VAPOR MITIGATION WORK PLAN

Leica, Inc. Site
Eggert and Sugar Roads
Town of Cheektowaga, Erie County, New York
Site ID Number 915156

Prepared for

Leica, Inc., c/o Videojet Tech
1500 Mittell Boulevard
Wood Dale, Illinois 60191

And

New York State Department of Environmental Conservation, Region 9
270 Michigan Avenue
Buffalo, New York 14203-2999

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ENERGYSOLUTIONS

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Vapor Mitigation Work Plan for the Former Leica Facility located at the Leica, Inc. Site
Eggert and Sugar Roads
Cheektowaga, New York
NYSDEC Site ID 915156

Project No. 137015 **Revision 1**

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☐ New Plan

☐ Title Change

☒ Plan Revision

☐ Plan Rewrite

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ACRONYMS AND ABBREVIATIONS

AS/DVE	Air Sparging/Dual Vacuum Extraction
BGS	Below grade surface
COC	Chain-of-Custody
CRA	Conestoga-Rovers Associates
DCE	cis-1,2-Dichloroethene
EPA	United States Environmental Protection Agency
HRC	Hydrogen Release Compound®
Leica	Leica, Inc.
NELAP	National Environmental Laboratory Accreditation Program
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PVC	Polyvinyl Chloride
RAO	Remedial Action Objective
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
Site	Leica, Inc. Site: NYSDEC Site ID Number 915156
SSD	Subslab Soil Depressurization
TCA	1,1,1-Trichloroethane
TCE	Tricholoroethene
µg/kg	microgram per kilogram
$\mu g/m^3$	microgram per cubic meter
VOC	Volatile Organic Compound

1.0 INTRODUCTION

On behalf of Leica, Inc., c/o Videojet Tech of Wood Dale, Illinois (Leica), Energy*Solutions*, LLC (Energy*Solutions*) has prepared this Vapor Mitigation Work Plan for the former Leica facility located on the Leica, Inc. site (Site) at Eggert and Sugar Roads, Cheektowaga, New York (NYSDEC Site ID Number 915156). A Site Location Map is included as Figure 1. A site map showing the building, site features, and monitoring well locations is included as Figure 2. This work plan is based on subslab and indoor air sample results collected from the Site on March 23, 2010. The results of these samples were provided to the New York State Department of Environmental Conservation (NYSDEC) on September 3, 2010 (Ref. No. 1.2.1). A summary table of the data is provided in Table 1.

Chlorinated volatile organic compounds (VOCs) were detected in subslab and indoor air samples collected from within the northeast portion of the facility during the March 2010 sampling event. Data was compared to the NYSDEC Soil Vapor/Indoor Air Matrices 1 and 2 as published in the New York State Department of Health (NYSDOH) "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (Ref. No 1.2.2). Data is compared to the Matrix guidelines in Table 1. The Matrix guidelines indicate that mitigation is required in several portions of the building. A detailed facility Map illustrating these sample locations is included as Figure 3.

1.1 Purpose

The purpose of this Work Plan is to provide a mitigation plan for several areas within the northeast portion of the former Leica facility, as required by the Soil Vapor/Indoor Air Matrices 1 and 2 of the NYSDOH guidance (Ref. No. 1.2.2). The Work Plan describes the actions proposed to reduce or eliminate the chlorinated VOCs present in the subslab soil and indoor air samples. Immediate mitigation is proposed in the basement area and the Main Entryway/Loading Dock area of the building. Both areas are located on the northeast side of the building (Figure 3).

In addition, the Work Plan also proposes additional investigation within the main warehouse portion of the building. Ongoing chlorinated VOC concentrations detected in groundwater samples collected from monitoring wells within the building and outside its southeast corner suggest that additional investigation within the building is warranted. The Work Plan proposes additional groundwater sampling activities to provide information for more effective groundwater remediation beneath the building. Reduction in VOCs in the groundwater will ultimately lead to VOC concentration reductions in the subslab and indoor air samples. Data collected during this supplemental groundwater sampling will be used to design future mitigation plans for the area surrounding monitoring wells MW-24 and MW-24A, and air sampling locations SB-3/IA-3.

1.2 References

1.2.1 31129-077, "Indoor Air and Sub-Slab Soil Vapor Sampling Results, Leica, Inc. Site; Erie County, Cheektowaga, New York, Inactive Hazardous Waste Disposal Site 915156," September 3, 2010.

1.2.2 New York State Department of Environmental Conservation Soil Vapor/Indoor Air Matrices 1 and 2 as published in the New York State Department of Health "Guidance for Evaluating Soil Vapor Intrusion in the State of New York," October 2006.

1.2.3 Conestoga-Rovers Associates, "Remedial Investigation Report, Leica, Inc., Cheektowaga, New York, Site Code 915156," October 1994.

1.2.4 Conestoga-Rovers Associates, "Remedial Pre-Design Work Plan, Leica, Inc., Cheektowaga, New York, Site Code 915156," March 1996.

1.2.5 NES, Inc., "Feasibility Study Addendum Submittal, Leica Optical Site, Cheektowaga, New York," February 3, 1997.

1.2.6 New York State Department of Environmental Conservation, Division of Environmental Remediation, "Record of Decision, Leica, Incorporated Site, Town of Cheektowaga, Erie County, Registry Number 915156," March 1997.

1.2.7 Beacon Environmental Services, Inc., "Passive Soil-Gas Survey, Leica Site, Cheektowaga, New York," prepared for SCIENTECH, Inc., July 19, 2005, Beacon Report No. EM1789.

1.2.8 31129-033, "Status Report (February 2006-April 2006), Leica, Inc. Site, Erie County, Cheektowaga, New York," June 1, 2006.

1.2.9 31129-039, "Status Report (May 2006-December 2006), Leica, Inc. Site, Erie County, Cheektowaga, New York," March 6, 2007.

1.2.10 Energy*Solutions*, "Supplemental Area B Soil Remediation Using Hydrogen Release Compound (HRC), Remedial Action Work Plan for the Leica, Inc. Site, Cheektowaga, New York," May 2007.

1.2.11 New York State Department of Environmental Conservation, Approval of "HRC Injection Plan for Area B, Leica, Inc. (Site #915156), Cheektowaga, New York," November 14, 2007.

1.2.12 31129-061, "Status Report Annual Reporting for 2008, Leica, Inc. Site, Erie County, Cheektowaga, New York, Inactive Hazardous Waste Disposal Site 915156," July 8, 2009.

1.2.13 Occupational Health & Safety Administration (OSHA), "Permissible Exposure Limits (PELs) for Air Contaminants," Code of Federal Regulations CFR 29 1910.1000, January 10, 1999.

1.2.14 United States Environmental Protection Agency, "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846," EPA publication number EPA/530-SW-846.3-1.

1.3 Background

The building is currently owned and operated as a warehouse and distribution center by SamSon Distributing. Currently, there are no activities conducted within the building that use products containing VOCs, however, such products have been used in the past.

Leica, with NYSDEC approval, initiated a Remedial Investigation/Feasibility Study (RI/FS) in November 1993 to address the contamination at the Site. The RI was completed in October 1994 by Conestoga-Rovers and Associates (CRA) (Ref. No. 1.2.3). An FS was submitted by CRA in May 1995 with subsequent revisions in July 1995 and March 1996 (Ref. No. 1.2.4). The final FS addendum was submitted by NES, Inc. (now Energy*Solutions*) in February 1997 (Ref. No. 1.2.5). Upon issuance of a Record of Decision (ROD) in 1997 (Ref. No. 1.2.6), NYSDEC authorized Leica to begin activities necessary to design and implement the chosen remedial alternative at the Site.

NES, Inc., (now Energy*Solutions*) was contracted in 1997 by Leica, to design, install and operate a remediation system at the Site. The system, which included a combination of air sparging and dual vacuum extraction (AS/DVE), was designed to remediate a shallow soil zone (0 – 4′) and an intermediate soil zone (8 – 13′) of contamination. The system was installed in 1999 and was designed to remediate soils in three specific areas of the site including: Area A, a former hazardous waste storage area located northeast of the main facility loading docks; Area B, a former dry well located immediately to the east of the main loading docks; and Area C, an area located beneath the main parking area in the southeastern portion of the property. A bedrock groundwater extraction system was also installed by NES, Inc. (now Energy*Solutions*) at the same time. The AS/DVE system was operated in Area A and Area B until July 2002 and in Area C until November 2002. The groundwater extraction system has operated continuously (excluding minor shutdown and maintenance periods) to the present. A Site Map showing the location of the remediation areas is included as Figure 2.

In order to determine the potential source of the elevated VOC concentrations in groundwater samples collected from monitoring wells MW-16R and MW-16A (Area B), SCIENTECH (now Energy*Solutions*) completed a soil gas survey of the area surrounding these wells in June 2005. The results of the study were provided to NYSDEC on July 19, 2005 (Ref. No. 1.2.7). Considering that remedial actions had been performed in the areas immediately to the east of the loading dock, the source areas were suspected to be located beneath the loading dock and the main warehouse facility to the west of the loading dock. The survey was completed using passive sampling techniques. Collection media was placed in small bore holes advanced through building floors, loading docks and other paved surfaces in the area and remained in-place for approximately two weeks. Approximately 25 soil gas samples were collected from beneath the surface in this area. The survey confirmed the presence of VOCs in this area with the highest VOC concentrations located to the west of MW-16R, immediately to the southwest of the former dry well approximately thirty feet away, and in the areas beneath the loading dock and other nearby sections of the building. Several contaminants of concern were detected in the soil gas survey including trichloroethene (TCE), 1,1,1 trichloroethane (TCA), 1,2 dichloroethene (DCE) and vinyl chloride. Sufficient samples were collected to the west, beneath the building, to locate what was believed to be the western edge of the hot spot which was within approximately fifty feet of the building's eastern side. Based on the information collected during the soil gas survey, the source of the VOCs in the groundwater samples collected from monitoring wells MW-16R and MW-16A was confirmed to be located beneath the eastern side of the building and the loading dock. These results are consistent with the conceptual fate and transport model for the former dry well (Area B) located in the area.

Following completion of this soil gas survey, three supplemental investigations were completed. The first two investigations included soil sampling beneath the building floors in December 2005 and additional soil sampling surrounding the former drywell and monitoring wells MW-16R and MW-16A in March 2006. The results of the December 2005 and March 2006 studies were provided to NYSDEC in 2006 (Ref. No. 1.2.8). The third investigation was a soil vapor survey completed in December 2006. The data for this study was provided to NYSDEC in 2007 (Ref. No. 1.2.9).

Soil sampling completed beneath the building floors in December 2005 revealed areas of limited contamination. TCE was detected in all of the samples collected and was present at a maximum concentration of 4,700 micrograms per kilogram (μg/kg) beneath the basement area. TCA was detected in 12 of the 13 samples at a maximum concentration of 4,900 μg/kg, which was also beneath the basement area.

Soil samples collected in March 2006 (Ref. No. 1.2.8) indicated that the VOC concentrations in the vicinity of the former dry well were lower than those under the building. TCE was detected at a maximum concentration of 390 µg/kg, and TCA was detected at a maximum concentration of 450 µg/kg, which are below their respective Remedial Action Objectives (RAOs) for the Site. These soil sample results confirm that the DVE system, operated from 1999 through 2002, had successfully reduced the VOC concentrations in the soils in Area B, and the soils in this area were not the cause of the elevated VOC concentrations in MW-16R and MW-16A.

Subslab vapor and ambient indoor air sampling confirmed the presence of VOC vapors in the area (Ref. No. 1.2.9). TCE was detected at a maximum concentration of 380,000 micrograms per cubic meter ($\mu g/m^3$) in subslab vapors and at a maximum concentration of 16 ug/m^3 in the ambient air of the building. Both samples were collected in the main entry room located south of the loading docks.

Based on these supplemental investigations completed in Area B, it was determined that a source area of VOCs was not present in Area B or its immediate vicinity; however, VOC concentrations above the site RAOs were detected in the soils beneath the building. These soils below the building were most probably impacted by releases from the dry well formerly located in Area B, in the vicinity of monitoring wells MW-16R and MW-16A.

In consultation with NYSDEC, a work plan to inject Hydrogen Release Compound® (HRC) at select locations within the site was submitted by Energy*Solutions* on September 27, 2007 (Ref. No. 1.2.10), and subsequently approved by NYSDEC on November 14, 2007 (Ref. No. 1.2.11). HRC injection was used to reduce chlorinated VOC contaminant concentrations in groundwater in addition to a reduction of the VOC concentrations in the soils beneath the main building. Reduction in the VOC concentrations in the soil was also expected to reduce VOC concentrations in the subslab and indoor air of the building.

In May 2008, Energy*Solutions* completed the implementation of the HRC injection plan, including the injection of approximately 4,000 pounds of HRC into 74 injection points in Areas B and C. A summary of these activities was included in Energy*Solutions*' "Status Report Annual Reporting for 2008, Leica, Inc. Site, Erie County, Cheektowaga, New York, Inactive Hazardous Waste Disposal Site 915156" in 2009 (Ref. No. 1.2.12). Injection points were advanced using a direct-push rig to a depth just above the bedrock surface, which is approximately 12 to 14 feet below ground surface (BGS). The HRC material was injected over a vertical interval of approximately five to ten feet depending on the specific location. A total of 52 injection points were advanced in Area B, surrounding the former dry well along a 60 foot by 90 foot grid, with injection points spaced approximately 10 feet on center. In addition to an anticipated reduction in VOC concentrations in groundwater, the HRC injection was also intended to aid in the reduction of subslab and indoor air concentrations in the vicinity of the main facility loading dock in Area B.

In order to assess the progress toward accomplishing this goal, the injection plan also included subsequent air sampling in the loading dock area. The first two rounds of air samples were collected 1 month and 6 months following the HRC injection. The results of this study were provided to NYSDEC in 2009 (Ref. No. 1.2.12). Subslab and indoor air samples were collected in the east entryway into the building, basement area, warehouse area, and the loading dock area. In addition, an ambient background outdoor air sample was collected upwind of the site, across the parking lot to the east and north of the loading dock. In general, the data indicated that VOC concentrations in subslab vapor and indoor air within the facility had declined significantly following the HRC injection program. Subsequent groundwater sampling indicated that VOC concentrations in groundwater had also been reduced in Area B. Also, a corresponding rise in the TCE degradation products DCE and vinyl chloride, and changes in additional monitoring parameters iron, chloride, and sulfide, indicated that HRC was working at the injection locations and was decreasing the chlorinated VOC plumes in these areas. All indoor ambient air concentrations were below the Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) in every case (Ref. No. 1.2.13).

The most recent indoor air and subslab soil vapor sampling event was conducted at the facility on March 23, 2010 (Ref. No. 1.2.1). Samples were once again collected from four locations inside the building at the Main Warehouse area, Loading Dock, Basement, and Main Entry areas. In addition, one ambient air sample was collected at a background location east of the building. One or more chlorinated VOCs were detected at concentrations above their NYSDOH minimum indoor air action threshold (Ref. No. 1.2.2); however, most of the VOC concentrations have decreased since the December 2008 sampling event.

As required by NYSDOH guidance (Ref. No. 1.2.2), the preparation and submittal of a mitigation plan for NYSDEC approval is necessary. The following Scope of Work is intended to fulfill this requirement with a plan to reduce the VOC concentrations in the subslab vapors and building indoor air.

2.0 SCOPE OF WORK

The following Scope of Work addresses the vapor intrusion issues present within the main facility building. This approach takes into account:

- Space use and accessibility,
- contaminant concentrations,
- groundwater impacts and contributions to vapor issues, and
- groundwater elevation.

The three areas to be mitigated are: the basement area, the combined Main Entryway and Loading Dock area, and the northeast portion of the Main Warehouse to the west of the Main Entryway as shown on Figure 3. Mitigation is not proposed at this time for the Main Warehouse because additional investigation is necessary and proposed to better identify potential source areas for a more effective mitigation of this area.

2.1 Basement Area Mitigation

The basement area contains the mechanical room and is isolated from the main warehouse. The basement area is infrequently accessed for brief maintenance checks. SamSon management indicates that the maintenance personnel visit the area approximately four times per year. The facility boilers are no longer in operation. The basement area is heated using a large propane heating unit. Maintenance personnel enter the area to ensure the heater is operating and the water lines in the room are not in danger of freezing. The basement area is monitored by an alarm system that notifies the office of entry into the basement either through interior or exterior doors. The floor of this room is at or near the high water table level and frequently has standing water. A typical subslab depressurization system would likely be ineffective at reducing VOC concentrations within this room due to the high water table and its associated operational problems with water.

2.1.1 Conceptual Design

Since this room is infrequently used and not normally occupied, the mitigation method chosen is to seal all cracks in the concrete floor and walls between the basement and the main warehouse. The proposed steps involved include:

- Visually inspect the floor to locate cracks, holes or penetrations of the concrete,
- seal all identified cracks, holes or penetrations with a vapor retarding coating,
- seal any large openings in the walls between the basement area and the main warehouse with concrete block and/or grout,
- close and lock (when unoccupied) the door to isolate the room from the main warehouse, and
- continue annual air monitoring.

2.1.2 Mitigation Monitoring and Contingency

Following the above-described mitigation actions, VOCs will be trapped beneath the sealed floor. Air monitoring of the basement area will be used to determine the effectiveness of the floor sealing activities. Remediation and mitigation efforts at areas adjacent to the basement (i.e., the Loading Dock and Main Entryway described below) should decrease VOC concentrations over time and would likely improve air quality within the basement. If, however, air monitoring does not indicate a reduction in VOC concentrations below the NYSDOH Matrix criteria (Ref. No. 1.2.2) after two rounds of sampling, exhaust fans will be installed in the basement room to vent vapors from the room.

2.2 Main Entryway/Loading Dock Mitigation

The Main Entryway and adjacent loading dock Area are adjoining rooms located on the east side of the building. Due to the proximity of the areas, they will be treated as one area for the purpose of this Work Plan. The Main Entryway is a small room which has the highest concentrations of VOCs in both subslab and indoor air samples. Based on the current conceptual model, the elevated VOC concentrations in the groundwater are believed to be the result of contamination migrating to the southwest in and on the surface of the groundwater from the original dry well location at MW-16R and MW-16A. It is believed that the building design (foundation wall) is trapping the vapors from the groundwater contamination in this area. The Loading Dock is located to the north of the Main Entryway and is constantly occupied with personnel. Although the Loading Dock frequently has opened doors during the warmer weather, these doors are closed more often during colder periods and thus are able to retain vapors within the prime working area of the building. The foundation wall configuration in this area may also be trapping vapors beneath the loading dock floors.

2.2.1 Conceptual Design

Energy*Solutions* proposes to install an active subslab soil depressurization (SSD) system to mitigate the risk of exposure to TCE and related VOCs within these areas of the building. The system will also control the migration of VOC contaminants and limit the migration of these VOCs into other occupied areas of the building. This method is widely used and was chosen because of its effectiveness, ease of installation, low cost, and low maintenance. In addition, the SSD system would be minimally intrusive to current operations at the facility.

A pilot test will be conducted prior to installation of the full-scale SSD system. The purpose of the pilot test is to evaluate the air flow at various locations beneath the floor slab, and determine the air flow and applied vacuum necessary to achieve the desired depressurization. A test suction point will be created by coring a hole through the slab to allow temporary installation of suction piping. The piping will be connected to a blower capable of supplying a vacuum at variable rates. Vacuum monitoring points will be installed by drilling small holes through the slab and installing pressure gauges. The vacuum monitoring points will be installed radially around the suction point at distances from approximately 10 to 50 feet. Locations and distances of the vacuum monitoring points may vary depending on site operations and field conditions encountered. Three tests will be conducted at each location using a low, intermediate, and high applied vacuum. Data will be recorded to aid in the final system design.

Conceptual vapor extraction well locations are shown in Figure 3. Actual final locations will be selected based on site conditions and the needs of the SamSon facility. The current plan proposes one vapor extraction well in the entryway and one vapor extraction well in the Loading Dock area. These two vapor extraction well locations have been selected in order to ensure that if there is a foundation wall beneath the northern wall of the Entryway area, vapors from areas both north and south of the wall will be captured by the mitigation system. The vapor extraction well in the Entryway will be installed in the vicinity of the northern wall of the room. The vapor extraction well in the Loading Dock area will be installed in the vicinity of a building column near the center of the area. These proposed well locations adjacent to a wall/column were chosen in order to minimize the need for trenching the facility floor. Suction piping will be installed from the extraction well to the nearest wall/column and from there will run vertically into the facility ceiling. Piping from the two locations will be combined in the ceiling near the northern wall of the Entryway room and then run along the wall in an eastern direction and then exit the eastern exterior wall of the building. A conceptual piping layout diagram is included as Figure 4.

2.2.2 Vapor Migration Control

Vapor migration will be controlled by creating pressure differentials to control the migration of the VOCs. The existing concrete slab will be utilized to our advantage in trapping the majority of the vapors. The gas vacuum sumps will be installed into the concrete slab in each area. The sumps will consist of a 12 to 24 inch deep hole in the aggregate and soil beneath the concrete floor. A slotted polyvinyl chloride (PVC) vent pipe will be installed into the sump and the annular space around the pipe will be filled with coarse aggregate. A steel or PVC cover will be installed over the sumps and around the vent pipe to seal the sumps and match the surrounding slab. The piping will be vented to the exterior of the building at least three feet above the roof line. Suction to withdraw vapors from within the pit will be created by an in-line fan installed within the piping. The fan will be appropriately sized based on the area to be mitigated and the final manifold design of the piping will be based on the results of the pilot study. A generalized gas collection sump design is included as Figure 5.

The proposed system will use the existing subslab base beneath the concrete floor as the medium for vapor flow. Previous investigations through the building floor have consistently encountered a 6-inch to 12-inch thick aggregate base beneath the concrete slab. The aggregate base has high porosity and will allow vapors to migrate due to the pressure differential created by the fan. Based on this high porosity, we anticipate that the two proposed vapor extraction wells will provide a sufficient zone of influence to remove the vapors from beneath the floors in the Entryway and the Loading Dock. The actual number of vapor extraction wells will be based on the pilot study. The vapors will be captured by the sump and vent pipe system and vented to the outside.

All penetrations of the concrete slab will be sealed with rubberized caulk to prevent short-circuiting and control vapor migration into the occupied spaces of the building. The final SSD system location will be determined based on the system design and space constraints.

In response to NYSDEC concerns pertaining to the concentration of VOCs present in the exhaust vapors from the subslab depressurization system, air modeling was performed in accordance with the New York State Air Toxics Program – DAR-1. Mitigation system air emissions were evaluated using the DAR-1 model for potential long term risk and the SCREEN3 model for potential short term risk. The DAR-1 and SCREEN3 models were run using the maximum contaminant concentrations detected in a March 2010 subslab vapor sample collected in the area of the proposed subslab depressurization system. The model results show the anticipated maximum concentrations for both short term and long term exposure to the mitigation system exhaust to be well below regulatory criteria.

The vapors from the exhaust fan, as determined using the DAR-1 and SCREEN3 models, do not exceed regulatory criteria. Therefore, the system installation/operation will not require an air discharge permit and a granular-activated carbon system is not required. Results and discussion of the model runs are attached in Appendix A.

2.3 Continued Vapor Monitoring

Subslab soil vapor and indoor air will be tested annually to evaluate the effectiveness of the remediation systems. Samples will be collected in approximately the same area as previous sampling locations within the Main Entryway, Loading Dock, and Warehouse areas.

2.3.1 Sampling Methods

Subslab soil vapor and indoor air samples will be collected during the winter heating season as recommended by NYSDOH guidance. Samples will be collected in substantial accordance with the September 2006 "Supplemental Area B Indoor Air and Sub-Slab Soil Gas Sampling Plan" and in compliance with NYSDOH guidance.

Six liter SUMMA canisters will be used for sample collection with sample collection occurring over a twenty-four hour period using the appropriate clean canisters and regulators provided by the laboratory. A length of Teflon^{TM} tubing will be connected to the SUMMA canister and one length connected to a photoionization detector (PID) with a low-flow vacuum air pump. A 3-way valve will be opened towards the PID and vacuum pump to allow for purging of three volumes of the tubing and monitoring of the air. Following purging activities, the vacuum pump will be turned off and the 3-way valve opened to allow airflow towards the SUMMA canister and the canisters will collect vapors for 24 hours.

2.3.2 Analyses

Both the subslab soil vapor and indoor air samples collected in the SUMMA canisters will be relinquished under Chain-of-Custody (COC) to Columbia Analytical Services. The samples will be analyzed for VOCs using United States Environmental Protection Agency (EPA) Method TO-15. Sample results will be compared to the Soil Vapor/Indoor Air Matrices 1 and 2 of the NYSDOH guidance (Ref. No. 1.2.2).

2.3.3 Schedule

Subslab soil vapor and indoor air samples will be collected annually to check the effectiveness of the remediation systems. In addition, the data will provide information that can be used to petition the NYSDEC to cease operations of the system.

2.4 Main Warehouse Groundwater Investigation

The Main Warehouse area is located near the northeast corner of the building, adjacent to the groundwater monitoring well pair MW-24 and MW-24A, and only represents a small portion of the entire building. Elevated concentrations of chlorinated VOCs remain in groundwater as evidenced by elevated VOC concentrations in samples collected from monitoring wells MW-24 and MW-24A in September 2010.

Energy*Solutions* proposes additional groundwater investigation within this portion of the building to determine the extent of these elevated concentrations of VOCs in groundwater. Groundwater samples will be collected using direct-push borings. The proposed sampling locations were chosen based on the direction of groundwater flow as observed during times when groundwater was not influenced by pumping well MW-16A, which is generally to the southwest beneath the building. As shown on Figure 6, two groundwater samples are proposed at distances of 50 feet and 150 feet downgradient (i.e., southwest) from the MW-24 well pair. Also, as shown on Figure 6, an additional four locations are proposed to determine the source of the low concentrations of TCE observed in the shallow unconsolidated aquifer at MW-6. Two groundwater samples will be collected at approximately 50 feet and 150 feet southeast from the MW-24 well pair, and along the eastern edge of the building. One groundwater sample is also proposed near the southeast corner of the building. One groundwater sample will also be advanced outside the southeast corner of the building between the building and the MW-6 well pair.

These six proposed groundwater samples will provide additional information on the location of VOC groundwater contamination beneath the building and provide information for a potential second round of HRC injections for this area. The HRC injections will have a dual goal of 1) reducing groundwater concentrations as part of the overall site remediation, and 2) reducing subslab VOC vapor concentrations as an anticipated outcome of the reduced groundwater concentrations. The HRC injection will fulfill the vapor mitigation requirements of the NYSDOH guidance (Ref. No. 1.2.2).

Due to the presence of several interior walls inside the building and the possible presence of warehoused material in some areas, these sampling locations may be adjusted in the field based on actual conditions and accessibility. These locations have been selected to provide specific data regarding contaminant concentrations in the downgradient direction from the previous HRC injection area.

2.4.1 Sampling Methods

Borings will be advanced using a small mobile direct-push unit which is able to access remote areas of the building. At each selected location, the concrete slab will be cored using a 4-inch to 6-inch concrete core drill, as necessary. Sampling devices will then be advanced by the direct push unit through the concrete core hole with continuous soil sampling conducted at 2-foot intervals. PID screening will be performed on the soil retrieved from each sleeve of each bore hole. Elevated PID readings are not anticipated at the selected sampling locations; however, if they are encountered within a boring, soils samples may be submitted for laboratory analysis at the discretion of the field geologist and/or the Project Manager.

Groundwater samples will be collected from the lowest sand unit located just above the top of the bedrock surface. A direct push groundwater sampling unit will be advanced to the desired depth. The screen within the sampler will be exposed to allow groundwater to enter the sampler. Groundwater will be collected from the sampler using a small diameter disposable polyethylene bailer lowered into the sampler. Field groundwater quality parameters (pH, temperature, and specific conductivity) will be recorded for each sample if sufficient water volume is available. The groundwater samples will be collected into the appropriate clean laboratory-supplied glass containers and preserved with the appropriate preservative. Samples will be labeled and logged onto chain of custody documents. The samples will be stored on ice for submittal to Columbia Analytical Services of Rochester, New York, a National Environmental Laboratory Accreditation Program (NELAP) laboratory for analysis. Groundwater samples will be analyzed for VOCs by EPA Method 8260B.

If soil samples are collected, they will also be handled and submitted to the laboratory in accordance with Energy*Solutions*' procedures discussed below. Soil logging information and PID readings will be recorded by the site geologist in the Site field log. Soil samples submitted to the laboratory will be analyzed, as needed, for the presence of VOCs using EPA Method 8260B.

Sample Handling

Soil and groundwater samples will be collected using disposable latex or nitrile sampling gloves, disposable bailers, metal sampling trowels, and other related equipment and sampling tools. The sampling gloves will be discarded after each sample, and any equipment and tools used at multiple sampling locations will be decontaminated before and after each use to prevent cross-contamination of the samples.

Sample Container Preservation and Storage

Sample container preservation and storage shall follow the requirements of the applicable test method and the analytical laboratory requirements. Requirements for analytical methods, sample containers, preservation, and holding times are contained in the following table.

Analytical Method, Preservation and Hold Times for Samples Collected

Parameter	Matrix	Analytical Method	Containers	Preservation	Holding Time
VOCs	soil	8260B	4 oz. Glass	4° ± 2°C	14 days
VOCs	water	8260B	40 ml VOA	HCl, 4° ± 2°C	14 days

Pre-cleaned containers supplied by the laboratory will be used to contain samples for chemical analysis. Prior to use, the sample bottles will be inspected by Energy*Solutions*'s geologist to verify their integrity and cleanliness. Sample jar labeling and COC record completion will also be performed in accordance with industry standards.

2.4.2 Analytical Method Requirements

The analytical method to be used for the sample analysis is contained in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846," (Ref. No. 1.2.14).

2.4.3 Instrument/Equipment Testing, Inspection, and Maintenance

Equipment to be used during field sampling will be examined daily to verify that it is in good operating condition. Field instrumentation to be used at the Site (e.g., PID) will be calibrated at the beginning of each day and with sufficient frequency and in such a manner that accuracy and result reproducibility are consistent with the instrument manufacturer's specifications. Copies of the calibration and operation instructions from the manufacturer will be kept with the instrument when it is used at the Site. It is the Energy*Solutions* geologists' responsibility to be familiar with these instructions. Calibration records will be documented in the field logs to provide a historical record of instrument performance.

2.4.4 Data Management

Field Data

The field data collected will be managed using forms and/or bound field notebooks. All measurements taken during this project will be identified by matrix, type, and sample location to avoid ambiguity. Field records will include the following minimum information:

- A chronological listing of significant site events and sampling activities;
- site name, field team members, signature, and date on each page;
- site conditions, notes or sketches of sampling locations and sample descriptions;
- sample times;
- record of all measurements (e.g., field screening parameters);
- boring logs (if appropriate); and
- photographic log (if taken).

Laboratory Data

The laboratory will be responsible for maintaining analytical logbooks and laboratory data as well as a sample inventory for submittal to Energy*Solutions*, if requested. Laboratory data will be transcribed onto a computer-based management system. This data will be summarized in a manner that provides efficiency in data reduction, tabulation, and evaluation. Samples will be maintained by the laboratory for a period of at least 30 days after issuance of the final report to Energy*Solutions* under the conditions prescribed by the appropriate analytical methods for additional analysis, if necessary. Raw data files will be maintained by the laboratory and at a minimum will consist of the following files:

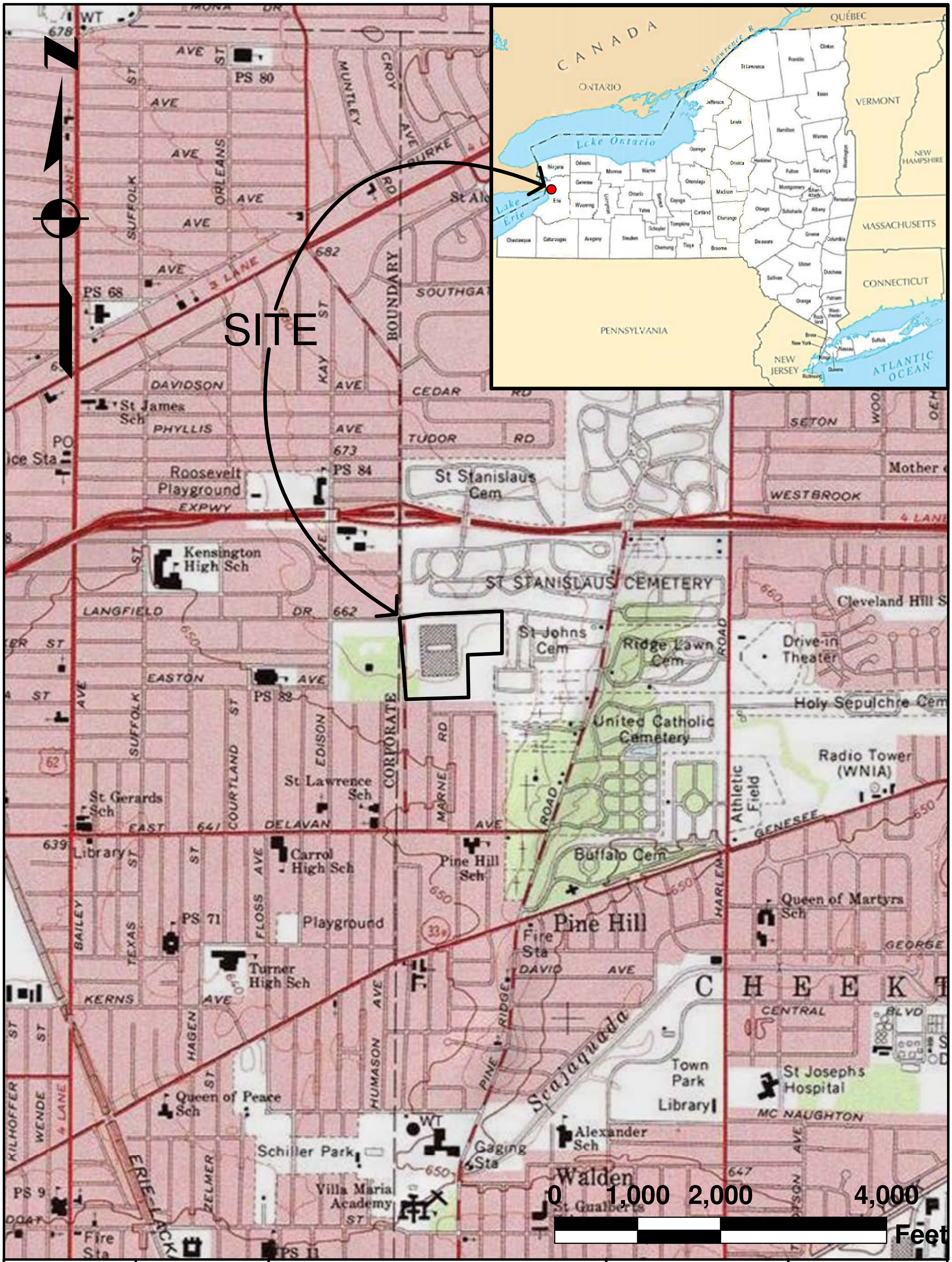
- Project-related plans;
- Project login data;
- Sample identification documents;
- Chain-of-Custody records;
- Project-related correspondence;
- Raw data sheets QC data;
- Copies of all final reports pertaining to the project; and
- Sample preparation records.

Raw laboratory data files will be retained by the laboratory for a minimum of 5 years.

Groundwater Data Review and Interpretation

Groundwater data collected during this investigation will be reviewed and compared to the existing database for the site. The data will be used to determine the need for permanent wells. The data will also be used to determine appropriate locations, if needed, for additional HRC injections. The data will be summarized and submitted in a letter report to NYSDEC.

FIGURE 1
SITE LOCATION MAP

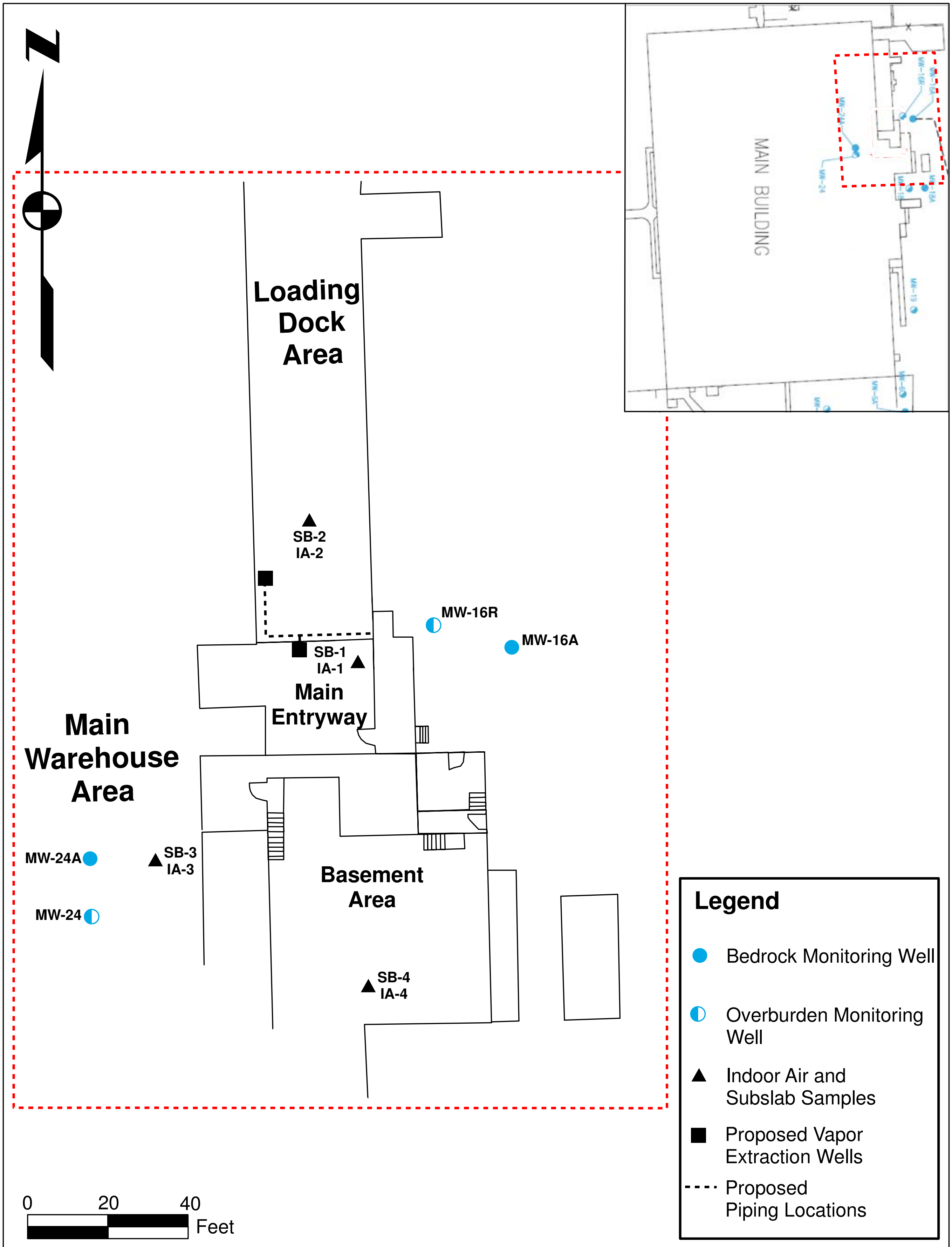


DOCUMENT CONTROL NO.	PROJECT	LEICA MICROSYSTEMS INC. 203 EGGERT ROAD CHEEKTOWAGA, NY	ENERGYSOLUTIONS 100 Mill Plain Road Danbury, CT 06811 203-797-8301	PROJECT # 137015	
				FILENAME:	
REVISION NO.	DRAWING	SITE LOCATION MAP		SCALE: SEE SCALEBAR	DATE: 12/23/09
				BY: MT	CK:
				FIGURE # 1	

FIGURE 2
SITE MAP

DOCUMENT CONTROL NO.	PROJECT	LEICA MICROSYSTEMS INC. 203 EGGERT ROAD CHEEKTOWAGA, NY	ENERGYSOLUTIONS 100 Mill Plain Road Danbury, CT 06811 203-797-8301	PROJECT # 137015	
				FILENAME:	
				SCALE: SEE SCALEBAR	DATE: 10/21/10
REVISION NO.	DRAWING	SITE MAP		BY: MT	CK: PM
				FIGURE # 2	

FIGURE 3
VAPOR MITIGATION AREAS



DOCUMENT CONTROL NO.

REVISION NO.

PROJECT

LEICA MICROSYSTEMS INC.
203 EGGERT ROAD
CHEEKTOWAGA, NY

DRAWING

Vapor Mitigation Areas

ENERGYSOLUTIONS
100 Mill Plain Road
Danbury, CT 06811

203-797-8301

PROJECT #
137015

FILENAME:

SCALE:
SEE SCALEBAR

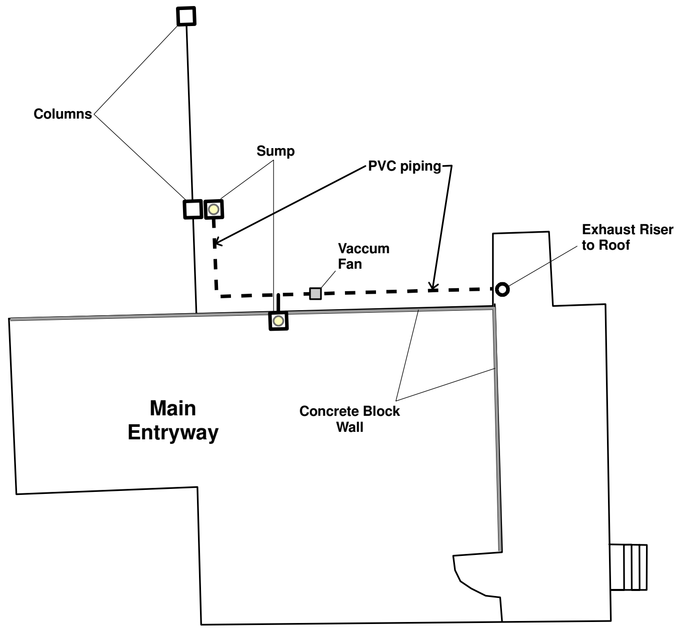
DATE:
11/10/10

BY:
MT

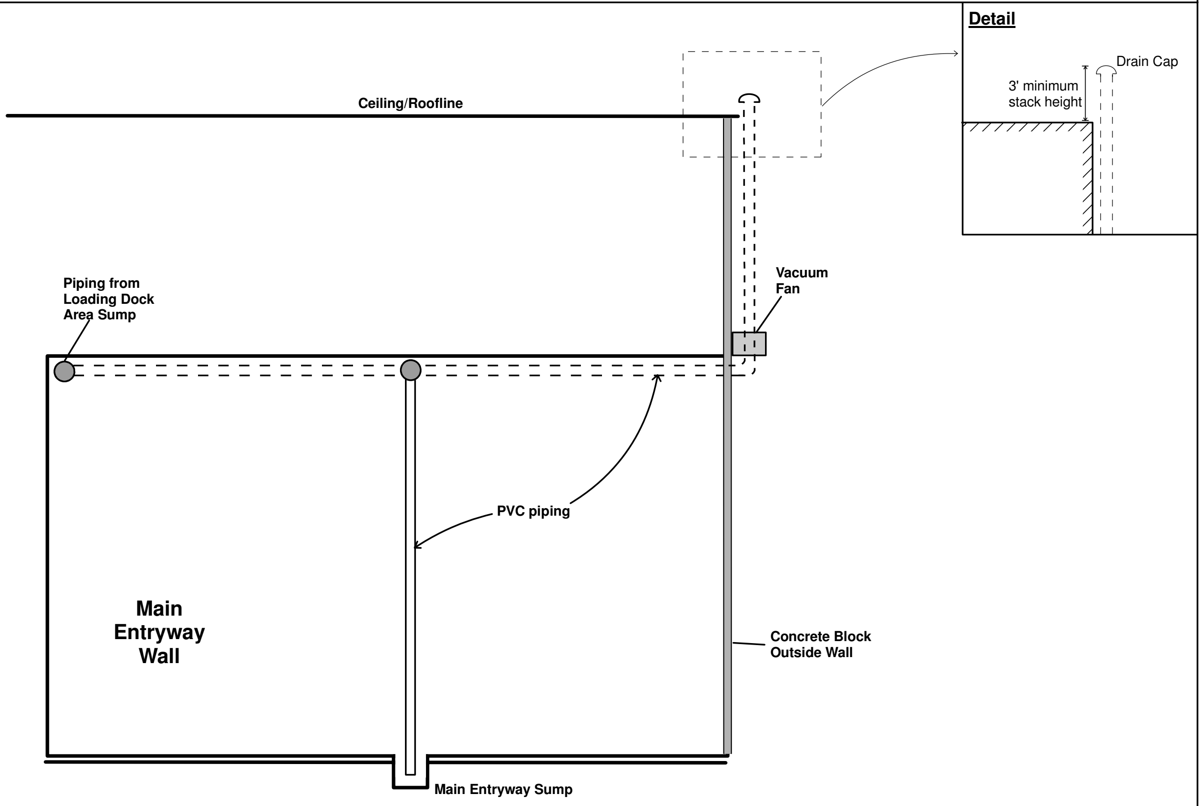
CK:

FIGURE #
3

FIGURE 4
CONCEPTUAL PIPING LAYOUT DIAGRAM



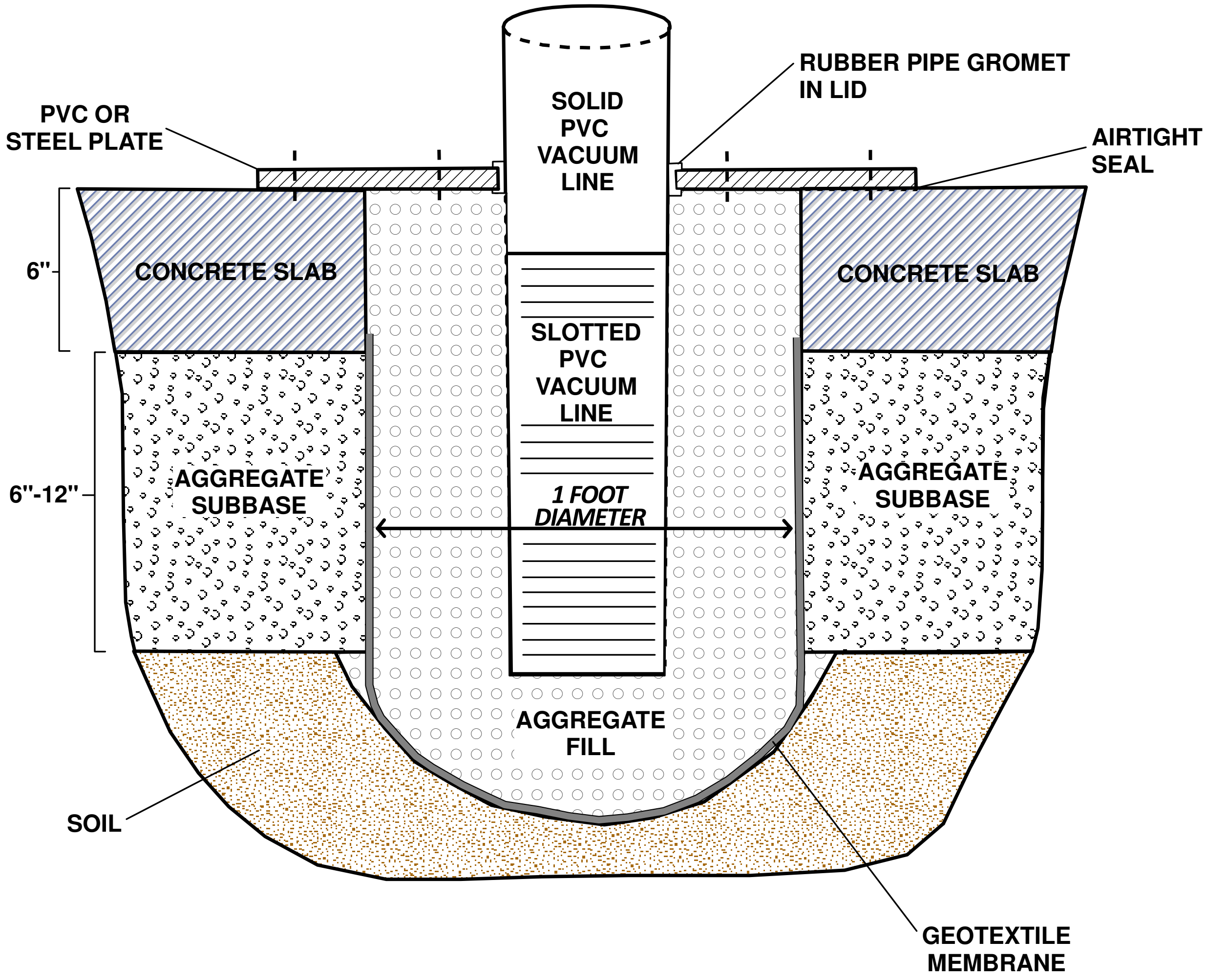
PLAN VIEW



PROFILE

DOCUMENT CONTROL NO.	PROJECT	LEICA MICROSYSTEMS INC. 203 EGGERT ROAD CHEEKTOWAGA, NY	ENERGYSOLUTIONS 100 Mill Plain Road Danbury, CT 06811 203-797-8301	PROJECT # 137015	
				FILENAME:	
REVISION NO.	DRAWING	Conceptual Piping Layout Diagram		SCALE: *NTS*	DATE: 11/11/10
				BY: MT	CK:
				FIGURE # 4	

FIGURE 5
GENERALIZED GAS COLLECTION SUMP DESIGN



DOCUMENT CONTROL NO.

REVISION NO.

PROJECT

LEICA MICROSYSTEMS INC.
203 EGGERT ROAD
CHEEKTOWAGA, NY

DRAWING

Generalized Gas Collection Sump Design

ENERGYSOLUTIONS
100 Mill Plain Road
Danbury, CT 06811

203-797-8301

PROJECT # 137015

FILENAME:

SCALE: NTS

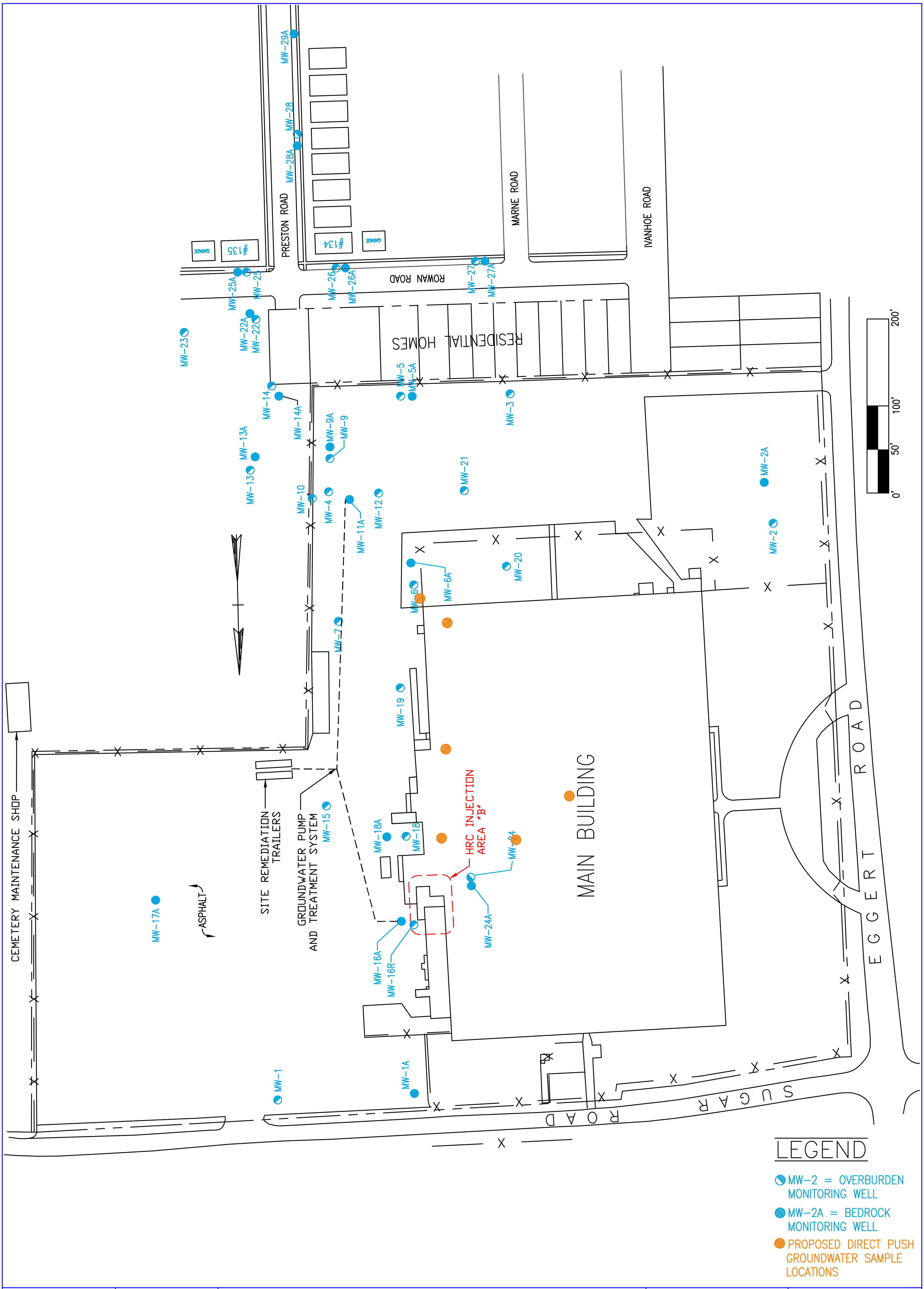
DATE: 11/10/10

BY: MT

CK:

FIGURE # 5

FIGURE 6
PROPOSED GROUNDWATER SAMPLING LOCATIONS



LEGEND

- MW–2 = OVERBURDEN MONITORING WELL
- MW–2A = BEDROCK MONITORING WELL
- PROPOSED DIRECT PUSH GROUNDWATER SAMPLE LOCATIONS

DOCUMENT CONTROL NO.	PROJECT	LEICA MICROSYSTEMS INC. 203 EGGERT RD CHEEKTOWAGA, NY	ENERGYSOLUTIONS
REVISION NO.	DRAWING	Proposed Groundwater Sampling Locations	100 MILL PLAIN RD DANBURY, CT. 06811 (203)797–8301

PROJECT # 137015

FILENAME:

SCALE: See Scalebar

DATE: 11/1/10

BY: MT

CK: RM

FIGURE # 6

TABLE 1
SUMMARY OF SUB-SLAB AND INDOOR AIR SAMPLES

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Table 1
Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	Minimum Action Thresholds (ug/m^3)					SS3		SB-1		SB-1		SB-1		AA3C		IA-1		IA-1		IA-1	
Sample Area:	Matrix 1 Indoor Air	Matrix 1 Sub Slab Vapor	Matrix 2 Indoor Air	Matrix 2 Sub Slab Vapor	OSHA PELs (ug/m3)	ENTRYWAY SUB SLAB								ENTRYWAY AMBIENT AIR							
Lab ID#						**965225**		**1106315**		**1162643**		**R1001548-001**		**965236**		**1106317**		**1162645**		**R1001548-002**	
Sample Collection Date:						12/20/2006		6/12/2008		12/12/2008		3/23/2010		12/20/2006		6/12/2008		12/12/2008		3/23/2010	
Analitical Dilution:						3143		14900		781		1.36		2		1.52		1.41		1.54	
Volatile Organic Compounds (mcg/m3)																					
carbon tetrachloride	0.25	5	---	---	62700	ND		**2100**	U	**110**	U	**320**	U	**0.5**		**0.61**		**0.64**		**0.57**	
1,1-dichloroethene	---	---	3	100	400000	**3300**		**6500**	D	**340**	U	**2000**		1.2	U	0.66	U	0.61	U	0.2	J
cis-1,2-dichloroethene	---	---	3	100	NE	**5500**		**23000**	D	**1900**	D	**8800**		ND		1.2		0.64		0.69	
tetrachloroethene	---	---	3	100	678000	ND		**2200**	U	**120**	U	**740**		ND		0.27		0.22		0.18	
1,1,1-trichloroethane	---	---	3	100	1900000	**180000**		**260000**	D	**13000**	D	**91000**		**9.3**		**12**		**4.3**		**8.2**	
trichloroethene	0.25	5	---	---	537000	**91000**		**480000**	D	**32000**	D	**190000**		**16**		**18**		**12**		**17**	
vinyl chloride	0.25	5	---	---	1280	ND		**4200**	U	**220**	U	**270**	U	ND		**0.43**	U	**0.4**	U	0.092	U

NOTES:

Bold = Exceeds applicable air matricies
ND = Not Detected
B = Analyte detected in method blank
D = Sample reanalyzed and quantified at higher dilution
E = Exceeds calibration range
J = Estimated concentration
U = Analyte was not detected
NE = Not Established

NYSDOH Guidance Matrix Recommended Actions Legend

* Driving Matrix Component for Action	** Secondary Matrix Component for Action	Action
🟩	🟩	No Further Action
🟦	🟦	Monitor
🟪	🟪	Mitigate

***** At this concentration, the specified action is required, at a minimum, regardless of the concentrations in the alternate media (subslab or ambient air).
****** At this concentration, a less aggressive action might be acceptable if the concentrations in the alternate media (subslab or ambient air) are reduced.

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Table 1
Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	Minimum Action Thresholds (ug/m^3)					SS7		SB-3		SB-3		SB-3		SB-3		SB-3		AA7A		IA-3		IA-3		IA-3	
Sample Area:	Matrix 1 Indoor Air	Matrix 1 Sub Slab Vapor	Matrix 2 Indoor Air	Matrix 2 Sub Slab Vapor	OSHA PELs (ug/m3)	WAREHOUSE AREA SUB SLAB												WAREHOUSE AREA AMBIENT AIR							
Lab ID#						**965232**		**1106320**		**1162648**		**R1001548-005**		**R1001548-005**		**Duplicate**		**965233**		**1106321**		**1162649**		**R1001548-012**	
Sample Collection Date:						12/20/2006		6/12/2008		12/12/2008		3/23/2010		3/23/2010		3/23/2010		12/20/2006		6/12/2008		12/12/2008		3/23/2010	
Analitical Dilution:						36.7		59.2		14.5		1.49		1.49		1		4		2.92		1.42		1.38	
Volatile Organic Compounds (mcg/m3)																									
carbon tetrachloride	0.25	5	---	---	62700	ND		**8.2**	U	2	U	**13**	U	**26**	U	**22**	U	ND		**0.64**		**0.6**		**0.62**	
1,1-dichloroethene	---	---	3	100	400000	22	U	26	U	6.3	U	84	U	160	U	**140**	U	2.4	U	1.3	U	0.62	U	0.03	J
cis-1,2-dichloroethene	---	---	3	100	NE	**220**	D	**300**	D	**110**		43	J	44	DJ	33	J	ND		1.3	U	0.62	U	0.35	J
tetrachloroethene	---	---	3	100	678000	31		64	D	18		36		31	D	29		ND		0.44	U	0.21	U	0.14	
1,1,1-trichloroethane	---	---	3	100	1900000	ND		48	D	9.7		14	J	42	DJ	13	J	ND		1.8	U	0.85	U	0.57	J
trichloroethene	0.25	5	---	---	537000	**1500**	D	**3100**	D	**660**		**220**		**260**	D	**190**		**8.1**		**4.9**		**5.7**		**9**	
vinyl chloride	0.25	5	---	---	1280	ND		**17**	U	**8.4**		**11**	U	**22**	U	**19**	U	ND		**0.82**	U	**0.4**	U	0.083	U

NOTES:

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E = Exceeds calibration range
J = Estimated concentration
U = Analyte was not detected
NE = Not Established

NYSDOH Guidance Matrix Recommended Actions Legend

* Driving Matrix Component for Action	** Secondary Matrix Component for Action	Action
🟩	🟩	No Further Action
🟦	🟦	Monitor
🟪	🟪	Mitigate

***** At this concentration, the specified action is required, at a minimum, regardless of the concentr
****** At this concentration, a less aggressive action might be acceptable if the concentrations in the

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Table 1
Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	**Minimum Action Thresholds (ug/m^3)**					**SS2**		**SB-2**		**SB-2**		**SB-2**		**AA1A**		**IA-2**		**IA-2**		**IA-2**	
Sample Area:	**Matrix 1 Indoor Air**	**Matrix 1 Sub Slab Vapor**	**Matrix 2 Indoor Air**	**Matrix 2 Sub Slab Vapor**	**OSHA PELs (ug/m3)**	**LOADING DOCK SUB SLAB**								**LOADING DOCK AMBIENT AIR**							
Lab ID#						**965237**		**1106318**		**1162647**		**R1001548-003**		**965235**		**1106319**		**1162646**		**R1001548-004**	
Sample Collection Date:						12/20/2006		6/12/2008		12/12/2008		3/23/2010		12/20/2006		6/12/2008		12/12/2008		3/23/2010	
Analitical Dilution:						100		1788		141		1.46		2		2.98		1.41		1.42	
Volatile Organic Compounds (mcg/m3)																					
carbon tetrachloride	0.25	5	---	---	62700	ND		**250**	U	**20**	U	**16**	U	**0.51**		**0.75**		**0.59**		**0.57**	
1,1-dichloroethene	---	---	3	100	400000	60	U	**780**	U	61	U	**100**	U	1.2	U	1.3	U	0.61	U	0.62	U
cis-1,2-dichloroethene	---	---	3	100	NE	ND		**780**	U	77	D	**130**		ND		1.3	U	0.61	U	0.19	J
tetrachloroethene	---	---	3	100	678000	28		**1200**	D	77	D	**190**		0.55		0.58		0.21	U	0.27	
1,1,1-trichloroethane	---	---	3	100	1900000	**430**		**11000**	D	**920**	D	**1900**		ND		1.8	U	0.85	U	0.22	J
trichloroethene	0.25	5	---	---	537000	**5000**	D	**75000**	D	**5100**	D	**12000**		**5.5**		**5.1**		**4.7**		**4.4**	
vinyl chloride	0.25	5	---	---	1280	ND		**500**	U	**62**	D	**14**	U	ND		**0.84**	U	**0.4**	U	0.085	U

NOTES:

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ND = Not Detected
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D = Sample reanalyzed and quantified at higher dilution
E = Exceeds calibration range
J = Estimated concentration
U = Analyte was not detected
NE = Not Established

NYSDOH Guidance Matrix Recommended Actions Legend

* Driving Matrix Component for Action	** Secondary Matrix Component for Action	Action
🟩	🟩	No Further Action
🟦	▨	Monitor
🟪	🟥	Mitigate

***** At this concentration, the specified action is required, at a minimum, regardless of the concent

****** At this concentration, a less aggressive action might be acceptable if the concentrations in the

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Table 1
Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	**Minimum Action Thresholds (ug/m^3)**					**SS5**		**SB-4**		**SB-4**		**SB-4**		**SB-4**		**AA5A**		**IA-4**		**IA-4**		**IA-4**	
Sample Area:	**Matrix 1 Indoor Air**	**Matrix 1 Sub Slab Vapor**	**Matrix 2 Indoor Air**	**Matrix 2 Sub Slab Vapor**	**OSHA PELs (ug/m3)**	**BASEMENT AREA SUB SLAB**										**BASEMENT AREA AMBIENT AIR**							
Lab ID#						**965229**		**1106322**		**1162650**		**R1001548-007**		**R1001548-007**		**965230**		**1106323**		**1162651**		**R1001548-008**	
Sample Collection Date:						12/20/2006		6/12/2008		12/12/2008		3/23/2010		3/23/2010		12/20/2006		6/12/2008		12/12/2008		3/23/2010	
Analitical Dilution:						1571		1430		633.6		1.4		1.4		1		1.47		1.35		1.44	
Volatile Organic Compounds (mcg/m3)																							
carbon tetrachloride	0.25	5	---	---	62700	ND		**200**	U	**88**	U	**25**	U	**49**	U	**0.61**		**0.6**		**0.6**		**0.71**	
1,1-dichloroethene	---	---	3	100	400000	**3200**		**1000**	D	**280**	U	**520**		**440**	D	0.6	U	0.64	U	0.59	U	0.63	U
cis-1,2-dichloroethene	---	---	3	100	NE	**3200**		**870**	D	**520**	D	**460**		**390**	D	ND		0.64	U	0.59	U	0.11	J
tetrachloroethene	---	---	3	100	678000	**16000**		**430**	D	**250**	D	**340**		**290**	D	0.28		0.22	U	0.2	U	0.076	J
1,1,1-trichloroethane	---	---	3	100	1900000	**110000**		**15000**	D	**3900**	D	**5100**		**4400**	D	1.1		1.2		1.2		0.19	J
trichloroethene	0.25	5	---	---	537000	**110000**		**59000**	D	**25000**	D	**25000**	E	**22000**	D	**1.4**		**1.1**		**0.92**		**0.35**	
vinyl chloride	0.25	5	---	---	1280	ND		**400**	U	**180**	U	**22**	U	**42**	U	ND		**0.41**	U	**0.38**	U	0.086	U

NOTES:

Bold = Exceeds applicable air matricies

ND = Not Detected

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D = Sample reanalyzed and quantified at higher dilution

E = Exceeds calibration range

J = Estimated concentration

U = Analyte was not detected

NE = Not Established

NYSDOH Guidance Matrix Recommended Actions Legend

* Driving Matrix Component for Action	** Secondary Matrix Component for Action	Action
🟩	🟩	No Further Action
🟦	🟦	Monitor
🟪	🟥	Mitigate

***** At this concentration, the specified action is required, at a minimum, regardless of the concent

****** At this concentration, a less aggressive action might be acceptable if the concentrations in the

Prepared by:PWM
Date: 4/29/10
Checked by: REM
Date:

Table 1
Summary of Sub-Slab and Indoor Air Samples
Leica Microsystems, Eggert Road
Cheektowaga, NY

Sample location	Minimum Action Thresholds (ug/m^3)					SS4		OA-1		QA-1		QA	
Sample Area:	Matrix 1 Indoor Air	Matrix 1 Sub Slab Vapor	Matrix 2 Indoor Air	Matrix 2 Sub Slab Vapor	OSHA PELs (ug/m3)	OUTDOOR AIR SAMPLE (BACKGROUND)							
Lab ID#						**965228**		**1106351**		**1162652**		**R1001548-010**	
Sample Collection Date:						12/20/2006		6/12/2008		12/12/2008		3/23/2010	
Analitical Dilution:						20		1.57		1.36		1.39	
Volatile Organic Compounds (mcg/m3)													
carbon tetrachloride	0.25	5	---	---	62700	ND		**0.59**		**0.63**		**0.1**	
1,1-dichloroethene	---	---	3	100	400000	**12**	U	0.68	U	0.59	U	0.61	U
cis-1,2-dichloroethene	---	---	3	100	NE	**120**		0.68	U	0.59	U	0.15	U
tetrachloroethene	---	---	3	100	678000	**5.6**		**3.2**		0.2	U	0.1	J
1,1,1-trichloroethane	---	---	3	100	1900000	**55**		0.94	U	0.82	U	0.011	J
trichloroethene	0.25	5	---	---	537000	**890**		**8.1**		0.23		0.0058	J
vinyl chloride	0.25	5	---	---	1280	ND		**0.44**	U	**0.38**	U	**0.33**	U

NOTES:

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NYSDOH Guidance Matrix Recommended Actions Legend

* Driving Matrix Component for Action	** Secondary Matrix Component for Action	Action
🟩	🟩	No Further Action
🟦	🟦	Monitor
🟪	🟪	Mitigate

***** At this concentration, the specified action is required, at a minimum, regardless of the concent

****** At this concentration, a less aggressive action might be acceptable if the concentrations in the

APPENDIX A
DAR-1 AND SCREEN3 MODEL INPUTS AND RESULTS

ENERGYSOLUTIONS

January 26, 2011
Ref. No. 31129-085

Mr. Jaspal Walia
Project Manager
New York State Department of Environmental Conservation, Region 9
270 Michigan Avenue
Buffalo, NY 14203-2999

Subject: **Vapor Mitigation Work Plan**
Leica Facility
Cheektowaga, New York
Inactive Hazardous Waste Disposal Site No. 915156

Dear Mr. Walia:

Enclosed are Energy*Solutions*' responses to comments contained in your December 20, 2010 letter following your review of the "Vapor Mitigation Work Plan." These responses will be incorporated into the Work Plan for mitigation of several areas within the Leica facility.

Comment 1

In response to conversations with you, Ms. Connie LaPort and Mr. Steve DeSantis of the NYSDEC Albany office, we have evaluated the mitigation system air emissions using the DAR-1 model for potential long term risk and the SCREEN3 model for potential short term risk. The DAR-1 and SCREEN3 models were run using the maximum contaminant concentrations detected in a March 2010 subslab vapor sample collected in the area of the proposed subslab depressurization system. The maximum contaminant concentration of 190,000 ug/m^3 for trichloroethene (TCE) was used for the model input. Lower concentrations of vinyl chloride and 1, 2, Dichloroethene were also modeled; however, the TCE produced results which represented the highest percentage of the published Agency for Toxic Substances and Disease Registry (ATSDR) allowable concentrations.

The DAR-1 model inputs for the Leica site were reviewed by Mr. DeSantis, the DAR-1 model's creator. Minor input parameter changes were made to the DAR-1 model based on Mr. DeSantis' review to create a more accurate and conservative model for TCE emissions. The DAR-1 model was run using these revised input parameters and produced a TCE concentration of 1.34 ug/m^3 at the nearest property boundary approximately 300 feet from the proposed discharge point. The SCREEN3 model was run and produced a maximum TCE concentration of 42.18 ug/m^3 at or beyond 5 meters from the discharge point.

Ms. LaPort's email dated January 10, 2011 provided the regulatory guidance for comparison to the model results. The short term exposure impacts were evaluated using the SCREEN3 model and compared to the acute inhalation exposure (14 days or less) minimum risk levels (MRLs) published by ATSDR. An acute MRL of 10,000 ug/m^3 is published by the ATSDR for TCE. The SCREEN3 model result of 42.18 ug/m3 is only 0.4% of this allowable ATSDR threshold. The long term exposure impacts were evaluated using the DAR-1 model. An MRL of 537 ug/m^3 was derived by ATSDR for long term exposures to TCE. The DAR-1 model result of 1.34 ug/m^3 is 0.25% of this allowable ATSDR long term exposure threshold. The model inputs and the results for the DAR-1 and SCREEN3 models are included as an attachment to this letter.

The model results show the anticipated maximum concentrations for both short term and long term exposure to the mitigation system exhaust to be well below regulatory criteria. This conclusion was confirmed by Mr. DeSantis during a telephone conversation on January 14, 2011.

Comment 2

The vapors from the exhaust fan, as determined using the DAR-1 and SCREEN3 models, do not exceed the ATSDR short and long term MRLs. Therefore, a granular-activated carbon system is not required.

Comment 3

We will make the modification to the Work Plan as suggested. If VOC concentrations do not show a reduction below the NYSDOH Matrix criteria after the next two sampling rounds, fans will be installed in the basement room to exhaust vapors from the room.

If you have any questions regarding these responses, please feel free to call me at 801-303-1092.

Sincerely,

Robert E. McPeak

Robert E. McPeak, Jr., P.E., LEP
Department Manager, Environmental Services

REM/lhc
Enclosure
cc: J. Egan
C. Grabinski
C. O'Connor, NYSDOH

DAR-1 (AirGuide-1) Model Run for LEICA

Parameter Values:

- Location : blank
- Facility: 0000
- Facility Name: Leica
- Facility Address: 203 Eggert Road
- Facility City: Cheektowaga
- SIC (Standard Industrial Code): 3670
- Emission Point #: TOTAL (performs worst case analysis)
- Source Code: default=blank
- UTME (meters): 363740
- UTMN (meters): 355780
- UTM Zone: 17 (this zone is not used in this version of the DAR-1 program)
- UNITS: lby (lb/year)
- Number of Pollutants: 6
- Meteorological Data: Buffalo (BUF.MET)
- Model Option: “R” for Rural

CAS Number	Emissions #/hr	Emissions #.yr
156-59-2	.0033	28.87
079-07-6	.0712	623.43
075-01-4	.000101	0.89
071-55-6	.0341	298.59
056-23-5	.00020	1.05
075-34-3	.00079	6.56

STACK PARAMETERS

Height above structure	3	feet
Stack Height	34	feet
Inside Diameter	4	inches
Exit Temperature	51	degrees F
Exit Velocity	19	ft/sec
Exit Flow Rate	100	CFM

STACK LOCATION & BUILDING DIMENSIONS

Shortest Distance from Stack to property line	300	feet
Building Width	420	feet
Building Length	640	feet
Building Length Facing Direction	360	degrees (North)

Long term Results:

%AGC=268% or 1.34ug/m3 (based on .5ug/m3)

MRL of 537 ug/m3

EMISSION RATES (6000 ft^3/hr)

Contaminants (6 total)	CAS #	ug/m^3	lb/ft^3	lb/hr	lb/yr	g/s
CIS-1,2 DCE	00156-59-2	8800	5.49E-07	3.30E-03	28.87	0.000415314
Trichloroehylene (TCE)	00079-01-6	190000	1.19E-05	7.12E-02	623.43	0.008967
Vinyl Chloride (VC)	00075-01-4	270	1.69E-08	1.01E-04	0.89	1.27426E-05
TCA	00071-55-6	91000	5.68E-06	3.41E-02	298.59	0.004294721
Carbon Tetrachloride	00056-23-5	320	2.00E-08	1.20E-04	1.05	1.51023E-05
1,1-Dichloroethane	00075-34-3	2000	1.25E-07	7.49E-04	6.56	9.43895E-05

SIC Code = 3670
Site # = 915156
SWIS Code = 143000

UTM E = 363740
UTM N = 355780
UTM ZONE = 17

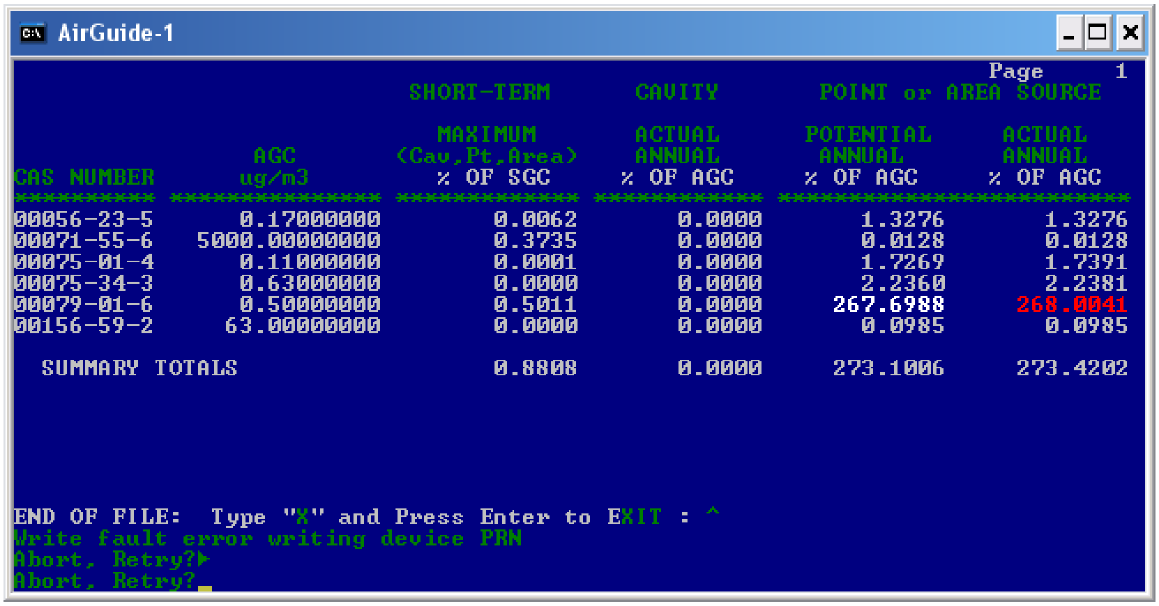
Units = lbs/year

Bldg Ht = 34ft
Stack Ht = 3ft
Stack Diam = 4in

Velocity = 19 ft/sec
Discharge = 100 ft^3/min

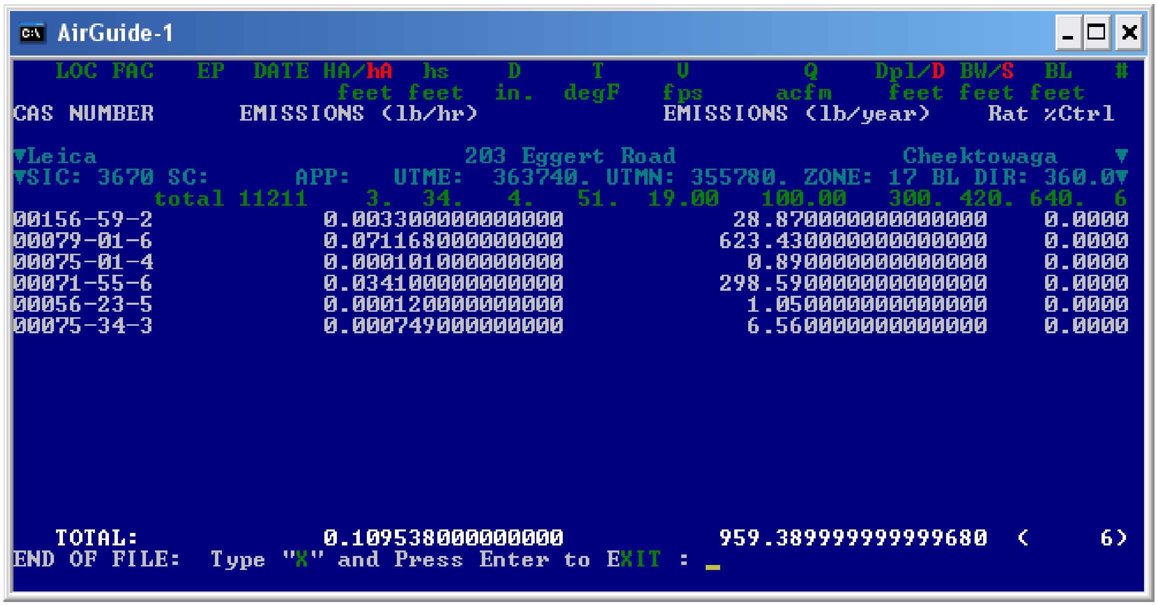
Bldg Length = 640 ft
Bldg Width = 420 ft
Stack to Prop Line = 300 ft

ASSESSMENT SUMMARY



```
                                                                         Page      1
                                             SHORT-TERM      CAVITY       POINT or AREA SOURCE

                                              MAXIMUM        ACTUAL      POTENTIAL      ACTUAL
                             AGC            (Cav,Pt,Area)    ANNUAL       ANNUAL        ANNUAL
CAS NUMBER                 ug/m3              % OF SGC      % OF AGC     % OF AGC      % OF AGC
********** *************** ************* ************ *************************
00056-23-5         0.17000000           0.0062        0.0000        1.3276        1.3276
00071-55-6      5000.00000000           0.3735        0.0000        0.0128        0.0128
00075-01-4         0.11000000           0.0001        0.0000        1.7269        1.7391
00075-34-3         0.63000000           0.0000        0.0000        2.2360        2.2381
00079-01-6         0.50000000           0.5011        0.0000      267.6988      268.0041
00156-59-2        63.00000000           0.0000        0.0000        0.0985        0.0985

  SUMMARY TOTALS                        0.8808        0.0000      273.1006      273.4202




END OF FILE:  Type "X" and Press Enter to EXIT : ^
Write fault error writing device PRN
Abort, Retry?▸
Abort, Retry?_
```

ALL INPUTS



```
   LOC FAC    EP   DATE HA/hA   hs      D     T      V        Q      Dpl/D BW/S   BL    #
                                feet feet   in.   degF   fps      acfm      feet feet feet
CAS NUMBER          EMISSIONS (lb/hr)                      EMISSIONS (lb/year)       Rat %Ctrl

▼Leica                                  203 Eggert Road                   Cheektowaga      ▼
▼SIC: 3670 SC:      APP:   UTME:  363740. UTMN: 355780. ZONE: 17 BL DIR: 360.0▼
          total 11211     3.  34.   4.   51.  19.00   100.00   300. 420. 640.  6
00156-59-2            0.003300000000000                 28.870000000000000     0.0000
00079-01-6            0.071168000000000                623.430000000000000     0.0000
00075-01-4            0.000101000000000                  0.890000000000000     0.0000
00071-55-6            0.034100000000000                298.590000000000000     0.0000
00056-23-5            0.000120000000000                  1.050000000000000     0.0000
00075-34-3            0.000749000000000                  6.560000000000000     0.0000










   TOTAL:             0.109538000000000                959.389999999999680  (      6)
END OF FILE:  Type "X" and Press Enter to EXIT : _
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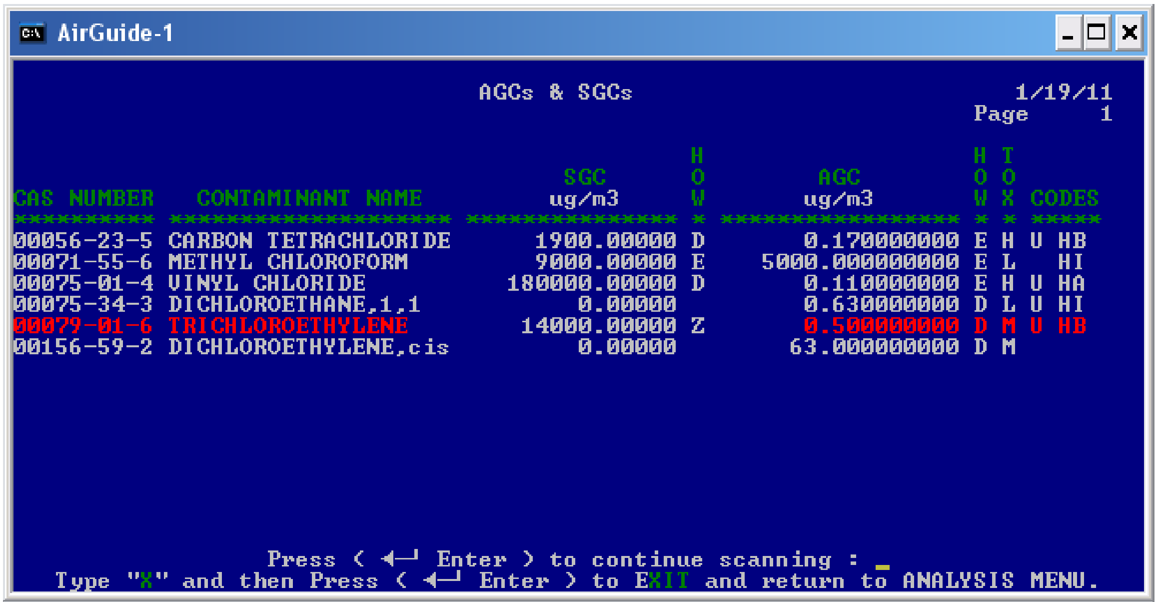

```
                                 AGCs & SGCs                              1/19/11
                                                                       Page     1

                                                  H                   H T
                                         SGC      O         AGC       O O
CAS NUMBER   CONTAMINANT NAME           ug/m3     W        ug/m3      W X CODES
********** ******************** *************** * ***************** * * *****
00056-23-5 CARBON TETRACHLORIDE     1900.00000 D      0.170000000 E H U HB
00071-55-6 METHYL CHLOROFORM        9000.00000 E   5000.000000000 E L   HI
00075-01-4 VINYL CHLORIDE         180000.00000 D      0.110000000 E H U HA
00075-34-3 DICHLOROETHANE,1,1           0.00000       0.630000000 D L U HI
00079-01-6 TRICHLOROETHYLENE       14000.00000 Z      0.500000000 D M U HB
00156-59-2 DICHLOROETHYLENE,cis         0.00000      63.000000000 D M









                     Press ( ◄┘ Enter ) to continue scanning : _
   Type "X" and then Press ( ◄┘ Enter ) to EXIT and return to ANALYSIS MENU.
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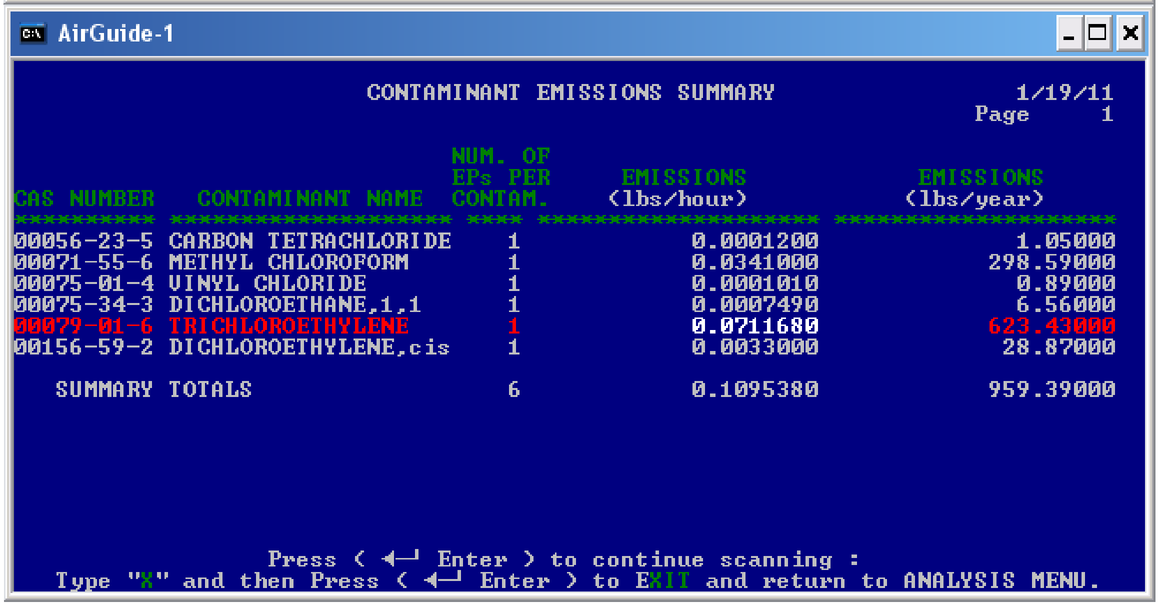
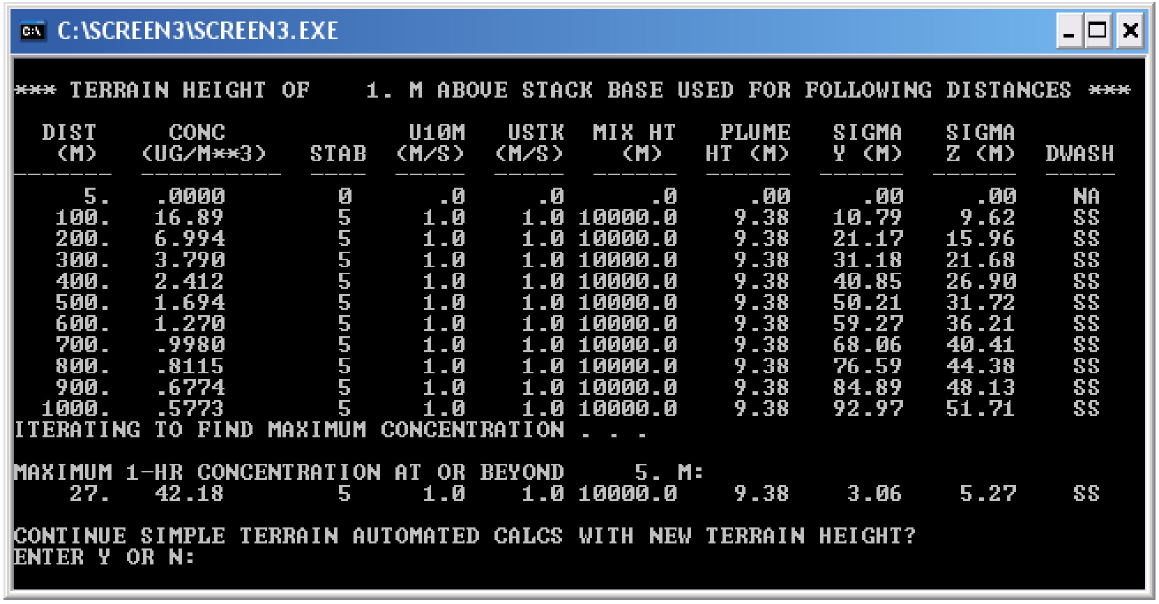


```
                         CONTAMINANT EMISSIONS SUMMARY                    1/19/11
                                                                       Page     1

                                NUM. OF
                                EPs PER      EMISSIONS               EMISSIONS
CAS NUMBER   CONTAMINANT NAME   CONTAM.      (lbs/hour)              (lbs/year)
********** ******************** **** ******************** ********************
00056-23-5 CARBON TETRACHLORIDE    1             0.0001200              1.05000
00071-55-6 METHYL CHLOROFORM       1             0.0341000            298.59000
00075-01-4 VINYL CHLORIDE          1             0.0001010              0.89000
00075-34-3 DICHLOROETHANE,1,1      1             0.0007490              6.56000
00079-01-6 TRICHLOROETHYLENE       1             0.0711680            623.43000
00156-59-2 DICHLOROETHYLENE,cis    1             0.0033000             28.87000

   SUMMARY TOTALS                  6             0.1095380            959.39000







                     Press ( ◄┘ Enter ) to continue scanning :
   Type "X" and then Press ( ◄┘ Enter ) to EXIT and return to ANALYSIS MENU.
```

Screen 3 Inputs

Title:	Leica
Source Type:	P (Point Source)
Emission Rate:	0.008967 G/S
Stack Height:	10.37m
Stack Inside Diam:	0.1m
Exit Velocity:	5.79
Gas Exit Temp:	283.55K
Ambient Temp:	293K (default)
Receptor Ht:	2m
Urban or Rural:	U (urban)
Consider Building Downwash:	Yes
Building Ht:	9m
Min Bldg Dimension:	128m
Max Bldg Dimension:	195m
Use complex terrain Screen:	Yes
Terrain Height Above stack ht:	0
Use Simple terrain Screen:	Yes
Choice of Meteorology:	1 (Full meteorology)
Automated Distance Array:	Yes
Terrain ht above Stack Base:	1m
Min/Max Distances:	5m, 1000m



```
*** TERRAIN HEIGHT OF    1. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

   DIST     CONC              U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)    STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)   DWASH
 -------  ----------   ----  -----  -----  ------  ------  ------  ------   -----
     5.   .0000          0      .0     .0      .0     .00     .00     .00    NA
   100.   16.89          5     1.0    1.0 10000.0    9.38   10.79    9.62    SS
   200.   6.994          5     1.0    1.0 10000.0    9.38   21.17   15.96    SS
   300.   3.790          5     1.0    1.0 10000.0    9.38   31.18   21.68    SS
   400.   2.412          5     1.0    1.0 10000.0    9.38   40.85   26.90    SS
   500.   1.694          5     1.0    1.0 10000.0    9.38   50.21   31.72    SS
   600.   1.270          5     1.0    1.0 10000.0    9.38   59.27   36.21    SS
   700.   .9980          5     1.0    1.0 10000.0    9.38   68.06   40.41    SS
   800.   .8115          5     1.0    1.0 10000.0    9.38   76.59   44.38    SS
   900.   .6774          5     1.0    1.0 10000.0    9.38   84.89   48.13    SS
  1000.   .5773          5     1.0    1.0 10000.0    9.38   92.97   51.71    SS
ITERATING TO FIND MAXIMUM CONCENTRATION . . .

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND     5. M:
    27.   42.18          5     1.0    1.0 10000.0    9.38    3.06    5.27    SS

CONTINUE SIMPLE TERRAIN AUTOMATED CALCS WITH NEW TERRAIN HEIGHT?
ENTER Y OR N:
```