ARCADIS

Infrastructure, environment, buildings

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ENVIRONMENT

Mr. Robert R. Stewart, Environmental Engineer
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region One
Building 40 - SUNY
Stony Brook, New York 11790-2356

Subject:
Final Vapor Control System Work Plan
25 Melville Park Road Site
Melville, New York

Date:
15 November 2005

Contact:
Steven M. Feldman

Phone:
(631) 391-5244

Email:
sfeldman@arcadis-us.com

Our ref:
NY001332.0012.00028

Dear Mr. Stewart:

On behalf of 25 MPR, LLC (25 MPR), ARCADIS is submitting this Vapor Control System Work Plan (Work Plan) for the 25 Melville Park Road Site in Melville, New York. This Work Plan has been revised based on a review of the New York State Department of Environmental Conservation (NYSDEC) comment letter dated October 12, 2005, and an appended letter from the New York State Department of Health (NYSDOH) to the NYSDEC dated September 19, 2005. Please note that NYSDOH comments regarding issues associated with the southern portion of the building are being addressed through separate communications with the NYSDEC.

Should you have any questions or comments, please do not hesitate to contact me at (631) 391-5244.

Sincerely,

ARCADIS G&M, Inc.

Steven M. Feldman
Project Manager

Copies:
Lawrence Levine, 25 MPR LLC
Melissa Menetti, NYSDOH
Geralyn Rosser, SCDHS

Vapor Control System Work Plan

25 Melville Park Road Site
Melville, New York

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Infrastructure, environment, buildings

ARCADIS

Steven M. Feldman
Project Manager

ARCADIS G&M of New York Architectural and Engineering Services, P.C.

Christina Berardi Tuohy, P.E.
Vice President
New York Professional Engineer
License Number NY-078743-1

Vapor Control System Work Plan

25 Melville Park Road Site
Melville, New York

Prepared for:
25 MPR, LLC
445 Broad Hollow Road
Suite 430
Melville, New York 11747

Prepared by:
ARCADIS G&M, Inc.
88 Duryea Road
Melville
New York 11747
Tel 631 249 7600
Fax 631 249 7610

Our Ref.:
NY001332.0012.00028

Date:
15 November 2005

Figures

Appendix

Disclosure Statement

The laws of New York State require that the corporations which render engineering services in New York be owned by individuals licensed to practice engineering in the State. ARCADIS cannot meet that requirement. Therefore, all engineering services rendered to 25 MPR, LLC in New York are being performed by ARCADIS G&M of New York Architectural and Engineering Services, P.C., a New York Professional corporation qualified to render professional engineering in New York. There is no surcharge or extra expense associated with the rendering of professional services by ARCADIS G&M of New York Architectural and Engineering Services, P.C.

ARCADIS is performing all those services that do not constitute professional engineering, and is providing administrative and personnel support to ARCADIS G&M of New York Architectural and Engineering Services, P.C. All matters relating to the administration of the contract with 25 MPR, LLC are being performed by ARCADIS pursuant to its Amended and Restated Services Agreement with ARCADIS G&M of New York Architectural and Engineering Services, P.C.

1. Introduction

ARCADIS and ARCADIS G&M of New York Architectural and Engineering Services, P.C., on behalf of 25 MPR, LLC (25 MPR), have prepared this Vapor Control System Work Plan (Work Plan) for the 25 Melville Park Road Site (hereinafter referred to as the "Site") in Melville, New York. One of the objectives of the Long-Term Remedial Implementation and Monitoring Plan (LTRIMP), which was prepared by ARCADIS and issued to the New York State Department of Environmental Conservation (NYSDEC) on May 16, 2005, was to eliminate or reduce to the extent practicable the migration of chlorinated solvents from groundwater into indoor air through soil vapors. ARCADIS has selected to voluntarily install a vapor control system (VCS) to eliminate this potential pathway.

The objective of the VCS is to eliminate the vapor intrusion pathway into the building to the extent practicable, thereby maintaining concentrations of Site related constituents of concern (COCs) in indoor air at levels consistent with the guidance values provided in the New York State Department of Health (NYSDOH) February 2005 draft document entitled, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York."

This Work Plan provides a summary of current environmental conditions related to indoor air quality (IAQ), provides a description of the proposed VCS conceptual design and implementation methodology, provides a description of proposed operation, maintenance, and monitoring (OM&M), and provides an implementation schedule. Accordingly, this Work Plan will provide the NYSDEC with specific mitigation details prior to implementation of the proposed source area reagent injections for groundwater remediation.

2. Summary of Current Environmental Conditions

ARCADIS advanced four (4) indoor soil borings (AGM-1 through AGM-4) on November 5, 2003. Mr. Robert Stewart of the NYSDEC was present during the work. The soil borings were advanced beneath the building slab to a depth of 12 ft bls using a Geoprobe® portable probing unit. The soil borings were installed to collect soil samples and soil gas samples in the vicinity of angled boring AB-1, where tetrachloroethene (PCE) was detected in groundwater at a concentration of 99,000 micrograms per liter (ug/L). Soil gas samples were collected using the Geoprobe® Post Run Tubing (PRT) System. Disposable Teflon® tubing was used at each soil gas sample location. The soil gas samples were collected using 1-L Summa canisters and submitted to Air Toxics Ltd. for VOC analysis using modified Environmental Protection Agency (EPA) Method TO-14A direct inject GC/MS. Both the NYSDEC and NYSDOH approved this analytical method prior to the commencement of the field work. Low-level concentrations (< 2 parts per million by volume [ppmv]) of VOCs were detected in the soil gas samples collected from a depth of 4 ft bls in the AGM-1 through AGM-3 soil boring locations. PCE was detected at concentrations ranging from 372 ug/m^3 in AGM-2 to 13,100 ug/m^3 in AGM-3. No VOCs were detected in the AGM-4 soil gas sample. The results of the soil gas sampling activities are summarized in Progress Report 27.

A quarterly indoor ambient air quality monitoring program began at the Site in June 2004. The quarterly monitoring program involves the collection of two (2) indoor ambient air quality samples from within floor space currently occupied by Concord Mortgage (i.e., in the former New York Twist Drill [NYTD] production area). One (1) indoor air quality sample is collected from within an occupied office to the west of the indoor work area where the indoor wells are located and one (1) indoor air quality sample is collected from an occupied office to the north of the indoor work area. The sample collection intakes are positioned approximately 3 feet above the floor level to represent the breathing zone within each office.

Since the inception of the quarterly indoor ambient air quality monitoring program in June 2004, volatile organic compounds (VOCs) have been detected in indoor ambient air quality samples at concentrations in the range of NYSDOH background indoor air levels (i.e., about 10 micrograms per cubic meter [ug/m^3]) and at elevated levels (i.e., 110 to 120 ug/m)^3 in June 2005.

The laboratory analytical results from the June 2004 indoor ambient air quality sampling indicate that no site-related COCs were detected in one of the indoor ambient air quality samples. PCE was detected at a concentration of 9.2 micrograms per cubic meter (ug/m^3) in the second indoor ambient air quality sample. This concentration is approximately 10 times lower than the NYSDOH guideline of 100 ug/m^3 for PCE and is within NYSDOH background indoor air levels (i.e., about 10 ug/m^3). NYSDOH recommends that the average air level for PCE in a residential community not exceed 100 ug/m^3, considering continuous lifetime exposure and sensitive people. No other site-related COCs were detected in the second indoor ambient air quality sample.

The laboratory analytical results from the August 2004 monitoring event indicate that no site-related COCs were detected in indoor ambient air.

The laboratory analytical results from the December 2004 monitoring event indicate that low levels of PCE were detected in indoor ambient air. PCE was detected at concentrations of 9.9 ug/m^3 and 11 ug/m^3 (within NYSDOH background indoor air levels) in the two indoor ambient air quality samples.

The laboratory analytical results from the March 2005 monitoring event indicate that PCE was detected in both of the air samples at concentrations slightly above the NYSDOH guideline of 100 ug/m^3. PCE was detected at concentrations of 110 ug/m^3 and 120 ug/m^3 in the two indoor ambient air quality samples. This is the first indoor ambient air monitoring event where PCE was detected above the NYSDOH guideline.

The laboratory analytical results from the June 2005 monitoring event indicate that low levels of PCE were detected in indoor ambient air. PCE was detected at concentrations of 9.6 ug/m^3 and 9.7 ug/m^3 (within NYSDOH background indoor air levels) in the two indoor ambient air quality samples. These PCE concentrations are significantly lower than the PCE concentrations (110 ug/m^3 and 120 ug/m^3) that were detected in the two indoor ambient air quality samples in March 2005. 2-butanone (methyl ethyl ketone) was also detected at low levels (3.7 ug/m^3 and 4.9 ug/m^3) in the two indoor ambient air quality samples. However, it is possible that these low levels of 2-butanone are associated with a background source.

3. Vapor Control System

The following sections describe the investigative activities which will be conducted prior to VCS installation, provides an overview of the proposed VCS conceptual design, and provides an overview of the proposed system startup testing activities.

3.1 Investigative Activities

ARCADIS conducted site investigative activities to ensure that the system was designed in a manner such that the performance objectives referenced previously will be successfully met. These activities included the following:

- Review of existing construction drawings of the building foundation and subsurface utilities; and,

- Initial site walkover and inspection. This site inspection focused on review/inspection of the following:

- Identification of potential short-circuiting mechanisms (i.e., floor drains, floor slab cracks, pipe penetrations, existing monitoring wells, etc.).

- Review of the building roof for HVAC air intakes; and,

- Review of the building interior for potential monitoring point installation locations.

Based on a review of records found at the Town of Huntington Building Department, on July 6, 2005, wall footings at the site exist down to a depth of approximately 5-feet below land surface along the original footprint of the building and 7-feet below land surface along the footprint of the addition to the building.

The initial site walkover was conducted on July 15, 2005. The following observations were noted during the site inspection:

- The only identified potential short-circuiting pathway was through the protective casing of existing monitoring wells. Accordingly, the proposed VCS should be capable of affecting a large influence area with minimal extraction locations.

- Review of the building roof for HVAC intakes identified one intake approximately 20-feet northwest of the space currently occupied by ARCADIS.

- The only space available for induced vacuum monitoring point installation is within the space currently occupied by ARCADIS. The remaining area located within the VCS target zone is currently occupied commercial office space.

3.2 Vapor Control System Design

The VCS will be designed to provide a means of establishing negative pressure beneath the building slab in order to eliminate the vapor intrusion pathway between the vapor source (groundwater) and the receptor (building interior). This will be accomplished through a network of vapor recovery wells and associated induced vacuum monitoring points, a negative pressure generation system, and an air treatment unit (as necessary). Figure 1 provides a site plan containing the proposed vapor recovery and monitoring well locations. Figure 2 provides a process flow diagram of the proposed recovery system. Details of the conceptual system design are presented below.

3.2.1 Vapor Recovery and Monitoring Wells

Figure 1 provides an estimate of the area targeted for vapor control, the location of space currently occupied by ARCADIS (i.e., area accessible for the VCS), the location of potential wall footings, and the proposed location of extraction and monitoring points. Based on a review of existing sub-slab soil boring logs, the July 15, 2005 site inspection, and our experience at sites with similar geology, we believe that a relatively large radius-of-influence (ROI) can be achieved. Specifically, our experience indicates that a ROI of 60 to greater than 100 feet can be achieved through a single extraction point, particularly if the land surface contains a barrier to vertical flow such as a building slab or parking area.

Two VCS recovery points (VCS-1 and VCS-2) will be installed at the locations shown on Figure 1. These points will be used to maintain negative pressure within the entire target area (i.e., one extraction point on the west and one on the east side of the wall footing). Each VCS recovery point will be installed to a depth of 7 feet below land surface (ft bls) using Geoprobe® drilling methods. The points will be constructed of 2-inch diameter PVC well casing with 5 feet of 10-slot PVC well screen and will be properly sealed to avoid short circuiting. Once the well casing and screen are inserted into the borehole, the annular space between the well screen and the borehole will be backfilled with Morie #1 filter pack, or equivalent, to approximately 1 foot above the top of the screen interval, followed by a six-inch thick fine sand seal (Morie #00, or equivalent), and a six-inch thick bentonite seal. The six-inch thick floor slab will then be restored with hydraulic cement. The well will be completed as a stick-up well through the floor surface. Installation to the proposed depth should allow the building wall footings to serve as an additional barrier to flow, thereby maximizing vacuum influence within the target area.

To demonstrate that negative pressure is being maintained within the target area, four VCS monitoring points (VCS-MP-1, VCS-MP-2, VCS-MP-3, and VCS-MP-4) will be installed at known distances from extraction point VCS-1. Similar to the recovery points, monitoring points VCS-MP-1 through VCS-MP-3 will be installed to a depth of 7 ft bls using Geoprobe® drilling methods. The points will be constructed of 1-inch diameter PVC well casing with 5 feet of 10-slot PVC well screen and will be properly sealed to avoid short circuiting. Once the well casing and screen are inserted into the borehole, the annular space between the well screen and the borehole will be backfilled with Morie #1 filter pack, or equivalent, to approximately 1 foot above the top of the screen interval, followed by a six-inch thick fine sand seal (Morie #00, or equivalent), and a six-inch thick bentonite seal. The six-inch thick floor slab will then be restored with hydraulic cement. The well will be completed as a stick-up well through the floor surface. Monitoring point VCS-MP-4 will be installed as an angle monitoring point due to accessibility issues (i.e., occupied floor space in the northeastern portion of the building). VCS-MP-4 will be installed to a depth of approximately 6.5 ft bls using Geoprobe® drilling methods. VCS-MP-4 will be installed through the wall footing at a 60^0 angle with a screen interval from approximately 4 to 6.5 ft bls. VCS-MP-4 will be constructed with a Geoprobe® 1.4-inch OD prepack screen (5 feet of 10-slot, 0.75-inch diameter PVC screen) and will be properly sealed to avoid short circuiting. Once the well casing and screen are inserted into the borehole, the annular space between the well casing (above the well screen) and the borehole will be backfilled with a bentonite seal. The wall footing will then be restored as appropriate. The well will be completed as a flush-mount well.

A discussion of how induced vacuum measurements will be used to demonstrate system performance is provided in Section 5.

3.2.2 Negative Pressure System

During system startup and initial system operation, a more active recovery method will be used to maintain negative pressure beneath the building slab. Specifically, a 1-horsepower (hp) regenerative blower will be used to extract the soil gas and maintain the negative pressure barrier beneath the building slab. A dilution valve will be installed on the influent (suction) side of the blower to adjust the vacuum level applied to the VCS wells. A soil gas sample port and a vacuum gauge will be located on each wellhead prior to the dilution valve. Figure 2 presents a detailed process flow diagram of the initial VCS.

There are several other methods of extraction commercially available which can potentially achieve the overall design objectives. These methods include, but are not limited to:

- Solar powered extraction blowers (similar to above but powered through solar energy).
- Electric powered roof ventilators (i.e., centrifugal).

- Wind powered roof turbines; and,

- Passive venting through barometric pumping (i.e., installation of a "BaroBall" valve or similar).

Accordingly, ARCADIS will reevaluate the vapor recovery method once site-specific performance data has been collected during system startup and performance monitoring site visits. Similar to a traditional soil vapor recovery system for soil remediation, it is believed that the concentration of soil vapor will decline significantly during the first year of operation. Since the proposed system is capturing mass migrating from the groundwater to air interface, and not from a continuing source within the capture zone, the anticipated decline may occur even earlier. Therefore, a more passive type system (wind turbine or barometric pumping) may be adequate to maintain IAQ following the initial mass removal period. ARCADIS will notify the NYSDEC of any proposed modifications prior to implementation.

3.2.3 Vapor Treatment

Depending on the influent vapor concentration determined through VCS operational performance monitoring, vapor treatment may be required for the VCS system. Based on the anticipated concentration of COCs identified through existing IAQ and sub-slab vapor monitoring data and anticipated maximum recovery flow rate (100 standard cubic feet per minute), preliminary modeling indicates that vapor treatment is not required (NYSDEC DAR-1, December 22, 2003). Nonetheless, vapor phase granular activated carbon (VPGAC) will initially be used to treat effluent vapor prior to discharge to the atmosphere. Specifically, the proposed VCS will be equipped with a 400-pound (lb) VPGAC vessel as shown on Figure 2. The VCS system stack will be directed away from the identified HVAC intake. As described in Section 3.2, it is anticipated that influent vapor concentrations will decline significantly during the first year of operation.

Similar to the vapor recovery method, the need for vapor treatment will be reevaluated following collection and review of system performance data. If vapor concentrations are below, or reduced to below applicable standards through system operation, ARCADIS may request discontinuation of vapor treatment.

In the event that the source area reagent injections result in an increase of vinyl chloride (VC) to above the applicable DAR-1 guidance criteria, alternate treatment means can be incorporated into the VCS. Specifically, a 400-lb potassium permanganate impregnated zeolite unit would be added as a polishing unit after the proposed VPGAC unit.

3.3 Vapor Control System Startup

The following section details the VCS installation methodology, the elimination of vapor intrusion pathways and VCS system startup testing.

3.3.1 Elimination of Vapor Intrusion Pathways

Prior to system startup, all potential vapor intrusion pathways identified during the initial site walkover (i.e., monitoring well protective casings) will be sealed. As referenced previously, sealing of these pathways will prevent potential short circuiting of the VCS system and will further eliminate the potential for vapor intrusion into the building.

3.3.2 System Startup Testing

The initial VCS system will be constructed in accordance with the process flow diagram presented on Figure 2 and as described in Section 3.2. System startup will begin immediately following system construction. A description of the system startup procedures is provided below.

3.3.2.1 System Startup Operational Testing and Monitoring

Following system construction, VCS startup will be completed during a one-day testing period as follows:

1. Recording of current meteorological conditions including barometric pressure and temperature. In addition, current ambient conditions (i.e., rain, sun, etc.) will be recorded and it will be noted whether the barometric pressure is currently rising or falling.

2. A baseline measurement of sub-slab pressure/vacuum will be conducted to determine the ambient sub-slab pressure conditions with respect to current meteorological and HVAC conditions.

3. The VCS system will be started at 100-percent vacuum.

4. One half hour, two hours, and three hours following startup the following parameters will be collected:

   - Measurement of induced vacuum at all VCS monitoring points (i.e., VCS-MP-1 through VCS-MP-4).
   - Measurement of flow and vacuum at the VCS recovery points; and,
   - Collection of Photoionization Detector (PID) readings from the VCS recovery points.

5. Four hours following VCS startup the following parameters and/or samples will be collected:

   - Measurement of induced vacuum at all VCS monitoring points.
   - Measurement of flow and vacuum at the VCS recovery points.
   - Collection of PID readings from the VCS recovery points; and,
   - Collection of vapor samples from recovery wells VCS-1, VCS-2 and total effluent (after VPGAC unit) for laboratory analysis of site-related VOCs using TO-14A direct inject. Vapor samples shall be analyzed for PCE, TCE, 1,1,1-TCA, cis-1,2-DCE, 1,1-DCE, VC and MEK.

6. After VOC samples have been collected, the influent vacuum will be reduced to 75-percent capacity and the following parameters will be collected following one hour of operation:

   - Measurement of induced vacuum at all VCS monitoring points.
   - Measurement of flow and vacuum at the VCS recovery points; and,
   - Collection of PID readings from the VCS recovery points.

7. The procedures referenced in Item 6 will be repeated at 25-percent capacity.

Following Item 7 above, the system will shut down to evaluate influent and effluent analytical data (i.e., confirm effectiveness of VPGAC and VC concentrations) and system operating parameters. The system will be restarted at 100 percent vacuum immediately following conformation of its effectiveness.

4. Operation and Maintenance

VCS OM&M activities will include the following:

- Weekly site inspections to ensure the system is running properly.
- The collection of meteorological and system operating parameters on a quarterly basis. Parameters to be recorded will include the following:
  - Barometric pressure, ambient temperature and atmospheric conditions. In addition, it will be noted if the barometric pressure is rising or falling;
  - Induced vacuum readings at all monitoring points;
  - Recovery vacuum and flowrate at each recovery well; and,
  - PID readings from each recovery well.
- The collection of a total influent and total effluent vapor sample for laboratory analysis on a quarterly basis. Vapor samples will be collected as grab samples directly from the influent and effluent pipelines. All samples will be submitted to Air Toxics for laboratory analysis of site-related VOCs using method TO-14A direct inject. Vapor samples shall be analyzed for PCE, TCE, 1,1,1-TCA, cis-1,2-DCE, 1,1-DCE, VC and MEK.
- The simultaneous collection (i.e., collected during same day) of IAQ samples for a period of one-year. IAQ samples will be collected and analyzed using the current methodology.

Maintenance of system equipment (i.e., blower maintenance) will be completed as necessary during the site inspections.

5. Data Evaluation and Reporting

The following section describes the data evaluation that will be used to demonstrate system performance and project reporting related to the VCS.

5.1.1 Data Evaluation

Data collected during system startup and OM&M site visits will be used to demonstrate that the VCS is operating as designed. Initially, the primary operational performance standards which will verify system operation shall include induced vacuum measurements and IAQ monitoring results. Due to the limitations in access for VCS monitoring points referenced previously (i.e., the area west of the space currently occupied by ARCADIS), the VCS influence area will be estimated through analysis of measurements collected from monitoring points VCS-MP-1 through VCS-MP-4. Specifically, the relationship of induced vacuum versus distance from the extraction point (VCS-1) will be generated and used to extrapolate the maximum achieved ROI. Assuming that the sub-slab geology is consistent on both the east and west side of the wall footing, data generated through measurement at monitoring points VCS-MP-1 through VCS-MP-4 will be sufficient to demonstrate the achieved ROI for the entire target area. IAQ results collected during the quarterly monitoring events will be compared to NYSDOH guideline values.

It is anticipated that the source area injections will not have an adverse effect on sub-slab vapor quality. Nonetheless, VCS total influent vapor samples will be used to monitor and document sub-slab vapor quality during the source area injections. This data will also be used to evaluate if vapor treatment is required or estimate VPGAC media breakthrough (and corresponding changeout frequency, if necessary). During initial system operation, total effluent vapor samples will be used to demonstrate that all COCs are treated to below their respective DAR-1 guidance criteria. As requested by the NYSDEC, the mass of contaminants removed by the VCS will be calculated on a quarterly basis and will be documented in the next issued Progress Report.

5.1.2 Reporting

ARCADIS will notify the NYSDEC of the testing results through electronic mail (email) transmittals. A formal summary of the VCS startup testing results will be provided in the following Progress Report. System OM&M results will be provided in the forthcoming Progress Report for the respective sampling period.

6. Schedule

A VCS implementation schedule has been provided on Figure 3. As shown on Figure 3, we intend to have the VCS constructed by November 29, 2005. System startup will commence immediately following the system construction on November 30, 2005. The

VCS will be restarted immediately prior to the first source area reagent injection on December 12, 2005.

Based on communication with Melissa Menetti of the NYSDOH on May 3, 2005 and NYSDOH comment letter dated September 19, 2005, it is ARCADIS' intent to discontinue IAQ monitoring upon demonstration that the VCS has successfully eliminated the vapor intrusion pathway. This demonstration will be provided through four consecutive quarters of IAQ monitoring results below the NYSDOH guideline values following VCS startup in conjunction with operational results from the VCS itself (i.e., demonstration of negative pressure beneath the building foundation).

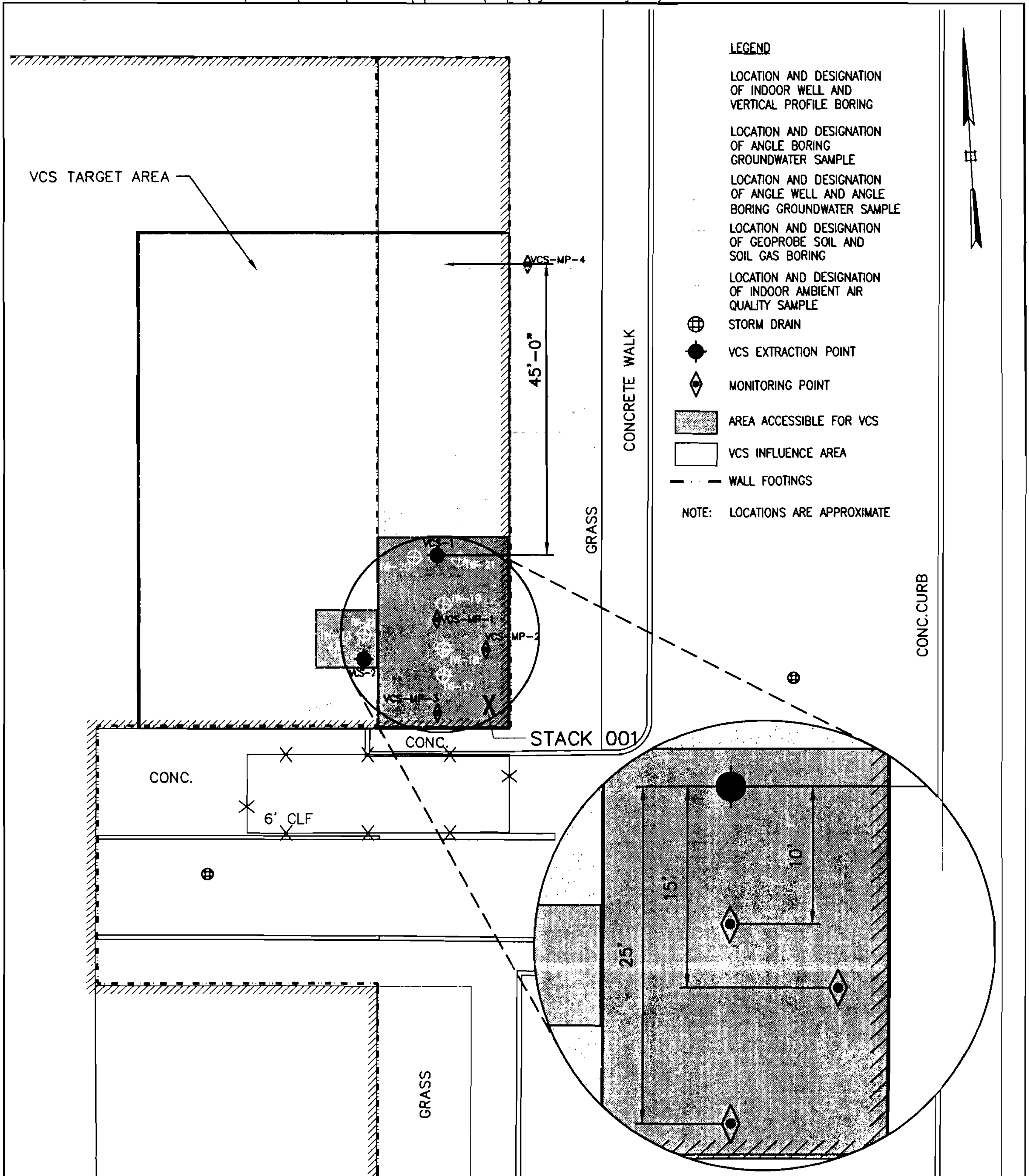
7. Permitting

A completed NYSDEC Air Permit Application Form is included as Appendix A.

8. References

ARCADIS G&M, Inc. 2005. Long-Term Remedial Implementation and Monitoring Plan, 25 Melville Park Road Site, Melville, New York. January 19, 2004.

Figures



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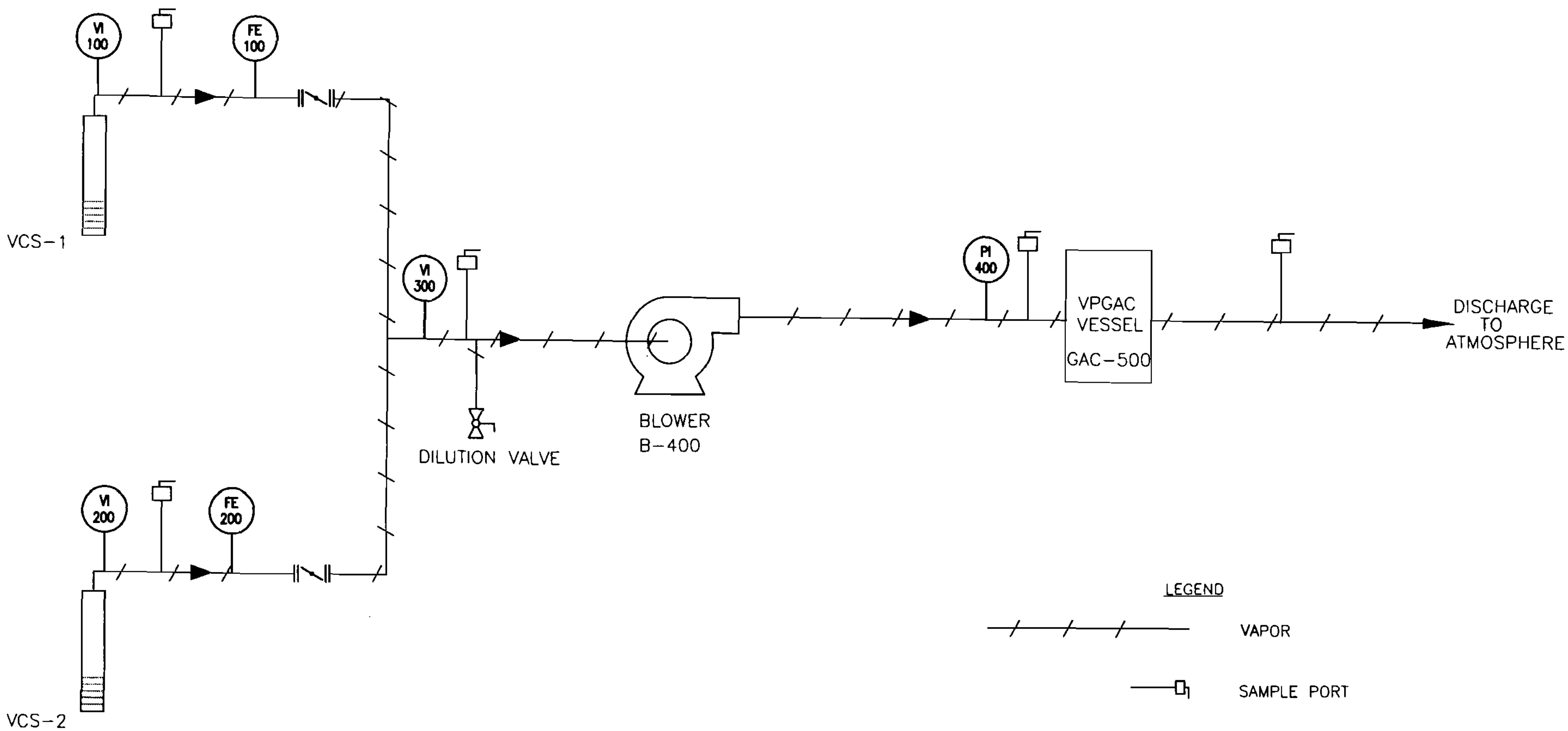
PROJECT MANAGER	DEPARTMENT MANAGER	LEAD DESIGN PROF.	CHECKED BY
S. FELDMAN	N. VALKENBURG		C. KEEN
SHEET TITLE		TASK/PHASE NUMBER 00028	DRAWN BY LMC
VAPOR CONTROL SYSTEM SITE PLAN 25 MELVILLE PARK ROAD, MELVILLE, NEW YORK 25 MPR, LLC.		PROJECT NUMBER NY001332.0012	DRAWING NUMBER 1

User Name: Hughes, Edward Path Name: G:\APROJECT\WHCS Melville\Vapor Intrusion\Workplan\SVE_Schematic DWN.dwg



LEGEND

VAPOR

SAMPLE PORT

VCS–VAPOR CONTROL SYSTEM WELL

VPGAC–VAPOR PHASE GRANULAR ACTIVATED CARBON

VI – VACUUM INDICATOR

FE – FLOW ELEMENT ACCESS PORT

PI – PRESSURE INDICATOR

ARCADIS

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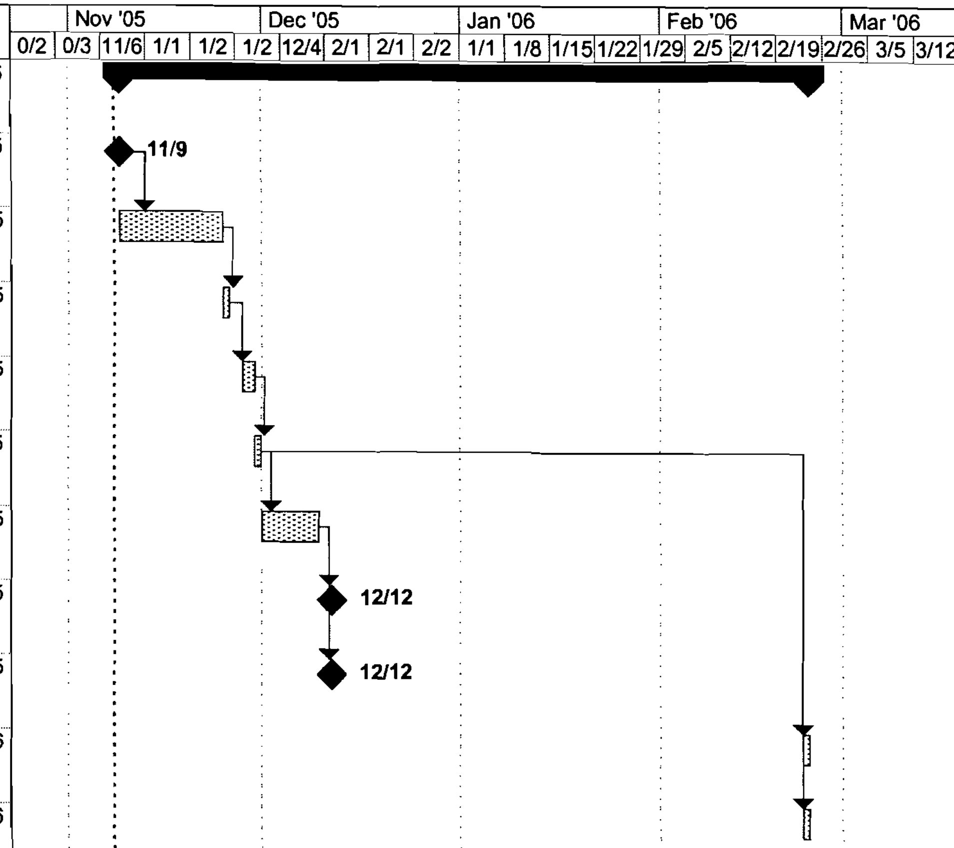
PROJECT MANAGER S. FELDMAN	DEPARTMENT MANAGER N. VALKENBURG	LEAD DESIGN PROF. C. TUOHY	CHECKED BY K. ZEGEL
SHEET TITLE		TASK/PHASE NUMBER 00028	DRAWN BY K. ZEGEL
VAPOR CONTROL SYSTEM PROCESS FLOW DIAGRAM		PROJECT NUMBER **NY001332.0012**	DRAWING NUMBER **2**

Figure 3. VCS Implementation Schedule, 25 Melville Park Road Site, Melville, New York.

ID	Task Name	Duration	Start	Finish
1	**VCS Implementation**	**77 days**	**Wed 11/9/05**	**Thu 2/23/06**
2	VCS Workplan Submittal	0 days	Wed 11/9/05	Wed 11/9/05
3	NYSDEC Review/Concurrence	12 days	Wed 11/9/05	Thu 11/24/05
4	Well Installation	1 day	Fri 11/25/05	Fri 11/25/05
5	System Construction	2 days	Mon 11/28/05	Tue 11/29/05
6	System Startup	1 day	Wed 11/30/05	Wed 11/30/05
7	Startup Data Analysis	7 days	Thu 12/1/05	Fri 12/9/05
8	VCS Restart	1 day	Mon 12/12/05	Mon 12/12/05
9	First Source Area IRZ Injection	1 day	Mon 12/12/05	Mon 12/12/05
10	System Performance Sampling	1 day	Thu 2/23/06	Thu 2/23/06
11	Indoor Air Quality Sampling	1 day	Thu 2/23/06	Thu 2/23/06



Notes:

1. System performance monitoring will be completed on a quarterly basis following system startup.
2. Indoor air quality samples will be collected on a quarterly basis for a period of 1-year following system startup pending demonstration that the VCS has eliminated the vapor intrusion pathway.

Project: VCS Schedule_rev1
Date: Tue 11/8/05

Task | Progress | Milestone | Summary

\\NY1fpex1\Data\APROJECT\WHCS Melville\Vapor Intrusion\Workplan\VCS Schedule_rev1.mpp

ARCADIS

Appendix A

Air Permit Application

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

COPIES
WHITE - ORIGINAL
GREEN - DIVISON OF AIR
WHITE - REGIONAL OFFICE
WHITE - FIELD REP.
YELLOW - APPLICANT

OP | LOCATION | FACILITY | EMISSION POINT

A ADD / C CHANGE / D DELETE

READ INSTRUCTIONS CONTAINED IN FORM 76-11-12 BEFORE ANSWERING ANY QUESTION

PROCESS, EXHAUST OR VENTILATION SYSTEM

APPLICATION FOR PERMIT TO CONSTRUCT OR CERTIFICATE TO OPERATE

SECTION A

- 1. NAME OF OWNER / FIRM: 25 MPR, LLC
- 2. NUMBER AND STREET ADDRESS: 445 Broad Hollow Road, Suite 430
- 3. CITY - TOWN - VILLAGE: Melville
- 4. STATE: NY
- 5. ZIP: 11747
- 6. OWNER CLASSIFICATON: A. [X] COMMERCIAL; B. [ ] INDUSTRIAL; C. [ ] UTILITY; D. [ ] FEDERAL; E. [ ] STATE; F. [ ] MUNICIPAL; G. [ ] EDUC. INST.; H. [ ] HOSPITAL; I. [ ] RESIDENTIAL; J. [ ] OTHER
- 7. NAME & TITLE OF OWNERS REPRESENTATIVE: Steven Feldman, AssociateVice President
- 8. TELEPHONE: 631-249-7600
- 9. NAME OF AUTHORIZED AGENT: ARCADIS G&M
- 10. TELEPHONE: 631-249-7600
- 11. NUMBER AND STREET ADDRESS: 88 Duryea Road
- 12. CITY - TOWN - VILLAGE: Melville
- 13. STATE: NY
- 14. ZIP: 11747
- 15. NAME OF P.E. OR ARCHITECT PREPARING APPLICATION: Christina Tuohy
- 16. N.Y.S. P.E. OR ARCHITECT LICENSE NO.: 078743-1
- 17. TELEPHONE: 631-249-7600
- 18. SIGNATURE OF OWNERS REPRESENTATIVE OR AGENT WHEN APPLYING FOR A PERMIT TO CONSTRUCT:
- 19. FACILITY NAME (IF DIFFERENT FROM OWNER / FIRM): NEW YORK TWIST DRILL
- 20. FACILITY LOCATION (NUMBER AND STREET ADDRESS): 25 Melville Park Road
- 21. CITY - TOWN - VILLAGE: Melville, Town of Huntington
- 22. ZIP: 11747
- 23. BUILDING NAME OR NUMBER: 25 MPR
- 24. FLOOR NAME OR NUMBER: Ground
- 25. START UP DATE: 8 / 05 (MO / YR)
- 26. DRAWING NUMBERS OF PLANS SUBMITTED: 1,2
- 27. PERMIT TO CONSTRUCT: A. [X] NEW SOURCE; B. [ ] MODIFICATION
- 28. CERTIFICATE TO OPERATE: A. [X] NEW SOURCE; B. [ ] MODIFICATION; C. [ ] EXISTING SOURCE

SEC. B

29. EMISSION POINT ID.	30. GROUND ELEVATION (FT.)	31. HEIGHT ABOVE STRUCTURES (FT.)	32. STACK HEIGHT (FT.)	33. INSIDE DIMENSIONS (IN.)	34. EXIT TEMP. (°F)	35. EXIT VELOCITY (FT./SEC.)	36. EXIT FLOW RATE (ACFM)	37. SOURCE CODE	38. HRS / DAY	39. DAYS / YR	40. % OPERATION BY SEASON Winter	Spring	Summer	Fall
0 01	120	3	19	4	85	19.7	103		24	365	25	25	25	25

SEC. C

41. DESCRIBE PROCESS OR UNIT: Vapor control system designed to eliminate the vapor intrusion pathway beneath a commercial office building. System will most likely collect low concentrations of chlorinated volatile organic compounds which will be treated with activated carbon prior to discharge.

SEC. D

EMISSION CONTROL EQUIPMENT I.D.	CONTROL TYPE	MANUFACTURER'S NAME AND MODEL NUMBER	DISPOSAL METHOD	DATE INSTALLED MONTH / YEAR	USEFUL LIFE
42. 1	43. 17	44. U.S. Filter/Westates VSC-400	45. 9	46. 08 / 05	47. TBD
48.	49.	50.	51.	52. /	53.

Activated carbon regenerated off-site at U.S. Filter Facility

SECTION E

CALCULATIONS

An example calculation is attached as Table A-1.

SECTION F

CONTAMINANT NAME	CAS NUMBER	INPUT OR PRODUCTION	UNIT	ENV. RATING	EMISSIONS ACTUAL	UNIT	HOW DET.	PERMISSIBLE	% CONTROL EFFIC'CY	HOURLY EMISSIONS (LBS/HR) ERP	HOURLY ACTUAL	ANNUAL EMISSIONS (LBS/YR) ACTUAL	10ˣ	PERMISSIBLE
54. Tetrachloroethene	55. 127 -18 -4	56.	57.	58.	59. 4.9X10-3	60. 1	61. 9	62.	63. 98	64.	65. 9.79 E-05	66. 0.86	67.	68.
69. Trichloroethene	70. 79 -01 -6	71.	72.	73.	74. 1.3X10-4	75. 1	76. 9	77.	78. 98	79.	80. 2.61 E-06	81. 0.02	82.	83.
84. 1,1,1 Trichloroethane	85. 71 -55 -6	86.	87.	88.	89. 6.2X10-5	90. 1	91. 9	92.	93. 98	94.	95. 1.24 E-06	96. 0.01	97.	98.
99.	100. - -	101.	102.	103.	104.	105.	106.	107.	108.	109.	110.	111.	112.	113.
114.	115. - -	116.	117.	118.	119.	120.	121.	122.	123.	124.	125.	126.	127.	128.
129.	130. - -	131.	132.	133.	134.	135.	136.	137.	138.	139.	140.	141.	142.	143.

SEC. G

SOLID FUEL TYPE	TONS / YR	% S	LIQUID FUEL TYPE	THOUSANDS OF GALLONS/YR	% S	GAS TYPE	THOUSANDS OF CF/YR	BTU/CF	APPLICABLE RULE	APPLICABLE RULE
144.	145.	146.	147.	148.	149.	150.	151.	152.	153.	154.

Upon completion of construction sign the statement listed below and forward to the appropriate field representative

THE PROCESS, EXHAUST OR VENTILATION SYSTEM HAS BEEN CONSTRUCTED AND WILL BE OPERATED IN ACCORDANCE WITH STATED SPECIFICATIONS AND IN CONFORMANCE WITH ALL PROVISIONS OF EXISTING REGULATIONS.

155. SIGNATURE OF AUTHORIZED REPRESENTATIVE OR AGENT | DATE

AGENCY USE ONLY

156. LOCATION CODE	157. FACILITY ID. NO.	158. U.T.M. (E)	159. U.T.M. (N)	160. SIC NUMBER	161. DATE APPL. RECEIVED	162. DATE APPL. REVIEWED	163. REVIEWED BY:
					/ /	/ /	

PERMIT TO CONSTRUCT

164. DATE ISSUED	165. EXPIRATION DATE	166. SIGNATURE OF APPROVAL	167. FEE
/ /	/ /		

168.
1. DEVIATION FROM APPROVED APPLICATION SHALL VOID THIS PERMIT
2. THIS IS NOT A CERTIFICATE TO OPERATE
3. TESTS AND/OR ADDITIONAL EMISSION CONTROL EQUIPMENT MAY BE REQUIRED PRIOR TO THE ISSUANCE OF A CERTIFICATE TO OPERATE

CERTIFICATE TO OPERATE

169. DATE ISSUED	170. EXPIRATION DATE	171. SIGNATURE OF APPROVAL	172. FEE
/ /	/ /		

173.
1. [ ] INSPECTED BY __________ DATE ______
2. [ ] INSPECTION DISCLOSED DIFFERENCES AS BUILT VS. PERMIT, CHANGES INDICATED ON FORM
3. [ ] ISSUE CERTIFICATE TO OPERATE FOR SOURCE AS BUILT
4. [ ] APPLICATION FOR C.O. DENIED

DATE | INITIALED

174. SPECIAL CONDITIONS:

1.	2.
3.	4.
5.	6.
7.	8.

ARCADIS

Table A-1. NYSDEC DAR-1 Air Modeling Estimate and Emissions Calculations for Vapor Control System, Melville, New York.

Discharge Temperature	T	544.67	°R
Ambient Temperature	Ta	519.67	°R
Stack Diameter	D	4	in
Stack Radius	R	0.166666667	ft
Stack Area	A	0.09	ft^2
Exit Velocity	V	19.7	fps
Exit Flow	Q	103	acfm
Exit Flow	Q	100	scfm
Stack Height	h_s	18	ft
Building Height	h_b	16	ft
Ratio of Heights	h_s/h_b	1.13	
Plume rise credit? $h_s/h_b > 1.5$?	(If no, h_e=h_s)	(If Yes, $h_e = h_s + 1.1 (F_m)^{1/3}$)	
Momentum Flux Fm = Ta/T * V2 * R2		n/a	ft^4/s^2
Effective Stack Height	h_e	17.0	ft
Reduction Factor? $2.5 > h_s/h_b > 1.5$?		No, do not reduce impact	
Actual Annual Impact	C_a	$RF*6*Q_a/h_e^{2.25}$	
Mass Flow	Q_a	S lbs emitted for last 12 months	

fps: feet per second
acfm: actual cubic feet per minute
ug/m³: micrograms per cubic meter
lb/yr: pounds per year
lb/hr: pounds per hour
ppb: parts per billion

Notes/Assumptions:

1. The stack discharge temperature is estimated at 85°F.
2. The ambient temperature is estimated at 60°F.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.
4. AGC refers to the Annual Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.

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Table A-1. NYSDEC DAR-1 Air Modeling Estimate and Emissions Calculations for Vapor Control System, Melville, New York.

Compounds	CAS Numbers	MW	Maximum Limit on C_a (AGC[4]) ug/m³	Maximum Mass Flow Q_a lb/yr	Design Concentrations[5] ppb	Estimated Uncontrolled Emissions C_a ug/m³	Estimated Uncontrolled Mass Flow per Hour lb/hr	Estimated Uncontrolled Mass Flow per Year lb/yr	% Control Efficiency	Estimated Controlled Mass Flow per Hour lb/hr	Estimated Controlled Mass Flow per Year lb/yr	Uncontrolled Percent of Annual %	Controlled Percent of Annual %
1,1,1-Trichloroethane(Methyl Chloroform)	71-55-6	133.4	1,000	97,804.50	30	166.39	6.22E-05	0.56	98.00	1.24E-06	0.01	0.00	0.00
Trichloroethene	79-01-6	131.4	0.5	48.90	64	349.60	1.31E-04	1.18	98.00	2.61E-06	0.02	2.42	0.05
Tetrachloroethene	127-18-4	165.9	1.00	97.80	1900	13099.77	4.89E-03	44.26	98.00	9.79E-05	0.86	45.26	0.88

fps: feet per second
acfm: actual cubic feet per minute
ug/m³: micrograms per cubic meter
lb/yr: pounds per year
lb/hr: pounds per hour
ppb: parts per billion

Notes/Assumptions:

1. The stack discharge temperature is estimated at 85°F.
2. The ambient temperature is estimated at 60°F.
3. Calculations assume that the system will run with the maximum allowable concentrations between quarterly readings.
4. AGC refers to the Annual Guideline Concentration as determined using the hand calculations in the DAR-1 AGC/SGC Tables dated December 22, 2003.
5. Design concentrations based on maximum observed sub-slab vapor concentration obtained during the November 5, 2003 sub-slab soil gas investigation.