

Waite - Heindel  
Environmental Management

July 30, 2015

Mr. Gerold Noyes, P.E.  
Vermont Department of Environmental Conservation  
Waste Management & Prevention Division  
1 National Life Drive - Davis 1  
Montpelier, VT 05620-3704

Sent via email: [Gerold.Noyes@vermont.gov](mailto:Gerold.Noyes@vermont.gov)

RE: 2nd Quarter 2015 Monitoring Report  
Bressett Site, Randolph, Vermont (Site #77-0019)

Dear Gerold:

Waite-Heindel Environmental Management (WHEM) is pleased to present the *2<sup>nd</sup> Quarter 2015 Monitoring Report* for the Bressett Site in Randolph, Vermont. Details of the April 2015 monitoring event, during which only one (1) water supply was sampled, are presented herein.

This report is being submitted electronically per WHEM's contract with the State of Vermont (contract EC13-04). I will let you distribute the electronic version as appropriate.

Do not hesitate to call me if you have any questions or concerns regarding this report or the work performed.

Sincerely,

A handwritten signature in black ink that reads "Chris Page".

Chris Page  
Staff Scientist

A handwritten signature in black ink that reads "Miles E. Waite".

Miles E. Waite, Ph.D.  
Senior Hydrogeologist

Enclosure

# **2nd QUARTER 2015 MONITORING REPORT**

for the

## **BRESSETT SITE RANDOLPH, VERMONT**

VT DEC Site #77-0019

July 30, 2015

*Prepared for:*

STATE OF VERMONT  
Vermont Department of Environmental Conservation  
Waste Management & Prevention Division  
1 National Life Drive - Davis 1  
Montpelier, VT 05620-3704

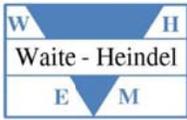
*Prepared by:*



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## **EXECUTIVE SUMMARY**

On April 2, 2015, Waite-Heindel Environmental Management, LLC (WHEM) conducted water supply sampling at the Bressett Site in Randolph, Vermont (VT DEC Site #77-0019). One (1) residential water supply well was sampled. A sample from the drilled well at the Hammond residence (“Shields Well”) was collected from an outside tap. No sample was collected from the “Bressett Spring” (former Voner residence) as the home has been unoccupied since September 2013. No significant problems were encountered during the sampling event, and all sampling procedures were in accordance with site protocols.

The water samples were analyzed by TestAmerica Laboratory (TA) using EPA Method 524.2 for volatile organic compounds (VOCs). 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).

No target compounds were detected at the Hammond residence. PCE has not been detected at the Hammond residence water system since 1981.

All analytical results were validated by an independent validator in accordance with Tier III guidelines as described by the USEPA Region I. Based on the Data Validation Report, results for target VOCs were determined to be valid with no qualifications.

Based on the results of the April 2015 sampling event, WHEM recommends continuing with water supply monitoring program as specified by the established site protocols. The next supply well sampling event is scheduled to occur in October 2015. Groundwater monitoring from monitoring wells is also scheduled for October 2015. If the former Voner residence remains vacant at that time, no water supply sample will be collected unless otherwise requested by the VT DEC.



## **1.0 INTRODUCTION**

The following 2<sup>nd</sup> Quarter 2015 Monitoring Report for the Bressett Site in Randolph, Vermont (see attached Site Location Map in Appendix A) was prepared by Waite-Heindel Environmental Management, LLC (WHEM) for the Vermont Department of Environmental Conservation (VT DEC). This report has been completed in accordance WHEM's contract with State of Vermont (contract EC13-04) for environmental monitoring.

The scheduled tasks for this Site during the 2nd Quarter 2015 have recently been modified, and now include only the sampling of one (1) residential water supply: the drilled well at the Hammond residence (“Shields Well”). The Voner residence was vacated in Fall 2013, prior to the October 22, 2013 sampling event. The shallow spring at the former Voner residence (“Bressett Spring”) will not be sampled unless the home is occupied or sampling is requested by the VT DEC.

## **2.0 WATER SUPPLY SAMPLING**

Water supply sampling was conducted by WHEM from the active drilled bedrock well at the Hammond residence (former Shields residence) on April 22, 2015. The water supply sampling location is identified as “Shields Well” as shown on the Site Plan in Appendix A.

Sampling from the water supply well was conducted in accordance with WHEM’s Work Plan and with the 2013 FLCM-Water. Details and results of the water supply sampling events are described below.

### **2.1 Water Supply Sample Collection**

The Shields well is accessed via a hand-activated pump the north side of the residence. On April 22 the well was purged of approximately 50 gallons prior to sampling. The sample (“Shields”) was collected directly from the hand pump discharge nozzle.

All samples were delivered by WHEM to TA. 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.

## 2.2 Discussion of Results

Validated laboratory analytical results are summarized in Table 1.0 in Appendix B. Full copies of the laboratory report and the data validation package are presented in the Data Validation Report (see Section 3.0). The text of the data validation report is included as Appendix C.

The analytical results indicate the following:

- No target VOCs were reported above quantitation limits in the Shields Well.

Historical results indicate that the Shields well is regularly free of detectable VOCs.

### 2.2.1 QA/QC Samples

WHEM collected a field duplicate (“Well Z”) from the Shields well. Target VOCs were not detected in either sample, so precision could not be evaluated in this field duplicate pair.

Based on trip blank (TB-1) and field blank (FB-1) sampling on April 22, 2015, also discussed in the data validation report, target VOCs were not detected.

## 3.0 DISCUSSION OF DATA VALIDATION

The laboratory data for water samples collected during April 2015 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 titled: *Data Validation for the UniFirst Project, Bressett and UniFirst Sites, Randolph and Williamstown, VT, Organic Analysis Data, Volatile Organics in Water Samples, Sample Delivery Group Nos. BRES60 and UNIF53, June 12, 2015*. The complete report is on file at the VT DEC offices in Waterbury. The text of the report is included as Appendix C.

Results for target volatile organic compounds collected from the Site on April 22, 2015 were determined to be valid as reported for all samples.

There were qualifications for non-target compounds (Bromomethane) as well as some minor lab documentation and presentation issues. While these issues do not directly affect that validity of the analytical data, they could be problematic if the results were to be used in a litigation situation.

#### **4.0 CONCLUSIONS AND RECOMMENDATIONS**

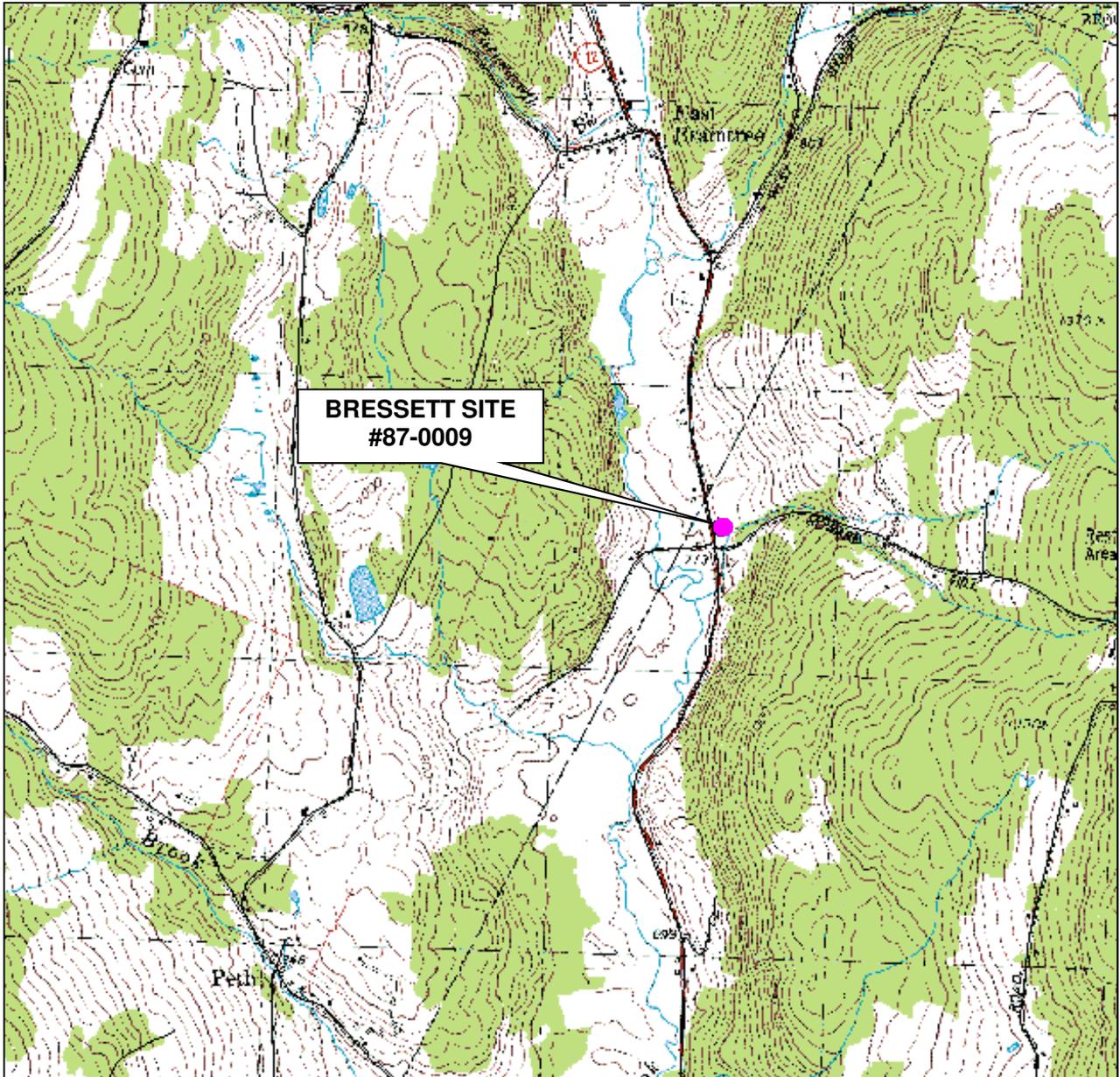
Based on results of water supply sampling conducted by WHEM at the Bressett Site on April 22, 2015, the following conclusions are presented:

- No target compounds were reported above quantitation limits in the Shields Well.
- Based on the Data Validation Report, results for all target compounds were determined to be valid as reported.

Based on the above information, WHEM recommends continuing with the water supply monitoring program as specified in the 2013 *Work Plan* and *FLCM-Water*. The next supply well sampling event is scheduled to occur in October 2015. Groundwater monitoring from monitoring wells is also scheduled for October 2015. Sampling of the former Voner residence (“Bressett Spring”) should only be conducted if the home is occupied.

# **APPENDIX A:**

## **FIGURES**



**LEGEND**

● State-Listed Hazardous Waste Site



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

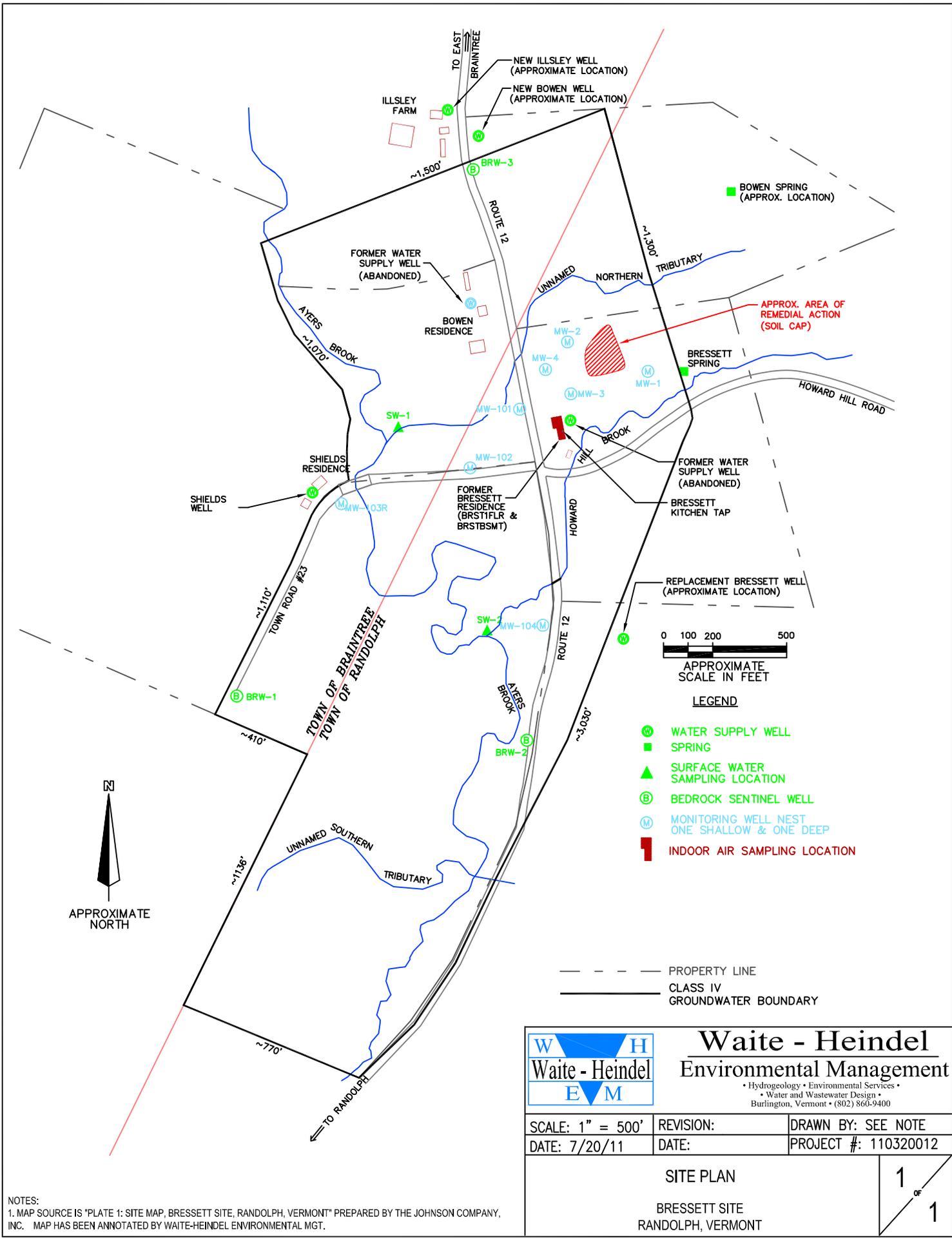


**Waite-Heindel**  
Environmental Management

**SITE LOCATION MAP**

**Bressett Site**  
**Randolph, Vermont**

Date: 12/15/12 | 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 HAS BEEN ANNOTATED BY WAITE-HEINDEL ENVIRONMENTAL MGT.

	<h2 style="margin: 0;">Waite - Heindel</h2> <h3 style="margin: 0;">Environmental Management</h3> <p style="font-size: small; margin: 0;">• Hydrogeology • Environmental Services •          • Water and Wastewater Design •          Burlington, Vermont • (802) 866-9400</p>	
	SCALE: 1" = 500'	REVISION:

DATE: 7/20/11	DATE:	PROJECT #: 110320012
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<p>SITE PLAN</p> <p>BRESSETT SITE</p> <p>RANDOLPH, VERMONT</p>	<p>1</p> <p>OF</p> <p>1</p>
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# **APPENDIX B:**

## **TABLES**



**TABLE 1.0  
SUPPLY WELL RESULTS: 2010-2015  
Bressett Site, Randolph, Vermont**

Owner	Location	Parameter <small>Method 524.2</small>	Drinking Water Guidance Level	Units	Apr-10	Oct-10	Apr-11	Oct-11	Apr-12	Oct-12	Apr-13	Oct-13	Apr-14	Oct-14	Apr-15
Voner	Bressett Kitchen Tap	PCE	0.7	ug/L	0.5 U										
		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										
Voner	Bressett Holding Tank / Bressett Pre-Filter	PCE	0.7	ug/L	0.5 U	0.5 U	0.5 U								
		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								
Hammond	Shields Well	PCE	0.7	ug/L	0.5 U										
		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										
Bowen	Bowen Well	PCE	0.7	ug/L											
		TCE	5.0	ug/L											
		cis-1,2-DCE	70.0	ug/L											
		trans-1,2-DCE	100.0	ug/L											

Notes:  
 - "PCE" = tetrachlorethene; "TCE" = trichlorethene; "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" = data are unusable  
 - "Dry" = well dry during monitoring event; "NA" = not applicable; "NS" = no sample collected.  
 - All data have been qualified based on the data validation report for each sampling event.  
 - 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.

# **APPENDIX C:**

## **DATA VALIDATION REPORT**



June 12, 2015

Mr. Gerold Noyes  
VT Department of Environmental Conservation  
Waste Management and Prevention Division  
1 National Life Drive - Davis 1  
Montpelier, VT 05620-3704

Reference #: 2015-0513 -001

Dear Gerold,

Attached please find the results of the data validation of Sample Delivery Group (SDG) Nos. BRES60 and UNIF53 from the Environmental Monitoring work at the Bressett Site, in Randolph and the UniFirst Site in Williamstown, VT. The water samples in these SDGs were collected on April 22, 2015. The laboratory analyses were performed by TestAmerica Burlington (formerly STL Burlington) of South Burlington, VT.

The data packages were received on May 13, 2015. The validation has been performed by Phoenix Chemistry Services, to the extent possible according to the Tier III guidelines as defined by USEPA Region I, as presented in "Region I EPA-NE Data Validation Manual and Functional Guidelines for Evaluating Environmental Analyses", December, 1996. The EPA's National Functional Guidelines for Organic Data Review (EPA 540/R-99/008, October, 1999), and the Field/Laboratory Coordination Memorandum for Water Monitoring (FLCM), June 25, 2013 were also considered during the evaluation, and professional judgment was applied as necessary and appropriate. Data qualifiers have been applied in the final validation report as necessary and appropriate, in accordance with these guidelines.

Electronic copies of these reports are being submitted to Waite Environmental Management and TestAmerica Burlington, as well as to your attention. The year-end quality assurance summary report for air and water analyses will address issues in this report pertaining to exceedances of the acceptance limits for the performance evaluation sample. No qualifications were necessary for associated field samples in this sampling round as a result of these exceedances.

Thank you for this opportunity to provide data validation services to the Waste Management Division. We look forward to continuing to work with you. If there are any questions or concerns about the material in this report, please do not hesitate to contact me for help and clarification.

Sincerely,

Deborah H. Gaynor, Ph.D.  
Principal, Phoenix Chemistry Services

**DATA VALIDATION**

**FOR**

**UniFirst Project  
Bressett and UniFirst Sites  
Randolph and Williamstown, VT**

**ORGANIC ANALYSIS DATA  
Volatile Organics in Water Samples**

**Sample Delivery Group Nos. BRES60 and UNIF53**

**Chemical Analyses Performed by:**

**TestAmerica Burlington  
30 Community Drive Dr. Suite 11  
South Burlington, VT 05403**

**FOR**

**Mr. Gerold Noyes  
VT Agency of Natural Resources,  
Waste Management Division  
1 National Life Drive - Davis 1  
Montpelier, VT 05620-3704**

**Data Validation Report by:**

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

**June 12, 2015**

**Reference #s 2015-0513-001  
VOA Validation Report/BRES60\_UNIF53/dpd/dhg**

### EXECUTIVE SUMMARY

Phoenix Chemistry Services (Phoenix) has completed the validation of the volatile organics analysis data prepared by TestAmerica Laboratories, Burlington (formerly STL Burlington) for 8 potable water samples, 1 performance evaluation (PE) sample, 2 field blanks (FB), and 2 trip blanks (TB) from the Bressett Site in Randolph, VT and the UniFirst Site in Williamstown, VT. The laboratory reported the data under Sample Delivery Group (SDG) Nos. BRES60 and UNIF53, which were submitted as two data packages received by Phoenix on May 13, 2015. These SDGs include the following samples:

Table 1. Sample Identifications

Sample Identifier	Laboratory ID
<i>SDG No. UNIF53</i>	
TB-2	200-27674-1
WP-5	200-27674-2
WP-7	200-27674-3
WP-13	200-27674-4
WP-8	200-27674-5
WP-3	200-27674-6
WP-X	200-27674-7
FB-2	200-27674-8
WP-23	200-27674-9
<i>SDG No. BRES60</i>	
TB-1	200-27675-1
SHIELDS	200-27675-2
WELL Z	200-27675-3
FB-1	200-27675-4

A cross-reference table of sample IDs was provided in all data packages.

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

- On the basis of the unacceptable %D values for bromomethane in the associated ICV analysis, results for bromomethane in all samples were qualified as estimated (UJ).

The laboratory appropriately applied “J” qualifiers to the sample Form I’s when the concentration of an analyte was less than the sample-specific practical quantitation limit (PQL). The validator did not remove these qualifiers. All laboratory-specific qualifiers, such as the asterisk (\*) and “B” qualifier have been removed by the validator from the spreadsheet results.

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.. The one manual integration performed in this data set was due to the automated system missing the peak, and was appropriate and properly documented.

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

## INTRODUCTION

Analyses were performed according to Safe Drinking Water Act Method 524.2 Rev. 4.1, as documented in TestAmerica SOP BR-MV-005r11 for Method 524.2, and in accordance with requirements in the Field/Laboratory Coordination Memorandum for Water Monitoring (FLCM), June 25, 2013, except as noted within this report. The target compound list for Method 524.2 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 in the "Region I EPA-NE Data Validation Manual: The Data Quality System", (12/96 Revision). To maintain consistency with previous work at these sites, 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 in the Data Summary Table contained in Attachment A and in the spreadsheet summary files (Attachment B, submitted electronically) 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. BRES60 and UNIF53 were collected on April 22, 2015. All volatiles analyses were performed within the acceptable holding times for preserved water samples (14 days from collection), as required by Region 1. As referenced in the Case Narrative (as required by the CLP SOW), the samples were properly preserved. The FLCM requires that the pH for each sample is measured within one day after receipt at the laboratory. The samples were screened and pH was taken as required, and this data was included with the data packages. All pH values were acceptable (<2).

Cooler temperatures for the field samples on receipt at the laboratory were checked and documented in the data packages, and were 2.2 and 4.6 °C, which are within the acceptance range of 4 °C ±2 °C.

### **II. GC/MS Instrument Performance Check (Tuning)**

The field samples were analyzed on a single GC/MS system identified as instrument CHL. The tuning of this instrument 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. Both BFB tunes were correctly calculated, within acceptance limits, and were reported accurately on the Form V summaries in the data packages.

### **III. Initial Calibration (IC)**

One IC (4/20/15) was performed on instrument CHL 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.

No target compounds were manually integrated in the IC. All % RSDs for the IC were below the maximum limit (30%) specified by Region I. All RRF's were above the 0.05 minimum technical criterion, with two exceptions: 2-butanone exhibited an average RRF of 0.0191, and acetone exhibited an average RRF of 0.0487.

Pursuant to the Region I validation document, results for 2-butanone and acetone in all samples warranted qualification as estimated (UJ) based on the low RRFs achieved. However, 2-butanone and acetone were spiked at a concentration of 5 µg/L in the matrix spikes, matrix spike duplicates, laboratory control samples, and laboratory control sample duplicates analyzed with this data set, and acceptable recoveries for this compound were achieved in these analyses. Therefore, results for 2-butanone and acetone were not qualified in any field samples on the basis of the low RRFs in the associated IC standards.

An ICV was analyzed immediately after the IC, as required, and the percent difference results were correctly calculated and accurately reported in the data packages. All %D values in the ICV were within (range: -4.9 to +20.9 %D overall) laboratory established control limits (±30 % D) and within Region 1 limits (±25 % D for an independent standard), with the single exception of bromomethane, which was reported with a +46.4 %D.

On the basis of the unacceptable %D value for bromomethane in the associated ICV analysis, results for bromomethane in all samples were qualified as estimated (UJ).

#### **IV. Continuing Calibration (CC)**

One continuing calibration (CC) standard was run in support of the field sample analyses reported in this data set. Documentation of the CC standard 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.

The maximum limit for %D in the CC standard allowed by Region 1 is  $\pm 25\%$ . All %D results were below this limit for the CC standards, and all RRFs were above the 0.05 minimum criterion, with the single exception of 2-butanone, which exhibited an RRF of 0.0205 in the CC standard.

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

#### **V. Blanks**

Results for one (1) water-matrix laboratory method blank (MB) were reported in association with this set of samples. No target analytes were detected in the MB.

Two trip blanks (TB) was reported in these SDGs. No target analytes were detected in either TB.

Two field blanks (FB) was reported in these SDGs. No target analytes were detected in either FB.

Two holding (storage) blanks (HB) were reported these SDGs. No target analytes were detected in either HB.

#### **VI. Surrogate Compounds**

Recovery of surrogate compounds is not being reported for Method 524.2; instead, the laboratory utilizes the Form VIII and monitors the area recoveries for these four compounds, similarly to the internal standards. All area recoveries for surrogate compounds in Method 524.2 were within method criteria ( $\pm 30\%$  of CC or  $\pm 50\%$  of IC).

#### **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.

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

Sample SHEILDS was used for the Method 524.2 MS/MSD analyses in this data set. The spiking solutions contained all target compounds at 1  $\mu\text{g/L}$  (except for the ketones at 5  $\mu\text{g/L}$ ) for the MS/MSD pair.

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 88 – 121 %R; limits: 70 – 130 %R) and reproducible (RPD range 0-5%; limit 20% RPD).

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. BRES60 and UNIF53 contained two potable water field duplicate pairs; the field sampling notes identified sample WP-X as the field duplicate of sample WP-5, and WELL Z as the field duplicate of sample SHEILDS.

No target analytes were reported in the field duplicate pair SHEILDS and Well Z, so precision could not be evaluated in this field duplicate pair. Tetrachloroethene was reported at 0.10 ug/L in WP-5, and was not detected in sample WP-X. Precision could not be evaluated because there was no target analyte greater than 2 times the quantitation limit in either member of the field duplicate pair WP-Z and WP-3.

## **X. Sensitivity Check**

The aqueous MDL and the verification studies for Method 524.2 submitted for this project were completed on 4/2/15, which is just prior to the sample analyses in this data set. All analytes had calculated and verified MDLs below the method quantitation limits in these MDL studies.

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 (and 5 ug/L for the ketones), as required by the FLCM. Recoveries within Region 1 acceptance criteria (60 – 140 %R) were obtained for all target analytes in all spiked analyses. In addition, the low standard of the initial calibration supports the reporting limit for the sample analyses.

## **XI. Performance Evaluation (PE) Samples/Accuracy Check**

One zero blind PE sample (commonly known as laboratory control sample, LCS) and duplicate (LCSD) pair was prepared and analyzed by the laboratory at 1 µg/L (ketones at 5 ug/L) on instrument CHL 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 all recoveries were acceptable (93 – 122 %R). Laboratory established limits are 70 - 130 %R, and Region 1 limits are 60 - 140 %R. Reproducibility between the LCS and LCSD was acceptable (1 - 14 %RPD; laboratory limit 20 %RPD) for all analytes.

One external single-blind PES sample for Method 524.2 was submitted with the samples in this sampling round. The results of the PES are summarized in Attachment C. All spiked compounds were within the vendor's published PT Performance Acceptance Limits with the following exceptions:

Table 2. PES Exceedances

WP-23	Compound	Result (ug/L)	Certified Value (ug/L)	PT Acceptance Range (ug/L)
4/24/2015 22:37	chlorobenzene	18.2	15.0	12.0 - 18.0
	styrene	14.9	12.2	9.76 - 14.6
	toluene	19.0	15.4	12.3 - 18.5
	xylenes (total)	40.0	33.2	26.6 - 39.8

Acceptance ranges for the individual or combined xylene isomers were not established by the vendor; however, the total xylenes result was outside its acceptance range. Although the laboratory reported the data using the appropriate number of significant figures, the validator used additional significant figures taken from the raw data to ensure that rounding did not impact the evaluation.

Since there were no detections for the chlorobenzene, styrene, toluene or xylenes (total) in any of the associated field samples, no qualifications were necessary on the basis of the high bias exhibited in the PES for these analytes.

A false positive for chloroform was reported in the PES at a concentration of 0.19 ug/L. This compound was not added to the PES, and it was reported as a J value less than ½ the reporting limit. Two field samples (WP-7 and WP-13) in this data set reported trace detections for chloroform, at 0.094 and 0.089 ug/L, respectively; the reporting limit is 0.5 ug/L and the MDL is 0.076 ug/L. As per Region 1 guidance, no qualifications were applied on the basis of the false positive in the PES.

It should be noted that the acceptance range is established by the vendor according to the NELAC standard for Performance Test Providers, and is based on regression equations and fixed acceptance criteria. These values are established using ampulated standards diluted in reagent water immediately prior to analysis; however, the PE sample used in this project is a whole-volume sample, prepared by the vendor using reagent water at the vendor's facility. The whole-volume sample thus represents all shipping, handling, and storage conditions that project samples are subjected to, and is more representative of the potential variability in homogeneity and stability than the original, concentrated and ampulated PE standard.

All analytes in the PES exhibited recoveries greater than 100%. Two possible explanations for the high bias exhibited are that the PES was diluted incorrectly by the vendor when the whole volume PES was made, or that the instrument was running at a high bias at the time of the analysis. The CC standard was well within acceptable operating parameters, but the validator noted that the associated LCS and LCSD standards, which also represent independent standards, both exhibited a slightly high bias (but within acceptance limits) for most analytes. The validator also noted that one or more analytes which are not historically detected in these samples were reported at concentrations at or below the reporting limit in samples WP-3, WP-7, and WP-13, which were analyzed in the same 12-hour analytical period as the PES. These analytes include: chloroform; chloromethane; acetone; bromodichloromethane; dibromochloromethane; bromoform; acetone; and methyl *t*-butyl ether.

The laboratory has been asked to investigate the PES exceedances, and to submit a summary of their investigation and a response which would address any necessary corrective actions to prevent a future recurrence. It is expected that the results of their investigation will be discussed in the annual quality assurance review.

## **XII. Target Compound Identification**

Reported target compounds were correctly identified with supporting spectra present for all samples in these data packages.

## **XIII. Compound Quantitation and Reported Quantitation Limits**

Target compound quantitation and practical quantitation limits (PQLs) were accurately reported on the Form I summaries.

The laboratory appropriately applied “J” qualifiers to the sample Form 1s when the concentration of an analyte was less than the sample-specific PQL. The validator did not remove these qualifiers.

The values and associated qualifiers that the validator has judged to be acceptable are presented on the Form 1s in Attachment B, and in the “Validated\_Value” and “Validator\_Qualifier” columns, respectively, in both the Data Summary Table in Attachment A and the spreadsheet summary file submitted electronically as Attachment C. The Data Summary Table presents all non-detect results for which the result or qualifier was changed during validation, and all positive results, whether or not the value or qualifier was changed as a result of the validation. All results, positive and non-detect, are listed in the spreadsheet summary. If a value or qualifier was changed, this is indicated by the “Y” (for yes) notation in the “Validator\_Change” column in the Data Summary Table and spreadsheet summary; if the value or qualifier was not changed during the validation effort, this field is marked with an “N” to indicate “no change”. Sample-specific (practical) quantitation limits are given in the summaries (“PQL” or “High Limit”), and may also be found on the laboratory-generated Form 1 for each sample (Attachment B).

All laboratory-specific qualifiers, such as the asterisk (\*) and “B” qualifier have been removed by the validator from the Form 1s and from the spreadsheet results. Neither is noted as a validation change.

## **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.

## **XVI. Overall Evaluation of Data**

Results for volatile organic compounds were determined to be valid as reported for all samples in SDG Nos. BRES60 and UNIF53, with the following exceptions and observation:

- On the basis of the unacceptable %D values for bromomethane in the associated ICV analysis, results for bromomethane in all samples were qualified as estimated (UJ).
- Since there were no detections for the chlorobenzene, styrene, toluene or xylenes (total) in any of

the associated field samples, no qualifications were necessary on the basis of the high bias exhibited in the PES for these analytes.

- A false positive for chloroform was reported in the PES at a concentration of 0.19 ug/L. As per Region 1 guidance, no qualifications were applied to the positive results for chloroform in WP-7 and WP-13 on the basis of the false positive in the PES.
- The laboratory appropriately applied “J” qualifiers to the sample results when the concentration of an analyte was less than the sample-specific PQL. The validator did not remove these qualifiers. All laboratory-specific qualifiers, such as the asterisk (\*) and “B” qualifier have been removed by the validator from the spreadsheet results.

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

## **XVII. Documentation**

Chain-of-custody (COC) records were present and completed accurately, with the following exceptions:

- A revised COC was provided by the field sampler to correct the sampling time for sample WP-5, and was included in the data package.
- The total number of containers submitted for sample WP-3 was not specified on the COC.

The laboratory bar codes provide a sufficient replacement for the internal chain of custody (ICOC) records described in the FLCM. Data presentation was acceptable.

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

**ATTACHMENT A**

**DATA SUMMARY TABLE  
SDG Nos. BRES60 and UNIF53  
Volatile Organics in Water Samples**