

June 2017

Off-Post

Quarterly Groundwater Monitoring Report



Prepared For

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

October 2017

EXECUTIVE SUMMARY

- A total of 16 off-post wells and 7 Granular Activated Carbon (GAC) filtered samples were collected during the June 2017 sampling event for volatile organic compound (VOC) analyses.
- Analyses indicated off-post wells OFR-3 and RFR-10 exceeded the maximum contaminant level (MCL) for tetrachloroethene (PCE) and/or trichloroethene (TCE). These wells are equipped with GAC filtration systems. All other wells were below the MCLs.
- GAC-filtered samples were not collected in June 2017 as part of the groundwater monitoring program. These samples are collected semi-annually and will be collected again in September 2017.
- Semi-annual GAC maintenance was performed March 28, 2017. This involved replacing the first carbon canister in each GAC system and other routine maintenance. This carbon exchange is performed semi-annually; the next carbon change-out is due in September 2017.

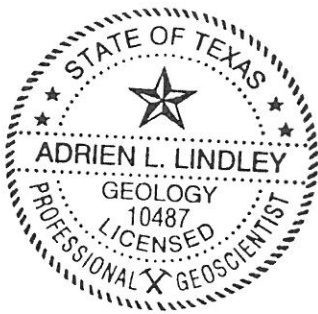
GEOSCIENTIST CERTIFICATION

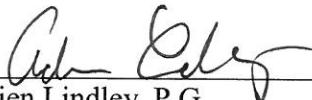
June 2017 Off-Post Quarterly Groundwater Monitoring Report

For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

I, Adrien Lindley, Professional Geologist (P.G.), hereby certify that the 2017 June Off-Post Quarterly Groundwater Monitoring Report for the Camp Stanley Storage Activity installation in Boerne, Texas accurately represents the site conditions of the subject area. This certification is limited only to geoscientific products contained in the subject report and is made on the basis of written and oral information provided by the Camp Stanley Storage Activity Environmental Office, laboratory data provided by APPL, and field data obtained during groundwater monitoring conducted at the site in June and July 2017, and is true and accurate to the best of my knowledge and belief.





Adrien Lindley, P.G.
State of Texas
Geology License No. 10487
10/16/17

Date

TABLE OF CONTENTS

EXECUTIVE SUMMARY	ii
GEOSCIENTIST CERTIFICATION	iii
1.0 INTRODUCTION	1-1
2.0 JUNE 2017 ANALYTICAL RESULTS.....	2-1
3.0 SUMMARY AND RECOMMENDATIONS.....	3-1

LIST OF TABLES

Table 2.1 Sampling Rationale for June 2017.....	2-2
Table 2.2 June 2017 Off-Post Groundwater Results, Detected Analytes Only	2-4
Table 3.1 Sampling Rationale for September 2017	3-2

LIST OF FIGURES

Figure 2.1 On-Post and Off-Post Well Sampling Locations for June 2017	2-3
---	-----

LIST OF APPENDICES

Appendix A Evaluation of Data Quality Objectives Attainment	
Appendix B June 2017 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.
BSR	Boerne Stage Road
CC	Cow Creek
<i>cis</i> -1,2-DCE	<i>cis</i> -1,2-Dichloroethene
CSSA	Camp Stanley Storage Activity
DQO	Data Quality Objective
FD	Field Duplicate
FO	Fair Oaks Ranch
GAC	Granular Activated Carbon
HS	Hidden Springs Estates
HSP	Health and Safety Plan
ISCO	In-Situ Chemical Oxidation
JW	Jackson Woods
LGR	Lower Glen Rose
LS	Leon Springs
LTMO	Long Term Monitoring Optimization
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NA	Not Applicable
OFR	Old Fredericksburg Road
OW	Oaks Water Supply Corporation
P&A	plugged and abandoned
Parsons	Parsons Government Services, Inc.
PCE	Tetrachloroethene
P.G.	Professional Geologist
Plan	Off-Post Monitoring Program and Response Plan
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RFR	Ralph Fair Road
RL	Reporting Limit
SAP	Sampling and Analysis Plan
SAWS	San Antonio Water System
SLD	Scenic Loop Drive
TCE	Trichloroethene

ABBREVIATIONS AND ACRONYMS (continued)

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

JUNE 2017
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 2017 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 2017 quarterly monitoring events (March, June, September, and December) will be described in detail in an Annual Report to be submitted after December 2017. 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 5 through July 12, 2017. The quarterly off-post groundwater monitoring program was initiated in September 2001 in accordance with the **Off-Post Monitoring Program and Response Plan (CSSA, 2002)**, herein referred to as the “Plan”. Action levels for detection of volatile organic compounds (VOCs) and the rationale for sampling off-post wells are described in the Plan.

The CSSA groundwater monitoring program also follows the provisions of the groundwater monitoring program data quality objectives (DQOs) as well as the recommendations of all applicable project-specific work plans. **Appendix A** provides an evaluation of the DQO attainment for this sampling event. Approval for the updated DQOs and the long term monitoring optimization (LTMO) was received from the Texas Commission on Environmental Quality (TCEQ) on April 22, 2016 and the United States Environmental Protection Agency (USEPA) on May, 5, 2016. The sampling schedule provided in the 2015 LTMO update was implemented during the December 2016 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 2017 ANALYTICAL RESULTS

During the June 2017 event, groundwater samples were collected from 16 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. Also, well I10-2 was not sampled due to pump outage.

Table 2.1 includes the rationale for selection of the 17 wells scheduled to be sampled in June 2017. These included:

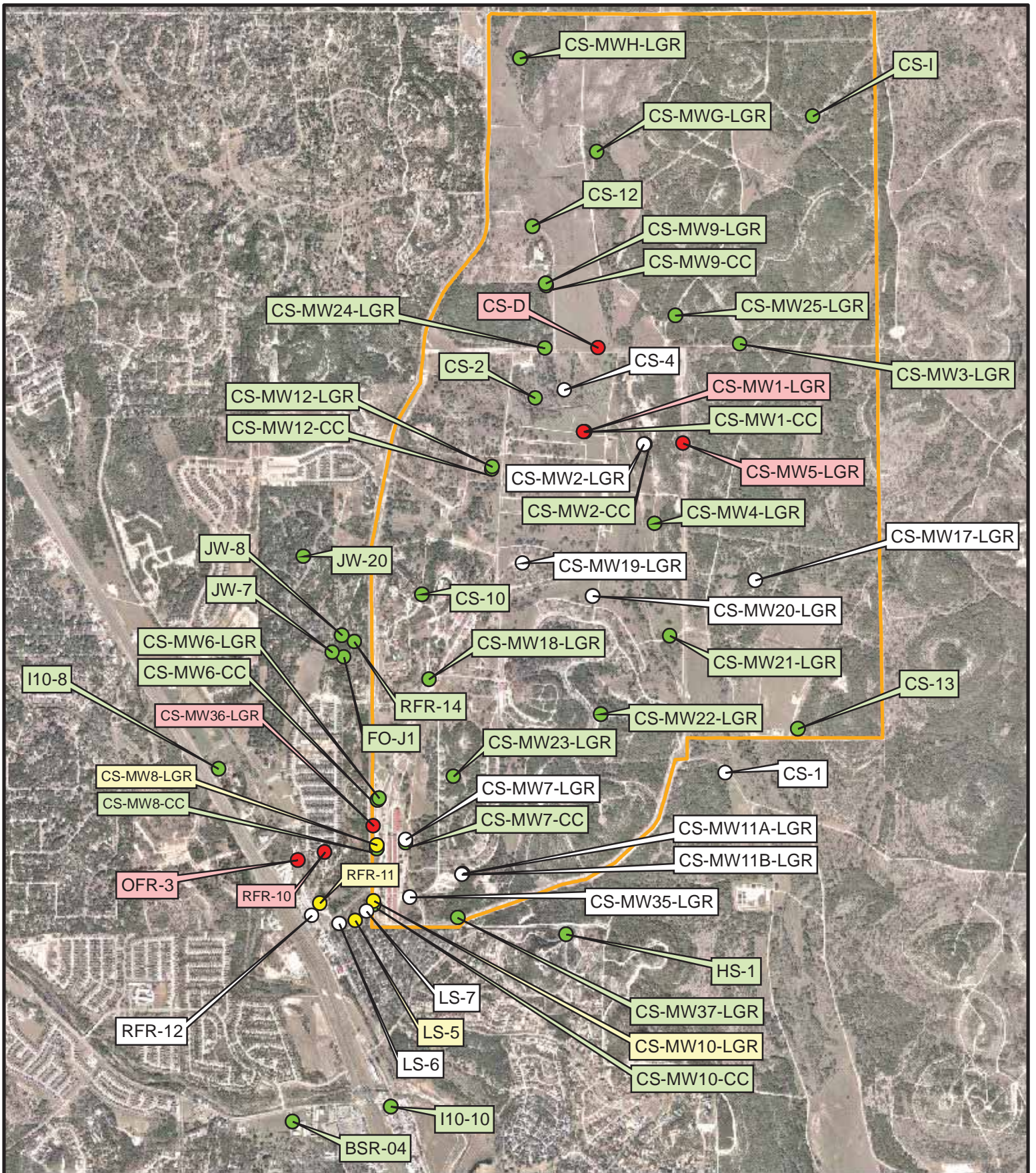
- One public well on Boerne Stage Road (BSR-04);
- One public supply well for the Fair Oaks water system (FO-J1);
- One public well in the Hidden Springs Estates subdivision (HS-1);
- Three wells used by the general public along Interstate Highway 10 (I10-2, I10-8, and I10-10);
- Three privately-owned wells in the Jackson Woods subdivision (JW-7, JW-8, and JW-20);
- 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);
- Four privately-owned wells in the Ralph Fair Road area (RFR-10, RFR-11, RFR-12, and RFR-14).

A total of 16 groundwater samples, three trip blanks, one field duplicate (FD), and one matrix spike/matrix spike duplicate (MS/MSD) included with the on-post data groups were submitted to Agriculture & Priority Pollutant Laboratories, Inc. (APPL) in Clovis, California for analysis. Groundwater samples were analyzed for the short list of VOCs using SW-846 Method 8260B. The approved short list of VOCs includes *cis*-1,2-dichloroethene (*cis*-1,2-DCE), tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride.

The data packages (Parsons Government Services, Inc. [Parsons] internal reference 110046-#80, -#82, -#89 and -#94) contain the analytical results for this sampling event and are presented in **Appendix C**. Laboratory results were reviewed and verified according to the guidelines outlined in the CSSA Quality Assurance Project Plan (QAPP), Version 1.0. Parsons received the data packages June 22 through July 28, 2017.

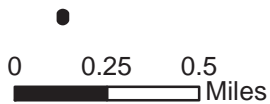
All active wells with submersible pumps were sampled from a tap located as close to the wellhead as possible. Most taps were previously installed by CSSA to obtain a representative groundwater sample before pressurization or storage of groundwater in the water supply distribution system. Water was purged 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 2017 are presented in **Table 2.2**. Full analytical results from the June 2017 sampling event are presented in **Appendix B**. As shown in **Table 2.1**, 16 of the 17 samples that were scheduled for collection in June 2017 were obtained. Well I10-2 was not sampled due to well pump outage.



Sampled Wells June 2017

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



©:CSSA/GIS/MXD/ANNUAL_GW_FACT_SHEET/Jun17_Sampled_Wells_fig2_color.cob46208r6 #23:19 AM wayne.simoneau@parsons.com

Figure 2-1

On-Post and Off-Post Well Sampling Locations for June 2017
Camp Stanley Storage Activity

Parsons

**Table 2.2
June 2017 Off-Post Groundwater Results, Detected Analytes Only**

Subdivision	Well ID	Sample Date	cis-1,2-DCE	PCE	TCE	Vinyl Chloride
Boerne Stage Road	BSR-04	6/6/2017	--	--	--	--
Fair Oaks	FO-J1	6/27/2017	--	--	--	--
Hidden Springs	HS-1	6/7/2017	--	--	--	--
IH-10	I10-8	6/7/2017	--	--	--	--
	I10-10	6/7/2017	--	--	--	--
	I10-10 FD	6/7/2017	--	--	--	--
Jackson Woods Subdivision	JW-7	6/7/2017	--	--	--	--
	JW-8	7/12/2017	--	--	--	--
	JW-20	6/8/2017	--	--	--	--
Leon Springs Villas	LS-5	6/5/2017	--	1.07F	2.4	--
	LS-6	6/5/2017	--	0.80F	0.52F	--
	LS-7	6/5/2017	--	1.14F	--	--
Old Fredericksburg Road	OFR-3	6/5/2017	--	6.29	3.62	--
Ralph Fair Road	RFR-10	6/5/2017	--	9.67	5.30	--
	RFR-11	6/5/2017	--	0.87F	1.63	--
	RFR-12	6/7/2017	--	--	0.69F	--
	RFR-14	6/7/2017	--	--	--	--
Laboratory Detection Limits & Maximum Contaminant Level						
Method Detection Limit (MDL)			0.07	0.06	0.05	0.08
Reporting Limit (RL)			1.2	1.4	1	1.1
Max. Contaminant Level (MCL)			70	5	5	2

BOLD	≥ MDL
BOLD	≥ RL
BOLD	≥ MCL

All samples were analyzed by APPL, Inc.

VOC data reported in ug/L.

Abbreviations/Notes:

FD Field Duplicate

TCE Trichloroethene

PCE Tetrachloroethene

DCE Dichloroethene

A2 & B2 sample collected after Granular Activated Carbon System

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.

Wells OFR-3 and RFR-10 exceeded the Maximum Contaminant Level (MCL) of 5 micrograms per liter ($\mu\text{g/L}$) in June 2017 for PCE and/or TCE. These wells are equipped with GAC filtration systems. TCE was detected above the Reporting Limits (RLs) in private drinking water wells LS-5 and RFR-11. These wells also have GAC filtration systems in place. Vinyl chloride and *cis*-1,2-DCE were not detected in any of the off-post wells sampled in June 2017.

On March 28, 2017, routine semi-annual maintenance was performed on the GAC treatment systems at LS-5, LS-6, LS-7, OFR-3, RFR-10, and RFR-11. Carbon canisters were exchanged and other routine maintenance was performed. GAC-filtered samples were not collected this quarter but are scheduled to be collected again during the September 2017 event.

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

3.0 SUMMARY AND RECOMMENDATIONS

Results of the June 2017 sampling event are summarized as follows:

- Sixteen of 17 samples scheduled for collection in June 2017 were obtained during the quarterly monitoring event. Well I10-2 was not sampled due to a pump outage.
- Wells OFR-3 and RFR-10 exceeded the MCL for PCE and/or TCE in June 2017. These wells are equipped with GAC filtration systems.
- TCE 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 June 2017.
- GAC-filtered samples were not collected as part of the quarterly groundwater monitoring in June 2017. GAC-filtered samples are collected semi annually, every March and September. The next GAC-filtered samples will be collected in September 2017.
- Semi-annual GAC maintenance, including carbon change-out, was performed March 28, 2017. The next semi-annual GAC maintenance is due in September 2017.
- In accordance with project DQOs and LTMO schedule, the rationale for selection of fifteen samples to be collected in September 2017 is provided in **Table 3.1**.

**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 February 2016).	Samples for laboratory analysis were collected from selected off-post public and private wells, which are located within a 3 mile radius of CSSA.	Partially	Replace wells where no VOCs were detected with wells that may be identified in the future, located to the west and southwest of Area of Concern (AOC)-65 to provide better definition of Plume 2. Continue sampling of wells to the west of Plume 1 (Fair Oaks and Jackson Woods) to confirm any detections possibly related to Plume 1.
	Meet CSSA QAPP quality assurance requirements.	Samples were analyzed in accordance with the CSSA QAPP, and approved variances. A chemist verified all data.	Yes	NA
		All data flagged with a “U” and “J” are usable for characterizing contamination.	Yes	NA

Activity	Objectives	Action	Objective Attained?	Recommendations
	<p>Evaluate CSSA monitoring program and expand as necessary (§2.1 of the DQOs for the Groundwater Contamination Investigation, revised February 2016). Determine locations of future monitoring locations.</p>	<p>Evaluation of data collected is ongoing and is reported in this quarterly groundwater report and will be reported in future quarterly groundwater reports. Additional information covering the CSSA monitoring program is available in Volume 5, CSSA Environmental Encyclopedia.</p>	<p>Yes</p>	<p>Continue data evaluation and quarterly teleconferences for evaluation of the monitoring program. Each teleconference / planning session covers expansion of the quarterly monitoring program, if necessary.</p>
<p>Project Schedule/ Reporting</p>	<p>The quarterly monitoring project schedule shall provide a schedule for sampling, analysis, validation, verification, reviews, and reports for monitoring events off-post.</p>	<p>A schedule for sampling, analysis, validation, verification and data review, and reports is provided in this quarterly groundwater report and will be reported in future quarterly groundwater reports. Additional information covering the CSSA monitoring program is available in Volume 5, CSSA Environmental Encyclopedia.</p>	<p>Yes</p>	<p>Continue quarterly reporting to include a schedule for sampling, analysis, validation, and verification and data review and data reports.</p>

Activity	Objectives	Action	Objective Attained?	Recommendations
Remediation	Evaluate the effectiveness of GACs and install as needed (§3.2 both of the DQOs for the Groundwater Contamination Investigation, revised February 2016).	Perform maintenance as needed. Install new GACs as needed.	Yes	Maintenance to the off-post GAC systems to be continued by Parsons' personnel every 3 weeks. Twice yearly (or as needed) maintenance to the off-post GAC systems by additional subcontractors to continue. Evaluations of future sampling results for installation of new GAC systems will occur as needed.

**APPENDIX B
JUNE 2017 QUARTERLY OFF-POST
GROUNDWATER ANALYTICAL RESULTS**

Appendix B
June 2017 Quarterly Off-post Groundwater Analytical Results

Well ID	Sample Date	cis-1,2-DCE	PCE	TCE	Vinyl Chloride
BSR-04	6/6/2017	0.07U	0.06U	0.05U	0.08U
FO-J1	6/27/2017	0.07U	0.06U	0.05U	0.08U
HS-1	6/7/2017	0.07U	0.06U	0.05U	0.08U
I10-8	6/7/2017	0.07U	0.06U	0.05U	0.08U
I10-10	6/7/2017	0.07U	0.06U	0.05U	0.08U
I10-10 FD	6/7/2017	0.07U	0.06U	0.05U	0.08U
JW-7	6/7/2017	0.07U	0.06U	0.05U	0.08U
JW-8	7/12/2017	0.07U	0.06U	0.05U	0.08U
JW-20	6/8/2017	0.07U	0.06U	0.05U	0.08U
LS-5	6/5/2017	0.07U	1.07F	2.4	0.08U
LS-6	6/5/2017	0.07U	0.80F	0.52F	0.08U
LS-7	6/5/2017	0.07U	1.14F	0.05U	0.08U
OFR-3	6/5/2017	0.07U	6.29	3.62	0.08U
RFR-10	6/5/2017	0.07U	9.67	5.30	0.08U
RFR-11	6/5/2017	0.07U	0.87F	1.63	0.08U
RFR-12	6/7/2017	0.07U	0.06U	0.69F	0.08U
RFR-14	6/7/2017	0.07U	0.06U	0.05U	0.08U
Laboratory Detection Limits & Maximum Contaminant Level					
Method Detection Limit (MDL)		0.07	0.06	0.05	0.08
Reporting Limit (RL)		1.2	1.4	1	1.1
Max. Contaminant Level (MCL)		70	5	5	2

BOLD	≥ MDL
BOLD	≥ RL
BOLD	≥ MCL

All samples were analyzed by APPL, Inc.

VOC data reported in ug/L.

Abbreviations/Notes:

FD = field duplicate

TCE = trichloroethene

PCE = tetrachloroethene

DCE = dichloroethene

A2 & B2 = sample collected after Granular Activated Carbon System

Data Qualifiers:

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

F-The analyte was positively identified but the associated numerical value is below the RL.

**APPENDIX C
DATA VALIDATION REPORTS**

**SDG 83024
SDG 83063
SDG 83208
SDG 83302**

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

BOERNE, TEXAS

Data Verification by: Tammy Chang
Parsons - Austin

INTRODUCTION

The following data verification summary report covers seven groundwater samples and the associated field quality control (QC) sample collected from off-post Camp Stanley Storage Activity (CSSA) on June 5th, 2017. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

83024

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

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

EVALUATION CRITERIA

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

VOLATILES

General

The volatiles portion of this data package consisted of seven (7) off-post groundwater samples and one (1) TB. All samples were collected on June 5th, 2017 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in one analytical batch, #219496 under one of initial calibration (ICAL). All samples were analyzed following the procedures outlined in the CSSA QAPP and were prepared and analyzed within the holding time required by the method. All analyses were performed undiluted.

Accuracy

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

All LCS and surrogate spike recoveries were within acceptance criteria.

Precision

Precision was could not be evaluated due to the lack of duplicate analyses.

Representativeness

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

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

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

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

There was one method blank and one TB associated with the VOC analyses in this SDG and both were 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%.

DATA VERIFICATION SUMMARY REPORT
For on-post and off-post samples collected from
CAMP STANLEY STORAGE ACTIVITY

BOERNE, TEXAS

Data Verification by: Tammy Chang
Parsons - Austin

INTRODUCTION

The following data verification summary report covers fifteen groundwater samples and the associated field quality control (QC) samples collected from on- and off-post Camp Stanley Storage Activity (CSSA) on June 26 and 27, 2017. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs) and drinking water wells were also analyzed for the following metals: arsenic, barium, cadmium, chromium, lead, zinc, and mercury.

83208

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

All samples were collected by Parsons and analyzed by APPL, Inc. following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0. Samples in this SDG were shipped to the laboratory in one cooler which was received by the laboratory at a temperature of 3.1°C, which was within the 2-6°C range recommended by the CSSA QAPP.

EVALUATION CRITERIA

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

VOLATILES

General

The volatiles portion of this data package consisted of one (1) off-post groundwater sample, fourteen (14) on-post groundwater samples, two FDs, one set of MS/MSD, and one (1) TB. All samples were collected on June 26 and 27, 2017 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in two analytical batches, #220266 and #220311, 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 two laboratory control spike (LCS) samples, MS/MSD analyses, and the surrogate spikes. Sample CS-12 was designated as the parent sample for the MS/MSD analyses on the chain-of-custody.

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

Precision

Precision was evaluated based on the relative percent difference (%RPD) of MS/MSD results and parent/FD sample results. Wells CS-MW7-CC and CS-1 were collected in duplicate.

None of the target analytes were detected at or above the reporting limits in both set of parent/FD samples, therefore, the relative percent difference calculation could not be performed.

All %RPDs of the MS/MSD results were compliant.

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 and trip blank for cross contamination of samples during analysis and collection/shipment.

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

- All instrument performance check criteria were met.
- All initial calibration criteria were met.
- All initial calibration verification (ICV) criteria were met. The ICV was prepared using a secondary source standard. All second source verification criteria were met.
- All continuing calibration verification (CCV) criteria were met.
- All internal standard criteria were met.

There were two method blanks and one TB associated with the VOC analyses in this SDG and all were 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 three (3) on-post groundwater samples, one FD, and one set of MS/MSD. All samples were collected on June 27, 2017. All 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 #220627. All analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS, MS and MSD. CS-12 was designated as the parent sample for the MS/MSD analyses.

All LCS, MS, and 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-1 was collected in duplicate.

All %RPDs were compliant for the MS/MSD.

For the parent/FD samples, only barium, copper, and zinc were detected above the reporting limits. The %RPDs were compliant.

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.
- No dilution test was required, as per the CSSA QAPP.

One method blank and several calibration blanks were analyzed in association with the ICP-AES analyses in this SDG. All blanks were 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 three (3) on-post groundwater samples, one FD, and one (1) set of MS/MSD. All samples were collected on June 27, 2017 and were analyzed for mercury.

The mercury analyses were performed using USEPA SW846 Method 7470A. These 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 #220226. The analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the %R obtained from the LCS, MS, and MSD analyses. CS-12 was designated as the parent sample for the MS/MSD analyses.

The LCS, MS, and MSD recovery were within acceptance criteria.

Precision

Precision was measured based on the %RPD of MS/MSD results and parent/FD sample results. Sample CS-1 was collected in duplicate.

The %RPD of MS/MSD was compliant.

Mercury was not detected in the parent and 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 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 calibration verification criteria were met.

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

Mercury result for the sample in this SDG was considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

DATA VERIFICATION SUMMARY REPORT
For on-post and off-post samples collected from
CAMP STANLEY STORAGE ACTIVITY

BOERNE, TEXAS

Data Verification by: Tammy Chang
Parsons - Austin

INTRODUCTION

The following data verification summary report covers thirteen groundwater samples and the associated field quality control (QC) samples collected from on- and off-post Camp Stanley Storage Activity (CSSA) on June 7 and 8, 2017. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

83063

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

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

EVALUATION CRITERIA

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

VOLATILES

General

The volatiles portion of this data package consisted of eight (8) off-post, five (5) on-post groundwater samples, one FD, and one (1) TB. All samples were collected on June 7 and 8, 2017 and analyzed for a reduced list of VOCs which included: *cis*-1,2-dichloroethene, tetrachloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in four analytical batches, #219546, #219737, #219758, and #219807 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 four laboratory control spike (LCS) samples and the surrogate spikes.

All LCSs and surrogate spike recoveries were within acceptance criteria.

Precision

Precision was evaluated based on the relative percent difference (%RPD) of parent and FD sample results. Well I10-10 was collected in duplicate. None of the target analytes were detected at or above the reporting limits, therefore, the %RPD calculation could not be 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 TB and laboratory blank for cross contamination of samples during sample collection/shipment 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 second source verification criteria were met.
- All continuing calibration verification (CCV) criteria were met.
- All internal standard criteria were met.

There were four method blanks and one TB associated with the VOC analyses in this SDG and all were 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%.

DATA VERIFICATION SUMMARY REPORT
for CS-MW37-LGR (newly developed well) and JW-8 samples collected from
CAMP STANLEY STORAGE ACTIVITY

BOERNE, TEXAS

Data Verification by: Tammy Chang
Parsons - Austin

INTRODUCTION

The following data verification summary report covers two groundwater samples and one associated field quality control (QC) sample collected from CS-MW37-LGR (on-post newly developed well) and JW-8 (off-post existing well) at Camp Stanley Storage Activity (CSSA) on July 12, 2017. The samples in the following Sample Delivery Group (SDG) were analyzed for a full list of volatile organic compounds (VOCs) for the newly developed well and short list for JW-8, metals (including arsenic, barium, cadmium, chromium, copper, lead, zinc, and mercury), total dissolved solids (TDS), anions, and total alkalinity (including carbonate, bicarbonate, and total alkalinity):

83302

JW-8 was analyzed for VOC only. The field QC sample associated with this SDG was one trip blank (TB). TB was analyzed for VOC only. No ambient blanks were collected. During the initiation of this project, it was determined that ambient blanks were not necessary due to the absence of a source at these sites.

Both samples were collected by Parsons and analyzed by APPL, Inc. following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0. The samples in this SDG were shipped to the laboratory in one cooler. The cooler was received by the laboratory at a temperature of 3.0°C, which was within the 2-6°C range recommended by the CSSA QAPP.

EVALUATION CRITERIA

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

VOLATILES

General

The volatiles portion of this data package consisted of three (3) water samples, including JW-8, CS-MW37-LGR, and TB. The samples were collected on July 12, 2017, new well and TB were analyzed for full list of VOCs; JW-8 was analyzed for short list of VOCs.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in two analytical batches (#220690 for the JW-8 and #220840 for TB and CS-MW37-LGR) under two sets of initial calibration (ICALs), each ICAL was performed with its own instrument. All samples were analyzed following the procedures outlined in the CSSA QAPP and were prepared and analyzed within the holding time required by the method. All analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the two laboratory control samples (LCSs) and the surrogate spikes.

All LCSs and surrogate spike recoveries were within acceptance criteria.

Precision

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

Representativeness

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

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

All three 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 for both instruments.
- All initial calibration criteria were met.
- Both LCSs were prepared using a secondary source. All second source verification criteria were met.
- All initial calibration verification (ICV) criteria were met.

- All continuing calibration verification (CCV) criteria were met.
- All internal standard criteria were met.

There were two method blanks and one TB associated with the VOC analyses in this SDG. All blanks were non-detect for all target VOCs at reporting limits. Parsons data validator also concluded that method blank had no target VOCs detected at or above the method detection limits.

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 one (1) groundwater sample which was collected on July 12, 2017 and as analyzed for aluminum, arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, and zinc.

The ICP-AES metals analyses were performed using USEPA SW846 Method 6010B. This sample was analyzed following the procedures outlined in the CSSA QAPP and was prepared and analyzed within the holding time required by the method.

The sample for ICP-AES metals was digested in batch #220646 under a single ICAL. The sample analysis was performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS.

All LCS recoveries were within acceptance criteria.

Precision

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

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.

This sample was analyzed following the COC and the analytical procedures described in the CSSA QAPP, Version 1.0. This sample was 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.
- No dilution test was required, as per the CSSA QAPP.

One method blank and several calibration blanks were analyzed in association with the ICP-AES analyses in this SDG. All blanks were 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 for the sample in this SDG were considered usable. The completeness for the ICP metals of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

MERCURY

General

The mercury portion of this SDG consisted of one (1) groundwater sample which were collected on July 12, 2017 and were analyzed for mercury.

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

The mercury sample was prepared in batch #220686 under a single ICAL. The analysis was performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCS.

The LCS recovery was within acceptance criteria.

Precision

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

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.

The sample in this SDG was analyzed following the COC and the analytical procedures described in the CSSA QAPP. This sample was 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 calibration verification criteria were met.

There was one method blank and several calibration blanks associated with the mercury analyses in this SDG. All blanks were free of mercury 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 mercury result for the sample in this SDG was considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.

WET CHEMISTRY

General

The wet chemistry portion of this SDG consisted of one (1) groundwater sample which were collected on July 12, 2017 and was analyzed for TDS, anions (including bromide, chloride, fluoride, nitrate, nitrite, and sulfate, and total alkalinity including carbonate and bicarbonate).

The TDS analysis was performed using EPA Method 160.1, anion analysis was performed according to USEPA Method 9056, and total alkalinity analysis was performed according to SM 2320B. The sample in this SDG was analyzed following the procedures outlined in the CSSA QAPP or methods listed above. This sample was prepared and analyzed within the holding time required by the method.

All analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery obtained from the LCSs.

All LCS recoveries were within acceptance criteria.

Precision

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

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.

The sample in this SDG was analyzed following the COC and the analytical procedures described in the CSSA QAPP. This sample was 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 applicable ICV was prepared using a secondary source.
- All calibration verification criteria were met.

There was one method blank and several calibration blanks associated with each of the analyses in this SDG. All blanks were free of target analytes 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 wet chemistry results for the sample in this SDG were considered usable. The completeness for the wet chemistry portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.