2006 ANNUAL MONITORING REPORT

for the

BRESSETT SITE
RANDOLPH, VERMONT

VT DEC Site #77-0019

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1.0 INTRODUCTION

The following *2006 Annual Monitoring Report* for the Bressett Site in Randolph, Vermont (see attached Site Location Map in Appendix A) was prepared by Waite Environmental Management, LLC (WEM) for the Vermont Department of Environmental Conservation (VT DEC). This report has been completed in accordance WEM's contract with State of Vermont (contract EC13-04) for environmental monitoring.

This report includes discussion of the results of groundwater, drinking water, surface water, and indoor air sampling conducted by WEM during 2006. Monitoring locations were in the vicinity of the former Bressett Residence, Vermont Route 12, and Town Road #23. Events covered in this report include:

- Monitoring of eighteen (18) groundwater monitoring wells during April and October 2006.
- Monitoring of one (1) active supply well in April and October 2006.
- Monitoring of one (1) active supply spring/water system during April, May and October 2006.
- Monitoring of two (2) surface water locations in July 2006.
- Monitoring of indoor air at two (2) locations inside the former Bressett Residence in February and July 2006.

Monitoring at these locations was conducted in accordance with WEM's *Work Plan for Environmental Monitoring* ("Work Plan") [1], and the *Field/Lab Coordination Memorandum for Water Monitoring* ("FLCM-Water") [2].

All results except those from 4th Quarter 2006, which are discussed in this report, have been previously reported by WEM [3, 4, 5].

2.0 GROUNDWATER SAMPLING

Groundwater monitoring well sampling was conducted by WEM from a total of fifteen (15) wells on April 27-28, 2006 and from fourteen (14) wells on October 3-6, 2006. Wells sampled included six paired monitoring wells (MW-3S/D, MW4-S/D, MW-101S/D, MW-102S/D, MW-103S/D, MW-104S/D) and three bedrock monitoring wells (BRW-1, BRW-2, BRW-3). In addition, groundwater elevation measurement was conducted on an additional three (3) wells (MW-1, MW-2S/D). Sampling was conducted in accordance site protocols as specified in WEM's Work Plan and the FLCM-Water. All wells were in the general vicinity of the former Bressett residence. All well locations are shown in the Site Plan in Appendix A. Details and results of the sampling events are described below.

2.1 Groundwater Level Measurement

Prior to sampling, the water level in each well was measured with a water level probe. Using top-of-casing elevation data, the measurements were converted into groundwater elevations. Elevation data from April and October 2006 are shown with historical measurements in Table 1.1 in Appendix B. These data indicate the following:

- Groundwater elevation measurements in April 2006 were slightly lower than measurements from April 2003-05 measurements. No atypical measurements were noted.
- Groundwater elevation measurements in October 2006 were similar to measurements from October 2003-05. The October elevation measurement in well MW-4S was atypically high in comparison to previous events.
- While well MW-103S was not dry during October 2006, it had too little water in it to sample.
- Groundwater elevations fluctuate slightly with the seasons, and are typically higher in April than in October, often by several feet. The April 2006 average elevation was 0.75 feet higher than the October 2006 average elevation.

Groundwater elevations were also plotted to develop groundwater elevation maps for each sampling event (see Appendix A). As these maps show, the general direction of groundwater flow (based on shallow well data) was toward the southwest. The lateral hydraulic gradient, as calculated between MW-2S and MW-102S, was 0.034 ft/ft in April 2006 and 0.032 ft/ft in October 2006. Vertical hydraulic gradients calculated between the paired wells (see Table 1.1) were generally upward, ranging from 0.01 to 0.12 ft/ft. Only paired wells MW-101S/D consistently has a measurable downward vertical gradient.

2.2 Groundwater Sample Collection

Overburden monitoring wells MW-101S/D, MW-102S/D, MW-103S/D, MW-104S/D were purged and sampled using a low-flow methodology. These monitoring wells were purged using a peristaltic pump (Geotech Geopump II) connected to dedicated high density polyethylene (HDPE) tubing within each well that extended to a pre-specified intake depth. The dedicated HDPE tubing was connected to disposable silicon tubing that ran through the head of the peristaltic pump; new silicon tubing was used for each well purged. Purge rates ranged between 75-300 milliliters/minute (ml/min). During the purging process, the water level was monitored using a water level probe (Solinst) with a 0.25-inch probe, and geochemical parameters were measured using a water quality meter (Horiba U-22 Model U-22XD) with a flow cell connected to the outlet of the peristaltic pump. The following field geochemical parameters were monitored: dissolved oxygen, specific conductance, temperature, pH, turbidity, and redox potential. Wells were allowed to purge until geochemical parameters stabilized, as specified by site protocols. Upon stabilization, the silicon tubing was disconnected from the water meter. Samples were then collected directly from the outlet of the peristaltic pump.

Bedrock monitoring wells BRW-1, BRW-2, and BRW-3 were also purged and sampled using the low flow methodology as described above. However, the pump used was a submersible (Grundfos Redi-Flo II) with dedicated flexible tubing. The pump was decontaminated with Alconox and deionized water prior to use and after use in each well. Purge rates and pump intake depths were as dictated by the site protocols. With the higher purge rates, the flow cell for the water quality meter could not be utilized, so water samples were regularly collected in a glass jar in which the probes for the water quality meter were inserted. Upon stabilization, samples were collected directly from the outlet of the disposable tubing.

Overburden monitoring wells MW-3S, MW-4S, and MW4-D were purged using dedicated bailers, and well MW-3D was purged with a combination of a peristalitic pump and a dedicated bailer. Purge volumes were calculated as three (3) times the volume of water in the well. Upon reaching the desired purge volume in each well, a small volume of the water was collected in a glass jar in which the probes for the water quality meter were inserted. Samples were then poured directly from the bailers into the sampling containers.

In all cases, the order of sample collection was as dictated by site protocols, and all samples were collected in pre-acidified sampling containers supplied by the laboratory and immediately placed on ice in a cooler. All samples were delivered by WEM to Severn-Trent Laboratories, Inc. (STL) of Colchester, Vermont STL for analysis of volatile organic compounds via EPA Method 8260B. The following four target VOCs are monitored as part of this project: tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and trans-1,2-dichloroethene (trans-1,2-DCE). Results, in micrograms per liter (ug/L), are discussed below.

2.3 Discussion of Results

2.3.1 Field Geochemical Data

Field geochemical parameter measurements are summarized in Tables 1.2 through 1.7 in Appendix B. Based on these data, the geochemical parameter measurements from the monitoring wells in 2006 were generally within the historical range measured over the past three years. Anomalous measurements from April and October 2006 are discussed below:

- Dissolved Oxygen: many wells had slightly depressed measurements in April 2006. The only noticeable trend has been a decreasing DO content with time in wells MW-101D and MW-102S.
- Specific Conductance: many wells had slightly depressed measurements in October 2006. No clear trends were noted.
- pH: many wells had slightly elevated measurements in April 2006, and well MW-3D had an atypically low measurement in October 2006. No clear trends were noted.
- Turbidity: Measurements in MW-101S were elevated during both April and October 2006, suggesting a rising trend. No other trends are noted.
- Redox: wells MW-3S/D and MW-4S/D had slightly depressed measurements in April 2006. No clear trends were noted.

2.3.2 Laboratory Data

Validated laboratory analytical results are summarized in Table 2.0 in Appendix B. Full copies of the laboratory reports are presented in the Data Validation Reports [6, 10] prepared by Phoenix Chemistry Service, on file at the VT DEC offices in Waterbury.

The analytical results for the target compounds of interest during April and October 2006 are described below:

PCE

- PCE was reported above quantitation limits in wells MW-3S, MW-3D, MW-4D, MW-101S, MW-101D, and MW-102S during both April and October 2006. PCE was reported at estimated concentrations below the quantitation limit in well MW-4S during both events in 2006.
- PCE was not reported above quantitation limits in any of the following wells: MW-102D, MW-103S/D, MW-104S/D, BRW-1, BRW-2, or BRW-3 during either April or October 2006.
- PCE concentrations increased between April and October 2006 in wells MW-3S, MW-3D, MW-101D, and MW-102S. This seasonal increase is not unusual.
- With the exception of brief increasing trends in PCE concentrations in wells MW-3D and MW-102S, PCE has generally been decreasing or stable with time.

TCE

- TCE was reported above quantitation limits in wells MW-3S, MW-3D, MW-4D, MW-101S, MW-101D, and MW-102S during both April and October 2006.
- TCE was not reported above quantitation limits in any of the following wells: MW-4S, MW-102D, MW-103S/D, MW-104S/D, BRW-1, BRW-2, or BRW-3 during either April or October 2006.
- TCE concentrations increased between April and October in wells MW-3S and MW-101D; these changes do not appear to be part of a long-term rising trend. There were no other significant changes in TCE concentrations between April and October 2006.

cis-1,2-DCE

- cis-1,2-DCE was reported above quantitation limits in wells MW-3S, MW-3D, MW-101S, MW-101D, and MW-102S during both April and October 2006. In well MW-4D, cis-1,2-DCE was reported at estimated concentrations below quantitation limits during 2006.
- cis-1,2-DCE was not reported above quantitation limits in wells MW-4S, MW-102D, MW-103S/D, MW-104S/D, BRW-1, BRW-2, or BRW-3 during April 2006. However, cis-1,2-DCE was reported at estimated concentrations below the quantitation limit in BRW-1, BRW-2, and BRW-3 during October 2006. This is the first time in the sampling history of these three wells that any chlorinated compounds were reported.
- cis-1,2-DCE concentrations increased between April and October in wells MW-3S and MW-101D; these changes do not appear to be part of a long-term rising trend. No significant trends in cis-1,2-DCE concentrations were noted.

trans-1,2-DCE

- trans-1,2-DCE was reported at estimated concentrations below the quantitation limit in wells MW-3S, MW-3D, MW-102S during both April and October 2006.
- The continued presence of trans-1,2-DCE in well MW-101D cannot be evaluated due to elevated detection limits in April 2006 and a qualification in October 2006.
- trans-1,2-DCE was not reported above quantitation limits in any of the following wells: MW-4S/D, MW-101S, MW-102D, MW-103S/D, MW-104S/D, BRW-1, BRW-2, or BRW-3.
- No significant trends in trans-1,2-DCE concentrations were noted.

Compared to Vermont groundwater enforcement standard ("VGES") [12] most of the reported PCE and TCE concentrations were above the 5.0 ug/L standard for each compound. Wells out of compliance with VGES for PCE and/or TCE during both the April and October 2006 events include: MW-3S/D, MW-4D, MW-101S, MW-101D, and MW-102S. In addition, well MW-101D was out of compliance with the VGES for cis-1,2-DCE during both April and October 2006.

To compare the 2006 results to historical results, total VOC concentrations, calculated as the sum of PCE, TCE and 1,2-DCE, were plotted against time (see graphs in Appendix C). As these graphs show, long-term concentration trends are generally decreasing or stable with time for wells MW-3S, MW-4S, MW-4D, MW-101S, MW-101D, and MW-102D. While PCE

concentrations in wells MW-3D and MW-102S have been increasing since 2005, the overall trends appear to be stable with time. The wells that are not shown in the graphs in Appendix C are generally steadily non-detect with time.

Regarding the distribution of VOC contamination, the plume continues to extend in a general northeast/southwest orientation between wells MW-3S/D and MW-102S/D. The approximate limits of the plume during 2006 are shown in the Total Reported VOCs in Groundwater maps in Appendix A. The downgradient extent of the plume increased slightly between April and October 2006, primarily due to the increase in VOCs in wells MW-101D and MW-102S.

In regard to the estimated presence of cis-1,2-DCE in the bedrock monitoring wells BRW-1, BRW-2, and BRW-3, it is WEM's opinion that these results are likely attributed to field contamination or a laboratory false positive and not an indication of contaminant migration from the source area. The pump used to collect these samples is rented by WEM, and the tubing used to connect to the pump is dedicated to each well. While the pump is decontaminated by WEM with Alconox and deionized water prior to use and after use in each well, it is possible that trace levels of cis-1,2-DCE remained on/in the pump. However, WEM is not ruling out the possibility that the laboratory reported false positives given that the reported concentrations are very low (0.24 – 0.34 ug/L).

2.3.3 QA/QC Samples

As part of the quality assurance/quality control (QA/QC) program, WEM collected field duplicate samples during the April and October 2006 sampling events; during both events, sample "MW-Z" was collected in conjunction with MW-101D. Duplicate samples were analyzed by STL using the same method (EPA Method 8260B). In both cases precision in these field duplicate samples was acceptable (less than 30% RPD) for all target analytes greater than 2 times the quantitation limit.

During each day of sampling for the April and October sampling events, one field blank was prepared and one pre-containerized trip blank was added to the cooler and submitted for analysis by EPA Method 8260B. No target compounds were reported in any field blank or trip blank sample during the April 2006 event. During the October 2006 event, the compound PCE was reported in trip blank TB-3 (0.27 ug/L) and in field blank FB-3 (0.41 ug/L). These blanks were collected by WEM on October 4, 2006 at a different site (Williamstown) after sampling at Bressett was complete. While the presence of PCE was well below the action limits in both cases, this unfortunate event did result in the qualification of one result at the Bressett site (see following section).

2.4 Discussion of Data Validation

The laboratory data from the April and October 2006 sampling events were validated by Phoenix Chemistry Services, an independent data validator. The validation was performed in accordance with Tier III guidelines as described by the USEPA Region I. Details are presented in the Data Validation Reports [6, 10] on file at the VT DEC offices in Waterbury. The text of the data validation report for the October 2006 sampling event is included in Appendix E.

Results for the target VOCs were determined to be valid as reported for all groundwater samples collected from the Site on April 27-28, 2006 (sample delivery group (SDG) No. BRES32 and BRES33) and on October 3-6, 2006 (SDG No. BRES36) with the following exceptions:

- On the basis of field contamination, results for tetrachloroethene in sample MW-4S was qualified as less than the reported value (U).

- On the basis of recoveries below the laboratory and Region 1 acceptance criteria in the associated MS or MSD analyses, the result for tetrachloroethene in MW-4S was qualified as estimated (J).

- April and October 2006 results for tetrachloroethene initially outside the calibration range in the original analyses of samples MW-102S, MW-101D, MW-3S, MW-3D, MW-Z, were rejected (R) and replaced with the acceptable concentrations from the corresponding diluted samples.

- April and October 2006 results for cis-1,2-dichloroethene initially outside the calibration range in the original analyses of samples MW-101D and MW-Z were rejected (R) and replaced with the acceptable concentrations from the corresponding diluted samples.

There were qualifications made for some non-target VOCs (chloromethane and acetone) from some of the monitoring wells sampled during 2006, but none that applied to the target VOC analytes. No other issues that directly affect that validity of data were discovered by the data validator.

Documentation errors for these sample groups included incomplete internal chain of custody forms, improper pH documentation, mis-identified internal standards (April 2006) and missing internal chain of custody forms (October 2006). In addition, the initial submission for BRES36 contained several serious flaws, which included use of an incorrect compound list, poor or no documentation of manual integrations, and apparent contamination of blanks and samples with chloroethane. At the request of the validator, a full revision of this SDGs was submitted by the laboratory, and used for the validation. While these issues do not directly affect the validity of the data, they could be problematic if the result were to be used in a litigation situation.

As mentioned in Section 2.3.2, WEM would also like to point out that the results for cis-1,2-DCE in wells BRW-1, BRW-2, and BRW-3 should be questioned, as they are likely related to

either pump contamination or a laboratory false positive, and NOT an indication of contaminant migration from the source area.

2.5 Recommendations

Based on the above information, overburden groundwater at the Site continues to show evidence of chlorinated VOCs at concentrations that exceed applicable enforcement standards. Given these conditions, WEM recommends continuing the groundwater monitoring program as specified in the Work Plan and FLCM-Water. The next sampling event is scheduled for April 2007.

3.0 WATER SUPPLY SAMPLING

Water supply sampling was conducted by WEM from the water system at the Jeannie Taylor residence (former Bressett residence) and from the active bedrock well at the former Shields residence on April 4, 2006 and on October 4, 2006. In addition, WEM re-sampled the water system Taylor residence on May 18, 2006. Sampling from the Sheilds Well was conducted in accordance with WEM's Work Plan and with the FLCM-Water. Sampling from the Bressett Spring was conducted in a different manner than previous sampling events; at the request of the VT DEC, this spring was sampled via the kitchen tap instead of directly from the spring tile in order to better assess the drinking water quality at the point of entry into the house. Expanded sampling in May 2006 followed due to the April 2006 results. Details and results of the water supply sampling event are described below.

3.1 Water Supply Sample Collection

The Bressett Spring is the primary water supply for the former Bressett residence, occupied for most of 2006 by Jeannie Taylor. The cement spring tile is located on the hill northeast of the house and extends above the ground surface covered by a cement top. A buried water line (assumed polyethylene) connects the spring to an approximately 300-gallon plastic holding tank in the basement of the residence. The holding tank is connected to a float activated jet pump, which pumps water to a 30-gallon pressure tank, and then is distributed throughout the house.

- In April 2006, WEM collected the sample from the kitchen sink tap (labeled "Bressett Spring") after purging of approximately 30 gallons. The aerator on the tap was removed prior to sampling.
- In May 2006, WEM collected samples from the spring tile, the kitchen sink tap, and from the inflow of the holding tank. No purging of the water system had been conducted prior to sampling. The spring tile sample was collected with a dedicated bailer. The static depth to water was 7.2 ft below the rim of the tile. The kitchen tap sample was collected after removal of the aerator. The holding tank inflow was collected from an in-line sampling tap immediately upstream of the holding tank.
- In October 2006, WEM collected a sample from the kitchen sink tap (labeled "Bressett Tap") after removal of the aerator and purging of approximately 30 gallons of cold water.

The Shields well is accessed via the hand-activated pump on the well head. During both April and October 2006 the well was purged of approximately 50 gallons prior to sampling. The sample was colleted directly from the hand pump discharge nozzle.

All samples were delivered by WEM to STL. Water supply samples were submitted for analysis of volatile organic compounds via EPA Method 524.2. Results for PCE, TCE, cis-1,2-DCE and trans-1,2-DCE are discussed below.

3.2 Discussion of Results

Validated laboratory analytical results are summarized in Table 3.0 in Appendix B. Full copies of the laboratory reports are presented in Data Validation Reports prepared by Phoenix Chemistry Service [6, 7, 10].

The analytical results indicate the following:

- The target compound PCE was reported at a concentration of 2.8 ug/L in the Bressett kitchen tap sample in April 2006. No other target VOCs were reported above quantitation limits.
- No target VOCs were reported above quantitation limits in the Bressett spring tile sample in May 2006.
- The target compound PCE was reported at a concentration of 2.0 ug/L in the Bressett kitchen tap sample in May 2006. No other target VOCs were reported above quantitation limits.
- The target compound PCE was reported at a concentration of 2.1 ug/L in the Bressett holding tank inflow sample in May 2006. No other target VOCs were reported above quantitation limits.
- The target compound PCE was reported at a concentration of 2.7 ug/L in the Bressett kitchen tap sample in October 2006. No other target VOCs were reported above quantitation limits.

- No target VOCs were reported above quantitation limits in the Shields Well during either April or October 2006.

The presence of PCE in the former Bressett water system at the house but NOT at the water source suggests that PCE is entering the system via the piping between the spring and the house. Because the PCE concentration at the kitchen tap is in excess of the target standard of 0.7 ug/L (Vermont Action Level) during all three events, WEM recommends that a water treatment system be installed and maintained.

3.2.1 QA/QC Samples

As part of the QA/QC program, WEM collected field duplicate samples during each sample event. In April 2006, “Well-Z” was collected in conjunction with the Shields Well. In May 2006, “Tap X” was collected in conjunction with the Bressett kitchen tap sample. In October 2006, “Well Z” was collected in conjunction with the Bressett kitchen tap sample. Each sample was analyzed by STL using the same method (EPA Method 524.2). No target compounds were detected in the April 2006 field duplicate pair, so precision could not be evaluated. Precision in the May and October 2006 field duplicate pairs was acceptable (less than 30% RPD) for all target analytes greater than 2 time the quantitation limit.

WEM also prepared field blanks and added pre-made trip blanks to the cooler during each day of water supply sampling in April, May, and October 2006. All samples were submitted to STL for analysis by EPA Method 524.2. No target compounds were reported in any of these samples, indicating that there was no effect of spurious influences on sample quality during the 2006 sampling events.

3.3 Discussion of Data Validation

The laboratory data from the April, May and October 2006 sampling events were validated by Phoenix Chemistry Services, an independent data validator. The validation was performed in accordance with Tier III guidelines as described by the USEPA Region I. Details are presented in the Data Validation Reports [6, 7, 10] on file at the VT DEC offices in Waterbury. The text of the data validation report for the October 2006 sampling event is provided in Appendix E.

Results for the target VOCs were determined to be valid as reported for all supply well samples collected from the Site on April 4, 2006 (sample delivery group SDG No. BRES31), May 18, 2006 (SDG No. BRES34) and on October 4, 2006 (SDG No. UNIF27). There were some documentation errors (refer to Section 2.4), but nothing that affected the validity of the water supply analytical data.

3.4 Recommendations

Due to presence of PCE in at the point of entry of the former Bressett residence and the continuing presence of chlorinated VOCs in the overburden aquifer as described in Section 2.0, WEM recommends continuing the supply well monitoring program as was conducted during October 2006, with the next sampling event scheduled for April 2007. Kitchen tap samples should continue to be collected from the former Bressett residence, and the Shields Well should be collected from the well head as is typical. Note that the kitchen tap sampling routine at the former Bressett residence replaces the spring tile sampling program that is described in the Work Plan and FLCM-Water.

WEM also recommends mitigation measures be pursued for the target contaminants detected in the water supply system. An activated charcoal water treatment unit should be installed downstream of the holding tank to provide clean water for the household.

4.0 SURFACE WATER SAMPLING

Surface water sampling was conducted by WEM on July 27, 2006. Sampling was conducted in accordance with WEM's Work Plan and the FLCM-Water. As dictated by the Work Plan, there had been at least 36 hours without precipitation prior to the collection of surface water samples (weather tracking data from Knapp State Airport in Barre, Vermont).

4.1 Surface Water Sample Collection

WEM collected two (2) surface water samples on July 27, 2006. Regular sampling locations, labeled as SW-1 and SW-2 in the Site Map in Appendix A, are along the Howard Hill Brook, and an unnamed tributary of the Ayers Brook. The unnamed tributary of the Ayers Brook (SW-1) was flowing at an approximate flow rate of 0.1 cubic feet/second (45 gallons per minute). This sample was collected by dipping the sample container directly into the pool of water. The Howard Hill Brook sample (SW-2) was also collected by dipping the container into the stream at the middle of the channel. The Brook was flowing at an approximate rate of 1.6 cfs (700 gpm). The beaver dam that was noted at the junction of the Howard Hill Brook and the Ayers Brook during July 2005 was no longer present.

All samples were delivered by WEM to STL for analysis of volatile organic compounds via EPA Method 8260B on the day of sampling. Results for PCE, TCE, cis-1,2-DCE and trans-1,2-DCE are discussed below.

4.2 Discussion of Results

Surface water sampling results from July 2006 are summarized in Table 4.0 in Appendix B. These results have been validated by an independent validator (see Section 4.3). Full copies of the laboratory report are presented in the data validation report [8].

The laboratory results indicate that VOCs were <u>not</u> reported above quantitation limits in either sample collected during the July 2006 sampling event. Based on results dating back to 2001 (see Table 4.0), target VOCs are not regularly detected at these two sampling locations.

4.2.1 QA/QC Samples

As part of the QA/QC program, WEM collected one (1) field duplicate sample (SW-X) on July 27, 2006. This sample was collected in conjunction with the sample SW-2 and analyzed by STL using the same method (EPA Method 8260B). No target compounds were detected in sample SW-2 or SW-X, so precision could not be evaluated in this field duplicate pair.

WEM also one (1) trip blank (TB-1) and one (1) field blank (FB-1) on July 27, 2006. No target compounds were reported in either sample, indicating that the effect of spurious influences on sample quality was non-existent during the July 2006 sampling event.

4.3 Discussion of Data Validation

The laboratory data were validated by Phoenix Chemistry Services, an independent data validator. The validation was performed in accordance with Tier III guidelines as described by the USEPA Region I. Details are presented in the report [8] on file at the VT DEC offices in Waterbury.

Results for the target VOCs were determined to be valid as reported for all surface water samples collected on July 27, 2006 (SDG No. BRES35). There were qualifications made for non-target VOCs (bromomethane and chloroethane) in this sample delivery group, and a documentation error, but no issues that directly affect that validity of data from the July 2006 sampling event.

4.4 Recommendations

Due to the continuing presence of chlorinated VOCs in the overburden aquifer as described in Section 2.0, WEM recommends continuing the surface water monitoring program as specified in the Work Plan and FLCM-Water. The next sampling event is scheduled for July 2007.

5.0 INDOOR AIR SAMPLING

Indoor air sampling was conducted at the Jeannie Taylor residence (former Bressett residence) by WEM on February 8 and July 27, 2006. Sampling was conducted in accordance with WEM's Work Plan and with the *Field/Lab Coordination Memorandum for Air Monitoring* ("FLCM-Air") developed by Phoenix Chemistry Services dated April 2, 2004. Details and results of the air sampling event are described below.

5.1 Air Sample Collection

A total of two (2) air samples were collected from the Taylor residence on February 8 and July 27, 2006. The 1st floor sample ("BRST1FLR") was collected from the bedroom/craft room off the kitchen on the east side of the house, and the basement ("BRSTBSMT") sample was collected from the northeastern portion of the basement, halfway between the stair and the north wall. No significant problems were encountered during the sampling event, and all sampling procedures were in accordance with the *Work Plan*. During both events, the house was being occupied by Ms. Jeannie Taylor.

Samples were collected by WEM using 6-liter stainless steel Silco air canisters. The canisters were procured by WEM from STL on the day prior to sampling. With each canister, a flow regulator was utilized that had a pressure gauge. The flow regulators were all calibrated by STL to provide a flow rate that allowed each canister will to have a final pressure between -7.0 psi and -0.5 psi below ambient pressure after a run time of approximately 4 hours.

The sampling procedure at each site involved setting up the canister at the designated sampling location, attaching the flow regulator with pressure gauge, recording initial canister pressure, recording ambient pressure and temperature, and then opening the valve to initiate the sample collection. Ambient pressure values were obtained in the morning and afternoon from the Knapp State Airport, and ambient temperature was recorded using a digital thermometer. Samples were allowed to run for approximately 4 hours.

The samples were delivered by WEM to STL for analysis of the four target volatile organic compounds: tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and trans-1,2-dichloroethene (trans-1,2-DCE). Analysis was by Method TO-14A/TO-15. Results, in parts per billion (ppbv), are discussed below. The reporting limit (practical quantitation limit) used by STL for these samples is 0.2 ppbv.

5.2 Discussion of Results

Air sampling results from February and July 2006 summarized in Table 5.0 in Appendix B. These results have been validated by an independent validator (see Section 5.3). Full copies of the laboratory report are presented in the data validation reports [9, 11]

The results indicate that one or more of the target compounds were reported in both of the indoor air samples collected in February and July 2006:

PCE

- PCE was reported above quantitation limits in BRST1FLR and BRSTBSMT during both February and July 2006;
- The PCE concentration increased between February and July at both BRST1FLR (from 4.4 to 6.3 ppbv) and at BRSTBSMT (from 9.7 to 22 ppbv). The July 2006 PCE concentrations are the highest recorded to date.

TCE

- TCE was reported above quantitation limits in BRST1FLR and BRSTBSMT during both February and July 2006;
- The TCE concentration increased between February and July at both BRST1FLR (from 0.53 to 0.58 ppbv) and at BRSTBSMT (from 1.2 to 1.6 ppbv). The July 2006 TCE concentrations are the highest recorded to date.

cis-1,2-DCE

- cis-1,2-DCE was reported above quantitation limits in BRSTBSMT during both February and July 2006;
- cis-1,2-DCE was reported above quantitation limits in BRST1FLR during February 2006, and at an estimated concentration below the quantitation limit during July 2006.

trans-1,2-DCE

- trans-1,2-DCE was not reported above quantitation limits in BRST1FLR or BRSTBSMT during either February or July 2006.

The Vermont Department of Health (DOH) has developed indoor air guidance levels of 1.0 ppbv for PCE and TCE (based on statewide study titled *Indoor Ambient Air Survey Results, Yearly Sampling Between 12/21/91 and 12/20/92*). The PCE concentrations detected on the 1st floor and the basement during both February and July 2006 are all above the DOH guidance level. In addition, the TCE concentration detected in the basement during July 2006 is above the DOH guidance level. The cis-1,2-DCE concentrations are below applicable guidelines.

Based on historical results dating back to 1997 (see Table 5.0 in Appendix B), the presence of target compounds inside the house, particularly PCE, is not unusual. This compound has been detected during all of the prior sampling events. As the graphs in Appendix C indicate, contaminant concentrations were generally steady or decreasing during 1997-2002. Since the sampling program resumed in 2006, there appears to be an increasing trend, particularly in the basement. The July 2006 PCE concentration in the basement is the highest recorded to date. As is typical, the basement concentrations are higher than the 1st floor concentrations, suggesting that the source of the contaminants is migration into the basement from the ground under/surrounding the house. The house has a stone foundation and the basement has a dirt floor.

5.2.1 QA/QC Samples

As part of the quality assurance/quality control (QA/QC) program, WEM collected one (1) field duplicate sample (FD-1) during each sampling event. These samples were collected in conjunction with the sample from the basement sample (BRSTBSMT) and analyzed by STL using the same method. During both events, the target compounds detected in the field duplicate pairs all showed acceptable precision range.

WEM also submitted one trip blank (TB-1) during each event. No target compounds were reported in the trip blanks, indicating that there were no spurious influences on sample quality during either the February or July 2006 sampling events.

5.3 Discussion of Data Validation

The laboratory data were validated by Phoenix Chemistry Services, an independent data validator. The validation was performed in accordance with Tier III guidelines as described by the USEPA Region I. Details are presented in the reports [9, 11] on file at the VT DEC offices in Waterbury.

Results for the target VOCs were determined to be valid as reported for the indoor air samples collected on February 8 (SDG No. 112497) and July 27, 2006 (SDG No. 115542) with the following exception:

- July 27, 2006 results for PCE in the BRSTBSMT, BRST1FLR, FD-1 and TB-1 were qualified as estimated due to the fact that the % difference (%D) values in the continuing calibration (CC) standard were greater than the EPA Region I limit.

While there were also some laboratory documentation issues noted in both validation reports, some of which required the lab to issue a data package addendum for the July results, these issues did not directly affect the validity of the analytical data.

5.4 Recommendations

Given the presence of VOCs in the overburden groundwater and historical indoor air sampling results and the fact that the house will continue to be occupied, WEM recommends that air sampling continue as specified in the Work Plan and FLCM-Air. The 2007 sampling schedule will be January and July. WEM also recommends that mitigation measures be pursued for the target contaminants detected in the indoor air. A basement air control system, similar to those installed at several residences in Williamstown, should be installed to minimize the entry of soil vapor into the building.

6.0 REFERENCES

1. Waite Environmental Management, LLC, *Work Plan for Environmental Monitoring at the UniFirst Plant Site, Williamstown, Vermont, Wheatley Farm Site, Brookfield, Vermont, Bressett Site, Randolph, Vermont*, February 6, 2004.

2. Phoenix Chemistry Services, *Field/Lab Coordination Memorandum for Water Monitoring, UniFirst Plant Site, Williamstown, Vermont, Wheatley Farm Site, Brookfield, Vermont, Bressett Site, Randolph, Vermont*, April 2, 2004.

3. Waite Environmental Management, LLC, *1st Quarter 2006 Monitoring Report, Bressett Site, Randolph, Vermont*, April 6, 2006.

4. Waite Environmental Management, LLC, *2nd Quarter 2006 Monitoring Report, Bressett Site, Randolph, Vermont*, July 20, 2006.

5. Waite Environmental Management, LLC, *3rd Quarter 2006 Monitoring Report, Bressett Site, Randolph, Vermont*, November 11, 2006.

6. Phoenix Chemistry Services, *Data Validation for the UniFirst Project, UniFirst and Bressett Sites, Williamstown and Randolph, VT, Organic Analyses Data, Volatile Organics in Water Samples, Sample Delivery Group Nos.BRES31, BRES32, UNIF25 and UNIF26*, June 30, 2006.

7. Phoenix Chemistry Services, *Data Validation for the UniFirst Project, Bressett Site, Randolph, VT (Sample Delivery Group No. BRES34)*, July 20, 2006.

8. Phoenix Chemistry Services, *Data Validation for the UniFirst Project, Bressett Site, Randolph, VT (Sample Delivery Group No. BRES35)*, October 11, 2006.

9. Phoenix Chemistry Services, *Data Validation for the UniFirst Project, Williamstown and Bressett Sites, Williamstown and Randolph, VT (Sample Delivery Group Nos. 115476 and 115542)*, October 10, 2006.

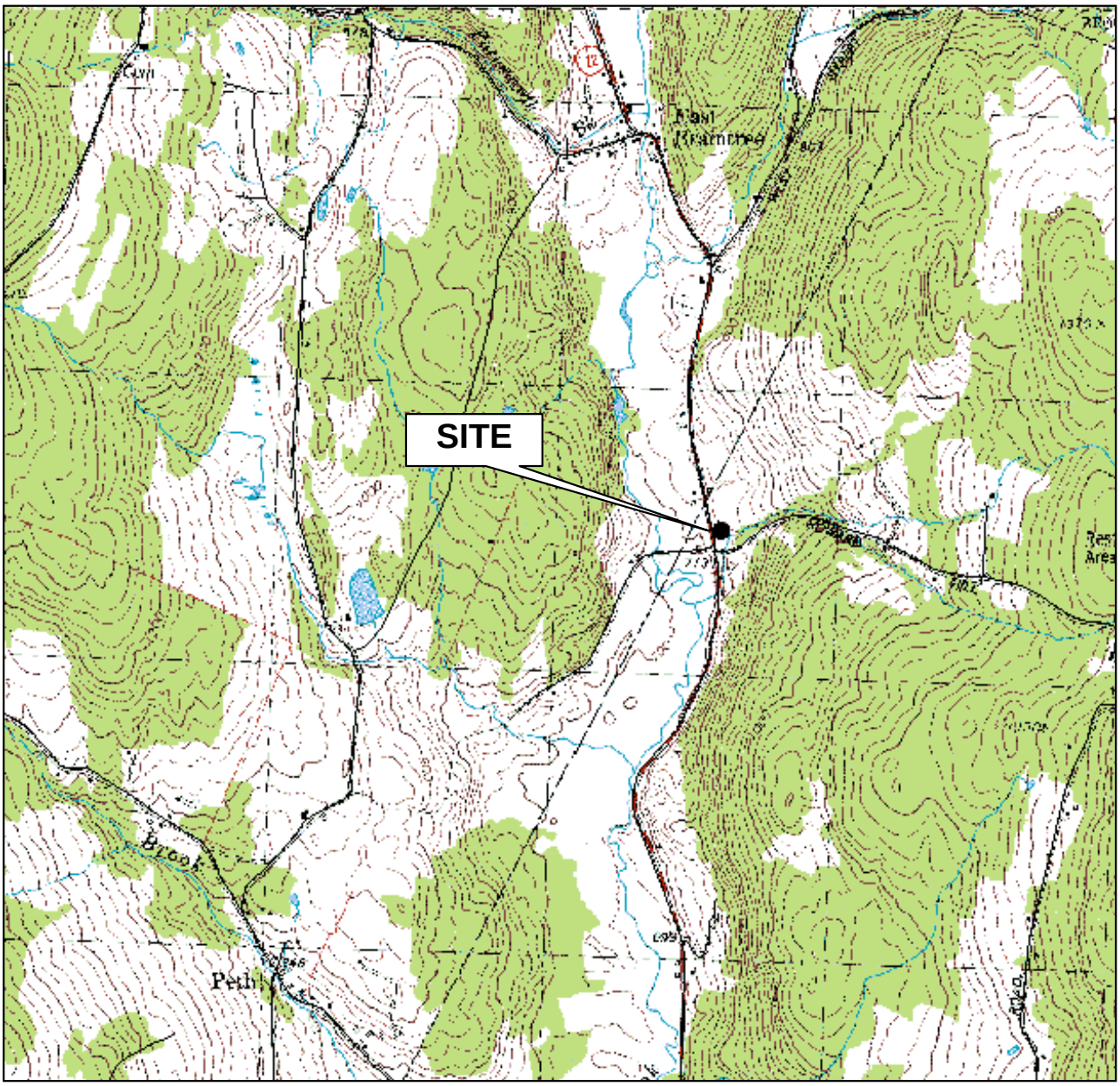
10. Phoenix Chemistry Services, *Data Validation for the UniFirst Project, Bressett, Wheatley, and UniFirst Sites, Randolph, Brookfield, and Williamstown, VT, Organic Analyses Data, Volatile Organics in Water Samples, Sample Delivery Group Sample Delivery Group Nos. BRES36, UNIF27 , and WHEA12*, December 26, 2006.

11. Phoenix Chemistry Services, *Data Validation for the UniFirst Project, Williamstown and Bressett Sites, Williamstown and Randolph, VT (Sample Delivery Group No. 112497)*, March 31, 2006.

12. State of Vermont, Agency of Natural Resources, Department of Environmental Conservation, *Chapter 12, Groundwater Protection Rule and Strategy*, January 20, 2000.

APPENDIX A:

FIGURES



N

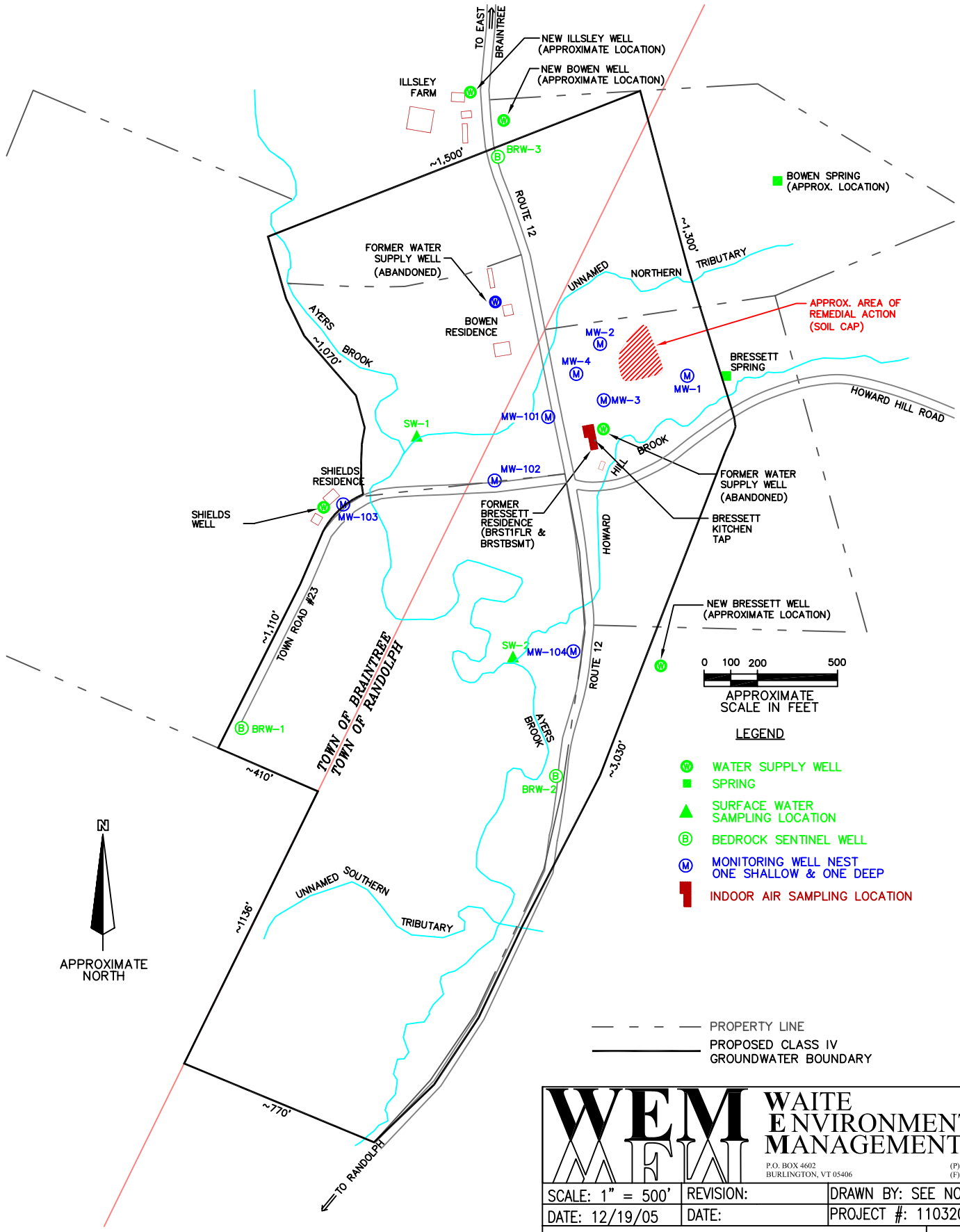
Map Source: *USGS Mapping 7.5 Minute Quadrangle: Randolph (1981)*

Waite Environmental Management, LLC

SITE LOCATION MAP

Bressett Site
Randolph, Vermont

Date: 01/04/05	Drawing No. 1	Scale: 1:24,000	By: MEW



NOTES:
1. MAP SOURCE IS "PLATE 1: SITE MAP, BRESSETT SITE, RANDOLPH, VERMONT" PREPARED BY THE JOHNSON COMPANY, INC. MAP DRAWN ON 4/25/00 BY TJK, MOST RECENTLY REVISED BY TJK ON 8/16/04. MAP TEXT WAS REVISED BY MEW OF WAITE ENVIRONMENTAL MGT ON 12/19/05.

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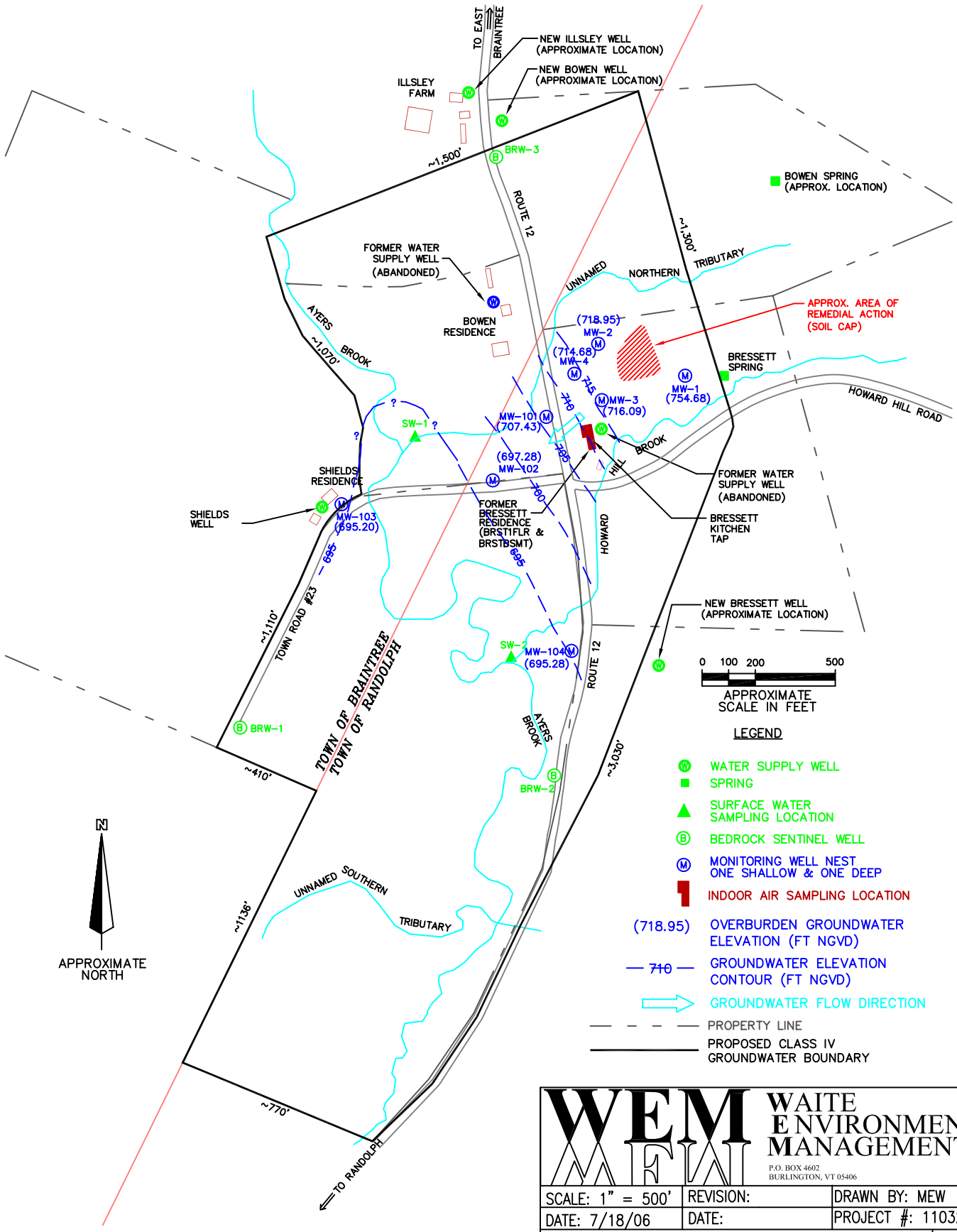
SCALE: 1" = 500'	REVISION:	DRAWN BY: SEE NOTE
DATE: 12/19/05	DATE:	PROJECT #: 110320012

SITE PLAN

BRESSETT SITE
RANDOLPH, VERMONT



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2. GROUNDWATER ELEVATIONS ARE FROM THE SHALLOW PAIRED WELL.
3. ELEVATIONS MEASURED BY WEM ON APRIL 25-27, 2006.

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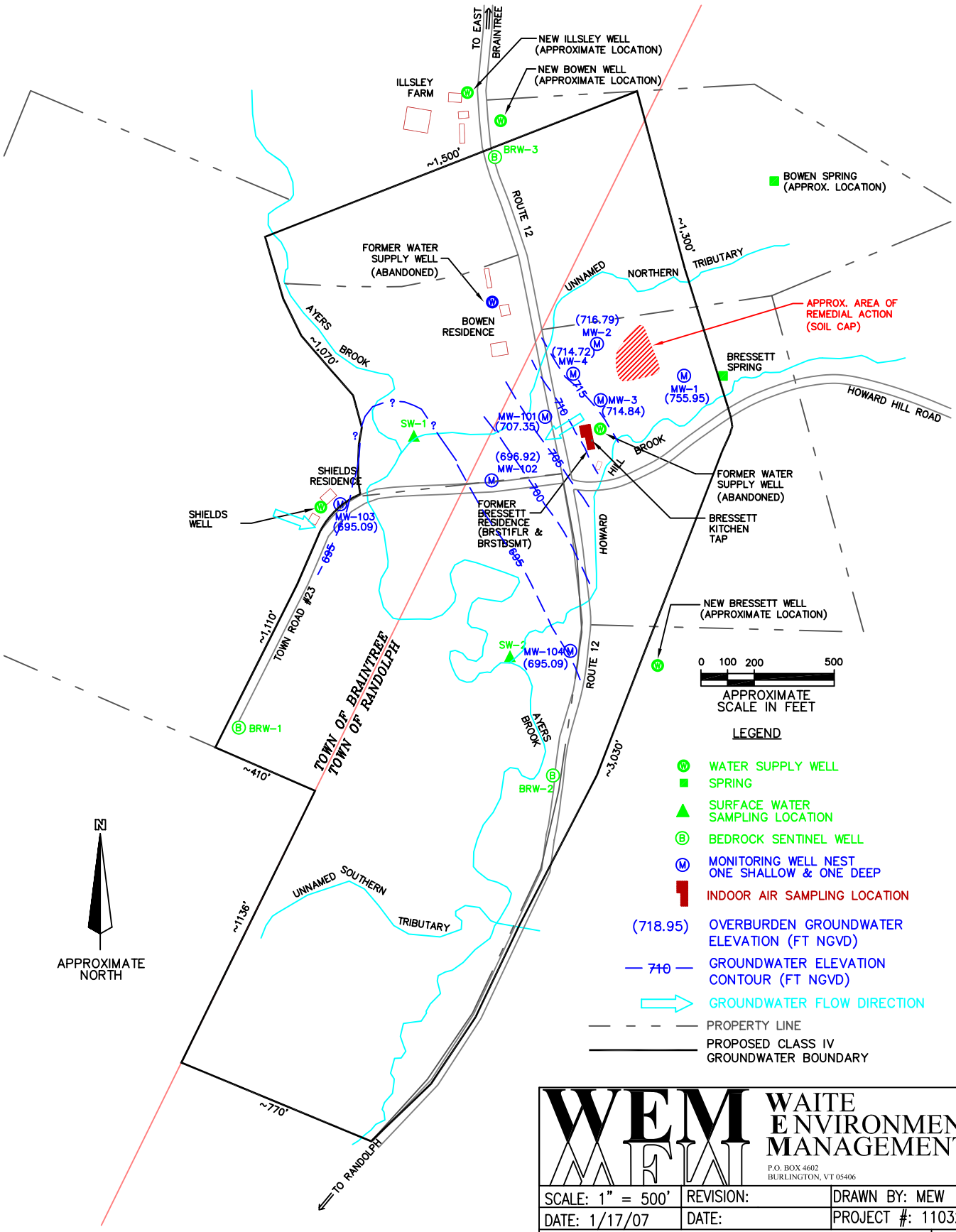
DATE: 7/18/06	DATE:	PROJECT #: 110320012

GROUNDWATER ELEVATION CONTOUR MAP
APRIL 2006
BRESSETT SITE
RANDOLPH, VERMONT



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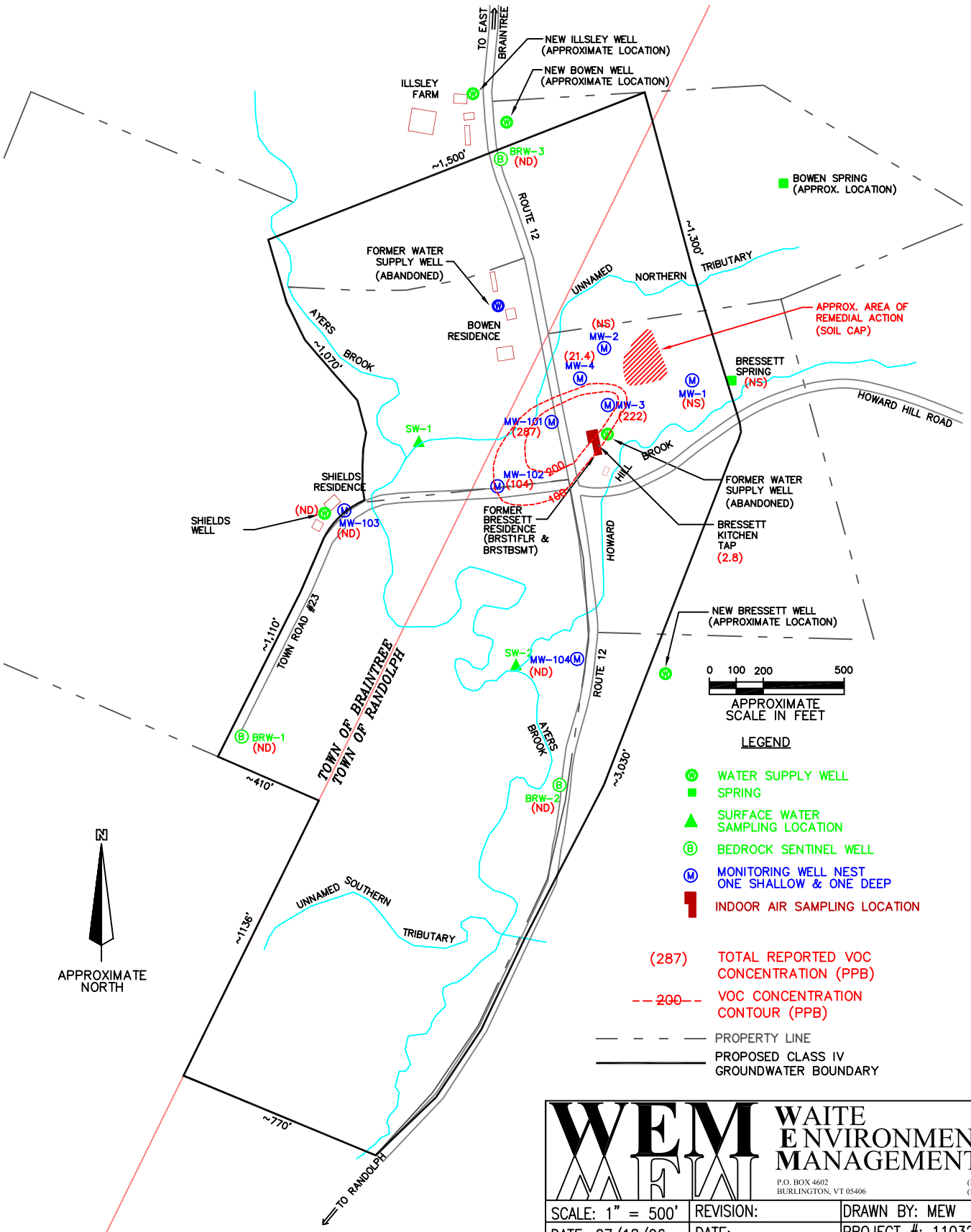
DATE: 1/17/07	DATE:	PROJECT #: 110320012

GROUNDWATER ELEVATION CONTOUR MAP
OCTOBER 2006
BRESSETT SITE
RANDOLPH, VERMONT



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2. TOTAL REPORTED VOC CONCENTRATION IS CALCULATED AS THE SUM OF PCE, TCE, AND 1,2-DCE CONCENTRATIONS. FOR THE PAIRED WELLS, THE MAXIMUM CONCENTRATION IS USED.
3. ND = VOCs NOT DETECTED BY EITHER EPA METHOD 8260B OR 524.2; NS = NOT SAMPLED

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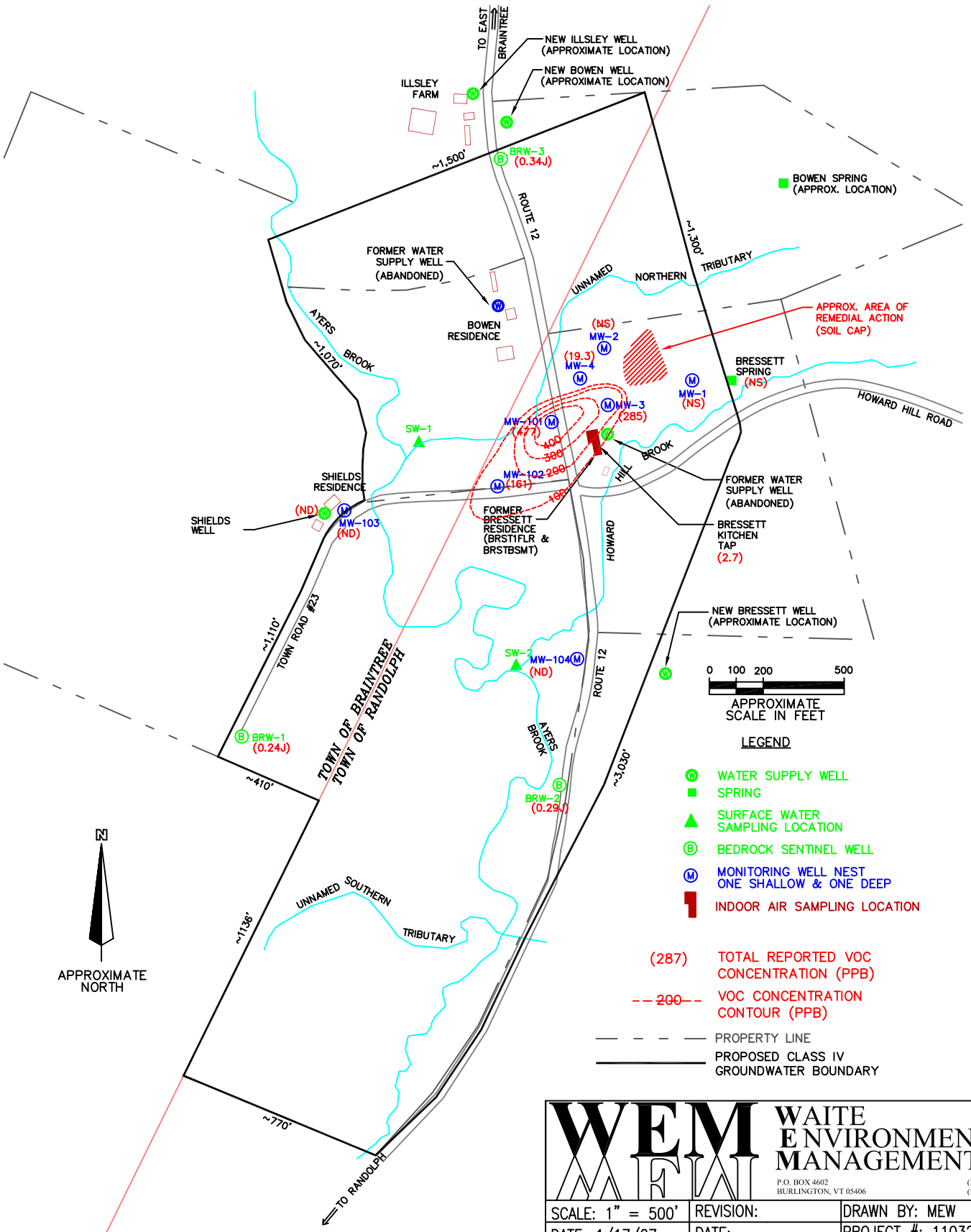
DATE: 07/18/06	DATE:	PROJECT #: 110320012

VOC CONCENTRATION CONTOUR MAP
APRIL 2006
BRESSETT SITE
RANDOLPH, VERMONT



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SCALE: 1" = 500'	REVISION:	DRAWN BY: MEW
DATE: 1/17/07	DATE:	PROJECT #: 110320012

VOC CONCENTRATION CONTOUR MAP
OCTOBER 2006
BRESSETT SITE
RANDOLPH, VERMONT

APPENDIX B:

TABLES

WEM

TABLE 1.1
Groundwater Elevation Measurements: 2005- 2006
Bressett Site, Randolph, Vermont

Location	Type	Units	Screen Center Elevation	Apr-05	Oct-05	Apr-06	Oct-06	Oct-05 Vertical Hydraulic Gradient (ft/ft)	Oct-06 Vertical Hydraulic Gradient (ft/ft)
MW-101D	Monitoring Well	FT	690.52	707.40	705.95	706.30	706.02	-0.11	-0.13
MW-101S	Monitoring Well	FT	701.03	708.73	707.13	707.43	707.35		
MW-102D	Monitoring Well	FT	674.76	698.29	697.11	697.48	697.01	0.00	0.01
MW-102S	Monitoring Well	FT	689.46	698.26	697.07	697.28	696.92		
MW-103D	Monitoring Well	FT	685.48	701.17	698.21	699.70	696.43	0.12	0.11
MW-103S	Monitoring Well	FT	697.39	700.84	696.75	698.22	695.09		
MW-104D	Monitoring Well	FT	676.26	697.07	696.07	695.20	695.24	0.06	0.01
MW-104S	Monitoring Well	FT	690.98	697.13	695.23	695.28	695.09		
MW-1	Monitoring Well	FT	755.60	757.58	755.91	754.68	755.95	NA	NA
MW-2D	Monitoring Well	FT	683.40	NA	NA	NA	NA	NA	NA
MW-2S	Monitoring Well	FT	714.50	719.42	716.78	718.95	716.79		
MW-3D	Monitoring Well	FT	664.55	719.73	715.80	715.95	715.54	0.03	0.01
MW-3S	Monitoring Well	FT	714.09	716.61	714.10	716.09	714.84		
MW-4D	Monitoring Well	FT	689.82	715.35	713.01	712.81	713.32	0.01	-0.06
MW-4S	Monitoring Well	FT	711.44	715.20	712.82	714.68	714.72		
BRW-1	Monitoring Well	FT	659.30	708.15	704.10	705.75	703.37	NA	NA
BRW-2	Monitoring Well	FT	639.40	696.49	696.49	697.37	698.19	NA	NA
BRW-3	Monitoring Well	FT	678.00	724.82	720.45	723.95	722.41	NA	NA

Notes:
-All elevations in feet above NGVD; "NGVD" = National Geodetic Vertical Datum (1988).
-"Dry" = well dry during monitoring event; "NA" = not applicable.
-Negative sign ("-") indicates downward vertical gradient. Positive numbers indicate upward vertical gradients.
-Screen center elevations are from Tighe & Bond reports: "2002 Monitoring Report Summary, Bressett Site" (March 12, 2003) and "2003 Monitoring Report Summary, Bressett Site" (March 12, 2004).
-Data starting in 2004 collected by Waite Environmental Management; refer to field data sheets for depth to water measurements.

WEM

TABLE 1.2
Dissolved Oxygen Field Measurements: 2002 - 2006
Bressett Site, Randolph, Vermont

Location	Type	Units	Apr-02	Oct-02	Apr-03	Oct-03	Apr-04	Oct-04	Apr-05	Oct-05	Apr-06	Oct-06
MW-101D	Monitoring Well	mg/L	0.00	NA	5.96	3.90	3.12	2.55	6.31	1.65	0.00	0.92
MW-101S	Monitoring Well	mg/L	0.00	0.64	4.26	0.00	0.39	0.28	5.32	0.00	0.00	0.10
MW-102D	Monitoring Well	mg/L	0.00	1.15	1.73	0.00	0.39	0.30	5.19	0.00	0.00	0.00
MW-102S	Monitoring Well	mg/L	2.94	8.87	7.48	8.86	4.68	5.21	6.74	4.33	0.13	4.16
MW-103D	Monitoring Well	mg/L	0.00	4.43	0.00	0.00	0.71	0.31	5.25	0.00	0.00	0.00
MW-103S	Monitoring Well	mg/L	6.56	DRY	6.79	DRY	5.26	DRY	9.08	DRY	0.98	DRY
MW-104D	Monitoring Well	mg/L	7.69	1.32	6.91	0.00	0.65	0.70	5.52	0.00	0.00	0.05
MW-104S	Monitoring Well	mg/L	3.52	5.17	3.61	1.50	7.60	2.78	8.57	2.20	2.79	1.91
MW-1	Monitoring Well	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2D	Monitoring Well	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2S	Monitoring Well	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3D	Monitoring Well	mg/L	7.47	6.02	13.26	2.61	13.38	3.65	8.99	11.64	9.12	12.90
MW-3S	Monitoring Well	mg/L	7.56	12.74	11.61	7.61	11.46	11.05	11.73	11.87	10.12	11.91
MW-4D	Monitoring Well	mg/L	9.68	14.10	11.34	8.76	13.39	10.68	9.44	11.15	9.82	9.65
MW-4S	Monitoring Well	mg/L	8.87	13.43	12.41	8.26	10.75	9.68	11.17	10.06	11.09	9.14
BRW-1	Monitoring Well	mg/L	1.55	4.16	1.68	3.44	7.82	4.52	10.32	4.56	2.41	2.06
BRW-2	Monitoring Well	mg/L	0.00	5.29	0.00	0.00	6.08	1.95	8.86	0.00	0.00	0.48
BRW-3	Monitoring Well	mg/L	8.06	7.80	8.26	6.51	10.36	7.40	10.41	7.30	7.23	10.41

Notes:
-"Dry" = well dry during monitoring event; "NA" = not applicable.
-Data from 2002-2003 collected by Tighe & Bond and reported in "2002 Monitoring Report Summary, Bressett Site" (March 12, 2003) and "2003 Monitoring Report Summary, Bressett Site" (March 12, 2004).
-Data starting in 2004 collected by Waite Environmental Management.

WEM

TABLE 1.3
Specific Conductance Field Measurements: 2002 - 2006
Bressett Site, Randolph, Vermont

Location	Type	Units	Apr-02	Oct-02	Apr-03	Oct-03	Apr-04	Oct-04	Apr-05	Oct-05	Apr-06	Oct-06
MW-101D	Monitoring Well	us/cm	851	NA	546	806	739	855	591	669	784	509
MW-101S	Monitoring Well	us/cm	618	440	386	652	529	469	221	273	334	197
MW-102D	Monitoring Well	us/cm	356	235	223	308	297	354	238	272	319	198
MW-102S	Monitoring Well	us/cm	504	354	312	445	380	489	277	367	385	247
MW-103D	Monitoring Well	us/cm	233	194	241	256	213	285	148	230	237	157
MW-103S	Monitoring Well	us/cm	192	DRY	201	DRY	161	DRY	137	DRY	260	DRY
MW-104D	Monitoring Well	us/cm	334	209	438	302	262	317	201	213	278	149
MW-104S	Monitoring Well	us/cm	396	296	522	371	238	394	327	337	248	210
MW-1	Monitoring Well	us/cm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2D	Monitoring Well	us/cm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2S	Monitoring Well	us/cm	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3D	Monitoring Well	us/cm	523	275	323	878	965	538	328	371	412	289
MW-3S	Monitoring Well	us/cm	780	472	372	981	512	639	361	519	534	374
MW-4D	Monitoring Well	us/cm	351	242	237	621	327	320	240	286	325	197
MW-4S	Monitoring Well	us/cm	201	202	163	528	186	236	144	189	121	74
BRW-1	Monitoring Well	us/cm	252	286	261	215	199	230	158	189	203	121
BRW-2	Monitoring Well	us/cm	356	278	348	320	298	377	255	299	312	193
BRW-3	Monitoring Well	us/cm	655	544	632	477	437	447	312	468	421	247

Notes:
- All conductivity meaurements in microsiemens per centimeter (us/cm).
-"Dry" = well dry during monitoring event; "NA" = not applicable.
-Data from 2002-2003 collected by Tighe & Bond and reported in "2002 Monitoring Report Summary, Bressett Site" (March 12, 2003) and "2003 Monitoring Report Summary, Bressett Site" (March 12, 2004).
-Data starting in 2004 collected by Waite Environmental Management.

WEM

TABLE 1.4
Temperature Field Measurements: 2002 - 2006
Bressett Site, Randolph, Vermont

Location	Type	Units	Apr-02	Oct-02	Apr-03	Oct-03	Apr-04	Oct-04	Apr-05	Oct-05	Apr-06	Oct-06
MW-101D	Monitoring Well	deg C	8.6	NA	9.0	10.4	9.1	10.2	8.8	11.1	8.8	11.5
MW-101S	Monitoring Well	deg C	6.3	12.9	6.5	12.8	7.5	13.2	6.1	14.6	6.9	14.4
MW-102D	Monitoring Well	deg C	7.9	8.5	9.0	8.7	10.0	8.7	8.4	10.0	9.9	10.7
MW-102S	Monitoring Well	deg C	6.0	10.1	6.8	9.9	7.9	10.1	7.2	11.5	8.6	11.5
MW-103D	Monitoring Well	deg C	7.6	9.1	8.0	9.1	9.9	10.0	7.7	11.2	8.4	10.1
MW-103S	Monitoring Well	deg C	7.5	DRY	8.3	DRY	7.0	DRY	5.0	DRY	7.7	DRY
MW-104D	Monitoring Well	deg C	6.9	10.0	10.6	10.7	7.4	10.4	7.7	12.1	7.9	11.4
MW-104S	Monitoring Well	deg C	6.3	12.6	10.6	11.1	5.4	12.1	6.7	14.1	7.3	13.6
MW-1	Monitoring Well	deg C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2D	Monitoring Well	deg C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2S	Monitoring Well	deg C	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3D	Monitoring Well	deg C	5.1	10.9	8.9	8.6	13.1	8.7	8.9	9.0	9.6	9.8
MW-3S	Monitoring Well	deg C	5.2	9.8	9.0	8.4	11.3	9.2	8.5	9.5	8.7	10.2
MW-4D	Monitoring Well	deg C	6.4	9.9	8.9	9.0	11.8	9.3	8.5	9.4	9.4	11.0
MW-4S	Monitoring Well	deg C	6.7	9.5	8.7	9.2	10.5	9.9	8.3	10.1	9.0	10.7
BRW-1	Monitoring Well	deg C	8.5	9.9	8.5	8.5	9.7	9.6	9.6	10.4	8.5	9.5
BRW-2	Monitoring Well	deg C	8.8	10.3	7.9	9.9	10.9	10.9	10.0	11.3	8.7	10.5
BRW-3	Monitoring Well	deg C	9.4	10.2	8.4	9.5	10.4	10.3	10.5	10.7	9.6	9.8

Notes:
- All temperature measurements in degrees Celsius (deg C).
-"Dry" = well dry during monitoring event; "NA" = not applicable.
-Data from 2002-2003 collected by Tighe & Bond and reported in "2002 Monitoring Report Summary, Bressett Site" (March 12, 2003) and "2003 Monitoring Report Summary, Bressett Site" (March 12, 2004).
-Data starting in 2004 collected by Waite Environmental Management.

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TABLE 1.5
pH Field Measurements: 2002 - 2006
Bressett Site, Randolph, Vermont

Location	Type	Units	Apr-02	Oct-02	Apr-03	Oct-03	Apr-04	Oct-04	Apr-05	Oct-05	Apr-06	Oct-06
MW-101D	Monitoring Well	unitless	7.11	NA	7.27	6.86	7.08	7.61	7.02	6.08	7.84	7.28
MW-101S	Monitoring Well	unitless	6.32	6.45	6.44	6.29	7.05	7.14	6.65	6.94	7.26	6.80
MW-102D	Monitoring Well	unitless	7.68	8.22	7.81	7.32	7.56	8.42	7.93	7.81	8.98	8.01
MW-102S	Monitoring Well	unitless	7.45	7.52	7.69	7.31	7.65	8.09	7.67	7.87	8.51	7.68
MW-103D	Monitoring Well	unitless	6.89	8.00	7.01	7.61	6.71	7.85	6.70	7.36	8.35	7.62
MW-103S	Monitoring Well	unitless	6.13	DRY	6.33	DRY	6.67	DRY	6.01	DRY	6.89	DRY
MW-104D	Monitoring Well	unitless	7.57	8.16	7.96	7.91	8.07	8.01	7.59	7.09	8.93	7.49
MW-104S	Monitoring Well	unitless	6.59	7.05	7.26	7.47	7.04	7.07	6.95	6.65	7.79	7.19
MW-1	Monitoring Well	unitless	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2D	Monitoring Well	unitless	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2S	Monitoring Well	unitless	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3D	Monitoring Well	unitless	7.46	7.68	7.68	7.40	7.40	7.95	7.50	7.59	8.47	6.09
MW-3S	Monitoring Well	unitless	7.25	7.42	7.45	7.28	7.25	7.65	7.31	5.41	8.21	7.55
MW-4D	Monitoring Well	unitless	7.00	7.75	7.89	7.60	7.63	8.31	7.45	5.02	8.32	7.82
MW-4S	Monitoring Well	unitless	7.84	7.75	6.80	7.41	7.47	8.46	7.50	6.70	8.62	7.96
BRW-1	Monitoring Well	unitless	7.49	7.71	7.45	8.21	7.91	8.36	7.36	7.58	8.52	7.79
BRW-2	Monitoring Well	unitless	7.24	7.17	7.31	8.12	7.75	8.14	6.98	7.43	7.98	7.61
BRW-3	Monitoring Well	unitless	7.00	6.96	6.74	7.91	7.59	7.97	6.76	8.19	7.81	7.86

Notes:
-"Dry" = well dry during monitoring event; "NA" = not applicable.
-Data from 2002-2003 collected by Tighe & Bond and reported in "2002 Monitoring Report Summary, Bressett Site" (March 12, 2003) and "2003 Monitoring Report Summary, Bressett Site" (March 12, 2004).
-Data starting in 2004 collected by Waite Environmental Management.

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TABLE 1.6
Turbidity Field Measurements: 2002 - 2006
Bressett Site, Randolph, Vermont

Location	Type	Units	Apr-02	Oct-02	Apr-03	Oct-03	Apr-04	Oct-04	Apr-05	Oct-05	Apr-06	Oct-06
MW-101D	Monitoring Well	NTU	0.93	NA	0.60	3.30	0.0	0.0	29.7	> 1000	124	15.1
MW-101S	Monitoring Well	NTU	0.40	2.2	0.95	1.60	0.0	0.0	53.8	72.5	625	627
MW-102D	Monitoring Well	NTU	0.50	2.9	1.70	0.75	7.2	13.7	56.2	28.7	44.9	22.6
MW-102S	Monitoring Well	NTU	0.06	2.5	0.62	0.50	6.9	15.7	37.4	4.9	15.0	16.7
MW-103D	Monitoring Well	NTU	4.76	6.2	4.10	5.60	20.7	10.3	15.8	230	112	13.1
MW-103S	Monitoring Well	NTU	36.7	DRY	3.40	DRY	262	DRY	34	DRY	> 1000	DRY
MW-104D	Monitoring Well	NTU	65	180	301	400	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000
MW-104S	Monitoring Well	NTU	2.31	2.8	1.61	0.06	6.0	0.0	4.4	73.8	0.0	8.1
MW-1	Monitoring Well	NTU	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2D	Monitoring Well	NTU	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2S	Monitoring Well	NTU	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3D	Monitoring Well	NTU	> 1000	> 1000	796	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000	> 1000
MW-3S	Monitoring Well	NTU	300	684	275	742	92.4	212	271	> 1000	594	283
MW-4D	Monitoring Well	NTU	36	67	169	265	427	425	464	115	575	131
MW-4S	Monitoring Well	NTU	290	336	240	197	163	162	162	32	82.7	81.5
BRW-1	Monitoring Well	NTU	0.84	1.0	0.95	1.80	10.2	46.0	1.1	9.8	0.0	3.5
BRW-2	Monitoring Well	NTU	45.3	16	36.1	116	87.2	273	67	109	612	39.5
BRW-3	Monitoring Well	NTU	4.00	3.7	4.80	2.60	0.0	52.8	12.9	6.7	35.9	9.8

Notes:
-All turbidity measurements in nephelometric turbidity units (NTU).
-"Dry" = well dry during monitoring event; "NA" = not applicable.
-Data from 2002-2003 collected by Tighe & Bond and reported in "2002 Monitoring Report Summary, Bressett Site" (March 12, 2003) and "2003 Monitoring Report Summary, Bressett Site" (March 12, 2004).
-Data starting in 2004 collected by Waite Environmental Management.

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TABLE 1.7
Redox Potential Field Measurements: 2002 - 2006
Bressett Site, Randolph, Vermont

Location	Type	Units	Apr-02	Oct-02	Apr-03	Oct-03	Apr-04	Oct-04	Apr-05	Oct-05	Apr-06	10/3/-6
MW-101D	Monitoring Well	mV	126	NA	132	210	126	105	146	85	24	69
MW-101S	Monitoring Well	mV	125	158	154	175	123	111	142	31	18	68
MW-102D	Monitoring Well	mV	-54	-153	-150	-167	82	-220	-86	-221	-199	-196
MW-102S	Monitoring Well	mV	66	130	88	162	78	79	84	-23	-3	57
MW-103D	Monitoring Well	mV	-24	-174	-31	-166	112	-218	-26	-217	-132	-215
MW-103S	Monitoring Well	mV	171	DRY	184	DRY	93	DRY	170	DRY	70	DRY
MW-104D	Monitoring Well	mV	75	-138	-61	-48	-172	-139	17	-122	-97	-113
MW-104S	Monitoring Well	mV	242	75	-76	130	180	89	133	64	52	19
MW-1	Monitoring Well	mV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2D	Monitoring Well	mV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-2S	Monitoring Well	mV	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-3D	Monitoring Well	mV	174	99	141	-31	139	196	158	150	20	192
MW-3S	Monitoring Well	mV	173	138	143	-10	160	167	167	162	57	103
MW-4D	Monitoring Well	mV	180	99	152	103	149	163	160	179	41	88
MW-4S	Monitoring Well	mV	159	59	190	110	171	105	151	200	43	78
BRW-1	Monitoring Well	mV	109	62	120	108	78	9	69	136	16	-53
BRW-2	Monitoring Well	mV	56	-122	63	-192	36	-156	-75	-170	-133	-160
BRW-3	Monitoring Well	mV	137	135	128	143	128	95	268	36	80	81

Notes:
-All redox potential measurements in millivolts (mV).
-"Dry" = well dry during monitoring event; "NA" = not applicable.
-Data from 2002-2003 collected by Tighe & Bond and reported in "2002 Monitoring Report Summary, Bressett Site" (March 12, 2003) and "2003 Monitoring Report Summary, Bressett Site" (March 12, 2004).
-Data starting in 2004 collected by Waite Environmental Management.

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TABLE 2.0
MONITORING WELL RESULTS: 2004-2006
Bressett Site, Randolph, Vermont

Location	Parameter Method 8260B	Groundwater Enforcement Standard	Units	Oct-04	Apr-05	Oct-05	Apr-06	Oct-06
MW-3S	**PCE**	**5.0**	ug/L	**130**	**86**	**150**	**90**	**150**
	TCE	**5.0**	ug/L	**48**	**19**	**37**	**23**	**36**
	cis-1,2-DCE	**70.0**	ug/L	**47**	**17**	**36**	**15**	**29**
	trans-1,2-DCE	**100.0**	ug/L	**1.2**	0.54 J	0.97 J	0.50 J	0.84 J
MW-3D	**PCE**	**5.0**	ug/L	**130**	**77**	**110**	**180**	**240**
	TCE	**5.0**	ug/L	**20**	**9.3**	**15**	**22**	**23**
	cis-1,2-DCE	**70.0**	ug/L	**16**	**6.5**	**13**	**20**	**21**
	trans-1,2-DCE	**100.0**	ug/L	0.51 J	0.28 J	0.42 J	0.58 J	0.61 J
MW-4S	**PCE**	**5.0**	ug/L	**2.6**	**2.2**	**2.2**	0.92 J	**1.3** UJ
	TCE	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MW-4D	**PCE**	**5.0**	ug/L	**15**	**22**	**21**	**19**	**17**
	TCE	**5.0**	ug/L	**2.5**	**3.3**	**2.8**	**2.0**	**2.0**
	cis-1,2-DCE	**70.0**	ug/L	**1.2**	**1.1**	0.74 J	0.38 J	0.29 J
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MW-101S	**PCE**	**5.0**	ug/L	**16**	**18**	**17 J**	**9.2**	**7.5**
	TCE	**5.0**	ug/L	**5.7**	**6.7**	**3.8**	**1.8**	**1.7**
	cis-1,2-DCE	**70.0**	ug/L	**6.7**	**7.9**	**5.7**	**1.6**	**1.2**
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MW-101D	**PCE**	**5.0**	ug/L	**170**	**190**	**180 J**	**180**	**310**
	TCE	**5.0**	ug/L	**40**	**46**	**46**	**36**	**45**
	cis-1,2-DCE	**70.0**	ug/L	**68**	**88**	**75**	**71**	**110**
	trans-1,2-DCE	**100.0**	ug/L	0.86 J	**1.6**	**1.1**	6.0 U	0.96 J
MW-102S	**PCE**	**5.0**	ug/L	**70**	**54**	**77 J**	**77**	**120**
	TCE	**5.0**	ug/L	**13**	**11**	**13**	**13**	**19**
	cis-1,2-DCE	**70.0**	ug/L	**14**	**11**	**13**	**14**	**21**
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	0.34 J	2.9 U	0.30 J	0.45 J
MW-102D	**PCE**	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	TCE	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MW-103S	**PCE**	**5.0**	ug/L	DRY	1.0 U	DRY	1.0 U	1.0 U
	TCE	**5.0**	ug/L	DRY	1.0 U	DRY	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	DRY	1.0 U	DRY	1.0 U	1.0 U
	trans-1,2-DCE	**100.0**	ug/L	DRY	1.0 U	DRY	1.0 U	1.0 U
MW-103D	**PCE**	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	TCE	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

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TABLE 2.0
MONITORING WELL RESULTS: 2004-2006
Bressett Site, Randolph, Vermont

Location	Parameter Method 8260B	Groundwater Enforcement Standard	Units	Oct-04	Apr-05	Oct-05	Apr-06	Oct-06
MW-104S	**PCE**	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	TCE	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
MW-104D	**PCE**	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	TCE	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
BRW-1	**PCE**	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	TCE	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	0.24 J
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
BRW-2	**PCE**	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	TCE	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	0.29 J
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
BRW-3	**PCE**	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	TCE	**5.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**70.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	0.34 J
	trans-1,2-DCE	**100.0**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Notes:
- "PCE" = tetrachlorethene; "TCE" = tricholorethene; "DCE" = dichloroethene.
- "U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported quantitation limit is an estimated value; "R" = the data are unusable (analyte may or may not be present).
- "Dry" = well dry during monitoring event; "NA" = not applicable; "NS" = not sampled.
- Data entered from the data validation report for each sampling event.
- Shaded cells indicate that the reported concentration is in excess of the Enforcement Standard.
- Groundwater Enforcement Standards referenced from Table 1, Chapter 12 - Groundwater Protection Rule and Strategey, December 2000.

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TABLE 3.0
SUPPLY WELL RESULTS: 2003-2006
Bressett Site, Randolph, Vermont

Owner	Location	Parameter Method 524.2	Groundwater Enforcement Standard	Units	Oct-03	Apr-04	Oct-04	Apr-05	Oct-05	Apr-06	May-06	Oct-06
Taylor	**Bressett Spring**	**PCE**	**0.7**	ug/L	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 U		0.5 U	
		TCE	**5.0**	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	
		cis-1,2-DCE	**70.0**	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	
		trans-1,2-DCE	**100.0**	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	
Taylor	**Bressett Kitchen Tap**	**PCE**	**0.7**	ug/L						**2.8**	**2.0**	**2.7**
		TCE	**5.0**	ug/L						0.5 U	0.5 U	0.5 U
		cis-1,2-DCE	**70.0**	ug/L						0.5 U	0.5 U	0.5 U
		trans-1,2-DCE	**100.0**	ug/L						0.5 U	0.5 U	0.5 U
Taylor	**Bressett Holding Tank Inflow**	**PCE**	**0.7**	ug/L							**2.1**	
		TCE	**5.0**	ug/L							0.5 U	
		cis-1,2-DCE	**70.0**	ug/L							0.5 U	
		trans-1,2-DCE	**100.0**	ug/L							0.5 U	
Hammond	**Sheilds Well**	**PCE**	**0.7**	ug/L	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 U		0.5 U
		TCE	**5.0**	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
		cis-1,2-DCE	**70.0**	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
		trans-1,2-DCE	**100.0**	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
Bowen	**Bowen Well**	**PCE**	**0.7**	ug/L	0.5 UJ							
		TCE	**5.0**	ug/L	0.5 U							
		cis-1,2-DCE	**70.0**	ug/L	0.5 U							
		trans-1,2-DCE	**100.0**	ug/L	0.5 U							
Illsley	**Illsley Well**	**PCE**	**0.7**	ug/L			0.5 UJ					
		TCE	**5.0**	ug/L			0.5 U					
		cis-1,2-DCE	**70.0**	ug/L			0.5 U					
		trans-1,2-DCE	**100.0**	ug/L			0.5 U					

Notes:
- "PCE" = tetrachlorethene; "TCE" = tricholorethene; "DCE" = dichloroethene.
- "U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported quantitation limit is an estimated value.
- "Dry" = well dry during monitoring event; "NA" = not applicable; "NS" = no sample collected.
- Data from 2004- was collected by Waite Environmental Management and was entered from the data validation report for each sampling event.
- Data prior to 2004 was collected by previous environmental contractor.
- Shaded cells indicate that the reported concentration is in excess of the Enforcement Standard.
- Enforcement Standard for PCE is the Vermont Action Level, taken from the Vermont Department of Health Drinking Water Guidance, December 2002.
- Enforcement Standard for TCE, cis-1,2-DCE, and trans-1,2-DCE is the Federal Maximum Contaminant Level (MCL), December 2002.

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TABLE 4.0
SURFACE WATER QUALITY RESULTS: 2001 - 2006
Bressett Site, Randolph, Vermont

Location	Parameter Method 8260B	Water Quality Standard	Units	Jul-01	Jul-02	Jul-03	Jul-04	Jul-05	Jul-06
SW-1	**PCE**	**0.8**	ug/L	DRY	1.0 U	DRY	1.0 U	1.0 U	1.0 U
	TCE	**2.7**	ug/L	DRY	1.0 U	DRY	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**NA**	ug/L	DRY	1.0 U	DRY	1.0 U	1.0 U	1.0 U
	trans-1,2-DCE	**NA**	ug/L	DRY	1.0 U	DRY	1.0 U	1.0 U	1.0 U
SW-2	**PCE**	**0.8**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	TCE	**2.7**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	cis-1,2-DCE	**NA**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	trans-1,2-DCE	**NA**	ug/L	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U

Notes:
- "PCE" = tetrachlorethene; "TCE" = tricholorethene; "DCE" = dichloroethene.
-"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported quantitation limit is an estimated value; "R" = the data are unusable (analyte may or may not be present).
-"Dry" = well dry during monitoring event; "NA" = not applicable; "NS" = not sampled.
- Data (qualified) from 2001-2003 was collected by Tighe & Bond and was entered from tabulated data from annual reports.
- Data (qualified) from 2004- was collected by Waite Environmental Management and was entered from the data validation report for each sampling event.
- Water Quality Standard referenced from Appendix C of "Vermont Water Quality Standards" (water and organisms) effective July 2, 2000.

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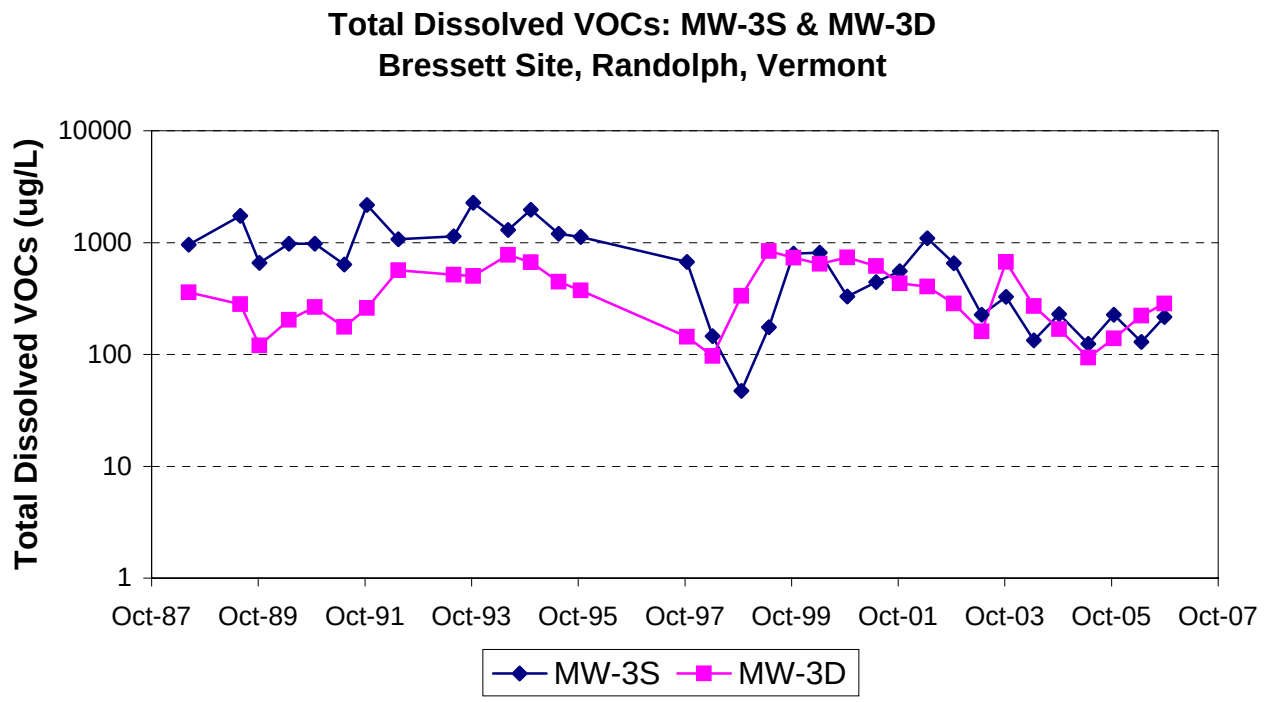
TABLE 5.0
INDOOR AIR QUALITY RESULTS: 1997-2006
Bressett Site, Randolph, Vermont

Owner	Location	Parameter Method T-014A	Guidance Level	Units	Oct-97	Jan-98	Jul-98	Jan-01	Jul-01	Jul-02	Feb-06	Jul-06
Taylor	BRST1FLR	Tetrachloroethene	1.0	ppbv	**3.07**	**1.76** J	1 U	**0.69**	2 U	0.5 U	**4.4**	**6.3** J
		Trichloroethene	1.0	ppbv	2.8 U	3 U	1 U	0.47 U	2 U	0.5 U	**0.53**	**0.58**
		cis-1,2-Dichloroethene	9.3	ppbv				0.47 U	2 U	0.5 U	**0.38**	**0.14** J
		trans-1,2-Dichloroethene	18.4	ppbv				0.47 U	2 U	0.5 U	0.20 U	0.20 U
	BRSTBSMT	Tetrachloroethene	1.0	ppbv	**6.47**	**5.72**	**10.7**	**4.8**	**6**	**1.2**	**9.7**	**22** J
		Trichloroethene	1.0	ppbv	3.1 U	2.9 U	**2.3** J	**0.5**	**0.53**	0.5 U	**1.2**	**1.6**
		cis-1,2-Dichloroethene	9.3	ppbv				0.35 U	0.42 U	0.5 U	**0.78**	**0.40**
		trans-1,2-Dichloroethene	18.4	ppbv				**0.33** J	0.42 U	0.5 U	0.20 U	0.20 U

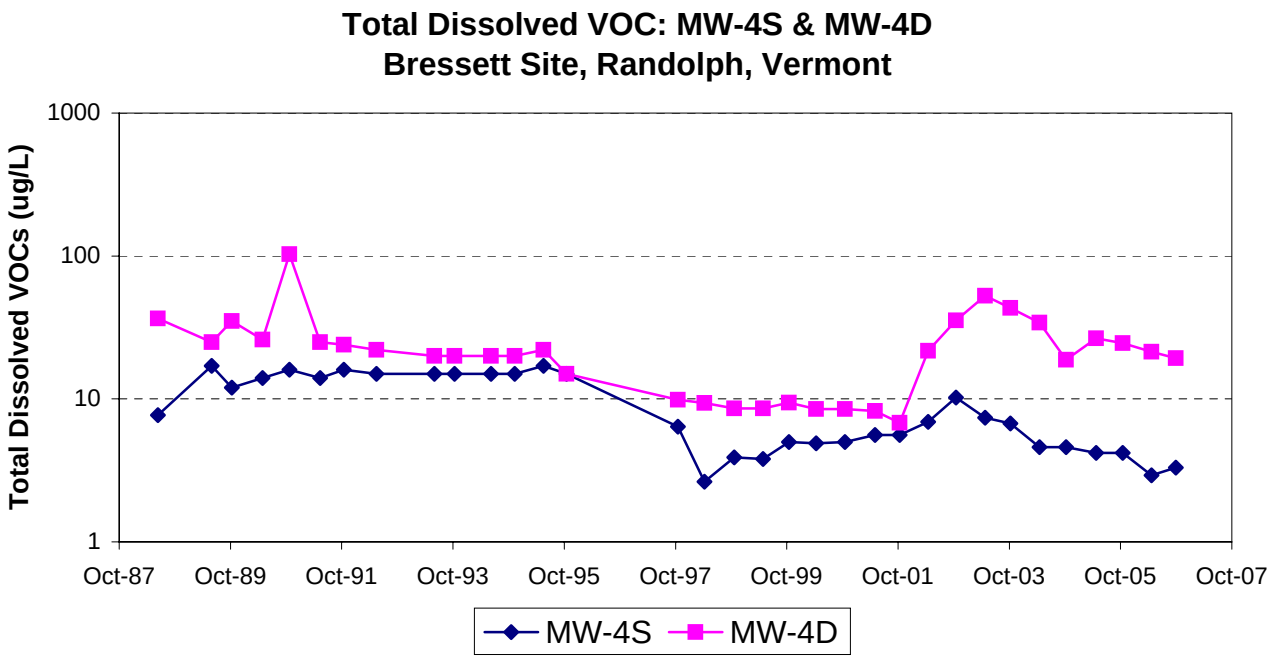
Notes:
-"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported quantitation limit is an estimated value; "R" = the data are unusable (analyte may or may not be present).
-"NS" = Not Sampled (house unoccupied or access not obtained).
Bold values are reported above quantitation limit; shaded cells are in excess of the guidance level.
Data (qualified) from 1997-2002 was collected by others; data (qualified) starting in 2006 was collected by WEM.
Guidance level for tetrachloroethene and trichloroethene based on results of statewide indoor ambient air survey conducted by the Vermont Dept. Health in 1991-92.
Guidance level for cis- and trans-1,2,-dichloroethene is based on the EPA Region III risk-based concentration for ambient air (2002 RBC table).

APPENDIX C:

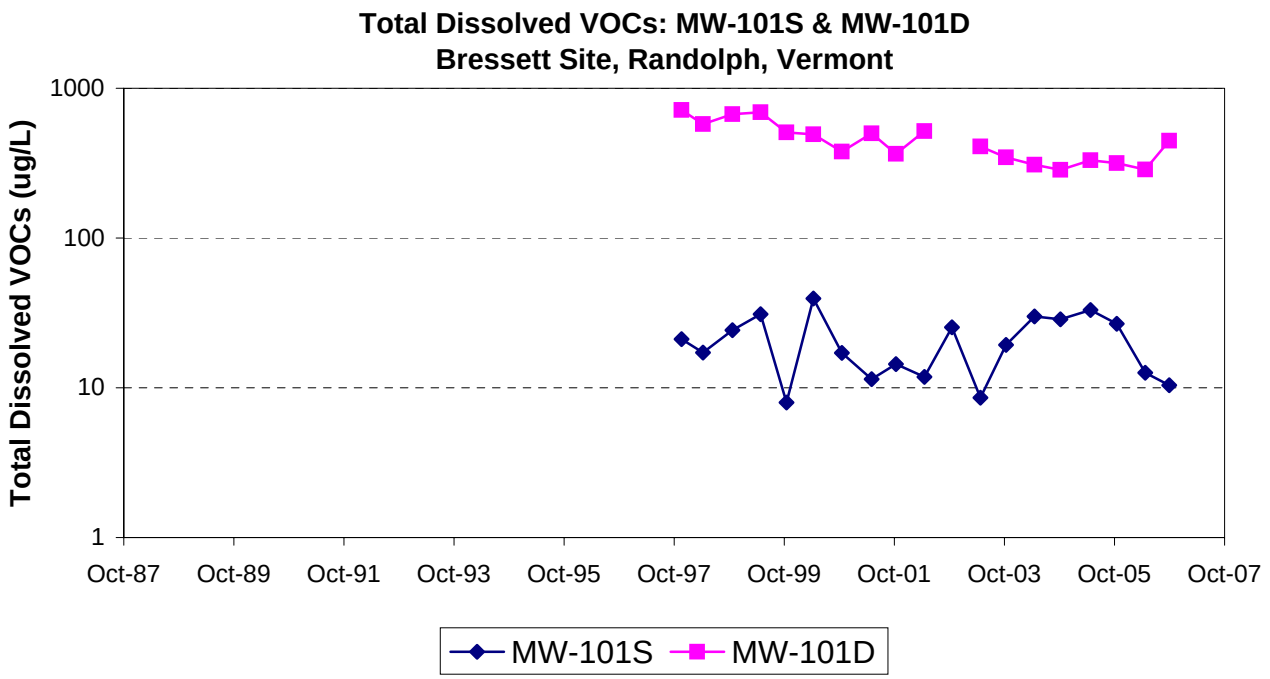
GRAPHS



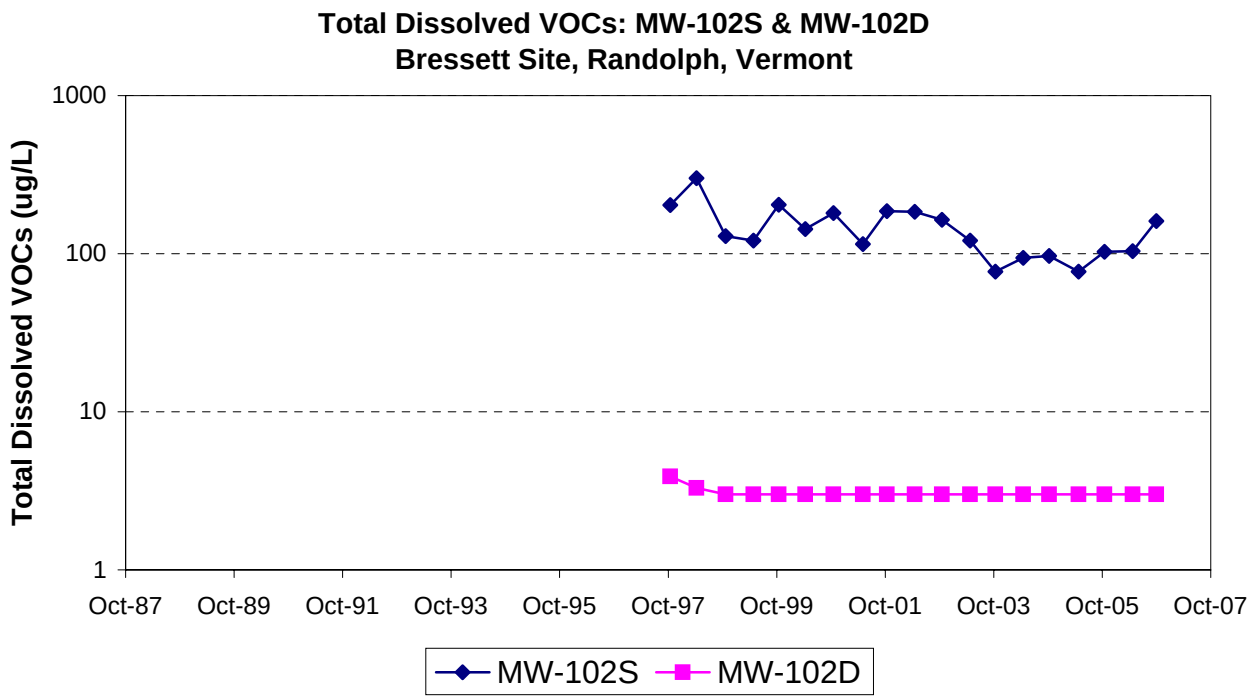
Note:
1) Reported concentrations are sums of PCE, TCE, and 1,2-DCE; non-detectable values (i.e. detection limits) are included in the summation process.



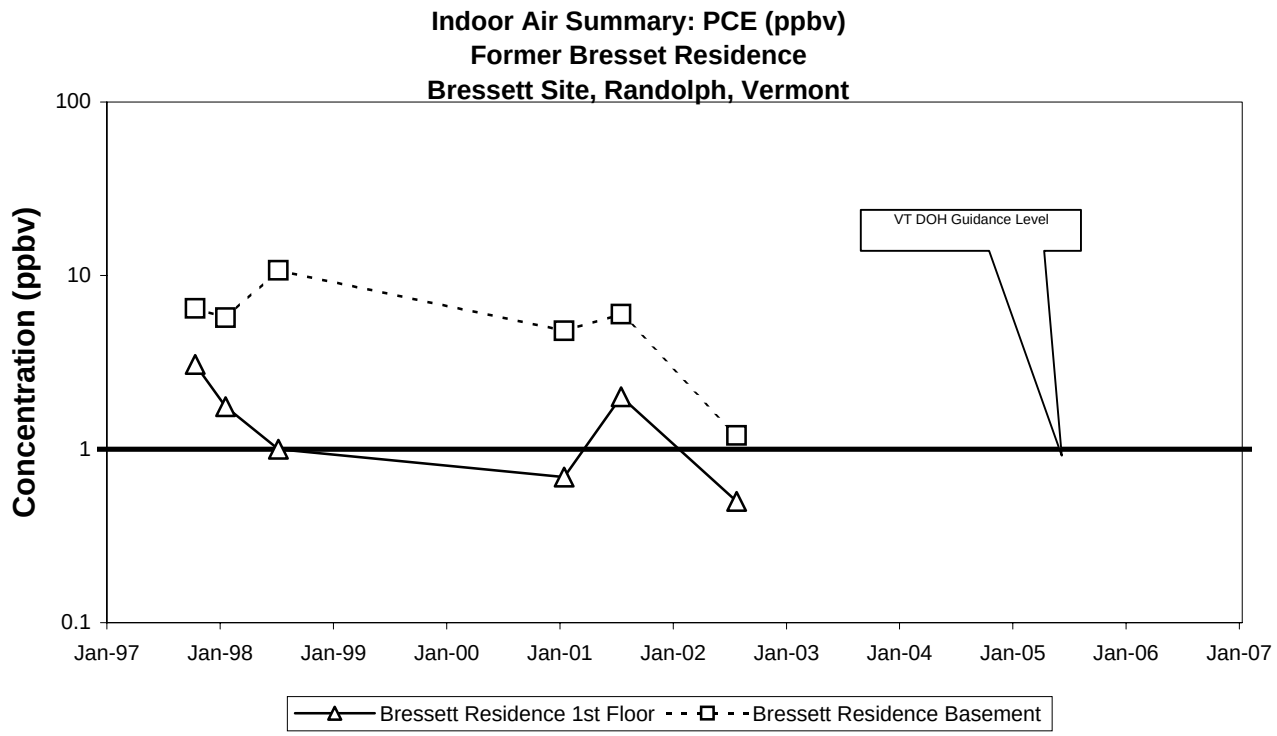
Note:
1) Reported concentrations are sums of PCE, TCE, and 1,2-DCE; non-detectable values (i.e. detection limits) are included in the summation process.



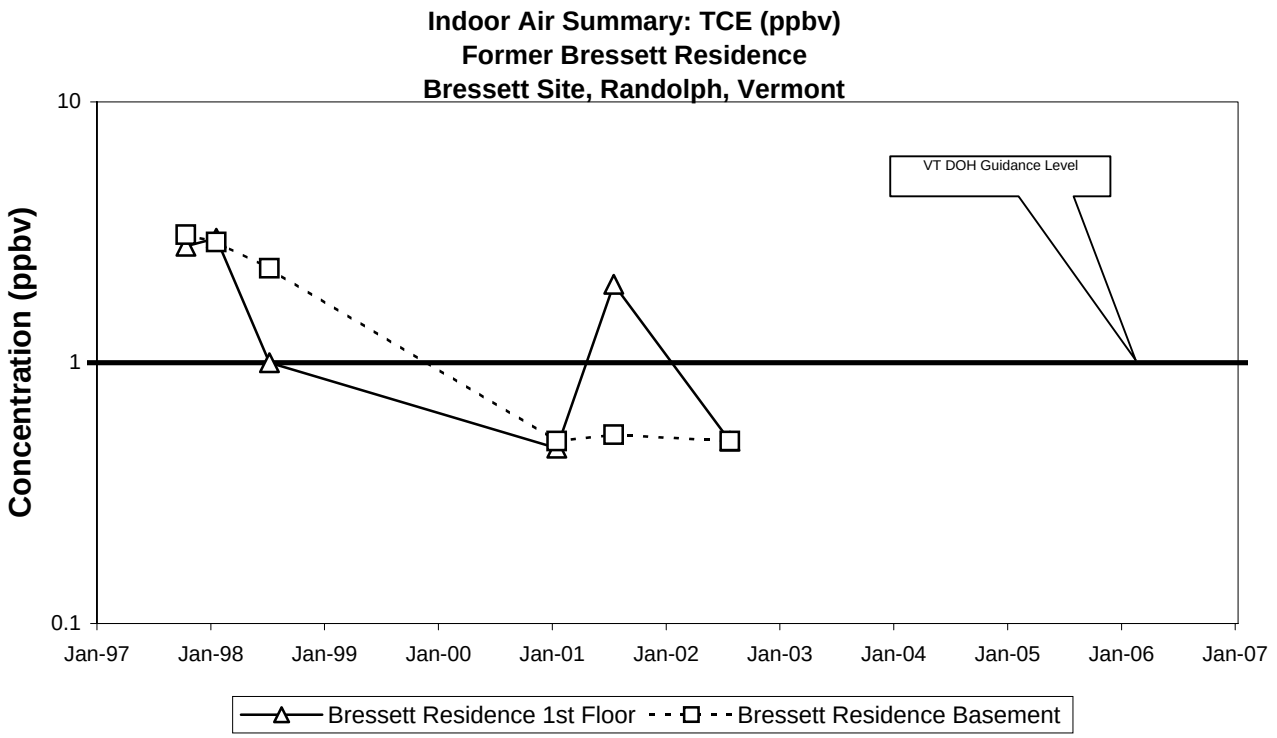
Note:
1) Reported concentrations are sums of PCE, TCE, and 1,2-DCE; non-detectable values (i.e. detection limits) are included in the summation process.



Notes:
1) Reported concentrations are sums of PCE, TCE, and 1,2-DCE; non-detectable values (i.e. detection limits) are included in the summation process.



Notes:
1) Non-detectable values (i.e. detection limits) are graphed as positive values.



Notes:
1) Non-detectable values (i.e. detection limits) are graphed as positive values.

APPENDIX D:

FIELD DATA SHEETS: OCTOBER 2006

WEM Waite Environmental Management, LLC.

SITE: BRENNETT

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-103S			Pump Intake Depth	—
Date	10/3/08			Pump Type/Serial	—
Sampler	MW			Well Diameter	3/4"
Weather	cl. & cool			Well Depth	8.88
Water Type	(gw)	sw	supply	Initial Depth to Water	dry
Sampling Method	bailer	(low flow)	grab	Traditional Purge Vol. (bailer)	—

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
1840										DRY

SAMPLE COLLECTION	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)	
Final Measurements:									

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #	
Sample								NO SAMPLE- DRY
As Required:								
Field Duplicate								
Field Blank								
MS/MSD								

General Notes:

WEM Project #110320012

VT DEC Site #

WEM Waite Environmental Management, LLC.

SITE: BRENNETT
FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-103D	Pump Intake Depth	
Date	10/3/06	Pump Type/Serial	Fed pump peri
Sampler	MW	Well Diameter	3/4"
Weather	cl & cool	Well Depth	20.20
Water Type	gw sw supply	Initial Depth to Water	7.63
Sampling Method	bailer low flow grab	Traditional Purge Vol. (bailer)	200 ml/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
0900										begin
0900	10.92	200	10.96	162	6.16	-102	1.04	105		
0903	12.21	200	10.66	152	6.60	-142	0.37	223		reduced to 150 ml/m
0908	13.06	150	10.27	160	6.96	-175	0.00	75.9		
0912	13.52	150	10.18	162	7.21	-191	0.00	46.0		
0917	13.38	150	10.14	160	7.35	-200	0.00	26.0		
0921	13.39	150	10.13	160	7.48	-206	0.00	16.9		
0926	13.44	150	10.19	158	7.59	-212	0.00	15.3		
0931	13.62	150	10.11	157	7.62	-215	0.00	13.1		

SAMPLE COLLECTION

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)	
Final Measurements:	1.6 gal	10.11	157	7.62	-215	0.00	13.1		

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #	
Sample	MW-103D	VOA	3	HCl	8260B	0935	UF-1	
As Required:								
Field Duplicate								
Field Blank								
MS/MSD								

General Notes: Added Trip blank TB-1 to cooler - 2 VOAs

WEM Project #110320012

VT DEC Site #

WEM Waite Environmental Management, LLC.

SITE: Bresset

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-104S	Pump Intake Depth	6.4
Date	10/3/06	Pump Type/Serial	Grepump peri
Sampler	MW	Well Diameter	3/4"
Weather	Cl & cool	Well Depth	8.88
Water Type	gw / sw / supply	Initial Depth to Water	2.22
Sampling Method	bailer / low flow / grab	Traditional Purge ~~Vol.~~ rate (ml / gal)	300 ml/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
10:00	2.22									began purging
1002	2.22	300	13.44	200	7.43	-3.0	2.53	92.4		
1006	2.22	300	13.58	206	7.33	1.0	2.41	20.8		
1011	2.24	300	13.63	209	7.26	6.0	1.91	11.3		
1015	2.23	300	13.60	210	7.22	12	1.79	8.6		
1020	2.23	300	13.64	210	7.21	17	1.97	8.4		
1025	2.23	300	13.60	210	7.19	19	1.91	8.1		purging complete

SAMPLE COLLECTION	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	1.9 gal	13.60	210	7.19	19	1.91	8.1	n

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	MW-104S	VOA	3	HCl	8260B	10:30	GF-1
As Required:							
Field Duplicate							
Field Blank							
MS/MSD							

General Notes:

WEM Project #110320012

VT DEC Site #

WEM Waite Environmental Management, LLC.

SITE: Bresset

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-104D			Pump Intake Depth	20.4'
Date	10/3/06			Pump Type/Serial	Geopump peri.
Sampler	MW			Well Diameter	3/4"
Weather	cl & cool			Well Depth	22.8'
Water Type	(gw)	sw	supply	Initial Depth to Water	2.10
Sampling Method	bailer	(low flow)	grab	Traditional Purge ~~Vol.~~ rate (ml / gal)	100-75 ml/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
1032	2.10	75*								begin purging
1035	7.30	75	11.44	165	7.55	-96	2.40	>1000		
1039	8.78	75	11.47	151	7.56	-110	0.19	>1000		
1044	10.62	75	11.48	146	7.53	-115	0.00	>1000		
1049	11.94	75	11.42	146	7.50	-112	0.00	>1000		
1055	13.00	75	11.42	149	7.49	-113	0.05	>1000		purging complete

SAMPLE COLLECTION	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	0.5 gal	11.42	149	7.49	-113	0.05	>1000	y

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	MW-104D	VOA	3	HCl	8260B	1100	UF-1
As Required:							
Field Duplicate							
Field Blank							
MS/MSD							

General Notes: * Slowest purge rate achievable

WEM Project #110320012

VT DEC Site #

WEM Waite Environmental Management, LLC.

SITE: Brassett

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-102D			Pump Intake Depth	28.8 *
Date	10/3/06			Pump Type/Serial	Geopump peri.
Sampler	MW			Well Diameter	3/4"
Weather	cl. & cool			Well Depth	30.80 *
Water Type	(gw)	sw	supply	Initial Depth to Water	6.06 *
Sampling Method	bailer	(low flow)	grab	Traditional Purge Vol. (ml / gal)	100 ml/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
1205	6.06	100								begin
1209	9.82	100	11.56	203	7.70	-130	0.90	203		
1214	10.76	100	11.08	201	7.80	-157	0.38	105		
1219	11.32	100	10.67	199	7.90	-179	0.04	54.6		
1223	11.35	100	10.72	199	7.96	-187	0.00	34.8		
1230	11.45	100	10.75	198	8.01	-194	0.00	24.7		
1233	11.48	100	10.68	198	8.01	-196	0.00	22.6		complete

SAMPLE COLLECTION

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	1.0 gal	10.68	198	8.01	-196	0.00	22.6	n

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	MW-102D	VOA	3	HCl	8260B	1235	UF1
As Required:							
Field Duplicate							
Field Blank							
MS/MSD							

General Notes: * after repair of well - temporarily removed 55 7/8" casing and added 21 3/4" casing

WEM Project #110320012

VT DEC Site #

5

WEM Waite Environmental Management, LLC.

SITE: Bressett

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-101S	Pump Intake Depth	11.9
Date	10/3/06	Pump Type/Serial	Geopump peri.
Sampler	MW	Well Diameter	3/4"
Weather	cl & cool	Well Depth	14.26
Water Type	gw / sw / supply	Initial Depth to Water	5.53
Sampling Method	bailer / low flow / grab	Traditional Purge ~~Vol.~~ Rate (ml / gal)	150-200 ml/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
1310	5.53	150								begin
1312	7.15	150	14.71	195	7.40	42	0.83	496		
1317	6.72	150	14.71	196	7.11	47	0.46	578		
1322	6.75	150	14.76	196	6.99	51	0.33	314		
1327	6.75	150	14.62	197	6.91	55	0.25	250		
1334	6.75	150	14.42	197	6.82	63	0.16	550		
1337	6.75	150	14.41	197	6.81	66	0.08	666		
1341	6.75	150	14.39	197	6.80	68	0.10	627		complete

SAMPLE COLLECTION

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	1.0 gal	14.39	197	6.80	68	0.10	627	n

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	MW-101S	VOA	3	HCl	8260B	1345	UF-1
As Required:							
Field Duplicate							
Field Blank							
MS/MSD							

General Notes:

WEM Project #110320012

VT DEC Site #

WEM Waite Environmental Management, LLC.

SITE: Bressett

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-102S	Pump Intake Depth	13.2 *
Date	10/3/06	Pump Type/Serial	Geopump peri.
Sampler	MW	Well Diameter	3/4"
Weather	cl & cool	Well Depth	15.80 *
Water Type	(gw) sw supply	Initial Depth to Water	5.96 *
Sampling Method	bailer (low flow) grab	Traditional Purge ~~Vol.~~ Rate (ml / gal)	200 ml/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
1352	5.96	200								began
1356	6.65	200	12.37	211	7.30	60	2.86	333		
1401	6.68	200	11.76	237	7.47	57	3.97	62.8		
1406	6.69	200	11.57	242	7.57	56	4.06	27.2		
1411	6.69	200	11.52	245	7.63	57	4.20	19.4		
1416	6.70	200	11.53	247	7.68	57	4.16	16.7		complete

SAMPLE COLLECTION	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	1.25 gal	11.53	247	7.68	57	4.16	16.7	n

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	MW-102S	VOA	3	HCl	8260B	1420	UF-1
As Required:							
Field Duplicate							
Field Blank							
MS/MSD							

General Notes: * after removal of 5 1/8" of casing and temp. addition of 17 1/8" casing

WEM Project #110320012

VT DEC Site #

WEM Waite Environmental Management, LLC.

SITE: Brosso
FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-101D	Pump Intake Depth	22.5'
Date	10/3/06	Pump Type/Serial	Geopump peri.
Sampler	MW	Well Diameter	7/4"
Weather	cl & cool	Well Depth	24.8
Water Type	(gw) sw supply	Initial Depth to Water	6.85
Sampling Method	bailer (low flow) grab	Traditional Purge ~~Vol.~~ rate (ml / gal)	200 ml/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
1430	6.95	200								begin purging
1435	9.10	200	12.11	512	7.36	76	1.47	66.6		
1440	9.04	200	11.67	513	7.29	72	1.27	42.9		
1445	9.06	200	11.42	509	7.28	71	1.04	22.5		
1450	9.07	200	11.24	506	7.28	69	0.93	15.3		
1455	9.07	200	11.45	509	7.28	69	0.92	15.1		complete

SAMPLE COLLECTION	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	1.25 gal	11.45	509	7.28	69	0.92	15.1	n

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	MW-101D	VOA	3	HCl	8260B	1455	UF-1
As Required:							
Field Duplicate	MW-Z	VOA	3	HCl	8260B	"1700"	UF-2
Field Blank							
MS/MSD							

General Notes:

blind

WEM Project #110320012

VT DEC Site #

WEM Waite Environmental Management, LLC.

SITE: Bressett

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-4S			Well Diameter	2
Date	10/3/06			Well Depth	24.20
Sampler	MW			Initial Depth to Water	19.47
Weather	Clr cool			Purge Vol. (3 x Well Volume)	2.25 gal
Water Type	(gw)	sw	supply		
Sampling Method	(bailer)	low flow	grab		

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)	Notes
	2.5 gal	10.67	74	7.96	78	9.14	81.5	n	
Final Measurements:									

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #	
Sample	MW-4S	VOA	3	HCl	8260B	1555	UF-1	
As Required:								
Field Duplicate								
Field Blank								
MS/MSD	MW-4S	VOA	4	HCl	8260B	1555	UF-1	

General Notes:

SAMPLING LOCATION	MW-4D			Well Diameter	2
Date	10/3/06			Well Depth	46.80
Sampler				Initial Depth to Water	20.95
Weather				Purge Vol. (3 x Well Volume)	12.4
Water Type	(gw)	sw	supply		
Sampling Method	(bailer)	low flow	grab		

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)	Notes
	12 gal	11.04	197	7.82	88	9.65	121		
Final Measurements:									

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #	
Sample	MW-4D	VOA	3	HCl	8260B	1635	UF-1	
As Required:								
Field Duplicate	FB-1	VOA	2	HCl	8260B	1655	UF-2	
Field Blank								
MS/MSD								

General Notes:

WEM Waste Environmental Management, Inc.

SITE: Brasseth

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	MW-3S	Well Diameter	2
Date	10/3/06	Well Depth	27.30
Sampler	CL & Cool	Initial Depth to Water	24.50
Weather		Purge Vol. (3 x Well Volume)	1.3 gal
Water Type	(gw) sw supply		
Sampling Method	(bailer) low flow grab		

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)	Notes
	1.5 gal	10.16	374	7.55	103	11.91	283		
Final Measurements:									

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #	
Sample	MW-3S	VOA	3	HCl	8260B	1655	UF-2	
As Required:								
Field Duplicate								
Field Blank								
MS/MSD								

General Notes:

SAMPLING LOCATION	MW-3D	Well Diameter	2"
Date	10/4/06	Well Depth	74.6
Sampler	MW	Initial Depth to Water	22.96
Weather	p.c & cool	Purge Vol. (3 x Well Volume)	24.8
Water Type	(gw) sw supply		
Sampling Method	(bailer) low flow grab		

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)	Notes
	25 gal	9.53	289	6.09	192	12.90	>1000	n	
Final Measurements:									

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #	
Sample	MW-3D	VOA	3	HCl	8260B	1245	UF-2	
As Required:								
Field Duplicate								
Field Blank								
MS/MSD								

General Notes: purged well from intake of 35' using peri. pump @ 6.4 ~~gpm~~ gal/hr from 1015 to 1215. Finished purging w/ bailer.

WEM Waite Environmental Management, LLC

SITE: BRESSETT
FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	BRW-3	Pump Intake Depth	72'
Date	10/6/02	Pump Type	Grundfos Rodi-flo
Sampler	MN	Well Diameter	2"
Weather	clear 1 [illegible]	Well Depth	80.8
Water Type	(gw) sw supply	Initial Depth to Water	8.92
Sampling Method	bailer (low flow) grab	Traditional Purge Vol. (bailer)	2-3 L/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
0909	8.92	3								began
0911	15.85	3	9.06	241	8.11	94	11.27	117		
0916	15.45	3	9.60	235	8.07	90	12.95	75.7		
0921	15.65	3	9.68	245	7.97	84	11.49	36.5		
0926	15.82	3	9.83	247	7.90	81	10.31	19.8		
0931	15.83	3	9.84	247	7.87	80	10.37	10.0		
0935	15.84	3	9.84	247	7.86	81	10.41	9.8		complete

SAMPLE COLLECTION	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	19 gal	9.84	247	7.86	81	10.41	9.8	

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	BRW-3	VOA	3	HCl	8260B	0940	UF-7
As Required:							
Field Duplicate							
Field Blank							
MS/MSD							

General Notes: Add Trip blank TB-5 to cooler : STL provided

WEM Project #110320012

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VT DEC Site #

WEM Waite Environmental Management, LLC.

SITE: BRESSETT
FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	BRW-2	Pump Intake Depth	75.0
Date	10/6/06	Pump Type	Grundfos Redi-flo
Sampler	MW	Well Diameter	2"
Weather	clear & cold	Well Depth	101.5
Water Type	(gw) sw supply	Initial Depth to Water	7.71
Sampling Method	bailer (low flow) grab	Traditional Purge Vol. (bailer)	2 L/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
1005	7.71	2								began
1008	14.38	2	8.90	194	8.08	-126	8.02	123		
1014	23.71	2	9.17	198	7.91	-129	8.50	81.5		reduced rate
1019	32.08	1	9.75	192	7.75	-137	2.23	81.2		
1025	33.92	1	10.45	193	7.67	-160	1.01	70.5		
1031	33.33	1	10.47	196	7.63	-162	0.53	34.1		
1035	34.01	1	10.46	193	7.61	-160	0.48	39.5		complete

SAMPLE COLLECTION

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	12 gal	10.46	193	7.61	-160	0.48	39.5	n

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	BRW-2	VOA	3	HCl	8260B	1040	UF-7
As Required:							
Field Duplicate							
Field Blank							
MS/MSD							

General Notes:

WEM Project #110320012

VT DEC Site #

12

WEM Waite Environmental Management, LLC.

SITE: BRESSETT

FIELD WATER COLLECTION SHEET

SAMPLING LOCATION	BRW-1			Pump Intake Depth	40.0
Date	10/6/06			Pump Type	Grundfos Redi-flo
Sampler	MW			Well Diameter	2"
Weather	cloudy & cold			Well Depth	81.8
Water Type	(gw)	sw	supply	Initial Depth to Water	14.21
Sampling Method	bailer	(low flow)	grab	Traditional Purge Vol. (bailer)	2 L/min

LOW FLOW PURGING DATA

Time	DTW (ft btp)	Purge Rate (ml/min)	Temp. (deg C)	Specific Cond. (us/cm)	pH	ORP (mv)	DO (mg/L)	Turbidity (NTU)		Notes
				within 3%	within 3%	1 pH unit	10 mv	within 10%	within 10%	
1115	14.21	2								began
1117	16.15	2	8.77	115	7.61	-24	3.34	25.6		
1121	17.32	2	9.12	116	7.63	-40	3.06	9.4		
1126	17.50	2	9.32	120	7.67	-48	2.73	0.3		
1131	17.92	2	9.36	119	7.70	-49	2.08	12.0		
1137	17.55	2	9.49	119	7.76	-52	2.08	5.8		
1142	17.96	2	9.47	121	7.79	-53	2.06	3.5		

SAMPLE COLLECTION

	Purge Volume	Temp.	Specific Cond.	pH	ORP	DO	Turbidity	Filtered (y/n)
Final Measurements:	14 gal	9.47	121	7.79	-53	2.06	3.5	

Sample Description	Label	Type Container	# Container	Preservative	Analysis Method	Collection Time	COC #
Sample	BRW-1	VOA	3	HCl	8260B	1145	UF-7
As Required:							
Field Duplicate							
Field Blank	FB-5	"	2	"	"	1155	"
MS/MSD							

General Notes:

WEM Project #110320012

VT DEC Site #

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APPENDIX E:

DATA VALIDATION REPORT: OCTOBER 2006

DATA VALIDATION

FOR

UniFirst Project
Bressett, Wheatley, and UniFirst Sites
Randolph, Brookfield, and Williamstown, VT

ORGANIC ANALYSIS DATA
Volatile Organics in Water Samples

Sample Delivery Group Nos. BRES36, UNIF27, and WHEA12

Chemical Analyses Performed by:

STL Burlington
208 South Park Dr. Suite 1
Colchester, VT 05446

FOR

Mr. Gerold Noyes
VT Department of Environmental Conservation
Waste Management Division
103 South Main Street, West Building
Waterbury, VT 05676-0404

Data Validation Report by:

Phoenix Chemistry Services
126 Covered Bridge Rd.
N. Ferrisburg, VT 05473
(802)-233-2473

December 26, 2006

Reference #2006-1103-001, -1107-001, & -1109-001
VOA Validation Report/BRES36_UNIF27_ WHEA12/dhg

EXECUTIVE SUMMARY

Phoenix Chemistry Services (Phoenix) has completed the validation of the volatile organics analysis data prepared by Severn Trent Laboratories (STL Burlington) for 42 groundwater samples, 10 water supply samples, 8 field blanks (FB), 8 trip blanks (TB) and one performance evaluation (PE) sample from the Bressett Site in Randolph, VT, the UniFirst Site in Williamstown, VT, and the Wheatley Site in Brookfield, VT. The laboratory reported the data under Sample Delivery Group (SDG) Nos. BRES36, UNIF27, and WHEA12, which were submitted as three data packages received by Phoenix on November 3, 7, and 9, 2006, and two complete revisions for SDG Nos. BRES36 and WHEA12, which were received on December 15, 2006. These SDGs include the following samples:

Sample Identifier	Laboratory ID
Method 8260B	
SDG No. BRES36	
TB-1	686168
MW-103D	686169
MW-104S	686170
MW-104D	686171
MW-102D	686172
MW-101S	686173
MW-102S	686174
MW-101D	686175
MW-4S	686176
MW-4D	686177
MW-3S	686178
FB-1	686179
MW-Z	686180
MW-3D	686181
TB-5	686188
BRW-3	686189
BRW-2	686190
BRW-1	686191
FB-5	686192
SDG No. WHEA12	
TB-4	686193
MW-PLZ	686194
MW-PLX	686195
MW-PL1	686196
MW-S3	686197
MW-S1	686198

Sample Identifier	Laboratory ID
MW-S2	686199
FB-4	686200
SDG No. UNIF27	
TB-6	686183
MW-25884	686184
BMW-X	686185
FB-6	686186
TB-3	686202
SS-2	686203
SS-5	686204
W-SEEP	686205
SEEP-1A	686206
SP-3	686207
SS-Z	686208
SS-3	686209
FB-3	686210
TB-7	686715
PZ-101	686716
PZ-102	686717
W-25	686718
MW-50	686719
W-19	686720
W-20	686721
MW-E	686722
MW-C	686723
MW-D	686724
W-1	686725
SP-4	686726
FB-7	686727
W-Z	686728
Method 524.2	
SDG No. UNIF27	
Bressett site	
TB-2	686162
SHIELDS WELL	686163
BRESSETT TAP	686164
FB-2	686165
WELL Z	686166
UniFirst site	
TB-8	686729
WP-5	686730

Sample Identifier	Laboratory ID
WP-7	686731
WP-8	686732
WP-13	686733
WP-20	686734
WP-3	686735
FB-8	686736
WP-Z	686737
WP-23	686738

A cross-reference table of sample IDs was provided in the data packages. Sample MW-PL2 was logged in and reported as MW-PLZ; the validator has not changed this identifier. The water supply samples from the Bressett site were logged in and reported with SDG No. UNIF27. The sites for the water supply samples are noted on the table above.

The initial submissions of SDG Nos. BRES36 and WHEA12 contained several serious flaws, which included use of an incorrect compound list, poor or no documentation of manual integrations, and apparent contamination of blanks and samples with the target analyte chloroethane. The validator requested that the laboratory investigate and address these and other issues, discussed later in this report. Full revisions of these two SDGs were submitted by the laboratory, and used for the validation. The original submissions should be discarded, and replaced with the revisions.

Findings of the validation effort resulted in the following qualifications of sample results.

- Results for bromomethane in samples TB-7, FB-7, W-25, W-19, FB-2, TB-8, FB-8, SHIELDS, BRESSETT TAP, and WELL Z were qualified as estimated (UJ).

- Results for chloromethane in samples MW-103D, MW-104S, MW-104D, and MW-Z were qualified as less than the quantitation limit (U).

- Results for tetrachloroethene in samples MW-25884, BMW-X, W-SEEP, SP-3, and SS-Z were qualified as less than the quantitation limit (U), and in results for tetrachloroethene samples MW-4S and SEEP-1A were qualified as less than the reported value (U).

- The result for acetone in MW-S2 was qualified as estimated (J).

- The result for tetrachloroethene in MW-4S was qualified as estimated (J).

- Results for tetrachloroethene in the original analyses of samples MW-102S, MW-101D, MW-3S, MW-Z, and MW-3D, and for cis-1,2-dichloroethene in the original analyses of samples MW-101D and MW-Z were rejected (R) and replaced with the acceptable concentrations from the corresponding diluted samples (MW-102SDL, MW-101DDL, MW-3SDL, MW-ZDL, and MW-3DDL).

- Results for all other analytes in samples MW-102SDL, MW-101DDL, MW-3SDL, MW-ZDL, and MW-3DDL were rejected (R).

The Overall Evaluation of Data (Section XVI) summarizes the validation results. The validation findings and conclusions for each analytical parameter are detailed in the remaining sections of this report.

Documentation problems observed in the data packages are described in Section XVII.

This validation report shall be considered part of the data packages for all future distributions of the volatiles (8260B and 524.2) analysis data.

INTRODUCTION

Analyses were performed according to SW-846 Method 8260B Low Level, as documented in STL SOP 8260B, and SDWA Method 524.2 Rev. 4.1, as documented in STL SOP 524.2, and in accordance with requirements in the Field/Laboratory Coordination Memorandum for Water Monitoring (FLCM), April 2, 2004. The target compound list for the Method 8260B analyses was limited to the OLM03.1 CLP target compound list, and the target compound list for Method 52.4.2 was limited to the OLM03.1 CLP target compound list plus methyl-*tert*-butyl ether (MTBE).

Tentative identification of non-target analyte peaks (i.e., tentatively identified compounds, or TICs) was not requested for these analyses.

Phoenix Chemistry Services' validation was performed in conformance with Tier III guidelines as defined by USEPA Region I. Data qualifiers were applied as necessary and appropriate. The data were evaluated in accordance with the "Region I EPA-NE Data Validation Functional Guidelines for Evaluating Environmental Analyses", December 1996. EPA's National Functional Guidelines for Organic Data Review (EPA 540/R-99/008, October, 1999) were also considered during the evaluation, and professional judgment was applied as necessary and appropriate.

The data validation process evaluates data on a technical basis for chemical analyses conducted under the CLP or other well-defined methods. Contract compliance is evaluated only in specific situations. Issues pertaining to contractual compliance are noted where applicable. It is assumed that the data package is presented in accordance with the CLP (CLP-like or SW-846) requirements. It is also assumed that the data package represents the best efforts of the laboratory and has already been subjected to adequate and sufficient quality review prior to submission for validation. In instances where SW-846 or other specific methods have been used for the analyses, the validation effort is modified to acknowledge the differences in methodology while maintaining the goals and quality objectives of the CLP.

Results of sample analyses are reported by the laboratory as either qualified or unqualified; various qualifier codes are used by the laboratory to denote specific information regarding the analytical results. During the validation process, laboratory data are verified against all available supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data validator. Raw data is examined in detail to check calculations, compound identification, and/or transcription errors. Validated results are either qualified or unqualified; if results are unqualified, this means that the reported values may be used without reservation. Final validated results are annotated with the following codes, as defined in the EPA Region I Functional Guidelines:

U - The analyte was analyzed for, but was not detected. The associated numerical value is the sample quantitation limit. The sample quantitation limit accounts for sample specific dilution factors and percent solids corrections or sample sizes that deviate from those required by the method.

J - The associated numerical value is an estimated quantity.

UJ - The analyte was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

R - The data are unusable (analyte may or may not be present). Resampling and reanalysis is necessary for verification. The R replaces the numerical value or sample quantitation limit. In some instances (e.g., a dilution) a result may be indicated as "rejected" to avoid confusion when a more quantitatively accurate result is available.

EB, TB, BB - An analyte that was identified in an aqueous equipment (field) blank, trip blank, or bottle blank that was used to assess field contamination associated with soil/sediment samples. These qualifiers are to be applied to soil/sediment sample results only.

These codes are assigned during the validation process and are based on the data review of the results. They are recorded on the Data Summary Forms contained in Attachment A and the Organic Analysis Data Sheets (Form I) in Attachment B of this validation report.

All data users should note two facts. First, **the "R" qualifier means that the laboratory-reported value is completely unusable.** The analysis is invalid due to significant quality control problems, and provides no information as to whether the compound is present or not. Rejected values should not appear on data tables because they have no useful purpose under any circumstances. Second, **no analyte concentration is guaranteed to be accurate even if all associated quality control is acceptable.** While strict quality control conformance provides well-defined confidence in the reported results, any analytical result will always contain some error.

The user is also cautioned that the validation effort is based on the materials provided by the laboratory. Software manipulation, resulting in misleading raw data printouts, cannot be routinely detected during validation; unless otherwise stated in the report, these kinds of issues are outside the scope of this review.

Detailed Findings of Measurement Error Associated with the Analytical Analysis

I. Preservation and Technical Holding Times (Sample Integrity)

The samples for volatiles analysis in SDG Nos. BRES36, UNIF27, and WHEA12 were collected on October 3, 4, 5, 6, 9, and 10, 2006. All volatiles analyses were performed within the acceptable holding times for preserved water samples (14 days from collection), as required by Region 1. Although not provided in the case narrative (as required by the CLP SOW), the pH of the samples was measured 2-10 days after receipt at the laboratory, and is recorded in the Sample Preparation sections of the data packages. It should be noted that the FLCM requires that the pH be measured upon receipt at the laboratory. All recorded sample pH values were <2.

The cooler temperatures on receipt at the laboratory were checked and documented in the data packages, and ranged from 2.0 ^{o}C to 5.1^{o}C, which are within the acceptable range of 4 ^{o}C ±2°C.

II. GC/MS Instrument Performance Check (Tuning)

The samples for volatiles analysis from SDG Nos. BRES36, UNIF27, and WHEA12 were analyzed on two GC/MS systems identified as instruments L and M. The tuning of these instruments was demonstrated with analysis of 4-bromofluorobenzene (BFB); tunes were analyzed for each shift (12-hour period) during which the samples or associated standards were analyzed. All twelve (12) BFB tunes were correctly calculated, within acceptance limits, and are reported accurately on the Form V summaries in the data packages.

III. Initial Calibration (IC)

One IC (10/2/06) was performed on instrument L and one IC (10/23/06) was performed on instrument M in support of the Method 8260B sample analyses reported in these data packages. One IC (10/14/06) was performed on instrument L in support of the Method 524.2 sample analyses reported in these data packages. Documentation of all individual IC standards was present in the data packages and relative response factor (RRF) as well as percent relative standard deviation (%RSD) values were correctly calculated and accurately reported on the Form VI summaries. Some target compounds were manually integrated in the ICs and in the continuing calibrations and spiked samples submitted with this data set. Many of the manual integrations submitted in the first submissions of SDG Nos. BRES36 and WHEA12 were not printed and the initials of the analyst were not shown; the laboratory addressed this and submitted proper documentation of all manual integrations in the revised data packages. In the data packages used for the validation, all of the manual integrations appear to be correctly performed, and are accurately reported with the final area listed on the tabular report.

All % RSDs for the Method 8260B ICs were below the maximum limit (30%) specified by Region I. All RRF's were above the 0.05 minimum technical criterion, with the exception of 2-butanone, which had average RRF values below (0.023 and 0.019) the acceptance level in the ICs performed on instruments L and

M, respectively, and acetone, which exhibited an average RRF value below (0.042) the acceptance level in the IC on instrument M. All RSDs for the Method 524.2 ICs were below the maximum limit, and all average RRF values were above the minimum criterion, with the exception of 2-butanone, which had an average RRF value below (0.022) the acceptance level; acetone exhibited a marginally low average RRF value , which rounds to within the criterion.

Pursuant to the Region I validation document, results for 2-butanone in all samples in this data set and for acetone in all samples analyzed by Method 8260B on instrument M warranted rejection (R) based on the low RRF achieved. However, 2-butanone was spiked at a concentration of 5 µg/L in the laboratory control samples and in the matrix spike and matrix spike duplicate samples prepared and analyzed with this data set, and acceptable or high recoveries for 2-butanone were achieved in almost all of these analyses. Likewise, acetone was spiked at a concentration of 5 µg/L in the laboratory control samples and in the matrix spike and matrix spike duplicate samples prepared and analyzed for Method 524.2, and acceptable recoveries for acetone were achieved in all of these analyses. Therefore, based on the mostly acceptable recoveries for acetone and 2-butanone in the laboratory control samples and the matrix spike analyses, results for acetone and 2-butanone were not qualified in any ground water or supply water samples based on the low RRFs in the associated ICs for both methods.

An ICV was analyzed immediately after each Method 8260B IC, as required, and recoveries were correctly calculated and accurately reported in the data packages. All recoveries in both ICVs were within laboratory established control limits.

IV. Continuing Calibration (CC)

Four continuing calibration (CC) standards were run on instrument L and one was run on instrument M in support of the Method 8260B sample analyses, and two CC standards were run on instrument L in support of the Method 524.2 sample analyses reported in these data packages. Documentation of the CC standards was present in the data packages and RRF as well as percent difference (%D) values were correctly calculated and accurately reported on the Form VII summaries within the data packages.

All RRFs were above the 0.05 minimum criterion, with the exception of 2-butanone, which had RRFs of 0.020 to 0.026 in the Method 8260B CCs, and acetone, which had RRFs of 0.046 to 0.049 in the Method 8260B CCs analyzed on instrument L on 10/10/06 at 1240, 10/11/06 at 2135, 10/12/06 at 0950, and on 10/19/06 at 0723, and an RRF of 0.045 in the Method 8260B CC analyzed on instrument M on 10/23/06 at 2049. In the Method 524.2 CCs, all RRFs were above the 0.05 minimum criterion, with the exceptions of 2-butanone, which had RRFs of 0.023 and 0.020 in the CCs analyzed on 10/15/06 and 10/16/06, and acetone, which had an RRF of 0.049 in the CC analyzed on 10/16/06.

For the reasons discussed in Section III, no results for acetone or 2-butanone were qualified on the basis of the low RRFs in the associated ICs and CCs.

The maximum limit for %D in the CC standard allowed by Region 1 is ±25%. All %D results were below this limit for the CC standards on both instruments and for both methods, with the following exceptions:

Date	Time	Compound	%D
L (Method 8260B)			
10/10/06	12:40	2-hexanone	25.2
10/19/06	07:23	bromomethane	34.7
10/19/06	22:09	chloromethane	33.3
L (Method 52.4.2)			
10/15/06	21:16	bromomethane	34.2

It should be noted that negative % difference values will result in a low bias for positive detects, and a positive % difference will result in a high bias for positive detects.

On the basis of the unacceptable %D in the associated CC standards, results for bromomethane in samples TB-7, FB-7, W-25, W-19, FB-2, TB-8, FB-8, SHIELDS, BRESSETT TAP, and WELL Z were qualified as estimated (UJ). No field samples were reported from the second analytical window on instrument L on 10/19/06, so no qualifications were necessary on the basis of the unacceptably high %D for chloromethane in the CC standard. On the basis of professional judgment, no results for 2-hexanone were qualified on the basis of its marginally high %D, which rounds to within the limit, in the CC standard analyzed on instrument L on 10/10/06.

V. Blanks

Results for eight (8) water-matrix laboratory method blanks (MBs) were reported in association with this set of samples. No target analytes were detected in any MB, with the exception of bromomethane, which was detected in MBLK101906LA, which was analyzed on instrument L on 10/19/06 at 0822.

Eight trip blanks (TBs) were reported in these SDGs. No target analytes were detected in any TB, with the exception of tetrachloroethene, which was detected in TB-3 at 0.27 ug/L.

Eight field blanks (FBs) were reported in these SDGs. No target analytes were detected in any FB, with the exception of tetrachloroethene, which was detected in FB-3 at 0.41 ug/L (action limit 2.0 ug/L).

Three holding (storage) blanks (HBs) for Method 8260B and one HB for Method 524.2 were reported in these SDGs. No target analytes were detected in any HB, with the exceptions of chloromethane, which was detected in HB88260 at 0.32 ug/L (action limit 1.6 ug/L), and tetrachloroethene, which was detected in HB368260 at 0.25 ug/L.

Since bromomethane was not detected in any sample associated with MBLK101906LA, no qualifications for bromomethane were necessary on the basis of laboratory contamination with bromomethane. On the basis of laboratory contamination, results for chloromethane in samples MW-103D, MW-104S, MW-104D, and MW-Z were qualified as less than the quantitation limit (U). On the basis of field contamination, results for tetrachloroethene in samples MW-25884, BMW-X, W-SEEP, SP-3, and SS-Z were qualified as less than the quantitation limit (U), and results for tetrachloroethene in samples MW-4S and SEEP-1A were qualified as less than the reported value (U).

VI. Surrogate Compounds

Percent recoveries (%R) for all four surrogate compounds were correctly calculated, accurately reported on the Form II summaries within the data packages, and were within acceptance limits for all sample analyses, with the following exceptions:

Recoveries for the surrogate compound bromofluorobenzene (BFB) were slightly above (116 and 119% R) the upper limit (115% R) for samples TB-7 and FB-7, respectively. The samples were appropriately reanalyzed, and the surrogate recovery for BFB in sample TB-7 improved in both analyses; however, the recovery (80% R) of surrogate toluene-d_8 in the reanalysis of TB-7 was below the lower acceptance limit (85% R), and recovery of the internal standard 1,4-dichlorobenzene-d_4 was below it's acceptance limit for both reanalyses. On the basis of professional judgment, only the first analyses of samples TB-7 and FB-7 were used for the validation effort, and since no target compounds were detected in either analysis, no qualifications were necessary on the basis of the slightly high recoveries of the surrogate compound BFB.

VII. Internal Standards (IS)

All IS areas and retention times (RT) were within the established QC limits for all reported sample analyses in these data packages, with the exceptions of the reanalyses of samples TB-7 and FB-7, as noted in Section VI above. Since these reanalyses were not used for the validation, no qualifications were necessary on the basis of the unacceptably low recoveries of the internal standard 1,4-dichlorobenzene-d_4 in these analyses.

VIII. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Samples SS-5, W-1, MW-4S, and MW-S2 were used for the MS/MSD analyses for Method 8260B, and samples SHIELDS and WP-8 were used for the MS/MSD analyses for Method 524.2 in this data set. The spiking solutions contained all target compounds at 1 µg/L (except for the ketones at 5 µg/L). Percent recoveries (%R) and relative percent differences (%RPD) between paired recoveries were correctly calculated and accurately reported on the Form III summaries for the spiked analytes.

All recoveries were acceptable (range 76 – 130 %R) and reproducible (RPD range 0-28%; limit 30% RPD for Method 8260B, and 40% RPD for Method 524.2), with the following exceptions:

Recoveries of bromomethane (140% R) in SS-5MSD, and tetrachloroethene (150% R) in W-1MS and W-1MSD were reported above the upper laboratory control limits (135% and 120% R, respectively), and recoveries of trans-1,3-dichloropropene (75% R) in W-1MS, acetone in MW-S2MS and MW-S2MSD (62% and 52% R, respectively), 2-butanone (76% R) in MW-4SMS, tetrachloroethene (50% R) in both MW-4SMS and MW-4SMSD, and styrene (78% R) in MW-4SMSD were reported below the lower laboratory control limits (80% R for trans-1,3-dichloropropene, 2-butanone, and styrene, and 65% R for tetrachloroethene). Other than tetrachloroethene, which was detected in the parent samples W-1MS and MW-4S at 27 and 1.3

ug/L, respectively, and acetone in MW-SWMSD, all other recoveries are with in the Region 1 acceptance limits (60 – 140 %R).

On the basis of professional judgment, and recoveries outside the laboratory established acceptance limits but within the Region 1 acceptance criteria (60 – 140 %R), no qualifications were applied on the basis of the high recoveries for bromomethane in the MSD analysis of sample SS-5, and the low recoveries of -1,3-dichloropropene in W-1MS, 2-butanone in MW-4SMS, and styrene in MW-4SMSD. On the basis of recovery below the laboratory and Region 1 lower limits in the associated MSD analysis, the result for acetone in MW-S2 was qualified as estimated (J).

On the basis of the native concentration of tetrachloroethene being more than four times the spiking level, no results for tetrachloroethene were qualified on the basis of the high recoveries in samples W-1MS and W-1MSD.

On the basis of recoveries below the laboratory and Region 1 acceptance criteria in the associated MS and MSD analyses, the result for tetrachloroethene in MW-4S was qualified as estimated (J).

All analytes were spiked into the MS/MSD analyses; therefore non-spiked target compounds could not be evaluated against the parent samples to evaluate laboratory precision.

IX. Field Duplicates

SDG Nos. BRES36, UNIF27, and WHEA12 contained five ground water field duplicate pairs and two supply water field duplicate pairs, which were identified as presented in the table below:

Field Sample	Field Duplicate
MW-101D	MW-Z
MW-25884	BMW-X
MW-PL1	MW-PLX
W-SEEP	SS-Z
MW-E	W-Z
BRESSETT TAP	WELL-Z
WP-3	WP-Z

Precision in the field duplicate pairs MW-101D and MW-Z, MW-25884 and BMW-X, MW-PL1 and MW-PLX, W-SEEP and SS-Z, MW-E and MW-Z, BRESSETT TAP and WELL-Z, and WP-3 and WP-Z was acceptable (less than 30 % RPD) for all target analytes greater than 2 times the quantitation limit.

X. Sensitivity Check

The aqueous MDL for Method 8260B submitted for this project was performed on 03/28/05, and the aqueous MDL for Method 524.2 submitted for this project was performed on 11/05/05, which are both slightly more than one year prior to the sample analyses in this data set. All analytes had calculated MDL's

below the method quantitation limits, however they were not all less than one fifth the PQL, as required in the Field/Laboratory Coordination Memorandum (FLCM).

All of the laboratory control samples and the MS and MSD analyses analyzed with the samples for both methods were spiked at 1 µg/L, as required by the FLCM. Recoveries within Region 1 acceptance criteria (60 – 140 %R) were obtained, except as noted in Sections VIII (above) and XI (below). In addition, the low standard of the initial calibration for Method 8260B supports the reporting limit for the sample analyses.

XI. Performance Evaluation (PE) Samples/Accuracy Check

Eight zero blind PE samples (commonly known as laboratory control sample, LCS) were prepared and analyzed by the laboratory at 1 µg/L in support of the Method 8260B sample analyses in this data set. Two LCS samples were prepared and analyzed by the laboratory at 1 µg/L in support of the Method 524.2 sample analyses in this data set. Percent recoveries were correctly calculated and accurately reported on Form III summaries in the data packages, and were acceptable (overall range, 73 – 142 %R for the Method 8260B analyses, and 93 – 120 %R for the Method 524.2 analyses), with the following exceptions in LCS samples analyzed for Method 8260B:

In the LCS analysis identified as LA101106LCS, o-xylene and styrene were recovered just below (79% R) the lower laboratory control limit (80% R). In LB101106LCS, chloromethane and bromomethane were recovered above (150% and 140% R, respectively) the upper laboratory control limits (130% R and 135% R, respectively). In LA101906LCS, bromomethane and chlorobenzene were recovered above (210% and 130% R, respectively), the upper laboratory control limits (135% R for bromomethane and 120% R for chlorobenzene). Almost half of the compounds in LB101906LCS were recovered above their upper laboratory control limits; however, no field samples were used for the validation from this analytical window, so no qualifications were necessary on the basis of the unacceptably high recoveries in this LCS.

On the basis of professional judgment, no results for o-xylene and styrene were qualified on the basis of recoveries just below the laboratory limit but above the Region 1 lower limit recovery (60% R), in LA101106LCS. Since chloromethane, bromomethane, and chlorobenzene were recovered above the upper laboratory control limits, and these compounds were not detected in any associated field samples, no qualifications were necessary on the basis of their high recoveries in one or more of the LCS analyses.

No laboratory control sample duplicates (LCSD) were analyzed with this data set, so laboratory precision could not be evaluated.

XII. Target Compound Identification

Reported target compounds were correctly identified with supporting spectra present for all samples in these data packages, with the following exception:

At the request of the data validator, the laboratory investigated the qualitative identification of chloroethane in all standards, blanks, and samples in SDG Nos. BRES36 and WHEA12. Since chloroethane was not reported in any blanks or samples for SDG No. UNIF27, no revision was requested for that data package. As presented in the Case Narratives submitted with the revised data packages, the laboratory identified instrument contamination with sulfur dioxide, which elutes at a very similar retention time, and which shares a mass spectral base peak (m/z 64) with chloroethane. Based on the matrix spike analyses, in which the spiked chloroethane peak can be clearly distinguished from the broader sulfur dioxide peak, and on the distinctly different ratio of m/z 64 to m/z 66 in the two compounds, the original identification of chloroethane in blanks and samples in SDG Nos. BRES36 and WHEA12 was revised to Undetected (U) in all affected analyses.

In the process of revising these identifications, some manual integrations were performed in the CC standards and laboratory control samples which were also reported originally in SDG No. UNIF27. Since no revision was requested for UNIF27, slight differences in the reported areas and amounts for these laboratory control samples may be found; however, these differences are not significant enough to warrant further revision or qualification of any results in SDG No. UNIF27.

XIII. Compound Quantitation and Reported Quantitation Limits

Target compound quantitation and practical quantitation limits (PQLs) were accurately reported on the Form I summaries. Tetrachloroethene was detected above the calibration range in the original analyses of samples MW-102S, MW-101D, MW-3S, MW-Z, and MW-3D, and cis-1,2-dichloroethene was also detected above the calibration range in the original analyses of samples MW-101D and MW-Z; these samples were reanalyzed at an appropriate dilution to bring tetrachloroethene within the upper half of the calibration range, and both sets of analyses were reported in the data packages. Based on screen results, samples W-1 and MW-D were analyzed at an appropriate dilution to bring tetrachloroethene within the upper half of the calibration range; as per the FLCM, a more concentrated analysis was not required or performed for either sample.

Results for tetrachloroethene initially outside the calibration range in the original analyses of samples MW-102S, MW-101D, MW-3S, MW-Z, and MW-3D, and for cis-1,2-dichloroethene in the original analyses of samples MW-101D and MW-Z were rejected (R) and replaced with the acceptable concentrations from the corresponding diluted samples (MW-102SDL, MW-101DDL, MW-3SDL, MW-ZDL, and MW-3DDL).

Results for all other analytes in samples MW-102SDL, MW-101DDL, MW-3SDL, MW-ZDL, and MW-3DDL were rejected (R) because acceptable results for these compounds were taken from the original analyses (MW-102S, MW-101D, MW-3S, MW-Z, and MW-3D).

“E” qualifiers were appropriately applied by the laboratory to sample Form I results when concentrations of target analytes were greater than the instrument calibration range. “D” qualifiers were properly applied by the laboratory to positive results from diluted sample analyses. The validator removed all laboratory-applied “E” and “D” qualifiers. An “X” has been drawn across the entire Form I for the diluted analyses noted above.

The laboratory appropriately applied "J" qualifiers to the sample Form I's when the concentration of an analyte was less than the sample-specific PQL. The validator did not remove these qualifiers.

The values that the validator has judged to be acceptable are presented on the Data Summary Forms in Attachment A and on the Form 1s in Attachment B.

The Data Summary Forms (DSFs) in Attachment A list all individual sample analytes affected by the applied qualifications. All positive results are listed on these forms, whether or not the value or qualifier was changed as a result of the validation. Where no result is listed, the compound was not detected and the PQL was not qualified. Sample-specific quantitation limits may be found on the laboratory-generated Form I for each sample (Attachment B) or may be calculated for waters from the information on the DSFs as follows: unadjusted PQL (far left column) multiplied by the concentration/dilution factor (DF).

XIV. Tentatively Identified Compounds (TICs)

Evaluation of unidentified, non-target analyte peaks was not requested or performed for these samples.

XV. System Performance

The analytical systems appear to have been operating well at the time of these analyses based on the evaluation of the available raw data, with the exception of the sulfur dioxide contamination discussed in Section XII above.

XVI. Overall Evaluation of Data

Results for volatile organic compounds were determined to be valid as reported for all samples in SDG Nos. BRES36, UNIF27, and WHEA12, with the following exceptions:

- On the basis of the unacceptable %D in the associated CC standards, results for bromomethane in samples TB-7, FB-7, W-25, W-19, FB-2, TB-8, FB-8, SHIELDS, BRESSETT TAP, and WELL Z were qualified as estimated (UJ).

- On the basis of laboratory contamination, results for chloromethane in samples MW-103D, MW-104S, MW-104D, and MW-Z were qualified as less than the quantitation limit (U).

- On the basis of field contamination, results for tetrachloroethene in samples MW-25884, BMW-X, W-SEEP, SP-3, and SS-Z were qualified as less than the quantitation limit (U), and results for tetrachloroethene in samples MW-4S and SEEP-1A were qualified as less than the reported value (U).

- On the basis of recovery below the laboratory and Region 1 lower limits in the associated MSD

analysis, the result for acetone in MW-S2 was qualified as estimated (J).

- On the basis of recoveries below the laboratory and Region 1 acceptance criteria in the associated MS or MSD analyses, the result for tetrachloroethene in MW-4S was qualified as estimated (J).

- Results for tetrachloroethene initially outside the calibration range in the original analyses of samples MW-102S, MW-101D, MW-3S, MW-Z, and MW-3D, and for cis-1,2-dichloroethene in the original analyses of samples MW-101D and MW-Z were rejected (R) and replaced with the acceptable concentrations from the corresponding diluted samples (MW-102SDL, MW-101DDL, MW-3SDL, MW-ZDL, and MW-3DDL).

- Results for all other analytes in samples MW-102SDL, MW-101DDL, MW-3SDL, MW-ZDL, and MW-3DDL were rejected (R) because acceptable results for these compounds were taken from the original analyses (MW-102S, MW-101D, MW-3S, MW-Z, and MW-3D).

Documentation problems observed in the data packages are described in Section XVII.

XVII. Documentation

Chain-of-custody (COC) records were present and completed accurately.

- Internal chain of custody (ICOC) documents, as required by the FLCM, were not submitted with this data set.

Data presentation was acceptable, with the following observations:

- Sample MW-PL2 was logged in and reported as MW-PLZ; the validator has not changed this identifier.

- The initial submissions of SDG Nos. BRES36 and WHEA12 contained several serious flaws, which included use of an incorrect compound list, poor or no documentation of manual integrations, and apparent contamination of blanks and samples with chloroethane. At the request of the validator, full revisions of these two SDGs were submitted by the laboratory, and used for the validation. The original submissions should be discarded, and replaced with the revisions.

- The electronic data deliverable (EDD) submitted with SDG No. UNIF27 contains erroneous identifications of laboratory sample numbers 686715 and 686716. The correct identifications for these samples are TB-7 and PZ-101, respectively. All other information on the EDD associated with these samples is correct.

These issues do not directly affect the validity of the analytical data, but could be problematic if the results were to be used in a litigation situation.