Waite - Heindel
Environmental Management

July 11, 2016

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

RE: 2nd Quarter 2016 Monitoring Report
Bressett Site, Randolph, Vermont (Site #77-0019)

Dear Gerold:

Waite-Heindel Environmental Management (WHEM) is pleased to present the *2nd Quarter 2016 Monitoring Report* for the Bressett Site in Randolph, Vermont. Details of the April 2016 monitoring event, during which two (2) water supplies were 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,

Chandler Noyes
Staff Geologist

Miles E. Waite, Ph.D.
Senior Hydrogeologist

Enclosure

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2nd QUARTER 2016 MONITORING REPORT

for the

BRESSETT SITE
RANDOLPH, VERMONT

VT DEC Site #77-0019

July 11, 2016

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:

Waite - Heindel
Environmental Management

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EXECUTIVE SUMMARY

On April 21, 2016, Waite-Heindel Environmental Management, LLC (WHEM) conducted water supply sampling at the Bressett Site in Randolph, Vermont (VT DEC Site #77-0019). Two (2) residential water supplies were sampled. A sample from the drilled well at the Hammond residence ("Shields Well") was collected from an outside tap, and a sample of the shallow spring at the Simpson residence ("Bressett Spring") was collected from the kitchen tap. This is the first time since April 2013 that a sample was collected from the Bressett Spring. 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 either of the residences. PCE has not been detected at the Hammond residence water system since 1981, and has not been detected at the Simpson residence since 2008.

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 2016 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 2016. Groundwater monitoring from monitoring wells is also scheduled for October 2016.

1.0 INTRODUCTION

The following *2nd Quarter 2016 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 2016 have recently been modified, and now include the sampling of two (2) residential water supplies: the drilled well at the Hammond residence ("Shields Well"), and the shallow spring at the Simpson residence ("Bressett Spring").

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) and from the shallow spring that supplies the Simpson residence (former Bressett residence) on April 21, 2016. The water supply sampling locations are identified as "Shields Well" and "Bressett Spring" as shown on the Site Plan in Appendix A.

Sampling from both water supply wells was conducted in accordance with WHEM's *Work Plan for Environmental Monitoring* ("Work Plan"; July 2013) and with the *Field/Lab Coordination Memorandum for Water Monitoring* ("FLCM-Water"; June 2013). 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 21 the well was purged of approximately 50 gallons prior to sampling. The sample ("Shields") was collected directly from the hand pump discharge nozzle.

The Bressett spring is sampled from inside the house from the kitchen tap ("Bressett Tap"). The cold water from the tap was allowed to run for approximately 10 minutes prior to sampling.

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 or the Bressett Tap.

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 21, 2016, 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 2016 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. BRES62 and UNIF55, May 19 and 23, 2016*. The complete report is on file at the VT DEC offices in Montpelier. The text of the report is included as Appendix C.

Results for target volatile organic compounds collected from the Site on April 21, 2016 were determined to be valid as reported for all samples.

There were qualifications for non-target compound (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 21, 2016, the following conclusions are presented:

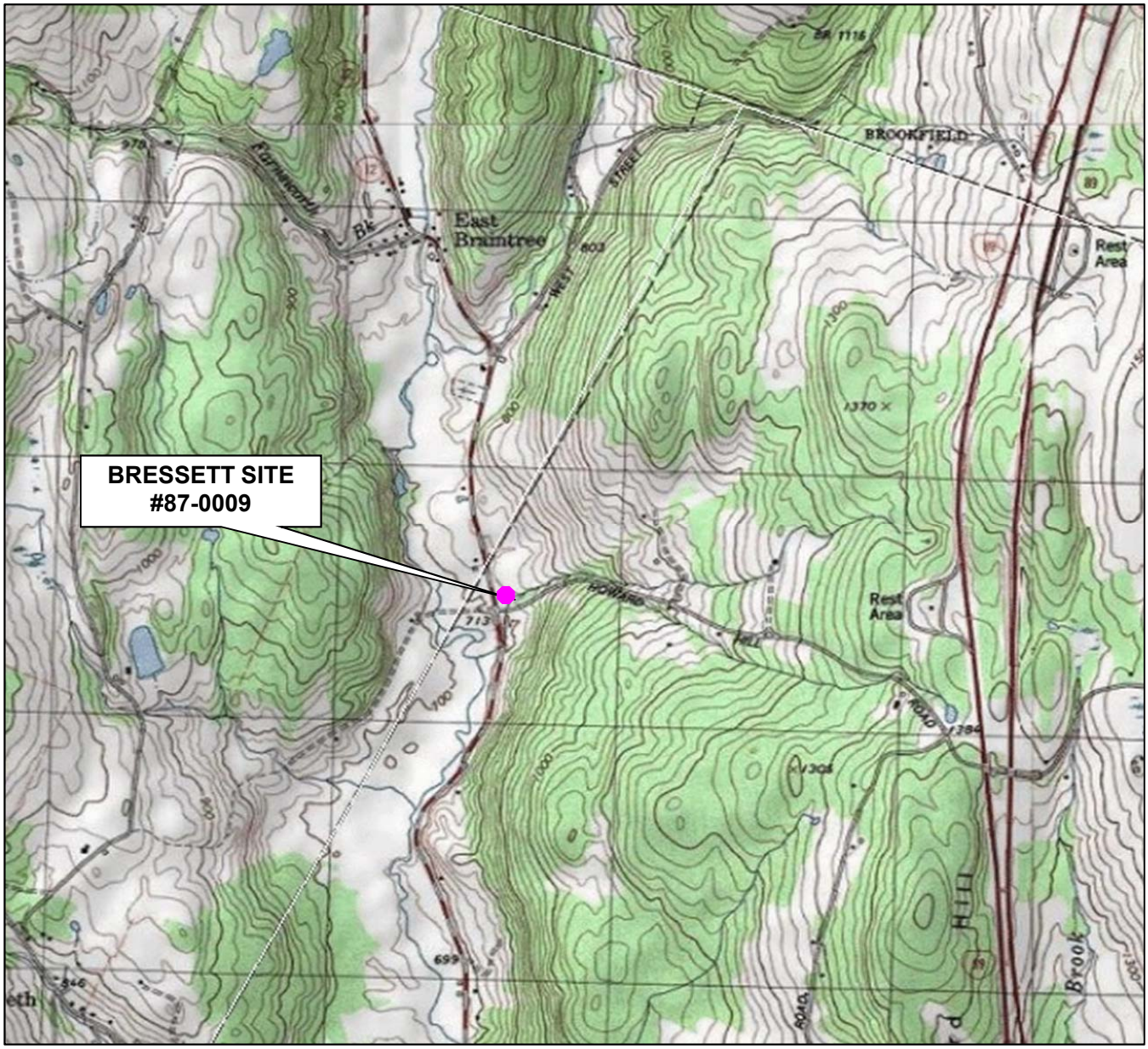
- No target compounds were reported above quantitation limits in the Shields Well or the Bressett Tap.

- 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 2016. Groundwater monitoring from monitoring wells is also scheduled for October 2016.

APPENDIX A:

FIGURES



LEGEND

State-Listed Hazardous Waste Site

N

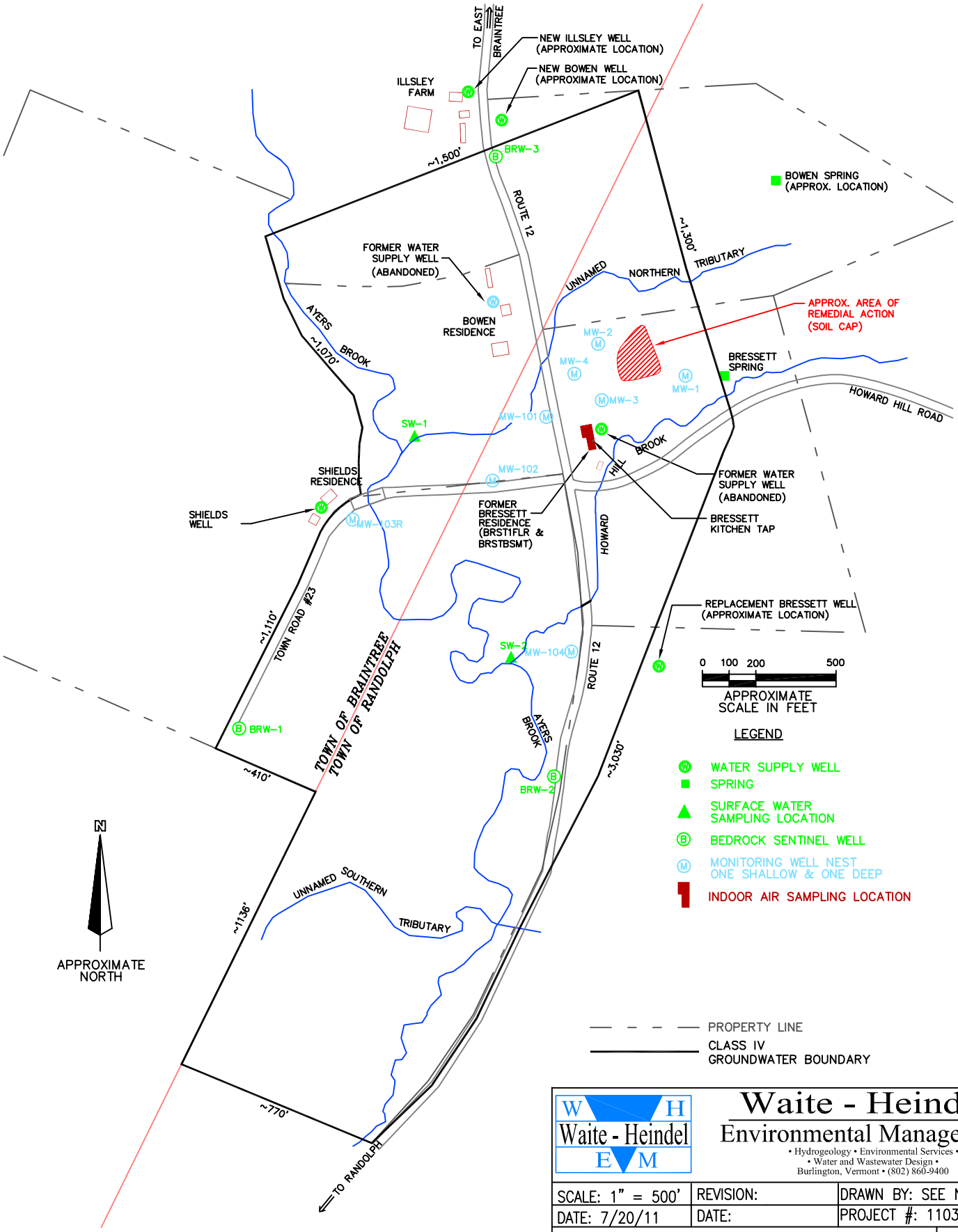
Map Source: *USGS Mapping from ANR Natural Resources Atlas*

Waite - Heindel
Environmental Management

SITE LOCATION MAP

Bressett Site
Randolph, Vermont

Date: 07/11/16	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.

W H
Waite - Heindel
E M

Waite - Heindel
Environmental Management

• Hydrogeology • Environmental Services •
• Water and Wastewater Design •
Burlington, Vermont • (802) 860-9400

SCALE: 1" = 500'	REVISION:	DRAWN BY: SEE NOTE
DATE: 7/20/11	DATE:	PROJECT #: 110320012

SITE PLAN

BRESSETT SITE
RANDOLPH, VERMONT

1 OF 1

APPENDIX B:

TABLES

TABLE 1.0
SUPPLY WELL RESULTS: 2011-2016
Bressett Site, Randolph, Vermont

Owner	Location	Parameter Method 524.2	Driking Water Guidance Level	Units	Apr-11	Oct-11	Apr-12	Oct-12	Apr-13	Oct-13	Apr-14	Oct-14	Apr-15	Oct-15	Apr-16
Simpson	**Bressett Kitchen Tap**	**PCE**	**0.7**	ug/L	0.5 U	0.5 U	0.5 U	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
		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
Simpson	**Bressett Holding Tank / Bressett Pre-Filter**	**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										
Hammond	**Shields Well**	**PCE**	**0.7**	ug/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	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	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	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	0.5 U	0.5 U	0.5 U	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; "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

Phoenix Chemistry Services

June 30, 2016

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

Reference #s: 2016-0519 -001 and -0523-001

Dear Gerold,

Attached please find the results of the data validation of Sample Delivery Group (SDG) Nos. BRES61, UNIF54, and WHEA21 from the Environmental Monitoring work at the Bressett Site, in Randolph, VT and the UniFirst Plant Site in Williamstown, VT. The water samples in these SDGs were collected on April 23, 2016. The laboratory analyses were performed by TestAmerica Burlington (formerly STL Burlington) of South Burlington, VT.

The data packages were received on May 19 and May 23, 2016, with a revision for SDG No. BRES62 received on June 24 (the electronic deliverable) and June 30 (the data package), 2016. 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-014-002, August, 2014), 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.

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. BRES62 and UNIF55

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 30, 2016

Reference #s 2016-0519-001 & -0523-001
VOA Validation Report/BRES62_UNIF55/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 7 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. BRES62 and UNIF55, which were submitted as two data packages received by Phoenix on May 19 and 23, 2016. These SDGs include the following samples:

Table 1. Sample Identifications

Sample Identifier	Laboratory ID
SDG No. UNIF55	
TB-2	200-33169-1
FB-2	200-33169-2
WP-7	200-33169-3
WP-8	200-33169-4
WP-13	200-33169-5
WP-5	200-33169-6
WP-23	200-33169-7
SDG No. BRES62	
TB-1	200-33170-1
FB-1	200-33170-2
SHIELDS	200-33170-3
BRESSETT TAP	200-33170-4
WELL Z	200-33170-5

A cross-reference table of sample IDs was provided in both data packages. Sample FB-1 was originally logged in incorrectly as FB-2; the validator requested that the laboratory correct the sample identifier, and a revision with this correction was submitted on June 24 (electronic deliverable) and June 30 (data package).

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 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. BRES62 and UNIF55 were collected on April 21, 2016. 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 ^{o}C, which are within the acceptance range of 4 ^{o}C ±2 ^{o}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. All three 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 (4/27/16) 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.

Manual integrations were performed on target compounds in the ICs, CCs, spiked analyses, and field samples in these data packages. Both the automated and manually integrated ion chromatograms were present within the data packages, and all manual integrations were labeled with the analyst's name, the date, and the reason for the change, and all appear acceptable.

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 0.0186, and acetone exhibited an average RRF of 0.0407.

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 these compounds 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 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 +34.8 %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)

Two continuing calibration (CC) standards were 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 ±25%. All %D results were below this limit for the CC standards, and all RRFs were above the 0.05 minimum criterion, with the exceptions of acetone and 2-butanone, which exhibited RRFs of 0.0432 and 0.0458 (acetone); and 0.0158 and 0.0168 (2-butanone) in the CC standards.

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 IC and CCs.

V. Blanks

Results for two (2) water-matrix laboratory method blanks (MB) were reported in association with this set of samples. No target analytes were detected in the MBs other than bromomethane at 0.192J ug/L in the MB identified as MB 200-103810, and methylene chloride at 0.128J ug/L in MB 200-103881.

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.

Since neither bromomethane or methylene chloride was reported in any field sample, no results required qualification on the basis of blank contamination.

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 laboratory criteria (±50% of IC).

VII. Internal Standards (IS)

All IS areas and retention times (RT) were within the established QC limits (±50% of IC) 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 µg/L (except for the ketones at 5 µg/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 82 – 120 %R; limits: 70 – 130 %R) and reproducible (RPD range 0-13%; 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. BRES62 and UNIF55 contained a single potable water field duplicate pair; the field sampler identified sample WELL-Z as the field duplicate of sample SHEILDS. A second field duplicate pair had been planned for collection at the WP-3 site; however, access to this water supply was unavailable during sample collection, and after consulting with the project manager and the data validator, the field sampler did not return to collect a second field duplicate at a previously sampled location.

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.

X. Sensitivity Check

The aqueous method detection limit (MDL) study for Method 524.2 submitted for this project was completed on 2/2/15 to 2/4/15, which is just over a year prior to the sample analyses in this data set. The limit of detection verification (LODV) study was also performed on 2/4/15. Limit of quantitation verification (LOQV) studies were performed on 2/4/16, 2/24/16, and 3/25/16. All analytes had properly calculated and acceptably verified MDLs below the method quantitation limits in these MDL and verification 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.

X. Performance Evaluation (PE) Samples/Accuracy Check

Two zero blind PE samples (commonly known as laboratory control sample, LCS) and duplicate (LCSD) pairs were 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 (87 – 114 %R). Laboratory established limits are 70 - 130 %R, and Region 1 limits are 60 - 140 %R. Reproducibility between the LCS and LCSD was acceptable (0 - 13 %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.

Acceptance ranges for the individual or combined xylene isomers were not established by the vendor.

A false positive for chloroform was reported in the PES at a concentration of 0.10 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 to low detections for chloroform, at 0.093 and 0.77 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.

XI. Target Compound Identification

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

XII. 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.

XIII. Tentatively Identified Compounds (TICs)

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

XIV. 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.

XV. Overall Evaluation of Data

Results for volatile organic compounds were determined to be valid as reported for all samples in SDG Nos. BRES62 and UNIF55, 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).

- A false positive for chloroform was reported in the PES at a concentration of 0.10 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.

XVI. Documentation

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

- The laboratory appropriately signed the COC documents when transferring the sample vials

to the field sampler; however, the field sampler did not sing for receipt of these vials, so the signatures on the COCs appear to be in the incorrect order. The validator asked the Client Services Manager at the laboratory and the Principal at the field sampling firm to review the appropriate procedures with their employees.

- The first field blank (in SDG No. BRES62) was incorrectly logged in as FB-2, although it is clearly identified on the COC as FB-1. The validator asked the laboratory to correct all references to this sample in the raw data, which they did, and a full revision of the spreadsheet electronic deliverable for SDG BRES62 was submitted on 6/24/16 and of the data package on June 30, 2016. The revised data package for SDG No. BRES62 should be maintained, and the original submission discarded.

The laboratory bar codes provide a sufficient replacement for the internal chain of custody (ICOC) records described in the FLCM; however, the laboratory maintains internal COC records, and included these in the data packages, and they were properly completed.

Data presentation was acceptable; however, the screen reports for these samples were not provided to the validator following sample receipt, which is an FLCM requirement. The validator has reminded the laboratory that sample screens and pH measurements must be submitted as soon as they are available.

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

ATTACHMENT A

DATA SUMMARY TABLE
SDG Nos. BRES62 and UNIF55
Volatile Organics in Water Samples