UNDERGROUND
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Mr. Chris Marraro, Esq.
Wallace King Marraro & Branson, PLLC
1735 New York Avenue, N.W.
Washington, DC 20006

Subject: CooperVision, Inc. Facility
Report on Environmental Investigations
Scottsville, NY

Dear Mr.Marraro:

This report presents a summary of the site investigative work undertaken to determine conditions related to subsurface presence of certain volatile organic compounds at the CooperVision, Inc. Scottsville facility. It presents a summary of previously-gathered data, results of recent investigation, a summary of health risk assessment, and recommended remediation of environmental conditions identified. This report has been prepared in support of anticipated application to the New York State Dept. Of Environmental Conservation (NYSDEC) for remediation under its Voluntary Clean-up Agreement (VCA) Program.

Note that this report describes conceptual remediation that will need additional design phase investigations to confirm, design and implement the selected remedy. Accordingly, concepts of site remediation described herein are expected to become more refined in the near future as decisions are made to move ahead with a VCA and design data is gathered.

Thank you for the opportunity to assist you and CooperVision with this challenging project. Please contact us if you have any questions.

Sincerely yours,
HALEY & ALDRICH OF NEW YORK

Vincent B. Dick
Vice President

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EXECUTIVE SUMMARY

This report is submitted in support of CooperVision Inc.'s ("CooperVision") application for approval of a remediation under the New York State Department of Environmental Conservation (NYSDEC) Voluntary Cleanup Program.

The CooperVision, Inc. facility is located on the northwest side of the Village of Scottsville, New York. The property is located 711 North Road in Scottsville, adjacent to Briarwood Lane, and is approximately 5.4 acres in size, improved with an approximately 50,000 sq. ft. building (see Figures in attached report).

Haley & Aldrich performed an investigation of the property and this sets forth a preferred alternative to remediate certain volatile organic compounds (VOCs) in soil and groundwater at the site. The investigation and report:

☐ Identifies the types and extent of the VOCs in the site's subsurface;

☐ Identifies certain hydrogeologic conditions related to the direction and rate of migration of the VOCs;

☐ Identifies potential health exposure pathways and assesses risk

☐ Identifies preferred remedial alternatives

This report also reviews previous investigations conducted at the site. A Phase I and limited Phase II Environmental Site Assessment performed for a financial institution identified past use and storage of the VOC 1,1,1-trichloroethane (TCA) at the site. The limited Phase II sampling indicated that detectable levels of TCA and lesser concentrations of other related chlorinated VOCs were present in the subsurface of the facility. Haley & Aldrich was retained to perform additional subsurface testing and develop a preferred conceptual design.

This report findings are:

☐ The property was undeveloped prior to about 1976, and was used for agricultural purposes before construction of the facility. Upon being developed, the site was owned and operated by Union Corporation for manufacture of contact lens eyewear, and was sold to CooperVision in 1983. CooperVision continues to manufacture contact lenses at the facility.

☐ Industrial grade TCA was used at this facility for the manufacture of contact lens eyewear from approximately the mid-1970's to 1993. TCA was delivered to the site in 55 gallon drums where it was dispensed to an above-ground, indoor 600 gal. tank. TCA was used to release lenses from lens forms, until the manufacturing process was modified in 1993. Once used, the TCA was transferred to an adjacent 275 gal. above-ground tank.

☐ The 600 gal. and 275 gal. tank were located in a compressor room on the south side of the facility. The facility is slab-on-grade construction with no floor drains in the compressor room or immediately adjoining rooms. The tanks were removed from the facility in 1993 and 1995 respectively.

☐ Phase I investigations were conducted for the first time in 1997 and identified no reported releases or spills at the facility, with the exception of an NYSDEC spill report regarding a 1990 incident in which a refrigerated chemical storage room lost power and a drum of temperature-sensitive chemical (hydroxethyl methacrylate) ignited when the drum warmed. The fire was extinguished, spilled chemicals contained, and the spill file closed. No spills of TCA under CooperVision's ownership were reported either in public records or by site personnel familiar with operation of the facility during that time.

☐ Initial Phase II sampling conducted 1997 in the area immediately outside the compressor room identified TCA in subsurface soils and groundwater. A grid of 20 soil vapor sample locations identified the soils beneath the former tank/delivery area to be the source of remaining TCA at the site. Additional subsurface testing found the highest concentration of TCA in soil ("source area residuals") are in soil between approximately 8 to 12 ft. below the ground surface immediately outside the compressor room, at concentrations of 1.964 PPM. Highest groundwater concentrations of TCA are also present at this location (approximately 420.8 PPM), greatly diminishing toward the downgradient property line to the east. The highest groundwater TCA concentration near a property line is approximately 0.0613 PPM, measured in a monitoring well approximately 240 ft. due east of the source residual location. Other plume-edge downgradient monitoring wells both near the property line and within the property have shown detectable TCA, but at concentrations *well* below NYSDEC drinking water standards.

☐ Site soils consist of glacial till in the source residue area and at depth in all of the borings performed on site. Hydraulic conductivity in the source residue area is approximately 4.6E-07 cm/sec. Shallow till east of the source residue area is less dense and exhibits a slightly higher permeability, on the order of 2.7E-05. Bedrock is reported to be at depths generally 45 to 80 ft. below ground surface. Groundwater was encountered at approximately 6 to 8+ ft. below ground surface. The site's groundwater flow direction is toward the east-southeast, exhibiting a gradient of approximately 0.03 to 0.045. Based on the plume-edge distance from the apparent source area, the estimated highest hydraulic conductivity and gradient, it is estimated the release of TCA took place more than 15+ years ago.

☐ Human health risk assessment was performed for potential exposure routes consistent with site and surrounding vicinity property use. The facility and surrounding areas are supplied with municipal water and no groundwater extraction wells were identified in the facility vicinity, therefore consumption of groundwater was not a presumed exposure route. Potential routes evaluated included direct contact by a contractor as a result of excavation in the source residue area, vapor infiltration into the commercial structure (CooperVision facility), and contact exposure with surface water (resulting from discharge from groundwater) in a drainage ditch along the eastern property boundary. Results of the risk assessment indicated no unacceptable or uncontrollable risk for TCA and VOC exposure routes.

CooperVision seeks to remediate the identified contamination in accordance with NYSDEC's Voluntary Clean-up (VC) Program. Under the VC Program, remediation targets removal of source concentrations above NYSDEC clean-up criteria, which for soil are listed in Technical Administrative Guidance Memorandum (TAGM) 4046. Residue concentrations at CooperVision are only slightly above the TAGM levels and result in no unacceptable risk. Groundwater TCA concentrations exceed NYSDEC groundwater standards in the source area and at one other well. Accordingly, appropriate response is installation of a migration control measure to prevent off-site migration.

Two preferred conceptual configurations to provide migration control have been developed, one consisting of a conventional pump & treat system, and the second consisting of an emerging technology passive migration control and in-situ treatment system. The pump & treat system has a 10 to 30-year NPV of combined capital and O&M of approximately $545K to $1.06M. The passive system has a 10 to 30-year NPV for combined capital and O&M of approximately $512K to $990K. Limited administrative controls would likely be needed for either application. We propose that migration control (as opposed to source removal) be implemented at the site, and that second method (passive system) be utilized due to its simpler operation and maintenance requirements.

The attached report also includes details of the work performed, conclusions and recommendations.

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I. INTRODUCTION AND OBJECTIVES

1.1 Project Background and Objectives

This report presents a summary of the site investigative work undertaken to determine conditions related to subsurface presence of certain volatile organic compounds at the CooperVision, Inc. Scottsville facility. It presents a summary of previously-gathered data, results of recent investigation, a summary of health risk assessment, and recommended remediation of environmental conditions identified. This report has been prepared in support of anticipated application to the New York State Dept. Of Environmental Conservation (NYSDEC) for remediation under its Voluntary Clean-up Agreement (VCA) Program.

The CooperVision, Inc. facility is located on the northwest side of the Village of Scottsville, New York. The property subject to this investigation is located at 711 North Road in Scottsville, adjacent to Briarwood Lane, and is approximately 5.4 acres in size, improved with an approximately 50,000 sq. ft. building (see Project Locus and Figure 1).

Haley & Aldrich performed an investigation of the property and proposes remediation of certain volatile organic compounds (VOCs) in soil and groundwater at the site. The investigation and report:

☐ Identifies types and extent of the VOCs in the site's subsurface;

☐ Identifies certain hydrogeologic conditions related to the direction and rate of migration of the VOCs;

☐ Identifies potential health exposure pathways and;

☐ Identifies preferred remediation alternatives.

This report also provides results of previous investigations conducted at the site. A Phase I and limited Phase II Environmental Site Assessment performed for a financial institution identified past use and storage of the VOC 1,1,1-trichloroethane (TCA) at the site. Limited Phase II sampling indicated that detectable levels of TCA and lesser concentrations of other related chlorinated VOCs were present in the subsurface of the facility. Haley & Aldrich was retained to perform additional subsurface testing and develop a preferred remedial approach.

1.2 Site History

Property history was based on review of a comprehensive Phase I Environmental Site Assessment ("Phase I") conducted by LaBella Associates in connection with a routine corporate financing and on a review of aerial photograghs.

The site was undeveloped agricultural property prior to 1976. Thereafter the site was developed, owned and operated by Union Corporation for manufacture of contact lens eyewear. In 1983 CooperVision acquired the operation and continues to manufacture contact lenses.

The current structure is a slab-on-grade building, developed for commercial purposes and founded on typical spread footings. Subsurface utilities consist of municipal sewerage, water, and electrical service. The building is shaped as an inverted "L" with the original one-story portion of the structure located on the northeast side of the structure. The two-story sections of the building that comprise the western/southwestern wing of the current structure were added in two phases in 1995 and 1997. Active manufacturing occupies the northeastern portion of the facility and warehousing/shipping occupies the western/southwestern portion.

The Phase I did not identify issues associated with the facility or surrounding areas with respect to NPL, ERNS, CERCLIS, Petroleum Bulk Storage, NY Inactive Hazardous Waste Site, or similar regulatory databases. Both CooperVision and Heany Industries, an adjacent manufacturer were however identified as RCRA generators.

Historically, chemical storage on site has included 1,1,1-TCA, methylene chloride, methanol, caustics, polymers, monomers, silicon oil, low odor paraffin solvent, acetone, alcohols, and other compounds. Most chemicals have been purchased in fairly small volumes of a few liters or less. Certain compounds (1,1,1-TCA, methylene chloride) were stored in 55 gal. drums in a secure indoor chemical storage room.

Industrial grade TCA was used at this facility for the manufacture of contact lens eyewear from approximately the mid-1970's to 1993. It was delivered to the site in 55 gallon drums and was dispensed to an above-ground, indoor 600 gal. tank. TCA was used to release lenses from lens forms, until the manufacturing process was modified in 1993. Once used, TCA was to an adjacent 275 gal. above-ground tank.

The 600 gal. and 275 gal. tanks were located in a compressor room on the south side of the facility. The facility is slab-on-grade construction with no floor drains apparent in the compressor room or immediately adjoining rooms. The tanks were removed from the facility in 1993 and 1995 respectively.

The Phase I identified no reported releases or spills at the facility, except for one resolved NYSDEC spill report in 1990. This incident involved a refrigerated chemical storage room, located on the couth-central side of the one-story section of the building. The storage room lost power and a drum of temperature-sensitive chemical (hydroxethyl methacrylate) ignited when the drum warmed. The fire was extinguished, spilled chemicals contained and the spill file closed. No spills of TCA under CooperVision's ownership were reported either in public records or by site personnel familiar with operation of the facility during that time.

Three floor drains only were identified at the facility, in the chemical storage room, the facility receiving dock area (south side of the original wing of the building), and in the current tool-cleaning room (cement plugged). Phase II sampling was conducted near the drains most potentially likely to have been impacted. The results are summarized in Section 2.1.

II. INVESTIGATION AND RESULTS

2.1 Summary of Previously-Collected Data

In 1997 LaBella performed Phase II sampling on the following areas, based upon its Phase I analyses:

- **Floor Drain Sampling** - The floor drain in the tool-cleaning room was penetrated and sampled for laboratory analysis by Method 8260. The chemical storage room drain had been closed with cement and could not be penetrated for sampling; the receiving area drain did not appear to be a likely a location of impact.

  Results of the tool-cleaning room drain sample indicated acetone at 1.8 PPM, 2-butanone at 0.059 PPM, 1,1,1-TCA at 0.066 PPM, and 1,1-DCA at 0.028 PPM in the soil sample.

- **Test Borings** - Three test borings were drilled at locations of probable impact along the south side of the facility. Boring TB-1 was drilled just outside the former compressor room (where the TCA tanks had been located); Boring TB-2 was drilled just south of the chemical storage room. Boring TB-3 was drilled immediately southeast of the loading area (see Figure 6 for boring locations). Each boring was drilled using a Geoprobe rig, to depths of 12 to 14 ft. below grade, using continuous sampling and field screening with a PID. See Appendix B for copies of the LaBella test boring logs. Two soil samples exhibiting highest VOC-concentration, based on PID results, were submitted for laboratory analysis by Method 8240. Both samples were taken from boring TB-1, which is located outside the former compressor room.

  Results of the soil analyses showed 1,1,1-TCA at 1.964 PPM in the 10 to 12 ft. depth interval, decreasing to 0.199 PPM in the 12 to 14 ft. depth interval. The deeper interval also contained 0.353 PPM of the TCA breakdown product 1,1-DCA. The NYSDEC soil cleanup guidance values for 1,1,1-TCA and 1,1-DCA are 0.8 an 0.2 PPM respectively.

- **Groundwater Sampling** - The test borings were converted to ¾ in. to 1 in. ID well points for collection of representative groundwater samples, which were analyzed by Method 8240.

  Results of the groundwater analyses indicated VOCs to be present in groundwater, consistent with the soil detections described above. Highest VOC concentrations were detected in well MW-1 (corresponding to the boring TB-1 location). The compound 1,1,1-TCA was detected at 370 PPM. 1,1-DCA was detected at 35.8 PPM, and 1,1-DCE was detected at 12.36 PPM.

  Groundwater concentrations significantly diminished toward the eastern two wells. 1,1,1-TCA remained the predominant compound among those detected.

A second round of sampling in the MW-1 well confirmed the compounds and concentrations detected.

Copies of the LaBella boring logs are contained in Appendix B, copies of the lab reports appear in Appendix C, and a summary of the analytical results is contained in Table 3 along with other site analytical results from the subsequent Haley & Aldrich work described below.

Importantly, LaBella reported difficulty in advancing the Geoprobe sampling tools due to the presence of dense glacial till at the site, indicating low permeability. This influenced initial sampling steps taken by Haley & Aldrich (see Section 2.2 below). Additional interpretation of subsurface conditions based on the Phase II and subsequent explorations is provided in Sections 2.3.A and B.

2.2 Soil Vapor Survey and Results

Based on the Phase II results, Haley & Aldrich was requested to undertake an investigation to provide better definition of the source and extent of VOC compounds that may have been released from prior site operations. The initial investigation consisted of a passive soil vapor survey to define the extent of affected subsurface. Quadrel Services Emflux® sampling chambers were selected to provide a high-sensitivity sampling method and allow for variation of VOC emissions over time. It was considered that shallow real-time VOC sampling may not provide a low enough detection limit to overcome slow diffusion rates resulting from the apparent high-density glacial till.

A grid of 20 soil vapor sample locations were deployed to cover the area of and surrounding the apparent source location (outside the former compressor room/TCA storage area). Grid sampling locations are shown on Figure 2. At each grid node, a 1 in. diameter hole was drilled through surface concrete or pavement and advanced approximately 18 to 24 in. below grade. In each hole the Emflux® sampler was opened and hung in an inverted position just above the base of the hole. Each hole was sealed with a plug of hydrated bentonite to prevent exchange with atmospheric air, and allowed to collect soil vapor for a period of one week. On retrieval, each chamber was sealed, packed for shipment under chain-of-custody and shipped to Quadrel's laboratory.

Sampling results showed that the soils beneath the former tank/delivery area are the source of remaining 1,1,1-TCA residues and breakdown products. All results are summarized on Table 1. Results of the 1,1,1-TCA/ 1,2-DCA detections appear on Figure 2 (these compounds are plotted together because they coelute) and show peak detected concentration to be approximately 15 ng/l. Results shown on Figures 3 and 4 show 1,1-DCA and perchloroethylene (PCE) to be the next highest concentration compounds detected in the vapor sampling with peak concentrations ranging from approximately 2 to 5 ng/l. Trichloroethylene (TCE) was detected at approximately 1 ng/l.

All plots of the vapor results showed a pattern of highest detection beneath and immediately outside (south of) the compressor room which formerly housed the 600 gal and 275 gal TCA tanks. MSDS sheets corresponding to 1,1,1-TCA used by CooperVision were reviewed. They do not indicate that the 1,1,1-TCA supplied to CooperVision contained other chlorinated components which were detected in the soil vapor samples, such as PCE and TCE.

The report of the sample analyses is included in Appendix A.

2.3 Subsurface Borings and Results

Based on the soil vapor sampling results and previous Phase II borings, another round of subsurface exploratory drilling was performed. A subcontracted driller was engaged to perform exploration and sampling at several locations both upgradient, and downgradient of the apparent source area (compressor room). Drilling locations are shown on Figure 6.

The test boring program consisted of drilling a total of five test borings. One of the borings (for MW-205) was located adjacent to and deeper than the previously-drilled source area boring B-1. The remaining four borings were located on the upgradient side (for MW- 201) and downgradient side of the property (for wells MW-202, MW-203 and MW-204). The borings ranged in depth from 20 to 28 ft. below-ground surface. Locations of the test borings are shown on Figure 6.

The borings were drilled by Nothnagle Drilling of Rochester, New York, using a truck-mounted drill rig. The drill rig utilized a 4-1/4 in. inside diameter hollow-stem augers. Split-spoon samples were obtained continuously to the depth of the borings. The standard penetration resistance, "N", was determined at each sample level by counting the number of blows required to drive a standard split-spoon sampler (1-3/8 in. I.D., 2 in. O.D.) a distance of 18 inches into the undisturbed soil under the impact of a 140-lb. hammer free-falling 30 inches. The number of blows required to advance the sampler each six inches was recorded. The "N" value is taken as the number of blows required to advance the sampler the last 12 inches of the 18 inch sampling range. All split-spoon samples recovered from the borings were viewed by a Haley & Aldrich geologist for visual classification. Copies of the test boring logs are included in Appendix B. Geologic characterization of the areas explored is summarized below in Section 2.3.A.

Borings were monitored also for observable evidence of subsurface contamination that may affect boring depth, and well construction or development; such evidence including visible staining, observable odors, unusual liquids, or detection of vapors or fumes using a hand-held VOC monitor (Microtip PID). As-drilled boring locations and elevations were surveyed by Ronald W. Staub Land Surveyors of Rochester, New York. A summary of soil chemical quality is provided below in Section 2.3.C.

Each well was converted to a groundwater monitoring well by placement of a 10 ft. section of clean, factory slotted 2-in. PVC well screen into each boring, surrounding it with silica sand and completing the well with a bentonite grouted riser and flush-mount surface protective casing. All wells were developed. Development water and soil cuttings were containerized in 55 gal. drums which were later properly disposed through Waste Technology Services of Buffalo, New York.

After allowing the wells adequate time to stabilize, each well was purged of three well volumes or to dryness, and sampled for laboratory analysis by Method 8240. Samples were chilled and transported under chain-of-custody to Paradigm Environmental Services laboratory of Rochester, New York. Results of the analyses are described in Section 2.3.D.

Groundwater elevations were obtained from all site wells (both LaBella Phase II and Haley & Aldrich installed wells) in order to determine groundwater flow directions and gradients. Hydraulic conductivity tests were also performed to aid in determining rates of groundwater flow. Results are described below in Section 2.3.B.

A. Site and Vicinity Geology

Topography in the vicinity of the site ranges in elevation from a high of approximately 580 to 590 ft. (mean sea level datum) along the top of a low-profile glacial drumlin northwest of and underlying the property, and slopes gradually down to elevations of about 565 ft. at a drainage channel located southeast of the property.

Elevations and topography provide positive drainage from the site toward a drainage channel that borders the eastern property line of the site along Briarwood Lane. This channel conveys drainage toward the south. It flows into a storm sewer that continues to the south and appears to eventually drain to a former mill race leading to Oatka Creek, roughly ¾ mile from the CooperVision facility.

Borings conducted on the site penetrated glacial till at all locations explored. Variability in the shallow portion of the till was apparent in the range of density indicated by N values. In general, borings on the western side of the site, including the source area, indicated high density till (i.e. with N values in excess of 75 to 100 blow counts) from within 5 ft. of the ground surface to the extent penetrated by the borings. Borings along the east side of the site indicated slightly lower density till (N values generally <50) up to depths of 7 to 10 ft. below grade. The "Surficial Geologic Map of New York, Finger Lakes Sheet" (Muller and Cadwell, 1986) indicates glacial outwash sands and gravels, and glacial lacustrine deposits exist in lower elevation areas to the south of the site and Scottsville, inferring that melting of the glacial ice that formed the drumlin on which the site is located, altered the density of the shallow till in the lower elevation portions of the site.

Bedrock is reported to be at elevations of between generally 500 to 525 ft. This indicates a significant overburden thickness of approximately 45 to 80 ft. Bedrock underlying the site is reported to consist of Salina Group Camillus Shale.

Neither the glacial till or shale bedrock, located at the site or in the site's vicinity, constitute significant potable water supply aquifers. The site and area surrounding are supplied with municipal water from surface supplies located several miles from the site.

B. Site Hydrogeology

Groundwater was encountered at approximately 6 to 8 ft. below ground surface. Groundwater elevations decrease from approximately 575 ft. at the northwest corner of the property (well MW-201) to approximately 563 ft. at the southeast side of the property (well MW-204). See Figure 6 for isopotential contours indicated by the well network. Water elevations were measured on three separate occasions and all indicated the same direction of shallow horizontal groundwater flow - to the east-southeast toward the drainage ditch bordering the site on the east side. The ditch contained standing water during a period of site explorations (June 1997) when little precipitation had fallen. Based on the direction of groundwater flow and depth to water in wells near the ditch it is possible that the lower reaches of the ditch (southeast section of the property boundary) act as a shallow groundwater discharge location during certain periods of the year.

The hydraulic gradient between the source area (MW-1, MW-205) and the nearest downgradient well (MW-202) is 0.03 to 0.045 based upon groundwater elevations measurements.

Hydraulic conductivity testing was performed on all site wells except well MW-3 which diameter (¾ in.) prevented performance of routine water level monitoring for the conductivity testing. Results of the testing indicate hydraulic conductivity ("K") values range from 4.6E-07 cm/sec to 7.4E-05 (see Table 2 for a summary of values).

Calculations based upon conductivity and gradient demonstrate that the existing TCA plume results from prior owner operations, as the spill is estimated to be at least 15 years old. Well MW-202 shows the highest detection of 1,1,1-TCA near a property line, downgradient from the source area (see Figure 6). The concentration in this well was 0.0613 PPM of 1,1,1-TCA, compared to an NYSDEC standard for TCA of 0.005 PPM. This well and the source area wells (MW-1 and MW-205) were used to estimate an approximate time of release of the TCA from the source area. Based on the distance of MW-202 from the apparent source area, the estimated highest hydraulic conductivity and gradient, and an effective porosity of 20%, it is estimated the release of TCA took place at least 15+ years ago.

C. Soil Chemical Quality

VOC soil analyses are described from the LaBella for the Phase II investigation. These samples are from LaBella's area of highest field-indicated subsurface contamination, therefore provide representative source area concentrations.

The apparent highest VOC-concentration soils (based on PID results) from borings TB-1 through TB-3 were submitted for laboratory analysis by Method 8240; both samples came from boring TB-1, outside the former compressor room.

Results of the soil analyses showed 1,1,1-TCA at 1.964 PPM in the 10 to 12 ft. depth interval, decreasing to 0.199 PPM in the 12 to 14 ft. depth interval. The deeper interval also contained 0.353 PPM of the TCA breakdown product 1,1-DCA. The NYSDEC soil cleanup guidance values for 1,1,1-TCA and 1,1-DCA are 0.8 an 0.2 PPM respectively.

D. Groundwater Chemical Quality

Results of the sampling performed in both the LaBella Phase II and more recent wells are summarized on Table 3. Volatile compounds consistent with past storage/use of the solvent 1,1,1-TCA were identified (detections of TCA and breakdown product 1,1-DCA). The pattern of detections of these two compounds indicates consistent decrease of concentration from the source area wells (MW-1, MW-205) toward the east and south.

The highest groundwater concentrations of TCA in the source area are approximately 420.8 PPM. These concentrations greatly diminish toward the downgradient property line to the east. The highest groundwater TCA concentration near a property line in approximately 0.0613 PPM, measured in monitoring well MW-202 approximately 240 ft. due east of the source residual location. Other plume-edge downgradient monitoring wells both near the property line (MW-204) and within the property (MW-203) have shown detectable TCA, but at concentrations below NYSDEC drinking water standards.

The rate of VOC attenuation is less in the eastern downgradient direction from the source area than the toward the south and southeast, suggesting that pathways of preferred migration may be aiding flow in the easterly direction. The foundation for the south wall of the facility runs in this direction and granular fill for the foundation footers may provide such a preferred pathway. It should be noted however, that even with this preferred pathway, the rate of flow calculated along the path should not be faster than the estimated minimum time of 15 years to travel from the source area to the well MW-202 area.

PCE and TCE and its breakdown products were also detected at low levels in site wells. CooperVision records do not indicate usage of these compounds during its ownership of the site. Based on this and the time since release at the source area, these compounds are likely related to the prior owner's operations.

III. RISK CHARACTERIZATION

3.1 Approach

A compound-specific Risk Characterization focused on potential human health exposures was conducted for the Site. The Risk Characterization was performed in accordance with USEPA's Risk Guidance documents (see references attached). This Risk Characterization addresses the relevant site contaminants, chlorinated volatile organic compounds (VOCs) detected in soil and groundwater at the Site. The Risk Characterization to support a clean-up alternative under the Voluntary Cleanup program.

3.2 Selection of Compounds of Concern

The data were reviewed in order to identify the compounds of concern (COCs) for the Risk Characterization. COCs are compounds which are potentially site-related for which data are of sufficient quality to use in a quantitative Risk Characterization. In this Risk Characterization, the compounds detected at concentrations greater than the laboratory reporting limits in soil and groundwater are considered COCs. The compounds detected at the site consist of chlorinated VOCs (1,1,1,-TCA, 1,1-DCA, 1,1-DCE, PCE, TCE) and acetone. Sampling locations are shown on Figures 3 through 6. Soil and groundwater data are shown on Table 3, but for use in risk characterization software have been repeated in the risk calculation Tables I and II, respectively, contained in Appendix D. In addition, the soil and groundwater data are summarized (i.e., presentation of frequency of detection, average and maximum concentrations) in Tables III and IV of Appendix D, respectively. The compounds of concern are listed in Table V. In both soil and groundwater, 1,1,1-TCA and 1,1-DCA were detected most frequently and at the highest concentrations. Higher concentrations of COC were detected in groundwater than in soil.

3.3 TOXICITY ASSESSMENT

A. General

The toxicity assessment is the evaluation of the potential health effects associated with *COCs* at the site. The toxicity assessment evaluates the potential non-carcinogenic (threshold) and carcinogenic (non-threshold) effects of the constituents, and describes the effects observed in humans and/or laboratory animals following the inhalation, ingestion, or dermal application of a specific dose of the compound. The information from the toxicity assessment is used in conjunction with information from the exposure assessment and the selected risk limits to estimate the risk-based criteria.

B. Non-Carcinogens

The non-carcinogenic toxicity values used in the development of the risk-based criteria include the chronic reference dose (RfD) for oral and dermal exposures, and the chronic reference concentration (RfC) for inhalation exposures. RfD and RfC values provide an estimate of the daily dose of the compound that human populations may receive without an appreciable risk of adverse health effects appearing during their lifetime. The chronic toxicity values used in this Risk Characterization are summarized in Appendix D, Table VI.

C. Carcinogens

The toxicity values used for compounds producing carcinogenic effects are the Cancer Slope Factor (CSF) or the Unit Risk (UR) for oral/dermal and inhalation exposures, respectively. Unlike the RfD or RfC value, the CSF/UR is based on the assumption that there is no threshold dose for carcinogenicity (i.e., no dose at which there is no risk of developing cancer). The CSF/UR is derived by the U.S. Environmental Protection Agency (EPA) using data obtained from animal studies or human epidemiologic studies.

By estimating the upper 95% confidence limit of the slope of the dose-response curve extrapolated to low doses, the CSF is considered a measure of the cancer causing potential of a substance as a result of continuous exposure to a chemical throughout a lifetime. The carcinogenic toxicity values used in this Risk Characterization are summarized in Table VII. Lifetime exposures for cancer effects were evaluated for compounds considered Class A (carcinogen), B (probable carcinogen), and C (possible carcinogen) carcinogens in accordance with EPA, weight-of evidence classification for which toxicity values are readily available.

D. Sources of Toxicity Values

The non-cancer and cancer toxicity values are obtained from the EPA's Integrated Risk Information System (IRIS), Health Effects Assessment Summary Tables (HEAST), via the Electronic Handbook of Risk Assessment Values or EPA Region III Table (which contain EPA-NCEA and withdrawn toxicity values if IRIS and HEAST values are not available). The sources of the non-cancer and cancer toxicity values are indicated in Tables VI and VII, respectively.

E. Adjustment of Toxicity Values

Adjustment factors (also called absorption factors) used to match the exposure estimate with the toxicity value (if one is based on an absorbed dose and the other is based on an administered dose) are used. For dermal and oral water exposures and inhalation exposures (routes of exposure for which site-specific risk-based criteria were derived in this Risk Characterization), a conservative default adjustment factor of 1 (100%) is used. This assumes that via these routes of exposure, the chemicals are completely absorbed into the bloodstream.

F. Toxicity Profiles

Toxicity profiles are descriptive summaries of the potential human health hazards posed by a chemical. The summaries include, when available, the known health effects associated with acute, subchronic, and chronic exposure to the chemical, as well as information on the carcinogenicity, genotoxicity, and the developmental and reproductive toxicity of the chemical. Toxicity profiles for the COC evaluated in this Risk Characterization were obtained from IRIS and reviewed. The full profiles form IRIS have not been reproduced here, but relevant profile factors that may influence outcome of the assessment have been incorporated into the assessment.

3.4 Exposure Assessment

A. Exposure Scenarios

1. General

The site currently contains a slab on grade building which is used for offices and manufacture, warehousing and shipping of contact lenses. The building is surrounded by an extensive paved parking lot and small landscaped areas. The apparent chlorinated solvent release source location is situated at the central portion of the property, as indicated on Figures 2 through 6. The property is abutted by commercial property (south and west) and residential properties (north, east and south beyond the commercial usage). Hydrogeologic evaluations indicate that site groundwater periodically discharges to a drainage channel situated at the eastern property boundary. No change on the current property use is foreseeable.

2. Potential Human Receptors

The most relevant human receptors associated with commercial site conditions are excavation workers who may be involved in foundation repair or construction of a building addition; a plant worker who works in the on-site building; or a nearby resident or passer-by who may traverse the site. The media, pathways and routes of exposure to which these potential receptors may be exposed are summarized in Table VIII and discussed below.

Excavation Worker Scenario - Potential excavation worker exposures to groundwater are not considered at this site since the depth to groundwater (approximately 6 to 8 ft.) in the source exceeds the typical depth of excavation that can be performed adjacent to a foundation footer and because the soils consist of dense glacial till which typically yields little water to an open excavation. It is unlikely that plant workers and nearby residents will be exposed to site-related COC via direct contact as the contamination is currently beneath pavement at depths greater than 8 ft. However, it is assumed that these receptors may be exposed to site-related compounds in soil during excavation work.

Plant Worker Scenario - Potential indoor air exposures are evaluated for plant workers since they spend the majority of their employment time inside the building and because the soil and groundwater contamination is situated adjacent to the building.

Surface Water Exposure Scenario - It is assumed that nearby child residents may play in the drainage channel situated at the eastern property boundary during the warm weather months. Since site groundwater may periodically discharge to this drainage channel, it is assumed that children playing in this channel may come into contact with site-related constituents currently present in groundwater.

Potable use of groundwater is not evaluated because it is not a current exposure nor is it deemed a reasonably foreseeable exposure at this site or for the site vicinity. Municipal drinking water is available at the property and in the property vicinity.

B. Applicable Standards

1. Soil

Generic risk-based soil criteria for both residential and industrial land use are considered in this Risk Characterization (Appendix D, Table IX). The generic criteria, which address direct contact and inhalation (particulate and outdoor air) routes of exposure, were obtained from EPA's Soil Screening Guidance:Technical Background Document and the EPA Region III Risk-Based Concentration Table. Use of residential criteria is conservative because foreseeable use of the property is commercial/industrial.

In addition, site-specific risk-based soil volatilization criteria (relative to the soil to indoor air migration pathway) were developed (Appendix D, Table IX). These site-specific soil volatilization criteria were developed using the vapor transport equations outlined in ASTM's publication ES 38-94 and risk-based target indoor air concentrations (TACs). The soil and building characteristics used in the vapor transport equations and the TACs are summarized in Table B1, contained in Appendix D. The soil parameters (i.e, porosity, moisture content) used to generate the criteria were based on the typical properties of glacial till. The vadose zone was assumed to have 12% moisture content (the default value referenced in the ASTM publication). The building was assumed to have a 1% slab/crack ratio, a 14 ft. ceiling height, a 0.5 ft. slab thickness and a building air exchange of 0.00023 exchanges/second (the ASTM default commercial/industrial building air exchange). Based on site-specific data it was assumed that the soil contamination is 8 ft. below the slab. Compound-specific physical constants (diffusivities, Henry's Law Constant) used in the equations are summarized in Table X. The TACs were derived for each COC using non-cancer and carcinogenic risk limits (a hazard quotient of 1 and a carcinogenic risk limit of 1×10^{-6}, respectively) and the inhalation toxicity values contained in Tables VI and VII (Appendix D). For each compound, the lowest of the non-cancer and cancer values was taken as the compound-specific TAC.

2. Groundwater

Site-specific risk-based groundwater criteria were developed assuming volatilization of VOCs in groundwater to indoor air (groundwater volatilization criteria) and migration of VOCs to surface water in the drainage channel situated at the eastern portion of the property (groundwater migration criteria). These criteria are summarized in Table IX.

The groundwater volatilization criteria were derived using generally the same equations and assumptions and TACs which were used to develop the soil volatilization criteria, as presented in the previous section. However, diffusion through the capillary fringe, which was not included in the derivation of the soil volatilization criteria (because it is assumed that the soil contamination is above the capillary fringe), was included in derivation of the groundwater volatilization criteria. Therefore, a capillary fringe thickness of 2 ft. (based on a glacial till), assumed to be at 90 % saturation, was assumed. In addition, based on site-specific data, it was assumed that the groundwater table was 12.5 ft. below the slab of the building in the source area.

The groundwater migration criteria were derived assuming that the COC in groundwater at the source area migrate to the drainage channel at the eastern property boundary. Firstly, risk-based surface water criteria were derived, as indicated in Table B2 contained in Appendix D. These surface water criteria were then compared to the estimated steady-state (i.e. potential worst case) concentration that may be present in groundwater where it may discharge into the ditch. The risk-based surface water criteria were derived assuming that a 7 to 17 year old plays in the ditch and incidentally ingests and dermally contacts COC in surface water. It was assumed that the 7 to 17 year old plays in the ditch 2 hours per day, 2 days per week for 4 months of the year. It was assumed that the 7 to 17 year old incidentally ingests surface water at a rate of 25 ml/day (approximately ½ an adult mouthful of water) and that his/her hands are exposed. Note that the channel is water depth appears to be no mor than 1 ft; therefore, it is considered unlikely that more skin area would be exposed while playing in the channel. The derivation of the surface water criteria also included use of oral non-cancer and cancer toxicity values listed in Tables VI and VII, respectively, and a hazard quotient and cancer risk limit of 1 and 1 x 10 $^{-6}$, respectively. The groundwater to surface water dilution factor was estimated using a Domenico (1987) fate & transport model.

Feet

C. Exposure Point Concentrations

The maximum detected concentrations in soil and groundwater are used as exposure point concentrations. Generally, for evaluation of potential indoor-air exposures, a data set proximal to the building is used. However, in this Risk Characterization the maximum site concentrations were used to evaluate this exposure pathway since the maximum concentrations at the site were detected near the building. Table V

(Appendix D) lists the compounds of concern and the applicable exposure point concentrations.

3.5 Risk Characterization

Excavation Worker Scenario - Comparison of the soil exposure point concentrations to the generic soil standards for industrial and residential usage indicates that the soil exposure point concentrations at the subject site do not exceed these criteria (Appendix D, Table XI). In addition, the soil exposure point concentrations do not exceed the site-specific volatilization criteria.

Plant Worker Scenario - The groundwater exposure point concentrations do not exceed the groundwater volatilization criteria except for the 1,1-DCE concentration (Appendix D, Table XII). For this compound, the estimated volatilization of 1,1-DCE from the highest groundwater concentration detected, assuming this concentration occurs beneath the building adjacent to where it was detected, indicates the potential for additional cancer risk exceeds the 1-in-1,000,000 (1E-06) threshold referenced by USEPA.

Note that the model calculation conservatively assumes that the groundwater-soil vapor pathway is in complete equilibrium, which rarely occurs in real-world interface interactions; there is no attenuation of concentration based on bio-activity within the vadose zone, which is known to be inaccurate for the site, because of the demonstrated degradation of TCA to DCA, and PCE/TCE to DCE; and facility air-exchange rates remain year-round at the default levels specified in the model guidance (actual risk is controllable via modification of building ventilation). None of these factors can be adequately compensated for in the guidance model and the user must rely on professional judgement to gage the result's meaning in the actual work setting.

Importantly, industrial hygiene sampling was performed at the facility to identify whether 1,1-DCE was detectable in the facility and , if detected, whether its value exceeded exposure levels set by OSHA or standards-issuing agencies. Results of sampling in the work space nearest the area with subsurface contamination showed 0.6PPM of 1,1-DCE in air. No OSHA PEL has been set for 1,1-DCE, but the detected value is well below the ACGIH exposure value of 5PPM. It is therefore concluded that, while the model indicates theoretical risk above the 1E-06 threshold, actual facility concentrations do not exceed agency-issued workplace exposure values.

Surface Water Exposure Scenario - Comparison of the groundwater exposure point concentrations to the groundwater migration criteria indicates that the groundwater exposure point concentrations at the subject site do not exceed these criteria (Appendix D, Table XII).

3.6 Uncertainty Analysis

With any Risk Characterization, there is inherent uncertainty associated with the assessment process, such as uncertainty associated with the results of the chemical analyses, uncertainty relative to non-human derived toxicity values, etc. These are summarized below.

In development of the generic and site-specific risk-based criteria, there are several assumptions which are also sources of uncertainty. The assumptions represent highly conservative estimates based on published population information; because they are estimates, the data only represent receptors at the site in a general sense. But because maximum concentrations an similar bias is applied, a level of conservatism results in the characterization.

In summary, the derivation of the criteria, which includes the use of dose-response values (RfDs, RfCs, CSFs, and Unit Risk values), physical constants (i.e., Henry's law constants), and assumptions about human exposure, can contribute to uncertainty in the Risk Characterization.

The criteria and their application also have the following uncertainties:

☐ the use of dose-response information from effects observed at high doses to predict the adverse health effects that may occur following exposure to the low levels expected from human contact with the compound in the environment;

☐ the use of dose-response information from short-term exposure studies to predict the effects of long-term exposures, and vice-versa;

☐ the use of dose-response information from animal studies to predict adverse health effects in humans;

☐ the use of dose-response information from homogeneous animal populations or healthy human populations to predict the adverse health effects likely to be observed in the general population consisting of individuals with a wide range of sensitivities;

☐ the use of default values for daily ingestion rates, average body weights, surface areas, and permeability constants, etc.

There is also uncertainty associated with development of the exposure point concentrations used for comparison to applicable standards. In this Risk Characterization we have conservatively used maximum detected concentrations which overestimate the cumulative risk estimates calculated for the site.

3.7 Risk Characterization Conclusions

In summary, a compound-specific Risk Characterization focused on potential human health exposures was conducted for the site. The Risk Characterization was performed in accordance with EPA guidance documents for human health risk assessment. The receptors evaluated included excavation workers, plant workers, and nearby residents.

The exposure pathways evaluated included direct and indirect contact soil exposures, and indirect contact groundwater exposures (volatilization of COC in groundwater to indoor air and migration of COC in groundwater to surface water in the drainage channel situated at the eastern portion of the site). Both generic and site-specific risk-based criteria were used to evaluate these potential exposures.

The results of the Risk Characterization indicated that the compounds present in soil and groundwater do not pose a risk to human health, except for the assumed concentration of 1,1-DCE in groundwater which indicated a calculated potential risk to human health relative to potential volatilization of 1,1-DCE from groundwater to indoor air. Several conservative factors specific to the recommended model for this pathway suggest this potential risk is overly conservative. Actual risk for the facility is easily controllable by modifying building ventilation. Further, industrial hygiene sampling of air within the workspace nearest the subsurface contaminated area did not detect 1,1-DCE above the workplace exposure TLV of 5PPM issued by ACGIH.

IV. REMEDIATION EVALUATION *AND SELECTION*

4.1 Factors Affecting Approach

The primary criteria that influences potential remedial selection include the contaminant type, media type, current/anticipated site uses, and risk reduction.

The contaminants of concern at the site consist of volatile compounds that are amenable to techniques that move the compounds to a vapor phase and extract, sort, or destroy the compounds in that phase. Chlorinated compounds in groundwater are also considered recalcitrant because, once sorbed in a soil or rock medium, their rate of desorption back to a dissolved phase is limited by solubility, and physical interconnection of the medium's pore space. Further, techniques for degradation of chlorinated VOCs are evolving. Accordingly, remediation of chlorinated compounds follow one of two general approaches:

- Aggressive source removal is appropriate if the risk posed at a source area is unacceptably high and rapid reduction is desired. Aggressive source removal/reduction is also appropriate where rapid site closure is possible . Methods used for VOCs include high-vacuum or multi-phase extraction, extraction supplemented by vapor sparging, or excavation and removal or treatment using thermal desorption or other ex-situ techniques.

- Long Term Migration Control - Where unacceptable risk is and rapid site closure are not necessary then migration control is adequate. Capital cost is typically lower than aggressive approaches, but life cycle costs may be costly due to an extended remediation period, because migration control must continue often for years.

Migration control is appropriate for the CooperVision facility because no unacceptable risk exists and rapid site closure is not a factor. The only forseeable site use is commercial manufacturing. Additionally, available space for remediation equipment is almost non-existent due to current and continuing manufacturing requirements.

4.2 Alternatives Evaluation

The evaluation of remedial techniques was limited to those techniques which could be easily incorporated into the site use. Treatment techniques such as thermal desorption and ex-situ bioremediation can not be considered because of operation space constraints, and on-site ex-situ techniques would interfere with ongoing site operation needs. The following list of potential remedial techniques was addressed:

☐ Excavation - Using conventional construction to remove contamination and transport it to an off site disposal facility. This method is not acceptable because it could destabilize the foundation outside the compressor room. Additionally, excavation is not warranted based upon risk estimates.

☐ Vapor Extraction - Using high vacuum to strip volatile organic compounds from the soil and groundwater. Contaminated off gas resulting from the vacuum striping would likely require treatment prior to discharge into the atmosphere. The technique is typically limited to permeable soil and to volatile organic compounds. The geology at the CooperVision facility does not exhibit sufficiently high permeability to allow cost-effective use of vapor extraction technology.

☐ Groundwater Pump and Treat - Uses pumping techniques to remove groundwater and treatment technologies to remove contaminants from the extracted groundwater. The groundwater and soil at the site do not represent significant human risk. Groundwater pump and treat techniques can be used to provide migration control and long term reduction in contaminant concentrations.

☐ Passive Migration Control (and treatment) - several techniques now exist which place subsurface mechanisms in the subsurface to direct groundwater flow in a controlled manner, to accomplish migration control. These methods typically include treatment at a centralized subsurface pass-through location. Such techniques (for example, "funnel and gate") are generally available for usage, but their installation may be constrained by subsurface conditions.

Because low site risk posed by the VOCs does not compel rapid response and low site hydraulic conductivity values exist, non-aggressive migration control is an appropriate and preferred remedial approach.

Migration control is proposed as one of two possible configurations:

➤ Conventional Pump & Treat - The first alternate is a system of 5 to 6 conventional pumping wells placed to collect groundwater in the source area (one of the existing source wells could be converted to use) and at critical downgradient areas. Water recovered from the wells would be piped to a centralized treatment location (anticipated to be aqueous carbon), and treated to allow municipal sewer or stormwater discharge.

Estimated capital cost for the conceptual system is approximately $128K and estimated annual O&M is approximately $52K. Ten to thirty-year NPV for the combined capital and O&M equates to approximately $545K to $1.06M. The time frames used for continued O&M estimations are based on: 1) an anticipated earliest time until an acceptable closure base on natural attenuation may be possible (ten year); an 2) a default time of 30 years based on EPA remediation cost estimation guidance. A breakdown of the costs appears in Appendix E.

➤ Passive Migration Control - In the second alternative, flow of the main portion of the VOC plume would be directed to a central subsurface area, passed through a treatment medium, and returned at reduced concentrations into the native soil formation. The system would consist of a barrier or highly permeable refracting medium would be placed in the subsurface in a "Y" or "X" shaped configuration. An engineering analysis of each shape's reliability to direct groundwater flow would determine the selection of a directing device. The treatment area would consist of an oxidizing medium such as a zero-valent metal, or biodegradation enhancer such as hydrogen release compound. Additional monitoring wells would be installed up- and down-gradient of the flow control and treatment barrier to monitor effectiveness. For zero-valent metal treatment, a periodic O&M cost is factored into the conceptual design to allow for possible replenishment or replacement of the treatment medium.

Estimated capital cost for the conceptual system is approximately $274K and estimated annual O&M is approximately $26K. Ten to thirty-year NPV for the combined capital and O&M equates to approximately $512K to $990K. This time frame is based on the same criteria described above for the active pump & treat system. A breakdown of the costs appears in Appendix E.

Institutional controls such as a deed notice may also be employed in conjunction with the migration control system.

V. *RECOMMENDED PROPOSAL*

The VOC concentrations at the CooperVision facility do not present an unacceptable risk to human health and the foreseeable use of the facility will remain industrial. Accordingly, the appropriate response and proposed voluntary remedial approach is the installation of a migration control measure intended to prevent off-site migration. Two conceptual configurations to provide migration control have been developed, one consisting of a conventional pump & treat system, and the second consisting of an emerging technology passive migration control and in-situ treatment system. The pump & treat system has a 10 to 30-year NPV of combined capital and O&M of approximately $545K to $1.06M. The passive system has a 10 to 30-year NPV for combined capital and O&M of approximately $512K to $990K. Limited administrative controls may also be included such as a deed notice at the site. Of the two alternatives, the passive system is recommended because it provides less intensive O&M and better capacity to address more of the plume, particularly if low permeability limits the capture capability of individual wells in the pump & treat system conceptually configured for the site.

Either system could be installed within 4 to 6 weeks of approval by NYSDEC. However, review of site investigations, and completion of VCA administrative procedures, including the public comment, should be anticipated to require several weeks to 3±months.

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3. U.S. Environmental Protection Agency, Chemical, Physical and Biological Properties of Compounds Present at Hazardous Waste Sites, Clement Associates, Inc. 1985.

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Table 1

Soil-Gas Concentrations (ng/L)
Coopervision Site
Scottsville, New York

SAMPLE LOCATION	Q.L.	A1	A2	A3	A4	AB34	B1	B2	B3	B4	B5
CONTAMINANTS											
Benzene	0.07	--	0.10	--	0.15	--	0.07	0.34	0.18	--	0.08
Toluene	0.06	0.07	0.14	--	1.86	--	--	1.03	0.34	--	10.52
Ethylbenzene	0.06	0.22	0.14	--	0.10	--	--	0.21	0.09	--	0.43
Xylenes (total)	0.06	--	--	--	3.23	--	--	0.79	0.52	0.30	4.02
Total BTEX	0.06	0.29	0.38	--	5.34	--	0.07	2.37	1.13	0.30	15.05
1,1-Dichloroethane	0.08	--	--	0.17	0.10	0.09	--	0.14	0.09	--	0.16
Methylene Chloride	0.10	--	0.41	0.12	--	--	--	--	2.69	--	--
Tetrachloroethene	0.06	1.75	3.63	0.18	--	0.16	0.48	0.27	--	5.64	--
1,1,1-TCA/1,2-DCA	0.07	3.55	4.48	1.08	1.40	0.86	1.41	1.39	1.65	18.52	1.30
Trichloroethene	0.06	0.27	0.26	--	--	--	0.24	0.15	--	0.44	--

SAMPLE LOCATION	Q.L.	BC4	C1	C2	C3	C4	C5	D1	D2	D3	D4
CONTAMINANTS											
Benzene	0.07	--	--	--	--	--	--	--	--	--	--
Toluene	0.06	--	1.74	0.61	--	3.14	2.73	0.25	0.72	--	0.50
Ethylbenzene	0.06	0.18	0.26	--	--	0.16	0.06	--	0.49	--	0.21
Xylenes (total)	0.06	0.82	1.35	0.21	--	2.01	3.35	--	--	--	0.92
Total BTEX	0.06	1.00	3.35	0.82	--	5.31	6.14	0.25	1.21	--	1.63
1,1-Dichloroethane	0.08	3.77	--	--	0.09	0.54	0.10	0.18	--	0.19	0.10
Methylene Chloride	0.10	2.34	--	--	--	--	--	--	--	--	--
Tetrachloroethene	0.06	5.23	0.07	0.06	--	0.46	--	--	--	--	--
1,1,1-TCA/1,2-DCA	0.07	13.20	1.79	0.96	0.56	5.05	1.08	3.60	1.79	1.45	1.16
Trichloroethene	0.06	1.32	--	--	--	0.15	--	0.19	--	--	--

NOTES:
1) Values listed under "Q.L." are reported soil-gas concentration quantitation levels.
2) "--" denotes absence of detections above the reported quantitation level.
3) o-Xylene and Styrene coelute and cannot be distinguished (see Section 5 and Attachment 2).
4) 1,1,1-Trichloroethane (1,1,1-TCA) and 1,2-Dichloroethane (1,2-DCA) coelute and cannot be distinguished (see Section 5).

TABLE 2
HYDRAULIC CONDUCTIVITY and GROUNDWATER VELOCITIES

WELL	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity (ft/day)
MW-1	2.3E-06	6.52E-03
MW-2	7.9E-06	2.24E-02
MW-201	7.4E-05	2.10E-01
MW-202	2.7E-05	7.66E-02
MW-203	6.4E-05	1.82E-01
MW-204	9.9E-06	2.81E-02
MW-205	4.6E-07	1.30E-03
	Kgeomean =	0.029

	ft/day
Kmax =	2.10E-01
Kmin =	1.30E-03
Kavg =	2.86E-02

Velocity = V = KI/Ne , where Ne (effect. porosity) is assumed 20%
Gradient = I = 10.81/240 = 0.045

Vmax = (Kmax*I)/Ne
= 0.21*0.045/0.2
= 0.047 ft/day

Vmin = (Kmin*I)/Ne
= 0.0013*0.045/0.2
= 0.00029 ft/day

Vavg = (Kavg*I)/Ne
= 0.029 * 0.045/0.2
= 0.0065 ft/day

Distance = Velocity/Time
D=V/T or T=D/V

Tmax = D/Vmin
= 240/0.00029
= 827590 days
= 2270 yr

Tmin = D/Vmax
= 240/0.047
= 5106 days
= 14 yr

Tavg = D/Vavg
= 240/0.0065
= 36923 days
= 101 yrs

NOTES:

1. Gradient based on groundwater measurements taken by Haley & Aldrich on 16 July 1997 and distance between MW-202 and MW-205 (240 ft).
2. See Appendix F for Rising Head Test Summary sheets for conductivity data above.

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COOPERVISION
SCOTTSVILLE, NEW YORK

TABLE 3
CHEMICAL TESTING RESULTS

GROUNDWATER ANALYTICAL RESULTS

ANALYTE		SAMPLE LOCATION								
	Sample No.:	MW-1 *	MW-2 *	MW-3 *	MW-201	MW-202	MW-203	MW-204	MW-205	T.O.G.S.
	Groundsurface El.									1.1.1 Criteria
VOCs-8240										
1,1-Dichloroethane		35.823	0.3716	2.0309	ND	0.0084	ND	ND	153.107	0.005
1,1-Dichloroethene		12.366	0.1817	0.6297	ND	0.0179	ND	ND	ND	0.005
Tetrachloroethene		ND	0.0057	ND	ND	ND	ND	ND	ND	0.005
1,1,1-Trichloroethane		370.242	0.5193	3.2629	ND	0.0613	0.0033	0.0027	420.812	0.005
Trichloroethene		ND	0.0385	ND	ND	0.008	ND	ND	ND	0.005
Acetone		ND	ND	ND	ND	0.0265	0.118	0.0145	ND	0.05
Total Chlorinated VOCs		418.431	1.1168	5.9235	ND	0.0956	0.0033	0.0027	573.919	

NOTES:

1. Water results expressed in milligrams per liter (ppm).
2. "ND" indicates analyte not present at or above detection limit.
3. Only compound detects are listed. All other analytes were "ND".
4. Wells sampled by Haley & Aldrich on 10 July 1997. Samples analyzed by Paradigm Environmental Services, Inc. of Rochester, New York.
5. Comparison criteria taken from NYSDEC T.O.G.S. 1.1.1.
6. " * " - indicates wells installed by LaBella Associates on 11 April 1997, and sampled on 16 April 1997.

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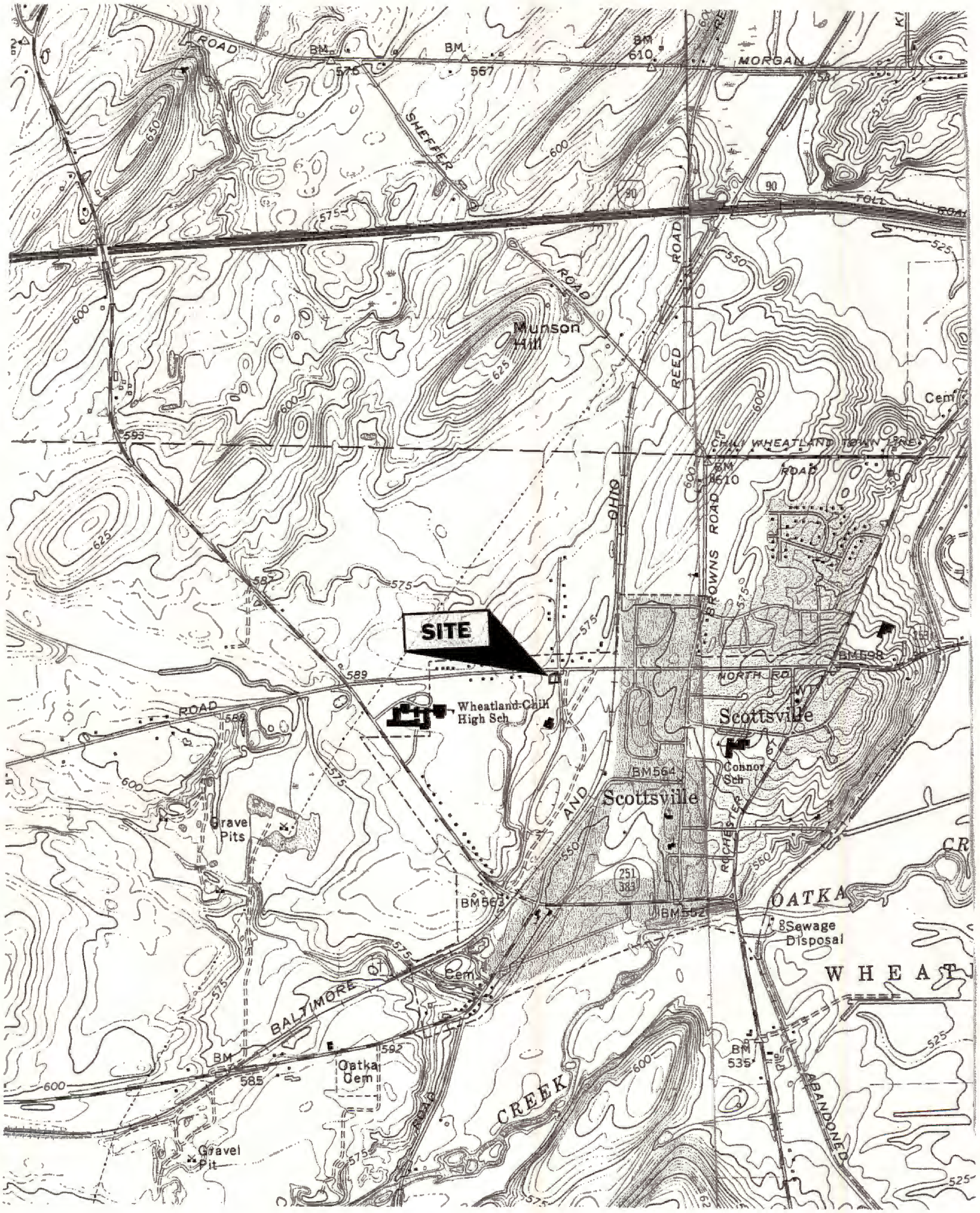
TABLE 4
ESTIMATED REMEDIATION SYSTEM COSTS
COOPERVISION, INC.
SCOTTSVILLE, NY
SUMMARY

OPTION	CAPITAL COST	ANNUAL O&M COST	ESTIMATED DURATION (YEARS)	NPV LIFE CYCLE COST RANGE		
PUMP AND TREAT	$127,900	$51,200	TEN TO THIRTY YEARS	$545,118	TO	$1,056,510
RFT - CROSS CONFIG	$273,900	$25,200	TEN TO THIRTY YEARS	$511,636	TO	$987,108

NOTES:

- * REFER TO TABLE 2 FOR COST DETAILS FOR PUMP AND TREAT
- * REFER TO TABLE 3 FOR COST DETAILS FOR REFRACTIVE FLOW TREATMENT
- * DISCOUNT RATE OF 6%
- * INFLATION RATE OF 2.5%



QUADRANGLE LOCATION: CLIFTON, N.Y.

HALEY & ALDRICH

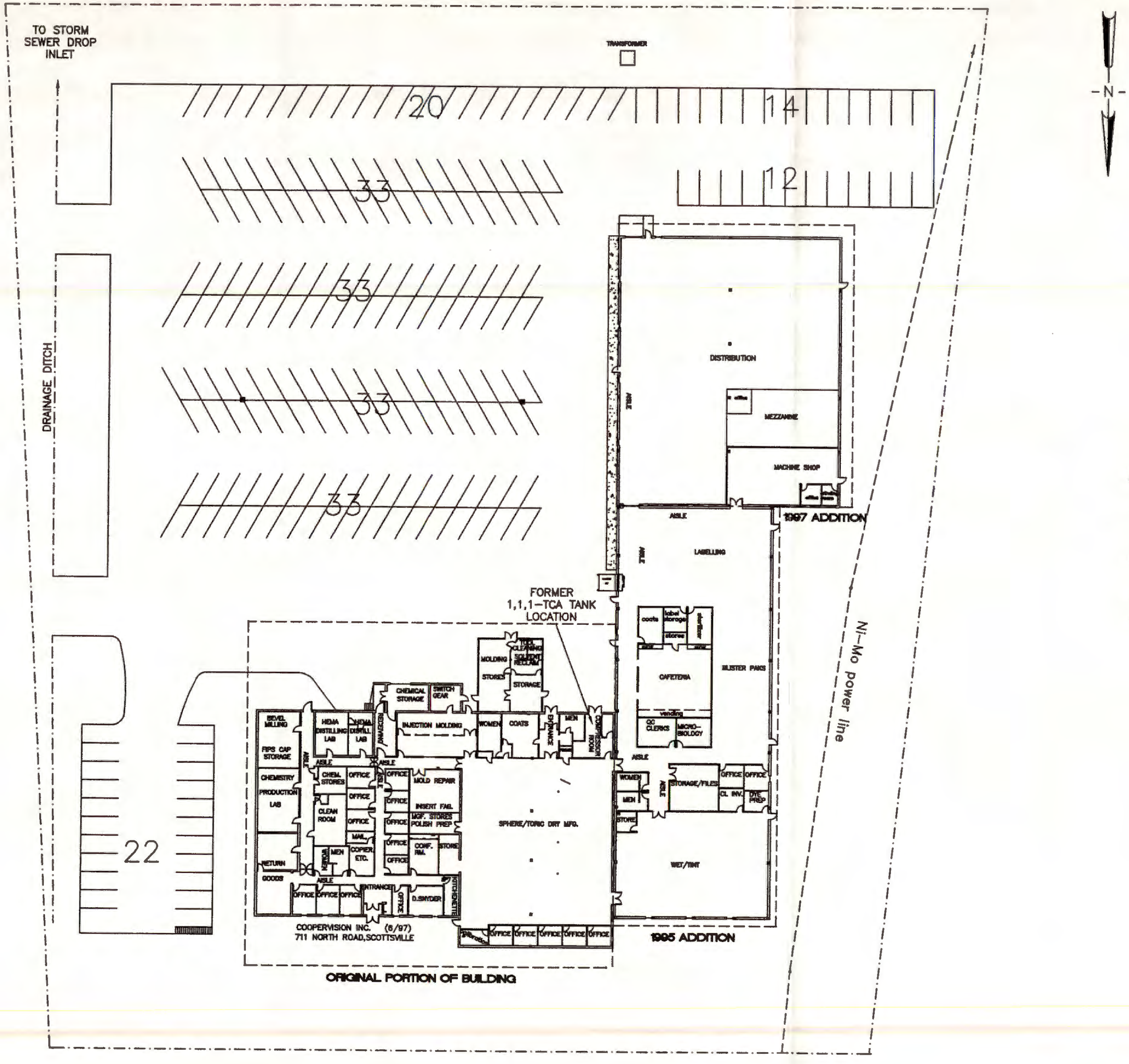
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

COOPERVISION FACILITY INVESTIGATION
711 NORTH ROAD
SCOTTSVILLE, NEW YORK

PROJECT LOCUS

SCALE: 1" = 2000'

MAY 1998



NOTES:

1. PLAN BASED ON "ALTA/ASCM LAND TITLE SURVEY MAY" PREPARED BY RONALD W. STAUB LAND SURVEYORS, ROCHESTER, NEW YORK, DATED 12/17/96.
2. FACILITY INTERIOR USES ACCURATE AS TO DATE OF SURVEY, BUT MAY CHANGE OVER TIME.
3. SEE OTHER FIGURES FOR EXPLORATION LOCATIONS.
4. SEE REPORT TEXT FOR FURTHER INFORMATION.

0 30 60 120
SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

COOPERVISION FACILITY INVESTIGATION
711 NORTH ROAD
SCOTTSVILLE, NEW YORK

EXISTING FEATURES PLAN

SCALE: AS SHOWN

MAY 1998

FILENAME: SITE.DWG

FIGURE 1

70665-002

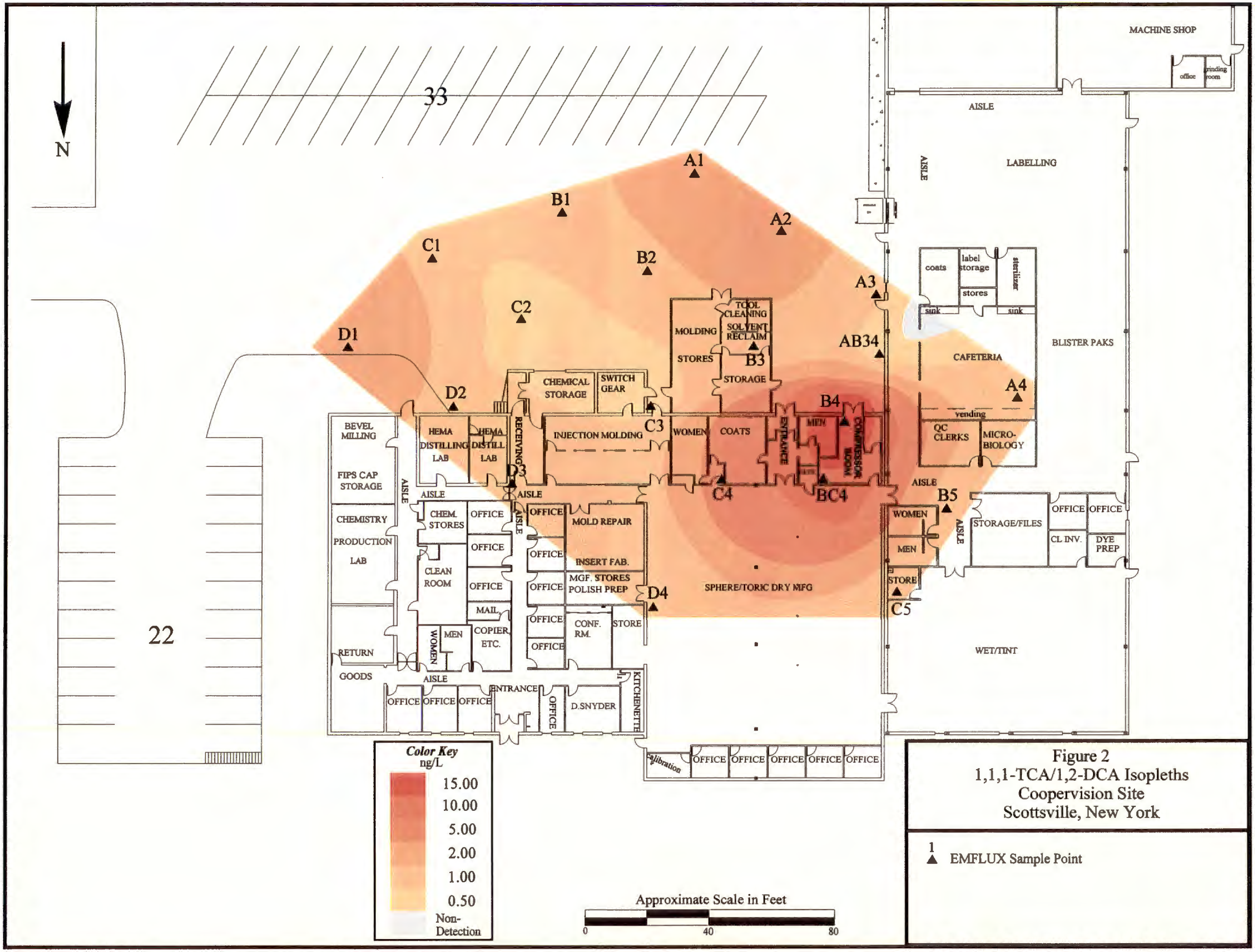


Figure 2
1,1,1-TCA/1,2-DCA Isopleths
Coopervision Site
Scottsville, New York

▲ 1 EMFLUX Sample Point

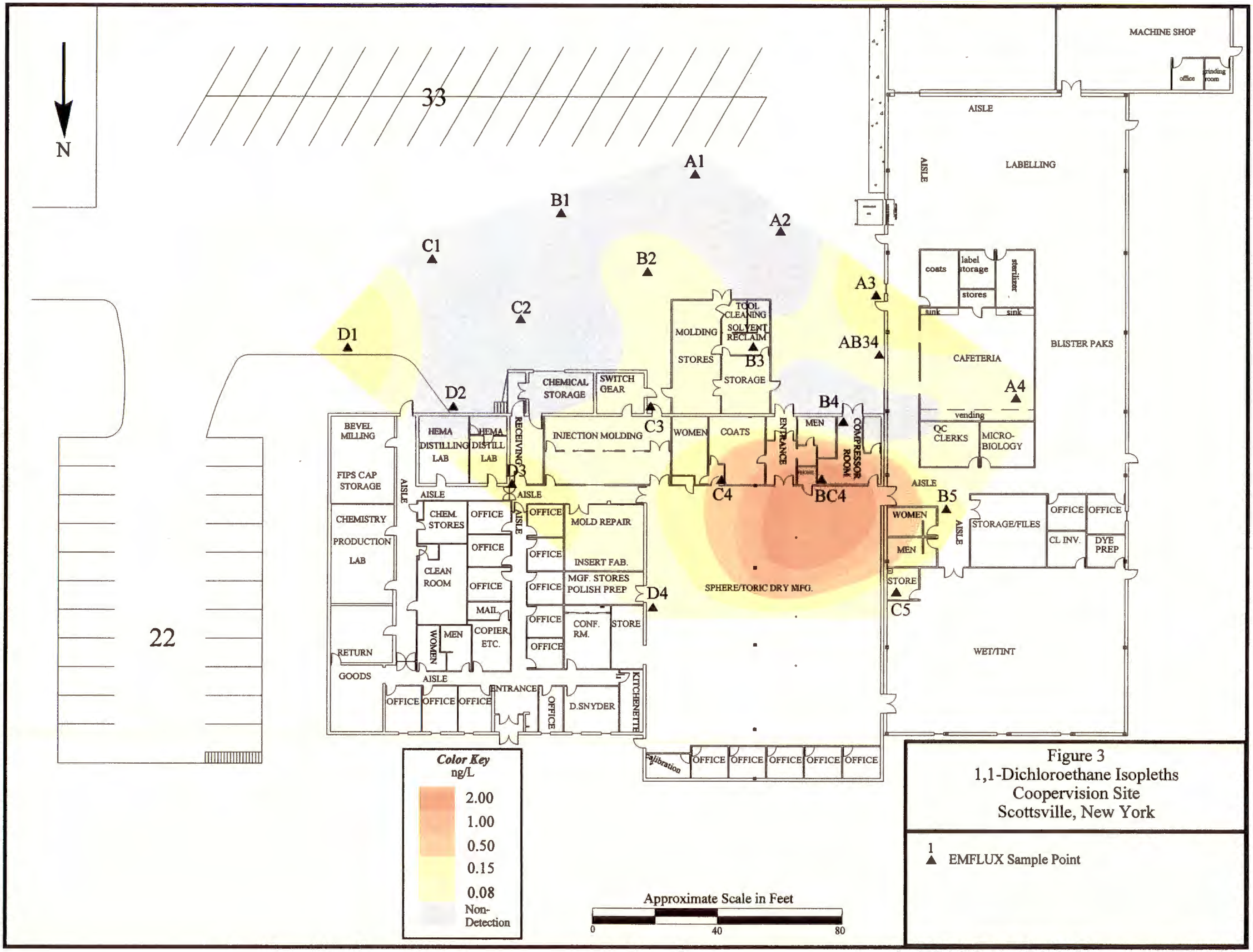


Figure 3
1,1-Dichloroethane Isopleths
Coopervision Site
Scottsville, New York

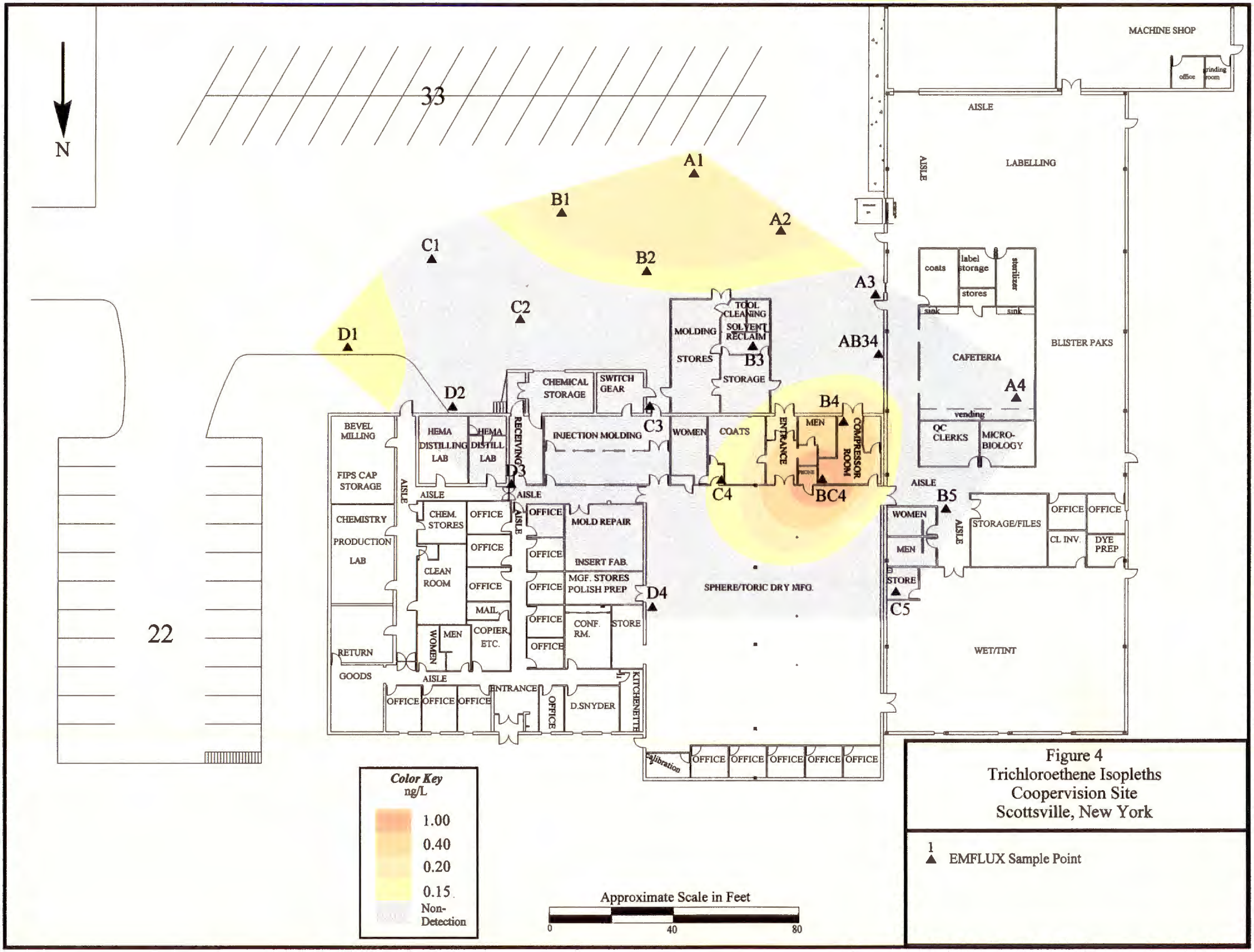


Figure 4
Trichloroethene Isopleths
Coopervision Site
Scottsville, New York

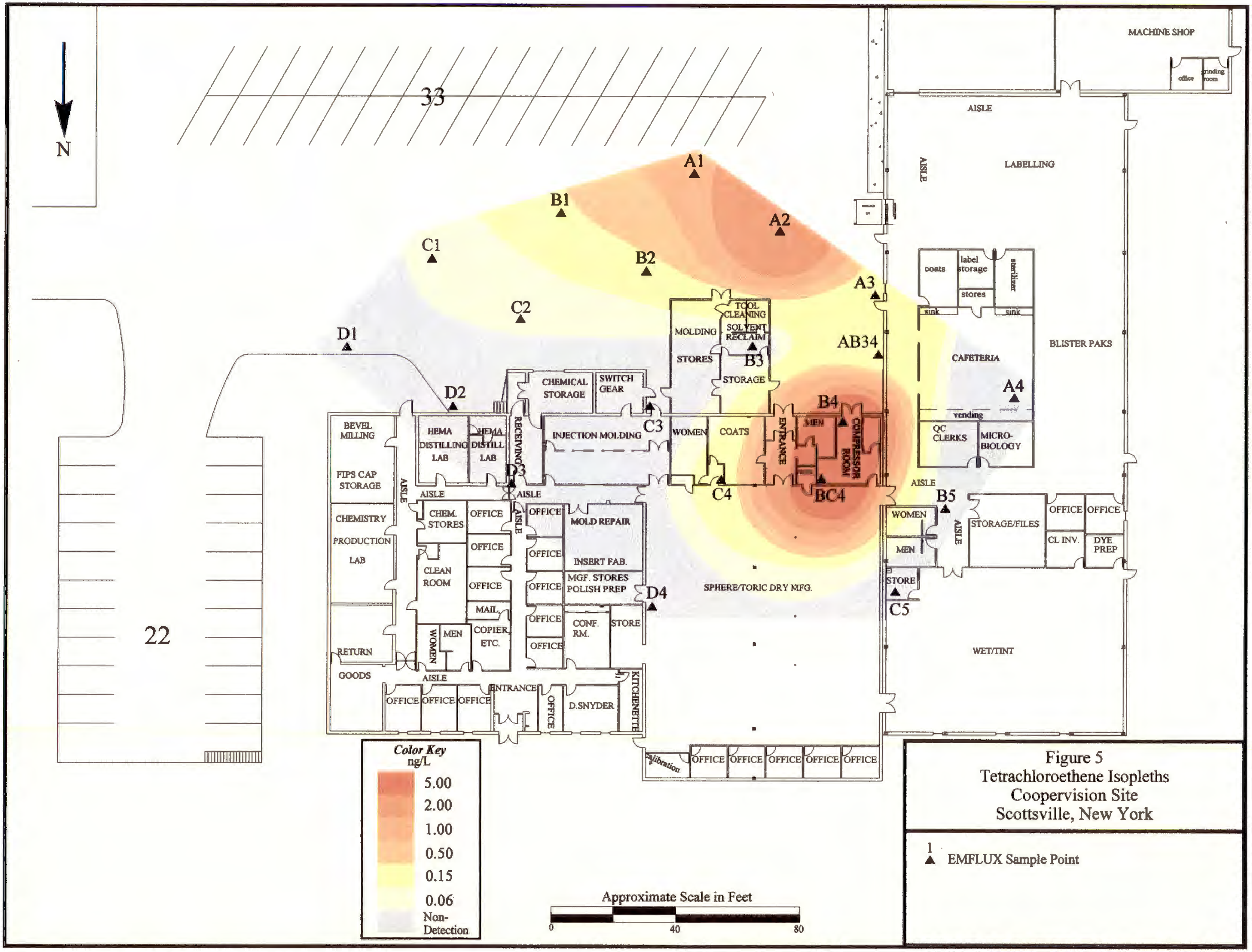
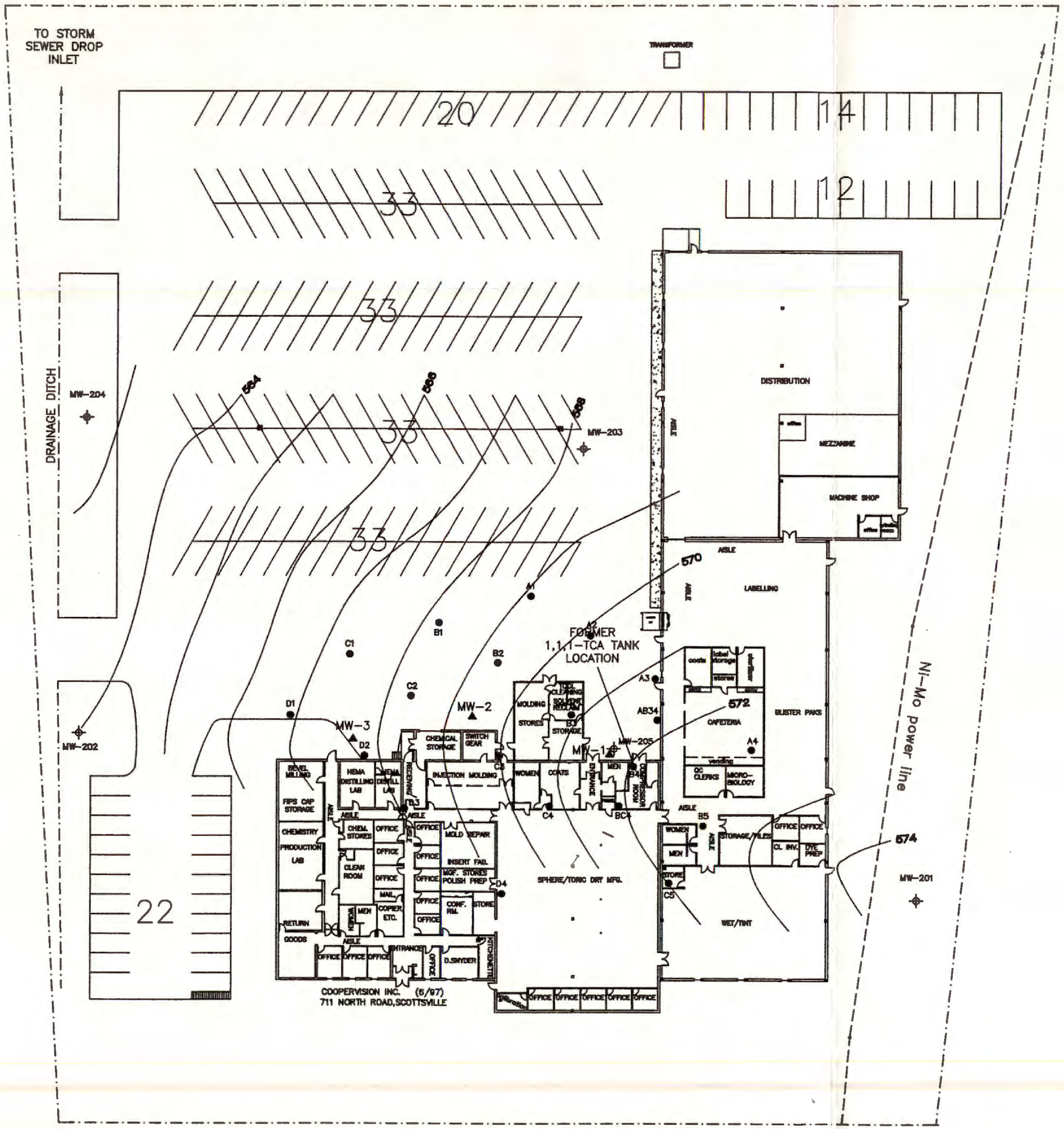


Figure 5
Tetrachloroethene Isopleths
Coopervision Site
Scottsville, New York



N

● B1	EMFLUX SOIL VAPOR SAMPLING LOCATION
MW-202 ⌖	SUBSURFACE BORING AND WELL INSTALLED UNDER THE OBSERVATION OF HALEY & ALDRICH OF NEW YORK.
MW-3 ▲	GEOPROBE EXPLORATION AND WELL INSTALLED UNDER THE OBSERVATION OF LABELLA ASSOCIATES.
— 574	GROUNDWATER ISOPOTENTIAL LINES.

NOTES:

1. PLAN BASED ON "ALTA/ASCM LAND TITLE SURVEY MAY" PREPARED BY RONALD W. STAUB LAND SURVEYORS, ROCHESTER, NEW YORK, DATED 12/17/96.
2. FACILITY INTERIOR USES ACCURATE AS TO DATE OF SURVEY, BUT MAY CHANGE OVER TIME.
3. SEE OTHER FIGURES FOR EXPLORATION LOCATIONS.
4. SEE REPORT TEXT FOR FURTHER INFORMATION.
5. GROUNDWATER ISOPOTENTIAL LINES INFERRED BETWEEN WELL LOCATIONS; VARIATION MAY OCCUR OVER TIME AND WITH VARIATION IN SUBSURFACE MATERIALS NOT ENCOUNTERED IN EXPLORATIONS.

0 30 60 120
SCALE IN FEET

HALEY & ALDRICH

UNDERGROUND
ENGINEERING &
ENVIRONMENTAL
SOLUTIONS

COOPERVISION FACILITY INVESTIGATION
711 NORTH ROAD
SCOTTSVILLE, NEW YORK

EXPLORATION LOCATIONS AND GROUNDWATER CONTOURS PLAN

SCALE: AS SHOWN

MAY 1998

FILENAME: FIG4.DWG

FIGURE 6

70665-002

APPENDIX A

Soil Vapor Report

Quadrel Report No. QS2692

EMFLUX® Passive, Non-Invasive Soil-Gas Survey

COOPERVISION SITE
SCOTTSVILLE, NY

Prepared for

Haley & Aldrich, Inc.
189 North Water Street
Rochester, NY 14604-1151

by

Quadrel Services, Inc.
1896 Urbana Pike
Suite 20
Clarksburg, MD 20871-8517

June 23, 1997

EMFLUX® Survey Number: QS2692

Coopervision Site
Scottsville, NY

This EMFLUX® Soil-Gas Survey Report has been prepared for Haley & Aldrich, Inc. by Quadrel Services, Inc. (Quadrel) in accordance with the terms of Order Confirmation No. QS2692 dated June 6, 1997. Quadrel's principal technical contact at Haley & Aldrich for this project has been Mr. Denis Conley.

1. Objectives

To screen the Coopervision Site for the presence of targeted compounds in the gas phase. Results will be used to profile contamination in soil and/or ground water at the site, thereby determining the distribution and relative strength of detected contaminants.

2. Target Compounds

This survey targeted those compounds listed in Quadrel's Method 8021 target compound list (TCL) in **Attachment 1**. **Attachment 2** provides the resulting laboratory data, in nanograms (ng) per trap, referencing the 11 compounds detected.

3. Survey Description

• No. of Field Sample Points:	20
• No. of Ambient-Air Control Samples:	1
• No. of Trip Blanks:	1
• Total No. of EMFLUX® Cartridges:	22
• Field sample locations are shown on **Figure 1**.	

4. Field Work

Quadrel provided Haley & Aldrich an EMFLUX® Field Kit with the equipment needed to conduct a 20-point EMFLUX® Soil-Gas Survey. Collectors were deployed on June 8, 1997 and retrieved June 15, 1997. **Attachment 3** describes the field procedures used. Individual deployment and retrieval times are given in the Field Deployment Report (**Attachment 4**).

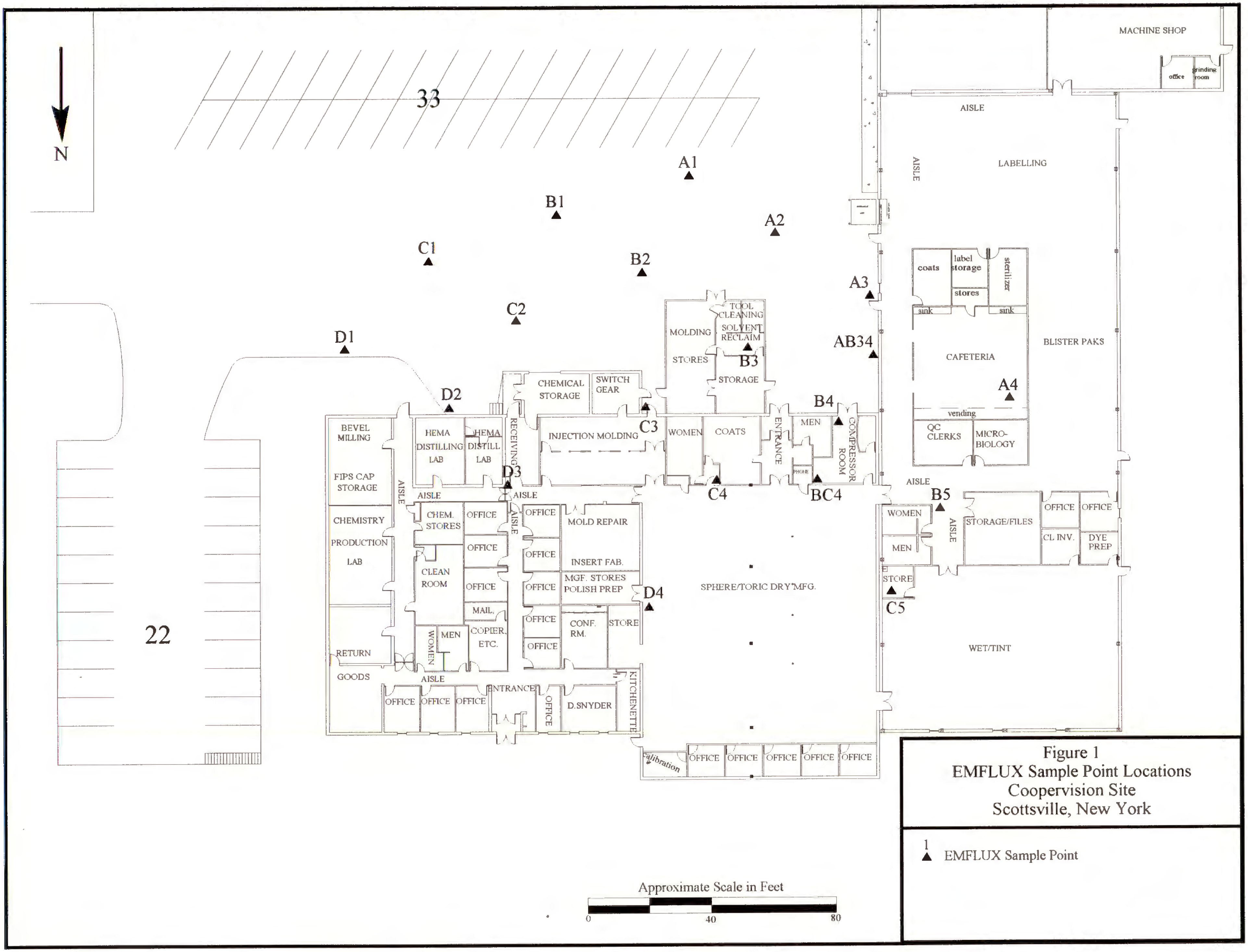


Figure 1
EMFLUX Sample Point Locations
Coopervision Site
Scottsville, New York

5. Analysis and Reporting Dates

- Quadrel received 22 sample cartridges for analysis on June 17, 1997.

- The laboratory analyzed the samples for the specified compounds, using thermal desorption and a capillary-column gas chromatograph (GC) with photoionization detector (PID) and a dry electrolytic conductivity detector (DELCD) in accordance with EPA Method 8021 (**Attachment 5**).

  Note: Quadrel's laboratory uses a 60-m, 0.53-mm-i.d., 5-µm-film-thickness MXT-5 capillary column for separation of compounds during analysis. When using this column 1,1,1-Trichloroethane (1,1,1-TCA) and 1,2-Dichloroethane (1,2-DCA) coelute; that is, when both compounds are present they appear at the same time on a chromatogram and cannot be distinguished. o-Xylene and Styrene also coelute. Therefore, when reviewing the data, it should be kept in mind that detections of 1,1,1-TCA/1,2-DCA *could* represent either compound and that the same is true for detections of o-Xylene/Styrene.

- Analysis was completed on June 20, 1997.

6. Data Treatment

- **Table 1** provides the survey results in soil-gas concentrations in nanograms per liter (ng/L, or parts per trillion). Laboratory values were converted to soil-gas concentrations using the following formula:

$$\mathbf{C = 10^3 KW/TR}$$

where: **C** = Avg. soil-gas conc. in collector (ng/L)
K = Cartridge collection constant (1.0 sec/cm^3)
W = Contaminant mass (ng)
T = Collection period (sec)
R = Adsorbent recovery factor (decimal fraction)

The specific collection period for each sample is given in the Field Deployment Report. Adsorbent recovery factors are provided in **Attachment 6**, values in **Table 1** have been corrected for recovery factors.

Note: Quadrel's derivation of the EMFLUX® cartridge collection constant, K, involved (i) adoption of 0.05 cm^2/sec as a typical diffusion coefficient, D, for VOCs in free air and (ii) evaluation of experimental laboratory data to determine the ratio between collection area, A, and diffusion distance, Z. The latter relationship, based on work done to date, appears to be A/Z = 20.2 cm. Given these values, Quadrel has computed the value of the constant to be:

$$\begin{aligned} \mathbf{K} &= 1/[D(A/Z)]\ \text{sec/cm}^3 \\ &= 1/[0.05(20.2)]\ \text{sec/cm}^3 \\ &= 1/1.01\ \text{sec/cm}^3 \\ &\approx 1.0\ \text{sec/cm}^3 \end{aligned}$$

- **Data Compatibility**. When sample locations are covered with an artificial surface (*e.g.*, asphalt or concrete), sample measurements are often distorted (increased) significantly. This distortion can be attributed to the fact that gas rising from sources beneath impermeable caps tends to reach equilibrium in relatively short periods of time and that, once equilibrium is reached, the soil-gas concentration measured at any point in a vertical line between source and cap is theoretically uniform. Thus, a reading taken below an impermeable surface is much higher than it would be in the absence of such a cap.

  Typically, when an EMFLUX® Survey is performed on a site which is partially covered by an impermeable cap, the values recorded beneath the cap should be arithmetically adjusted for comparison with values recorded in uncapped areas. To make these comparisons, the following equation can be applied.

$$\mathbf{C_{(e)} = C_{(c)} Z_{(c)} / Z_{(s)}}$$

where: $\mathbf{C_{(e)}}$ = Estimated *uncapped* measurement (ng)
$\mathbf{C_{(c)}}$ = Measurement in Collector (ng)
$\mathbf{Z_{(c)}}$ = Depth of Collector (cm)
$\mathbf{Z_{(s)}}$ = Known or assumed depth to source (cm)

This calculation assumes that concentration gradients are linear with depth from source to surface, an assumption deemed acceptable by Quadrel on the basis of literature reviews and previous experience.

7. Report Notes and Quality Assurance/Quality Control Factors

- **Table 1** provides survey results in soil-gas concentrations by sample-point number and compound name. The quantitation levels (Q.L.) represent values above which quantitative laboratory results can be achieved within specified limits of precision and with a high degree of confidence. The quantitation level of each compound, therefore, provides a reliable basis for comparison of the relative strength of individual detections of that compound.

- The **Chain-of-Custody** form, which was shipped with the samples for this survey, is supplied as **Attachment** 7.

- **Laboratory QA/QC procedures** consist of control blanks and verifications, as well as system calibration, as specified for EPA Method 8021. Laboratory personnel conducted internal control blanks and internal control verification analyses daily to ensure that the system was contaminant free and properly calibrated. The system was calibrated using external-standard procedures to at least five different concentrations for each compound targeted .

- **Laboratory Method Blanks**. The laboratory method blanks analyzed in connection with these samples revealed no contamination.

- The **trip blank** is a cartridge prepared, transported, and analyzed with other samples but intentionally not exposed. Contamination on this field QA/QC sample is subtracted from measurements of the same compounds on other samples prior to their conversion to soil-gas concentrations. Here, the trip blank (labeled as such in **Attachment 1**) recorded none of the targeted compounds, indicating that the survey site itself is the source of detected contamination.

- **Control samples** are field QA/QC samples which serve to identify compounds present in ambient air during deployment and retrieval of collection devices. Contamination found on the control sample is subtracted from measurements of the same compounds on field samples prior to their conversion to soil-gas concentrations. In this case, the control sample (trap A in **Attachment** 1) recorded 56 ng of 1,1,1-TCA/1,2-DCA, 45 ng of Toluene, and 40 ng of Xylenes.

- **Survey findings** are relative exclusively to this project and should not routinely be compared with results of other EMFLUX® Surveys. *To establish a relationship between reported soil-gas concentrations and actual subsurface contaminant concentrations, which will indicate those detections representing significant subsurface contamination, Quadrel recommends the guidelines on the inside front cover of this report.*

- The following **Attachments** are included:

  -1- Quadrel's Method 8021 Target Compound List
  -2- Laboratory Report
  -3- EMFLUX® Field Procedures
  -4- Field Deployment Report
  -5- Laboratory Procedures
  -6- Adsorbent Recovery Factors
  -7- Chain-of-Custody Form

- At the request of Haley and Aldrich the following **Maps** have been supplied:

  -Figure 1- EMFLUX® Sample Locations
  -Figure 2- 1,1,1-Trichloroethane/1,2-Dichloroethane Isopleths
  -Figure 3- 1,1-Dichloroethane Isopleths
  -Figure 4- Trichloroethene Isopleths
  -Figure 5- Tetrachloroethene Isopleths

QS2692mtc

Table 1

Soil-Gas Concentrations (ng/L)
Coopervision Site
Scottsville, New York

SAMPLE LOCATION	Q.L.	A1	A2	A3	A4	AB34	B1	B2	B3	B4	B5
CONTAMINANTS											
Benzene	0.07	--	0.10	--	0.15	--	0.07	0.34	0.18	--	0.08
Toluene	0.06	0.07	0.14	--	1.86	--	--	1.03	0.34	--	10.52
Ethylbenzene	0.06	0.22	0.14	--	0.10	--	--	0.21	0.09	--	0.43
Xylenes (total)	0.06	--	--	--	3.23	--	--	0.79	0.52	0.30	4.02
Total BTEX	0.06	0.29	0.38	--	5.34	--	0.07	2.37	1.13	0.30	15.05
1,1-Dichloroethane	0.08	--	--	0.17	0.10	0.09	--	0.14	0.09	--	0.16
Methylene Chloride	0.10	--	0.41	0.12	--	--	--	--	2.69	--	--
Tetrachloroethene	0.06	1.75	3.63	0.18	--	0.16	0.48	0.27	--	5.64	--
1,1,1-TCA/1,2-DCA	0.07	3.55	4.48	1.08	1.40	0.86	1.41	1.39	1.65	18.52	1.30
Trichloroethene	0.06	0.27	0.26	--	--	--	0.24	0.15	--	0.44	--

SAMPLE LOCATION	Q.L.	BC4	C1	C2	C3	C4	C5	D1	D2	D3	D4
CONTAMINANTS											
Benzene	0.07	--	--	--	--	--	--	--	--	--	--
Toluene	0.06	--	1.74	0.61	--	3.14	2.73	0.25	0.72	--	0.50
Ethylbenzene	0.06	0.18	0.26	--	--	0.16	0.06	--	0.49	--	0.21
Xylenes (total)	0.06	0.82	1.35	0.21	--	2.01	3.35	--	--	--	0.92
Total BTEX	0.06	1.00	3.35	0.82	--	5.31	6.14	0.25	1.21	--	1.63
1,1-Dichloroethane	0.08	3.77	--	--	0.09	0.54	0.10	0.18	--	0.19	0.10
Methylene Chloride	0.10	2.34	--	--	--	--	--	--	--	--	--
Tetrachloroethene	0.06	5.23	0.07	0.06	--	0.46	--	--	--	--	--
1,1,1-TCA/1,2-DCA	0.07	13.20	1.79	0.96	0.56	5.05	1.08	3.60	1.79	1.45	1.16
Trichloroethene	0.06	1.32	--	--	--	0.15	--	0.19	--	--	--

NOTES:
1) Values listed under "Q.L." are reported soil-gas concentration quantitation levels.
2) "--" denotes absence of detections above the reported quantitation level.
3) o-Xylene and Styrene coelute and cannot be distinguished (see Section 5 and Attachment 2).
4) 1,1,1-Trichloroethane (1,1,1-TCA) and 1,2-Dichloroethane (1,2-DCA) coelute and cannot be distinguished (see Section 5).

Attachment 1

Quadrel's Method 8021 Target Compound List

- Benzene
- Bromodichloromethane
- Bromoform
- Carbon Tetrachloride
- Chlorobenzene
- Chloroform
- Dibromochloromethane
- 1,1-Dichloroethane
- 1,2-Dichloroethane[1]
- 1,1-Dichloroethene
- *cis*-1,2-Dichloroethene
- *trans*-1,2-Dichloroethene
- Ethylbenzene
- Methylene Chloride
- Styrene[2]
- 1,1,2,2-Tetrachloroethane
- Tetrachloroethene
- Toluene
- 1,1,1-Trichloroethane[1]
- Trichloroethene
- Vinyl Chloride
- o-Xylene[2]
- m+p-Xylenes

[1,2] Compounds noted can coelute.

Attachment 2

Laboratory Report

Attachment 2

Laboratory Report
Results in Nanograms (ng)
Analysis Completed: June 20, 1997

Quadrel Project No. QS2692

In this analysis 22 EMFLUX® samples were analyzed under the requirements of EPA Method 8021 using an **SRI 8610B Gas Chromatograph** equipped with a **thermal desorber**, a **photo ionization detector**, and a **dry electrolytic conductivity detector**.

SAMPLE NO.	A1	A2	A3	A4	AB34	B1	B2	B3
COMPOUNDS								
1,1-Dichloroethane	U	U	64	38	35	U	53	33
Methylene Chloride	U	120	36	U	U	U	U	791
Tetrachloroethene	882	1834	89	U	80	245	136	U
1,1,1-TCA/1,2-DCA	1614	2027	533	682	437	680	669	789
Trichloroethene	124	119	U	U	U	114	68	U
Benzene	U	43	U	70	U	31	153	83
Toluene	80	115	56	1001	U	68	566	217
Ethylbenzene	112	70	U	52	U	U	110	46
m+*p*-Xylenes	U	U	34	1415	U	U	386	263
o-Xylene/Styrene	U	U	32	266	U	U	50	38

Reported Quantitation Level = 30 nanograms; U = Below Reported Quantitation Level

Attachment 2 (cont.)

Laboratory Report
Results in Nanograms (ng)
Analysis Completed: June 20, 1997

Quadrel Project No. QS2692

SAMPLE NO.	B4	B5	BC4	C1	C2	C3	C4
COMPOUNDS							
1,1-Dichloroethane	U	59	1410	U	U	34	201
Methylene Chloride	U	U	692	U	U	U	U
Tetrachloroethene	2890	U	2681	37	32	U	237
1,1,1-TCA/1,2-DCA	8321	641	5947	846	480	304	2304
Trichloroethene	207	U	622	U	U	U	71
Benzene	U	35	U	U	U	U	U
Toluene	U	5468	U	929	355	U	1651
Ethylbenzene	U	228	94	136	U	U	85
m+*p*-Xylenes	192	U	454	651	75	U	U
o-Xylene/Styrene	U	2086	U	66	72	U	1053

Reported Quantitation Level = 30 nanograms; U = Below Reported Quantitation Level

Attachment 2 (cont.)

Laboratory Report
Results in Nanograms (ng)
Analysis Completed: June 20, 1997

Quadrel Project No. QS2692

SAMPLE NO.	C5	D1	D2	D3	D4	A	TRIP
COMPOUNDS							
1,1-Dichloroethane	38	68	U	70	36	U	U
Methylene Chloride	U	U	U	U	U	U	U
Tetrachloroethene	U	U	U	U	U	U	U
1,1,1-TCA/1,2-DCA	540	1653	848	701	573	56	U
Trichloroethene	U	90	U	U	U	U	U
Benzene	U	U	U	U	U	U	U
Toluene	1450	174	413	70	300	45	U
Ethylbenzene	32	U	253	U	111	U	U
m+*p*-Xylenes	U	U	U	U	429	40	U
o-Xylene/Styrene	1744	U	53	U	76	U	U

Reported Quantitation Level = 30 nanograms; U = Below Reported Quantitation Level

Attachment 3

FIELD PROCEDURES FOR EMFLUX® SOIL-GAS SURVEYS

The following field procedures are routinely used during EMFLUX® Soil-Gas Surveys. Modifications can be and are incorporated from time to time in response to individual project requirements. In all instances, Quadrel adheres to EPA-approved Quality Assurance and Quality Control practices.

A. Field personnel carry EMFLUX® system components and support equipment to the site and deploy the EMFLUX® Collectors in a prearranged survey pattern. Although EMFLUX® Collectors require only one person for emplacement and retrieval, the specific number of field personnel required depends upon the scope and schedule of the project. Each Collector emplacement generally takes less than two minutes.

B. For those sample locations covered with soils or vegetation, a field technician clears vegetation and debris exposing the ground surface. Using a hammer and a ¾-inch-diameter pointed metal stake, the technician creates a hole approximately three inches deep. For those locations covered with an asphalt or concrete cap, the field technician drills a one-inch-diameter hole through the cap to the soils beneath. (If necessary, the Collector can be sleeved with a ¾-inch i.d. copper pipe for either capped or uncapped locations).

C. The technician then removes the solid plastic cap from an EMFLUX® Collector (a glass vial containing an adsorbent cartridge with a length of wire attached to the vial for retrieval) and replaces it with a Sampling Cap (a plastic cap with a hole covered by screen meshing). The technician inserts the Collector, with the Sampling Cap end facing down, into the hole (**see attached figure**). The Collector is then covered with either local soils for uncapped locations or, for capped locations, aluminum foil and a concrete patch. The Collector's location, time and date of emplacement, and other relevant information are recorded on the Field Deployment Form.

D. As a quality-control check during emplacement and retrieval, the technician takes periodic ambient-air control samples and records the date, time, and location of each. (One or more trip blanks are also included as part of the quality-control procedures).

E. Once all EMFLUX® Collectors have been deployed, field personnel schedule Collector recovery (approximately 72 hours after emplacement) and depart, taking all no-longer-needed equipment and materials with them.

F. Field personnel retrieve the Collectors at the end of the 72-hour exposure period. At each location, a field technician withdraws the Collector from its hole and wipes the outside of the vial clean using gauze cloth; following removal of the Sampling Cap, the threads of the vial are also cleaned. A solid plastic cap is screwed onto the vial and the sample location number is written on the label. The technician then records sample-point location, date, time, etc. on the Field Deployment Form.

G. Sampling holes are refilled with soil, sand, or other suitable material. If Collectors have been installed through asphalt or concrete, the hole if filled to grade with a plug of cold patch or cement.

H. Following retrieval, field personnel ship or carry the EMFLUX® Collectors to analytical laboratories under contract to Quadrel Services. The remaining equipment is returned to Quadrel's preparation facility.

SAMPLE NUMBER	TIME		FIELD NOTES (*e.g.*, asphalt/concrete covering, description of sample location, cartridge/vial condition)
	Emplaced	Retrieved	
18	1040	0756	EMF #18 OUTSIDE DISTRUBUTION DOOR A3
19	1055	0753	EMF #19 " " DOCK A2
20	1110	0751	AMF #20 " " PARKING AREA A1
A			Collected @ point # ____
Trip Blank			Not to be opened, For QA/QC purposes only!
extra↓			

Attachment 5

LABORATORY PROCEDURES FOR EMFLUX® ADSORBENT CARTRIDGES

Following are laboratory procedures used with the EMFLUX® Soil-Gas System, a screening technology for expedited site investigation. After exposure, EMFLUX® cartridges are analyzed using U.S. EPA Method 8021 as described in the Solid Waste Manual (SW-846) for screening purposes. This method, which is modified to accommodate thermal desorption screening of the adsorbent cartridges, uses a capillary gas chromatograph with a photo ionization detector (PID) in series with a dry electrolytic conductivity detector (DELCD). This procedure is summarized below:

A. EMFLUX® cartridges are placed in the thermal desorbtion chamber, where they are desorbed and immediately injected into the GC. At injection, helium flushes the desorption chamber and continues to flow through the desorption chamber during the entire sample run. The analytes are cryofocused at the front of the column using liquid CO_2. Analytes in the helium flow are detected with a PID then a DELCD.

B. The laboratory uses a 60-m, 0.53-mm-i.d., 5 μm-film-thickness MXT-5 capillary column for separation during analysis.

C. The PID and DELCD are set at high gain; the air pressure for the DELCD is set between two and three psi air.

D. Lab personnel conduct internal control blank and internal control verification analyses daily to ensure that the system is contaminant free and properly calibrated. The system is calibrated using the external standard calibration procedure to at least five different concentration levels for each compound targeted, with the lowest concentration level at or near the method detection limit.

E. The instrumentation used for these analyses is an SRI 8610 Gas Chromatograph, connected to a PID in series with a DELCD and equipped with a manually actuated thermal desorber.

Attachment 6

ADSORBENT RECOVERY FACTORS

Quadrel maintains an ongoing laboratory-based program to quantify recovery factors for the adsorbents used in EMFLUX® field collection devices. This program is designed to determine adsorbent affinity (a combination of attraction and retention characteristics) for a broad spectrum of compounds, including each of the VOCs targeted in this survey. The adsorbent with the highest overall affinity for the targeted VOCs was utilized for this survey, and the recovery factors of those compounds that were detected are as follows:

Compound	Percent Recovered
Benzene	76
1,1-Dichloroethane	62
Ethylbenzene	87
Methylene Chloride	49
Tetrachloroethene (PCE)	85
Toluene	85
1,1,1-Trichloroethane	73
Trichloroethene (TCE)	78
Xylenes (total)	84

Attachment 7

Chain-of-Custody Form

QUADREL SERVICES, INC.
CHAIN-OF-CUSTODY FORM

PROJECT NUMBER: QS2692

PROJECT NAME: Client Property in New York

LOCATION: New York

CLIENT: Haley & Aldrich

TARGET COMPOUNDS: 8021

SAMPLE NUMBER	LAB ID No. (for lab use only)	REMARKS Condition of sample or vial	Date	Time	Init.
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
A					
Trip Blank					

RELINQUISHED BY		DATE	TIME	RECEIVED BY	
Signature	Printed Name			Signature	Printed Name
	Steve Thornley	6·6·97	1700	Fedex	
Fedex		6·7·97	1030	Jim Marschner MC	Jim Marschner
		6·7·97	1030		Vincent Dick
	Vincent B. Dick	6·15·97	0700	Margaret J Corrigan	Margaret Corrigan
Margaret Corr	Margaret Corrigan	6·16·97	1630	Fed Ex	
Fedex		6-17-97	1130	ST	STEVE Thornley

132 9420 793

APPENDIX B

Test Boring Logs

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B-201

PROJECT:	WELL INSTALLATION	FILE NO.	70665-002
CLIENT:	COOPERVISION, SCOTTSVILLE, NEW YORK	SHEET NO.	1 OF 1
CONTRACTOR:	NOTHNAGLE DRILLING COMPANY	LOCATION:	See Plan

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Augers	SS	--
INSIDE DIAMETER (IN)	4-1/4	1-3/8	--
HAMMER WEIGHT (LB)	--	140	--
HAMMER FALL (IN)	--	30	--

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME-75, Truck Mount
BIT TYPE: --
DRILL MUD: --
OTHER: --

ELEVATION:
DATUM:
START: 7 July 1997
FINISH: 7 July 1997
DRILLER: K. Busch
H&A REP: J. Marschner

DEPTH (FT)	MICRO-TIP READING	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	ND	6 16 12 11	S1 5"/24"	0.0 2.0		Medium dense brown SILT, trace gravel and fine sand, with numerous roots. -GLACIAL OUTWASH-
	ND	11 14 48 34	S2 11"/24"	2.0 4.0	3.4 4.0	Same, except damp. Very dense brown gravelly SAND, trace silt, damp. -GLACIAL OUTWASH-
5	ND	17 28 52 58	S3 20"/24"	4.0 6.0		Very dense brown SILT, trace fine sand, occasional layers of fine sand and gravel, moist.
	ND	38 81 100/.4	S4 10"/17"	6.0 7.4		Same. -GLACIAL TILL-
	ND	37 100/.5	S5 9"/12"	8.0 9.0		Same.
10	ND	32 60 53 51	S6 24"/24"	10.0 12.0		Very dense brown SILT, trace gravel and fine sand, moist. -GLACIAL TILL-
	ND	23 59 60 50	S7 16"/24"	12.0 14.0		Same.
15	ND	30 58 100/.4	S8 16"/17"	14.0 15.4		Same, except wet and medium to fine sand seam from 14.0 ft. to 14.2 ft.
	ND	54 100/.4	S9 11"/11"	16.0 16.9		Very dense brown SILT, trace gravel and fine sand, wet. -GLACIAL TILL-
	ND	100/.4	S10 4"/5"	18.0 18.4		Same. -GLACIAL TILL-
20						Bottom of Boring at 20.0 ft.
25						

Notes:

1. Each sample screened using Photovac Microtip 2020 for organic vapor concentrations.
2. ND = Not Dectected.
3. Installed monitoring well in completed borehole. See Groundwater Monitoring Well Installation Report.

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon

SUMMARY

OVERBURDEN (LIN FT):	20.0
ROCK CORED (LIN FT):	--
SAMPLES:	10S
BORING NO.	B-201

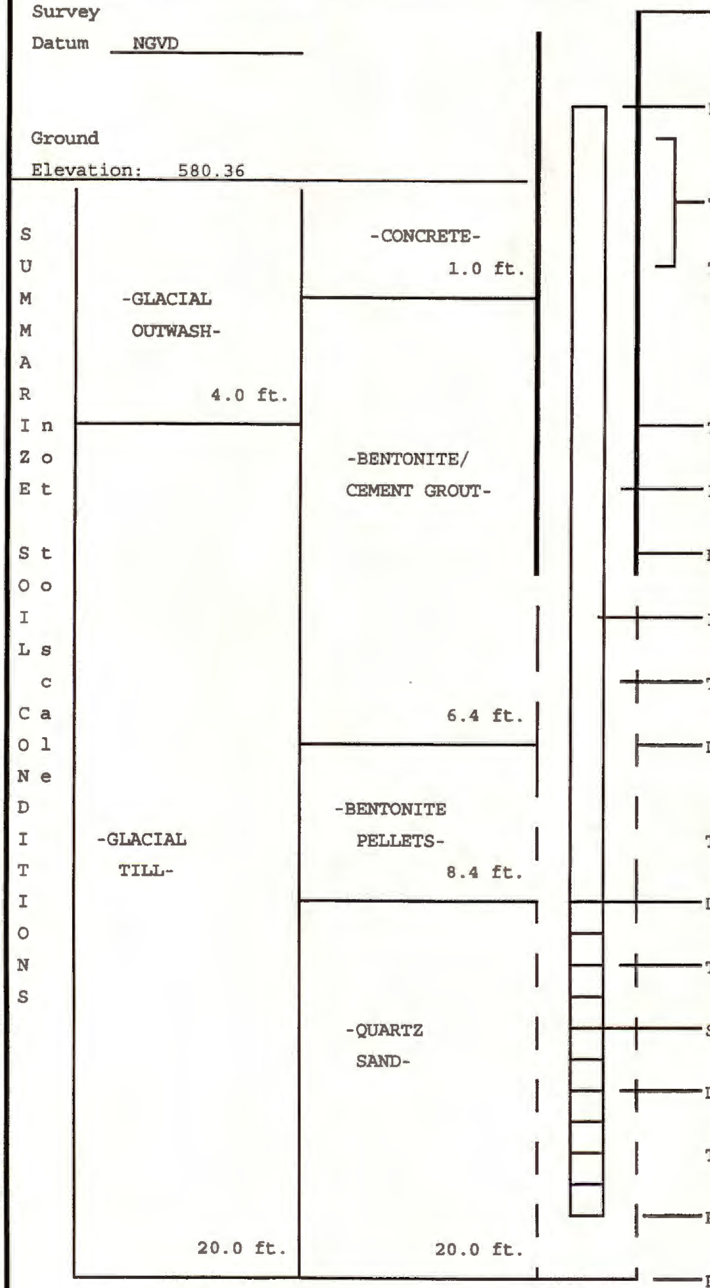
H&A OF NEW YORK
CONSULTING GEOTECHNICAL ENGINEERS
GEOLOGISTS AND HYDROGEOLOGISTS

OVERBURDEN GROUNDWATER MONITORING WELL REPORT

PROJECT:	WELL INSTALLATION	FILE NO.:	70665-002
LOCATION:	SCOTTSVILLE, NEW YORK	WELL NO.:	MW-201
CLIENT:	COOPERVISION	LOCATION:	SEE PLAN
CONTRACTOR:	NOTHNAGLE DRILLING		
DRILLER:	K. BUSCH RIG TYPE: CME-75, TRUCK-MOUNT	SHEET:	1 OF 1
INSTALLATION DATE:	7 JULY 1997	INSPECTOR:	J. MARSCHNER

Survey Datum NGVD

Ground Elevation: 580.36



Depth below ground surface of protective casing.	0.0 ft.
Depth below ground surface of riser pipe.	0.3 ft.
Thickness of Surface Seal	1.0 ft.
Type of Surface Seal [indicated all seals showing depth, thickness and type]	Concrete
Type of Protective Casing	Roadway Box
Inside Diameter of Protective Casing	8.0 in.
Depth of Bottom of Protective Casing	1.0 ft.
Inside Diameter of Riser Pipe	2.0 in.
Type of Backfill Around Riser	Bentonite/Cement Grout
Diameter of Borehole	8.0 in. +/-
Type of coupling (threaded, welded, etc.)	Threaded
Depth of Bottom of Riser	9.8 ft.
Type of Wellscreen	PVC
Screen Slot Size	0.010 in.
Diameter of Wellscreen	2.0 in.
Type of Backfill Around Wellscreen	Quartz Sand
Depth of Bottom of Wellscreen	20.0 ft.
Depth of Bottom of Borehole	20.0 ft.

Remarks:

Well No. MW-201

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B-202

PROJECT: WELL INSTALLATION
CLIENT: COOPERVISION, SCOTTSVILLE, NEW YORK
CONTRACTOR: NOTHNAGLE DRILLING COMPANY

FILE NO. 70665-002
SHEET NO. 1 OF 1
LOCATION: See Plan

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Augers	SS	--
INSIDE DIAMETER (IN)	4-1/4	1-3/8	--
HAMMER WEIGHT (LB)	--	140	--
HAMMER FALL (IN)	--	30	--

DRILLING EQUIPMENT & PROCEDURES
RIG TYPE: CME-75, Truck Mount
BIT TYPE: --
DRILL MUD: --
OTHER: --

ELEVATION:
DATUM:
START: 7 July 1997
FINISH: 7 July 1997
DRILLER: K. Busch
H&A REP: J. Marschner

DEPTH (FT)	MICRO-TIP READING	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	ND	6 15 21 15	S1 7"/24"	0.0 2.0	2.0	Dense brown SILT, trace gravel and sand, damp. -GLACIAL OUTWASH-
	ND	9 7 8 8	S2 14"/24"	2.0 4.0		Medium dense brown medium to fine SAND, trace gravel and silt, dry. -GLACIAL TILL-
5	ND	8 8 4 4	S3 4"/24"	4.0 6.0		Same.
	--	8 10 8 12	S4 NR	6.0 8.0		No Recovery. Very dense brown SAND, trace gravel and silt, wet.
10	ND	69 60 23 45	S5 18"/24"	8.0 10.0	8.4	Very dense brown SILT, trace gravel and sand, wet. -GLACIAL TILL-
	ND	21 50 58 45	S6 20"/24"	10.0 12.0		Same.
	ND	6 18 45 23	S7 10"/24"	12.0 14.0		Same. -GLACIAL TILL-
15	ND	9 20 100/.5	S8 10"/18"	14.0 15.5		Same.
	ND	100/.5	S9 6"/6"	16.0 16.5		Same.
	ND	100/.4	S10 2"/4"	18.0 18.4		Same. -GLACIAL TILL-
20 25						Bottom of Boring at 20.4 ft.

Notes:

1. Each sample screened using Photovac Microtip 2020 for organic vapor concentrations.
2. ND = Not Dectected.
3. Installation monitoring well in completed borehole. See Groundwater Monitoring Well Installation Report.

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER
7/8/97	1445	~22 hrs.	19.63	--	16.25

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon

SUMMARY

OVERBURDEN (LIN FT):	20.4
ROCK CORED (LIN FT):	--
SAMPLES:	10S
BORING NO.	B-202

H&A OF NEW YORK
CONSULTING GEOTECHNICAL ENGINEERS
GEOLOGISTS AND HYDROGEOLOGISTS

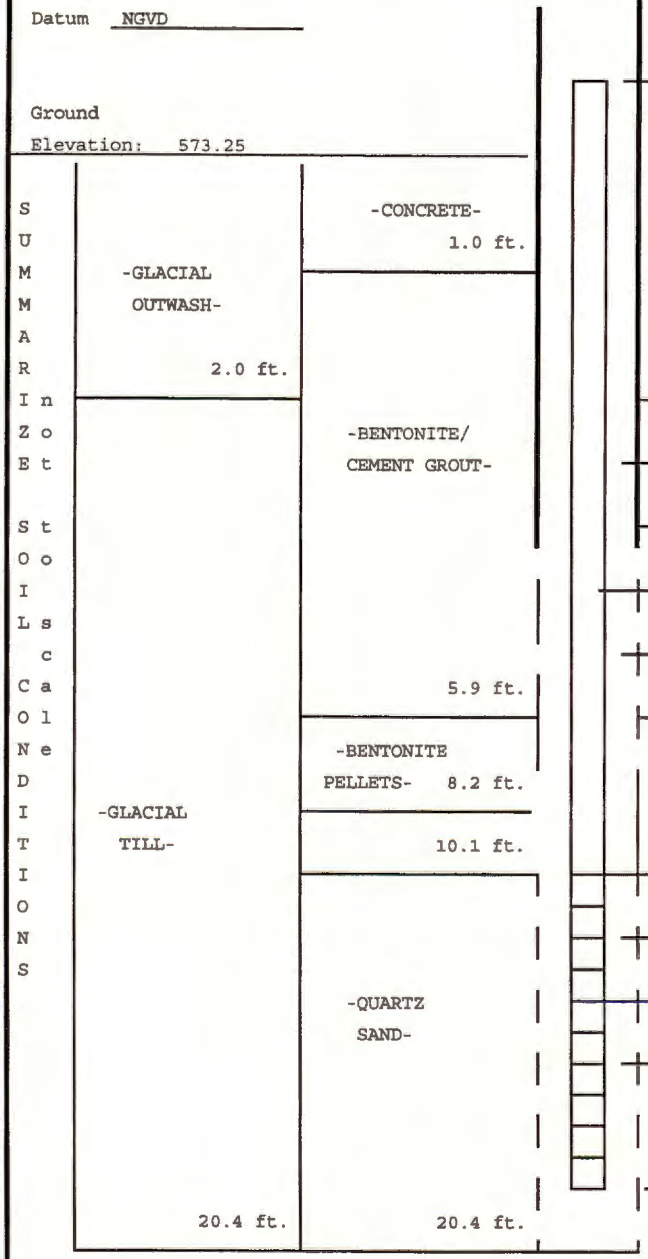
OVERBURDEN GROUNDWATER MONITORING WELL REPORT

PROJECT: WELL INSTALLATION
LOCATION: SCOTTSVILLE, NEW YORK
CLIENT: COOPERVISION
CONTRACTOR: NOTHNAGLE DRILLING
DRILLER: K. BUSCH
RIG TYPE: CME-75, TRUCK-MOUNT
INSTALLATION DATE: 7 JULY 1997

FILE NO.: 70665-002
WELL NO.: MW-202
LOCATION: SEE PLAN
SHEET: 1 OF 1
INSPECTOR: J. MARSCHNER

Survey Datum NGVD

Ground Elevation: 573.25



Depth below ground surface of protective casing.	0.0 ft.
Depth below ground surface of riser pipe.	0.7 ft.
Thickness of Surface Seal	1.0 ft.
Type of Surface Seal [indicated all seals showing depth, thickness and type]	Concrete
Type of Protective Casing	Roadway Box
Inside Diameter of Protective Casing	8.0 in.
Depth of Bottom of Protective Casing	1.0 ft.
Inside Diameter of Riser Pipe	2.0 in.
Type of Backfill Around Riser	Bentonite/Cement Grout
Diameter of Borehole	8.0 in. +/-
Type of coupling (threaded, welded, etc.)	Threaded
Depth of Bottom of Riser	10.1 ft.
Type of Wellscreen	PVC
Screen Slot Size	0.010 in.
Diameter of Wellscreen	2.0 in.
Type of Backfill Around Wellscreen	Quartz Sand
Depth of Bottom of Wellscreen	20.3 ft.
Depth of Bottom of Borehole	20.4 ft.

Remarks:

Well No. MW-202

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B-203

PROJECT:	WELL INSTALLATION	FILE NO.	70665-002
CLIENT:	COOPERVISION, SCOTTSVILLE, NEW YORK	SHEET NO.	1 OF 1
CONTRACTOR:	NOTHNAGLE DRILLING COMPANY	LOCATION:	See Plan

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Augers	SS	--
INSIDE DIAMETER (IN)	4-1/4	1-3/8	--
HAMMER WEIGHT (LB)	--	140	--
HAMMER FALL (IN)	--	30	--

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME-75, Truck Mount
BIT TYPE: --
DRILL MUD: --
OTHER: --

ELEVATION:
DATUM:
START: 8 July 1997
FINISH: 8 July 1997
DRILLER: K. Busch
H&A REP: J. Marschner

DEPTH (FT)	MICRO-TIP READING	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
					0.8	-ASPHALT & SUBBASE-
	ND	15 35	S1 6"/14"	0.8 2.0	1.5	Medium dense brown SILT, trace gravel and sand, moist. -GLACIAL OUTWASH-
	ND	49 100/.5	S2 10"/12"	2.0 3.0		Dense brown gravelly SAND, trace silt, dry. Same. -GLACIAL OUTWASH-
5	ND	8 18 37 37	S3 10"/24"	4.0 6.0	5.7	Medium dense brown SAND, trace gravel and silt, wet.
	ND	13 29 57 32	S4 22"/24"	6.0 8.0		Dense brown SILT, trace gravel and sand, moist. -GLACIAL TILL- Very dense brown SILT, trace gravel and fine sand, moist.
	ND	51 75 80 100/.4	S5 12"/23"	8.0 9.9		Same.
10	ND	87 100/.5	S6 8"/12"	10.0 11.0		Same.
	ND	60 100/.3	S7 6"/9"	12.0 12.8		Same.
15	ND	62 100/.5	S8 8"/12"	14.0 15.0		Same, except damp. -GLACIAL TILL-
	ND	100/.4	S9 5"/5"	16.0 16.4		Same.
	ND	100/.4	S10 5"/5"	18.0 18.4		Same. -GLACIAL TILL-
20						Bottom of Boring at 20.0 ft.
25						

Notes:

1. Each sample screened using Photovac Microtip 2020 for organic vapor concentrations.
2. ND = Not Dectected.
3. Installation monitoring well in completed borehole. See Groundwater Monitoring Well Installation Report.

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	BOTTOM OF HOLE	WATER

SAMPLE IDENTIFICATION

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon

SUMMARY

OVERBURDEN (LIN FT):	20.0
ROCK CORED (LIN FT):	--
SAMPLES:	10S
BORING NO.	B-203

H&A OF NEW YORK
CONSULTING GEOTECHNICAL ENGINEERS
GEOLOGISTS AND HYDROGEOLOGISTS

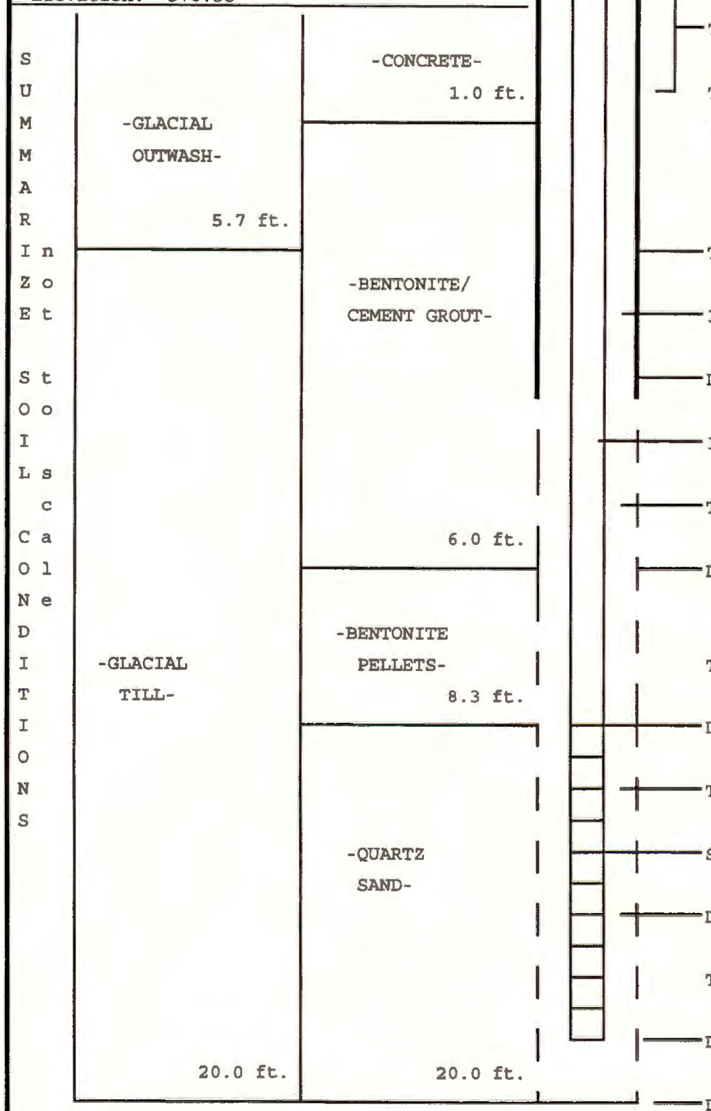
OVERBURDEN GROUNDWATER MONITORING WELL REPORT

PROJECT: WELL INSTALLATION
LOCATION: SCOTTSVILLE, NEW YORK
CLIENT: COOPERVISION
CONTRACTOR: NOTHNAGLE DRILLING
DRILLER: K. BUSCH RIG TYPE: CME-75, TRUCK-MOUNT
INSTALLATION DATE: 8 JULY 1997

FILE NO.: 70665-002
WELL NO.: MW-203
LOCATION: SEE PLAN
SHEET: 1 OF 1
INSPECTOR: J. MARSCHNER

Survey Datum NGVD

Ground Elevation: 576.35



Depth below ground surface of protective casing.	0.0 ft.
Depth below ground surface of riser pipe.	0.5 ft.
Thickness of Surface Seal	12.0 ft.
Type of Surface Seal [indicated all seals showing depth, thickness and type]	Concrete
Type of Protective Casing	Roadway Box
Inside Diameter of Protective Casing	8.0 in.
Depth of Bottom of Protective Casing	1.0 ft.
Inside Diameter of Riser Pipe	2.0 in.
Type of Backfill Around Riser	Bentonite/Cement Grout
Diameter of Borehole	8.0 in. +/-
Type of coupling (threaded, welded, etc.)	Threaded
Depth of Bottom of Riser	9.8 ft.
Type of Wellscreen	PVC
Screen Slot Size	0.010 in.
Diameter of Wellscreen	2.0 in.
Type of Backfill Around Wellscreen	Quartz Sand
Depth of Bottom of Wellscreen	20.0 ft.
Depth of Bottom of Borehole	20.0 ft.

Remarks:

Well No. MW-203

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B-204

PROJECT: WELL INSTALLATION
CLIENT: COOPERVISION, SCOTTSVILLE, NEW YORK
CONTRACTOR: NOTHNAGLE DRILLING COMPANY

FILE NO. 70665-002
SHEET NO. 1 OF 1
LOCATION: See Plan

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Augers	SS	--
INSIDE DIAMETER (IN)	4-1/4	1-3/8	--
HAMMER WEIGHT (LB)	--	140	--
HAMMER FALL (IN)	--	30	--

DRILLING EQUIPMENT & PROCEDURES

RIG TYPE: CME-75, Truck Mount
BIT TYPE: --
DRILL MUD: --
OTHER: --

ELEVATION:
DATUM:
START: 8 July 1997
FINISH: 8 July 1997
DRILLER: K. Busch
H&A REP: J. Marschner

DEPTH (FT)	MICRO-TIP READING	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	ND	23 30 45 37	S1 8"/24"	0.0 2.0		Very dense brown SILT, trace gravel and fine sand, dry. -GLACIAL OUTWASH-
	ND	16 14 11 12	S2 18"/24"	2.0 4.0	3.4 4.0	Medium dense brown SILT, trace gravel and fine sand, dry. Medium dense brown medium to fine SAND, trace silt and gravel, dry. -GLACIAL OUTWASH-
5	ND	6 8 17 16	S3 14"/24"	4.0 6.0		Medium dense brown gravelly SAND, trace silt, damp. -GLACIAL OUTWASH-
	ND	26 35 20 26	S4 16"/24"	6.0 8.0		Same. Same, except very dense.
10	ND	6 10 18 30	S5 20"/24"	8.0 10.0	8.7	Medium dense brown SILT, trace fine sand and gravel, moist. -GLACIAL TILL-
	ND	34 53 100/.5	S6 16"/18"	10.0 11.5		Same, except very dense. Same.
	ND	34 34 37 51	S7 22"/24"	12.0 14.0	12.8 14.0	Very dense brown sandy SILT, trace gravel, wet.
15	ND	43 61 61 73	S8 18"/24"	14.0 16.0		Very dense brown SILT, trace sand and gravel, wet. -GLACIAL TILL-
	ND	23 64 75 67	S9 23"/24"	16.0 18.0		Same.
20	ND	42 50 49 51	S10 18"/24"	18.0 20.0		Same. -GLACIAL TILL-
25						Bottom of Boring at 20.0 ft.

Notes:

1. Each sample screened using Photovac Microtip 2020 for organic vapor concentrations.
2. ND = Not Dectected.
3. Installation monitoring well in completed borehole. See Groundwater Monitoring Well Installation Report.

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon

SUMMARY

OVERBURDEN (LIN FT):	20.0
ROCK CORED (LIN FT):	--
SAMPLES:	10S
BORING NO.	B-204

H&A OF NEW YORK
CONSULTING GEOTECHNICAL ENGINEERS
GEOLOGISTS AND HYDROGEOLOGISTS

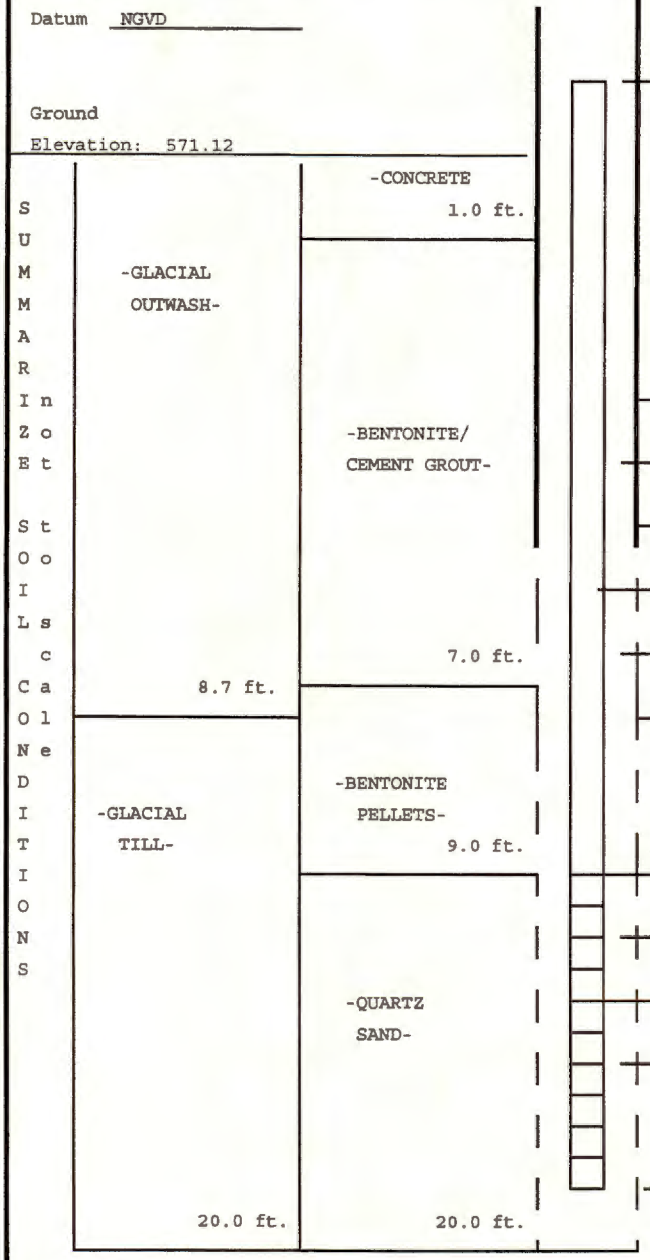
OVERBURDEN GROUNDWATER MONITORING WELL REPORT

PROJECT: WELL INSTALLATION
LOCATION: SCOTTSVILLE, NEW YORK
CLIENT: COOPERVISION
CONTRACTOR: NOTHNAGLE DRILLING
DRILLER: K. BUSCH
RIG TYPE: CME-75, TRUCK-MOUNT
INSTALLATION DATE: 8 JULY 1997

FILE NO.: 70665-002
WELL NO.: MW-204
LOCATION: SEE PLAN
SHEET: 1 OF 1
INSPECTOR: J. MARSCHNER

Survey Datum NGVD

Ground Elevation: 571.12



Depth below ground surface of protective casing. 0.0 ft.
Depth below ground surface of riser pipe. 0.5 ft.
Thickness of Surface Seal 1.0 ft.
Type of Surface Seal [indicated all seals showing depth, thickness and type] Concrete
Type of Protective Casing Roadway Box
Inside Diameter of Protective Casing 8.0 in.
Depth of Bottom of Protective Casing 1.0 ft.
Inside Diameter of Riser Pipe 2.0 in.
Type of Backfill Around Riser Bentonite/Cement Grout
Diameter of Borehole 8.0 in. +/-
Type of coupling (threaded, welded, etc.) Threaded
Depth of Bottom of Riser 9.8 ft.
Type of Wellscreen PVC
Screen Slot Size 0.010 in.
Diameter of Wellscreen 2.0 in.
Type of Backfill Around Wellscreen Quartz Sand
Depth of Bottom of Wellscreen 20.0 ft.
Depth of Bottom of Borehole 20.0 ft.

Remarks:

Well No. MW-204

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B-205

PROJECT: WELL INSTALLATION
CLIENT: COOPER VISION, SCOTTSVILLE, NEW YORK
CONTRACTOR: NOTHNAGLE DRILLING COMPANY

FILE NO. 70665-002
SHEET NO. 1 OF 2
LOCATION: See Plan

ITEM	CASING	DRIVE SAMPLER	CORE BARREL
TYPE	Augers	SS	--
INSIDE DIAMETER (IN)	4-1/4	1-3/8	--
HAMMER WEIGHT (LB)	--	140	--
HAMMER FALL (IN)	--	30	--

DRILLING EQUIPMENT & PROCEDURES
RIG TYPE: CME-75, Truck Mount
BIT TYPE: --
DRILL MUD: --
OTHER: --

ELEVATION:
DATUM:
START: 9 July 1997
FINISH: 9 July 1997
DRILLER: K. Busch
H&A REP: J. Marschner

DEPTH (FT)	MICRO-TIP READING	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	ND	5 6 10 8	S1 4"/24"	0.0 2.0		Medium dense brown SILT, trace gravel and fine sand, moist. -GLACIAL OUTWASH-
	ND	9 7 17 19	S2 12"/24"	2.0 4.0	4.0	Same.
5	ND	9 21 41 91	S3 20"/24"	4.0 6.0		Very dense brown SILT, little fine sand, trace gravel, moist. -GLACIAL TILL-
	ND	71 100/.5	S4 12"/12"	6.0 7.0		Same.
	134	37 100/.5	S5 10"/12"	8.0 9.0		Same, except sweet odor.
10	124	11 100/.5	S6 12"/12"	10.0 11.0	12.0	Same, except sweet odor.
	245	42 100/.3	S7 8"/8"	12.0 12.8		Same, except gray-brown and sweet odor.
15	149	54 100/.3	S8 8"/8"	14.0 14.8		Same, except wet. -GLACIAL TILL-
	57	61 87 77 100/.4	S9 22"/22"	16.0 17.9		Same, except wet.
20	19	41 100/.5	S10 12"/12"	19.5 20.5		Same, except wet.
	ND	100/.5	S11 6"/6"	22.0 22.5		Same, except wet.
25	ND	78 100/.4	S12 11"/11"	24.0 24.9		Same, except wet.

WATER LEVEL DATA

DATE	TIME	ELAPSED TIME (HR)	DEPTH (FT) TO: BOTTOM OF CASING	DEPTH (FT) TO: BOTTOM OF HOLE	DEPTH (FT) TO: WATER

SAMPLE IDENTIFICATION

O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon

SUMMARY

OVERBURDEN (LIN FT):	28.0
ROCK CORED (LIN FT):	--
SAMPLES:	13S
BORING NO.	B-205

H&A OF NEW YORK, ROCHESTER, NEW YORK Consulting Geotechnical Engineers, Geologists and Hydrogeologists	TEST BORING REPORT	BORING NO. B-205 FILE NO. 70665-002 SHEET NO. 2 OF 2

DEPTH (FT)	MICRO-TIP READING	SAMPLER BLOWS PER 6 IN	SAMPLE NUMBER & RECOVERY	SAMPLE DEPTH (FT)	STRATA CHANGE (FT)	VISUAL CLASSIFICATION AND REMARKS
	ND	65 81 65 90	S13 18"/24"	26.0 28.0		Same, except wet. -GLACIAL TILL-
						Bottom of Boring at 28.0 ft.
30						
35						
40						
45						
50						
55						
60						

H&A OF NEW YORK
CONSULTING GEOTECHNICAL ENGINEERS
GEOLOGISTS AND HYDROGEOLOGISTS

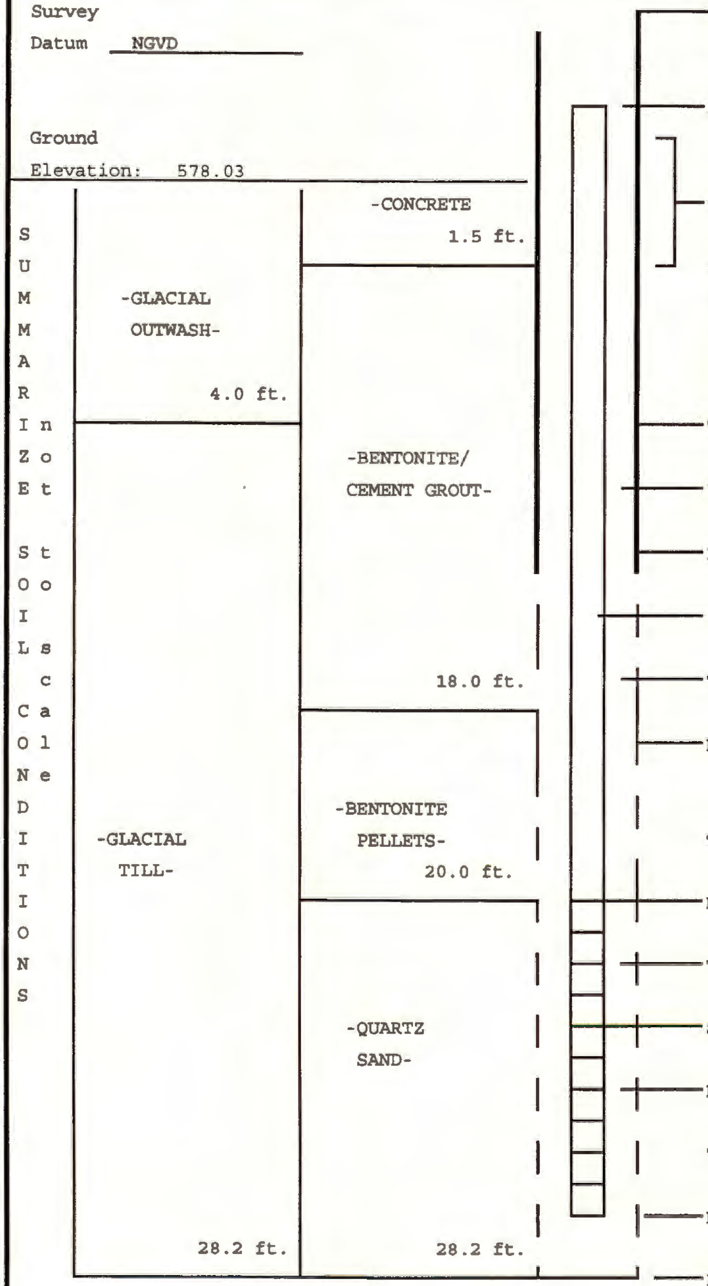
OVERBURDEN GROUNDWATER MONITORING WELL REPORT

PROJECT: WELL INSTALLATION
LOCATION: SCOTTSVILLE, NEW YORK
CLIENT: COOPERVISION
CONTRACTOR: NOTHNAGLE DRILLING
DRILLER: K. BUSCH
RIG TYPE: CME-75, TRUCK-MOUNT
INSTALLATION DATE: 8 JULY 1997

FILE NO.: 70665-002
WELL NO.: MW-205
LOCATION: SEE PLAN
SHEET: 1 OF 1
INSPECTOR: J. MARSCHNER

Survey Datum NGVD

Ground Elevation: 578.03



Depth below ground surface of protective casing.	0.0 ft.
Depth below ground surface of riser pipe.	0.5 ft.
Thickness of Surface Seal	1.5 ft.
Type of Surface Seal [indicated all seals showing depth, thickness and type]	Concrete
Type of Protective Casing	Roadway Box
Inside Diameter of Protective Casing	8.0 in.
Depth of Bottom of Protective Casing	19.4 ft.
Inside Diameter of Riser Pipe	2.0 in.
Type of Backfill Around Riser	Bentonite/Cement Grout
Diameter of Borehole	8.0 in. +/-
Type of coupling (threaded, welded, etc.)	Threaded
Depth of Bottom of Riser	21.2 ft.
Type of Wellscreen	PVC
Screen Slot Size	0.010 in.
Diameter of Wellscreen	2.0 in.
Type of Backfill Around Wellscreen	Quartz Sand
Depth of Bottom of Wellscreen	28.0 ft.
Depth of Bottom of Borehole	28.2 ft.

Remarks:

Well No. MW-205

LABELLA ASSOCIATES, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	PROJECT COOPERVISION 711 NORTH ROAD SCOTTSVILLE, NEW YORK	BORING # MW-1 SHEET 1 OF 1 JOB # 97076 CHKD. BY DP

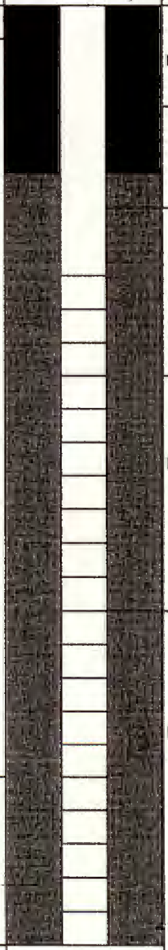
CONTRACTOR Marcor Environmental
DRILLER Paul Willey
LABELLA REPRESENTATIVE Dennis Peck

BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 4/11/97 END DATE 4/11/97

TYPE OF DRILL RIG Geo-Probe
AUGER SIZE AND TYPE NA
OVERBURDEN SAMPLING METHOD Macro-core
ROCK DRILLING METHOD NA

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS



DEPTH	SAMPLE BLOW / 6"	NO.	DEPTH (FT.)	N-VALUE /RQD(%)	RECOVERY (INCHES)	SAMPLE DESCRIPTION	EQUIPMENT INSTALLATION LOG	MOISTURE	PID	NOTES
						brown top soil and organics				
1						Dark brown Sandy SILT, little coarse Sand, trace Gravel		moist	0	
2										
3										
4									0	
5										
6						. . . very compact, sweet odor				
7								moist	8	
8										
9										
10										
11								moist/wet	18	
12						Gray SILT, little Gravel, very compact				
13									3	
14									0	
						Boring terminated at 14'				
15										
16										

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Set 1" ID PVC tempoary well point, screened from 4'-14', sand pack 2.5'-14', granular bentonite 0'-2.5'

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

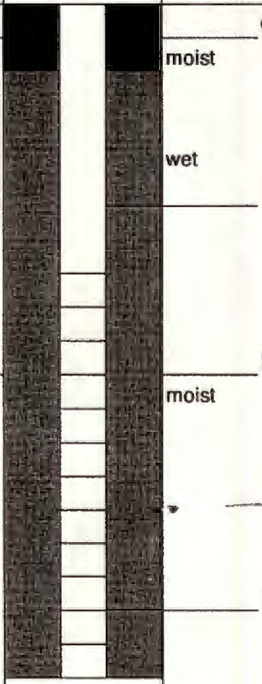
LABELLA ASSOCIATES, P.C. 300 STATE STREET, ROCHESTER, NEW YORK ENVIRONMENTAL ENGINEERING CONSULTANTS	PROJECT COOPERVISION 711 NORTH ROAD SCOTTSVILLE, NEW YORK	BORING # MW-2 SHEET 1 OF 1 JOB # 97076 CHKD. BY DP

CONTRACTOR	Marcor Environmental	BORING LOCATION	
DRILLER	Paul Willey	GROUND SURFACE ELEVATION	DATUM
LABELLA REPRESENTATIVE	Dennis Peck	START DATE 4/11/97	END DATE 4/11/97

TYPE OF DRILL RIG	Geo-Probe
AUGER SIZE AND TYPE	NA
OVERBURDEN SAMPLING METHOD	Macro-core
ROCK DRILLING METHOD	NA

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS



DEPTH	SAMPLE BLOW / 6"	SAMPLE NO.	SAMPLE DEPTH (FT.)	SAMPLE N-VALUE /RQD(%)	SAMPLE RECOVERY (INCHES)	SAMPLE DESCRIPTION	EQUIPMENT INSTALLATION LOG	MOISTURE	PID	NOTES
						brown top soil and organics				
1								moist	0	
						SAND and GRAVEL (Fill)				
2										
								wet		
3										
4									0	
5										
6						light brown Sandy SILT, little Gravel, very compact		moist	0	
7										
8										
9										
10										
11								moist	0.2	
12										
						Boring terminated at 12', caved in to 10'				
13										
14										
15										
16										

LEGEND	NOTES:
S - SPLIT SPOON SOIL SAMPLE	Set 1" ID PVC tempoary well point, screened from 2-10", sand pack 1'-10', granular bentonite 0'-1'
U - UNDISTURBED SOIL SAMPLE	Boring caved in to 10' and well had to be set at this depth
C - ROCK CORE SAMPLE	Boring situated adjacent to new electrical service trench, causing wet conditions

GENERAL NOTES:

1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.

2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

LABELLA ASSOCIATES, P.C.
300 STATE STREET, ROCHESTER, NEW YORK

ENVIRONMENTAL ENGINNEERING CONSULTANTS

PROJECT
COOPERVISION
711 NORTH ROAD
SCOTTSVILLE, NEW YORK

BORING # MW-3
SHEET 1 OF 1
JOB # 97076
CHKD. BY DP

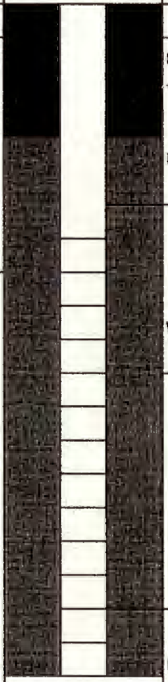
CONTRACTOR Marcor Environmental
DRILLER Paul Willey
LABELLA REPRESENTATIVE Dennis Peck

BORING LOCATION
GROUND SURFACE ELEVATION DATUM
START DATE 4/11/97 END DATE 4/11/97

TYPE OF DRILL RIG Geo-Probe
AUGER SIZE AND TYPE NA
OVERBURDEN SAMPLING METHOD Macro-core
ROCK DRILLING METHOD NA

WATER LEVEL DATA

DATE	TIME	WATER	CASING	REMARKS

DEPTH	SAMPLE BLOW / 6"	NO.	DEPTH (FT.)	N-VALUE /RQD(%)	RECOVERY (INCHES)	SAMPLE DESCRIPTION	EQUIPMENT INSTALLATION LOG	MOISTURE		PID	NOTES
						Asphalt, crushed stone			Granular bentonite seal 0-2'		
1								moist		0	
						SAND and GRAVEL (Fill)					
2											
								moist			
3									3/4" PVC riser		
4										0	
						light brown Sandy SILT, little Gravel, very compact					
5								wet 4.5-5.5'			
									Sand pack 2-10'		
6										0	
7											
8											
9									3/4" PVC well screen		
10								moist			
11										0.2	
12											
13								moist			
14											
						Boring terminated at 14', caved in to 10'					
15											
16											

LEGEND
S - SPLIT SPOON SOIL SAMPLE
U - UNDISTURBED SOIL SAMPLE
C - ROCK CORE SAMPLE

NOTES:
Set 3/4" ID PVC tempoary well point, screened from 3-10", sand pack 2'-10', granular bentonite 0'-2'
Boring caved in to 10' and well had to be set at this depth

GENERAL NOTES:
1) STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARY BETWEEN SOIL TYPES, TRANSITIONS MAY BE GRADUAL.
2) WATER LEVEL READINGS HAVE BEEN MADE AT TIMES AND UNDER CONDITIONS STATED, FLUCTUATIONS OF GROUNDWATER MAY OCCUR DUE TO OTHER FACTORS THAN THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE

LBA
BORING # MW-3

APPENDIX C

Laboratory Reports

HALEY &
ALDRICH

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	Haley & Aldrich of New York	**Lab Project No.:**	GE7054
Client Job Site:	New Well Sampling	**Lab Sample No.:**	18797
Client Job No.:	70665-002	**Sample Type:**	Water
Field Location:	MW-201	**Date Sampled:**	07/10/97
		Date Received:	07/10/97
Field ID No.:	N/A	**Date Analyzed:**	07/11/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 2.0	Benzene	ND< 2.0
Bromomethane	ND< 2.0	Chlorobenzene	ND< 2.0
Bromoform	ND< 2.0	Ethylbenzene	ND< 2.0
Carbon tetrachloride	ND< 2.0	Toluene	ND< 2.0
Chloroethane	ND< 2.0	m,p - Xylene	ND< 2.0
Chloromethane	ND< 2.0	o - Xylene	ND< 2.0
2-Chloroethyl vinyl ether	ND< 2.0	Styrene	ND< 2.0
Chloroform	ND< 2.0		
Dibromochloromethane	ND< 2.0		
1,1-Dichloroethane	ND< 2.0		
1,2-Dichloroethane	ND< 2.0		
1,1-Dichloroethene	ND< 2.0	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 2.0	Acetone	ND< 10.0
1,2-Dichloropropane	ND< 2.0	Vinyl acetate	ND< 5.0
cis-1,3-Dichloropropene	ND< 2.0	2-Butanone	ND< 5.0
trans-1,3-Dichloropropene	ND< 2.0	4-Methyl-2-pentanone	ND< 5.0
Methylene chloride	ND< 5.0	2-Hexanone	ND< 5.0
1,1,2,2-Tetrachloroethane	ND< 2.0	Carbon disulfide	ND< 2.0
Tetrachloroethene	ND< 2.0		
1,1,1-Trichloroethane	ND< 2.0		
1,1,2-Trichloroethane	ND< 2.0		
Trichloroethene	ND< 2.0		
Vinyl Chloride	ND< 2.0		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ______________________
Laboratory Director

GE7054V1.XLS

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	Haley & Aldrich of New York	**Lab Project No.:**	GE7054
Client Job Site:	New Well Sampling	**Lab Sample No.:**	18798
Client Job No.:	70665-002	**Sample Type:**	Water
Field Location:	MW-202	**Date Sampled:**	07/10/97
		Date Received:	07/10/97
Field ID No.:	N/A	**Date Analyzed:**	07/11/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 2.0	Benzene	ND< 2.0
Bromomethane	ND< 2.0	Chlorobenzene	ND< 2.0
Bromoform	ND< 2.0	Ethylbenzene	ND< 2.0
Carbon tetrachloride	ND< 2.0	Toluene	ND< 2.0
Chloroethane	ND< 2.0	m,p - Xylene	ND< 2.0
Chloromethane	ND< 2.0	o - Xylene	ND< 2.0
2-Chloroethyl vinyl ether	ND< 2.0	Styrene	ND< 2.0
Chloroform	ND< 2.0		
Dibromochloromethane	ND< 2.0		
1,1-Dichloroethane	8.4		
1,2-Dichloroethane	ND< 2.0		
1,1-Dichloroethene	17.9	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 2.0	Acetone	26.5
1,2-Dichloropropane	ND< 2.0	Vinyl acetate	ND< 5.0
cis-1,3-Dichloropropene	ND< 2.0	2-Butanone	ND< 5.0
trans-1,3-Dichloropropene	ND< 2.0	4-Methyl-2-pentanone	ND< 5.0
Methylene chloride	ND< 5.0	2-Hexanone	ND< 5.0
1,1,2,2-Tetrachloroethane	ND< 2.0	Carbon disulfide	ND< 2.0
Tetrachloroethene	ND< 2.0		
1,1,1-Trichloroethane	61.3		
1,1,2-Trichloroethane	ND< 2.0		
Trichloroethene	8.0		
Vinyl Chloride	ND< 2.0		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ______________________
Laboratory Director

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	Haley & Aldrich of New York	Lab Project No.:	GE7054
Client Job Site:	New Well Sampling	Lab Sample No.:	18799
Client Job No.:	70665-002	Sample Type:	Water
Field Location:	MW-203	Date Sampled:	07/10/97
		Date Received:	07/10/97
Field ID No.:	N/A	Date Analyzed:	07/11/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 2.0	Benzene	ND< 2.0
Bromomethane	ND< 2.0	Chlorobenzene	ND< 2.0
Bromoform	ND< 2.0	Ethylbenzene	ND< 2.0
Carbon tetrachloride	ND< 2.0	Toluene	ND< 2.0
Chloroethane	ND< 2.0	m,p - Xylene	ND< 2.0
Chloromethane	ND< 2.0	o - Xylene	ND< 2.0
2-Chloroethyl vinyl ether	ND< 2.0	Styrene	ND< 2.0
Chloroform	ND< 2.0		
Dibromochloromethane	ND< 2.0		
1,1-Dichloroethane	ND< 2.0		
1,2-Dichloroethane	ND< 2.0		
1,1-Dichloroethene	ND< 2.0	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 2.0	Acetone	118.0
1,2-Dichloropropane	ND< 2.0	Vinyl acetate	ND< 5.0
cis-1,3-Dichloropropene	ND< 2.0	2-Butanone	ND< 5.0
trans-1,3-Dichloropropene	ND< 2.0	4-Methyl-2-pentanone	ND< 5.0
Methylene chloride	ND< 5.0	2-Hexanone	ND< 5.0
1,1,2,2-Tetrachloroethane	ND< 2.0	Carbon disulfide	ND< 2.0
Tetrachloroethene	ND< 2.0		
1,1,1-Trichloroethane	3.3		
1,1,2-Trichloroethane	ND< 2.0		
Trichloroethene	ND< 2.0		
Vinyl Chloride	ND< 2.0		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By
Laboratory Director

GE7054V3.XLS

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	Haley & Aldrich of New York	**Lab Project No.:**	GE7054
Client Job Site:	New Well Sampling	**Lab Sample No.:**	18800
Client Job No.:	70665-002	**Sample Type:**	Water
Field Location:	MW-204	**Date Sampled:**	07/10/97
		Date Received:	07/10/97
Field ID No.:	N/A	**Date Analyzed:**	07/11/97

VOLATILE HALOCARBONS	RESULTS (ug/L)
Bromodichloromethane	ND< 2.0
Bromomethane	ND< 2.0
Bromoform	ND< 2.0
Carbon tetrachloride	ND< 2.0
Chloroethane	ND< 2.0
Chloromethane	ND< 2.0
2-Chloroethyl vinyl ether	ND< 2.0
Chloroform	ND< 2.0
Dibromochloromethane	ND< 2.0
1,1-Dichloroethane	ND< 2.0
1,2-Dichloroethane	ND< 2.0
1,1-Dichloroethene	ND< 2.0
trans-1,2-Dichloroethene	ND< 2.0
1,2-Dichloropropane	ND< 2.0
cis-1,3-Dichloropropene	ND< 2.0
trans-1,3-Dichloropropene	ND< 2.0
Methylene chloride	ND< 5.0
1,1,2,2-Tetrachloroethane	ND< 2.0
Tetrachloroethene	ND< 2.0
1,1,1-Trichloroethane	2.7
1,1,2-Trichloroethane	ND< 2.0
Trichloroethene	ND< 2.0
Vinyl Chloride	ND< 2.0

VOLATILE AROMATICS	RESULTS (ug/L)
Benzene	ND< 2.0
Chlorobenzene	ND< 2.0
Ethylbenzene	ND< 2.0
Toluene	ND< 2.0
m,p - Xylene	ND< 2.0
o - Xylene	ND< 2.0
Styrene	ND< 2.0
Ketones & Misc.	
Acetone	14.5
Vinyl acetate	ND< 5.0
2-Butanone	ND< 5.0
4-Methyl-2-pentanone	ND< 5.0
2-Hexanone	ND< 5.0
Carbon disulfide	ND< 2.0

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ______________________
Laboratory Director

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	Haley & Aldrich of New York	**Lab Project No.:**	GE7054
Client Job Site:	New Well Sampling	**Lab Sample No.:**	18802
Client Job No.:	70665-002	**Sample Type:**	Water
Field Location:	MW-205	**Date Sampled:**	07/10/97
		Date Received:	07/10/97
Field ID No.:	N/A	**Date Analyzed:**	07/15/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 10000	Benzene	ND< 10000
Bromomethane	ND< 10000	Chlorobenzene	ND< 10000
Bromoform	ND< 10000	Ethylbenzene	ND< 10000
Carbon tetrachloride	ND< 10000	Toluene	ND< 10000
Chloroethane	ND< 10000	m,p - Xylene	ND< 10000
Chloromethane	ND< 10000	o - Xylene	ND< 10000
2-Chloroethyl vinyl ether	ND< 10000	Styrene	ND< 10000
Chloroform	ND< 10000		
Dibromochloromethane	ND< 10000		
1,1-Dichloroethane	153107		
1,2-Dichloroethane	ND< 10000		
1,1-Dichloroethene	ND< 10000	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 10000	Acetone	ND< 50000
1,2-Dichloropropane	ND< 10000	Vinyl acetate	ND< 25000
cis-1,3-Dichloropropene	ND< 10000	2-Butanone	ND< 25000
trans-1,3-Dichloropropene	ND< 10000	4-Methyl-2-pentanone	ND< 25000
Methylene chloride	ND< 25000	2-Hexanone	ND< 25000
1,1,2,2-Tetrachloroethane	ND< 10000	Carbon disulfide	ND< 10000
Tetrachloroethene	ND< 10000		
1,1,1-Trichloroethane	420812		
1,1,2-Trichloroethane	ND< 10000		
Trichloroethene	ND< 10000		
Vinyl Chloride	ND< 10000		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ______________________
Laboratory Director

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	Haley & Aldrich of New York	**Lab Project No.:**	GE7054
Client Job Site:	New Well Sampling	**Lab Sample No.:**	18801
Client Job No.:	70665-002	**Sample Type:**	Water
Field Location:	Trip Blank	**Date Sampled:**	07/10/97
		Date Received:	07/10/97
Field ID No.:	N/A	**Date Analyzed:**	07/11/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 2.0	Benzene	ND< 2.0
Bromomethane	ND< 2.0	Chlorobenzene	ND< 2.0
Bromoform	ND< 2.0	Ethylbenzene	ND< 2.0
Carbon tetrachloride	ND< 2.0	Toluene	ND< 2.0
Chloroethane	ND< 2.0	m,p - Xylene	ND< 2.0
Chloromethane	ND< 2.0	o - Xylene	ND< 2.0
2-Chloroethyl vinyl ether	ND< 2.0	Styrene	ND< 2.0
Chloroform	ND< 2.0		
Dibromochloromethane	ND< 2.0		
1,1-Dichloroethane	ND< 2.0		
1,2-Dichloroethane	ND< 2.0		
1,1-Dichloroethene	ND< 2.0	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 2.0	Acetone	ND< 10.0
1,2-Dichloropropane	ND< 2.0	Vinyl acetate	ND< 5.0
cis-1,3-Dichloropropene	ND< 2.0	2-Butanone	ND< 5.0
trans-1,3-Dichloropropene	ND< 2.0	4-Methyl-2-pentanone	ND< 5.0
Methylene chloride	ND< 5.0	2-Hexanone	ND< 5.0
1,1,2,2-Tetrachloroethane	ND< 2.0	Carbon disulfide	ND< 2.0
Tetrachloroethene	ND< 2.0		
1,1,1-Trichloroethane	ND< 2.0		
1,1,2-Trichloroethane	ND< 2.0		
Trichloroethene	ND< 2.0		
Vinyl Chloride	ND< 2.0		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By Bru Hoof
Laboratory Director

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	Haley & Aldrich of New York	**Lab Project No.:**	GE7054
Client Job Site:	New Well Sampling	**Lab Sample No.:**	N/A
Client Job No.:	70665-002	**Sample Type:**	VOA Water Blank
Field Location:	N/A	**Date Sampled:**	N/A
		Date Received:	N/A
Field ID No.:	N/A	**Date Analyzed:**	7/11 & 14/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 2.0	Benzene	ND< 2.0
Bromomethane	ND< 2.0	Chlorobenzene	ND< 2.0
Bromoform	ND< 2.0	Ethylbenzene	ND< 2.0
Carbon tetrachloride	ND< 2.0	Toluene	ND< 2.0
Chloroethane	ND< 2.0	m,p - Xylene	ND< 2.0
Chloromethane	ND< 2.0	o - Xylene	ND< 2.0
2-Chloroethyl vinyl ether	ND< 2.0	Styrene	ND< 2.0
Chloroform	ND< 2.0		
Dibromochloromethane	ND< 2.0		
1,1-Dichloroethane	ND< 2.0		
1,2-Dichloroethane	ND< 2.0		
1,1-Dichloroethene	ND< 2.0	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 2.0	Acetone	ND< 10.0
1,2-Dichloropropane	ND< 2.0	Vinyl acetate	ND< 5.0
cis-1,3-Dichloropropene	ND< 2.0	2-Butanone	ND< 5.0
trans-1,3-Dichloropropene	ND< 2.0	4-Methyl-2-pentanone	ND< 5.0
Methylene chloride	ND< 5.0	2-Hexanone	ND< 5.0
1,1,2,2-Tetrachloroethane	ND< 2.0	Carbon disulfide	ND< 2.0
Tetrachloroethene	ND< 2.0		
1,1,1-Trichloroethane	ND< 2.0		
1,1,2-Trichloroethane	ND< 2.0		
Trichloroethene	ND< 2.0		
Vinyl Chloride	ND< 2.0		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By

Laboratory Director

VOLATILES
SURROGATE RECOVERY SUMMARY FORM

Water Method

			Percent Recovery		
Lab Sample ID	Field Location		Toluene d-8	BFB	1,2-DCE-d4
Blank 7/11/97	N/A		104	96	112
Blank 7/14/97	N/A		105	103	111
LCS	N/A		101	99	109
LCSD	N/A		113	101	109
18797	MW-201		105	97	108
18797MS	MW-201		99	103	108
18797MSD	MW-201		95	100	107
18798	MW-202		100	96	105
18799	MW-203		104	94	109
18800	MW-204		102	99	111
18801	Trip Blank		103	107	98
18802	MW-205		99	97	108

Surrogate Recovery Windows	Toluene-d8	88-110%
EPA SW-846 8240	BFB	86-115%
	1,2-DCE-d4	76-114%

PARADIGM

ENVIRONMENTAL

SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

VOLATILES
LABORATORY CONTROL SAMPLE RECOVERY SUMMARY FORM
Water Method

		Percent Recovery				
Lab Sample ID	Field Location	1,1-Dichloro ethene	Trichloro ethene	Benzene	Toluene	Chloro benzene
LCS	N/A	103	94	100	93	100
LCS Dup	N/A	112	99	106	108	106
18797MS	MW-201	101	99	105	96	106
18797MSD	MW-201	97	94	101	91	101

	VOLATILE	{CLP SOW}	{SW846}
LCS Recovery	1,1-Dichloroethene	61-145%	D-234%
Windows	Trichloroethene	71-120%	71-157%
CLP SOW OLM01.0	Benzene	76-127%	37-151%
SW-846 8240	Toluene	76-125%	47-150%
	Chlorobenzene	75-130%	37-160%

PARADIGM
ENVIRONMENTAL
SERVICES, INC.
179 Lake Avenue
Rochester, NY 14608
(716) 647-2530 • (800) 724-1997
FAX (716) 647-3311

CHAIN OF CUSTODY

REPORT TO:		INVOICE TO:		LAB PROJECT #
COMPANY Haley and Aldrich		COMPANY		GE7054
ADDRESS 189 North Water Street		ADDRESS		
CITY Rochester	STATE NY ZIP 14604	CITY	STATE ZIP	P.O. #
ATT. Vince Dick	PHONE# 327-5507	ATT.	PHONE#	
	FAX# 232-6768	FAX#		☐ ADDENDUM

PROJECT NAME/SITE NAME: NEW WELL SAMPLING

PROJECT #: 70665-002

COMMENTS:

TURN AROUND TIME (WORKING DAYS) ☐ ONE ☐ THREE ☐ FIVE(STD) ☐ OTHER 7/16 Due!

REPRESENTATIVE:

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	REQUESTED ANALYSIS EPA 8240											REMARKS	PARADIGM LAB SAMPLE NUMBER	ANALYTICAL COSTS
1	7/10/97	1402		X	MW-201	GW	2	X											18797	~~18767~~	
2	7/10/97	1510		X	MW-202	GW	2	X											18798	~~18768~~	RR
3	7/10/97	1530		X	MW-203	GW	2	X											18799	~~18769~~	7/11/97
4	7/10/97	1555		X	MW-204	GW	2	X											18800	~~18770~~	
5	7/10/97	0745		X	TRIP BLANK	W	1	X											18801	~~18771~~	
6	7/10/97	1615		X	MW-205	GW	2	X											18802	~~18772~~	
7																					
8																					
9																					
10																			Ref#	57160	
11																			10		
12																					

RELINQUISHED BY:	DATE/TIME 7/10/97 1640	RECEIVED BY:	DATE/TIME 7/10/97 1640	SAMPLE CONDITION	CHECK #	TOTAL COST
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	CARRIER COMPANY	AIR BILL NO.	P.I.F
RELINQUISHED BY:	DATE/TIME	RECEIVED @ LAB BY:	DATE/TIME 7/10/97 1655	CARRIER PHONE #	DATE RESULTS REPORTED BY:	DATE/TIME

WHITE COPY-SAMPLE YELLOW COPY-FILE PINK COPY-RELINQUISHER

PARADIGM
ENVIRONMENTAL
SERVICES, INC. 179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Organic Compound Laboratory Analysis Report For Soil/Sludge

Client:	LaBella Associates	**Lab Project No:**	GE6590
		Lab Sample No:	17495
Client Job Site:	Cooper Vision		
Client Job No:	N/A	**Sample Type:**	Soil
		Date Sampled:	04/11/97
Field Location:	TB-1, 10-12'	**Date Received:**	04/14/97
Field ID No:	N/A	**Date Analyzed:**	04/17/97

VOLATILE HALOCARBONS	RESULTS (ug/Kg)	VOLATILE AROMATICS	RESULTS (ug/Kg)
Bromodichloromethane	ND< 321	Benzene	ND< 321
Bromomethane	ND< 321	Chlorobenzene	ND< 321
Bromoform	ND< 321	Ethylbenzene	ND< 321
Carbon tetrachloride	ND< 321	Toluene	ND< 321
Chloroethane	ND< 321	m,p - Xylene	ND< 321
Chloromethane	ND< 321	o - Xylene	ND< 321
2-Chloroethyl vinyl ether	ND< 321	Styrene	ND< 321
Chloroform	ND< 321		
Dibromochloromethane	ND< 321		
1,1-Dichloroethane	ND< 321		
1,2-Dichloroethane	ND< 321		
1,1-Dichloroethene	ND< 321		
trans-1,2-Dichloroethene	ND< 321	**Ketones & Misc.**	
1,2-Dichloropropane	ND< 321	Acetone	ND< 1284
cis-1,3-Dichloropropene	ND< 321	Vinyl acetate	ND< 642
trans-1,3-Dichloropropene	ND< 321	2-Butanone	ND< 642
Methylene chloride	ND< 321	4-Methyl-2-pentanone	ND< 642
1,1,2,2-Tetrachloroethane	ND< 321	2-Hexanone	ND< 642
Tetrachloroethene	ND< 321	Carbon disulfide	ND< 642
1,1,1-Trichloroethane	1964		
1,1,2-Trichloroethane	ND< 321		
Trichloroethene	ND< 321		
Vinyl Chloride	ND< 321		

Analytical Method: EPA 8240

ELAP ID No: 10958

Comments: ND denotes Not Detected

Approved By ______________________
Laboratory Director

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Organic Compound Laboratory Analysis Report For Soil/Sludge

Client:	LaBella Associates	**Lab Project No:**	GE6590
		Lab Sample No:	17496
Client Job Site:	Cooper Vision	**Sample Type:**	Soil
Client Job No:	N/A	**Date Sampled:**	04/11/97
Field Location:	TB-1 12-14'	**Date Received:**	04/14/97
Field ID No:	N/A	**Date Analyzed:**	04/18/97

VOLATILE HALOCARBONS	RESULTS (ug/Kg)	VOLATILE AROMATICS	RESULTS (ug/Kg)
Bromodichloromethane	ND< 8.6	Benzene	ND< 8.6
Bromomethane	ND< 8.6	Chlorobenzene	ND< 8.6
Bromoform	ND< 8.6	Ethylbenzene	ND< 8.6
Carbon tetrachloride	ND< 8.6	Toluene	ND< 8.6
Chloroethane	ND< 8.6	m,p - Xylene	ND< 8.6
Chloromethane	ND< 8.6	o - Xylene	ND< 8.6
2-Chloroethyl vinyl ether	ND< 8.6	Styrene	ND< 8.6
Chloroform	ND< 8.6		
Dibromochloromethane	ND< 8.6		
1,1-Dichloroethane	353.1		
1,2-Dichloroethane	ND< 8.6		
1,1-Dichloroethene	ND< 8.6		
trans-1,2-Dichloroethene	ND< 8.6	**Ketones & Misc.**	
1,2-Dichloropropane	ND< 8.6	Acetone	65.3
cis-1,3-Dichloropropene	ND< 8.6	Vinyl acetate	ND< 21.5
trans-1,3-Dichloropropene	ND< 8.6	2-Butanone	ND< 21.5
Methylene chloride	ND< 21.5	4-Methyl-2-pentanone	ND< 21.5
1,1,2,2-Tetrachloroethane	ND< 8.6	2-Hexanone	ND< 21.5
Tetrachloroethene	ND< 8.6	Carbon disulfide	ND< 21.5
1,1,1-Trichloroethane	199.2		
1,1,2-Trichloroethane	ND< 8.6		
Trichloroethene	ND< 8.6		
Vinyl Chloride	ND< 8.6		

Analytical Method: EPA 8240

ELAP ID No: 10958

Comments: ND denotes Not Detected

Approved By
Laboratory Director

PARADIGM ENVIRONMENTAL SERVICES, INC.

179 Lake Avenue
Rochester, NY 14608
(716) 647-2530 • (800) 724-1997
FAX (716) 647-3311

1

CHAIN OF COSTODY

REPORT TO:
COMPANY LaBella
ADDRESS 300 State St
CITY Rochester STATE NY ZIP 14614
ATT. Dennis or Greg PHONE# 454-6110
FAX# 454-3066

INVOICE TO:
COMPANY
ADDRESS SAME
CITY STATE ZIP
ATT. PHONE#
FAX#

LAB PROJECT # 8E6590
P.O. #
☐ ADDENDUM

PROJECT NAME/SITE NAME: CooperVision
PROJECT #:
COMMENTS:

TURN AROUND TIME (WORKING DAYS) ☐ ONE ☐ THREE ☒ FIVE(STD) ☐ OTHER
REPRESENTATIVE: Dennis Peck

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	REQUESTED ANALYSIS EPA 8240	REMARKS	PARADIGM LAB SAMPLE NUMBER	ANALYTICAL COSTS
1	4/11/97	10⁰⁰		X	TB-1 10-12'	Soil	1	X	possible hit	17495	
2	4/11/97	1010		X	TB-1 12-14'	Soil	1	X		17496	
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

RELINQUISHED BY: Dennis M Peck DATE/TIME 4/14/97 13:23
RECEIVED BY: DATE/TIME 4/14/97 1:23
RELINQUISHED BY: DATE/TIME
RECEIVED BY: DATE/TIME
RELINQUISHED BY: DATE/TIME
RECEIVED @ LAB BY: DATE/TIME 4/14/97

SAMPLE CONDITION
CARRIER COMPANY
CARRIER PHONE #
CHECK #
AIR BILL NO.
TOTAL COST
P.I.F
DATE RESULTS REPORTED BY: DATE/TIME

WHITE COPY-SAMPLE YELLOW COPY-FILE PINK COPY-RELINQUISHER

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	LaBella Associates	**Lab Project No.:**	GE6603
Client Job Site:	Cooper Vision	**Lab Sample No.:**	17529
Client Job No.:	N/A	**Sample Type:**	Water
Field Location:	MW-1	**Date Sampled:**	04/16/97
		Date Received:	04/16/97
Field ID No.:	N/A	**Date Analyzed:**	04/21/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND < 5000	Benzene	ND < 5000
Bromomethane	ND < 5000	Chlorobenzene	ND < 5000
Bromoform	ND < 5000	Ethylbenzene	ND < 5000
Carbon tetrachloride	ND < 5000	Toluene	ND < 5000
Chloroethane	ND < 5000	m,p - Xylene	ND < 5000
Chloromethane	ND < 5000	o - Xylene	ND < 5000
2-Chloroethyl vinyl ether	ND < 5000	Styrene	ND < 5000
Chloroform	ND < 5000		
Dibromochloromethane	ND < 5000		
1,1-Dichloroethane	35823		
1,2-Dichloroethane	ND < 5000		
1,1-Dichloroethene	12356	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND < 5000	Acetone	ND < 25000
1,2-Dichloropropane	ND < 5000	Vinyl acetate	ND < 12500
cis-1,3-Dichloropropene	ND < 5000	2-Butanone	ND < 12500
trans-1,3-Dichloropropene	ND < 5000	4-Methyl-2-pentanone	ND < 12500
Methylene chloride	ND < 12500	2-Hexanone	ND < 12500
1,1,2,2-Tetrachloroethane	ND < 5000	Carbon disulfide	ND < 5000
Tetrachloroethene	ND < 5000		
1,1,1-Trichloroethane	370242		
1,1,2-Trichloroethane	ND < 5000		
Trichloroethene	ND < 5000		
Vinyl Chloride	ND < 5000		

Analytical Method: EPA 8240 ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ______________________
Laboratory Director

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	LaBella Associates	**Lab Project No.:**	GE6603
Client Job Site:	Cooper Vision	**Lab Sample No.:**	17528
Client Job No.:	N/A	**Sample Type:**	Water
Field Location:	MW-2	**Date Sampled:**	04/16/97
		Date Received:	04/16/97
Field ID No.:	N/A	**Date Analyzed:**	04/18/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 5.0	Benzene	ND< 5.0
Bromomethane	ND< 5.0	Chlorobenzene	ND< 5.0
Bromoform	ND< 5.0	Ethylbenzene	ND< 5.0
Carbon tetrachloride	ND< 5.0	Toluene	ND< 5.0
Chloroethane	ND< 5.0	m,p - Xylene	ND< 5.0
Chloromethane	ND< 5.0	o - Xylene	ND< 5.0
2-Chloroethyl vinyl ether	ND< 5.0	Styrene	ND< 5.0
Chloroform	ND< 5.0		
Dibromochloromethane	ND< 5.0		
1,1-Dichloroethane	371.6		
1,2-Dichloroethane	ND< 5.0		
1,1-Dichloroethene	181.7	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 5.0	Acetone	ND< 25.0
1,2-Dichloropropane	ND< 5.0	Vinyl acetate	ND< 12.5
cis-1,3-Dichloropropene	ND< 5.0	2-Butanone	ND< 12.5
trans-1,3-Dichloropropene	ND< 5.0	4-Methyl-2-pentanone	ND< 12.5
Methylene chloride	ND< 12.5	2-Hexanone	ND< 12.5
1,1,2,2-Tetrachloroethane	ND< 5.0	Carbon disulfide	ND< 5.0
Tetrachloroethene	5.7		
1,1,1-Trichloroethane	519.3		
1,1,2-Trichloroethane	ND< 5.0		
Trichloroethene	38.5		
Vinyl Chloride	ND< 5.0		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ____________________
Laboratory Director

GE6603V2.XLS

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	LaBella Associates	**Lab Project No.:**	GE6603
Client Job Site:	Cooper Vision	**Lab Sample No.:**	17527
Client Job No.:	N/A	**Sample Type:**	Water
Field Location:	MW-3	**Date Sampled:**	04/16/97
		Date Received:	04/16/97
Field ID No.:	N/A	**Date Analyzed:**	04/18/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 40.0	Benzene	ND< 40.0
Bromomethane	ND< 40.0	Chlorobenzene	ND< 40.0
Bromoform	ND< 40.0	Ethylbenzene	ND< 40.0
Carbon tetrachloride	ND< 40.0	Toluene	ND< 40.0
Chloroethane	ND< 40.0	m,p - Xylene	ND< 40.0
Chloromethane	ND< 40.0	o - Xylene	ND< 40.0
2-Chloroethyl vinyl ether	ND< 40.0	Styrene	ND< 40.0
Chloroform	ND< 40.0		
Dibromochloromethane	ND< 40.0		
1,1-Dichloroethane	2030.9		
1,2-Dichloroethane	ND< 40.0		
1,1-Dichloroethene	629.7	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 40.0	Acetone	ND< 200.0
1,2-Dichloropropane	ND< 40.0	Vinyl acetate	ND< 100.0
cis-1,3-Dichloropropene	ND< 40.0	2-Butanone	ND< 100.0
trans-1,3-Dichloropropene	ND< 40.0	4-Methyl-2-pentanone	ND< 100.0
Methylene chloride	ND< 100.0	2-Hexanone	ND< 100.0
1,1,2,2-Tetrachloroethane	ND< 40.0	Carbon disulfide	ND< 40.0
Tetrachloroethene	ND< 40.0		
1,1,1-Trichloroethane	3262.9		
1,1,2-Trichloroethane	ND< 40.0		
Trichloroethene	ND< 40.0		
Vinyl Chloride	ND< 40.0		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ____________________
Laboratory Director

GE6603V1.XLS

PARADIGM ENVIRONMENTAL SERVICES, INC.

179 Lake Avenue
Rochester, NY 14608
(716) 647-2530 • (800) 724-1997
FAX (716) 647-3311

CHAIN OF COSTODY

REPORT TO		INVOICE TO		
COMPANY LaBella Associates		COMPANY		LAB PROJECT # GS 6603
ADDRESS 300 State Street		ADDRESS		
CITY Rochester	STATE NY ZIP 14	CITY	STATE ZIP	P.O. #
ATT. Dennis Peck	PHONE# 454-6110	ATT.	PHONE#	
	FAX#	FAX#		☐ ADDENDUM

PROJECT NAME/SITE NAME: CooperVision

PROJECT #:

COMMENTS:

TURN AROUND TIME (WORKING DAYS) ☐ ONE ☐ THREE ☐ FIVE(STD) ☐ OTHER

REPRESENTATIVE:

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	REQUESTED ANALYSIS EPA 8240	REMARKS	PARADIGM LAB SAMPLE NUMBER	ANALYTICAL COSTS
1	4/16/97	1015		X	MW-3	W	2	✓		17527	
2	4/16/97	1030		X	MW-2	↓	2	✓		17528	
3	4/16/97	1050		X	MW-1	↓	2	✓	Might be Hot	17529	
4											
5											
6											
7											
8											
9											
10											
11											
12											

RELINQUISHED BY: Dennis M Peck	DATE/TIME 4/16/97 130	RECEIVED BY:	DATE/TIME 4/16/97 1:00	SAMPLE CONDITION	CHECK #	TOTAL COST
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	CARRIER COMPANY	AIR BILL NO.	P.I.F
RELINQUISHED BY:	DATE/TIME	RECEIVED @ LAB BY:	DATE/TIME 4/16/97 130	CARRIER PHONE #	DATE RESULTS REPORTED BY:	DATE/TIME

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PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	LaBella Associates	**Lab Project No.:**	GE6701
Client Job Site:	Cooper Vision	**Lab Sample No.:**	17804
Client Job No.:	N/A	**Sample Type:**	Water
Field Location:	MW-1	**Date Sampled:**	05/06/97
		Date Received:	05/06/97
Field ID No.:	N/A	**Date Analyzed:**	05/10/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 5000	Benzene	ND< 5000
Bromomethane	ND< 5000	Chlorobenzene	ND< 5000
Bromoform	ND< 5000	Ethylbenzene	ND< 5000
Carbon tetrachloride	ND< 5000	Toluene	ND< 5000
Chloroethane	ND< 5000	m,p - Xylene	ND< 5000
Chloromethane	ND< 5000	o - Xylene	ND< 5000
2-Chloroethyl vinyl ether	ND< 5000	Styrene	ND< 5000
Chloroform	ND< 5000		
Dibromochloromethane	ND< 5000		
1,1-Dichloroethane	12823		
1,2-Dichloroethane	ND< 5000		
1,1-Dichloroethene	18721	Ketones & Misc.	
trans-1,2-Dichloroethene	ND< 5000	Acetone	ND< 25000
1,2-Dichloropropane	ND< 5000	Vinyl acetate	ND< 12500
cis-1,3-Dichloropropene	ND< 5000	2-Butanone	ND< 12500
trans-1,3-Dichloropropene	ND< 5000	4-Methyl-2-pentanone	ND< 12500
Methylene chloride	ND< 12500	2-Hexanone	ND< 12500
1,1,2,2-Tetrachloroethane	ND< 5000	Carbon disulfide	ND< 5000
Tetrachloroethene	ND< 5000		
1,1,1-Trichloroethane	400710		
1,1,2-Trichloroethane	ND< 5000		
Trichloroethene	ND< 5000		
Vinyl Chloride	ND< 5000		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ______________________
Laboratory Director

GE6701V1.XLS

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Laboratory Analysis Report For Non-Potable Water

Client:	LaBella Associates	**Lab Project No.:**	GE6701
Client Job Site:	Cooper Vision	**Lab Sample No.:**	N/A
Client Job No.:	N/A	**Sample Type:**	VOA Water Blk
Field Location:	N/A	**Date Sampled:**	N/A
		Date Received:	N/A
Field ID No.:	N/A	**Date Analyzed:**	05/10/97

VOLATILE HALOCARBONS	RESULTS (ug/L)	VOLATILE AROMATICS	RESULTS (ug/L)
Bromodichloromethane	ND< 2.0	Benzene	ND< 2.0
Bromomethane	ND< 2.0	Chlorobenzene	ND< 2.0
Bromoform	ND< 2.0	Ethylbenzene	ND< 2.0
Carbon tetrachloride	ND< 2.0	Toluene	ND< 2.0
Chloroethane	ND< 2.0	m,p - Xylene	ND< 2.0
Chloromethane	ND< 2.0	o - Xylene	ND< 2.0
2-Chloroethyl vinyl ether	ND< 2.0	Styrene	ND< 2.0
Chloroform	ND< 2.0		
Dibromochloromethane	ND< 2.0		
1,1-Dichloroethane	ND< 2.0		
1,2-Dichloroethane	ND< 2.0		
1,1-Dichloroethene	ND< 2.0	**Ketones & Misc.**	
trans-1,2-Dichloroethene	ND< 2.0	Acetone	ND< 10.0
1,2-Dichloropropane	ND< 2.0	Vinyl acetate	ND< 5.0
cis-1,3-Dichloropropene	ND< 2.0	2-Butanone	ND< 5.0
trans-1,3-Dichloropropene	ND< 2.0	4-Methyl-2-pentanone	ND< 5.0
Methylene chloride	ND< 5.0	2-Hexanone	ND< 5.0
1,1,2,2-Tetrachloroethane	ND< 2.0	Carbon disulfide	ND< 2.0
Tetrachloroethene	ND< 2.0		
1,1,1-Trichloroethane	ND< 2.0		
1,1,2-Trichloroethane	ND< 2.0		
Trichloroethene	ND< 2.0		
Vinyl Chloride	ND< 2.0		

Analytical Method: EPA 8240

ELAP ID No.: 10958

Comments: ND denotes Not Detected

Approved By ______________
Laboratory Director

VOLATILES
LABORATORY CONTROL SAMPLE RECOVERY SUMMARY FORM
Water Method

		Percent Recovery				
Lab Sample ID	Field Location	1,1-Dichloro ethene	Trichloro ethene	Benzene	Toluene	Chloro benzene
LCS	N/A	99	90	100	98	92
LCS Dup	N/A	101	90	99	95	91

LCS Recovery
Windows
CLP SOW OLM01.0
SW-846 8240

VOLATILE	(CLP SOW)	(SW846)
1,1-Dichloroethene	61-145%	D-234%
Trichloroethene	71-120%	71-157%
Benzene	76-127%	37-151%
Toluene	76-125%	47-150%
Chlorobenzene	75-130%	37-160%

PARADIGM
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SERVICES, INC.

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VOLATILES
SURROGATE RECOVERY SUMMARY FORM
Water Method

			Percent Recovery		
Lab Sample ID	Field Location		Toluene d-8	BFB	1,2-DCE-d4
Blank	N/A		107	106	112
LCS	N/A		104	91	111
LCSD	N/A		103	103	107
17804	MW-1		104	93	112

Surrogate Recovery Windows
EPA SW-846 8240

Toluene-d8	88-110%
BFB	86-115%
1,2-DCE-d4	76-114%

PARADIGM ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue
Rochester, NY 14608
(716) 647-2530 • (800) 724-1997
FAX (716) 647-3311

CHAIN OF CUSTODY

PROJECT NAME/SITE NAME: Cooper Vision
PROJECT #:

REPORT TO
COMPANY LaBella Associates P.C.
ADDRESS 300 State St
CITY Rochester STATE NY ZIP 14614
ATT. Greg or Dennis PHONE# ~~461~~ 454-611
FAX# 454-3066

INVOICE TO
COMPANY
ADDRESS
CITY STATE ZIP
ATT. PHONE#
FAX#

LAB PROJECT # OE6701
P.O. #
☐ ADDENDUM

COMMENTS:

TURN AROUND TIME (WORKING DAYS) ☐ ONE ☐ THREE ☒ FIVE(STD) ☐ OTHER
REPRESENTATIVE: Dennis Peck

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	REQUESTED ANALYSIS													REMARKS	PARADIGM LAB SAMPLE NUMBER	ANALYTICAL COSTS
								EPA 8240															
1	5/6/97	0925		X	MW-1	W	2	X														17804	
2																							
3																							
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

RELINQUISHED BY: Dennis M Peck	DATE/TIME 5/6/97 11:10	RECEIVED BY:	DATE/TIME 5/6/97	SAMPLE CONDITION		CHECK #	TOTAL COST	
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	CARRIER COMPANY		AIR BILL NO.	P.I.F	
RELINQUISHED BY:	DATE/TIME	RECEIVED @ LAB BY:	DATE/TIME 5/6/97 1310	CARRIER PHONE #		DATE RESULTS REPORTED BY:		DATE/TIME

WHITE COPY-SAMPLE YELLOW COPY-FILE PINK COPY-RELINQUISHER

PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Organic Compound Laboratory Analysis Report For Soil/Sludge

Client:	LaBella Associates	**Lab Project No:**	GE6446
		Lab Sample No:	17110
Client Job Site:	Coopervision	**Sample Type:**	Soil
Client Job No:	N/A	**Date Sampled:**	3/13/97
Field Location:	FD#3 Crock	**Date Received:**	3/18/97
Field ID No:	N/A	**Date Analyzed:**	3/26/97

VOLATILE HALOCARBONS	RESULTS (ug/Kg)
Bromodichloromethane	ND< 3.6
Bromomethane	ND< 3.6
Bromoform	ND< 3.6
Carbon tetrachloride	ND< 3.6
Chloroethane	ND< 3.6
Chloromethane	ND< 3.6
2-Chloroethyl vinyl ether	ND< 3.6
Chloroform	ND< 3.6
Dibromochloromethane	ND< 3.6
1,1-Dichloroethane	28.4
1,2-Dichloroethane	ND< 3.6
1,1-Dichloroethene	ND< 3.6
trans-1,2-Dichloroethene	ND< 3.6
1,2-Dichloropropane	ND< 3.6
cis-1,3-Dichloropropene	ND< 3.6
trans-1,3-Dichloropropene	ND< 3.6
Methylene chloride	ND< 3.6
1,1,2,2-Tetrachloroethane	ND< 3.6
Tetrachloroethene	ND< 3.6
1,1,1-Trichloroethane	66.0
1,1,2-Trichloroethane	ND< 3.6
Trichloroethene	ND< 3.6
Vinyl Chloride	ND< 3.6

VOLATILE AROMATICS	RESULTS (ug/Kg)
Benzene	ND< 3.6
Chlorobenzene	ND< 3.6
Ethylbenzene	ND< 3.6
Toluene	ND< 3.6
m,p - Xylene	ND< 3.6
o - Xylene	ND< 3.6
Styrene	ND< 3.6
1,3-Dichlorobenzene	ND< 3.6
1,4-Dichlorobenzene	ND< 3.6
1,2-Dichlorobenzene	ND< 3.6
Ketones & Misc.	
Acetone	1800 E
Vinyl acetate	ND< 9.0
2-Butanone	59.1
4-Methyl-2-pentanone	ND< 9.0
2-Hexanone	ND< 9.0
Carbon disulfide	ND< 9.0

Analytical Method: EPA 8260

ELAP ID No: 10958

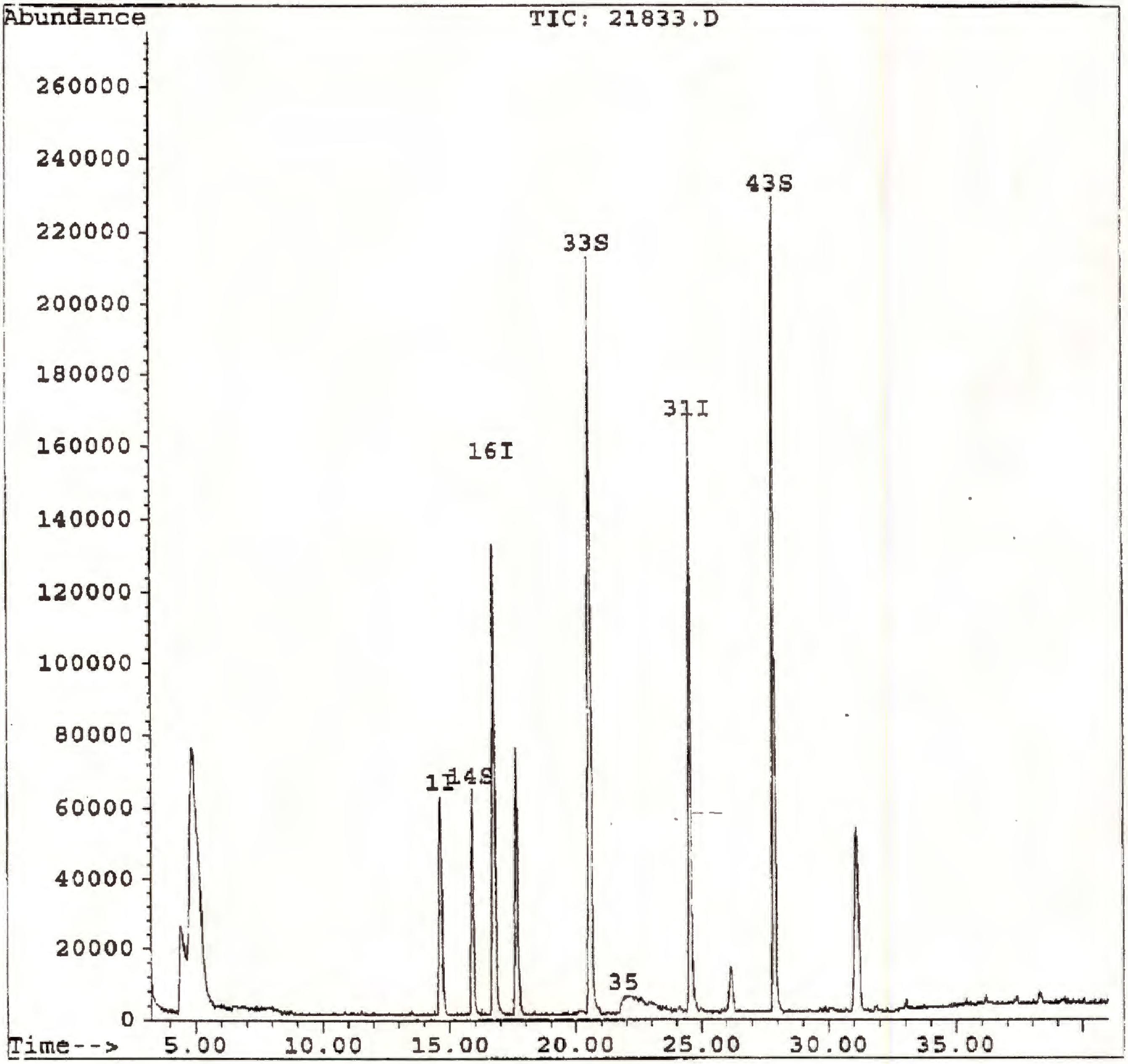
Comment ND denotes Not Detected
E = Concentration above calibration range.

Approved By
Laboratory Director

GE6446V1.XLS

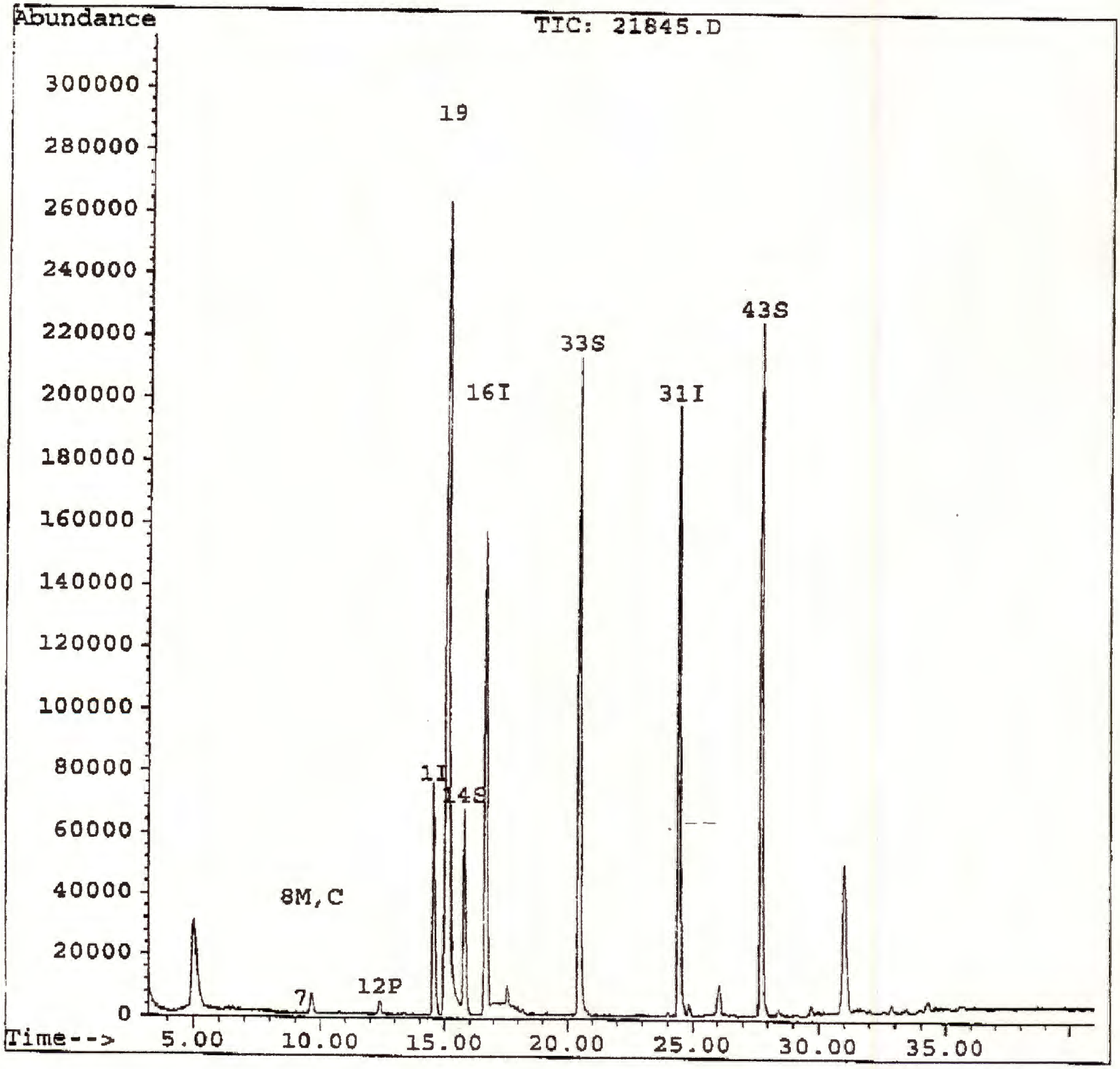
Quantitation Report

```
Data File : C:\HPCHEM\1\DATA\21833.D
Acq Time  :  9 May 97   4:33 pm                    Operator:
Sample    : SOIL L/L & WATER LRB                   Inst     : 5971 - In
Misc      : EPA 8021 STARS & 8240 Cpds             Multiplr: 1.00
Quant Time: May 12 13:00 1997

Method         : C:\HPCHEM\1\METHODS\624H.M
Title          : Calibration Table for EPA Method 624 & SW-846 824
Last Update    : Wed May 07 11:21:59 1997
Response via   : Multiple Level Calibration
```



Quantitation Report

```
Data File  : C:\HPCHEM\1\DATA\21845.D
Acq Time   : 10 May 97   1:37 am                    Operator:
Sample     : WATER #17804                           Inst      : 5971 - In
Misc       : EPA 8240 Cpds, 2ul Sample              Multiplr: 1.00
Quant Time: May 10  2:18 1997

Method           : C:\HPCHEM\1\METHODS\624H.M
Title            : Calibration Table for EPA Method 624 & SW-846 824
Last Update      : Wed May 07 11:21:59 1997
Response via : Multiple Level Calibration
```



PARADIGM
ENVIRONMENTAL
SERVICES, INC.

179 Lake Avenue Rochester, New York 14608 716-647-2530 FAX 716-647-3311

Volatile Aromatic Analysis Report For Soil/Sludge
(Additional 8260 Compounds)

Client:	LaBella Associates	**Lab Project No.:**	GE6446
		Lab Sample No.:	17110
Client Job Site:	Coopervision		
Client Job No.:	N/A	**Sample Type:**	Soil
Field Location:	FD#3 Crock	**Date Sampled:**	03/13/97
Field ID No.:	N/A	**Date Received:**	03/18/97
		Date Analyzed:	03/26/97

VOLATILE AROMATICS	RESULTS (ug/Kg)
Methyl tert-Butyl Ether	ND< 3.6
Isopropylbenzene	ND< 3.6
n-Propylbenzene	ND< 3.6
1,3,5-Trimethylbenzene	ND< 3.6
tert-Butylbenzene	ND< 3.6
1,2,4-Trimethylbenzene	ND< 3.6
sec-Butylbenzene	ND< 3.6
p-Isopropyltoluene	ND< 3.6
n-Butylbenzene	ND< 3.6
Naphthalene	ND< 3.6

Analytical Method: EPA 8260 NYS ELAP ID No.: 10958

Comments: ND denotes not detected

Approved By: ______________________
Laboratory Director

PARADIGM ENVIRONMENTAL SERVICES, INC.
179 Lake Avenue
Rochester, NY 14608
(716) 647-2530 • (800) 724-1997
FAX (716) 647-3311

CHAIN OF COUSTODY

6446

REPORT TO:	INVOICE TO:	LAB PROJECT # GE [illegible]
COMPANY LaBella Associates	COMPANY	
ADDRESS 300 State Street	ADDRESS Same	
CITY Rochester STATE NY ZIP 14614	CITY STATE ZIP	P.O. #
ATT. Greg Senecal PHONE# 454-6110	ATT. PHONE#	
FAX# 454-3066	FAX#	☐ ADDENDUM

PROJECT NAME/SITE NAME: COOPER VISION

PROJECT #:

COMMENTS:

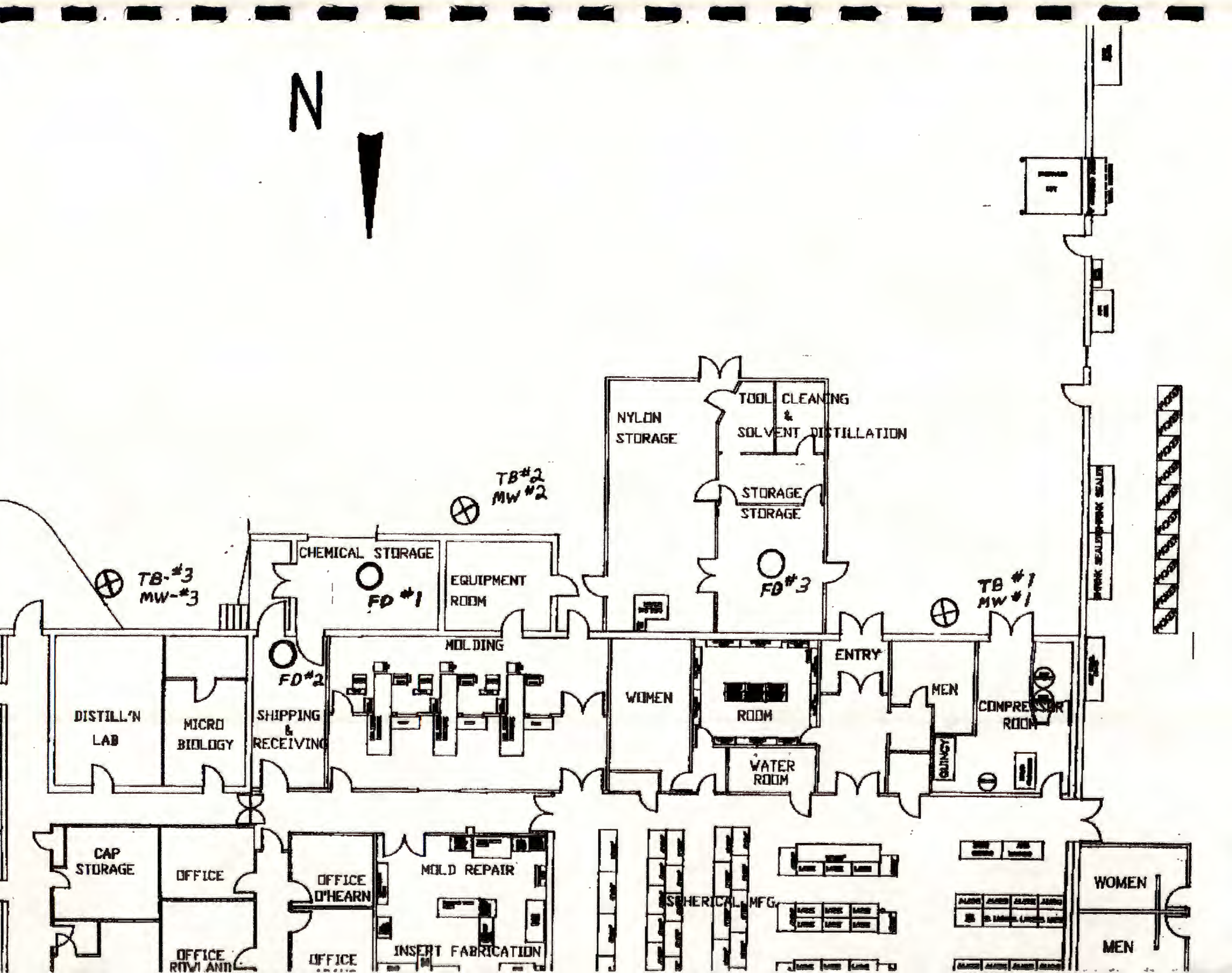
TURN AROUND TIME (WORKING DAYS) ☐ ONE ☐ THREE ☒ FIVE(STD) ☐ OTHER ____

REPRESENTATIVE:

	DATE	TIME	COMPOSITE	GRAB	SAMPLE LOCATION/FIELD ID	MATRIX	NUMBER CONTAINERS	REQUESTED ANALYSIS EPA 8260													REMARKS	PARADIGM LAB SAMPLE NUMBER	ANALYTICAL COSTS
1	3/13/97	11:00	X		FO #3 crock	S	1	✓														17115	
2								✓															
3								✓															
4																							
5																							
6																							
7																							
8																							
9																							
10																							
11																							
12																							

RELINQUISHED BY: Senecal	DATE/TIME 3/18/97 16:30	RECEIVED BY:	DATE/TIME	SAMPLE CONDITION	CHECK #	TOTAL COST	
RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	CARRIER COMPANY	AIR BILL NO.	P.I.F	
RELINQUISHED BY:	DATE/TIME	RECEIVED @ LAB BY:	DATE/TIME 3/18/97 1625	CARRIER PHONE #	DATE RESULTS REPORTED BY:		DATE/TIME

WHITE COPY-SAMPLE YELLOW COPY-FILE PINK COPY-RELINQUISHER


N
TB#2
MW#2
TB-#3
MW-#3
FD#1
FD#2
FD#3
TB#1
MW#1
NYLON STORAGE
TOOL CLEANING & SOLVENT DISTILLATION
STORAGE
STORAGE
CHEMICAL STORAGE
EQUIPMENT ROOM
MOLDING
ENTRY
DISTILL'N LAB
MICRO BIOLOGY
SHIPPING & RECEIVING
WOMEN
ROOM
WATER ROOM
MEN
COMPRESSOR ROOM
CAP STORAGE
OFFICE
OFFICE O'HEARN
MOLD REPAIR
OFFICE ROWLAND
OFFICE
INSERT FABRICATION
SPHERICAL MFG.
WOMEN
MEN

Sentry Services
Industrial Hygiene Division

Sentry Services
Industrial Hygiene Division
1800 North Point Drive
Stevens Point, WI 54481
800-443-9655
FAX 715-346-6330

LABORATORY REPORT

Client HALEY & ALDRICH

Address 189 N WATER ST

City ROCHESTER **State** NY **ZIP** 14606

Contact GREG ERTEL

Client Purchase Order/Job Number 70665-004

AIHA
ACCREDITED LABORATORY

Certification # 113

Sentry Services Project Number 98-587

Date Received 4/29/98

Date Issued 4/30/98

			Analytical Results						
Sample #	**Contaminant**	**Lab #**	**µg**	**ppm**	**%**	**LOQ* µg**	**Method**	**Date Analyzed**	**Analyst**
CV-01	Vinylidene Chloride	4071	248	0.6		10	NIOSH 1015	4/29/98	SVH
Blank	Vinylidene Chloride (blank)	4072	< 10			10	NIOSH 1015	4/29/98	SVH

*Limit of quantitation

Ted Carapezza

TED CARAPEZZA, CIH
LABORATORY SUPERVISOR
800-443-9655

Sentry Services
Industrial Hygiene Division

Sentry Services
Industrial Hygiene Lab
1800 North Point Drive
Stevens Point, WI 54481
800-443-9655
Fax: 715-346-6330

Page ______ of ______

Analytical Request Form

Client: Haley & Aldrich
Address: 189 N. Water St.
City: Rochester State: NY Zip: 14606
Contact: Greg Ertel
Phone: 716 327-5530 Fax: 716-232-6768
Client Purchase Order/Job Number: 70665-004

AIHA
ACCREDITED LABORATORY
Certification # 113

LAB USE ONLY

Sentry Services Project Number
Date Received
Date Issued

SAMPLE DATA | ANALYTICAL RESULTS

Sample #	One Contaminant Per Line	① Media Type	② TAT	AIR Vol (L)	③ Total Time (min)	Lab #	mg, µg	mg/m3, ppm	%	④ LOQ	Method	Date Analyzed	Analyst
CV-01	Vinylidene chloride	F	R	101.364	480								
	(1,1-Dichloroethylene												
Blank		F	R	NA	NA								

Chain of Custody

Relinquished by: Greg Ertel (FedEx) Date/Time 4/28/98 1600
Received by: Date/Time

COMMENTS/SPECIAL INSTRUCTIONS

① Media Type: Filter – F, Treated Filter – TF, Tube – T, Inhalable dust sampler – IOM, Passive – P, Impinger – IMP

② Turnaround Time: Normal – N, Rush – R (100% surcharge, must notify lab in advance)

③ Passive Monitors only

④ Limit of quantitation

SEND ORIGINAL TO LAB
RETAIN COPY FOR RECORDS

76-3

12-97

APPENDIX D

Risk Characterization Tables

HALEY &
ALDRICH

TABLE I
SOIL QUALITY DATA
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

SAMPLE DESIGNATION SAMPLE DEPTH SAMPLING DATE SAMPLE DEPTH (feet)	CAS NUMBER	TB-1 10-12 11-Apr-97 10-12	TB-1 12-14 11-Apr-97 12-14
1,1-Dichloroethane	75-34-3	ND(161)	353.1
1,1,1-Trichloroethane	71-55-6	1964	199.2
Acetone	67-64-1	ND(642)	65.3

NOTES:
1. ND(1): Compound not detected above laboratory detection limit, number in parentheses indicates half of detection limit.
2. Soil results expressed in microgram per kilogram.

TABLE II
GROUNDWATER QUALITY DATA
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

SAMPLE DESIGNATION	CAS NUMBER	MW-1	MW-1	MW-1 Average	MW-2	MW-3	MW-201	MW-202	MW-203	MW-204	MW-205
SAMPLING DATE		16-Apr-97	06-May-97		16-Apr-97	16-Apr-97	10-Jul-97	10-Jul-97	10-Jul-97	10-Jul-97	10-Jul-97
VOCs (ug/l)											
1,1-Dichloroethane	75-34-3	35823	12823	24323	371.6	2030.9	ND(1)	8.4	ND(1)	ND(1)	153107
1,1-Dichloroethylene	75-35-4	12366	18721	15543.5	181.7	629.7	ND(1)	17.9	ND(1)	ND(1)	ND(5000)
Tetrachloroethylene	127-18-4	ND(2500)	ND(2500)	ND(2500)	5.7	ND(20)	ND(1)	ND(1)	ND(1)	ND(1)	ND(5000)
1,1,1-Trichloroethane	71-55-6	370242	400710	385476	519.3	3262.9	ND(1)	61.3	3.3	2.7	420812
Trichloroethylene	79-01-6	ND(2500)	ND(2500)	ND(2500)	38.5	ND(20)	ND(1)	8	ND(1)	ND(1)	ND(5000)
Acetone	67-64-1	ND(12500)	ND(12500)	ND(2500)	ND(12.5)	ND(100)	ND(5)	26.5	118	14.5	ND(25000)

NOTES:

1. ND(1): compound not detected above laboratory detection limit, number in parentheses indicates half of the detection limit.
2. This table includes only those compounds detected during the indicated sampling dates.
3. Water results expressed in micrograms per liter (ppb).

TABLE III
SUMMARY OF SOIL QUALITY DATA
RISK CHARACTERIZATION
COOPERVISION
ROCHESTER, NEW YORK

COMPOUNDS	CAS NUMBER	FREQUENCY OF DETECTION	MINIMUM DETECTED CONCENTRATION (ug/kg)	AVERAGE CONCENTRATIONS (ug/kg)	MAXIMUM DETECTED CONCENTRATION (ug/kg)	SAMPLE WITH MAXIMUM CONCENTRATION
1,1-Dichloroethane	75-34-3	1 / 2	353	257	353	TB-1 12-14
1,1,1-Trichloroethane	71-55-6	2 / 2	199	1082	1964	TB-1 10-12
Acetone	67-64-1	1 / 2	65	354	65	TB-1 12-14

NOTES AND ABBREVIATIONS:

1. ND(1): Compound not detected above laboratory detection limit,

TABLE IV
SUMMARY OF GROUNDWATER QUALITY DATA
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUNDS	CAS NUMBER	FREQUENCY OF DETECTION	MINIMUM DETECTED CONCENTRATION (ug/L)	AVERAGE CONCENTRATIONS (ug/L)	MAXIMUM DETECTED CONCENTRATION (ug/L)	SAMPLE WITH MAXIMUM CONCENTRATION
1,1-Dichloroethane	75-34-3	5 / 8	8.4	22480	153107	MW-205
1,1-Dichloroethylene	75-35-4	4 / 8	17.9	2672	15544	MW-1 Average
Tetrachloroethylene	127-18-4	1 / 8	5.7	941	6	MW-2
1,1,1-Trichloroethane	71-55-6	7 / 8	2.7	101267	420812	MW-205
Trichloroethylene	79-01-6	2 / 8	8	946	39	MW-2
Acetone	67-64-1	3 / 8	14.5	4722	118	MW-203

TABLE V
SUMMARY OF COMPOUNDS OF CONCERN AND EXPOSURE POINT CONCENTRATIONS
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUND	CAS NUMBER	MAXIMUM CONCENTRATION IN SOIL (ug/kg)	MAXIMUM CONCENTRATION IN GROUNDWATER (ug/l)
1,1-Dichloroethane	75-34-3	353	153,107
1,1,1-Trichloroethane	71-55-6	1,964	420,812
Acetone	67-64-1	65	118
1,1-Dichloroethylene	75-35-4	---	15,544
Tetrachloroethylene	205-99-2	---	6
Trichloroethylene	79-01-6	---	39

TABLE VI
SUMMARY OF TOXICITY VALUES AND POTENTIAL NON-CARCINOGENIC EFFECTS
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUND/ROUTE	CHRONIC RfD (mg/kg*day)	UF/MF	SOURCE	EFFECTS OF CONCERN
ORAL/DERMAL				
1,1-Dichloroethane	0.1	1000	HEAST (FY97)	none observed
1,1,1-Trichloroethane	0.02	NA	EPA REGION III (10/97)(NCEA)	hepatotoxicity
Acetone	0.1	1000/1	IRIS (1997)	increased liver & kidney weights, nephrotoxicity
1,1-Dichloroethylene	0.009	1000/1	IRIS (1997)	liver lesions
Tetrachloroethylene	0.01	1000/1	IRIS (1997)	hepatotoxicity in mice, weight gain in rats
Trichloroethylene	0.006	NA	EPA REGION III (10/97)(NCEA)	NA

NOTES AND ABBREVIATIONS:

1. NA: Not Available; *: Inhalation RfC values calculated from oral RfD values, or vice-versa.
2. IRIS: Integrated Risk Information System, 1997; HEAST: Health Effects Assessment Summary Table.
3. RfDs for inhalation were calculated from the inhalation RfC considering an adult of a body weight of 70 kg with a ventilation rate of 20 m3/day.
4. EPA Region III RBC Table: EPA Region III Risk-Based Concentration Table dated October 1997, downloaded from EPA Web Site.
   NCEA= EPA-NCEA Regional Support provisional value   O=Other EPA documents.

TABLE VI
SUMMARY OF TOXICITY VALUES AND POTENTIAL NON-CARCINOGENIC EFFECTS
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUND/ROUTE	CHRONIC RfC (mg/m3)	CHRONIC RfD (mg/kg*day)	UF/MF	SOURCE	EFFECTS OF CONCERN
INHALATION					
1,1-Dichloroethane	0.5	1.4E-01	1000	HEAST (FY97)	kidney damage
1,1,1-Trichloroethane	1	2.9E-01	1000	EPA REGION III (10/97)(withdrawn value)	NA
Acetone	0.4	1.0E-01	NA	ORAL RfD	NA
1,1-Dichloroethylene	0.032	9.0E-03	NA	ORAL RfD	NA
Tetrachloroethylene	0.035	1.0E-02	NA	ORAL RfD	NA
Trichloroethylene	0.021	6.0E-03	NA	ORAL RfD	NA

TABLE VII
SUMMARY OF TOXICITY VALUES AND POTENTIAL CARCINOGENIC EFFECTS
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUND/ROUTE	CANCER SLOPE FACTOR 1/(mg/kg*day)	UNIT RISK 1/(ug/m3)	WEIGHT OF EVIDENCE CLASSIFICATION	CANCER TYPE	CANCER SLOPE FACTOR SOURCE	UNIT RISK SOURCE	WEIGHT OF EVIDENCE SOURCE
INHALATION							
1,1-Dichloroethane	---	---	C	NA	NA	NA	IRIS (1997)
1,1,1-Trichloroethane	---	---	D	NA	NA	NA	IRIS (1997)
Acetone	---	---	D	NA	NA	NA	IRIS (1997)
1,1-Dichloroethylene	0.175	5.00E-05	C	kidney adenocarcinoma	IRIS (1997)	calculated from CSF	IRIS (1997)
Tetrachloroethylene	0.00203	5.80E-07	C-B2	liver & leukemia	EPA REGION III (10/97)(NCEA)	calculated from CSF	NA
Trichloroethylene	0.006	1.71E-06	NA	lung	EPA REGION III (10/97)(NCEA)	calculated from CSF	NA

TABLE VII
SUMMARY OF TOXICITY VALUES AND POTENTIAL CARCINOGENIC EFFECTS
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUND/ROUTE	CANCER SLOPE FACTOR 1/(mg/kg*day)	WEIGHT OF EVIDENCE CLASSIFICATION	CANCER TYPE	CANCER SLOPE FACTOR SOURCE	WEIGHT OF EVIDENCE SOURCE
ORAL/DERMAL					
1,1-Dichloroethane	---	C	hemangiosarcomas, adenocarcinomas	NA	IRIS (1997)
1,1,1-Trichloroethane	---	D	NA	NA	IRIS (1997)
Acetone	---	D	NA	NA	IRIS (1997)
1,1-Dichloroethylene	0.6	C	adrenal tumors	IRIS (1997)	IRIS (1997)
Tetrachloroethylene	0.052	NA	liver	EPA REGION III (10/97)	NA
Trichloroethylene	0.011	NA	liver	EPA REGION III (10/97)(w)	NA

NOTES AND ABBREVIATIONS:
1. NA: Not Available; ---: Value not developed or not available.
2. DEP Background Document: MADEP Background Document for the Development of the MCP Numerical Standards (April 1994).
3. IRIS: Integrated Risk Information System, 1997; HEAST: Health Effects Assessment Summary Table.
4. EPA Region III RBC Table: EPA Region III Risk-Based concentration table, dated October 1997, downloaded from EPA web site.
NCEA: U.S. EPA's National Center for Environmental Assessment. w: withdrawn value.

TABLE VIII
SUMMARY OF EXPOSURE SCENARIOS
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

EXPOSURE SCENARIOS	HUMAN RECEPTORS		
	------------- CURRENT & FORESEEABLE USE (Note 6) ---------		
	Excavation Workers (Note 1)	Plant Worker (Note 1)	Nearby Resident (Note 1)
EXPOSURE TO SOIL			
Incidental Ingestion of Soil	**Yes (a) (Note 2)**	**Yes (a) (Note 2)**	**Yes (a) (Note 2)**
Dermal Contact With Soil	**Yes (a) (Note 2)**	**Yes (a) (Note 2)**	**Yes (a) (Note 2)**
Inhalation of Fugitive Dust	**Yes (a) (Note 2)**	**Yes (a) (Note 2)**	**Yes (a) (Note 2)**
EXPOSURE TO GROUNDWATER			
Incidental Ingestion of Groundwater	No	No	No
Dermal Contact with Groundwater	No	No	No
EXPOSURES TO OUTDOOR AIR			
Inhalation of COC From Soil	**Yes (a)(Note 3)**	No (Note 3)	No (Note 3)
Inhalation of COC From Groundwater	No	No	No
EXPOSURES TO INDOOR AIR			
Inhalation of COC From Soil	No	**Yes (a) (Note 4)**	No
Inhalation of COC From Groundwater	No	**Yes (b) (Note 4)**	No
EXPOSURES TO SURFACE WATER (DRAINAGE CHANNEL)	No	No	**Yes (c) (Note 5)**
EXPOSURES TO SEDIMENT (DRAINAGE CHANNEL)	No	No	**Yes (c) (Note 5)**

DATA SETS

a	The maximum soil concentration will be used as the soil exposure point concentration.
b	The maximum or 95th % UCL groundwater concentration will be used as the groundwater exposure point concentration.
c	Predicted surface water concentrations based on the groundwater exposure point concentration.

NOTES

1 It is assumed that an excavation worker may come into contact with contaminated soil during foundation repair or construction of a building addition. It is also assumed that the plant worker/visitor to the plant/nearby resident may be exposed to site-related compounds during excavation work.

2 These routes of exposure will be conservatively evaluated by comparing soil exposure point concentrations to generic risk-based criteria.

3 Due to atmospheric dilution, this pathway is deemed negligeable except for persons potentially excavating soil in the unit.

4 For the indoor air pathway, site-specific groundwater and soil criteria protective of indoor air exposures were developed using ASTM RBCA Guidelines (1996) and/or the Johnson & Ettinger (1991) Method.

5 It is assumed that compounds detected in site groundwater migrate to and discharge to the drainage channel situated at the eastern portion of the site. Therefore, predicted surface water concentrations (based on site groundwater concentrations and a simple mass balance) will be compared to risk-based surface water concentrations derived assuming a nearby resident plays in the drainage channel during the good weather months.

6 Potable use of groundwater is not evaluated because it is not a current exposure nor is it deemed a reasonably foreseeable exposure at this site or for the site vicinity. Municipal drinking water is available at the site and in the site vicinity.

TABLE IX
SUMMARY OF SOIL AND GROUNDWATER COMPOUND-SPECIFIC RISK-BASED CRITERIA
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

Soil Criteria

COMPOUND	SSL Ingestion (mg/kg)	SSL Inhalation (mg/kg)	EPA Region III Residential (mg/kg)	EPA Region III Industrial (mg/kg)	Soil Volatilization Criteria (mg/kg)
1,1-Dichloroethane	7,800b	1,300b	7,800N	200,000N	172
1,1,1-Trichloroethane	---a	1,200c	1,600N	41,000N	222
Acetone	7,800b	62,000c	7,800N	200,000N	5,438

Groundwater Criteria

COMPOUND	Groundwater Volatilization Criteria (ug/l)	Groundwater Migration Criteria (ug/l)
1,1-Dichloroethane	2,632,589	747,270,000
1,1,1-Trichloroethane	1,935,489	804,059,480
Acetone	102,995,268	1,783,933,000
1,1-Dichloroethylene	23	58,000
Tetrachloroethylene	3,396	38,000
Trichloroethylene	1,764	290,000

ABBREVIATIONS:
SSL = Soil Screening Guidance
a: no toxicity value available for route of exposure.
b: calculated value corresponds to a Hazard Quotient of 1.
c: soil saturation concentration.
N: noncancer basis

NOTES:

1. SSLs obtained from U.S. EPA "Soil Screening Guidance:Technical Background Document", dated May 1995.
2. EPA Region III values obtained from U.S. EPA Region III "Risk-Based Concentration Table", dated 22 October 1997.
3. Groundwater and soil volatilization criteria calculated according to ASTM ES 38-94.

Groundwater migration criteria calculated for human health exposures in the drainage channel.

See text and Appendix A for additional information on the calculations and asumptions used for calculating soil and groundwater volatilization criteria and groundwater migration criteria.

4. Some of the calculated groundwater criteria (based on an analysis of risk) are higher than what could be expected in groundwater based on the chemical's solubility. Therefore, the selected risk level or hazard quotient cannot be reached or exceeded for that compound and exposure pathway.

TABLE X
PHYSICAL PROPERTIES OF COMPOUNDS OF CONCERN
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUNDS	Molecular Weight, MW (g/mole)	Vapor Pressure Vp (mmHg)	Vp Source	Diffusivity Dair (cm2/s)	Dair Source	Diffusivity Dwater (cm2/	Dwater Source	Henry's Law Constant, Hp (atm-m3/mol)	Hp Source	Henry's Law Constant, H (dimensionless)	H Source	Log Ocatne Water Partition Coefficient Log(Kow)	Log(Kow) Source	Koc (cm3/g)	Koc Source	Skin Permeability Coefficient Kp(cm/hr)	Kp SOURCE
1,1-Dichloroethane	99	5.91E+02	WATER8	7.42E-02	EPA	1.05E-05	EPA	5.62E-03	EPA	2.30E-01	EPA	1.79E+00	EPA	3.16E+01	EPA	8.9E-03	DEA
1,1-Dichloroethylene	97	6.30E+02	WATER8	9.00E-02	EPA	1.04E-05	EPA	2.61E-02	EPA	1.07E+00	EPA	2.13E+00	EPA	5.89E+01	EPA	1.6E-02	DEA
Tetrachloroethylene	166	1.90E+01	WATER8	7.20E-02	EPA	8.20E-06	EPA	1.84E-02	EPA	7.54E-01	EPA	2.67E+00	EPA	1.55E+02	EPA	3.7E-01	DEA
1,1,1-Trichloroethane	133	1.23E+02	WATER8	7.80E-02	EPA	8.80E-06	EPA	1.72E-02	EPA	7.05E-01	EPA	2.48E+00	EPA	1.10E+02	EPA	1.7E-02	DEA
Trichloroethylene	131	7.50E+01	WATER8	7.90E-02	EPA	9.10E-06	EPA	1.03E-02	EPA	4.22E-01	EPA	2.71E+00	EPA	1.66E+02	EPA	2.3E-01	DEA
Acetone	58	2.31E+02	WATER8	1.24E-01	EPA	1.14E-05	EPA	3.88E-05	EPA	1.59E-03	EPA	-2.40E-01	EPA	5.75E-01	EPA	5.70E-04	Potts & Guy

REFERENCES:

1. EPA: Soil Screening Guidance: Technical Background Document, EPA/540/R-95/128, May 1996.
2. WATER8: U.S. EPA., Wastewater Treatment Compound Property Processor and Air Emissions Estimator or Water8, EPA-453/C-94-080C, November 1994.
3. DEA: EPA Dermal Exposure Assessment: Principals and Applications, January 1992.
4. POTTS AND GUY: estimated using Potts and Guy empirical equation (EPA Dermal Exposure Assessment: Principals and Applications, p5-p37): $\log(Kp)=-2.72+0.71*\log(Kow)-0.0061*(MW)$, where Kow is octane/water partition coefficient, MW is the molecular weight.

TABLE XI
COMPARISON OF SITE SOIL CONCENTRATIONS TO RISK-BASED SOIL CRITERIA
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUND	MAXIMUM CONCENTRATION IN SOIL (mg/kg)	SSL Ingestion (mg/kg)	SSL Inhalation (mg/kg)	EPA Region III Residential (mg/kg)	EPA Region III Industrial (mg/kg)	Soil Volatilization Criteria (mg/kg)
1,1,1-Trichloroethane	2.0	---a	1,200c	1600N	41000N	222
1,1-Dichloroethane	0.35	7,800b	1,300b	7800N	200,000N	172
Acetone	0.07	7,800b	62,000c	7,800N	200,000N	5,438

ABBREVIATIONS:

SSL = Soil Screening Guidance

a: no toxicity value available for route of exposure.

b: calculated value corresponds to a Hazard Quotient of 1.

c: soil saturation concentration.

N: noncancer basis

NOTES:

1. SSLs obtained from U.S. EPA "Soil Screening Guidance:Technical Background Document", dated May 1995.
2. EPA Region III values obtained from U.S. EPA Region III "Risk-Based Concentration Table", dated 22 October 1997.

TABLE XII
COMPARISON OF SITE GROUNDWATER CONCENTRATIONS TO RISK-BASED GROUNDWATER CRITERIA
RISK CHARACTERIZATION
COOPERVISION
SCOTTSVILLE, NEW YORK

COMPOUND	MAXIMUM CONCENTRATION IN GROUNDWATER (ug/l)	GROUNDWATER VOLATILIZATION CRITERIA (ug/l)	GROUNDWATER MIGRATION CRITERIA (ug/l)
1,1-Dichloroethane	153,107	2,632,589	747,270,000
1,1,1-Trichloroethane	420,812	1,935,489	804,059,480
Acetone	118	102,995,268	1,783,933,000
1,1-Dichloroethylene	**15,544**	23	58,000
Tetrachloroethylene	6	3,396	38,000
Trichloroethylene	39	1,764	290,000

NOTE:

1. Bolded values indicate that a risk-based criteria is exceeded.

TABLE B1
CALCULATION OF GROUNDWATER AND SOIL VOLATILIZATION CRITERIA
RISK CHARACTERIZATION
COPERVISION
SCOTTSVILLE, NEW YORK

Soil Matrix Characteristics: Glacial Till

Soil Density:	2.3 g/cm3	Soil Porosity (by volume):	0.25
Capillary Fringe Thickness:	2 ft.	Groundwater Depth:	13 ft.
Moisture Content in Capillary Fringe (by weight):	10%	Moisture Content in Vadose Zone(by weight):	12%
Organic Carbon Fraction	0.001		

Building Characteristics

Ceiling Height:	10 ft.	Slab Thickness:	0.5 ft.
Slab Crack Ratio:	1%	Slab to Groundwater Distance:	12.5 ft.
Slab Thickness:	0.5 ft.	Air Exchange Rate:	0.00023 ex./sec.
Slab to Contaminated Soil Distance:	8 ft.		

Site-Specific Groundwater Volatilization Criteria:

COMPOUND	TAC (ug/m3)	VF	GWC (ug/l)
1,1-Dichloroethane	500	1.9E-04	2,632,589
1,1-Dichloroethylene	0.02	8.8E-04	23
Tetrachloroethylene	1.72	5.1E-04	3,396
1,1,1-Trichloroethane	1000	5.2E-04	1,935,489
Trichloroethylene	0.58	3.3E-04	1,764
Acetone	350	3.4E-06	102,995,268

Site-Specific Soil Volatilization Criteria:

COMPOUND	TAC (ug/m3)	VF	SWC (mg/kg)
1,1-Dichloroethane	500	2.9E-06	172
1,1,1-Trichloroethane	1000	4.5E-06	222
Acetone	350	6.4E-08	5,438

NOTES:

1: TAC: Target Indoor Air Concentrations are the lowest of the RfC and 1 x 10-6 cancer risk level.

2. VF = Volatilization Factor (mg/m3-air)/(mg/l-water) or (mg/m3-air)/(ug/kg-soil)

3. GWC = Groundwater Volatilization Criteria (TAC/VF).

4. SWC = Soil Volatilization Criteria (TAC/VF)*1E-6.

TABLE B2
CALCULATION OF COMPOUND AND SITE SPECIFIC RISK-BASED CRITERIA - GROUNDWATER MIGRATION CRITERIA
COOPERVISION
SCOTTSVILLE, NEW YORK

CARCINOGENIC - NEARBY CHILD RESIDENT PLAYING IN DRAINAGE CHANNEL

COMPOUND	CAS NUMBER	TARGET RISK	SURFACE WATER DAILY INGESTION INTAKE RATE (L/kg-day) (Equation 1)	Kp (cm/hr)	SURFACE WATER DAILY DERMAL INTAKE RATE (L/kg-day) (Equation 2)	CSFo (mg/kg-day)-1	CONVERSION FACTOR (ug/mg)	CARCINOGENIC RISK-BASED LEVELS (ug/L)
1,1-Dichloroethane	75-34-3	1E-06	7.2E-06	8.9E-03	1.19E-05	—	1000	—
1,1-Dichloroethylene	75-35-4	1E-06	7.2E-06	1.6E-02	2.13E-05	0.600	1000	58
Tetrachloroethylene	127-18-4	1E-06	7.2E-06	3.7E-01	4.93E-04	0.052	1000	38
1,1,1-Trichloroethane	71-55-6	1E-06	7.2E-06	1.7E-02	2.27E-05	—	1000	—
Trichloroethylene	79-01-6	1E-06	7.2E-06	2.3E-01	3.07E-04	0.011	1000	290
Acetone	67-64-1	1E-06	7.2E-06	5.7E-04	7.60E-07	—	1000	—

Equation (1): Ingestion Intake Rate (L/kg-day)=(IR)(EF)(ED)(1/BW)(1/AT) . IR: 25 ml/day; EF: 32 days/year;ED:10 years;BW: 43.2 Kg; AT: 70 years.RAF of 1 assumed.
Equation (2): Dermal Intake Rate (L/kg-day)=(SA)(Kp)(ET)(EF)(ED)(CF2)(CF3)(1/BW)(1/AT). SA: 0.23 m2; Kp:compound-specific;ED: 10 years; EF: 32 days/year; ET: 2 hr/day; BW: 43.2 Kg; AT: 70 years.
Note that 32 days per year is 2 days/week for 4 months per year. Body weight is the avg female/male for 6 - 18 yr. olds, EPA Exposure Factors Handbook, Jul.'89.
SA (Skin Area) is based on hands and feet for a child 7 - 17 years old (Tables 4-3 and 4B-4, EPA Exposure Factors Handbook, dated July 1989).

NON-CARCINOGENIC - NEARBY CHILD RESIDENT PLAYING IN DRAINAGE CHANNEL

COMPOUND	CAS NUMBER	TARGET HAZARD INDEX	SURFACE WATER CHRONIC DAILY INGESTION INTAKE RATE (L/kg-day) (Equation 1)	Kp (cm/hr)	SURFACE WATER CHRONIC DAILY DERMAL INTAKE RATE (L/kg-day) (Equation 2)	RfD (mg/kg-day)	CONVERSION FACTOR (ug/mg)	NONCARCINOGENIC RISK-BASED LEVELS (ug/L)
1,1-Dichloroethane	75-34-3	1	5.1E-05	8.9E-03	8.31E-05	0.100	1000	747270
1,1-Dichloroethylene	75-35-4	1	5.1E-05	1.6E-02	1.49E-04	0.009	1000	44977
Tetrachloroethylene	127-18-4	1	5.1E-05	3.7E-01	3.45E-03	0.010	1000	2853
1,1,1-Trichloroethane	71-55-6	1	5.1E-05	1.7E-02	1.59E-04	0.020	1000	95494
Trichloroethylene	79-01-6	1	5.1E-05	2.3E-01	2.15E-03	0.006	1000	2730
Acetone	67-64-1	1	5.1E-05	5.7E-04	5.32E-06	0.100	1000	1783933

Equation (1): Ingestion Intake Rate (L/kg-day)=(IR)(EF)(ED)(1/BW)(1/AT) . IR: 25 ml/day; EF: 32 days/year;ED:10 years;BW: 43.5 Kg; AT: 10 years.RAF of 1 assumed.
Equation (2): Dermal Intake Rate (L/kg-day)=(SA)(Kp)(ET)(EF)(ED)(CF2)(CF3)(1/BW)(1/AT). SA: 0.23 m2; Kp:compound-specific;ET: 2 hrs/day; EF: 32 days/year; ED: 10 years; BW: 43.5 Kg; AT: 10 years.
Note that 32 days per year is 2 days/week for 4 months per year. Body weight is the avg female/male for 6 - 18 yr. olds, EPA Exposure factors Handbook, Jul.'89.
SA (Skin Area) is based on hands and feet for a child 7 - 17 years old (Tables 4-3 and 4B-4, EPA Exposure Factors Handbook, dated July 1989).

TABLE C1
ASTM MODEL FOR PREDICTING CONTAMINANT VAPORS IN A CONFINED SPACE BUILDING FROM SOIL OR GROUNDWATER SOURCE
COOPERVISION

A. SOIL CHARACTERISTICS	COMPOUND IN SOIL	COMPOUND IN GROUNDWATER	
Moisture Conent in Capillary Fringe: qm(cap)	0.10	0.10	
Moisture Conent in Vadose Zone: qm(v)	0.05	0.05	
SOIL DENSITY: r (g/cm3)	2.3	2.3	
TOTAL SOIL POROSITY: e(T)	0.25	0.25	
ORGANIC CARBON FRACTION: foc	0.001	0.001	
Thickness of Capillary Fringe: hcap (ft)	2	2	
B. BUILDING CHARACTERISTICS			
CEILING HEIGHT: L1(ft.)	10	10	
FLOOR SLAB TO CONTAMINATION DISTANCE: LT (ft.)	8	12.5	
SLAB THICKNESS: L(crack) (ft.)	0.5	0.5	
RATIO OF CRACK: h (DEFAULT 0.001)	0.001	0.001	
BUILDING AIR EXCHANGE RATE: R(air) (exchange/hr)	0.828	0.828	ASTM default for Commercial/Industrial

TABLE C1
ASTM MODEL FOR PREDICTING CONTAMINANT VAPORS IN A CONFINED SPACE BUILDING FROM SOIL OR GROUNDWATER SOURCE
COOPERVISION

COMPOUND	Moisture Cont in Capillary fringe qm(cap) g/g	SOIL DENSITY in Capillary fringe (g/cm^3) r(cap)	MOISTURE POROSITY in Capillary fringe em(cap) (cm3/cm3) (Eq. 1)	TOTAL SOIL POROSITY in Capillary fringe et(cap)	MOLECULAR DIFFUSIVITY IN WATER D(water) (cm2/s)	VAPOR POROSITY in Capillary fringe eu(cap) (Eq. 2)	Moisture Diffustio Coefficient in Capillary fringe Dm(cap) (Eq. 3)	AIR DIFFUSION COEFFICIENT Dair(cap) (cm2/s)	Vapor Diffustion Coefficient in Capillary fringe Dv(cap) (Eq. 4)	HENRY'S LAW CONSTANT H (cm3/cm3)	Effective Diffustion Coefficient in Capillary fringe Deff(cap) (Eq. 5)
SOIL											
1,1-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
GROUNDWATER											
1,1-Dichloroethane	0.097826087	2.3	0.225	0.25	1.05E-05	0.025	1.17E-06	7.42E-02	5.49E-06	2.30E-01	1.058E-05
1,1-Dichloroethylene	0.097826087	2.3	0.225	0.25	1.04E-05	0.025	1.16E-06	9.00E-02	6.66E-06	1.07E+00	7.743E-06
Tetrachloroethylene	0.097826087	2.3	0.225	0.25	8.20E-06	0.025	9.13E-07	7.20E-02	5.33E-06	7.54E-01	6.540E-06
1,1,1-Trichloroethane	0.097826087	2.3	0.225	0.25	8.80E-06	0.025	9.80E-07	7.80E-02	5.77E-06	7.05E-01	7.163E-06
Trichloroethylene	0.097826087	2.3	0.225	0.25	9.10E-06	0.025	1.01E-06	7.90E-02	5.85E-06	4.22E-01	8.249E-06
Acetone	0.097826087	2.3	0.225	0.25	1.14E-05	0.025	1.27E-06	1.24E-01	9.18E-06	1.59E-03	8.079E-04

NOTES:

Column headings underlined indicate values calculated from the designated equations.

Eq. 1: em=qm*r
Eq. 2: eu=et-em
Eq. 3: Dm={D(water)*[em^3.33]}/et^2
Eq. 4: Dv={Dair*[eu^3.33]}/et^2
Eq. 5: Deff=Dv+Dm/H

TABLE C1
ASTM MODEL FOR PREDICTING CONTAMINANT VAPORS IN A CONFINED SPACE BUILDING FROM SOIL OR GROUNDWATER SOURCE
COOPERVISION

COMPOUND	Moisture Cont in Vadose Zone (g/g) qm(v)	SOIL DENSITY in Vadose Zone (g/cm^3) r(v)	MOISTURE POROSITY in Vadose Zone em(v) (Eq. 1)	TOTAL SOIL POROSITY in Vadose Zone et(v)	MOLECULAR DIFFUSIVITY IN WATER D(water) (cm2/s)	VAPOR POROSITY in Vadose Zon eu(v) (Eq. 2)	Moisture Diffustio Coefficient in Vadose Zone Dm(v) (Eq. 3)	AIR DIFFUSION COEFFICIENT Dair(v) (cm2/s)	Vapor Diffustion Coefficient in Vadose Zone Dv(v) (Eq. 4)	HENRY'S LAW CONSTANT H (cm3/cm3)	Effective Diffusti Coefficient in Vadose Zone Deff(v) (Eq. 5)	CRACK DIFFUSION COEFFICIENT D(crack) (cm2/s) (Eq. 6)
SOIL												
1,1-Dichloroethane	0.052	2.3	0.12	0.25	1.05E-05	0.13	1.44E-07	7.42E-02	1.33E-03	2.30E-01	1.33E-03	1.33E-03
1,1,1-Trichloroethane	0.052	2.3	0.12	0.25	8.80E-06	0.13	1.21E-07	7.80E-02	1.40E-03	7.05E-01	1.40E-03	1.40E-03
Acetone	0.052	2.3	0.12	0.25	1.14E-05	0.13	1.57E-07	1.24E-01	2.22E-03	1.59E-03	2.32E-03	2.32E-03
GROUNDWATER												
1,1-Dichloroethane	0.052	2.3	0.12	0.25	1.05E-05	0.13	1.44E-07	7.42E-02	1.33E-03	2.30E-01	1.331E-03	1.331E-03
1,1-Dichloroethylene	0.052	2.3	0.12	0.25	1.04E-05	0.13	1.43E-07	9.00E-02	1.61E-03	1.07E+00	1.614E-03	1.614E-03
Tetrachloroethylene	0.052	2.3	0.12	0.25	8.20E-06	0.13	1.13E-07	7.20E-02	1.29E-03	7.54E-01	1.291E-03	1.291E-03
1,1,1-Trichloroethane	0.052	2.3	0.12	0.25	8.80E-06	0.13	1.21E-07	7.80E-02	1.40E-03	7.05E-01	1.399E-03	1.399E-03
Trichloroethylene	0.052	2.3	0.12	0.25	9.10E-06	0.13	1.25E-07	7.90E-02	1.42E-03	4.22E-01	1.417E-03	1.417E-03
Acetone	0.052	2.3	0.12	0.25	1.14E-05	0.13	1.57E-07	1.24E-01	2.22E-03	1.59E-03	2.322E-03	2.322E-03

NOTES:

Eq.6: D(crack)=Deff(v), assuming that the floor/wall cracks and openings are filled with dust and dirt similar to the underlying soil.

TABLE C1
ASTM MODEL FOR PREDICTING CONTAMINANT VAPORS IN A CONFINED SPACE BUILDING FROM SOIL OR GROUNDWATER SOURCE
COOPERVISION

COMPOUND	Thickness of Capillary Fringe hcap (cm)	Slab to Groundwater Distance Lt (cm)	Thickness Vadose Zone hv (cm) (Eq. 7)	Effective Diffustion Coefficient in Capillary fringe Deff(cap)	Effective Diffustion Coefficient in Vadose Zone Deff(v)	Effective Diffusion Coefficient between Source and slab Deff(ws) (cm2/s) (Eq. 8)
SOIL						
1,1-Dichloroethane	NA	NA	NA	NA	1.331E-03	1.331E-03
1,1,1-Trichloroethane	NA	NA	NA	NA	1.399E-03	1.399E-03
Acetone	NA	NA	NA	NA	2.322E-03	2.322E-03
GROUNDWATER						
1,1-Dichloroethane	60.960	381.000	320.04	1.058E-05	1.331E-03	6.346E-05
1,1-Dichloroethylene	60.960	381.000	320.04	7.743E-06	1.614E-03	4.721E-05
Tetrachloroethylene	60.960	381.000	320.04	6.540E-06	1.291E-03	3.982E-05
1,1,1-Trichloroethane	60.960	381.000	320.04	7.163E-06	1.399E-03	4.360E-05
Trichloroethylene	60.960	381.000	320.04	8.249E-06	1.417E-03	5.002E-05
Acetone	60.960	381.000	320.04	8.079E-04	2.322E-03	1.786E-03

NOTES:

Column headings underlined indicate values calculated from the designated equations.

Eq. 7: hv=Lt-hcap

Eq. 8: Deff(ws)=Deff(v) for soil

Deff(ws)=(hcap+hv)/[hcap/Deff(cap)+hv/Deff(v)]

TABLE C1
ASTM MODEL FOR PREDICTING CONTAMINANT VAPORS IN A CONFINED SPACE BUILDING FROM SOIL OR GROUNDWATER SOURCE
COOPERVISION

COMPOUND	CEILING HEIGHT L1 (cm)	AIR EXCHANGE RATE R(air) (exchange/s)	Effective Diffusion Coefficient between Source and slab Deff(ws) (cm2/s)	SLAB -SOURCE DISTANCE LP (cm)	CRACK DIFFUSION COEFFICIENT D(crack) (cm2/s)	THICKNESS OF CRACK L(crack) (cm)	CRACK RATIO (Acrack/Ab) n	C(indoor) Csv(source) alpha (Eq. 9)
SOIL								
1,1-Dichloroethane	304.8	2.300E-04	1.331E-03	243.84	1.331E-03	1.524E+01	0.001	1.2E-06
1,1,1-Trichloroethane	304.8	2.300E-04	1.399E-03	243.84	1.399E-03	1.524E+01	0.001	1.3E-06
Acetone	304.8	2.300E-04	2.322E-03	243.84	2.322E-03	1.524E+01	0.001	2.1E-06
GROUNDWATER								
1,1-Dichloroethane	304.8	2.300E-04	6.346E-05	381	1.331E-03	1.500E+01	0.001	8.258E-07
1,1-Dichloroethylene	304.8	2.300E-04	4.721E-05	381	1.614E-03	1.500E+01	0.001	8.214E-07
Tetrachloroethylene	304.8	2.300E-04	3.982E-05	381	1.291E-03	1.500E+01	0.001	6.732E-07
1,1,1-Trichloroethane	304.8	2.300E-04	4.360E-05	381	1.399E-03	1.500E+01	0.001	7.329E-07
Trichloroethylene	304.8	2.300E-04	5.002E-05	381	1.417E-03	1.500E+01	0.001	7.836E-07
Acetone	304.8	2.300E-04	1.786E-03	381	2.322E-03	1.500E+01	0.001	2.137E-06

NOTES

Column headings underlined indicate values calculated from the designated equations.

Eq. 9: Alpha=[Deff(ws)/(R*Lt*L1]/{1+[Deff(ws)/(R*Lt*L1]+[Deff(ws)*Lcrack/Deff(crack)/Lt/n]}

TABLE C1
ASTM MODEL FOR PREDICTING CONTAMINANT VAPORS IN A CONFINED SPACE BUILDING FROM SOIL OR GROUNDWATER SOURCE
COOPERVISION

COMPOUND	HENRY'S LAW CONSTANT H (cm3/cm3)	SOIL DENSITY r (g/cm3)	MOISTURE POROSITY em	VAPOR POROSITY eu	CARBON WATER SORPTION COEFFICIENT Koc (cm3/g)	ORGANIC CARBON FRACTION foc	C(soilwater)/ C(source) (mg/l)/(ug/kg) or dimensionless (Eq. 10)	C(soilvapor)/ C(soilwater) (mg/m3)/(mg/l) (Eq. 11)	C(indoor) Csv(source) alpha	VFwesp C(indoor)/C(source) (mg/m3)/(ug/kg) or (mg/m3)/(mg/l) (Eq. 12)
SOIL (ug/kg)										
1,1-Dichloroethane	2.30E-01	2.3	0.12	0.13	3.16E+01	0.001	1.03E-02	2.38E+00	1.23E-06	2.914E-06
1,1,1-Trichloroethane	7.05E-01	2.3	0.12	0.13	1.10E+02	0.001	4.96E-03	3.50E+00	1.29E-06	4.504E-06
Acetone	1.59E-03	2.3	0.12	0.13	5.75E-01	0.001	1.89E-02	3.01E-02	2.14E-06	6.436E-08
GROUNDWATER										
1,1-Dichloroethane	2.30E-01						1	2.30E+02	8.26E-07	1.899E-04
1,1-Dichloroethylene	1.07E+00						1	1.07E+03	8.21E-07	8.789E-04
Tetrachloroethylene	7.54E-01						1	7.54E+02	6.73E-07	5.076E-04
1,1,1-Trichloroethane	7.05E-01						1	7.05E+02	7.33E-07	5.167E-04
Trichloroethylene	4.22E-01						1	4.22E+02	7.84E-07	3.307E-04
Acetone	1.59E-03						1	1.59E+00	2.14E-06	3.398E-06

NOTES

Column headings underlined indicate values calculated from the designated equations.

Eq. 10: C(soilwater)/C(source)=r/(em+Koc*foc*r+H*eu) for soil; C(soilwater)/C(source)=1 for groundwater.

Eq. 11: C(soilvapor)/Csource=H*C(soilwater)/C(source)*1000

Eq. 12: C(indoor)/C(source)=alpha*C(soilvapor)/C(source)

APPENDIX E

Cost Estimate Sheets for Conceptual Development

TABLE 1
ESTIMATED REMEDIATION SYSTEM COSTS
COOPERVISION, INC.
SCOTTSVILLE, NY
SUMMARY

OPTION	CAPITAL COST	ANNUAL O&M COST	ESTIMATED DURATION (YEARS)	NPV LIFE CYCLE COST RANGE		
PUMP AND TREAT	$127,900	$51,200	TEN TO THIRTY YEARS	$545,118	TO	$1,056,510
RFT - CROSS CONFIG	$273,900	$25,200	TEN TO THIRTY YEARS	$511,636	TO	$987,108

NOTES:

- REFER TO TABLE 2 FOR COST DETAILS FOR PUMP AND TREAT
- REFER TO TABLE 3 FOR COST DETAILS FOR REFRACTIVE FLOW TREATMENT
- DISCOUNT RATE OF 6%
- INFLATION RATE OF 2.5%

TABLE 2

ESTIMATED REMEDIATION SYSTEM COSTS

COOPERVISION, INC.
SCOTTSVILLE, NY

PUMP AND TREAT

ESTIMATED INSTALLATION COSTS

NO.	ITEM	UNIT	ESTIMATED QUANTITY	UNIT PRICE	ESTIMATED COST
1	RECOVERY WELLS	EA	4	$3,000	$12,000
2	PUMPS	EA	4	$2,500	$10,000
3	PIPING	LF	750	$15	$11,250
4	TRENCHING	LS	500	$25	$12,500
5	CARBON VESSELS	EA	3	$1,500	$4,500
6	FILTRATION SYSTEM	LS	1	$2,500	$2,500
7	POWER	LS	1	$12,000	$12,000
8	VAULTS	EA	4	$1,000	$4,000
9	COMPRESSOR	LS	1	$3,000	$3,000
10	MONITORING WELLS	EA	2	$3,000	$6,000
11	MISCELLANEOUS DISPOSAL	LS	1	$7,500	$7,500
12		LS	1		$0
					$0
					$0
					$0

SUBTOTAL INSTALLATION COSTS:	$85,250
CONTINGENCY COSTS (20%):	$17,050
ENGINEERING COSTS (30%):	$25,575
TOTAL INSTALLATION COSTS:	**$127,900**

ASSUMPTIONS:

- LOCATION FOR EQUIPMENT WITHIN EXISTING BUILDING
- PNEUMATIC PUMPING SYSTEM
- POWER IS AVAILABLE WITHIN REASONABLE DISTANCE
-

ESTIMATED ANNUAL O & M COSTS

NO.	ITEM	UNIT	ESTIMATED QUANTITY	UNIT PRICE	ESTIMATED COST
1	CARBON CONSUMPTION	QTRLY	4	$2,000	$8,000
2	ENGINEERING SUPPORT	MO	12	$500	$6,000
3	MAINTENANCE	LS	1	$2,500	$2,500
4	PROCESS ANALYTICAL	EVENT	4	$750	$3,000
5	POWER	MO	12	$750	$9,000
6	REPORTING	QTRLY	4	$1,500	$6,000
7	GROUNDWATER MONITORING	QTRLY	4	$3,000	$12,000
				$0	$0

SUBTOTAL O & M COSTS:	$46,500
CONTINGENCY COSTS (10%):	$4,650
TOTAL O & M COSTS:	**$51,200**

ASSUMPTIONS:

- QUARTERLY CHANGE-OUT OF CARBON, DEPENDENT ON MASS REMOVAL AND EFFICIENCY
- FACILITY PERSONNEL TO DO DAY-TO-DAY OPERATIONS
- POWER AT $0.10/KW, 10 HP

ESTIMATED NET PRESENT VALUE

ITEM	COST
CAPITAL COST	$127,900
OPERATION & MAINTENANCE COST	$51,200
TEN-YEAR NPV	$545,118
THIRTY-YEAR NPV	$1,056,510

NOTES:

6.00%	DISCOUNT RATE
2.50%	INFLATION RATE

TABLE 3

ESTIMATED REMEDIATION SYSTEM COSTS

COOPERVISION, INC.
SCOTTSVILLE, NY

REFRACTIVE FLOW TREATMENT - CROSS CONFIGURATION

ESTIMATED INSTALLATION COSTS

NO.	ITEM	UNIT	ESTIMATED QUANTITY	UNIT PRICE	ESTIMATED COST
1	TRENCHING	LF	320	$150	$48,000
2	REACTIVE IRON	FT^3	282	$70	$19,740
3	SAND BACKFILL	FT^3	11625	$1	$11,625
4	BACKFILL	CY	300	$10	$3,000
5	DISPOSAL	TON	720	$100	$72,000
6	RESTORATION	LS	1	$5,000	$5,000
7	MONITORING WELLS	EA	3	$2,500	$7,500
8	TRANSPORTATION	LOAD	72	$400	$28,800
9					$0
10					$0
11					$0
12					$0
13					$0
14					$0
15					$0
16					$0
					$0

SUBTOTAL INSTALLATION COSTS:	**$195,665**
CONTINGENCY COSTS (20%):	**$39,133**
ENGINEERING COSTS (20%):	**$39,133**
TOTAL INSTALLATION COSTS:	**$273,900**

ASSUMPTIONS:

- 320 FT x 2.5 FT x 25 FT DEEP ~20000 FT^3 OR ~ 740 CY: TRENCH
- 5 FT x 5 FT CROSS ~282 FT^3: IRON
- 310 FT x 2.5 FT x 15 FT DEEP ~ 11625 FT^3 ~ 430 CY
- WEIGHT OF SOIL 120 LB/FT^3
-

ESTIMATED ANNUAL O & M COSTS

NO.	ITEM	UNIT	ESTIMATED QUANTITY	UNIT PRICE	ESTIMATED COST
1	GROUNDWATER MONITORING	QTRLY	4	$3,000	$12,000
2	REPORTING	QTRLY	4	$1,500	$6,000
3	IRON REPLENISHMENT	YRLY	0.1	$30,000	$3,000
				$0	$0
				$0	$0

SUBTOTAL O & M COSTS:	**$21,000**
CONTINGENCY COSTS (20%):	**$4,200**
TOTAL O & M COSTS:	**$25,200**

ASSUMPTIONS:

- ZERO VALENT IRON REPLACEMENT AT 10 YEAR INTERVALS
-
-
-
-

ESTIMATED NET PRESENT VALUE

ITEM	COST
CAPITAL COST	$273,900
OPERATION & MAINTENANCE COST	$25,200
TEN-YEAR NPV	$511,636
THIRTY-YEAR NPV	$987,108

NOTES:

6.00%	DISCOUNT RATE
2.50%	INFLATION RATE

APPENDIX F

Rising Head Hydraulic Conductivity Test Summaries

RISING HEAD TEST SUMMARY

WELL NAME: MW-1 - TEST 1
DATE OF TEST: 12-AUG-97

Rising Head Permeability Calculation
Bouwer-Rice Method
Kh=[(rc*rc*ln(Re/rw))(ln(Yo/Yt)]/2Lt

Test Sectn. Radius (rw), in ft.:	0.08
Casing Radius (rc), in ft.:	0.06
Test Section length (L),in ft.:	9.0
C:	4.38
L/rw:	107.52
Saturated Thickness(H),in ft.:	9.0
ln (Re/rw):	3.62
Yo, in ft.:	0.71
Yt, in ft.:	0.710
t, in min.:	0.33
Kh (cm/sec) =	2.3E-06
Kh (ft/min) =	4.6E-06
Kh (ft/day) =	6.6E-03

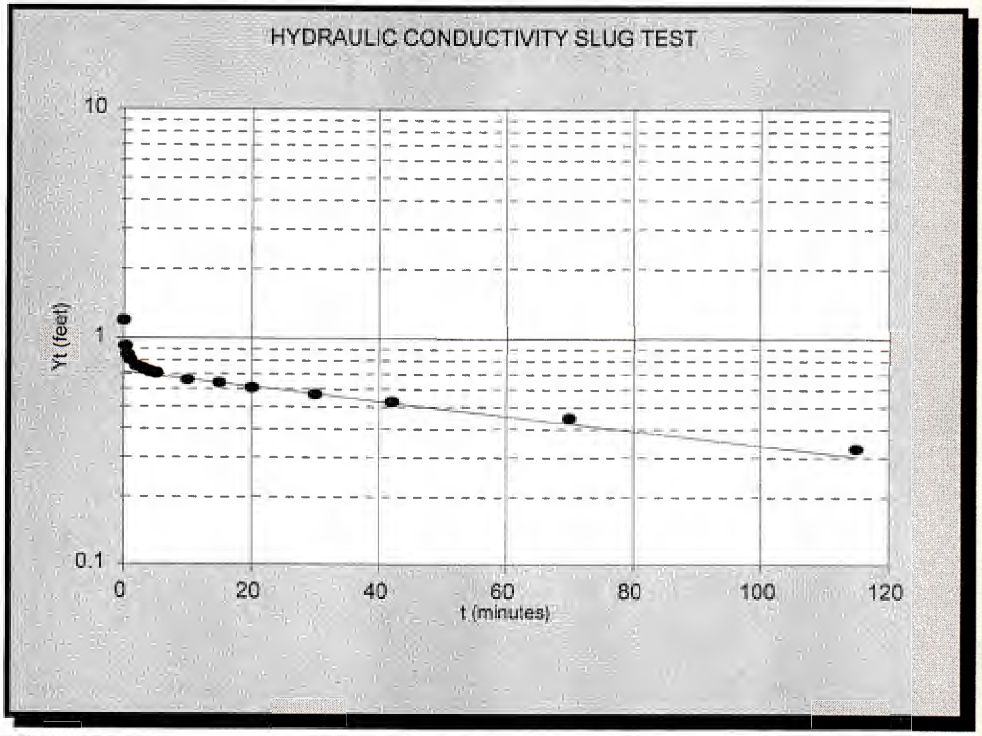
Static Water
6.34

Rising Head Test Field Data

Depth Water (ft)	Elapsed Time (min)	Residual Head Y (ft)
7.54	0	1.20
7.27	0.33	0.93
7.19	0.66	0.85
7.15	1	0.81
7.10	2	0.76
7.08	3	0.74
7.06	4	0.72
7.05	5	0.71
7.00	10	0.66
6.98	15	0.64
6.95	20	0.61
6.91	30	0.57
6.87	42	0.53
6.79	70	0.45
6.67	115	0.33

NOTES

1. C=-2.343E-05(L/rw)^2 + .033(L/rw) + 1.103
2. ln(Re/rw) calculated from 1/[{1.1/ln(H/rw)}+{C/(L/rw)}].
3. Test Section radius (rw) is equal to the borehole radius.
4. Method taken from Bouwer and Rice, 1976.
5. Best fit line defined by shaded time values and corresponding residual heads.



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RISING HEAD TEST SUMMARY

WELL NAME: MW-2 - TEST 1
DATE OF TEST: 12-AUG-97

Rising Head Permeability Calculation
Bouwer-Rice Method
Kh=[(rc*rc*ln(Re/rw))(ln(Yo/Yt)]/2Lt

Test Sectn. Radius (rw), in ft.:	0.08
Casing Radius (rc), in ft.:	0.06
Test Section length (L),in ft.:	4.3
C:	2.75
L/rw:	51.84
Saturated Thickness(H),in ft.:	4.3
ln (Re/rw):	3.01
Yo, in ft.:	1.38
Yt, in ft.:	1.371
t, in min.:	0.33 –
Kh (cm/sec) =	7.8E-06
Kh (ft/min) =	1.5E-05
Kh (ft/day) =	2.2E-02

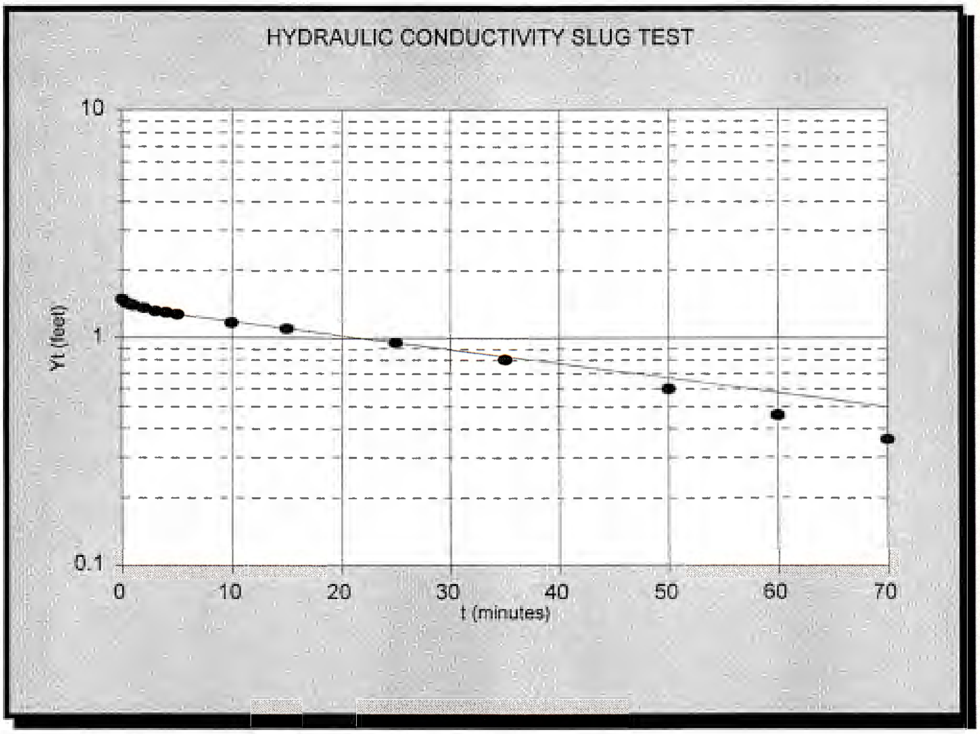
Static Water
6.88

Rising Head Test Field Data

Depth Water (ft)	Elapsed Time (min)	Residual Head Y (ft)
8.38	0	1.50
8.33	0.33	1.45
8.31	0.66	1.43
8.29	1	1.41
8.25	2	1.37
8.21	3	1.33
8.19	4	1.31
8.17	5	1.29
8.06	10	1.18
7.99	15	1.11
7.84	25	0.96
7.69	35	0.81
7.48	50	0.60
7.34	60	0.46
7.24	70	0.36

NOTES

1. C=-2.343E-05(L/rw)^2 + .033(L/rw) + 1.103
2. ln(Re/rw) calculated from 1/[{1.1/ln(H/rw)}+{C/(L/rw)}].
3. Test Section radius (rw) is equal to the borehole radius.
4. Method taken from Bouwer and Rice, 1976.
5. Best fit line defined by shaded time values and corresponding residual heads.



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RISING HEAD TEST SUMMARY

WELL NAME: MW-201 - TEST 1
DATE OF TEST: 12-AUG-97

Rising Head Permeability Calculation
Bouwer-Rice Method
Kh=[(rc*rc*ln(Re/rw))(ln(Yo/Yt)]/2Lt

Test Sectn. Radius (rw), in ft.:	0.33
Casing Radius (rc), in ft.:	0.08
Test Section length (L),in ft.:	11.6
C:	2.23
L/rw:	35.15
Saturated Thickness(H),in ft.:	12.6
ln (Re/rw):	2.73
Yo, in ft.:	1.07
Yt, in ft.:	1.007
t, in min.:	0.33
Kh (cm/sec) =	7.4E-05
Kh (ft/min) =	1.5E-04
Kh (ft/day) =	2.1E-01

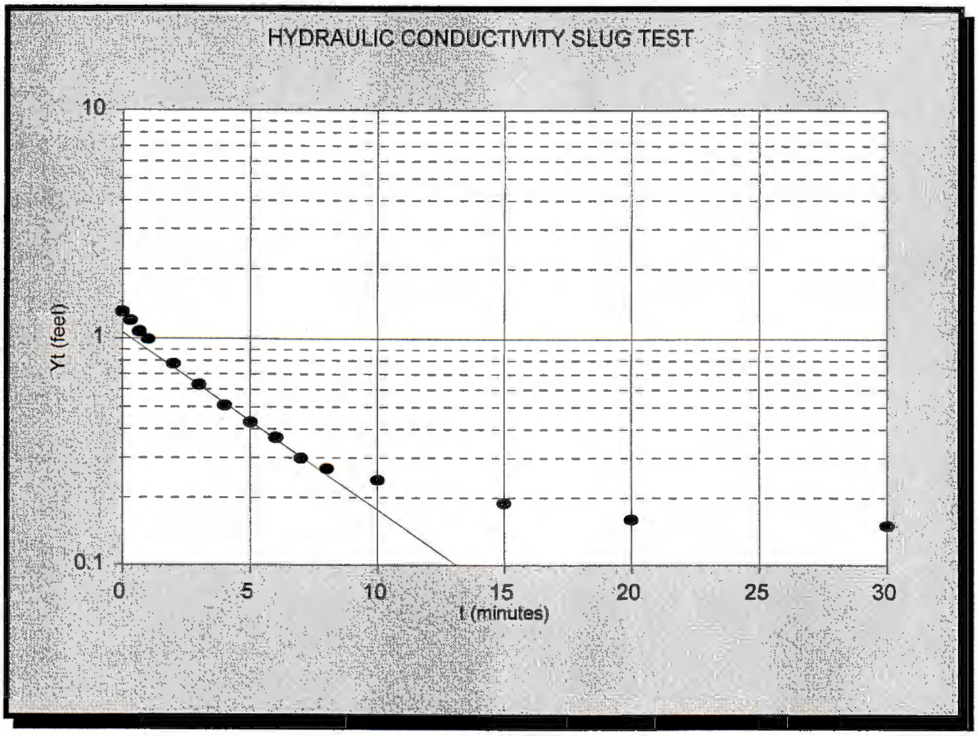
Static Water
7.12

Rising Head Test Field Data

Depth Water (ft)	Elapsed Time (min)	Residual Head Y (ft)
8.43	0	1.31
8.32	0.33	1.20
8.20	0.66	1.08
8.12	1	1.00
7.90	2	0.78
7.75	3	0.63
7.63	4	0.51
7.55	5	0.43
7.49	6	0.37
7.42	7	0.30
7.39	8	0.27
7.36	10	0.24
7.31	15	0.19
7.28	20	0.16
7.27	30	0.15

NOTES

1. C=-2.343E-05(L/rw)^2 + .033(L/rw) + 1.103
2. ln(Re/rw) calculated from 1/[{1.1/ln(H/rw)}+{C/(L/rw)}].
3. Test Section radius (rw) is equal to the borehole radius.
4. Method taken from Bouwer and Rice, 1976.
5. Best fit line defined by shaded time values and corresponding residual heads.



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RISING HEAD TEST SUMMARY

WELL NAME: MW-202 - TEST 1
DATE OF TEST: 12-AUG-97

Rising Head Permeability Calculation
Bouwer-Rice Method
Kh=[(rc*rc*ln(Re/rw))(ln(Yo/Yt)]/2Lt

Test Sectn. Radius (rw), in ft.:	0.33
Casing Radius (rc), in ft.:	0.19
Test Section length (L),in ft.:	12.1
C:	2.28
L/rw:	36.67
Saturated Thickness(H),in ft.:	11.5
ln (Re/rw):	2.69
Yo, in ft.:	0.41
Yt, in ft.:	0.412
t, in min.:	0.16
Kh (cm/sec) =	2.7E-05
Kh (ft/min) =	5.4E-05
Kh (ft/day) =	7.8E-02

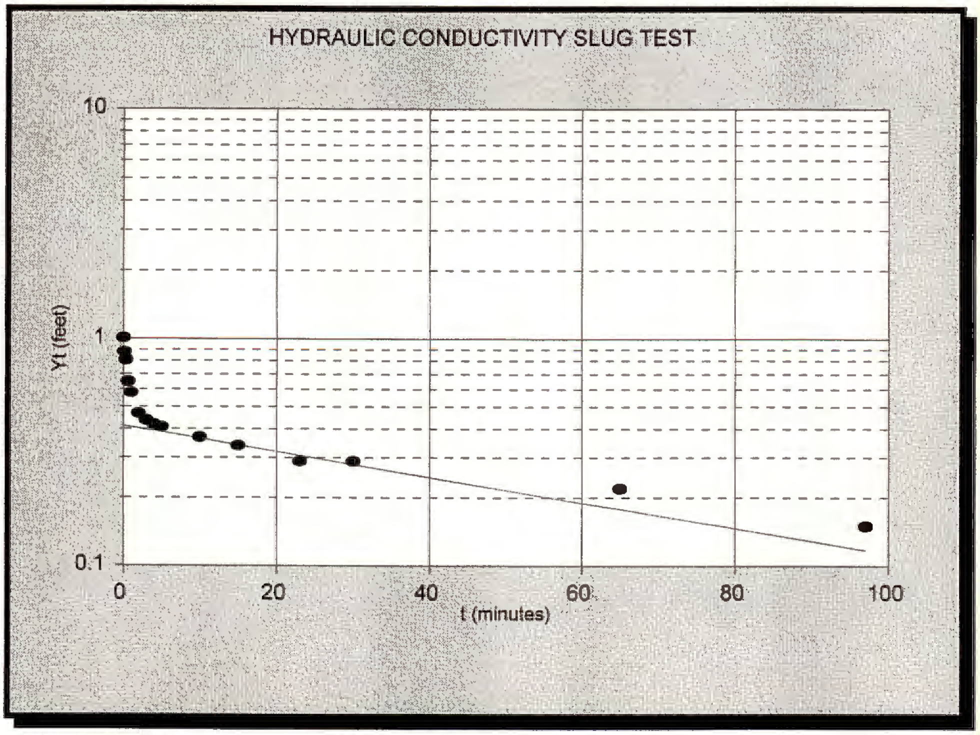
Static Water
8.13

Rising Head Test Field Data

Depth Water (ft)	Elapsed Time (min)	Residual Head Y (ft)
9.15	0	1.02
9.01	0.16	0.88
8.94	0.33	0.81
8.78	0.66	0.65
8.71	1	0.58
8.60	2	0.47
8.57	3	0.44
8.55	4	0.42
8.54	5	0.41
8.50	10	0.37
8.47	15	0.34
8.42	23	0.29
8.42	30	0.29
8.35	65	0.22
8.28	97	0.15

NOTES

1. C=-2.343E-05(L/rw)^2 + .033(L/rw) + 1.103
2. ln(Re/rw) calculated from 1/[{1.1/ln(H/rw)}+{C/(L/rw)}].
3. Test Section radius (rw) is equal to the borehole radius.
4. Method taken from Bouwer and Rice, 1976.
5. Best fit line defined by shaded time values and corresponding residual heads.



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RISING HEAD TEST SUMMARY

WELL NAME: MW-203 - TEST 1
DATE OF TEST: 12-AUG-97

Rising Head Permeability Calculation
Bouwer-Rice Method
Kh=[(rc*rc*ln(Re/rw))(ln(Yo/Yt)]/2Lt

Test Sectn. Radius (rw), in ft.:	0.33
Casing Radius (rc), in ft.:	0.08
Test Section length (L),in ft.:	11.7
C:	2.23
L/rw:	35.10
Saturated Thickness(H),in ft.:	13.4
ln (Re/rw):	2.77
Yo, in ft.:	0.95
Yt, in ft.:	0.924
t, in min.:	0.16

Kh (cm/sec) =	6.4E-05
Kh (ft/min) =	1.3E-04
Kh (ft/day) =	1.8E-01

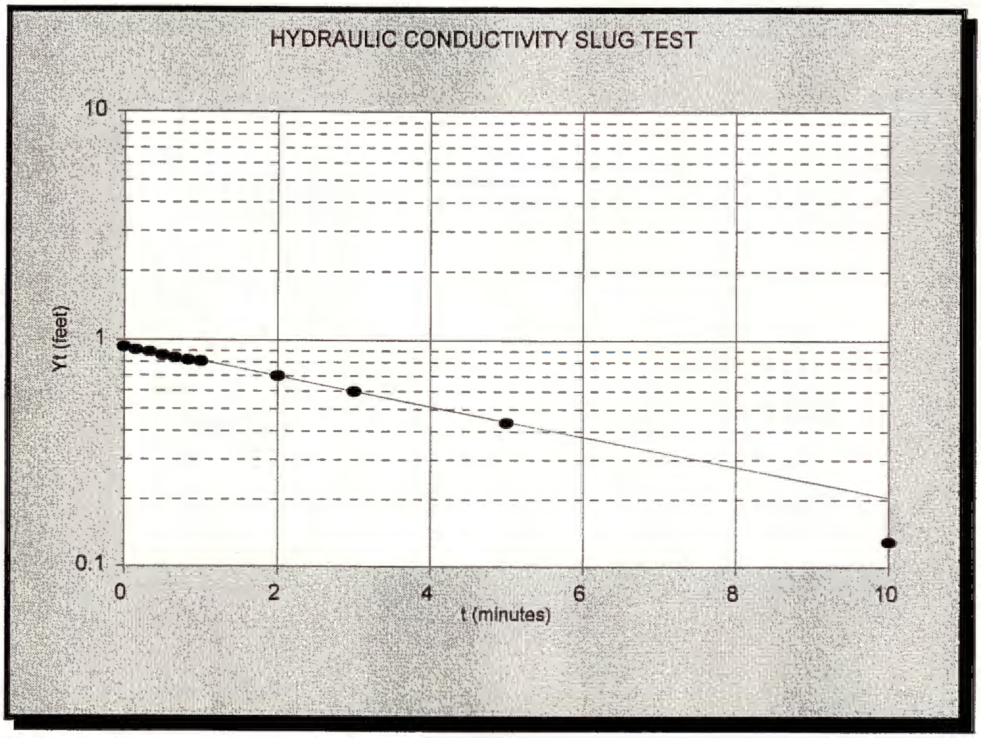
Static Water
6.09

Rising Head Test Field Data

Depth Water (ft)	Elapsed Time (min)	Residual Head Y (ft)
7.03	0	0.94
7.00	0.16	0.91
6.98	0.33	0.89
6.95	0.5	0.86
6.93	0.66	0.84
6.91	0.83	0.82
6.90	1	0.81
6.79	2	0.70
6.69	3	0.60
6.53	5	0.44
6.22	10	0.13

NOTES

1. C=-2.343E-05(L/rw)^2 + .033(L/rw) + 1.103
2. ln(Re/rw) calculated from 1/[{1.1/ln(H/rw)}+{C/(L/rw)}].
3. Test Section radius (rw) is equal to the borehole radius.
4. Method taken from Bouwer and Rice, 1976.
5. Best fit line defined by shaded time values and corresponding residual heads.



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RISING HEAD TEST SUMMARY

WELL NAME: MW-204 - TEST 1
DATE OF TEST: 12-AUG-97

Rising Head Permeability Calculation
Bouwer-Rice Method
Kh=[(rc*rc*ln(Re/rw))(ln(Yo/Yt)]/2Lt

Test Sectn. Radius (rw), in ft.:	0.33
Casing Radius (rc), in ft.:	0.08
Test Section length (L),in ft.:	11.0
C:	2.17
L/rw:	33.00
Saturated Thickness(H),in ft.:	12.4
ln (Re/rw):	2.70
Yo, in ft.:	1.11
Yt, in ft.:	1.094
t, in min.:	0.50

Kh (cm/sec) = 1.0E-05
Kh (ft/min) = 2.0E-05
Kh (ft/day) = 2.8E-02

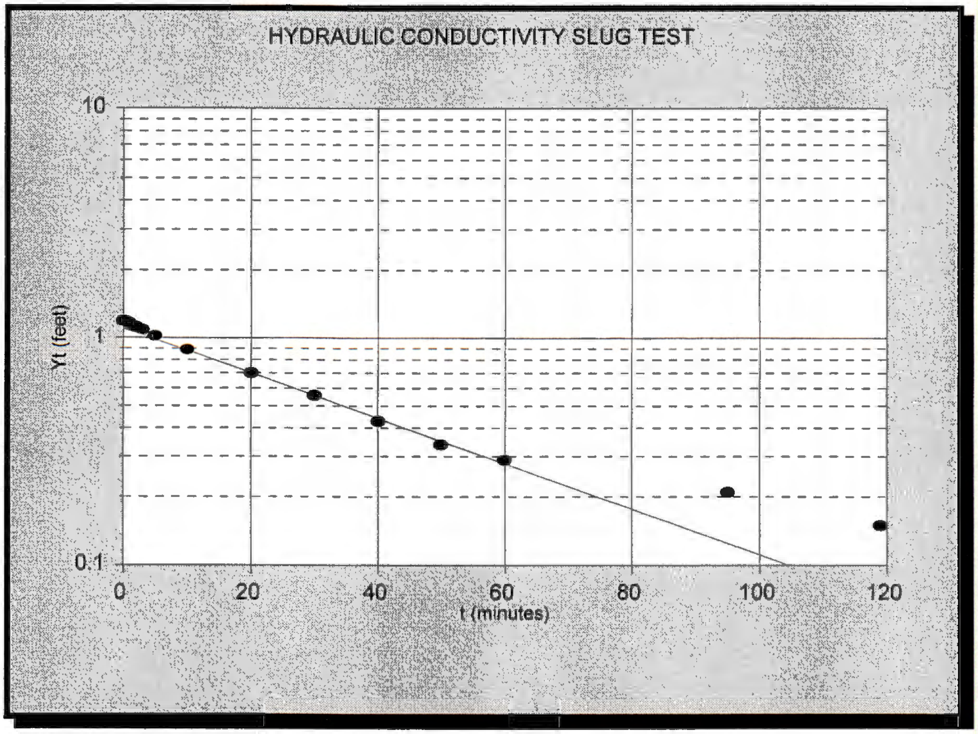
Static Water
7.10

Rising Head Test Field Data

Depth Water (ft)	Elapsed Time (min)	Residual Head Y (ft)
8.30	0	1.20
8.29	0.5	1.19
8.28	0.83	1.18
8.27	1	1.17
8.23	2	1.13
8.20	3	1.10
8.13	5	1.03
7.99	10	0.89
7.80	20	0.70
7.66	30	0.56
7.53	40	0.43
7.44	50	0.34
7.39	60	0.29
7.31	95	0.21
7.25	119	0.15

NOTES

1. C=-2.343E-05(L/rw)^2 + .033(L/rw) + 1.103
2. ln(Re/rw) calculated from 1/[{1.1/ln(H/rw)}+{C/(L/rw)}].
3. Test Section radius (rw) is equal to the borehole radius.
4. Method taken from Bouwer and Rice, 1976.
5. Best fit line defined by shaded time values and corresponding residual heads.



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RISING HEAD TEST SUMMARY

WELL NAME: MW-205 - TEST 1
DATE OF TEST: 12-AUG-97

Rising Head Permeability Calculation
Bouwer-Rice Method
Kh=[(rc*rc*ln(Re/rw))(ln(Yo/Yt)]/2Lt

Test Sectn. Radius (rw), in ft.:	0.33
Casing Radius (rc), in ft.:	0.08
Test Section length (L),in ft.:	8.2
C:	1.90
L/rw:	24.60
Saturated Thickness(H),in ft.:	23.2
ln (Re/rw):	2.97
Yo, in ft.:	1.31
Yt, in ft.:	1.307
t, in min.:	0.50

Kh (cm/sec) = 4.6E-07
Kh (ft/min) = 9.0E-07
Kh (ft/day) = 1.3E-03

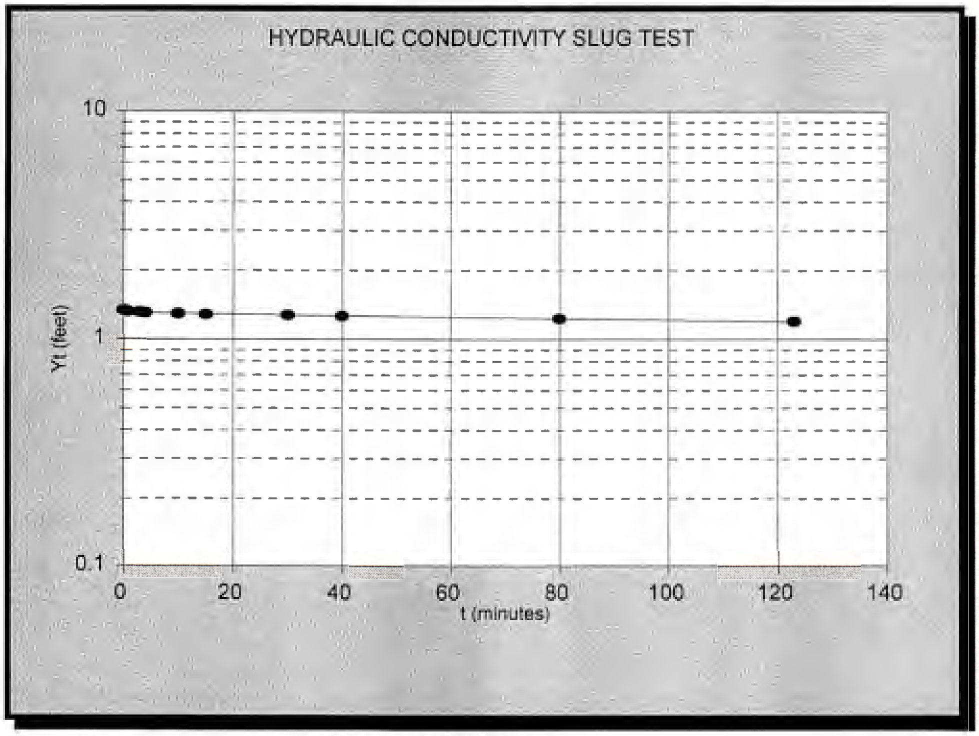
Static Water
4.50

Rising Head Test Field Data

Depth Water (ft)	Elapsed Time (min)	Residual Head Y (ft)
5.85	0	1.35
5.84	0.5	1.34
5.83	0.83	1.33
5.82	3	1.32
5.81	4	1.31
5.80	10	1.30
5.79	15	1.29
5.78	30	1.28
5.77	40	1.27
5.74	80	1.24
5.71	123	1.21

NOTES

1. C=-2.343E-05(L/rw)^2 + .033(L/rw) + 1.103
2. ln(Re/rw) calculated from 1/[{1.1/ln(H/rw)}+{C/(L/rw)}].
3. Test Section radius (rw) is equal to the borehole radius.
4. Method taken from Bouwer and Rice, 1976.
5. Best fit line defined by shaded time values and corresponding residual heads.



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