4429 Walden Avenue
Lancaster, NY 14086

Phone: (716) 597-0001
Fax: (716) 597-0505

April 29, 2013

Mr. Gregory P. Sutton, P.E.
Regional Hazardous Waste Remediation Engineer
Division of Environmental Remediation, Region 9
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, New York 14203-2999

Re: Remedial Completion Report
Former "Our Cleaners" Site
3163 Eggert Road
Tonawanda, Erie County, New York 14150
Order on Consent Index #B9-0740-07-03

Dear Mr. Sutton:

Environmental Products & Services of Vermont, Inc. (EPSVT) hereby submits the enclosed Remedial Completion Report (RCR) for the former "Our Cleaners" site in Tonawanda, NY on behalf of SRK Colvin-Eggert Plaza Associates LP (SRK).

The RCR:

- Identifies the boundaries of the site;
- Describes the site investigations that have been completed at or near the site;
- Describes the Interim Remedial Measures (IRMs) and other remedial activities completed at the site, including a description and respective quantity of contaminated materials removed and/or treated, and the disposition of waste streams; and,
- Identifies the institutional and engineering controls and deed restrictions placed on the property.

The RCR was certified by Mr. Joseph Juszkiewicz, P.E., New York State Engineer License # 059887.

Please feel free to contact our office with any questions or comments.

Sincerely,

Environmental Products & Services of Vermont, Inc.

Mark D. Wilder
Geoscience Manager

Enc.
Cc: Mr. Fred Back – Benchmark Management Corp.

Mr. David Nossavage – Benchmark Management Corp.
Mr. Kevin J. Cross, Esq. – Lippes Mathias Wexler Friedman LLP
Mr. James D. Charles, Esq. – NYSDEC
Mr. Gary Litwin – NYSDOH
Mr. Randy Klosko – EPSVT
Mr. Mike Hinton – NYSDEC
Mr. Matt Forcucci – NYSDOH

Former "Our Cleaners" Site
Erie County, New York

Remedial Completion Report

NYSDEC Order on Consent # B9-0740-07-03

Prepared For:

SRK Colvin-Eggert Plaza Associates LP
4053 Maple Road, Suite 200
Amherst, New York 14226

Prepared By:

Environmental Products & Services of Vermont, Inc.
4429 Walden Avenue
Lancaster, New York 14086
(716) 597-0001
EPSVT Project No. B3186

April 29, 2013

CERTIFICATIONS

I, _____, am currently a registered professional engineer licensed by the State of New York, I had primary direct responsibility for implementation of the remedial program activities, and I certify the Interim Remedial Measure (IRM) was implemented and that all construction activities were completed in substantial conformance with the Department-approved IRM.

I certify that the data submitted to the Department with this Remediation Completion Report (RCR) demonstrates that the remediation requirements set forth in the IRM and in all applicable statutes and regulations have been or will be achieved in accordance with the time frames, if any, established for the remedy.

I certify that all use restrictions, Institutional Controls, Engineering Controls, and/or any operation and maintenance requirements applicable to the Site are contained in an environmental easement created and recorded pursuant to ECL 71-3605 and that all affected local governments, as defined in ECL 71-3603, have been notified that such easement has been recorded.

I certify that a Site Management Plan (SMP) has been submitted for the continual and proper operation, maintenance, and monitoring of all Engineering Controls employed at the Site, including the proper maintenance of all remaining monitoring wells, and that such plan has been approved by Department.

I certify that all documents generated in support of this report have been submitted in accordance with the DER's electronic submission protocols and have been accepted by the Department.

I certify that all data generated in support of this report have been submitted in accordance with the Department's electronic data deliverable and have been accepted by the Department.

I certify that all information and statements in this certification form are true. I understand that a false statement made herein in punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of Penal Law. I _____, of _____, am certifying as Owner's representative and have been authorized and designated by all site owners to sign this certification for the site.

_____	_____	_____
NYS Professional Engineer #	Date	Signature

Note: include PE stamp

TABLE OF CONTENTS

Remedial Completion Report
(April 2013)

Former "Our Cleaners" Site
Index #B9-0740-07-03

1.0 Site Description & Background

1.1 Site Description

The site is located at 3161 - 3185 Eggert Road in the Town of Tonawanda, County of Erie, State of New York. The site is part of two parcels (tax ID numbers 53.11-2-31.1 [southern parcel] and 53.11-2-31.2 [northern parcel]) and consists of the area immediately around and beneath the former "Our Cleaners" location in the former West Shops Building and the area to the north-northeast extending to the Buffalo Athletic Club for Women (BACW) property. The southern parcel is approximately six-acres improved with two slab-on-grade buildings. The main building (East Shops building) encompasses approximately 38,000 square feet while the smaller outbuilding encompasses approximately 1,600 square feet. Currently, the main site building is an operating strip mall. Tenants of the strip mall include BK Ryan's (bar/restaurant), Carol Ann Hair Fashions (beauty shop), The Goodwill Store, Midnight Wines and Liquors (liquor store), Autumn Tan (tanning salon), Jindo Martial Arts, and US Renal Care. The smaller outbuilding is occupied by Dunkin Donuts. The northern parcel is approximately three acres improved with one slab-on-grade building encompassing approximately 24,000 square feet. This building is currently the BACW. SRK Colvin-Eggert Plaza Associates LP (SRK) purchased both parcels in 1998 and sold the northern parcel to BACW in 2004. The site is located in a commercial/residential area of the Town of Tonawanda. A Site Location Map is attached as **Figure 1**. A site map is shown as **Figure 2**. Surrounding land use is as follows:

- Interstate Route 290 is located north of the site.
- The East Shops followed by residential properties are located east of the site.
- Additional portions of tax parcel 53.11-2-31.1 including the vacant outbuilding followed by the Augustana Lutheran Church are located south of the site.
- The intersection of Colvin Boulevard and Eggert Road followed by a Kwik Fill gas station/convenience store are located to the west of the property.

SRK Colvin-Eggert Plaza Associates LP (SRK) entered into an Order on Consent with the New York State Department of Environmental Conservation (NYSDEC) on February 5, 2009, to investigate and remediate the above referenced property.

1.2 Site History

In April 1998, Sear-Brown Group completed a Phase I Environmental Site Assessment (ESA) of the property as it was defined at the time. The Phase I ESA identified environmental concerns which showed that a dry cleaning business had been in operation in the West Shops building on site for approximately 10 years. Although there was no physical evidence of any spilling, soil sampling was recommended to determine if there was any impact because of the dry cleaning operations.

In June 1998, Sear-Brown Group completed a Phase II ESA. The Phase II ESA was conducted to investigate the soil and groundwater near the Our Cleaners operations in the West Shops building identified as an environmental concern in the Phase I ESA. The West Shops building, which housed Our Cleaners, was still in existence at this time. During the Phase II ESA, two small diameter soil borings were advanced (i.e., B-1 and B-2) near the dry cleaning facility (see **Figure 3** for a site map with these boring locations). Temporary monitoring wells were then installed in B-1 and B-2 for collection of groundwater samples. The sample from B-2 returned a result with an elevated concentration of tetrachloroethene (PCE), a common dry cleaning solvent, thereby warranting the need for additional subsurface investigation to define the source and the horizontal and vertical extent of the impacts near the dry cleaner operation.

In September 1998, a Limited Subsurface Investigation was completed by Barron & Associates, P.C. to confirm the impacts identified in the Sear-Brown Group Phase II ESA. During the SSI, a 2-inch monitoring well (i.e., B/OW-2) was installed adjacent to B-2. Groundwater samples were collected from B/OW-2 and another previously installed monitoring well (i.e., OW-VAC). PCE was detected in both of these wells, but at levels below the New York State Department of Environmental Conservation (NYSDEC) TOGS 1.1.1 standard. Based on the results, Benchmark proceeded with the purchase of the property.

In June 2004, Stantec Consulting Group completed a Phase II ESA to determine if any groundwater impacts had migrated north from the former dry cleaners onto the area of the property that was being considered for subdivision and sale to BACW. The investigation was performed at the request of BACW. During this Phase II ESA, four soil borings (i.e., B1 through B4) were advanced north of the proposed subdivision line in locations presumed to be downgradient of the former dry cleaner. The locations of B1 through B4 and the proposed property line are shown on **Figure 3**. Groundwater samples only were collected from the four borings. Groundwater collected from boring locations B1 and B2 indicated concentrations of chlorinated solvents above NYSDEC TOGS 1.1.1 groundwater standards, while concentrations of chlorinated solvents were not detected in borings B3 and B4.

In November 2004, Clayton Group Services, Inc. completed a Limited Phase II ESA. The ESA was conducted to further delineate chlorinated solvent impacts to groundwater on-site as well as determine a source of the impacts. Nine soil borings (i.e., SB-1 through SB-9) were advanced, two of which were inside the former dry cleaners storefront in the "West Shops" near the former dry cleaning machine (i.e., SB-3 and SB-4). The locations of SB-1 through SB-9 are shown on **Figure 3**. Soil samples were collected from all nine soil boring locations and the results indicated PCE at levels above NYSDEC TAGM 4046 guidance values in SB-3 and SB-4. PCE

was not detected or was detected at levels below TAGM 4046 guidance values in the remaining soil borings. Seven temporary groundwater monitoring wells (i.e., TW-1 through TW-7) were installed and groundwater analytical results indicated PCE levels above NYSDEC TOGS 1.1.1 standards were present under the former "West Shops" building and migrating onto the northern portion of the property.

In December 2006, Clayton Group Services, Inc. completed an excavation of chlorinated solvent-impacted soil with the approximate dimensions of 80 feet wide (east to west) by 45 feet long (north to south) by 4 to 8 feet deep. Approximately 1,130 tons of soil was excavated and transported offsite to CWM Chemical Services, LLC, Model City, NY for final disposition. Confirmatory endpoint sampling returned PCE analytical results at or below NYSDEC TAGM 4046 guidance values. Copies of the waste disposal manifests are included in **Appendix B.**

On October 28, 2008, EPSVT submitted to NYSDEC a Remedial Investigation/Interim Remedial Measure (RI/IRM) Work Plan to investigate the nature and extent of current vapor phase and groundwater impacts on the site and the BACW property located north of the site. Although there had been an extensive remedial excavation of approximately 1,130 tons of former source area impacted soil completed at the site, the current nature and extent of groundwater and soil vapor contamination at the site needed further investigation. Work plan approval was received from NYSDEC, and the installation of monitoring wells MW-1S&D through MW-8S&D, and soil vapor points SV-1 through SV-8 was completed from November 18 through November 24, 2008. In January 2009, after receiving the Preliminary Data Package from EPSVT discussing the results of the previously mentioned installation event, NYSDEC requested the installation of six additional monitoring wells (i.e., MW-9S&D through MW-14S&D) as well as six corresponding soil vapor sampling points (i.e., SV-9 through SV-14). Installation of monitoring wells MW-9S&D through MW-13S&D and MW-14S as well as installation of soil vapor sampling points SV-9 through SV-14 was completed from January 19 through January 21, 2009. Installation of MW-14D was completed on February 2, 2009. **Figure 4** shows the monitoring well locations. **Figure 5** shows the soil vapor sampling point locations.

In February 2009, EPSVT collected groundwater samples from the new wells and several of the wells installed during the first phase of drilling (MW-1S&D through MW-3S&D and MW-8S&D through MW-14S&D). MW-4S&D through MW-7S&D were not sampled during the second round due to lack of significant contamination in the first round. The samples were sent for analysis of VOCs using USEPA Method 8260. In addition to the groundwater analysis, the six new soil vapor points (SV-9 through SV-14) and the previously installed soil vapor points were also sampled. Results from the soil vapor sampling revealed that data from the first sampling event (in December 2008) remained consistent with this sampling event, therefore eliminating the concern for soil vapor intrusion. However, the results from the groundwater sampling indicated that the size of the contaminated groundwater plume was larger than originally anticipated, and that the potential for shallow dissolved phase groundwater to migrate downward (from the former source area) was a substantial concern for the deeper groundwater to the east. This new information was provided to the NYSDEC in a Supplementary Preliminary Data Package on March 27, 2009, and subsequently warranted a change in the original IRM Work Plan. A Revised IRM Work Plan (incorporating comments from the NYSDEC &

NYSDOH) was submitted to the NYSDEC on May 8, 2009, and was approved through the regulatory agencies.

To facilitate in-situ chemical oxidation and soil vapor extraction (SVE), twelve chemical oxidation remediation well pairs (i.e., RW-1 through RW-12) and five SVE wells (i.e., SVE-1 through SVE-5) were installed April 20, 2009 through April 30, 2009 in the locations shown on **Figure 4**. All work was completed in accordance with the Remedial Investigation (RI) and Revised Interim Remedial Measure (IRM) Work Plan submitted to NYSDEC in May 2009. During drilling of boreholes for the chemical oxidation injection well pairs, soil samples were collected continuously from grade to approximately 27 feet below ground surface (bgs). Soil samples were not collected during drilling for the installation of the SVE wells. Soil from each sample interval was placed in a plastic bag and the headspace was screened for organic vapors using a photoionization detector (PID) meter. Soil descriptions, including soil type, observations regarding the presence of free product, observable odors, staining, etc. and PID readings were detailed on soil boring logs and can be found as **Appendix B** in this report. In accordance with the IRM Work Plan, since no sample returned a PID reading above 50 parts per million (ppm), no soil sample was submitted for laboratory analysis.

Two 2-inch ID remediation injection wells were installed in each injection well pair boring. One well was screened from approximately 25 to 27 feet bgs. The other well was screened from approximately 22 to 24 feet bgs. A sand pack was placed from 27 feet bgs to approximately 20 feet bgs. The remainder of the borehole was sealed using tremie-grout to approximately 2 feet bgs, and then with sand pack to near surface. The remediation wells were finished with a flush-mount protective road box in a concrete well pad. A 4-inch ID SVE well screened from approximately five to ten feet bgs was installed in each SVE boring. A sand pack was placed from ten feet bgs to approximately four feet bgs. A bentonite seal was placed from approximately four to two feet bgs. The remainder of the borehole was filled with sand until the well was completed during the installation of the SVE system from April 27 through May 1, 2009. The locations of the SVE wells, process piping trench and remedial shed are shown on **Figure 4**.

Based on site data and groundwater chemistry obtained during the RI, EPSVT designed an in-situ chemical oxidation application regime. The chemical injection event was conducted from May 11 through May 18, 2009. A 10% solution of hydrogen peroxide ("peroxide") with no additional modifications was used for chemical oxidation. The peroxide was injected in the shallower screened injection well (i.e., screened from 22 to 24 feet bgs) using a Geoprobe GS2000 injection machine specifically designed for this purpose. During injection of the hydrogen peroxide, a tow-behind air compressor was connected to the deeper screened injection well (i.e., screened from 25 to 27 feet bgs) to facilitate air sparging. A total of 3,300 gallons of peroxide, or approximately 275 gallons of peroxide per well, was injected per event. However, only 165 gallons of peroxide was able to be injected into RW-11 due to a compromised well seal. To ensure the remainder of peroxide planned for RW-11 was injected at the site, the amount of peroxide injected into RW-6 and RW-7 was increased by 55 gallons (i.e., 330 gallons). RW-6 and RW-7 were chosen based on their proximity to the center of the contaminant plume.

The SVE system, which was installed from April 27 to May 1, 2009, was started on May 8, 2009. An effluent air sample was collected on May 14 and June 10, and sent for laboratory analysis of volatile organic compounds (VOCs) using method TO-15 SIM. Discharge loading calculations for May 14th were 2.20E-05 pounds per hour, which converts to 9.63E-05 tons per year. Discharge loading calculations for June 10th were 2.14E-05 pounds per hour and 9.36E-05 tons per year. The average discharge from the SVE system based on these two sampling events is 2.17E-5 lbs/hr. Since this was several orders of magnitude less than the NYSDEC threshold of 0.5 lbs/hr when treatment would be required, EPSVT concluded that future sampling of the SVE system effluent for laboratory analysis would not be required unless a PID reading of 5ppm or greater was obtained during the monthly O&M site check.

A second chemical injection event occurred from November 11 through November 24, 2009. A 10% solution of hydrogen peroxide with no additional modifications was used for chemical oxidation. The peroxide was injected in the shallower screened injection well (i.e., screened from 22 to 24 feet bgs) using a Geoprobe GS2000 injection machine. In cases where the peroxide could not be injected into the shallow well (due to refusal), it was injected into the deeper screened injection well (i.e., screened from 25 to 27 feet bgs) instead. During injection of the hydrogen peroxide, a tow-behind air compressor was connected to the deeper or shallower screened injection well, depending on which interval the peroxide was being injected into, to facilitate air sparging. A total of 3,987.5 gallons of peroxide was injected during this event. This is almost 1,000 more gallons than the anticipated (per event) amount discussed in the April 2009 RI and IRM Work Plan. Two wells (RW-9 and RW-10) were targeted for extra peroxide based on their proximity to the eastern edge of the contaminant plume, and because of the presence of higher permeable material surrounding each well. An average of 618.5 gallons was injected into the two wells. The targeted peroxide amount (275 gallons) was not able to be injected into remediation wells RW-5 and RW-7. This is likely due to the lower permeability of the native material in this area. 192.5 gallons were injected into RW-5, and 247.5 gallons were injected into RW-7. A lower volume of peroxide (less than 50 gallons) was injected into RW-11, due to lower permeability native material in this area. The remaining seven remediation wells (i.e., RW-1, RW-2, RW-3, RW-4, RW-6, RW-8, and RW-12) had an average of 330 gallons of peroxide injected into them.

On December 21, 2009, EPSVT received a comment letter from the NYSDEC in response to the July-September 2009 Quarterly Report. One of the requests from the NYSDEC was to implement EPSVT recommendations in the July-September 2009 Quarterly Report. One of the recommendations pertained to applying extra sparge gas near wells that have shown an increase in chlorinated hydrocarbon concentrations between June and September 2009 (i.e., MW-10S, MW-11S, and MW-12D). This application of extra sparge gas occurred in December 2009. Another recommendation was to more closely monitor MW-12S&D since chlorinated hydrocarbon concentrations increased between June and September 2009, and because of its proximity to the property boundary. Subsequently, MW-12S&D were added to the base list of wells that are sampled quarterly. The second request by the NYSDEC was to install two shallow and deep well pairs east of MW-12S&D and two shallow wells south of MW-10S&D, based on an increase in concentration of cis-1,2 Dichloroethene in those wells during the September 2009 sampling event. EPSVT suggested maintaining close monitoring of those wells, and to re-evaluate the decision after the March 2010 quarterly sampling event.

Correspondence between NYSDEC and EPSVT in January 2010 allowed for the deferment of the installation of wells east of MW-12S&D, but affirmed their request for the installation of two shallow wells to the south of MW-10S&D. The NYSDEC also suggested that the next quarterly sampling event be moved up from March to February 2010, and that MW-4S&D be added to the list of wells sampled during the next quarter. EPSVT response in February 2010 to NYSDEC requested deferring the installation of wells to the south of MW-10S&D, based on groundwater flow and lack of potential receptors to the south. EPSVT also suggested that, rather than move the whole quarterly sampling event up, only MW-3S&D and MW-4S&D would be re-sampled in February 2010, and the sparging schedule would be adjusted accordingly. The NYSDEC responded insisting that new wells south of MW-10S&D were necessary, and accepted the request to sample MW-3S&D and MW-4S&D in February and adjust the sparging schedule accordingly. SRK authorized EPSVT to install two shallow wells south of MW-10S&D.

To increase the potential for remediation efforts to impact site contaminant levels, extra sparging occurred at the site from January 20 through 21, 2010 and from February 10 through 11, 2010. The sparging occurred in the vicinity of monitoring wells that showed relatively higher contaminant concentrations.

On March 3 and 4, 2010, EPSVT mobilized to the site for the installation of two shallow wells (i.e., MW-17S and MW-18S) south of MW-10S&D. During drilling of boreholes for the shallow monitoring wells, soil samples were collected continuously from grade to approximately 26 feet below ground surface (bgs) for MW-17S, and approximately 20 feet bgs for MW-18S. Soil from each sample interval was placed in a plastic bag and the headspace was screened for organic vapors using a photoionization detector (PID) meter. Since no sample returned a PID reading above 50 parts per million (ppm), no soil sample was submitted for laboratory analysis. One 2-inch ID monitoring well was installed in each boring (two borings/wells total). MW-17S was screened from approximately 10 to 26 feet bgs. MW-18S was screened from approximately 10 to 20 feet bgs. A sand pack was placed from the bottom of each well to approximately 8 feet bgs. The remainder of the borehole was sealed using tremie-grout to approximately 2 feet bgs, and then with sand to near surface. The remediation wells were finished with a flush-mount protective road box in a concrete well pad. The locations of MW-17S and MW-18S are shown on **Figure 4**.

A comprehensive sampling event including the new wells was performed in June 2010. Conclusions in the subsequent report included:

- Shallow and deep groundwater flow patterns continued to show a west to east-northeast trend.
- Groundwater contaminant concentrations across the site have decreased since the initiation of chemical oxidation application events and, in particular, since there was a spike in concentrations at several wells in December 2009. This trend is particularly noticeable at deeper wells on site like MW-3D and MW-10D. This is especially relevant since there is an overall downward hydraulic gradient across the site.
- There are two shallow wells, MW-3S and MW-8S, where contaminant concentrations remained somewhat elevated. However, in the case of MW-3S, the bulk of the chlorinated hydrocarbon compounds detected were breakdown products, which is indicative of the

dechlorination of PCE. This fact, in conjunction with the downward hydraulic gradient from shallow wells in the former source area (MW-8S), and the downward trend in deep well concentrations with distance from the source area, leads to the conclusion that the predominant dry cleaning solvent used (PCE) is breaking down as groundwater travels across the site from the former source area, and the contamination is contained in the study area. In addition, the contaminant concentrations have dropped dramatically at MW-3S during the December 2010 sampling event.

- In several wells monitored at the site, the drop in contaminant concentrations has leveled off over time. This trend indicates that the reduction in contaminated mass has become asymptotic and that continued chemical oxidation application events will not be cost effective.
- Chlorinated hydrocarbon contaminant mass calculations indicate this trend by showing a reduction of 4.76% from March to June 2010. From February 2009 to December 2010 there has been an overall reduction of 45.43%.
- Some concerns have surfaced over the possible mounding of groundwater during and after the injection of chemicals and air sparging below the water table at the site and its potential to force contaminated mass outward toward the edges of the plume. Following the last injection event, groundwater elevations were measured and there was a noticeable increase in the water levels.
- For the above reasons, EPSVT recommended discontinuing chemical oxidizer applications at the site. Since the chemical oxidizer applications are recommended to cease, there would be no need for continued operation of the SVE system.

Based upon the conclusions presented above, in a work plan dated December 8, 2010, EPSVT recommended Monitored Natural Attenuation (MNA), through the monitoring of water levels across the site and the collection of groundwater samples. In correspondence dated December 17, 2010, NYSDEC approved the MNA work plan.

Operation of the former SVE system was discontinued in November 2010 with NYSDEC permission. The former SVE system was dismantled during February 2011. In lieu of continued operation of the SVE System through the winter season (per NYSDEC request in August 24, 2010 letter), a sub-slab depressurization system was installed below the northern portion of the "East Shops" structure. A portion of the deep zone dissolved groundwater plume was implied by existing water quality data to be located beneath the northern portion of the East Shops. A build-out of the northern East Shops space was underway for a new tenant (US Renal Care) and the sub-slab depressurization system was installed as a preventative measure to guard against possible future vapor issues in the northern portion of the East Shops building. The exhaust of the sub-slab depressurization system was sampled in December 2011 and analyzed for the presence of VOCs in accordance with USEPA Method TO-15. The exhaust was also sampled in January and February 2012. Sampling was conducted to evaluate the potential VOC concentrations in soil vapor extracted from beneath the northern portion of the "East Shops" structure. The initial SSDS exhaust sampling (December 22, 2011) yielded low VOC detections. Tetrachloroethylene was detected at a concentration of 4.7 micrograms per cubic meter, below the NYSDOH guideline value of 100 micrograms per cubic meter. Analytical results from the subsequent sampling events indicated a stable trend in Tetrachloroethylene (7.5 micrograms per cubic meter – January 12, 2012, and 8.8 micrograms per cubic meter – February 2012). Several compounds including Acetone,

Dichlorodifluoromethane, Ethanol, Ethyl Acetate, and Methylene Chloride were detected in the SSDS exhaust samples and background samples indicating these detections were laboratory contaminants.

The low level contaminant concentrations found in soil vapor samples collected for TO-15 analysis from the sub-slab depressurization system exhaust are below the NYSDOH Soil Vapor Intrusion Guidance value of 100 micrograms per cubic meter. The documented soil vapor contaminant concentrations are in the range where a significant effect on indoor air quality is not anticipated. Furthermore, the collected soil vapor data are conservative based upon sample collection during an operational HVAC timeframe. Stack effect typically contributes to increased contaminant concentrations.

2.0 Remedial Action Objectives

2.1 Groundwater RAOs

Based on the results of the groundwater monitoring and laboratory analytical results, there are dissolved phase groundwater impacts in the shallow groundwater near the former source area that have a downward migration component affecting the deeper groundwater to the east. Although the dissolved phase groundwater contaminant plume is larger than anticipated, impacted groundwater has not migrated off the property to the east and does not appear to be significant in any area below any structure in the study area including the BACW and the East Shops. In these areas, the groundwater contamination is present predominantly in the deeper groundwater zone and off-gassing into the vadose zone was not an issue as shown by the lack of significant soil gas impacts near the buildings downgradient of the source area. The Groundwater RAOs consisted of an attempt to meet NYSDEC TOGS 1.1.1 Class GA Groundwater Standards via injection of Hydrogen Peroxide to chemically oxidize and break down the dry-cleaning related chlorinated solvent contamination in the groundwater at the site. Over time, significant improvements in groundwater quality occurred as a direct result of the chemical injection activities, however; the improvements became asymptotic. At this point, Monitored Natural Attenuation became the RAO, as groundwater sampling events revealed naturally occurring breakdown of the chlorinated solvent contamination in the groundwater at the site was occurring.

2.2 Soil RAOs

Based on soil laboratory analytical results collected during the IRM investigation, the on-site soil meets 6 NYCRR Part 375 Unrestricted Use SCOs. Therefore, any further remedial investigation activities did not need to include soil sampling and analysis.

2.3 Soil Gas Vapor RAOs

Based on the results of the soil vapor laboratory analytical results collected during the IRM, elevated concentrations of PCE and TCE existed in the soil vapor near the location of the former dry cleaning machine. There are no buildings in this area, so the elevated PCE and TCE concentrations in the soil vapor were not of significant concern at the time of IRM investigation. Soil vapor sampling results from samples taken near the BACW and East Shops Building returned very low-level concentrations of PCE and TCE. The contaminant concentration levels; however, were not sufficient to cause concern. Therefore, soil vapor intrusion in the BACW and East Shops Building was not occurring during the IRM investigation.

After review of the IRM data, there were three main remedial goals for the site as follows:

1. Keep impacted groundwater from migrating further east.
2. Ensure remedial efforts on-site do not create any potential soil vapor intrusion issues where there are currently no issues.
3. Remediate the groundwater impacts identified in the Remedial Investigation.

With these goals in mind, EPSVT proposed a revised Interim Remedial Measure that was originally presented in the RI/IRM Work Plan submitted on October 28, 2008.

3.0 Interim Remedial Measures

The goal of IRM was to mitigate groundwater impacts identified in the RI and not create any soil vapor issues. The design criteria for the work scope was based on information from the RI. Based on this information, the remedial technology chosen for use at the site was periodic in-situ chemical oxidation with sparging in conjunction with soil vapor extraction (SVE) enhancement to minimize potential soil vapor intrusion in the vicinity of the BACW and the East Shops Building.

3.1 In-Situ Chemical Oxidation Remediation Well Installation

In order to facilitate in-situ chemical oxidation, twelve chemical oxidation remediation wells (i.e., RW-1 through RW-12) were installed in the proposed locations shown on **Figure 4**. The locations of the injection wells were chosen based on the greatest groundwater impacts identified in the RI.

Drilling was completed using a drill rig advancing 6 ¼-inch ID HSA to target depth. Soil samples were collected continuously from grade to approximately 27 feet bgs where the first evidence of the dense low-permeability glacial till was noted in the soil borings. Soil descriptions, including soil type, observations regarding the presence of free product, observable odors, staining, etc. and PID readings were detailed on soil boring logs. Soil from each sample interval was collected in a plastic bag and the headspace was screened for organic vapors using a PID meter. No soil samples were submitted for laboratory analytical analysis due to PID reading of less than 50 parts per million (ppm) obtained from the headspace screening of soil samples collected during the IRM. Copies of the soil boring logs can be found in **Appendix B**.

Two 2-inch diameter remediation injection wells were installed in each boring. One well was screened from approximately 25 to 27 feet bgs. The other well was screened from approximately 22 to 24 feet bgs. A sand pack was placed from 27 feet bgs to approximately 20 feet bgs. The remainder of the borehole was sealed using tremi-grout to approximately 2 feet bgs. The remediation wells were finished with a flush mount protective road box in a concrete well pad.

3.2 In-Situ Chemical Oxidation Application

Based on site data and groundwater chemistry obtained in the RI, EPSVT designed an in-situ chemical oxidation application regime. Since there was sufficient naturally occurring iron in the groundwater, a 10% solution of hydrogen peroxide (peroxide) with no additional modifications was used for chemical oxidation. Due to the size of the contaminant plume, the injection of the peroxide was enhanced with air sparging during the application events using a portable air compressor. The peroxide was injected using the shallower screened injection well (i.e., screened from 22 to 24 feet bgs). During injection of the hydrogen peroxide, a tow-behind air compressor was connected to the deeper screened injection well (i.e., screened from 25 to 27 feet bgs) to facilitate air sparging. Sparging helped push the hydrogen peroxide farther out into the

formation resulting in a greater radius of influence (ROI) than would be accomplished by injection of the peroxide solution alone. The actual ROI (i.e., approximately 40 feet) of the injection wells is shown on **Figure 4**. A total of 3,000 gallons of peroxide or approximately 250 gallons of peroxide per well was planned per injection event. Two semi-annual injection events were planned. Once the two events were completed, site data was evaluated to determine the need for additional injection wells and/or events.

The first injection event summary is as follows:

- The event was conducted from May 11 through May 18, 2009. A 10% solution of hydrogen peroxide ("peroxide") with no additional modifications was used for chemical oxidation
- A total of 3,300 gallons of peroxide, or approximately 275 gallons of peroxide per well, was injected.
- During injection of the hydrogen peroxide, a tow-behind air compressor was connected to the deeper screened injection well to facilitate air sparging.
- Only 165 gallons of peroxide was able to be injected into RW-11 before the well seal was compromised.
- After discussion with New York State Department of Environmental Conservation (NYSDEC), no additional injection activities were conducted in RW-11 during this injection event.
- The remainder of peroxide planned for RW-11 was injected into RW-6 and RW-7, increasing the injection total to 330 gallons for these two wells. RW-6 and RW-7 were chosen based on their proximity to the center of the contaminant plume.

The second injection event summary is as follows:

- The event occurred from November 11 through November 24, 2009. A 10% solution of hydrogen peroxide with no additional modifications was used for chemical oxidation.
- A total of 3,987.5 gallons of peroxide was injected during this event. This was almost 1,000 more gallons than the anticipated (per event) amount discussed in the April 2009 RI and IRM Work Plan.
- In cases where the peroxide could not be injected into the shallow well (due to refusal), it was injected into the deeper screened injection well (i.e., screened from 25 to 27 feet bgs) instead.
- During injection of the hydrogen peroxide, a tow-behind air compressor was connected to the deeper or shallower screened injection well, depending on which interval the peroxide was being injected into, to facilitate air sparging.
- Two wells (RW-9 and RW-10) were targeted for extra peroxide based on their proximity to the eastern edge of the contaminant plume, and because of the presence of higher permeable material surrounding each well. An average of 618.5 gallons was injected into the two wells.
- The targeted peroxide amount (275 gallons) was not able to be injected into remediation wells RW-5 and RW-7. This was likely due to the lower permeability of the native material in this area.
- 192.5 gallons were injected into RW-5, and 247.5 gallons were injected into RW-7. A lower volume of peroxide (less than 50 gallons) was injected into RW-11, due to lower permeability native material in this area.

- The remaining seven remediation wells (i.e., RW-1, RW-2, RW-3, RW-4, RW-6, RW-8, and RW-12) had an average of 330 gallons of peroxide injected into them.

Correspondence between EPSVT and NYSDEC in December 2009 led to the implementation of the application of extra sparge gas near wells that had shown an increase in chlorinated hydrocarbon concentrations between the June and September 2009 sampling events (i.e., MW-10S, MW-11S, and MW-12D). The application of extra sparge gas occurred in December 2009, January 2010, and February 2010. The sparging occurred in the vicinity of monitoring wells that showed relatively higher contaminant concentrations.

The third injection event summary is as follows:

- The injection event occurred from May 18 through May 21, 2010, based upon contaminant concentration trends observed in the quarterly groundwater sampling data from the site.
- A 17.5% solution of hydrogen peroxide was used for chemical oxidation.
- The peroxide was injected in the shallower screened injection well. In cases where the peroxide could not be injected into the shallow well (due to refusal), it was injected into the deeper screened injection well.
- During injection of the hydrogen peroxide, a tow-behind air compressor was connected to the deeper or shallower screened injection well, depending on which interval the peroxide was being injected into, to facilitate air sparging.
- A total of 1,925 gallons of peroxide was injected during this event. This event was targeted on select wells (with relatively higher residual chlorinated solvent concentrations) and used a stronger peroxide solution, so about 1,000 gallons less peroxide was used than in previous injection events.
- A total of seven drums (385 gallons) were injected into each remediation well (RW-2, RW-3, RW-4, RW-5 and RW-8). These injection wells were used at the request of the NYSDEC (per May 14, 2010 e-mail correspondence).
- Peroxide was injected in the shallower screened zone, with the exception of remediation well RW-3. Since the peroxide could not be injected into the shallower screened zone due to refusal, it was injected into the deeper screened zone, and air sparging did not take place.

At the request of the NYSDEC, groundwater chemistry data (including temperature, dissolved oxygen and the presence of peroxide) were recorded at specific remediation wells surrounding the injection well prior to and after the injection event.

3.3 Soil Vapor Extraction

The SVE system was started on May 8, 2009. The SVE system remained operational before, during, and after the peroxide injection events to mitigate any potential soil gas vapor migration in the vicinity of the BACW and the East Shops buildings. The location of the former soil vapor extraction system is indicated on **Figure 4**. SVE system details are listed below:

- *Former SVE Equipment Type:*	One Rotron DR404AR58M 1-HP regenerative blower
- *Number and Type of SVE Points:*	Five 4-inch diameter, 0.010-inch slot screen PVC wells (5-10 feet deep)
- *Former SVE System Start Date:*	May 8, 2009
- *Estimated Run Time Percentage: (During Operational Period)*	>99.5% (May 8, 2009–November 10, 2010)
- *Former SVE System Shut Down Date:*	November 10, 2010; Decommissioned during February 2011

The former SVE system was shut down on November 10, 2010 before the start of the Sub-Slab Depressurization System (SSDS) pilot test. NYSDEC had requested the installation of the SSDS in the portion of the East Shops where the groundwater contaminant plume was inferred to exist below the northern portion of the East Shops in lieu of operation of the SVE system.

4.0 Remedial Performance/Documentation Sampling

4.1 Quarterly Groundwater Sampling

To evaluate the effectiveness and ROI of the chemical oxidant application, the following parameters were recorded prior to and at the conclusion of the injection event in monitoring wells MW-1S&D, MW-2S&D, MW-3S&D, MW-8S&D, MW-10S&D, MW-11S&D and MW-13S&D:

- Temperature
- Dissolved Oxygen
- Presence of Hydrogen Peroxide

These wells were monitored weekly after the injection event until elevated temperature, elevated dissolved oxygen and/or the presence of hydrogen peroxide was detected.

Groundwater monitoring and sampling events were conducted quarterly. During the quarterly sampling events, water levels were collected in all wells (see **Table 1**). Samples for laboratory analysis of TCL VOCs via USEPA Method 8260 were collected from monitoring wells MW-1S&D, MW-3S&D MW-10S&D, MW-11S&D and MW-13S&D during each sampling event. In addition to the monitoring wells listed above, monitoring wells MW-2S&D, MW-8S&D and MW-12S&D were sampled during the odd numbered quarters and MW-7S&D, MW-9S&D and MW-14S&D were sampled during the even numbered quarters. Monitoring wells MW-4S&D, MW-5S&D and MW-6S&D were not included in the groundwater sampling program based on the location of these wells relative to the contaminant plume and from previous laboratory analytical results. Low-flow sampling protocols (i.e., the use of a peristaltic pump) were utilized during the collection of groundwater samples.

Quarterly groundwater monitoring and sampling was conducted by EPSVT on December 12, 2008, February 9, 2009, June 10, 2009, September 17, 2009, December 16, 2009 and March 10, 2010. Water levels were collected from all monitoring wells installed as part of the RI on-site at the time of sampling. Laboratory analytical samples were collected from select wells in accordance with the Revised IRM Work Plan and sent for laboratory analysis for VOCs using USEPA Method 8260.

The final quarterly sampling event occurred on June 29, 2010, with eight shallow and deep well pairs (MW-1S&D, MW-2S&D, MW-3S&D, MW-8S&D, MW-10S&D, MW-11S&D, MW-12S&D and MW-13S&D) being sampled for laboratory analysis of VOCs via USEPA Method 8260. This sampling period was an "Odd Quarter" period. Therefore, the odd quarter supplemental well list was sampled in addition to the base well list (with the exception of MW-4S&D, which is no longer be sampled due to repeated non-detect results in the analytical data).

On August 24, 2010, NYSDEC responded to EPSVT recommendations in the April-June 2010 Quarterly Site Monitoring Report and gave conditional approval for the Monitored Natural Attenuation (MNA) remedial approach for the site. NYSDEC requested an addendum to the previously approved May 2009 Remedial Investigation Report and IRM Work Plan outlining the proposed MNA plan including sample parameters and frequency. On December 8, 2010,

EPSVT submitted to NYSDEC the IRM Work Plan Letter for Natural Monitored Attenuation. On December 17, 2010, NYSDEC conditionally approved the December 8, 2010 addendum. As a result, a full round of groundwater sampling and water level monitoring from all accessible wells was performed in December 2010 for the purpose of pre-MNA baseline data collection and as a follow-up to the chemical oxidation injection events. All accessible wells were sampled on December 29 and 30, 2010, and analyzed for VOCs via Method 8260. On February 16, 2011, EPSVT submitted the findings of the baseline sampling event to NYSDEC in a summary report.

Subsequent to the December 2010 sampling event, semi-annual groundwater evaluation was performed during June 2011 at a select list of wells designed to provide perimeter monitoring supplemented by wells nearer to the original source area of contamination. The June 2011 semi-annual sampling event targeted the following perimeter or sentinel wells; MW-10S, MW-10D, MW-11S, MW-11D, MW-12S, MW-12D, and MW-13D and groundwater monitoring points MW-1S, MW-3S, MW-3D, and MW-8S. Groundwater elevation data was collected during the semi-annual event from all existing wells on-site and was utilized in monitoring groundwater transport mechanisms. Groundwater samples collected during the semi-annual sampling event were submitted for laboratory analysis for volatile organic compound (VOC) analysis including the compounds of specific concern in accordance with USEPA Method 8260 with the full list of applicable compounds reported. In addition to VOC analysis, NYSDEC requested MNA indicator parameter analyses at the same wells. **Table 2** presents a Historical Summary of Groundwater Analytical Data.

4.2 Contaminant Mass Calculations

Groundwater contaminant concentrations across the site decreased as a result of the chemical oxidation application events. Analytical results from the last sampling event (December 2011) confirmed the trend was particularly noticeable at both shallow (MW-1S, MW-3S, and MW-10S) and deep wells (MW-10D, MW-11D, and MW-13D). This was relevant since there is an overall downward hydraulic gradient across the site and MW-1S, MW-3S and MW-10S and have historically had higher levels of contamination.

MW-1S, MW-3S, and MW-10S dropped in contaminant levels during the December 2011 sampling event. The total chlorinated solvent concentration dropped from 529 µg/l to 420 µg/l at MW-1S, and from 282 µg/l to 213 µg/l at MW-3S. The peak chlorinated solvent concentration at MW-3S was 3,564 µg/l in December 2009. MW-10S dropped from 450.0 µg/l to 348.0 µg/l. The downward hydraulic gradient from shallow wells in the former source area (MW-8S), and the downward trend in deep well concentrations of PCE with distance from the source area, affirmed the conclusion that the predominant dry cleaning solvent used (PCE) was breaking down as groundwater traveled across the site from the former source area, and the groundwater contamination plume was captured by the on-site network of monitoring wells.

Chlorinated hydrocarbon contaminant mass calculations indicated there has been an overall reduction of 93.64% in chlorinated hydrocarbon concentrations from February 2009 to December 2011 (see **Table 3** for more information). Contaminant mass calculations indicate a significant decrease in the shallow and deep well chlorinated solvent mass.

5.0 Contaminated Material Removal

In December 2006, Clayton Group Services, Inc. completed an excavation of chlorinated solvent-impacted soil with the approximate dimensions of 80 feet wide (east to west) by 45 feet long (north to south) by 4 to 8 feet deep (refer to **Figure 6**). Approximately 1,130 tons of soil was excavated and disposed of off-site. Confirmatory endpoint sampling returned PCE analytical results at or below NYSDEC TAGM 4046 guidance values. Copies of the waste disposal manifests are included in **Appendix B.**

Investigation derived waste (two-30 cubic yard roll off boxes) of drill rig soil cuttings were generated and transported for disposal at Allied Waste Niagara Falls Landfill Facility, Niagara Falls, NY in March 2009. A total of 12.8 tons of non-hazardous soil was generated during the IRM installation of monitoring wells and injection wells. Copies of the waste disposal manifests are included in **Appendix B.**

All development water and groundwater sampling purge water was containerized in 55-gallon drums and staged onsite until drums were full, then transported offsite for disposal to EPSVT Syracuse, NY facility. A total of one drum of contaminated well purge water was generated and transported for offsite disposal. A copy of the waste disposal manifest is included in **Appendix C.**

6.0 Contamination Remaining at the Site

Based upon the soil analytical data collected during the IRM investigation, and earlier data collected by Clayton Group Services, Inc., no significant area of near surface soil contamination related to the Former Our Cleaners structure remains on-site. The Clayton Group Services, Inc. excavation of approximately 1,130 tons of PCE impacted soil essentially removed the near surface impacted soils.

The results of the Remedial Investigation/Interim Remedial Measure (RI/IRM) to investigate the nature and extent of vapor phase and groundwater impacts on the site, the BACW property, and the northern portion of the East Shops indicated there were no significant vapor phase soil gas issues at the site. A review of the data reveals there are elevated levels of PCE and TCE near the location of the former dry cleaning machine (i.e., SV-1 and SV-2) but there is no concern for soil vapor intrusion near the BACW and East Shops Building (i.e., SV-8, SV-11, SV-12, SV-13 and SV-14). The concentrations Tetrachloroethene and Trichloroethene are below the 6 NYCRR Part 375 Unrestricted Use Soil Cleanup Objectives (SCOs).

Chlorinated hydrocarbon contaminant mass calculations indicate there was an overall reduction of 93.64% in chlorinated hydrocarbon concentrations in groundwater from February 2009 to December 2011. **Figure 7** and **Figure 8** depict the shallow and deep Groundwater Elevation Maps, respectively, for the December 2011 Monitored Natural Attenuation (MNA) sampling event. The remaining dissolved phase contamination at the site appears to have stabilized and is confined to the site. Shallow groundwater chlorinated solvent concentrations from the December 2011 groundwater sampling event are depicted on **Figure 9**. Deeper groundwater chlorinated solvent concentrations from the December 2011 groundwater sampling event are depicted on

Figure 10. Contaminant mass calculations indicate a significant decrease in the shallow and deep well chlorinated solvent mass.

6.1 Monitored Natural Attenuation

December 2010 represented the start of the Monitored Natural Attenuation program at the site. The June 2011 semi–annual sampling event for the volatile organic compounds included on the USEPA Method 8260 full list and MNA parameters (Fe^{+2}, Fe^{+3}, Total Fe, Methane, Ethane, Propane, Propene, Total Organic Carbon, BOD, COD, Chloride, Nitrate, Nitrite, Sulfate and Sulfide) were collected from deep perimeter wells MW-3D, 10D, 11D, 12D and 13D; and from shallow wells MW-1S and 8S. During the December 2011 semi-annual sampling event no MNA parameters were analyzed as agreed by NYSDEC in its MNA work plan approval.

Contaminant levels in MW-1S, MW-3S, and MW-10S dropped during the December 2011 sampling event. The total chlorinated solvent concentration decreased from 529 µg/l to 420 µg/l from the June 2011 sampling event to the December 2011 sampling event at MW-1S, from 282 µg/l to 213 µg/l at MW-3S, and from 450.0 µg/l to 348.0 µg/l at MW-10S. The downward hydraulic gradient from shallow wells in the former source area (MW-8S), and the downward trend in deep well concentrations of PCE with distance from the source area, lead to the conclusion that the predominant dry cleaning solvent used (PCE) is breaking down as groundwater travels across the site from the former source area, and the contamination is contained in the study area.

The levels of dissolved oxygen and sulfate at the site at the time of the December 2011 MNA sampling were competing electron acceptors at the site affecting the reductive chlorination process; however, the higher levels of daughter products of PCE (TCE, DCE, Vinyl Chloride) found with distance and depth from the original source area coupled with the higher levels of methane from the June 2011 MNA parameter sampling (indicating breakdown of vinyl chloride) in the deep water samples collected at the site indicate reductive chlorination is active at the site and should improve over time as dissolved oxygen levels decrease, particularly in the deeper groundwater zone.

The overall reduction in chlorinated solvent mass continues at the site. There were only slight increases in chlorinated solvent groundwater concentrations in three wells sampled during the December 2011 sampling event. Wells MW-3D, MW-8S, and MW-13D increased 2 µg/l, 1 µg/l, and 0.3 µg/l respectively, between the June 2011 and December 2011 semi-annual sampling events. This indicates the concentrations have stabilized, and semi-annual sampling of the site groundwater was discontinued.

7.0 Soil Cover or Cap System

The site is covered with an asphalt paved surface parking lot with a storm water collection system. The storm water collection system acts to intercept and redirect surface water away from the area of concern. The asphalt paved surface essentially acts as a cap, however; impacted soils below the former Our Cleaners structure were removed in December 2006 during the Clayton Group Services, Inc. excavation work.

7.1 Sub-Slab Depressurization System

Based on NYSDEC request, a sub-slab depressurization system (SSDS) was installed to prevent potential migration of contaminated soil vapor to the interior of the northern portion of the "East Shops" structure. A pre-installation pilot test was performed, to assist with the system design, and post-installation testing was completed to verify system effectiveness.

The pilot test was performed on November 10, 2010 within the subject structure prior to remodeling. The data collected during pilot test activities outlines relative vacuum influence beneath the structural slab in the approximate 98- foot by 59-foot area.

To simulate conditions of system operation, an extraction point was installed through the structural slab. The temporary extraction point consisted of a 4-inch diameter penetration through the slab extending approximately six inches below slab depth simulating the conditions applied in the installation of a permanent extraction point. Simulation of extraction conditions was accomplished by applying vacuum pressure to the temporary extraction point with a commercial vacuum capable of producing 70 cubic feet per minute (cfm) air flow at the unrestricted opening on the unit.

The data showed the extension of the area of influence to the south at a range of 25 feet from the temporary extraction point. Based on data collection, a radius of influence of 25 feet per suction point was established. Subsequent to data collection, all structural slab penetrations were sealed with hydraulic cement.

Utilizing data collected during the pilot test, system design parameters were calculated. Based on the square footage and the observed radius of vacuum influence, seven extraction points were included in sub-slab depressurization system construction.

Each permanent extraction point consists of a 3-inch diameter penetration through the structural slab extending approximately four inches beneath the base elevation of the slab. Prior to installation of the extraction points, base gravel was removed six inches below and laterally from the final location of piping. Extraction piping consists of 3-inch diameter Schedule 40 PVC. The extraction piping is sealed to the slab utilizing Sonolastic NP-1 caulking specifically formulated to eliminate vapor intrusion. The extraction piping extends vertically and is connected to a common manifold and exits through the roof of the structure. During the process of connecting the individual extraction points to the common manifold, the number of connection fittings utilized was minimized to prevent unnecessary friction loss as air passes

through the system. The pitch of horizontal piping was set to allow for drainage of condensation to the individual extraction points.

Prior to exiting the structure, extraction piping was fitted with a 3-inch diameter fire collar at the exit interface. The piping was then sealed on the roofline to prevent moisture intrusion to the structure. The vapor extraction piping was connected to two vacuum blowers in series located outside the conditioned space of the subject structure in an enclosure to prevent damage from environmental conditions. The vacuum blower series consists of two sealed housing blowers commonly used in Radon reduction applications. The vacuum blower assembly is rated to create a total of approximately 590 cfm of total air movement. The total cfm rating of the blower series is applied to the seven extraction points allowing for greater air movement per extraction point relative to the flow removed during pilot test activities. Accounting for friction loss in system piping, the blower assembly is rated create an approximate 17 percent increase in influence per point as compared to the equipment used in pilot test activities. The vacuum blower series is installed in-line in the 3-inch diameter extraction piping. The extracted air stream passes through the vacuum blowers and is vented approximately five feet above the roofline of the subject structure.

Per the requirement of the New York State Department of Health (NYSDOH), post installation testing of the SSDS was conducted by EPSVT on June 22, 2011. Post installation testing on this date evaluated the vacuum influence created beneath the structural slab created by the SSDS. Vacuum influence testing consisted of the advancement of 0.5 inch diameter pilot holes through the structural slab at eight locations distributed over the footprint of the structure. Using a digital manometer, vacuum influence was measured at the pilot hole locations while the SSDS was operational. Vacuum influence ranging from 0.11 to 0.38 inch of water column was recorded at the test locations designated as TP-1 through TP-8.

The approved work plan dictated that the exhaust of the SSDS was to be tested for the presence of volatile organic compounds (VOCs) during three months of HVAC system operation. On December 22, 2011, EPSVT mobilized to the Site to conduct the first of three proposed monthly sampling events. The SSDS was accessed and was observed to be operational at the time of sampling. Using a one liter capacity Summa canister, a grab sample was collected from the SSDS exhaust. The sample was submitted for VOC analysis in accordance with USEPA Method TO-15.

The initial SSDS exhaust sampling (December 22, 2011) yielded low-level VOC detections. Tetrachloroethylene was detected at a concentration of 4.7 micrograms per cubic meter, below the NYSDOH guideline value of 100 micrograms per cubic meter. Several other VOCs were reported above method detection limits.

The second and third proposed SSDS exhaust sampling events occurred on January 12 and February 23, 2012, respectively. Analytical results showed a stable trend in Tetrachloroethylene concentrations from those noted in the December 2011 sampling with a value of 7.5 micrograms per cubic meter reported in January 2012 results and 8.8 micrograms per cubic meter in the February 2012 sample. Several other VOCs were reported above method detection limits in the January and February 2012 samples. Please note that several compounds including Acetone,

Dichlorodifluoromethane, Ethanol, Ethyl Acetate, and Methylene Chloride were detected in SSDS system exhaust samples and in background samples indicating these compounds to be potential laboratory contaminants.

8.0 Institutional Controls

Institutional controls for the site include:

- A deed restriction (see **Appendix D**) on soil excavation and groundwater use.
- Continued operation of the SSDS system in the East Shops structure.

9.0 Soil/Materials Management Plan

In accordance with the Site Management Plan (SMP) (separate document) any excavation work in the deed restricted area cannot be performed without prior notification of NYSDEC and SRK Colvin-Eggert Plaza Associates LP (SRK). Any soil produced during excavation work must be properly tested to determine if impacted, and if so, properly managed. A copy of the deed restriction is included in **Appendix D**.

The following restrictions on soil and groundwater use at the site include:

- A deed restriction (see **Appendix D**) defining the area of the site where excavation work must adhere to soil testing requirements (USEPA Method 8260 Full List Parameters). Any work which involves the excavation of soil in the deed restricted area must receive approval from NYSDEC and the property owner before the start of work. Excavated soils will be field screened with a photoionization detector (PID) and soil samples will be collected for laboratory analysis. Any excavated soils, at a minimum, must be placed on plastic sheeting and covered until analytical results are received. The analytical results will be compared to NYSDEC CP-51 Commercial SCOs for a determination of disposition of the excavated soil.
- Groundwater near and/or within the deed restricted area cannot be used for human consumption. Any work which involves the pumping of groundwater in the deed restricted area must receive approval from NYSDEC and the property owner before the start of work. Any groundwater pumped in the deed restricted area must be at a minimum, containerized until analytical results (USEPA Method 8260 Full List Parameters). Upon receipt of analytical results, a comparison will be made to NYSDEC TOGS 1.1.1 Class GA Groundwater Standards for a determination of disposition of the collected groundwater.
- The SSDS system located in the East Shops building must continue to be operated and inspected on a regular interval as indicated in the SMP.

10.0 List of Figures

11.0 List of Tables

12.0 List of Appendices

13.0 List of Acronyms

BACW – Buffalo Athletic Club for Women
BGS – Below Ground Surface
BOD – Biological Oxygen Demand
CFM – Cubic Feet per Minute
COD – Chemical Oxygen Demand
DCE - Dichloroethene
EC – Engineering Control
EPSVT – Environmental Products & Services of Vermont, Inc.
ESA – Environmental Site Assessment
HVAC – Heat Ventilation Air Conditioning
IC – Institutional Control
ID – Inside Diameter
IRM – Interim Remedial Measure
MW- 1 – Monitoring Well
NYSDEC – New York State Department of Environmental Conservation
NYSDOH – New York State Department of Health
PCE – Perchloroethylene or Tetrachloroethylene
PID – Photo Ionization Detector
PPB – Parts Per Billion
PPM – Parts Per Million
PVC – Polyvinyl Chloride
RAO – Remedial Action Objective
RAWP – Remedial Action Work Plan
RCR – Remedial Completion Report
RI – Remedial Investigation
ROI – Radius of Influence
RW-1 - Remediation Well
SCO – Soil Cleanup Objective
SMP – Site Management Plan
SSDS – Sub-Slab Depressurization System
SV-1 – Soil Vapor Well
SVE – Soil Vapor Extraction
TAGM 4046 – NYSDEC Technical Administrative Guidance Manual
TCE – Trichloroethylene
TOGS 1.1.1 – NYSDEC Technical and Operational Guidance Series
USEPA – United States Environmental Protection Agency
VOCs – Volatile Organic Compounds
µg/l – micrograms per liter (parts per billion)
6 NYCRR Part 375 – Title 6 of the Official Compilation of New York Codes, Rules, and Regulations