Interim Remedial Measures Work Plan

for the

Former RKO Dry Cleaners Site

SSF Site No. 401065

Prepared by:

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Implemented by:

Precision Environmental Services, Inc.

831 Route 67

Ballston Spa, NY 12020

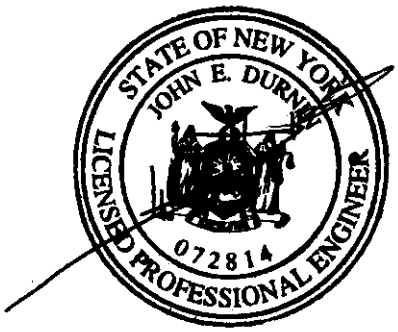
July 2017

P.E. Certification

Interim Remedial Measures Work Plan
Former RKO Dry Cleaners SSF Site No. 401065

I, JOHN DURNIN, certify that I am currently a NYS registered professional engineer and that this Interim Remedial Measures Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

072814	7/7/2017	P.E.
NYS Professional Engineer #	Date	Signature



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Executive Summary

Precision Environmental Services (PES) has been hired by the New York State Department of Environmental Conservation (NYSDEC) (Call-Out ID# 129707) under Contract No. C100614 to perform an interim remedial measure (IRM) excavation at the Former RKO Dry Cleaners site, State Superfund Site No. 401065, located on the corner of Ontario St and Washington Ave in Albany, NY.

Tetrachloroethene (PCE) has been detected in subsurface soils at depths ranging from 6 to 12 feet below grade near the eastern boundary of the former dry cleaning building. The building was demolished in June 2012 because of safety concerns. The PCE identified in soils is impacting the local groundwater and was the cause of impacts related to soil vapor intrusion in the adjacent structure on Washington Avenue. Impacts to the adjacent property have been mitigated via installation and activation of a sub-slab depressurization system (SSDS). The SSDS was installed following the Site Characterization (SC) which concluded in March 2013. Following the SC, the site was re-classified to a Class 2 Inactive Hazardous Waste Disposal Facility. The site was subsequently referred to the Office of General Counsel for a Remedial Investigation/Feasibility Study with a provision to conduct an IRM.

Following the conclusion of the Remedial Investigation (RI), the extent of PCE contamination in subsurface soils was determined to reside in a concentrated exterior area proximate to a doorway used by the former dry cleaner. The extent of the PCE in the subsurface soils makes for an ideal IRM excavation to remove this source area which is impacting groundwater and nearby soil vapor. In addition to excavating this material, a chemical reducing agent comprised of zero-valent-iron and a controlled-release carbon source will be mixed at the base of the excavation to stimulate abiotic and biotic dechlorination mechanisms that appear to be already active as substantiated by the presence of PCE degradation products including, trichloroethene (TCE), and cis-1,2-dichloroethene (cis-1,2-DCE).

1.0 Site Description

Site Features

The site is approximately 50 feet wide by 70 feet long, and is currently a vacant lot covered with concrete and gravel. Until June 2012, a circa 1950 building was present on the property with an area of approximately 2,575 square feet. The building was a one-story structure with a flat roof and a basement beneath approximately half the building. A fire occurred at the building in 2000 that left charred wood on much of the interior of the structure and holes in the roof. The exterior of the building was subsequently boarded up. In June 2012, the building was razed because of public safety concerns. A small driveway exists on the east side of the site.

Current Zoning and Land Use

The site is currently inactive/vacant and is zoned for residential use. The surrounding area consists of a mix of residential and commercial properties.

Past Use of the Site

The property was reportedly developed as early as 1909. From 1964 to 2005, the site was occupied by RKO Dry Cleaners and Tailors, except for the year 1995 when Lee's Market was listed as the occupant. In December 2000, a large fire occurred at the site resulting in generation of Spill Case 0010595 that states dry cleaning fluid may have been spilled, but it was reportedly consumed by the fire.

Site Geology and Hydrogeology

The geology of the overburden aquifer consists of generally brown, plastic clay that transitions into a mixture of silt and clay at approximately 7.5 feet to 10 feet below ground surface. Some fine sand layers were also encountered. Although bedrock was not intersected as a result of the recent site RI, a September 2011 Phase I Environmental Site Assessment (ESA) indicated that the local bedrock is identified as the Normanskill Shale. Groundwater was encountered at approximately 9.5 feet below ground surface and is documented as generally flowing toward the east, eventually discharging into the Hudson River.

2.0 Environmental Assessment

Soil and groundwater have been analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, poly-chlorinated biphenyls (PCBs), and pesticides. Soil vapor has been analyzed for VOCs. Based upon investigations conducted to date, the primary contaminant of concern is tetrachloroethene (PCE) and its related degradation compounds. PCE was identified in the soils, groundwater, and soil vapor on and off the site.

Soil

PCE is reported in soil samples on-site up to 110 parts per million (ppm). The unrestricted use soil cleanup objective (UUSCO) level for PCE is 1.3 ppm. PCE levels above UUSCOs were localized proximate to a former door of the former building at depths ranging from 6 to 12 feet below ground surface (bgs). One other location near the middle of the former building exhibited PCE concentrations of 3.5 ppm at a depth of approximately 12 feet bgs.

Groundwater

PCE is reported in groundwater samples collected on-site at concentrations ranging from non-detect (ND) to 9,600 parts per billion (ppb). The groundwater standard for PCE is 5.0 ppb. Off-site concentrations of PCE have been reported for different locations ranging from ND to 21 ppb.

Soil Vapor and Indoor Air

Sub-slab soil vapor samples were collected from one location on-site and three locations off-site. PCE was detected in on-site samples at 50,000 micrograms per cubic meter (ug/m3) near the edge of the basement of the former building. Three off-site structures were sampled, and the sub-slab air PCE concentrations were reported above 1,000 ug/m3 at two of the three locations. However, the indoor air concentrations were comparable to the background levels commonly found in homes where vapor intrusion is not occurring. Currently, the building slabs are effectively preventing soil vapor intrusion. The New York State Department of Health recommends mitigation if a structure has 1,000 ug/m3 of PCE or greater present in sub-slab soil vapor. In this case, the potential for future interior exposures to sub-slab concentrations exists. Therefore, a sub-slab depressurization system (SSDS) was installed in one building, and one other building is being monitored periodically since a SSDS could not be effectively installed.

Significant Threat

The site presents a significant environmental threat because of ongoing potential releases of contaminants from source area/s into the groundwater.

3.0 Health Assessment

People will not come into contact with contaminated soils since they are located at depth and beneath a building foundation. Contaminated groundwater at the site is not used for drinking or other purposes and the site is served by a public water supply that obtains water from a different source not affected by this contamination. Volatile organic compounds (VOCs) in groundwater may move into the soil vapor (air spaces within the soil), which in turn may move into overlying buildings and affect indoor air quality. This process, which is similar to the movement of radon gas from the subsurface into the indoor air of buildings, is referred to as soil vapor intrusion (SVI). The potential for off-

site inhalation exposures due to SVI is currently being investigated. To date, the indoor air and soil vapor was sampled in four off-site structures. The concentrations of VOCs detected in the indoor air of these structures are within the range of contaminant levels commonly found in homes where SVI is not occurring and their presence at the concentrations detected do not represent a health concern. However, based on the results of the soil vapor samples collected from beneath these buildings one of the four structures warranted mitigation which resulted in installation of a sub slab depressurization system in the adjacent building. Subsequent SVI sampling indicated that no other structures require mitigation at this time.

4.0 Remedial Action Objectives (RAOs)

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards
- Prevent contact with, or inhalation of volatiles, from contaminated groundwater

RAOs for Environmental Protection

- Restore groundwater to pre-disposal/pre-release conditions, to the extent practicable
- Reduce or remove the source of groundwater contamination, to the extent practicable

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil
- Prevent inhalation of or exposure from contaminants in soil

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater contamination

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings on-site and off-site

5.0 Summary of IRM

The goal of this IRM is to remove all subsurface soils that have been identified as containing concentrations of PCE above the PGWSCOs. The contaminated area appears to be isolated within a localized area just outside of a former doorway used by the former dry cleaning business (see Figure 2 from Aztech's Interim Remedial Measures Report, October 30, 2012).

Based on the most recent RI, the majority of the PCE contamination resides at depths up to 12 feet below grade within an area approximately 15 feet wide by 25 feet long, as illustrated in Figure 3. It is estimated that approximately 180 cubic yards (cy) of material will require excavation and disposal at an approved off-site disposal facility. More highly contaminated material is localized at depths below 5 feet, and it is anticipated that the upper 5 feet of soils will be approved for disposal as non-hazardous waste, depending on the disposal facility. Disposal of material as non-hazardous material will require a "contained in" approval letter from NYSDEC – see Section 7.3 below. Soils at depths greater than 5 feet below grade are anticipated to require disposal at a hazardous waste disposal facility. Based on an anticipated total excavation depth of 13 feet below grade, approximately 70 cy of soil is anticipated to be disposed as non-hazardous waste, while approximately 110 cy are anticipated to require disposal at a hazardous waste disposal facility.

Following excavation of contaminated material, an enhanced bio-degradation amendment will be added to the base of the excavation and mixed with bottom soils using the excavator bucket. Specifics related to the amendment are discussed in Section 6.9.

6.0 IRM: Remedial Program

The following sections in this work plan describe all specific activities necessary to carry out the IRM in accordance with the RAOs detailed above.

6.1 Pre-Excavation Survey and Utility Mark-out

Before any intrusive work, a pre-excavation survey will be performed by a licensed Professional Surveyor. The surveyor will be sub-contracted by PES to verify property boundaries with respect to the planned limit of excavation. The surveyor will clearly demarcate a benchmark for future use by PES to document excavation extents and depths.

PES will also be responsible for hiring a private utility mark-out contractor, and will also conduct required notification through Dig-Safe to ensure that utilities are not damaged during the IRM.

6.2 Site Security

Prior to any excavation work, the site will be secured with construction fencing to prevent trespassing during implementation of the IRM.

Tenants of the adjacent building on Washington Avenue appear to use the subject site for parking. NYSDEC has been in contact with the manager of this adjacent property and will notify them that all vehicles will need to be removed prior to securing the work area with the fence.

6.3 Health and Safety

6.3.1 Construction Health and Safety Plan

A Site Specific Health and Safety Plan has been developed by PES and is attached in Appendix A.

6.3.2 Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) has been attached in Appendix B and will be abided by during all intrusive activity at the site. The attached CAMP is the standard CAMP which appears in Appendix 1A of NYSDEC's DER-10, Technical Guidance for Site Investigation and Remediation. PES will maintain two on-site CAMP stations that can measure particulates and VOCs with real time data recording and equipped with alarms set to the required action levels.

Any exceedances will be reported to the NYSDEC/NYSDOH project managers (see Section 9.0 for contact info), and appropriate actions will be taken to mitigate these exceedances.

Odor suppressant foams, sprays, or water will be kept on hand by PES for contingency purposes to mitigate any potential CAMP exceedances or nuisance conditions encountered during excavation.

6.4 Pre-Excavation Delineation

Depending on the results of the survey and proximity to the property boundary of the adjacent building, there may be a need to collect pre-excavation delineation samples. In this case, soil samples would be collected and analyzed to assist with refinement to the excavation extents and depths. Discussions between NYSDEC and PES will be conducted to determine whether pre-excavation delineation is warranted. If pre-excavation delineation is determined to be warranted, NYSDEC will procure all laboratory glass wear for VOC sampling under a separate call out with 24 turn-around time (if necessary) such that excavation planning and commencement can begin immediately following pre-excavation delineation.

6.5 Material Excavation, Staging, and Load-out

6.5.1 Containment Pad/Vehicle Loading Pad

Prior to excavation activities, a vehicle load-out and containment pad for potential material staging will be constructed to ensure that any excavated material will be contained on-site, and any potential spillage encountered while loading trucks will be adequately contained.

A Site Operations Plan (SOP) will be provided to NYSDEC by PES prior to the start of work. The SOP should contain construction level detail of the vehicle/material staging containment pad, and the locations of these items at the site.

6.5.2 Excavation

It is estimated that approximately 180 cy of material will need to be removed from the site. Of the 180 cy, it is anticipated that approximately 70 cy will be classified as non-hazardous, and 110 cy will be classified as hazardous, based on RI data.

The excavation extents shall limited to the site property boundaries. As indicated above, a survey will be conducted to verify these boundaries. The anticipated excavation limits are outlined in red on Figures 2 and 3 and will be refined with the pre-excavation survey discussed earlier.

Northing and Easting data in New York State Plane East are available for the sample locations illustrated in Figure 3 and can be used to verify RI sample locations to refine the planned excavation extents.

PES will utilize a photo-ionization detector (PID) on-site during the course of the excavation to help guide excavation depths.

The SOP discussed above will include locations of all necessary equipment and staging areas on a figure to be submitted before the start of work.

6.5.3 Material Transport off-site

All material transported off-site will be performed by trucks that have a Part 364 Permit. Hazardous waste transporters will also comply with 6 NYCRR Part 372 and obtain an EPA identification number prior to the trucking of hazardous waste off-site.

After leaving the site, trucks shall turn right onto Washington Avenue, immediately left onto Quail Street, left onto Central Avenue, and then right onto Everett Road which has access to NYS Route 90 East or West. A truck route map is included as Figure 4.

All hazardous and non-hazardous waste manifests shall be kept by PES and provided to NYSDEC upon completion of the project. See Section 8.0 for additional reporting requirements.

6.6 Support of Excavation (SOE)

Because of the excavation depths required to remove the PCE source material, SOE will be required. Based on the results of the pre-excavation sampling, if benching or trench box(s) are determined to be insufficient, PES will procure a structural engineering subcontractor to design the SOE (certified NYS PE firm).

If a trench box(s) is determined to be appropriate, a NYSPE/PE firm will need to certify that PES's use of a trench box(s) as SOE will be adequate and that a more extensive sheeting and shoring plan is not necessary.

6.6.1 Adjacent Building Monitoring

Due to the proximity of the adjacent buildings on Ontario Street and Washington Avenue, a structural assessment will be required to document the pre-excavation conditions of these buildings before the commencement of intrusive site activities. Monitoring of these buildings will also be required during excavation. Building assessment and monitoring will be completed by an independent, third party firm who possess qualifications necessary to perform such services. Prior to any inspections, NYSDEC will be notified and will oversee this work.

6.6.2 Certifications

A NYSPE/NYSPE firm will be required to certify the SOE design, if support is needed. A NYSPE/PE firm will also need to certify the excavation plan if it is determined that a trench box will be an appropriate method of supporting the excavation. PE certification can be submitted to the NYSDEC in letter format.

6.7 Documentation Sampling

For documentation purposes, two (2) soil samples will be collected at the base of the excavation for analysis of VOCs via EPA Method 8260. For health and safety purposes, these samples can be collected with help from the excavator bucket. A separate laboratory work authorization has been issued by NYSDEC to Test America for these documentation samples. Results of these samples will be included in the final reporting, as described in Section 8.0.

6.8 Dewatering

Because the water table depth is located approximately 9.5 feet below grade, dewatering may be required. Slow recharge rates of the subsurface aquifer have been documented and therefore, it is anticipated that any required dewatering will be minimal and only be needed once PES approaches the target depth.

PES will have the necessary treatment equipment to containerize pumped groundwater on-site and discharge to the Albany sanitary sewer. The treatment train will consist of a settling tank, bag filters, and carbon filters to remove VOCs before discharge to the sewer. PES will procure the necessary permitting to allow discharge to the Albany sewer system and present the required permit(s) to NYSDEC before the start of work.

6.9 Soil Mixing Amendment

Once the desired excavation depth is reached, an in-situ chemical reduction (ISCR) agent, EHC, which contains controlled release organic carbon and zero valent iron, will be placed and mixed at the base of the excavation to enhance the breakdown of residual PCE and stimulate the already-occurring biological dechlorination mechanisms. The presence of PCE degradation compounds (TCE and cis-1,2-DCE) in a nearby monitoring well indicate that subsurface conditions will be conducive to further enhancing the ongoing biological dechlorination processes. It's anticipated that up to five (5) 50 pound bags of EHC will be placed and mixed at the base of the excavation. The product specifications are attached in Appendix C.

6.10 Backfill

Following excavation and off-site transport/disposal, the excavation will be backfilled with clean native fill from a NYSDEC approved source. The import of this backfill material will require sample collection and analyses in accordance with Table 5.4(e)10 of DER-10. However, if the material is from a native mine or borrow area, and can be certified by the generator as such, only the first 100 cy of material is required to be sampled in accordance with this table. Certification of the material being native fill will be submitted to NYSDEC prior to import to the site.

In addition to the clean backfill, crushed stone shall be placed within the upper 2 feet of the excavation. The backfilled area shall also be appropriately compacted to ensure minimal settling once PES de-mobilizes from the site.

7.0 Non-Hazardous and Hazardous Waste Disposal

Due to the elevated concentrations of PCE in certain soil samples analyzed during the RI, it is likely that the majority of excavated soils will need to be disposed of as hazardous waste. The upper soils may be considered non-hazardous waste by certain solid waste disposal facilities, but transport of "non-hazardous" material will require a "contained-in" determination letter as detailed below.

7.1 Waste Characterization

Any soil leaving the site will require sampling in accordance with the protocol included in DER-10, Table 5.4(e)10 or as required by the approved disposal facility.

A separate laboratory work authorization has been issued by NYSDEC to Test America for documentation sample analyses with extra samples included for waste characterization if required. If there is a need for additional sample collection, procurement of additional lab bottles will be arranged by NYSDEC.

7.2 Facility Approval(s)

PES will coordinate with prospective disposal facilities (e.g., sending RI data to the facilities), and if additional sampling is required, NYSDEC will coordinate with the

laboratory for bottles and PES will collect additional samples as necessary. Prior to off-site shipment of contaminated materials, PES will provide facility acceptance letters to the NYSDEC.

7.3 Contained-In approval

Soil which has been deemed acceptable at a solid waste disposal facility (i.e., classified as non-hazardous) will require issuance of a "contained-in" approval letter from the NYSDEC. The NYSDEC Project Manager will obtain the contained-in determination internally and coordinate with PES to provide this letter for the disposal facility.

8.0 Reporting

As discussed above, PES will comply with the CAMP in Appendix B and retain all data readouts for VOCs and particulate monitoring. This data will be saved and included (as separate CD or attachment) within the IRM Construction Completion Report (IRMCCR) to be submitted to NYSDEC by PES. The IRM CCR should generally follow the format of the Final Engineering Report (FER template is available).

In addition to the above, the IRMCCR will also include the following:

- documentation of VOC sample analytical results,
- hazardous and non-hazardous waste trucking manifests, and bills of lading (for imported and exported material),
- disposal facility approval/acceptance letters,
- reports generated from neighboring building monitoring,
- a soil cut and fill map that includes any utilities discovered; can be based off of surveyor's benchmark and PES measurements,
- a brief description of the work conducted, and
- any deviations from this work plan

9.0 Personnel

NYSDEC Project Manager – Kyle Forster, kyle.forster@dec.ny.gov, 518-402-8644

NYSDEC Section Chief – Janet Brown, janet.brown@dec.ny.gov, 518-402-9767

NYSDOH Project Manager – Steve Berninger, BEEI@health.ny.gov, 518-402-7860

PES Contact – Steve Phelps, sphelps@precisionenvironmentalny.com, 518-885-4399

10.0 References

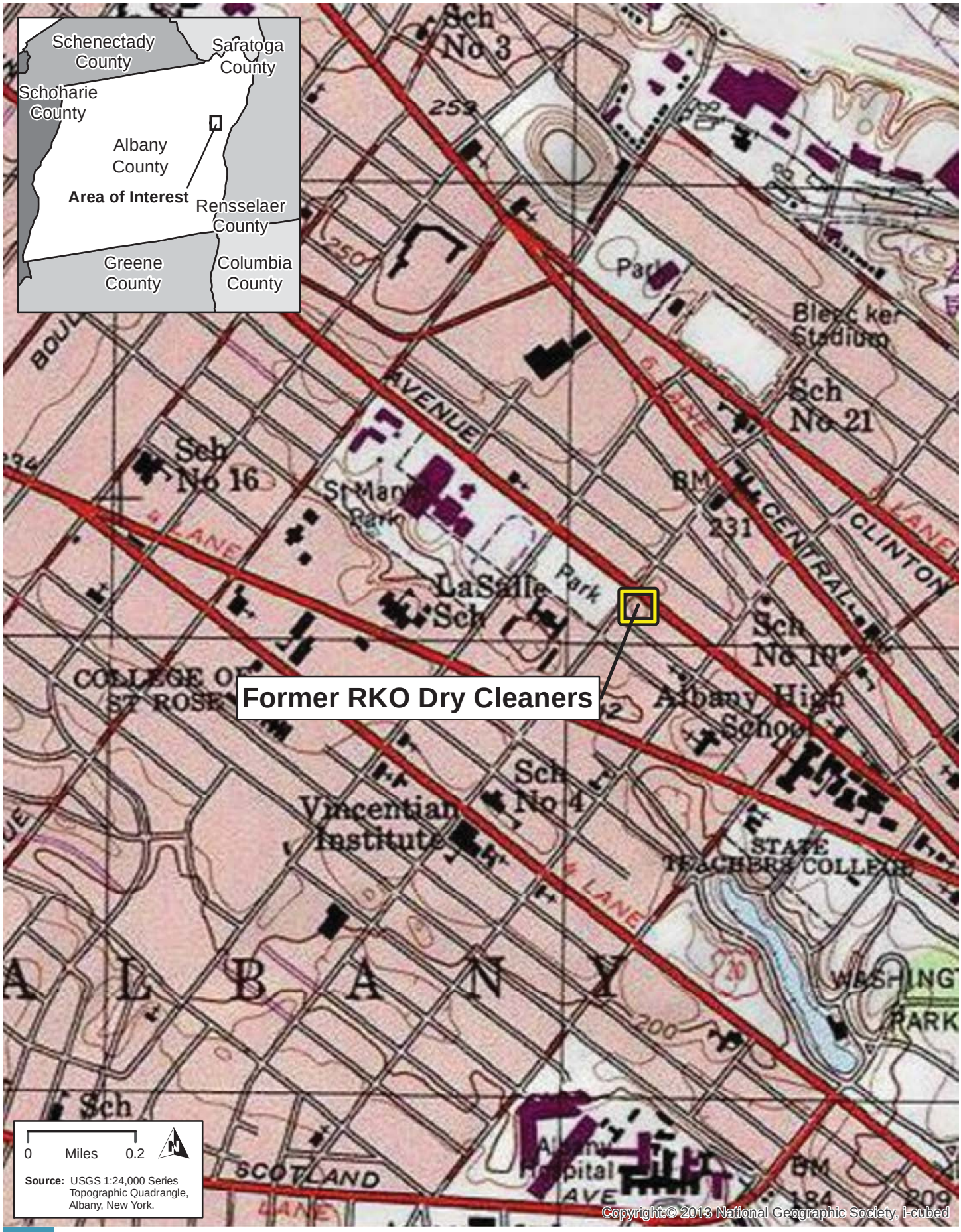
The following reports were used to develop this work plan:

"Interim Remedial Measures Report for the Former RKO Cleaners", prepared by Aztech Technologies, Inc., dated October 30, 2012.

“Site Characterization Report for the Former RKO Dry Cleaners”, prepared by Aztech Technologies, Inc., dated March 1, 2013.

“Remedial Investigation Report”, prepared by HDR, dated February 2017.

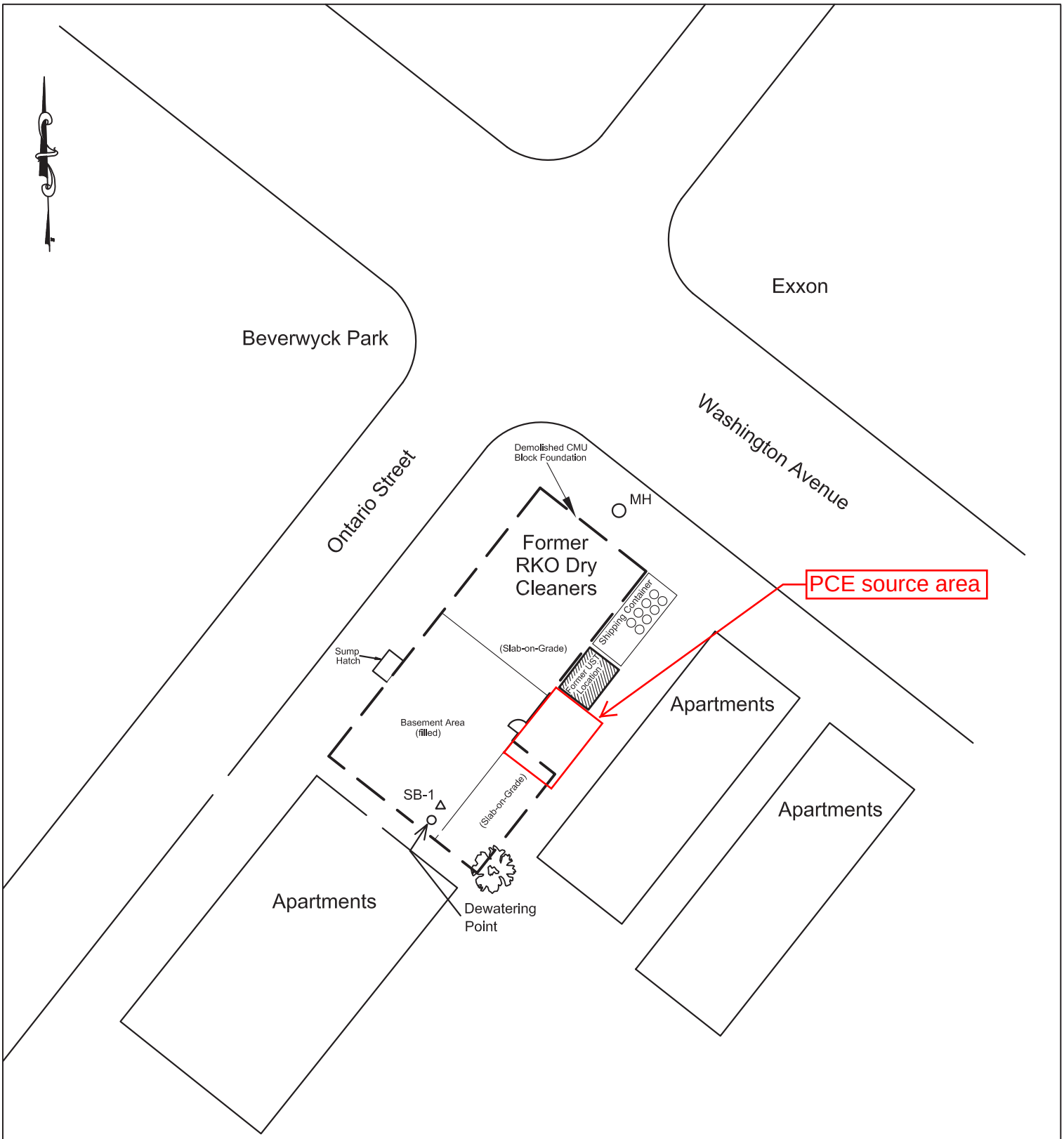
Figures



SITE LOCATION MAP

FORMER RKO DRY CLEANERS (NYSDEC SITE #401065)

FIGURE 1



Aztech Technologies, Inc.
5 McCrea Hill Road
Ballston Spa
New York 12020
Phone: 518-885-5383
Fax: 518-885-5385
www.aztechtech.com

SITE: **NYSDEC Site # 401065**
Former RKO Dry Cleaners
566 Washington Ave
Albany, New York

Figure 2

DATE: August, 2012 | Approximate Scale: 1" = 30'

Site Map

Legend:

SB-1 △ Sub-slab soil and groundwater sampling location

○ MH Sewer manhole (discharge of treated basement water)

SP9-0-1-20151218	
12/18/2015	
Methylene chloride	0.027 J
Tetrachloroethene	0.014 J
SP9-9-10-20151218	
12/18/2015	
cis-1,2-Dichloroethene	0.044
Methylene chloride	0.0079 J
Tetrachloroethene	0.37 J
Trichloroethene	0.12

SP8-0-1-20151218	
12/18/2015	
Methylene chloride	0.013
Tetrachloroethene	0.021
SP8-9-11-20151218	
12/18/2015	
Methylene chloride	0.0033 J
Tetrachloroethene	0.0029 J

SS11-0-1-20150701	
7/1/2015	
Methylene chloride	0.0044
Tetrachloroethene	0.0078

SP7-3-4-20151217	
12/17/2015	
Methylene chloride	0.0034
Tetrachloroethene	0.012
SP7-10-20151217	
12/17/2015	
cis-1,2-Dichloroethene	0.018
Methylene chloride	0.013
Tetrachloroethene	0.34
Trichloroethene	0.041

SS12-0-1-20150701	
7/1/2015	
Methylene chloride	0.0022

SP1-0-1-20151217	
12/17/2015	
Tetrachloroethene	0.0089
SP1-15-16-20151217	
12/17/2015	
Methylene chloride	0.0039

SP2-3-4-20151217	
12/17/2015	
Methylene chloride	0.0039 J
Tetrachloroethene	0.0054
SP2-15-16-20151217	
12/17/2015	
Methylene chloride	0.0037

MP7-SS-10-14-20150701	
7/1/2015	
cis-1,2-Dichloroethene	***0.46***
Tetrachloroethene	0.90
Trichloroethene	***3.5***

SP3-3-4-20151217	
12/17/2015	
Methylene chloride	0.0048
Tetrachloroethene	0.0040
SP3-9-10-20151217	
12/17/2015	
Tetrachloroethene	***44***
Trichloroethene	***0.92***

SS10-SS-10-20150701	
7/1/2015	
cis-1,2-Dichloroethene	0.018
Methylene chloride	0.014
Tetrachloroethene	0.084
Trichloroethene	0.026
SS10-SS-26-20150701	
7/1/2015	
Methylene chloride	0.0084

SP12-0-8-20151218	
12/18/2015	
Methylene chloride	0.012 J
Tetrachloroethene	0.0038
SP12-10.5-16-20151218	
12/18/2015	
Methylene chloride	0.011 J
SP12-18-20151218	
12/18/2015	
Chloroform	0.0031
Methylene chloride	0.0062

MP4-SS-10-12-20150701	
7/1/2015	
Benzene	0.0030
m&p-Xylenes	0.0014
Methylene chloride	0.0044
o-Xylene	0.0012
Tetrachloroethene	0.0072
Toluene	0.0025
Trichloroethene	0.0029
Xylenes (Total)	0.0026
MP4-SS-20-20150701	
7/1/2015	
Methylene chloride	0.011

MP6-SS-0-1-20150701	
7/1/2015	
Tetrachloroethene	0.010
MP6-SS-10-12-20150701	
7/1/2015	
Tetrachloroethene	***24 J***
Trichloroethene	***0.53***
MP6-SS-23-24-20150701	
7/1/2015	
Methylene chloride	0.012

SP5-2-4-20151217	
12/17/2015	
Acetone	***0.11***
Chloroform	0.0024
Methylene chloride	0.015
Tetrachloroethene	0.054
SP5-8-12-20151217	
12/17/2015	
Tetrachloroethene	0.72

SP6-5-7-20151217	
12/17/2015	
Tetrachloroethene	0.028
SP6-10-11-20151217	
12/17/2015	
Tetrachloroethene	1.1
Trichloroethene	0.051

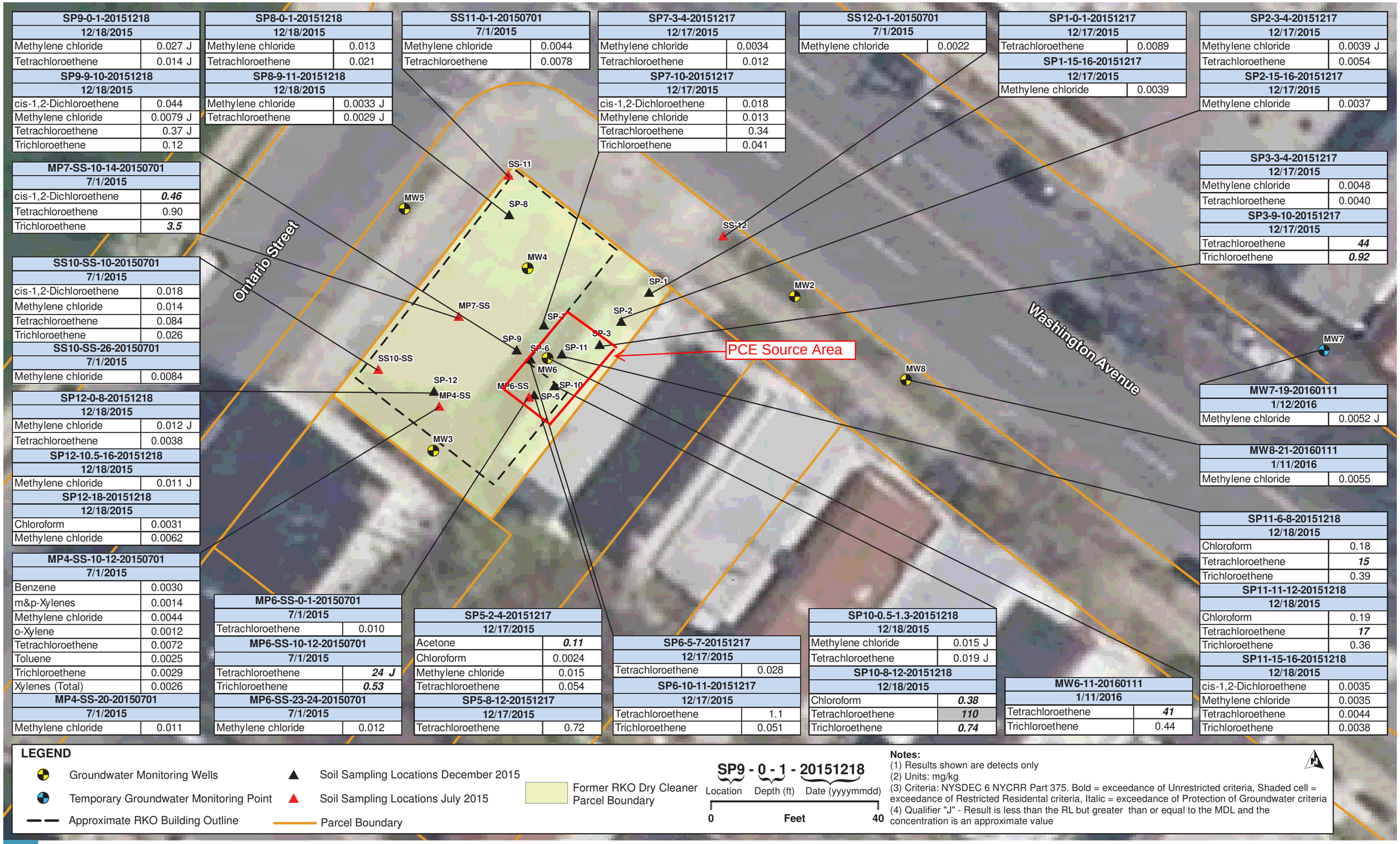
SP10-0.5-1.3-20151218	
12/18/2015	
Methylene chloride	0.015 J
Tetrachloroethene	0.019 J
SP10-8-12-20151218	
12/18/2015	
Chloroform	***0.38***
Tetrachloroethene	***110***
Trichloroethene	***0.74***

MW6-11-20160111	
1/11/2016	
Tetrachloroethene	***41***
Trichloroethene	0.44

MW7-19-20160111	
1/12/2016	
Methylene chloride	0.0052 J

MW8-21-20160111	
1/11/2016	
Methylene chloride	0.0055

SP11-6-8-20151218	
12/18/2015	
Chloroform	0.18
Tetrachloroethene	***15***
Trichloroethene	0.39
SP11-11-12-20151218	
12/18/2015	
Chloroform	0.19
Tetrachloroethene	***17***
Trichloroethene	0.36
SP11-15-16-20151218	
12/18/2015	
cis-1,2-Dichloroethene	0.0035
Methylene chloride	0.0035
Tetrachloroethene	0.0044
Trichloroethene	0.0038



LEGEND

- Groundwater Monitoring Wells
- Temporary Groundwater Monitoring Point
- Approximate RKO Building Outline
- Soil Sampling Locations December 2015
- Soil Sampling Locations July 2015
- Parcel Boundary
- Former RKO Dry Cleaner Parcel Boundary

SP9 - 0 - 1 - 20151218
Location Depth (ft) Date (yyyymmdd)

0 Feet 40

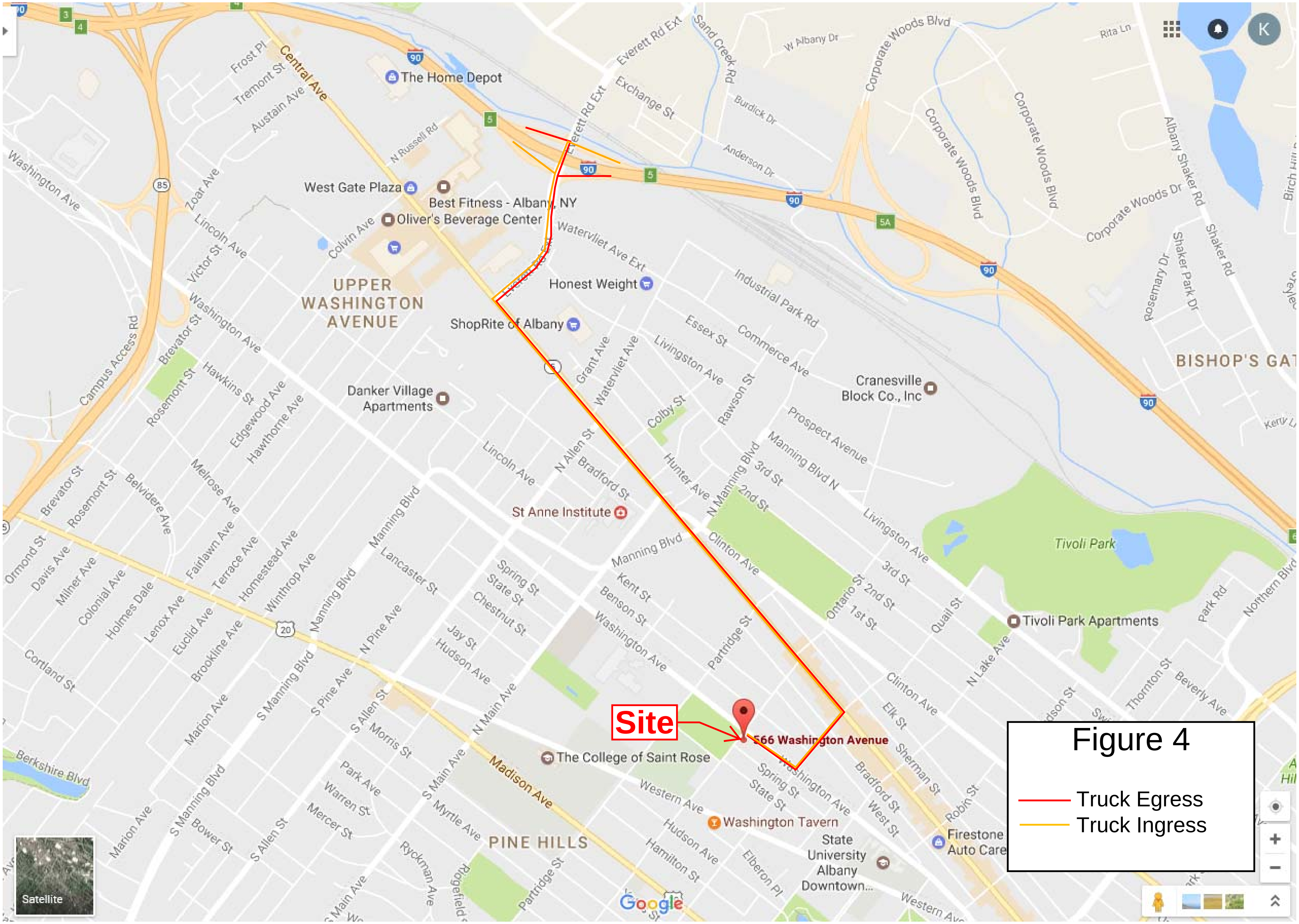
Notes:
(1) Results shown are detects only
(2) Units: mg/kg
(3) Criteria: NYSDEC 6 NYCRR Part 375. Bold = exceedance of Unrestricted criteria, Shaded cell = exceedance of Restricted Residental criteria, Italic = exceedance of Protection of Groundwater criteria
(4) Qualifier "J" - Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value

HDR

SOIL SAMPLING RESULTS – VOCS

FORMER RKO DRY CLEANERS (NYSDEC SITE #401065)

FIGURE 3



Site
566 Washington Avenue
Figure 4
Truck Egress
Truck Ingress
The Home Depot
West Gate Plaza
Best Fitness - Albany, NY
Oliver's Beverage Center
Honest Weight
ShopRite of Albany
Danker Village Apartments
St Anne Institute
Cranesville Block Co., Inc
Tivoli Park
Tivoli Park Apartments
The College of Saint Rose
Washington Tavern
State University Albany Downtown...
Firestone Auto Care
UPPER WASHINGTON AVENUE
PINE HILLS
BISHOP'S GAT
Central Ave
Washington Ave
Madison Ave
Western Ave
Manning Blvd
Everett Rd Ext
Corporate Woods Blvd
Industrial Park Rd
Satellite

Appendix A Site Specific Health & Safety Plan prepared by Precision Environmental Services

SITE SPECIFIC HEALTH AND SAFETY PLAN - EXECUTIVE SUMMARY

Project Name:	Former RKO Dry Cleaners	HASP Prepared by:	Precision Environmental Services, Inc.
Site Location:	566 Washington Avenue, Albany, NY NYSDEC Site No.: 401065	Approvals:	
Plan Preparation Date:	June 23, 2017	Revision Date:	

Site Description: Former RKO Dry Cleaners Site (the "Site") is an Inactive Hazardous Waste Disposal Site (Site No. 401065), located at 566 Washington Avenue, within the City of Albany, Albany County, New York. The Site is currently inactive/vacant and zoned for residential use.

Site History: The property was reportedly developed as early as 1909. From 1964 to 2005, the site was occupied by RKO Dry Cleaners and Tailors, except for the year 1995 when Lee's Market was listed as the occupant. In December 2000, a large fire occurred at the site resulting in generation of Spill Case 0010595 that states dry cleaning fluid may have been spilled, but it was reportedly consumed by the fire.

Soil and groundwater have since been analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, poly-chlorinated biphenyls (PCBs), and pesticides. Soil vapor has been analyzed for VOCs. Based upon investigations conducted to date, the primary contaminant of concern is tetrachloroethene (PCE) and its related degradation compounds. PCE was identified in the soils, groundwater, and soil vapor on and off the site.

Project Description: The primary objective of the proposed work is to remove PCE source contamination within soils from the site and implement enhanced biological degradation of the site post-excavation.

PRIMARY PHYSICAL HAZARDS					
x	Underground Utilities	x	Traffic Control		
x	Overhead Utilities	x	Slips, Trips/Walking Surface		
x	Heavy Equipment Operations	x	Manual Lifting		

CHEMCIAL HAZARDS, MONITORING, ACTION LEVELS		
Chemical of Concern	**MONITORING**	**ACTION LEVELS**
Volatile Organic Compounds (VOCs): • Tetrachloroethene	PID with 10.6eV (general field screening during boring install and sample collection)	Upgrade to Level C at 5 ppm sustained in the work area within breathing zone

CONTENTS

1.0 INTRODUCTION

This Health and Safety Plan (HASP) provides a general description of the levels of personal protection and safe operating guidelines expected of each employee associated with the interim remedial measures project planned at the Former RKO Dry Cleaners site, located at 566 Washington Avenue, Albany, NY. This HASP also identifies chemical and physical hazards known to be associated with the planned site activities as described in the work plan dated July 2017 and submitted under separate cover.

1.1 GENERAL

The provisions of this HASP are mandatory for all PES personnel engaged in fieldwork associated with the environmental services being conducted at The Site. A copy of this HASP and any applicable HASP Supplements shall be accessible on site and available for review at all times. In the event of a conflict between this HASP and federal, provincial, state, and local regulations, workers shall follow the most stringent/protective requirements. Concurrence with the provisions of this HASP are mandatory for all personnel at the site covered by this HASP and must be signed on the acknowledgement page.

1.2 PROJECT POLICY STATEMENT

PES is committed to protecting the safety and health of our employees, properties and infrastructure that are affected by our activities and protecting and preserving the natural environment in which we operate. The safety of persons and property is of vital importance to the success of this project and accident prevention measures shall be taken toward the avoidance of needless waste and loss. PES personnel will maintain a safe and healthy working environment. Subcontractors shall comply with the requirements of this HASP, provisions contained within the contract document and all applicable rules, requirements and health, safety and environmental regulations. All practical measures shall be taken to promote safety and maintain a safe place to work.

1.3 REFERENCES

This HASP conforms to the regulatory requirements and guidelines established in the following documents:

- Title 29, Part 1910 of the Code of Federal Regulations (29 CFR 1910), *Occupational Safety and Health Standards* (with special attention to Section 120, *Hazardous Waste Operations and Emergency Response*).
- Title 29, Part 1926 of the Code of Federal Regulations (29 CFR 1926), *Safety and Health Regulations for Construction*.

2.0 SITE INFORMATION AND SCOPE OF WORK

PES will conduct remedial activities at The Site. Work will be performed in accordance with the applicable Proposed Remedial Measures Work Plan, dated July 2017. Deviations from the Work Plan may require that changes be made to this HASP, to ensure adequate protection of personnel and other property.

The following is a summary of relevant data concerning the project and the work procedures to be performed.

2.1 SITE INFORMATION

This section provides a general description and historical information associated with the site.

2.1.1 General Description

The site is approximately 50 feet wide by 70 feet long, and is currently a vacant lot covered with concrete and gravel. Until June 2012, a circa 1950 building was present on the property with an area of approximately 2,575 square feet. The building was a one-story structure with a flat roof and a basement beneath approximately half the building. A fire occurred at the building in 2000 that left charred wood on much of the interior of the structure and holes in the roof. The exterior of the building was subsequently boarded up. In June 2012, the building was razed because of public safety concerns. A small driveway exists on the east side of the site. The site is currently

inactive/vacant and is zoned for residential use. The surrounding area consists of a mix of residential and commercial properties.

2.1.2 Site Background/History

The property was reportedly developed as early as 1909. From 1964 to 2005, the site was occupied by RKO Dry Cleaners and Tailors, except for the year 1995 when Lee's Market was listed as the occupant. In December 2000, a large fire occurred at the site resulting in generation of Spill Case 0010595 that states dry cleaning fluid may have been spilled, but it was reportedly consumed by the fire. Soil and groundwater have been analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, poly-chlorinated biphenyls (PCBs), and pesticides. Soil vapor has been analyzed for VOCs. Based upon investigations conducted to date, the primary contaminant of concern is tetrachloroethene (PCE) and its related degradation compounds. PCE was identified in the soils, groundwater, and soil vapor on and off the site.

2.1.3 Previous Investigations

Table 2-1 presents historical available data and potential exposure concentrations.

Table 2-1: Previous Investigation Data

Contaminant	Reported Low Groundwater Concentration (ug/L)	Reported High Groundwater Concentration (ug/L)	Reported High Soil Concentration (mg/KG)
Tetrachloroethene	0.0	9,600	110

2.2 SCOPE OF WORK

The goal of this IRM is to remove subsurface soils that have been identified as containing concentrations of PCE above the PGWSCOs. The contaminated area appears to be isolated within a localized area just outside of a former doorway used by the former dry cleaning business (see Figure 2 from Aztech's Interim Remedial Measures Report, October 30, 2012). Once the desired excavation depth is reached, an amendment will be mixed at the base of the excavation with the excavator to enhance the continued bio-degradation of PCE. Following excavation and off-site transport/disposal, the excavation will be backfilled with clean native fill from a NYSDEC approved source.

2.2.1 Mobilization/Demobilization

Mobilization and demobilization represent limited pre and post-task activities. These activities include driving to and from the site; initial site preparations, such as setup and staging of equipment; and post-work activities, such as removing equipment and general housekeeping. This activity does not represent any intrusive activities.

2.2.2 Site Preparation

Site preparation includes utility mark-out and clearance, and the set-up of other work support related items are included as well. Other site preparation activities will include the verification of utility mark-outs (on-site). All utility clearance shall be obtained by the authorizing authority for the subject site. If utility locations cannot be verified on-site by the public authority, then a private utility location contractor may need to be utilized to confirm/deny the presence of private underground utilities on The Site. Typical lead time is 72 hours and the permits generally valid for 14 days.

2.2.3 Pre-Excavation Delineation

Direct Push borings will be advanced through the subsurface in four-foot increments, potentially intersecting the water table. The location of borings will be chosen to determine the lateral and vertical extend of the plume, and therefore infer anticipate dig boundaries. Discrete macro-core samples will be collected continuously throughout boring advancement. Soil samples will be field screened for VOCs using a calibrated PID. Select Soil samples will be collected and submitted for laboratory analysis. Data collected will be used to inform spatial constraints for excavating and to develop a potential shoring plan. Soil cuttings generated during boring installation will be temporarily staged on-site in 55-gallon drums while awaiting characterization.

2.2.4 Excavation

It is estimated that approximately 180 cy of material will need to be removed from the site. Of the 180 cy, it is anticipated that approximately 70 cy will be classified as non-hazardous, and 110 cy will be classified as hazardous, based on RI data. The excavation extents shall be limited to the site property boundaries. PES will utilize a photo-ionization detector (PID) on-site during the course of the excavation to help guide excavation depths.

2.2.5 Material Transport Off Site

All material transported off-site will be performed by trucks that have a Part 364 Permit. Hazardous waste transporters will also comply with 6 NYCRR Part 372.

After leaving the site, trucks shall turn right onto Washington Avenue, immediately left onto Quail Street, left onto Central Avenue, and then right onto Everett Road which has access to NYS Route 90 East or West. A truck route map is included as Figure 4.

All hazardous and non-hazardous waste manifests shall be kept by PES and provided to NYSDEC upon completion of the project.

2.2.6 Equipment Decontamination

PES will perform decontamination of equipment used to perform work within controlled work areas.

Pre-cleaned and dedicated sampling materials/equipment will be used to collect the soil and groundwater samples for laboratory analysis. After the samples are collected, any disposable, or one-time use equipment (tubing, bladders, etc.) will be placed in a plastic bag for disposal in accordance with the paragraph above. Non-disposable sampling and drilling equipment that contacted the soil and/or groundwater will be decontaminated between each sampling location. Gross sediments and/or contamination will first be removed from the sampling and drilling equipment. The equipment will then be washed with DI water and Alconox detergent and then rinsed with potable water.

3.0 HEALTH AND SAFETY HAZARD ASSESSMENT

The potential exists for personnel coming into contact with hazardous materials as well as physical hazards during the performance of the work. All potential hazards will be addressed prior to the start of operations. Observation of activities and air monitoring during the operation will be continuous.

3.1 PHYSICAL HAZARDS

The following physical hazards are anticipated to be present on the site.

3.1.1 Slips, Trips, Falls, and Protruding Objects

A variety of conditions may exist that may result in injury from slips, trips, falls, and protruding objects. Slips and trips may occur as a result of wet, slippery, or uneven walking surfaces. To prevent injuries from slips and trips, always keep work areas clean; keep walkways free of objects and debris; and report/clean up liquid spills. Protruding objects are any object that extends into the path of travel or working area that may cause injury when contacted by personnel. Always be aware of protruding objects and when feasible remove or label the protruding object with an appropriate warning.

Slippery, uneven footing and tripping hazards will likely be present at the site. Be vigilant, avoid puddles, and wear footwear with slip resistant soles.

Walk around, not over or on top of debris or trash piles. When carrying equipment, identify a path that is clear of any obstructions. It might be necessary to remove obstacles to create a smooth, unobstructed access point to the work areas on site.

During the winter months, snow shovels and salt crystals should be kept on site to keep work areas free of accumulated snow and ice. Furthermore, use sand or other aggregate material to help keep work surfaces from being slippery, especially where salt/calcium chloride cannot be used. In addition, make sure work boots have soles that provide good traction.

Maintaining a work environment that is free from accumulated debris is the key to preventing slip, trip and fall hazards at construction sites. Essential elements of good housekeeping include

- Orderly placement of materials, tools and equipment out of walkways;
- Placing trash receptacles at appropriate locations for the disposal of miscellaneous rubbish; and,
- Prompt removal and secure storage of items that are not needed to perform the immediate task at hand.

3.1.2 Housekeeping

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials.

3.1.3 Manual Lifting

Most materials associated with investigation and remedial activities are moved by hand. The human body is subject to severe damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process. Whenever possible, use mechanical assistance to lift or move materials and at a minimum, use at least two people to lift, or roll/lift with your arms as close to the body as possible.

3.1.4 Utilities

Various forms of underground/overhead utility lines or pipes may be encountered during site activities. Prior to the start of intrusive operations, utility clearance is mandated, as well as obtaining authorization from all concerned public utility department offices. If insufficient data is available to accurately determine the location of the utility lines, PES will hand clear or use soft dig techniques to a depth of at least six (6) feet below ground surface in the proposed areas of subsurface investigation. Should intrusive operations cause equipment to come into contact with utility lines, the Site Safety Officer (SSO) and PES management will be notified immediately. Work will be suspended until the applicable utility agency is contacted and the appropriate actions for the particular situations can be taken. The phone number for the applicable state agency is provided in the Emergency Contacts list found in Section 8.

Ensure equipment operators, truck drivers, etc. and signal person are aware of overhead power lines when working around overhead power lines. Overhead power and utility lines may be present on, or adjacent to, the site and represent a potential hazard during the mobe/demobe of equipment and supplies. Maintain a minimum of 10 feet between overhead power lines and drill rig mast. Any deviation must be approved by the SSO and PES management.

3.1.5 Drilling and Excavation Operations

Drilling and excavation operations present their own set of hazards. Several basic precautions that should be taken include, but are not limited to, confirming locations of underground and overhead utilities, wearing of appropriate PPE and the avoidance of loose clothing or jewelry, staying clear of moving parts, knowing the locations of emergency shut-off switches. Operators will be aware of obstructions, changes of grade, and personnel. Ground personnel will not cross paths with moving equipment. When sampling soil, the excavator bucket will be placed on the ground, the operator will deactivate and/or throttle down the machine, and sampler will not stand between the bucket and open excavation.

3.1.6 Dust and Odor Control

While dust generation is not anticipated, specific controls will be implemented if needed. If dust is observed in the work area or reaching or approaching the site boundary, activities causing the dust will be immediately stopped. Dust control measures (water spray, soil covers, slower work pace, or change in work activities) will be deployed prior to resuming work.

Based on available data, odors are not anticipated to be of concern at The Site. In the event that an odor complaint is received, the SSO will immediately assess site conditions and determine the probable cause or causes. Appropriate odor mitigation measures will be deployed. These measures may include deploying odor suppressing foam, implementation of air monitoring or discontinuing activities that are generating the odor.

3.1.7 Traffic Control

During certain work tasks, the establishment of traffic control to adequately protect workers and the public may be required. Site specific requirements will be determined by the SSO on a case-by-case basis. General traffic control precautions include placing a work vehicle between your worksite and oncoming traffic whenever possible. Not only is it a large, visible warning sign, but also if an oncoming car should fail to yield or deviate, the parked vehicle rather than your body would absorb the first impact of a crash. Turn the vehicle wheels so that if it was struck, it would swing away from the worksite. When using cones or other devices to modify traffic flow, ensure use of the proper taper length and device spacing to provide adequate warning distance to on-coming motor vehicles. In addition, proper PPE is to be worn during traffic operations, to include hardhat and high-visibility vests.

3.2 CHEMICAL HAZARDS

Employees can be exposed by inhalation to the chemicals of concern during intrusive activities. Another route of potential exposure is via direct dermal contact with soils and groundwater during sampling. Although highly unlikely, exposure to all of the chemicals of concern can occur via ingestion (hand-to-mouth transfer). The decontamination procedures described in Section 6 address personal hygiene issues that will limit the potential for contaminant ingestion.

The chemical hazards associated with site activities can be controlled in several ways, including:

- Maintaining a upwind position;
- Use of personal protective equipment;
- Avoiding direct contact with contaminated media;
- Slow equipment down to prevent dusting;
- Use of water to prevent or minimize the generation of dust;
- Following decontamination procedures; and
- Washing hands prior to eating or using tobacco products.

TABLE 3-2.1: Assessment of Chemical Hazards

Contaminant	*Unrestricted Use mg/kg (ppm)*	*Protection of Groundwater mg/kg (ppm)*	*OSHA PEL-TWA*	*OSHA PEL-STEL (ppm)*	*OSHA PEL-C (ppm)*	*IDLH (ppm)*	*Acute Health Effects*	*Chronic Health Effects*
Tetrachloroethene (PCE)	1.3	1.3	100 ppm	none	none	150	Irritation to eyes, skin, nose, throat, and respiratory system. Nausea. Dizziness. Drowsiness. Weakness. Muscle incoordination.	Liver changes in animals. Liver cancer.

TABLE 3-2.2: Monitoring of Chemical Hazards

Contaminant	Monitoring Equipment	Monitoring Protocol	Monitored Level for Mandatory Respirator Use	Monitored Level for Mandatory Stop Work
Tetrachloroethene (PCE)	PID	Initial and Continuous Through Shift	>5 ppm in Breathing Zone	>25 ppm

3.3 WEATHER HAZARDS

The Site Safety Officer will be attentive to daily weather forecasts for the project area each morning. Predicted weather conditions of potential field impact are to be included in safety briefings for that day. Weather-related hazards will directly correlate to the type of weather involved. Hot, dry weather may cause greater dust emissions, particularly during intrusive activities. Rain and snow may increase slip/trip hazards, particularly for ground workers.

Severe weather can occur with little warning. Employees will be vigilant for the potentials for storms, lightning, high winds, and flash flood events. Additionally, lightning strikes during electrical storms could also be a potential hazard. The following procedures will be implemented once thunder is heard or lightning spotted:

1) If thunder is heard, all site personnel are to be alert of any visible lightning flashes. The SSO will observe the storm front and track the direction it is moving. The SSO will continue to observe the storm front until it passes or until the prevailing direction is determined to be away from the site.

2) If lightning is observed, the SSO is to be notified. When the next lightning flash is observed, a "second" count shall be initiated from the time the lightning is observed until the thunder from the strike is heard.

3) The following action guidelines shall be implemented once the "second" count is </= 30 seconds:

   a) "second" count > 30, the SSO will continually observe the storm front. If the front is moving away, work will continue. If the front is moving towards the site, the SSO will initially place workers on alert for potential evacuation.

   b) "second" count </= 30, the SSO will issue the evacuation command and all workers are to vacate the work area and equipment. Work can be re-initiated once the front has passed by and thunder has not been heard for 30 minutes.

4) If lightning is observed and the storm front is moving away from or around the site and is > 20 miles away, work will be permitted to continue. The location of the storm can be confirmed via internet access to a local weather website that has a Doppler radar tracking system.

3.4 OTHER HAZARDS

A Task specific hazard assessment has been completed for all tasks identified in the Scope of Work. These tasks include:

1. Mobe/Demobe
2. Delineation
3. Excavation Activities
4. Soil sampling
5. Soil disposal
6. Backfilling

TABLE 3-4: Assessment of Non-Chemical Hazards

Non-Chemical Hazard	*Applicable?*	*Task No.(s)*
Electrical (overhead lines)	Yes	1,2,6
Electrical (underground lines)	Yes	2,4
Gas/Water Lines	Yes	2,4
Drilling Equipment	No	
Excavation Equipment	Yes	1,2,3,4,5,6
Machinery	Yes	1,2,,5,6
Heat Exposure	Yes	1,2,3,4,5,6
Cold Exposure	No	
Oxygen Deficiency	No	
Confined Spaces	No	
Noise	Yes	2,5,6
Ionizing Radiation	No	
Non-ionizing Radiation	No	
Fire	No	

As a result of unanticipated work activities or changing conditions, additional hazard assessments may be required. All additional assessments will be reviewed and approved by the SSO and PES management.

Community air monitoring will be done throughout the project as deemed necessary by the SSO, given the work tasks that are being performed and site specific conditions encountered.

4.0 PROJECT PERSONNEL RESPONSIBILITIES

4.1 PROJECT MANAGER

This person will act in a supervisory capacity over all employees and activities with respect to The Site. The Project Manager has the authority to direct response operations and assumes total control over all site activities. Stephen Phelps is the Project Manager. Stephen Phelps can be reached at 518-885-4399 (office) or at 518-528-1427 (cell phone).

4.2 SITE SAFETY OFFICER (SSO)

This individual advises the project manager/supervisor on all aspects of health and safety on site. This individual also has the authority to stop work if any operation threatens workers or public safety and health. Depending on circumstances, the Project Manager may act as the SSO as well. The SSO will be assigned at the start of the project.

4.3 EMPLOYEES

Responsibilities of employees associated with this project include, but are not limited to:

- Understanding and abiding by the policies and procedures specified in the HASP and other applicable safety policies, and clarifying those areas where understanding is incomplete.
- Providing feedback to health and safety management relating to omissions and modifications in the HASP or other safety policies.
- Notifying the SSO immediately and then in writing, of unsafe conditions and acts.

4.4 SUBCONTRACTORS

Each PES subcontractor is responsible for assigning specific work tasks to their employees. Each subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel with any required personnel protective equipment (PPE and all required training).

PES considers each subcontractor to be an expert in all aspects of the work operations for which they are tasked to provide, and each subcontractor is responsible for compliance with the regulatory requirements that pertain to those services. Each subcontractor is expected to perform its operations in accordance with its own unique safety policies and procedures, in order to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to PES for review prior to the start of onsite activities, if required.

Hazards not listed in this HASP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the PES PM or the SSO prior to beginning work operations. The SSO or authorized representative has the authority to halt any subcontractor operations, and to remove any subcontractor or subcontractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

4.5 VISITORS

Authorized visitors (e.g., client representatives, regulators, PES management staff, etc.) requiring entry to any work location on the site will be briefed by SSO on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer's health and safety policies. In addition, this HASP specifies the minimum acceptable qualifications, training and personal protective equipment which are required for entry to any controlled work area; visitors must comply with these requirements at all times.

4.5.1 Visitor Access

Visitors to any HAZWOPER controlled-work area must comply with the health and safety requirements of this HASP, and demonstrate an acceptable need for entry into the work area. All visitors desiring to enter any controlled work area must observe the following procedures:

1. A written confirmation must be received by PES documenting that each of the visitors has received the proper training and medical monitoring required by this HASP. Verbal confirmation can be considered acceptable provided such confirmation is made by an officer or other authorized representative of the visitor's organization.
2. Each visitor will be briefed on the hazards associated with the site activities being performed and acknowledge receipt of this briefing by signing the appropriate tailgate safety briefing form.
3. All visitors must be escorted by a PES employee.

5.0 PERSONAL PROTECTIVE EQUIPMENT

5.1 PERSONAL PROTECTIVE EQUIPMENT

The purpose of personal protective equipment (PPE) is to provide a barrier, which will shield or isolate individuals from the chemical and/or physical hazards that may be encountered during work activities. Table 7-1 lists the minimum PPE required during site operations and additional PPE that may be necessary. All personnel will be provided with appropriate personal safety equipment and protective clothing. Each individual will be properly trained in the use of this safety equipment before the start of field activities. Safety equipment and protective clothing shall be used as directed by the SSO. All such equipment and clothing will be cleaned and maintained in proper condition by the personnel. The SSO will monitor the maintenance of personal protective equipment to ensure proper procedures are followed.

By signing this HASP the employee agrees having been trained in the use, limitations, care and maintenance of the protective equipment to be used by the employee at this project. If training has not been provided, request same of the PM/SSO for the proper training before signing.

The personal protective equipment levels designated below are in conformance with EPA criteria for Level A, B, C, and D protection. All respiratory protective equipment used will be approved by NIOSH/MSHA.

TABLE 5-1: Personal Protective Equipment

TYPE	MATERIAL	ADDITIONAL INFORMATION	TASK
Minimum PPE			
Safety Vest	ANSI Type II high-visibility	Must have reflective tape/be visible from all sides	1,2,3,4
Boots	Leather	ANSI approved safety toe	1,2,3,4
Safety Glasses		ANSI Approved	1,2,3,4
Hard Hat		ANSI Approved	2,3,4
Work Uniform		No shorts/cutoff jeans or sleeveless shirts	1,2,3,4
Additional PPE:			
Hearing Protection	Ear plugs and/ or muffs	In hazardous noise areas	2
Leather Gloves		If working with sharp objects or powered	2, 4
Protective Chemical Gloves	Nitrile	During handling of all potential chemically impacted media.	2,3,4
Protective Chemical Coveralls	Tyvek	For use where contact potential with chemically impacted media exists.	2 (as needed)
Protective Chemical Boots	Rubber Overbooties or dedicated rubber boots	For use where contact potential with chemically impacted media exists.	2 (as needed)
Level C Respiratory Protection	MSA (Full Face or equivalent) equipped with GME/P100	Upgrade based on air monitoring requirements established in Table 3-2.2	2 (as needed)
Sunscreen	SPF 30 or higher		2,3,4
Cold Weather Gear	Hard hat liner, hand warmers, insulated gloves		2,3,4

5.2 PPE DOFFING AND DONNING INFORMATION

The following information is to provide field personnel with helpful hints that, when applied, make donning and doffing of PPE a more safe and manageable task:

- Never cut disposable booties from your feet with basic utility knives. This has resulted in workers cutting through the booty and the underlying sturdy leather work boot, resulting in significant cuts to the legs/ankles. Recommend using a pair of scissors or a package/letter opener (cut above and parallel with the work boot) to start a cut in the edge of the booty, then proceed by manually tearing the material down to the sole of the booty for easy removal.
- When applying duct tape to PPE interfaces (wrist, lower leg, around respirator, etc.) and zippers, leave approximately one inch at the end of the tape to fold over onto itself. This will make it much easier to remove the tape by providing a small handle to grab while still wearing gloves. Without this fold, trying to pull up the tape end with multiple gloves on may be difficult and result in premature tearing of the PPE.
- Have a "buddy" check your ensemble to ensure proper donning before entering controlled work areas. Without mirrors, the most obvious discrepancies can go unnoticed and may result in a potential exposure situation.
- Never perform personal decontamination with a pressure washer.

6.0 DECONTAMINATION

6.1 GENERAL REQUIREMENTS

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment through or over, tracking, or splashing potential or known contaminated/impacted materials, etc).

All personal decontamination activities shall be performed with an attendant (buddy) to provide assistance to personnel that are performing decontamination activities. Depending on specific site hazards, attendants may be required to wear a level of protection that is equal to the required level in the Exclusion Zone (EZ).

All persons and equipment entering the EZ shall be considered contaminated, and thus, must be properly decontaminated prior to entering the CRZ.

Decontamination procedures may vary based on site conditions and nature of the contaminant(s). If chemicals or decontamination solutions are used, care should be taken to minimize reactions between the solutions and contaminated materials. In addition, personnel must assess the potential exposures created by the decontamination chemical(s) or solutions. The applicable Material Safety Data Sheet (MSDS) must be reviewed, implemented, and filed by personnel contacting the chemicals/solutions.

All contaminated PPE and decontamination materials shall be contained, stored and disposed of in accordance with site-specific requirements determined by site management.

6.2 DECONTAMINATION EQUIPMENT

The equipment required to perform decontamination may vary based on site-specific conditions and the nature of the contaminant(s). The following equipment is commonly used for decontamination purposes:

- Soft-bristle scrub brushes or long-handled brushes to remove contaminants;
- Hoses, buckets of water or garden sprayers for rinsing;
- Large plastic/galvanized wash tubs or children's wading pools for washing and rinsing solutions;
- Large plastic garbage cans or similar containers lined with plastic bags for the storage of contaminated clothing and equipment;
- Metal or plastic cans or drums for the temporary storage of contaminated liquids; and
- Paper or cloth towels for drying protective clothing and equipment.

6.3 PERSONAL/EQUIPMENT DECONTAMINATION

All equipment leaving the EZ shall be considered contaminated and must be properly decontaminated to minimize the potential for exposure and off-site migration of impacted materials. Such equipment may include, but is not limited to: sampling tools, heavy equipment, vehicles, PPE, support devices (e.g., hoses, cylinders, etc.), and various handheld tools.

All employees performing equipment decontamination shall wear the appropriate PPE to protect against exposure to contaminated materials. The level of PPE may be equivalent to the level of PPE required in the EZ. Other PPE may include splash protection, such as face-shields and splash suits, and knee protectors. Following equipment decontamination, employees may be required to follow the proper personal decontamination procedures above.

Personnel decontamination should consist of the following procedure:

1. For Overbootie Removal
    - Grasp top of overbootie and roll downward (inside out)
    - Using gloved hands, place booties in receptacle
2. For Suit Removal
    - Unzip suit and remove arms, turning inside-out
    - Slide suit down, over waist
    - Slide suit downward over legs, and step out
    - Using gloved hands, grasp inside of suit, and place in receptacle.
3. For Glove removal:
    - Grasp the cuff of the dominant hand and pull glove over the bulk of the hand, leaving the fingers inside the glove.
    - Use the dominant hand to grasp the cuff of the non-dominant hand and pull the glove completely off (inside-out) and place inside of the dominant hand glove.
    - Once removed, employee should only touch the inside material of the dominant hand glove.
    - Thoroughly wash hands.
4. For APR Removal
    - Remove cartridges and place in receptacle
    - Loosen straps, grasp back strap and face piece, and doff mask
    - Decon mask and hang to dry

All employees who are expected to don respiratory protection must have successfully passed a qualitative or quantitative fit-test within the past year for the brand, model and size respirator they plan to don. If worn, respirators will be cleaned after each use with respirator wipe pads and will be stored in plastic bags after cleaning. Respirators will be thoroughly cleaned using disinfectant material within one week following any respirator use. Refer to the cleaning instructions provided with the respirator or specified in the OSHA regulations at 29 CFR 1910.134.

For larger equipment, a high-pressure washer may need to be used. Some contaminants require the use of a detergent or chemical solution and scrub brushes to ensure proper decontamination. Before heavy equipment and trucks are taken offsite, the SSO will visually inspect them for signs of contamination. If contamination is present, the equipment must be decontaminated.

For smaller equipment, use the following steps for decontamination:

1. Remove majority of visible gross contamination in EZ.
2. Wash equipment in decontamination solution with a scrub brush and/or power wash heavy equipment.
3. Rinse equipment.
4. Visually inspect for remaining contamination.
5. Follow appropriate personal decontamination steps outlined above.

All decontaminated equipment shall be visually inspected for contamination prior to leaving the Contaminant Reduction Zone (CRZ). Signs of visible contamination may include an oily sheen, residue or contaminated soils left on the equipment. All equipment with visible signs of contamination shall be discarded or re- decontaminated until clean. Depending on the nature of the contaminant, equipment may have to be analyzed using a wipe method or other means.

7.0 RESPONSE / WORK AREAS

7.1 GENERAL

The purpose of site control is to minimize potential contamination of workers, protect the public from site hazards, and prevent vandalism. The degree of site control necessary depends on the site characteristics, site size, and the surrounding community.

Controlled work areas will be established at each work location, and if required, will be established directly prior to the work being conducted. Diagrams designating specific controlled work areas will be drawn on site maps, posted in the support vehicle or trailer and discussed during the daily safety meetings. If the site layout changes, the new areas and their potential hazards will be discussed immediately after the changes are made.

7.2 CONTROLLED WORK AREAS

Each HAZWOPER controlled work area will consist of the following three zones:

- Exclusion Zone (EZ): Contaminated work area.
- Contamination Reduction Zone (CRZ): Decontamination area.
- Support Zone (SZ): Uncontaminated or “clean area” where personnel should not be exposed to hazardous conditions.

Each zone will be periodically monitored in accordance with the air monitoring requirements established in this HASP. The Exclusion Zone and the Contamination Reduction Zone are considered work areas. The Support Zone is accessible to the public (e.g., vendors, inspectors).

7.2.1 Exclusion Zone

The Exclusion Zone is the area where primary activities occur, such as sampling, remediation operations, installation of wells, cleanup work, etc. This area must be clearly marked with hazard tape, barricades or cones, or enclosed by fences or ropes. Only personnel involved in work activities, and meeting the requirements specified in this HASP will be allowed in an Exclusion Zone.

The extent of each area will be sufficient to ensure that personnel located at/beyond its boundaries will not be affected in any substantial way by hazards associated with sample collection activities.

All personnel should be alert to prevent unauthorized, accidental entrance into controlled-access areas (the EZ and CRZ). If such an entry should occur, the trespasser should be immediately escorted outside the area, or all HAZWOPER-related work must cease. All personnel, equipment, and supplies that enter controlled-access areas must be decontaminated or containerized as waste prior to leaving (through the CRZ only).

7.2.2 Contamination Reduction Zone

The Contamination Reduction Zone is the transition area between the contaminated area and the clean area. Decontamination is the main focus in this area. The decontamination of workers and equipment limits the physical transfer of hazardous substances into the clean area. This area must also be clearly marked with hazard tape and access limited to personnel involved in decontamination.

7.2.3 Support Zone

The Support Zone is an uncontaminated zone where administrative and other support functions, such as first aid, equipment supply, emergency information, etc., are located. The Support Zone shall have minimal potential for significant exposure to contaminants (i.e., background levels).

Employees will establish a Support Zone (if necessary) at the site before the commencement of site activities. The Support Zone would also serve as the entry point for controlling site access.

8.0 EMERGENCY PROCEDURES

Although the potential for an emergency to occur is remote, an emergency action plan has been prepared for this project should such critical situations arise. In the event of a site emergency, fire, medical, spill, site personnel will immediately notify on site or outside emergency personnel. The PM/SSO if not on site will be immediately notified.

8.1 SAFETY ACCIDENT/INCIDENT REPORTING

All accidents and incidents that occur on-site during any field activity will be promptly reported to the SSO and the immediate supervisor.

If any PES employee is injured and requires medical treatment, the Site Supervisor will report the incident in accordance with PES's incident reporting procedures. A copy of the final Supervisor's Report of Incident will be provided to PES Management before the end of the following shift.

If any employee of a subcontractor is injured, documentation of the incident will be accomplished in accordance with the subcontractor's procedures; however, copies of all documentation (which at a minimum must include the OSHA Form 301 or equivalent) must be provided to the SSO within 24 hours after the accident has occurred.

All accidents/incidents will be investigated.

8.2 ENVIRONMENTAL SPILL/RELEASE REPORTING

All environmental spills or releases of hazardous materials (e.g., fuels, solvents, etc.), whether in excess of the Reportable Quantity or not, will be reported to the PM and PES management. In determining whether a spill or release must be reported to a regulatory agency, the Site Supervisor will assess the quantity of the spill or release and evaluate the reporting criteria against the state-specific reporting requirements, applicable regulatory permit, and/or client-specific reporting procedures.

TABLE 8-2: Emergency Contacts

Nearest Hospital: Albany Memorial Hospital, 600 Northern Blvd.(Map and Directions attached at the end of HASP)		518-471-3221
Ambulance		911
Fire Department		911
Emergency Control		911
Police Department		911
Poison Control Center	Upstate Medical Center	800-336-6997
US Government Chemical Toxin Spills, Oil Spills, and Pollutant Discharges		800-424-8802
National Response Center (for all emergencies)		800-424-8800
NYSDEC Oil & Chemical Spills 24-hour Hotline		800-457-7362
PES Project Manager Stephen Phelps		518-528-1427
NYSDEC Project Manager Kyle Forster		518-402-8644
Dig Safely NY - Call Before You Dig		800-962-7962

9.0 MISCELLANEOUS HEALTH AND SAFETY ITEMS

9.1 HEAT STRESS

Pervious clothing: when the ambient air temperature has exceed 80º F for more than one hour the Safety Officer will begin to monitor employees for signs of heat stress. Monitoring will take the form of measuring oral temperatures. The air temperature will be measured after every shift at a minimum or as determined by the Safety Officer.

Impervious clothing: when the ambient air temperature has exceeded 70ºF for one hour, the Safety Officer will begin to monitor employees for signs of heat stress. Monitoring will take the form of measuring oral temperatures. As the air temperature exceeds 85ºF, oral temperatures will be measured after every shift at a minimum or as determined by the Safety Officer.

In the event that the oral temperature at the beginning of the rest period exceeds 100ºF, the employee will be decontaminated and be advised to proceed to an air conditioned room or to apply wet cloths to his/her head and neck areas and to drink some fluids. At the end of the rest period, the oral temperature will be taken again to ensure that the employee's temperature is below 100ºF. If the oral temperature has remained above 100ºF, the employee will be advised to take a shower to reduce his/her temperature. However, if the oral temperature still remains above 100ºF after the shower, the employee will be immediately sent to consult a physician.

9.2 COLD WORK ENVIRONMENTS

Planning for work in cold weather is the most important defense. Wearing the appropriate clothing and being aware of how your body is reacting to the cold are important to preventing cold stress. Avoiding alcohol, certain medications and smoking can also help minimize the risk.

Protective clothing: Wearing the right clothing is the most important way to avoid cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. The following are recommendations for working in cold environments:

Wear at least three layers of clothing:
An outer layer to break the wind and allow some ventilation (Goretex® or nylon)
A middle layer of down or wool to absorb sweat and provide insulation even when wet
An inner layer of cotton or synthetic weave to allow ventilation
Wear a hat. Up to 40% of body heat can be lost when the head is left exposed.
Wear insulated boots or footwear.
Have a change of dry clothes available.

Work Practices

Drink lots of fluids. Avoid caffeine and alcohol.
If possible, heavy work should be scheduled during the warmer parts of the day.
Take breaks.
Signs and Symptoms:

Mild Hypothermia
Shivering
Lack of coordination, stumbling
Fumbling hands
Slurred speech
Memory Loss
Pale, cold skin

Moderate Hypothermia
Shivering stops
Unable to walk or stand
Confused and irrational

Severe Hypothermia
Severe muscle stiffness
Very sleepy or unconscious
Ice cold skin
Death

What To Do: Move to warm area, stay active, remove wet clothes and replace with dry clothes or blankets, cover the head, drink warm (not hot) sugary drink. Moderate to severe hypothermia all of the above plus call 911, cover all extremities completely, place hot packs or water bottles on the victim's neck, head, chest and groin. Severe hypothermia do not re-warm the body.

Frostbite
Cold, tingling or aching feeling in frostbitten area, followed by numbness.
Skin color turns red, then purple, then white or very pale. Cold to the touch.
Blisters in severe cases.

What to Do: Call 911. Don't rub the area. Wrap in soft cloth. Run under warm water not hot water if help is delayed.

10.0 SAFETY MEETINGS/COMMUNICATION

10.1 TAILGATE MEETINGS

Prior to the commencement of daily project activities, a tailgate meeting will be conducted by the PM/SSO to review the specific requirements of this HASP. Attendance at the daily tailgate meeting is mandatory for all employees at the site covered by this HASP and must be documented on the attendance form. All safety training documentation is to be maintained in the project file by the SSO.

Additional safety meetings will be held on an as required basis.

10.2 HAZARD COMMUNICATION

Hazardous materials that may be encountered as existing on-site environmental or physical/health contaminants during the work activities are addressed in this HASP and their properties, hazards and associated required controls will be communicated to all affected staff and subcontractors.

All personnel shall be briefed on the hazards of any chemical product they use, and shall be aware of and have access to all MSDS.

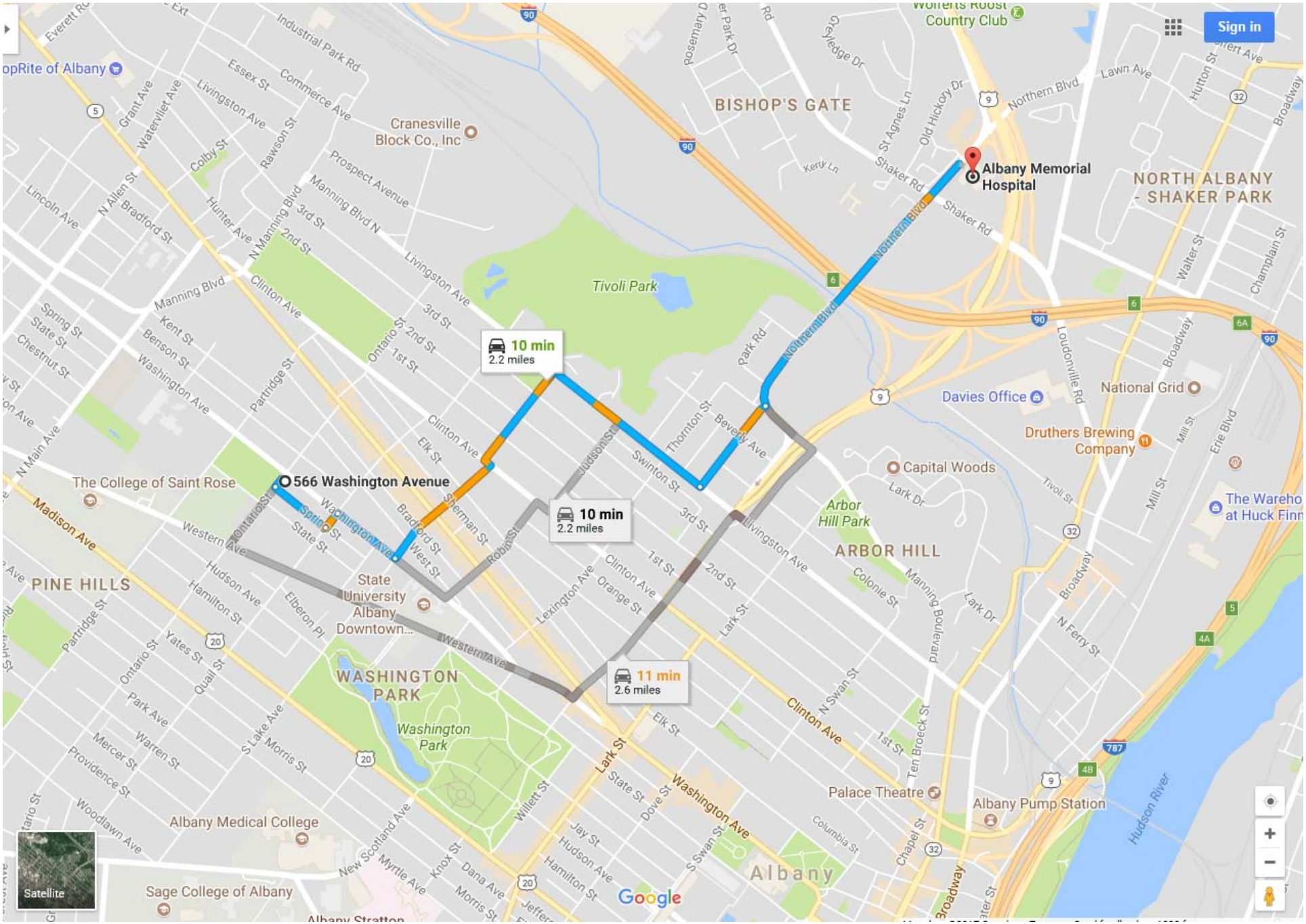
All containers on site shall be properly labeled to indicate their contents. Labeling on any containers not intended for single-day, individual use shall contain additional information indicating potential health and safety hazards (flammability, reactivity, etc.).

10.3 BUDDY SYSTEM

All field personnel will use the buddy system when working within any controlled work area. Personnel belonging to another organization on site can serve as "buddies" for PES personnel. Under no circumstances will any employee be present alone in a controlled work area.

11.0 TRAINING

All field personnel will be 40 Hour HAZWOPER and 10 Hour Construction Safety trained.



Hospital Map

Appendix B
Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B
Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m3, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m3 continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM10 at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

(a) Applying water on haul roads;
(b) Wetting equipment and excavation faces;
(c) Spraying water on buckets during excavation and dumping;
(d) Hauling materials in properly tarped or watertight containers;
(e) Restricting vehicle speeds to 10 mph;
(f) Covering excavated areas and material after excavation activity ceases; and
(g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m3 action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

Appendix C
EHC Product Specifications

Environmental Solutions

EHC® Reagent

Product Sheet

EHC® The Original ISCR Reagent

EHC® *in situ* chemical reduction (ISCR) reagent is the original patented combination of controlled-release organic carbon and zero valent iron (ZVI) used for the treatment of groundwater and saturated soil impacted by persistent halogenated compounds, including chlorinated solvents, pesticides and organic explosives. The EHC formula is the culmination of years of research and successful field use. EHC is comprised of a synergistic mixture of micro-scale ZVI and a solid organic carbon source, stimulating both abiotic and biotic dechlorination mechanisms.

Contaminants treated

- Chlorinated solvents including chlorinated ethenes, ethanes and methanes
- Energetic compounds such as TNT, DNT, HMX, RDX and perchlorate
- Most pesticides including DDT, DDE, dieldrin, 2,4-D and 2,4,5-T
- Chlorobenzenes including di- and tri-chlorobenzene
- Chloroflurocarbons
- Nitrate compounds

Applications

EHC can address a wide range of contaminant concentrations and has successfully been applied to treat large dilute plume areas, groundwater hots-spots, and high concentration source areas:

- Permeable Reactive Barriers (PRBs) for Plume Control: EHC has an estimated lifetime > 5 years in the subsurface, which makes it ideal for placement into PRBs. The first full-scale EHC PRB has been operating since 2005, and has continuously supported >90% CVOC removal under flow-through conditions.
- Grid-Applications: EHC is also commonly used for source area/hot-spot treatment, and the product's longevity allows for continued treatment of contaminants as they slowly back diffuse from the solid matrix to groundwater at sites with high concentrations of sorbed mass / NAPL. EHC successfully treated a site with starting TCE concentrations >600 mg/L.
- Plume Treatment: Designs with multiple PRBs have been employed for cost effective treatment of large dilute plume areas.

Installation methods

- Injection of EHC Slurry via Direct Push Technology (DPT)
- Hydraulic or Pneumatic Fracturing (applied to fine-grain formations including weathered and fractured bedrock)
- Direct placement into open excavations or trench PRBs
- Deep soil mixing

SPECIFICATIONS

Composition:

- Micro-scale ZVI (~40%*)
- Controlled-release, food grade, complex organic carbon (~60%*)
- Major, minor, and micronutrients
- Food grade organic binding agent

Packaging:

Delivered as a dry powder, available in 50-lb / 25 kg bags and 1 ton super sacs.

Health and Safety:

Non-hazardous and safe to handle.

Longevity:

3 to 5+ years, depending on application

*Custom formulations available upon request

EHC Slurry for DPT Injection

Environmental Solutions

EHC® Reagent

Product Sheet

The sound science of EHC

EHC will rapidly create strong reducing conditions via biotic and abiotic mechanisms as detailed below:

- The addition of organic carbon to the subsurface will support the growth of indigenous heterotrophic bacteria in the groundwater environment. As the bacteria feed on the organic carbon particles, the bacteria consume dissolved oxygen and other electron acceptors, thereby reducing the redox potential in groundwater.
- The ZVI particles will scavenge oxygen as it undergoes oxidation promoting an additional drop in the redox potential of groundwater.

EHC promotes both biotic and abiotic dechlorination reactions:

- As the bacteria ferment the organic portion of EHC, they release a variety of volatile fatty acids (VFAs) such as lactic, propionic and butyric acids, which diffuse from the site of fermentation into the groundwater plume and serve as electron donors for other bacteria, including dehalogenators.
- The small ZVI particles (i.e., <100 µm) provide substantial reactive surface area that stimulates direct chemical dechlorination. Furthermore, as the ZVI is corroding ferrous iron is released into the groundwater. As the dissolved iron travels into areas with higher redox potential, it will precipitate out as a number of ferrous and ferric precipitates, including, but not limited to iron oxide and sulfide. These ferrous iron precipitates have also been proven to be reactive with CVOCs and will stimulate abiotic dechlorination mechanisms in an extended area downgradient of the points of application.

EHC KEY ATTRIBUTES

- Abiotic and Biotic Degradation
- pH Balanced
- Long-Lasting
- Field-Proven
- Quickly Generates Reducing Conditions
- Minimal Generation of Daughter Products
- Manufactured from Sustainable Recycled Materials

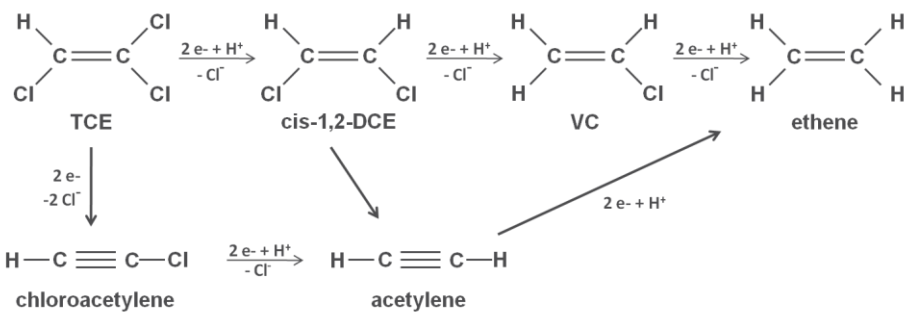
Synergistic benefits of combining organic carbon and ZVI:

- Redox potentials as low as –500 mV have been observed in groundwater after EHC addition. These Eh values are significantly lower than those achieved when using either organic materials (e.g. lactate and molasses) or reduced metal alone. These low Eh potentials not only improve the kinetics of the dechlorination reactions but also support more complete decomposition of chlorinated solvents.
- Self-buffered – the alkalinity generated from ZVI corrosion (release of hydroxide) is off-set by the acidity from organic carbon fermentation (VFAs). Maintaining a near neutral pH is beneficial for microbial growth and also serves to prevent ZVI passivation from mineral coatings, hence extending the reactive life of the ZVI.

Multiple degradation pathways:

The addition of organic carbon will promote conventional step-wise reductive dechlorination reactions, whereas the dominant abiotic pathway observed in contact with zero-valent iron and ferrous iron precipitates is beta-elimination; minimizing the generation of daughter products (specifically vinyl chloride).

Biotic Pathway (Step-Wise Reductive Dechlorination)



Main Abiotic Pathway (β-Elimination)

PeroxyChem

remediation@peroxychem.com | 1.866.860.4760 | peroxychem.com/remediation

Document 04-02-ESD-14

Environmental Solutions

EHC® Reagent

Product Sheet

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- Permeable Reactive Barriers (PRBs) for Plume Control: EHC has an estimated lifetime > 5 years in the subsurface, which makes it ideal for placement into PRBs. The first full-scale EHC PRB has been operating since 2005, and has continuously supported >90% CVOC removal under flow-through conditions.
- Grid-Applications: EHC is also commonly used for source area/hot-spot treatment, and the product's longevity allows for continued treatment of contaminants as they slowly back diffuse from the solid matrix to groundwater at sites with high concentrations of sorbed mass / NAPL. EHC successfully treated a site with starting TCE concentrations >600 mg/L.
- Plume Treatment: Designs with multiple PRBs have been employed for cost effective treatment of large dilute plume areas.

Installation methods

- Injection of EHC Slurry via Direct Push Technology (DPT)
- Hydraulic or Pneumatic Fracturing (applied to fine-grain formations including weathered and fractured bedrock)
- Direct placement into open excavations or trench PRBs
- Deep soil mixing

SPECIFICATIONS

Composition:

- Micro-scale ZVI (~40%*)
- Controlled-release, food grade, complex organic carbon (~60%*)
- Major, minor, and micronutrients
- Food grade organic binding agent

Packaging:

Delivered as a dry powder, available in 50-lb / 25 kg bags and 1 ton super sacs.

Health and Safety:

Non-hazardous and safe to handle.

Longevity:

3 to 5+ years, depending on application

*Custom formulations available upon request

EHC Slurry for DPT Injection

Environmental Solutions

EHC® Reagent

Product Sheet

The sound science of EHC

EHC will rapidly create strong reducing conditions via biotic and abiotic mechanisms as detailed below:

- The addition of organic carbon to the subsurface will support the growth of indigenous heterotrophic bacteria in the groundwater environment. As the bacteria feed on the organic carbon particles, the bacteria consume dissolved oxygen and other electron acceptors, thereby reducing the redox potential in groundwater.
- The ZVI particles will scavenge oxygen as it undergoes oxidation promoting an additional drop in the redox potential of groundwater.

EHC promotes both biotic and abiotic dechlorination reactions:

- As the bacteria ferment the organic portion of EHC, they release a variety of volatile fatty acids (VFAs) such as lactic, propionic and butyric acids, which diffuse from the site of fermentation into the groundwater plume and serve as electron donors for other bacteria, including dehalogenators.
- The small ZVI particles (i.e., <100 µm) provide substantial reactive surface area that stimulates direct chemical dechlorination. Furthermore, as the ZVI is corroding ferrous iron is released into the groundwater. As the dissolved iron travels into areas with higher redox potential, it will precipitate out as a number of ferrous and ferric precipitates, including, but not limited to iron oxide and sulfide. These ferrous iron precipitates have also been proven to be reactive with CVOCs and will stimulate abiotic dechlorination mechanisms in an extended area downgradient of the points of application.

EHC KEY ATTRIBUTES

- Abiotic and Biotic Degradation
- pH Balanced
- Long-Lasting
- Field-Proven
- Quickly Generates Reducing Conditions
- Minimal Generation of Daughter Products
- Manufactured from Sustainable Recycled Materials

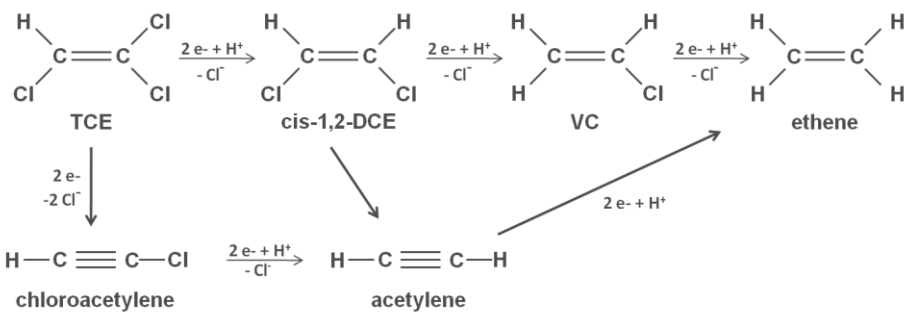
Synergistic benefits of combining organic carbon and ZVI:

- Redox potentials as low as –500 mV have been observed in groundwater after EHC addition. These Eh values are significantly lower than those achieved when using either organic materials (e.g. lactate and molasses) or reduced metal alone. These low Eh potentials not only improve the kinetics of the dechlorination reactions but also support more complete decomposition of chlorinated solvents.
- Self-buffered – the alkalinity generated from ZVI corrosion (release of hydroxide) is off-set by the acidity from organic carbon fermentation (VFAs). Maintaining a near neutral pH is beneficial for microbial growth and also serves to prevent ZVI passivation from mineral coatings, hence extending the reactive life of the ZVI.

Multiple degradation pathways:

The addition of organic carbon will promote conventional step-wise reductive dechlorination reactions, whereas the dominant abiotic pathway observed in contact with zero-valent iron and ferrous iron precipitates is beta-elimination; minimizing the generation of daughter products (specifically vinyl chloride).

Biotic Pathway (Step-Wise Reductive Dechlorination)



Main Abiotic Pathway (β-Elimination)

PeroxyChem

remediation@peroxychem.com | 1.866.860.4760 | peroxychem.com/remediation

Document 04-02-ESD-14