

**September 2021**

**Off-Post**

**Quarterly Groundwater Monitoring Report**



*Prepared For*

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

**December 2021**

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## EXECUTIVE SUMMARY

- Thirteen off-post samples were collected during the September 2021 sampling event for volatile organic compound (VOC) analyses.
- Analyses indicated two off-post wells, OFR-3 and RFR-10, exceeded the maximum contaminant level (MCL) for volatile organic compounds (VOCs). These wells are equipped with GAC filtration systems.
- Wells LS-5 and RFR-11 had VOC detections above the RL (reporting limit) but below the MCL this sampling event. These wells are also equipped with GAC filtration systems.
- GAC-filtered samples were collected in September 2021 as part of the groundwater monitoring program. All GAC filtered samples were non-detect with the exception of LS-6-A2. This sample reported a trace detection of *cis*-1,2-DCE. No historical *cis*-1,2-DCE detections have ever been reported in this well. The follow up sample collected in October was non-detect. GAC filtered samples are collected semi-annually and after GAC maintenance and will be collected again in March 2022.
- Semi-annual GAC maintenance was performed October 19, 2021. This involved replacing the first carbon canister in each GAC system and other routine maintenance. Seven GAC filtered samples were collected on October 27, 2021 after GAC maintenance, all samples were non-detect indicating the filtration systems remain effective. This carbon exchange is performed semi-annually; the next carbon change-out is due in April 2022.

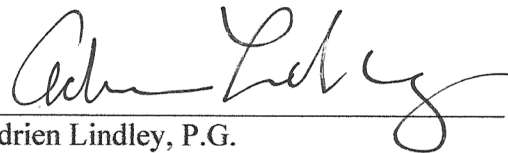
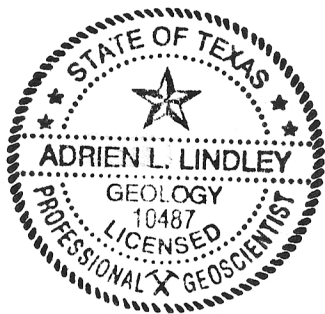
## GEOSCIENTIST CERTIFICATION

### September 2021 Off-Post Quarterly Groundwater Monitoring Report

For

Department of the Army  
Camp Stanley Storage Activity  
Boerne, Texas

I, Adrien Lindley, Professional Geologist (P.G.), hereby certify that the 2021 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 2021, and is true and accurate to the best of my knowledge and belief.



Adrien Lindley, P.G.  
State of Texas  
Geology License No. 10487

12/7/2021

Date

Parsons Government Services, Inc.  
Firm Registration No. 50316

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	ii
GEOSCIENTIST CERTIFICATION .....	iii
1.0 INTRODUCTION .....	1-1
2.0 SEPTEMBER 2021 ANALYTICAL RESULTS .....	2-1
3.0 SUMMARY AND RECOMMENDATIONS.....	3-1

## LIST OF TABLES

Table 2.1 Sampling Rationale for September 2021 .....	2-2
Table 2.2 September 2021 Off-Post Groundwater Results, Detected Analytes Only .....	2-4
Table 3.1 Sampling Rationale for December 2021 .....	3-2

## LIST OF FIGURES

Figure 2.1 On-Post and Off-Post Well Sampling Locations for September 2021 .....	2-3
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## LIST OF APPENDICES

Appendix A Evaluation of Data Quality Objectives Attainment	
Appendix B September 2021 Quarterly Off-post Groundwater Analytical Results	
Appendix C Data Validation Reports	

### ABBREVIATIONS AND ACRONYMS

µg/L	microgram per liter
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
HASP	Health and Safety Plan
JW	Jackson Woods
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
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

**SEPTEMBER 2021  
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 2021 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 2021 quarterly monitoring events (March, June, September, and December) will be described in detail in an Annual Report to be submitted after December 2021. 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 1<sup>st</sup> through 3<sup>rd</sup>, 2021. 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 September 18, 2020 and the United States Environmental Protection Agency (USEPA) on September 23 & 18, 2020. The sampling schedule provided in the 2020 LTMO update was implemented during the December 2020 sampling event.

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 2021 ANALYTICAL RESULTS

During the September 2021 event, groundwater samples were collected from 6 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), and were collected during this event.

**Table 2.1** includes the rationale for selection of the 6 wells scheduled to be sampled in September 2021. These included:

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

A total of 6 groundwater samples, one trip blank, 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), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride.

The data package (Parsons Government Services, Inc. [Parsons] internal reference CS12FF-#61) contains 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 these data packages on October 22<sup>nd</sup>, 2021.

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 2021 are presented in **Table 2.2**. Full analytical results from the September 2021 sampling event are presented in **Appendix B**. As shown in **Table 2.1**, 6 samples were scheduled for collection in September 2021 and all samples were obtained.

Table 2-1  
Sampling Rationale for September 2021

Well ID	2001		2002				2003				2004				2005				2006				2007				2008				2009				2010				2011			
	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec				
FO-J1													NS					NS	NS																	NS	NS					
I10-2																				NS	NS	NS															NA	NS	NS	NS		
I10-8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS				
I10-10																																										
JW-7		NS	NS	NS	NS	NS	NS	NS	NS																												NS	NS				
JW-8	NS	NS	NS	NS	NS	NS	NS																														NS	NS				
LS-5																																										
LS-5-A2																																						NS				
LS-6																																										
LS-6-A2					NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS				
LS-7																																										
LS-7-A2					NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS				
OFR-3																																										
OFR-3-A2	NS	NS			NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS				
RFR-10																																										
RFR-10-A2					NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS				
RFR-10-B2					NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS				
RFR-11																																										
RFR-11-A2					NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS				
RFR-12																																						NS	NS			
RFR-14																																						NS	NS			

VOCs detected are greater than 90% of the MCL. Sample monthly; quarterly after GAC installation.

VOCs detected are greater than 80% of the MCL. The well will be placed on a monthly sampling schedule until GAC installation then quarterly sampling after GAC installation.

VOCs detected are less than 80% of the MCL (<4.0 ppb and >0.06 ppb for PCE & <4.0 ppb >0.05 ppb for TCE). After four quarters of stable results the well can be removed from quarterly sampling.

No VOCs detected. Sample on an as needed basis.

This well has a GAC filtration unit installed by CSSA. Post GAC samples are collected every six months.  
A1 - after GAC canister #1  
A2 - after GAC canister #2

Well ID	2012				2013				2014				2015				2016				2017				2018				2019				2020				2021			Sampling Frequency
	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Mar	Jun	Sept						
FO-J1	NA	NS	NS	NA	NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	NS		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	30 month exclude after final sample, pump out			
I10-2		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	NS	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		
I10-8		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	30 month		
I10-10																																						15 month		
JW-7		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NS	30 month		
JW-8		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NS	30 month		
LS-5																																					Yes	Quarterly		
LS-5-A2		NS			NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS	Yes	Biannually (Mar & Sep)		
LS-6																																					NA	Yes	Quarterly	
LS-6-A2		NS			NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS	Yes	Biannually (Mar & Sep)		
LS-7																																					Yes	Quarterly		
LS-7-A2		NS			NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS	Yes	Biannually (Mar & Sep)		
OFR-3																																						Yes	Quarterly	
OFR-3-A2		NS			NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS	Yes	Biannually (Mar & Sep)		
RFR-10																																						Yes	Quarterly	
RFR-10-A2		NS			NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS	Yes	Biannually (Mar & Sep)		
RFR-10-B2		NS			NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS	Yes	Biannually (Mar & Sep)		
RFR-11																																					Yes	Quarterly		
RFR-11-A2		NS			NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS	Yes	Biannually (Mar & Sep)		
RFR-12		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NS	15 month		
RFR-14		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NS	30 month		

Yes

To be sampled in September 2021.

NS

Not sampled for that event.

NA

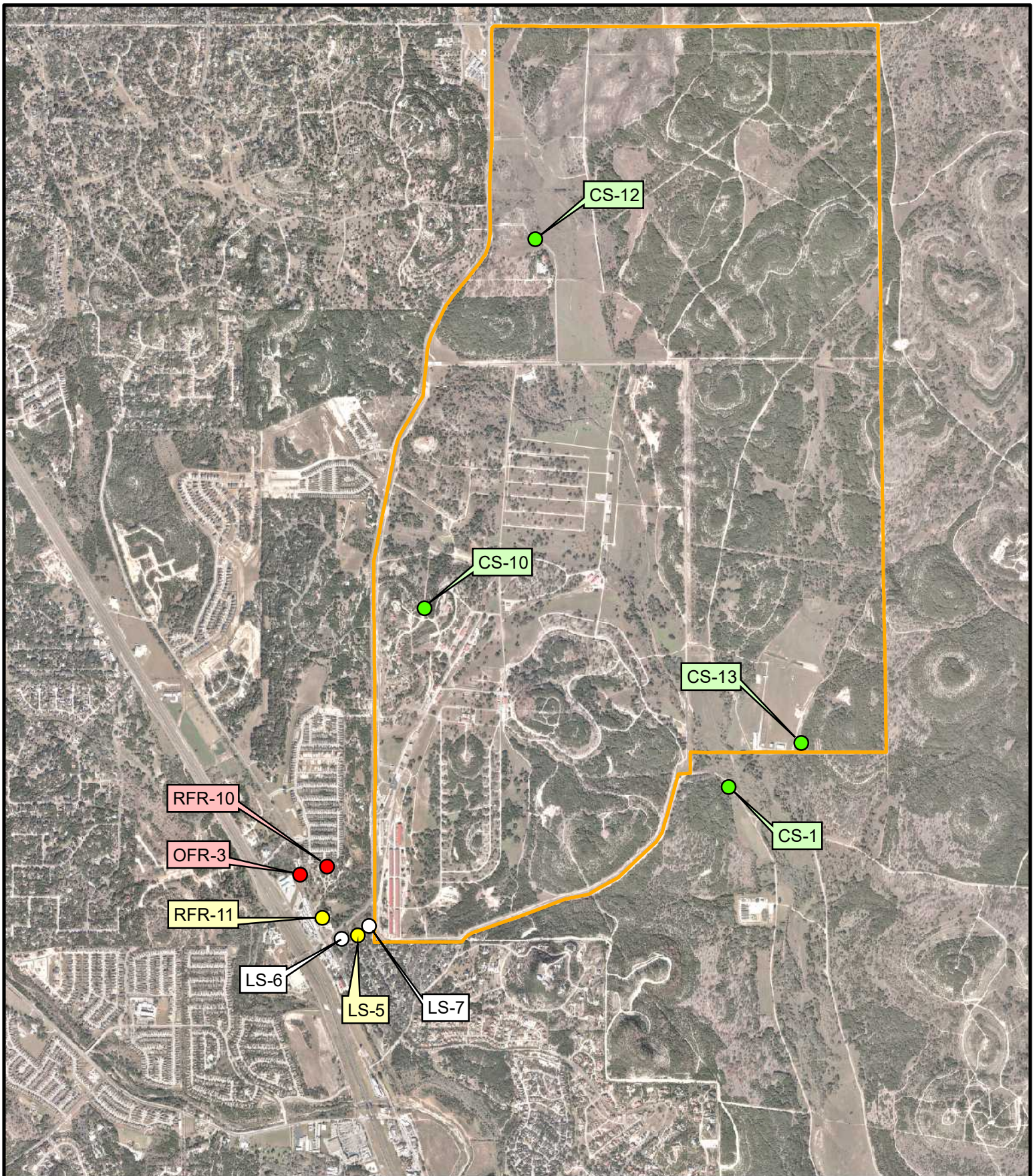
Not applicable, sample could not be collected due to pump outage or well access conflict.

Wells Sampled: 6  
Post GAC samples: 7  
Total Samples: 13

LTMO has excluded the following wells from the program:  
 -Dec. 2015: BSR-03, FO-8, FO-17, FO-22, HS-2, HS-3, I10-5, I10-7, JW-6, JW-9, JW-12, JW-13, JW-14, JW-15, JW-26, JW-27, JW-28, JW-29, JW-30, JW-31, OW-HH1, OW-CE1, OW-MT2, OW-DAIRYWELL, OW-HH3, RFR-3, RFR-4, RFR-5, RFR-8, RFR-9, RFR-13, SLD-01, and SLD-02. OW-HH3, RFR-3, RFR-4, RFR-5, RFR-8, RFR-9, RFR-13, SLD-01, and SLD-02.  
 -Sept. 2016: JW-5, OW-HH2, and OW-BARNOWL.  
 -Sept. 2017: BSR-04 and HS-1.  
 -Mar. 2019: JW-20

The following wells have been plugged and abandoned: I10-4, I10-9, LS-1, LS-4, OFR-1, and OFR-4.





0 0.25 0.5  
Miles

**Sampled Wells September 2021**

- > 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 2021  
Camp Stanley Storage Activity

**PARSONS**



**Table 2.2**  
**September 2021 Off-Post Groundwater Results, Detected Analytes Only**

Subdivision	Well ID	Sample Date	cis-1,2-DCE	PCE	TCE	Vinyl Chloride
Leon Springs Villas	LS-5	9/1/2021	--	1.24F	4.04	--
	LS-5-A2	9/1/2021	--	--	--	--
	LS-5-A2	10/27/2021	--	--	--	--
	LS-6	9/1/2021	--	0.99F	0.23F	--
	LS-6-A2	9/1/2021	0.16F	--	--	--
	LS-6-A2	10/27/2021	--	--	--	--
	LS-6-A2 FD	10/27/2021	--	--	--	--
	LS-7	9/1/2021	--	0.95F	--	--
	LS-7-A2	9/1/2021	--	--	--	--
Old Fredericksburg Road	LS-7-A2	10/27/2021	--	--	--	--
	OFR-3	9/1/2021	--	5.50	3.31	--
	OFR-3 FD	9/1/2021	--	4.77	3.44	--
	OFR-3-A2	9/1/2021	--	--	--	--
Ralph Fair Road	OFR-3-A2	10/27/2021	--	--	--	--
	RFR-10	9/1/2021	--	8.13	4.34	--
	RFR-10-A2	9/1/2021	--	--	--	--
	RFR-10-A2	10/27/2021	--	--	--	--
	RFR-10-B2	9/1/2021	--	--	--	--
	RFR-10-B2	10/27/2021	--	--	--	--
	RFR-11	9/1/2021	--	1.69	0.76F	--
	RFR-11-A2	9/1/2021	--	--	--	--
RFR-11-A2	10/27/2021	--	--	--	--	
<b>Laboratory Detection Limits &amp; Maximum Contaminant Level</b>						
<b>Method Detection Limit (MDL)</b>			<b>0.07</b>	<b>0.06</b>	<b>0.05</b>	<b>0.08</b>
<b>Reporting Limit (RL)</b>			<b>1.2</b>	<b>1.4</b>	<b>1</b>	<b>1.1</b>
<b>Max. Contaminant Level (MCL)</b>			<b>70</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:**

TCE            Trichloroethene  
PCE            Tetrachloroethene  
DCE            Dichloroethene  
FD              Field Duplicate

**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.

Two wells (OFR-3 & RFR-10) exceeded the Maximum Contaminant Level (MCL) of 5 micrograms per liter ( $\mu\text{g/L}$ ) in September 2021 for PCE. PCE and/or TCE was detected above the Reporting Limits (RLs) in private drinking water wells LS-5 and RFR-11. These wells are equipped with GAC filtration systems. Post GAC samples were collected during this sampling event. All post GAC samples were non-detect with the exception of LS-6. Post GAC sample LS-6-A2 reported a trace detection of *cis*-1,2-DCE (0.16F  $\mu\text{g/L}$ ). Historically well LS-6 has never had a detection of *cis*-1,2-DCE, this well has been sampled since 2001. Because this trace detection is only slightly above the laboratory's method detection limit for *cis*-1,2-DCE (0.07  $\mu\text{g/L}$ ), and also because no *cis*-1,2-DCE was detected in the sample from well LS-6 prior to entry into the GAC filtration system, the presence of *cis*-1,2-DCE at the reported value is uncertain and questionable; therefore, a follow up sample was collected. The follow up sample, collected on 10/27/21 after GAC maintenance, indicated no detectable PCE, TCE, or *cis*-1,2-DCE in the water being delivered for daily use. Vinyl chloride was not detected in any of the off-post wells sampled in September 2021.

On October 19, 2021, 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. Follow up GAC-filtered sampling after GAC maintenance performed on October 27, 2021 were non-detect indicating the GAC systems are functioning properly. GAC-filtered samples will be collected again during the March 2022 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. Detections above the RL (1.4  $\mu\text{g/L}$ ) and MCL (5  $\mu\text{g/L}$ ) however, are confined to within 0.5 miles of the southwest corner of CSSA. VOC detections beyond that distance range between 1% and 28% of the regulatory MCL thresholds of 5  $\mu\text{g/L}$  for PCE and TCE and are therefore considered trace detections. The CSSA action levels that trigger the requirement for installation of wellhead protection on water supply wells for both PCE and TCE are 80% of the MCL (4  $\mu\text{g/L}$ ), and the furthest historical detection exceeding the action level is 0.43 miles from the southwest corner of the post (and 0.32 miles to the closest point along the CSSA boundary).

### 3.0 SUMMARY AND RECOMMENDATIONS

Results of the September 2021 sampling event are summarized as follows:

- Thirteen samples scheduled for collection in September 2021 were obtained during the quarterly monitoring event.
- Two wells (OFR-3 & RFR-10) exceeded the MCL for PCE in September 2021. These wells have GAC filtration systems in place.
- TCE and/or PCE was detected above the RL in private drinking water wells LS-5 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 2021.
- GAC-filtered samples were collected as part of the quarterly groundwater monitoring in September 2021. All GAC filtered samples were non-detect with the exception of LS-6. Post GAC sample LS-6-A2 reported a trace detection of *cis*-1,2-DCE (0.16F µg/L). A follow up sample was collected 10/27/21 after GAC maintenance and was non-detect. GAC-filtered samples are collected semiannually, every March and September and following GAC maintenance. The next GAC-filtered samples will be collected in March 2022.
- Semi-annual GAC maintenance, including carbon change-out, was performed October 19, 2021. GAC filtered samples were collected October 27<sup>th</sup> following this maintenance. All samples were non-detect indicating the GAC filtration systems are functioning properly. The next semi-annual GAC maintenance is due in April 2022.
- The 2020 update to the LTMO and DQOs was accepted by the TCEQ on September 18, 2020 and the EPA on September 18<sup>th</sup> and September 23, 2020, respectively.
- In accordance with the recently updated project DQOs and LTMO schedule, the rationale for the selection of 6 samples to be collected in December 2021 is provided in **Table 3.1**.



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

<b>Activity</b>	<b>Objectives</b>	<b>Action</b>	<b>Objective Attained?</b>	<b>Recommendations</b>
Field Sampling	Conduct field sampling in accordance with procedures defined in the project work plan, SAP, QAPP, and HASP.	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 April 2020).	Samples for laboratory analysis were collected from selected off-post public and private wells, which are located within a ½ 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 April 2020). 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 April 2020).	Perform maintenance as needed. Install new GACs as needed.	Yes	Maintenance of 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 2021 QUARTERLY OFF-POST  
GROUNDWATER ANALYTICAL RESULTS**

**Appendix B**  
**September 2021 Quarterly Off-post Groundwater Analytical Results**

Subdivision	Well ID	Sample Date	cis-1,2-DCE	PCE	TCE	Vinyl Chloride
Leon Springs Villas	LS-5	9/1/2021	0.07U	<b>1.24F</b>	<b>4.04</b>	0.08U
	LS-5-A2	9/1/2021	0.07U	0.06U	0.05U	0.08U
	LS-5-A2	10/27/2021	0.07U	0.06U	0.05U	0.08U
	LS-6	9/1/2021	0.07U	<b>0.99F</b>	<b>0.23F</b>	0.08U
	LS-6-A2	9/1/2021	<b>0.16F</b>	0.06U	0.05U	0.08U
	LS-6-A2	10/27/2021	0.07U	0.06U	0.05U	0.08U
	LS-6-A2 FD	10/27/2021	0.07U	0.06U	0.05U	0.08U
	LS-7	9/1/2021	0.07U	<b>0.95F</b>	0.05U	0.08U
	LS-7-A2	9/1/2021	0.07U	0.06U	0.05U	0.08U
	LS-7-A2	10/27/2021	0.07U	0.06U	0.05U	0.08U
Old Fredericksburg Road	OFR-3	9/1/2021	0.07U	<b>5.50</b>	<b>3.31</b>	0.08U
	OFR-3 FD	9/1/2021	0.07U	<b>4.77</b>	<b>3.44</b>	0.08U
	OFR-3-A2	9/1/2021	0.07U	0.06U	0.05U	0.08U
	OFR-3-A2	10/27/2021	0.07U	0.06U	0.05U	0.08U
Ralph Fair Road	RFR-10	9/1/2021	0.07U	<b>8.13</b>	<b>4.34</b>	0.08U
	RFR-10-A2	9/1/2021	0.07U	0.06U	0.05U	0.08U
	RFR-10-A2	10/27/2021	0.07U	0.06U	0.05U	0.08U
	RFR-10-B2	9/1/2021	0.07U	0.06U	0.05U	0.08U
	RFR-10-B2	10/27/2021	0.07U	0.06U	0.05U	0.08U
	RFR-11	9/1/2021	0.07U	<b>1.69</b>	<b>0.76F</b>	0.08U
	RFR-11-A2	9/1/2021	0.07U	0.06U	0.05U	0.08U
	RFR-11-A2	10/27/2021	0.07U	0.06U	0.05U	0.08U
<b>Laboratory Detection Limits &amp; Maximum Contaminant Level</b>						
<b>Method Detection Limit (MDL)</b>			<b>0.07</b>	<b>0.06</b>	<b>0.05</b>	<b>0.08</b>
<b>Reporting Limit (RL)</b>			<b>1.2</b>	<b>1.4</b>	<b>1</b>	<b>1.1</b>
<b>Max. Contaminant Level (MCL)</b>			<b>70</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:**

TCE                    Trichloroethene  
PCE                    Tetrachloroethene  
DCE                    Dichloroethene  
FD                      Field Duplicate

**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 97401  
SDG 98004**

**DATA VERIFICATION SUMMARY REPORT**  
**for groundwater samples collected from**  
**CAMP STANLEY STORAGE ACTIVITY**

**BOERNE, TEXAS**

Data Verification by: Beth Driskill  
Parsons - Austin

**INTRODUCTION**

The following data verification summary report covers twenty water samples collected from Camp Stanley Storage Activity (CSSA) September 1, 2021. The samples were assigned to the following Sample Delivery Group (SDG).

97401

The field QC sample associated with this SDG was one trip blank (TB), one matrix spike/matrix spike duplicate (MS/MSD) set, and two field duplicates (FD). 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. Samples in this SDG were shipped to the laboratory in a single cooler, which was received by the laboratory at an acceptable temperature of 1.1°C.

**SAMPLE IDs AND REQUESTED PARAMETERS**

Sample ID	Matrix	VOCs	Metals	Mercury	Comments
TB-1	Water	X			
LS-7	Water	X			
LS-7-A2	Water	X			
LS-5	Water	X			
LS-5-A2	Water	X			
LS-6	Water	X			
LS-6-A2	Water	X			
OFR-3	Water	X			
OFR-3-FD	Water	X			FD of OFR-3
RFR-10	Water	X			
RFR-10-A2	Water	X			
RFR-10-B2	Water	X			
RFR-11	Water	X			

Sample ID	Matrix	VOCs	Metals	Mercury	Comments
RFR-11-A2	Water	X			
CS-12	Water	X	X	X	
CS-12-FD	Water	X	X	X	FD of CS-12
CS-13	Water	X	X	X	
CS-1	Water	X	X	X	
CS-10	Water	X	X	X	MS/MSD

## EXTRACTION, ANALYTICAL, AND REPORTING DETAILS

Parameter	Matrix	Prep Method	Analytical Method	Units
VOCS	WATER	SW5030B	SW8260B	µg/L
METALS	WATER	SW3010A	SW6010B	mg/L
MERCURY	WATER	SW7470A	SW7470A	mg/L

## EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the CSSA QAPP, Version 1.0. The control limits in the updated CSSA QAPP, August 2021 that is not yet finalized were used to evaluate the surrogates, laboratory control samples (LCSs), and MS/MSDs. These control limits are also referenced in the DoD QSM, version 5.3 for the methods in this data set. 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.

## VOLATILES

### General

The volatiles portion of this data package consisted of seventeen (17) groundwater samples, one (1) TB, one (1) MS/MSD set and two (2) FD. All samples were collected on September 1, 2021 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene (*cis* 1,2-DCE), tetrachloroethene, trichloroethene (TCE), 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, #269244 and #269245, under one 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 sample (LCS), MS/MSD, and the surrogate spikes. Sample CS-10 was designated as the MS/MSD on the COC.

The LCS, MS/MSD, and surrogate spike recoveries were within acceptance criteria.

### **Precision**

Precision was evaluated using the relative percent difference (RPD) obtained from the MS/MSD results. Precision was further evaluated by comparing the field duplicate analyte results. Sample OFR-3-FD was collected and analyzed as the field duplicate of OFR-3. Sample CS-12-FD was collected and analyzed as the field duplicate of CS-12.

The MS/MSD RPDs were within acceptance criteria.

All target metals that were detected above the reporting limit (RL) in the parent and FD samples, met criteria.

### **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 and TB 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.
- All initial calibration verification (ICV) criteria were met. The ICV was prepared using a secondary source standard.
- All continuing calibration verification (CCV) criteria were met.
- All internal standard criteria were met.

Two method blanks were associated with the VOC analyses in this SDG. The MBs were non-detect for all target VOCs.

There was one trip blank sample associated with the VOC analyses in this SDG. The TB was non-detect 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%.

## **ICP-AES METALS**

### **General**

The ICP-AES portion of this SDG consisted of four (4) groundwater samples, one (1) FD, and one (1) MS/MSD set. All samples were collected on September 1, 2021. The samples were analyzed for arsenic, barium, cadmium, chromium, copper, lead, and zinc.

The ICP-AES metals analyses were performed using USEPA SW846 Method 6010B. 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.

The samples for ICP-AES metals were digested in batch #268539. All analyses were performed undiluted.

### **Accuracy**

Accuracy was evaluated using the percent recovery obtained from the LCS, MS, and MSD. Sample CS-10 was designated as the MS/MSD on the COC.

All LCS, MS, and MSD recoveries were within acceptance.

### **Precision**

Precision was measured based on the RPD of MS/MSD results and parent/FD sample results. Sample CS-12-FD was collected and analyzed as the field duplicate of CS-12.

All RPDs were compliant for the MS/MSD and FD.

### **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 preservation and holding times; and
- Examining laboratory blank for cross contamination of samples during analysis.

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

- All initial calibration criteria were met.

- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All CCV criteria were met.
- All interference check (ICSA/ICSAB) criteria were met.
- Dilution test (DT) was not applicable since all target metals met criteria in the MS/MSD.
- Post digestion spike (PDS) was also not applicable since all target metals met criteria in the MS/MSD samples.
- The initial calibration blank (ICB) and continuing calibration blank (CCB) samples were all non-detect, except for a trace arsenic and cadmium detection in a CCB. No action was required since cadmium was non-detect in all the samples and arsenic detections were less than the reporting limit and were already qualified as estimated and flagged “F”.

One method blank was analyzed in association with the ICP-AES analyses in this SDG. The method blank was free of target metals at or above the RL.

### **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

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

## **MERCURY**

### **General**

The mercury portion of this SDG consisted of four (4) groundwater samples, one (1) FD, and one (1) MS/MSD set. All samples were collected on September 1, 2021 and were analyzed for mercury.

The mercury analyses were performed using USEPA SW846 Method 7470A. The samples were analyzed following the procedures outlined in the CSSA QAPP, prepared and analyzed within the holding time required by the method.

The mercury samples were prepared in batch #269243. All analyses were performed undiluted.

### **Accuracy**

Accuracy was evaluated using the percent recovery obtained from the LCS and MS/MSD. Sample CS-10 was designated as the MS/MSD on the COC.

The LCS and MS/MSD recoveries were within acceptance criteria.



## **Precision**

Precision was measured based on the RPD of MS/MSD results and parent/FD sample results. Sample CS-12-FD was collected and analyzed as the field duplicate of CS-12.

All RPDs were compliant for the MS/MSD and FD.

## **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 blanks for cross contamination of samples during analysis.

All samples were analyzed following the COC and the analytical procedures described in the CSSA QAPP, prepared and analyzed within the holding times required by the method.

- All initial calibration criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All CCV criteria were met.

There was one method blank and three calibration blanks associated with the mercury analyses in this SDG. All blanks were free of mercury.

## **Completeness**

Completeness has been evaluated by comparing the total number of samples collected with the total number of samples with valid analytical data.

Mercury result for the samples in this SDG was considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

**DATA VERIFICATION SUMMARY REPORT**  
**for groundwater samples collected from**  
**CAMP STANLEY STORAGE ACTIVITY**

**BOERNE, TEXAS**

Data Verification by: Sandra de las Fuentes  
Parsons - Austin

**INTRODUCTION**

The following data verification summary report covers nine water samples collected from Camp Stanley Storage Activity (CSSA) October 27, 2021. The samples were assigned to the following Sample Delivery Group (SDG).

98004

The field QC sample associated with this SDG was one trip blank (TB), one matrix spike/matrix spike duplicate (MS/MSD) set, and one field duplicate (FD). 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. Samples in this SDG were shipped to the laboratory in a single cooler, which was received by the laboratory at an acceptable temperature of 1.1°C.

**SAMPLE IDs AND REQUESTED PARAMETERS**

<b>Sample ID</b>	<b>Matrix</b>	<b>VOCs</b>	<b>Comments</b>
TB-1	Water	X	
LS-7-A2	Water	X	
LS-6-A2	Water	X	
LS-6-A2-FD	Water	X	FD of LS-6-A2
LS-5-A2	Water	X	
OFR-3-A2	Water	X	
RFR-10-A2	Water	X	MS/MSD
RFR-10-B2	Water	X	
RFR-11-A2	Water	X	

## EXTRACTION, ANALYTICAL, AND REPORTING DETAILS

Parameter	Matrix	Prep Method	Analytical Method	Units
VOCS	WATER	SW5030B	SW8260B	µg/L

## EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in the CSSA QAPP, Version 1.0. The control limits in the updated CSSA QAPP, August 2021 that is not yet finalized were used to evaluate the surrogates, laboratory control samples (LCSs), and MS/MSDs. These control limits are also referenced in the DoD QSM, version 5.3 for the methods in this data set. 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.

## VOLATILES

### General

The volatiles portion of this data package consisted of seven (7) groundwater samples, one (1) TB, one (1) MS/MSD set and one (1) FD. All samples were collected on October 27, 2021 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene (*cis* 1,2-DCE), tetrachloroethene, trichloroethene (TCE), and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in a single analytical batch, #269931, under one 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 sample (LCS), MS/MSD, and the surrogate spikes. Sample CS-10-A2 was designated as the MS/MSD on the COC.

The LCS, MS/MSD, and surrogate spike recoveries were within acceptance criteria.

### Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the MS/MSD results. Precision was further evaluated by comparing the field duplicate analyte results. Sample LS-6-A2-FD was collected and analyzed as the field duplicate of LS-6-A2.

The MS/MSD RPDs were within acceptance criteria.

There were no target VOCs detected above the reporting limit (RL) in the parent or FD sample, therefore this precision evaluation was not performed.

### **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 and TB 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.
- All initial calibration verification (ICV) criteria were met. The ICV was prepared using a secondary source standard.
- All continuing calibration verification (CCV) criteria were met.
- All internal standard criteria were met.

One method blank was associated with the VOC analyses in this SDG. The MB was non-detect for all target VOCs.

There was one trip blank sample associated with the VOC analyses in this SDG. The TB was non-detect 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%.