

September 2016

Off-Post

Quarterly Groundwater Monitoring Report



Prepared For

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

November 2016

EXECUTIVE SUMMARY

- A total of 20 off-post wells and 7 Granular Activated Carbon (GAC) filtered samples were collected during the September 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 GAC filtration systems. All other wells were below the MCLs.
- GAC-filtered samples were collected in September 2016 as part of the groundwater monitoring program. All sample results were non-detect indicating that the GAC filtration systems are functioning properly.
- Semi-annual GAC maintenance was performed September 6, 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 is due in March 2017.
- 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 the transition schedule accomplished during this sampling event.
- Off-post wells LS-1 and LS-4 are scheduled to be plugged and abandoned by San Antonio Water System (SAWS). Camp Stanley Storage Activity (CSSA) has proposed to install an on-post replacement well that will be within 300 feet of LS-1. Existing off-post well I10-10 will be incorporated into the sampling network to replace LS-4 as the southernmost well sampled for groundwater characterization.

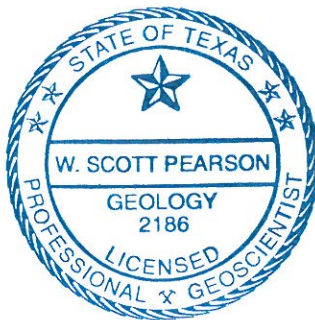
GEOSCIENTIST CERTIFICATION


September 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 September 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 September 2016, and is true and accurate to the best of my knowledge and belief.





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


Date

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ABBREVIATIONS AND ACRONYMS

µg/L	microgram per liter
AOC	Area of Concern
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
BSR	Boerne Stage Road
CC	Cow Creek
<i>cis</i> -1,2-DCE	<i>cis</i> -1,2-Dichloroethene
CSSA	Camp Stanley Storage Activity
DQO	Data Quality Objective
FD	Field Duplicate
FO	Fair Oaks Ranch
GAC	Granular Activated Carbon
HS	Hidden Springs Estates
HSP	Health and Safety Plan
ISCO	In-Situ Chemical Oxidation
JW	Jackson Woods
LGR	Lower Glen Rose
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
OW	Oaks Water Supply Corporation
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
SAWS	San Antonio Water System
SLD	Scenic Loop Drive
TCE	Trichloroethene

ABBREVIATIONS AND ACRONYMS (continued)

TCEQ	Texas Commission on Environmental Quality
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

**SEPTEMBER 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 September 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 September 6 through 27, 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 SEPTEMBER 2016 ANALYTICAL RESULTS

During the September 2016 event, groundwater samples were collected from 20 off-post wells shown in **Figure 2.1**. Two wells scheduled for sampling were not sampled due to a pump outage at I10-2 and a locked power panel at FO-J1. 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), and were collected during this event.

Table 2.1 includes the rationale for selection of the 22 wells scheduled to be sampled in September 2016, and **Figure 2.1** provides well locations for the following 20 sampled wells:

- One public supply well (BSR-04) along Boerne Stage Road.
- One public well in the Hidden Springs Estates subdivision (HS-1).
- Two wells used by the general public in the Interstate-10 area (I10-2, I10-8 & I10-10).
- Four privately-owned wells in the Jackson Woods subdivision (JW-5, JW-7, JW-8, and JW-20).
- Five wells in the Leon Springs Villa area (two public supply wells removed from service: LS-1, and LS-4; and three privately-owned wells: LS-5, LS-6, and LS-7).
- One privately-owned well on Old Fredericksburg Road (OFR-3).
- Four privately-owned wells in the Ralph Fair Road area (RFR-10, RFR-11, RFR-12, and RFR-14);
- Two public supply wells from The Oaks Water Supply System (OW-HH2 and OW-BARNOWL);

The following wells were scheduled to be monitored in September 2016, but extenuating circumstances prevented groundwater samples from being obtained:

- The power panel at one public supply well in the Fair Oaks area (FO-J1) was locked.
- One well used by the general public in the Interstate-10 area (I10-2) has a submersible pump outage.

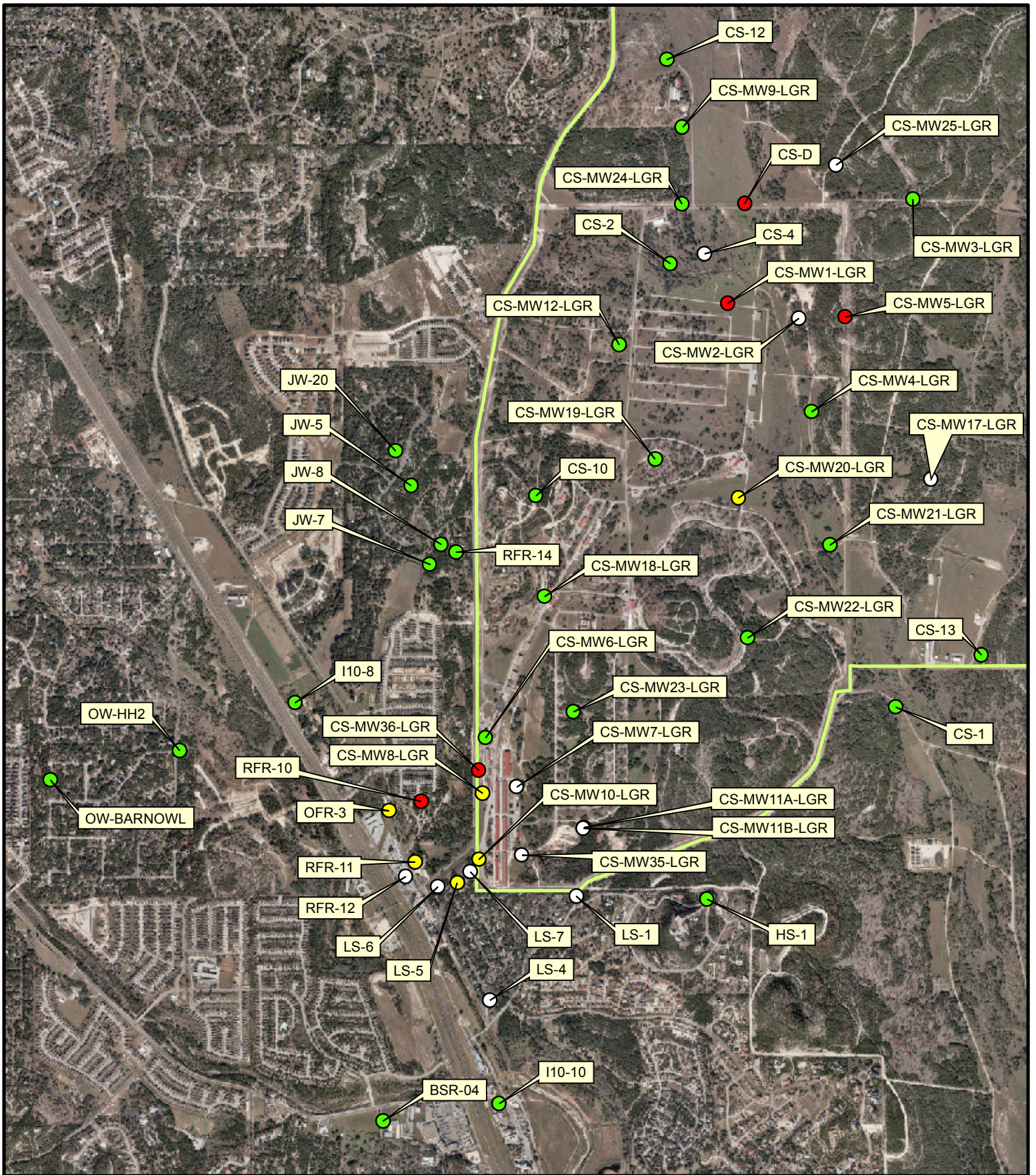
A total of 27 groundwater samples, two trip blanks, three field duplicates (FD), and one matrix spike/matrix spike duplicate (MS/MSD) included with the on-post data groups were submitted to Agriculture & Priority Pollutant Laboratories, Inc. (APPL) in Clovis, California for analysis. Groundwater samples 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), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride.

The data packages (Parsons Government Services, Inc. [Parsons] internal reference 110046-#25 through -#27 and -#29 through -#30) 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 packages September 29 through October 4, 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 September 2016 are presented in **Table 2.2**. Full analytical results from the September 2016 sampling event are presented in **Appendix B**. As shown in **Table 2.1**, 27 of 29 samples that were scheduled for collection in September 2016 were obtained.



Sampled Wells September 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 September 2016
Camp Stanley Storage Activity

PARSONS

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

Subdivision	Well ID	Sample Date	cis-1,2-			Vinyl Chloride
			DCE	PCE	TCE	
Boerne Stage Road	BSR-04	9/14/2016	--	--	--	--
Hidden Spring	HS-1	9/7/2016	--	--	--	--
IH-10	I10-8	9/14/2016	--	--	--	--
	I10-8 FD	9/14/2016	--	--	--	--
	I10-10	9/7/2016	--	--	--	--
Jackson Woods Subdivision	JW-5	9/12/2016	--	--	--	--
	JW-7	9/8/2016	--	--	--	--
	JW-8	9/8/2016	--	--	--	--
	JW-20	9/8/2016	--	--	--	--
Leon Springs Villas	LS-1	9/7/2016	--	0.25F	--	--
	LS-4	9/7/2016	--	0.16F	--	--
	LS-5	9/6/2016	--	0.75F	1.85	--
	LS-5-A2	9/6/2016	--	--	--	--
	LS-6	9/6/2016	--	0.88F	--	--
	LS-6-A2	9/6/2016	--	--	--	--
	LS-7	9/6/2016	--	0.57F	--	--
Old Fredericksburg Road	OFR-3	9/6/2016	--	3.14	2.02	--
	OFR-3-A2	9/6/2016	--	--	--	--
The Oaks Water Supply	OW-HH2	9/8/2016	--	--	--	--
	OW-BARNOWL	9/8/2016	--	--	--	--
Ralph Fair Road	RFR-10	9/6/2016	0.18F	6.95	4.27	--
	RFR-10-A2	9/6/2016	--	--	--	--
	RFR-10-A2 FD	9/6/2016	--	--	--	--
	RFR-10-B2	9/6/2016	--	--	--	--
	RFR-11	9/6/2016	--	1.49	0.47F	--
	RFR-11-A2	9/6/2016	--	--	--	--
	RFR-12	9/7/2016	--	--	0.49F	--
	RFR-14	9/8/2016	--	--	--	--
RFR-14 FD	9/8/2016	--	--	--	--	
Laboratory Detection Limits & Maximum Contaminant Level						
Method Detection Limit (MDL)			0.07	0.06	0.05	0.08
Reporting Limit (RL)			1.2	1.4	1	1.1
Max. Contaminant Level (MCL)			70	5	5	2

BOLD	≥ MDL
BOLD	≥ RL
BOLD	≥ 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
A2 sample collect after Granular Activated Carbon System
Data Qualifiers:
--The analyte was
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 September 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, OFR-3, and RFR-11. These wells have GAC filtration systems in place. Vinyl chloride was not detected in any of the off-post wells sampled in September 2016.

In September 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 collected this quarter as part of the groundwater project and all samples were non-detect. GAC-filtered samples will be collected again during the March 2017 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 CHANGES IN OFF-POST MONITORING

CSSA has been notified by the San Antonio Water System (SAWS) that they will be abandoning former water supply wells LS-1 and LS-4 (Figure 2.1). CSSA has utilized these wells in their off-post monitoring network since September 2001. These wells are located along the southern boundary of CSSA, and are used to monitor Plume 2 VOC contamination associated with AOC-65. LS-1 is a 644-foot open-hole completion through both the Lower Glen Rose (LGR) and Cow Creek (CC) segments of the Middle Trinity aquifer. LS-4 is a 505-foot open hole completion in the LGR segment only.

Groundwater sampled from LS-1 routinely has detections of PCE between the method detection limit (MDL) and RL, with an average PCE concentration of 0.49 µg/L in 30 of 36 samples collected. TCE is also present in LS-1 in similar concentrations (0.34 µg/L), but at half the detection rate (15 of 36 samples). During the same timeframe, LS-4 has an average PCE concentration of 0.16 µg/L in 20 of 44 samples collected, but no TCE was reported.

Along with all the wells in the CSSA groundwater monitoring program, these two wells were evaluated in the January 2016 LTMO study, and were recommended for sampling on a 15-month basis. These recommendations to retain these wells are based upon the fact that neither location has satisfied the DQO of five consecutive years without VOC detections, and because they define the detectable limits of Plume 2 to the south and southeast.

CSSA has proposed drilling an on-post LGR replacement well to fulfill the impending data gap. A replacement well could be drilled on-post, within 300 feet of the current position of LS-1. The well would entail 4-inch casing and screen installed within an 8-inch borehole to a predicted depth of 515 feet. SAWS would be able to plug LS-1 and LS-4 and relinquish their properties, as needed. This option would provide a suitable replacement to the Leon Springs (LS) well with the most contamination, and removes any reliance on SAWS for future monitoring activities.

USEPA and TCEQ concurred with the well replacement plan during a regulatory meeting held on August 18, 2016. Another existing well located at Compass Bank (I10-10 shown in Figure 2.1) will replace the southernmost sampling position of LS-4.

4.0 SUMMARY AND RECOMMENDATIONS

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

- A total of 27 of 29 samples scheduled for collection in September 2016 were obtained during the quarterly monitoring event. This included 7 GAC filtered samples from the treatment units serving those wells. Two wells, I10-2 (offline for repairs) and FO-J1 (panel locked out), were not sampled during this event.
- Well RFR-10 exceeded the MCL in September 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, OFR-3, and RFR-11. These wells have GAC filtration systems in place.
- Vinyl chloride was not detected in any of the off-post wells sampled in September 2016.
- GAC-filtered samples were collected as part of the quarterly groundwater monitoring in September 2016. All GAC-filtered samples were non-detect indicating the GAC systems are functioning properly. The next GAC-filtered samples will be collected in December 2016 as part of the In-Situ Chemical Oxidation (ISCO) treatability project.
- Semi-annual GAC maintenance, including carbon change-out, was performed September 6, 2016. The next semi-annual GAC maintenance is due in March 2017.
- In accordance with project DQOs and LTMO schedule, the rationale for selection of six samples to be collected in December 2016 is provided in **Table 4.1**.
- Off-post wells LS-1 and LS-4 are scheduled to be plugged and abandoned by SAWS. CSSA has proposed to install an on-post replacement well that will be within 300 feet of LS-1. Off-post well I10-10 will be incorporated into the sampling network to replace LS-4 as the southernmost well sampled for groundwater characterization.

**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 (§2.1 of the DQOs for the Groundwater Contamination Investigation, revised February 2016).	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 (§2.1 of the DQOs for the Groundwater Contamination Investigation, revised February 2016). 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 and install as needed (§3.2 both of the DQOs for the Groundwater Contamination Investigation, revised February 2016).	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
SEPTEMBER 2016 QUARTERLY OFF-POST
GROUNDWATER ANALYTICAL RESULTS**

Appendix B
September 2016 Quarterly Off-post Groundwater Analytical Results

Well ID	Sample Date	cis-1,2-DCE	PCE	TCE	Vinyl Chloride
BSR-04	9/14/2016	0.07U	0.06U	0.05U	0.08U
HS-1	9/7/2016	0.07U	0.06U	0.05U	0.08U
I10-8	9/14/2016	0.07U	0.06U	0.05U	0.08U
I10-8 FD	9/14/2016	0.07U	0.06U	0.05U	0.08U
I10-10	9/7/2016	0.07U	0.06U	0.05U	0.08U
JW-5	9/12/2016	0.07U	0.06U	0.05U	0.08U
JW-7	9/8/2016	0.07U	0.06U	0.05U	0.08U
JW-8	9/8/2016	0.07U	0.06U	0.05U	0.08U
JW-20	9/8/2016	0.07U	0.06U	0.05U	0.08U
LS-1	9/7/2016	0.07U	0.25F	0.05U	0.08U
LS-4	9/7/2016	0.07U	0.16F	0.05U	0.08U
LS-5	9/6/2016	0.07U	0.75F	1.85	0.08U
LS-5-A2	9/6/2016	0.07U	0.06U	0.05U	0.08U
LS-6	9/6/2016	0.07U	0.88F	0.05U	0.08U
LS-6-A2	9/6/2016	0.07U	0.06U	0.05U	0.08U
LS-7	9/6/2016	0.07U	0.57F	0.05U	0.08U
LS-7-A2	9/6/2016	0.07U	0.06U	0.05U	0.08U
OFR-3	9/6/2016	0.07U	3.14	2.02	0.08U
OFR-3-A2	9/6/2016	0.07U	0.06U	0.05U	0.08U
OW-HH2	9/8/2016	0.07U	0.06U	0.05U	0.08U
OW-BARNOWL	9/8/2016	0.07U	0.06U	0.05U	0.08U
RFR-10	9/6/2016	0.18F	6.95	4.27	0.08U
RFR-10-A2	9/6/2016	0.07U	0.06U	0.05U	0.08U
RFR-10-A2 FD	9/6/2016	0.07U	0.06U	0.05U	0.08U
RFR-10-B2	9/6/2016	0.07U	0.06U	0.05U	0.08U
RFR-11	9/6/2016	0.07U	1.49	0.47F	0.08U
RFR-11-A2	9/6/2016	0.07U	0.06U	0.05U	0.08U
RFR-12	9/7/2016	0.07U	0.06U	0.49F	0.08U
RFR-14	9/8/2016	0.07U	0.06U	0.05U	0.08U
RFR-14 FD	9/8/2016	0.07U	0.06U	0.05U	0.08U

BOLD	≥ MDL
BOLD	≥ RL
BOLD	≥ 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

A2 = sample collected after Granular Activated Carbon System

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 80876
SDG 80877
SDG 80890
SDG 80905
SDG 90972**

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) sample collected from off-post Camp Stanley Storage Activity (CSSA) on September 6, 2016. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

80876

The field QC sample associated with this SDG were one set of parent/field duplicate (FD) samples. 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 coolers. 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 (including trip blank) involved in the shipment, but were logged in the SDG 80877. 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 and one (1) FD. All samples were collected from September 6, 2016 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene, tetrachloroethene, 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, #211663 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 RFR-10-A2 was collected in duplicate.

None of the target 4 VOCs were detected at or above the reporting limits (RL); therefore, the %RPD calculation was not applicable.

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 laboratory blank for cross contamination of samples during 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 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%.

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 twelve groundwater samples and the associated field quality control (QC) sample collected from off-post Camp Stanley Storage Activity (CSSA) on September 6 and 7, 2016. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

80877

The field QC sample associated with this SDG was a trip blank (TB). 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 coolers. 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, but were logged in the SDG 80876 due to different turn-around-time requirement. 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 twelve (12) off-post groundwater samples and one (1) TB. All samples were collected from September 6 and 7, 2016 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene, tetrachloroethene, 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, #211660 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 could not be evaluated due to the lack of duplicate analysis for 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 blank for cross contamination of samples during sample collection, transportation, and 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%.

DATA VERIFICATION SUMMARY REPORT
for on-post and 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 eight groundwater samples and the associated field quality control (QC) samples collected from on-post and off-post Camp Stanley Storage Activity (CSSA) on September 8. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

80890

The field QC samples associated with this SDG were a trip blank (TB), a pair of matrix spike/matrix spike duplicate (MS/MSD), and a set of parent/field duplicate (FD) samples. 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 one cooler which had temperature of 3.0 °C upon delivery to the lab. It was within the 2-6°C range recommended by the CSSA QAPP.

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 twelve (12) groundwater samples which included six (6) off-post wells, two (2) on-post wells, one (1) FD, one (1) set of MS/MSD, and one (1) TB. All samples were collected from September 8, 2016 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in two analytical batches, #211660 and #211879, under two sets 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 two laboratory control spike (LCS) samples, MS/MSD, and the surrogate spikes. Sample OW-BARNOWL was designated as the parent sample for the MS/MSD analyses on the chain-of-custody.

All LCSs, MS, MSD, and surrogate spike recoveries were within acceptance criteria.

Precision

Precision was evaluated based on the relative percent difference (%RPD) of the parent and FD results and MS/MSD results. Sample RFR-14 was collected in duplicate.

All %RPDs of MS/MSD were compliant.

None of the four target VOCs were detected at or above the reporting limits; therefore, the %RPD calculation was not applicable.

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 sample collection, transportation, and 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 two ICVs were 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 two method blanks 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%.

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 fourteen on-post groundwater samples and the associated field quality control (QC) samples collected from Camp Stanley Storage Activity (CSSA) on September 9 and 12, 2016. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

80905

The field QC samples associated with this SDG were one trip blank (TB), one set of matrix spike (MS)/matrix spike duplicate (MSD), and two 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°C, which was within the 2-6°C range recommended by the CSSA QAPP. There were other samples involved in the shipment. All VOC vials were packed in the same 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 ten (10) on-post groundwater, two (2) off-post samples, two (2) FD, (1) one set of MS/MSD, and one (1) TB. All samples were collected on September 13 and 14, 2016 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in two analytical batches, #212091 & #212287 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 two laboratory control spike (LCS) samples, MS/MSD, and the surrogate spikes. Sample CS-MW11B-LGR was designated as the parent sample for the MS/MSD analyses.

All LCSs, MS, MSD, and surrogate spike recoveries were within acceptance criteria.

Precision

Precision was evaluated based on the percent relative difference (%RPD) of the MS/MSD results and parent/FD sample results. Samples CS-4 and I10-8 were collected in duplicate.

All %RPDs of the MS/MSD were compliant.

None of the target VOCs were detected at or above the reporting limits in both sets of parent and FD samples; therefore, the %RPD calculations were not applicable.

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.
- 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 two method blanks 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%.

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 nine on-post and two off-post groundwater samples and the associated field quality control (QC) samples collected from Camp Stanley Storage Activity (CSSA) on September 13 and 14, 2016. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

80972

The field QC samples associated with this SDG were one trip blank (TB), one set of matrix spike (MS)/matrix spike duplicate (MSD), and one field duplicate (FD) sample. 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°C, which was within the 2-6°C range recommended by the CSSA QAPP. There were other samples involved in the shipment. All VOC vials were packed in the same 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 ten (10) on-post groundwater, two (2) off-post samples, one (1) FD, (1) one set of MS/MSD, and one (1) TB. All samples were collected on September 13 and 14, 2016 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in two analytical batches, #212091 & #212287 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 two laboratory control spike (LCS) samples, MS/MSD, and the surrogate spikes. Sample CS-MW11B-LGR was designated as the parent sample for the MS/MSD analyses.

All LCSs, MS, MSD, and surrogate spike recoveries were within acceptance criteria.

Precision

Precision was evaluated based on the percent relative difference (%RPD) of the MS/MSD results and parent/FD sample results. Sample I10-8 was collected in duplicate.

All %RPDs of the MS/MSD are compliant.

None of the target VOCs were detected in the parent and FD samples, therefore, the %RPD calculations were not applicable.

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.
- 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 two method blanks 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%.