June 2022

Off-Post
Quarterly Groundwater Monitoring Report

Prepared For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

July 2022

EXECUTIVE SUMMARY

- Six off-post samples were collected during the June 2022 sampling event and 7 post-granular activated carbon (GAC) samples were collected in May for volatile organic compound (VOC) analyses.
- Analyses indicated one off-post well (RFR-10) exceeded the maximum contaminant level (MCL) for volatile organic compounds (VOCs).
- Wells LS-5, LS-7, OFR-3, RFR-10, and RFR-11 had VOC detections above the LOQ (limit of quantitation) but below the MCL this sampling event. While well LS-6 reported VOC dectection just below the LOQ. These wells are equipped with GAC filtration systems.
- GAC-filtered samples were collected in May 2022 after GAC maintenance was performed. All GAC filtered samples were non-detect indicationg the filtration systems are functioning properly. GAC filtered samples are collected semi-annually and after GAC maintenance and will be collected again in September 2022.
- Semi-annual GAC maintenance was performed May 13, 2022. This involved replacing the first carbon canister in each GAC system and other routine maintenance. Seven GAC filtered samples were collected on May 16, 2022 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 November 2022.

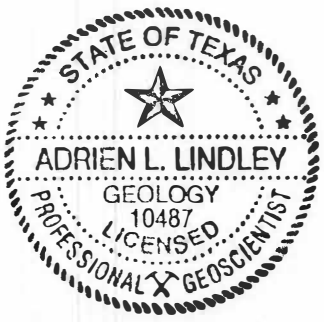
GEOSCIENTIST CERTIFICATION

June 2022 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 2022 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 ETA, and field data obtained during groundwater monitoring conducted at the site in June 2022, and is true and accurate to the best of my knowledge and belief.



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

7/14/2022
Date

Parsons Government Services, Inc.
Firm Registration No. 50316

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

µg/L	microgram per liter
AOC	Area of Concern
cis-1,2-DCE	*cis*-1,2-Dichloroethene
CSSA	Camp Stanley Storage Activity
DL	Detection Limit
DQO	Data Quality Objective
ETA	Eurofins TestAmerica - Denver
FD	Field Duplicate
GAC	Granular Activated Carbon
HASP	Health and Safety Plan
JW	Jackson Woods
LS	Leon Springs
LOQ	Limit of Quantitation
LTMO	Long Term Monitoring Optimization
MCL	Maximum Contaminant Level
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
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

JUNE 2022
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 2022 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 2022 quarterly monitoring events (March, June, September, and December) will be described in detail in an Annual Report to be submitted after December 2022. 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 1st through 15th, 2022. 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 JUNE 2022 ANALYTICAL RESULTS

During the June 2022 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 not collected during this event. However, follow up GAC filtered samples were collect after the carbon exchange in May 2022.

Table 2.1 includes the rationale for selection of the 6 wells scheduled to be sampled in June 2022. 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 13 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 Eurofins TestAmerica (ETA) in Dever, Colorado for analysis. Groundwater samples were analyzed for the short list of VOCs using SW-846 Method 8260C. 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 280-162401 and 280-162982) 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 May 25th and June 16th, 2022.

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 2022 are presented in **Table 2.2**. Full analytical results from the June 2022 sampling event are presented in **Appendix B**. As shown in **Table 2.1**, 6 samples were scheduled for collection in June 2022 and all samples were obtained.

Table 2-1
Sampling Rationale for June 2022

Well ID	2001		2002				2003				2004				2005				2006				2007				2008				2009				2010				2011				2012			
	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	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec
FO-J1												NS						NS	NS																		NS	NS	NA	NS	NS	NA
I10-2																				NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS				NA	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	NS	
I10-10																																														
JW-7		NS	NS	NS	NS	NS	NS	NS																														NS	NS		NS	NS				
JW-8	NS	NS	NS	NS	NS	NS	NS																															NS	NS		NS	NS				
LS-5																																														
LS-5-A2																																						GAC installed 10/6/11			NS		NS		NS	
LS-6																																														
LS-6-A2				NS		NS		NS		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		NS		NS		NS	
OFR-3																																						NS		NS							
OFR-3-A2	NS	NS		NS		NS		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		NS		NS		NS	
RFR-10-B2				NS	NS	NS	NS	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		NS		NS		NS	
RFR-12																				NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS		NS		NS	
RFR-14															Well Installed																								NS	NS		NS	NS	

Well ID	2013				2014				2015				2016				2017				2018				2019				2020				2021				2022		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	Dec	Mar	Jun	Sept	Dec	Mar	Jun	
FO-J1	NS	NS		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	NS	NS	no sample until litigation determines ownership
I10-2	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	NS	NA	NS	NS	NS	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	exclude after final sample, pump out
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	30 month
I10-10	access agreement received			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	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	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	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		NS	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		NS	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		NS	Biannually (Mar & Sep)
OFR-3		NA	NA	NA	NA	NA	NA	NA																																Yes	Quarterly
OFR-3-A2		NS	NA	NS	NA	NA	NA	NA		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	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		NS	Biannually (Mar & Sep)
RFR-10-B2		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	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		NS	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	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	NS	NS		NS	30 month

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.

Wells Sampled: 6
Post GAC samples: 0
Total Samples: 6

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

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

Yes
To be sampled in June 2022.

NS
Not sampled for that event.

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

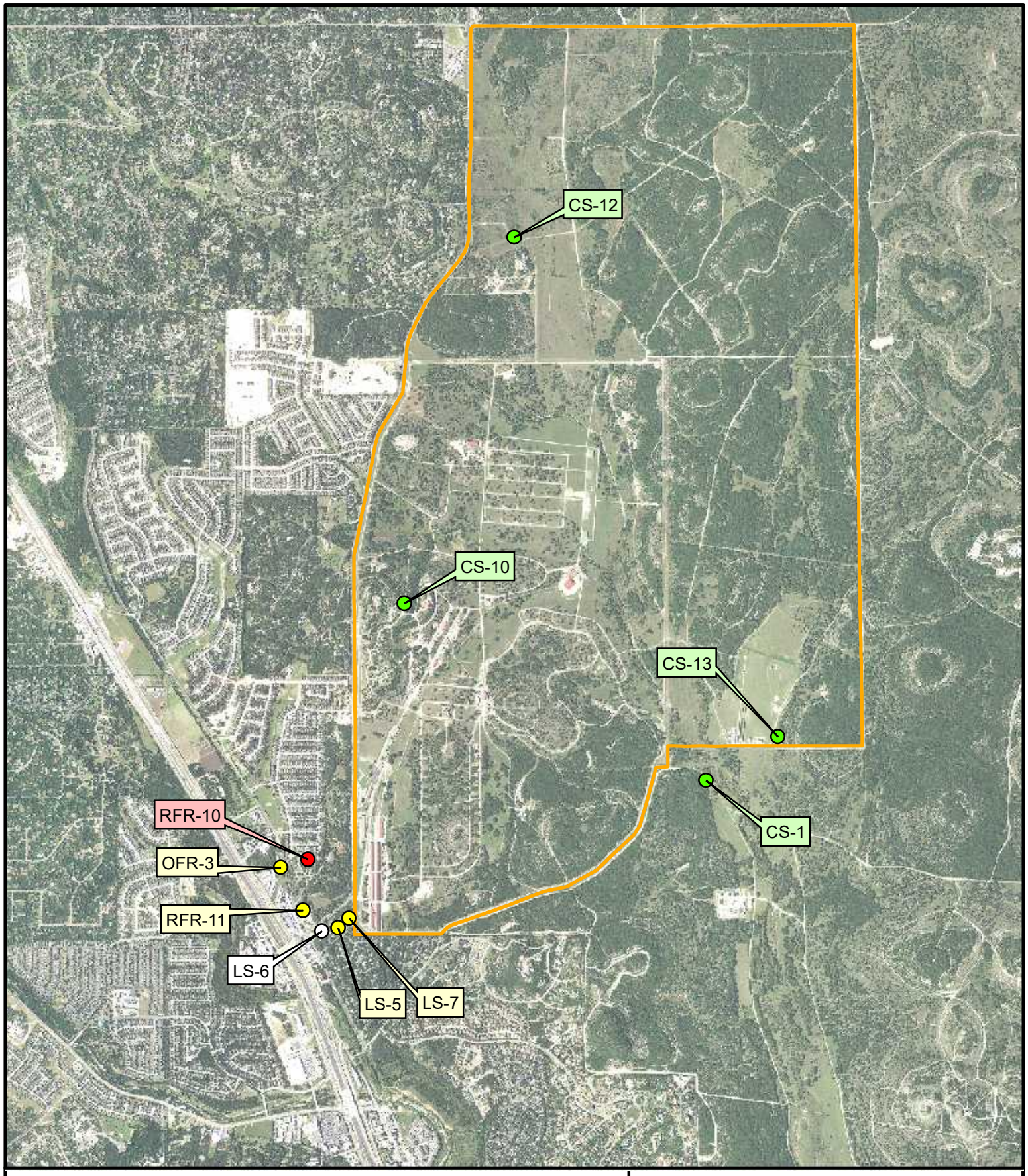


Figure 2-1

On-Post and Off-Post Well Sampling Locations for June 2022

Camp Stanley Storage Activity

PARSONS

Table 2.2
June 2022 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	6/2/2022	--	**1.06**	**3.76**	--
	LS-5-A2	5/16/2022	--	--	--	--
	LS-6	6/2/2022	--	**0.825J**	**0.949J**	--
	LS-6-A2	5/16/2022	--	--	--	--
	LS-7	6/2/2022	--	**1.48**	**0.602J**	--
	LS-7-A2	5/16/2022	--	--	--	--
Old Fredericksburg Road	OFR-3	6/2/2022	--	**4.48**	**2.55**	--
	OFR-3-A2	5/16/2022	--	--	--	--
	OFR-3-A2 FD	5/16/2022	--	--	--	--
Ralph Fair Road	RFR-10	6/2/2022	--	**5.23**	**1.67**	--
	RFR-10-A2	5/16/2022	--	--	--	--
	RFR-10-B2	5/16/2022	--	--	--	--
	RFR-11	6/2/2022	--	**0.898J**	**2.2**	--
	RFR-11-A2	5/16/2022	--	--	--	--
	Laboratory Detection Limits & Maximum Contaminant Level					
	Detection Limit (DL)		**0.15**	**0.2**	**0.16**	**0.1**
	Limit of Quantitation (LOQ)		**1.0**	**1.0**	**1.0**	**1.4**
	Max. Contaminant Level (MCL)		**70**	**5**	**5**	**2**

BOLD	≥ DL
BOLD	≥ LOQ
BOLD	≥ MCL

All samples were analyzed by Eurofins TestAmerica.
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 DL.
J - Estimated: The analyte was positively identified; the quantitation is an estimation.

One well (RFR-10) exceeded the Maximum Contaminant Level (MCL) in June 2022. PCE and/or TCE was detected above the Limit of Quantitation (LOQs) in private drinking water wells LS-5, LS-7, OFR-3, RFR-10, and RFR-11. Well LS-6 also reported PCE and TCE just below the LOQ. These wells are equipped with GAC filtration systems. Post GAC samples were collected in May after the carbon exchange was completed on the GAC systems. All post GAC samples were non-detect. Vinyl chloride and *cis*-1,2-DCE were not detected in any of the off-post wells sampled in June 2022.

On May 13, 2022, 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 was performed on May 16, 2022 and were non-detect indicating the GAC systems are functioning properly. GAC-filtered samples will be collected again during the September 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. Historic detections above the laboratory-determined reporting limit (1.4 µg/L) and MCL (5 ug/L) however, are confined to within 0.5 miles of the southwest corner of CSSA. Historical VOC detections beyond that distance range between 1% and 28% of the regulatory MCL thresholds of 5 µg/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 µg/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 June 2022 sampling event are summarized as follows:

- Six samples scheduled for collection in June 2022 were obtained during the quarterly monitoring event. Along with 7 GAC-filtered samples collected in May after maintenance was performed on the GAC systems.
- One well (RFR-10) exceeded the MCL in June 2022. This well is equipped with a GAC filtration system.
- TCE and/or PCE were detected above the LOQ in private drinking water wells LS-5, LS-7, OFR-3, RFR-10, and RFR-11. These wells have GAC filtration systems in place.
- TCE and PCE were detected just below the LOQ in private drinking water well LS-6. This well is equipped with a GAC filtration system.
- Vinyl chloride and cis-1,2-DCE were not detected in any of the off-post wells sampled in June 2022.
- GAC-filtered samples were collected on May 16, 2022 after maintenance was performed on the GAC systems May 13, 2022. All GAC-filtered samples were non-detect indicating the filtration systems are functioning properly. GAC-filtered samples are collected semiannually, every March and September and following GAC maintenance. The next GAC-filtered samples will be collected in September 2022.
- Semi-annual GAC maintenance, including carbon change-out, was performed May 13, 2022. The next semi-annual GAC maintenance is due in November 2022.
- The 2020 update to the LTMO and DQOs was accepted by the TCEQ on September 18, 2020 and the EPA on September 18th and September 23, 2020, respectively.
- In accordance with the recently updated project DQOs and LTMO schedule, the rationale for the selection of 13 samples to be collected in September 2022 is provided in **Table 3.1**.

Table 3-1
Sampling Rationale for September 2022

Well ID	2001		2002				2003				2004				2005				2006				2007				2008				2009				2010				2011				2012			
	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	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec
FO-J1												NS						NS	NS																						NS	NS	NA	NS	NS	NA
I10-2																				NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS				NA	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	NS	
I10-10																																														
JW-7		NS	NS	NS	NS	NS	NS	NS																																NS	NS		NS	NS	
JW-8	NS	NS	NS	NS	NS	NS	NS																																	NS	NS		NS	NS	
LS-5																																													
LS-5-A2																																								GAC installed 10/6/11			NS		NS		NS
LS-6																																													
LS-6-A2				NS		NS		NS		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		NS		NS		NS
OFR-3																																							NA	NS						
OFR-3-A2	NS	NS		NS		NS		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		NS		NS		NS
RFR-10-B2				NS	NS	NS	NS	NS		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		NS		NS		NS
RFR-12																				NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS				NA	NS		NS		NS	NS	
RFR-14															Well Installed																										NS	NS		NS	NS	

Well ID	2013				2014				2015				2016				2017				2018				2019				2020				2021				2022			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	Sep	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sept	Dec	Mar	Jun	Sep	
FO-J1	NS	NS		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	NS	NS	NS	no sample until litigation determines ownership
I10-2	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	NS	NA	NS	NS	NS	NA	NA	NA	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	exclude after final sample, pump out
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		30 month
I10-10	access agreement received			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	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	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	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		NA		NS	Yes		Biannually (Mar & Sep)
OFR-3		NA	NA	NA	NA	NA	NA	NA																																Yes		Quarterly
OFR-3-A2		NS	NA	NS	NA	NA	NA	NA		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NA		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		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		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		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	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	NS	NS		NS	NS		30 month

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.

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

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

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

Yes
To be sampled in September 2022.

NS
Not sampled for that event.

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

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 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
	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.	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.	Yes	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.
Project Schedule/ Reporting	The quarterly monitoring project schedule shall provide a schedule for sampling, analysis, validation, verification, reviews, and reports for monitoring events off-post.	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.	Yes	Continue quarterly reporting to include a schedule for sampling, analysis, validation, and verification and data review and data reports.

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
June 2022 Quarterly Off-post Groundwater Analytical Results

Well ID	Sample Date	cis-1,2-DCE	PCE	TCE	Vinyl Chloride
LS-5	6/2/2022	0.15U	**1.06**	**3.76**	0.10U
LS-5-A2	5/16/2022	0.15U	0.20U	0.16U	0.10U
LS-6	6/2/2022	0.15U	**0.825J**	**0.949J**	0.10U
LS-6-A2	5/16/2022	0.15U	0.20U	0.16U	0.10U
LS-7	6/2/2022	0.15U	**1.48**	**0.602J**	0.10U
LS-7-A2	5/16/2022	0.15U	0.20U	0.16U	0.10U
OFR-3	6/2/2022	0.15U	**4.48**	**2.55**	0.10U
OFR-3-A2	5/16/2022	0.15U	0.20U	0.16U	0.10U
OFR-3-A2 FD	5/16/2022	0.15U	0.20U	0.16U	0.10U
RFR-10	6/2/2022	**0.15U**	**5.23**	**1.67**	0.10U
RFR-10-A2	5/16/2022	0.15U	0.20U	0.16U	0.10U
RFR-10-B2	5/16/2022	0.15U	0.20U	0.16U	0.10U
RFR-11	6/2/2022	0.15U	**0.898J**	**2.2**	0.10U
RFR-11-A2	5/16/2022	0.15U	0.20U	0.16U	0.10U
Laboratory Detection Limits & Maximum Contaminant Level					
Detection Limit (DL)		**0.15**	**0.2**	**0.16**	**0.1**
Limit of Quantitation (LOQ)		**1.0**	**1.0**	**1.0**	**1.4**
Max. Contaminant Level (MCL)		**70**	**5**	**5**	**2**

BOLD	≥ DL
BOLD	≥ LOQ
BOLD	≥ MCL

All samples were analyzed by Eurofins TestAmerica.
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 DL.
J - Estimated: The analyte was positively identified; the quantitation is an estimation.

APPENDIX C
DATA VALIDATION REPORTS

SDG 280-162401
SDG 280-162982

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 eleven groundwater samples collected from Camp Stanley Storage Activity (CSSA) May 16, 2022, 2022. The samples were assigned to the following Work Oder (WO).

280-162401

The field QC sample associated with this WO 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 Eurofins TestAmerica in Denver, Colorado (ETA) following the procedures outlined in the DRAFT CSSA QAPP (pending approval, Parsons 2022) and in PO #0012175. Samples in this WO were shipped to the laboratory in a single cooler, which was received by the laboratory at an acceptable temperature of 2.8ºC.

SAMPLE IDs AND REQUESTED PARAMETERS

Sample ID	Lab ID	Matrix	VOCs	Comments
TB-1	280-162401-1	Water	X	
LS-6-A2	280-162401-2	Water	X	
RFR-10-A2	280-162401-3	Water	X	
RFR-10-B2	280-162401-4	Water	X	
OFR-3-A2	280-162401-5	Water	X	
OFR-3-A2_FD	280-162401-6	Water	X	FD of OFR-3-A2
RFR-11-A2	280-162401-7	Water	X	
LS-5-A2	280-162401-8	Water	X	
LS-7-A2	280-162401-9	Water	X	MS/MSD

EXTRACTION, ANALYTICAL, AND REPORTING DETAILS

Parameter	Matrix	Prep Method	Analytical Method	Units
VOCs	Water	SW5030B	SW8260C	µg/L

EVALUATION CRITERIA

The data submitted by the laboratory has been reviewed and verified following the guidelines outlined in in the DRAFT CSSA QAPP (Parsons 2022) and in PO #0012175. The control limits used to evaluate the surrogates, laboratory control samples (LCSs), and MS/MSDs 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 PO and DRAFT CSSA QAPP were met.

A table detailing the data qualifiers applied, removed, or changed (if any) for the samples in this WO as a result of the data validation process is included at the end of this report.

VOLATILES

General

The volatiles portion of this data package consisted of eleven (11) groundwater samples, including one (1) TB, one (1) MS/MSD set and one (1) FD. All samples were collected on May 16, 2022 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 8260C. The samples were analyzed in one analytical batch, #575954, under one initial calibration (ICAL). All samples were analyzed following the procedures outlined in the DRAFT 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), LCS duplicate (LCSD), the MS, MSD, and the surrogate spikes. Sample LS-7-A2_was designated as the MS/MSD on the COC.

All LCS, LCSD, and surrogate spike recoveries were within acceptance criteria.

All MS and MSD spike recoveries were within acceptance criteria, except as follows.

Spiked Sample: LS-7-A2

Analyte	MS %R	MSD %R	Criteria
Tetrachloroethane	72	(90)	74-129%
Trichloroethane	73	(94)	79-123%

( ) = Indicates criteria was met

Tetrachloroethane and trichloroethane were qualified as estimated (M) in the parent sample due to the low MS and MSD recoveries. The data validator revised the qualifier applied by the laboratory from 'J1' to 'M'.

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the LCS/LCSD and MS/MSD results. Precision was further evaluated by comparing the field duplicate analyte results. Sample OFR-3-A2_FD was collected and analyzed as the field duplicate of OFR-3-A2.

The LCS/LCSD RPDs were within acceptance criteria.

The MS/MSD RPDs were within acceptance criteria, except as follows.

Analyte	RPD	Criteria
Tetrachloroethane	23	20
Trichloroethane	26	20

Since results for both analytes in the parent sample were non-detect, no action was required.

Only target VOCs above the limit of quantitation (LOQ) in both the parent and FD samples are evaluated. There were no target VOCs detected above the LOQ in either the parent or FD sample.

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 DRAFT CSSA QAPP;
- Comparing actual analytical procedures to those described in the DRAFT 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 DRAFT CSSA QAPP. 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 WO. The MB was non-detect for all target VOCs.

There was one trip blank sample associated with the VOC analyses in this WO. The TB was non-detect for all target VOCs.

Completeness

Completeness has been evaluated in accordance with the DRAFT 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 WO were considered usable. The completeness for this WO is 100%, which meets the minimum acceptance criteria of 90%.

DATA QUALIFIER DEFINITIONS

The data qualifiers are defined in Table 36.3 of the project-specific DRAFT CSSA QAPP, as follows:

Data Validation Codes and Definitions

Data Qualifiers	Definitions
U	The analyte was analyzed for, but not detected. The associated numerical value is at or below the Detection Limit (DL).
F	The analyte was positively identified; the quantitation is an estimation above the DL and below the Limit of Quantitation (LOQ).
J	The analyte was positively identified, but the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
UJ	The analyte was analyzed for, but not detected; the associated numerical value is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
M	A matrix effect was present.
R	Data is rejected as unusable due to serious deficiencies in meeting certain analyte-specific quality control criteria.

DATA QUALIFIER CHANGES

The following data qualifiers were added, removed, or changed as a result of the data validation process:

Sample ID	Analyte	Units	Original Result	Final Result	Reason Code
LS-7-A2	Tetrachloroethane	µg/L	0.200 U J1	0.200 U M	M3
LS-7-A2	Trichloroethane	µg/L	0.160 U J1	0.200 U M	M3

REASON CODE DEFINITIONS

The data validation reason codes were used to document the logic behind all data validation qualifiers. The following reason codes for data qualification were associated with the samples in this SDG:

M3: MS/MSD percent recovery Infraction with Low Bias

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 eleven groundwater samples collected from Camp Stanley Storage Activity (CSSA) June 2, 2022. The samples were assigned to the following Work Order (WO).

280-162982

The field QC sample associated with this WO 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 Eurofins TestAmerica in Denver, Colorado (ETA) following the procedures outlined in the DRAFT CSSA QAPP (pending approval, Parsons 2022) and in PO #0012175. Samples in this WO were shipped to the laboratory in two coolers, which were received by the laboratory at acceptable temperatures of 1.2ºC and 1.8ºC.

SAMPLE IDs AND REQUESTED PARAMETERS

Sample ID	Lab ID	Matrix	VOCs	Metals	Mercury	Comments
TB-1	280-162982-1	Water	X			
LS-7	280-162982-2	Water	X			
LS-5	280-162982-3	Water	X			
OFR-3	280-162982-4	Water	X			
RFR-10	280-162982-5	Water	X			
RFR-11	280-162982-6	Water	X			
LS-6	280-162982-7	Water	X			
CS-1	280-162982-8	Water	X	X	X	
CS-13	280-162982-9	Water	X	X	X	MS/MSD
CS-12	280-162982-10	Water	X	X	X	
CS-10	280-162982-11	Water	X	X	X	
CS-10_FD	280-162982-12	Water	X	X	X	FD of CS-10

EXTRACTION, ANALYTICAL, AND REPORTING DETAILS

Parameter	Matrix	Prep Method	Analytical Method	Units
VOCs	Water	SW5030B	SW8260C	µg/L
Metals	Water	SW3010A	SW6010C	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 in the DRAFT CSSA QAPP (Parsons 2022) and in PO #0012175. The control limits used to evaluate the surrogates, laboratory control samples (LCSs), and MS/MSDs 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 PO and DRAFT CSSA QAPP were met.

A table detailing the data qualifiers applied, removed, or changed (if any) for the samples in this WO as a result of the data validation process is included at the end of this report.

VOLATILES

General

The volatiles portion of this data package consisted of fourteen (14) groundwater samples, including one (1) TB, one (1) MS/MSD set and one (1) FD. All samples were collected on June 2, 2022 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 8260C. The samples were analyzed in a single analytical batch, #577689, under one initial calibration (ICAL). All samples were analyzed following the procedures outlined in the DRAFT 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), LCS duplicate (LCSD), the MS, MSD, and the surrogate spikes. Sample CS-13 was designated as the MS/MSD on the COC.

All LCS, LCSD, MS and MSD spike recoveries were within acceptance criteria.

All surrogate spike recoveries were within acceptance criteria.

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the LCS/LCSD and MS/MSD results. Precision was further evaluated by comparing the field duplicate analyte results. Sample CS-10_FD was collected and analyzed as the field duplicate of CS-10.

The LCS/LCSD and MS/MSD RPDs were within acceptance criteria.

Only target VOCs above the limit of quantitation (LOQ) in both the parent and FD samples are evaluated. There were no target VOCs detected above the LOQ in either the parent or FD sample.

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 DRAFT CSSA QAPP;
- Comparing actual analytical procedures to those described in the DRAFT 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 DRAFT CSSA QAPP. 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 WO. The MB was non-detect for all target VOCs.

There was one trip blank sample associated with the VOC analyses in this WO. The TB was non-detect for all target VOCs.

Completeness

Completeness has been evaluated in accordance with the DRAFT 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 WO were considered usable. The completeness for this WO is 100%, which meets the minimum acceptance criteria of 90%.

ICP-AES METALS

General

The ICP portion of this WO consisted of seven (7) groundwater samples, including one (1) MS/MSD set and one (1) FD. All samples were collected on June 2, 2022. The samples were analyzed for arsenic, barium, cadmium, chromium, copper, lead, and zinc.

The ICP metals analyses were performed using USEPA SW846 Method 6010C. All samples were analyzed following the procedures outlined in the PO and DRAFT CSSA QAPP and were prepared and analyzed within the holding time required by the method. The samples for ICP metals were analyzed in batch #578132. All analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the LCS, LCSD, the MS and MSD. Sample CS-13 was designated as the MS/MSD on the COC.

All LCS, LCSD, MS and MSD spike recoveries were within acceptance criteria.

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the LCS/LCSD and MS/MSD results. Precision was further evaluated by comparing the field duplicate analyte results. Sample CS-10_FD was collected and analyzed as the field duplicate of CS-10.

The LCS/LCSD and MS/MSD RPDs were within acceptance criteria.

Only target metals above the LOQ in both the parent and FD samples are evaluated. Barium and zinc were detected above the LOQs in both the parent and FD samples. Barium and zinc both met the RPD criterion for metals of 20.

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 DRAFT CSSA QAPP;
- Comparing actual analytical procedures to those described in the DRAFT 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 DRAFT CSSA QAPP, 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 CCVL criteria were met.
- All interference check (ICSA/ICSAB) criteria were met.
- The serial dilution test (DT) was performed on the same sample as the MS/MSD. A DT is only applicable for those target metals where the sample concentration is ≥ 50x the MDL and the MS and/or MSD failed recovery criteria. The DT was not required since the MS and MSD passed recovery criterion.
- The post digestion spike (PDS) was performed on the same samples as the MS/MSD. A PDS is only applicable for those metals that failed the MS/MSD and DT criteria. The PDS was not required since the MS and MSD passed recovery criterion.
- The initial calibration blank (ICB) and continuing calibration blank (CCB) samples were all non-detect.

One method blank was analyzed in association with the ICP analyses in this WO. The method blank was free of target metals, except as follows. Zinc was detected in MB-280-577877/1-A at 0.00173 mg/L. All associated samples contained zinc at concentrations greater than 5 times the amount in the MB, therefore corrective action was not required.

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 metals results for the samples in this WO were considered usable. The completeness for the ICP metals portion of this WO is 100%, which meets the minimum acceptance criteria of 90%.

MERCURY

General

The mercury portion of this WO consisted of seven (7) groundwater samples, including one (1) MS/MSD set and one (1) FD. All samples were collected on June 2, 2022 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 PO and DRAFT CSSA QAPP, prepared and analyzed within the holding time required by the method.

The mercury samples were analyzed in batch #577670. All analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the LCS, LCSD, the MS and the MSD. Sample CS-13 was designated as the MS/MSD on the COC.

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

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the LCS/LCSD and MS/MSD results. Precision was further evaluated by comparing the field duplicate analyte results. Sample CS-10_FD was collected and analyzed as the field duplicate of CS-10.

The LCS/LCSD and MS/MSD RPDs were within acceptance criteria.

Only mercury above the LOQ in both the parent and FD samples are evaluated. There was no mercury detected above the LOQ in either the parent or FD sample.

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 DRAFT CSSA QAPP;
- Comparing actual analytical procedures to those described in the DRAFT 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 DRAFT 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.
- The serial dilution test (DT) was performed on the same sample as the MS/MSD. A DT is only applicable for mercury where the sample concentration is ≥ 50x the MDL and the MS and/or MSD failed recovery criteria. The DT was not required since the MS and MSD passed recovery criterion.
- The post digestion spike (PDS) was performed on the same sample as the MS/MSD. A PDS is only applicable for mercury when it failed the MS/MSD and DT criteria. The PDS was not required since the MS and MSD passed recovery criterion.

There was one method blank, and several calibration blanks associated with the

mercury analyses in this WO. 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 WO was considered usable. The completeness for the mercury portion of this WO is 100%, which meets the minimum acceptance criteria of 90%.

DATA QUALIFIER DEFINITIONS

The data qualifiers are defined in Table 36.3 of the project-specific DRAFT CSSA QAPP, as follows:

Data Validation Codes and Definitions

Data Qualifiers	Definitions
U	The analyte was analyzed for, but not detected. The associated numerical value is at or below the Detection Limit (DL).
F	The analyte was positively identified; the quantitation is an estimation above the DL and below the Limit of Quantitation (LOQ).
J	The analyte was positively identified, but the quantitation is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
UJ	The analyte was analyzed for, but not detected; the associated numerical value is an estimation due to discrepancies in meeting certain analyte-specific quality control criteria.
M	A matrix effect was present.
R	Data is rejected as unusable due to serious deficiencies in meeting certain analyte-specific quality control criteria.

DATA QUALIFIER CHANGES

There were no data qualifiers were added, removed, or changed as a result of the data validation process.

REASON CODE DEFINITIONS

The data validation reason codes were used to document the logic behind all data validation qualifiers. There were no reason codes for data qualification associated with the samples in this SDG.