# Revised Remedial Action Work Plan

## FOR

## BVC0106
## Bayville Village Cleaners
## 290 Bayville Road
## Bayville, New York 11560
## VCP #:V00220-1
## Voluntary Cleanup Agreement #:W1-0848-9903

## April 2011

**Prepared for:**

New York State Department Of Environmental Conservation
Building 40, SUNY
Stony Brook, NY 11790
Attention: Mr. Jamie Ascher

WALDEN ASSOCIATES

*Federal Express Tracking #8755 7127 3188*

April 14, 2011
BVC0106

Mr. Jamie Ascher
Engineer Geologist 2
Division of Environmental Remediation
New York State Department of Environmental Conservation
Building 40, SUNY
Stony Brook, New York 11790

Re: Revised Remedial Action Work Plan
VCP #:V00220-1
Voluntary Cleanup Agreement #:W1-0848-9903
Bayville Village Cleaners
290 Bayville Avenue, Bayville, New York

Dear Mr. Ascher:

Please find enclosed the *Revised Remedial Action Work Plan*, dated March 2011, for the Bayville Village Cleaners site located at 290 Bayville Avenue, Bayville, New York. Walden has submitted this Revised Remedial Action Work Plan to be approved conceptually by the NYSDEC to address the PCE contamination detected at the Site.

If you have any questions or require additional information please call (516) 624-7200.

Very truly yours,
Walden Associates

Joseph M. Heaney III, P.E.
Principal

Peter Brighton
Project Engineer

cc: Renata Ockerby, New York State Department of Health
Tom Ryan

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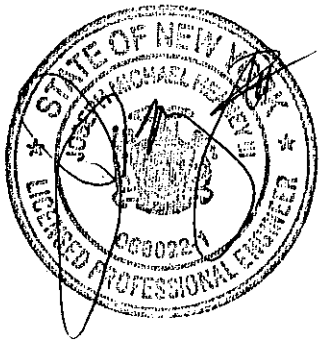
F. Community Air Monitoring Plan (CAMP)

## Professional Engineer Certification

I certify that I am a professional engineer licensed to practice in New York State in accordance with New York State Education Law, Article 145, Section 7200 et seq. I have completed accredited university courses and degrees in engineering and have sufficient training and experience in environmental engineering and remedial design; soil, soil vapor/air and groundwater contamination; and related fields that enable me to make sound professional judgments with regards to engineering design.

I further certify that this submittal, *Revised Remedial Action Work Plan*, dated March 2010, was prepared under my direction.




Joseph M. Heaney, III, P.E.
Walden Environmental Engineering, PLLC

3/3/11
Date

## 1.0 INTRODUCTION

Walden Environmental Engineering, PLLC (Walden) has been retained by Mr. Thomas Ryan to develop and implement this *Revised Remedial Action Work Plan* (Revised RAWP) to remediate the Bayville Village Cleaners Site located at 290 Bayville Road in the Village of Bayville, New York (Section 28, Block 20, Lot 58). This Revised RAWP proposes a plan to eliminate potential exposure to the sub-slab vapors detected at the Site by utilizing a sub-slab depressurization system.

This Revised RAWP was developed in accordance with NYSDEC's *DER-13: Strategy for Evaluating Soil Vapor Intrusion at Remedial Sites in New York* (issued October 18, 2006) and the New York State Department of Health (NYSDOH) *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (dated October 2006).

### 1.1 Site Description

The Site is a commercial property with a small single story building (approximately 1,325 $ft^2$) containing the Bayville Village Cleaners dry cleaning facility and an associated parking lot. The Site is abutted by Bayville Avenue to the North, Tri-County Installations, Inc, (plumbing and heating business) to the East, residential homes to the South, and 17$^{th}$ Street to the West.

The Site is currently operating as a dry cleaning facility. A Realstar Model KM503 dry cleaning machine was installed on site in January 2002 and is currently in use. This Realstar dry cleaning machine is hydrocarbon based and does not utilize Tetrachloroethylene (PCE).

### 1.2 Site History

- A comprehensive history of the Site, regarding past environmental activities and investigations that were completed from May 1995 through to May 2007 is presented in the *"Revised Site Investigation Work Plan"* compiled by Walden, dated May 17, 2007.
- A *"Site Investigation Report,"* dated December 9, 2008, compiled by Walden, contains the soil, groundwater, air/vapor sampling results (February 2008) from samples collected throughout the Site as proposed within the New York State Department of Environmental Conservation (NYSDEC) approved "*Revised Site Investigation Work Plan*".

- A "*Site Investigation Report Addendum,*" dated September 16, 2009, compiled by Walden, containing the air/vapor sampling results collected in March 2009 to confirm the results of the February 2008 sampling event as per NYSDEC request within the *"Site Investigation Report: December 2008"* letter dated January 16, 2009.
- A "*Remedial Action Work Plan,*" dated June 4, 2010, prepared by Walden to address the PCE contamination detected at the Site by installing Sub-slab Depressurization (SSD) System.
- All reports listed above are bound under a separate covers.

## 1.3 Summary of Site Environmental Conditions

### *1.3.1 March 2009 Soil Vapor Intrusion Investigation Sampling Event*

Based on the March 2009 soil vapor intrusion sampling results, a vapor mitigation system was recommended by Walden in the September 2009 *Site Investigation Report Addendum.* Accordingly, the NYSDEC subsequently required that a RAWP be submitted for the construction of a vapor mitigation system in a letter dated January 6, 2010 (See Appendix A).

#### *1.3.1.1 Indoor Air Sampling Results*

Analytical results of the air samples [I-1 (indoor) and O-1 (outdoor/background)] collected at the Site in March 2009 confirmed the presence of several Volatile Organic Compounds (VOCs); however, most of these VOC compounds were detected at concentrations below both the New York State Department of Health (NYSDOH) Air Guidance Values and the United States Environmental Protection Agency (USEPA) BASE 90$^{th}$ percentile values for indoor air within office and commercial buildings. TCE was detected in the indoor air sample I-1 at a concentration exceeding the NYSDOH Air Guidance Value; however, it should be noted that TCE was detected at a concentration half of what was detected in the 2008 sampling event.

The other VOC compounds detected within indoor air sample I-1 were Acetone, Ethylbenzene, Toluene and Xylenes. These VOC compounds are commonly contained within solvents or cleaning solutions. Additionally, the VOC compound d-Limonene was detected, and it is commonly used as a component within cleaning solutions for its fragrance

properties. Therefore, the VOC concentrations detected within the indoor air sample (I-1) are assumed to be sourced at the hydrocarbon dry cleaning machine, spot removers and other cleaning products stored and utilized by the current operator/workers at the Bayville Village Cleaners on Site.

*1.3.1.2 Sub-Slab Vapor Sampling Results*

Analytical results of the sub-slab vapor sample (SS-1) collected in September 2009 indicated that several VOC compounds, including PCE [2200µg/$m^3$ (ppb)] were detected at concentrations above the laboratory's MDLs.

## 2.0 VAPOR MITIGATION SYSTEM

Based on an evaluation of the nature and concentrations of the contaminants detected below the building slab at the Site, Walden proposes the installation of a Sub-Slab Depressurization (SSD) system to reduce potential migration into the building and thus reduce potential exposure to the sub-slab vapors detected at the Site. SSD systems have been successful in reducing subsurface vapors at residential, commercial and industrial facilities. The purpose of an SSD system is to create negative pressure field directly under a building and on the outside of the foundation (in relation to building ambient pressure).

Underpressurization within a building (relative to ambient atmosphere) can create a significant negative pressure differential between the building air and the surrounding soil and induce the transport of vapor-phase contaminants towards and into the building. This negative pressure field becomes a "sink" for any gases present in the vicinity of the SSD system. VOCs caught in this negative pressure filed are collected and piped to an ambient air discharge point.

### 2.1 Sub-slab Depressurization System (SSD) Design

The Sub-slab Depressurization System design was developed in accordance with Section 4 of the NYSDOH *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (dated October, 2006).

The proposed SSD system design shall incorporate the following components (see Figure 1):

- A fan will be utilized to induce negative pressure to the sub-slab region. Specifically, a RadonAway fan (Model GP 501) with maximum of 4.2 inches of water, maximum airflow of 95 cfm (static pressure at 1 inch of water) operating at 70-140 Watts will be utilized (See Appendix B for technical specifications). Fans for SSD systems typically have a maximum suction of 1.5 to 4 inches of water; therefore, this design includes a fan with the ability to achieve this range.
- An extraction point shall be installed in the center of the building, beneath the building slab, to ensure that all vapors in the sub-slab shall be captured. The extraction point shall be sealed with non-shrink grout.

- A series of interconnecting pipes will be installed from the sub-slab extraction point, extend to above the suspended ceiling, and then connected to the GP 501 fan utilizing flexible couplings. A combination of three or four-inch diameter schedule 40 PVC shall be utilized.
- A warning alarm (audible and visual) shall be installed to alert building occupants when the SSD stops working properly. The warning alarm shall be placed where it can be easily seen and heard by the occupants.
- Due to the known presence of the PCE in the vapors in the sub-slab, the piping will be extended from the exhaust side of the GP 501 fan to granular activated carbon (GAC) to treat the effluent gas prior to discharge to the atmosphere. Specifically, a 175 pound capacity Tetrasolv Filtration (model VFD-55) GAC filled vessel that can handle approximately 280 cfm and withstand pressure up to 18.57 inches of water (4 psig) will be utilized (See Appendix B for technical specifications). The GAC vessel shall be situated outside the building. The exhaust of GAC vessel shall be monitored by a sampling port installed on the effluent side of the GAC vessel (Refer to Section 3.2).
- Sampling/monitoring ports shall be installed on the extraction piping and after the GAC vessel for monitoring vacuum, flow and contaminant concentration (See Appendix B for technical specifications for gauges).

## 2.2 Installation of the Permanent Exterior Vapor Sampling Point

Five (5) permanent soil gas sampling points, PP-1 through PP-2 (see Figure 1) shall be installed adjacent to the location of temporary sampling points (SV-1 through SV-5) (see Walden's *"Site Investigation Report"* dated December 9, 2008)

- The exterior vapor sampling points shall be installed utilizing direct push Geoprobe method to a depth of approximately 4.5 feet below grade.
- Each permanent soil gas sampling point shall be constructed of 1 foot stainless steel screen connected to 1/4 inch polyethylene tubing and a closed coupling at the top (see Figure 3 for construction details). The sampling zone shall be backfilled with inert, porous material to create 1 to 2 foot sampling zone.
- Soil vapor probe shall be sealed with betonite slurry for a minimum distance of 3 feet to prevent air infiltration. The remainder of the borehole shall be backfilled with clean material and a protective casing shall be installed to prevent accidental damage.

## 2.2 Engineering Controls

Walden shall evaluate and eliminate any other sub-slab transport pathways (i.e. cracks in the building floor). All possible routes shall be seal off to prevent the entrance of soil gas and to enhance the sub-slab negative pressure field of the SSD system.

## 3.0 SSD SYSTEM OPERATION, MAINTENANCE AND MONITORING

### 3.1 Operation and Maintenance

All mechanical aspects of the SSD system will be visually inspected on a routine basis, and repaired as needed, to ensure proper function. Following the initial startup of the SSD system, routine inspections, monitoring, and maintenance will be conducted on a periodic basis (consistent with the monitoring schedule described below) contingent upon the rates of carbon breakthrough and the stabilization of readings collected regarding pressure.

### 3.2 Monitoring

#### *3.2.1 SSD System and Permanent Exterior Vapor Sampling Point Air Sampling*

- The extracted soil vapors shall be monitored to evaluate effectiveness of the SSD system and to check for carbon vessel breakthrough. Monitoring shall include screening the influent and effluent air sampling ports with photoionization detector (PID) and collecting influent and effluent samples using 6 liter Summa® canisters. Additionally, the vacuum at the extraction point and on the effluent of the GAC vessel will be measured. All system PID screening and gauge readings will be collected for subsequent reporting.
- The permanent exterior vapor sampling points shall be sampled 24 hours after the SSD system start up. One to three volumes shall be purge prior to collecting the sample using 6 liter Summa® canisters. Flow rates for both purging and collecting shall not exceed 0.2 liters per minute to minimize ambient air infiltration during sampling.

##### *3.2.1.1 Monitoring Frequency*

- In order to verify the effectiveness of the SSD system, an indoor sample for laboratory analysis shall be collected after four weeks of SSD operation.
- Permanent exterior vapor sampling points shall be sampled after SSD system start up to ensure that the SSD system is capturing and containing soil gas from migrating off-site. Depending on the results of exterior soil vapor monitoring, additional points might be installed.

*3.2.1.2 Summa® Canister Sampling Procedure*

A laboratory provided and certified clean 6 liter Summa® canister will be connected to each sampling port to obtain grab samples from the SSD system. Prior to sampling at each point, a pressure gauge will be used to check the Summa® canister for vacuum, and the pressure will be recorded. Additionally, the weather conditions will be noted at the time of sampling (wind speed and direction, precipitation, outdoor temperature, barometric pressure, etc.).

The air samples will then be collected by opening the valve of the Summa® Canister to draw air through the regulator to collect the grab sample. After the sampling is completed, the Summa® Canister valve will be closed, and the pressure gauge will again be read, and the vacuum will be recorded.

*3.2.1.3 Sample Laboratory Analysis*

The influent and effluent summa canister air samples will be submitted to the selected NYSDOH ELAP certified laboratory for analysis. Prior to the start of work, the selected analytical laboratory shall review the attached QAPP policies and procedures and sign an acknowledgement of the same (Refer to Appendix C for the QAPP).

The influent and effluent air samples will be analyzed for target VOCs [PCE, TCE and their breakdown products, 1,1,1-TCA, 1,1,2-TCA, 1,1-dichloroethane (1,1-DCA), 1,2-dichloroethylene (1,1-DCE), and vinyl chloride (VC)] by USEPA Test Method TO-15 and include Category B deliverables. The analytical laboratory will achieve a minimum detection limit of 0.25 $\mu g/m^3$ for trichloroethene (TCE) and 1.0 $\mu g/m^3$ for all other VOCs in the USEPA Method TO-15 analysis.

*3.2.1.4 Sample Handling*

The collected samples will be containerized in laboratory provided certified clean Summa® canisters. The sample containers will be labeled with the site name, the Walden job number, sample location and identification, date, time, sampler's initials, and the parameter(s) for analysis. Samples will be transported to the laboratory in such a manner as to avoid container damage during transportation and to minimize the possibility of cross-

contamination. The samples will be picked up by the analytical laboratory or delivered via an overnight courier under the appropriate Chain-of-Custody protocol.

*3.2.1.5 Quality Assurance/Quality Control (QA/QC)*

- The NYSDOH guidance recommends using a tracer gas as QA/QC measure to verify the integrity of the permanent exterior vapor sampling points. This measure is used to determine that the soil vapor sample has not been diluted by ambient air. Walden shall perform this monitoring by placing plastic sheeting around the permanent exterior sampling points and seal around the edges to create an adequate surface seal to prevent outdoor air infiltration. Helium tracer gas shall be introduce under the plastic sheeting through a small opening to enrich the atmosphere in the immediate vicinity of the permanent exterior sampling points with the tracer gas. A portable helium monitoring device shall be utilized to analyze a soil vapor sample for the helium tracer gas to confirm the integrity of the probe seals before vapor samples are collected in Summa® canisters.
- The proposed work may include method blanks, field blanks, trip blanks, duplicates, matrix spike/matrix spike duplicates (MS/MSD) and duplicates as necessary and specified in the QAPP (Refer to Appendix C). Any method blank, field blank or trip blank samples (properly sealed vials filled with distilled water by the laboratory) used will be carried into the field and handled and transported in the same manner as all other samples, as needed. MS/MSD and duplicate samples may be randomly collected during each sampling event, dependent upon total number of samples collected. Additional QA/QC details are described in the QAPP presented in Appendix C.

### *3.2.2 Building Perimeter Vacuum Testing*

Pressure monitoring points will be installed around the perimeter of the on-site building to ensure that negative vacuum is attained beneath the entire slab of the building. The conditions observed will be discussed with the NYSDEC, and if negative pressure is not observed, an additional extraction point may need to be proposed for the building.

### 3.2.3 *Annual Soil Vapor Intrusion Sampling & System Shut Down*

After construction of the SSD system is completed and the system is operating as designed and is deemed effective, a site management plan (SMP) will be submitted for NYSDEC approval. The SMP will define, but will not be limited to, the following tasks; periodic monitoring of the system including indoor air quality sampling, operation and maintenance of the system, and shutdown criteria as determined by NYSDEC. A Periodic Review Report will be submitted to the DEC annually which will summarize the operation, maintenance and monitoring activities associated with the approved SMP

### 3.2.4 *On-site Product Inventory*

A product inventory shall be conducted to determine if there is a source of the trichloroethene inside the building. A complete list of the products used at the site shall be included in the report summarizing monitoring and sampling activities.

## 4.0 DATA EVALUATION AND REPORTING

All data compiled during monitoring events will be evaluated to monitor effectiveness and proper operation of the SSD system installed and to determine when the carbon in the effluent gas treatment vessel should be changed out.

### 4.1 Effluent Sample Analysis

The effluent air samples will be compared to the influent concentrations and the NYSDEC Division of Air Resources (DAR) Guideline Concentrations to determine the frequency that the carbon in the emissions treatment level needs to be replaced.

#### *4.1.1 DAR-1 Guidance Values for Stack Emissions*

Allowable air emissions limits for the contaminants of concern at the site were determined using NYSDEC Division of Air Resources (DAR) guidance. The stack emissions will not exceed the determined limits since the SSD system effluent air is filtered via GAC vessels in series to achieve zero emissions.

The NYSDEC DAR issued a December 22, 2003 memorandum which contained the official DAR-1 (Air Guide-1) annual guideline concentration and short-term guideline concentration (AGC/SGC) tables. These tables are sorted alphabetically by contaminant name and numerically by Chemical Abstract Service (CAS) registry number, and were originally included in Appendix C of the 1991 draft Edition of Air Guide-1. The tables list the following:

- Short-term (one-hour) and Annual Guideline Concentrations (SGCs and AGCs),
- Federal and State one-hour and annual air quality standards, and
- DAR-1 "equivalent" one-hour and annual air quality standards.

The DAR-1 equivalent standards are Federal and State Air Quality Standards that have been adjusted to a one-hour or annual averaging period. These equivalent standards serve as screening surrogates to assess compliance with the Federal and State Air Quality Standards that are based upon 3-hour, 8-hour, 24-hour, 1-month or 3-month averaging periods.

Many organizations and agencies derive short-term or annual exposure limits to protect workers or the general public from exposure to toxic air contaminants. Each one of these exposure limits requires extensive research and development time. As such, the NYSDEC

often uses the limits published by other agencies or organizations to derive SGCs or AGCs. SGCs are chosen to protect the general population from adverse acute one-hour exposures. AGCs are chosen to protect against adverse chronic exposure and are based upon the most conservative carcinogenic or non-carcinogenic annual exposure limit.

When exposure limits are derived by NYSDEC, USEPA or NYSDOH, the most conservative (lowest) of these preliminary values is adopted as the SGC or AGC value. If no exposure limits are derived by the NYSDEC, USEPA or NYSDOH, the AGC/SGC values are derived from Threshold Limit Values (TLVs), TLV Ceiling Limits or Short-Term Exposure Limits (STELs) published by the American Conference of Governmental Industrial Hygienists (ACGIH). When no exposure limits or ACGIH values are available, the NYSDEC often derives AGC/SGC values based on an analogy to a compound with similar toxicological properties. Lastly, when no exposure limits or ACGIH values are available and no analogies can be made, the NYSDEC assigns a conservative *de minimis* limit as the AGC.

The DAR-1 SGC and AGC air emission limits for the SSD system contaminants of concern are summarized Appendix D. Any emissions from the SSD system would be negligible in comparison to the emissions allowed under DAR-1 limits.

## 4.2 Reporting

After construction of the SSD system, Walden will submit to the Department a Final Engineering Report (FER) signed and sealed by a NYS licensed PE, which will summarize the construction criteria of the system, as built drawings, vacuum testing data and other relevant information, in accordance with the DEC FER template.

It should be noted that typical turnaround time for analytical samples is 10 business days. Analytical data will be submitted following receipt, data validation and evaluation.

## 5.0 HEALTH & SAFETY PLAN AND COMMUNITY AIR MONITORING PLAN

The site-specific Health and Safety Plan and Community Air Monitoring Plan will be followed during all applicable SSD system installation, operation, maintenance and monitoring activities (Refer to Appendices E & F).

## 6.0 SCHEDULE OF PROPOSED SSD SYSTEM INSTALLATION

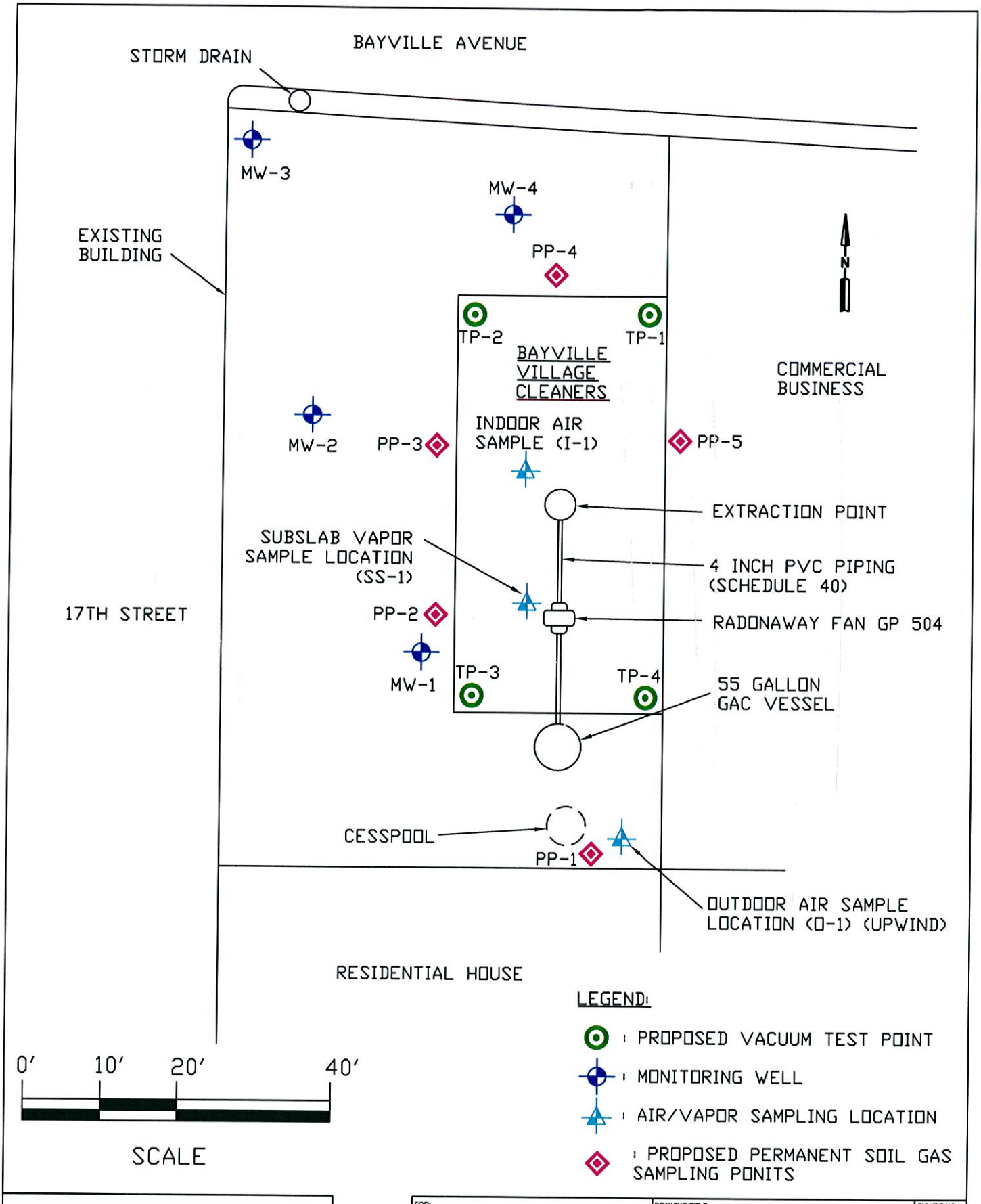
Walden has submitted this *Revised Remedial Action Work Plan* to be approved by the NYSDEC for a SSD to be utilized to eliminate the potential exposure to sub-slab vapors at the building on-site. After completing the construction of the SSD system, a Site Management Plan and Final Engineering Report shall be submitted in accordance with DER-10 *"Technical Guidance for Site Investigation and Remediation"*.

A tentative schedule for installation of the SSD system and subsequent monitoring is presented in the table below.

| | | | |
|---|---|---|---|
| 1 | NYSDEC Approval of Remedial Action Work Plan | 0 | 4 |
| 2 | Order Materials, Scheduling of Work/Coordination with On-Site Tenant | 4 | 8 |
| 3 | Installation of SSD System | 8 | 12 |
| 4 | Startup of SSD System | 12 | 13 |
| 5 | Initial Monitoring of SSD System/Secure Influent & Effluent Air Samples | 13 | 13 |
| 6 | Bi-Weekly Monitoring of SSD System/Secure Influent & Effluent Air Samples | 15 | 15 |
| 7 | Monthly Monitoring of SSD System/Secure Influent & Effluent Air Samples | 17 | 17 |

# Figure 1

## Site Location Plan

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FOR:
BAYVILLE VILLAGE CLEANERS
290 BAYVILLE AVENUE
BAYVILLE, NEW YORK 11709

DRAWING TITLE: Site Location Plan

FIGURE NO: 1

JOB NO: BVC0106

DATE: March 2, 2011

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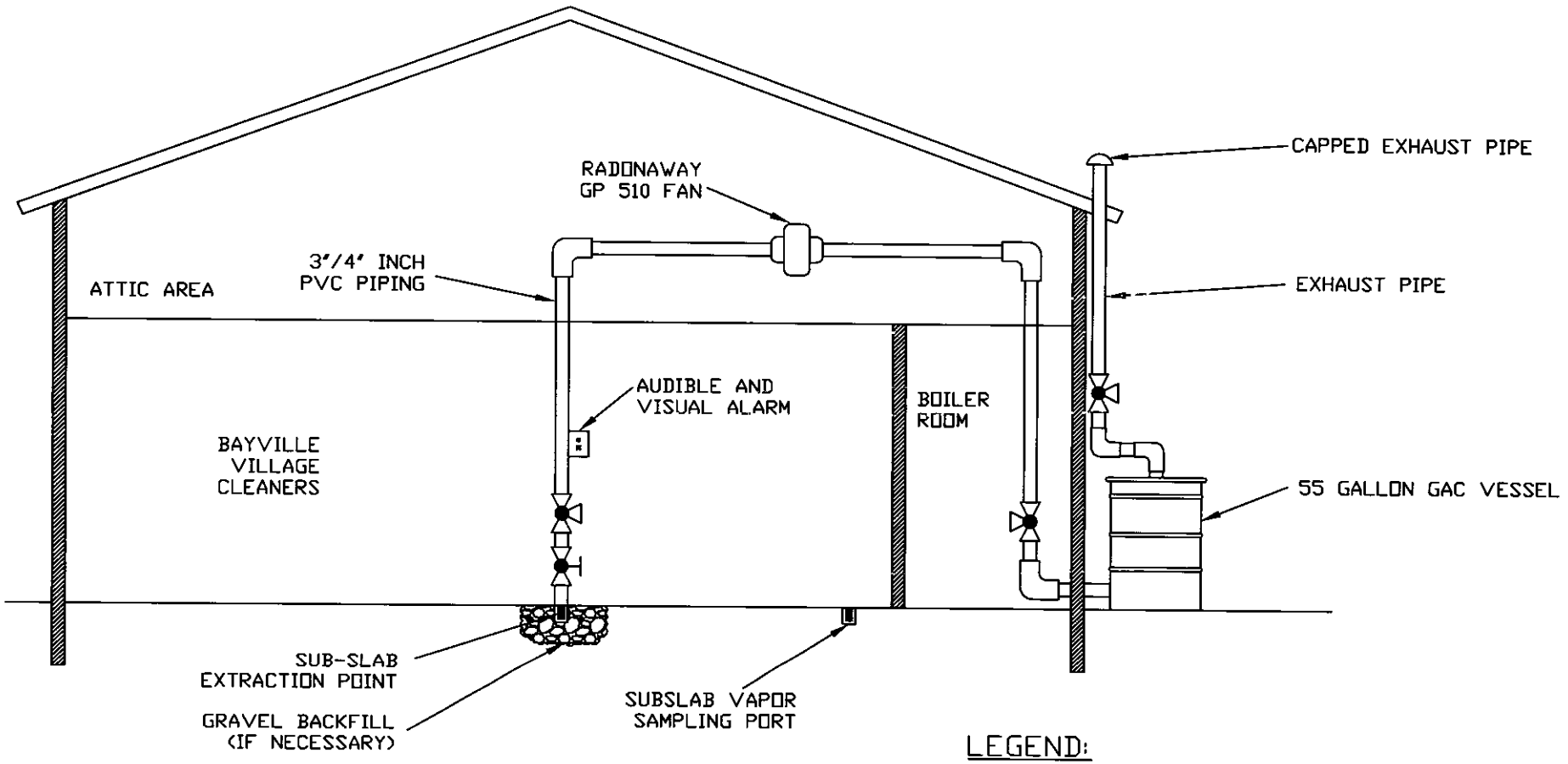
# Figure 2

## Proposed SSD System Schematic




LEGEND:

: QUARTER TURN VALVE

: VACUUM / AIR SAMPLING PORT

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LOCATION:
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290 BAYVILLE AVENUE
BAYVILLE, NEW YORK 11709

DRAWING TITLE:
Proposed SSD System Schematic

FIGURE NO:
2

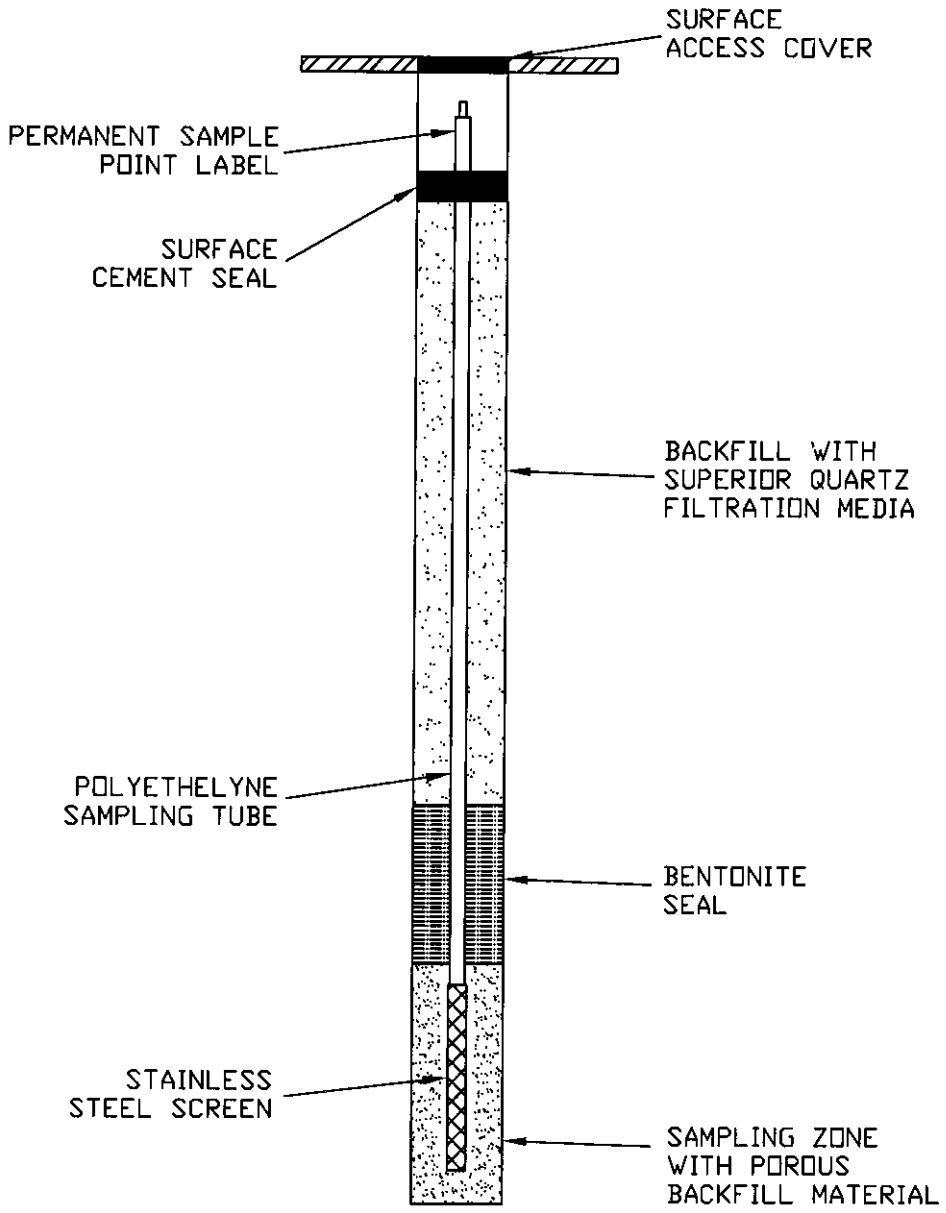
JOB NO: BVC0106

DATE: March 2, 2011

CAD FILE NAME: Z:\Bayville Cleaners - BVC0106\Remedial Action Workplan 2010\Remedial Action Work Plan Addendum 2010\Revised Remedial Action Workplan-DEC approved\SSD Plan.dwg

# Figure 3

## Permanent Soil Gas Sampling Point

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DRAWING TITLE:
Permanent Soil Gas Sampling Point

FIGURE NO:
3

JOB NO: BVC0106
DATE: March 2, 2011

# Appendix A

## JANUARY 6, 2010 AND AUGUST 9, 2010

## NYSDEC LETTERS

**Bayville Village Cleaners**
**Bayville, New York**
**VCP #:V00220-1**
**Voluntary Cleanup Agreement #:W1-0848-9903**

**New York State Department of Environmental Conservation**
**Division of Environmental Remediation, Region One**
**Stony Brook University**
50 Circle Road, Stony Brook, New York 11790-3409
**Phone:** (631) 444-0240 • **Fax:** (631) 444-0248
**Website:** www.dec.ny.gov



Alexander B. Grannis
Commissioner

cc: JMH
PAP

January 6, 2010

Mr. Thomas Ryan
19 Todd Drive
Glen Head, NY 11545

**Re: Bayville Village Cleaners Site #V00220**
**Voluntary Cleanup Agreement Index #W1-0848-9903**
**Site Investigation Report: December 2008**
**Site Investigation Report Addendum: August 2009**

Dear Mr. Ryan,

The New York State Department of Environmental Conservation and the New York State Department of Health have reviewed the referenced reports and concur with the recommendations presented in Section 9.0 of the August 2009 report. As such, please submit a remedial action work plan stamped and signed by a NYS licensed Professional Engineer for the construction of a vapor mitigation system.

Nothing contained herein represents a waiver by the Department of any rights held under the voluntary cleanup agreement (VCA) or applicable state and federal law or any rights held under the same or a release for any party from any obligations held under the VCA or those laws. If you should have any questions, please feel free to contact me at (631) 444-0246.

Sincerely,

Jamie Ascher
Engineering Geologist 2

cc: C. Vasudevan, NYSDEC
M. Lesser, NYSDEC
W. Parish, NYSDEC
S. Shearer, NYSDOH
R. Ockerby, NYSDOH
J. DeFranco, NCDH
P. Brighton, Walden Associates

**New York State Department of Environmental Conservation**
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Alexander B. Grannis
Commissioner

August 9, 2010

Mr. Joseph M. Heaney, P.E.
Walden Associates
16 Spring Street
Oyster Bay, NY 11771

**Re: Bayville Village Cleaners #V00220**
**Remedial Action Work Plan: June 2010**

Dear Mr. Heaney,

The New York State Department of Environmental Conservation and the New York State Department of Health (NYSDOH) have reviewed the referenced work plan and are providing the following comments to be incorporated therein:

- Please refer to Section 4 of the NYSDOH guidance document, "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" for additional information on mitigation and monitoring.

- The proposed vacuum test points shown in Figure 1 should be relocated inside the building in order to conduct and effective sub-slab diagnostic test and avoid any influence of the building's footings.

- Permanent soil gas sampling points (Figure 2.2 - NYSDOH Guidance) should be constructed adjacent to the locations of temporary sampling points (SV-1 through SV-5). The permanent points should be sampled after system start-up, in accordance with NYSDOH guidance, to ensure that the system is capturing and containing soil gas from migrating off-site. Depending on the results of exterior soil vapor monitoring, additional extraction points may need to be installed and an off-site vapor intrusion study may be warranted.

- After construction of the system has been completed, a Site Management Plan and a Final Engineering Report should be submitted in accordance with DER-10 "Technical Guidance for Site Investigation and Remediation".

- A product inventory should be conducted to determine if there is a source of trichloroethene inside the building.

- A warning indicator should be installed in conjunction with the system which will alert the building's occupants if the system stops operating properly. Occupants should be made familiar with the system and who to contact in the event of system shutdown or malfunction.

- Section 3.2: In order to verify the effectiveness of the system, please collect an indoor air sample for laboratory analysis after four weeks of system operation. Based on previous outdoor air sampling results, you may choose to omit an outdoor air sample at this time.

Please revise the work plan in accordance with these comments and re-submit it electronically for conditional approval before sending signed and sealed hardcopies. If you should have any questions, please feel free to contact me at (631) 444-0246.

Sincerely,

Jamie Ascher
Engineering Geologist 2

ec: C. Vasudevan, NYSDEC
W. Parish, NYSDEC
G. Bobersky, NYSDEC
F. Navratil, NYSDOH
R. Ockerby, NYSDOH
P. Brighton, Walden Associates

# Appendix B

## TECHNICAL SPECIFICATIONS OF THE PROPOSED SUB-SURFACE SOIL DEPRESSURIZATION SYSTEM COMPONENTS

**Bayville Village Cleaners**
**Bayville, New York**
**VCP #:V00220-1**
**Voluntary Cleanup Agreement #:W1-0848-9903**

RadonAway™
*The World's Leading Radon Fan Manufacturer*

# GP Series

## Radon Mitigation Fans

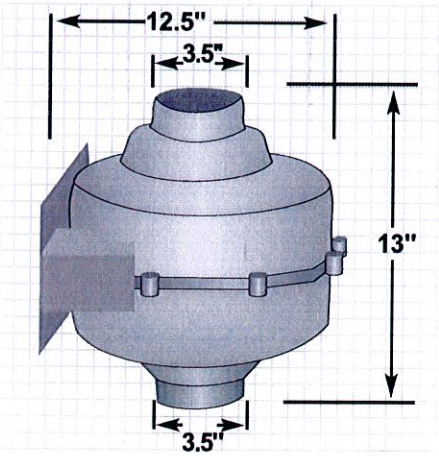
All RadonAway fans are specifically designed for radon mitigation. GP Series Fans provide a wide range of performance that makes them ideal for most sub-slab radon mitigation systems.

## Features:

- Five-year hassle-free warranty
- Mounts on duct pipe or with integral flange
- 3.5" diameter ducts for use with 3" or 4" pipe
- Electrical box for hard wire or plug in
- ETL Listed - for indoor or outdoor use
- Meets all electrical code requirements
- Thermally protected
- Rated for commercial and residential use.

| Model | Watts | Max. Pressure "WC | Typical CFM vs. Static Pressure WC | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 1.0" | 1.5" | 2.0" | 2.5" | 3.0" | 3.5" | 4.0" |
| GP201 | 40-60 | 2.0 | 82 | 58 | 5 | - | - | - | - |
| GP301 | 55-90 | 2.6 | 92 | 77 | 45 | 10 | - | - | - |
| GP401 | 60-110 | 3.4 | 93 | 82 | 60 | 40 | 15 | - | - |
| GP501 | 70-140 | 4.2 | 95 | 87 | 80 | 70 | 57 | 30 | 10 |

Choice of model is dependent on building characteristics including sub-slab materials and should be made by a radon professional.



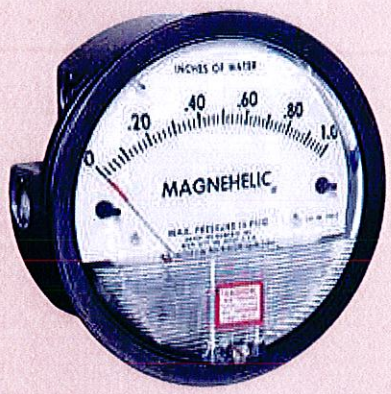

**For Further Information Contact:**

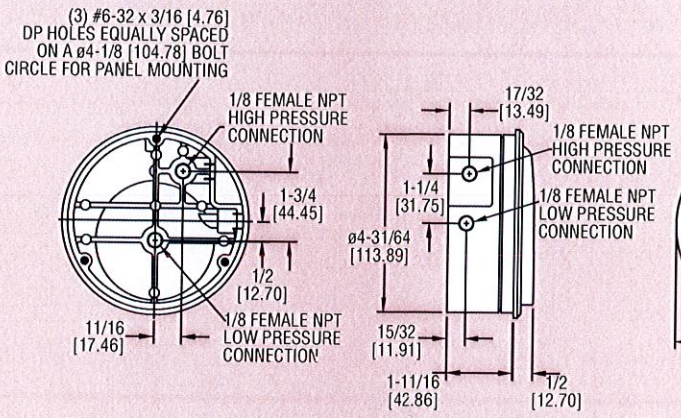
10/08
P/N 02002

Series 2000

# Magnehelic® Differential Pressure Gages

## Indicate Positive, Negative or Differential, Accurate within 2%




**Dimensions, Standard Series 2000 Magnehelic® Pressure Gages. (Slightly different on medium and high pressure models)**

**Select the Dwyer® Magnehelic® gage** for high accuracy – guaranteed within 2% of full scale – and for the wide choice of 81 models available to suit your needs precisely. Using Dwyer's simple, frictionless Magnehelic® gage movement, it quickly indicates low air or non-corrosive gas pressures – either positive, negative (vacuum) or differential. The design resists shock, vibration and over-pressures. No manometer fluid to evaporate, freeze or cause toxic or leveling problems. It's inexpensive, too.

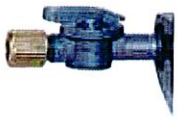
The Magnehelic® gage is the industry standard to measure fan and blower pressures, filter resistance, air velocity, furnace draft, pressure drop across orifice plates, liquid levels with bubbler systems and pressures in fluid amplifier or fluidic systems. It also checks gas-air ratio controls and automatic valves, and monitors blood and respiratory pressures in medical care equipment.

**Note:** May be used with Hydrogen. When ordering a Buna-N diaphragm pressures must be less than 35 psi.

### Mounting

A single case size is used for most models of Magnehelic® gages. They can be flush or surface mounted with standard hardware supplied. With the optional **A-610** Pipe Mounting Kit they may be conveniently installed on horizontal or **vertical 1-1/4" - 2" pipe. Although calibrated for vertical position, many ranges above 1" may be used at any angle by simply re-zeroing. However, for maximum accuracy,** they must be calibrated in the same position in which they are used. These characteristics make Magnehelic® gages ideal for both stationary **and portable applications. A 4-9/16" hole is required for flush panel mounting.** Complete mounting and connection fittings plus instructions are furnished with each instrument.

**Flush...Surface... or Pipe Mounted**



### Vent Valves

In applications where pressure is continuous and the Magnehelic® gage is connected by metal or plastic tubing which cannot be easily removed, we suggest using Dwyer A-310A vent valves to connect gage. Pressure can then be removed to check or re-zero the gage.

### High and Medium Pressure Models

Installation is similar to standard gages except that a 4-13/16" hole is needed for flush mounting. The medium pressure construction is rated for internal pressures up to 35 psig and the high pressure up to 80 psig. Available for all models. Because of larger case, the medium pressure and high pressure models will not fit in a portable case size. Installation of the A-321 safety relief valve on standard Magnehelic® gages often provides adequate protection against infrequent overpressure.

### SPECIFICATIONS

**Service:** Air and non-combustible, compatible gases. (Natural Gas option available.)
**Wetted Materials:** Consult factory.
**Housing:** Die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test.
**Accuracy:** ±2% of full scale (±3% on - 0, -100 Pa, -125 Pa, 10MM and ±4% on - 00, -60 Pa, -6MM ranges), throughout range at 70°F (21.1°C).
**Pressure Limits: -20" Hg. to 15 psig.† (-0.677 bar to 1.034 bar); MP option:** 35 psig (2.41 bar), HP option: 80 psig (5.52 bar).
**Overpressure:** Relief plug opens at approximately 25 psig (1.72 bar), standard gages only.
**Temperature Limits:** 20 to 140°F.* (-6.67 to 60°C).
**Size: 4" (101.6 mm) Diameter dial face.**
**Mounting Orientation:** Diaphragm in vertical position. Consult factory for other position orientations.
**Process Connections: 1/8" female NPT duplicate high and low pressure taps** - one pair side and one pair back.
**Weight:** 1 lb 2 oz (510 g), MP & HP 2 lb 2 oz (963 g).
**Standard Accessories: Two 1/8" NPT plugs for duplicate pressure taps, two 1/8" pipe thread to rubber tubing adapter and three flush mounting adapters** with screws. (Mounting and snap ring retainer substituted for 3 adapters in MP & HP gage accessories.)

*Low temperature models available as special option.
†For applications with high cycle rate within gage total pressure rating, next higher rating is recommended. See Medium and High pressure options at lower left.

## OPTIONS AND ACCESSORIES

**Transparent Overlays**
Furnished in red and green to highlight and emphasize critical pressures.

**Adjustable Signal Flag**
Integral with plastic gage cover. Available for most models except those with medium or high pressure construction. Can be ordered with gage or separate.

**LED Setpoint Indicator**
Bright red LED on right of scale shows when setpoint is reached. Field adjustable from gage face, unit operates on 12-24 VDC. Requires MP or HP style cover and bezel.

**A-432 Portable Kit**
Combine carrying case with any Magnehelic® gage of standard range, except high pressure connection. Includes 9 ft (2.7 m) of 3/16" I.D. rubber tubing, standhang bracket and terminal tube with holder.

**A-605 Air Filter Gage Accessory Kit**
Adapts any standard Magnehelic® gage for use as an air filter gage. Includes aluminum surface mounting bracket with screws, two 5 ft (1.5 m) lengths of 1/4" aluminum tubing two static pressure tips and two molded plastic vent valves, integral compression fittings on both tips and valves.

# Quality design and construction features

**Bezel** provides flange for flush mounting in panel.

**Clear plastic face** is highly resistant to breakage. Provides undistorted viewing of pointer and scale.

**Precision litho-printed scale** is accurate and easy to read.

**Red tipped pointer** of heat treated aluminum tubing is easy to see. It is rigidly mounted on the helix shaft.

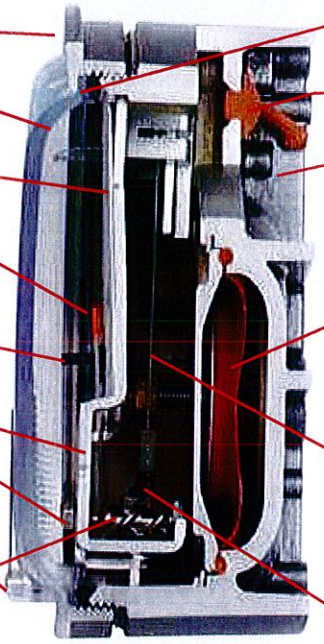
**Pointer stops** of molded rubber prevent pointer over-travel without damage.

**"Wishbone" assembly** provides mounting for helix, helix bearings and pointer shaft.

**Jeweled bearings** are shock-resistant mounted; provide virtually friction-free motion for helix. Motion damped with high viscosity silicone fluid.

**Zero adjustment screw** is conveniently located in the plastic cover, and is accessible without removing cover. O-ring seal provides pressure tightness.

**Helix** is precision made from an alloy of high magnetic permeability. Mounted in jeweled bearings, it turns freely, following the magnetic field to move the pointer across the scale.



**O-ring seal** for cover assures pressure integrity of case.

**Blowout plug** of silicone rubber protects against overpressure on 15 psig rated models. Opens at approximately 25 psig.

**Die cast aluminum case** is precision made and iridite-dipped to withstand 168 hour salt spray corrosion test. Exterior finished in baked dark gray hammerloid. One case size is used for all standard pressure options, and for both surface and flush mounting.

**Silicone rubber diaphragm** with integrally molded O-ring is supported by front and rear plates. It is locked and sealed in position with a sealing plate and retaining ring. Diaphragm motion is restricted to prevent damage due to overpressures.

**Calibrated range** spring is flat spring steel. Small amplitude of motion assures consistency and long life. It reacts to pressure on diaphragm. Live length adjustable for calibration.

**Samarium Cobalt magnet** mounted at one end of range spring rotates helix without mechanical linkages.

**Series 2000 Magnehelic® Gage — Models and Ranges**

Page V shows examples of special models built for OEM customers. For special scales furnished in ounces per square inch, inches of mercury, metric units, square root scales for volumetric flow, etc., contact the factory.

| Model | Range Inches of Water |
|---|---|
| 2000-00N†•• | .05-0-.2 |
| 2000-00†•• | 0-.25 |
| 2000-0†• | 0-.50 |
| 2001 | 0-1.0 |
| 2002 | 0-2.0 |
| 2003 | 0-3.0 |
| 2004 | 0-4.0 |
| 2005 | 0-5.0 |
| 2006 | 0-6.0 |
| 2008 | 0-8.0 |
| 2010 | 0-10 |
| 2012 | 0-12 |
| 2015 | 0-15 |
| 2020 | 0-20 |
| 2025 | 0-25 |
| 2030 | 0-30 |
| 2040 | 0-40 |
| 2050 | 0-50 |
| 2060 | 0-60 |
| 2080 | 0-80 |
| 2100 | 0-100 |
| 2120 | 0-120 |
| 2150 | 0-150 |
| 2160 | 0-160 |
| 2180 | 0-180 |
| 2250 | 0-250 |
| Zero Center Ranges | |
| 2300-00†•• | 0.125-0-0.125 |
| 2300-0†• | .25-0-.25 |
| 2301 | .5-0-.5 |
| 2302 | 1-0-1 |
| 2304 | 2-0-2 |
| 2310 | 5-0-5 |
| 2320 | 10-0-10 |
| 2330 | 15-0-15 |

| Model | Range PSI |
|---|---|
| 2201 | 0-1 |
| 2202 | 0-2 |
| 2203 | 0-3 |
| 2204 | 0-4 |
| 2205 | 0-5 |
| 2210* | 0-10 |
| 2215* | 0-15 |
| 2220* | 0-20 |
| 2230** | 0-30 |
| **Model** | **Range, CM of Water** |
| 2000-15CM | 0-15 |
| 2000-20CM | 0-20 |
| 2000-25CM | 0-25 |
| 2000-50CM | 0-50 |
| 2000-80CM | 0-80 |
| 2000-100CM | 0-100 |
| 2000-150CM | 0-150 |
| 2000-200CM | 0-200 |
| 2000-250CM | 0-250 |
| 2000-300CM | 0-300 |
| Zero Center Ranges | |
| 2300-4CM | 2-0-2 |
| 2300-10CM | 5-0-5 |
| 2300-30CM | 15-0-15 |

†These ranges calibrated for vertical scale position.
• Accuracy +/-3%
•• Accuracy +/-4%
*MP option standard
**HP option standard

| Model | Range MM of Water |
|---|---|
| 2000-6MM†•• | 0-6 |
| 2000-10MM†• | 0-10 |
| 2000-15MM | 0-15 |
| 2000-25MM | 0-25 |
| 2000-30MM | 0-30 |
| 2000-50MM | 0-50 |
| 2000-80MM | 0-80 |
| 2000-100MM | 0-100 |
| 2000-125MM | 0-125 |
| 2000-150MM | 0-150 |
| 2000-200MM | 0-200 |
| 2000-250MM | 0-250 |
| 2000-300MM | 0-300 |
| Zero Center Ranges | |
| 2300-6MM†•• | 3-0-3 |
| 2300-10MM†• | 5-0-5 |
| 2300-20MM†• | 10-0-10 |
| **Model** | **Range, Pa** |
| 2000-60NPA†•• | 10-0-50 |
| 2000-60PA†•• | 0-60 |
| 2000-100PA†• | 0-100 |
| 2000-125PA†• | 0-125 |
| 2000-250PA | 0-250 |
| 2000-300PA | 0-300 |
| 2000-500PA | 0-500 |
| 2000-750PA | 0-750 |
| 2000-1000PA | 0-100 x 10 |
| Zero Center Ranges | |
| **Model** | **Range, Pa** |
| 2300-60PA†•• | 30-0-30 |
| 2300-100PA†• | 50-0-50 |
| 2300-120PA | 60-0-60 |
| 2300-200PA | 100-0-100 |
| 2300-250PA | 125-0-125 |
| 2300-300PA | 150-0-150 |
| 2300-500PA | 250-0-250 |
| 2300-1000PA | 500-0-500 |

| Model | Range, kPa |
|---|---|
| 2000-0.5KPA | 0-0.5 |
| 2000-1KPA | 0-1 |
| 2000-1.5KPA | 0-1.5 |
| 2000-2KPA | 0-2 |
| 2000-2.5KPA | 0-2.5 |
| 2000-3KPA | 0-3 |
| 2000-4KPA | 0-4 |
| 2000-5KPA | 0-5 |
| 2000-8KPA | 0-8 |
| 2000-10KPA | 0-10 |
| 2000-15KPA | 0-15 |
| 2000-20KPA | 0-20 |
| 2000-25KPA | 0-25 |
| 2000-30KPA | 0-30 |
| Zero Center Ranges | |
| 2300-1KPA | .5-0-.5 |
| 2300-2KPA | 1-0-1 |
| 2300-2.5KPA | 1.25-0-1.25 |
| 2300-3KPA | 1.5-0-1.5 |

**Dual Scale Air Velocity Units**
For use with pitot tube

| Model | Range in W.C./ Velocity F.P.M. |
|---|---|
| 2000-00AV†•• | 0-.25/300-2000 |
| 2000-0AV†• | 0-.50/500-2800 |
| 2001AV | 0-1.0/500-4000 |
| 2002AV | 0-2.0/1000-5600 |
| 2005AV | 0-5.0/2000-8800 |
| 2010AV | 0-10/2000-12500 |

**Dual Scale English/Metric Models**

| Model | Range, In. W.C. | Range, Pa or kPa |
|---|---|---|
| 2000-OOD†•• | 0-.25 | 0-62 Pa |
| 2000-OD†• | 0-0.5 | 0-125 Pa |
| 2001D | 0-1.0 | 0-250 Pa |
| 2002D | 0-2.0 | 0-500 Pa |
| 2003D | 0-3.0 | 0-750 Pa |
| 2004D | 0-4.0 | 0-1.0 kPa |
| 2005D | 0-5.0 | 0-1.25 kPa |
| 2006D | 0-6.0 | 0-1.5 kPa |
| 2008D | 0-8.0 | 0-2.0 kPa |
| 2010D | 0-10 | 0-2.5 kPa |
| 2015D | 0-15 | 0-3.7 kPa |
| 2020D | 0-20 | 0-5 kPa |
| 2025D | 0-25 | 0-6.2 kPa |
| 2050D | 0-50 | 0-12.4 kPa |
| 2060D | 0-60 | 0-15 kPa |

**ACCESSORIES**
**A-299,** Surface Mounting Bracket
**A-300,** Flat Flush Mounting Bracket
**A-310A,** 3-Way Vent Valve
**A-321,** Safety Relief Valve
**A-432,** Portable Kit
**A-448,** 3-piece magnet kit for mounting Magnehelic® gage directly to magnetic surface
**A-605,** Air Filter Kit
**A-610,** Pipe Mount Kit

**OPTIONS** — To order, add suffix: I.E. 2001-ASF
**ASF,** Adjustable Signal Flag
**HP,** High Pressure Option
**LT,** Low Temperatures to -20°F
**MP,** Med. Pressure Option
**SP,** Setpoint Indicator
**Scale Overlays,** Red, Green, Mirrored or Combination, Specify Locations

**Contents:**

**Liquid Filters**

**Vapor Filters**

VFD Series
- VFD-30
- VFD-55
- VFD-85
- VFD-110

VFV Series
- VFV-250
- VFV-500
- VFV-1000
- VFV-2000
- VFV-3000
- VFV-5000
- VFV-10000

VF Series
- VF-500
- VF-1000
- VF-2000
- VF-3000
- VF-5000
- VF-10000

VR Series
- VR-140
- VR-170
- VR-225
- VR-400
- VR-700
- VR-1600
- VR-2600

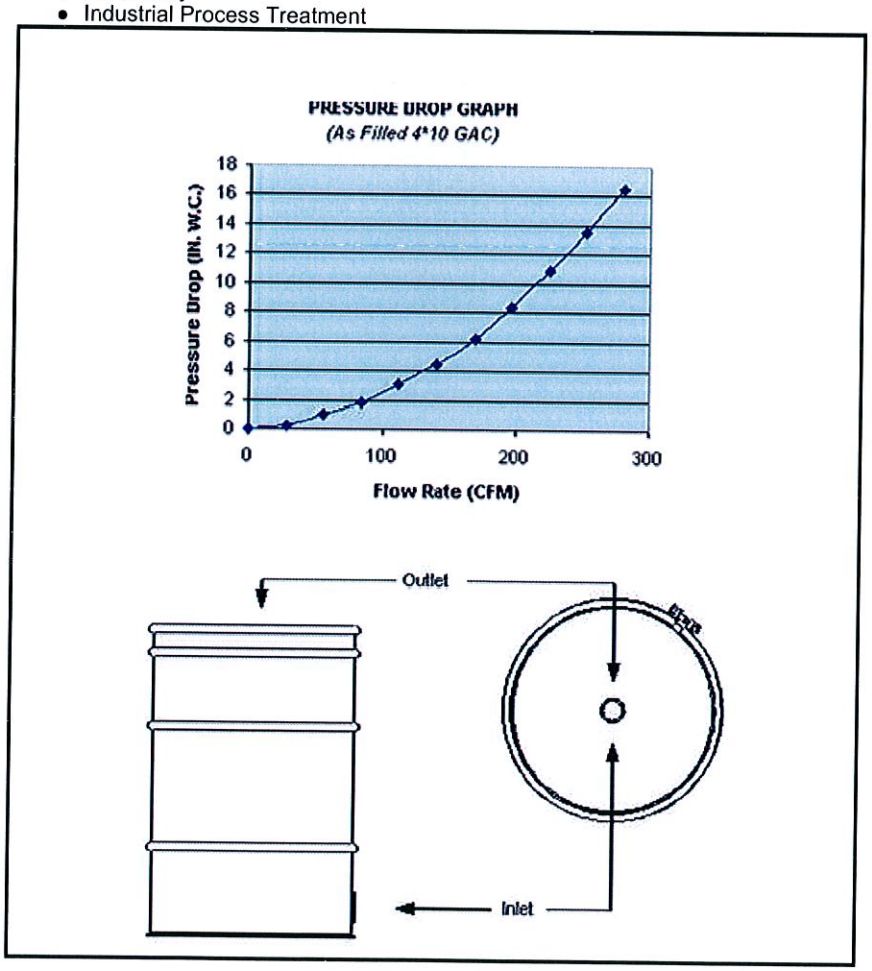
**Filtration Media**

**Special Products**

# VFD SERIES FILTERS
# MODEL VFD-55

The VFD-55 filter is a media filter vessel designed to treat vapor streams. While the typical design application is a activated carbon adsorbtion unit, the filter can easily accommodate many medias. The sturdy construction makes these filter vessels ideal for long term treatment units. Some applications include:

- Soil Vapor Extraction Treatment
- Air Stripper Off Gas Treatment
- Odor Removal System
- Storage Tank Purge Vapor Treatment
- Pilot Study
- Industrial Process Treatment

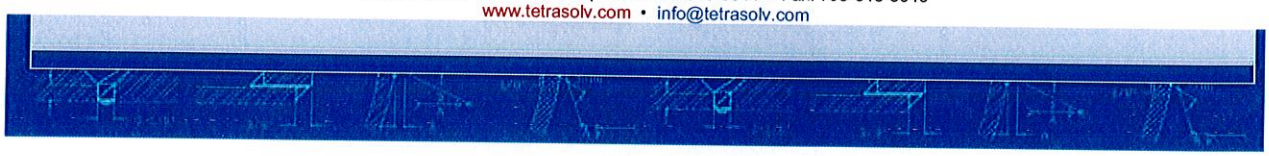



| VFD-55 SPECIFICATIONS |
|---|

| | | | |
|---|---|---|---|
| Overall Height | 2'10" | Vessel/Internal Piping Materials | CS/CS (False Floor) |
| Diameter | 23" | Internal Coating | Polyamide Epoxy Resin |
| Inlet / Outlet (FNPT) | 2" | External Coating | Urethane Enamel |
| Drain / Vent (FNPT) | OPT | Maximum Pressure / Temp | 4 PSIG / 250° F |
| GAC Fill (lbs) | 175 | Cross Sectional Bed Area | 2.8 $FT^2$ |
| Shipping / Operational Weight (lbs) | 225/300 | Bed Depth/Volume | 2.2 FT / 6.3 $FT^3$ |



Tetrasolv Filtration, Inc. • 1200 East 26th Street • Anderson, Indiana 46016 • USA
Toll Free: 800-441-4034 Telephone: 765-643-3941 • Fax: 765-643-3949
www.tetrasolv.com • info@tetrasolv.com



# Appendix C

## QUALITY ASSURANCE PROJECT PLAN (QAPP)

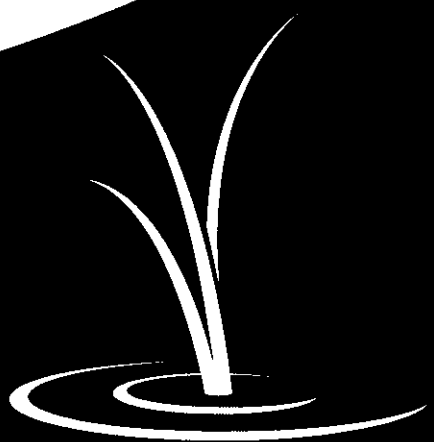
**Bayville Village Cleaners**
**Bayville, New York**
**VCP #:V00220-1**
**Voluntary Cleanup Agreement #:W1-0848-9903**

# QUALITY ASSURANCE PROJECT PLAN (QAPP)

FOR

BVC0106
BAYVILLE VILLAGE CLEANERS
290 BAYVILLE ROAD
BAYVILLE, NEW YORK 11560
VCP #:V00220-1
VOLUNTARY CLEANUP AGREEMENT #:W1-0848-9903

WALDEN ASSOCIATES
16 SPRING STREET
OYSTER BAY, NY 11771
PHONE: (516) 624-7200
FAX: (516) 624-3219
WWW.WALDEN-ASSOCIATES.COM



WALDEN ASSOCIATES

## Quality Assurance Project Plan (QAPP)

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## 1.0 Project Organization and Responsibilities

Walden maintains company policies and procedures to ensure that all sample collection and all analyses meet a high degree of quality. These policies and procedures provide confidence that the resulting data provide an accurate representation of the matrix being sampled. Quality Assurance/Quality Control (QA/QC) starts with the design of the sampling program and ends with the summarized analytical data submitted in the final report. This Quality Assurance Project Plan (QAPP) describes all of these policies and procedures.

The project Quality Assurance Officer (QAO) is responsible for ongoing surveillance of project activities, for ensuring conformance to this QAPP, and for evaluating the effectiveness of its requirements. The QAO has access to any personnel or subcontractors, as necessary, to resolve technical problems and take corrective action as appropriate and has the authority to recommend that work be stopped when there are factors present that may jeopardize quality. The QAO will be available to respond to immediate QA/QC problems.

The primary responsibilities of the QAO are as follows:

- Monitor the correction of QC problems and alert task leaders to where similar problems might occur.
- Develop and maintain project QA files for sampling, monitoring, and field QA records.
- Participate in QA audits.
- Recommend changes to the project manager to improve the effectiveness of the project in reaching its QA objectives for field sampling and monitoring activities.
- Review proposed additions and changes to this QAPP.

The project QA will be maintained under the direction of Mr. Peter Brighton, who will be assigned as the project's QAO, in accordance with this QAPP. QC for specific tasks will be the responsibility of Walden and its subcontractors, which shall be selected at the time the work is required under the direction of Mr. Brighton.

## 2.0 Quality Assurance Project Plan Objectives

### 2.1 Overview

Overall project goals are defined through the development of Data Quality Objectives (DQOs), which are qualitative and quantitative statements that specify the quality of the data required to support decisions. Data quality is measured by how well the data met the QA/QC goals of the project. In this plan, "Quality Assurance" and "Quality Control" are defined as follows:

- Quality Assurance - The total integrated program for assuring reliability of monitoring and measurement data.
- Quality Control - The routine application of procedures for obtaining prescribed standards of performance in the monitoring and measurement process.

As stated in the Guidance for Data Quality Objectives Process (EPA QA/G-4), DQOs are derived from the outputs of each step of the DQO process that:

- Classify the study objective;
- Define the most appropriate type of data to collect;
- Determine the most appropriate conditions from which to collect the data; and
- Specify acceptable levels of decision errors that will be used as the basis for establishing the quantity and quality of data needed to support the decision (USEPA, 1994).

A non-probabilistic (judgmental) sampling approach will be used to select the specific sampling locations for the areas of concern. A judgmental sampling design consists of directed samples at specific sampling locations to confirm the existence of contamination at these chosen locations based on visual or historical information (i.e., discoloration, staining, and deterioration).

Total study error is the combination of sampling and measurement error. Total study error is directly related to decision error. These decision errors can be controlled through the use of hypothesis testing. For this sampling, the null hypothesis (baseline condition) is that the

parameter of interest exceeds the cleanup levels. This decision has the smallest degree of decision error. In addition, measurement error is reduced by analyzing individual samples using more precise laboratory and sampling methods. Analyses will be performed using the Test Methods for Evaluating Solid Waste (SW-846). The soil, water and soil vapor sampling will be performed with dedicated equipment and following the appropriate standard operating procedures for sample handling.

## 2.2 QA/QC Requirements

QA elements to be evaluated include accuracy, precision, sensitivity, representative and completeness. Reporting of the data must be clear, concise and comprehensive. The data generated by the analytical laboratory for this project is required to be sensitive enough to achieve detection levels low enough to meet Contract Required Quantitation Limits (CRQLs) as specified in NYSDEC Analytical Services Protocol (NYSDEC ASP) for Superfund CLP and EPA SW-846 methods performed in accordance with NYSDEC ASP protocol. The analytical results meeting the CRQLs will provide data sensitive enough to meet the objectives of this site investigation as described in the *Site Investigation Work Plan*. The QC elements that are important to this project are blank contamination, instrument calibration, completeness of field data, sample-holding times, sample preservation and sample chain of custody.

## 2.3 Initial Instrument Calibration

Calibration curves will be developed for each of the compounds to be analyzed. Standard concentrations and a blank will be used to produce the initial curves. The development of calibration curves and initial calibration response factors must be consistent with method requirements presented in the most recent version of SW-846 and the NYSDEC's Analytical Services Protocol (ASP).

## 2.4 Continuing Instrument Calibration

The initial calibration curve will be verified every 12 hours by analyzing one calibration standard. The standard concentration will be the midpoint concentration of the initial

calibration curve. The calibration check compound must come within 25% relative percent difference (RPD) of the average response factor obtained during initial calibration. If the RPD is greater than 25%, then corrective action must be taken as provided in the specific methodology.

2.5 Method Blanks

Method blank or preparation blank is prepared from an analyze-free matrix, which includes the same reagents, internal standards and surrogate standards as the related samples. It is carried through the entire sample preparation and analytical procedure. A method blank analysis will be performed once for each 12-hour period during the analysis of samples for Volatile Organic Compounds (VOCs) and once for each batch or twenty (20) samples (whichever is most frequent) for Semi-Volatile Organic Compounds (SVOCs) and metals. Sample values of up to ten (10) times the quantity of Methylene Chloride, Acetone, 2-Butanone, and Phthalate Esters found in the blank must be qualified. For all other target compounds, the method blank must contain less than or equal to the CRQL of any single target compound. For non-target peaks in the method blank, the peak area must be less than 10% of the nearest internal standard. The method blank will be used to demonstrate the level of laboratory background and reagent contamination that might result from the analytical process itself.

2.6 Field Blanks

A field blank consists of two sets of identical, laboratory-cleaned sample containers. The first set is filled at the laboratory, with de-ionized laboratory-grade water. The water used is from the same source as that used for the laboratory method blank. In the field prior to collecting soil samples, this water will be passed through the field sampling equipment into an additional second set of containers that will then be taken back to the laboratory to be analyzed for the compounds of interest. The purpose of a field blank is to determine whether the field sampling equipment is cross-contaminating soil samples. The rinsate samples will be collected using dedicated sampling equipment provided by the laboratory; therefore, no field blanks will be collected.

2.7 Trip Blanks

Trip blanks consist of a single set of sample containers filled at the laboratory with de-ionized laboratory-grade water. The water used will be from the same source as that used for the laboratory method blank. The containers will be carried into the field and handled and transported in the same manner as the samples collected that day. Analysis of the trip blank for VOCs is used to identify contamination from the air, shipping containers, or from other items coming in contact with the sample bottles. (The bottles holding the trip blanks will be not opened during this procedure). A complete set of trip blanks will be provided with each shipment of groundwater samples to the certified laboratory.

2.8 Duplicates

Duplicate samples are two or more samples considered representative sub-samples of the same source. The samples are identically processed throughout the measurement system. Laboratory duplicate analyses will be performed on liquid and solid matrices at a rate of one (1) for every twenty (20) field samples in a batch or one for every batch of field samples (whichever is more frequent). Duplicate samples will be analyzed as per appropriate methodology. Duplicate analyses for Target Compound List (TCL) compounds will be associated with matrix spike and matrix spike duplicate analyses. The results of the duplicate analyses will be used to assess the precision of the measurement systems.

2.9 Surrogate Spike Analysis

Surrogate standard determinations will be performed on all samples and blanks analyzed by the analytical laboratory. All samples and blanks will be spiked with the appropriate surrogate compounds (as indicated by the methodology) before purging or extraction in order to monitor preparation and analyses of samples. Surrogate spike recoveries shall fall within the advisory limits in accordance with the SW-846 protocols for samples falling within the quantitation limits without dilution.

2.10 Matrix Spike (MS)/Matrix Spike Duplicate (MSD)/Matrix Spike Blank (MSB) Analysis

MS and MSD analyses will be performed to evaluate the matrix effect of the mple upon the analytical methodology along with the precision of the instrument by measuring recoveries. The MS/MSD samples will be analyzed for each group of samples of a similar matrix, at a rate of one for every twenty (20) field samples. The Relative Percent Difference (RPD) will be calculated from the difference between the MS and MSD. Matrix spike blank analysis will be performed to indicate the appropriateness of the spiking solution(s) used for the MS/MSD.

2.11 Accuracy

Accuracy is defined as the nearness of a real or the mean (x) of a set of results to the true value. Accuracy is assessed by means of reference samples and percent recoveries. Accuracy includes both precision and recovery, and is expressed as Percent Recovery (% REC). The MS sample is used to determine the percent recovery. The matrix spike % REC is calculated by the following equation:

$$\%REC = \frac{SSR - SR}{SA}$$

where:

SSR = measurement from spiked sample

SR = measurement from un-spiked sample

SA = actual data of spike added

2.12 Precision

Precision is defined as the measurement of agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed by means of duplicate/replicate sample analyses. Analytical precision is expressed in terms of RPD. The RPD is calculated using the following equation:

$$RPD = \frac{D_1 - D_2}{(D_1 + D_2)/2}$$

where:

RPD = Relative Percent Difference

$D_1$ = larger sample value

$D_2$ = smaller sample value (duplicate)

2.13 Sensitivity

The sensitivity objectives for this plan require that data generated by the analytical laboratory achieve detection levels low enough to meet the CRQLs as specified by SW-846 methods. The Method Detection Limits (MDL) for target compounds and target analyses will be established by the analytical laboratory to be well below the remedial objectives and submit appropriate documentation to Walden as required by the QAO.

2.14 Representativeness

Representativeness is a measure of the relationship of an individual sample taken from a particular site to the remainder of the site and the relationship of a small aliquot of the sample (i.e., the one used in the actual analysis) to the sample remaining on-site. A blind duplicate is used to accomplish this task, as well as assessing the precision of the data. Two identical groundwater samples will be collected from one (1) monitoring well and submitted as different samples. The RPD between the two samples should be less than 50%. The use of standardized techniques and statistical sampling methods influences the representativeness of an aliquot of sample to the sample at the site. The representativeness of samples is assured by adherence to sampling procedures presented in this document, therefore no specific representativeness samples are to be collected.

2.15 Completeness

Completeness is a measure of the quantity of data obtained from a measurement system as compared to the amount of data expected from the measurement system. Completeness is defined as the percentage of all results that are not affected by failing QC qualifiers and should be between 90% and 100% of all analyses performed. The objective of completeness in laboratory reporting is to provide a thorough data support package. The laboratory data package provides documentation of sample analysis and results in the form

of summaries, QC data and raw analytical data. The laboratory will be required to submit data packages that follow SW-846 reporting format, which, at a minimum, will include the following components:

1. All sample chain-of custody forms.
2. The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
3. Documentation demonstrating the laboratory's ability to attain the contract specified detection limits for all target analyses in all required matrices.
4. Tabulated target compound results and tentatively identified compounds.
5. Surrogate spike analysis results (organics).
6. Matrix spike/matrix spike duplicate results.
7. QC checks sample and standard recovery results.
8. Spike sample result (inorganics).
9. Blank results (field, trip, and method).
10. Internal standard area and RT summary.

2.16 Comparability

Comparability is the degree to which analytical data generated from an individual laboratory can be compared with those from another laboratory, in terms of use of standardized industry methods and equivalent instrumentation techniques. No laboratory split samples will be taken for this project.

## 3.0 Calibration and Maintenance Procedures of Field Equipment

Walden follows manufacturer's recommendations and guidelines with regard to filed instrument calibration procedures. The calibration of each instrument will be checked prior to each day's use. The date and time of the calibration check, serial number, model number and signature of the calibrating technician will be entered into the field logbook. If the instrument readings are incorrect, the instrument will be either recalibrated by the technician or returned to the Walden's office where it will be further evaluated and/or repaired. If field instruments require major overhauls, the instruments will be returned to the appropriate manufacturer.

Preventive maintenance of field equipment is performed routinely before each sampling event and more extensive maintenance is performed based on hours of use. The Walden equipment coordinator has overall responsibility for the preventive maintenance program. However, certain maintenance programs are overseen by the project manager. Routinely, manually operated sampling equipment is checked to ensure it operates properly and that excessive wear has not occurred. If necessary, equipment is taken out of service for repair or replacement.

## 4.0 Sample Custody

### 4.1 Overview

The handling of samples in the field and in the laboratory will conform to the sample custody procedures presented in this section. Field custody procedures involve proper sample identification, chain-of-custody forms, packaging and shipping procedures. Laboratory custody begins with the receipt of samples by the laboratory and continues through sample storage, analysis, data reporting and data archiving. This section provides the procedures that will be followed during the course of the project to ensure proper sample custody.

### 4.2 Field Custody Procedures for Off-Site Laboratory

The following elements are important for maintaining the field custody of samples:

- Sample identification
- Sample labels
- Custody records
- Shipping records
- Packaging procedures

Sample labels will be attached to all sampling bottles before field activities begin. Each label will contain an identifying number and each number will have a suffix that identifies the site and where the sample was collected. Approximate sampling locations will be marked on a map with a description of the sample location. The number, type of sample and sample identification will be entered into the field logbook. A chain-of-custody form will accompany the sample bottles from the laboratory into the field. Upon receipt of the bottles and cooler, the sampler will sign and date the first "received" blank space. After each sample is collected and appropriately identified entries will be made on the chain-of-custody form that will include:

- Site name and address
- Samplers' names and signatures

- Names and signatures of persons involved in chain of possession
- Sample number
- Number of containers
- Sampling station identification
- Date and time of collection
- Type of sample and the analyses requested
- Preservatives used (if any)
- Pertinent field data i.e. pH, temperature, turbidity, etc. (if any)

After sampling has been completed, the samplers' will return/ship the samples to the laboratory. The sampler will sign and date the next "relinquished" blank space. One copy of the custody form will remain with the field personnel and the remaining copies will accompany the samples to the laboratory. The laboratory will receive all samples within 24 hours of collection. Samples will be received by laboratory personnel, who will assume custody of the samples and sign and date the next "received" blank.

4.3 Laboratory Custody Procedures

Upon receipt by the analytical laboratory, samples will proceed through an orderly processing sequence specifically designed to ensure continuous integrity of both the sample and its documentation. All samples will be received by the laboratory's sample control group and will be carefully checked for label identification and completed accurate chain-of-custody records. The sample will be tracked from storage through the laboratory system until the analytical process is completed and the sample is returned to the custody of the sample control group for disposal.

## 5.0 Sample Preparation and Analytical Procedures

Containers, preservation and holding times of environmental samples will be applied as detailed in the NYSDEC ASP. The holding time of samples for VOC analysis of all matrices will be seven (7) days and five (5) days for SVOC analyses from the Verified Time of Sample Receipt (VTSR). Analyses of environmental samples will be performed by the protocol requirements of the SW-846.

A summary of analyses and related QA/QC samples would be performed on the samples collected at the site are presented in Table 1. Organic compounds will be analyzed by the following methods:

- Soil and Groundwater Samples
    - TCL VOCs by USEPA Method 8260
- Soil Gas and Air Samples
    - TCL VOCs by USEPA Method TO-15

If any modifications or additions to the standard procedures are anticipated, and if any nonstandard sample preparation or analytical protocol is to be used, the modifications and the nonstandard protocol will be explicitly defined and documented. Prior approval by Walden's QAO is necessary for any nonstandard analytical or sample preparation protocol used by the laboratory, i.e., dilution of samples or extracts by greater than a factor of 5.

## 6.0 Data Reduction, Validation, Review and Reporting

### 6.1 Overview

The process of data reduction, review, and reporting ensures that assessments or conclusions based on the final data accurately reflect actual site conditions. This plan presents the specific procedures, methods, and format that will be employed for data reduction, review and reporting of each measurement parameter determined in the laboratory and field. Also described in this section is the process by which all data, reports and work plans are proofed and checked for technical and numerical errors prior to final submission.

### 6.2 Data Reduction

Data reduction is the process by which raw analytical data generated from the laboratory instrument systems are converted into usable mass concentrations. The raw data, which may take the form of summation of areas under the curve instrument responses, or observations is processed by the laboratory and converted into concentrations expressed in ug/kg for soil samples and ug/l for water samples. The analytical laboratory will be required to follow SW-846 data reduction procedures.

Data reduction also includes the process by which raw field data is summarized into tables and graphs, from which quantitative or qualitative assessments can be derived by filter integration and evaluation. Field data that is anomalous will be thrown out to create a linear interpretation of the data that depicts a more accurate trend.

Field data obtained during sampling is summarized on appropriate field forms. This information will be used to assess field conditions at the time of sampling and is summarized and analyzed along with the chemistry data in the final report. Occasionally, the reduction of actual field data requires correcting measurement data for the measurement system's baseline value. The data will be adjusted only after the raw data has been submitted to Walden's QAO and prior to preparation of the final report.

## 6.3 Validation

Data validation is the systematic process by which data quality is determined with respect to data quality criteria that are defined in project and laboratory QC programs and within the referenced analytical methods. The data validation process consists of an assessment of the acceptability or validity of project data with respect to the stated project goals and the requirements for data usability. Ideally, data validation establishes the data quality in terms of project DQOs. Data validation consists of data editing, screening, checking, auditing, certification, review and interpretation.

The purpose of data validation is to define and document analytical data quality and determine whether the laboratory data quality is sufficient for the intended use(s) of the data. An approved independent data evaluator will not review data prior to its use in reports prepared by Walden unless requested by the NYSDEC. Both the field and laboratory data will be subjected to a level of data validation commensurate with the required data quality level. If required, the data will be validated in accordance with the following document: "Functional Guidelines for Evaluating Inorganic Analyses" and the "Functional Guidelines for Evaluating Organic Analyses" (Technical Directive Document No. HQ-8410-01, USEPA). The validator will evaluate the analytical laboratory's ability to meet the DQOs provided in this QAPP. Noncompliant data will be flagged in accordance with the NYSDEC ASP and corrective action will be undertaken to rectify any problems.

If an independent validator is required, the data validator will review the data from compliance by performing the following tasks:

### *6.3.1 Task I: Determine Data Completeness*

Each data package will be reviewed for completeness. A complete data package will at a minimum contain following components:

- All sample chain-of-custody forms.

- The case narrative(s) presenting a discussion of any problems and/or procedural changes required during analyses. Also presented in the case narrative are sample summary forms.
- QA/QC summaries.
- All relevant calibration data summaries.
- Instrument and method performance data.
- Documentation demonstrating the laboratory's ability to attain the contract specified method detection limits for all target analyses in all required matrices.

If during the review process it is found that deficiencies exist in the data package, the analytical laboratory will be contacted and given 10 calendar days to produce the documentation necessary to remove these deficiencies.

### *6.3.2 Task II: Determine Data Compliance*

Each data package will be reviewed to determine compliance with those portions of this QAPP that pertain to the production of laboratory data. Compliance is defined by the following criteria:

- The data package is complete as defined in Task I above.
- The data have been produced and reported in a manner consistent with the requirements of this plan and the laboratory subcontract.
- All protocol-required QA/QC criteria have been met.
- All instrument calibration requirements have been met for the time frame during
- Which the analyses were completed.
- All protocol required initial and continuing calibration summaries have been presented.
- All data reporting forms are complete for all samples submitted. This will include all requisite flags, all sample dilution/concentration factors and all pre-measurement sample cleanup procedures.

- All problems encountered during the analytical process have been reported in the case narrative along with any and all actions taken by the laboratory to correct these problems.
- Verifying that calibration procedures were followed.
- Verifying that data are reported in correct units.
- Checking 10% of all field calculations.
- Verifying that samples were properly shipped with the appropriate chain-of-custody documentation.
- Verifying that QC samples were prepared and taken.

Walden's QAO will perform further review of such data prior to data integration and evaluation. All assigned data reduction or analytical procedures will be verified for accuracy and content by the QAO, who is qualified and experienced in evaluating the particular technical specialty.

## 6.4 Walden Data Review

### *6.4.1 Laboratory Data*

The QAO or a designee under the project manager's supervision, will review each analytical data package for completeness (i.e., Have all the analyses requested been performed?) and general protocol compliance, such as holding times, detection limits, spike recoveries and surrogate recoveries. The results of this review will be summarized and submitted to the independent validator with the data package. If information is found to be missing from the data package the analytical laboratory will be contacted and requested to submit any missing information.

### *6.4.2 Usability Report*

Upon completion of data validation, Walden's QAO will perform a data usability analysis on all analytical laboratory data. Taking into account protocols for sampling, transport, analysis, reduction, reporting and the data validation report, the QAO will use

this information and his/her own experience to establish whether the results of each analysis can be used for the purpose intended. It will be determined whether the final results can be used as reported, qualified to indicate limitations, or rejected outright.

## 6.5 Reporting

### *6.5.1 Field Data Reporting*

All field real-time measurements and observations will be recorded in project logbooks or field data records. Field measurements may include pH, temperature, specific conductance and FID/PID, if applicable. All data will be recorded directly and legibly into field logbooks. If entries are changed, the change will not obscure the original entry and the correction will be signed. Field data records will be organized into standard formats whenever possible and retained in permanent files.

### *6.5.2 Laboratory Data Reporting*

All sample data packages submitted by the analytical laboratory will be required to be reported in conformance to the SW-846 deliverable requirements as applicable to the method utilized.

## 6.6 Data Usage

The data will be used to define the nature and extent of the suspected contamination at the subject site.

## 7.0 Internal Quality Control

### 7.1 Overview

QC checks will be performed to ensure the collection of representative and valid data. Internal QC refers to all data compilation and contaminant measurements. QC checks will be used to monitor project activities to determine whether QA objectives are being met. All specific internal QC checks to be used are identified in this section.

### 7.2 Laboratory Quality Control

The analytical laboratory is required to exercise internal control in a manner consistent with the requirements of this QAPP. Control checks and internal QC audits are required by the NYSDEC ASP methods. These include reference material analysis, blank analysis, MS/MSD analysis, cleanups, instrument adjustments and calibrations, standards and internal audits. One qualified professional will proof and check all final reports for transcription and/or calculation errors. Twenty percent of all final reports will be subsequently checked again by a qualified professional. All data tables will be checked to ensure no transcription errors have occurred. Data tables will also be checked to see that any criteria cited for comparison purposes is appropriate and correctly referenced. All calculations will be checked to ensure that they will be properly presented and that resulting values are achievable. If any results cannot be duplicated the calculations will be independently checked for accuracy.

## 8.0 Performance and System Audits

Performance audits, when performed, will be used to monitor project activities to assure compliance with project DQOs. The following text summarizes the field audits that are conducted periodically.

### 8.1 Field Audits

Walden periodically conducts internal audits of field activities. Walden's on-site project manager will routinely monitor all field activities to ensure that work is done correctly. All sampling and analytical work will be reviewed routinely by the project manager. All data sheets obtained in the field will be initialed and dated by project manager after review and acceptance of the services performed. A field audit will include monitoring and evaluation of sample collection, sample holding times, preservation techniques, field QC and equipment calibration. These audit forms will be kept on file with the Walden project manager for a period of at least one (1) year after completion of the project, then will be transferred to storage and held for an additional five (5) years.

## 9.0 Analytical Corrective Action

### 9.1 Laboratory Corrective Action

Corrective actions will be implemented if unsatisfactory performance and/or system audit results indicate that problems exist. Corrective action may also be implemented if the result of a data assessment or internal QC check warrants such action.

# Appendix D

## DAR-1 AGC/SCG VALUES TABLE FOR CONTAMINANTS OF CONCERN

**Bayville Village Cleaners**
**Bayville, New York**
**VCP #:V00220-1**
**Voluntary Cleanup Agreement #:W1-0848-9903**

## APPENDIX D
## DAR-1 AGC/SCG VALUES TABLE FOR CONTAMINANTS OF CONCERN

| Contaminant | CAS Number | Short Term (one-hour) Guideline Concentration SGC (ug/m3) | Annual Guideline Concentration AGC (ug/m3) | Who Derived SCG/AGC |
|---|---|---|---|---|
| 1,1,2-Trichloroethane | 00079-00-5 | none | 1.40 | NYSDEC |
| 1,1-Dichloroethane | 00075-34-3 | none | 0.63 | NYSDEC |
| 1,2-Dichloroethylene | 00540-59-0 | none | 1,900 | ACGIH TLV |
| 1,1,1-Trichloroethane (Methyl Chloroform) | 00071-55-6 | 68,000 | 1,000 | NYSDEC |
| Trichloroethylene | 00079-01-6 | 54,000 | 0.50 | ACGIH STELs/ NYSDEC |
| Tetrachloroethylene | 00127-18-4 | 1,900 | 1.00 | NYSDOH |
| Vinyl Chloride | 00075-01-4 | 180,000 | 0.11 | NYSDEC/USEPA |

These values were taken from the Dec. 22, 2003 DAR-1 (Air Guide - 1) AGC/SCG Tables, and were last revised on July 12, 2000.
SGC = short-term (one-hour) guideline concentration
AGC = annual guideline concentration.
The DAR-1 tables list the SGC and AGC, federal and state one-hour and annual air quality standards, and the equivalent one-hour and annual air quality standards.

# Appendix E

## HEALTH AND SAFETY PLAN (HASP)

**Bayville Village Cleaners**
**Bayville, New York**
**VCP #:V00220-1**
**Voluntary Cleanup Agreement #:W1-0848-9903**

# HEALTH AND SAFETY PLAN (HASP)

FOR

**BAYVILLE VILLAGE CLEANERS**
**290 BAYVILLE ROAD**
**BAYVILLE, NEW YORK 11560**
**VCP #:V00220-1**
**VOLUNTARY CLEANUP AGREEMENT #:W1-0848-9903**


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WALDEN ASSOCIATES

# Site Specific Health and Safety Plan

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Figure 1: Hospital Location Map, North Shore University Hospital, Glen Cove


## Appendices


Appendix I: Site Safety Plan Acknowledgement Form
Appendix II: Heat Stress
Appendix III: Cold Stress
Appendix IV: Chemical Hazard Information
Appendix V: Directions to Nearest Hospital

## 1.0 Statement of Commitment to Worker Health and Safety

Walden Environmental Engineering, PLLC (Walden) employees may be exposed to risks from site-related hazardous conditions while performing field activities at the Bayville Village Cleaners. Walden's policy is to minimize the possibility of work-related injury through aware and qualified supervision, health and safety training, medical monitoring and the use of appropriate Personal Protective Equipment (PPE). Walden has established a guidance program to implement this corporate policy in a manner that protects personnel to the maximum reasonable extent.

This site-specific Health and Safety Plan (HASP) applies to all Walden personnel, owners' representatives, subcontractors, and the New York State Department of Environmental Conservation (NYSDEC) personnel and/or its representatives on the job site where operations involve actual or potential physical and chemical hazards that have been identified by Walden or others. This HASP is also intended to inform and guide all personnel (Walden employees and/or owner representatives and/or NYSDEC representatives and/or subcontractors) entering the exclusion zone, ensuring that each person sign and acknowledge the site hazards on the acknowledgement form provided in Appendix I. Walden and/or the owner's subcontractors are retained as independent contractors and, as such, are responsible for ensuring the safety of their employees.

Walden may require that on-site personnel take certain precautions in accordance with this HASP, and Walden may request that others protect their personnel in a manner that they deem necessary or sufficient.

## 2.0 General

### 2.1 Site Information

Site Name: Bayville Village Cleaners

Location: 290 Bayville Avenue, Bayville, New York 11709

Walden Job #: BVC0106

### 2.2 Project Personnel

Primary Consultant: Walden Environmental Engineering, PLLC
16 Spring Street, Oyster Bay, New York 11771
(516) 624-7200 (phone)
(516) 624-3219 (fax)

On-Site Safety Coordinator: Peter Brighton

On-Site Health and Safety Officer: Peter Brighton

### 2.3 Training

All site-related workers entering the exclusion zone must be trained in accordance with 29 CFR 1910.120 E3 and E4, and all others must have at least 29 CFR 1910.120 E3.

Documentation of Walden personnel training is maintained on files and each Walden employee will have copies of his/her applicable 40-Hour OSHA Training, 8-Hour Refresher and Supervision Training Certificates on-site (maintained by the job health and safety officer or designee).

Each subcontractor working on the job must provide the site safety officer with training documentation for its personnel.

## 2.4 Affidavit

All Walden personnel and subcontractors who enter site-related exclusion zones must sign the attached Safety Plan Acknowledgment form (**Appendix I**). Walden personnel and site-related subcontractors must also read and comply with Walden's generic HASP.

## 2.5 Alternative Work Practices

Underground utilities must be identified before commencing any subsurface work. Blowers may be employed to reduce and disperse any releases of toxic gases. If items proposed within the work plan are modified based on changes in field conditions, they would be evaluated and an addendum would be prepared to cover these alternative work practices.

## 3.0 Hazardous Substances

Hazardous substances are defined as the suspected or known hazardous substance stored, within any media (contaminated), etc.

*In soils:* Volatile Organic Compounds (VOCs) identified as being contained in soils are Tetrachloroethylene (PCE) and Trichloroethylene (TCE).

*In groundwater:* VOCs identified as being contained in groundwater are PCE and TCE.

*In soil vapor:* VOCs identified as being contained in soil vapor are PCE and TCE.

### 3.1 Hazard Assessment

Defined as toxic effects, including Threshold Limit Values (TLVs), Immediately Dangerous to Life or Health's (IDLHs), reactivity, stability, flammability and operational hazards with sampling, decontaminating, etc.

The major route of exposure to potential contaminants will be respiratory; however, dermal exposure may also be possible. Inhalation of vapors and contaminated dusts would provide the mechanism for respiratory exposure. Skin contact with soils and groundwater would result in dermal exposure. PCE is the compound of highest concern both due to its suspected carcinogenicity and its high vapor pressure. TCE has also been identified as a compound of concern because of past presence in soil and groundwater. The International Agency for Research on Cancer (IRAC) has classified PCE and TCE as probable human carcinogens. The program will use engineering controls and Personal Protective Equipment (PPE) to reduce the amount of potential exposure. Continuous air monitoring and personal protection devices will serve to prevent exposure to chemicals.

Other site hazards include those that exist on all sites where heavy equipment, industrial and construction type operations take place, e.g., dangers from falling equipment, cuts, abrasions, and contusions.

In general, backhoes, drill rigs, and other heavy machinery used during field activities present a hazard with their moving parts and overhead equipment. All field personnel, except for the equipment operator, must remain away from the machinery while work is taking place. All field personnel, including the operator, must wear steel-toe boots. Hard hats and safety glasses are required by all personnel not operating any heavy machinery. All the persons unrelated to the project must remain outside the exclusion zone while work is taking place. If persons have business in the exclusion area, other than Walden personnel or associated contractors, they must remain at a safe distance away from the machinery as determined by the site health and safety officer.

During typical work activities, surfaces can be expected to become uneven and slippery, causing unsure footing and requiring additional care by personnel engaged in operations. Additional site hazards are presented by the possibility of airborne and waterborne transport of hazardous materials and the presence of contaminated soils, vessels and equipment.

## 4.0 Site Work Zones

Defined as designated exclusion zone, contaminant reduction zone and support zone. The work zone will be divided into three areas: a support zone, a contaminant reduction zone and an exclusion zone based on the degree of danger present. To the extent possible, the support and contaminant reduction zones will be established outside of the exclusion zone.

### 4.1 Support Zone

The support zone will be located outside the of the exclusion zone. Personnel allowed in this area include all site personnel, visitors and representatives of regulatory agencies and observers. No particular training or PPE equipment are needed in the support zone/clean area.

### 4.2 Contaminant Reduction Zone

The contaminant reduction zone will be located between the support zone and the designated exclusion zone. In this area authorized personnel will don protective equipment, as needed in the exclusion zone. When exiting the contaminant reduction zone, personnel will remove contaminated PPE.

### 4.3 Exclusion Zone

The exclusion zone is in the immediate work area and that adjacent area as defined by the safety coordinator. Attempts will be made so that equipment and site activities taking place in the exclusion zone are situated so that personnel are upwind of sources. Fans or blowers will be used, if necessary, to disperse gases released during site-related activities.

### 4.4 Task Specific Level of Protection

See **Table 1** for levels of personal protective equipment (PPE) requirements.

### 4.5 Communications

In the event that either Level C or Level B respiratory protection is used, hand signals will be developed for communication. At this point, all proposed site-related work would be conducted in level D PPE.

**BAYVILLE VILLAGE CLEANERS**

**BAYVILLE, NEW YORK**

## TABLE 1

## PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

| LOCATION | LEVEL OF PROTECTION/TASKS | DESCRIPTION |
|---|---|---|
| Support Zone | D | Steel toe boots and work clothes |
| Exclusion Zone and Contamination Reduction Zone | To be determined by the site safety officer based on contamination present | |
| | D (modified) | Steel toe boots, nitrile or latex gloves, hard hat, safety glasses |
| | C | Full face respirator fitted with organic vapor cartridge and Level D |
| | B | Positive pressure, pressure demand self-contained breathing apparatus or positive pressure, pressure demand supplied air and Level C. |

## 5.0 Site Access

The topography of the site is relatively flat. The area is developed with a single story building with an associated paved parking lot. In the event of an emergency, the project personnel and subcontractors should assemble at the predetermined assembly area, designated by the site safety officer.

The predetermined assembly area for this site or task is the southwestern corner of Bayville Avenue and 17th Street, Bayville, New York. The project manager or on-site health and safety officer may relocate this area, if necessary.

## 6.0 Monitoring Procedures

Monitoring the site for the identity of contaminants and contaminant concentrations in all media:

Direct reading instruments will be used in active work areas in order to enable rapid field decisions regarding levels of respiratory protection, as well as indicate the need for increased monitoring frequency at the edge of the exclusion zone.

A Photo Ionization Detector (PID), which will be calibrated daily and adjusted to give maximum sensitivity to the contaminants of concern, will be used to monitor the air on a continuous basis while air, soil and/or groundwater sampling activities are performed.

### 6.1 Task Specific Air Monitoring Action Levels

See **Table 2** for air monitoring action levels.

**BAYVILLE VILLAGE CLEANERS**
**BAYVILLE, NEW YORK**

## TABLE 2

## AIR MONITORING ACTION LEVELS

| INSTRUMENT | HAZARD MONITORED | INSTRUMENT READING | ACTION REQUIRED |
|---|---|---|---|
| PID | Organic Vapors | 0.5 ppm or greater above background in the breathing zone for 1 minute and the source of the reading is unknown. | PPE will be upgraded to Level C. |
| | | 5 ppm or greater above background in the breathing zone for 30 continuous seconds | Stop work. Evaluate the source and upgrade Level C to Level B. |
| Combustible Gas Indicator | Explosive Vapors | >10% LEL | Explosion hazard! Withdraw from the area immediately until LEL <10%. |
| Oxygen Meter | Oxygen | <19.5%$0_2$ | Stop work and withdraw from area until oxygen levels increase. |

## 7.0 Decontamination and Disposal

Decontamination procedures apply to all contaminated personnel, surfaces, materials, instruments, equipment, etc. PPE will be removed prior to removing any respiratory protection. All personnel will thoroughly wash their hands and face before leaving the site. Subsurface tools will be steam-cleaned or washed with Alconox detergent and water, then followed by a DI rinse and/or air-drying.

Disposal procedures also apply to all contaminated equipment, supplies, disposable items and wash water. Any PPE will be bagged and contained in a drum designated for PPE disposal. All decontamination water and materials will also be drummed and disposed of off-site.

## 8.0 Emergency Procedures

The topography of the site is relatively flat and open. Rapid escape from the work areas may be restricted by buildings and other barriers, particularly fences and buildings located in the proposed work area. Free and clear secondary egress is to be provided.

Preparatory meetings will be held to ensure that procedures for reporting and responding to emergency incidents are compatible with emergency response of local, state, and federal agencies. The emergency response plan will be rehearsed prior to start-up of site activities.

### 8.1 Personnel Exposure

In event of personnel exposure (skin contact, inhalation, ingestion, specific procedures for specific chemicals):

- Skin Contact - Wash with soap and water.
- Inhalation - Remove to fresh air, monitor for ABCs (Airway, Breathing and Circulation).
- Ingestion - Call Poison Control Center and monitor ABCs.
- Eye Exposure - Repeated eye flush, monitor ABCs and transport to hospital.

### 8.2 Personnel Injury

In the event of personnel injury:

Check ABCs (Airway, Breathing and Circulation). Perform first aid, if required. Contact local ambulance if professional help is needed.

### 8.3 Potential or Actual Fire or Explosion

In event of potential or actual fire or explosion:

If a fire or explosion occurs leave the site and contact the appropriate emergency team (i.e. fire or police).

### 8.4 Environmental Accident

In event of environmental accident (spread of contamination outside site):

Stop spread of chemical as best as possible and notify Walden, NYSDEC, associated contractors and Nassau County Health Department at first opportunity.

8.5 Emergency Services

| | |
|---|---|
| Emergency Medical Facility: | North Shore University Hospital, Glen Cove |
| Location: | 101 St Andrews Lane, Glen Cove, New York 11542 |
| Telephone: | (516) 674-7852 |

Directions to hospital from site (See **Figure 1**): Start from Bayville Village Cleaners, go west along Bayville Ave, continue on Horse Hollow Road, turn left at Lattingtown Road, turn left at Ford Street, bear right at Titus Road, turn right at St. Andrews Lane, arrive at 101 St Andrews Lane (North Shore University Hospital).

| | |
|---|---|
| Ambulance Service: | 911 |
| National Response Center: | (800) 424-8802 |
| Fire Department: | (516) 628-1922 |
| NCMC (Non-emergency): | (516) 572-0123 |
| Police Department: | 911 or (516) 628-2320 |
| Poison Control Center - | (516) 542-2323 |
| NYSDEC Spills Hotline- | (800) 457-7362 |

## Appendix I: Site Safety Plan Acknowledgement Form

I have read and understand the procedures set forth in this Health and Safety Plan for the Bayville Village Cleaners.

| Printed Name | Signature | Representing | Date |
|---|---|---|---|
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## Appendix II: Heat Stress

Heart rate (HR) should be monitored by the radial pulse for 30 seconds as soon as possible in the resting period. If at the beginning of the rest period a worker's radial pulse is measured and his heart rate exceeds 100 beats per minute, the worker's next work period should be reduced by 33%. Therefore, if the original work period was one hour, the following work cycle should be reduced to 40 minutes.

Heat Stroke is a true medical emergency. First aid should be directed toward immediate measures to cool the body quickly, as well as seeing that the victim receives medical attention as soon as possible.

Prior to medical treatment, remove as much clothing as possible and proceed to cool the victim's body, taking care not to overchill the victim once his temperature falls below $102^0$F. One of the following cooling measures should be taken:

a) Sponge the bare skin with cool water;
b) Apply cold packs continuously;
c) Wrap the victim in a sheet soaked with water;
d) Immerse the victim in a tub of cold water, while closely monitoring the victim's level of consciousness.

Prior to site activity, the Site Safety Officer may make arrangements for heat stress monitoring (i.e., monitoring heart rate, body temperature and body water loss) during actual site work if conditions warrant these measures. In addition, the Site Safety Officer would want to ensure that the team members have been acclimatized to the particular environmental conditions and that personnel are aware of the signs and symptoms of heat sickness and have been adequately trained in first aid procedures. As Site Safety Officer, one should also make sure that sufficient personnel are on-site, so as to rotate work assignments, schedule work during hours of reduced temperatures, and ensure personnel do not consume alcoholic or caffeinated beverages but rather drink moderate levels of an electrolyte solution and eat well prior to commencing site work.

The worker could be experiencing a condition of heat rash. Allow workers to rest and relieve the itching associated with heat rash rather than return to work too soon. Itching workers may not follow stringent decon procedures or scratch where it itches on-site and risk cross contamination.

Keeping the skin clean and dry will reduce the incidence of heat rash. This can be accomplished by wearing cotton garments (or other materials that absorb perspiration) underneath protective clothing. Upon removing the protective clothing, the worker should wash and dry his skin thoroughly.

The sense of thirst is not an adequate regulator of water replacement during heat exposure. Therefore, as a general rule, the amount of water administered should replace the amount of water lost, and it should be administered at regular intervals throughout the day. For every ½ pound of water loss, 8 ounces of water should be ingested. Water should be replaced by drinking 2 to 4 ounce servings during every rest period. A recommended alternative to water is an electrolyte drink diluted 50/50 with water.

Although there is no specific test given during a baseline physical that would identify a person's intolerance to heat, there are physical factors and personal habits which may indicate possible intolerance to heat, such as whether or not an individual smokes, one's dietary habits, body weight, as well as predisposing physical conditions such as high blood pressure, heart conditions, diabetes, or one's medication, that may influence an individual's ability to tolerate excessive heat.

Heat cramps are caused by profuse perspiration with inadequate fluid intake and salt replacement. Heat cramps most often afflict people in good physical condition who overwork in conditions of high temperature and humidity. Heat cramps usually come on suddenly during vigorous activity. Untreated, heat cramps may progress directly to heat exhaustion or heat stroke. First aid treatment: remove victim to a cool place and give sips of salted water (1 teaspoon of salt to 1 quart of water) - 4 ounces every 15 minutes over a period of one hour. A commercial preparation, e.g., Gatorade, may be used if diluted 50/50 with water.

Salted water or solution should mitigate the cramps. Manual pressure should not be applied to the cramped muscles.

Required Frequency of Heat Stress Monitoring for workers in Impermeable Clothing

| Adjusted[1] Temperature (°F) | Work-Rest Interval for Monitoring (Min. of Each) |
|---|---|
| 90 or above | 15 |
| 87.5-90 | 30 |
| 82.5-87.5 | 60 |
| 77.5-82.5 | 90 |
| 72.5-77.5 | 120 |

(1) Adapted from Eastern Research Group and National Institute for Occupational Safety and Health, Occupational Safety and Health Guidance Manual for Super Activities. September 26, 1984, pp. 8-75.

(2) Calculate the adjusted air temperature (Ta adj) by using this equation:

$$Ta\ adj\ ^{0}F = Ta\ ^{0}F + (13 \times \%\ sunshine)$$

Measure air temperature (Ta) with a standard thermometer, with the bulb shielded from radiant heat. Then estimate percent sunshine (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows).

Heat Stress Signs and Symptoms

| Heat Stress Indicator | When to Measure | If Greater Than | Action |
|---|---|---|---|
| Heart rate (pulse) | Beginning of rest period | 110 beats per minute | Shorten next work period by 33% |
| Oral temperature | Beginning of rest period | $99^{0}$F (after thermometer is under tongue for 3 minutes) or | Shorten next work period by 33% |
| | | 100.6 $^{0}$F or greater | Prohibit work in impermeable clothing and shorten next work period by 33% |
| Body weight | 1. Before workday begins (a.m.)<br>2. After workday ends (p.m.) | Decreases more than 5% | Increase fluid intake |

## Appendix III: Cold Stress (Hypothermia)

Cold stress is a function of cold, wetness and wind. A worker's susceptibility to cold stress can vary according to his/her physical fitness, degree of acclimatization to cold weather, age and diet.

Prevention

Institute the following steps to prevent overexposure of workers to cold:

1. Maintain body core temperature at $96.8^0$F or above by encouraging workers to drink warm liquids during breaks (preferably not coffee) and wear several layers of clothing. Wool is recommended since it can keep the body warm even when the wool is wet.
2. Avoid frostbite by adequately covering hands, feet, and other extremities. Clothing such as insulated gloves or mittens, earmuffs, and hat liners should be worn. To prevent contact frostbite (from touching metal and cold surfaces below $20^0$F) workers should wear anti-contact gloves. Tool handles and control bars should be covered with insulating material.
3. Adjust work schedules if necessary, providing adequate rest periods. When feasible, rotate personnel and perform work during the warmer hours of the day.
4. Provide a heated enclosure for workers close to their work area. Workers should remove their outer layer(s) of clothing while in the shelter to allow sweat to evaporate.
5. In the event that wind barriers are constructed around an intrusive operation (such as drilling), the enclosure must be properly vented to prevent the build-up of toxic or explosive gases or vapors. Care must be taken to keep any heat source away from flammable substances.
6. Using a wind chill chart such as the one attached, obtain the equivalent chill temperature (ECT) based on actual wind speed and temperature. Refer to the ECT when setting up work warm-up schedules, planning appropriate clothing, etc. Workers should use warming shelters at regular intervals at or below an ECT or $20^0$F. For exposed skin, continuous exposure should not be permitted at or below an ECT of -35 $^0$F.

7. Workers who become immersed in water or whose clothing becomes wet (from perspiration, rain, etc.) must immediately be provided a change of dry clothing whenever the air temperature is $25.6^0$F or below.
8. Maintain an optimal level of worker fitness by encouraging regular exercise, proper diet, etc. If possible, acclimatize workers to site conditions for several days before work begins.

Monitoring

Personnel should be aware of the symptoms of cold stress. If the following symptoms of systemic hypothermia are noticed in any worker, he/she should immediately go the warm shelter:

- Heavy, uncontrollable shivering;
- Excessive fatigue or drowsiness;
- Loss of coordination;
- Difficulty in speaking;
- Frostbite (see below).

Frostbite is the generic term for local injury resulting from cold. The stages of frostbite and their symptoms are as follows:

- Frostbite or incipient frostbite: sudden blanching or whitening of the skin.
- Superficial frostbite: waxy or white skin which is firm to the touch (tissue underneath is still resilient).
- Deep frostbite: tissues are cold, pale and solid.

## Wind-chill Chart

| Wind Speed (mph) | Actual Temperature Reading (°F) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Equivalent Temperature (°F) | | | | | | | | | |
| calm | 50 | 40 | 30 | 20 | 10 | 0 | -10 | -20 | -30 | -40 |
| 5 | 48 | 37 | 27 | 16 | 6 | -5 | -15 | -26 | -36 | -47 |
| 10 | 40 | 28 | 16 | 4 | -9 | -21 | -33 | -46 | -58 | -70 |
| 15 | 36 | 22 | 9 | -5 | -18 | -36 | -45 | -58 | -72 | -85 |
| 20 | 32 | 18 | 4 | -10 | -25 | -39 | -53 | -67 | -82 | -96 |
| 25 | 30 | 16 | 0 | -15 | -29 | -44 | -59 | -74 | -88 | -104 |
| 30 | 28 | 13 | -2 | -18 | -33 | -48 | -63 | -79 | -94 | -109 |
| 35 | 27 | 11 | -4 | -20 | -35 | -49 | -67 | -82 | -98 | -113 |
| 40 | 26 | 10 | -6 | -21 | -37 | -53 | -69 | -85 | -100 | -116 |
| >40 (Little added effect) | Little Danger (for properly clothed person) | | | | Increasing Danger (Danger from freezing of exposed flesh) | | | Great Danger | | |

## Appendix IV: Chemical Hazards

### 1.0 Tetrachloroethylene (PCE)

Introduction

Tetrachloroethylene (PCE), also know as Perchloroethylene, is a man-made substance widely used for metal-degreasing operations, dry cleaning fabrics and textiles. It is also used as a starting material (building block) in producing other man-made chemicals. Other names that may be used for PCE include perc, perclene and perchlor. Although PCE is a liquid at room temperature, some of the liquid can be expected to evaporate into the air producing an ether-like odor; evaporation increases as temperature increases.

Exposure Pathways

Humans can be exposed to PCE from environmental, consumer product, and occupational sources. Common environmental levels of PCE (often called background levels) are usually several thousand times lower than levels found in some workplaces. Background levels found in the air we breathe and in the food and water we consume probably result from evaporation from industrial or dry-cleaning operations or from releases from areas where chemical wastes are stored. PCE has been found in at least 330 of the 1117 National Priorities List (NPL) hazardous waste sites.

In general, PCE levels in air are higher in urban and industrialized areas than in more rural or remote areas. Higher-than-background concentrations of PCE have occasionally been measured in air close to chemical waste sites and in water taken from nearby wells.

Exposure to PCE may also occur from some consumer products. Products that may contain PCE include auto brake quieters and cleaners, suede protectors, water repellents, silicone lubricants, belt lubricants, dressings, specialized aerosol cleaners, ignition wire driers, fabric finishers, spot

removers, adhesives, and wood cleaners. Although uncommon, small amounts of PCE have been found in food.

The levels of PCE in air in dry-cleaning shops, textile and chemical processing operations, and degreasing operations can result in exposures that are much higher than those found in the outside environment. Levels of PCE in the workplace are usually measured in parts of PCE per million parts of air (ppm), while common environmental levels are usually measured in parts per billion (ppb) or parts per trillion (ppt).

Metabolism

Because PCE evaporates quickly, the most common exposure to PCE comes from breathing air containing it. This is certainly true for individuals who work with the chemical, but it is probably also true for those who live in industrial and commercial areas where large amounts of the compound are used or disposed of. PCE may also enter the body through drinking contaminated water or eating contaminated food. Because PCE does not pass through the skin to any significant extent, entry into the body by this path is of minimal concern, although skin irritation may result from repeated or prolonged contact with the undiluted liquid. Scientific reports indicate that PCE is present (and may in fact be concentrated) in the breast milk of mothers who have been exposed to the chemical.

Health Effects

In high concentrations in air, particularly in closed, poorly ventilated areas, single exposures to PCE can cause Central Nervous System (CNS) effects leading to dizziness, headache, sleepiness, confusion, nausea, difficulty in speaking and walking, and possibly unconsciousness and death. As might be expected, these symptoms occur almost entirely in work (or hobby) environments. The potential long-term health effects that might occur in humans from breathing lower levels of PCE than those that produce CNS effects or from ingesting very low levels of the chemical found in some water supplies have not been identified. The effects of exposing infants to PCE through breast milk are unknown.

Animal studies, conducted with amounts much higher than typical environmental levels, have shown that PCE can cause liver and kidney damage, liver and kidney cancers, and leukemia (cancer of the tissues that form the white blood cells). Developmental effects in fetuses have been observed but only at PCE exposure levels that also produce toxicity in the maternal animal.

The U.S. Department of Health and Human Services has determined that PCE may reasonably be anticipated to be a carcinogen. Based on evidence from animal studies, PCE is thought to be capable of causing cancer in humans. It should be emphasized, however, that currently available information is not sufficient to determine whether PCE causes cancer in humans.

Short-term exposures to air containing more than 100 ppm of PCE have produced harmful effects in both humans and animals, and more prolonged exposures to approximately 9 ppm caused harmful liver effects in mice. It should be pointed out that some of the highest environmental levels of PCE ever recorded (at waste disposal sites, for example) were still 150 times smaller than the concentrations shown to produce symptoms of toxicity in animals after repeated exposure. Drinking (or eating) the equivalent of approximately 60 to 80 mg (less than a spoonful) of undiluted PCE per kg of body weight (1 kg = 2.2 pounds) has produced effects similar to drinking alcohol. PCE was used in the past as a medicine to eliminate worms in humans, but safer and more effective drugs are now available. More prolonged exposures in animals have produced harm to the liver at doses of approximately 100 mg/kg/day. These levels of exposure are more than 1,000 times higher than would be expected even if humans ingested the most contaminated drinking water ever reported.

Cancer: From data in animals, EPA has estimated that if people breathe air containing 1 ppm PCE all day every day for 70 years, there would be an added risk of 66 additional cases of cancer in a population of 10,000 people (or 65,500 additional cases in a population of 10,000,000) over the number of cases that would be observed in a population not exposed to PCE. If people consume 1.0 mg PCE/kg/day in food and water every day for 70 years, there would be at the most a risk of 510 additional cases of cancer in a population of 10,000, or 510,000 additional

cases in a population of 10,000,000. It should be noted that these risk values are plausible upper-limit estimates. Actual risk levels are unlikely to be higher and may be lower.

Regulations

The government has made recommendations to limit the exposure of the general public to PCE in drinking water and the exposure of workers to PCE in the workplace.

The United States Environmental Protection Agency (USEPA) has developed the following health advisories to describe concentrations of PCE in drinking water at which no adverse effects are anticipated to occur: 2.0 milligrams per liter of water (mg/L) for short-term exposure of children, 1.4 mg/L for longer term exposure of children, and 5.0 mg/L for long-term exposure of adults. In addition, a drinking water equivalent level (DWEL) of 0.5 mg/L has been established.

The Occupational Safety and Health Administration (OSHA) has a legally enforceable exposure limit of 25 ppm PCE in air for an 8-hour workday, 40-hour workweek based on non-cancer health considerations. The National Institute for Occupational Safety and Health (NIOSH) has classified PCE as a potential occupational carcinogen and recommends that workplace exposure be limited to the lowest possible level.

# TETRACHLOROETHENE or PERCHLOROETHENE (PCE)

| Chemical name, structure / formula, CAS and RTECS Nos , and DOT 10 and guide Nos. | Synonyms, trade names, and conversion factors | Exposure limits (TWA unless noted otherwise) | IDLH | Physical description | Chemical and physical Properties MW, SP, SOL FLIP, IP, Sp, Gr, flammability | VP, FRZ UEL, LEL | Incompatibilities and reactivity | Measurement method (See Table 1) |
|---|---|---|---|---|---|---|---|---|
| Tetrachoroethylene<br>Cl2C=CCl2<br>127-18-4<br>[#1C03<br>KX3850000 | Perchlorethyene.<br>Perchloroethylene.<br>Perk.<br>Tetracrioretrylene | NIOSH<br>Ca<br>See Appendix A<br>Minimize workplace exposure concentrations limit<br>number of workers exposed<br>OSHAt<br>100PPM<br>C 200 ppm | Ca<br>[150 ppm) | Colorless quid with a mild chloroform-like odor | MW 165 8<br>BP 250°F<br>Sol: 0.02%<br>FIP NA<br>IP 9. 32 eV<br>Sp Gr 1 62<br>Noncombustible lquid but decomposes in | VP 14mm<br>FRZ -2°F<br>UEL NA<br>LEL NA | Strong oxidizers<br>chemically-active metals such as lithium beryllium & barium, caustic soda<br>sodium hydroxide<br>potash | Char<br>CS<br>GC/FID<br>III<br>Halogenated Hydrocarbons) |
| 1897 74 | 1 ppm = 6.89 mg/m³ | 300 ppm (5-min max peak in any 3 hri) | | | a fire lo hydrogen chloride and phosgene. | | | |

| Personal protection And sanitation<br>Target organs | Recommendations for respirator selection-maximum concentration for use (MLIC) | Route | Symptoms | Health hazards<br>First aid | |
|---|---|---|---|---|---|
| Skin: Prevent skin contact<br>eyes, skin | NIOSH | Inh | Jmt eyes nose :throat | Eye<br>irrimmed | |
| Eyes Prevent eye contact<br>liver, kidneys, CNS | SCBAF PD,PPISAF PID,PP ASCBA | Abs | nau, flush face, necx. | Skin<br>Soap wash prompt | |
| Washskin: When contain<br>animals: | Escape GMFOVISCBAE | Ing | verti. dizz. inco head | breath<br>Resp support | (in |
| Remove: When wet or contain<br>liver tumors] | | Con | som, skin eryl. liver | Swallow<br>Medical attention | |
| Change: N.R.<br>Provide: Eyewash, Quick drench | | | damage, (carc] | immed | |

**Perchloroethylene.** (Tetrachlorocthylene). CAS: 127-18-4. C12C:CC12.

Properties:

Colorless liquid, ether-like odor, extremely stable, resists hydrolysis, d 1.625 (20/20C), bp 121C, fp -22AC, bulk d 13.46 lb/gal (26C), refr index 1.5029 (25C), flash p none. Miscible with alcohol, ether, and oils; insoluble in water. Non-flammable.

Derivation:

(1) By chlorination of hydrocarbons and pyrolysis of the carbon tetrachloride also formed,

(2) from acetylene and chlorine via trichloroethylene.

Method of purification: Distillation.

Grade: Purified, technical, USP, as tetrachloroethylene, spectrophotometric.

Hazard: Irritant to eyes and skin. TLV: 50 ppm in air.

Use: Dry-cleaning solvent, vapor-degreasing solvent, drying agent for metals and certain other solids, vermifuge, heat transfer medium, manufacture of fluorocarbons.

## 2.0 Trichloroethylene (TCE)

### Introduction

Trichloroethylene (TCE) is also known as Triclene, Vitran and by other trade names in industry. TCE is a nonflammable, colorless liquid at room temperature with a somewhat sweet odor and a sweet, burning taste. This manmade chemical does not occur naturally in the environment. TCE is now mainly used as a solvent to remove grease from metal parts. It is also used as a solvent in other ways and is used to make other chemicals. TCE can also be found in some household products, including typewriter correction fluid, paint removers, adhesives, and spot removers. Most people begin to smell TCE in air when there are around 100 parts of TCE per one million parts of air (ppm).

### Fate & Transport

By far, the biggest source of TCE in the environment is evaporation from factories that use it to remove grease from metals. It can also enter the air and water when it is disposed of at chemical waste sites. TCE evaporates easily but can stay in the soil and in groundwater. Once it is in the air, about half will be broken down within a week. When TCE is broken down in the air, Phosgene, a lung irritant, can be formed. Under certain conditions found in the workplace, TCE can break down into chemicals such as Dichloroacetylene and Phosgene. In the body, TCE may break down into Dichloroacetic acid (DCA), Trichloroacetic acid (TCA), Chloral Hydrate, and 2-Chloroacetaldehyde. These chemical products have been shown to be toxic to animals and are probably toxic to humans. Once TCE is in water, much will evaporate into the air; again, about half will break down within a week. It will take days to weeks to break down in surface water; in groundwater the breakdown is much slower because of the much slower evaporation rate. Very little TCE breaks down in the soil and it can pass through the soil into underground water. It is found in some foods; TCE found in foods is believed to come from contamination of the water used in food processing, or from food processing equipment cleaned with TCE. It does not build up in fish, but it has been found at low levels in them. TCE is not likely to build up in the human body.

Exposure Pathways

TCE is found in the outdoor air at levels far less than 1 ppm. When measured several years ago, some of the water supplies in the United States were found to have TCE. The most recent monitoring study found mean levels in surface water ranging from 0.0001 to 0.001 parts of TCE per million parts (ppm) of water and a mean level of 0.007 ppm in groundwater. About 400,000 workers are exposed to TCE in the United States on a full-time (i.e., a 40-hour workweek) basis. The chemical can also get into the air or water in many ways, for example, at waste treatment facilities; by evaporation from paints, glues, and other products; or by release from factories where it is made. Another exposure route is breathing the air around factories that use TCE. People living near hazardous waste sites may be exposed to TCE in the air or in drinking water, or in the water used for bathing or cooking. Products that may contain TCE are some types of typewriter correction fluids, paints and paint removers, glues, spot removers, rug cleaning fluids, and metal cleaners.

Metabolism

TCE can enter the body by breathing air or drinking water containing it. TCE can also enter the body if it gets on the skin. A person could be exposed to contaminated water or air if they live near or work in a factory that uses TCE or if they live near a waste disposal site that contains TCE. If TCE is inhaled, about half the amount breathed in will get into the bloodstream and organs; the rest will be exhaled. If TCE is ingested, most of it will be absorbed into the blood. If TCE comes in contact with skin, some of it can enter the body, although not as easily as when it is breathed or swallowed.

Once in the blood, the liver changes much of the TCE into other chemicals. The majority of these breakdown products leave the body in the urine within a day. Much of the trichloroethylene that is in your bloodstream will be quickly breathed out. Some of the TCE or its breakdown products can be stored in body fat for a brief period, and thus may build up in the body if exposure continues.

Health Effects

TCE was once used as an anesthetic for surgery. People who are exposed to large amounts of TCE can become dizzy or sleepy and may become unconscious when exposed to very high levels. Death may occur from inhalation of large amounts. Many people have jobs where they work with TCE and can breathe it or get it on their skin. Some people who get concentrated solutions of TCE on their skin develop rashes. People who breathe moderate levels of TCE may have headaches or dizziness. Some people who breathe high levels of TCE may develop damage to some of the nerves in the face. Humans have reported health effects when exposed to the level of TCE at which its odor is noticeable. Effects have also occurred at much higher levels. Animals that were exposed to moderate levels of TCE had enlarged livers, and high-level exposure caused liver and kidney damage. However, it is unknown if these changes would occur in humans.

It is uncertain whether people who breathe air or drink water containing TCE are at higher risk of cancer or if their children have more birth defects. People who used water for several years from two wells that had high levels of TCE may have had a higher incidence of childhood leukemia than others. Increased numbers of children were reported to be born with cardiac abnormalities, a finding which is supported by data from some animal studies showing developmental effects of TCE on the heart. However, other chemicals were also in the water from this well. There is no clear evidence that TCE alone can cause leukemia or any other type of cancer in humans. As part of the National Exposure Registry, the Agency for Toxic Substances and Disease Registry (ATSDR) compiled data on 4,280 residents of three states (Michigan, Illinois, and Indiana) who had environmental exposure to TCE. This study found no definitive evidence for an excess of cancers from TCE exposure. In studies using high doses of TCE in rats and mice, tumors in the lung, liver, and testes were found, providing some evidence that high doses of TCE can cause cancer in experimental animals. It is unknown if TCE affects human reproduction.

# TRICHLOROETHYLENE (TCE)

| Chemical name, structurelfomm"la, CAS and RTIECS Nos., and DOT id and guide Nos. | Synonyms, trade names, and conversion factors | Exposure limits (TWA unless noted otherwise) | IDLH | Physical description | Chemical and physical properties | | Incompatibilities and reactivities | Measurement method (See Table 1) |
|---|---|---|---|---|---|---|---|---|
| | | | | | MW, BP, SOL<br>FI.P. IP. Sp. Gr.<br>flammability | VP. FRZ<br>LIEL LEL | | |
| 1.1.2-Tnchloroethane | Ethane Inctdonde. | NIOSH | Ca | Colorless liquid | MW. 133 « | VP 19mm | Strong oxidizers | char, |
| | 11-Trichicroettuirie. | Ca | [100ppm] | with a sweet, | BP.237°F | FR.7 .3.4'F | a. caustics: | CS, |
| CHCI,CH.CI | Vinyl incrilande | See Appendix A<br>**SeeAppendlxC** | | chloroform-like | Sol 0.4% | UEL 11151% | critemically-actrve | **CI~ID,** |
| | | (Chloroethanes) | | odor. | FIY ? | LEL 6% | metals(such as | [if |
| 79 00-5 | | 10 ppm (45 mg/m~) | | | IP. 11 .00 eV | | aluminum, magnesium | 101003, |
| KJ3150000 | | Iskinj | | | | | powders. sodium & | Haloge |
| | | OSHA | | | | | potassium) | nated |
| | | 10 ppm (45 mgW) | | | Sp.Gr 1.44 | | | Hydro |
| 2831 74 | 1 ppm 5,55 mglml | [skin] | | | Combustible Liquid, forms dense soot | | | carbons) |
| | | Recommendations s | | | | | | |

| Personal protection and:anitat! n organs | for respirator selection-maximum concentration for use (MLIC) | Health hazards | | | | |
|---|---|---|---|---|---|---|
| | | Route | Symptoms | First aid | | Target |
| Skin: Prevent skin contact | NIOSH | Inn | Ina eyes. nc5e CNS | Eye | trimmed | Eyes, |
| resp sys. CNS, | | | | | | |
| Eyes: Prevent eye contact | V SCBAF PD.PPISAF PD.PP ASC3A | Abs | depres: liver, kidney | skin | Soap wash prompt | liver, |
| kidneys | | | | | | |
| Washskin: Whencontam | Escape GMFOVISCBAE | Ing | damage. derm; | Breath | Resp support | (in |
| animals: | | | | | | |
| Remmie: Whanwetorcontzm | | Con | | Swallow~ | Medical attention | liver |
| cancer) | | | | | | |
| Change: N.R. | | | | | immed | |
| Provide: Eyewash. Quick drench | | | | | | |

[1,1,2-Trirhloroethanel

**1,1,2-trichloroethane.** (vinyl trichloride; β-trichloroethane). CAS: 79-00-5. CHC12CH2Cl.

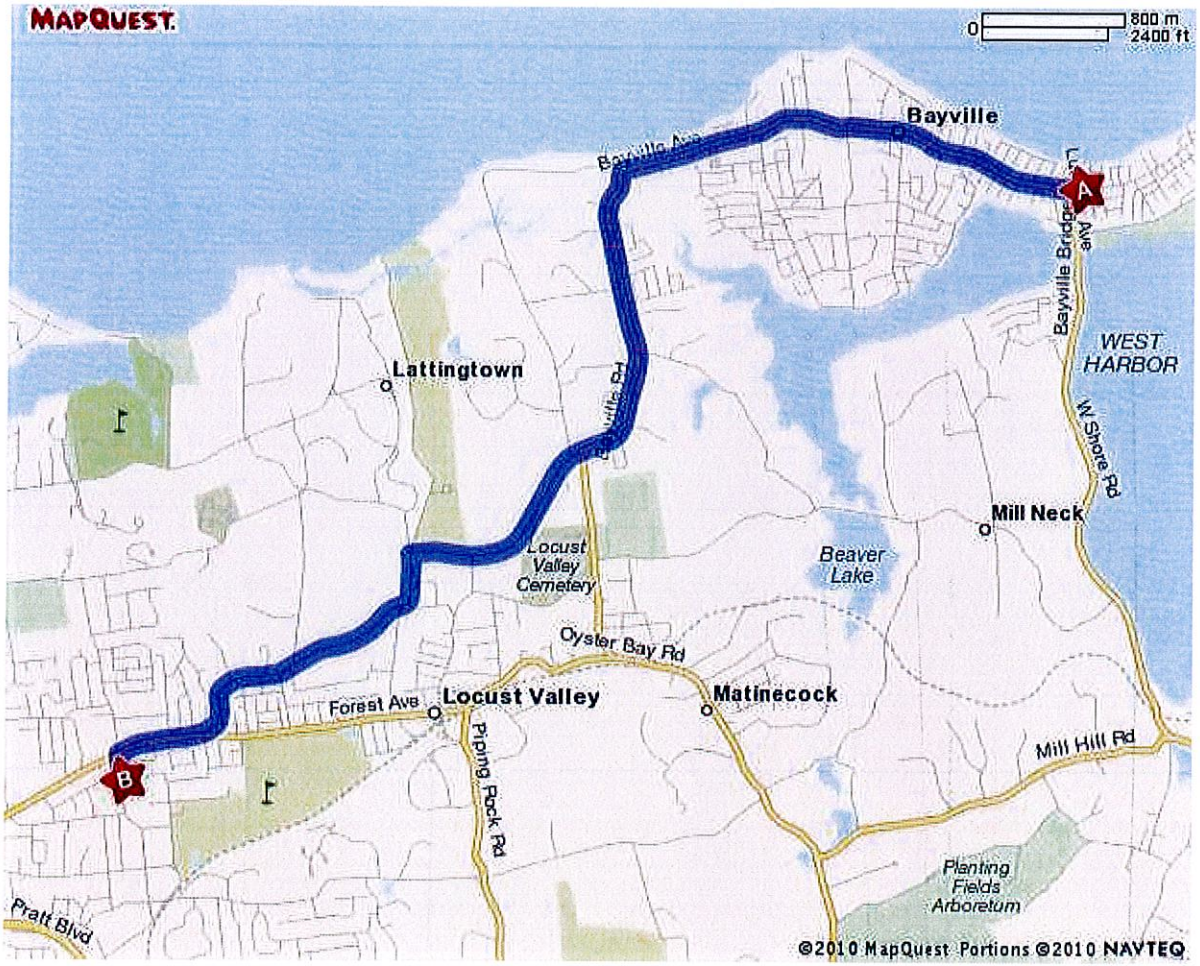
Properties: Clear, colorless liquid, characteristic sweet odor, bp 113.7C, d 1.4432 (20C/4C), refr index 1.4458, vap press 16.7 mm Hg (20C), bulk d 12.0 lb/gal (20C), fp -36.4C, flash p none. Miscible with alcohols, ethers, esters and ketones; insoluble in water. Non-flammable.

Grade: Technical.

Hazard: Irritant, absorbed by skin. TLV: 10 ppm in air.

Use: Solvent for fats, oils, waxes, resins, other products; organic synthesis.

## Appendix V: Directions to Nearest Hospital




| | | |
|---|---|---|
| 1. | Start out going WEST on BAYVILLE AVE. toward 17th St. | 1.9 mi |
| 2. | BAYVILLE AVE. becomes BAYVILLE RD. | 1.3 mi |
| 3. | Stay STRAIGHT to go onto HORSE HOLLOW RD. | 0.9 mi |
| 4. | Turn LEFT onto LATTINGTOWN RD. | 1.2 mi |
| 5. | Turn SLIGHT RIGHT onto FOREST AVE. | 0.4 mi |
| 6. | Turn LEFT onto WALNUT RD. | 0.1 mi |
| 7. | Turn RIGHT onto ST ANDREWS LN. | 0.0 mi |
| 8. | 101 SAINT ANDREWS LN. | |

# Appendix F

## COMMUNITY AIR MONITORING PLAN (CAMP)

**Bayville Village Cleaners**
**Bayville, New York**
**VCP #:V00220-1**
**Voluntary Cleanup Agreement #:W1-0848-9903**

**APPENDIX F**
**New York State Department of Health**
**Generic Community Air Monitoring Plan**

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 volatile organic compounds (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 NYSDEC/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. 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.

- 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.

- 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.

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

All 15-minute readings must be recorded and be available for State (DEC and DOH) 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.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) 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/m3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 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/m3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.