The Johnson Company ENVIRONMENTAL SCIENCE AND ENGINEERING SOLUTIONS

ph (802) 229-4600
fax (802) 229-5876
100 State Street, Suite 600
Montpelier, VT 05602
www.johnsonco.com

December 31, 2012

Mr. Matt Becker
Vermont Department of Environmental Conservation
Waste Management Division
103 South Main Street, West Building
Waterbury, Vermont 05671

Re: Corrective Action Feasibility Investigation Up-date and Corrective Action Plan Addendum
Former Fillipo Cleaners, 84 Woodstock Ave., Rutland, Vermont
SMS Site #97-2194

VIA E-MAIL

JCO Project No. 3-2218-7

Dear Mr. Becker:

The Johnson Company is pleased to present the Vermont Department of Environmental Conservation (VT DEC) with the following Corrective Action Feasibility Investigation Up-date and Corrective Action Plan Addendum for the Fillipo Cleaners Site in Rutland, Vermont. Field work for the project included groundwater and soil vapor sampling and analyses. Also included in the project was an evaluation of remedial alternatives designed to mitigate potential vapor intrusion impacts to nearby properties from the Fillipo Cleaners Site.

Thank you for the opportunity to provide these services to VT DEC. Please do not hesitate to contact me should you have any questions or concerns pertaining to this project.

Sincerely,

THE JOHNSON COMPANY, INC.

By: _____
Donald M. Maynard, P.E.
Senior Geologist/Engineer

Attachments

Fillipo Drycleaners 97-2194 CAFI-CAPAddendum 123112.docxReviewed by: PCS-CFF-CE

□ Initial Site Investigation X Corrective Action Feasibility Investigation Update X Corrective Action Plan Addendum □ Corrective Action Summary Report □ Operations & Monitoring Report	□ Work Scope X Technical Report □ PCF Reimbursement Request □ General Correspondence

Corrective Action Feasibility Study Update and Corrective Action Plan Addendum

Former Fillipo Cleaners
84 Woodstock Avenue
Rutland, Vermont

SMS Site #97-2194

Prepared for:
Vermont Department of Environmental Conservation
Waste Management Division – Sites Management Section
Contact: Matt Becker

Prepared By:
The Johnson Company, Inc.
100 State Street, Suite 600
Montpelier, Vermont 05602
Contact: Donald M. Maynard, P.E.
(802) 229-4600

December 31, 2012

EXECUTIVE SUMMARY

This Corrective Action Feasibility Investigation Up-date and Corrective Action Plan Addendum for the Fillipo Cleaners Site located at 84 Woodstock Avenue in Rutland, Vermont (the Site; VT SMS Site #97-2194) has been prepared by The Johnson Company, Inc. (JCO) under contract with the Vermont Department of Environmental Conservation, Waste Management Division, Sites Management Section (VT SMS). Sections 1.0 through 3.0 constitute the Corrective Action Feasibility Investigation Up-date portion of the report, and Sections 4.0 through 8.0 constitutes the Corrective Action Plan Addendum.

The Site was used for dry cleaning, a coin-operated Laundromat, and as an auto repair shop and gasoline service station. The 84 Woodstock Ave. property has been vacant since the "Fillipo Cleaners and Tailors" dry cleaning operation ceased in approximately 1993. The front of the building previously on the property was demolished in 2004, and the back in June 2008. The property is currently owned by Second City LLC, a development company that desires to redevelop the property into commercial/retail use.

The Site has been the subject of many investigations over the years, beginning in 1997 and most recently in 2012 as described in this report. The primary contaminants of concern at the Site are chlorinated volatile organic compounds; specifically tetrachloroethene (PCE) and its degradation products trichloroethene (TCE), cis-1, 2 dichloroethene (cis-1, 2-DCE) and vinyl chloride.

Additional field data collected during this project included chlorinated volatile organic compound (CVOC) analysis of groundwater and soil vapor samples, groundwater level measurements, an elevation re-survey of the remaining monitoring wells, and inorganic analysis of selected groundwater samples.

The nature and extent of contamination, hydrogeologic and geologic conditions, and potential associated human health and ecological risks have been defined by the extensive investigations completed to date. The testing completed on and in the vicinity of the Site is summarized as follows:

- Sampling and analysis of 24 monitoring wells (many of which have been sampled multiple times);
- Sampling and analysis of 53 surface and subsurface soil samples;
- Sampling and analysis of soil vapor samples along Harrington Avenue, on-site sub-slab vapor screening samples, and indoor air samples from the adjacent 91 Harrington Avenue residence;
- Sampling of surface water;
- Hydraulic conductivity testing

The results of these investigations provided a basis for the following Conceptual Site Model (CSM).

The overburden is comprised of silty sand, gravel outwash and ablation till deposits overlying dense basal silt tills. Groundwater is present at approximately ten feet below grade (at the elevation of the former Fillipo basement slab) and at or within a few feet of ground surface downgradient on the JAMAC property. Groundwater generally flows toward the south.

There are two potential PCE source areas; both in the former Fillipo dry-cleaning facility building. PCE and TCE are present in on-site soils beneath the former building at concentrations above the Vermont Soil Screening Values for residential and industrial use. PCE concentrations in soils at groundwater near the source areas suggest that the solvent may be present as DNAPL.

PCE and TCE are present in groundwater above the Vermont Groundwater Enforcement Standards on the Site and adjacent JAMAC property to the south. The groundwater plume has been documented to be at least 50 feet wide, 250 feet long and 15 feet deep. Concentrations at the southern edge of the monitoring network at Harrington Avenue have increased since the previous monitoring event conducted in 2009, suggesting the contaminant plume is expanding to the south. PCE and TCE are present in groundwater above their Vermont Vapor Intrusion Target Groundwater Concentrations at locations within 100 feet of some residences located along the south side of Harrington Avenue. The limits of groundwater contamination above applicable standards and guidance values are unknown downgradient to the south, and the eastern limit is uncertain. The maximum depth of groundwater contamination is unknown.

Shallow soil vapor tests at two locations adjacent to, and south of Harrington Avenue did not detect any chlorinated volatile organic compounds. However, a duplicate of one sample, collected approximately 25 feet in front of the residence at 84-86 Harrington Avenue, was reported to contain 9.4 $\mu g/m^3$ TCE, which is above the Vermont Shallow Soil Gas VI Screening value of 5 $\mu g/m^3$. The presence of this compound in the duplicate, but not the parent sample, combined with the absence of the primary contaminant of concern, PCE, in either, suggests that cross-contamination of the duplicate sample canister from off-site sources (during transport, in the laboratory or due to inadequate cleaning following previous use) may be the source of the reported TCE.

A Class III wetland is present on the JAMAC property above the dissolved CVOC contaminant plume in groundwater. Previously collected surface water samples did not contain detected CVOC in the wetlands.

Available data indicates that all buildings in the vicinity use public water supplies, and no water supply wells are currently at risk of contamination from the Site.

Potential risks to potential human health receptors include:

- Potential future potable use of CVOC contaminated groundwater from potential future water supply wells.
- Potential physical and/or inhalation exposure of construction workers to CVOC present in contaminated soils beneath the former Fillipo building.

- Potential indoor air inhalation exposure in residences south of Harrington Avenue and any new buildings built on the former Fillipo or JAMAC properties.

The following remedial alternatives were developed, all of which required institutional controls:

- Alternative 1: Excavation and Off-site Soil Disposal or Treatment;
- Alternative 2: Permeable Reactive Barrier;
- Alternative 3: Potential Receptor Vapor Mitigation.

The remedial alternatives were analyzed in detail and compared using evaluation criteria including overall protection of human health and the environment, compliance with regulations, long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost, and community acceptance. Capital cost estimates were prepared following EPA's *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*. These estimates include construction oversight, design, permitting, and professional services, which were estimated as a percentage of the direct capital costs. Consistent with the EPA guidance document, these estimates roughly correspond to a level of certainty of -30% to +50%. A synopsis of the comparison of alternatives is summarized below.

Institutional controls will be needed to protect human health unless all three remedial alternatives are implemented. These controls should include:

- Groundwater reclassification to Class IV (non-potable), or implementation of municipal regulations preventing use of groundwater for potable purposes within the CVOC dissolved plume that has concentrations above Vermont Groundwater Enforcement Standards.
- Deed restrictions requiring Site Specific Health and Safety Plans, work plans and Vermont Sites Management Section approval prior to excavation on the former Fillipo property (not needed if Alternative 1, Excavation, is implemented).
- Deed restrictions for the former Fillipo and JAMAC properties preventing construction of cellars, and requiring installation of vapor intrusion barriers and sub-slab depressurization systems for all new construction.

<u>Alternative 1:</u>
Alternative 1 includes the excavation of approximately 1,300 tons of soil from beneath the former Fillipo building (875 cubic yards at 1.5 tons/cubic yard), and transport of it off-site for treatment or disposal at a licensed facility. The goal of the work would be to remove the core of the contamination, and allow natural attenuation processes to reduce groundwater, soil vapor and indoor air concentrations to acceptable levels over time. The excavation size needed to reach Vermont Residential Soil Screening Levels of 800 µg/kg PCE and 860 µg/kg TCE is approximately 75 feet long by 22 feet wide and 15 feet deep. This area is considerably greater than that proposed in the WEM 2010 Corrective Action Plan (CAP) in order to encompass all known areas of soils contaminated above the Soil Screening Levels, and due to anticipated

feasibility considerations related to difficulties with excavation of local "hot spots" in saturated groundwater conditions. Due to the presence of groundwater at or near the former Fillipo building cellar elevation several items were included in Alternative 1 that were not included in the WEM 2010 CAP. For instance, sheet piles will be needed around the excavation to control groundwater in-flow, and to provide stability of the excavation walls. Excavation stability is of particular concern due to the presence of active in-use petroleum underground storage tanks located approximately 15 feet to the east below the adjacent Irving Mainway property. It was assumed that sheet piles could be driven to 1.5 times the excavation depth. On-site treatment for CVOCs in groundwater infiltrating into the excavation is also included in this remedy. Additionally, the cost estimate for Alternative 1 includes transport and disposal of the soils as F002 listed wastes. F002 wastes include spent solvents mixtures and blends which contained more than 10% PCE before use. The WEM CAP assumed that the contaminated soils were not listed hazardous wastes, and could be disposed of at a local lined landfill. The WEM CAP total estimated excavation, transport and disposal costs for 336 tons (at 1.08 tons/cubic yard) were approximately $64,000. The estimated cost to implement Alternative 1 as described above is approximately $665,000 to $815,000. If the soil were not a listed waste, and WEM estimates of $90/ton instead of $195/ton transport and disposal costs were used, $138,000 in savings could be anticipated.

Alternative 2:

Alternative 2 includes placement of a permeable reactive barrier (PRB) along the north side of Harrington Avenue. The goal of this alternative is to treat contaminated groundwater in-situ to prevent continued expansion of the dissolved contamination plume, and to protect downgradient residences from potential indoor air inhalation risks. The proposed PRB would be built using zero valent iron, which degrades CVOC to non-toxic by-products. The PRB is designed to be more permeable than the surrounding soils, and to be two feet wide, which will provide a minimum of four days residence time. A 20 foot deep PRB was designed to insure at least two feet penetration into the basal till. A hundred foot length (from MW-17D to a distance 40 feet east of the sanitary sewer) was designed, to insure capture and treatment of all groundwater contaminated above applicable standards and guidance levels. Sheet-piling and groundwater collection and treatment are included in the cost estimate. In contrast, the WEM CAP assumed a 25-foot long by 17-foot deep PRB, non-hazardous waste soil disposal, no sheet piling, and no groundwater infiltration or treatment during construction. The WEM CAP total estimated PRB cost was approximately $40,000. The estimated cost to implement Alternative 2 as described above is approximately $430,000 to $530,000. A shorter 50-foot barrier, which could be installed if the groundwater plume width were confirmed to be less than forty feet, would cost approximately $257,000 to $315,000.

Alternative 3:
Alternative 3 includes vapor intrusion mitigation systems for two residences with cellars, which are present downgradient of the observed CVOC plume in groundwater: 82 and 84-86 Harrington St., Rutland, VT. Soil vapor could enter the basements through cracks/openings and/or utility penetrations in the walls and/or floors. Available groundwater level data suggests that the cellars may extend below the groundwater table during portions of the year. If the cellars are not watertight groundwater could enter the residences and release CVOC vapors. The specific construction details and uses of the cellars have not been evaluated. Vapor intrusion mitigation includes a combination of passive vapor barriers and vapor collection/discharge systems. If necessary, due to "wet basements" they also include groundwater collection, treatment and discharge. These components prevent soil vapors from entering the residence from outside the building by creating a vacuum beneath and outside the foundation, and by controlling groundwater influx. The estimated costs of design and installation of indoor air abatement systems for two residences at 82 and 84-86 Harrington Avenue are $150,000. These costs include "Worst Case" assumptions as follows: Unfinished cellars with dirt floors, groundwater infiltration/sumps, and fieldstone walls. If the cellars are cast-in-place concrete, dry, and with existing sub-slab gravel bedding, the costs would be approximately half of that estimated above.

Recommendations:
The following additional tasks are recommended in order to confirm the nature and extent of the contamination, and support the chosen alternative:

1. Obtain or conduct a property line survey of both the JAMAC and former Fillipo properties, including placement of permanent corner pins, to insure any active remedial action remains within properties that have access agreements. Include a survey of the Harrington Avenue right-of-way to support installation of monitoring wells and other intrusive activities.
1. Update and distribute an updated news release/public relations document describing the contamination and proposed corrective action to the owners and renters of 82 and 84-85 Harrington Avenue residences. Contact and notify municipal authorities, provide them with similar information and discuss utility concerns as needed. Obtain access agreements.
2. Install three pairs of 2-inch diameter monitoring wells in the right-of-way along the south side of Harrington Avenue. Each pair of wells should have a shallow member with a five-foot screen straddling the water table, and a deep member with a five-foot screen just above the basal till. One well pair should be located near SV-2, across the street from existing well MW-18D, and the other two pairs at locations approximately 50 feet to the northwest and southeast from the first. Continuous soil samples should be collected to confirm the stratigraphy at all deep well locations from ground surface to refusal. The portion of the boreholes in the basal till should be sealed with bentonite pellets during well installation to prevent potential contaminant migration to the bedrock.

3. Purge and collect low-flow samples for 8260B CVOC analysis from all existing and the six new wells to determine the magnitude and extent of groundwater contamination as it changes over time.
4. Perform hydraulic conductivity slug tests of the six new wells to confirm the rate of contaminant travel and required minimum permeability of a permeable reactive barrier.
5. Evaluate the foundation construction of 82 and 84-85 Harrington Avenue residences, and collect sub-slab soil gas samples for CVOC analysis beneath both buildings. These data should be used to refine vapor abatement costs if needed, and to determine if a current health risk exists.
6. Collect a sample of the water in the storm drain in front of 91 Harrington Avenue, and any sumps in the cellars of 92 and 94-96 Harrington, analyze them for CVOC. Determine the discharge location of any sump pumps, and of the pipe extending south from the storm drain in front of 91 Harrington Avenue, in order to evaluate potential threats to human health or the environment from those discharges.

The lack of available data for groundwater quality in bedrock may be a data gap, given that PCE concentrations at the source areas indicate the possible presence of DNAPL.

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LIST OF ACRONYMS

®	Registered Trademark
°C	Degrees Celsius
µg	Micrograms
1,1 DCE	1,1 dichloroethene
µg/kg	microgram per kilogram
µg/L	micro grams per liter
µg/m3	micrograms per cubic meter
µS/cm	micro Siemens per centimeter
AMSL	Above Mean Seal Level
BTEX	benzene, toluene, ethylbenzene, and xylene
btoc	below top of casing
CAFI	Corrective Action Feasibility Investigation
CAP	Corrective Action Plan
CFR	Code of Federal Regulations
Cis-1, 2 DCE	*Cis*-1, 2 dichloroethene
COPC	Chemical of Potential Concern
CSM	Conceptual Site Model
CVOC	Chlorinated volatile organic compound
Dia.	Diameter
DNAPL	Dense Non Aqueous Phase Liquid
DO	Dissolved oxygen
DRO	Diesel Range Organics
ELCR	Excess Lifetime Cancer Risk
ERH	Electro-Resistive Heating
Ft	Feet
Fbgs	Feet below ground surface
Fbtoc	Feet below top of casing
ft/mile	feet per mile
Fpd	Feet per day
ft/s	feet per second
GAC	Granular Activated Carbon
GIS	Geographic Information System
GPM	Gallons per Minute
GRO	Gasoline Range Organics
HI	Hazard Index
Hr	Hour
IC	Institutional Control
In	Inch
in/wk	inches per week
IDW	Investigation Derived Waste
IROCP	Investigation and Remedial of Contaminated Properties Procedure

JCO	The Johnson Company
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
L/minute	Liters per minute
MCLs	Maximum Contaminant Levels
mg/L	milligrams per liter
Min	Minute
mL/min	milliliters/minute
MNA	Monitored Natural Attenuation
MS	Matrix Spike
Ms	Millisecond
MSD	Matrix Spike Duplicate
mS/m	milliSiemens per meter
MTBE	methyl-tertiary-butyl-ether
mV	millivolt
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NE	Northeast
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resource Conservation Service
NTU	Nephelometric Units
NW	Northwest
ORP	Oxidation Reduction Potential
OSHA	Occupational Safety and Health Administration
PCE	Tetrachloroethene
PID	photoionization detector
ppbV	parts per billion by volume
ppm	parts per million
PRB	permeable reactive barrier
QA/QC	Quality Assurance/Quality Control
PRG	Preliminary Remedial Goal
Psi	pounds per square inch
RA	Remedial Alternative
RAO	Remedial Action Objective
RL	Reporting Limit
RMS	Root Mean Square
RPD	Relative Percent Deviation
Sfpd	Square feet per day
SE	Southeast
SOP	Standard Operating Procedure
SSHP	Site Safety and Health Plan
SSL	Soil Screening Level
SVOC	Semi Volatile Organic Compounds

SW	Southwest
TIAC	target indoor air concentration
TCE	Trichloroethene
TDS	Total Dissolved Solids
TGWC	target groundwater concentration
TPH-DRO	Total Petroleum Hydrocarbons-Diesel Range Organics
TPH-GRO	Total Petroleum Hydrocarbons-Gasoline Range Organics
Trans-1, 2 DCE	*Trans*-1,2 dichloroethene
TSS	Total Suspended Solids
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UST	Underground Storage Tank
UV	Ultra Violet
VC	Vinyl Chloride
VGES	Vermont Groundwater Enforcement Standard
VOCs	Volatile Organic Compounds
VT DEC	Vermont Department of Environmental Conservation
VT SMS	Vermont Sites Management Section
WEM	Waite Environmental Management
µS/m	microSeimens per meter
Ω-m	Ohm-meters

1.0 INTRODUCTION AND BACKGROUND

This report is a Corrective Action Feasibility Investigation Up-date and Corrective Action Plan Addendum for the Fillipo Cleaners Site located at 84 Woodstock Avenue in Rutland, Vermont (the Site; VT SMS Site #97-2194). The property location is shown on Figures 1, 2 and 3. This report has been prepared by The Johnson Company, Inc. (JCO) under contract with the Vermont Department of Environmental Conservation, Waste Management Division, Sites Management Section (VT SMS). Sections 1.0 through 3.0 constitute the Corrective Action Feasibility Investigation Up-date portion of the report, and Sections 4.0 through 8.0 constitute the Corrective Action Plan Addendum. Figures and Tables are provided at the end of the document.

Much of the background information in this report is copied or summarized from previous investigation documents. The reader is directed to the Waite Environmental Management (WEM) Corrective Action Feasibility Investigation (CAFI) dated March 30, 2010, and the WEM Corrective Action Plan (CAP) dated August 9, 2010 for additional details.

The Site was used for dry cleaning, a coin-operated Laundromat; and as an auto repair shop and gasoline service station. The property has been vacant since the "Fillipo Cleaners and Tailors" dry cleaning operation ceased in approximately 1993. It is currently owned by Second City LLC, a development company that desires to redevelop the property into commercial/retail use.

The primary contaminant of concern is the dry-cleaning chemical tetrachloroethene (PCE). Its breakdown or daughter products, trichloroethene (TCE), dichloroethane (DCA), Dichloroethene (DCE) and vinyl chloride are also contaminants of concern. PCE and related chlorinated volatile organic compound (CVOC) contamination has been detected in soils, groundwater and soil vapor.

Although groundwater and soils are contaminated with CVOC above applicable standards and/or guidance limits, there does not appear to be a current direct risk to human health from these media, due to the current lack of buildings or construction on-site and the lack of water supply wells in the area. The primary objective of the project is mitigating the potential risk to downgradient residential receptors due to impacted indoor air. The primary objective will be met by reducing contaminants of concern to acceptable concentrations in groundwater that is migrating in the direction of the residential receptors, or by limiting the migration of contaminated soil vapors entering the residences.

2.0 SITE INVESTIGATIONS

2.1 PREVIOUS INVESTIGATIONS

Environmental investigations of the Site were conducted between 1997 to present. At one time, there were fourteen monitoring wells on the Fillipo site, nine on the JAMAC property, and one on the DuPrey Property (see Figure 4). Eighteen wells were screened in the shallow (overburden) aquifer: MW-1S, MW-2S, MW-3H, MW-4S, MW-5S, MW-6S, MW-7S, MW-8S, MW-9S, MW-11H, MW-12S, MW-13H, MW-14S, MW-15S, MW-16S, MW-17S, MW-18S, and MW-19H. Five wells were screened in the deeper glacial till aquifer: MW-2D, MW-4D, MW-12D, MW-17D, and MW-18D. Of these, six wells (MW-2D, 2S, 12D, 12S, 13H, and 3H) were abandoned by WEM in October 2010 by removing the casings and filling the bores with bentonite (WEM personal communication, September, 2012). As of September 2012, well MW-1S was covered by a large soil stockpile, and MW-4S and MW-5S had been inadvertently destroyed. The remaining wells (and former well locations) are shown on Figure 4.

Environmental investigations of the Site commenced in 1997 with the performance of an Environmental Site Assessment conducted by The Johnson Company. Soil gas tests of 21 locations had photoionization detector (PID) readings from 0 to 37.1 parts per million by volume (ppmV). The highest value was measured in the test location beneath the slab of the concrete basement. Additionally, chlorinated volatile organic compounds (CVOC), including

tetrachloroethene (PCE), trichloroethene (TCE), 1, 2-dichloroethene (1,2-DCE), and vinyl chloride, were reported in groundwater samples. The highest PCE concentration in groundwater of 5,800 parts per billion (ppb or µg/L) was reported under the concrete slab of the building.

Several additional environmental investigations were conducted by Waite Environmental Management between 2006 and 2009. These investigations were conducted under a brownfields program implemented by the Rutland Regional Planning Commission.

WEM conducted environmental site assessments in 2006 which included closure of three petroleum underground storage tanks (USTs) and installation of ten soil borings/groundwater monitoring wells. These investigations indicated fuel oil and gasoline release(s) from the on-site USTs/piping, including the presence of petroleum related compounds in soils, and also in groundwater at concentrations above the Vermont Groundwater Enforcement Standards (VGES). CVOCs were also detected in the soil above applicable guidance values and in groundwater above the VGES. Only trace levels of two semi-volatile organic compounds (SVOCs) and background levels of metals were detected in the soil under the Site.

In 2007 WEM conducted additional subsurface investigations including the installation of groundwater monitoring wells on the abutting DuPrey and JAMAC properties, soil sampling from the sewer line corridor south of the Site, sampling of surface water in the wetland area on the JAMAC property, and re-sampling of the ten existing monitoring wells. CVOC contamination was not detected in the groundwater under the DuPrey property, in the soil next to the sewer line or in the surface water on the JAMAC property. CVOC contamination was defined in an elongated plume extending from the Fillipo building southward onto the abutting JAMAC property.

In 2008 WEM installed eleven additional monitoring wells, collected soils from 15 locations, and tested soil, groundwater and soil vapor. The data indicate that there is minimal unsaturated soil underneath the basement slab of the building, and CVOC concentrations in soils

and soil vapor exceeded applicable guidance values. The highest concentrations of PCE in groundwater were reported at MW-2S (22,000 µg/L) and MW-12S (18,000 µg/L). The highest reported PCE concentration in soil (380,000 µg/kg) was reported at a depth of 12 feet at location SB19 (MW-12) beneath the northeast corner of the building (see Figure 4 for locations and Appendix 1 for details of soil concentrations). The SB19/MW-12 maximum soil concentration is above the PCE water solubility (150 – 250 ppm), indicating that the PCE may be present in the form of dense non-aqueous phase liquid (DNAPL). Dissolved petroleum contamination was detected in groundwater, but was decreasing with time, particularly in well MW-1S near the former tank graves where the USTs were removed in December 2006. Neither petroleum nor chlorinated VOCs were detected in the soil under the JAMAC property. Dissolved petroleum contamination was not detected in groundwater beneath the JAMAC property. Groundwater samples collected in December 2008 suggested that the CVOC plume was increasing in concentration over time in the downgradient direction, and extended southward beyond Harrington Avenue.

In 2009 WEM conducted additional groundwater monitoring in 22 wells, installed one new monitoring well, performed geochemical and aquifer testing, soil and concrete testing for waste characterization, and chemical oxidation pilot testing. Groundwater sampling continued to show CVOCs in an elongated plume extending from the former Fillipo building southward beyond the southern end of the JAMAC property, with increasing concentrations in the south over time in the deeper aquifer. In the pilot test, 360 pounds of a 6% slurry containing the chemical oxidant RegenOx™ was injected into four injection points below the former Fillipo building. Short-circuiting of oxidant to the ground surface prevented injection of the entire design dose. Post injection groundwater sampling revealed the presence of oxidant immediately adjacent to the injection zone (MW-3H) and within 30 feet upgradient of the injection zone (MW-2S) with reductions in CVOC contaminant concentrations at these two locations. Both of these locations are within the Fillipo building footprint and movement of oxidant was likely through the more permeable sub-slab fill material. However, the presence and effect of the oxidant were not observed within 10 feet downgradient of the injection zone, suggesting that the

oxidant did not effectively move through the target native silty sand under the JAMAC property. The inability of the subsurface to absorb the oxidant slurry suggests that the soils have insufficient permeability to use rapid injection remedial techniques. Three weeks after the September 29, 2009 oxidant injection there was a notable spike in dissolved oxygen, a, increase in hydrogen peroxide, and a notable decrease in dissolved manganese in nearby wells, indicating probable manganese precipitation.

Environmental Compliance Solutions (ECS) was contracted by the VT DEC to conduct indoor air, outdoor air, and water sampling at the DuPrey residence in May 2009. Neither petroleum nor CVOC were detected in a water sample from the garage floor drain, or in a drinking water sample from the kitchen tap. CVOC were not detected in air samples collected from under the porch on the north side of the house, nor in those collected indoors from the basement and the first floor.

2.2 2012 INVESTIGATIONS

2.2.1 Field Investigations

Several field investigations were conducted by The Johnson Company (JCO) in autumn 2012 to evaluate current conditions and support a revised evaluation of feasible corrective actions. Well development was performed by JCO on September 21, 2012. Groundwater sampling was conducted between October 2nd and 5th, 2012. Soil Vapor sampling, a re-survey of the well top-of-casings, and a synoptic groundwater level round were performed on November 2nd, 2012.

Well development was performed using a large-diameter peristaltic pump and/or Waterra foot-valve. Water in the wells was pumped was pumped and surged until the well was dry, or until low turbidity water was produced. Well MW-18S produced a large quantity of fine sand during development, and the well began filling up with this material. Therefore, well development was suspended at this well, due to the likelihood of a broken casing or well point.

Representative groundwater samples were collected from 12 monitoring wells using a peristaltic pump and low-purge low-stress sampling techniques. Groundwater samples placed in appropriate containers and shipped on ice in coolers under chain-of-custody procedures to Eastern Analytical Inc. of Concord, NH for laboratory analysis of chlorinated volatile organic compounds (CVOCs) using SW846 Method 8260B. Seventeen wells were initially proposed for monitoring, however several had been sealed and abandoned or destroyed, as described in Section 2.1 above (see Figure 4). As a result, the specific wells monitored for water quality were revised with the verbal approval of the Vermont Waste Management Division – Sites Management Section (VT SMS) Site Manager, Matt Becker. Wells tested in autumn 2012 for CVOC included MW-4D, -7S, -9S, -11H, -14S, -15S, -16S, -17S&D, -18S&D, and -19H.

CVOC analytical results for PCE, TCE, *cis*- and *trans*- 1, 2 DCE and vinyl chloride are presented in Table 1. Appendix 2 contains laboratory reports, and Appendix 3 includes the slow-purge sampling field notes. One field duplicate, one trip blank and one equipment blank were collected and analyzed for CVOCs. The parent sample for the duplicate (Dup-01) was MW-19H. Relative percent differences (RPD) between the two samples ranged from 0% (identical results) for PCE and vinyl chloride, to 3.8% for *cis*-1, 2 DCE and 4.3% for TCE. Trans-1, 2 DCE was not detected. These RPD values are well within the generally accepted maximum RPD for 30% for groundwater samples, indicating that the sampling and analyses were reproducible. No VOC were detected in the equipment or trip blanks. Laboratory quality control testing including: method blanks, calibrations, Laboratory Control Samples and surrogate recovery were within the Method limits, except for the vinyl chloride results for MW-9S, which may be biased high due to surrogate recovery in the diluted analysis (see Appendix 2: EAI 114864 Report, page 5).

Additional inorganic analyte concentration data were collected from four of the most contaminated wells in order to support the feasibility evaluation of the PRB, as well as other potential in-situ remediation techniques. Groundwater collected from MW-4D, MW-11H, MW-

18S and MW-18D were analyzed for total and dissolved iron, manganese and calcium; total organic carbon; alkalinity; and dissolved nitrate, nitrite and sulfate.

Inorganic groundwater quality results are presented in Table 2. Appendix 2 contains laboratory reports. Since the data are not used for compliance purposes, no duplicates or blanks were collected (in accordance with the work plan). Laboratory quality control testing including: method blanks, calibrations, Laboratory Control Samples and surrogate recovery were within the Method limits.

During well purging, a multi-parameter instrument (YSI) was used in accordance with The Johnson Company's Standard Operating Procedure for Low Stress Groundwater Sampling of Monitoring Wells and Piezometers (JCO-SOP-053) to monitor pH, oxidation-reduction potential (ORP), temperature, specific conductivity, and dissolved oxygen concentrations. Turbidity was monitored with a stand-alone turbidimeter. Readings of all parameters were recorded at 3- to 5-minute intervals, and samples were collected when parameters remained stable for three consecutive readings. In several cases the well was pumped dry during purging, even at the lowest effective pumping rate of 150 mL/minute. In this event, samples were collected after allowing the well to recharge in accordance with the SOP. This occurred during sampling of wells MW-4D, -7S, -11H, -15S -17S and -17D. Details are provided in the field notes included in Appendix 3.

Table 3 provides a summary of the field parameter data collected during purging. A "not equilibrium" designation in Table 3 indicates that the well was purged dry, and that the reported field parameters may not reflect actual in-situ conditions. The YSI and turbidimeter were calibrated daily, and the values checked at the end of each day of use. The end-of-day checks indicate that dissolved oxygen (DO) values are accurate to within 1%, ORP to within 2 mV, pH to within 0.1 SU, and specific conductance to within 0.16 mS/cm. Turbidity end-of-day values matched the daily calibration values to within 0.2 NTU. Completed calibration forms are provided in Appendix 3.

Purge, development and decontamination water were containerized in a DOT approved 55-gallon drum, transported off-site under manifest as F002 listed hazardous waste and disposed of by ENPRO of Williston, Vermont. The signed manifest is included at the back of Appendix 3.

During well development, it became apparent that a number of the monitoring wells had "heaved" or shifted, probably due to historic winter frost action, while others had been altered by cutting down the well casing. Therefore, an autolevel was used to re-survey the top-of-casing elevations. Subsequently, a synoptic round of water level measurements was performed using an electronic water marker to evaluate the current groundwater gradient.

All survey elevation and water level measurements were recorded to the nearest 0.01 feet and are presented in Table 4. The elevation survey was checked by repeatedly surveying the top-of-casing elevations of several wells from each of the survey stations. An accuracy of +- 0.02 feet was demonstrated (see survey field notes in Appendix 3).

The original August scope of services was revised as described in an October 31 e-mail to Matt Becker of VT WMD to include shallow soil vapor sampling and analysis. The purpose of this effort was to further evaluate potential impacts to residential indoor air quality. Two temporary soil vapor sampling points were installed and sampled along Harrington Avenue in Rutland. The preferred locations of these points were between the north edge of the pavement on Harrington and existing wells MW-17S and MW-18S. However, groundwater was encountered at less than 20 inches in these locations, so the vapor points were installed on the south side of the street as shown on Figure 4.

The sample collection procedure used was as follows:

1. Hand auger a hole to refusal at approximately 2.0-2.3 feet below ground surface (fbgs). Soils encountered included silty fine sand, medium sand, and particles of coal, slag and asphalt. Detailed soil descriptions are provided the field notes in Appendix 3.
2. Install a decontaminated stainless steel Geoprobe screen (0.5 feet long) equipped with Teflon or Teflon lined tubing to 2.0-2.1 fbgs. Fill the annulus with silica sand to 1.3-1.4 fbgs. Add dry granulated bentonite over the sand in 2-inch lifts and slowly add ¼ cup of DI to the surface of the bentonite. Repeat adding and hydrating bentonite in 2-inch lifts to two inches below ground surface. Add 2" of native material over the bentonite and firmly compact in place to prevent the bentonite from swelling out of the hole. Connect the tubing to a Swagelok 3-way fitting. The third point of the fitting will be used to purge ambient air from the tubing prior to filling the Summa canister.
3. Purge equivalent of 3 sample port well volumes (i.e. the volume of the tubing and screen) with a peristaltic pump for a period of 6-10 minutes and close the valve to the purging port.
4. Attach Summa canisters. Zero the pressure gauge at the summa canisters, open the canister valve, and record the initial vacuum pressure and time. After four hours (or when the pressure gauge reads -4 inches mercury if earlier than 4 hours), measure and record the remaining vacuum, close the valve, detach the canister, and ship to the lab under chain-of-custody protocols. For the duplicate sample, a "Y" tubing connection was installed so that both the parent and duplicate were collected simultaneously. Ship the samples to Alpha Analytical of Mansfield MA for analysis using Method TO-15 for chlorinated volatile organic compounds.

Results of the soil vapor analyses are presented in Table 5, and lab reports are provided in Appendix 2. The canisters were batch cleaned by the Laboratory prior to use. Then one of the batch was tested for VOC at the lab. No CVOC were detected in the cleaned canister. A field blank was transported from and to the lab as an additional quality control measure. No CVOC were detected in the field blank. The canisters all had more than 4 inches mercury vacuum upon receipt by the lab, indicating they likely did not leak during transport. A field duplicate, SV-Dup-01, was collected with SVE-02. 9.4 $\mu g/m^3$ TCE were detected in the duplicate, but none the parent sample. The presence of this compound in the duplicate, but not the parent sample, combined with the absence of the primary contaminant of concern, PCE, in either, suggests that cross-contamination of the duplicate sample canister from off-site sources (during transport, in the laboratory or due to inadequate cleaning following previous use) may be the source of the

reported TCE. The results for laboratory internal quality control testing were all within their accepted values for the Method.

2.2.2 Results

Piezometric Head Elevation

The groundwater and top-of-casing elevations on November 2nd, 2012 are provided on Table 4. Figure 5 presents contours of the shallow and deep aquifer potentiometric surfaces. Both data sets indicate gradients sloping generally towards the south. The shallow water-table gradient (light blue on Figure 5) is wrapped around the wetlands in the southern portion of the JAMAC property, suggesting groundwater discharge to the wetlands. The shallow gradient is approximately 3.5% beneath the former Fillipo property, and 1.5% near Harrington Avenue. These gradients are less than the 4% reported previously in the WEM 2010 CAP. The deep aquifer gradient is towards the south at approximately 2.5%, however only three data points were available in November 2012. The only remaining paired wells; MW-17S&D and MW-18S&D indicate a downward vertical component to the hydraulic gradient near Harrington Avenue, similar to most previous monitoring events.

CVOC Concentrations and Trends

PCE and TCE groundwater results in October, 2012 are shown on Figures 6 through 9. Table 1 provides CVOC data as well. Graphs of water quality over time for selected wells and analytes are provided in Appendix 4.

The CVOC shallow groundwater plume is at least 50 feet wide and more than 250 feet long. One or more Groundwater Enforcement Standards for PCE, TCE, *cis*- 1, 2 DCE and/or vinyl chloride were exceeded in the 2012 samples from the following wells: MW-4D, -9S, -11H, -17D, -18D and -19H.

Declining concentrations observed since 2008 up-gradient of the former Fillipo building in MW-7S were confirmed by the 2012 monitoring event. Cross-gradient well MW-9S continues to show relatively steady CVOC concentrations, although vinyl chloride increased in

2012 above previous reported concentrations. Non-detects in wells MW-14S, -15S, -16S and -17S confirm that the dissolved plume has not spread cross-gradient to the west since the previous monitoring event in 2009.

In the core of the plume, Wells MW-19H had increases in PCE since 2009, while MW-11H PCE concentrations remained stable. TCE, *cis*- 1, 2 DCE and vinyl chloride increased in MW-19H. In the downgradient well MW-18S, PCE increased slightly to 3 µg/L, while TCE and *cis*- 1, 2 DCE declined from their 2009 values.

PCE increased since 2009 in two of the three remaining deep wells. PCE in MW-4D more than doubled to 9,300 µg/L, while PCE in MW-18D increased from 30 µg/L in 2009 to 220 µg/L in 2012. PCE in MW-17D was reported at 6 µg/L in 2012, similar to the 4 µg/L reported in 2009, and 5.8 µg/L reported in August 2008.

Inorganic Analyses and Field Parameters

Total iron ranged between 0.10 and 0.84 mg/L, with the highest concentration reported in MW-18S. These data are lower than the values reported in the 2012 WEM CAFI (ranging between 1.6 and 11.8 mg/L) even after an inadvertent CAFI error reporting µg/L as mg/L is corrected. The reduction in reported total iron in the 2012 data compared to the 2009 and 2012 data is attributed to the successful redevelopment of the wells, and subsequent low turbidity values of the samples. No dissolved iron was detected in the 2012 samples.

Total manganese concentrations in 2012 ranged between 0.078 mg/L (in MW-11H) to 0.25 mg/L. Dissolved manganese in 2012 ranged between 0.026 mg/L in MW-11H to between 0.20 and 0.23 mg/L in MW-4D and MW-18S and D. The similarity of the dissolved and total concentrations indicates that most of the manganese in the aquifer is in the dissolved form. Most of these levels are similar to, but slightly lower than those reported in the 2009 CAFI (after correction into mg/L from µg/L).

Dissolved sulfate concentrations reported in 2012 between 24 and 37 mg/L are similar to those reported in the WEM 2010 CAFI.

The total and dissolved calcium, dissolved chloride and total alkalinity concentrations reported in the 2012 samples are provided in Table 2. The concentrations reported are not excessive when compared with typical New England overburden values. Chloride concentrations are similar to those expected in developed areas. No dissolved nitrate was detected, and only one well (MW-4D) had detectable levels of total nitrate (2.3 mg/L), indicating minimal in-situ nitrogen nutrients available in the aquifer. Total organic carbon was lowest in MW-4D, at 0.8 mg/L, and ranged upward to 4.8 mg/L in other wells. These levels are typical of low-organic materials deposited in ice-proximal glacial environments. Low nitrates and low organic carbon generally reduce the viability of in-situ natural biodegradation.

Almost none of the field parameter measurements were taken at equilibrium due to the low productivity of the wells. Wells MW-9S, MW-14S, MW-16S, MW-18S&D and MW-19H reached equilibrium during purging. The following discussion is limited to those six wells. Dissolved oxygen (DO) levels in 2012 ranged between 0.31 to 2.78 mg/L and ORP ranged from 202 to 440 mV (except a reported -69 mV in MW-9S), indicating a moderately oxygenated environment. pH was between 6.06 and 7.08 SU, suggesting a nearly neutral to slightly acidic nature to the groundwater. Specific conductance measurements were between 1,197 and 3,365 us/cm.

Soil Vapor

No CVOCs were detected in the downgradient shallow soil vapor samples SV-01 and SV-02 (see Figure 4 for locations). However, a duplicate of SV-02 was reported to contain 9.4 $\mu g/m^3$ TCE, which is above the Vermont Shallow Soil Gas Vapor Intrusion (VI) Screening Value of 5 µg/m3. As discussed above, this reported TCE detection in the duplicate might be the result of a laboratory or sampling artifact, and not representative of in-situ conditions.

3.0 CONCEPTUAL SITE MODEL

Much of the Conceptual Site Model presented below is based upon data in the 2010 WEM CAP and CAFI reports. The reader is encouraged to refer to those reports for additional details.

3.1 SITE PROFILE

3.1.1 Site Description and Location

Fillipo Dry Cleaners is on approximately 0.18 acres at 84 Woodstock Avenue (U.S. Route 4) in Rutland, Vermont (City of Rutland tax parcel #14849). The abutting property to the south is known as the "JAMAC property". This property is identified as "Lot 5 & 6" on Harrington Avenue and as City of Rutland tax parcel #12729.

The Site was operated as a dry cleaning facility between the 1970s and early 1990s. The WEM CAP reports that the Site formerly had five (5) petroleum underground storage tanks (USTs). Three were closed by WEM in 2006. The 84 Woodstock Ave. property has been vacant since the "Fillipo Cleaners and Tailors" dry cleaning operation ceased in approximately 1993. Until recently, the only building on the property was a two-story cement block building. The front of the building, built on a slab, was demolished in 2004, and the back (which had a cellar) in June 2008. The first floor of the building was at grade with the street level. The former concrete floor of the cellar is broken and allows infiltration at this time.

The Site has a municipal water service from Woodstock Avenue connected to northwest corner of the building. A municipal sewer line (10-inch) parallels the eastern property line (and the eastern JAMAC property line), and was connected to the southeast corner of the Fillipo building (see Figure 4). There was also a basement floor drain in the southeast corner of the former Fillipo basement that was apparently connected to the sewer line.

The uses proposed by current owners are commercial/retail, with a single building on the Fillipo property, and a single building on the JAMAC property. Access would be from

Woodstock Avenue, with the curb cut to be in the northwest corner of the Site. The driveway would slope downward from Woodstock Avenue onto the northern half of the JAMAC property.

3.2 PHYSICAL PROFILE

3.2.1 Topography and Natural Features

The land surface to the north and east of the former building is flat, while the natural topography slopes to the south and east behind and to the west of the former building. (see Figure 3). The JAMAC property is generally flat, with an often wet shallow depression near the southern edge (see Figure 4).

3.2.2 Surface Water and Drainage

Surface water drainage is to the south, particularly on the western side of the former Fillipo building where a sloping paved driveway exists. There are no catch basins or stormwater drainage systems on the former Fillipo or JAMAC property, but stormwater drains are present nearby on Woodstock Avenue**.** A storm drain is also present on Harrington Avenue, in front of the DuPrey residence (see Figure 4). Water was heard flowing in this drain in September 2012 following a relatively dry period, suggesting that groundwater is collected and routed via underground pipes southward from this location.

3.2.3 Bedrock Geology

The Vermont Geological Survey 2011 Bedrock Geological Map of Vermont indicates that the bedrock in the area is Dunham Dolostone (Lower Cambrian). The rock is characterized by buff- and pink-mottled poorly bedded dolostone. It contains distinctive small pebbles and grains of well-rounded quartz. Minor beds of dolostone-breccia and conglomerate occur near Rutland.

No bedrock has been encountered in soil borings on-site or under abutting properties. The Vermont Geological Survey Depth to Bedrock map indicates less than 30 feet to rock (see Figure 10). There are no existing public or private drilled bedrock wells within 0.5 miles of the site (WEM, 2010).

3.2.4 Overburden Geology

The overburden deposits in this part of the state are ice contact and terminal moraine materials from the most recent Wisconsian glacial period. As observed in the soil borings, these soils include: poorly sorted silty sand and gravel ablation till deposits overlying dense silty basal tills. A four-foot thick well graded sand and gravel unit is reported to be present between these two lower permeability units on the JAMAC property (see WEM 2010 Cross Section A-A" in Appendix 1).

The Soil Conservation Service has mapped the soils below the Site as Paxton Series, consisting primarily of silt loam to depths of six feet.

Soil logs describe soils under the northern portion of the property as silty fine sand with gravel down to a depth of 12 ft. The shallow soil in the northern portion of the Fillipo property was interpreted by WEM to be fill material brought in during the construction of Woodstock Avenue and development of the property.

Soil stratigraphy under the Fillipo building was reported by WEM to be gravel fill immediately under the concrete slab underlain by native silty sand. The Waite Environmental Management (WEM) Corrective Action Plan (CAP) dated August 9, 2010, reports that soils beneath the former building have a porosity ranging from 40-63% and a "high" organic content. Site specific soil porosity and total organic carbon data were not found in the WEM CAP.

Soil stratigraphy under the JAMAC property to the south is reported by WEM to consist of native silty sand underlain by fine sand with gravel. The fine sand becomes very dense at the contact with a basal silt till at a depth of 16-17 feet below ground surface (fbgs).

3.2.5 Hydrogeology

Depth to groundwater between the former Fillipo building and Woodstock Avenue is reported to be between 5-7 ft. below grade. Depth to groundwater under the building was reported between 0.5-2.0 ft. below the cellar slab. Depth to groundwater under the JAMAC

property varies from 7 fbgs near the JAMAC/Fillipo property line to zero in the wet area to the south.

The groundwater flow direction is toward the south at a shallow gradient of approximately 0.03 to 0.05 feet/foot (see Figure 5).

Based on slug testing data in two wells, the hydraulic conductivity (K) of the silty sand between a depth of 3-8 feet below grade behind the Fillipo building and under the northern portion of the JAMAC property is estimated to be 4.58 E^{-06} ft/sec. MW-19H values were 8.1 and 8.9 E^{-06} ft./sec. MW-4S values were 5.7 and 7.0 E^{-07} ft./sec. The well sorted sand and gravel unit beneath the silty sand likely has a higher hydraulic conductivity.

Using the shallow groundwater hydraulic gradient (dh/dl) in this area (0.04 ft/ft) and a porosity of 30%, the groundwater velocity is estimated to be 18 feet per year. The groundwater velocity in the gravel fill immediately under the Fillipo basement slab, and the fine sand with gravel beneath the JAMAC property, is likely higher. It should be noted that preferential groundwater flow at a higher velocity may occur in the bedding of the buried sewer line present under the eastern edge of the property. This line connects the sewer under Woodstock Avenue downgradient to Harrington Avenue.

3.3 RELEASE PROFILE

3.3.1 Nature of Release

Hundreds of parts per million CVOCs were reported in the saturated soil at MW-12D under the northeast corner of the cellar. These data suggest that the northeast cellar corner was one source area where the solvent tetrachloroethene (PCE) was released. The depth of the highest soil concentration was at 12 feet, suggesting vertical migration of the leaked solvent through the floor and downward as DNAPL to the top of the glacial till. Elevated CVOC concentrations in soils beneath the former dry-cleaning machine in the south-center of the cellar suggest a second release in that area (see Figure 4 and WEM cross Section A-A' (in Appendix 1).

Summarizing the WEM CAP, there had been fuel oil and gasoline release(s) from the former on-site USTs and/or piping. Petroleum contamination in the soil extended from the UST grave southward to at least the northern edge of the Fillipo building, and was also present in the southeast corner of the Fillipo building. Concentrations of petroleum compounds in soil were below EPA soil standards (EPA RSLs). A dissolved petroleum plume extended from the former UST grave towards the southeast. Concentrations of some petroleum compounds in on-site groundwater were above Vermont Groundwater Enforcement Standards (VGES).

3.3.2 Nature and Extent of Contamination

The most recent 2012 groundwater monitoring indicates a dissolved phase plume of CVOCs emanating from the source area southward onto, and beyond the JAMAC property. The plume in shallow groundwater encompasses most of the Fillipo property and the JAMAC property but does not extend southward beyond Harrington Avenue at concentrations above Vermont Groundwater Enforcement Standards (VGES). The CVOC plume above VGES in the deeper groundwater extends further south beyond Harrington Avenue based on recent detections of PCE (220 µg/L) in MW-18D. It is estimated that an area of more than 10,000 square feet has been impacted by dissolved concentrations of CVOCs above VGES. Chlorinated volatile organic compound (CVOC) contamination in groundwater (including PCE and TCE) extends to depths of 20 feet. Groundwater contamination by petroleum VOCs is relatively minor, limited to the Site, and with most concentrations below Vermont standards.

Chlorinated compounds in soil under the Fillipo property exceed risk-based soil standards. PCE was present in soils under the northeastern corner of the former dry cleaning building, with a maximum reported concentration of 380,000 µg/kg at an approximate depth of 12 feet below ground surface. Maximum PCE concentrations reported in groundwater are in excess of 10,000 µg/L. These concentrations are above the water solubility of PCE (150 – 250 µg/L), indicating that PCE may be in the form of pure solvent or dense non-aqueous phase liquid (DNAPL).

Concentrations of select petroleum compounds in groundwater were above Vermont Groundwater Enforcement Standards (VGES). Concentrations of petroleum compounds in soil were below EPA Regional Screening Levels (RSLs).

Both petroleum and CVOC contamination were historically detected at MW-1S, MW-8S, MW-9S, MW-2D, and MW-12D, indicating a co-mingled plume along the eastern edge of the Site.

In 2007 CVOC contamination was not detected in the groundwater under the DuPrey property. CVOC contamination was not detected in the soil next to the sewer line on the DuPrey property. CVOC contamination was not detected in the surface water on the JAMAC property. Neither petroleum nor chlorinated VOCs were detected in the soil under the JAMAC property.

The core of the dissolved CVOC plume in groundwater appears to be migrating southward since 2008 based upon stable or decreasing concentrations under the source area and increasing concentrations downgradient.

Laboratory testing (TCLP) of soil and concrete from the Fillipo cellar proposed excavation zone indicated that the soils are not a characteristically hazardous waste.

3.3.3 Contaminant Fate and Transport

Decreasing PCE concentrations in conjunction with increasing vinyl chloride (VC) concentrations at MW-9S are suggestive of reductive dechlorination that can be stimulated by petroleum hydrocarbons.

Neglecting the effects of retardation, dissolved contaminant migration is expected to reflect the groundwater velocity, on the order of 20 feet per year (or higher in the well sorted sands and gravels below the JAMAC property).

3.4 LAND USE AND EXPOSURE PROFILE

The site was previously used for commercial purposes. It is currently unused. The proposed use is as commercial/retail, with a single building on the Fillipo property, and a single building on the JAMAC property. Access would be from Woodstock Avenue, with the curb cut to be in the northwest corner. The driveway would slope downward from Woodstock Avenue onto the northern half of the JAMAC property.

Drinking water is not considered to be a sensitive receptor because the buildings in this part of Rutland generally have municipal water connections and there are no public water supply sources within at least 0.5-mile of the Site.

WEM also established that there are no neighboring schools, playgrounds or ecologically sensitive areas. However, the wet area near the southern edge of the JAMAC property has vegetation and soil characteristics indicative of a wetland. Since it is not mapped, or contiguous to a mapped wetland area, it is considered a Class III wetland under Vermont regulations. The area of the wetland is less than 1/10 of an acre.

3.5 PATHWAY ANALYSIS

The shallow groundwater at the abutting DuPrey property on Harrington Avenue was considered a potential impacted sensitive receptor until groundwater testing of a monitoring well (MW-10H) on the property in 2007 and testing of the standing water in a garage floor drain in 2009 ruled this out.

The basement and first floor airspace at the abutting DuPrey residence was considered a potentially impacted sensitive receptor until air testing in 2009 ruled this out.

Current and/or future potential receptors include: 1) construction workers contacting contaminated soil or inhaling vapors during excavation beneath the former Fillipo cellar; 2) users

of potential future buildings on the former Fillipo or JAMAC properties due to exposure to contaminated indoor air, 4) potential future users of water supply wells completed in the contaminated plume; and 5) residents downgradient who may now or in the future be impacted by CVOC contamination of indoor air.

No significant ecological receptors have been identified.

4.0 BASIS FOR SITE REMEDIATION

The 2012 Vermont IROCP provides target groundwater concentrations on Table C7 developed in order to protect human health through the indoor air-inhalation pathway. These include tetrachloroethene (PCE) with a target indoor air concentration of 0.57 $\mu g/m^3$ and target groundwater concentration of 0.76 µg/L, trichloroethene (TCE) with a target indoor air concentration of 0.5 $\mu g/m^3$ and target groundwater concentration of 1.19 µg/L, and vinyl chloride, with a target indoor air concentration of 0.11 $\mu g/m^3$ and target groundwater concentration of 0.1 µg/L. Target groundwater concentrations for PCE and TCE have been exceeded in monitoring well clusters MW-18 and MW-17, located less than 100 feet from residences.

A duplicate of one soil vapor sample (SV-02), collected approximately 25 feet in front of the residence at 84-86 Harrington Avenue, was reported to contain 9.4 $\mu g/m^3$ TCE, which is above the Vermont Shallow Soil Gas VI Screening value of 5 $\mu g/m^3$. No CVOC were detected in the parent sample.

VGES for PCE, TCE, *cis*-1, 2 DCE and vinyl chloride are exceeded in groundwater. Vermont industrial and residential soil screening levels (SSLs) are exceeded for PCE and other CVOCs in Fillipo property soils.

5.0 DEVELOPMENT OF REMEDIAL ACTION OBJECTIVES AND PRELIMINARY REMEDIATION GOALS

Corrective action is necessary because:

1) Groundwater standards are exceeded;
2) Risk-based soil standards are exceeded in soil under the former Fillipo building cellar hole footprint;
3) Potential onsite sensitive receptors are at risk from direct contact during construction or future indoor air contamination, particularly if the site is redeveloped for commercial or retail use;

and

4) Potential offsite sensitive receptors are at risk through potential indoor air contamination due to the plume of contaminated groundwater that is migrating southward beneath Harrington Avenue.

Preliminary remedial goals include:

- Prevent ingestion or potable use of groundwater containing CVOC concentrations above Vermont Groundwater Enforcement Standards;
- Prevent direct contact with soils contaminated with CVOC above risk-based limits (residential and industrial Soil Screening Values as risk-based limits may be used in lieu of site specific risk assessments);
- Prevent inhalation of CVOC in indoor air above Vapor Intrusion guidance values.

6.0 IDENTIFICATION AND SCREENING OF REMEDIAL ALTERNATIVES

Several remedial technologies were assessed as to their feasibility in term of implementation and likelihood of success at the Site. Some of these technologies are in addition to, or have been expanded beyond, those described in the 2010 WEM CAP.

Chemical Oxidation

The results of the chemical oxidation pilot test performed by WEM in the fall of 2009 suggest that the strategy of injecting fluids into the aquifer is not a viable option. The injection pilot test event resulted in no significant reduction in contaminant concentrations downgradient of the injection zone on the JAMAC property, which was the intended target of an in-situ remediation strategy. The poor performance was likely due to limited exposure of the soil to the

oxidant due to low permeability in dense soils and prevalence of short-circuiting to the ground surface. This method was not considered viable due to the lack of success of the pilot test.

Soil Mixing with Granular Iron

Soil Mixing with Granular Iron was considered as a potential strategy for the source area. A proposal from Envirometal Technologies, Inc. was used to evaluate this remedial alternative. This technology utilizes a mixture of zero valent iron and clay (ZVI-Clay). The ZVI-clay is mixed in situ with the CVOC contaminated soil. Decreased hydraulic conductivity and degradation of CVOCs reduces the migration of contamination from the source area. Since this strategy is nearly as costly as source area excavation and potentially not as effective, it was not considered a viable option.

In-site Enhanced Biodegradation

Enhanced biodegradation is the process of injecting nutrients into the groundwater that promote growth of biological organisms that degrade PCE and TCE. Nutrients are added to groundwater to create anaerobic conditions that stimulate the growth of CVOC degrading organisms.

Since the CVOC plume has already migrated to Harrington Avenue, the optimal location for enhanced biodegradation treatment would be in close proximity to the sensitive receptors (the residences south of Harrington Avenue). The nutrient injection process would need to be conducted slowly over a period of years based on the low soil permeability and results of the chemical oxidation pilot test.

The probable creation of vinyl chloride, a highly volatile and toxic degradation product of PCE and TCE, is a concern with this technology. Since the primary risk to human health is due to inhalation of indoor air contaminated with soil vapors, this concern is justified. Incomplete degradation of PCE and TCE can result in increases in vinyl chloride in soil vapors and indoor air, resulting in more risk to human health than current conditions.

This alternative was not considered a viable option because of the potential increased risk to human health and the extensive time frame needed to inject nutrients.

Excavation and Off-site Disposal

Excavation of the source area soils is a proven technique for reducing and eliminating downgradient groundwater contamination. The source area in this case is considered to be the soils with concentrations above the IROCP Residential soil screening Values for CVOC (800 µg/kg for PCE and 860 µg/kg for TCE). This area is generally below the former basement of the former Fillipo Laundry.

Excavation would remove the bulk of the contamination permanently and reliably. However, it would not immediately remediate the dissolved contaminant plume extending south to Harrington Avenue. That CVOC plume has increased in concentration at Harrington Avenue since 2008 (PCE in MW-18D was 9.7 µg/L in August 2008 and 220 µg/L in October 2012). However, removal of the source soils containing parts-per-million concentrations of CVOC would likely result in declining concentrations downgradient as dilution, degradation and dispersion act to attenuate the dissolved contaminant plume.

Using a 180 foot distance between the former Fillipo Laundry and Harrington Avenue, and the estimated 18 feet per year groundwater velocity, an order-of-magnitude estimate of the minimum time for clean groundwater to reach Harrington from the remediated excavation is a decade.

Excavation of the source area soils, and their transport and off-site disposal, was retained as a viable option.

Permeable Reactive Barrier

Permeable reactive barriers (PRB) are the placement of materials into the subsurface to cause the degradation of CVOC in the dissolved groundwater plume. The materials cause chemical degradation of CVOC to harmless by-products. The goal of this alternative is to treat contaminated groundwater in-situ to prevent continued expansion of the dissolved contamination plume. As contaminated groundwater flows through the PRB, the CVOCs are treated, and clean groundwater flows out the down-gradient side.

Considerations that need to be incorporated into PRBs include:

- The permeability of the PRB must be greater than that of the surrounding soils, so groundwater flows through, rather than around the PRB;
- The thickness of the PRB must be sufficient to allow sufficient residence time for the CVOC to be degraded;
- The bottom of the PRB needs to be extended to a low-permeability layer (basal silt till or rock in this case), so that contaminated groundwater does not flow beneath the PRB instead of through it;
- The PRB material needs to be compatible with the aquifer chemistry, as changes in the oxidation/reduction characteristics of the groundwater can cause dissolution or precipitation of naturally occurring iron, manganese, arsenic and other compounds which can either 1) plug the PRB or 2) release toxic metals downgradient.

A permeable reactive barrier was retained as a viable option.

Indoor Air Abatement

Vapor intrusion mitigation systems include a combination of passive vapor barriers and vapor collection/discharge systems to protect human health at the potential receptor location. If necessary, due to the presence of "wet basements" they also include groundwater collection. These components prevent soil vapors from entering the residence from outside the building by creating a vacuum beneath and outside the foundation, and by controlling groundwater influx.

Indoor Air Abatement was retained as a viable option.

7.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

Three potential remedial technologies (Excavation, PRB and Indoor Air Abatement) were retained as viable and are further evaluated below. This comparative evaluation included consideration of the following factors:

- Human Health Protection
- Compliance with Preliminary Remediation Goals
- Short and Long Term Effectiveness and Permanence
- Reduction of Toxicity, Mobility and/or Volume of Contaminated Media
- Implementability
- Cost
  and
- Community Acceptance.

Table 6 provides a detailed comparison between the three alternatives based upon these factors. Specific details regarding the design and construction of each alternative are provided below. Appendix 5 contains figures portraying the alternatives, and supporting documentation including cost estimate details. The cost estimates were prepared following EPA's *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*. These estimates include construction oversight, design, permitting, and professional services, which were estimated as a percentage of the direct capital costs. Consistent with the EPA guidance document, these estimates roughly correspond to a level of certainty of -30%/+50%. On-going monitoring and institutional control implementation costs were not included in the estimates, as they are likely to be similar for all three alternatives.

None of the three remedial alternatives completely protect human health immediately. Therefore, institutional controls will be needed to protect human health. These controls should include:

- Groundwater reclassification to Class IV (non-potable), or implementation of municipal regulations preventing use of groundwater for potable purposes within the CVOC dissolved plume that has concentrations above Vermont Groundwater Enforcement Standards.

- Deed restrictions requiring Site Specific Health and Safety Plans, Work Plans and Vermont Sites Management Section approval prior to excavation on the former Fillipo property. This control would not be needed after Alternative 1, Excavation, was implemented.
- Deed restrictions for the former Fillipo and JAMAC properties preventing construction of cellars, and requiring installation of vapor intrusion barriers and sub-slab depressurization systems for all new construction.

7.1 ALTERNATIVE 1 – EXCAVATION AND OFF-SITE DISPOSAL

Alternative 1 includes the excavation of approximately 1,300 tons of soil from beneath the former Fillipo building (875 cubic yards at 1.5 tons/cubic yard), and transport of it off-site for treatment or disposal at a licensed facility. The goal of the work would be to remove the core of the contamination, and allow natural attenuation processes to reduce groundwater, soil vapor and indoor air concentrations to acceptable levels over time.

Conceptual sources of on-going contamination in groundwater at the Fillipo Site include residual DNAPL droplets beneath the former building foundation that diffuse into the soil matrix. If full remediation of the residual source areas is not achieved, groundwater CVOC concentrations are unlikely to diminish sufficiently to reach VGES. Therefore, the proposed extent of excavation includes all soils contaminated above residential SSL values, and confirmation sampling with rapid turn-around-time analysis to insure that highly contaminated residual soils are not left in place.

The excavation size needed to reach Vermont Residential Soil Screening Levels of 800 µg/kg PCE and 860 µg/kg TCE is approximately 75 feet long by 22 feet wide and 15 feet deep (See Figure A1 and revised WEM Cross Section A-A' in Appendix 5. This area is considerably greater than that proposed in the WEM 2010 Corrective Action Plan (CAP) in order to encompass all known areas of soils contaminated above the Soil Screening Levels, and due to anticipated feasibility considerations related to difficulties with excavation of local "hot spots" in saturated groundwater conditions.

Due to the presence of groundwater at or near the former Fillipo building cellar elevation several items were included in Alternative 1 that were not included in the WEM 2010 CAP. For example, sheet piles will be needed around the excavation to control groundwater in-flow, and to provide stability of the excavation walls. Excavation stability is of particular concern due to the presence of active in-use petroleum underground storage tanks located approximately 15 feet to the east below the adjacent Irving Mainway property. It was assumed that sheet piles could be driven to 1.5 times the excavation depth. On-site treatment for CVOCs in groundwater infiltrating into the excavation is also included in this remedy.

Additionally, the cost estimate for Alternative 1 includes transport and disposal of the soils as F002 listed wastes. F002 wastes include spent solvents mixtures and blends which contained more than 10% PCE before use. The WEM CAP assumed that the contaminated soils were not listed hazardous wastes, and could be disposed of at a local lined landfill.

The WEM CAP total estimated excavation, transport and disposal costs for 336 tons (at 1.08 tons/cubic yard) were approximately $64,000. The estimated cost to implement Alternative 1 as described above is approximately $665,000 to $815,000 (details provided in Appendix 5). If the soil were not a listed waste, and WEM estimates of $90/ton instead of $195/ton transport and disposal costs were used, $138,000 in savings could be anticipated.

7.2 ALTERNATIVE 2 - PERMEABLE REACTIVE BARRIER

Alternative 2 includes placement of a permeable reactive barrier (PRB) along the north side of Harrington Avenue (see Figure A-2 in appendix 5 for proposed location). The goal of this alternative is to treat contaminated groundwater in-situ to prevent continued expansion of the dissolved contamination plume, and to protect downgradient residences from potential indoor air inhalation risks.

A proposal from Envirometal Technologies, Inc. was used to evaluate this remedial alternative. This technology utilizes a mixture called zero valent iron, which degrades CVOC to non-toxic by-products. The zero-valent iron treatment wall should be designed with a minimum of four days residence time (the worst case, slowest rate of dechlorination reported in EPA *EnviroMetals treatment technology review document; EPA/540/R-98/501*). Given an 18 feet per year groundwater velocity (0.05 feet per day), the minimum barrier thickness is 0.2 feet. However a 0.2 foot barrier is impractical to install. Instead, a 2 foot barrier is proposed that would be sufficient allowing for an order-of-magnitude variation in hydraulic conductivity. The PRB is designed to be more permeable than the surrounding soils. A 20 foot deep PRB was designed to insure at least two feet penetration into the basal till (see Figure A-2a in Appendix 5). A hundred foot length was designed (from MW-17D to a distance 40 feet east of the sanitary sewer as shown in Figure A2 in Appendix 5) to insure capture and treatment of all groundwater contaminated above applicable standards and guidance levels.

Sheet-piling and groundwater collection and treatment are included in the cost estimate. In contrast, the WEM CAP assumed a 25-foot long by 17-foot deep PRB, non-hazardous waste soil disposal, no sheet piling, and no groundwater infiltration or treatment during construction. The WEM CAP total estimated PRB cost was approximately $40,000. The estimated cost to implement Alternative 2 as described above is approximately $430,000 to $530,000. A shorter 50-foot barrier, which could be installed if the groundwater plume width were confirmed to be less than forty feet, would cost approximately $257,000 to $315,000.

7.3 ALTERNATIVE 3 - INDOOR AIR ABATEMENT SYSTEMS

Two residences with cellars are present downgradient of the observed CVOC plume in groundwater: 82 and 84-86 Harrington St., Rutland, VT (see Figure A3 in Appendix 5). The specific construction details and uses of the cellars have not been evaluated. Soil vapor could enter the basements through cracks/openings and/or utility penetrations in the walls and/or floors. Available groundwater level data suggests that the cellars may extend below the

groundwater table during portions of the year. If the cellars are not watertight groundwater could enter the residences and release CVOC vapors.

Vapor intrusion mitigation systems include a combination of passive vapor barriers and vapor collection/discharge systems. If necessary, due to "wet basements" they also include groundwater collection. These components prevent soil vapors from entering the residence from outside the building by creating a vacuum beneath and outside the foundation, and by controlling groundwater influx. Examples of design details are provided as Figures A-3a and A-3b in Appendix 5.

Passive vapor barriers are installed to isolate the vapor collection pipe and potential soil vapor pathways from the interior space of the basement. Vapor barriers are installed as needed over the walls and floor in the basement and/or crawl space. These barriers are designed to work in concert with the vapor and groundwater collection components described below.

Vapor barriers can be constructed of cast-in-place concrete, or a polyethylene material combined with a rodent guard (steel hardware cloth). If used, both the rodent guard and the vapor barrier are installed along the walls and attached to the concrete sill and the concrete floor using dimensional lumber, construction adhesive, and foam cushioning.

A concrete slab (nominal 2-inch thickness) is typically used to replace dirt floors. Perforated vapor/groundwater collection pipes are installed in excavations, and then covered with a polyethylene vapor barrier and a concrete slab.

A fresh air intake pipe system (airboot) is typically installed to provide outside air to the furnace for combustion. The airboot runs from the combustion air intake on the furnace up to the basement ceiling, then horizontally to a basement wall penetration. The airboot terminates with

a screened air intake on the outside wall of the basement. The airboot ensures that the newly installed vapor barriers do not interfere with the operation of the existing furnace.

Vapor collection components are included in the system to transport soil vapors to vapor exhaust points located above the building's roof. The three primary vapor collection components are:

- Perforated vapor collection pipes beneath and beyond the foundation/vapor barriers.
- Exhaust fans to collect vapors and create the vacuum beyond the foundation/barriers, and
- Vapor exhaust pipes routed up the building wall to points above the roof.

A fourth component to control groundwater infiltration may be necessary if the basements are wet. A typical groundwater control system includes three components: collection pipes, a groundwater sump, and a sump pump. Groundwater discharge is usually to ground surface downhill of the building. Activated carbon treatment prior to discharge may be necessary if CVOC are present in the water. Typically, groundwater collection pipes are installed beneath the basement floor along the base of the walls and underneath the floor slab. These perforated pipes are sloped to facilitate gravity flow of collected groundwater to a sealed polyethylene sump and lid. The sealed lid isolates the groundwater and soil vapors present in the sump from the rest of the basement, and float switches to operate the sump pump. A high water level alarm activates a red light that provides a visual indication if there are high water conditions in the event the sump pump is not working.

The following tasks would need to be performed in order to implement air abatement systems.

1) Visit each residence, and evaluate the cellars, including their use, construction, utility entrances, sumps, and access. Interview owners in regard to groundwater seepage, current and future uses, and structural details/construction history. Negotiate access agreements.
2) Collect a water sample from the basement sump (if present) as soon possible to evaluate whether volatile organic compounds (VOCs) are present at concentrations

that may contribute to indoor air contamination and may require treatment prior to discharge;

3) If the cellars are “wet” conduct an feasibility evaluation to identify the preferred option for managing groundwater to be integrated with the indoor air abatement system;
4) Prepare Draft Design and Feasibility Evaluation Report, submit it to VT SMS and the owners, respond to comments, and finalize the documents.
5) Prepare a bid package for construction, coordinate the bidding process, and develop a schedule for implementation.
6) Oversee construction and coordinate soil waste disposal if needed.
7) Prepare as-built reports, operation and maintenance manuals, and homeowners’ information sheets.
8) Long term monitoring of vacuum to ensure system operation.

The estimated cost of design and installation of indoor air abatement systems are $170,000 for two residences; 82 and 84-86 Harrington St., Rutland, VT. These costs include "Worst Case" assumptions as follows: Unfinished cellars with dirt floors, groundwater infiltration/sumps, and fieldstone walls. If the cellars are cast-in-place concrete, dry, and with existing sub-slab gravel bedding, the system costs would be about half of the estimated $170,000. Details supporting the cost estimate and additional assumptions are provided in Appendix 5. Long term monitoring of the system vacuum is not included in costs, as it is assumed that the monitoring will be performed concurrently with groundwater monitoring. Electrical costs of operation of the sump pump and exhaust fan are also not included because: 1) the sump pump improves the usability of the cellar and is therefore a benefit to the owner, and 2) the exhaust fan power needs are similar to a 100 watt electric bulb, and considered negligible. Treatment of collected groundwater with granulated active carbon would cost on the order of $2,000-$3,000 per year, if needed.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The overburden at the Site is comprised of silty sand and gravel outwash and ablation till deposits overlying dense basal silt tills. Groundwater is present at approximately ten feet below

grade (at the elevation of the former Fillipo basement slab) and at or within a few feet of ground surface downgradient on the JAMAC property. Groundwater flows toward the south.

There are two potential PCE source areas; both in the former Fillipo dry-cleaning facility building. PCE and TCE are present in on-site soils beneath the former building at concentrations above the Vermont Soil Screening Values for residential and industrial use. PCE concentrations in soils at groundwater near the source areas suggest that the solvent may be present at DNAPL.

PCE and TCE are present in groundwater above the Vermont Groundwater Enforcement Standards on the Site and adjacent JAMAC property to the south. The groundwater plume has been documented to be at least 50 feet wide, 250 feet long and fifteen feet deep. Concentrations at the southern edge of the monitoring network at Harrington Avenue have increased since the previous monitoring event conducted in 2009, suggesting the contaminant plume is expanding to the south. PCE and TCE are present in groundwater above their Vermont Vapor Intrusion Target Groundwater Concentrations at locations within 100 feet of some residences located along the south side of Harrington Avenue. The limits of groundwater contamination above applicable standards and guidance values are unknown downgradient to the south, and the eastern limit is uncertain. The maximum depth of groundwater contamination is unknown.

Shallow soil vapor tests at two locations adjacent to, and south of Harrington Avenue did not detect any chlorinated volatile organic compounds. However, a duplicate of one sample, collected approximately 25 feet in front of the residence at 84-86 Harrington Avenue, was reported to contain 9.4 $\mu g/m^3$ TCE, which is above the Vermont Shallow Soil Gas VI Screening Value of 5 $\mu g/m^3$. The presence of this compound in the duplicate, but not the parent sample, combined with the absence of the primary contaminant of concern, PCE, in either, suggests that cross-contamination of the duplicate sample canister from off-site sources (during transport, in the laboratory or due to inadequate cleaning following previous use) may be the source of the reported TCE.

A 0.1 acre Class III wetland is present on the JAMAC property above the dissolved CVOC contaminant plume in groundwater. Previously collected surface water samples did not contain detected CVOC in the wetlands.

Available data indicates that all buildings in the vicinity use public water supplies, and no water supply wells are currently at risk of contamination from the Site.

Potential risks to potential human health receptors include:

- Potential future potable use of CVOC contaminated groundwater from potential future water supply wells.
- Potential physical and/or inhalation exposure of construction workers to CVOC present in contaminated soils beneath the former Fillipo building.
- Potential indoor air inhalation exposure in residences south of Harrington Avenue and any new buildings built on the former Fillipo or JAMAC properties.

Three potential remedial technologies (Excavation, PRB and Indoor Air Abatement) were retained as viable and are further evaluated.

Alternative 1 includes the excavation of approximately 1,300 tons of soil from beneath the former Fillipo building to reach Vermont Residential Soil Screening Levels of 800 µg/kg PCE and 860 µg/kg TCE, and transport it off-site for treatment or disposal at a licensed facility. The goal of the work would be to remove the core of the contamination, and allow natural attenuation processes to reduce groundwater, soil vapor and indoor air concentrations to acceptable levels over time. The cost estimate for Alternative 1 includes transport and disposal of the soils as F002 listed wastes. The estimated cost to implement Alternative 1 is approximately $665,000 to $815,000. If the soil were not a listed waste, and WEM estimates of $90/ton instead of $195/ton transport and disposal costs were used, $138,000 in savings could be anticipated.

Alternative 2 includes placement of a zero-valent iron permeable reactive barrier (PRB) along the north side of Harrington Avenue. The goal of this alternative is to treat contaminated groundwater in-situ to prevent continued expansion of the dissolved contamination plume, and to

protect downgradient residences from potential indoor air inhalation risks. A 20 foot deep by 100-foot long PRB was used for cost estimating purposes. The estimated cost to implement Alternative 2 is approximately $430,000 to $530,000. A shorter 50-foot barrier, which could be installed if the groundwater plume width were confirmed to be less than forty feet, would cost approximately $257,000 to $315,000.

Alternative 3 includes vapor intrusion mitigation systems for two residences with cellars which are present downgradient of the observed CVOC plume in groundwater: 82 and 84-86 Harrington St., Rutland, VT. The specific construction details and uses of the cellars have not been evaluated. These systems prevent soil vapors from entering the residence from outside the building by creating a vacuum beneath and outside the foundation, and by controlling groundwater influx. The estimated cost of design and installation of indoor air abatement systems for two residences at 82 and 84-86 Harrington Avenue are $150,000. These costs include "Worst Case" assumptions as follows: Unfinished cellars with dirt floors, groundwater infiltration/sumps, and fieldstone walls. If the cellars are cast-in-place concrete, dry, and with existing sub-slab gravel bedding, the costs would be approximately half of that estimated above.

Institutional controls will be needed to protect human health unless all three remedial alternatives are implemented. These controls should include:

- Groundwater reclassification to Class IV (non-potable), or implementation of municipal regulations preventing use of groundwater for potable purposes within the CVOC dissolved plume that has concentrations above Vermont Groundwater Enforcement Standards.
- Deed restrictions requiring Site Specific Health and Safety Plans, work plans and Vermont Sites Management Section approval prior to excavation on the former Fillipo property (not needed if Alternative 1, Excavation, is implemented).
- Deed restrictions for the former Fillipo and JAMAC properties preventing construction of cellars, and requiring installation of vapor intrusion barriers and sub-slab depressurization systems for all new construction.

The following additional tasks are recommended in order to confirm the nature and extent of the contamination, and support the chosen alternative:

1. Obtain or conduct a property line survey of both the JAMAC and former Fillipo properties, including placement of permanent corner pins, to insure any active remedial action remains within properties that have access agreements. Include a survey of the Harrington Avenue right-of-way to support installation of monitoring wells and other intrusive activities.
2. Update and distribute an updated news release/public relations document describing the contamination and proposed corrective action to the owners and renters of 82 and 84-85 Harrington Avenue residences. Contact and notify municipal authorities, provide them with similar information and discuss utility concerns as needed. Obtain access agreements.
3. Install three pairs of 2-inch diameter monitoring wells in the right-of-way along the south side of Harrington Avenue. Each pair of wells should have a shallow member with a five-foot screen straddling the water table, and a deep member with a five-foot screen just above the basal till. One well pair should be located near SV-2, across the street from existing well MW-18D, and the other two pairs at locations approximately 50 feet to the northwest and southeast from the first. Continuous soil samples should be collected to confirm the stratigraphy at all deep well locations from ground surface to refusal. The portion of the boreholes in the basal till should be sealed with bentonite pellets during well installation to prevent potential contaminant migration to the bedrock.
4. Purge and collect low-flow samples for 8260B CVOC analysis from all existing and the six new wells to determine the magnitude and extent of groundwater contamination as it changes over time.
5. Perform hydraulic conductivity slug tests of the six new wells to confirm the rate of contaminant travel and required minimum permeability of a permeable reactive barrier.
6. Evaluate the foundation construction of 82 and 84-85 Harrington Avenue residences, and collect sub-slab soil gas samples for CVOC analysis beneath both buildings. These data should be used to refine vapor abatement costs if needed, and to determine if a current health risk exists.
7. Collect a sample of the water in the storm drain in front of 91 Harrington Avenue, and any sumps in the cellars of 92 and 94-96 Harrington, analyze them for CVOC. Determine the discharge location of any sump pumps, and of the pipe extending south from the storm drain in front of 91 Harrington Avenue, in order to evaluate potential threats to human health or the environment from those discharges.

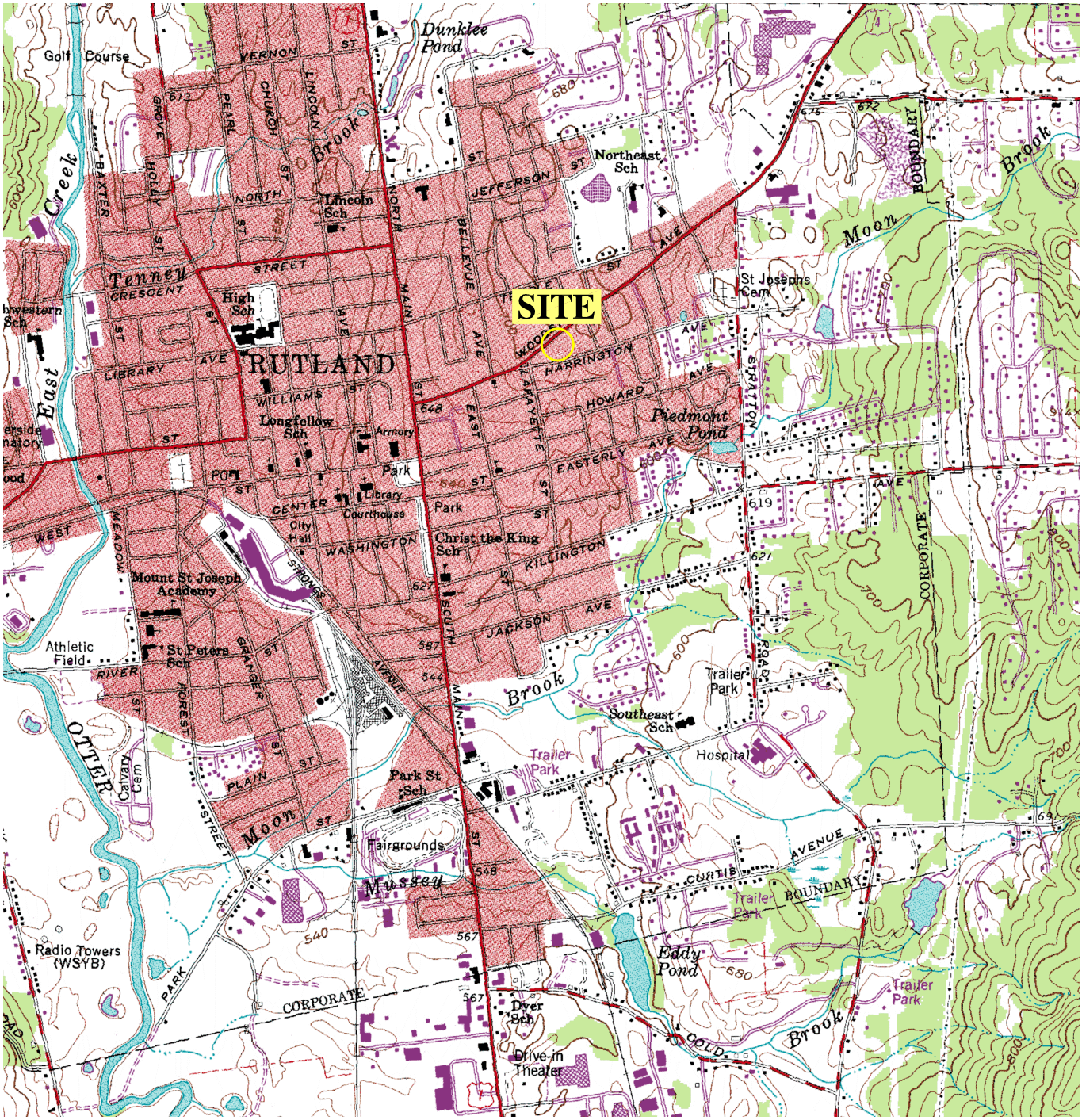
The lack of available data for groundwater quality in bedrock may be a data gap, given that PCE concentrations at the source areas indicate the possible presence of DNAPL.

9.0 REFERENCES

References have been copied from the WEM Corrective Action Plan dated August 9, 2010 and are provided in Appendix 1.

FIGURES

K:\3-2218-07\CAD-GIS\Location Map.dwg



N

1 0.5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000

FEET

CONTOUR INTERVAL 20 FEET

MAP LOCATION

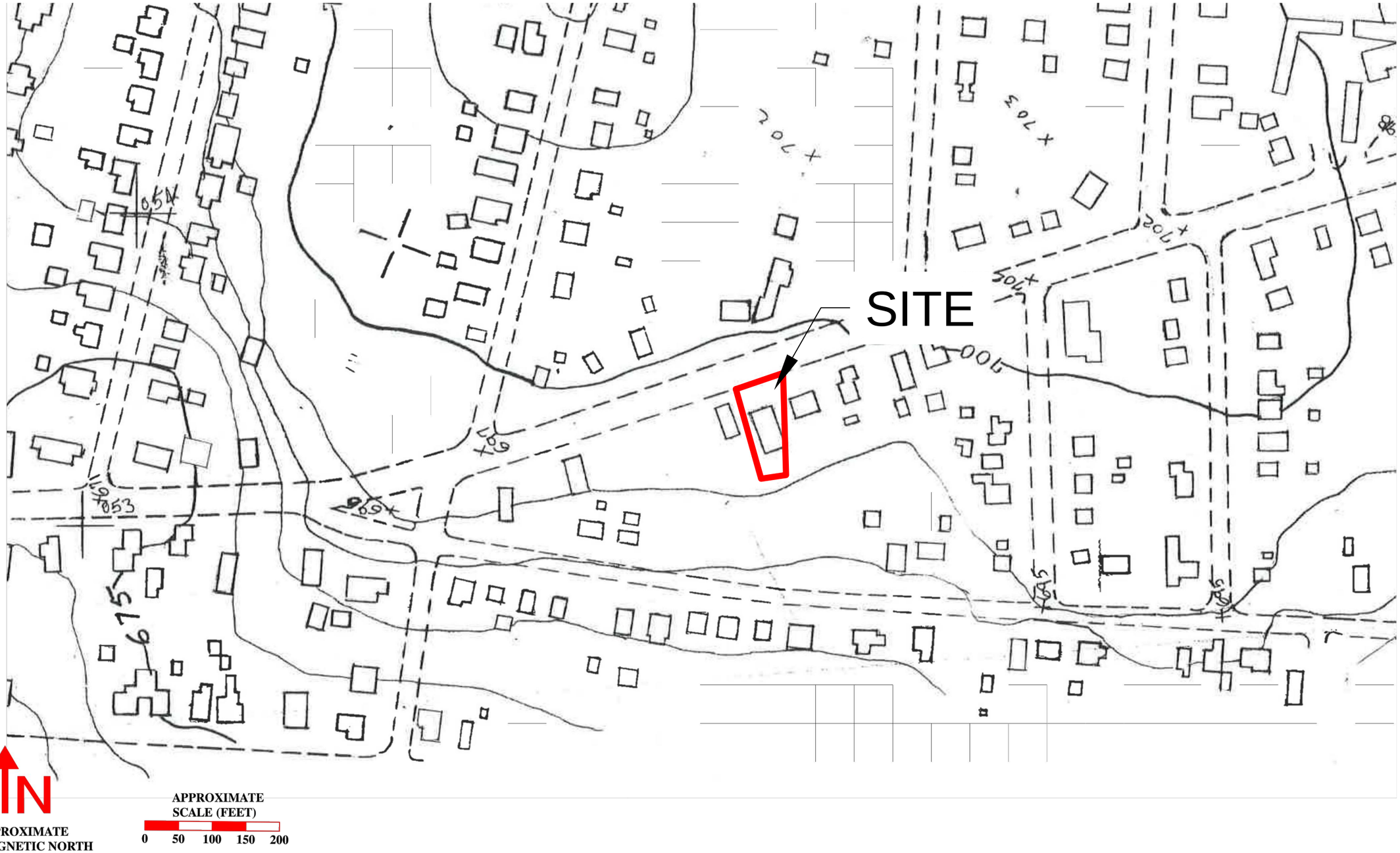
BASE MAP: USGS 7.5 Minute Topographic Quadrangle RUTLAND, VT. 1980

FIGURE 1: SITE LOCATION MAP
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE, RUTLAND, VERMONT

The Johnson Company

100 State Street, Suite 600
Montpelier, VT 05602

Drawn by: TJK	Date: 11/08/12
Chk'd by: DMM	Date: 11/08/12
Scale: As Shown	Project: 3-2218-07



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The Johnson Company

100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600

Drawn by: CFF Date: 12/03/12
Chk'd by: DMM Date: 12/03/12
Scale: As Shown Project: 3-2218-07

FIGURE 2
PHOTOGRAMETRIC TOPOGRAPHY: VT AOT-1958
FILLIPO DRY CLEANERS SITE #97-2194
RUTLAND, VERMONT

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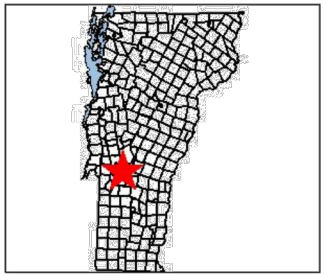
ANR Environmental Interest Locator

Vermont Agency of Natural Resources (ANR)

0 250 500 750 ft.

Map center: 462406, 123668



Legend

Roads
- US Highway
- Vermont State Highway
- Class One
- Class Two
- Legal Trail
- Emergency U-Turn Area
- Proposed Class Two
- Proposed Class Three
- Proposed Vermont State Highway
- Proposed US Highway
- Proposed Interstate
- Discontinued
- Interstate
- Class Three
- Class Four
- State/National Forest Highway
- Military Road (No Public Access)
- Private Road
- Wetland Advisory Layer: Class 3 Wetlands

VSWI
- Class 1 Wetland
- Class 2 Wetland
- Hydrography Lakes and Ponds (VHD 5k)
- Hydrography (VHD 5k)
- VT County Boundary
- Hydric Soils
- Hydric Soils
- VT Town Boundaries (No Fill)
- NAIP Color Orthophotos 2009
- VT State Boundary (Fill)

VT State Plane Meters (NAD83)

N

Scale: 1:2,594

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. VCGI and the State of Vermont make no representations of any kind, including but not limited to the warranties of merchantability or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

URL: http://maps.vermont.gov/imf/sites/ANR_NATRESViewer/jsp/launch.jsp

11/7/12

FIGURE 3: AERIAL PHOTO
FILLIPO DRY CLEANERS SITE #97-2194
RUTLAND, VERMONT

The Johnson Company

100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600

Drawn by: CFF	Date: 12/03/12
Chk'd by: DMM	Date: 12/03/12
Scale: As Shown	Project: 3-2218-07

SOURCE: 2007 SURVEY DRAWING BY WAITE ENVIRONMENTAL MANAGEMENT, LLC

77 WOODSTOCK
FOTO HUT

79 WOODSTOCK
CHITTENDEN BANK

WOODSTOCK AVENUE

SIDEWALK

FORMER FUEL OIL USTs

GRAVEL

FORMER GASOLINE UST

ASPHALT

82 WOODSTOCK

84 WOODSTOCK
FORMER FILLIPO
DRY CLEANER

CURRENT IRVING
GASOLINE PUMPS

CURRENT (3)
IRVING
GASOLINE
USTS

76 WOODSTOCK
SHERWIN WILLIAMS

ASPHALT PARKING

SITE

86 WOODSTOCK
IRVING MAINWAY
(SITE 93-1413)

CONCRETE
SLAB

FORMER DRY
CLEANER LOCATION

FLOOR DRAIN

ASPHALT

IRVING
PROPERTY

JAMAC PROPERTY

WET AREA

SHED

DuPREY PROPERTY

CHAIN LINK
FENCE

91 HARRINGTON

93 HARRINGTON

GRASS

78 HARRINGTON

80 HARRINGTON

82 HARRINGTON

84-86 HARRINGTON

HARRINGTON AVENUE

MW-6S
MW-7S
MW-1S
MW-8S
MW-12S
MW-12D
MW-13H
MW-5S
MW-2S
MW-2D
MW-3H
MW-9S
MW-14S
MW-4S
MW-4D
MW-19H
MW-15S
MW-16S
MW-11H
MW-10H
MW-17S
MW-17D
MW-18S
MW-18D
SW-1
SV-1
SV-2

SB-20
SB-21
SB-22
SB-23
SB-24
SB-25
SB-26
SB-28/CS-2

0 10 20 40
SCALE IN FEET

LEGEND

	PROPERTY LINE (APPROXIMATE)
	1' GROUND SURFACE CONTOUR
WS	UNDERGROUND MUNICIPAL WATER LINE
SS	UNDERGROUND MUNICIPAL SEWER LINE
SD	UNDERGROUND MUNICIPAL STORM DRAIN
OHP	OVERHEAD ELECTRIC LINE
	STORMWATER CATCHBASIN
	UTILITY POLE
SB-20	SOIL BORING LOCATOIN (2008)
SB-28/CS-2	SOIL BORING/CONCRETE SAMPLE LOCATION (2009)
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2006-2009)
MW-8S	WELL MISSING/DESTROYED
MW-13H	WELL CLOSED
SV-1	SOIL VAPOR SAMPLING POINT (2012)
SW-1	SURFACE WATER SAMPLING POINT BY WEM (2007)
M	MONITORING WELL INSTALLED BY OTHERS (1993)

FIGURE 4: SITE PLAN
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600

Drawn by: CFF Date: 11/08/12
Chk'd by: DMM Date: 11/08/12
Scale: As Shown Project: 3-2218-07

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SOURCE: 2007 SURVEY DRAWING BY WAITE ENVIRONMENTAL MANAGEMENT, LLC

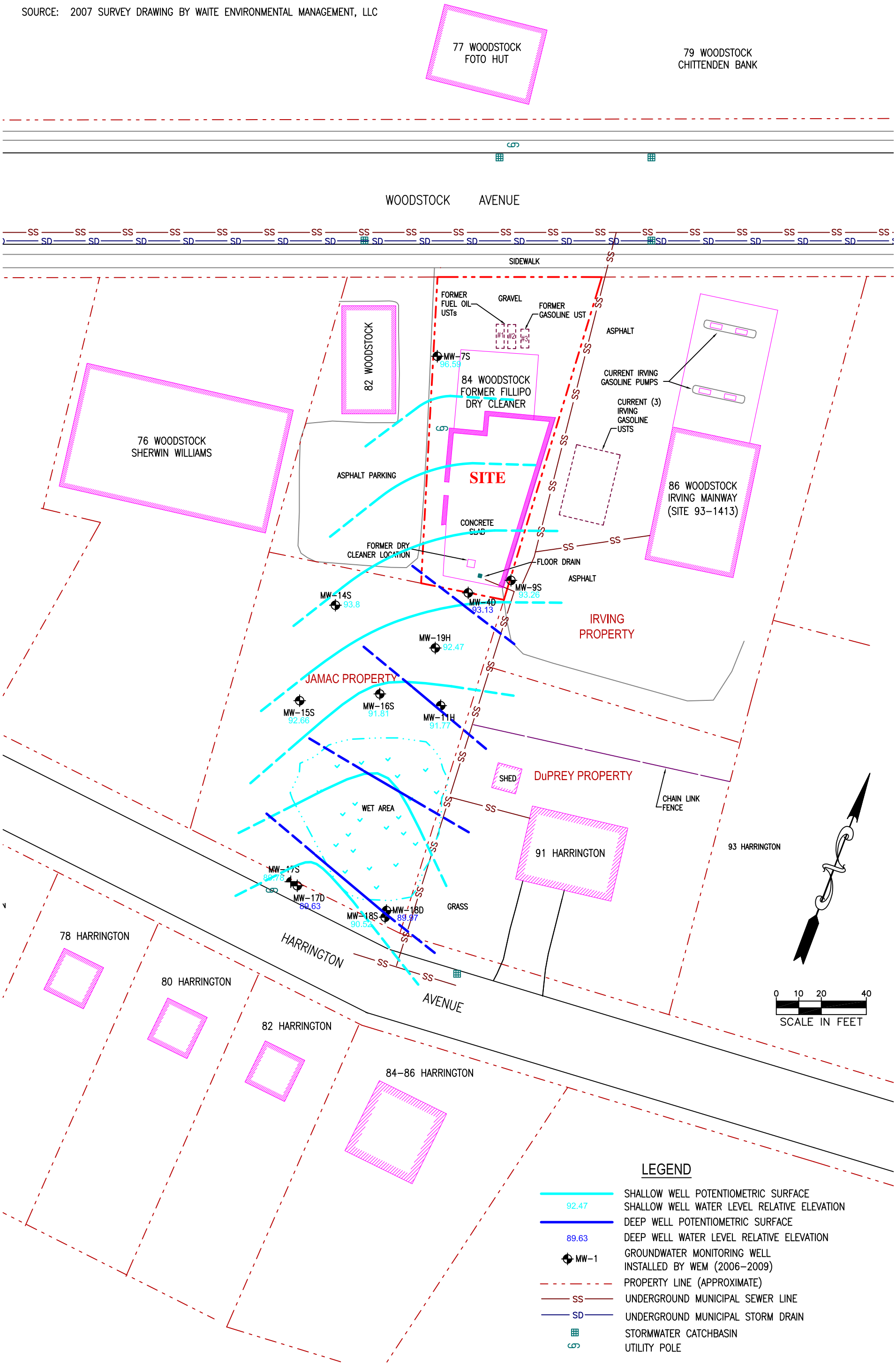

FIGURE 5: SHALLOW AND DEEP POTENTIOMETRIC SURFACES
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
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(802) 229-4600

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Scale: As Shown Project: 3-2218-07

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SOURCE: 2007 SURVEY DRAWING BY WAITE ENVIRONMENTAL MANAGEMENT, LLC

77 WOODSTOCK
FOTO HUT

79 WOODSTOCK
CHITTENDEN BANK

WOODSTOCK AVENUE

SIDEWALK

FORMER FUEL OIL USTs

GRAVEL

FORMER GASOLINE UST

#1 #2 #3

ASPHALT

MW-7S
5.0

84 WOODSTOCK
FORMER FILLIPO
DRY CLEANER

CURRENT IRVING GASOLINE PUMPS

CURRENT (3) IRVING GASOLINE USTS

82 WOODSTOCK

76 WOODSTOCK
SHERWIN WILLIAMS

ASPHALT PARKING

SITE

86 WOODSTOCK
IRVING MAINWAY
(SITE 93-1413)

CONCRETE SLAB

FORMER DRY CLEANER LOCATION

FLOOR DRAIN

ASPHALT

MW-9S
ND (<2.0)

MW-14S
ND (<2.0)

IRVING PROPERTY

MW-19H
170

JAMAC PROPERTY

MW-15S
ND (<2.0)

MW-16S
ND (<2.0)

MW-11H
1,800

SHED

DuPREY PROPERTY

CHAIN LINK FENCE

WET AREA

91 HARRINGTON

93 HARRINGTON

MW-17S
ND (<2.0)

GRASS

MW-18S
3.0

78 HARRINGTON

HARRINGTON AVENUE

80 HARRINGTON

82 HARRINGTON

84-86 HARRINGTON

0 10 20 40
SCALE IN FEET

LEGEND

3.0	PCE CONCENTRATION (ug/L)
100	PCE CONCENTRATION CONTOURS (ug/L) NOTE: FORMER CONCENTRATIONS FROM CLOSED AND DESTROYED WELLS CONSIDERED DURING INTERPRETATION
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2006-2009)
	PROPERTY LINE (APPROXIMATE)
SS	UNDERGROUND MUNICIPAL SEWER LINE
SD	UNDERGROUND MUNICIPAL STORM DRAIN
	STORMWATER CATCHBASIN
	UTILITY POLE

FIGURE 6: PCE IN SHALLOW GROUNDWATER
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600

Drawn by: CFF Date: 12/03/12
Chk'd by: DMM Date: 12/03/12
Scale: As Shown Project: 3-2218-07

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SOURCE: 2007 SURVEY DRAWING BY WAITE ENVIRONMENTAL MANAGEMENT, LLC

77 WOODSTOCK
FOTO HUT

79 WOODSTOCK
CHITTENDEN BANK

WOODSTOCK AVENUE

SIDEWALK

FORMER FUEL OIL USTs

GRAVEL

FORMER GASOLINE UST

#1 #2 #3

ASPHALT

MW-7S
ND (<2.0)

84 WOODSTOCK
FORMER FILLIPO
DRY CLEANER

CURRENT IRVING GASOLINE PUMPS

CURRENT (3) IRVING GASOLINE USTS

82 WOODSTOCK

76 WOODSTOCK
SHERWIN WILLIAMS

ASPHALT PARKING

SITE

86 WOODSTOCK
IRVING MAINWAY
(SITE 93-1413)

CONCRETE SLAB

FORMER DRY CLEANER LOCATION

FLOOR DRAIN

ASPHALT

MW-9S
3.0

MW-14S
ND (<2.0)

IRVING PROPERTY

MW-19H
46

JAMAC PROPERTY

MW-15S
ND (<2.0)

MW-16S
ND (<2.0)

MW-11H
680

SHED

DuPREY PROPERTY

CHAIN LINK FENCE

WET AREA

91 HARRINGTON

93 HARRINGTON

MW-17S
ND (<2.0)

MW-18S
3.0

GRASS

78 HARRINGTON

HARRINGTON AVENUE

80 HARRINGTON

82 HARRINGTON

84-86 HARRINGTON

0 10 20 40
SCALE IN FEET

LEGEND

3.0	TCE CONCENTRATION (ug/L)
100	TCE CONCENTRATION CONTOURS (ug/L) NOTE: FORMER CONCENTRATIONS FROM CLOSED AND DESTROYED WELLS CONSIDERED DURING INTERPRETATION
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2006-2009)
	PROPERTY LINE (APPROXIMATE)
SS	UNDERGROUND MUNICIPAL SEWER LINE
SD	UNDERGROUND MUNICIPAL STORM DRAIN
	STORMWATER CATCHBASIN
	UTILITY POLE

FIGURE 7: TCE IN SHALLOW GROUNDWATER
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company

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77 WOODSTOCK
FOTO HUT

79 WOODSTOCK
CHITTENDEN BANK

WOODSTOCK AVENUE

SIDEWALK

FORMER FUEL OIL USTs

GRAVEL

FORMER GASOLINE UST

#1 #2 #3

ASPHALT

82 WOODSTOCK

84 WOODSTOCK
FORMER FILLIPO
DRY CLEANER

CURRENT IRVING GASOLINE PUMPS

CURRENT (3) IRVING GASOLINE USTS

76 WOODSTOCK
SHERWIN WILLIAMS

ASPHALT PARKING

SITE

86 WOODSTOCK
IRVING MAINWAY
(SITE 93-1413)

CONCRETE SLAB

FORMER DRY CLEANER LOCATION

FLOOR DRAIN

ASPHALT

MW-4D
9,300

IRVING PROPERTY

JAMAC PROPERTY

SHED

DuPREY PROPERTY

CHAIN LINK FENCE

WET AREA

91 HARRINGTON

93 HARRINGTON

6.0
MW-17D

MW-18D
220

GRASS

78 HARRINGTON

HARRINGTON AVENUE

80 HARRINGTON

82 HARRINGTON

84-86 HARRINGTON

0 10 20 40
SCALE IN FEET

LEGEND

220	PCE CONCENTRATION (ug/L)
100	PCE CONCENTRATION CONTOURS (ug/L) NOTE: FORMER CONCENTRATIONS FROM CLOSED AND DESTROYED WELLS CONSIDERED DURING INTERPRETATION
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2006-2009)
	PROPERTY LINE (APPROXIMATE)
SS	UNDERGROUND MUNICIPAL SEWER LINE
SD	UNDERGROUND MUNICIPAL STORM DRAIN
	STORMWATER CATCHBASIN
	UTILITY POLE

FIGURE 8: PCE IN DEEP GROUNDWATER
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600

Drawn by: CFF Date: 12/03/12
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Scale: As Shown Project: 3-2218-07

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SOURCE: 2007 SURVEY DRAWING BY WAITE ENVIRONMENTAL MANAGEMENT, LLC

77 WOODSTOCK
FOTO HUT

79 WOODSTOCK
CHITTENDEN BANK

WOODSTOCK AVENUE

SIDEWALK

FORMER FUEL OIL USTs

GRAVEL

FORMER GASOLINE UST

#1 #2 #3

ASPHALT

82 WOODSTOCK

84 WOODSTOCK
FORMER FILLIPO
DRY CLEANER

CURRENT IRVING GASOLINE PUMPS

CURRENT (3) IRVING GASOLINE USTS

76 WOODSTOCK
SHERWIN WILLIAMS

ASPHALT PARKING

SITE

86 WOODSTOCK
IRVING MAINWAY
(SITE 93-1413)

CONCRETE SLAB

FORMER DRY CLEANER LOCATION

FLOOR DRAIN

ASPHALT

MW-4D
ND (<50)

IRVING PROPERTY

JAMAC PROPERTY

SHED

DuPREY PROPERTY

CHAIN LINK FENCE

WET AREA

91 HARRINGTON

93 HARRINGTON

MW-17D
ND (<2)

MW-18D
25

GRASS

78 HARRINGTON

HARRINGTON AVENUE

80 HARRINGTON

82 HARRINGTON

84-86 HARRINGTON

0 10 20 40
SCALE IN FEET

LEGEND

25	TCE CONCENTRATION (ug/L)
10	TCE CONCENTRATION CONTOURS (ug/L) NOTE: FORMER CONCENTRATIONS FROM CLOSED AND DESTROYED WELLS CONSIDERED DURING INTERPRETATION
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2006-2009)
	PROPERTY LINE (APPROXIMATE)
SS	UNDERGROUND MUNICIPAL SEWER LINE
SD	UNDERGROUND MUNICIPAL STORM DRAIN
	STORMWATER CATCHBASIN
	UTILITY POLE

FIGURE 9: TCE IN DEEP GROUNDWATER
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
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Drawn by: CFF Date: 12/03/12
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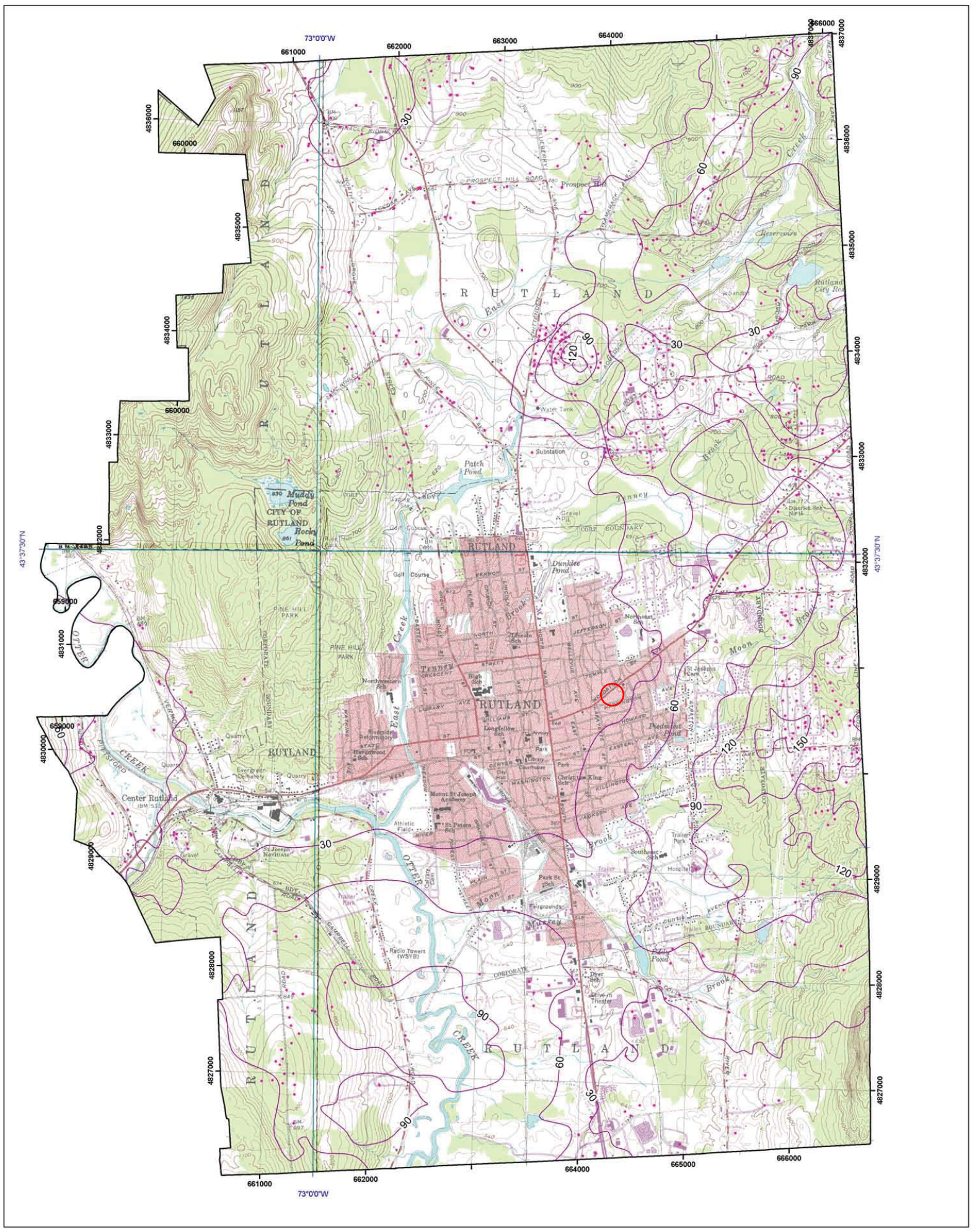


SCALE 1:24,000

0 0.5 1 2 Miles

0 0.5 1 2 3 Kilometers

Contour Interval 20 Feet

MN N

Magnetic declination
15.5 degrees west, 1968

Legend

- Depth to bedrock, contour interval 30 feet
- Located water well log
- USGS Quadrangle Boundary

USGS 7.5 minute quadrangle basemap.
Coordinate System: Vermont State Plane, meters, NAD 83.
Grid overlay on map is Universal Transverse Mercator, Zone 18N, NAD 83.
Digital Cartography by John Van Hoesen and Marjorie Gale
Date: September 2009

OPEN FILE REPORT - DEPTH TO BEDROCK, RUTLAND, VERMONT

by
John Van Hoesen
2009

Location Map

Published by:
Vermont Geological Survey
Laurence Becker, State Geologist
Department of Environmental Conservation
Agency of Natural Resources
103 South Main St., Logue Cottage
Waterbury, VT 05671-2420
http://www.anr.state.vt.us/dec/geo/vgs.htm

FIGURE 10
VERMONT GEOLOGICAL SURVEY
OPEN FILE REPORT -
DEPTH TO BEDROCK,
RUTLAND, VEMONT

Research supported by the Vermont Geological Survey, Dept. of Environmental Conservation, VT ANR. This geologic map was funded in part by the USGS National Cooperative Mapping Program. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

TABLES

Table 1
Groundwater Quality Summary

		Reported Concentration ug/L												
	DATE	PCE		TCE		Cis-1,2-DCE		Trans-1,2-DCE		VC		TOTAL VOC	GW ELEV[1]
MW-1S	6/28/07	15		0.43	J	1	U	5.1		1	U	22	95.78
	10/31/07	14		0.44	J	2	U	1	U	1	U	16	96.17
	1/10/08	15		0.63	J	3	U	1	U	1	U	18	96.33
	4/24/08	13		1	U	4	U	1	U	1	U	17	96.05
	8/21/08	13		0.76	J	0.45	J	1	U	1	U	15	96.28
	12/3/08	15		1.3	U	0.68	J	1	U	1	U	17	96.41
	9/16/09	13		1.5		0.59	J	1	U	1	U	17	96.30
MW-2S	12/13/06	9,600		1,800		10,000		1,500		380		23,280	95.62
	6/28/07	22,000		1,100		3,700		490	J	590	U	27,585	94.23
	10/31/07	4,900		490		2,800		370		45	J	8,605	95.56
	1/10/08	5,600		510		3,100		450		63	J	9,723	95.87
	4/24/08	8,000		510		2,700		410		55	U	11,648	93.22
	8/21/08	550		190		1,800		240		15		2,788	93.89
	12/3/08	180		31		200		22		0.32	J	433	93.93
	9/16/09	200		41		330		33		0.99	J	605	93.75
	10/22/09	140		18		180		17		4.3	U	357	93.94
MW-2D	8/21/08	9.1		2.3		6.7		0.62	J	1.0	U	18.7	93.69
	12/3/08	9.1		4.2		10		1.1		1.0	U	24.4	93.83
	9/16/09	6.2		2.8		2.6		0.40	J	1.0	U	12.0	93.63
MW-3H	12/13/06	10,000		820		370		340	U	340	U	11,530	94.02
	6/28/07	6,500		590		360		130	U	29	J	7,530	92.84
	10/31/07	4,900		570		260		160	U	160	U	5,890	93.47
	1/10/08	6,800		500		250		210	U	210	U	7,760	94.12
	4/24/08	12,000		790		490		73	U	73	U	13,353	93.12
	8/21/08	5,900		600		390		10	J	19		6,919	93.33
	12/3/08	7,700		600		340		10	J	34	U	8,667	93.49
	9/16/09	3,100		250		320		11	J	35		3,716	92.98
	10/22/09	640		140		200		3.9	J	7.4	J	991	93.43
MW-4S	12/13/06	1,600		330		390		44	U	19	J	2,383	93.39
	6/28/07	96		1,000		470		7.6	J	11	J	1,585	92.45
	10/31/07	8.6	J	40		580		5.0	J	11	J	645	93.31
	1/10/08	260		280		480		5.5	J	13	J	1,039	93.82
	4/24/08	360		250		330		4.4		14		958	92.73
	8/21/08	8,900		1,800		460		14	J	23		11,197	93.33
	12/3/08	9,800		1,400		470		14	J	24	J	11,708	93.12
	9/16/09	8,600		1,500		620		15		26		10,761	92.48
	10/22/09	8,700		1,600		610		220	U	220	U	11,130	92.85
MW-4D	12/13/06	1,700		58		14	J	55	U	55	U	1,827	94.14
	6/28/07	990		680		90		28	U	28	U	1,788	92.51
	10/31/07	190		500		170		23	U	23	U	883	93.16
	1/10/08	280		480		200		19	U	19	U	979	93.56
	4/24/08	320		630		210		1.7	J	4.6	U	1,163	92.65
	8/21/08	2,000		3.5	J	1.2	J	5.2	U	5.2	U	2,010	93.13
	12/3/08	2,900		210		15	U	15	U	15	U	3,140	93.26
	9/16/09	3,600		93		6.1	J	15	U	15	U	3,714	92.46
	10/22/09	4,000		78		42	J	110	U	110	U	4,230	92.83
	10/2/12	9,300		50	U	50	U	50	U	100	U	9,425	93.29
MW-5S	12/13/06	29		0.29	J	0.4	J	1.0	U	1.0	U	32	94.04
	6/28/07	9.5		0.78	J	1.2	U	1.0	U	1.0	U	13	93.65
	10/31/07	3.2		0.78	J	0.52	J	1.0	U	1.0	U	7	94.20
	1/10/08	2.1		0.55	J	0.99	J	1.0	U	1.0	U	6	94.52
	4/24/08	2.6		0.42	J	1.3		1.0	U	1.0	U	6	93.71
	8/21/08	3.6		1.1		2.2		1.0	U	1.0	U	9	94.15
	12/3/08	4.8		1.6	U	3.1		1.0	U	1.0	U	12	94.37
	9/16/09	6.0		2.3		3.3		1.0	U	1.0	U	14	93.87

Table 1
Groundwater Quality Summary

		Reported Concentration ug/L											
	DATE	PCE		TCE		Cis-1,2-DCE		Trans-1,2-DCE		VC		TOTAL VOC	GW ELEV[1]
MW-6S	6/28/07	1	U	1	U	1	U	1	U	1	U	**3**	95.86
	10/31/07	1	U	1	U	1	U	1	U	1	U	**3**	95.85
	1/10/08	1	U	1	U	1	U	1	U	1	U	**3**	96.52
	4/24/08	1	U	1	U	1	U	1	U	1	U	**3**	96.21
	8/21/08	1	U	1	U	1	U	1	U	1	U	**3**	96.25
	12/3/08	1	U	1	U	1	U	1	U	1	U	**3**	96.00
	9/16/09	1	U	1	U	1	U	1	U	1	U	**3**	96.44
MW-7S	12/13/06	**1.9**		1.0	U	1.0	U	1.0	U	1.0	U	**4**	95.31
	6/28/07	**17**		**0.27**	J	1.0	U	1.0	U	1.0	U	**19**	95.35
	10/31/07	**17**		1.0	U	1.0	U	1.0	U	1.0	U	**19**	95.50
	1/10/08	**31**		1.0	U	1.0	U	1.0	U	1.0	U	**33**	95.69
	4/24/08	**28**		1.0	U	1.0	U	1.0	U	1.0	U	**30**	97.14
	8/21/08	**34**		**0.35**	J	1.0	U	1.0	U	1.0	U	**36**	95.54
	12/3/08	**33**		1.0	U	1.0	U	1.0	U	1.0	U	**36**	95.41
	9/16/09	**29**		1.0	U	1.0	U	1.0	U	1.0	U	**31**	96.12
	10/4/12	**5**		2.0	U	2.0	U	2.0	U	2.0	U	**9**	96.07
MW-8S	12/13/06	**1.8**	J	4.4	U	3.3	J	4.4	U	4.4	U	**12**	94.73
	6/28/07	**35**		**2.4**		1.0	U	1.0	U	1.0	U	**39**	94.56
	10/31/07	**30**		**2.3**		**4.1**		1.0	U	1.0	U	**37**	94.60
	1/10/08	**32**		**2.3**		**1.0**		1.0	U	1.0	U	**36**	95.93
	4/24/08	**36**		**1.5**		1.0	U	1.0	U	1.0	U	**39**	95.10
	8/21/08	**27**		**3.4**		**5.3**		1.0	U	1.0	U	**37**	94.90
	12/3/08	**19**		**3.4**		**10**		1.0	U	1.0	U	**33**	94.75
	9/16/09	**15**		**1.4**		**2.7**		1.0	U	1.0	U	**20**	94.93
MW-9S	12/13/06	**0.69**	J	**2.7**		**56**		**2.2**		**71**		**133**	92.92
	6/28/07	**21**		**94**	J	**160**	J	**7.3**		**78**	J	**360**	92.45
	10/31/07	3.6	U	**2.2**	J	**110**		**4.1**		**94**		**214**	92.99
	1/10/08	**2.5**		**2.0**		**34**		**1.6**		**34**		**74**	93.71
	4/24/08	**3.7**		**14**		**78**		**5.0**		**61**		**162**	92.82
	8/21/08	**1.5**	J	**1.9**	J	**120**		**6.4**	J	**93**		**223**	92.88
	12/3/08	**0.30**	J	1.6	U	**69**		**4.3**		**71**		**146**	92.91
	9/16/09	**0.29**	J	**1.2**		**76**		**8.1**		**130**		**216**	92.68
	10/4/12	2.00	U	**3.0**		**70**		**3.0**		**170**		**247**	93.28
MW-10	6/28/07	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	91.42
MW-11H	6/28/07	**360**	J	**210**	J	**180**	J	**3.0**		**1.2**		**754**	90.68
	8/21/08	**1,200**		**240**		**320**		**4.0**	J	**8.3**		**1,772**	91.58
	12/3/08	**1,300**		**350**		**390**		**5.3**	J	**13**		**2,058**	91.58
	9/16/09	**1,300**		**730**		**1,000**		**18**		**29**		**3,077**	90.38
	10/22/09	**1,500**		**790**		**820**		**21**	J	**17**	J	**3,148**	90.25
	10/3/12	**1,800**		**680**		**430**		10	U	20	U	**2,925**	91.69
MW-12S	1/10/08	**18,000**		**23,000**		**5,700**		**230**		**200**		**47,130**	93.78
	4/24/08	**6,000**		**9,400**		**2,100**		**74**		**95**		**17,669**	94.00
	8/21/08	**4,400**		**9,100**		**4,900**		**190**		**110**		**18,700**	94.77
	12/3/08	**1,500**		**2,800**		**1,800**		**59**	J	**41**		**6,200**	94.83
	9/16/09	**250**		**720**		**1,500**		**43**		**86**	J	**2,599**	94.73
MW-12D	8/21/08	**240**		**50**		**7.7**		**0.30**	J	**0.27**	J	**298**	94.33
	12/3/08	**24**		**76**		**4.5**		1.7	U	1.7	U	**108**	94.51
	9/16/09	**71**		**310**		**32**		**1.1**	J	2.2	U	**416**	94.54
MW-13S	1/10/08	**390**		**66**		**30**		**5.3**		5.0	U	**491**	92.98
	4/24/08	**530**		**80**		**76**		**14**		3.4	U	**700**	93.05
	8/21/08	**220**		**31**		**8.3**		**1.8**		1.0	U	**261**	93.84
	12/3/08	**220**		**29**		**9.5**		**1.9**		1.0	U	**260**	93.82
	9/16/09	**95**		**6.0**		**4.1**		**0.41**	J	1.0	U	**106**	93.52

Table 1
Groundwater Quality Summary

		Reported Concentration ug/L											
	DATE	PCE		TCE		Cis-1,2-DCE		Trans-1,2-DCE		VC		TOTAL VOC	GW ELEV[1]
MW-14S	8/21/08	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	93.25
	12/3/08	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	93.93
	9/16/09	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	92.43
	10/5/12	2	U	2	U	2	U	2	U	2	U	**5**	93.45
MW-15S	8/21/08	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	91.49
	12/3/08	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	92.62
	9/16/09	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	90.60
	10/5/12	2	U	2	U	2	U	2	U	2	U	**5**	92.27
MW-16S	8/21/08	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	91.30
	12/3/08	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	91.80
	9/16/09	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	90.60
	10/5/12	2	U	2	U	2	U	2	U	2	U	**5**	91.77
MW-17S	8/21/08	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	89.74
	12/3/08	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U	**3**	89.45
	9/16/09	1.0	U	**0.5**	J	0.5	J	1.0	U	1.0	U	**2**	86.93
	10/5/12	2	U	2	U	2	U	2	U	2	U	**5**	89.88
MW-17D	8/21/08	**5.8**		1.0	U	1.0	U	1.0	U	1.0	U	**8**	89.86
	12/3/08	**1.2**		1.0	U	1.0	U	1.0	U	1.0	U	**3**	89.83
	9/16/09	**4.0**		**0.3**	J	1.0	U	1.0	U	1.0	U	**6**	87.19
	10/5/12	**6**		2	U	2	U	2	U	2	U	**10**	89.53
MW-18S	8/21/08	**0.79**	J	**4.2**		**6.3**		1.0	U	1.0	U	**11.3**	89.76
	12/3/08	**0.35**	J	**3.3**		**7.9**		1.0	U	1.0	U	**11.6**	90.00
	9/16/09	**0.35**	J	**2.3**		**13**		1.0	U	1.0	U	**15.7**	86.80
	10/3/12	**3.0**		**3.0**		**4**		2.0	U	2.0	U	**12.0**	90.52
MW-18D	8/21/08	**9.7**		**2.4**		**4.0**		1.0	U	1.0	U	**16.1**	89.97
	12/3/08	**34**		**5.8**		**2.1**		1.0	U	1.0	U	**41.9**	89.10
	9/16/09	**30**		**41**		**13**		1.0	U	1.0	U	**84.0**	86.66
	10/3/12	**220**		**25**		**74**		2.0	U	4.0	U	**322.0**	89.94
MW-19H	9/16/09	**26**		**6.5**		**27**		**0.36**	J	**2.8**		**62.7**	91.07
	10/22/09	**20**		**11**		**43**		**0.62**	J	**5.4**		**80.0**	91.16
	10/2/12	**170**		**46**		**78**		2	U	**12**		**307**	92.42

[1] Assumes elevation of TOC for MW-7S equals 101.59 per Table 1 of 2010 CAP

Table 2
October 2012 Inorganic Concentrations in Groundwater

Client Sample ID:	Date of Sampling	Alkalinity Total (CaCO3)	Dissolved Calcium	Total Calcium	Dissolved Chloride	Dissolved Iron	Total Iron	Dissolved Manganese	Total Manganese	Dissolved Sulfate	Total Organic Carbon	Dissolved Nitrate	Disolved Nitrite
MW-11H	10/03/2012	360	120	130	540	< 0.05	0.15	0.026	0.078	37	4.5	< 0.5	< 0.5
MW-18D	10/03/2012	**380**	**150**	**160**	**560**	**< 0.05**	**0.10**	**0.20**	**0.24**	**36**	**1.7**	**< 0.5**	**< 0.5**
MW-18S	10/03/2012	**230**	**72**	**75**	**300**	**< 0.05**	**0.84**	**0.23**	**0.25**	**24**	**4.8**	**< 0.5**	**< 0.5**
MW-4D	10/03/2012	370	200	210	1200	< 0.05	0.37	0.11	0.14	37	0.8	2.3	< 0.5

ALL DATA IN mg/L

Table 3
October 2012 Field Parameter Data

Well I.D.	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)	Notes
MW-1S							
MW-2S							Closed October 2010
MW-2D							Closed October 2010
MW-3H							Closed October 2010
MW-4S							Casing Cut 31" October 2010
MW-4D	15.54	3911	7.25	189.5	3.57	30	Not Equilibirum-Casing cut 21.25 in. Oct. 2010
MW-5S							
MW-6S							
MW-7S	18.1	444	7.65	203.1	1.03	13.3	Not Equilibirum
MW-8S							
MW-9S	17.99	1997	7.08	-69	0.31	1.7	
MW-11H	14.52	2143	6.89	215.6	1.55	238.0	Not Equilibirum
MW-12S							Closed October 2010
MW-12D							Closed October 2010
MW-13H							Closed October 2010
MW-14S	17	2659	6.66	440	1.50	3	
MW-15S	16.16	470	6.78	293	2.06	61	Not Equilibirum
MW-16S	16.24	2868	6.56	281.8	1.15	4.1	Soft bottom of well
MW-17S	15.86	1074	6.66	114.8	5.55	36	Not Equilibirum
MW-17D	16.28	531	7.21	-46	1.79	14.9	Not Equilibirum
MW-18S	15.84	1197	6.67	306.9	0.83	11	
MW-18D	15.86	2204	7.08	280.7	2.78	497	
MW-19H	14.88	3365	6.93	202.5	0.51	6	

Table 4
November 2, 2012 Monitoring Well Top-of-Casing and Water Relative Elevations

Well	TOC elevation (feet)	Ground elevation (feet)	Water depth (feet below TOC)	WL elevation (feet)
MW-7S	101.59	101.98	5	96.59
MW-9S	101.23	101.39	7.97	93.26
MW-4D	94.53	94.19	1.4	93.13
MW-17S	94.5	92.27	4.72	89.78
MW-17D	95.33	92.32	5.7	89.63
MW-18D	94.99	91.37	5.02	89.97
MW-18S	94.17	91.46	3.65	90.52
MW-15S	95.45	92.88	2.79	92.66
MW-16S	94.63	92.03	2.82	91.81
MW-11H	94.67	91.85	2.9	91.77
MW-19H	94.42	92.62	1.95	92.47
MW-14S	97.18	94.33	3.38	93.8

Elevation relative to MW-7S TOC = 101.59' per Table 1 of WEM 2010 CAP

TOC indicates top-of-casing (PVC). WL indicates water level on Nov. 2, 2012.

Table 5
Soil Gas Results for Samples Collected November 2, 2012

Client ID	Analysis	Concentration	Units	Detection Limit	Method ID	Sample Date
SV-1	Vinyl chloride	ND	ug/m3	0.511	TO-15	2-Nov-12
SV-1	1,1-Dichloroethane	ND	ug/m3	0.809	TO-15	2-Nov-12
SV-1	1,1,1-Trichloroethane	ND	ug/m3	1.09	TO-15	2-Nov-12
SV-1	Trichloroethene	ND	ug/m3	1.07	TO-15	2-Nov-12
SV-1	Tetrachloroethene	ND	ug/m3	1.36	TO-15	2-Nov-12
SV-2 Duplicate	Vinyl chloride	ND	ug/m3	0.511	TO-15	2-Nov-12
SV-2 Duplicate	1,1-Dichloroethane	ND	ug/m3	0.809	TO-15	2-Nov-12
SV-2 Duplicate	1,1,1-Trichloroethane	ND	ug/m3	1.09	TO-15	2-Nov-12
SV-2 Duplicate	Trichloroethene	9.4	ug/m3	1.07	TO-15	2-Nov-12
SV-2 Duplicate	Tetrachloroethene	ND	ug/m3	1.36	TO-15	2-Nov-12
SV-2	Vinyl chloride	ND	ug/m3	0.511	TO-15	2-Nov-12
SV-2	1,1-Dichloroethane	ND	ug/m3	0.809	TO-15	2-Nov-12
SV-2	1,1,1-Trichloroethane	ND	ug/m3	1.09	TO-15	2-Nov-12
SV-2	Trichloroethene	ND	ug/m3	1.07	TO-15	2-Nov-12
SV-2	Tetrachloroethene	ND	ug/m3	1.36	TO-15	2-Nov-12
Trip Blank	Vinyl chloride	ND	ug/m3	0.511	TO-15	2-Nov-12
Trip Blank	1,1-Dichloroethane	ND	ug/m3	0.809	TO-15	2-Nov-12
Trip Blank	1,1,1-Trichloroethane	ND	ug/m3	1.09	TO-15	2-Nov-12
Trip Blank	Trichloroethene	ND	ug/m3	1.07	TO-15	2-Nov-12
Trip Blank	Tetrachloroethene	ND	ug/m3	1.36	TO-15	2-Nov-12

Table 6
Comparative Analysis of Alternatives Summary

Criteria and Associated Factors	Alternative 1 Excavation and Off-site Soil Disposal	Alternative 2 Permeable Reactive Barrier and Monitored Natural Attenuation	Alternative 3 Potential Receptor Vapor Mitigation
OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT			
- Human Health Protection			
- Direct Contact (Soil & Groundwater)	Highly contaminated soils will be excavated, reducing potential future risk.	Future potential risk during excavation would be controlled by instiutional controls and appropriate monitoring and safety techniques implemented during excavation.	Future potential risk during excavation would be controlled by instiutional controls and appropriate monitoring and safety techniques implemented during excavation.
- Inhalation (Soil & Groundwater)	Potential downgradient indoor air inhalation risk eventually addressed by removal of source area contaminated soils and anticipated subsequent attenuation of dissolved groundwater plume.	Potential downgradient indoor air inhalation risk eventually addressed by in-situ groundwater treatment. Future potential risk due to new buildings on-site would be controlled by institutional controls and appropriate building designs.	Potential downgradient indoor air inhalation risk immediately addressed by point-of-impact indoor air assessment and subsequent mitigation Future potential risk due to new buildings on-site will be limited by institutional controls. Potential future risks related to to plume migration would have to be addressed separately.
- Groundwater Ingestion for Current Users	The ANR well location map does not indicate drinking water wells are located in the vicinity of the Site.	The ANR well location map does not indicate drinking water wells are located in the vicinity of the Site.	The ANR well location map does not indicate drinking water wells are located in the vicinity of the Site.
- Groundwater Ingestion for Potential Future Users	Since public water is available, institutional controls should be considered to prevent users of groundwater from installing new water supply wells where VOC concentrations in groundwater at the Site currently exceed the VGES.	Since public water is available, institutional controls should be considered to prevent users of groundwater from installing new water supply wells where VOC concentrations in groundwater at the Site currently exceed the VGES.	Since public water is available, institutional controls should be considered to prevent users of groundwater from installing new water supply wells where VOC concentrations in groundwater at the Site currently exceed the VGES.
- Environmental Protection	The available data does not indicate known risks to ecological receptors at the Site. However, a detailed ecological risk assessment has not been performed.	The available data does not indicate known risks to ecological receptors at the Site. Available information indicates that the wet area is a 0.1 acre Class III wetlands, and a conditional use permit is not required for PRB installation.	The available data does not indicate known risks to ecological receptors at the Site. However, a detailed ecological risk assessment has not been performed.

Table 6
Comparative Analysis of Alternatives Summary

Criteria and Associated Factors	Alternative 1 Excavation and Off-site Soil Disposal	Alternative 2 Permeable Reactive Barrier and Monitored Natural Attenuation	Alternative 3 Potential Receptor Vapor Mitigation
COMPLIANCE WITH REMEDIAL GOALS			
- Groundwater Goal (PCE and TCE VGES of 5 ug/L, and target groundwater concentrations for protection of Indoor Air of 0.76 and 1.19 ug/L, respectively)	Would be achieved eventually through monitored natural attenuation processes, which are expected to take at least a decade. During excavation activities, groundwater in the vicinity of the excavation area will be dewatered and treated.	Groundwater exiting the PRB would contain VOC concentrations less than the remedial goals. The PRB would not affect groundwater located upgradient of the PRB. During excavation activities, groundwater in the vicinity of the PRB will be dewatered and treated.	Would be achieved eventually through monitored natural attenuation processes, which typically takes decades.
- Soil Goal (PCE Residential VDH guidence level of 0.8 mg/Kg and TCE of 0.86 mg/Kg)	Would be achieved through removal and off-site disposal of contaminated soils.	Would not be achieved.	Would not be achieved.
- Indoor Air Goal (Target Indoor Air Value of 0.57 ug/m^3 for PCE and 0.3 ug/m^3 for TCE)	Would be achieved through removal and off-site disposal of contaminated soils, followed by natural attenuation of residual groundwater contamination over a period of years or decades.	Would be achieved downgradient of the PRB for existing off-site potenial receptors in a few years based upon a groundwater velocity of 18 feet per year. Would not be achieved on-site.	Would be achieved immediately for residences treated. Indoor air has not been sampled. Therefore, the indoor air goals could already be met, or there could be more buildings with potential impacts May not be achieved if future expansion of the contaminated groundwater plume to other residences occurs.
LONG-TERM EFFECTIVENESS AND PERMANENCE			
- Magnitude of Residual Risk			
- Direct Contact (Soil & Groundwater)	Highly contaminated soils will be excavated, permanently reducing potential future risk. Confirmatory samples will be collected to confirm that shallow soils with VOC concentrations greater than SSLs are removed from the Site. Groundwater VOC concentrations will naturally attenuate over time.	No current risk from direct contact. Future potential risks on-site during excavation would need to be prevented by institutional controls.	No current risk from direct contact. Future potential risk during excavation would be prevented by institutional controls.
- Inhalation (Soil & Groundwater)	Highly contaminated soils will be excavated, followed by decreases in groundwater contamination, and therefore, indoor concentrations, permanently reducing potential future risk. The time needed for groundwater concentrations to decline sufficiently to avoid impacts to indoor air is likely at least a decade.	PRB will cause decreases in groundwater contamination, and therefore, indoor concentrations, permanently reducing potential future risk. The time needed for groundwater concentrations to decline sufficiently to avoid impacts to indoor air has not been determined, but would likely be on the order of years. On-site and JAMAC property future receptors would not be protected without institutional controls.	Installation of systems in downgradient residences would prevent on-site and downgradient indoor air inhalation risk, until the contaminant plume migrates further downgradient, and impacts additional structures. On-site and JAMAC property future receptors would not be protected without institutional controls.
- Groundwater Ingestion for Current Users	No current groundwater ingestion risk.	No current groundwater ingestion risk.	No current groundwater ingestion risk.

Table 6
Comparative Analysis of Alternatives Summary

Criteria and Associated Factors	Alternative 1 Excavation and Off-site Soil Disposal	Alternative 2 Permeable Reactive Barrier and Monitored Natural Attenuation	Alternative 3 Potential Receptor Vapor Mitigation
LONG-TERM EFFECTIVENESS AND PERMANENCE - CONTINUED			
- Groundwater Ingestion for Potential Future Users	Soil excavation and disposal will permanently remove soils with VOC concentrations greater than SSLs from the Site. Reductions in dissolved concentrations in groundwater improvements are expected to eventually occur as a result of natural attenuation.	Institutional controls would be needed to prevent potential future users of on-site and JAMAC property groundwater drawn from new water supply wells where groundwater exceeds the VGES for PCE or TCE.	Institutional controls would be needed to prevent potential future users on-site and downgradient from ingesting groundwater drawn from new water supply wells where groundwater exceeds the VGES for PCE or TCE.
- Adequacy and Reliability of Controls	Soil removal, with confirmation testing (both of soils after excavation, and long-term ground water monitoring), provide adequate and reliable controls that can be used to ensure its effectiveness. Remediation of groundwater through natural attenuation following the source removal is cetain to happen eventually, by would like take at least a decade.	Zero valent iron in-situ treatment of CVOC is a proven technology. On-going monitoring or groundwater quality will be necessary to confirm the effectiveness of the PRB.	Vapor barriers and collection techniques have been proven through years of their use for radon mitigation and other indoor air problems.
REDUCTION OF TOXICITY, MOBILITY OR VOLUME			
- Treatment Process Used	Various potential off-site disposal/treatment methods. On-site temporary GAC treatment of excavation groundwater.	In-situ chemcial reduction of contaminants dissolved in groundwater. On-site temporary GAC treatment of excavation groundwater.	GAC treatment of groundwater infiltrating into cellars, if present
- Amount Destroyed or Treated	Approximately 1350 tons of soils contaminated above VDH SSVs would be treated or disposed of off-site. Limited GAC treatment of groundwater during excavation.	Dissolved contamination migrating off-site in groundwater would be treated. Limited GAC treatment of groundwater during excavation.	Minor ammounts of infiltrating groundwater may be treated if present.

Table 6
Comparative Analysis of Alternatives Summary

Criteria and Associated Factors	Alternative 1 Excavation and Off-site Soil Disposal	Alternative 2 Permeable Reactive Barrier and Monitored Natural Attenuation	Alternative 3 Potential Receptor Vapor Mitigation
REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT continued			
- Reduction of Toxicity, Mobility, or Volume Through Treatment	On-site volume and mobility reduced through excavation and off-site disposal. Downgradient toxicity expected to reduce through natural attenuation following excavation.	Toxicity of dissolved contamination migrating off-site and potential resulting indoor air risks reduced as the PRB will reduce VOC concentrations present in groundwater flowing through the PRB. On-site soil and groundwater contamination not reduced.	Potential indoor air risks mitigated to the extent possible using available technology. Toxicity and volume of soil and dissolved contamination not reduced.
- Degree to Which Treatment is Irreversible	Treatment is irreversable.	Treatment is irreversable.	No treatment. Alternative relies on physical barriers, which could theroetically fail.
- Type and Quantity of Residuals Remaining After Treatment	Treatment of groundwater using activated carbon would produce treatment residuals that would require regeneration and/or disposal at a licensed facility. Residual soil contamination would exist at concentrations below SSVs, and residual groundwater contamination would exist until natural attentuation was complete.	Treatment of groundwater using activated carbon would produce treatment residuals that would require regeneration and/or disposal at a licensed facility. The PRB would remain in-place as a permanent feature. The anarobic dehalogenation of VOC generates ethene, but no other byproducts. Existing soil and groundwater contamination up-gradient of the PRB would remain.	Existing soil and groundwater contamination would remain. Potentially resdiual spent carbon may be produced during treatment of infiltrating groundwater.
- Degree to Which Treatment Reduces Principle Threats	Reduces direct contact, and eventually indoor air and groundwater related threats.	Reduces downgradient indoor air and groundwater related threats. Does not reduce on-site threats.	Reduces indoor air related threats. Does not reduce threats related to soil or groundwater contamination, or future threats to indoor air quality due to potential expansion of groundwater plume.

Table 6
Comparative Analysis of Alternatives Summary

Criteria and Associated Factors	Alternative 1 Excavation and Off-site Soil Disposal	Alternative 2 Permeable Reactive Barrier and Monitored Natural Attenuation	Alternative 3 Potential Receptor Vapor Mitigation
SHORT-TERM EFFECTIVENESS			
- Protection of Community During Remedial Action	Signs and barriers will protect the public from the physical risks of the excavation. Vehicular traffic may increase during excavation but it is of limited duration. Perimeter monitoring during excavation of fugitive air emissions and corrective actions if necessary would be implemented.	Signs and barriers will protect the public from the physical risks of the excavation. Vehicular traffic may increase during construction but it is of limited duration. Perimeter monitoring during excavation of fugitive air emissions and corrective actions if necessary would be implemented.	None needed.
- Protection of Workers During Remedial Action	Adherence to health safety plans, use of protective equipment and trained personnel should prevent any short-term impacts caused by remedial activities.	Adherence to health safety plans, use of protective equipment and trained personnel should prevent any short-term impacts caused by remedial activities.	Adherence to health safety plans, use of protective equipment and trained personnel should prevent any short-term impacts caused by remedial activities.
- Environmental Impacts	None anticipated.	None anticipated.	None anticipated.
- Time Until Remedial Action Objectives Are Achieved	Soil objective met immediately On-site. Groundwater and indoor air objectives would be met after residual groundwater contamination attenuates.	Groundwater and indoor air objectives would be met within a period of months or years downgradient of PRB. Soil and groundwater objectives would not be met up-gradient of PRB.	Potential impacts to indoor air quality would be mitigated immediately. Soils and groundwater contamination, including potential expansion of the groundwater plume would not be addressed, and soil and groundwater goals not achieved.

Table 6
Comparative Analysis of Alternatives Summary

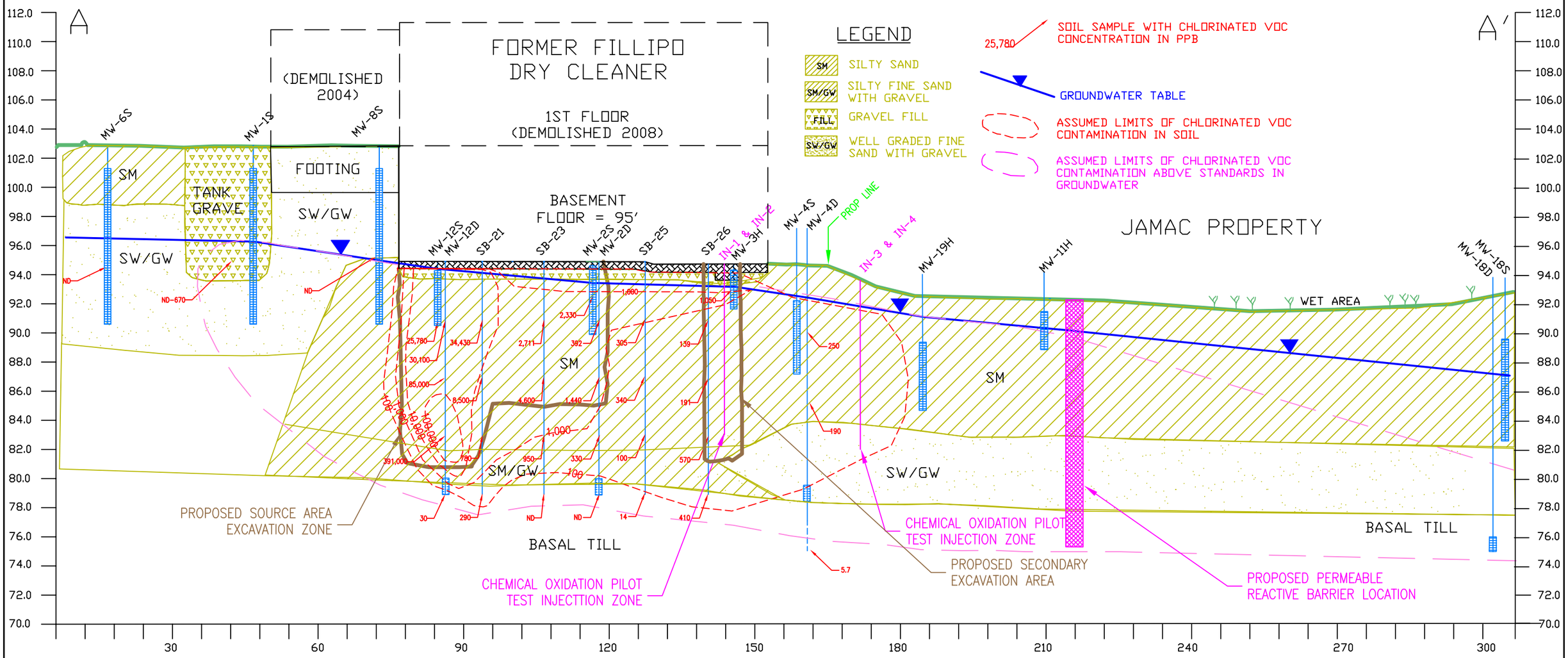
Criteria and Associated Factors	Alternative 1 Excavation and Off-site Soil Disposal	Alternative 2 Permeable Reactive Barrier and Monitored Natural Attenuation	Alternative 3 Potential Receptor Vapor Mitigation
IMPLEMENTABILITY			
- Ability to Construct and Operate	Excavation will require temproary shoring (sheet-piles) and groundwater removal and on-site GAC treatment and storage, followed by treated water discharge into the excavation.	Construction of trench to install PRB will likely require shoring (sheet-piles) groundwater removal and on-site GAC treatment and storage, followed by discharge into the excavation.	Existing construction of residences may require extensive vapor barrier installation, and collection and treatment of infiltering groundwater.
- Ease of Doing More If Needed	Would not limit further actions.	Would not limit further actions except in the area of the PRB itself.	Would not limit further actions.
- Ability to Monitor Effectiveness	Confirmation testing of soils during excavation is feasible. Groundwater monitoring would effectively monitor PCE and TCE attenuation, distribution and concentrations over time.	Groundwater monitoring would effectively monitor PCE and TCE distribution and concentrations over time.	Monitoring would include confirmation of vacuum, and possibly monitoring of treated infiltrating groundwater discharges on a periodic basis.
- Ability to Obtain Approvals and Coordinate with Other Agencies	No approvals necessary.	Municipal approval and permits would be needed for work in right-of-way. Wetlands conditional use determination not needed.	Electrical systems may require state permits. Discharge of treated infiltrating groundwater to municipal sewer would likely require local permits.
- Availability of Equipment, Materials, Specialists, and Off-site Support Services	Excavators, shoring installers, activated carbon, transport trucks and disposal locations that can accept listed wastes are readily available.	Equipment, materials, specialists and off-site support services are readily available.	Equipment, materials, design and installation services are readily available.
- Availability of Technologies	Excavators, shoring, carbon treatment equipment, transport trucks and disposal locations that can accept listed wastes are readily available.	Zero valent iron and similar materials are readily available. Excavators, shoring, carbon treatment equipment, transport trucks and disposal locations that can accept listed wastes are readily available.	Post-construction vapor sealing mitigation, and groundwater collection awith GAC treatment technologies are readily available.

Table 6
Comparative Analysis of Alternatives Summary

Criteria and Associated Factors	Alternative 1 Excavation and Off-site Soil Disposal	Alternative 2 Permeable Reactive Barrier and Monitored Natural Attenuation	Alternative 3 Potential Receptor Vapor Mitigation
COST			
- Capital Cost (preliminary order-of-magnitude)	$665,000 to $815,000	$430,000 to $530,000. $257,000 to $315,000 for a shorter 50-foot PRB	$150,000 for 2 buildings. $75,000 if the cellars are cast-in-place concrete, dry, and with existing sub-slab gravel bedding.
- Annual O&M Cost (including system monitoring but excluding groundwater monitoring)	None	None	$500 to $6,000 per year depending upon system complexity and including electricity used by fans / heat tape / sump pumps, carbon use and replacement, and oversight.
- Annual Long-term Monitoring Cost	Not calculated -limited to long-term groundwater monitoring which is the same for all alternatives.	Not calculated -limited to long-term groundwater monitoring which is the same for all alternatives.	Not calculated -limited to vacuum confirmation and GAC discharge monitoring (if needed), during long-term groundwater monitoring, which is the same for all alternatives.
COMMUNITY ACCEPTANCE	All work is on-site, resulting in minimal expected community concerns. Comments received during the public comment period will be incorporated into the CAP in a responsiveness summary.	Construction work is on JAMAC property and in municipal right-of-way, but adjacent to existing residences so that noise, traffic and other temporary issues during construction may cause adverse public reaction. Comments received during the public comment period will be incorporated into the CAP in a responsiveness summary.	Work is required within existing residences. Acceptance by property owners and tenants is unknown, and is critical to the effectivenss of this remedy. Comments received from residents and owenrs, and during the public comment period will be incorporated into the CAP in a responsiveness summary.

APPENDIX 1

HISTORICAL DATA TABLES AND FIGURES



CROSS-SECTION A-A'

SCALE:

HORIZONTAL: 1" = 20'

VERTICAL 3" = 20' (1" = 6.66')

NOTES: SOIL SAMPLE DATA PRESENTED DECEMBER 2006, FEBRUARY 2008; AND AUGUST 2008. CHLORINATED VOC CONCENTRATIONS ARE SUM OF PCE, TCE, 1,2-DCE, AND VC (EPA METHOD 8260B). WATER TABLE DATA PRESENTED ARE FROM SEPTEMBER 2009. REFER TO FIGURE 4 FOR THE CROSS-SECTION LINE.

WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 20'	REVISION:	DRAWN BY: MEW
DATE: 8/5/10	DATE:	PROJECT #: 06062-34

CROSS SECTION A-A'
FORMER FILLIPO DRY CLEANER
84 WOODSTOCK AVENUE, RUTLAND, VERMONT

TABLE 4
Soil Quality Data: VOCs
Former Fillipo Dry Cleaner
Rutland, Vermont

Sample Location		EPA Region IX	SS-4	SS-5	SS-6	SS-7	SS-8	SS-10	MW-2H	MW-3H	MW-12H	MW-13H
			UST GRAVE						**SUB-SLAB**			
Sample Depth Interval (ft)		PRG	6.2'	5.8'	7.6'	7.8'	5.8'	5.7'	2.1'	1.8'	4.0'	3.0'
Sample Date		Residential	11/6/06	11/6/06	11/6/06	11/6/06	11/6/06	11/6/06	12/6/07	12/6/06	2/20/08	2/20/08
PETROLEUM VOCs (EPA Method 8260B)												
Benzene	ug/Kg (ppb)	640	400 U	**0.99 J**	350 U	320 U	410 U	**2.2 J**	330 U	220 U	300 U	170 U
Toluene	ug/Kg (ppb)	520,000	400 U	5 U	350 U	**300 J**	410 U	**6.3**	330 U	220 U	300 U	170 U
Ethylbenzene	ug/Kg (ppb)	400,000	**150 J**	**2.3 J**	**660**	**770**	**830**	**4.5**	330 U	220 U	300 U	170 U
Xylenes	ug/Kg (ppb)	270,000	**83 J**	**3.5 J**	**4,500**	**4,800**	**5,100**	**26**	330 U	220 U	300 U	170 U
1,3,5-Trimethylbenzene	ug/Kg (ppb)	21,000	**520**	**13**	**2,800**	**2,300**	**2,900**	**10**	330 U	220 U	**72 J**	170 U
1,2,4-Trimethylbenzene	ug/Kg (ppb)	52,000	**220 J**	5 U	**8,500**	**7,700**	**9,100**	**32**	330 U	220 U	**190 J**	170 U
Naphthalene	ug/Kg (ppb)	56,000	400 U	**23**	**4,700**	**4,400**	**6,200**	**23**	330 U	**74 J**	310 U	170 U
MTBE	ug/Kg (ppb)	32,000	400 U	5 U	350 U	320 U	410 U	4.5 U	330 U	220 U	300 U	170 U
n-Butylbenzene	ug/Kg (ppb)	240,000	400 U	**14**	**1,800**	**1,700**	**1,900**	**4.6**	330 U	220 U	300 U	170 U
sec-Butylbenzene	ug/Kg (ppb)	220,000	**130 J**	**19**	**1,000**	**920**	**1,000**	**3.5 J**	330 U	220 U	**110 J**	170 U
Isopropylbenzene	ug/Kg (ppb)	--	400 U	**3.9 J**	**480**	**470**	**500**	**2.3 J**	330 U	220 U	300 U	170 U
4-Isopropyltoluene	ug/Kg (ppb)	--	**150 J**	**19**	**1,200**	**910**	**1,000**	**3.8 J**	330 U	220 U	300 U	170 U
n-Propylbenzene	ug/Kg (ppb)	240,000	**140 J**	**4.2 J**	**990**	**1,000**	**1,200**	**3.5 J**	330 U	220 U	**59 J**	170 U
TOTAL BTEX	ug/Kg (ppb)		**233**	**7**	**5,160**	**5,870**	**5,930**	**39**	ND	ND	ND	ND
NON-PETROLEUM VOCs (EPA Method 8260B)												
Tetrachloroethene (PCE)	ug/Kg (ppb)	480	**670**	**4.7 J**	350 U	320 U	410 U	**5.4**	**160 J**	**470**	**21,000**	**280**
Trichloroethene (TCE)	ug/Kg (ppb)	53	400 U	**3.0 J**	350 U	320 U	410 U	4.5 U	**140 J**	**200 J**	**4,400**	**57 J**
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	43,000	400 U	5.0 U	350 U	320 U	410 U	4.5 U	**1,900**	**380**	**380**	170 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	69,000	400 U	5.0 U	350 U	320 U	410 U	4.5 U	**130 J**	220 U	300 U	170 U
Vinyl Chloride (VC)	ug/Kg (ppb)	79	400 U	5.0 U	350 U	320 U	410 U	4.5 U	330 U	220 U	300 U	170 U
Acetone	ug/Kg (ppb)	14,000,000	**990**	**71 B**	**460**	**380**	**560**	34 U	**890**	**540**	**850**	**530**
2-Butanone (MEK)	ug/Kg (ppb)	22,000,000	400 U	**12**	350 U	320 U	410 U	**4.5**	330 U	220 U	300 U	170 U
TOTAL REPORTED CHLORINATED VOCS	*ug/Kg (ppb)*		**670**	**7.7**	ND	ND	ND	**5.4**	**2,330**	**1,050**	**25,780**	**337**

TABLE 4
Soil Quality Data: VOCs
Former Fillipo Dry Cleaner
Rutland, Vermont

Sample Location		EPA Region IX	SB-19 (MW-12D)	SB-19 (MW-12D)	SB-19 (MW-12D)	SB-19 (MW-12D)	SB-20	SB-20	SB-20	SB-20	SB-21
			SUB-SLAB								
Sample Depth Interval (ft)		PRG	4.0'	8.0'	12.0'	16.0'	4.0'	8.0'	12.0'	16.0'	4.0'
Sample Date		Residential	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08
PETROLEUM VOCs (EPA Method 8260B)											
Benzene	ug/Kg (ppb)	640	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
Toluene	ug/Kg (ppb)	520,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
Ethylbenzene	ug/Kg (ppb)	400,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
Xylenes	ug/Kg (ppb)	270,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
1,3,5-Trimethylbenzene	ug/Kg (ppb)	21,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
1,2,4-Trimethylbenzene	ug/Kg (ppb)	52,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
Naphthalene	ug/Kg (ppb)	56,000	**330**	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	**130 J**
MTBE	ug/Kg (ppb)	32,000	220 U	480 U	2,800 U	**34**	200 U	210 U	4.3 U	4.8 U	200 U
n-Butylbenzene	ug/Kg (ppb)	240,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
sec-Butylbenzene	ug/Kg (ppb)	220,000	**140 J**	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
Isopropylbenzene	ug/Kg (ppb)	--	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
4-Isopropyltoluene	ug/Kg (ppb)	--	**180 J**	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
n-Propylbenzene	ug/Kg (ppb)	240,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
TOTAL BTEX	ug/Kg (ppb)		ND	ND	ND	ND	ND	ND	ND	ND	ND
NON-PETROLEUM VOCs (EPA Method 8260B)											
Tetrachloroethene (PCE)	ug/Kg (ppb)	480	**7,900**	**85,000**	**380,000**	**21**	**240**	**3,400**	**1.8 J**	**2.1 J**	**28,000**
Trichloroethene (TCE)	ug/Kg (ppb)	53	**21,000**	480 U	**11,000**	**8.9**	**280**	210 U	4.3 U	4.8 U	**5,600**
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	43,000	**1,200**	480 U	2,800 U	5.0 U	**250**	210 U	4.3 U	4.8 U	**830**
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	69,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
Vinyl Chloride (VC)	ug/Kg (ppb)	79	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	4.8 U	200 U
Acetone	ug/Kg (ppb)	14,000,000	220 U	480 U	2,800 U	**15 J**	200 U	210 U	**6.9 J**	**18 J**	200 U
2-Butanone (MEK)	ug/Kg (ppb)	22,000,000	220 U	480 U	2,800 U	5.0 U	200 U	210 U	4.3 U	**2.5 J**	200 U
TOTAL REPORTED CHLORINATED VOCS	*ug/Kg (ppb)*		**30,100**	**85,000**	**391,000**	**30**	**770**	**3,400**	**1.8**	**2.1**	**34,430**

TABLE 4
Soil Quality Data: VOCs
Former Fillipo Dry Cleaner
Rutland, Vermont

Sample Location		EPA Region IX	SB-21	SB-21	SB-21	SB-22	SB-22	SB-22	SB-22	SB-23	SB-23
			SUB-SLAB								
Sample Depth Interval (ft)		PRG	8.0'	12.0'	16.0'	4.0'	8.0'	12.0'	16.0'	4.0'	8.0'
Sample Date		Residential	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08
PETROLEUM VOCs (EPA Method 8260B)											
Benzene	ug/Kg (ppb)	640	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
Toluene	ug/Kg (ppb)	520,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
Ethylbenzene	ug/Kg (ppb)	400,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
Xylenes	ug/Kg (ppb)	270,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
1,3,5-Trimethylbenzene	ug/Kg (ppb)	21,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
1,2,4-Trimethylbenzene	ug/Kg (ppb)	52,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
Naphthalene	ug/Kg (ppb)	56,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
MTBE	ug/Kg (ppb)	32,000	260 U	240 U	250 U	220 U	230 U	**8.5**	5.1 U	120 U	240 U
n-Butylbenzene	ug/Kg (ppb)	240,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
sec-Butylbenzene	ug/Kg (ppb)	220,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
Isopropylbenzene	ug/Kg (ppb)	--	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
4-Isopropyltoluene	ug/Kg (ppb)	--	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
n-Propylbenzene	ug/Kg (ppb)	240,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
TOTAL BTEX	ug/Kg (ppb)		ND	ND	ND	ND	ND	ND	ND	ND	ND
NON-PETROLEUM VOCs (EPA Method 8260B)											
Tetrachloroethene (PCE)	ug/Kg (ppb)	480	**8,500**	**780**	**290**	**1,100**	**1,700**	**5.8**	5.1 U	**2,600**	**4,600**
Trichloroethene (TCE)	ug/Kg (ppb)	53	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	**63 J**	240 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	43,000	260 U	240 U	250 U	**140 J**	230 U	4.6 U	5.1 U	**48 J**	240 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	69,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
Vinyl Chloride (VC)	ug/Kg (ppb)	79	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
Acetone	ug/Kg (ppb)	14,000,000	260 U	240 U	250 U	220 U	230 U	**6.4 J**	**17 J**	120 U	240 U
2-Butanone (MEK)	ug/Kg (ppb)	22,000,000	260 U	240 U	250 U	220 U	230 U	4.6 U	5.1 U	120 U	240 U
TOTAL REPORTED CHLORINATED VOCS	*ug/Kg (ppb)*		**8,500**	**780**	**290**	**1,240**	**1,700**	**5.8**	ND	**2,711**	**4,600**

TABLE 4
Soil Quality Data: VOCs
Former Fillipo Dry Cleaner
Rutland, Vermont

Sample Location		EPA Region IX	SB-23	SB-23	SB-24 (MW-2D)	SB-24 (MW-2D)	SB-24 (MW-2D)	SB-24 (MW-2D)	SB-25	SB-25	SB-25
			SUB-SLAB								
Sample Depth Interval (ft)		PRG	12.0'	16.0'	4.0'	8.0'	12.0'	16.0'	4.0'	8.0'	12.0'
Sample Date		Residential	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08
PETROLEUM VOCs (EPA Method 8260B)											
Benzene	ug/Kg (ppb)	640	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
Toluene	ug/Kg (ppb)	520,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
Ethylbenzene	ug/Kg (ppb)	400,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
Xylenes	ug/Kg (ppb)	270,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
1,3,5-Trimethylbenzene	ug/Kg (ppb)	21,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
1,2,4-Trimethylbenzene	ug/Kg (ppb)	52,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
Naphthalene	ug/Kg (ppb)	56,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
MTBE	ug/Kg (ppb)	32,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	**1.6 J**	**2.9 J**	4.4 U
n-Butylbenzene	ug/Kg (ppb)	240,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
sec-Butylbenzene	ug/Kg (ppb)	220,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
Isopropylbenzene	ug/Kg (ppb)	--	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
4-Isopropyltoluene	ug/Kg (ppb)	--	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
n-Propylbenzene	ug/Kg (ppb)	240,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
TOTAL BTEX	ug/Kg (ppb)		ND	ND	ND	ND	ND	ND	ND	ND	ND
NON-PETROLEUM VOCs (EPA Method 8260B)											
Tetrachloroethene (PCE)	ug/Kg (ppb)	480	**950**	4.4 U	**300**	**1,300**	**330**	5.2 U	**160**	**180**	**100**
Trichloroethene (TCE)	ug/Kg (ppb)	53	230 U	4.4 U	230 U	250 U	290 U	5.2 U	**39**	**51**	4.4 U
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	43,000	230 U	4.4 U	**92 J**	**140 J**	290 U	5.2 U	**89**	**92**	4.4 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	69,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	**12**	**13**	4.4 U
Vinyl Chloride (VC)	ug/Kg (ppb)	79	230 U	4.4 U	230 U	250 U	290 U	5.2 U	**4.7**	**3.7 J**	4.4 U
Acetone	ug/Kg (ppb)	14,000,000	230 U	**7.1 J**	230 U	250 U	290 U	**14 J**	**30 J**	**7.5 J**	**7.0 J**
2-Butanone (MEK)	ug/Kg (ppb)	22,000,000	230 U	4.4 U	230 U	250 U	290 U	5.2 U	4.3 U	4.6 U	4.4 U
TOTAL REPORTED CHLORINATED VOCS	*ug/Kg (ppb)*		**950**	ND	**392**	**1,440**	**330**	ND	**305**	**340**	**100**

TABLE 4
Soil Quality Data: VOCs
Former Fillipo Dry Cleaner
Rutland, Vermont

Sample Location		EPA Region IX	SB-25	SB-26	SB-26	SB-26	SB-26	MW-4D	MW-4D	MW-4D	MW-5S
			SUB-SLAB					**EXTERIOR FILLIPO**			
Sample Depth Interval (ft)		PRG	16.0'	4.0'	8.0'	12.0'	16.0'	5.0'	10.0'	20.0'	5.0'
Sample Date		Residential	8/13/08	8/13/08	8/13/08	8/13/08	8/13/08	12/6/07	12/6/07	12/6/07	12/6/07
PETROLEUM VOCs (EPA Method 8260B)											
Benzene	ug/Kg (ppb)	640	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
Toluene	ug/Kg (ppb)	520,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
Ethylbenzene	ug/Kg (ppb)	400,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
Xylenes	ug/Kg (ppb)	270,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
1,3,5-Trimethylbenzene	ug/Kg (ppb)	21,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
1,2,4-Trimethylbenzene	ug/Kg (ppb)	52,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
Naphthalene	ug/Kg (ppb)	56,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
MTBE	ug/Kg (ppb)	32,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
n-Butylbenzene	ug/Kg (ppb)	240,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
sec-Butylbenzene	ug/Kg (ppb)	220,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
Isopropylbenzene	ug/Kg (ppb)	--	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
4-Isopropyltoluene	ug/Kg (ppb)	--	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
n-Propylbenzene	ug/Kg (ppb)	240,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	2.8 U	4.2 U
TOTAL BTEX	ug/Kg (ppb)		ND	ND	ND	ND	ND	ND	ND	ND	ND
NON-PETROLEUM VOCs (EPA Method 8260B)											
Tetrachloroethene (PCE)	ug/Kg (ppb)	480	**14**	**77**	**160 J**	**570**	**410**	**250**	**190**	**5.1**	**11**
Trichloroethene (TCE)	ug/Kg (ppb)	53	4.7 U	**19**	**12**	250 U	230 U	190 U	180 U	2.8 U	**3.0 J**
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	43,000	4.7 U	**32**	**16**	250 U	230 U	190 U	180 U	**0.56 J**	4.2 U
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	69,000	4.7 U	**3.1 J**	**1.9 J**	250 U	230 U	190 U	180 U	2.8 U	4.2 U
Vinyl Chloride (VC)	ug/Kg (ppb)	79	4.7 U	**7.4**	**1.2 J**	250 U	230 U	190 U	180 U	2.8 U	4.2 U
Acetone	ug/Kg (ppb)	14,000,000	**11 J**	**20 J**	**6.7 J**	250 U	230 U	190 U	**580**	**60**	**93**
2-Butanone (MEK)	ug/Kg (ppb)	22,000,000	4.7 U	4.5 U	4.4 U	250 U	230 U	190 U	180 U	**11**	**12**
TOTAL REPORTED CHLORINATED VOCS	*ug/Kg (ppb)*		**14**	**139**	**191**	**570**	**410**	**250**	**190**	**5.7**	**14**

TABLE 4
Soil Quality Data: VOCs
Former Fillipo Dry Cleaner
Rutland, Vermont

Sample Location		EPA Region IX	MW-6S	MW-7S	MW-8S	MW-9S	SS-SEWER	MW-14	MW-16		
			EXTERIOR FILLIPO				**JAMAC PROPERTY**				
Sample Depth Interval (ft)		PRG	8.5'	7.0'	8.0'	10.0'	4.0'	6.5'	6.5		
Sample Date		Residential	12/7/07	12/7/07	12/7/07	12/7/07	6/28/07	7/23/08	7/23/08		
PETROLEUM VOCs (EPA Method 8260B)											
Benzene	ug/Kg (ppb)	640	**0.98 J**	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
Toluene	ug/Kg (ppb)	520,000	4.4 U	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
Ethylbenzene	ug/Kg (ppb)	400,000	4.4 U	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
Xylenes	ug/Kg (ppb)	270,000	4.4 U	180 U	200 U	**59 J**	3.6 U	2.8 U	3.0 U		
1,3,5-Trimethylbenzene	ug/Kg (ppb)	21,000	4.4 U	180 U	**140 J**	**670**	3.6 U	2.8 U	3.0 U		
1,2,4-Trimethylbenzene	ug/Kg (ppb)	52,000	4.4 U	180 U	**370**	**2,700**	3.6 U	2.8 U	3.0 U		
Naphthalene	ug/Kg (ppb)	56,000	4.4 U	180 U	**170 J**	**990**	3.6 UJ	2.8 U	3.0 U		
MTBE	ug/Kg (ppb)	32,000	4.4 U	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
n-Butylbenzene	ug/Kg (ppb)	240,000	4.4 U	180 U	**160 J**	**1,100**	3.6 U	2.8 U	3.0 U		
sec-Butylbenzene	ug/Kg (ppb)	220,000	4.4 U	180 U	**100 J**	**470**	3.6 U	2.8 U	3.0 U		
Isopropylbenzene	ug/Kg (ppb)	--	4.4 U	180 U	200 U	**98 J**	3.6 U	2.8 U	3.0 U		
4-Isopropyltoluene	ug/Kg (ppb)	--	4.4 U	180 U	**190 J**	**1,200**	3.6 U	2.8 U	3.0 U		
n-Propylbenzene	ug/Kg (ppb)	240,000	4.4 U	180 U	200 U	**220 J**	3.6 U	2.8 U	3.0 U		
TOTAL BTEX	ug/Kg (ppb)		**1 J**	ND	ND	**59 J**	ND	ND	ND		
NON-PETROLEUM VOCs (EPA Method 8260B)											
Tetrachloroethene (PCE)	ug/Kg (ppb)	480	4.4 U	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
Trichloroethene (TCE)	ug/Kg (ppb)	53	4.4 U	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
cis-1,2-Dichloroethene (cis-1,2-DCE)	ug/Kg (ppb)	43,000	4.4 U	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
trans-1,2-Dichloroethene (trans-1,2-DCE)	ug/Kg (ppb)	69,000	4.4 U	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
Vinyl Chloride (VC)	ug/Kg (ppb)	79	4.4 U	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
Acetone	ug/Kg (ppb)	14,000,000	**38**	**520**	**720**	**670**	13 U	**10 J**	**11 J**		
2-Butanone (MEK)	ug/Kg (ppb)	22,000,000	**5.0**	180 U	200 U	250 U	3.6 U	2.8 U	3.0 U		
TOTAL REPORTED CHLORINATED VOCS	*ug/Kg (ppb)*		ND	ND	ND	ND	ND	ND	ND		

NOTES:
"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value.
EPA Region IX PRGs are Preliminary Remediation Goals for Residential Soil (October 2004).
Blank spaces indicate data not collected
EPA Method 8260B compounds not shown indicate that they were not detected above respective quantitation limits.
Results reported above quantitation limits are indicated in bold.
Values greater than the EPA Region IX PRGs are shaded.

8.0 REFERENCES

1. The Johnson Company, *Report of Hydrogeological Investigation for Foto-Hut Site #91-1101, Rutland, Vermont*, December 1993.
2. The Johnson Company, *Phase II Environmental Site Assessment, Fillipo Dry Cleaner's*, March 1997.
3. Letter from Richard Spiese (VT DEC) to Mr. and Mrs. Alan Perry, August 25, 1997.
4. Letter from Richard Spiese (VT DEC) to Mr. and Mrs. Alan Perry, May 27, 1998.
5. Waite Environmental Management, *Phase I Environmental Site Assessment Report,* Former Fillipo Dry Cleaner, July 26, 2006.
6. Waite Environmental Management, *Phase II Environmental Site Assessment Report,* Former Fillipo Dry Cleaner, February 14, 2007.
7. Waite Environmental Management, *Additional Subsurface Investigation Report,* Former Fillipo Dry Cleaner, September 18, 2007.
8. Waite Environmental Management, *Quarterly Monitoring and Additional Sub-Slab Investigation Report,* Former Fillipo Dry Cleaner, May 6, 2008.
9. Waite Environmental Management, *Continuing Subsurface Investigation Report,* Former Fillipo Dry Cleaner, October 24, 2008.
10. Waite Environmental Management, *Quarterly Groundwater Monitoring Report,* Former Fillipo Dry Cleaner, February 15, 2009.
11. ECS, *DuPrey Residence Air & Water Sampling Report, DuPrey Residence, 91 Harrington Avenue, Rutland, Vermont*, June 2009.
12. Waite Environmental Management, *Report on Groundwater Monitoring and Corrective Action Feasibility Investigation,* Former Fillipo Dry Cleaner, February 25, 2010.
13. Teleconference between Matt Becker (VT DEC), Ed Bove (RRPC), John Ruggiero (Second City, LLC), and Miles Waite (WEM), March 31, 2010.

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APPENDIX 2

LABORATORY REPORTS

Eastern Analytical, Inc.

professional laboratory & drilling services

Don Maynard
The Johnson Company
100 State Street
Montpelier , VT 05602

ACCREDITED IN ACCORDANCE WITH nelac

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 114864
Client Identification: 3-2218-07
Date Received: 10/9/2012

Dear Mr. Maynard :

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.eailabs.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director	10.16.12	8
	Date	# of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **114864**

Client: **The Johnson Company**

Client Designation: **3-2218-07**

Temperature upon receipt (°C): 3.5

Acceptable temperature range (°C): 0-6

Received on ice or cold packs (Yes/No): Y

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
114864.01	EB	10/9/12	10/5/12	aqueous		Adheres to Sample Acceptance Policy
114864.02	MW-15S	10/9/12	10/5/12	aqueous		Adheres to Sample Acceptance Policy
114864.03	MW-17S	10/9/12	10/5/12	aqueous		Adheres to Sample Acceptance Policy
114864.04	MW-16S	10/9/12	10/5/12	aqueous		Adheres to Sample Acceptance Policy
114864.05	MW-14S	10/9/12	10/5/12	aqueous		Adheres to Sample Acceptance Policy
114864.06	MW-17D	10/9/12	10/5/12	aqueous		Adheres to Sample Acceptance Policy
114864.07	MW-7S	10/9/12	10/5/12	aqueous		Adheres to Sample Acceptance Policy
114864.08	MW-9S	10/9/12	10/5/12	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitibility, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.

All results contained in this report relate only to the above listed samples.

References include:

1) EPA 600/4-79-020, 1983

2) Standard Methods for Examination of Water and Wastewater : Inorganics, 19th Edition, 1995; Microbiology, 20th Edition, 1998

3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB

4) Hach Water Analysis Handbook, 2nd edition, 1992

LABORATORY REPORT

EAI ID#: **114864**

Client: **The Johnson Company**

Client Designation: **3-2218-07**

Sample ID:	EB	MW-15S	MW-17S	MW-16S	MW-14S	MW-17D	MW-7S
Lab Sample ID:	114864.01	114864.02	114864.03	114864.04	114864.05	114864.06	114864.07
Matrix:	aqueous	aqueous	aqueous	aqueous	aqueous	aqueous	aqueous
Date Sampled:	10/5/12	10/5/12	10/5/12	10/5/12	10/5/12	10/5/12	10/5/12
Date Received:	10/9/12	10/9/12	10/9/12	10/9/12	10/9/12	10/9/12	10/9/12
Units:	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Date of Analysis:	10/11/12	10/11/12	10/11/12	10/11/12	10/11/12	10/11/12	10/11/12
Analyst:	KJP	KJP	KJP	KJP	KJP	KJP	KJP
Method:	8260B	8260B	8260B	8260B	8260B	8260B	8260B
Dilution Factor:	1	1	1	1	1	1	1
Dichlorodifluoromethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloromethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Vinyl chloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Bromomethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Chloroethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichlorofluoromethane	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Diethyl Ether	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Acetone	< 10	< 10	< 10	< 10	< 10	< 10	< 10
1,1-Dichloroethene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Methylene chloride	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon disulfide	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl-t-butyl ether(MTBE)	< 5	< 5	< 5	< 5	< 5	< 5	< 5
trans-1,2-Dichloroethene	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,1-Dichloroethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2,2-Dichloropropane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
cis-1,2-Dichloroethene	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2-Butanone(MEK)	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Bromochloromethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Tetrahydrofuran(THF)	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Chloroform	< 2	< 2	< 2	< 2	< 2	< 2	**27**
1,1,1-Trichloroethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Carbon tetrachloride	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,1-Dichloropropene	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Benzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichloroethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Trichloroethene	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dichloropropane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromomethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Bromodichloromethane	< 1	< 1	< 1	< 1	< 1	< 1	**1**
4-Methyl-2-pentanone(MIBK)	< 10	< 10	< 10	< 10	< 10	< 10	< 10
cis-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-Trichloroethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
2-Hexanone	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Tetrachloroethene	< 2	< 2	< 2	< 2	< 2	**6**	**5**
1,3-Dichloropropane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dibromochloromethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2-Dibromoethane(EDB)	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,1,1,2-Tetrachloroethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Ethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
mp-Xylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
o-Xylene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	< 2	< 2	< 2	< 2	< 2	< 2	< 2
IsoPropylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1

LABORATORY REPORT

EAI ID#: **114864**

Client: **The Johnson Company**

Client Designation: **3-2218-07**

Sample ID:	EB	MW-15S	MW-17S	MW-16S	MW-14S	MW-17D	MW-7S
Lab Sample ID:	114864.01	114864.02	114864.03	114864.04	114864.05	114864.06	114864.07
Matrix:	aqueous	aqueous	aqueous	aqueous	aqueous	aqueous	aqueous
Date Sampled:	10/5/12	10/5/12	10/5/12	10/5/12	10/5/12	10/5/12	10/5/12
Date Received:	10/9/12	10/9/12	10/9/12	10/9/12	10/9/12	10/9/12	10/9/12
Units:	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Date of Analysis:	10/11/12	10/11/12	10/11/12	10/11/12	10/11/12	10/11/12	10/11/12
Analyst:	KJP	KJP	KJP	KJP	KJP	KJP	KJP
Method:	8260B	8260B	8260B	8260B	8260B	8260B	8260B
Dilution Factor:	1	1	1	1	1	1	1
Bromobenzene	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,1,2,2-Tetrachloroethane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,2,3-Trichloropropane	< 2	< 2	< 2	< 2	< 2	< 2	< 2
n-Propylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-Chlorotoluene	< 2	< 2	< 2	< 2	< 2	< 2	< 2
4-Chlorotoluene	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,3,5-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
tert-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trimethylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
sec-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-Isopropyltoluene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
n-Butylbenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Naphthalene	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2,3-Trichlorobenzene	< 1	< 1	< 1	< 1	< 1	< 1	< 1
4-Bromofluorobenzene (surr)	**90 %R**	**94 %R**	**91 %R**	**89 %R**	**92 %R**	**90 %R**	**88 %R**
1,2-Dichlorobenzene-d4 (surr)	**107 %R**	**108 %R**	**102 %R**	**105 %R**	**103 %R**	**107 %R**	**102 %R**
Toluene-d8 (surr)	**103 %R**	**100 %R**	**103 %R**	**102 %R**	**98 %R**	**97 %R**	**98 %R**

LABORATORY REPORT

EAI ID#: **114864**

Client: **The Johnson Company**

Client Designation: **3-2218-07**

Sample ID:	MW-9S
Lab Sample ID:	114864.08
Matrix:	aqueous
Date Sampled:	10/5/12
Date Received:	10/9/12
Units:	ug/l
Date of Analysis:	10/11/12
Analyst:	KJP
Method:	8260B
Dilution Factor:	1

Dichlorodifluoromethane	< 5
Chloromethane	< 2
Vinyl chloride	**170**
Bromomethane	< 2
Chloroethane	< 5
Trichlorofluoromethane	< 5
Diethyl Ether	< 5
Acetone	< 10
1,1-Dichloroethene	< 1
Methylene chloride	< 5
Carbon disulfide	< 5
Methyl-t-butyl ether(MTBE)	< 5
trans-1,2-Dichloroethene	**3**
1,1-Dichloroethane	< 2
2,2-Dichloropropane	< 2
cis-1,2-Dichloroethene	**70**
2-Butanone(MEK)	< 10
Bromochloromethane	< 2
Tetrahydrofuran(THF)	< 10
Chloroform	< 2
1,1,1-Trichloroethane	< 2
Carbon tetrachloride	< 2
1,1-Dichloropropene	< 2
Benzene	< 1
1,2-Dichloroethane	< 2
Trichloroethene	**3**
1,2-Dichloropropane	< 2
Dibromomethane	< 2
Bromodichloromethane	< 1
4-Methyl-2-pentanone(MIBK)	< 10
cis-1,3-Dichloropropene	< 1
Toluene	< 1
trans-1,3-Dichloropropene	< 1
1,1,2-Trichloroethane	< 2
2-Hexanone	< 10
Tetrachloroethene	< 2
1,3-Dichloropropane	< 2
Dibromochloromethane	< 2
1,2-Dibromoethane(EDB)	< 1
Chlorobenzene	< 2
1,1,1,2-Tetrachloroethane	< 2
Ethylbenzene	< 1
mp-Xylene	< 1
o-Xylene	< 1
Styrene	< 1
Bromoform	< 2
IsoPropylbenzene	< 1

LABORATORY REPORT

EAI ID#: **114864**

Client: **The Johnson Company**

Client Designation: **3-2218-07**

Sample ID:	MW-9S
Lab Sample ID:	114864.08
Matrix:	aqueous
Date Sampled:	10/5/12
Date Received:	10/9/12
Units:	ug/l
Date of Analysis:	10/11/12
Analyst:	KJP
Method:	8260B
Dilution Factor:	1
Bromobenzene	< 2
1,1,2,2-Tetrachloroethane	< 2
1,2,3-Trichloropropane	< 2
n-Propylbenzene	< 1
2-Chlorotoluene	< 2
4-Chlorotoluene	< 2
1,3,5-Trimethylbenzene	< 1
tert-Butylbenzene	< 1
1,2,4-Trimethylbenzene	< 1
sec-Butylbenzene	**4**
1,3-Dichlorobenzene	< 1
p-Isopropyltoluene	< 1
1,4-Dichlorobenzene	< 1
1,2-Dichlorobenzene	< 1
n-Butylbenzene	**3**
1,2-Dibromo-3-chloropropane	< 1
1,2,4-Trichlorobenzene	< 1
Hexachlorobutadiene	< 1
Naphthalene	< 5
1,2,3-Trichlorobenzene	< 1
4-Bromofluorobenzene (surr)	**93 %R**
1,2-Dichlorobenzene-d4 (surr)	**105 %R**
Toluene-d8 (surr)	**102 %R**

Deviations from the Report:

MW-9S Parameter: Vinyl chloride Date of Analysis: 10/11/2012 Dilution Factor: 10

MW-9S: The CV was outside of control limits high for sec-Butylbenzene and n-Butylbenzene. The values reported may be biased high and should be used with due consideration.

QC REPORT

EAI ID#: **114864**

Client: **The Johnson Company**

Client Designation: **3-2218-07**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
Dichlorodifluoromethane	< 5	11 (57 %R)	12 (60 %R) (5 RPD)	10/11/2012	ug/l	40 - 160	20	8260B
Chloromethane	< 2	15 (74 %R)	15 (76 %R) (3 RPD)	10/11/2012	ug/l	40 - 160	20	8260B
Vinyl chloride	< 2	16 (81 %R)	17 (84 %R) (4 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Bromomethane	< 2	20 (100 %R)	21 (104 %R) (4 RPD)	10/11/2012	ug/l	40 - 160	20	8260B
Chloroethane	< 5	21 (105 %R)	21 (103 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Trichlorofluoromethane	< 5	19 (96 %R)	20 (100 %R) (4 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Diethyl Ether	< 5	22 (108 %R)	23 (113 %R) (5 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Acetone	< 10	20 (97 %R)	20 (99 %R) (2 RPD)	10/11/2012	ug/l	40 - 160	20	8260B
1,1-Dichloroethene	< 1	20 (98 %R)	20 (102 %R) (4 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Methylene chloride	< 5	20 (102 %R)	21 (106 %R) (4 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Carbon disulfide	< 5	21 (105 %R)	22 (109 %R) (4 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Methyl-t-butyl ether(MTBE)	< 5	17 (85 %R)	17 (86 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
trans-1,2-Dichloroethene	< 2	19 (97 %R)	20 (102 %R) (5 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,1-Dichloroethane	< 2	21 (103 %R)	21 (105 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
2,2-Dichloropropane	< 2	* 10 (51 %R)	* 10 (52 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
cis-1,2-Dichloroethene	< 2	20 (101 %R)	21 (104 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
2-Butanone(MEK)	< 10	20 (92 %R)	20 (87 %R) (6 RPD)	10/11/2012	ug/l	40 - 160	20	8260B
Bromochloromethane	< 2	21 (103 %R)	21 (105 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Tetrahydrofuran(THF)	< 10	20 (101 %R)	20 (98 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Chloroform	< 2	20 (100 %R)	21 (104 %R) (4 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,1,1-Trichloroethane	< 2	20 (99 %R)	21 (104 %R) (5 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Carbon tetrachloride	< 2	21 (105 %R)	22 (108 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,1-Dichloropropene	< 2	20 (102 %R)	21 (105 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Benzene	< 1	21 (103 %R)	21 (106 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2-Dichloroethane	< 2	21 (105 %R)	21 (106 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Trichloroethene	< 2	20 (101 %R)	21 (106 %R) (5 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2-Dichloropropane	< 2	20 (100 %R)	21 (104 %R) (4 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Dibromomethane	< 2	21 (104 %R)	21 (106 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Bromodichloromethane	< 1	20 (101 %R)	21 (106 %R) (5 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
4-Methyl-2-pentanone(MIBK)	< 10	20 (103 %R)	20 (99 %R) (4 RPD)	10/11/2012	ug/l	40 - 160	20	8260B
cis-1,3-Dichloropropene	< 1	20 (101 %R)	21 (104 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Toluene	< 1	21 (104 %R)	21 (106 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
trans-1,3-Dichloropropene	< 1	18 (91 %R)	19 (93 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,1,2-Trichloroethane	< 2	21 (104 %R)	21 (103 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
2-Hexanone	< 10	20 (106 %R)	20 (103 %R) (3 RPD)	10/11/2012	ug/l	40 - 160	20	8260B
Tetrachloroethene	< 2	21 (107 %R)	21 (107 %R) (0 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,3-Dichloropropane	< 2	21 (104 %R)	21 (104 %R) (0 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Dibromochloromethane	< 2	21 (104 %R)	21 (105 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2-Dibromoethane(EDB)	< 1	21 (103 %R)	21 (104 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Chlorobenzene	< 2	21 (103 %R)	21 (104 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,1,1,2-Tetrachloroethane	< 2	22 (109 %R)	22 (112 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Ethylbenzene	< 1	21 (106 %R)	22 (108 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
mp-Xylene	< 1	42 (106 %R)	43 (106 %R) (0 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
o-Xylene	< 1	22 (109 %R)	22 (109 %R) (0 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Styrene	< 1	22 (108 %R)	22 (110 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Bromoform	< 2	20 (98 %R)	20 (99 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B

QC REPORT

EAI ID#: **114864**

Client: **The Johnson Company**

Client Designation: **3-2218-07**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
IsoPropylbenzene	< 1	23 (117 %R)	24 (120 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Bromobenzene	< 2	21 (103 %R)	21 (105 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,1,2,2-Tetrachloroethane	< 2	19 (96 %R)	19 (97 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2,3-Trichloropropane	< 2	21 (104 %R)	21 (103 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
n-Propylbenzene	< 1	22 (108 %R)	22 (109 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
2-Chlorotoluene	< 2	21 (103 %R)	21 (106 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
4-Chlorotoluene	< 2	21 (106 %R)	22 (110 %R) (4 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,3,5-Trimethylbenzene	< 1	22 (110 %R)	23 (113 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
tert-Butylbenzene	< 1	22 (111 %R)	22 (111 %R) (0 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2,4-Trimethylbenzene	< 1	22 (111 %R)	22 (112 %R) (1 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
sec-Butylbenzene	< 1	22 (108 %R)	22 (111 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,3-Dichlorobenzene	< 1	20 (102 %R)	21 (104 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
p-Isopropyltoluene	< 1	22 (112 %R)	23 (114 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,4-Dichlorobenzene	< 1	20 (100 %R)	21 (103 %R) (3 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2-Dichlorobenzene	< 1	20 (101 %R)	21 (103 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
n-Butylbenzene	< 1	22 (108 %R)	22 (110 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2-Dibromo-3-chloropropane	< 1	19 (96 %R)	20 (101 %R) (5 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2,4-Trichlorobenzene	< 1	21 (105 %R)	21 (107 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Hexachlorobutadiene	< 1	18 (89 %R)	19 (94 %R) (5 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
Naphthalene	< 5	21 (107 %R)	21 (105 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
1,2,3-Trichlorobenzene	< 1	19 (97 %R)	20 (99 %R) (2 RPD)	10/11/2012	ug/l	70 - 130	20	8260B
4-Bromofluorobenzene (surr)	98 %R	102 %R	100 %R	10/11/2012	% Rec	70 - 130	50	8260B
1,2-Dichlorobenzene-d4 (surr)	103 %R	98 %R	96 %R	10/11/2012	% Rec	70 - 130	50	8260B
Toluene-d8 (surr)	100 %R	102 %R	100 %R	10/11/2012	% Rec	70 - 130	50	8260B

Samples were extracted and analyzed within holding time limits.
Instrumentation was calibrated in accordance with the method requirements.
The method blanks were free of contamination at the reporting limits.
Sample surrogate recoveries met the above stated criteria.
The associated matrix spikes and/or Laboratory Control Samples met acceptance criteria.
There were no exceptions in the analyses, unless noted.
*/! Flagged analyte recoveries deviated from the QA/QC limits. Any impact to data is addressed below.

Page 1 of 1

Chain-of-Custody Record

114864

Bold Fields Required. Please Circle Requested Analysis.

Sample I.D.	Sampling Date/Time *If Composite, Indicate Both Start & Finish Date/Time	Matrix (see below)	Grab/*Composite	VOC: 524.2 BTEX 524.2 MTBE only	VOC: 8260B 624 VOCs 1, 4 Dioxane	VOC: 8021B BTEX Halos	VOC: 8015B GRO MAVPH	SVOC: 8270D 625 SVOCs EDB DBCP ABN A BN PAH	SVOC: TPH8100 L1 L2	SVOC: 8015B DRO MAEPH	SVOC: PEST 608 PCB 608 PEST 8081A PCB 8082	SVOC: Oil & Grease 1664 TPH 1664	TCLP: TCLP 1311 ABN Metals VOC Pest Herb	Metals: Dissolved Metals (List Below)	Metals: Total Metals (List Below)	Inorganics: TS TSS TDS Spec. Con.	Inorganics: Br Cl F SO_4 NO_2 NO_3 NO_2NO_3	Inorganics: BOD CBOD T. Alk.	Inorganics: TKN NH_3 T. Phos. O. Phos.	Inorganics: pH T. Res. Chlorine	Inorganics: COD Phenols TOC DOC	Inorganics: Total Cyanide Total Sulfide	Inorganics: Reactive Cyanide Reactive Sulfide Flashpoint Ignitability	Micro: Total Coliform E. Coli Fecal Coliform	Micro: Enterococci Heterotrophic Plate Count	Other	Other	Other	# of Containers	Notes MeOH Vial #
EB	10/05/12 / 1625	GW	G		X																									
MW-15S	10/05/12 / 1515				X																									
MW-17S	10/05/12 / 1540				X																									
MW-16S	10/05/12 / 1202				X																									
MW-14S	10/05/12 / 1447				X																									
MW-17D	10/05/12 / 1550				X																									
MW-7S	10/05/12 / 1610				X																									
MW-9S	10/04/12 / 1507				X																									

Matrix: A-Air; S-Soil; GW-Ground Water; SW-Surface Water; DW-Drinking Water; WW-Waste water

Preservative: H-HCL; N-HNO_3; S-H_2SO_4; Na-NaOH; M-MEOH

Project Manager: Donald Maynard

Company: The Johnson Co.

Address: 100 State Street Suite 600

City: Montpelier State: VT Zip: 05602

Phone: 802-229-4600 Ext.:

Fax:

E-Mail: DMM@jcomail.com

Site Name:

Project #: 3-2218-07

State: NH MA ME VT Other:

Regulatory Program: NPDES RGP POTW Stormwater or GWP, Oil Fund, Brownfield or Other:

Quote #: PO #:

Date Needed:

QA/QC Reporting Level: A B C OR Presumptive Certainty

Reporting Options: Prelims: Yes or No; If Yes: Fax or PDF

Electronic Options: No Fax E-Mail PDF Equis

Temp. 3.5 °C

Ice? Yes No

Sampler(s): CFF

Relinquished By:	Date:	Time:	Received By:
[signature]	10/05/12	2000	
Relinquished By:	Date:	Time:	Received By:
Custody Seal	10/9/12	0919	[signature]
Relinquished By:	Date:	Time:	Received By:

Metals: 8 RCRA 13 PP Fe, Mn Pb, Cu

Other Metals:

Samples Field Filtered? ☐ Yes ☐ No

Notes: (ie: Special Detection Limits, Billing Info, If Different)

Site History:

Suspected Contamination:

Field Readings:

Eastern Analytical, Inc.

Professional laboratory & drilling services

Don Maynard
The Johnson Company
100 State Street
Montpelier , VT 05602

ACCREDITED IN ACCORDANCE WITH nelac

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 114799
Client Identification: Fillipo / 3-2218-07
Date Received: 10/4/2012

Dear Mr. Maynard :

Enclosed please find the laboratory report for the above identified project. All analyses were performed in accordance with our QA/QC Program. Unless otherwise stated, holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol. Samples which were collected by Eastern Analytical, Inc. (EAI) were collected in accordance with approved EPA procedures. Eastern Analytical, Inc. certifies that the enclosed test results meet all requirements of NELAP and other applicable state certifications. Please refer to our website at www.eailabs.com for a copy of our NELAP certificate and accredited parameters.

The following standard abbreviations and conventions apply to all EAI reports:

Solid samples are reported on a dry weight basis, unless otherwise noted
< : "less than" followed by the reporting limit
> : "greater than" followed by the reporting limit
%R : % Recovery

Eastern Analytical Inc. maintains certification in the following states: Connecticut (PH-0492), Maine (NH005), Massachusetts (M-NH005), New Hampshire/NELAP (1012), Rhode Island (269) and Vermont (VT1012).

The following information is contained within this report: Sample Conditions summary, Analytical Results/Data, Quality Control data (if requested) and copies of the Chain of Custody. This report may not be reproduced except in full, without the the written approval of the laboratory.

If you have any questions regarding the results contained within, please feel free to directly contact me or the chemist(s) who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Lorraine Olashaw, Lab Director | 10.12.12 Date | 12 # of pages (excluding cover letter)

SAMPLE CONDITIONS PAGE

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Temperature upon receipt (°C): 5 **Received on ice or cold packs (Yes/No): Y**

Acceptable temperature range (°C): 0-6

Lab ID	Sample ID	Date Received	Date Sampled	Sample Matrix	% Dry Weight	Exceptions/Comments (other than thermal preservation)
114799.01	MW-19H	10/4/12	10/2/12	aqueous		Adheres to Sample Acceptance Policy
114799.02	TB	10/4/12	9/14/12	aqueous		Adheres to Sample Acceptance Policy
114799.03	MW-11H	10/4/12	10/3/12	aqueous		Adheres to Sample Acceptance Policy
114799.04	MW-18S	10/4/12	10/3/12	aqueous		Adheres to Sample Acceptance Policy
114799.05	MW-18D	10/4/12	10/3/12	aqueous		Adheres to Sample Acceptance Policy
114799.06	MW-4D	10/4/12	10/3/12	aqueous		Adheres to Sample Acceptance Policy
114799.07	Dup-01	10/4/12	10/2/12	aqueous		Adheres to Sample Acceptance Policy

Samples were properly preserved and the pH measured when applicable unless otherwise noted. Analysis of solids for pH, Flashpoint, Ignitibility, Paint Filter, Corrosivity, Conductivity and Specific Gravity are reported on an "as received" basis.
All results contained in this report relate only to the above listed samples.

References include:

1) EPA 600/4-79-020, 1983
2) Standard Methods for Examination of Water and Wastewater : Inorganics, 19th Edition, 1995; Microbiology, 20th Edition, 1998
3) Test Methods for Evaluating Solid Waste SW 846 3rd Edition including updates IVA and IVB
4) Hach Water Analysis Handbook, 2nd edition, 1992

LABORATORY REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Sample ID:	MW-19H	TB	MW-11H	MW-18S	MW-18D	MW-4D	Dup-01
Lab Sample ID:	114799.01	114799.02	114799.03	114799.04	114799.05	114799.06	114799.07
Matrix:	aqueous	aqueous	aqueous	aqueous	aqueous	aqueous	aqueous
Date Sampled:	10/2/12	9/14/12	10/3/12	10/3/12	10/3/12	10/3/12	10/2/12
Date Received:	10/4/12	10/4/12	10/4/12	10/4/12	10/4/12	10/4/12	10/4/12
Units:	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Date of Analysis:	10/9/12	10/9/12	10/10/12	10/10/12	10/10/12	10/10/12	10/10/12
Analyst:	KJP	KJP	KJP	KJP	KJP	KJP	KJP
Method:	8260B	8260B	8260B	8260B	8260B	8260B	8260B
Dilution Factor:	1	1	10	1	2	50	1
Dichlorodifluoromethane	< 5	< 5	< 50	< 5	< 10	< 300	< 5
Chloromethane	< 2	< 2	< 20	< 2	< 4	< 100	< 2
Vinyl chloride	**12**	< 2	< 20	< 2	< 4	< 100	**12**
Bromomethane	< 2	< 2	< 20	< 2	< 4	< 100	< 2
Chloroethane	< 5	< 5	< 50	< 5	< 10	< 300	< 5
Trichlorofluoromethane	< 5	< 5	< 50	< 5	< 10	< 300	< 5
Diethyl Ether	< 5	< 5	< 50	< 5	< 10	< 300	< 5
Acetone	< 10	< 10	< 100	< 10	< 20	< 500	< 10
1,1-Dichloroethene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
Methylene chloride	< 5	< 5	< 50	< 5	< 10	< 300	< 5
Carbon disulfide	< 5	< 5	< 20	< 5	< 5	< 100	< 5
Methyl-t-butyl ether(MTBE)	< 5	< 5	< 10	< 5	< 5	< 50	< 5
trans-1,2-Dichloroethene	< 2	< 2	< 10	< 2	< 2	< 50	< 2
1,1-Dichloroethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
2,2-Dichloropropane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
cis-1,2-Dichloroethene	**78**	< 2	**430**	**4**	**74**	< 50	**81**
2-Butanone(MEK)	< 10	< 10	< 100	< 10	< 20	< 500	< 10
Bromochloromethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
Tetrahydrofuran(THF)	< 10	< 10	< 100	< 10	< 20	< 500	< 10
Chloroform	< 2	< 2	< 10	< 2	< 2	< 50	< 2
1,1,1-Trichloroethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
Carbon tetrachloride	< 2	< 2	< 10	< 2	< 2	< 50	< 2
1,1-Dichloropropene	< 2	< 2	< 10	< 2	< 2	< 50	< 2
Benzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
1,2-Dichloroethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
Trichloroethene	**46**	< 2	**680**	**3**	**25**	< 50	**48**
1,2-Dichloropropane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
Dibromomethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
Bromodichloromethane	< 1	< 1	< 10	< 1	< 2	< 50	< 1
4-Methyl-2-pentanone(MIBK)	< 10	< 10	< 100	< 10	< 20	< 500	< 10
cis-1,3-Dichloropropene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
Toluene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
trans-1,3-Dichloropropene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
1,1,2-Trichloroethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
2-Hexanone	< 10	< 10	< 100	< 10	< 20	< 500	< 10
Tetrachloroethene	**170**	< 2	**1800**	**3**	**220**	**9300**	**170**
1,3-Dichloropropane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
Dibromochloromethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
1,2-Dibromoethane(EDB)	< 1	< 1	< 10	< 1	< 2	< 50	< 1
Chlorobenzene	< 2	< 2	< 10	< 2	< 2	< 50	< 2
1,1,1,2-Tetrachloroethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
Ethylbenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
mp-Xylene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
o-Xylene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
Styrene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
Bromoform	< 2	< 2	< 20	< 2	< 4	< 100	< 2
IsoPropylbenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1

LABORATORY REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Sample ID:	MW-19H	TB	MW-11H	MW-18S	MW-18D	MW-4D	Dup-01
Lab Sample ID:	114799.01	114799.02	114799.03	114799.04	114799.05	114799.06	114799.07
Matrix:	aqueous	aqueous	aqueous	aqueous	aqueous	aqueous	aqueous
Date Sampled:	10/2/12	9/14/12	10/3/12	10/3/12	10/3/12	10/3/12	10/2/12
Date Received:	10/4/12	10/4/12	10/4/12	10/4/12	10/4/12	10/4/12	10/4/12
Units:	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Date of Analysis:	10/9/12	10/9/12	10/10/12	10/10/12	10/10/12	10/10/12	10/10/12
Analyst:	KJP	KJP	KJP	KJP	KJP	KJP	KJP
Method:	8260B	8260B	8260B	8260B	8260B	8260B	8260B
Dilution Factor:	1	1	10	1	2	50	1
Bromobenzene	< 2	< 2	< 10	< 2	< 2	< 50	< 2
1,1,2,2-Tetrachloroethane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
1,2,3-Trichloropropane	< 2	< 2	< 10	< 2	< 2	< 50	< 2
n-Propylbenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
2-Chlorotoluene	< 2	< 2	< 10	< 2	< 2	< 50	< 2
4-Chlorotoluene	< 2	< 2	< 10	< 2	< 2	< 50	< 2
1,3,5-Trimethylbenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
tert-Butylbenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
1,2,4-Trimethylbenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
sec-Butylbenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
1,3-Dichlorobenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
p-Isopropyltoluene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
1,4-Dichlorobenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
1,2-Dichlorobenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
n-Butylbenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
1,2-Dibromo-3-chloropropane	< 1	< 1	< 10	< 1	< 2	< 50	< 1
1,2,4-Trichlorobenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
Hexachlorobutadiene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
Naphthalene	< 5	< 5	< 50	< 5	< 10	< 300	< 5
1,2,3-Trichlorobenzene	< 1	< 1	< 10	< 1	< 2	< 50	< 1
4-Bromofluorobenzene (surr)	**96 %R**	**94 %R**	**93 %R**	**97 %R**	**97 %R**	**96 %R**	**95 %R**
1,2-Dichlorobenzene-d4 (surr)	**105 %R**	**101 %R**	**103 %R**	**105 %R**	**108 %R**	**102 %R**	**107 %R**
Toluene-d8 (surr)	**99 %R**	**100 %R**	**97 %R**	**99 %R**	**94 %R**	**93 %R**	**99 %R**

QC REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
Dichlorodifluoromethane	< 5	11 (53 %R)	11 (55 %R) (4 RPD)	10/9/2012	ug/l	40 - 160	20	8260B
Chloromethane	< 2	13 (65 %R)	14 (68 %R) (5 RPD)	10/9/2012	ug/l	40 - 160	20	8260B
Vinyl chloride	< 2	14 (70 %R)	15 (77 %R) (10 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Bromomethane	< 2	16 (79 %R)	16 (82 %R) (4 RPD)	10/9/2012	ug/l	40 - 160	20	8260B
Chloroethane	< 5	19 (97 %R)	20 (102 %R) (5 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Trichlorofluoromethane	< 5	18 (88 %R)	18 (89 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Diethyl Ether	< 5	21 (105 %R)	22 (108 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Acetone	< 10	10 (74 %R)	20 (76 %R) (3 RPD)	10/9/2012	ug/l	40 - 160	20	8260B
1,1-Dichloroethene	< 1	19 (95 %R)	20 (98 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Methylene chloride	< 5	20 (98 %R)	20 (102 %R) (4 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Carbon disulfide	< 5	21 (103 %R)	22 (108 %R) (5 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Methyl-t-butyl ether(MTBE)	< 5	21 (104 %R)	21 (105 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
trans-1,2-Dichloroethene	< 2	19 (96 %R)	20 (98 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,1-Dichloroethane	< 2	20 (100 %R)	20 (102 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
2,2-Dichloropropane	< 2	16 (78 %R)	16 (79 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
cis-1,2-Dichloroethene	< 2	20 (98 %R)	20 (100 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
2-Butanone(MEK)	< 10	20 (86 %R)	20 (89 %R) (3 RPD)	10/9/2012	ug/l	40 - 160	20	8260B
Bromochloromethane	< 2	19 (97 %R)	20 (99 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Tetrahydrofuran(THF)	< 10	20 (103 %R)	20 (104 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Chloroform	< 2	20 (98 %R)	20 (100 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,1,1-Trichloroethane	< 2	19 (94 %R)	19 (97 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Carbon tetrachloride	< 2	18 (88 %R)	19 (96 %R) (9 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,1-Dichloropropene	< 2	20 (99 %R)	20 (101 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Benzene	< 1	20 (102 %R)	21 (104 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2-Dichloroethane	< 2	20 (98 %R)	20 (98 %R) (0 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Trichloroethene	< 2	20 (99 %R)	20 (101 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2-Dichloropropane	< 2	20 (101 %R)	20 (102 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Dibromomethane	< 2	20 (100 %R)	20 (101 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Bromodichloromethane	< 1	19 (94 %R)	20 (98 %R) (4 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
4-Methyl-2-pentanone(MIBK)	< 10	20 (103 %R)	20 (103 %R) (0 RPD)	10/9/2012	ug/l	40 - 160	20	8260B
cis-1,3-Dichloropropene	< 1	21 (103 %R)	21 (106 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Toluene	< 1	21 (104 %R)	21 (107 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
trans-1,3-Dichloropropene	< 1	19 (97 %R)	20 (102 %R) (5 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,1,2-Trichloroethane	< 2	21 (103 %R)	21 (105 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
2-Hexanone	< 10	20 (106 %R)	20 (105 %R) (1 RPD)	10/9/2012	ug/l	40 - 160	20	8260B
Tetrachloroethene	< 2	21 (104 %R)	21 (105 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,3-Dichloropropane	< 2	21 (104 %R)	21 (104 %R) (0 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Dibromochloromethane	< 2	19 (96 %R)	20 (101 %R) (5 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2-Dibromoethane(EDB)	< 1	20 (102 %R)	21 (105 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Chlorobenzene	< 2	21 (104 %R)	21 (105 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,1,1,2-Tetrachloroethane	< 2	21 (104 %R)	21 (107 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Ethylbenzene	< 1	21 (107 %R)	21 (107 %R) (0 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
mp-Xylene	< 1	42 (104 %R)	43 (108 %R) (4 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
o-Xylene	< 1	21 (107 %R)	22 (109 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Styrene	< 1	20 (101 %R)	21 (103 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Bromoform	< 2	18 (91 %R)	19 (96 %R) (5 RPD)	10/9/2012	ug/l	70 - 130	20	8260B

QC REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
IsoPropylbenzene	< 1	23 (116 %R)	23 (117 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Bromobenzene	< 2	22 (109 %R)	22 (110 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,1,2,2-Tetrachloroethane	< 2	21 (107 %R)	22 (108 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2,3-Trichloropropane	< 2	21 (105 %R)	22 (108 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
n-Propylbenzene	< 1	23 (113 %R)	23 (115 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
2-Chlorotoluene	< 2	22 (110 %R)	22 (110 %R) (0 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
4-Chlorotoluene	< 2	22 (111 %R)	22 (112 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,3,5-Trimethylbenzene	< 1	23 (116 %R)	23 (116 %R) (0 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
tert-Butylbenzene	< 1	22 (111 %R)	23 (113 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2,4-Trimethylbenzene	< 1	23 (115 %R)	23 (116 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
sec-Butylbenzene	< 1	23 (113 %R)	23 (115 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,3-Dichlorobenzene	< 1	22 (108 %R)	21 (106 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
p-Isopropyltoluene	< 1	23 (117 %R)	24 (118 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,4-Dichlorobenzene	< 1	21 (106 %R)	21 (105 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2-Dichlorobenzene	< 1	21 (105 %R)	21 (105 %R) (0 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
n-Butylbenzene	< 1	23 (114 %R)	23 (113 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2-Dibromo-3-chloropropane	< 1	22 (108 %R)	21 (105 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2,4-Trichlorobenzene	< 1	23 (115 %R)	23 (114 %R) (1 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Hexachlorobutadiene	< 1	19 (95 %R)	19 (97 %R) (2 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
Naphthalene	< 5	23 (113 %R)	23 (116 %R) (3 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
1,2,3-Trichlorobenzene	< 1	21 (106 %R)	21 (106 %R) (0 RPD)	10/9/2012	ug/l	70 - 130	20	8260B
4-Bromofluorobenzene (surr)	96 %R	95 %R	98 %R	10/9/2012	% Rec	70 - 130	50	8260B
1,2-Dichlorobenzene-d4 (surr)	102 %R	97 %R	99 %R	10/9/2012	% Rec	70 - 130	50	8260B
Toluene-d8 (surr)	101 %R	101 %R	101 %R	10/9/2012	% Rec	70 - 130	50	8260B

Samples were extracted and analyzed within holding time limits.
Instrumentation was calibrated in accordance with the method requirements.
The method blanks were free of contamination at the reporting limits.
Sample surrogate recoveries met the above stated criteria.
The associated matrix spikes and/or Laboratory Control Samples met acceptance criteria.
There were no exceptions in the analyses, unless noted.
*/! Flagged analyte recoveries deviated from the QA/QC limits. Any impact to data is addressed below.

QC REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
Dichlorodifluoromethane	< 5	13 (64 %R)	12 (61 %R) (5 RPD)	10/10/2012	ug/l	40 - 160	20	8260B
Chloromethane	< 2	15 (76 %R)	15 (75 %R) (1 RPD)	10/10/2012	ug/l	40 - 160	20	8260B
Vinyl chloride	< 2	17 (87 %R)	17 (86 %R) (1 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Bromomethane	< 2	20 (102 %R)	21 (104 %R) (2 RPD)	10/10/2012	ug/l	40 - 160	20	8260B
Chloroethane	< 5	22 (112 %R)	20 (102 %R) (9 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Trichlorofluoromethane	< 5	22 (108 %R)	21 (105 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Diethyl Ether	< 5	23 (113 %R)	22 (112 %R) (1 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Acetone	< 10	20 (89 %R)	20 (89 %R) (0 RPD)	10/10/2012	ug/l	40 - 160	20	8260B
1,1-Dichloroethene	< 1	21 (103 %R)	21 (103 %R) (0 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Methylene chloride	< 5	21 (106 %R)	21 (104 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Carbon disulfide	< 5	23 (115 %R)	23 (113 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Methyl-t-butyl ether(MTBE)	< 5	20 (102 %R)	21 (105 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
trans-1,2-Dichloroethene	< 2	21 (105 %R)	21 (103 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,1-Dichloroethane	< 2	21 (106 %R)	21 (107 %R) (1 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
2,2-Dichloropropane	< 2	16 (80 %R)	16 (82 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
cis-1,2-Dichloroethene	< 2	21 (105 %R)	21 (105 %R) (0 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
2-Butanone(MEK)	< 10	20 (96 %R)	20 (90 %R) (6 RPD)	10/10/2012	ug/l	40 - 160	20	8260B
Bromochloromethane	< 2	21 (105 %R)	21 (107 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Tetrahydrofuran(THF)	< 10	20 (104 %R)	20 (98 %R) (6 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Chloroform	< 2	21 (106 %R)	21 (106 %R) (0 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,1,1-Trichloroethane	< 2	21 (105 %R)	21 (105 %R) (0 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Carbon tetrachloride	< 2	22 (108 %R)	22 (110 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,1-Dichloropropene	< 2	21 (106 %R)	21 (106 %R) (0 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Benzene	< 1	21 (107 %R)	21 (107 %R) (0 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2-Dichloroethane	< 2	22 (108 %R)	22 (110 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Trichloroethene	< 2	21 (107 %R)	22 (108 %R) (1 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2-Dichloropropane	< 2	21 (104 %R)	21 (106 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Dibromomethane	< 2	22 (108 %R)	22 (111 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Bromodichloromethane	< 1	22 (108 %R)	22 (109 %R) (1 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
4-Methyl-2-pentanone(MIBK)	< 10	20 (110 %R)	20 (106 %R) (4 RPD)	10/10/2012	ug/l	40 - 160	20	8260B
cis-1,3-Dichloropropene	< 1	22 (110 %R)	22 (112 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Toluene	< 1	21 (107 %R)	21 (103 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
trans-1,3-Dichloropropene	< 1	21 (103 %R)	20 (100 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,1,2-Trichloroethane	< 2	22 (109 %R)	20 (102 %R) (7 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
2-Hexanone	< 10	20 (111 %R)	20 (107 %R) (4 RPD)	10/10/2012	ug/l	40 - 160	20	8260B
Tetrachloroethene	< 2	23 (115 %R)	23 (114 %R) (1 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,3-Dichloropropane	< 2	22 (108 %R)	21 (104 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Dibromochloromethane	< 2	22 (110 %R)	21 (107 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2-Dibromoethane(EDB)	< 1	21 (107 %R)	20 (102 %R) (5 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Chlorobenzene	< 2	22 (108 %R)	21 (103 %R) (5 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,1,1,2-Tetrachloroethane	< 2	23 (115 %R)	22 (111 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Ethylbenzene	< 1	22 (109 %R)	21 (106 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
mp-Xylene	< 1	44 (110 %R)	42 (105 %R) (5 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
o-Xylene	< 1	22 (110 %R)	21 (106 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Styrene	< 1	24 (121 %R)	22 (110 %R) (10 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Bromoform	< 2	21 (106 %R)	20 (102 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B

QC REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Parameter Name	Blank	LCS	LCSD	Analysis Date	Units	Limits	RPD	Method
IsoPropylbenzene	< 1	24 (122 %R)	23 (117 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Bromobenzene	< 2	21 (106 %R)	20 (102 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,1,2,2-Tetrachloroethane	< 2	20 (101 %R)	19 (95 %R) (6 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2,3-Trichloropropane	< 2	21 (107 %R)	20 (100 %R) (7 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
n-Propylbenzene	< 1	22 (112 %R)	21 (107 %R) (5 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
2-Chlorotoluene	< 2	22 (108 %R)	21 (103 %R) (5 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
4-Chlorotoluene	< 2	22 (112 %R)	21 (107 %R) (5 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,3,5-Trimethylbenzene	< 1	23 (114 %R)	22 (110 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
tert-Butylbenzene	< 1	22 (109 %R)	21 (106 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2,4-Trimethylbenzene	< 1	23 (113 %R)	22 (111 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
sec-Butylbenzene	< 1	23 (113 %R)	22 (110 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,3-Dichlorobenzene	< 1	21 (105 %R)	21 (103 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
p-Isopropyltoluene	< 1	23 (117 %R)	22 (112 %R) (4 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,4-Dichlorobenzene	< 1	21 (105 %R)	21 (103 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2-Dichlorobenzene	< 1	21 (103 %R)	20 (101 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
n-Butylbenzene	< 1	23 (115 %R)	22 (112 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2-Dibromo-3-chloropropane	< 1	21 (103 %R)	19 (97 %R) (6 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2,4-Trichlorobenzene	< 1	22 (110 %R)	21 (107 %R) (3 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Hexachlorobutadiene	< 1	19 (96 %R)	19 (96 %R) (0 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
Naphthalene	< 5	21 (105 %R)	21 (103 %R) (2 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
1,2,3-Trichlorobenzene	< 1	20 (100 %R)	20 (100 %R) (0 RPD)	10/10/2012	ug/l	70 - 130	20	8260B
4-Bromofluorobenzene (surr)	96 %R	100 %R	102 %R	10/10/2012	% Rec	70 - 130	50	8260B
1,2-Dichlorobenzene-d4 (surr)	102 %R	97 %R	98 %R	10/10/2012	% Rec	70 - 130	50	8260B
Toluene-d8 (surr)	99 %R	99 %R	96 %R	10/10/2012	% Rec	70 - 130	50	8260B

Samples were extracted and analyzed within holding time limits.
Instrumentation was calibrated in accordance with the method requirements.
The method blanks were free of contamination at the reporting limits.
Sample surrogate recoveries met the above stated criteria.
The associated matrix spikes and/or Laboratory Control Samples met acceptance criteria.
There were no exceptions in the analyses, unless noted.
*/! Flagged analyte recoveries deviated from the QA/QC limits. Any impact to data is addressed below.

LABORATORY REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Sample ID:	MW-11H	MW-18S
Lab Sample ID:	114799.03	114799.04
Matrix:	aqueous	aqueous
Date Sampled:	10/3/12	10/3/12
Date Received:	10/4/12	10/4/12

			Analytical Matrix	Units	Analysis Date Time	Method	Analyst
Sulfate	**37**	**24**	AqDis	mg/L	10/6/12 4:16	300.0	KL
Chloride	**540**	**300**	AqDis	mg/L	10/5/12 11:03	4500CIE	KD
Nitrite-N	< 0.5	< 0.5	AqDis	mg/L	10/5/12 10:48	353.2	KD
Nitrate-N	< 0.5	< 0.5	AqDis	mg/L	10/5/12 10:48	353.2	KD
Alkalinity Total (CaCO3)	**360**	**230**	AqTot	mg/L	10/8/12 11:14	2320B	SEL
TOC	**4.5**	**4.8**	AqTot	mg/L	10/9/12 13:41	5310C	LO

Sample ID:	MW-18D	MW-4D
Lab Sample ID:	114799.05	114799.06
Matrix:	aqueous	aqueous
Date Sampled:	10/3/12	10/3/12
Date Received:	10/4/12	10/4/12

			Analytical Matrix	Units	Analysis Date Time	Method	Analyst
Sulfate	**36**	**37**	AqDis	mg/L	10/11/12 9:58	300.0	KD
Chloride	**560**	**1200**	AqDis	mg/L	10/5/12 11:09	4500CIE	KD
Nitrite-N	< 0.5	< 0.5	AqDis	mg/L	10/5/12 10:59	353.2	KD
Nitrate-N	< 0.5	**2.3**	AqDis	mg/L	10/5/12 10:59	353.2	KD
Alkalinity Total (CaCO3)	**380**	**370**	AqTot	mg/L	10/8/12 11:14	2320B	SEL
TOC	**1.7**	**0.8**	AqTot	mg/L	10/8/12 17:27	5310C	LO

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QC REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Parameter Name	Blank	LCS	LCSD	Units	Date of Analysis	Limits	RPD	Method
Sulfate	< 1	21 (106 %R)	21 (106 %R) (0 RPD)	mg/L	10/6/12	90 - 110	20	300.0
Sulfate	< 1	21 (103 %R)	21 (105 %R) (2 RPD)	mg/L	10/11/12	90 - 110	20	300.0
Chloride	< 1	26 (104 %R)	26 (104 %R) (0 RPD)	mg/L	10/5/12	90 - 110	20	4500CIE
Nitrite-N	< 0.5	5.1 (103 %R)	5.0 (101 %R) (2 RPD)	mg/L	10/5/12	90 - 110	20	353.2
Nitrate-N	< 0.5	5.3 (106 %R)	5.2 (105 %R) (1 RPD)	mg/L	10/5/12	90 - 110	20	353.2
Alkalinity Total (CaCO3)	< 1	10 (100 %R)	10 (102 %R) (2 RPD)	mg/L	10/8/12	85 - 115	20	2320B
TOC	< 0.5	10 (102 %R)	10 (100 %R) (2 RPD)	mg/L	10/9/12	90 - 110	20	5310C

Samples were analyzed within holding times unless noted on the sample results page.
Instrumentation was calibrated in accordance with the method requirements.
The method blanks were free of contamination at the reporting limits.
The associated matrix spikes and/or Laboratory Control Samples met the above stated criteria.
Exceptions to the above statements are flagged or noted above or on the QC Narrative page.
*/! Flagged analyte recoveries deviated from the QA/QC limits.

LABORATORY REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Sample ID:	MW-11H	MW-18S	MW-18D	MW-4D					
Lab Sample ID:	114799.03	114799.04	114799.05	114799.06					
Matrix:	aqueous	aqueous	aqueous	aqueous					
Date Sampled:	10/3/12	10/3/12	10/3/12	10/3/12	**Analytical Matrix**	**Units**	**Date of Analysis**	**Method**	**Analyst**
Date Received:	10/4/12	10/4/12	10/4/12	10/4/12					
Calcium	**130**	**75**	**160**	**210**	AqTot	mg/L	10/9/12	6010B	DS
Calcium	**120**	**72**	**150**	**200**	AqDis	mg/L	10/9/12	6010B	DS
Iron	**0.15**	**0.84**	**0.10**	**0.37**	AqTot	mg/L	10/9/12	6010B	DS
Iron	< 0.05	< 0.05	< 0.05	< 0.05	AqDis	mg/L	10/9/12	6010B	DS
Manganese	**0.078**	**0.25**	**0.24**	**0.14**	AqTot	mg/L	10/9/12	6010B	DS
Manganese	**0.026**	**0.23**	**0.20**	**0.11**	AqDis	mg/L	10/9/12	6010B	DS

QC REPORT

EAI ID#: **114799**

Client: **The Johnson Company**

Client Designation: **Fillipo / 3-2218-07**

Parameter Name	Blank	LCS	LCSD	Units	Date of Analysis	Limits	RPD	Method
Calcium	< 0.05	12 (105 %R)		mg/L	10/9/12	80 - 120		6010B
Iron	< 0.05	12 (106 %R)		mg/L	10/9/12	80 - 120		6010B
Manganese	< 0.005	1.1 (105 %R)		mg/L	10/9/12	80 - 120		6010B

Parameter Name	MS/MSD Parent ID	MS/MSD Parent	Matrix Spike	MSD	Units	Date of Analysis	Limits	RPD	Method
Calcium	114799.06	210	210 (12 %R)	220 (18 %R) (40 RPD)	mg/L	10/9/12	75-125		6010B
Iron	114799.06	0.37	11 (97 %R)	11 (99 %R) (2 RPD)	mg/L	10/9/12	75-125		6010B
Manganese	114799.06	0.14	1.1 (94 %R)	1.1 (95 %R) (1 RPD)	mg/L	10/9/12	75-125		6010B

Samples were analyzed within holding times unless noted on the sample results page.
Instrumentation was calibrated in accordance with the method requirements.
The method blanks were free of contamination at the reporting limits.
The associated matrix spikes and/or Laboratory Control Samples met the above stated criteria.
Exceptions to the above statements are flagged or noted above or on the QC Narrative page.
*/! Flagged analyte recoveries deviated from the QA/QC limits.

CHAIN OF CUSTODY RECORD

114799

12

Client / Project Name: The Johnson Co. / Fillipo	Project Location: Rutland, VT
Project No.: 3-2218-07	Field Logbook No.:
Sampler: (Signature) Charles Farmer	Chain of Custody Tape No.:

ANALYZES

Sample No. / Identification	Date	Time	Lab Sample Number	Type of Sample	8260B	Total Metals by ICP, Dissolved Metals by ICP, Iron, Manganese, Calcium only	Iron, Manganese, Calcium	TOC	Alkalinity	Dissolved nitrate, nitrite, sulfate, chloride	REMARKS
MW-19H	10/02/12	1300		Aq.	X						* Lab filter dissolved
TB	10/02/12	1300		Aq.	X						metals and dissolved
MW-11H	10/03/12	1530		Aq.	X	X	X	X	X	X	nitrate, nitrite, sulfate,
MW-18S	10/03/12	1247		Aq.	X	X	X	X	X	X	chloride *
MW-18D	10/03/12	1620		Aq.	X	X	X	X	X	X	
MW-4D	10/03/12	1440		Aq.	X	X	X	X	X	X	
DUP-01	10/02/12	1200		Aq	X						

Relinquished by: (Signature) Charles Farmer	Date 10/04/12	Time 0830	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received for Laboratory: (Signature) K. Zuk-Mullan	Date 10/4/12	Time 15:10
Sample Disposal Method:	Disposed of by: (Signature)			Date	Time

SAMPLE COLLECTOR

100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600
Fax (802) 229-5876

THE JOHNSON COMPANY, INC.
Environmental Sciences and Engineering

ANALYTICAL LABORATORY: Eastern Analytical
5°C on ice

Shipper ID #

WHITE - To accompany sample to the lab and returned to the Johnson Co. YELLOW - Lab copy PINK - Transporter copy GOLD - Sampler copy

Reorder Form #50 for printing service 1-800 662-6627 NEBS, Inc. Pelham, NH 03076 www.nebs.com Rel. No: G 194100504

ANALYTICAL REPORT

Lab Number:	L1219992
Client:	The Johnson Company, Inc 100 State Street Suite 600 Montpelier, VT 05602
ATTN:	Donald Maynard
Phone:	(802) 229-4600
Project Name:	FILLIPO
Project Number:	3-2218-07
Report Date:	11/12/12

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: NY (11627), CT (PH-0141), NH (2206), NJ NELAP (MA015), RI (LAO00299), PA (68-02089), LA NELAP (03090), FL (E87814), TX (T104704419), WA (C954), DOD (L2217.01), USDA (Permit #P330-11-00109), US Army Corps of Engineers.

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1219992-01	SV-1	RUTLAND, VT	11/02/12 19:37
L1219992-02	SV-DUP-01	RUTLAND, VT	11/02/12 20:09
L1219992-03	SV-2	RUTLAND, VT	11/02/12 20:09
L1219992-04	TB	RUTLAND, VT	11/02/12 00:00

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples free of charge for 30 days from the date the project is completed. After 30 days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

Project Name: FILLIPO **Lab Number:** L1219992
Project Number: 3-2218-07 **Report Date:** 11/12/12

Case Narrative (continued)

Volatile Organics in Air

Canisters were released from the laboratory on October 30, 2012. The canister certification results are provided as an addendum.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Christopher J. Anderson

Title: Technical Director/Representative Date: 11/12/12

AIR

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

SAMPLE RESULTS

Lab ID:	L1219992-01	Date Collected:	11/02/12 19:37
Client ID:	SV-1	Date Received:	11/05/12
Sample Location:	RUTLAND, VT	Field Prep:	Not Specified
Matrix:	Soil_Vapor		
Anaytical Method:	48,TO-15		
Analytical Date:	11/07/12 21:00		
Analyst:	RY		

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	81		60-140
Bromochloromethane	94		60-140
chlorobenzene-d5	92		60-140

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

SAMPLE RESULTS

Lab ID:	L1219992-02	Date Collected:	11/02/12 20:09
Client ID:	SV-DUP-01	Date Received:	11/05/12
Sample Location:	RUTLAND, VT	Field Prep:	Not Specified
Matrix:	Soil_Vapor		
Anaytical Method:	48,TO-15		
Analytical Date:	11/07/12 21:30		
Analyst:	RY		

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Trichloroethene	1.75	0.200	--	9.40	1.07	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	81		60-140
Bromochloromethane	94		60-140
chlorobenzene-d5	93		60-140

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

SAMPLE RESULTS

Lab ID:	L1219992-03	Date Collected:	11/02/12 20:09
Client ID:	SV-2	Date Received:	11/05/12
Sample Location:	RUTLAND, VT	Field Prep:	Not Specified
Matrix:	Soil_Vapor		
Anaytical Method:	48,TO-15		
Analytical Date:	11/07/12 22:01		
Analyst:	RY		

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	83		60-140
Bromochloromethane	96		60-140
chlorobenzene-d5	96		60-140

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

SAMPLE RESULTS

Lab ID:	L1219992-04	Date Collected:	11/02/12 00:00
Client ID:	TB	Date Received:	11/05/12
Sample Location:	RUTLAND, VT	Field Prep:	Not Specified
Matrix:	Soil_Vapor		
Anaytical Method:	48,TO-15		
Analytical Date:	11/07/12 19:28		
Analyst:	RY		

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	85		60-140
Bromochloromethane	96		60-140
chlorobenzene-d5	93		60-140

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Method Blank Analysis
Batch Quality Control

Analytical Method: 48,TO-15
Analytical Date: 11/07/12 12:53

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab for sample(s): 01-04 Batch: WG572421-4								
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1

	Results	Qualifier	Units	RDL	Dilution Factor
Tentatively Identified Compounds					
No Tentatively Identified Compounds					

Lab Control Sample Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 Batch: WG572421-3								
Chlorodifluoromethane	82		-		70-130	-		
Propylene	98		-		70-130	-		
Propane	74		-		70-130	-		
Dichlorodifluoromethane	71		-		70-130	-		
Chloromethane	99		-		70-130	-		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	100		-		70-130	-		
Methanol	76		-		70-130	-		
Vinyl chloride	99		-		70-130	-		
1,3-Butadiene	98		-		70-130	-		
Butane	85		-		70-130	-		
Bromomethane	99		-		70-130	-		
Chloroethane	100		-		70-130	-		
Ethyl Alcohol	88		-		70-130	-		
Dichlorofluoromethane	83		-		70-130	-		
Vinyl bromide	92		-		70-130	-		
Acrolein	88		-		70-130	-		
Acetone	88		-		70-130	-		
Acetonitrile	90		-		70-130	-		
Trichlorofluoromethane	100		-		70-130	-		
iso-Propyl Alcohol	93		-		70-130	-		
Acrylonitrile	87		-		70-130	-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 Batch: WG572421-3								
Pentane	85		-		70-130	-		
Ethyl ether	86		-		70-130	-		
1,1-Dichloroethene	100		-		70-130	-		
tert-Butyl Alcohol	84		-		70-130	-		
Methylene chloride	98		-		70-130	-		
3-Chloropropene	100		-		70-130	-		
Carbon disulfide	91		-		70-130	-		
1,1,2-Trichloro-1,2,2-Trifluoroethane	99		-		70-130	-		
trans-1,2-Dichloroethene	88		-		70-130	-		
1,1-Dichloroethane	102		-		70-130	-		
Methyl tert butyl ether	95		-		70-130	-		
Vinyl acetate	106		-		70-130	-		
2-Butanone	93		-		70-130	-		
cis-1,2-Dichloroethene	112		-		70-130	-		
Ethyl Acetate	96		-		70-130	-		
Chloroform	103		-		70-130	-		
Tetrahydrofuran	96		-		70-130	-		
2,2-Dichloropropane	85		-		70-130	-		
1,2-Dichloroethane	100		-		70-130	-		
n-Hexane	85		-		70-130	-		
Isopropyl Ether	79		-		70-130	-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 Batch: WG572421-3								
Ethyl-Tert-Butyl-Ether	74		-		70-130	-		
1,1,1-Trichloroethane	91		-		70-130	-		
1,1-Dichloropropene	80		-		70-130	-		
Benzene	89		-		70-130	-		
Carbon tetrachloride	94		-		70-130	-		
Cyclohexane	99		-		70-130	-		
Tertiary-Amyl Methyl Ether	86		-		70-130	-		
Dibromomethane	78		-		70-130	-		
1,2-Dichloropropane	98		-		70-130	-		
Bromodichloromethane	89		-		70-130	-		
1,4-Dioxane	91		-		70-130	-		
Trichloroethene	97		-		70-130	-		
2,2,4-Trimethylpentane	93		-		70-130	-		
Methyl methacrylate	110		-		70-130	-		
Heptane	93		-		70-130	-		
cis-1,3-Dichloropropene	106		-		70-130	-		
4-Methyl-2-pentanone	92		-		70-130	-		
trans-1,3-Dichloropropene	92		-		70-130	-		
1,1,2-Trichloroethane	98		-		70-130	-		
Toluene	104		-		70-130	-		
1,3-Dichloropropane	87		-		70-130	-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 Batch: WG572421-3								
2-Hexanone	100		-		70-130	-		
Dibromochloromethane	94		-		70-130	-		
1,2-Dibromoethane	105		-		70-130	-		
Butyl Acetate	94		-		70-130	-		
Octane	95		-		70-130	-		
Tetrachloroethene	104		-		70-130	-		
1,1,1,2-Tetrachloroethane	88		-		70-130	-		
Chlorobenzene	106		-		70-130	-		
Ethylbenzene	111		-		70-130	-		
p/m-Xylene	110		-		70-130	-		
Bromoform	94		-		70-130	-		
Styrene	110		-		70-130	-		
1,1,2,2-Tetrachloroethane	113		-		70-130	-		
o-Xylene	115		-		70-130	-		
1,2,3-Trichloropropane	89		-		70-130	-		
Nonane (C9)	95		-		70-130	-		
Isopropylbenzene	94		-		70-130	-		
Bromobenzene	91		-		70-130	-		
o-Chlorotoluene	96		-		70-130	-		
n-Propylbenzene	97		-		70-130	-		
p-Chlorotoluene	94		-		70-130	-		

Lab Control Sample Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 Batch: WG572421-3								
4-Ethyltoluene	99		-		70-130	-		
1,3,5-Trimethylbenzene	119		-		70-130	-		
tert-Butylbenzene	100		-		70-130	-		
1,2,4-Trimethylbenzene	122		-		70-130	-		
Decane (C10)	96		-		70-130	-		
Benzyl chloride	104		-		70-130	-		
1,3-Dichlorobenzene	114		-		70-130	-		
1,4-Dichlorobenzene	117		-		70-130	-		
sec-Butylbenzene	96		-		70-130	-		
p-Isopropyltoluene	92		-		70-130	-		
1,2-Dichlorobenzene	115		-		70-130	-		
n-Butylbenzene	96		-		70-130	-		
1,2-Dibromo-3-chloropropane	96		-		70-130	-		
Undecane	102		-		70-130	-		
Dodecane (C12)	109		-		70-130	-		
1,2,4-Trichlorobenzene	127		-		70-130	-		
Naphthalene	100		-		70-130	-		
1,2,3-Trichlorobenzene	99		-		70-130	-		
Hexachlorobutadiene	116		-		70-130	-		

Lab Duplicate Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG572421-5 QC Sample: L1219979-01 Client ID: DUP Sample						
Propylene	18.0	17.6	ppbV	2		25
Dichlorodifluoromethane	ND	ND	ppbV	NC		25
Chloromethane	ND	ND	ppbV	NC		25
1,2-Dichloro-1,1,2,2-tetrafluoroethane	ND	ND	ppbV	NC		25
Vinyl chloride	4.41	3.97	ppbV	11		25
1,3-Butadiene	ND	ND	ppbV	NC		25
Bromomethane	ND	ND	ppbV	NC		25
Chloroethane	ND	ND	ppbV	NC		25
Ethyl Alcohol	ND	ND	ppbV	NC		25
Vinyl bromide	ND	ND	ppbV	NC		25
Acetone	125	116	ppbV	7		25
Trichlorofluoromethane	ND	ND	ppbV	NC		25
iso-Propyl Alcohol	ND	ND	ppbV	NC		25
1,1-Dichloroethene	3.39	3.21	ppbV	5		25
Methylene chloride	ND	ND	ppbV	NC		25
3-Chloropropene	ND	ND	ppbV	NC		25
Carbon disulfide	ND	ND	ppbV	NC		25
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ND	ppbV	NC		25
trans-1,2-Dichloroethene	73.8	68.6	ppbV	7		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG572421-5 QC Sample: L1219979-01 Client ID: DUP Sample					
1,1-Dichloroethane	7.05	6.55	ppbV	7	25
Methyl tert butyl ether	ND	ND	ppbV	NC	25
Vinyl acetate	ND	ND	ppbV	NC	25
2-Butanone	11.6	10.9	ppbV	6	25
cis-1,2-Dichloroethene	1990E	1880E	ppbV	6	25
Ethyl Acetate	ND	ND	ppbV	NC	25
Chloroform	23.7	22.0	ppbV	7	25
Tetrahydrofuran	3.22	3.05	ppbV	5	25
1,2-Dichloroethane	ND	ND	ppbV	NC	25
n-Hexane	7.40	8.02	ppbV	8	25
1,1,1-Trichloroethane	15.6	17.2	ppbV	10	25
Benzene	8.37	8.83	ppbV	5	25
Carbon tetrachloride	ND	ND	ppbV	NC	25
Cyclohexane	ND	ND	ppbV	NC	25
1,2-Dichloropropane	ND	ND	ppbV	NC	25
Bromodichloromethane	ND	ND	ppbV	NC	25
1,4-Dioxane	ND	ND	ppbV	NC	25
Trichloroethene	2910E	3160E	ppbV	8	25
2,2,4-Trimethylpentane	ND	ND	ppbV	NC	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG572421-5 QC Sample: L1219979-01 Client ID: DUP Sample					
Heptane	4.61	5.09	ppbV	10	25
cis-1,3-Dichloropropene	ND	ND	ppbV	NC	25
4-Methyl-2-pentanone	ND	ND	ppbV	NC	25
trans-1,3-Dichloropropene	ND	ND	ppbV	NC	25
1,1,2-Trichloroethane	ND	ND	ppbV	NC	25
Toluene	53.8	49.3	ppbV	9	25
2-Hexanone	ND	ND	ppbV	NC	25
Dibromochloromethane	ND	ND	ppbV	NC	25
1,2-Dibromoethane	ND	ND	ppbV	NC	25
Tetrachloroethene	1350E	1230E	ppbV	9	25
Chlorobenzene	ND	ND	ppbV	NC	25
Ethylbenzene	13.6	12.4	ppbV	9	25
p/m-Xylene	47.9	43.9	ppbV	9	25
Bromoform	ND	ND	ppbV	NC	25
Styrene	ND	ND	ppbV	NC	25
1,1,2,2-Tetrachloroethane	ND	ND	ppbV	NC	25
o-Xylene	12.4	11.5	ppbV	8	25
4-Ethyltoluene	ND	ND	ppbV	NC	25
1,3,5-Trimethylbenzene	ND	ND	ppbV	NC	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG572421-5 QC Sample: L1219979-01 Client ID: DUP Sample					
1,2,4-Trimethylbenzene	3.58	3.35	ppbV	7	25
Benzyl chloride	ND	ND	ppbV	NC	25
1,3-Dichlorobenzene	ND	ND	ppbV	NC	25
1,4-Dichlorobenzene	ND	ND	ppbV	NC	25
1,2-Dichlorobenzene	ND	ND	ppbV	NC	25
1,2,4-Trichlorobenzene	ND	ND	ppbV	NC	25
Hexachlorobutadiene	ND	ND	ppbV	NC	25
Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG572421-5 QC Sample: L1219979-01 Client ID: DUP Sample					
cis-1,2-Dichloroethene	1700	1700	ppbV	0	25
Trichloroethene	2780	2870	ppbV	3	25
Tetrachloroethene	1000	1000	ppbV	0	25

Project Name: FILLIPO

Project Number: 3-2218-07

Lab Number: L1219992

Report Date: 11/12/12

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controler Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L1219992-01	SV-1	0015	#20 SV	10/31/12	82728		-	-	-	Pass	9.0	8.7	3
L1219992-01	SV-1	457	2.7L Can	10/31/12	82728	L1218291-01	Pass	-28.7	-5.6	-	-	-	-
L1219992-02	SV-DUP-01	0407	#20 SV	10/31/12	82728		-	-	-	Pass	9.0	8.6	5
L1219992-02	SV-DUP-01	153	2.7L Can	10/31/12	82728	L1218291-01	Pass	-28.9	-5.4	-	-	-	-
L1219992-03	SV-2	0231	#20 SV	10/31/12	82728		-	-	-	Pass	9.0	8.4	7
L1219992-03	SV-2	245	2.7L Can	10/31/12	82728	L1218291-01	Pass	-29.4	-4.3	-	-	-	-
L1219992-04	TB	1743	2.7L Can	10/31/12	82728	L1218291-01	Pass	-29.5	-29.7	-	-	-	-

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

Air Canister Certification Results

Lab ID:	L1218291-01	Date Collected:	10/11/12 15:33
Client ID:	CAN 1743 SHELF 10	Date Received:	10/12/12
Sample Location:		Field Prep:	Not Specified
Matrix:	Air		
Anaytical Method:	48,TO-15		
Analytical Date:	10/13/12 15:33		
Analyst:	RY		

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.860	--		1
Propane	ND	0.200	--	ND	0.361	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.200	--	ND	0.434	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

Air Canister Certification Results

Lab ID: L1218291-01 Date Collected: 10/11/12 15:33

Client ID: CAN 1743 SHELF 10 Date Received: 10/12/12

Sample Location: Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

Air Canister Certification Results

Lab ID: L1218291-01 Date Collected: 10/11/12 15:33

Client ID: CAN 1743 SHELF 10 Date Received: 10/12/12

Sample Location: Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.20	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

Air Canister Certification Results

Lab ID: L1218291-01 Date Collected: 10/11/12 15:33

Client ID: CAN 1743 SHELF 10 Date Received: 10/12/12

Sample Location: Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethybenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

	Results	Qualifier	Units	RDL	Dilution Factor
Tentatively Identified Compounds					
No Tentatively Identified Compounds					

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

Air Canister Certification Results

Lab ID: L1218291-01 Date Collected: 10/11/12 15:33

Client ID: CAN 1743 SHELF 10 Date Received: 10/12/12

Sample Location: Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	99		60-140
Bromochloromethane	99		60-140
chlorobenzene-d5	93		60-140

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

Air Canister Certification Results

Lab ID:	L1218291-01	Date Collected:	10/11/12 15:33
Client ID:	CAN 1743 SHELF 10	Date Received:	10/12/12
Sample Location:		Field Prep:	Not Specified
Matrix:	Air		
Anaytical Method:	48,TO-15-SIM		
Analytical Date:	10/12/12 18:29		
Analyst:	RY		

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Acetone	ND	2.00	--	ND	4.75	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.08	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Halothane	ND	0.050	--	ND	0.404	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

Air Canister Certification Results

Lab ID: L1218291-01 Date Collected: 10/11/12 15:33

Client ID: CAN 1743 SHELF 10 Date Received: 10/12/12

Sample Location: Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.500	--	ND	2.46	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.500	--	ND	2.74	--		1
p-Isopropyltoluene	ND	0.500	--	ND	2.74	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.500	--	ND	2.74	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

Air Canister Certification Results

Lab ID: L1218291-01 Date Collected: 10/11/12 15:33

Client ID: CAN 1743 SHELF 10 Date Received: 10/12/12

Sample Location: Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	100		60-140
bromochloromethane	102		60-140
chlorobenzene-d5	85		60-140

AIR Petro Can Certification

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1218291

Project Number: CANISTER QC BAT **Report Date:** 11/12/12

AIR CAN CERTIFICATION RESULTS

Lab ID:	L1218291-01	Date Collected:	10/11/12 15:33
Client ID:	CAN 1743 SHELF 10	Date Received:	10/12/12
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	10/17/12 17:14		
Analyst:	MB		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbons in Air - Mansfield Lab						
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Project Name: FILLIPO
Project Number: 3-2218-07

Lab Number: L1219992
Report Date: 11/12/12

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information **Custody Seal**

Cooler	
NA	Present/Intact

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1219992-01A	Canister - 2.7 Liter	NA	NA	NA	NA	Present/Intact	TO15-LL(30)
L1219992-02A	Canister - 2.7 Liter	NA	NA	NA	NA	Present/Intact	TO15-LL(30)
L1219992-03A	Canister - 2.7 Liter	NA	NA	NA	NA	Present/Intact	TO15-LL(30)
L1219992-04A	Canister - 2.7 Liter	NA	NA	NA	NA	Present/Intact	TO15-LL(30)

*Values in parentheses indicate holding time in days

Project Name: FILLIPO **Lab Number:** L1219992

Project Number: 3-2218-07 **Report Date:** 11/12/12

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than five times (5x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported

Report Format: Data Usability Report

Project Name: FILLIPO **Lab Number:** L1219992

Project Number: 3-2218-07 **Report Date:** 11/12/12

Data Qualifiers

due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name: FILLIPO **Lab Number:** L1219992
Project Number: 3-2218-07 **Report Date:** 11/12/12

REFERENCES

48 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air. Second Edition. EPA/625/R-96/010b, January 1999.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certificate/Approval Program Summary

Last revised August 3, 2012 – Mansfield Facility

The following list includes only those analytes/methods for which certification/approval is currently held.
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

Connecticut Department of Public Health Certificate/Lab ID: PH-0141.

Wastewater/Non-Potable Water (Inorganic Parameters: pH, Turbidity, Conductivity, Alkalinity, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Suspended Solids (non-filterable). Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables, Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, PAHs, Haloethers, Chlorinated Hydrocarbons, Volatile Organics.)

Solid Waste/Soil (Inorganic Parameters: pH, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Titanium, Vanadium, Zinc, Total Organic Carbon, Corrosivity, TCLP 1311, SPLP 1312. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Volatile Organics, Acid Extractables, Benzidines, Phthalates, Nitrosamines, Nitroaromatics & Cyclic Ketones, PAHs, Haloethers, Chlorinated Hydrocarbons.)

Florida Department of Health Certificate/Lab ID: E87814. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SM2320B, SM2540D, SM2540G.)

Solid & Chemical Materials (Inorganic Parameters: 6020, 7470, 7471, 9045. Organic Parameters: EPA 8260, 8270, 8082, 8081.)

Air & Emissions (EPA TO-15.)

Louisiana Department of Environmental Quality Certificate/Lab ID: 03090. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: EPA 180.1, 245.7, 1631E, 3020A, 6020A, 7470A, 9040, 9050A, SM2320B, 2540D, 2540G, 4500H-B, Organic Parameters: EPA 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 5030B, 8015D, 3570, 8081B, 8082A, 8260B, 8270C, 8270D.)

Solid & Chemical Materials (Inorganic Parameters: EPA 1311, 3050B, 3051A, 3060A, 6020A, 7196A, 7470A, 7471B, 7474, 9040B, 9045C, 9060. Organic Parameters: EPA 3540C, 3570, 3580A, 3630C, 3640A, 3660, 3665A, 5035, 8015D, 8081B, 8082A, 8260B, 8270C, 8270D.)

Biological Tissue (Inorganic Parameters: EPA 6020A. Organic Parameters: EPA 3570, 3510C, 3610B, 3630C, 3640A, 8270C, 8270D.)

Air & Emissions (EPA TO-15.)

New Hampshire Department of Environmental Services Certificate/Lab ID: 2206. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: EPA 180.1, 1631E, 6020A, 7470A, 9040B, 9050A, SM2540D, 2540G, 4500H+B, 2320B, 3020A, . Organic Parameters: EPA 3510C, 3630C, 3640A, 3660B, 8081B, 8082A, 8270C, 8270D, 8015D.)

Solid & Chemical Materials (Inorganic Parameters: SW-846 1311, 3050B, 3051A, 6020A, 7471B, 9040B, 9045C. Organic Parameters: SW-846 3540C, 3580A, 3630C, 3640A, 3660B, 3665A, 8270C, 8015D, 8082A, 8081B.)

New Jersey Department of Environmental Protection Certificate/Lab ID: MA015. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SW-846 1312, 3020A, SM2320B, SM2540D, 2540G, 4500H-B, EPA 180.1, 1631E, SW-846 7470A, 9040C, 6020A, 9050A. Organic Parameters: SW-846 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 8015D, 8081B, 8082A, 8270C, 8270D)

Solid & Chemical Materials (Inorganic Parameters: SW-846 1311, 1312, 3050B, 3051A, 6020A, 7471B, 7474, 9040B, 9040C, 9045C, 9045D, 9060. Organic Parameters: SW-846 3540C, 3570, 3580A, 3630C, 3640A, 3660B, 3665A, 8081B, 8082A, 8270C, 8270D, 8015D.)

Atmospheric Organic Parameters (EPA 3C, TO-15, TO-10A, TO-13A-SIM.)

Biological Tissue (Inorganic Parameters: SW-846 6020A. Organic Parameters: SW-846 8270C, 8270D, 3510C, 3570, 3610C, 3630C, 3640A)

New York Department of Health Certificate/Lab ID: 11627. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SM2320B, SM2540D, 6020A, 1631E, 7470A, 9050A, EPA 180.1, 3020A. Organic Parameters: EPA 8270C, 8270D, 8081B, 8082A, 3510C.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 6020A, 7471B, 7474, 9040C, 9045D. Organic Parameters: EPA 8270C, 8270D, 8081B, 8082A, 1311, 3050B, 3580A, 3570, 3051A.)

Air & Emissions (EPA TO-15, TO-10A.)

Pennsylvania Certificate/Lab ID: 68-02089 ***NELAP Accredited***

Non-Potable Water (Inorganic Parameters: 1312, 1631E, 180.1, 3020A, 6020A, 7470A, 9040B, 9050A, 2320B, 2540D, 2540G, SM4500H+-B. Organic Parameters: 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 8015D, 8081B, 8082A, 8270C, 8270D .)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 3051A, 6020A, 7471B, 7474 9040B, 9045C, 9060. Organic Parameters: EPA3050B, 3540C, 3570, 3580A, 3630C, 3640A, 3660B, 3665A, 8270C, 8270D, 8081B, 8015D, 8082A.)

Rhode Island Department of Health Certificate/Lab ID: LAO00299. ***NELAP Accredited via NJ-DEP.***

Refer to NJ-DEP Certificate for Non-Potable Water.

Texas Commission of Environmental Quality Certificate/Lab ID: T104704419-08-TX. ***NELAP Accredited.***

Solid & Chemical Materials (Inorganic Parameters: EPA 6020, 7470, 7471, 1311, 9040, 9045, 9060. Organic Parameters: EPA 8015, 8270, 8081, 8082.)

Air (Organic Parameters: EPA TO-15)

Virginia Division of Consolidated Laboratory Services Certificate/Lab ID:460194. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters:EPA 3020A, 6020A, 245.7, 9040B. Organic Parameters: EPA 3510C, 3640A, 3660B, 3665A, 8270C, 8270D, 8082A, 8081B, 8015D.)

Solid & Chemical Materials (Inorganic Parameters: EPA 6020A,7470A,7471B,9040B,9045C,3050B,3051, 9060. Organic Parameters: EPA 3540C, 3580A, 3630C, 3640A, 3660B, 3665A, 3570, 8270C, 8270D, 8081B, 8082A, 8015D.)

Washington State Department of Ecology Certificate/Lab ID: C954. *Non-Potable Water* (Inorganic Parameters: SM2540D, 180.1, 1631E.)

Solid & Chemical Materials (Inorganic Parameters: EPA 6020, 7470, 7471, 7474, 9045C, 9050A, 9060. Organic Parameters: EPA 8081, 8082, 8015, 8270.)

U.S. Army Corps of Engineers

Department of Defense, L-A-B Certificate/Lab ID: L2217.01.

Non-Potable Water (Inorganic Parameters: EPA 6020A, SM4500H-B. Organic Parameters: 3020A, 3510C, 8270C, 8270D, 8270C-ALK-PAH, 8270D-ALK-PAH, 8082A, 8081B, 8015D-SHC, 8015D.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 3050B, 6020A, 7471A, 9045C, 9060, SM 2540G, ASTM D422-63. Organic Parameters: EPA 3580A, 3570, 3540C, 8270C, 8270D, 8270C-ALK-PAH, 8270D-ALK-PAH 8082A, 8081B, 8015D-SHC, 8015D.

Air & Emissions (EPA TO-15.)

Analytes Not Accredited by NELAP

Certification is not available by NELAP for the following analytes: **8270C:** Biphenyl. **TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 2-Methylnaphthalene, 1-Methylnaphthalene.

AIR ANALYSIS

PAGE 1 OF 1

CHAIN OF CUSTODY

ALPHA ANALYTICAL
320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab:

ALPHA Job #: L1219992

Client Information

Client: The Johnson Company
Address: 100 State Street Suite 600
Montpelier, VT 05602
Phone: (802) 229-4600
Fax:
Email: cff@jcomail.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Fillipo
Project Location: Rutland, VT
Project #: 3-2218-07
Project Manager: Don Maynard
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: Time:

Report Information - Data Deliverables

☐ FAX
☐ ADEx
Criteria Checker:
(Default based on Regulatory Criteria Indicated)
Other Formats:
☒ EMAIL (standard pdf report)
☐ Additional Deliverables:

Report to: (if different than Project Manager)
dmm@jcomail.com

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed	Program	Criteria

Other Project Specific Requirements/Comments:

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-14A by TO-15	TO-15 CVOCs Only	TO-15 SIM	APH	FIXED GASES	TO-13A	TO-4 / TO-10	Sample Comments (i.e. PID)
L1219992-01	SV-1	11/2/12	1537	1937	-28.84	-5.92	SV	CFF	2.7L	457	0015		X						
-02	SV-Dup-01	11/2/12	1609	2009	-28.65	-5.80	SV	CFF	2.7L	153	0407		X						
-03	SV-2	11/2/12	1609	2009	-28.66	-4.67	SV	CFF	2.7L	245	0231		X						
-04	TB	11/2/12	N/A	N/A	N/A	N/A	SV	CFF	2.7L	1743	N/A		X						

*SAMPLE MATRIX CODES
AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type

Relinquished By:	Date/Time	Received By:	Date/Time:
Charles Fac UPS (CB) 11/6/12	11/3/12/1300	UPS (CB) 11/6/12	11/5/12 (CB) 11/6/12 12:00 12:30

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Form No: 101-02 (19-Jun-09)

Serial No:1112121407

APPENDIX 3

FIELD NOTES

THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, VT 05602 USA

Phone: (802) 229-4600
Fax: (802) 229-5876
www.johnsonco.com

Ground Water Monitoring Well Sample Collection Record

Well ID: MW-4D

Project Name: Fillipo Project #: 3-2218-07

Site Location: Rutland, VT Sampler: CFF Date: 10/02/12

Weather Conditions: Overcast, 70°F, calm wind Time On Site: 1150

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 1.24

Total well depth (ft): 15.38 Well diameter (in): 1 Length of water column in well (ft): 14.14

Gallons per foot[1]: 0.041 Well volume (gal): 0.58

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: 14.38

Purge Volume @ 1 well volume: 2.19 (Liters) Purge Rate: 100 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. mS (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1220	1.24	0	0	Start	----	----	----	----	----
1225	1.24	0	- increase peri-pump to max flow to fill tubing / overcome headloss						
1230	2.71	0.5	100	15.60	3.934	1.73	7.18	125.1	33.2
1235	7.94	1.0	100	15.78	3.937	2.15	7.19	149.1	27.6
1240	9.94	1.5	100	15.75	3.934	2.69	7.21	168.8	23.5
1245	12.54	2.0	100	15.54	3.911	3.57	7.25	189.5	29.7
1248	- well dry to intake depth								
	- lower to bottom of well and pump dry								
	- Purge dry again @ 0940 on 10/03/12								
	- WL = 1.9 ftbtoc @ 1438								
	- Sample taken @ 1440								

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear, no odor

3. SAMPLE COLLECTION: Method: Peri-pump, Purge dry sample recharge Sample Time: 1440

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	9269	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1255

THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, VT 05602 USA

Phone: (802) 229-4600
Fax: (802) 229-5876
www.johnsonco.com

Ground Water Monitoring Well Sample Collection Record

Project Name: Fillipo Project #: 3-2218-07 Well ID: MW-7S

Site Location: Rutland, VT Sampler: CFF Date: 10/04/12

Weather Conditions: Showers, 65°F, calm wind Time On Site: 1250

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 5.52

Total well depth (ft): 11.63 Well diameter (in): 1 Length of water column in well (ft): 6.11

Gallons per foot[1]: 0.041 Well volume (gal): 0.25

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: 10.63

Purge Volume @ 1 well volume: 0.95 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25°C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1305	5.52	0	0	Start	----	----	----	----	----
1310	6.54	0.75	150	18.23	0.453	2.25	7.55	149.1	28.7
1315	7.74	1.5	150	18.22	0.466	1.25	7.50	168.3	9.81
1320	8.98	2.25	150	18.26	0.458	1.15	7.55	187.8	12.8
1325	10.49	3.0	150	18.10	0.444	1.03	7.65	203.1	13.3
1326	- Well dry to intake depth, lower tubing to bottom of well								
		and purge dry, sample recharge							
	- Purged dry again on 10/05/12 @ 0945								
1610	Sample Taken on 10/05/12 (WL = 6.11)								

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear, no odor

3. SAMPLE COLLECTION: Method: Peri-pump, Purge dry and sample recharge Sample Time: 1610

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	EA 1 of 1	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1330

THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, VT 05602 USA

Phone: (802) 229-4600
Fax: (802) 229-5876
www.johnsonco.com

Ground Water Monitoring Well Sample Collection Record

Well ID: MW-9S

Project Name: Fillipo

Project #: 3-2218-07

Site Location: Rutland, VT

Sampler: CFF

Date: 10/04/12

Weather Conditions: Showers, 65°F, calm wind

Time On Site: 1400

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 7.95

Total well depth (ft): 11.60 Well diameter (in): 1 Length of water column in well (ft): 3.65

Gallons per foot[1]: 0.041 Well volume (gal): 0.15

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: 10.60

Purge Volume @ 1 well volume: 0.57 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1410	7.95	0	0	Start	----	----	----	----	----
1415	7.95	0	- stop pump, open head + adjust silicone						
1420	8.80	0.75	150	18.23	1.462	2.21	7.13	85.1	57.6
1425	9.24	1.5	150	18.10	1.604	1.27	7.09	86.1	14.6
1430	9.35	2.25	150	18.10	1.819	0.81	7.03	-33.3	6.2
1435	9.42	3.0	150	18.08	1.866	0.74	7.04	-40.2	5.7
1440	9.44	3.75	150	18.11	1.884	0.53	7.05	-42.8	3.6
1445	9.47	4.5	150	18.18	1.893	0.50	7.06	-46.1	3.3
1450	9.53	5.25	150	18.10	1.937	0.34	7.06	-64.0	2.5
1455	9.54	6.0	150	18.02	1.958	0.30	7.07	-72.5	2.2
1500	9.56	6.75	150	18.00	1.976	0.30	7.07	-70.0	2.2
1505	9.58	7.5	150	17.99	1.997	0.31	7.08	-69.0	1.7
1507	Sample	Taken							

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear / no odor

3. SAMPLE COLLECTION: Method: Peri-pump Sample Time: 1507

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	EA 1 of 1	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1515

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Ground Water Monitoring Well Sample Collection Record

Well ID: MW-11H

Project Name: Fillipo Project #: 3-2218-07

Site Location: Rutland, VT Sampler: CFF Date: 10/02/12

Weather Conditions: Overcast, 70°F, calm wind Time On Site: 1440

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 2.95

Total well depth (ft): 6.15 Well diameter (in): 1 Length of water column in well (ft): 3.2

Gallons per foot[1]: 0.041 Well volume (gal): 0.13

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: See Below

Purge Volume @ 1 well volume: 0.5 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1450	2.95	0	0	Start	----	----	----	----	----
1455	3.22	0.75	150	14.38	2.224	4.72	7.06	186.7	34.4
~~1500~~ 1458	CF								
1500	3.35	1.5	150	14.76	2.226	5.27	7.10	204.3	62.8
	- Started pulling air @ 3.3 ft bgs - tubing bound in well / not								
		able to advance tubing to desired intake depth							
	- Try again w/ tubing weight - See page 2/2								
~~1520~~	~~3.02~~	CF							

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear, no odor

3. SAMPLE COLLECTION: Method: Peri-pump Sample Time: N/A

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	N/A	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments: See page 2/2 for continued development and sample information

Time Off Site 1520

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Ground Water Monitoring Well Sample Collection Record

Well ID: MW/11H

Project Name: Filipo Project #: _____

Site Location: Rutland, VT Sampler: CFF Date: 10/02/12

Weather Conditions: Overcast, 65°F, calm wind Time On Site: 1615

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 2.97

Total well depth (ft): 6.15 Well diameter (in): 1 Length of water column in well (ft): 3.18

Gallons per foot[1]: 0.041 Well volume (gal): 0.13

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: 5.15

Purge Volume @ 1 well volume: 0.49 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25°C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1625	2.97	0	0	Start	----	----	----	----	----
1630	3.25	0.75	150	14.71	2.158	2.73	6.88	195.2	330
1635	4.76	1.5	150	14.52	2.143	1.55	6.89	215.6	238
1640	4.88	- Dry @ intake depth @~1641, lower intake and pump well							
		dry, sample recharge							
		- Very turbid @ bottom of well, likely needs more development							
		- Lighter brown after 2 well ∀'s removed							
		- Very light brn becoming clear after 3rd well ∀ removed							
		- Time to recover to ~~3.15 fbtoc (3ft water)~~ =							
		3.38 fbtoc @ 22 min.							
		- Very light brn becoming clear after ~4th well ∀ removed							
		- Clear during 5th well ∀ removed							
		~~- Re attempt sampling @~~ (CF)							
		- Purge dry again @ 1000 on 10/03/12							
		- Sample Taken @ 1530 (WL=2.98)							

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear / no odor

3. SAMPLE COLLECTION: Method: Peri-pump, Purge dry and Sample Recharge Sample Time: 1530

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	9269	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1540

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Ground Water Monitoring Well Sample Collection Record

Well ID: MW-14S

Project Name: Filipo

Project #: 3-2218-07

Site Location: Rutland, VT

Sampler: CFF

Date: 10/05/12

Weather Conditions: Sunny, 70°F, light breeze

Time On Site: 1335

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing

Depth to water below MP (ft): 3.73

Total well depth (ft): 10.5

Well diameter (in): 1

Length of water column in well (ft): 6.77

Gallons per foot[1]: 0.041

Well volume (gal): 0.28

2. PURGING DATA: Method: Peristaltic Pump

Stabilized intake depth: 9.5

Purge Volume @ 1 well volume: 1.05 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1345	3.73	0	0	Start	----	----	----	----	----
1350	4.47	0.75	150	17.80	2.134	1.88	6.48	262.8	321
1355	4.88	1.5	150	17.51	2.050	3.31	6.47	348.5	70.7
1400	5.11	2.25	150	17.33	2.162	1.21	6.48	370.6	21.4
1405	5.30	3.0	150	17.17	2.297	1.03	6.53	393.3	17.1
1410	5.38	3.75	150	17.15	2.393	1.18	6.57	403.2	17.2
1415	5.41	4.5	150	17.12	2.462	1.31	6.59	412.3	11.2
1420	5.42	5.25	150	17.23	2.580	1.28	6.62	422.9	44.4
1425	5.42	6.0	150	17.31	2.610	3.88	6.63	426.6	7.7
1430	5.43	6.75	150	17.25	2.619	1.60	6.63	434.6	4.1
1435	5.45	7.5	150	17.22	2.638	1.49	6.64	439.0	3.1
1440	5.47	8.25	150	17.08	2.653	1.50	6.64	442.5	3.3
1445	5.49	9.0	150	17.00	2.659	1.50	6.66	440.0	3.2
1447	Sample Taken								

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear, no odor

3. SAMPLE COLLECTION: Method: Peri-Pump Sample Time: 1447

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	EA 1 of 1	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1455

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Ground Water Monitoring Well Sample Collection Record

Well ID: MW-15S

Project Name: Fillipo

Project #: 3-2218-07

Site Location: Rutland, VT

Sampler: CFF

Date: 10/05/12

Weather Conditions: Sunny, 70°F, light breeze

Time On Site: 1250

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing

Depth to water below MP (ft): 3.18

Total well depth (ft): 10.11

Well diameter (in): 1

Length of water column in well (ft): 6.93

Gallons per foot[1]: 0.041

Well volume (gal): 0.28

2. PURGING DATA: Method: Peristaltic Pump

Stabilized intake depth: 9.11

Purge Volume @ 1 well volume: 1.08 (Liters)

Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1300	3.18	0	0	Start	----	----	----	----	----
1305	4.98	0.75	150	16.02	0.341	1.76	6.89	184.9	206
1310	7.59	1.5	150	16.07	0.409	3.86	6.74	281.1	47.5
1315	9.01	2.25	150	16.16	0.470	2.06	6.78	293.0	60.9
1316	- Well dry at intake, lower tubing to bottom and purge dry								
1515	Sample Taken (WL = 3.20)								

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear, no odor

3. SAMPLE COLLECTION: Method: Peri-pump Sample Time: 1515

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	EA 1 of 1	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1325

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Ground Water Monitoring Well Sample Collection Record

Well ID: MW-16S

Project Name: Fillipo

Project #: 3-2218-07

Site Location: Rutland, VT

Sampler: CFF

Date: 10/05/12

Weather Conditions: Sunny, 70°F, light breeze

Time On Site: 1058

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing

Depth to water below MP (ft): 2.86

Total well depth (ft): 9.53*

Well diameter (in): 1

Length of water column in well (ft): 6.67

Gallons per foot[1]: 0.041

Well volume (gal): 0.27

2. PURGING DATA: Method: Peristaltic Pump

Stabilized intake depth: 8.53

Purge Volume @ 1 well volume: 1.04 (Liters)

Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1110	2.86	0	0	Start	----	----	----	----	----
1115	3.72	0.75	150	16.12	2.816	1.30	6.65	84.1	800+
1120	3.76	1.5	150	16.50	2.610	1.22	6.61	130.9	800+
1125	3.80	2.25	150	16.41	2.718	1.89	6.54	233.4	436
1130	3.83	3.0	150	16.55	2.737	1.12	6.54	273.2	132
1135	3.85	3.75	150	16.45	2.857	2.80	6.55	267.4	15.2
1140	3.87	4.5	150	16.29	2.846	1.52	6.55	277.6	7.1
1145	3.89	5.25	150	16.19	2.850	1.14	6.56	269.6	6.1
1150	3.90	6.0	150	16.16	2.858	1.17	6.56	275.1	4.7
1155	3.91	6.75	150	16.21	2.865	1.17	6.56	279.9	4.3
1200	3.92	7.5	150	16.24	2.868	1.15	6.56	281.8	4.1
1202	Sample Taken								

* Soft on bottom

Purge Water Disposal Method Drum Comments (e.g. color / odor): Clear, no odor

3. SAMPLE COLLECTION: Method: Peri-Pump Sample Time: 1202

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	EA 1 of 1	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1210

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Ground Water Monitoring Well Sample Collection Record

Well ID: MW-17S

Project Name: Fillipo Project #: 3-2218-07

Site Location: Rutland, VT Sampler: CFF Date: 10/04/12

Weather Conditions: Showers, 65°F, calm wind Time On Site: 1640

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 4.62

Total well depth (ft): 9.9 Well diameter (in): 1 Length of water column in well (ft): 5.28

Gallons per foot[1]: 0.041 Well volume (gal): 0.22

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: 8.9

Purge Volume @ 1 well volume: 0.82 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1650	4.62	0	0	Start	---	---	---	---	---
1655	5.66	0.75	150	16.18	1.056	4.14	6.66	101.9	38.7
1700	6.01	1.5	150	15.95	1.057	3.16	6.65	114.7	23.9
1705	6.31	2.25	150	15.86	1.063	2.64	6.65	126.1	14.8
1710	6.56	3.0	150	15.79	1.060	3.17	6.65	118.7	13.6
1715	6.99	3.75	150	15.81	1.064	3.65	6.65	136.4	27.4
1720	7.33	4.5	150	15.84	1.072	4.07	6.65	131.7	31.2
1725	7.64	5.25	150	15.84	1.076	4.47	6.66	121.1	16.9
1730	7.98	6.0	150	15.81	1.076	4.83	6.66	119.3	21.1
1735	8.28	6.75	150	15.78	1.072	4.94	6.66	126.7	29.2
1740	8.52	7.5	150	15.78	1.073	5.07	6.66	132.2	30.6
1745	8.66	8.25	150	15.74	1.074	5.19	6.66	135.3	40.9
1750	8.73	9.0	150	15.86	1.074	5.55	6.66	114.8	35.5
1754	- Started sucking air through system / dry @ intake point								
	Lower tubing to bottom of well, purge dry, sample recharge								
	- Purged dry again @ 1000 on 10/05/12								
1540	- Sample taken on 10/05/12 (WL = 4.76)								

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear / no odor

3. SAMPLE COLLECTION: Method: Peri-pump Sample Time: 1540

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	EA 1 of 1	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1805

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Ground Water Monitoring Well Sample Collection Record

Well ID: MW-17D

Project Name: Fillipo

Project #: 3-2218-07

Site Location: Rutland, VT

Sampler: CFF

Date: 10/04/12

Weather Conditions: Showers, 65°F, calm wind

Time On Site: 1600

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 5.80

Total well depth (ft): 19.32 Well diameter (in): 1 Length of water column in well (ft): 13.52

Gallons per foot[1]: 0.041 Well volume (gal): 0.55

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: 18.32

Purge Volume @ 1 well volume: 2.1 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1615	5.80	0	0	Start	----	----	----	----	----
1620	10.72	0.75	150	16.68	0.881	1.40	7.35	-84.7	13.0
1625	13.73	1.5	150	16.45	0.624	1.38	7.29	-68.5	14.9
1630	17.24	2.25	150	16.28	0.531	1.79	7.21	-46.0	
1632	- Well dry at intake depth, lower tubing to bottom of well								
	and purge dry, sample recharge								
	- Purged dry again @ 1000 on 10/05/12								
1550	Sample taken on 10/05/12 (pH = 6.33)								

Purge Water Disposal Method Drum Comments (e.g. color / odor): Clear, slight sulfur/anoxic odor

3. SAMPLE COLLECTION: Method: Peri-Pump, Purge dry and Sample Recharge Sample Time: 1550

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	EA 1 of 1	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1640

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Ground Water Monitoring Well Sample Collection Record

Project Name: Fillipo Project #: 3-2218-07 Well ID: MW-18S

Site Location: Rutland, VT Sampler: CFF Date: 10/03/12

Weather Conditions: light rain, 70°F, calm wind Time On Site: 1050

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 3.65

Total well depth (ft): 9.68 Well diameter (in): 1 Length of water column in well (ft): 6.03

Gallons per foot[1]: 0.041 Well volume (gal): 0.25

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: 8.68

Purge Volume @ 1 well volume: 0.93 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1115	3.65	0	0	Start	----	----	----	----	----
1120	~~5.42~~ 4.72	0.75	150	15.18	1.272	3.16	6.71	245.6	456
1125	4.72	1.5	150	15.51	1.256	2.71	6.71	247.8	231
1130	4.68	2.25	150	15.73	1.238	2.49	6.70	251.2	123
* 1135	4.68	3.0	150	15.80	0.628	5.21	6.68	258.8	91.2
1140	4.66	3.75	150	15.68	1.196	1.04	6.67	260.7	74.6
1145	4.66	4.5	150	15.66	1.194	0.81	6.67	261.6	73.6
1150	4.66	5.25	150	15.76	1.196	0.76	6.67	262.5	45.6
1155	4.66	6.00	150	15.78	1.195	1.04	6.67	267.2	40.7
1200	4.66	6.75	150	15.64	1.192	0.88	6.66	271.6	37.1
1205	4.66	7.5	150	15.77	1.194	1.21	6.68	270.6	27.6
1210	4.66	8.25	150	15.80	1.195	1.18	6.67	274.5	27.7
1215	4.66	9.0	150	15.81	1.194	0.98	6.67	279.8	30.6
1220	4.66	9.75	150	15.96	1.197	1.21	6.64	297.2	20.4
1225	4.66	10.5	150	15.93	1.200	0.95	6.65	302.1	14.9
1230	4.66	11.25	150	15.85	1.198	1.02	6.66	304.7	11.2
1235	4.66	12.0	150	15.90	1.199	0.74	6.67	305.9	10.8
1240	4.66	12.75	150	15.89	1.198	0.82	6.67	306.7	11.4
1245	4.66	13.5	150	15.84	1.197	0.83	6.67	306.9	11.1

* Flow cell partially empty after clearing out turbid water
1247 Sample Taken

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear , no odor

3. SAMPLE COLLECTION: Method: Peri-Pump Sample Time: 1247

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	9269	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1300

THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, VT 05602 USA

Phone: (802) 229-4600
Fax: (802) 229-5876
www.johnsonco.com

Ground Water Monitoring Well Sample Collection Record

Well ID: MW-18D

Project Name: Fillipo

Project #: 3-2218-07

Site Location: Rutland, VT

Sampler: CFF

Date: 10/03/12

Weather Conditions: Rain, 65°F, No wind

Time On Site: 1320

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing

Depth to water below MP (ft): 5.05

Total well depth (ft): 18.76

Well diameter (in): 2

Length of water column in well (ft): 13.71

Gallons per foot[1]: 0.041

Well volume (gal): 0.56

2. PURGING DATA: Method: Peristaltic Pump

Stabilized intake depth: 17.76

Purge Volume @ 1 well volume: 2.13 (Liters)

Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1335	5.05	0	0	Start	----	----	----	----	----
1340	9.19	0.75	150	16.12	2.200	1.83	7.02	273.1	32.7
1345	11.02	1.5	150	16.15	2.204	1.74	7.05	254.8	26.6
1350	13.52	2.25	150	15.90	2.206	3.01	7.10	265.5	708
1355	15.39	3.0	150	15.86	2.204	2.78	7.08	280.7	497
~~1400~~ CF	- Dry @ intake @ 1359, lower intake to bottom and purge dry								
	- Time to recover from 18 ftbtoc to 17 ftbtoc = 2m 15s								
	- Sample taken @ 1620 (WL = 5.38)								

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear, no odor

3. SAMPLE COLLECTION: Method: Peri-Pump, Purge dry and sample recharge Sample Time: 1620

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	9269	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1630

THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, VT 05602 USA

Phone: (802) 229-4600
Fax: (802) 229-5876
www.johnsonco.com

Ground Water Monitoring Well Sample Collection Record

Project Name: Fillipo Project #: 3-2218-07 Well ID: MW-19H

Site Location: Rutland, VT Sampler: CFF Date: 10/02/12

Weather Conditions: Overcast, 70°F, calm wind Time On Site: 1300

1. WATER LEVEL DATA: (from TOC)

Description of measuring point (MP) Top of PVC casing Depth to water below MP (ft): 2.00

Total well depth (ft): 9.61 Well diameter (in): 2 Length of water column in well (ft): 7.61

Gallons per foot[1]: ~~0.041~~ (CF) 0.16 Well volume (gal): ~~0.31~~ (CF) 1.22

2. PURGING DATA: Method: Peristaltic Pump Stabilized intake depth: 7.0 ft btoc

Purge Volume @ 1 well volume: ~~1.18~~ (CF) 4.61 (Liters) Purge Rate: 150 (ml/min)

Parameter equipment: YSI, Turbidimeter, PID

Time	Depth (ft.)	volume removed (liters)	Flow Rate (mL/min)	Temp (°C)	Spec Cond. (uS/cm) @25 °C	Dissolved Oxygen (mg/L)	p.H. (Std)	ORP (mV)	Turb. (NTU)
1310	2.00	0	0	Start	----	----	----	----	----
1315	2.00	0	0						
1320	2.00	0	0	– adjust pump head + replace silicone					
1325	2.75	0.75	150	15.09	3.458	1.17	6.93	172.5	115
1330	2.82	1.5	150	15.24	3.447	0.76	6.92	171.0	55.2
1335	2.92	2.25	150	15.11	3.398	0.44	6.93	171.0	22.1
1340	2.93	3.0	150	14.98	3.386	0.47	6.93	176.1	15.2
1345	2.93	3.75	150	14.95	3.378	0.57	6.93	183.2	11.0
1350	2.93	4.5	150	14.87	3.369	0.49	6.93	192.6	7.9
1355	2.93	5.25	150	14.88	3.367	0.52	6.93	197.9	7.6
1400	2.92	6.00	150	14.87	3.366	0.53	6.92	200.4	6.7
1405	2.92	6.75	150	14.89	3.366	0.50	6.93	201.2	6.1
1410	2.92	7.5	150	14.88	3.365	0.51	6.93	202.5	6.2
1412	Sample Taken								

Purge Water Disposal Method Drum Comments (e.g. color / odor): clear, no odor

3. SAMPLE COLLECTION: Method: Peri-pump Sample Time: 1412

Sample Matrix	Chain-of-Custody#	Shipper ID#	Container Qty/type	Preservation	Analytical method/Lab
Groundwater	9269	Courier	3 x 40 ml voa	HCl	8260B/

[1]well volumes for various diameters in gal./ft.

0.50" = 0.01	0.75" = 0.023	1.00" = 0.041	1.25" = 0.064	1.50" = 0.09
2.00" = 0.16	3.00" = 0.32	3.50" = 0.50	4.00" = 0.65	6.00" = 1.47

1 Gallon = 3.785 Liters

Comments:

Time Off Site 1420

The Johnson Company, Inc.
100 State Street, Suite 600
Montpelier, VT 05602

Phone: (802) 229-4600
Fax: (802) 229-5876
www.johnsonco.com

YSI CALIBRATION SHEET

Job Name: Filipo Job # : 3-2218-07

Equipment ID : YSI # Pine Rental ID # 1598 Serial # : 01B0582 AH

Brand of Standard	----------	YSI	Oakton	Oakton	Oakton	Oakton	Oakton	YSI	YSI	YSI		Oakton
Lot #	----------		9817		2202046	2201632	2111265	3611				
Expiration Date	----------		7/27/13		1/2014	1/2014	4/2013	9/2016				

Date	Time	Initials	YSI Temp. - °C	Specific Cond. 1.413 ms/cm	Specific Cond. _____ ms/cm	pH 7.00	pH 4.01	pH 10.00	ORP-Zobell Solution (200-275mV)	Barometric Pressure (mmHg)	100% D.O. (%)	100% D.O. (mg/L)	Zero O_2 Solution (mg/L)
Calibration 10/02/12	0720	CFF	17.91	1.413		7.00	4.01	10.00	240	747.2	99.0	9.33	—
End of Day Check 10/02/12	2000	CFF	17.93	1.429		7.09	4.05	10.09	239.1	747.1	98.8	9.22	—
Calibration 10/03/12	1040	CFF	18.14	1.413		7.00	4.02	10.00	240	746.2	99.1	9.49	—
End of Day Check 10/03/12	1830	CFF	18.01	1.398		7.11	4.05	10.08	239.6	746.1	99.0	9.47	—
Calibration 10/04/12	1050	CFF	17.98	1.413		7.00	4.01	10.00	240	746.2	98.7	9.19	—
End of Day Check 10/04/12	2030	CFF	18.09	1.401		7.07	4.01	10.01	238.7	745.9	98.9	9.32	—
Calibration 10/05/12	1020	CFF	17.71	1.413		7.00	4.01	9.99	240.1	744.4	98.0	9.26	—
End of Day Check 10/05/12	2050	CFF	18.05	1.403		7.08	4.03	10.02	239.2	744.6	98.4	9.35	—
Calibration													
End of Day Check													

NIST Traceable Ertco Model 1003S (serial # 1480) Thermometer - Date of calibration check: November 1, 2010 (must be completed at least once per year)

Notes: Calibration order is left to right on chart. The optimum pH mV range for pH7 is -70 to +70 after calibration.

The Johnson Company, Inc.
100 State Street, Suite 600
Montpelier, VT 05602

Phone: (802) 229-4600
Fax: (802) 229-5876
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TURBIDITY METER CALIBRATION SHEET

Job Name: Filipo

Job #: 3-2218-07

Equipment ID: Hach 2100Q - Pine Rental

Serial #: 11090C012363

Brand of Standard						Comments
Lot #			N/A	A1249	A1251	
Expiration Date:			N/A	09/12/12	09/12/12	
Date	Time	Initials	~~1.0~~ 10 NTU Value	~~10.0~~ 20 NTU Value	100 NTU Value	
10/02/12	0715	CFF	9.80	19.9	98.4	
10/02/12	1955	CFF	9.76	19.8	98.2	
10/03/12	1050	CFF	9.61	19.9	99.7	
10/03/12	1826	CFF	9.74	19.9	99.8	
10/04/12	1045	CFF	9.69	19.7	99.9	
10/04/12	2025	CFF	9.79	19.8	100	
10/05/12	1050	CFF	9.67	19.5	101	
10/05/12	2045	CFF	9.71	19.7	99.8	

Location Filippo Laundry Date 9-21-12

Project / Client DMR 46

≥ TD ~ 9.00

4" pvc Guard SU

(M W/8S NOM TP = 8' + SU = 2.62

actual: 9.55' FTP, WL 4.00 FBTOC SU = 2.54

M W/8D: NOM TP = 17' + SU @ 12:35

WL = 6.00 @ 12:50 FBTOC

TP 18.7 FBTOC

4" pvc well Guard - SU = 2.70

1" well SU = 3.48

TD ~ 13.2' FBGS

13:10 Develop 8S w/ 13' 1/2" Tube + Waterra

pump Dry 2" in 14" 5-Gal Bucket

Grey - then Brown v. turbid.

13:19 - 13:20:30 pump Dry

Brown - v. TURBID - with Fine Tan Sand

1" into Bucket (10" B. rim)

13:28 - 13:29:00 pump Dry - 1" in Bucket (8" BR)

No change in well TD - Feels Hard.

~ One Cup Fine Tan sand total in 1/2 Full Bucket.

DMR

Location Date

Project / Client

13:13 Develop 8D w/ 22' 1/2" Tube + Waterra

pump Dry @ 13:15:30

13" = 1" H2O in Bucket

Clear - then Black - then Brown turbid H2O

13:24 - 13:24:40 pump Dry

Tan - turbid - 1" into Bucket (9" BRim)

13:31 - 13:31:30 pump Dry

1/2" in Bucket (7 1/2" BR)

No change in well TD - Feels Hard

Empty Bucket

13:43 - 13:43:30 pump Dry

one inch in Bucket (13' BR)

slighty tan - turbid.

14:09 - 1409:39 - pump Dry - slighty tan

1" in bucket (10" BR)

14:15 - 14:15:20 pump Dry

3/4" in bucket (8 1/4" BRim)

DMR

Location Fillipo Laundry Date 9-21-12
Project / Client DM446 / D. Maynard

Develop MW18-S Contin.
1347:30 - 1348:30 1" in Bucket
pump Dry Turbid-Tan w/FS
(12" BR)

14:05 - 1406 pump Dry Turbid.
1" into bucket (11" BR)

14:11 - 14:12:15 pump Dry - turbid
1" into Bucket (9¼" BR)
TD rose 1 in. - sand Filling
well.
14:22 - 14:23:30 Pump Dry
1" H2O in Bucket (7¼" BR)
Brown
TD rose 1" (2 total)
END Development

DM

Location Next week Email Date
Project / Client Scope change..

reset MW17D Needs new
Guard + Cap.

ADD Flush mount MW4D

ADD 2 SOIL VPS +
Sampling

survey TOCs

MW-19H - 2" Cap...

Change in Wells tested.
~~Due to unaval.~~
metals in 4D, 11H, 18S+D

ADD 6 - 1" in Emotion
CAPS TO WELLS

Buy more Silicon tubing
+ 1/2 x 5/8"s PE

WOODSTOCK AVENUE

SIDEWALK

MW-6S

FORMER FUEL OIL USTs

GRAVEL

FORMER GASOLINE UST

ASPHALT

82 WOODSTOCK

MW-7S

MW-1S

84 WOODSTOCK

FORMER FILLIPO DRY CLEANER

MW-8S

CURRENT IRVING GASOLINE PUMPS

CURRENT (3) IRVING GASOLINE USTS

76 WOODSTOCK

SHERWIN WILLIAMS

SB-20

MW-12S

MW-12D

MW-13H

SB-21

SB-22

ASPHALT PARKING

MW-5S

SB-23

86 WOODSTOCK

IRVING MAINWAY (SITE 93-1413)

SB-24

MW-2S

MW-2D

SB-25

FORMER DRY CLEANER LOCATION

SB-26

MW-3H

FLOOR DRAIN

ASPHALT

MW-9S

MW-4S

MW-4D

IRVING PROPERTY

MW-14S

JAMAC PROPERTY

MW-19H

GRASS

MW-15S

MW-16S

MW-11H

GRASS

CHAIN LINK FENCE

WET AREA

SHED

MW-10H

SS-SEWER

91 HARRINGTON

93 HARRINGTON

SW-1

MW-17S

MW-17D

MW-18D

MW-18S

SHIPREY PROPERTY

HARRINGTON AVENUE

80 HARRINGTON

82 HARRINGTON

84-86 HARRINGTON

DRAWING LEGEND

	PROPERTY LINE (APPROX)
W	UNDERGROUND MUNICIPAL WATER LINE
S	UNDERGROUND MUNICIPAL SEWER LINE
SD	UNDERGROUND MUNICIPAL STORM DRAIN
OHP	OVERHEAD ELECTRIC LINE
	STORMWATER CATCHBASIN
	UTILITY POLE
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2006-2008)
SW-1	SURFACE WATER SAMPLING POINT BY WEM (2007)
SS	SOIL SAMPLING LOCATION BY WEM (2007)
M	MONITORING WELL INSTALLED BY OTHERS (1993)
SB-25	SOIL BORING LOCATION (2008)
SB-27/CS-1	SOIL BORING/CONCRETE SAMPLE LOCATION (2009)

0 15 30 60

GRAPHIC SCALE: 1" = 30'

WEM WAITE ENVIRONMENTAL MANAGEMENT

SCALE: 1" = 30'	REVISION:	DRAWN BY: MEW
DATE: 12/30/09	DATE:	PROJECT #: 06062-34

SITE PLAN

FORMER FILLIPO DRY CLEANER

84 WOODSTOCK AVENUE, RUTLAND, VERMONT

VT DEC SITE #97-2194

2

THE JOHNSON CO., INC.
100 STATE ST #600
MONTPELIER, VT 05602
802-229-4600 , Fax 802-229-5876

JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

	NOM. ID	FBTOP Total Pipe	FBTOP Water	Ground SURFACE NO Guard	Well SURFACE
MW 19H	2 inc.	9.60	2.40		1.70
MW 16S	8FBGS	9.46 (soft)	3.18	2.33	2.33 + 0.09
MW 15S	8FBGS	10.09 (hard)	4.05	2.66	2.66 - 0.27
MW 17S	8FBGS	9.89 (hard)	4.65	2.39	2.39 - 0.37
MW 17D	18FBGS	19.27 (hard)	6.45	2.93	2.93 + 0.04
MW-14S	—	10.1 (soft)	4.09	2.92	2.92 - 0.15
MW-11H	— see OFF FB			3.00	3.0 - 0.18
MW 18S + D	— see AMM FB 46				
~~MW 19~~					

THE JOHNSON CO., INC.
100 STATE ST #600
MONTPELIER, VT 05602
802-229-4600 , Fax 802-229-5876

JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Machete

2-inch plug.

AOT TOPO map - 5' contours
metal detect.

125 D Buried - broken
13 H Gone - in dirt
3 H - Open Guard filled/w. sand
45/4D one w/ 6" SU
25/2D - one cemented/ other in dirt is gone.
55

CAP 8/17.
11 MWS
Aband.
15, 25, 2D, 3H, 125, 12D
13 H.

65, 1H, 145, 155

SU3 CU 17
45, 4D 1H, 165, 17D
165, 16D, 1H.

Need PL Survey prior to PRB installation

concern - sentacing GW in cattail wetlands + odor/toxicity of infected materials.

Don Maynard

From: Miles Waite <mwaite@waiteenv.com>
Sent: Monday, September 24, 2012 9:47 AM
To: Don Maynard
Subject: RE: Request for electronic data - Fillipo Dry Cleaner - SMS Site 97-2194 - Woodstock Ave., Rutland, Vermont
Attachments: Fillipos CAD for JCO.dwg; Fillipo Air Data.xls; Fillipo CAFI Data.xls; Fillipo Soil Data.xls; Fillipo Water Data.xls; Fillipos Survey Data.xls

Don,

Here are the files.

In October 2010, I abandoned MW-2D, 2S, 12D, 12S, 13H, and 3H by removing the casings and filling the bores with bentonite. I also cut down the casings for MW-4S and 4D by 31" and 31.25", respectively, and then added new flushmount well boxes and covered with a tire. This was all in anticipation of digging everything up.

Miles

Miles E. Waite, PhD
Principal Hydrogeologist
Waite Environmental Management, LLC
11 Kilburn St, Suite 212
Burlington, VT 05401
P: (802) 860-9400
C: (802) 310-2979
mwaite@waiteenv.com
www.waiteenv.com

From: Don Maynard [mailto:DMM@jcomail.com]
Sent: Monday, September 24, 2012 8:12 AM
To: Ed Bove
Cc: Miles Waite; Becker, Matthew; Charles Farmer
Subject: RE: Request for electronic data - Fillipo Dry Cleaner - SMS Site 97-2194 - Woodstock Ave., Rutland, Vermont

Miles:
Please send the available data in the next week if you can.

Also, it appears that a number of the wells have been abandoned. Could you please confirm which wells you plugged with bentonite?

Donald M. Maynard, CG, PE, LWD

Senior Geologist/Engineer

The Johnson Company

From: Ed Bove [mailto:EBove@rutlandrpc.org]
Sent: Friday, September 21, 2012 9:16 AM

THE JOHNSON COMPANY, INC.
100 State Street, Suite 600
Montpelier, VT 05602

Phone: (802) 229-4600
Fax: (802) 229-5876
www.johnsonco.com

Water Level Measurement Record

Project Name: Fillipo

Project #: 3-2218-07

Site Location: Rutland, VT

Date: 11/2/12

Weather Conditions: Showers, 50°F, calm wind

Time on Site: 1000

Personnel: CFF/PAE

Well	Time	Depth to Water (ft. btoc)	Observations
MW-7S	1735	5.00	
MW-9S	1728	7.97	
MW-14S	1740	3.38	
MW-15S	1743	2.79	
MW-17S	1747	4.72	
MW-17D	1750	5.70	
MW-18S	1752	3.65	
MW-18D	1754	5.02	
MW-16S	1805	2.82	
MW-19H	1807	1.95	
MW-11H	1812	2.90	
MW-4D	1820	1.40	

Location: Filipo Date: 11/2/12

Project / Client: personnel: CFF, PAE

Time On-Site: 1000
Weather: Showers, 50°F, calm wind
Objective: Install and sample 2SV points.
- Synoptic UL round
- Relative elevation survey

MW-14 - SV 1 : ~5' S of MW-14S

0-6" [0-4.5" Brown Moist Moderately Dense Silt and Fine Sand Rootlets Decreasing w/ Depth
4.5-6" Brown (Greyish) Moist Moderately Dense FS and Silt Orange Mottles Hydric

6-11"
6-8" = SAA
8-11" Gray Brown with Tan Mottles Moist Dense Silt Some Fine Sand Trace Subangular Gravel
11-14" Tan with Orange + Brown Mottles Moist Very Dense Silt and Clay Little FS Trace Subangular Gravel
14-20" SAA
20-23" SAA but saturated @ 20"

Water in bottom of boring when checked w/ WL marker. at ~16" bgs SV point not installed

Location Fillipo Date 11/2/2012

Project / Client CFF/DAE

MW-17-SV1 (Photos 1,2,3): ~3' S of MW-17S

0-6" Brown Damp Moderately Dense Fine Sand Some Silt Little Clay (Rootlets decreasing with depth)

6-7" Brown FS Some subangular Gravel Little Silt

7-10" Light Brown / Tan Moist Dense Silt Some Fine Sand Trace subangular Gravel

10-15"

10-12" SAA

12-15" Grey/Brown (Tan Mottles) Dense Wet Fine Sand Some Silt, Clay

15-20"

Brown / Tan with Orange + Dark Brown Mottles, Wet, Fine Sand Some Silt, Clay Trace Rootlets (Hydric)

20-25"

20-23" SAA

23-25" Tan Wet Very Dense Fine Sand Some Silt, Clay One 2" Subangular Pebble @ Contact (23")

– Water in boring at ~19" bgs. Do not complete point

MW-17-SV2 (Picture 4,5,6,7) S. Side of Harrington Ave.

0-0.85'

0-0.65' Brown, Loose, Damp, Fine Sand Little Silt, subangular Gravel

Location Fillipo Date 11/2/2012

Project / Client CFF, DAE

0.65-0.85' Brown/Orange, Loose, Damp Medium Sand Little FS, Trace Silt subangular Gravel

0.85-1.10' SAA

1.10-1.50'

1.1-1.2' SAA

1.2-1.5 Tan/Light Brown with DB Mottles Moist, Moderately Dense Fine Sand Some Clay Little Silt

1.5-1.8

1.5-1.7 SAA

1.7-1.8 Black/Brown Coal, Gravel, Slag Some MS Trace FS/Silt

1.8-2.1 Black Coal / Possible Asphalt

2.1-2.3 SAA

2.3 Total Depth

Sand at 2.1 → Inserted Screen → Sand to 1.4' → Granular Bentonite from 1.4' to 1.2' FBGS with 1/4 Cup of DI Water → Granular Bentonite from 1.2' to 1.0' with ½ cup of DI Water → Granular Bentonite from 1.0 to 0.8 with approx ½ cup of DI water slowly added → Granular Bentonite from 0.8 to 0.6' and slowly added approx. ½ DI Water

Location Filipo Date 11/2/2012

Project / Client CFF, PAE

→ Backfilled to Ground Surface with Native (compacted)

MW-17-SV2 Completed @ 1400

MW-18-SV2 : S. Side of Harrington Ave.

0.0-0.5

0.0-0.3 Brown, Moderately Loose, Damp Fine Sand Little Silt, subangular Gravel Crotlets decreasing with depth

0.3-0.5 Brown/Orange, Loose, ~~Moist~~ Damp Medium Sand Some Fine Sand Little Coarse PAE Sand Trace subangular Gravel

0.5-0.8 SAA

0.8-1.1

0.8-0.9 SAA

0.9-1.1 Light Brown/Tan, Moist, Moderately Dense Fine Sand, Some Silt Little Clay

1.1-1.3 Light Brown/Tan Moist Moderately Dense FS Some Silt Little Clay, Gravel

1.3-1.7

~~1.5-1.6~~ PAE ~~SAA~~ PAE 1.3-1.4 SAA

~~1.6-1.7~~ PAE 1.4-1.6 Tan/Brown Moist Moderately Dense FS Some Silt Little Clay

1.6-1.7 White Decomposed Woody Material, Coal/Slag (Fill)

1.7-2.0 SAA

Refusal at 2.2'

Location Filipo Date 11/2/12

Project / Client CFF, PAE

1) Sand to 2.0' 2)→ Inserted Screen →3) Sand 2.0' to 1.3' 4) Granular Bentonite 1.3'-1.1' with approximately 1/4 cup of DI Water sprinkled over top 5) Granular Bentonite 1.1-0.9' FBGS with approximately 1/2 cup of DI Water sprinkled over top 6) 0.9-0.7' Granular Bentonite with approx. 1/2 cup of DI Water sprinkled over top 7) Backfill to Ground Surface and Compact Thoroughly

MW-18-SV2 Completed @ 1437

CF

Location Filipo Date 11/2/12

Project / Client

CFF, PAE

MW-17-SV2

Vapor Point Tubing Volume

4.5' x 0.17 ID Tubing ∴ Well Volume 0.225 cu Inches

0.225 cubic Inches x 0.01639 = 0.020089 litres = 20.089 ml

Tedlar Bag Filled in 5 minutes 17 seconds

1000 ml / 5m 17s 3.15 ml/min 20.089 ml / 3.15 = 6.38 m

Purge SV tubing ∀

start @ 0329 m 0 sec 10 sec

CF

Location Fillipo Date 11/2/12

Project / Client

CFF / PAE

SV1

VP tubing ∀ / purge time

0.17" ID = 0.0227 in² x 4.5' (54")

= 1.226 in³

1.226 in³ = 0.02 L = 20 mL

Peri = 3.15 mL/min = 0.0525/sec

CF CF

20/3.15 = 6.35 min.

SV2

VP tubing ∀ / purge time

0.17" ID = 0.0227 in² x 7.1' (85.2)

= 1.934 in³

= 0.032 L

= 32 mL / 3.15 = 10 min.

Location Fillipo Date 11/2/12

Project / Client SV1 Sample Collection Record

Purge ✓

15:30:00 – 15:36:30

Sample SV-1 (soils logged as MW-17-SV2)

Time	Pressure	
1537	-28.84	Start
1600	-26.62	
1610	-25.56	
1641	-22.76	
1715	-19.40	
1833	-12.13	
1904	-9.08	
1927	-6.92	
1937	-5.92	end

CF

Location Fillipo Date 11/2/12

Project / Client SV2 Sample Collection Record

SV-Dup-01 collected

Purge ✓ : 15:59:00 – 16:09:00

(soils logged as MW-18-SV-2)

SV-2		SV-Dup-01		
Time	Press.	Time	Pressure	
1609	-28.66	1609	-28.65	Start
1641	-25.47	1641	-25.66	
1715	-21.99	1715	-22.30	
1832	-14.40	1832	-15.22	
1904	-11.16	1904	-12.09	
1927	-8.85	1927	-9.85	
2009	-4.67	2009	-5.80	End

CF

Location: Fillipo Date: 11/2/12

Project / Client: Relative Survey CFF/PAE

Station 1

Well	TOC	GS	Δ
MW-9S	2.74	2.57	FS
MW-7S	2.36	2.18	FS
MW-4D	~~9.42~~ (F)		
	~~9.42~~ (F)		
	9.43	9.75	FS
MW-14S	6.76	9.61	FS
MW-19H	9.54		FS

Station 2

MW-19H	2.67		BS 6.87 ✓
MW-4D	2.57	2.48	BS 6.86
~~MW-14S~~ (F)			~~BS~~ (F)
MW-19H	(CP) 2.43	4.47	FS
MW-11H	~~2.45~~	5.19	
MW-16S	2.46	5.02	
MW-15S	1.63	4.36	
MW-17S	2.60	4.81	
MW-17D	1.76	4.75	
MW-18D	2.10	5.72	
MW-18S	2.91	5.57	

Location: Fillipo Date: 11/2/12

Project / Client: Relative Survey CFF/PAE

Station 3 (back-check) comp to St. 2

	TOC	Δ	GS	Δ
MW-17S	2.96	0.36 ✓	5.19	
MW-17D	2.13	0.37 ✓	5.14	
MW-18D	2.47	0.37 ✓	6.09	
MW-18S	3.29	0.38 ✓	6.00	
MW-15S	2.01	0.38 ✓	4.58	
MW-16S	2.83	0.37 ✓	5.43	
MW-11H	2.79	0.36 ✓	5.61	
MW-19H	3.04	0.37 ✓	4.84	
Δ 3 to 1 MW-14S	0.28	6.48 ✓	3.13	
MW-4D	2.93	6.5 ✓	3.26	

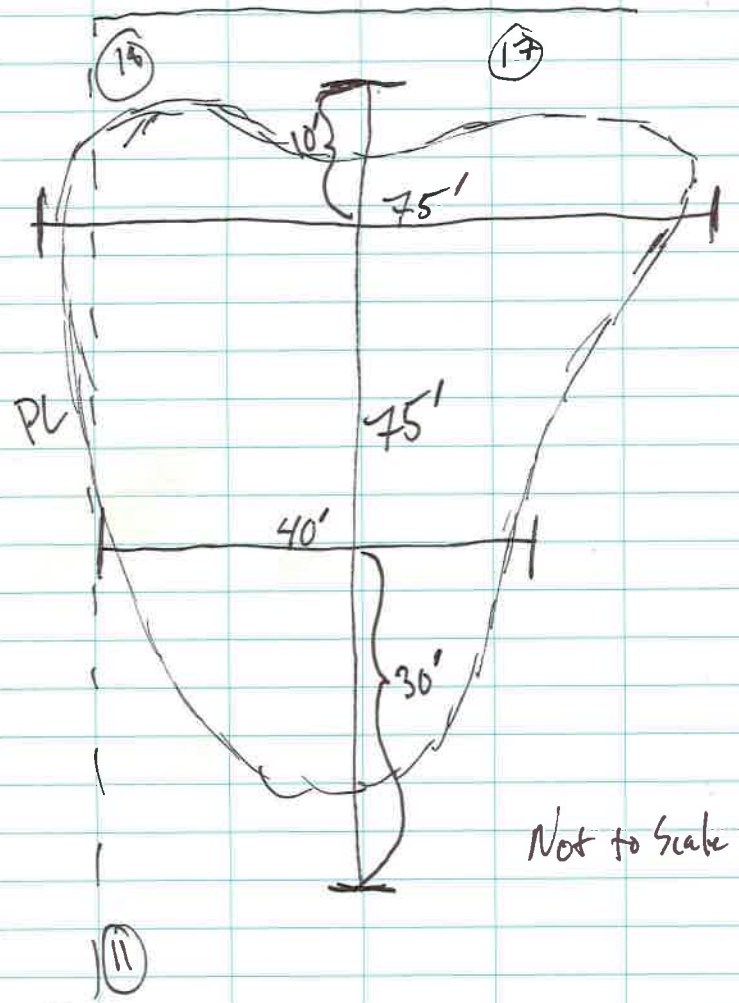
Station 4

		Δ 4 to 1	
MW-9S	2.80	.06 ✓	2.64
MW-7S	2.44	.08 ✓	2.05
MW-4D	9.50	.07 ✓	9.84

Location Fillipo Date 11/2/12

Project / Client

Approx Size Wetland On-Site



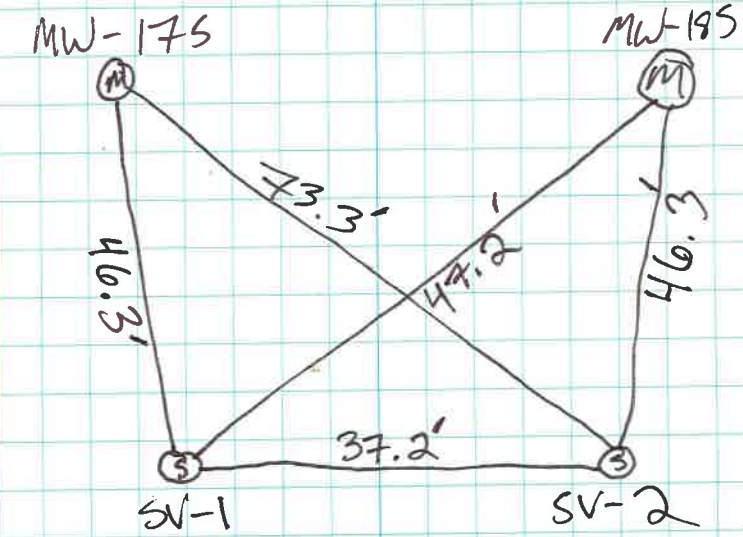
Not to Scale

CF

Location Fillipo Date 11/2/12

Project / Client

SV locs



Not to Scale

CF

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator ID Number: VTD019124892
2. Page 1 of 1
3. Emergency Response Phone: 800 968-1102
4. Manifest Tracking Number: 001551314 GBF

5. Generator's Name and Mailing Address
84 Woodstock LLC.
PO Box 681
Rutland VT 05701
Att: John Ruggiero
Generator's Phone: 802 236-3149

Generator's Site Address (if different than mailing address)
Former Filippo Dry Cleaner
84 Woodstock Avenue
Rutland VT 05701

6. Transporter 1 Company Name: ENPRO SERVICES, INC.
U.S. EPA ID Number: MAD980870004

7. Transporter 2 Company Name:
U.S. EPA ID Number:

8. Designated Facility Name and Site Address
ENPRO SERVICES OF VERMONT, INC.
54 AVENUE D
WILLISTON VT 05495
Facility's Phone: 802 880-1200
U.S. EPA ID Number: VTR000517052

9a. HM	9b. U.S. DOT Description (including Proper Shipping Name, Hazard Class, ID Number, and Packing Group (if any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes
X	1. UN3082, WASTE Environmentally hazardous substance, liquid, n.o.s. 9, PGIII	1	DM	50	G	F002 VX62
	2.					
	3.					
	4.					

SC

14. Special Handling Instructions and Additional Information
DELTA Well Purge Water. NF #Filippo-PYR. Approval #VT-1212-ERG#171 ENPRO
ENPRO JOB# 8391-12

15. GENERATOR'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name: Agent For Natalie Boivin
Signature: Natalie M. Boivin
Month 12 Day 6 Year 12

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:
Transporter signature (for exports only): Date leaving U.S.:

17. Transporter Acknowledgment of Receipt of Materials
Transporter 1 Printed/Typed Name: Anthony Tirado
Signature:
Month 12 Day 6 Year 12
Transporter 2 Printed/Typed Name:
Signature:
Month Day Year

18. Discrepancy
18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection
Manifest Reference Number:

18b. Alternate Facility (or Generator)
U.S. EPA ID Number
Facility's Phone:

18c. Signature of Alternate Facility (or Generator)
Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)
1. H141 2. 3. 4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a
Printed/Typed Name: Kathleen Mikell
Signature:
Month 12 Day 7 Year 12

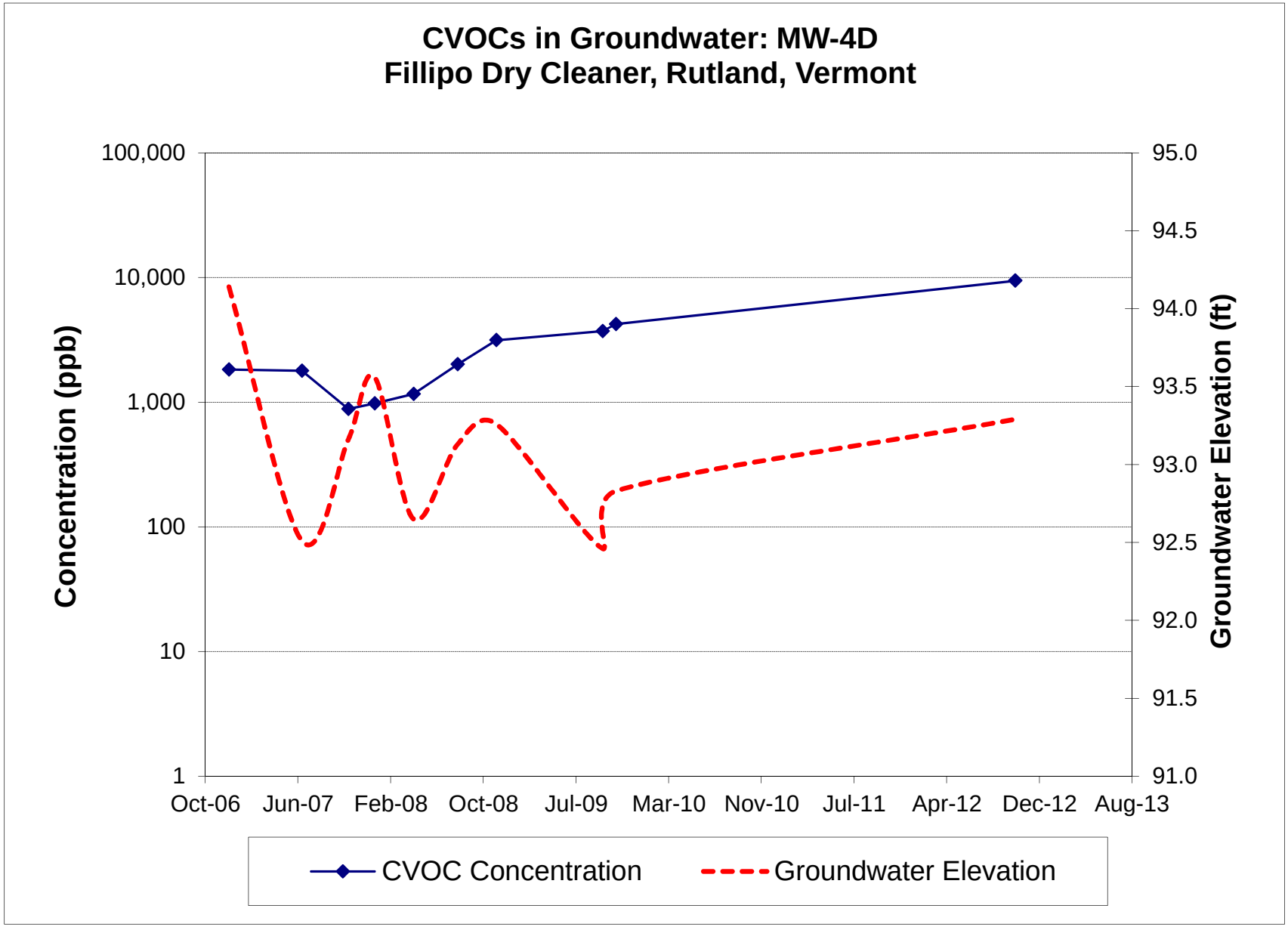
EPA Form 8700-22 (Rev. 3-05) Previous editions are obsolete.

DESIGNATED FACILITY TO DESTINATION STATE (IF REQUIRED)

WWW.hazardouswaste.com

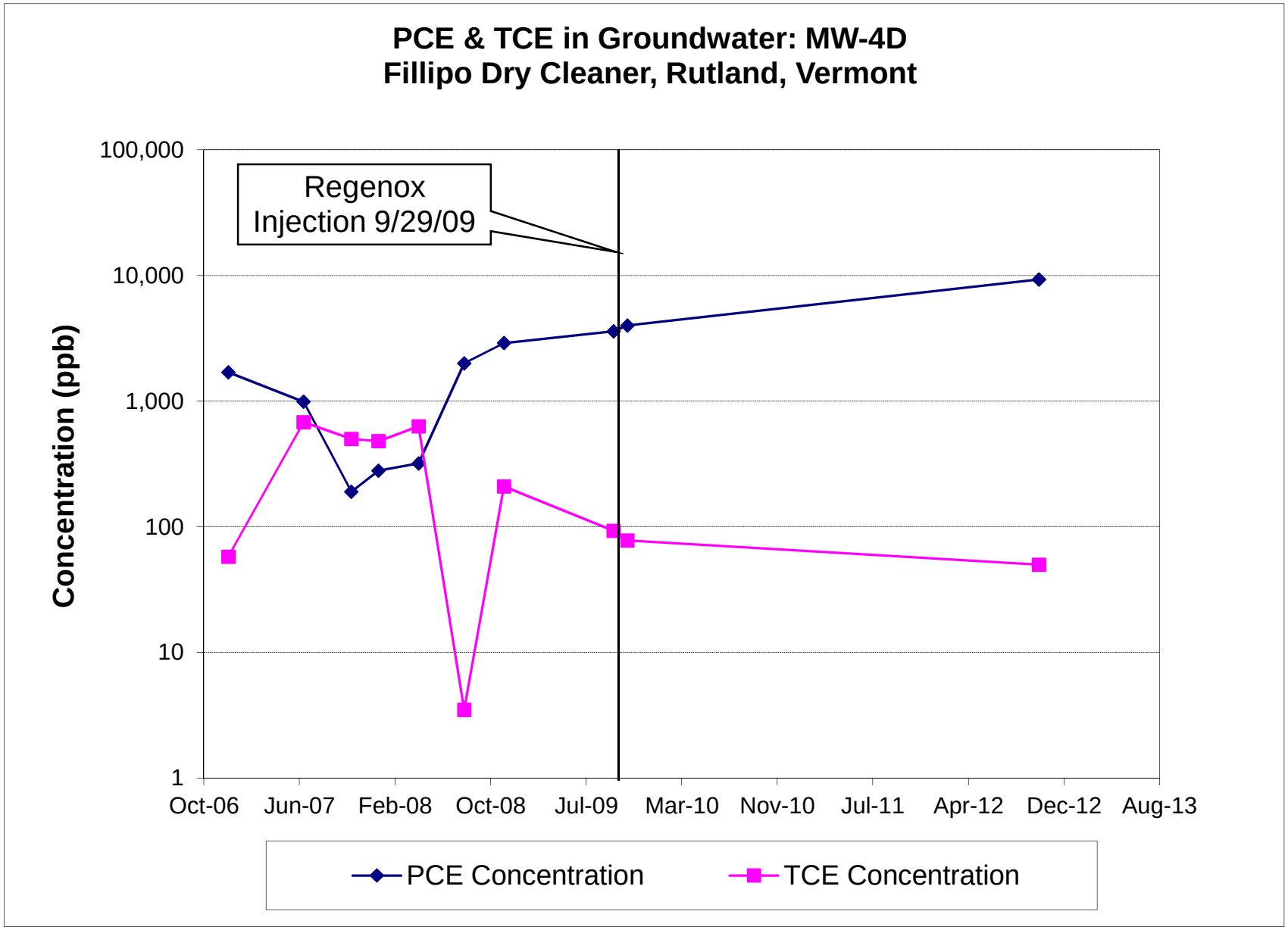
APPENDIX 4

WATER QUALITY GRAPHS



Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



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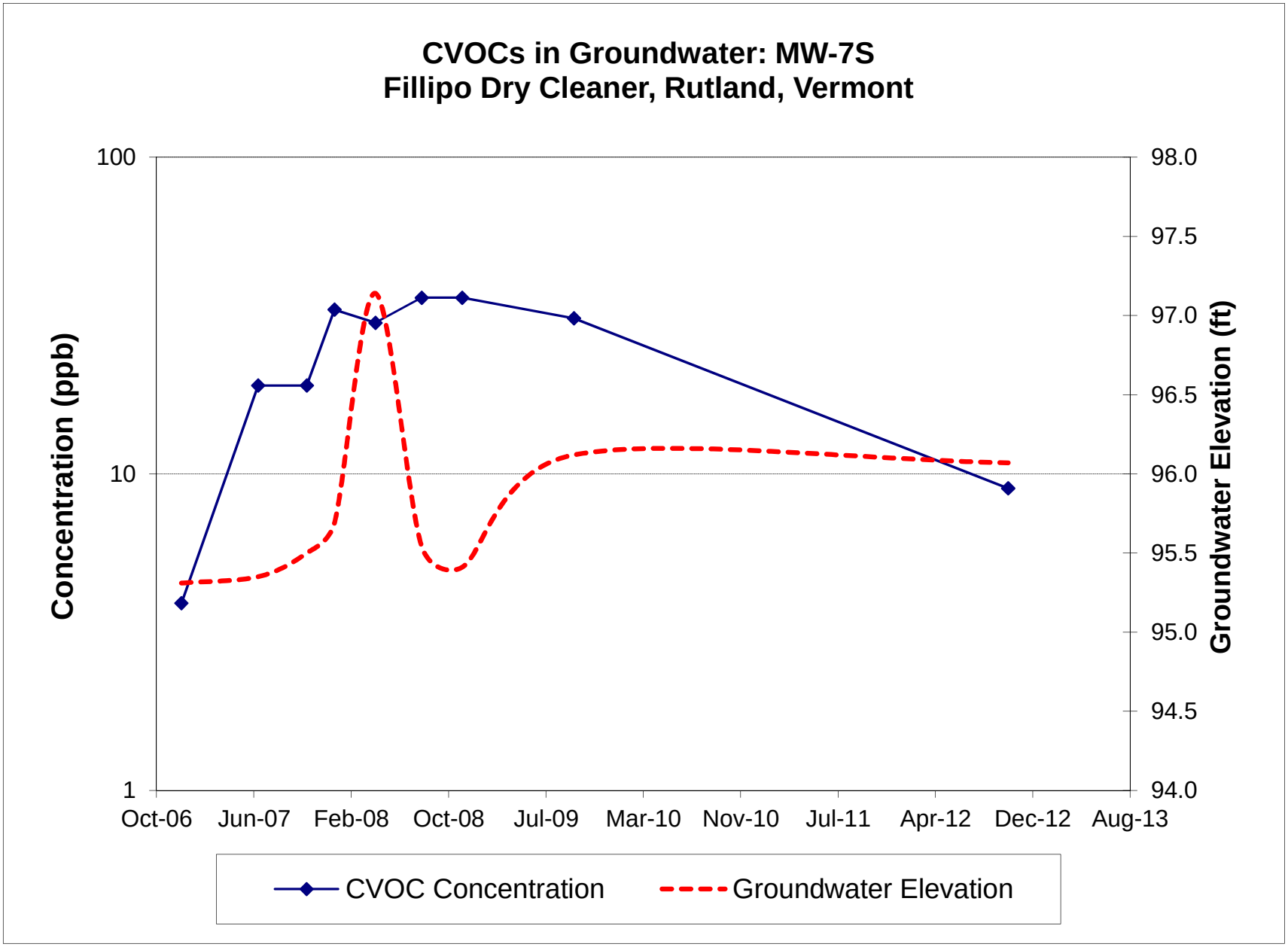
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



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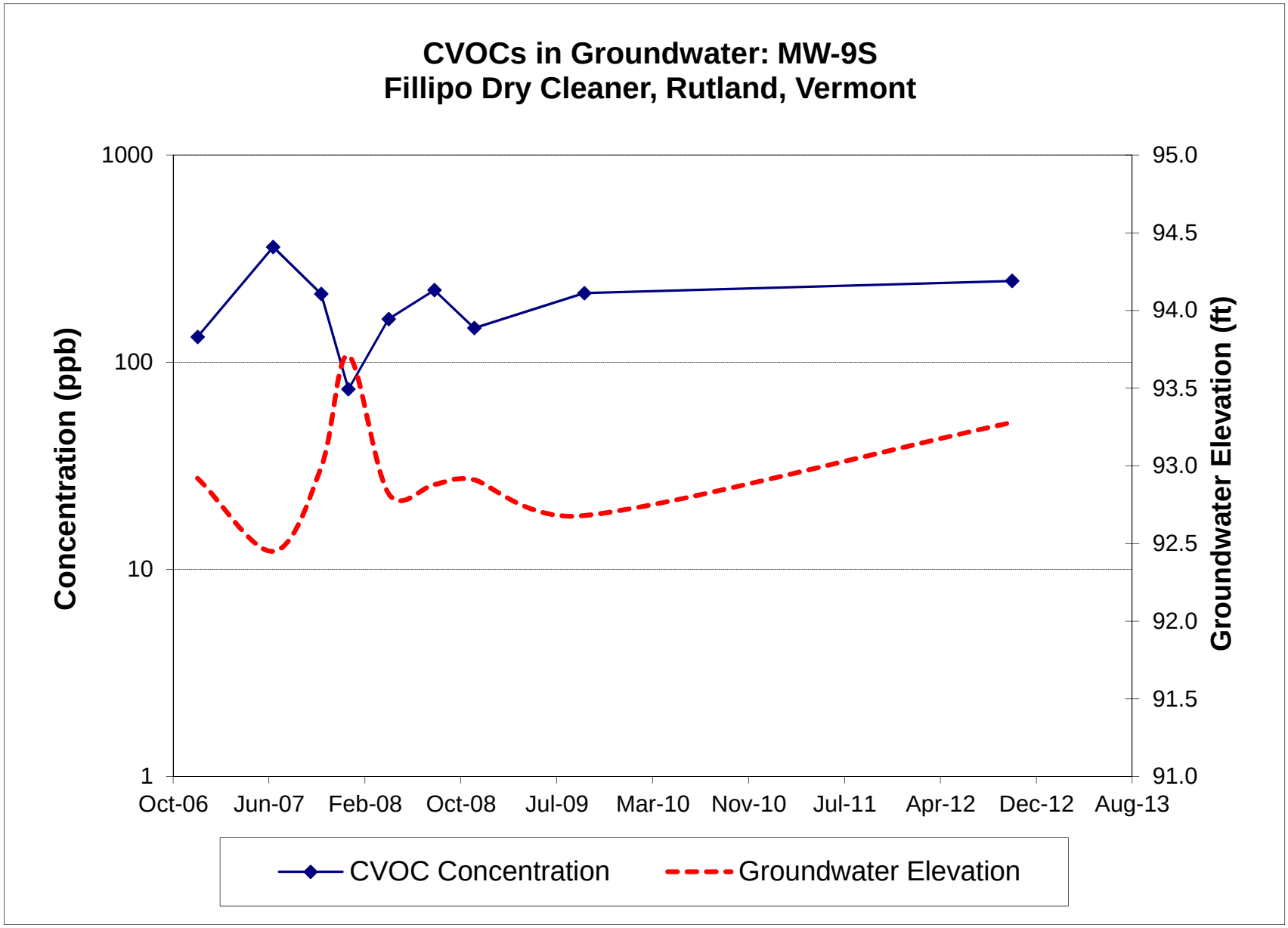
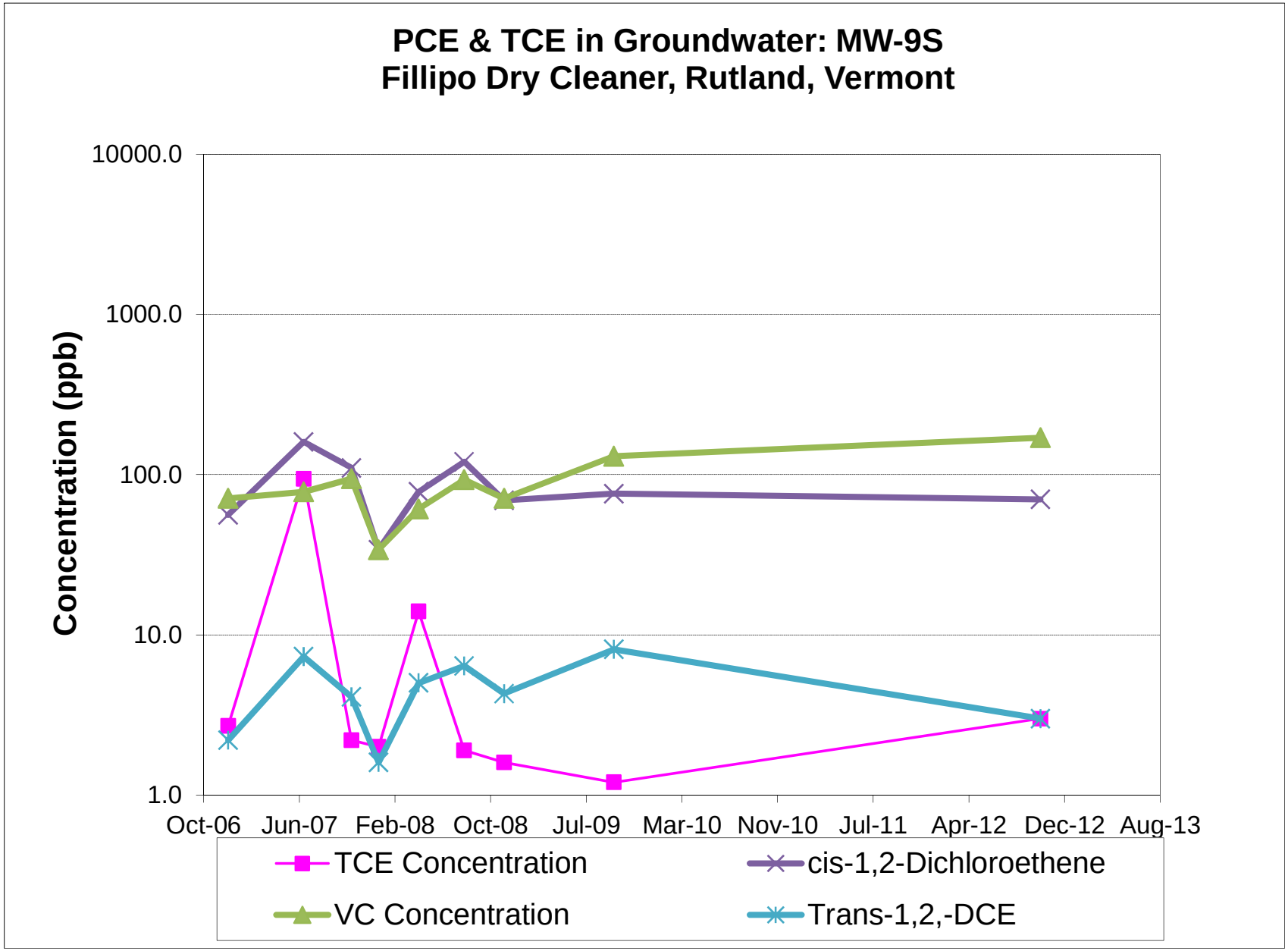
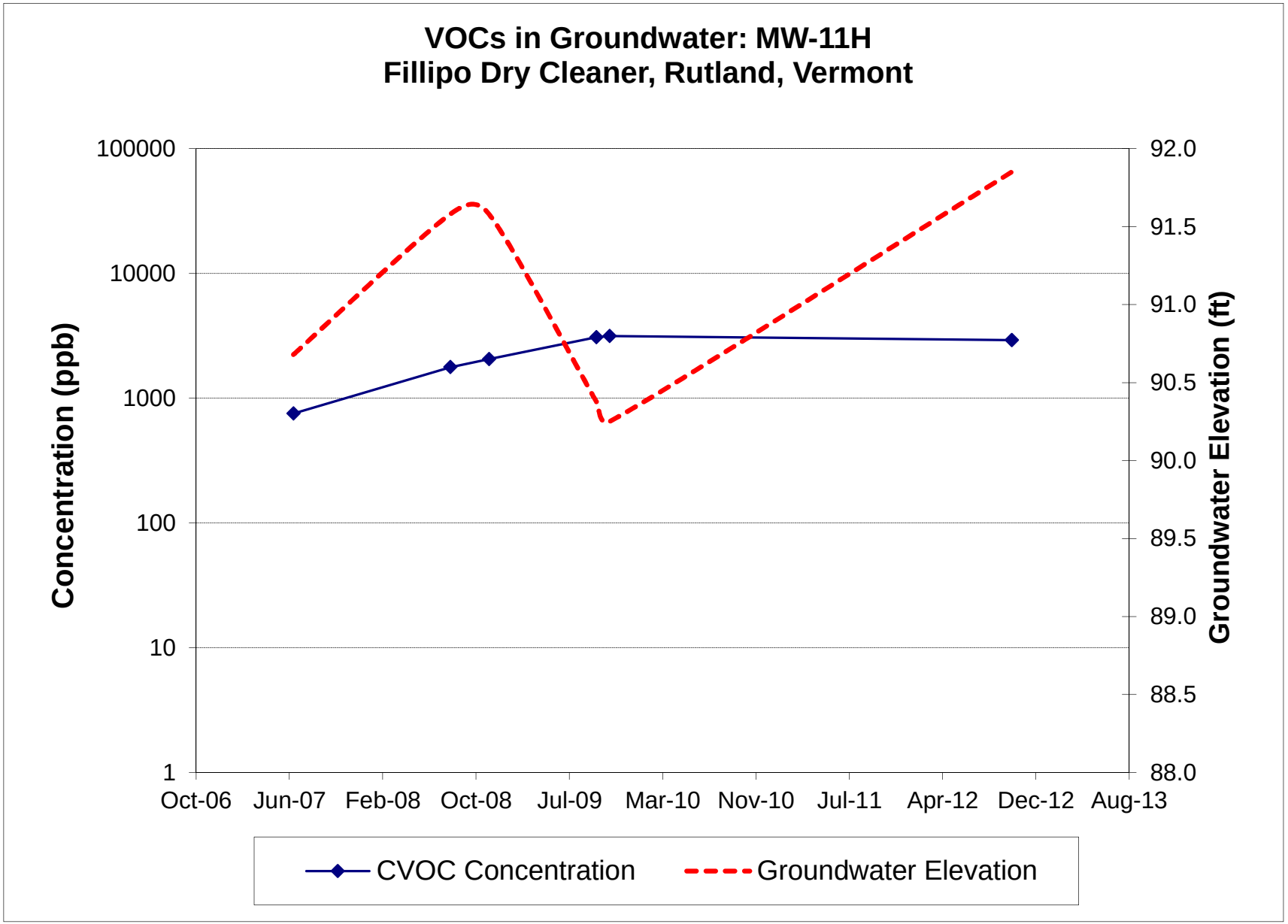
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

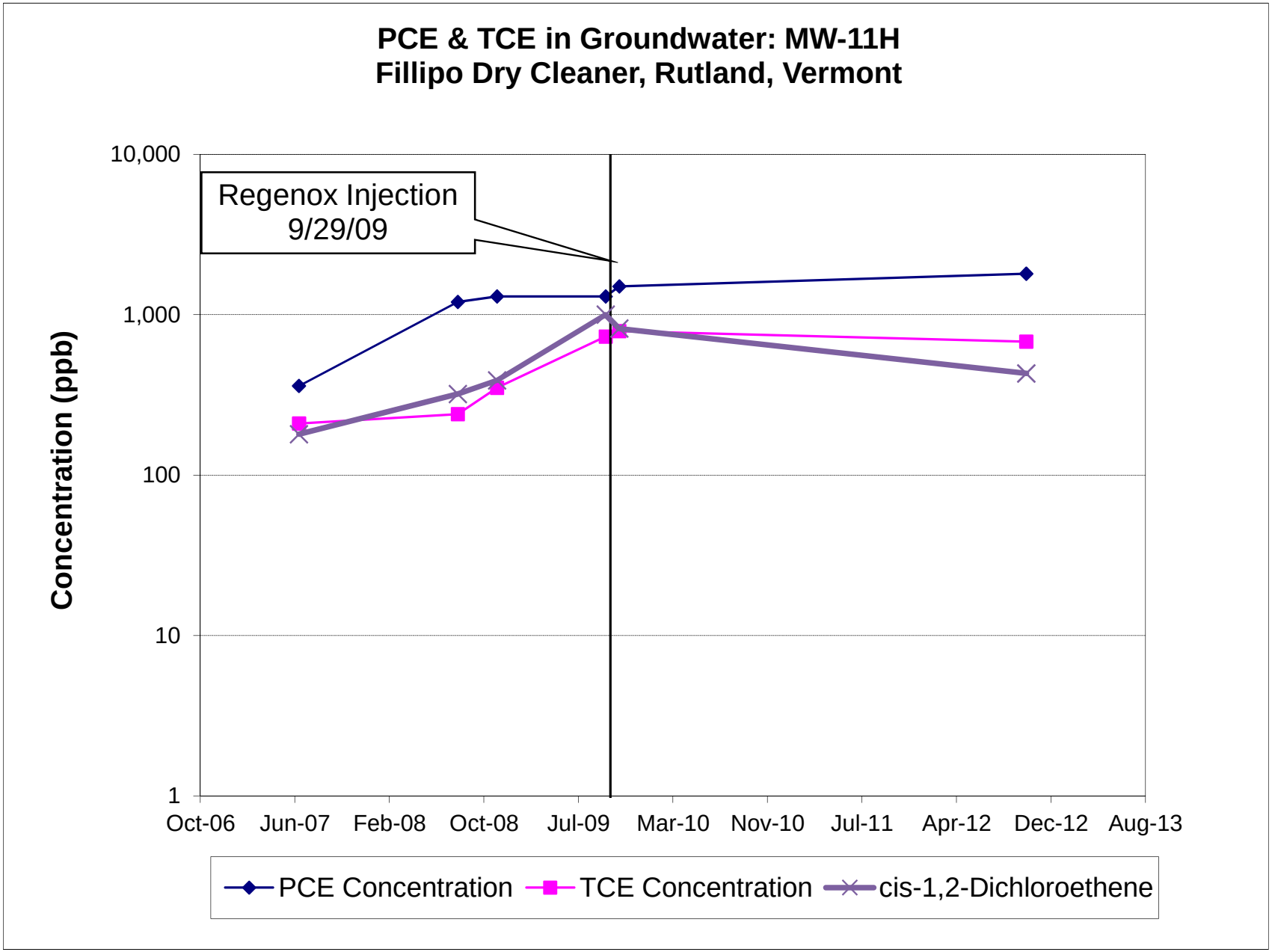
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls


PCE & TCE in Groundwater: MW-9S
Fillipo Dry Cleaner, Rutland, Vermont
Concentration (ppb)
10000.0
1000.0
100.0
10.0
1.0
Oct-06
Jun-07
Feb-08
Oct-08
Jul-09
Mar-10
Nov-10
Jul-11
Apr-12
Dec-12
Aug-13
TCE Concentration
cis-1,2-Dichloroethene
VC Concentration
Trans-1,2,-DCE



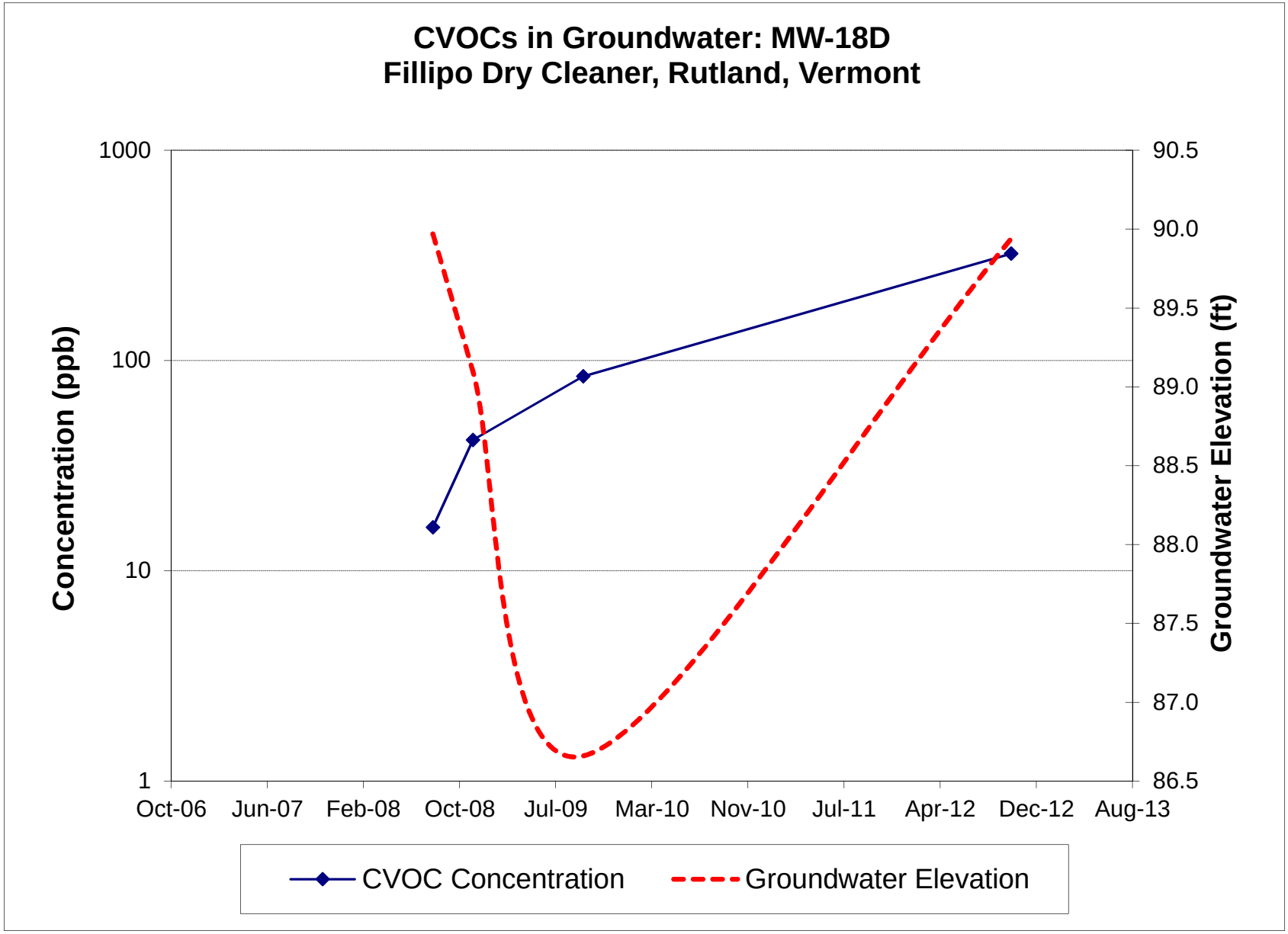
Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



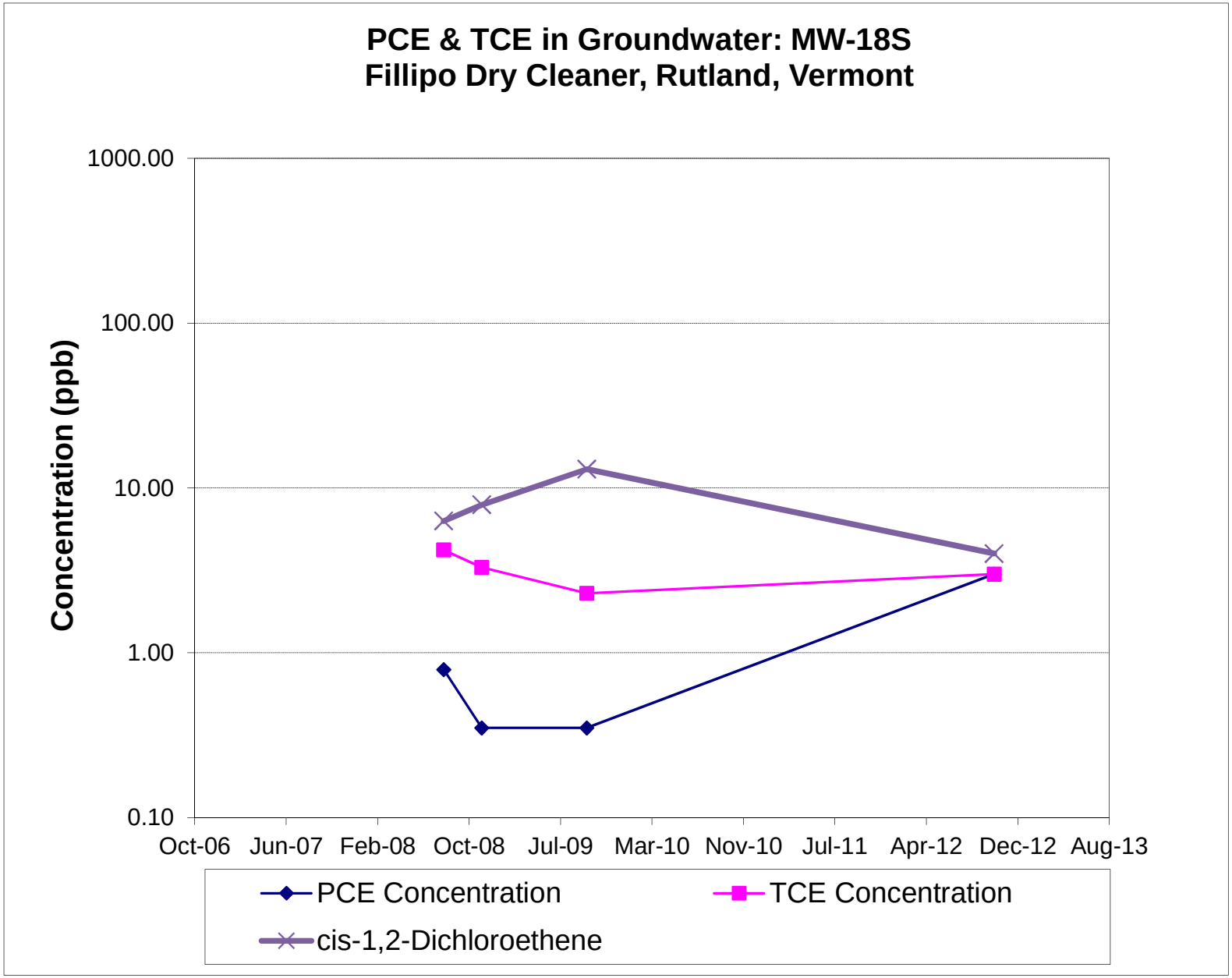
Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

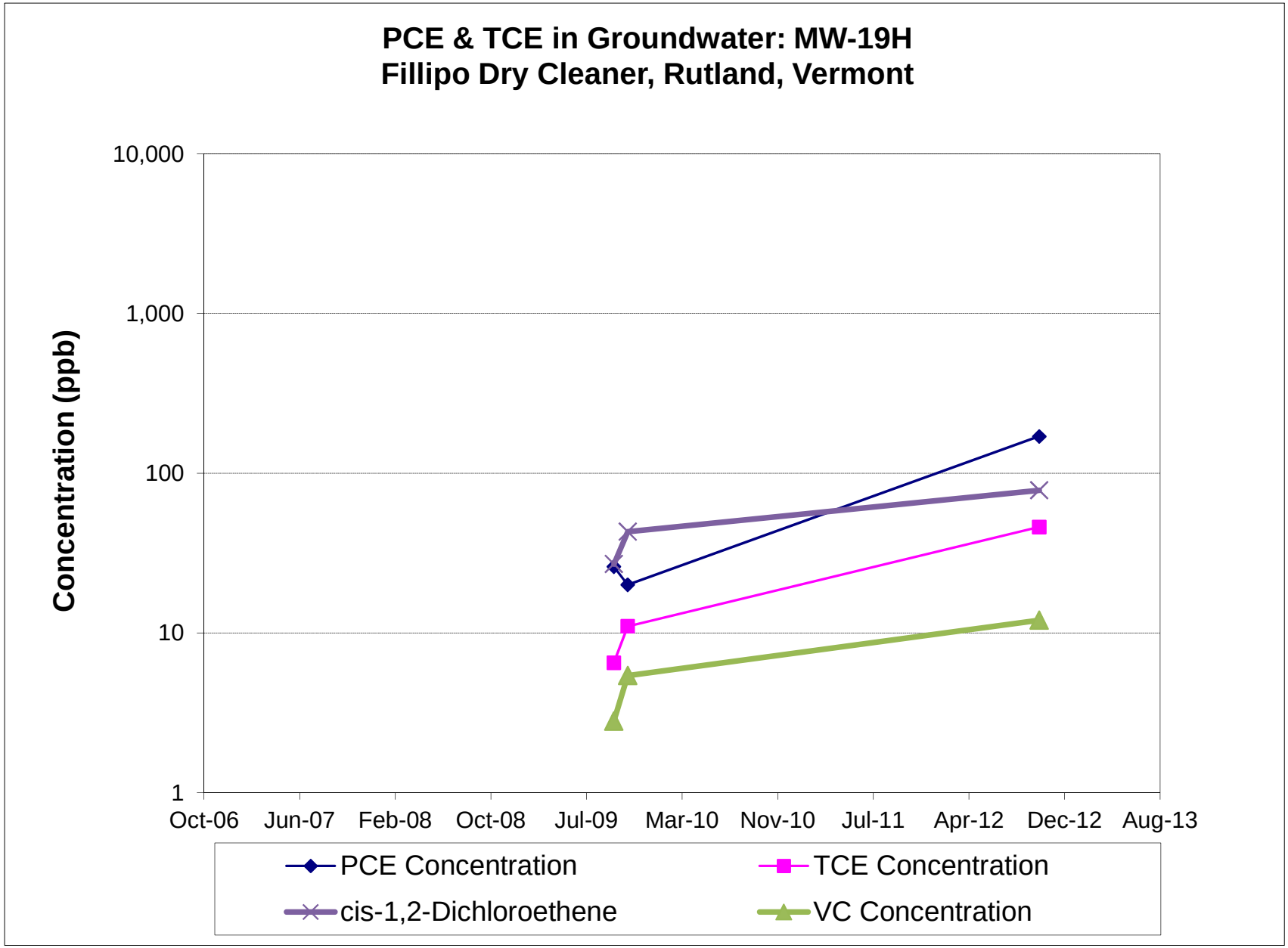
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls

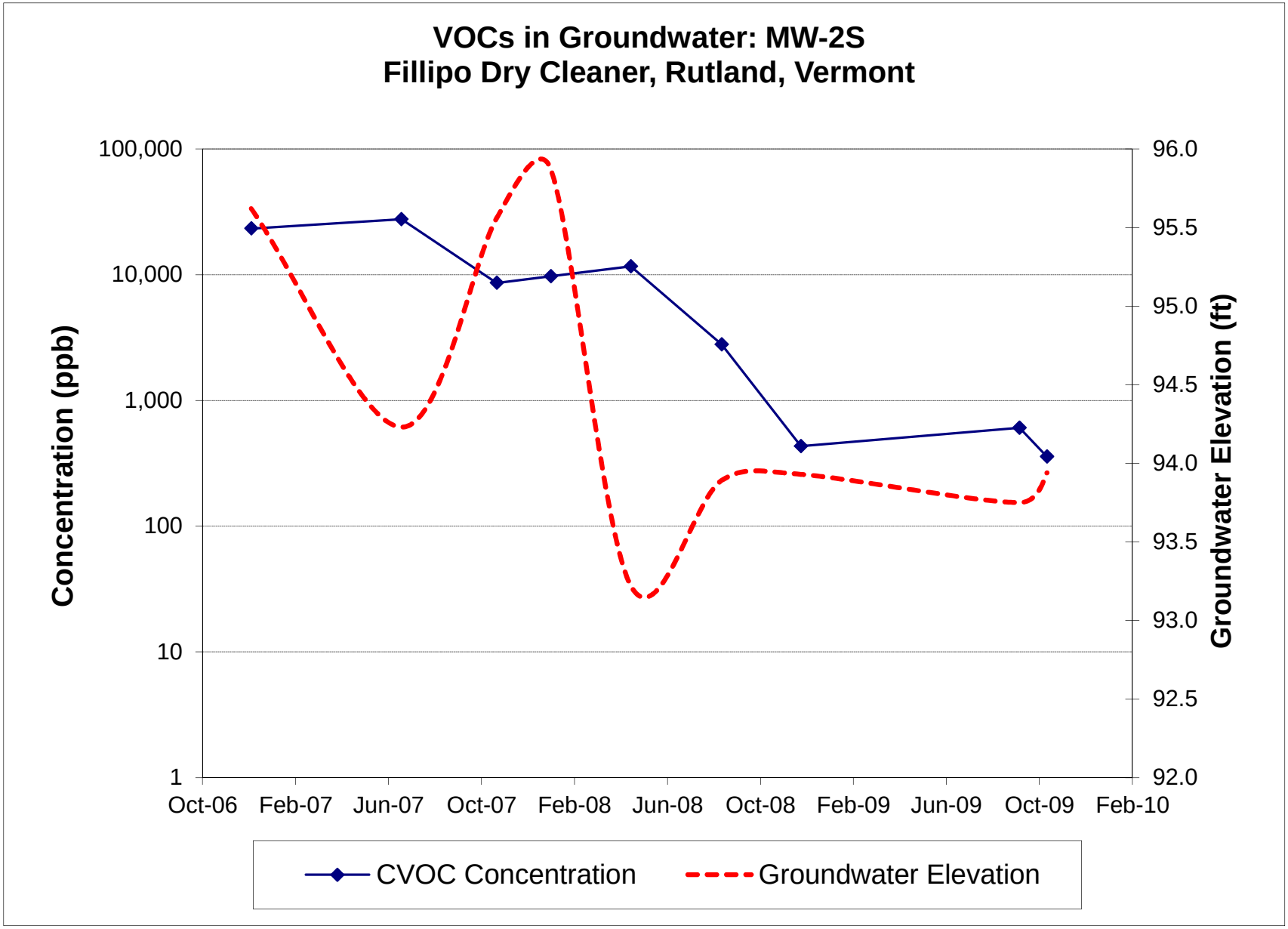


Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls

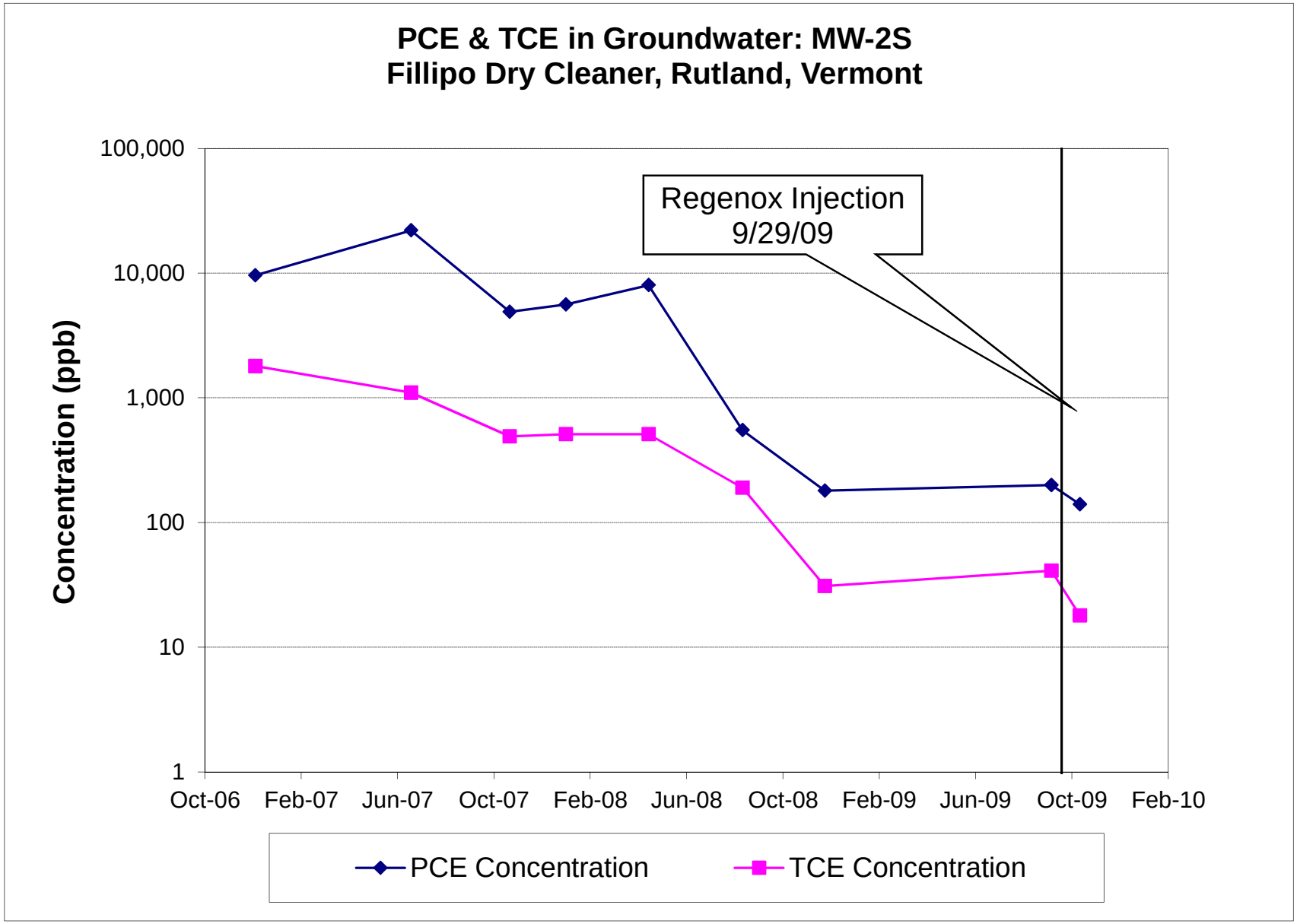

PCE & TCE in Groundwater: MW-18S
Fillipo Dry Cleaner, Rutland, Vermont
Concentration (ppb)
1000.00
100.00
10.00
1.00
0.10
Oct-06
Jun-07
Feb-08
Oct-08
Jul-09
Mar-10
Nov-10
Jul-11
Apr-12
Dec-12
Aug-13
PCE Concentration
TCE Concentration
cis-1,2-Dichloroethene


PCE & TCE in Groundwater: MW-19H
Fillipo Dry Cleaner, Rutland, Vermont
Concentration (ppb)
10,000
1,000
100
10
1
Oct-06
Jun-07
Feb-08
Oct-08
Jul-09
Mar-10
Nov-10
Jul-11
Apr-12
Dec-12
Aug-13
PCE Concentration
TCE Concentration
cis-1,2-Dichloroethene
VC Concentration



Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



Notes:
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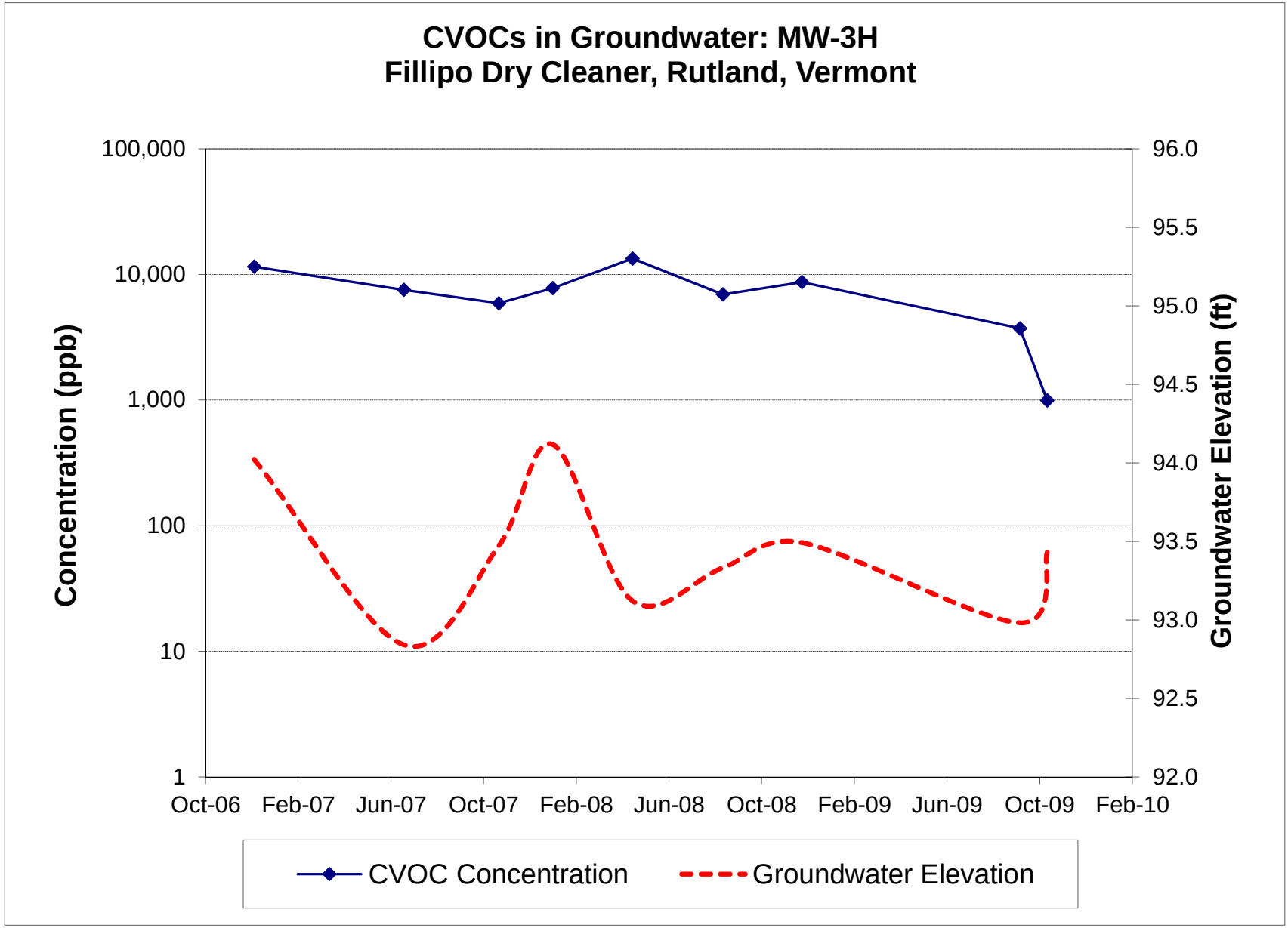
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



Notes:
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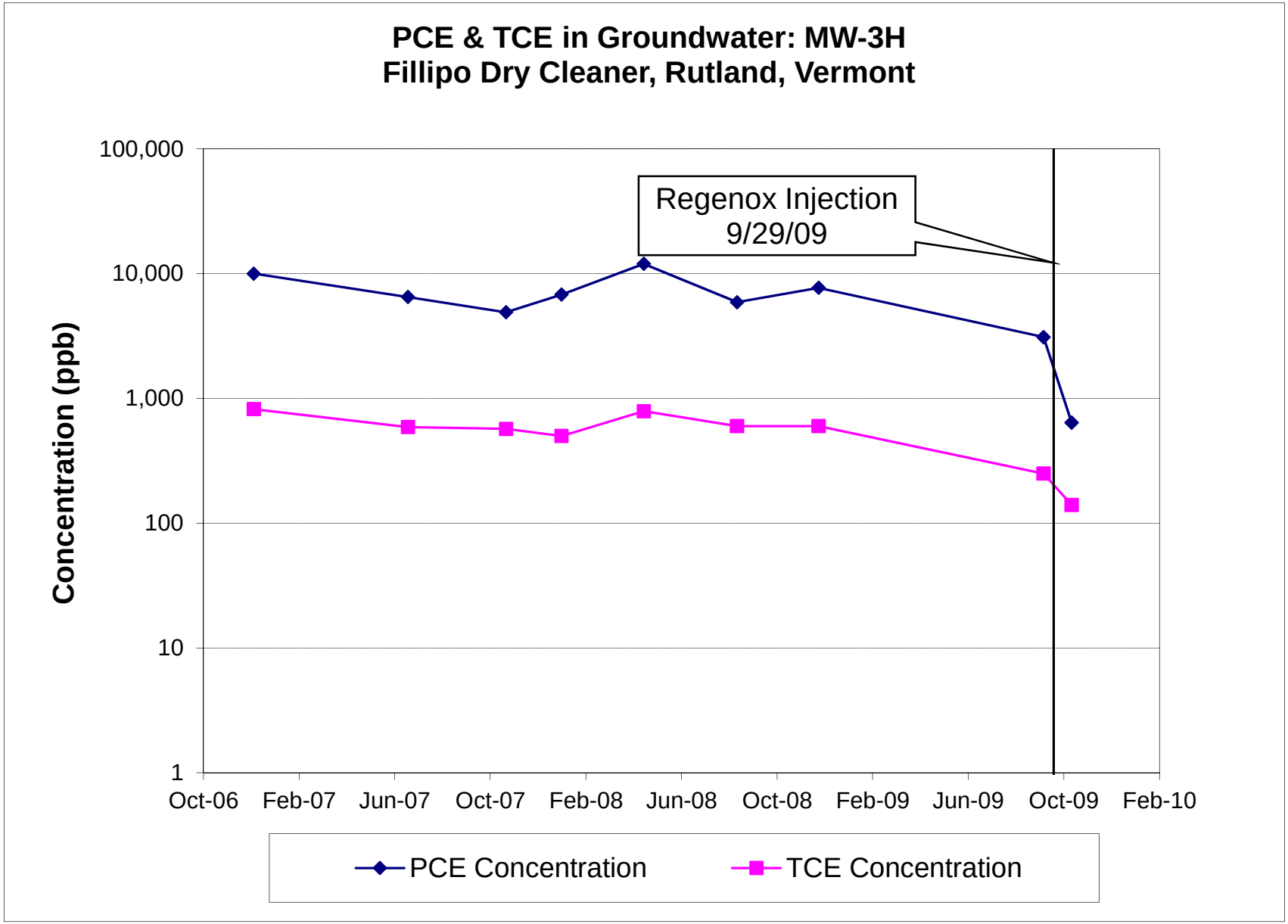
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



Notes:
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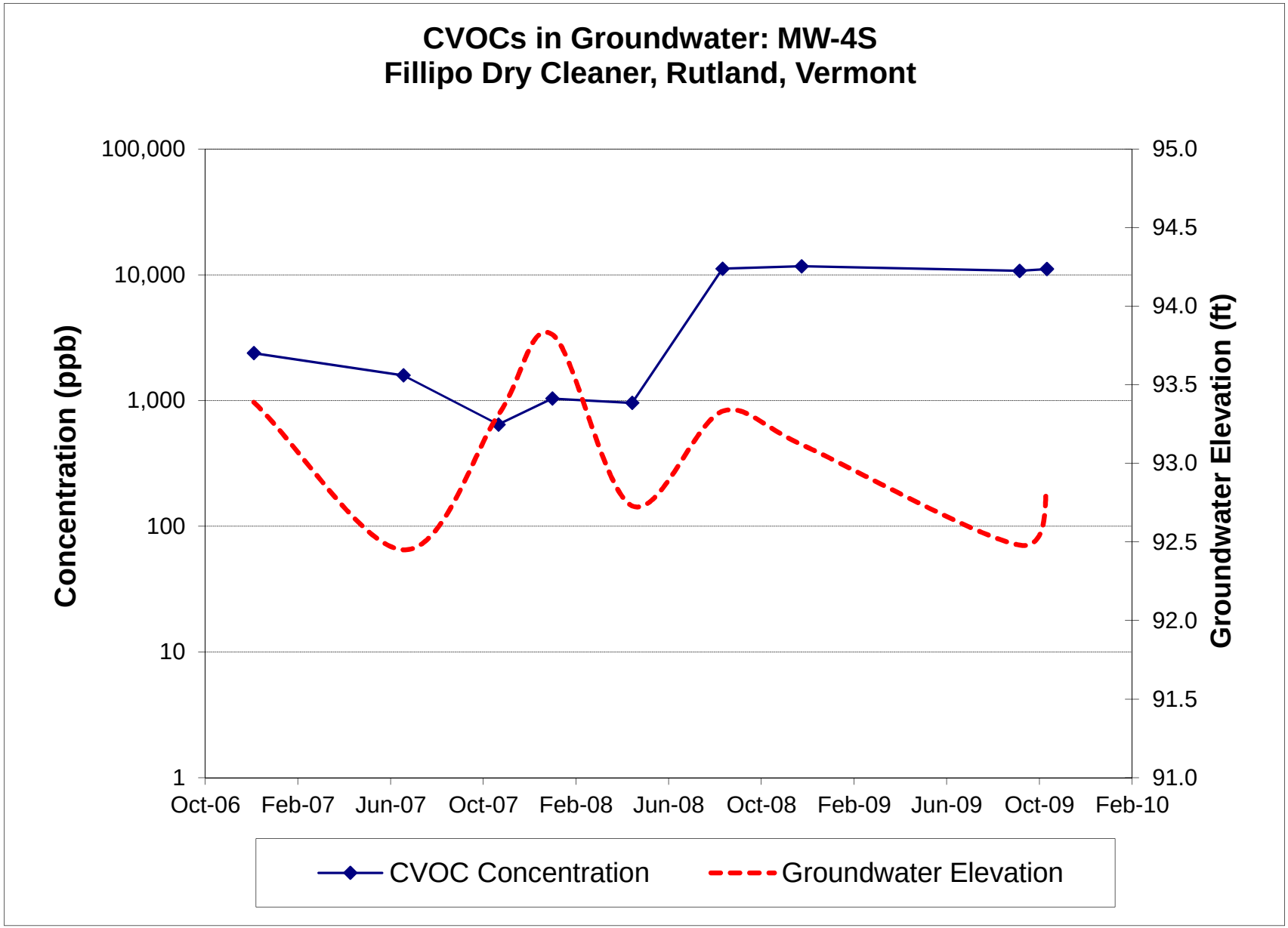
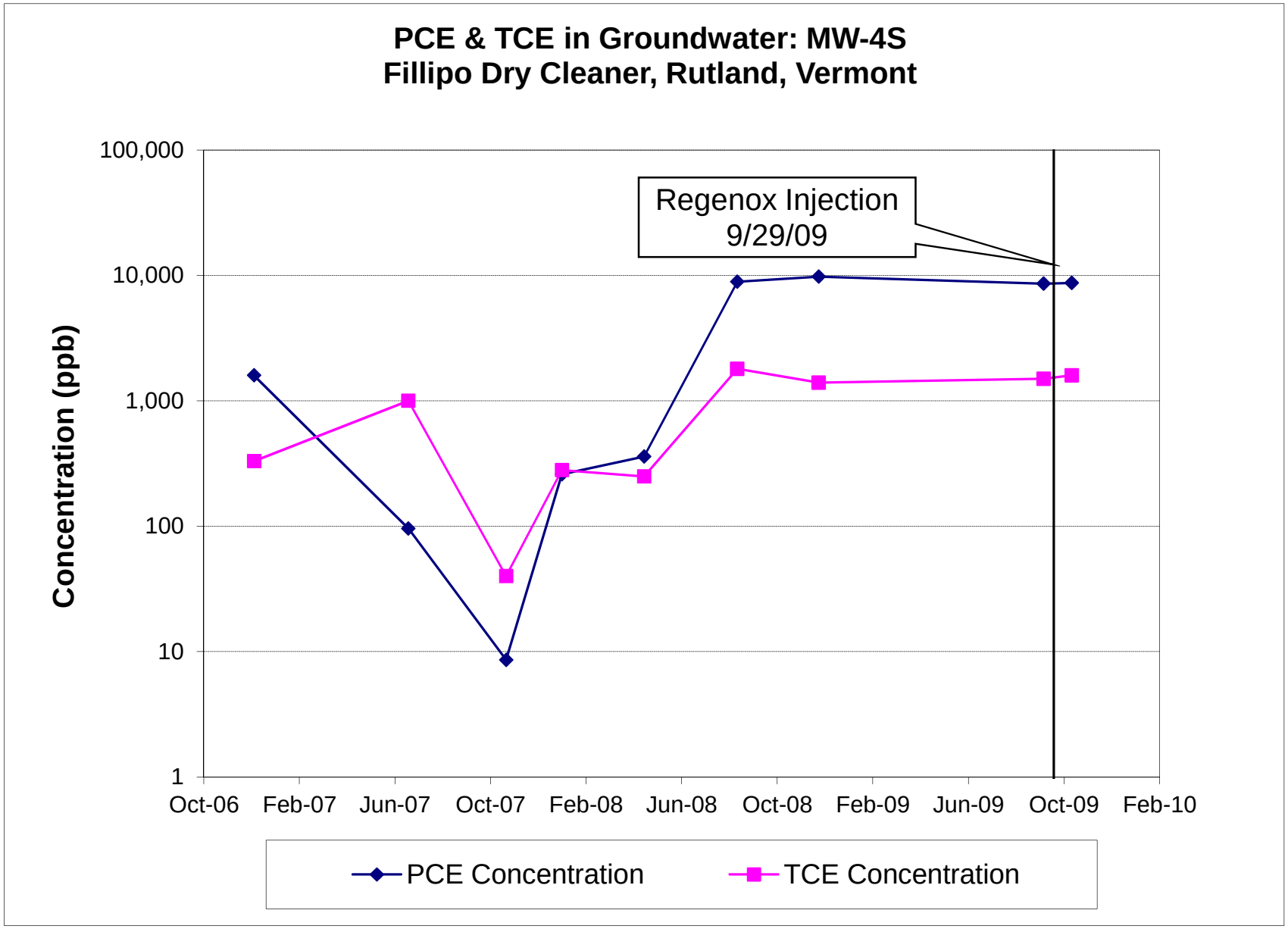
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



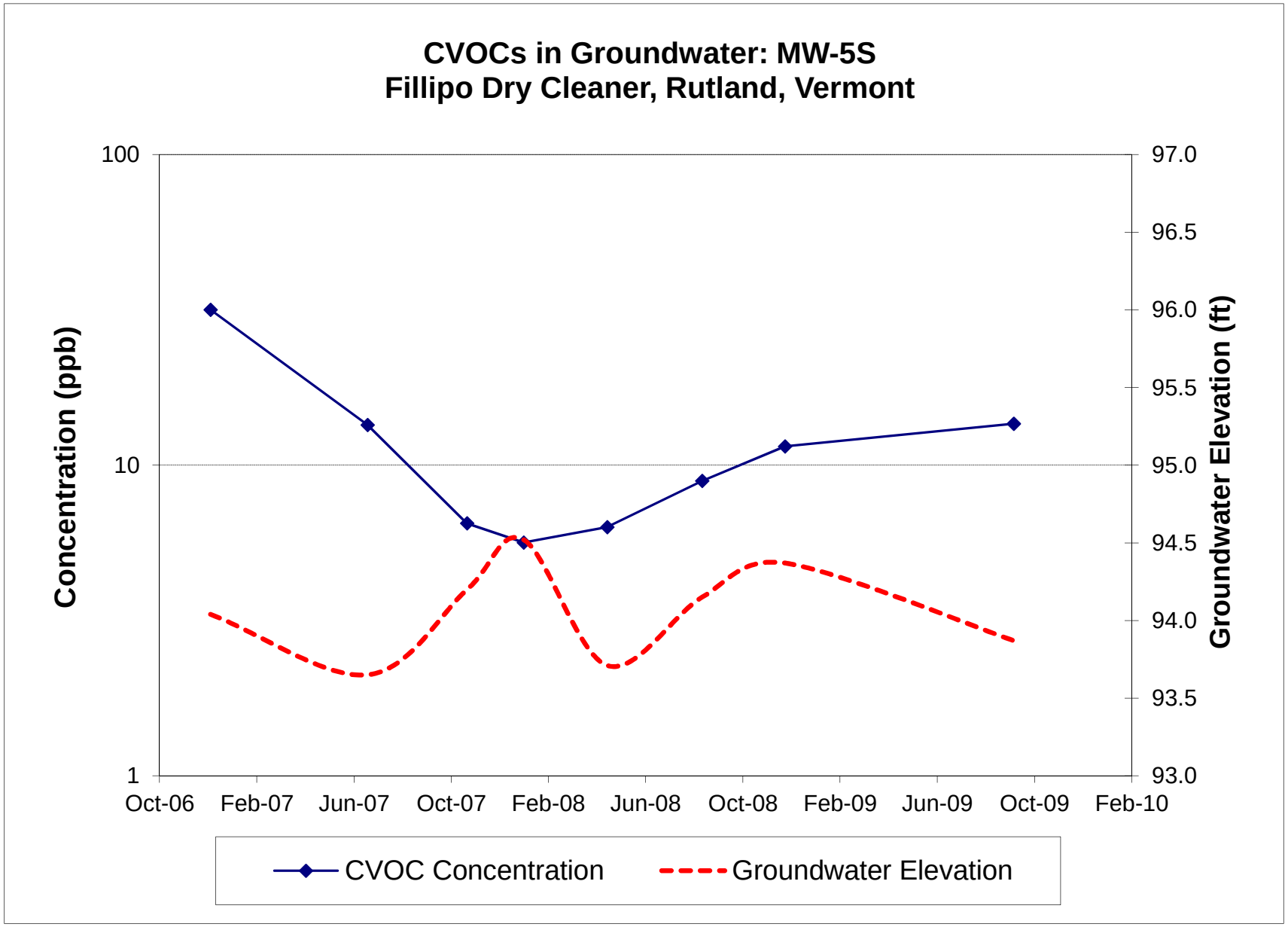
Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



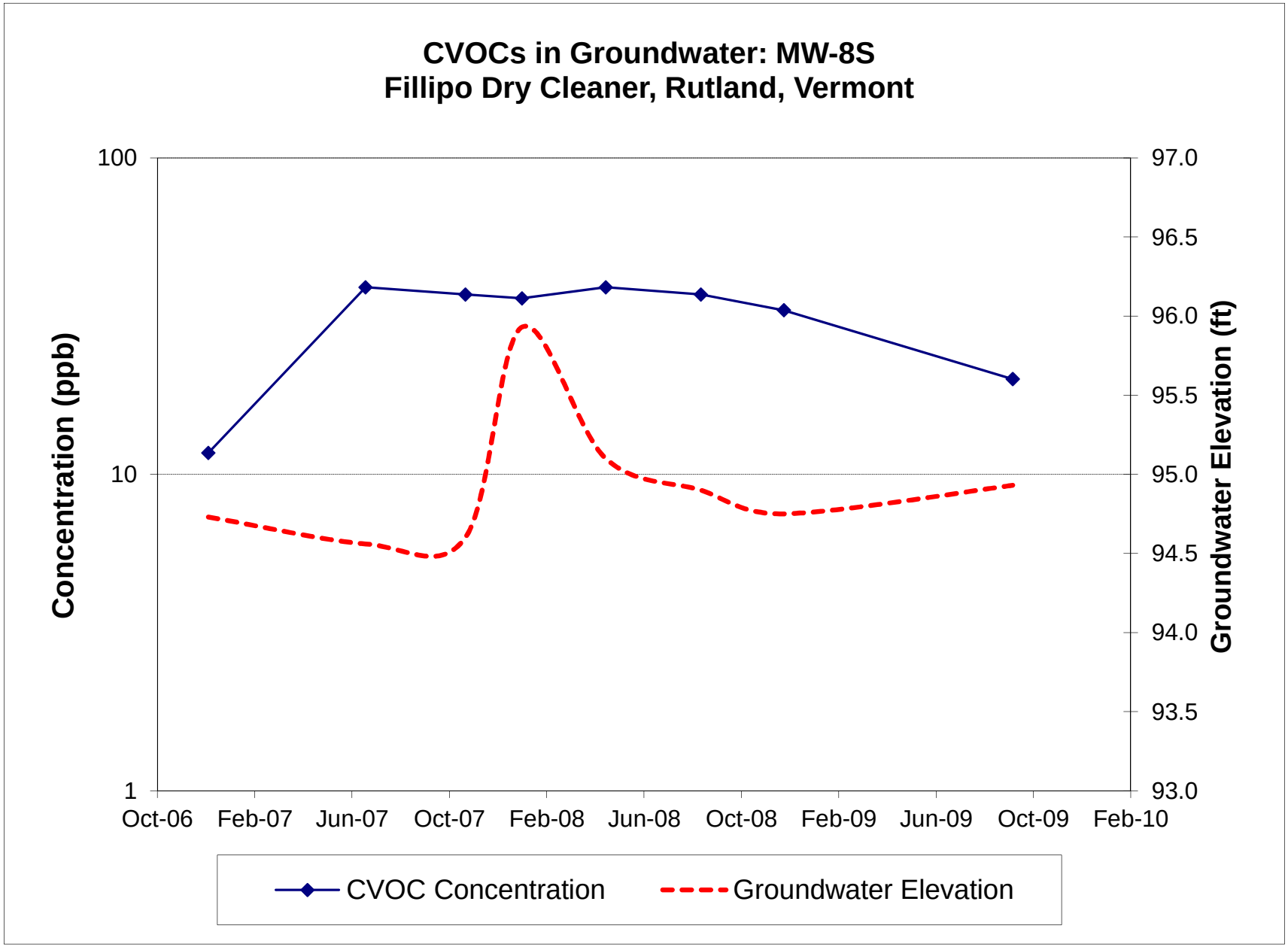
Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



Notes:
CVOC = chlorinated volatile organic compounds; sum of PCE, TCE, 1,2-DCE, and VC

VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



Notes:
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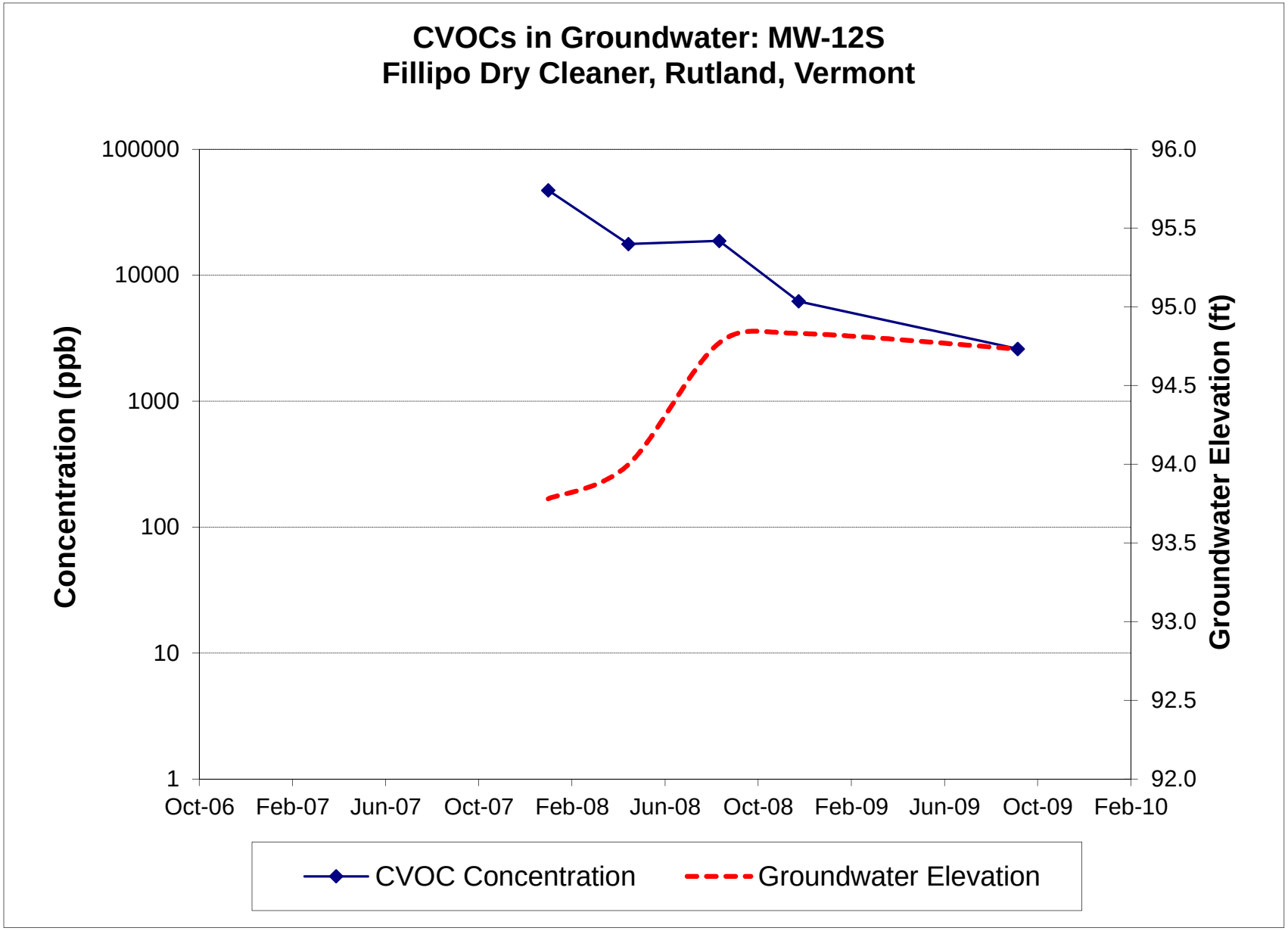
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



Notes:
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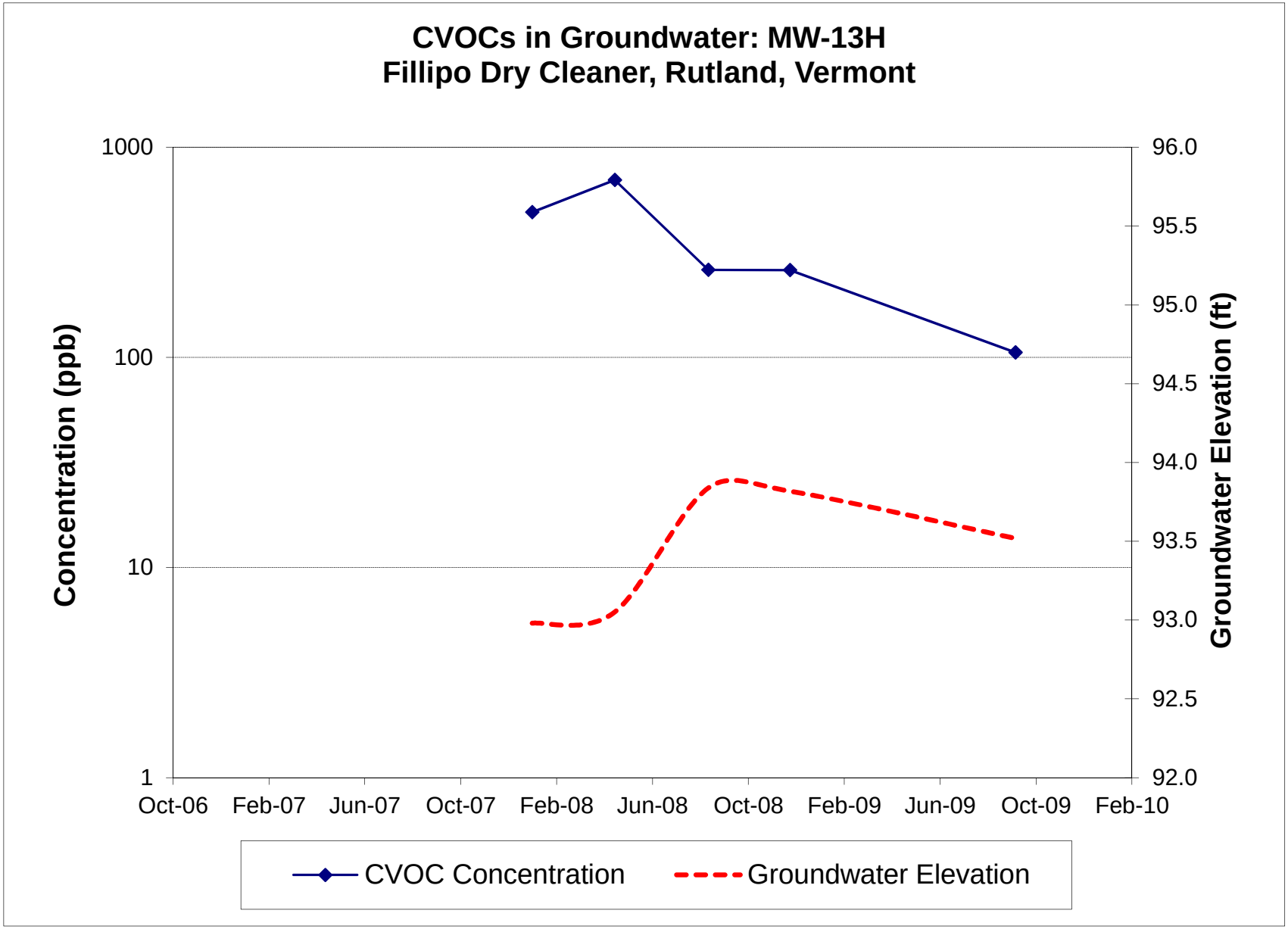
VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls



Notes:
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VT DEC Site #97-2194
Fillipo Water Data rev 110912.xls

APPENDIX 5

REMEDIAL ACTION COST CALCULATIONS AND SUPPORTING DATA

SOURCE: 2007 SURVEY DRAWING BY WAITE ENVIRONMENTAL MANAGEMENT, LLC

77 WOODSTOCK
FOTO HUT

79 WOODSTOCK
CHITTENDEN BANK

WOODSTOCK AVENUE

SIDEWALK

FORMER FUEL OIL USTs

GRAVEL

FORMER GASOLINE UST

ASPHALT

MW-6S

MW-7S

MW-1S

82 WOODSTOCK

84 WOODSTOCK
FORMER FILLIPO
DRY CLEANER

MW-8S

CURRENT IRVING
GASOLINE PUMPS

CURRENT (3)
IRVING
GASOLINE
USTS

MW-12S
MW-12D

MW-13H

76 WOODSTOCK
SHERWIN WILLIAMS

ASPHALT PARKING

SITE

MW-5S

MW-2S
MW-2D

86 WOODSTOCK
IRVING MAINWAY
(SITE 93-1413)

CONCRETE
SLAB

FORMER DRY
CLEANER LOCATION

MW-3H

FLOOR DRAIN

ASPHALT

MW-9S

MW-14S

MW-4S

MW-4D

IRVING
PROPERTY

MW-19H

JAMAC PROPERTY

MW-15S

MW-16S

MW-11H

WET AREA

SHED

DuPREY PROPERTY

MW-10H

CHAIN LINK
FENCE

91 HARRINGTON

93 HARRINGTON

SW-1

MW-17S

MW-17D

MW-18D
MW-18S

GRASS

78 HARRINGTON

80 HARRINGTON

HARRINGTON

AVENUE

SV-1

82 HARRINGTON

SV-2

84-86 HARRINGTON

0 10 20 40
SCALE IN FEET

LEGEND

	SITE BOUNDARY (APPROXIMATE)
	PROPOSED EXCAVATION AREA (APPROXIMATE)
	PROPERTY LINE (APPROXIMATE)
	1' GROUND SURFACE CONTOUR
WS	UNDERGROUND MUNICIPAL WATER LINE
SS	UNDERGROUND MUNICIPAL SEWER LINE
SD	UNDERGROUND MUNICIPAL STORM DRAIN
OHP	OVERHEAD ELECTRIC LINE
	STORMWATER CATCHBASIN
	UTILITY POLE
SB-20	SOIL BORING LOCATOIN (2008)
SB-28/CS-2	SOIL BORING/CONCRETE SAMPLE LOCATION (2009)
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2006-2009)
MW-8S	WELL MISSING/DESTROYED
MW-13H	WELL CLOSED
SV-1	SOIL VAPOR SAMPLING POINT (2012)
SW-1	SURFACE WATER SAMPLING POINT BY WEM (2007)
M	MONITORING WELL INSTALLED BY OTHERS (1993)

FIGURE A-1: SOURCE AREA EXCAVATION
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600

Drawn by: CFF Date: 12/03/12
Chk'd by: DMM Date: 12/03/12
Scale: As Shown Project: 3-2218-07

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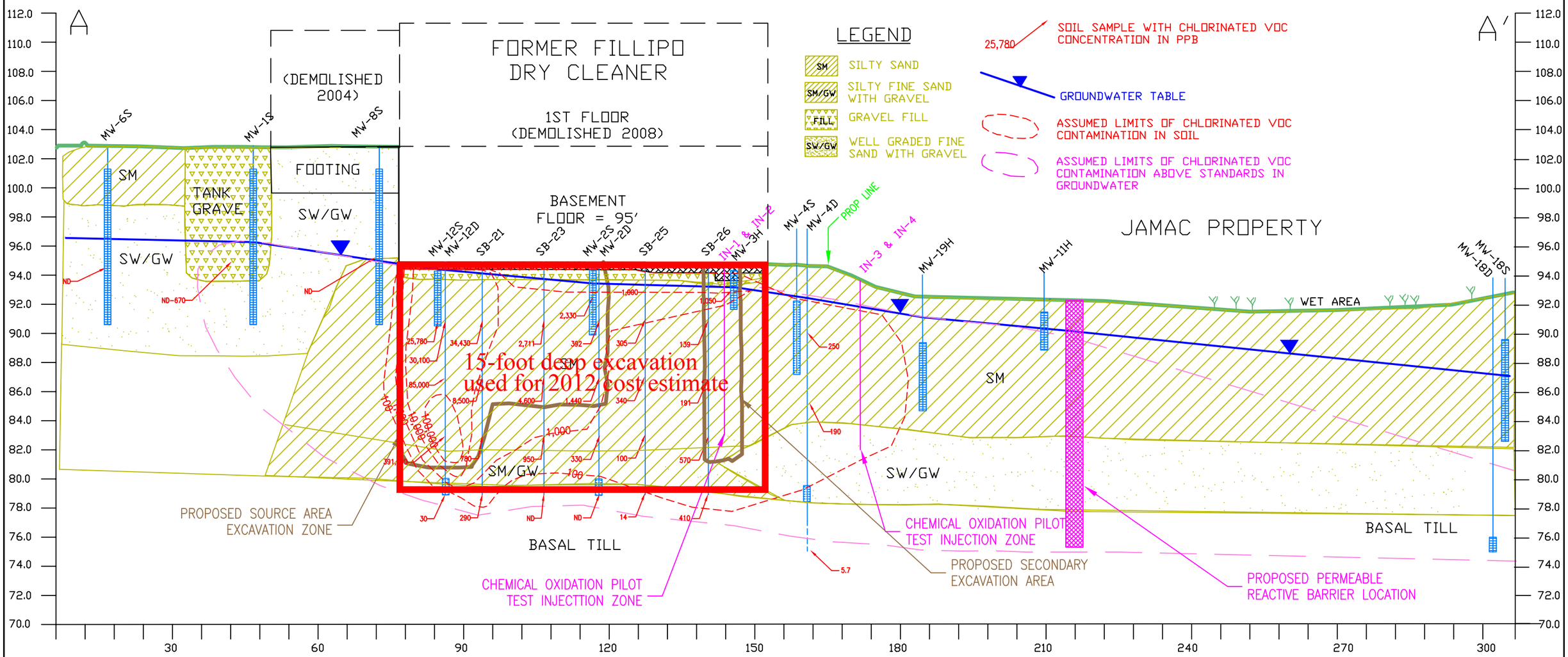

CROSS-SECTION A-A'

SCALE:
HORIZONTAL: 1" = 20'
VERTICAL 3" = 20' (1" = 6.66')

NOTES: SOIL SAMPLE DATA PRESENTED DECEMBER 2006, FEBRUARY 2008; AND AUGUST 2008. CHLORINATED VOC CONCENTRATIONS ARE SUM OF PCE, TCE, 1,2-DCE, AND VC (EPA METHOD 8260B). WATER TABLE DATA PRESENTED ARE FROM SEPTEMBER 2009. REFER TO FIGURE 4 FOR THE CROSS-SECTION LINE.

WAITE ENVIRONMENTAL MANAGEMENT
P.O. BOX 4602
BURLINGTON, VT 05406
(P) 802-860-9400
(F) 802-860-9440

SCALE: 1" = 20'	REVISION:	DRAWN BY: MEW
DATE: 8/5/10	DATE:	PROJECT #: 06062-34

CROSS SECTION A-A'
FORMER FILLIPO DRY CLEANER
84 WOODSTOCK AVENUE, RUTLAND, VERMONT

Table A1 CAPITAL COSTS FOR ALTERNATIVE 1 - EXCAVATION AND OFF SITE DISPOSAL OF SOILS LOCATED ON THE FILLIPO PROPERTY

Description	Units	Unit Cost	Quantity	Extended Cost	Unit Cost Reference
Site Survey, prepare for construction	ls	$1,500	1	$1,500	Estimate
Field offices, staging areas, site security	ls	$10,000	1	$10,000	Estimate
Mobilzation / Demobilization	ls	$5,000	1	$5,000	Estimate
Advance/remove sheet piling shoring	ft^2	$24.64	4260	$104,956	RS Means 2008
Excavation, live load onto trucks	yd^3	$6.90	875	$6,036	RS Means 2008
Live load, stockpile excavated materials	yd^3	$4.10	875	$3,583	RS Means 2008
Transport and Disposal of excavated soils	ton	$195	1313	$255,938	Estimate
Import clean fill to Site	ton	$25.00	1313	$32,813	Estimate
Import topsoil to Site	ton	$30.00	88	$2,625	Estimate
Place imported common backfill	yd^3	$13.19	875	$11,545	RS Means 2008
Compact placed backfill	yd^3	$6.42	817	$5,242	RS Means 2008
seed / MULCH topsoil	ls	$5,000.00	1	$5,000	Estimate
Confirmatory sampling, soil characterization	ls	$15,000.00	1	$15,000	estimate
Excavation dewatering and water treatment	l.s.			$40,000	Estimate
Direct Costs Subtotal				$499,238	
Detailed Design and Contractor Coordination		15%		$74,886	USEPA, 2000
Project Management		8%		$39,939	USEPA, 2000
On-site Construction Management		10%		$49,924	USEPA, 2000
Contingency		30%		$149,771	USEPA, 2000
Total Capital Costs				**$813,758**	

Assume 1,313 tons excavated soils form source area to reach VDH/SMS SSL of 800 ppb PCE and 860 ppb TCE. Excavation size approximately 75'x21'x22.5 feet long (assumes 15 foot excavation depth and sheet piles 1.5x the excavation depth).

HOWEVER, since the likely exposure pathways are through vapor intrusion sourced from contaminant concentrations in groundwater (not soil contact) the default exposure scenarios used to develop the SSVs may preclude their use as cleanup standards.

The EPA Protection of Groundwater SSLs user's manual states a dilution factor of 20 can be applied to source areas less than 0.5 acres for protection of groundwater SSLs. If MCL-based SSLs are used the source area excavation would need to be expanded to include MW-4D (190 ppb PCE at 10 fbgs). There is limited soil data from the JAMAC property; this larger excavation size may not remove all soils with CVOC concentrations that contribute dissolved contamination to groundwater.

The EPA 5 ppb MCL-based soil SSLs for protection of groundwater are 2.3 ppb for PCE and 1.8 ppb for TCE. Using the 20-time dilution factor cited above, remedial goals in soils would be 46 ppb for PCE and 36 ppb for TCE. Even lower values would be needed if indoor-air risk based groundwater values of 0.76 ppb for PCE and 1.19 ppb for TCE were used.

The limited vertical extent of soil data complicates assessment of the practicality of the source area excavation. Due to the lack of depth to groundwater at the site, steel sheet piles would be the best shoring option for the excavation. More exhaustive soil investigation to further delineate the lateral and vertical extent of soil contamination may be warranted in order to confirm the extent of the proposed excavation prior to driving the piles.

Another concern is the lack of knowledge of the depth to bedrock in the vicinity. There is little data close to the site, however the isopachs indicate that the depth to bedrock is less than 30 feet at the Site. Sheet piles for the 15 foot excavation (as included in the estimate on the following pages) would need to be driven ~ 22.5 feet bgs (note that the bottom of the basement is already ~8-10 feet below grade). These could potentially create a pathway at the source area for contamination to enter bedrock. Due to the excavation being almost entirely below the water table the interlocked steel sheet piles would be the best option, but if the depth to bedrock limits how far we can drive the piles hydraulic bracing would need to be deployed to reach the max depth of excavation. These products are available but not included in the estimated cost.

SOURCE: 2007 SURVEY DRAWING BY WAITE ENVIRONMENTAL MANAGEMENT, LLC

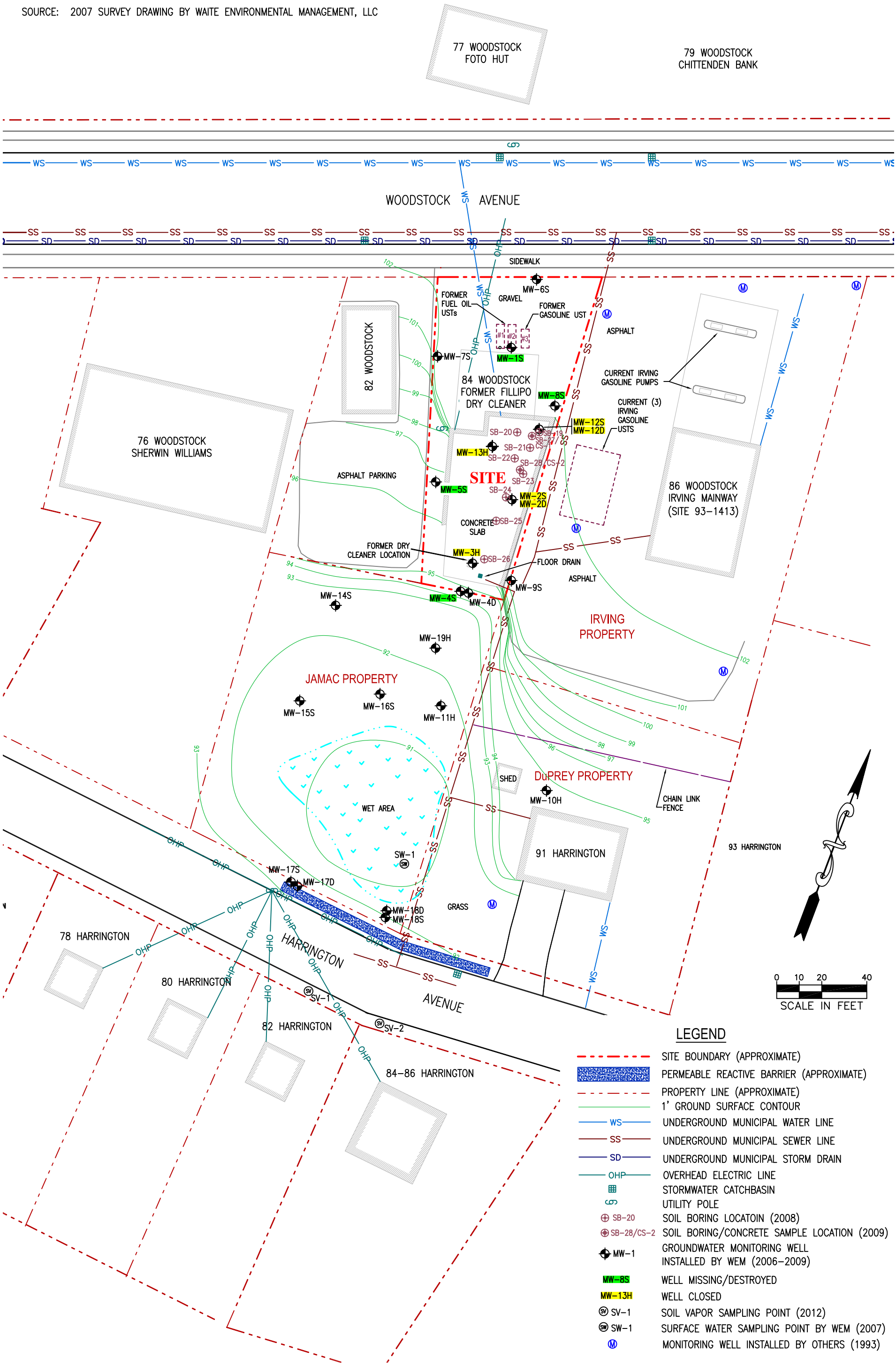

FIGURE A-2: PERMEABLE REACTIVE BARRIER
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600

Drawn by: CFF Date: 12/03/12
Chk'd by: DMM Date: 12/03/12
Scale: As Shown Project: 3-2218-07

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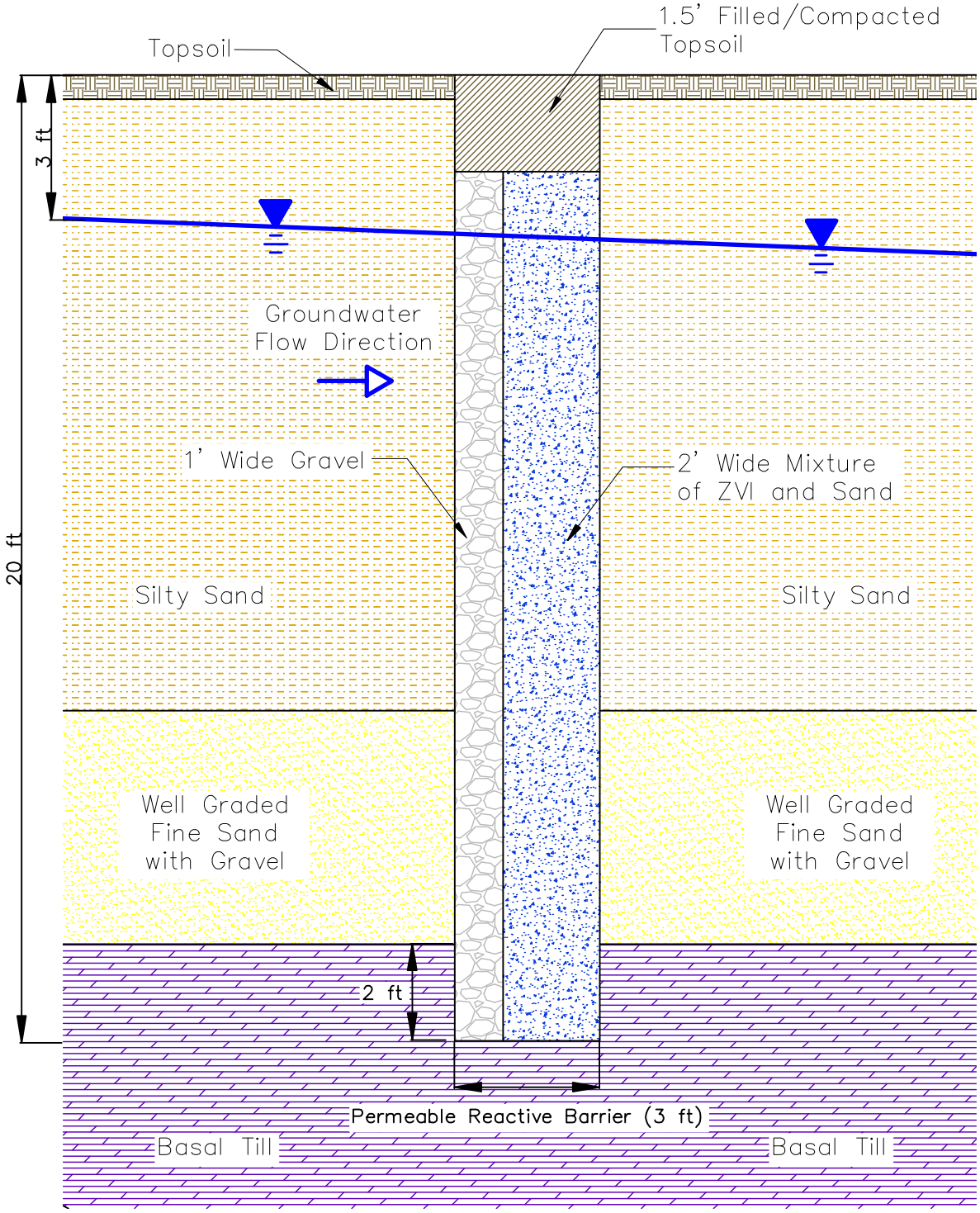

Notes:
1) The depths and thicknesses of soil layers are based on monitoring well logs MW-17D and MW-18D (Waite, 2010).
2) All dimensions are approximate.
3) Not to scale
4) ZVI = zero valent iron

FIGURE A-2a: CONCEPTUAL PROFILE OF PRB
FILLIPO DRY CLEANERS - SITE#97-2194
RUTLAND, VERMONT

The Johnson Company

100 State Street, Suite 600
Montpelier, VT 05602

Drawn by: CFF Date: 12/13/12
Chk'd by: PCS Date: 12/13/12
Scale: not to scale Project: 3-2218-07

Table A2 CAPITAL COSTS FOR ALTERNATIVE 2B - 100 ft. PERMEABLE REACTIVE BARRIER

Description	Units	Unit Cost	Quantity	Extended Cost	Unit Cost Reference
Field offices, staging areas, traffic control	ls	$20,000	1	$20,000	Estimate
Advance/remove sheet piling shoring	ft^2	$24.64	6000	$147,825	RS Means 2008
Trench excavation	yd^3	$6.90	222	$1,533	RS Means 2008
ZVI delivered to the Site	ton	$1,660	26	$43,160	Estimate / vendor quote
Sand, delviered to the Site	ton	$30	171	$5,130	Estimate
Mix, place, ZVI and Sand in trench	yd^3	$26.39	133	$3,519	RS Means 2008
Gravel, delivered to the Site	ton	$30.00	94	$2,820	
Place gravel in trench	yd^3	$13.19	67	$884	RS Means 2008
Imported common backfill, delivered	ton	$25.00	30	$750	Estimate
Place imported common backfill	yd^3	$13.19	22	$293	RS Means 2008
Compact placed backfill	yd^3	$6.42	22	$143	RS Means 2008
Live load, stockpile excavated materials	yd^3	$4.10	222	$910	RS Means 2008
Haul excavated material for backfill	yd^3	$6.02	22	$132	RS Means 2008
Transport and Disposal of excavated soils	ton	$195	303	$59,085	Estimate
Site restoration	l.s.	$5,000	1	$5,000	Estimate
Excavation dewatering and water treatment	l.s.			$35,000	Estimate
Direct Costs Subtotal				**$326,184**	
Detailed Design and Contractor Coordination		15%		$48,928	USEPA, 2000
Project Management		8%		$26,095	USEPA, 2000
On-site Construction Management		10%		$32,618	USEPA, 2000
Contingency		30%		$97,855	USEPA, 2000
Total Capital Costs				**$531,679**	

SOURCE: 2007 SURVEY DRAWING BY WAITE ENVIRONMENTAL MANAGEMENT, LLC

77 WOODSTOCK
FOTO HUT

79 WOODSTOCK
CHITTENDEN BANK

WOODSTOCK AVENUE

SIDEWALK

FORMER FUEL OIL USTs

GRAVEL

FORMER GASOLINE UST

ASPHALT

82 WOODSTOCK

84 WOODSTOCK
FORMER FILLIPO
DRY CLEANER

CURRENT IRVING
GASOLINE PUMPS

CURRENT (3)
IRVING
GASOLINE
USTS

76 WOODSTOCK
SHERWIN WILLIAMS

ASPHALT PARKING

SITE

86 WOODSTOCK
IRVING MAINWAY
(SITE 93-1413)

CONCRETE
SLAB

FORMER DRY
CLEANER LOCATION

FLOOR DRAIN

ASPHALT

IRVING
PROPERTY

JAMAC PROPERTY

WET AREA

SHED

DuPREY PROPERTY

CHAIN LINK
FENCE

91 HARRINGTON

93 HARRINGTON

GRASS

78 HARRINGTON

80 HARRINGTON

82 HARRINGTON

84-86 HARRINGTON

HARRINGTON
AVENUE

MW-6S
MW-7S
MW-1S
MW-8S
MW-12S
MW-12D
MW-13H
MW-5S
MW-2S
MW-2D
MW-3H
MW-9S
MW-14S
MW-4S
MW-4D
MW-19H
MW-15S
MW-16S
MW-11H
MW-10H
SW-1
MW-17S
MW-17D
MW-18D
MW-18S
SV-1
SV-2

SB-20
SB-19
SB-27
CS-1
SB-21
SB-22
SB-28
CS-2
SB-23
SB-24
SB-25
SB-26

0 10 20 40
SCALE IN FEET

LEGEND

	SITE BOUNDARY (APPROXIMATE)
	POTENTIAL RECEPTOR VAPOR MITIGATION LOCATION
	PROPERTY LINE (APPROXIMATE)
	1' GROUND SURFACE CONTOUR
WS	UNDERGROUND MUNICIPAL WATER LINE
SS	UNDERGROUND MUNICIPAL SEWER LINE
SD	UNDERGROUND MUNICIPAL STORM DRAIN
OHP	OVERHEAD ELECTRIC LINE
	STORMWATER CATCHBASIN
	UTILITY POLE
SB-20	SOIL BORING LOCATOIN (2008)
SB-28/CS-2	SOIL BORING/CONCRETE SAMPLE LOCATION (2009)
MW-1	GROUNDWATER MONITORING WELL INSTALLED BY WEM (2006-2009)
MW-8S	WELL MISSING/DESTROYED
MW-13H	WELL CLOSED
SV-1	SOIL VAPOR SAMPLING POINT (2012)
SW-1	SURFACE WATER SAMPLING POINT BY WEM (2007)
M	MONITORING WELL INSTALLED BY OTHERS (1993)

FIGURE A-3: POTENTIAL RECEPTOR VAPOR MITIGATION
FILLIPO DRY CLEANERS - SITE #97-2194
84 WOODSTOCK AVENUE
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
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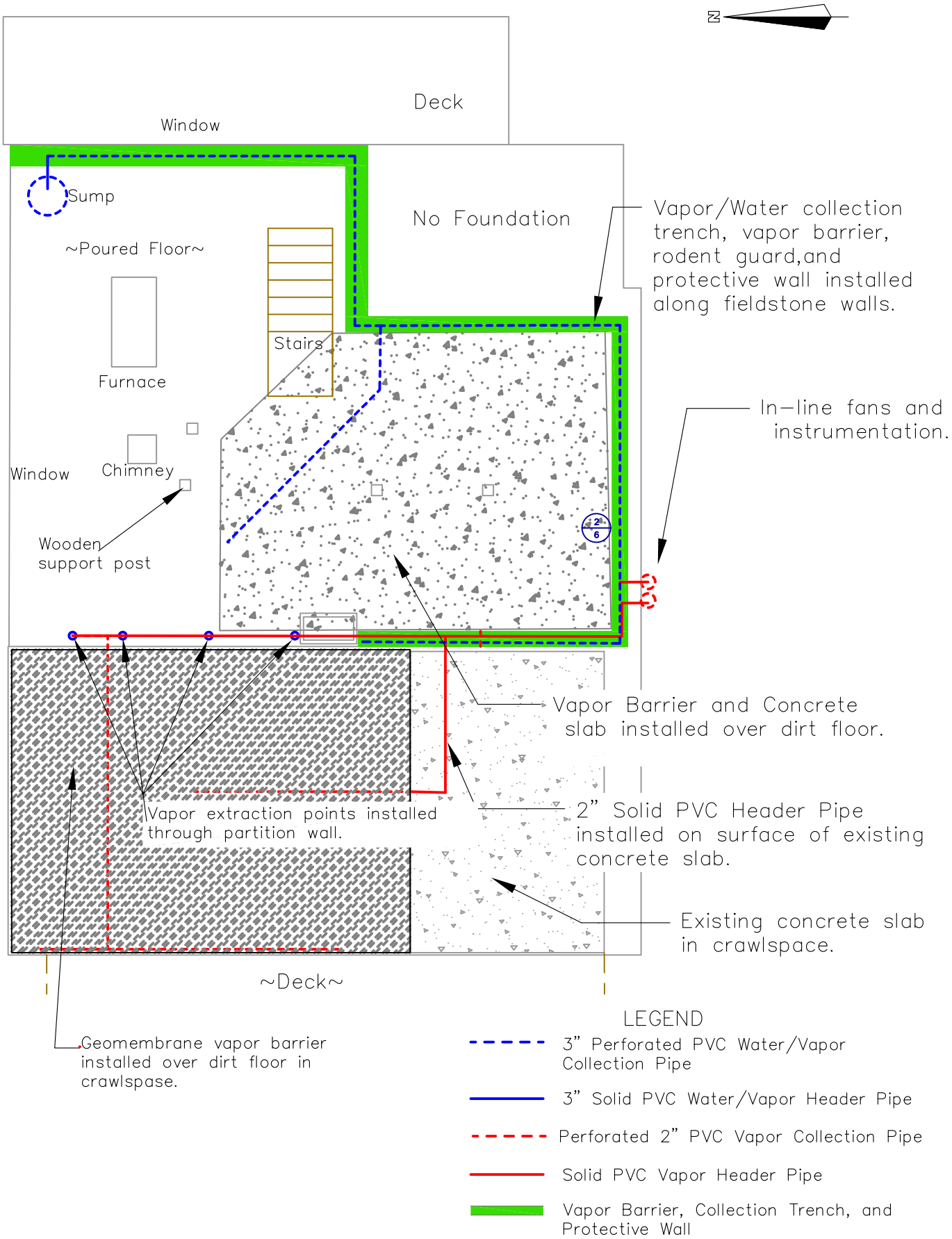

FIGURE 3a: EXAMPLE AIR ABATEMENT SYSTEM LAYOUT
FILLIPO DRY CLEANERS - SITE#97-2194
RUTLAND, VERMONT

The Johnson Company

100 State Street, Suite 600
Montpelier, VT 05602

Drawn by: PCS	Date: 12/03/12
Chk'd by:	Date:
Scale: None	Project: 3-2218-07

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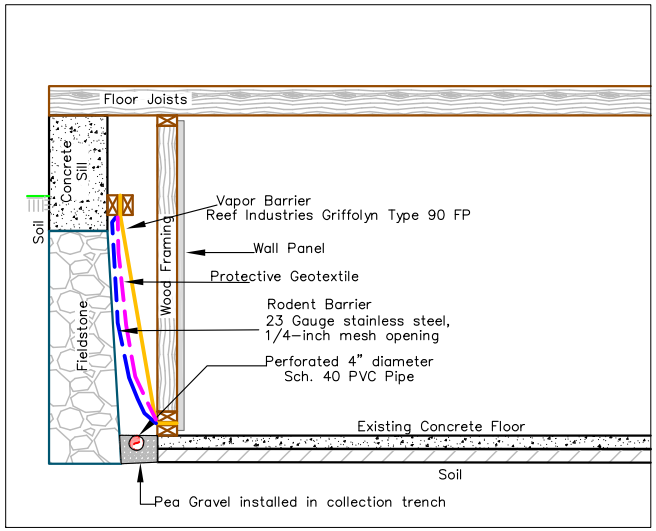
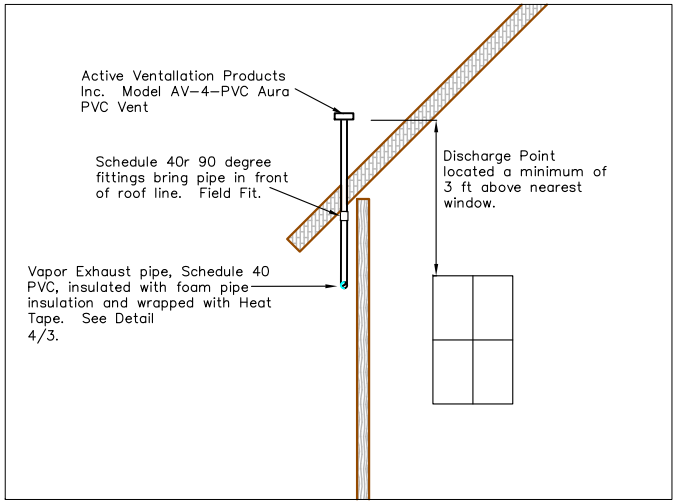


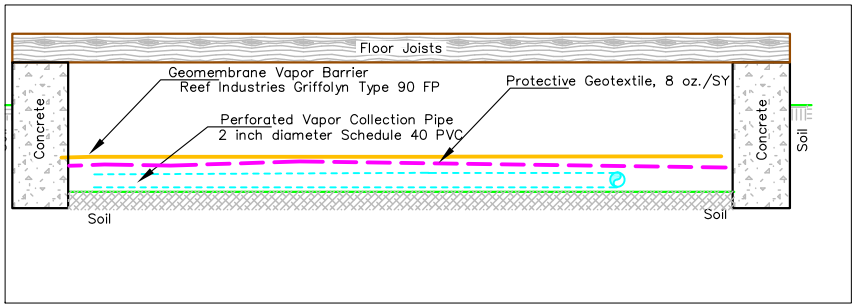
DETAIL Typical Fieldstone Wall Vapor Barrier (1/3)

SCALE: NONE



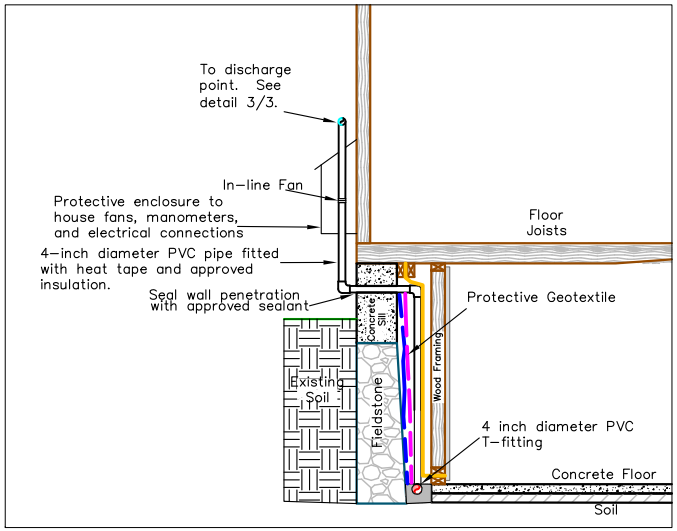
DETAIL Vapor Exhaust Pipe (3/3)

SCALE: NONE



DETAIL Crawl Space Vapor Barrier and Collection Pipe (2/3)

SCALE: NONE



DETAIL Vapor Pipe Penetration Through Basement Wall (4/3)

SCALE: NONE

FIGURE A-3b: EXAMPLE VAPOR ABATEMENT SYSTEMS
FILLIPO DRY CLEANERS - SITE #97-2194
RUTLAND, VERMONT

The Johnson Company
100 State Street, Suite 600
Montpelier, VT 05602
(802) 229-4600

Drawn by: PCS Date: 12/12/12
Chk'd by: Date:
Scale: not to scale Project: 3-2218-07

Table A3 CAPITAL COSTS FOR ALTERNATIVE 3 - INDOOR AIR ABATEMENT SYSTEM

for Two Residences at 82 and 84-86 Harrington Avenue, Rutland, VT

Former Fillipo Cleaners, 84 Woodstock Ave., Rutland, Vermont - SMS Site #97-2194

"Worst Case" Assumptions: Unfinished cellars with dirt floors, groundwater infiltration/sumps, and fieldstone walls

	Labor Hours						
Task	Manager ($80/hr)	Sr. Eng ($105/hr)	Staff Eng ($70/hr)	CADD ($70/hr)	Sec ($40/hr)	Expenses (communications, copies, shipping, mileage, PID etc.)	Total Cost
Access Agreement, Building Characterization and Pre-Design							
Develop access agreement	1	8			2	$25	$1,025
Initial Site Visit, sump water testing (4 samples), and PID screening		10				$780	$1,830
Prepare building plans and Pre-Design	4	40	24	8	2	$90	$6,930
Evaluate Ground Water Interception/Collection Systems and Integration with Indoor Air Abatement Systems							
for interception/collection of infiltrating	2	8	8			$20	$1,580
Review applicability, implementability, and cost of alternatives for each residence	1	4	4			$20	$800
Evaluate methods to integrate the recommended alternative into the indoor air abatement system designs	1	8	4			$20	$1,220
Prepare Design and Feasibility Evaluation Report							
Prepare Draft Design and Feasibility Evaluation Report	4	12	8	4	2	$120	$2,620
Address comments and Prepare Final Design and Report	2	2	4	4	2	$60	$1,070
Project Planning, Bid Solicitation, Management, and Scheduling							
Project planning and bid solicitation (including 1 site visit)	8	20	8		4	$220	$3,680
Finalize subcontract and schedule	4	2			1	$5	$575
Manage project costs, invoices, and schedule	4	1			1	$5	$470
Coordinate implementation schedule with residents	2	2				$5	$375
System Installation							
Engineering oversight (6 visits)	3	66	24			$1,250	$10,100
Prepare as-built drawings of installed system	1	16		16		$120	$3,000
Compile electronic copies of all equipment manuals, documentation, and photographs for installed equipment	1	2	8		6	$5	$1,095
Soil sample collection and soil disposal coordination	4	4				$55	$795
Direct Cost: Installation Contractor (based upon actual bid for similar system in 2011 + 30% for larger building)							$120,000
Direct Cost: Laboratory analysis and disposal of soil from sump installation (2 samples and 2 drums)							$1,500
Documentation and Reporting							
Prepare As-Built Reports	2	16	24	8	2	$170	$4,330
Prepare O&M Manuals	2	12	16	8	2	$110	$3,290
Prepare Homeowner Information Sheets	1	6	6	3	1	$60	$1,440
						Total Estimated Cost	**$150,650**