March 2016

Off-Post
Quarterly Groundwater Monitoring Report

Prepared For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

May 2016

EXECUTIVE SUMMARY

- A total of six off-post wells and seven granular activated carbon (GAC) filtered samples were collected during the March 2016 sampling event for volatile organic compound (VOC) analyses.
- Analyses indicated off-post well RFR-10 exceeded the maximum contaminant level (MCL) for tetrachloroethene (PCE) and trichloroethene (TCE). This well is equipped with GAC filtration systems. All other wells were below the MCLs.
- Seven GAC-filtered samples were collected in March 2016. The GAC-filtered sample collected from the "A2" side of the RFR-10 GAC filtration system showed detections of PCE and TCE above the MCL. The "B2" side of the same GAC system showed no detection of VOCs. Based on this result, the "A" side of the GAC system was turned off and additional samples were collected. The additional samples indicated no VOCs present at the kitchen tap of both homes. The carbon canisters on the "A" side of the system were replaced and confirmation samples were collected. All samples indicated that both sides of the GAC system were functioning properly.
- At the remaining six GAC systems, all sample results were non-detect, indicating the GAC systems are functioning properly. The next scheduled GAC-filtered samples will be collected in September 2016.
- Due to the RFR-10 post-GAC sample detection changes were made to the sampling protocol in order to enhance the quality of the monitoring program.
- Semi-annual GAC maintenance was performed February 18, 2016. This involved replacing the first carbon canister in each GAC system and other routine maintenance. This carbon exchange is performed semi-annually; the next carbon change-out will be due in August 2016.
- Updates to the data quality objectives (DQOs) and the long term monitoring optimization (LTMO) have been submitted to the Texas Commission on Environmental Quality (TCEQ) and United States Environmental Protection Agency (USEPA) for approval.

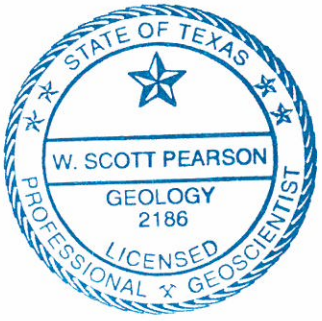
GEOSCIENTIST CERTIFICATION

March 2016 Off-Post Quarterly Groundwater Monitoring Report

For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

I, W. Scott Pearson, Professional Geologist (P.G.), hereby certify that the 2016 March 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 March 2016, and is true and accurate to the best of my knowledge and belief.



W. Scott Pearson

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

5-31-2016

Date

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ABBREVIATIONS AND ACRONYMS

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

MARCH 2016
OFF-POST GROUNDWATER MONITORING REPORT
CAMP STANLEY STORAGE ACTIVITY

1.0 INTRODUCTION

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

Groundwater monitoring was performed March 7 through 16, 2016. The quarterly off-post groundwater monitoring program was initiated in September 2001 in accordance with the **Off-Post Monitoring Program and Response Plan** (**CSSA, 2002**)**,** herein referred to as the "Plan". Action levels for detection of volatile organic compounds (VOCs) and the rationale for sampling off-post wells are described in the Plan.

The CSSA groundwater monitoring program also follows the provisions of the groundwater monitoring program data quality objectives (DQOs) as well as the recommendations of all applicable project-specific work plans. **Appendix A** provides an evaluation of the DQO attainment for this sampling event. Currently, an update to the DQOs and the long term monitoring optimization (LTMO) has been submitted to the Texas Commission on Environmental Quality (TCEQ) and United States Environmental Protection Agency (USEPA) for approval.

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 MARCH 2016 ANALYTICAL RESULTS

During the March 2016 event, groundwater samples were collected from six off-post wells shown in **Figure 2.1.** Seven granular activated carbon (GAC) filtered samples (LS-5-A2, LS-6-A2, LS-7-A2, OFR-3-A2, RFR-10-A2, RFR-10-B2, and RFR-11-A2) are collected semi-annually (March and September), and were also collected during this event.

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

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

A total of 13 groundwater samples, two trip blanks, one field duplicate (FD), and one matrix spike/matrix spike duplicate (MS/MSD) included with the on-post data groups were submitted to Agriculture & Priority Pollutant Laboratories, Inc. (APPL) in Clovis, California for analysis. Groundwater samples were analyzed for the short list of VOCs using SW-846 Method 8260B. The approved short list of VOCs includes *cis*-1,2-dichloroethene (*cis*-1,2-DCE), *trans*-1,2-DCE, 1,1-DCE, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride.

The data packages (Parsons Government Services, Inc. [Parsons] internal reference 810000-#113) contain the analytical results for this sampling event and are presented in **Appendix C**. Laboratory results were reviewed and verified according to the guidelines outlined in the CSSA Quality Assurance Project Plan (QAPP), Version 1.0. Parsons received the data package March 21, 2016.

2.1 OFF-POST WELL SAMPLING

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 March 2016 are presented in **Table 2.2**. Full analytical results from the March 2016 sampling event are presented in **Appendix B**. As shown in **Table 2.1**, all 13 samples that were scheduled for collection in March 2016 were obtained. Additional follow up samples were collected in April to confirm the RFR-10 GAC filtration system was functioning properly.

On February 18, 2016, routine semi-annual maintenance was performed on the GAC treatment systems at LS-5, LS-6, LS-7, OFR-3, RFR-10, and RFR-11. Carbon canisters were exchanged and other routine maintenance was performed. GAC-filtered samples were collected this quarter and are scheduled to be collected again during the September 2016 event.

Table 2.1
Sampling Rationale for March 2016

Well ID	2001		2002				2003				2004				2005				2006				2007				2008				2009				2010				2011				2012				2013				2014				2015				2016	Sampling Frequency
	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	
BSR-03																																										access agreement received		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
BSR-04																																													access agreement received		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
FO-8	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
FO-17	NS	NS		NS	NS	NS		NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
FO-22		NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
FO-J1												NS						NS	NS																						NS	NS	NA	NS	NS	NA	NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
HS-1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS															NS	NS	NS				NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
HS-2	NS																																			NS			NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
HS-3	NS		NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
I10-2																				NS	NS	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	9-month (snapshot)
I10-4	NS									NS														NA	NA	NA	NA	NA	NA																						NA	NA	NA	NA	NA	NA	NA	NA	NA	P&A
I10-5	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	expired access agreement
I10-7	NS	NS		NS	NS	NS			NS	NS	NS		NS																							NS	NA	NA	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
I10-8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS								NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
I10-9																																								access agreement received					NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P&A
I10-10																																																access agreement received		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	One time sample
JW-5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS					NS	NS	NS										NS	NS	NS		NS	NS	NS			NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-6		NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-7		NS	NS	NS	NS	NS	NS	NS																																	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-8	NS	NS	NS	NS	NS	NS	NS																																		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-9																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	9-month (snapshot)
JW-12		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS			NA		NA	NA										access agreement expired, no response from owners		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NS		NS	9-month (snapshot)
JW-13		NS	NS	NS	NS		NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-14																			Tol																						NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS					NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	house vacant
JW-20																																																	access agreement received					NS		NS	NS		NS	9-month (snapshot)
JW-26	NS	NS		NS											NS	NS	NS		NS	NS	NS		NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	expired access agreement
JW-27	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS									NS						NS	NS	NS		NS	NS	NS			NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-28	NS	NS	NS	NS	NS	NS	NS	NS																	NS	NS	NS														NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	new homeowners
JW-29	NS	NS	NS	NS	NS	NS	NS																																		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-30	NS	NS	NS	NS	NS	NS																																			NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
JW-31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA					NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
LS-1													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	9-month (snapshot)
LS-4																								NS	NS	NS	NS														NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NS	NS	9-month (snapshot)
LS-5																																																											Yes	Quarterly
LS-5-A2																																									GAC installed 10/6/11	NS		NS		NS		NS		NS		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)
LS-6																																																											Yes	Quarterly
LS-6-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		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)
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		NS		NS		NS		NS		NS		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)
OFR-1	NS																																								NS	NS		NS	NS		NS	NS		NS	NS		NS	NA	NA	NA	NA	NA	NA	P&A
OFR-3																																						NA	NS									NA	NA	NA	NA	NA	NA	NA					Yes	Quarterly
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		NS		NS	NA	NS	NA	NA	NA	NA		NS		NS	Yes	Biannually (Mar & Sept)
OFR-4	NS	NS	NS	NS	NS	NS	NS			NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS		NS	NS		NS	NS		NS	NS		NS	NA	NA	NA	NA	NA	NA	P&A
OW-HH1																																						access agreement received						NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
OW-HH2																																						access agreement received												NS	NS		NS	NS			NS		NS	9-month (snapshot)
OW-CE1																																						access agreement received						NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
OW-CE2																																						access agreement received						NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
OW-MT2																																						access agreement received						NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
OW-BARNOWL																																						access agreement received												NS	NS		NS	NS			NS		NS	9-month (snapshot)
OW-DAIRYWELL																																						access agreement received						NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
OW-HH3																																						access agreement received						NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
RFR-3	NS	NS	NS	NS	NS	NS	NS	NS	NS						NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
RFR-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS	Tol	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	9-month (snapshot)
RFR-5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS		NS	NS	NS		NS	NS	NS		NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
RFR-8		NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
RFR-9			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	NA	NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
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		NS		NS		NS		NS		NS		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)
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		NS		NS		NS		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)
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		NS		NS		NS		NS		NS		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)
RFR-12																				NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS				NA	NS			NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
RFR-13													Well Installed								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	electricity off
RFR-14																		Well Installed																							NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)
SLD-01																																								permission to sample granted, no access agreement		NS		NS	NS	NA	NS	NS											NS	9-month (snapshot)
SLD-02																																								permission to sample granted, no access agreement	NA	NS		NS	NS	NA	NS	NS		NS	NS		NS	NS		NS	NS		NS	9-month (snapshot)

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

Legend	Description
(red)	VOCs detected are greater than 90% of the MCL. Sample monthly; quarterly after GAC installation.
(orange)	VOCs detected are greater than 80% of the MCL. The well will be placed on a monthly sampling schedule until GAC installation then quarterly sampling after GAC installation.
(yellow)	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.
(lavender)	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 Mar. 2016.
NS	Not sampled for that event.
(green)	No VOCs detected. Sample on an as needed basis.
NA	Not applicable, sample could not be collected due to pump outage or well access conflict.

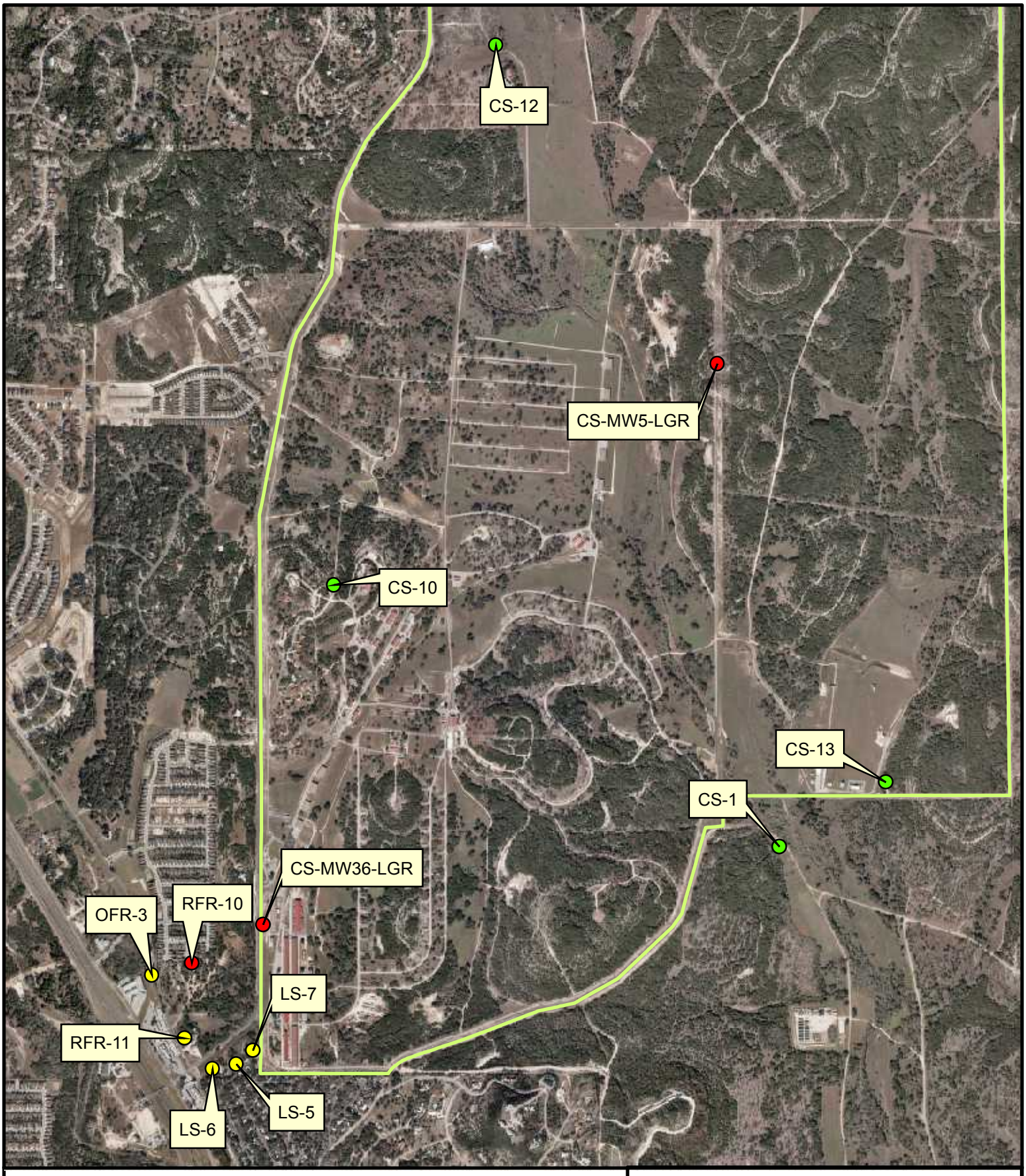


Figure 2.1

On-Post and Off-Post Well Sampling Locations for March 2016

Camp Stanley Storage Activity

PARSONS

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

Subdivision	Well ID	Sample Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl Chloride
Leon Springs Villas	LS-5	3/7/2016	--	--	--	**1.12F**	**2.50**	--
	LS-5-A2	3/7/2016	--	--	--	--	--	--
	LS-6	3/7/2016	--	--	--	**0.76F**	**1.47**	--
	LS-6-A2	3/7/2016	--	--	--	--	--	--
	LS-7	3/7/2016	--	--	--	**1.63**	**0.28F**	--
	LS-7-A2	3/7/2016	--	--	--	--	--	--
Old Fredericksburg Road	OFR-3	3/7/2016	--	--	--	**2.86**	**2.38**	--
	OFR-3-A2	3/7/2016	--	--	--	--	--	--
Ralph Fair Road	RFR-10	3/7/2016	--	**0.18F**	--	**13.85**	**7.40**	--
	RFR-10 FD	3/7/2016	--	--	--	**13.33**	**6.76**	--
	RFR-10-A2	3/7/2016	--	**0.17F**	--	**10.38**	**6.41**	--
	RFR-10-B2	3/7/2016	--	--	--	--	--	--
	RFR-10-HKT	4/1/2016	--	--	--	--	--	--
	RFR-10-TKT	4/1/2016	--	--	--	--	--	--
	RFR-10	4/4/2016	--	**0.17F**	--	**11.89**	**6.73**	--
	RFR-10-A1	4/4/2016	--	--	--	--	--	--
	RFR-10-A2	4/4/2016	--	--	--	--	--	--
	RFR-10-B1	4/4/2016	--	--	--	--	--	--
	RFR-10-B2	4/4/2016	--	--	--	--	--	--
	RFR-10-TANK	4/4/2016	--	--	--	--	--	--
	RFR-11	3/7/2016	--	--	--	**0.96F**	**1.62**	--
	RFR-11-A2	3/7/2016	--	--	--	--	--	--
Laboratory Detection Limits & Maximum Contaminant Level								
Method Detection Limit (MDL)			**0.12**	**0.07**	**0.08**	**0.06**	**0.05**	**0.08**
Reporting Limit (RL)			**1.2**	**1.2**	**0.6**	**1.4**	**1**	**1.1**
Max. Contaminant Level (MCL)			**7**	**70**	**100**	**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

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.

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 to SLD-01 **(Figure 2.1).**

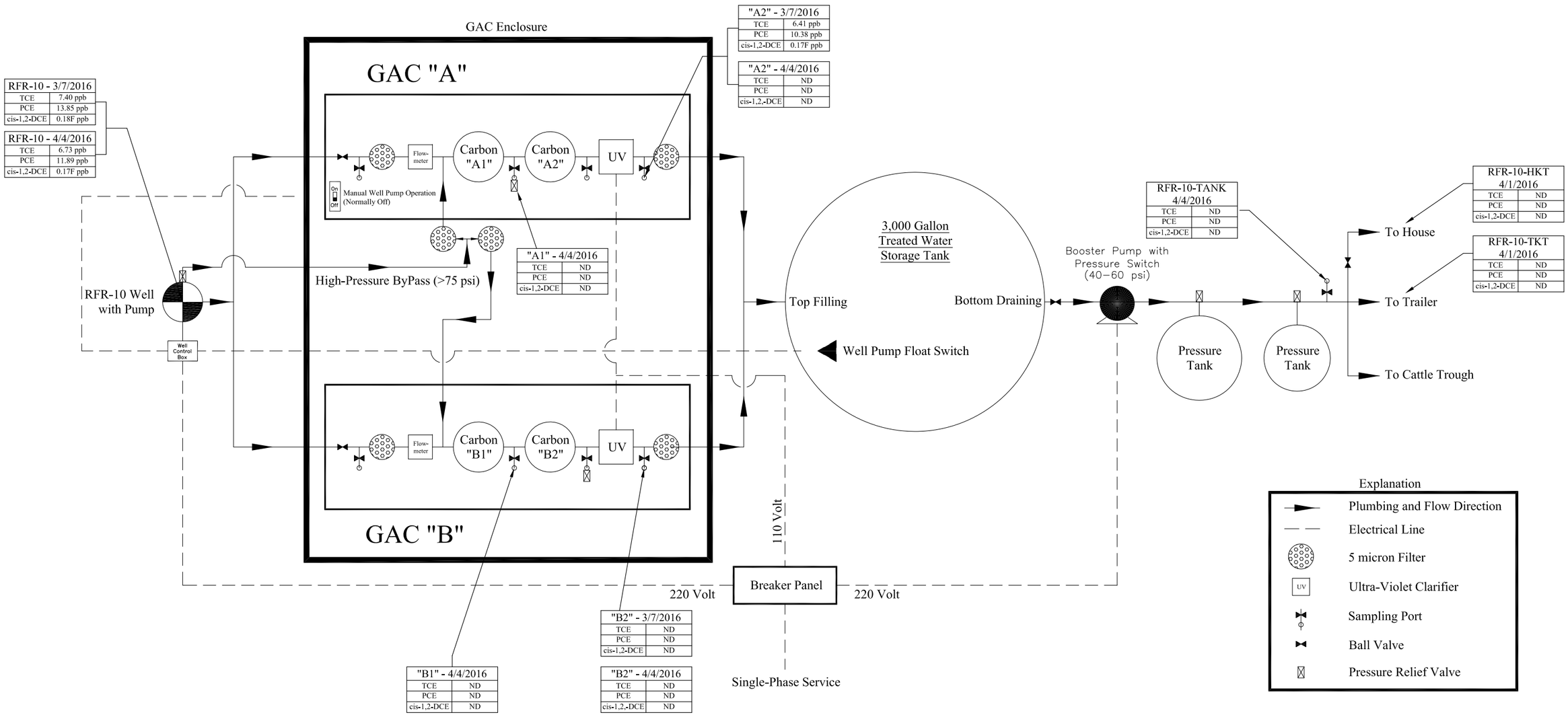
2.2 GAC SYSTEM SAMPLING

GAC-filtered samples were collected as part of the quarterly groundwater monitoring in March 2016. All GAC-filtered samples, with the exception of RFR-10-A2, were non-detect indicating the GAC systems are functioning properly. The next GAC-filtered samples will be collected in September 2016.

The GAC-filtered sample collected from the "A2" side of the RFR-10 GAC filtration system showed detections of PCE and TCE above the MCL (**Figure 2.2**). The "B2" side of the same GAC system showed no detection of VOCs. These two GAC systems run in parallel and are sent to a 3,000 gallon holding tank before distribution. Upon receipt of this result, tap samples were collected from the two homes fed by this well and the "A" side of the GAC system was turned off. These results initially indicated low levels of VOCs (less than the reporting limit [RL]) in the sample collected from the house kitchen tap (RFR-10-HKT) and no VOCs present in the tap sample collected from the trailer (RFR-10-TKT). Upon laboratory verification of this detection it was determined that no VOCs were present in either of the kitchen tap samples. Carbonair was contacted to change both carbon canisters on the "A" side of the system. Confirmation samples were collected from the "A2" and "B2" sides of the system and also between the carbon canisters (A1 and B1). All samples indicated that both sides of the GAC system were functioning properly. The "A" side of the GAC system was then placed back into service.

Due to the RFR-10 post-GAC sample detection the following changes will be made to the sampling protocol to minimize the time between sample collection and receipt of the results.

- Order expedited (3-day) turnaround times from the laboratory for all scheduled or unscheduled post-GAC (A2 and B2) sample analyses so that problems in GAC treatment are identified quickly.
- Collect post-GAC samples (A2 and B2) following each carbon canister replacement, in addition to the normal quarterly monitoring event, to identify any problems with replacement parts.
- Maintain a carbon canister at CSSA that can be transported to the well and installed by CSSA personnel if the service provider is unable to make a same day service call.



640149.0008.810000.04100 RFR10_GAC_LAYOUT.DWG 5/25/16

Figure 2.2

VOC Sampling of RFR-10
GAC Treatment System
March/April 2016

PARSONS

3.0 SUMMARY AND RECOMMENDATIONS

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

- All six wells scheduled for collection in March 2016 were obtained during the quarterly monitoring event. Seven GAC filtered samples were collected from the treatment units serving those wells.
- Well RFR-10 exceeded the MCL in March 2016 for PCE and TCE. This well is equipped with two GAC filtration systems.
- PCE and/or TCE were detected above the Reporting Limits (RLs) in private drinking water wells LS-5, LS-6, LS-7, OFR-3, and RFR-11. These wells have GAC filtration systems in place.
- 1,1-DCE, *trans*-1,2-DCE, and vinyl chloride were not detected in any of the off-post wells sampled in March 2016.
- GAC-filtered samples were collected as part of the quarterly groundwater monitoring in March 2016. All GAC-filtered samples, with the exception of RFR-10-A2, were non-detect indicating the GAC systems are functioning properly. The next GAC-filtered samples will be collected in September 2016.
- The GAC-filtered sample collected from the "A2" side of the RFR-10 GAC filtration system showed detections of PCE and TCE above the MCL. The "B2" side of the same GAC system showed no detection of VOCs. Upon receipt of this result, tap samples were collected from the two homes fed by this well and the "A" side of the GAC system was turned off. Samples were collected from the kitchen faucets from the two homes served by the GAC system, which both returned non-detect results. The "A" side carbon canisters were immediately replaced and confirmation samples were collected. All samples indicated that both sides of the GAC system were functioning properly. The "A" side of the GAC system was then placed back into service.
- Due to the RFR-10 post-GAC sample detection the following changes will be made to the sampling protocol to minimize the time between sample collection and receipt of the results.
    - Order expedited (3-day) turnaround times from the laboratory for all scheduled or unscheduled post-GAC sample analyses.
    - Collect post-GAC samples following each carbon canister replacement.
    - Maintain a spare carbon canister at CSSA that can be transported to the well and installed by CSSA personnel if the service provider is unable to make a same day service call.
- Semi-annual GAC maintenance, including carbon change-out, was performed February 18, 2016. The next semi-annual GAC maintenance will be due in August 2016.
- In accordance with project DQOs, the rationale for the selection of 6 samples to be collected in June 2016 is provided in **Table 3.1**.

Table 3.1
Sampling Rationale for June 2016

Well ID	2001 Sept	2001 Dec	2002 Mar	2002 June	2002 Sept	2002 Dec	2003 Mar	2003 June	2003 Sept	2003 Dec	2004 Mar	2004 June	2004 Sept	2004 Dec	2005 Mar	2005 June	2005 Sept	2005 Dec
BSR-03																		
BSR-04																		
FO-8	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS
FO-17	NS	NS		NS	NS	NS		NS	NS	NS	NS		NS	NS	NS		NS	NS
FO-22		NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS	
FO-J1												NS						NS
HS-1	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
HS-2	NS																	
HS-3	NS		NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
I10-2																		
I10-4	NS									NS								
I10-5	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS	
I10-7	NS	NS		NS	NS	NS			NS	NS	NS		NS					
I10-8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	
I10-9																		
I10-10																		
JW-5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS			
JW-6		NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
JW-7		NS	NS	NS	NS	NS	NS	NS										
JW-8	NS	NS	NS	NS	NS	NS	NS											
JW-9																NS	NS	NS
JW-12		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS		NS	NS	NS
JW-13		NS	NS	NS	NS		NS		NS	NS	NS		NS	NS	NS		NS	NS
JW-14																		
JW-15	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS			
JW-20																		
JW-26	NS	NS		NS											NS	NS	NS	
JW-27	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	
JW-28	NS	NS	NS	NS	NS	NS	NS	NS										
JW-29	NS	NS	NS	NS	NS	NS	NS											
JW-30	NS	NS	NS	NS	NS	NS												
JW-31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
LS-1													NS	NS	NS	NS	NS	NS
LS-4																		
LS-5																		
LS-5-A2																		
LS-6																		
LS-6-A2				NS		NS		NS		NS		NS		NS		NS		NS
LS-7																		
LS-7-A2				NS		NS		NS		NS		NS		NS		NS		NS
OFR-1	NS																	
OFR-3																		
OFR-3-A2	NS	NS		NS		NS		NS		NS		NS		NS		NS		NS
OFR-4	NS	NS	NS	NS	NS	NS	NS			NS		NS	NS	NS		NS	NS	NS
OW-HH1																		
OW-HH2																		
OW-CE1																		
OW-CE2																		
OW-MT2																		
OW-BARNOWL																		
OW-DAIRYWELL																		
OW-HH3																		
RFR-3	NS	NS	NS	NS	NS	NS	NS	NS	NS						NS	NS	NS	
RFR-4	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS	Tol	NS	NS	NS
RFR-5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS
RFR-8		NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
RFR-9			NS		NS	NS	NS			NS	NS	NS		NS	NS	NS		NS
RFR-10																		
RFR-10-A2				NS		NS		NS		NS		NS		NS		NS		NS
RFR-10-B2				NS	NS	NS	NS	NS		NS		NS		NS		NS		NS
RFR-11																		
RFR-11-A2				NS		NS		NS		NS		NS		NS		NS		NS
RFR-12																		
RFR-13													Well Installed					
RFR-14																		Well Installed
SLD-01																		
SLD-02																		

Well ID	2006 Mar	2006 June	2006 Sept	2006 Dec	2007 Mar	2007 June	2007 Sept	2007 Dec	2008 Mar	2008 June	2008 Sept	2008 Dec	2009 Mar	2009 June	2009 Sept	2009 Dec	2010 Mar	2010 June	2010 Sept	2010 Dec	2011 Mar	2011 June	2011 Sept	2011 Dec
BSR-03																								access agreement received
BSR-04																								
FO-8		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS
FO-17	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
FO-22	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS
FO-J1	NS																						NS	NS
HS-1	NS	NS															NS	NS	NS				NS	NS
HS-2																		NS			NS		NS	NS
HS-3	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
I10-2		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS				NA	NS		NS	NS
I10-4						NA	NA	NA	NA	NA	NA													
I10-5	NS	NS	NS		NS	NS	NS	NS	NS	NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS
I10-7																		NS	NA	NA	NS		NS	NS
I10-8	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS								NS	NS
I10-9																						access agreement received		
I10-10																								
JW-5		NS	NS	NS										NS	NS	NS		NS	NS	NS			NS	NS
JW-6	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
JW-7																							NS	NS
JW-8																							NS	NS
JW-9		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS	NS		NS	NS
JW-12	NS	NS		NS	NS	NS			NA		NA	NA			access agreement expired, no response from owners									NA
JW-13	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
JW-14	Tol																						NS	NS
JW-15		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS
JW-20																								
JW-26	NS	NS	NS		NS	NS	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NS	NS		NS	NS
JW-27								NS						NS	NS	NS		NS	NS	NS			NS	NS
JW-28							NS	NS	NS														NS	NS
JW-29																							NS	NS
JW-30																							NS	NS
JW-31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA					NS	NS		NS	NS
LS-1	NS	NS	NS	NS	NS	NS	NS	NS	NS														NS	NS
LS-4						NS	NS	NS	NS														NS	NS
LS-5																								
LS-5-A2																							GAC installed 10/6/11	NS
LS-6																								
LS-6-A2		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
OFR-1																							NS	NS
OFR-3																				NA	NS			
OFR-3-A2		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	NS	NS		NS
OFR-4		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS			NS	NS
OW-HH1																				access agreement received				
OW-HH2																				access agreement received				
OW-CE1																				access agreement received				
OW-CE2																				access agreement received				
OW-MT2																				access agreement received				
OW-BARNOWL																				access agreement received				
OW-DAIRYWELL																				access agreement received				
OW-HH3																				access agreement received				
RFR-3	NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS		NS	NS
RFR-4		NS	NS	NS		NS	NS	NS		NS	NS		NS	NS	NS		NS	NS	NS		NS		NS	NS
RFR-5		NS	NS	NS		NS	NS	NS		NS	NS		NS	NS	NS		NS	NS	NS		NS		NS	NS
RFR-8	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
RFR-9	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
RFR-10-B2		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
RFR-12		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS				NA	NS			NS
RFR-13			NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS	NS		NS	NS
RFR-14																							NS	NS
SLD-01													permission to sample granted, no access agreement											NS
SLD-02													permission to sample granted, no access agreemen										NA	NS

Well ID	2012 Mar	2012 June	2012 Sept	2012 Dec	2013 Mar	2013 June	2013 Sept	2013 Dec	2014 Mar	2014 June	2014 Sept	2014 Dec	2015 Mar	2015 June	2015 Sept	2015 Dec	2016 Mar	2016 June	Sampling Frequency
BSR-03		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
BSR-04			access agreement received		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
FO-8		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
FO-17		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
FO-22		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
FO-J1	NA	NS	NS	NA	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
HS-1		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
HS-2		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
HS-3		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
I10-2		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
I10-4									NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P&A
I10-5		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	NS	expired access agreement
I10-7		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
I10-8		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
I10-9			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	P&A
I10-10						access agreement received		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	One time sample
JW-5		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-6		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-7		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-8		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-9		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		NS		NS	NS	9-month (snapshot)
JW-13		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-14		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-15		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	NS	house vacant
JW-20							access agreement received					NS		NS	NS		NS	NS	9-month (snapshot)
JW-26		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	NS	expired access agreement
JW-27		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-28		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NA	NS	NS	new homeowners
JW-29		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-30		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
JW-31		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
LS-1		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
LS-4		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	NS	NS	NS	9-month (snapshot)
LS-5																		Yes	Quarterly
LS-5-A2		NS		NS		NS		NS		NS		NS		NS		NS		NS	Biannually (Mar & Sept)
LS-6																		Yes	Quarterly
LS-6-A2		NS		NS		NS		NS		NS		NS		NS		NS		NS	Biannually (Mar & Sept)
LS-7																		Yes	Quarterly
LS-7-A2		NS		NS		NS		NS		NS		NS		NS		NS		NS	Biannually (Mar & Sept)
OFR-1		NS	NS		NS	NS		NS	NS		NS	NA	NA	NA	NA	NA	NA	NA	P&A
OFR-3						NA	NA	NA	NA	NA	NA	NA						Yes	Quarterly
OFR-3-A2		NS		NS		NS	NA	NS	NA	NA	NA	NA		NS		NS		NS	Biannually (Mar & Sept)
OFR-4		NS	NS		NS	NS		NS	NS		NS	NA	NA	NA	NA	NA	NA	NA	P&A
OW-HH1		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
OW-HH2								NS	NS		NS	NS			NS		NS	NS	9-month (snapshot)
OW-CE1		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
OW-CE2		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
OW-MT2		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
OW-BARNOWL								NS	NS		NS	NS			NS		NS	NS	9-month (snapshot)
OW-DAIRYWELL		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
OW-HH3		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
RFR-3		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
RFR-4		NS	NS		NS	NS		NS	NS		NS	NS	NS	NS	NS	NS	NS	NS	9-month (snapshot)
RFR-5		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
RFR-8		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
RFR-9		NS	NS		NS	NS	NA	NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
RFR-10																		Yes	Quarterly
RFR-10-A2		NS		NS		NS		NS		NS		NS		NS		NS		NS	Biannually (Mar & Sept)
RFR-10-B2		NS		NS		NS		NS		NS		NS		NS		NS		NS	Biannually (Mar & Sept)
RFR-11																		Yes	Quarterly
RFR-11-A2		NS		NS		NS		NS		NS		NS		NS		NS		NS	Biannually (Mar & Sept)
RFR-12		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
RFR-13		NS	NS		NS	NS		NS	NS		NS	NS	NA	NA	NA	NA	NA	NA	electricity off
RFR-14		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)
SLD-01		NS	NS	NA	NS	NS											NS	NS	9-month (snapshot)
SLD-02		NS	NS	NA	NS	NS		NS	NS		NS	NS		NS	NS		NS	NS	9-month (snapshot)

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

Legend:

- (Red) VOCs detected are greater than 90% of the MCL. Sample monthly; quarterly after GAC installation.
- (Orange) VOCs detected are greater than 80% of the MCL. The well will be placed on a monthly sampling schedule until GAC installation then quarterly sampling after GAC installation.
- (Yellow) 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.
- (Lavender) 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 2016.
- NS: Not sampled for that event.
- (Green) No VOCs detected. Sample on an as needed basis.
- NA: Not applicable, sample could not be collected due to pump outage or well access conflict.

APPENDIX A
EVALUATION OF DATA QUALITY OBJECTIVES ATTAINMENT

Appendix A Evaluation of Data Quality Objectives Attainment

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

Activity	Objectives	Action	Objective Attained?	Recommendations
	Evaluate CSSA monitoring program and expand as necessary (§2.3.1 of the DQOs for the Groundwater Contamination Investigation, revised November 2010). Determine locations of future monitoring locations.	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 (§3.2.3) and install as needed (§3.2.5 both of the DQOs for the Groundwater Contamination Investigation, revised November 2010).	Perform maintenance as needed. Install new GACs as needed.	Yes	Maintenance to the off-post GAC systems to be continued by Parsons' personnel every 3 weeks. Twice yearly (or as needed) maintenance to the off-post GAC systems by additional subcontractors to continue. Evaluations of future sampling results for installation of new GAC systems will occur as needed.

APPENDIX B
MARCH 2016 QUARTERLY OFF-POST GROUNDWATER ANALYTICAL RESULTS

Appendix B
March 2016 Quarterly Off-post Groundwater Analytical Results

Well ID	Sample Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl Chloride
LS-5	3/7/2016	0.12U	0.07U	0.08U	**1.12F**	**2.5**	0.08U
LS-5-A2	3/7/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
LS-6	3/7/2016	0.12U	0.07U	0.08U	**0.76F**	**1.47**	0.08U
LS-6-A2	3/7/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
LS-7	3/7/2016	0.12U	0.07U	0.08U	**1.63**	**0.28F**	0.08U
LS-7-A2	3/7/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
OFR-3	3/7/2016	0.12U	0.07U	0.08U	**2.86**	**2.38**	0.08U
OFR-3-A2	3/7/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10	3/7/2016	0.12U	**0.18F**	0.08U	**13.85**	**7.4**	0.08U
RFR-10 FD	3/7/2016	0.12U	0.07U	0.08U	**13.33**	**6.76**	0.08U
RFR-10-A2	3/7/2016	0.12U	**0.17F**	0.08U	**10.38**	**6.41**	0.08U
RFR-10-B2	3/7/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10-HKT	4/1/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10-TKT	4/1/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10	4/4/2016	0.12U	**0.17F**	0.08U	**11.89**	**6.73**	0.08U
RFR-10-A1	4/4/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10-A2	4/4/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10-B1	4/4/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10-B2	4/4/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10-TANK	4/4/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-11	3/7/2016	0.12U	0.07U	0.08U	**0.96F**	**1.62**	0.08U
RFR-11-A2	3/7/2016	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U

BOLD	≥ MDL
BOLD	≥ RL
BOLD	≥ MCL

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

FD	Field Duplicate
TCE	Trichloroethene
PCE	Tetrachloroethene
DCE	Dichloroethene

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 78870
SDG 79220

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 thirteen groundwater samples and the associated field quality control (QC) samples collected from off-post Camp Stanley Storage Activity (CSSA) on March 8, 2016. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

78870

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

All samples were collected by Parsons and analyzed by APPL, Inc. following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0. Samples in this SDG were shipped to the laboratory in two cooler. Both coolers were received by the laboratory at a temperature of 4.5 ºC, which was within the 2-6ºC range recommended by the CSSA QAPP. There were other samples involved in the shipment. All VOC vial were packed in one cooler.

EVALUATION CRITERIA

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

VOLATILES

General

The volatiles portion of this data package consisted of fourteen (14) off-post groundwater samples and one (1) TB. There was a set of parent/FD collected. All samples were collected from March 7, 2016 and analyzed for a reduced list of VOCs which included: 1,1-dichloroethene, *cis*-1,2-dichloroethene, tetrachloroethene, *trans*-1,2-dichloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in three analytical batches #205443, #205459, and #205494, with two instrument under two sets of initial calibration (ICAL). All samples were analyzed following the procedures outlined in the CSSA QAPP and were prepared and analyzed within the holding time required by the method. All analyses were performed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the three 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) between the parent and FD sample results. Sample RFR-10 was collected in duplicate.

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

Analyte	Parent (µg/L)	FD (µg/L)	%RPD	Criteria (%RPD)
TCE	7.40	6.76	9.0	≤30
PCE	13.85	13.33	3.8	≤30

Representativeness

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

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

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

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

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

Completeness

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

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

DATA VERIFICATION SUMMARY REPORT

for off-post samples collected from

CAMP STANLEY STORAGE ACTIVITY

BOERNE, TEXAS

Data Verification by: Tammy Chang
Parsons - Austin

INTRODUCTION

The following data verification summary report covers eight groundwater samples and the associated field quality control (QC) sample collected from off-post Camp Stanley Storage Activity (CSSA) on April 1st and 4, 2016. The samples were assigned to the following Sample Delivery Group (SDG). All samples were analyzed for volatile organic compounds (VOCs).

79220

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

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

EVALUATION CRITERIA

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

VOLATILES

General

The volatiles portion of this data package consisted of eight (8) off-post groundwater samples and one (1) TB. All samples were collected on April 1st and 4th, 2016 and analyzed for a reduced list of VOCs which included: 1,1-dichloroethene, *cis*-1,2-dichloroethene, tetrachloroethene, *trans*-1,2-dichloroethene, trichloroethene, and vinyl chloride.

The VOC analyses were performed using United States Environmental Protection Agency (USEPA) SW846 Method 8260B. The samples were analyzed in one analytical batches #206250, with one instrument under one set of initial calibration (ICAL). All samples were analyzed following the procedures outlined in the CSSA QAPP and were prepared and analyzed within the holding time required by the method. All analyses were performed undiluted.

Accuracy

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

All LCS and surrogate spike recoveries were within acceptance criteria.

Precision

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

Representativeness

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

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

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

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

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

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

Completeness

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

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