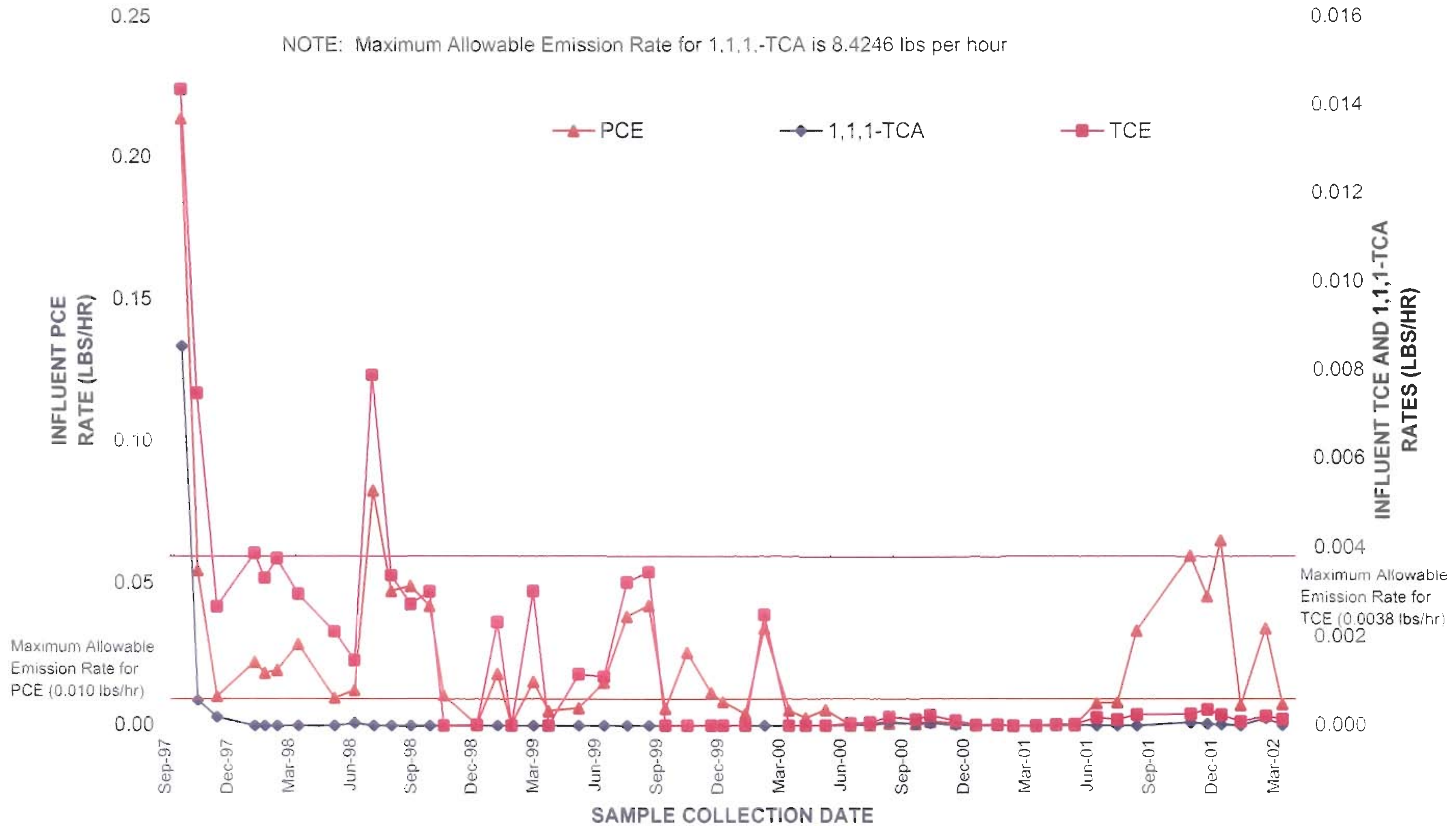
CHART 2

SYSTEM COC INFLUENT REMOVAL RATE SUMMARY


NOTE: Maximum Allowable Emission Rate for 1,1,1,-TCA is 8.4246 lbs per hour

HULL & ASSOCIATES, INC.
DUBLIN OHIO

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