

FINAL

March 2011

Off-Post

Quarterly Groundwater Monitoring Report



Prepared For

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

June 2011

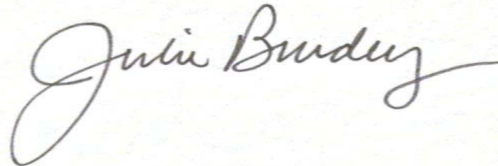
GEOSCIENTIST CERTIFICATION

March 2011 Off-post Quarterly Groundwater Monitoring Report

For

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

I, Julie Burdey, P.G., hereby certify that the March 2011 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 CSSA Environmental Office, laboratory data provided by APPL, and field data obtained during groundwater monitoring conducted at the site in March 2011, and is true and accurate to the best of my knowledge and belief.



Julie Burdey, P.G.
State of Texas
Geology License No. 1913

6/27/2011

Date

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ABBREVIATIONS AND ACRONYMS

APPL	Agriculture & Priority Pollutant Laboratory
BRAC	Base realignment and closure
CSSA	Camp Stanley Storage Activity
CESWF	Corps of Engineers Fort Worth District
DCE	dichloroethene
DQO	Data quality objective
FD	Field duplicate
FO	Fair Oaks
GAC	granular activated carbon
HS	Hidden Springs
I10	Interstate Highway 10
JW	Jackson Woods
LS	Leon Springs
MCL	maximum contaminant level
MDL	method detection limit
MS/MSD	matrix spike/matrix spike duplicate
N/A	not applicable
OFR	Old Fredericksburg Road
OW	The Oaks Water Supply Corporation
Parsons	Parsons Infrastructure and Technology Group
PCE	tetrachloroethene
P.G.	Professional Geologist
QAPP	Quality Assurance Program Plan
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RFR	Ralph Fair Road
RL	Reporting limit
SAP	Sampling and Analysis Plan
SDWA	Safe Drinking Water Act
TCE	trichloroethene
USACE	United States Army Corps of Engineers
VOC	volatile organic compound

EXECUTIVE SUMMARY

- A total of 34 off-post wells and 5 granular activated carbon (GAC) filtered samples were collected during the March 2011 monitoring event. Well HS-2 was not sampled because it was offline; the operator on site did not know the reason why it was offline. Well JW-9 was not sampled due to an expired access agreement and inability to coordinate with the well owner. Well JW-26 was not sampled due to inability to coordinate sampling with the well owner.
- Eight wells on the west side of IH-10 were sampled for the first time. These wells are part of The Oaks Water Supply Corporation. Two of the 8 samples had detections, below the RL, of tetrachloroethene (PCE). All 8 wells will be sampled quarterly for at least 4 consecutive quarters.
- Analyses indicated off-post wells I10-4 and RFR-10 exceeded the maximum contaminant level (MCL) for PCE and/or trichloroethene (TCE). Well RFR-10 is equipped with a GAC treatment system and well I10-4 is not in use.
- GAC-filtered samples were collected at LS-6, LS-7, RFR-10, and RFR-11 in March 2011. All samples were non-detect, indicating the GAC systems are functioning properly. Well OFR-3 and its post GAC sample were not collected this quarter due to an expired access agreement. The access agreement was obtained after the sampling event and this well will be sampled next quarter (June 2011). GAC-filtered samples will be collected again during the September 2011 event.
- Semi-annual GAC maintenance was performed in January 2011. This involved replacing the first carbon canister in each GAC unit and other routine maintenance. This carbon exchange is performed semi-annually; the next carbon change-out will be due in July 2011.

MARCH 2011 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 2011 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 2011 quarterly monitoring events (March, June, September, and December) will be described in detail in an Annual Report to be submitted after December 2011. 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 February 28 through March 17, 2011. 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 located in the Plan.

The CSSA groundwater monitoring program also follows the provisions of the groundwater monitoring program DQOs as well as the recommendations of all applicable project-specific work plans. **Appendix A** provides an evaluation of the Data Quality Objective Attainment for this 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 MARCH 2011 ANALYTICAL RESULTS

In March 2011, a groundwater sample was collected from each of 34 off-post wells shown in **Figure 2-1**. GAC (granular activated carbon) filtered samples (LS-6-A2, LS-7-A2, RFR-10-A2, RFR-10-B2, and RFR-11-A2) are collected semi-annually and were collected this event. Four wells (HS-2, JW-9, JW-26, and OFR-3) were not sampled for various reasons explained in more detail later in this report. **Table 2-1** includes the rationale for selection of the wells sampled in March 2011, and **Figure 2-1** provides well locations for the following sampled wells:

- Three public supply wells in the Fair Oaks area (FO-J1, FO-8, and FO-22);
- One public supply well in the Hidden Springs Estates subdivision (HS-1);
- Two public wells (I10-5 and I10-8) and one privately-owned unused well (I10-4) in the Interstate-10 area;
- Nine privately-owned wells in the Jackson Woods subdivision (JW-5, JW-7, JW-8, JW-14, JW-15, JW-27, JW-28, JW-29, and JW-30);

- Five wells in the Leon Springs Villa area (one public well: LS-6; two privately-owned wells: LS-5 and LS-7; and two wells: LS-1 and LS-4 that were taken out of service but will remain in the sampling program for data collection purposes);
- Two privately-owned wells on Old Fredericksburg Road (OFR-1 and OFR-4);
- Three privately-owned wells (RFR-10, RFR-11, and RFR-14) in the Ralph Fair Road area; and
- Eight public supply wells from The Oaks Water Supply System (OW-BARNOWL, OW-CE1, OW-CE2, OW-DAIRYWELL, OW-HH1, OW-HH2, OW-HH3, and OW-MT2) were added to the sampling list for this quarter.

All wells 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.

A total of 39 groundwater samples (34 well samples and 5 GAC filtered samples), four field duplicate samples, two matrix spike/matrix spike duplicate (MS/MSD) pairs, and three trip blanks were submitted to Agriculture & Priority Pollutant Laboratory (APPL) in Fresno, 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 internal reference 787780-#13 and -#16) 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 data packages March 17 and 25, 2011.

Concentrations of the VOCs detected in March 2011 are presented in **Table 2-2**. Full analytical results from the March 2011 sampling event are presented in **Appendix B**. As shown in **Table 2-1**, 42 samples were scheduled for collection in March 2011 and 39 of the 42 samples were collected. Four wells were not sampled due to the following reasons: well HS-2 was offline; the JW-9 and OFR-3 well owners have not returned the CSSA Right-of-Entry Agreement; and the JW-26 well owner did not return call attempts to schedule access.

In January 2011, routine semi-annual maintenance was performed on the GAC treatment systems at LS-6, LS-7, RFR-10, and RFR-11. GAC treatment system OFR-3 was not serviced due to an expired CSSA Right-of-Entry Agreement. Carbon canisters were exchanged and other routine maintenance was performed. GAC filtered samples were collected this quarter and will be collected again in September 2011.

Based on historical detections, the lateral extent of VOC detections extends approximately 1.5 miles beyond the south and west boundaries of CSSA. Detections of VOCs have extended south to well LS-4 and west to OW-BARNOWL (**Figure 2-1**).

Table 2-1
Sampling Rationale for March 2011

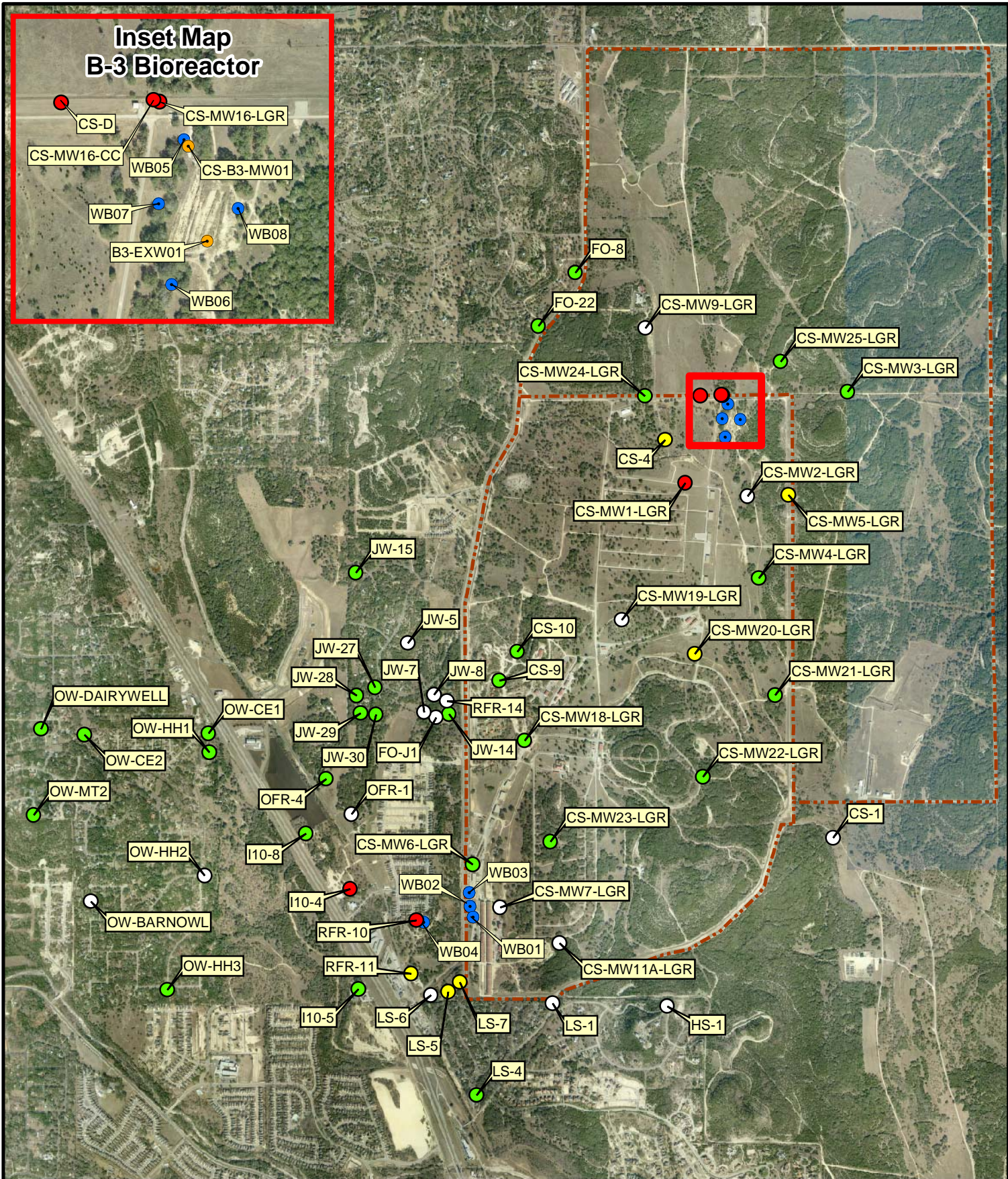
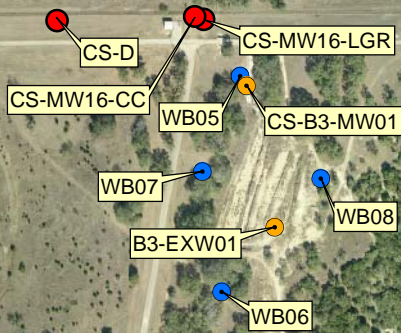
Well ID	2001		2002				2003				2004				2005				2006				2007				2008				2009				2010				2011	Sampling Frequency:
	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar	June	Sept	Dec	Mar					
FO-8	NS	NS																																	Yes	As needed, once annually				
FO-17	NS	NS																																	NS	As needed, once annually				
FO-22																																			Yes	As needed, once annually				
FO-J1																																			Yes	Qtrly, 1 year thru Dec. 11				
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	Yes	Qtrly, 1 year thru Dec. 11					
HS-2	NS	NS																																	Yes	Qtrly, 1 year thru June 11				
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	As needed, once annually				
I10-2																																		NA	access agreement expired					
I10-4	NS																																		Yes	Quarterly				
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	Yes	As needed, once annually					
I10-7	NS	NS																																NA	access agreement expired					
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	Yes	Qtrly, for delineation					
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	Yes	As needed, once annually					
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	As needed, once annually				
JW-7		NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Qtrly, 1 year thru Dec. 11				
JW-8	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Qtrly, 1 year thru Dec. 11				
JW-9																																			Yes	As needed, once annually				
JW-9-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	NS	NS	NS	NS	NS	NS	NS	As needed				
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	As needed, once annually				
JW-14																																			Yes	Qtrly, due to location				
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	Yes	As needed, once annually				
JW-26	NS	NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	Yes	Qtrly, 1 year thru Dec. 11				
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	Yes	As needed, once annually				
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	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	Yes	Qtrly, due to location				
JW-29	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	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	Qtrly, due to location				
JW-30	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	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	Qtrly, due to location				
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	As needed, once annually					
LS-1																																			Yes	QED low flow pump installed				
LS-4																																			Yes	QED low flow pump installed				
LS-5																																			Yes	Qtrly, 1 year thru Dec. 11				
LS-6																																			Yes	Qtrly, 1 year thru Dec. 11				
LS-6-A2				NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)				
LS-7																																			Yes	Qtrly, 1 year thru Dec. 11				
LS-7-A2				NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)				
OFR-1	NS																																		Yes	Qtrly, 1 year thru Dec. 11				
OFR-3																																			NA	access agreement expired				
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	NS	NS	NS	NS	NS	NS	NS	NS	NS	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	Yes	As needed, once annually				
OW-HH1																																			access agreement received	Yes				
OW-HH2																																				access agreement received	Yes			
OW-CE1																																				access agreement received	Yes			
OW-CE2																																				access agreement received	Yes			
OW-MT2																																				access agreement received	Yes			
OW-BARNOWL																																				access agreement received	Yes			
OW-DAIRYBARN																																				access agreement received	Yes			
OW-DEERVIEV																																				access agreement received	Yes			
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	As needed, once annually				
RFR-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	As needed, once annually				
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	As needed, once annually				
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	As needed, once annually				
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	NS	NS	As needed, once annually				
RFR-10																																				Yes	Qtrly, 1 year thru Dec. 11			
RFR-10-A2				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	Yes	Biannually (Mar & Sept)				
RFR-11																																				Yes	Qtrly, 1 year thru Dec. 11			
RFR-11-A2				NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS		NS	Yes	Biannually (Mar & Sept)				
RFR-12																																			NA	access agreement expired				
RFR-13																																				NS	As needed, once annually			
RFR-14																																				Yes	Qtrly, 1 year thru Sept. 11			

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

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

VOCS detected are less than 80% of the MCL (<4.0 ppb and >0.06 ppb for PCE & <4

Inset Map B-3 Bioreactor



0 1,250 2,500 3,750 5,000 Feet

Sampled Wells March 2011

- > MCL (VOC's only)
- > RL (VOC's only)
- > MDL (VOC's only)
- ND
- Other Wells
- Westbay Wells
- Fence Line

Figure 2-1

On-Post and Off-Post Well Sampling
Locations for March 2011

Camp Stanley Storage Activity

PARSONS

**Table 2-2
March 2011 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	Comments
Fair Oaks	FO-8	3/2/2011	--	--	--	--	--	--	
	FO-22	3/2/2011	--	--	--	--	--	--	
	FO-22 FD	3/2/2011	--	--	--	--	--	--	
	FO-J1	3/3/2011	--	--	--	0.22F	--	--	sporadic low levels of PCE
Hidden Springs	HS-1	3/3/2011	--	--	--	0.15F	--	--	
	HS-1 FD	3/3/2011	--	--	--	0.15F	--	--	
IH-10	I10-4	3/1/2011	--	--	--	6	2.26	--	PCE remains sporadically above the MCL since Dec. 2008
	I10-5	3/2/2011	--	--	--	--	--	--	No historical VOC detections.
	I10-8	3/2/2011	--	--	--	--	--	--	Delineation well to the north-west of the plume boundary
Jackson Woods Subdivision	JW-5	3/1/2011	--	--	--	0.12F	--	--	Last PCE detection was in March 2008
	JW-7	3/3/2011	--	--	--	0.37F	--	--	
	JW-8	3/1/2011	--	--	--	0.31F	--	--	
	JW-14	3/3/2011	--	--	--	--	--	--	
	JW-15	3/1/2011	--	--	--	--	--	--	
	JW-27	3/3/2011	--	--	--	--	--	--	No PCE detections since Mar. 2008
	JW-28	3/1/2011	--	--	--	--	--	--	
	JW-29	3/1/2011	--	--	--	--	--	--	No VOC detections since Mar. 2009
Leon Springs Villas	LS-1	3/2/2011	--	--	--	0.28F	--	--	
	LS-4	3/2/2011	--	--	--	--	--	--	
	LS-5	3/2/2011	--	--	--	1.10F	2.59	--	TCE consistently at higher concentrations than PCE
	LS-6	2/28/2011	--	--	--	0.76F	0.85F	--	Pre-GAC Sample
	LS-6-A2	2/28/2011	--	--	--	--	--	--	Post-GAC sample
	LS-7	2/28/2011	--	--	--	2.88	0.43F	--	Pre-GAC Sample
	LS-7-A2	2/28/2011	--	--	--	--	--	--	Post-GAC sample
Old Fredericksburg	OFR-1	3/3/2011	--	--	--	0.24F	--	--	consistently low levels of PCE
	OFR-4	3/3/2011	--	--	--	--	--	--	
Ralph Fair Road	RFR-10	2/28/2011	--	0.39F	--	30.98	13.03	--	Pre-GAC Sample, first time to have PCE concentrations > 30 ppb in consecutive events
	RFR-10-A2	2/28/2011	--	--	--	--	--	--	Post-GAC sample
	RFR-10-B2	2/28/2011	--	--	--	--	--	--	Post-GAC sample
	RFR-10-B2 FD	2/28/2011	--	--	--	--	--	--	Post-GAC sample
	RFR-11	2/28/2011	--	--	--	0.68F	1.37	--	Pre-GAC Sample
	RFR-11-A2	2/28/2011	--	--	--	--	--	--	Post-GAC sample
	RFR-14	3/3/2011	--	--	--	0.11F	--	--	
The Oaks Water Supply	OW-BARNOWL	2/28/2011	--	--	--	0.15F	--	--	First sampling event for these wells.
	OW-CE1	2/28/2011	--	--	--	--	--	--	
	OW-CE1 FD	2/28/2011	--	--	--	--	--	--	
	OW-CE2	2/28/2011	--	--	--	--	--	--	
	OW-DAIRYWELL	2/28/2011	--	--	--	--	--	--	
	OW-HH1	2/28/2011	--	--	--	--	--	--	
	OW-HH2	2/28/2011	--	--	--	0.20F	--	--	
	OW-HH3	2/28/2011	--	--	--	--	--	--	
	OW-MT2	2/28/2011	--	--	--	--	--	--	

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.

3.0 SUMMARY AND RECOMMENDATIONS

Results of the March 2011 sampling are summarized as follows:

- Well HS-2 was not sampled because it was offline. Wells JW-9 and OFR-3 were not sampled due to expired access agreements, and the JW-26 well owner did not return call attempts to schedule access.
- Wells OW-BARNOWL, OW-CE1, OW-CE2, OW-DAIRYWELL, OW-HH1, OW-HH2, OW-HH3, and OW-MT2 were added to the sampling schedule for the first time this quarter. These wells are on the west side of IH-10 and are owned by The Oaks Water Supply Corporation. Wells OW-BARNOWL and OW-HH2 had low levels (less than the RL) of PCE. These wells will be sampled quarterly for 4 consecutive quarters in accordance with project DQOs and the LTMO Plan.
- PCE and TCE exceeded the MCL in wells I10-4 and RFR-10 in March 2011. Well RFR-10 is equipped with GAC treatment systems and well I10-4 is not in use.
- PCE and/or TCE were detected above the RLs in private drinking water wells LS-5, LS-7 and RFR-11. Wells LS-7 and RFR-11 have GAC treatment systems in place, and well LS-5 is monitored quarterly (and has never exceeded the MCL). Per the Plan, if VOC levels in LS-5 rise above 90% of the applicable MCL, a GAC treatment system will be installed at the well or an alternative water source provided to the well owner. The highest concentration at LS-5 is 2.82 µg/L TCE, which is 56% of the MCL. In March 2011 the PCE concentration was 2.59 µg/L, concentrations have been consistently above the RL since 2008. A quote for GAC installation at LS-5 has been received and will be acted on quickly, if concentrations exceed the 90% limit.
- Low levels (below the RL) of PCE and/or TCE were also detected in wells FO-J1, HS-1, HS-1 field duplicate, JW-5, JW-7, JW-8, LS-1, LS-6, OFR-1, RFR-14, OW-BARNOWL, and OW-HH2.
- 1,1-DCE, *trans*-1,2-DCE, and vinyl chloride were not detected in any off-post wells in March 2011.
- No VOCs were detected in wells FO-8, FO-22, I10-5, I10-8, JW-14, JW-15, JW-27, JW-28, JW-29, JW-30, LS-4, OFR-4, OW-CE1, OW-CE1 field duplicate, OW-CE2, OW-DAIRYWELL, OW-HH1, OW-HH3, and OW-MT2.
- GAC filtered samples were collected in March 2011. All GAC filtered samples were non-detect indicating the GAC units were functioning properly. The next GAC filtered samples will be collected in September 2011.
- Semi-annual GAC maintenance, including carbon change-out, was performed in January 2011; the next semi-annual GAC maintenance will be due in July 2011.
- Additional wells to the west and southwest of CSSA are currently being located. As access agreements are received these wells will be added to future sampling events.
- In accordance with project DQOs, the rationale for the selection of 50 wells to be sampled in June 2011 is provided in **Table 3-1**.

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 ½ mile radius of CSSA.	Partially	Replace wells where no VOCs were detected with wells that may be identified in the future, located to the west and southwest of 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 2011 QUARTERLY OFF-POST
GROUNDWATER ANALYTICAL RESULTS

Appendix B
March 2011 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
FO-8	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
FO-22	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
FO-22 FD	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
FO-J1	3/3/2011	0.12U	0.07U	0.08U	0.22F	0.05U	0.08U
HS-1	3/3/2011	0.12U	0.07U	0.08U	0.15F	0.05U	0.08U
HS-1 FD	3/3/2011	0.12U	0.07U	0.08U	0.15F	0.05U	0.08U
I10-4	3/1/2011	0.12U	0.07U	0.08U	6	2.26	0.08U
I10-5	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
I10-8	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-5	3/1/2011	0.12U	0.07U	0.08U	0.12F	0.05U	0.08U
JW-7	3/3/2011	0.12U	0.07U	0.08U	0.37F	0.05U	0.08U
JW-8	3/1/2011	0.12U	0.07U	0.08U	0.31F	0.05U	0.08U
JW-14	3/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-15	3/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-27	3/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-28	3/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-29	3/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-30	3/1/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
LS-1	3/2/2011	0.12U	0.07U	0.08U	0.28F	0.05U	0.08U
LS-4	3/2/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
LS-5	3/2/2011	0.12U	0.07U	0.08U	1.10F	2.59	0.08U
LS-6	2/28/2011	0.12U	0.07U	0.08U	0.76F	0.85F	0.08U
LS-6-A2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
LS-7	2/28/2011	0.12U	0.07U	0.08U	2.88	0.43F	0.08U
LS-7-A2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
OFR-1	3/3/2011	0.12U	0.07U	0.08U	0.24F	0.05U	0.08U
OFR-4	3/3/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10	2/28/2011	0.12U	0.39F	0.08U	30.98	13.03	0.08U
RFR-10-A2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10-B2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-10-B2 FD	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-11	2/28/2011	0.12U	0.07U	0.08U	0.68F	1.37	0.08U
RFR-11-A2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-14	3/3/2011	0.12U	0.07U	0.08U	0.11F	0.05U	0.08U
OW-BARNOWL	2/28/2011	0.12U	0.07U	0.08U	0.15F	0.05U	0.08U
OW-CE1	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
OW-CE1 FD	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
OW-CE2	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
OW-DAIRYWELL	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
OW-HH1	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
OW-HH2	2/28/2011	0.12U	0.07U	0.08U	0.20F	0.05U	0.08U
OW-HH3	2/28/2011	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
OW-MT2	2/28/2011	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**

(Laboratory data packages are submitted to CSSA electronically.)

**SDG 64013
SDG 64070**

DATA VERIFICATION SUMMARY REPORT

for off-post samples collected from CAMP STANLEY STORAGE ACTIVITY

BOERNE, TEXAS

Data Verification by: Tammy Chang and Katherine LaPierre
Parsons - Austin

INTRODUCTION

The following data verification summary report covers quarterly groundwater samples and the associated field quality control (QC) samples collected from off-post Camp Stanley Storage Activity (CSSA) under Environmental Protection Support, Investigations, and Treatability Studies on February 28, 2011. The samples in the following Sample Delivery Group (SDG) were analyzed for a reduced list of volatile organic compounds (VOCs):

64013

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

All samples were collected by Parsons and analyzed by APPL Inc. following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0. The samples in this SDG were shipped to the laboratory in one cooler. The cooler was received by the laboratory at a temperature of 2.5°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

This data package consisted of twenty-two (22) samples, including seventy (17) off-post groundwater samples, two (2) FD samples, one MS/MSD pair, and one (1) TB. The samples were collected on February 28, 2011 and were 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 four batches (#152951, #152951, #152953, and #152954) under two initial calibration (ICAL) curves. All samples were analyzed following the procedures outlined in the CSSA QAPP and within the holding time required by the method. All samples were analyzed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the four laboratory control spike (LCS) samples, the MS/MSD samples, and the surrogate spikes. Sample LS-7 was designated as the parent sample for the MS/MSD analysis on the chain of custody.

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

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the MS/MSD concentrations. Precision was further evaluated by comparing the field duplicate analyte results. Samples OW-CE1 and RFR-10-B2 were collected in duplicate and the second set of vials from each location was submitted as a field duplicate.

All MS/MSD RPDs were within acceptance criteria.

All target VOCs were non-detect in the parent and field duplicate samples for both field duplicate pair.

Representativeness

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

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

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

- All instrument performance check criteria were met.

- All initial calibration criteria were met.
- All four LCS samples were prepared with 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 four method blanks and one TB associated with the VOC analyses in this SDG. All blanks 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 off-post samples collected from CAMP STANLEY STORAGE ACTIVITY

BOERNE, TEXAS

Data Verification by: Tammy Chang and Katherine LaPierre
Parsons - Austin

INTRODUCTION

The following data verification summary report covers quarterly groundwater samples and the associated field quality control (QC) samples collected from off-post Camp Stanley Storage Activity (CSSA) under Environmental Protection Support, Investigations, and Treatability Studies on March 1, 2, and 3, 2011. The samples in the following Sample Delivery Group (SDG) were analyzed for a reduced list of volatile organic compounds (VOCs):

64070

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

All samples were collected by Parsons and analyzed by APPL Inc. following the procedures outlined in the Statement of Work and CSSA QAPP, Version 1.0. 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

This data package consisted of twenty-seven (27) samples, including twenty-two (22) off-post groundwater samples, two (2) FD samples, one MS/MSD pair, and one (1) TB. The samples were collected on March 1, 2, and 3, 2011 and were 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 batches (#152772, #152992, and #153012) under two initial calibration (ICAL) curves. 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 samples were analyzed undiluted.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the three laboratory control spike (LCS) samples, the MS/MSD samples, and the surrogate spikes. Sample OFR-4 was designated as the parent sample for the MS/MSD analysis on the chain of custody.

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

Precision

Precision was evaluated using the relative percent difference (RPD) obtained from the MS/MSD concentrations. Precision was further evaluated by comparing the field duplicate analyte results. Samples FO-22 and HS-1 were collected in duplicate and the second set of vials from each location was submitted as a field duplicate.

All MS/MSD RPDs were within acceptance criteria.

All target VOCs were non-detect in sample FO-22 and the associated field duplicate.

All target VOCs were below the reporting limit (RL) in parent sample HS-1 and the associated field duplicate.

Representativeness

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

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

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

- All instrument performance check criteria were met.
- All initial calibration criteria were met.
- All three LCS samples were prepared with 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 three method blanks and one TB associated with the VOC analyses in this SDG. All blanks 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%.