

**June 2016**

**Off-Post**

**Quarterly Groundwater Monitoring Report**



*Prepared For*

**Department of the Army  
Camp Stanley Storage Activity  
Boerne, Texas**

**August 2016**

## EXECUTIVE SUMMARY

- A total of six off-post wells were sampled during the June 2016 sampling event for volatile organic compound (VOC) analyses.
- Analyses indicated off-post well RFR-10 exceeded the maximum contaminant level (MCL) for tetrachloroethene (PCE). This well is equipped with granular activated carbon (GAC) filtration systems. All other wells were below the MCLs.
- GAC-filtered samples (RFR-10-A2 and RFR-10-B2) were collected in May 2016 from well RFR-10. This monthly sampling was triggered by detections in an RFR-10 GAC-filtered sample collected in March. Both GAC-filtered samples collected in May from RFR-10 were non-detect indicating the GAC filtration systems are working properly.
- GAC-filtered samples were not collected in June 2016 as part of the groundwater monitoring program. The next scheduled GAC-filtered samples will be collected in September 2016.
- Semi-annual GAC maintenance was performed February 18, 2016. This involved replacing the first carbon canister in each GAC system and other routine maintenance. This carbon exchange is performed semi-annually; the next carbon change-out will be due in August 2016.
- Updates to the data quality objectives (DQOs) and the long term monitoring optimization (LTMO) have been approved by the Texas Commission on Environmental Quality (TCEQ) and United States Environmental Protection Agency (USEPA). The new sampling schedule will be implemented in December 2016 with a transition schedule to be accomplished in September 2016.

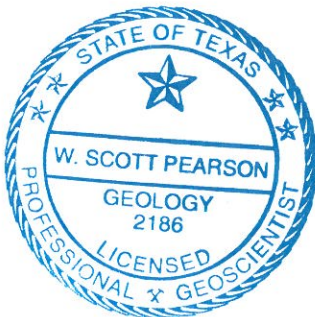
## GEOSCIENTIST CERTIFICATION

### June 2016 Off-Post Quarterly Groundwater Monitoring Report

For

Department of the Army  
Camp Stanley Storage Activity  
Boerne, Texas

I, W. Scott Pearson, Professional Geologist (P.G.), hereby certify that the 2016 June Off-Post Quarterly Groundwater Monitoring Report for the Camp Stanley Storage Activity installation in Boerne, Texas accurately represents the site conditions of the subject area. This certification is limited only to geoscientific products contained in the subject report and is made on the basis of written and oral information provided by the Camp Stanley Storage Activity Environmental Office, laboratory data provided by APPL, and field data obtained during groundwater monitoring conducted at the site in June 2016, and is true and accurate to the best of my knowledge and belief.



*W. Scott Pearson*

W. Scott Pearson, P.G.  
State of Texas  
Geology License No. 2186

*August 24, 2016*

Date

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**ABBREVIATIONS AND ACRONYMS**

µg/L	microgram per liter
1,1-DCE	1,1-dichloroethene
AOC	Area of Concern
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
<i>cis</i> -1,2-DCE	<i>cis</i> -1,2-Dichloroethene
CSSA	Camp Stanley Storage Activity
DQO	Data Quality Objective
FD	Field Duplicate
GAC	Granular Activated Carbon
HSP	Health and Safety Plan
LS	Leon Springs
LTMO	Long Term Monitoring Optimization
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NA	Not Applicable
OFR	Old Fredericksburg Road
Parsons	Parsons Government Services, Inc.
PCE	Tetrachloroethene
P.G.	Professional Geologist
Plan	Off-Post Monitoring Program and Response Plan
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RFR	Ralph Fair Road
RL	Reporting Limit
SAP	Sampling and Analysis Plan
SLD	Scenic Loop Drive
<i>trans</i> -1,2-DCE	<i>trans</i> -1,2-Dichloroethene
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

**JUNE 2016**  
**OFF-POST GROUNDWATER MONITORING REPORT**  
**CAMP STANLEY STORAGE ACTIVITY**

**1.0 INTRODUCTION**

This report presents results from the off-post quarterly sampling performed for Camp Stanley Storage Activity (CSSA) in June 2016 as required by the Administrative Order on Consent dated May 5, 1999. The purpose of this report is to present a summary of the sampling results. Results from all four 2016 quarterly monitoring events (March, June, September, and December) will be described in detail in an Annual Report to be submitted after December 2016. The Annual Report will also provide an interpretation of all analytical results and an evaluation of any temporal or spatial trends observed in the groundwater contaminant plume during investigations.

Groundwater monitoring was performed June 6 through 20, 2016. The quarterly off-post groundwater monitoring program was initiated in September 2001 in accordance with the **Off-Post Monitoring Program and Response Plan (CSSA, 2002)**, herein referred to as the “Plan”. Action levels for detection of volatile organic compounds (VOCs) and the rationale for sampling off-post wells are described in the Plan.

The CSSA groundwater monitoring program also follows the provisions of the groundwater monitoring program data quality objectives (DQOs) as well as the recommendations of all applicable project-specific work plans. **Appendix A** provides an evaluation of the DQO attainment for this sampling event. Approval for the updated DQOs and the long term monitoring optimization (LTMO) was received from the Texas Commission on Environmental Quality (TCEQ) on April 22, 2016 and the United States Environmental Protection Agency (USEPA) on May, 5, 2016. The new schedule will be implemented during the December 2016 sampling event with a transition schedule being implemented during the September 2016.

The primary objective of the off-post groundwater monitoring program is to determine whether concentrations of chlorinated VOCs detected in off-post public and private drinking water wells exceed safe drinking water standards. Other objectives are to determine the lateral and vertical extent of the contaminant plumes and identify trends (decreasing or increasing) in contaminant levels over time in the sampled wells.

## 2.0 MAY AND JUNE 2016 ANALYTICAL RESULTS

During the June 2016 event, groundwater samples were collected from six off-post wells shown in **Figure 2.1**. Seven granular activated carbon (GAC) filtered samples (LS-5-A2, LS-6-A2, LS-7-A2, OFR-3-A2, RFR-10-A2, RFR-10-B2, and RFR-11-A2) are collected semi-annually (March and September), but were not collected during this event.

**Table 2.1** includes the rationale for selection of the six wells to be sampled in June 2016, and **Figure 2.1** provides well locations for the following sampled wells:

- Three privately-owned wells in the Leon Springs (LS) Villa area: LS-5, LS-6, and LS-7;
- One privately-owned well on Old Fredericksburg Road (OFR) (OFR-3).
- Two privately-owned wells in the Ralph Fair Road (RFR) area (RFR-10 and RFR-11).

GAC-filtered samples were not collected as part of the quarterly groundwater monitoring in June 2016. However, previously in May 2016 raw water and GAC-filtered samples were collected from well RFR-10. This sampling was triggered by GAC-filtered detections from March 2016. These GAC-filtered samples (RFR-10-A2 and RFR-10-B2) were non-detect indicating the GAC systems are functioning properly.

From May and June 2016, a total of 9 groundwater samples, two trip blanks, one field duplicate (FD), and one matrix spike/matrix spike duplicate (MS/MSD) included with the on-post data groups were submitted to Agriculture & Priority Pollutant Laboratories, Inc. (APPL) in Clovis, California for analysis. Groundwater samples were analyzed for the short list of VOCs using SW-846 Method 8260B. The approved short list of VOCs includes *cis*-1,2-dichloroethene (*cis*-1,2-DCE), *trans*-1,2-Dichloroethene (*trans*-1,2-DCE), 1,1-dichloroethene (1,1-DCE), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride.

The data packages (Parsons Government Services, Inc. [Parsons] internal reference 810000-#131 and 110046-#1) contain the analytical results for this sampling event and are presented in **Appendix C**. Laboratory results were reviewed and verified according to the guidelines outlined in the CSSA Quality Assurance Project Plan (QAPP), Version 1.0. Parsons received the data package May 24 and June 27, 2016.

All active wells with submersible pumps were sampled from a tap located as close to the wellhead as possible. Most taps were previously installed by CSSA to obtain a representative groundwater sample before pressurization or storage of groundwater in the water supply distribution system. Water was purged to engage the well pump prior to sample collection. Conductivity, pH, and temperature readings were recorded to confirm adequate purging while the well was pumping. Generally, this required an average of 20 gallons to be purged prior to sample collection.

Concentrations of the VOCs detected in June 2016 are presented in **Table 2.2**. Full analytical results from the June 2016 sampling event are presented in **Appendix B**. As shown in **Table 2.1**, all 6 samples that were scheduled for collection in June 2016 were obtained.







**Sampled Wells June 2016**

- > MCL (VOC's) only
- > RL (VOC's) only
- > MDL (VOC's) only
- ND

**Figure 2.1**

On-Post and Off-Post Well Sampling Locations for June 2016  
Camp Stanley Storage Activity

**PARSONS**

0 0.25 0.5 Miles



**Table 2.2  
June 2016 Off-Post Groundwater Results, Detected Analytes Only**

Subdivision	Well ID	Sample Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl Chloride
Leon Springs Villas	LS-5	6/6/2016	--	--	--	<b>0.88F</b>	<b>1.79</b>	--
	LS-6	6/6/2016	--	--	--	<b>0.72F</b>	<b>0.89F</b>	--
	LS-7	6/6/2016	--	--	--	<b>0.62F</b>	--	--
Old Fredricksburg Road	OFR-3	6/6/2016	--	--	--	<b>3.16</b>	<b>3.02</b>	--
	OFR-3 FD	6/6/2016	--	--	--	<b>3.34</b>	<b>3.03</b>	--
Ralph Fair Road	RFR-10	5/3/2016	--	--	--	<b>6.53</b>	<b>4.48</b>	--
	RFR-10-A2	5/3/2016	--	--	--	--	--	--
	RFR-10-B2	5/3/2016	--	--	--	--	--	--
	RFR-10	6/6/2016	--	--	--	<b>7.70</b>	<b>4.90</b>	--
	RFR-11	6/6/2016	--	--	--	<b>0.94F</b>	<b>0.30F</b>	--
<b>Laboratory Detection Limits &amp; Maximum Contaminant Level</b>								
<b>Method Detection Limit (MDL)</b>			<b>0.12</b>	<b>0.07</b>	<b>0.08</b>	<b>0.06</b>	<b>0.05</b>	<b>0.08</b>
<b>Reporting Limit (RL)</b>			<b>1.2</b>	<b>1.2</b>	<b>0.6</b>	<b>1.4</b>	<b>1</b>	<b>1.1</b>
<b>Max. Contaminant Level (MCL)</b>			<b>7</b>	<b>70</b>	<b>100</b>	<b>5</b>	<b>5</b>	<b>2</b>

<b>BOLD</b>	≥ MDL
<b>BOLD</b>	≥ RL
<b>BOLD</b>	≥ MCL

All samples were analyzed by APPL, Inc.  
VOC data reported in ug/L.

**Abbreviations/Notes:**

FD                                      Field Duplicate  
TCE                                      Trichloroethene  
PCE                                      Tetrachloroethene  
DCE                                      Dichloroethene

**Data Qualifiers:**

--The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.  
F-The analyte was positively identified but the associated numerical value is below the RL.

Well RFR-10 exceeded the Maximum Contaminant Level (MCL) of 5 micrograms per liter ( $\mu\text{g/L}$ ) in June 2016 for PCE. This well is equipped with two GAC filtration systems. PCE and/or TCE were detected above the Reporting Limits (RLs) in private drinking water wells LS-5 and OFR-3. These wells have GAC filtration systems in place. 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, and vinyl chloride were not detected in any of the off-post wells sampled in June 2016.

In February 2016, routine semi-annual maintenance was performed on the GAC treatment systems at LS-5, LS-6, LS-7, OFR-3, RFR-10, and RFR-11. Carbon canisters were exchanged and other routine maintenance was performed. GAC-filtered samples were not collected this quarter as part of the groundwater project but will be collected again during the September 2016 event.

Based on historical detections, the lateral extent of VOC detections extends beyond the south and west boundaries of CSSA. Past detections of VOCs have extended 0.37 miles south to well LS-4 and 2.9 miles west towards Scenic Loop Drive (SLD) at well SLD-01 (**Figure 2.1**).

### 3.0 SUMMARY AND RECOMMENDATIONS

Results of the June 2016 sampling event are summarized as follows:

- All six wells scheduled for collection in June 2016 were obtained during the quarterly monitoring event. Seven GAC filtered samples were collected from the treatment units serving those wells.
- Well RFR-10 exceeded the MCL in June 2016 for PCE. This well is equipped with two GAC filtration systems.
- PCE and/or TCE were detected above the RLs in private drinking water wells LS-5 and OFR-3. These wells have GAC filtration systems in place.
- 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, and vinyl chloride were not detected in any of the off-post wells sampled in June 2016.
- GAC-filtered samples were not collected as part of the quarterly groundwater monitoring in June 2016. However, in May 2016 GAC-filtered samples were collected from well RFR-10. This sampling was triggered by GAC-filtered detections from March 2016. These GAC-filtered samples (RFR-10-A2 and RFR-10-B2) were non-detect indicating the GAC systems are functioning properly. The next GAC-filtered samples will be collected in September 2016.
- Semi-annual GAC maintenance, including carbon change-out, was performed February 18, 2016. The next semi-annual GAC maintenance is scheduled for August 2016.
- In accordance with project DQOs and the LTMO transition schedule, the rationale for selection of 29 samples to be collected in September 2016 is provided in **Table 3.1**.



**APPENDIX A**  
**EVALUATION OF DATA QUALITY OBJECTIVES ATTAINMENT**

**Appendix A Evaluation of Data Quality Objectives Attainment**

Activity	Objectives	Action	Objective Attained?	Recommendations
Field Sampling	Conduct field sampling in accordance with procedures defined in the project work plan, SAP, QAPP, and HSP.	All sampling was conducted in accordance with the procedures described in the project plans.	Yes	NA
Contamination Characterization (Groundwater Contamination)	Determine the potential extent of off-post contamination (§2.3.1 of the DQOs for the Groundwater Contamination Investigation, revised November 2010).	Samples for laboratory analysis were collected from selected off-post public and private wells, which are located within a 3 mile radius of CSSA.	Partially	Replace wells where no VOCs were detected with wells that may be identified in the future, located to the west and southwest of Area of Concern (AOC)-65 to provide better definition of Plume 2. Continue sampling of wells to the west of Plume 1 (Fair Oaks and Jackson Woods) to confirm any detections possibly related to Plume 1.
	Meet CSSA QAPP quality assurance requirements.	Samples were analyzed in accordance with the CSSA QAPP, and approved variances. A chemist verified all data.	Yes	NA
		All data flagged with a “U” and “J” are usable for characterizing contamination.	Yes	NA

Activity	Objectives	Action	Objective Attained?	Recommendations
	<p>Evaluate CSSA monitoring program and expand as necessary (§2.3.1 of the DQOs for the Groundwater Contamination Investigation, revised November 2010). Determine locations of future monitoring locations.</p>	<p>Evaluation of data collected is ongoing and is reported in this quarterly groundwater report and will be reported in future quarterly groundwater reports. Additional information covering the CSSA monitoring program is available in Volume 5, CSSA Environmental Encyclopedia.</p>	<p>Yes</p>	<p>Continue data evaluation and quarterly teleconferences for evaluation of the monitoring program. Each teleconference/ planning session covers expansion of the quarterly monitoring program, if necessary.</p>
<p>Project Schedule/ Reporting</p>	<p>The quarterly monitoring project schedule shall provide a schedule for sampling, analysis, validation, verification, reviews, and reports for monitoring events off-post.</p>	<p>A schedule for sampling, analysis, validation, verification and data review, and reports is provided in this quarterly groundwater report and will be reported in future quarterly groundwater reports. Additional information covering the CSSA monitoring program is available in Volume 5, CSSA Environmental Encyclopedia.</p>	<p>Yes</p>	<p>Continue quarterly reporting to include a schedule for sampling, analysis, validation, and verification and data review and data reports.</p>



Activity	Objectives	Action	Objective Attained?	Recommendations
Remediation	Evaluate the effectiveness of GACs (§3.2.3) and install as needed (§3.2.5 both of the DQOs for the Groundwater Contamination Investigation, revised November 2010).	Perform maintenance as needed. Install new GACs as needed.	Yes	Maintenance to the off-post GAC systems to be continued by Parsons' personnel every 3 weeks. Twice yearly (or as needed) maintenance to the off-post GAC systems by additional subcontractors to continue. Evaluations of future sampling results for installation of new GAC systems will occur as needed.

**APPENDIX B  
JUNE 2016 QUARTERLY OFF-POST  
GROUNDWATER ANALYTICAL RESULTS**

**Appendix B**  
**June 2016 Quarterly Off-post Groundwater Analytical Results**

Well ID	Sample Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl Chloride
LS-5	6/6/2016	0.12U	0.07U	0.08U	<b>0.88F</b>	<b>1.79</b>	0.08U
LS-6	6/6/2016	0.12U	0.07U	0.08U	<b>0.72F</b>	<b>0.89F</b>	0.08U
LS-7	6/6/2016	0.12U	0.07U	0.08U	<b>0.62F</b>	0.05U	0.08U
OFR-3	6/6/2016	0.12U	0.07U	0.08U	<b>3.16</b>	<b>3.02</b>	0.08U
OFR-3 FD	6/6/2016	0.12U	0.07U	0.08U	<b>3.34</b>	<b>3.03</b>	0.08U
RFR-10	5/3/2016	0.12U	0.07U	0.08U	<b>6.53</b>	<b>4.48</b>	0.08U
RFR-10	6/6/2016	0.12U	0.07U	0.08U	<b>7.70</b>	<b>4.90</b>	0.08U
RFR-11	6/6/2016	0.12U	0.07U	0.08U	<b>0.94F</b>	<b>0.30F</b>	0.08U

<b>BOLD</b>	≥ MDL
<b>BOLD</b>	≥ RL
<b>BOLD</b>	≥ MCL

All samples were analyzed by APPL, Inc.  
 VOC data reported in ug/L.

**Abbreviations/Notes:**

FD                      Field Duplicate  
 TCE                     Trichloroethene  
 PCE                     Tetrachloroethene  
 DCE                     Dichloroethene

**Data Qualifiers:**

U-The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.  
 F-The analyte was positively identified but the associated numerical value is below the RL.

**APPENDIX C  
DATA VALIDATION REPORTS**

**SDG 79722  
SDG 80058**

**DATA VERIFICATION SUMMARY REPORT**  
**for off-post samples collected from**  
**CAMP STANLEY STORAGE ACTIVITY**  
**BOERNE, TEXAS**

Data Verification by: Tammy Chang  
Parsons - Austin

**INTRODUCTION**

The following data verification summary report covers three groundwater samples and the associated field quality control (QC) sample collected from off-post Camp Stanley Storage Activity (CSSA) on May 3rd, 2016. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

79722

The field QC samples associated with this SDG was one trip blank (TB). TB was analyzed for VOC only. No ambient blanks were collected. During the initiation of this project, it was determined that ambient blanks were not necessary due to the absence of a source at these sites.

All samples were collected by Parsons and analyzed by APPL, Inc. following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0. Samples in this SDG were shipped to the laboratory in two cooler. Both coolers were received by the laboratory at a temperature of 3.0 °C, which was within the 2-6°C range recommended by the CSSA QAPP. There were other samples involved in the shipment. All VOC vial were packed in one cooler.

**EVALUATION CRITERIA**

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the CSSA QAPP, Version 1.0. Information reviewed in the data package included sample results; field and laboratory quality control samples; calibrations; case narratives; raw data; chain-of-custody (COC) forms and the sample receipt checklist. The findings presented in this report are based on the reviewed information, and whether the guidelines in the CSSA QAPP, Version 1.0, were met.

## **VOLATILES**

### **General**

The volatiles portion of this data package consisted of three (3) off-post groundwater samples and one (1) TB. All samples were collected on May 3rd, 2016 and analyzed for a reduced list of VOCs which included: 1,1-dichloroethene, *cis*-1,2-dichloroethene, tetrachloroethene, *trans*-1,2-dichloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in one analytical batch #207194, with one instrument under one set of initial calibration (ICAL). All samples were analyzed following the procedures outlined in the CSSA QAPP and were prepared and analyzed within the holding time required by the method. All analyses were performed undiluted.

### **Accuracy**

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control spike (LCS) sample and the surrogate spikes.

All LCS and surrogate spike recoveries were within acceptance criteria.

### **Precision**

Precision could not be evaluated due to the lack of duplicate analysis in this SDG.

### **Representativeness**

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining trip and laboratory blanks for cross contamination of samples during transit or analysis.

All samples in this data package were analyzed following the COC and the analytical procedures described in the CSSA QAPP, Version 1.0. All samples were prepared and analyzed within the holding time required by the method.

- All instrument performance check criteria were met.
- All initial calibration criteria were met for both sets of curves.
- The LCS was prepared using a secondary source standard. All second source verification criteria were met.
- All initial calibration verification (ICV) criteria were met.
- All continuing calibration verification (CCV) criteria were met.

PAGE 2 OF 3

- All internal standard criteria were met.

There were one method blank and one TB associated with the VOC analyses in this SDG. Both blanks were non-detect at method detection limits for all target VOCs.

### **Completeness**

Completeness has been evaluated in accordance with the CSSA QAPP. The number of usable results has been divided by the number of possible individual analyte results and expressed as a percentage to determine the completeness of the data set.

All VOC results for the samples in this SDG were considered usable. The completeness for this SDG is 100%, which meets the minimum acceptance criteria of 95%.

**DATA VERIFICATION SUMMARY REPORT**  
**for off-post samples collected from**  
**CAMP STANLEY STORAGE ACTIVITY**

**BOERNE, TEXAS**

Data Verification by: Tammy Chang  
Parsons - Austin

**INTRODUCTION**

The following data verification summary report covers six groundwater samples and the associated field quality control (QC) samples collected from off-post Camp Stanley Storage Activity (CSSA) on June 6, 2016. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

80058

The field QC samples associated with this SDG were one trip blank (TB) and one set of parent/field duplicate (FD) samples. TB was analyzed for VOC only. No ambient blanks were collected. During the initiation of this project, it was determined that ambient blanks were not necessary due to the absence of a source at these sites.

All samples were collected by Parsons and analyzed by APPL, Inc. following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0. Samples in this SDG were shipped to the laboratory in two cooler. Both coolers were received by the laboratory at a temperature of 3.0 °C, which was within the 2-6°C range recommended by the CSSA QAPP. There were other samples involved in the shipment. All VOC vial were packed in one cooler.

**EVALUATION CRITERIA**

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the CSSA QAPP, Version 1.0. Information reviewed in the data package included sample results; field and laboratory quality control samples; calibrations; case narratives; raw data; chain-of-custody (COC) forms and the sample receipt checklist. The findings presented in this report are based on the reviewed information, and whether the guidelines in the CSSA QAPP, Version 1.0, were met.



## VOLATILES

### General

The volatiles portion of this data package consisted of six (6) off-post groundwater samples, one (1) FD, and one (1) TB. All samples were collected from June 6, 2016 and analyzed for a reduced list of VOCs which included: 1,1-dichloroethene, *cis*-1,2-dichloroethene, tetrachloroethene, *trans*-1,2-dichloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in one analytical batch, #208422 under one of initial calibration (ICAL). All samples were analyzed following the procedures outlined in the CSSA QAPP and were prepared and analyzed within the holding time required by the method. All analyses were performed undiluted.

### Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control spike (LCS) sample and the surrogate spikes.

All LCS and surrogate spike recoveries were within acceptance criteria.

### Precision

Precision was evaluated based on the relative percent difference (%RPD) between the parent and FD sample results. Sample OFR-3 was collected in duplicate.

Only TCE and PCE were detected above the reporting limit (RL).

Analyte	Parent (µg/L)	FD (µg/L)	%RPD	Criteria (%RPD)
TCE	3.02	3.03	0.33	≤30
PCE	3.16	3.34	5.5	≤30

### Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. Representativeness has been evaluated by:

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining trip and laboratory blank for cross contamination of samples during transit or analysis.

All samples in this data package were analyzed following the COC and the analytical procedures described in the CSSA QAPP, Version 1.0. All samples were prepared and analyzed within the holding time required by the method.

- All instrument performance check criteria were met.

- All initial calibration criteria were met for both sets of curves.
- All initial calibration verification (ICV) criteria were met. The ICV was prepared using a secondary source standard. All second source verification criteria were met.
- All continuing calibration verification (CCV) criteria were met.
- All internal standard criteria were met.

There were one method blank and one TB associated with the VOC analyses in this SDG. All blanks were non-detect at method detection limits for all target VOCs.

### **Completeness**

Completeness has been evaluated in accordance with the CSSA QAPP. The number of usable results has been divided by the number of possible individual analyte results and expressed as a percentage to determine the completeness of the data set.

All VOC results for the samples in this SDG were considered usable. The completeness for this SDG is 100%, which meets the minimum acceptance criteria of 95%.