

**March 2014**

**Off-Post**

**Quarterly Groundwater Monitoring Report**



*Prepared For*

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

**May 2014**

## EXECUTIVE SUMMARY

- A total of 13 off-post samples (7 wells and 6 treatment units) were scheduled to be collected during the March 2014 monitoring event; all samples were collected.
- Analyses indicated off-post well RFR-10 exceeded the maximum contaminant level (MCL) for tetrachloroethene (PCE). Trichloroethene (TCE) was also detected above the laboratory reporting limit (RL). This well is equipped with granular activated carbon (GAC) filtration system.
- Well JW-20 was added to the sampling program after the new owners attended the CSSA public meeting on January 16<sup>th</sup>, 2014. A sample was collected after the public meeting on January 22, 2014 and then again during the quarterly March sampling event. Both sample results were non-detect.
- Well SLD-01 reported its first detection of PCE, below the RL, in September 2013. March 2014 was its second consecutive quarterly non-detect. This well is 2.9 miles west of CSSA.
- GAC-filtered samples were collected in March 2014 and all analyses were non-detect indicating the GAC filtration systems are functioning properly. The next GAC-filtered samples will be collected during the September 2014 event.
- Semi-annual GAC maintenance was performed February 5, 2014. 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 August 2014.
- On January 16, 2014 CSSA held a public meeting at Leon Springs Baptist Church to present recent data and discuss ongoing treatability studies and the cleanup effort at CSSA.

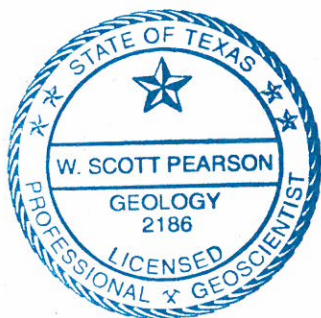
## GEOSCIENTIST CERTIFICATION

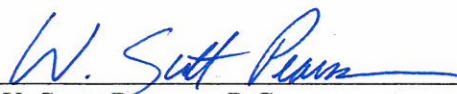
### March 2014 Off-Post Quarterly Groundwater Monitoring Report

For

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

I, W. Scott Pearson, P.G., hereby certify that the 2014 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 2014, and is true and accurate to the best of my knowledge and belief.



  
\_\_\_\_\_  
W. Scott Pearson, P.G.  
State of Texas  
Geology License No. 2186  
  
5-29-2014  
\_\_\_\_\_  
Date

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>i</b>
<b>GEOSCIENTIST CERTIFICATION.....</b>	<b>ii</b>
<b>APPENDICES .....</b>	<b>iii</b>
<b>LIST OF TABLES .....</b>	<b>iii</b>
<b>LIST OF FIGURES .....</b>	<b>iii</b>
<b>1.0 INTRODUCTION.....</b>	<b>1-1</b>
<b>2.0 MARCH 2014 ANALYTICAL RESULTS.....</b>	<b>2-2</b>
<b>3.0 PUBLIC MEETING .....</b>	<b>3-1</b>
<b>4.0 SUMMARY AND RECOMMENDATIONS.....</b>	<b>4-1</b>

## LIST OF TABLES

Table 2.1	Sampling Rationale for March 2014.....	2-4
Table 2.2	March 2014 Off-Post Groundwater Results, Detected Analytes Only .....	2-5
Table 4.1	Sampling Rationale for June 2014.....	4-1

## LIST OF FIGURES

Figure 2.1	On-Post and Off-Post Well Sampling Locations for March 2014.....	2-3
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## LIST OF APPENDICES

Appendix A	Evaluation of Data Quality Objectives Attainment
Appendix B	March 2014 Quarterly Off-post Groundwater Analytical Results
Appendix C	Data Validation Reports

## ABBREVIATIONS AND ACRONYMS

AOC	Area of Concern
APPL	Agriculture & Priority Pollutant Laboratory
CSSA	Camp Stanley Storage Activity
DCE	Dichloroethene
DQO	Data Quality Objective
FD	Field Duplicate
GAC	Granular Activated Carbon
JW	Jackson Woods
LS	Leon Springs
MCL	Maximum Contaminant Level
MS/MSD	Matrix Spike/Matrix Spike Duplicate
N/A	Not Applicable
OFR	Old Fredericksburg Road
Parsons	Parsons Government Services, Inc.
PCE	Tetrachloroethene
P.G.	Professional Geologist
QAPP	Quality Assurance Program Plan
QA/QC	Quality Assurance/Quality Control
RFR	Ralph Fair Road
RL	Reporting Limit
SAP	Sampling and Analysis Plan
SWMU	Solid Waste Management Unit
SLD	Scenic Loop Drive
TCE	Trichloroethene
VOC	Volatile Organic Compound

## MARCH 2014 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 2014 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 2014 quarterly monitoring events (March, June, September, and December) will be described in detail in an Annual Report to be submitted after December 2014. 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 3-21, 2014. 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 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 2014 ANALYTICAL RESULTS

During the March 2014 event, groundwater samples were collected from 7 off-post wells shown in **Figure 2.1**. GAC (granular activated carbon) filtered samples (LS-5-A2, LS-6-A2, LS-7-A2, RFR-10-A2, RFR-10-B2, and RFR-11-A2) are collected semi-annually and were also collected this event. **Table 2.1** includes the rationale for selection of the wells sampled in March 2014, and **Figure 2.1** provides well locations for the following sampled wells:

- One privately-owned well in the Jackson Woods subdivision (JW-20).
- Three privately owned wells in the Leon Springs Villa area: (LS-5, LS-6, and LS-7).
- Two privately-owned wells in the Ralph Fair Road area (RFR-10 and RFR-11);
- One public supply well in the Scenic Loop Drive area (SLD-01).

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.

A total of 13 groundwater samples, two trip blanks, one field duplicate (FD), and one matrix spike/matrix spike duplicate (MS/MSD) were submitted to Agriculture & Priority Pollutant Laboratory (APPL) in Clovis, California for analysis. Additional FDs and MS/MSDs were collected with the on-post wells associated with this sample data groups for quality assurance/quality control (QA/QC) purposes. 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, PCE, TCE, and vinyl chloride.

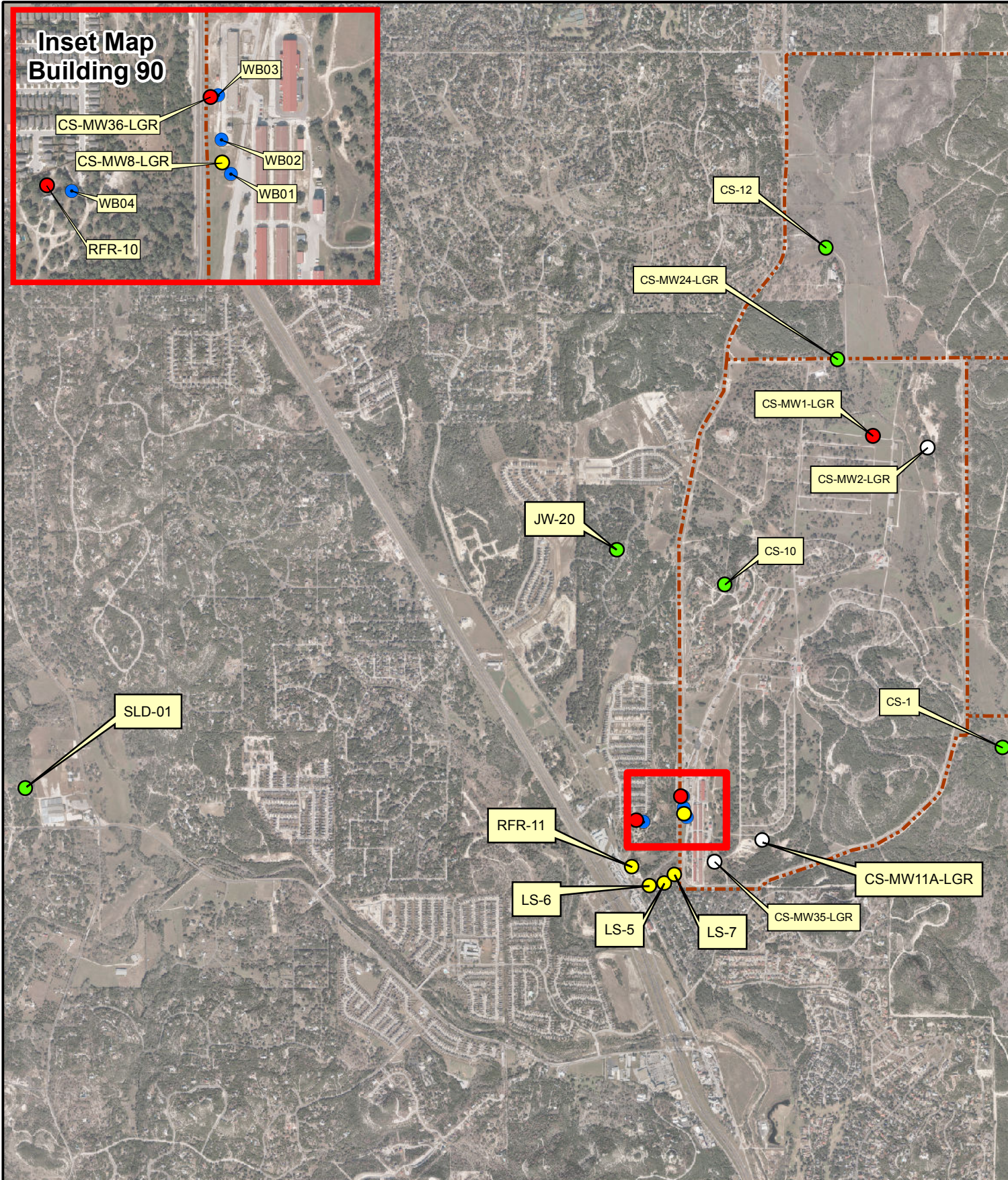
The data packages (Parsons internal reference 749138-#22, and -#24) contain the analytical results for this sampling event and are presented in **Appendix C**. Laboratory results were reviewed and verified according to the guidelines outlined in the CSSA Quality Assurance Project Plan (QAPP), Version 1.0. Parsons received data packages March 24-25, 2014.

Concentrations of the VOCs detected in March 2014 are presented in **Table 2.2**. Full analytical results from the March 2014 sampling event are presented in **Appendix B**. As shown in **Table 2.1**, 13 samples were scheduled for collection in March 2014 and all 13 were collected.

In February 2014, routine semi-annual maintenance was performed on the GAC treatment systems at LS-5, LS-6, LS-7, RFR-10, and RFR-11. Carbon canisters were exchanged and other routine maintenance was performed. GAC filtered samples were collected this quarter and will be collected again during the September 2014 event. Maintenance was not performed on the OFR-3 GAC system, since it is not in use due to the electricity being shut off at the property, samples were also not collected.

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**).





**Inset Map  
Building 90**

- WB03
- CS-MW36-LGR
- CS-MW8-LGR
- WB04
- RFR-10
- WB02
- WB01



0 1,500 3,000 4,500 6,000  
Feet

**Sampled Wells March 2014**

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

**Figure 2.1**

**On-Post and Off-Post Well Sampling  
Locations for March 2014  
Camp Stanley Storage Activity**

**PARSONS**





**Table 2.2 March 2014 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
Jackson Woods	JW-20	1/22/2014	--	--	--	--	--	--
		3/5/2014	--	--	--	--	--	--
Leon Springs Villas	LS-5	3/5/2014	--	--	--	<b>1.01F</b>	<b>2.99</b>	--
	LS-5-A2	3/5/2014	--	--	--	--	--	--
	LS-6	3/5/2014	--	--	--	<b>0.76F</b>	<b>3.19</b>	--
	LS-6-A2	3/5/2014	--	--	--	--	--	--
	LS-7	3/5/2014	--	--	--	<b>1.62</b>	<b>0.44F</b>	--
	LS-7-A2	3/5/2014	--	--	--	--	--	--
Ralph Fair Road	RFR-10	3/5/2014	--	--	--	<b>8.36</b>	<b>3.43</b>	--
	RFR-10-A2	3/5/2014	--	--	--	--	--	--
	RFR-10-B2	3/5/2014	--	--	--	--	--	--
	RFR-11	3/5/2014	--	--	--	<b>0.54F</b>	<b>2.29</b>	--
	RFR-11-A2	3/5/2014	--	--	--	--	--	--
Scenic Loop Drive	SLD-01	3/5/2014	--	--	--	--	--	--
	SLD-01 FD	3/5/2014	--	--	--	--	--	--
<b>Laboratory Detection Limits &amp; Maximum Contaminant Level</b>								
<b>Method Detection Limit (MDL)</b>			<b>0.12</b>	<b>0.07</b>	<b>0.08</b>	<b>0.06</b>	<b>0.05</b>	<b>0.08</b>
<b>Reporting Limit (RL)</b>			<b>1.2</b>	<b>1.2</b>	<b>0.6</b>	<b>1.4</b>	<b>1</b>	<b>1.1</b>
<b>Max. Contaminant Level (MCL)</b>			<b>7</b>	<b>70</b>	<b>100</b>	<b>5</b>	<b>5</b>	<b>2</b>

<b>BOLD</b>	≥ MDL
<b>BOLD</b>	≥ RL
<b>BOLD</b>	≥ MCL

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

On January 16, 2014, CSSA held a public meeting at Leon Springs Baptist Church to present recent data and discuss ongoing treatability studies and the cleanup effort at CSSA. Five booths were set up to highlight the following topics: history, restoration, groundwater, and treatability technologies at SWMU B-3 and AOC-65. Nine people attended this meeting. A meeting was also held on February 13, 2014 with Mayor Cheryl Landman of the City of Fair Oaks Ranch to brief her on recent CSSA environmental issues and successes.

#### 4.0 SUMMARY AND RECOMMENDATIONS

Results of the March 2014 sampling event are summarized as follows:

- Seven wells and 6 post-GAC locations were scheduled for sampling in March 2014 and all samples were collected.
- Well RFR-10 exceeded the MCL in March 2014 for PCE. This well is equipped with a GAC filtration system.
- PCE and/or TCE were detected above the RLs in public and/or private drinking water wells LS-5, LS-6, LS-7, and RFR-11. These four wells have GAC treatment systems in place.
- 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, and vinyl chloride were not detected in any of the off-post wells in March 2014.
- Well JW-20 was added to the sampling program after the new owners attended the CSSA public meeting on January 16<sup>th</sup>, 2014. A sample was collected after the public meeting on January 22, 2014 and then again during the quarterly March sampling event. Both sample results were non-detect. This well will be sampled again during the next 2 quarterly sampling events to capture 4 consecutive samples, as stated in the DQOs.
- Well SLD-01 reported its first detection of PCE, below the RL, in September 2013. The March 2014 event was the second consecutive non-detect since the initial detection in September. This well is 2.9 miles west of CSSA.
- GAC-filtered samples were collected as part of the quarterly groundwater monitoring. All GAC-filtered samples were non-detect indicating the GAC units are functioning properly. The next GAC-filtered samples will be collected in September 2014.
- Semi-annual GAC maintenance, including carbon change-out, was performed February 5, 2014; the next semi-annual GAC maintenance will be due in August 2014.
- In accordance with project DQOs, the rationale for the selection of 55 samples to be collected in June 2014 is provided in **Table 4.1**.
- January 16, 2014 CSSA held a public meeting at Leon Springs Baptist Church to present recent data and discuss ongoing treatability studies and the cleanup effort at CSSA.





**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 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, 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 2014 QUARTERLY OFF-POST**  
**GROUNDWATER ANALYTICAL RESULTS**

**Appendix B - March 2014 Quarterly Off-Post  
Groundwater Analytical Results**

Subdivision	Well ID	Sample Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl Chloride
Jackson Woods	JW-20	1/22/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
		3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Leon Springs Villas	LS-5	3/5/2014	0.12U	0.07U	0.08U	<b>1.01F</b>	<b>2.99</b>	0.08U
	LS-5-A2	3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	LS-6	3/5/2014	0.12U	0.07U	0.08U	<b>0.76F</b>	<b>3.19</b>	0.08U
	LS-6-A2	3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	LS-7	3/5/2014	0.12U	0.07U	0.08U	<b>1.62</b>	<b>0.44F</b>	0.08U
	LS-7-A2	3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Ralph Fair Road	RFR-10	3/5/2014	0.12U	0.07U	0.08U	<b>8.36</b>	<b>3.43</b>	0.08U
	RFR-10-A2	3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	RFR-10-B2	3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	RFR-11	3/5/2014	0.12U	0.07U	0.08U	<b>0.54F</b>	<b>2.29</b>	0.08U
	RFR-11-A2	3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Scenic Loop Drive	SLD-01	3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SLD-01 FD	3/5/2014	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
<b>Laboratory Detection Limits &amp; Maximum Contaminant Level</b>								
<b>Method Detection Limit (MDL)</b>			<b>0.12</b>	<b>0.07</b>	<b>0.08</b>	<b>0.06</b>	<b>0.05</b>	<b>0.08</b>
<b>Reporting Limit (RL)</b>			<b>1.2</b>	<b>1.2</b>	<b>0.6</b>	<b>1.4</b>	<b>1</b>	<b>1.1</b>
<b>Max. Contaminant Level (MCL)</b>			<b>7</b>	<b>70</b>	<b>100</b>	<b>5</b>	<b>5</b>	<b>2</b>

<b>BOLD</b>	≥ MDL
<b>BOLD</b>	≥ RL
<b>BOLD</b>	≥ MCL

All samples were analyzed by APPL, Inc.  
VOC data reported in ug/L.  
**Abbreviations/Notes:**  
FD                      Field Duplicate  
TCE                     Trichloroethene  
PCE                     Tetrachloroethene  
DCE                     Dichloroethene

**Data Qualifiers:**  
F-The analyte was positively identified but the associated numerical value is below the RL.  
U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.

**APPENDIX C  
DATA VALIDATION REPORTS**

**SDG 72812  
SDG 72811**



**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 groundwater samples and the associated field quality control (QC) sample collected from off-post Camp Stanley Storage Activity (CSSA) on March 5, 2014. The samples were assigned to the following Sample Delivery Group (SDG) and were analyzed for volatile organic compounds (VOCs).

72812

The field QC sample associated with this SDG was a 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 2.0°C, which was within the 2-6°C range recommended by the CSSA QAPP.

**EVALUATION CRITERIA**

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

## **VOLATILES**

### **General**

The volatiles portion of this data package consisted of twelve (12) samples, including eleven (11) off-site groundwater samples and one (1) TB. All samples were collected on March 5, 2014 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 two analytical batches (#185167 and #185309) 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) samples and the surrogate spikes.

All LCS and surrogate spike recoveries were within acceptance criteria.

### **Precision**

Precision could not be measured due to the lack of duplicate analyses 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.
- The LCS was prepared using a secondary source. All second source verification criteria were met.
- All initial calibration verification (ICV) criteria were met.

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

There were two method blanks and one TB associated with the VOC analyses in this SDG. All blanks were non-detect for all target VOCs. No target VOC was detected at or above the associated MDL in all blanks.

### **Completeness**

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

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

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

**BOERNE, TEXAS**

Data Verification by: Tammy Chang  
Parsons - Austin

**INTRODUCTION**

The following data verification summary report covers groundwater samples and the associated field quality control (QC) samples collected from on and off-post Camp Stanley Storage Activity (CSSA) on March 4 and 5, 2014. The samples were assigned to the following Sample Delivery Group (SDG) and were analyzed for volatile organic compounds (VOCs) and metals including arsenic, barium, cadmium, chromium, copper, lead, zinc and mercury. Not all samples were analyzed for the complete list of metals.

72811

The field QC samples associated with this SDG were two sets of parent/field duplicate (FD), one set of matrix spike/matrix spike duplicate (MS/MSD) and a 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. The samples in this SDG were shipped to the laboratory in one cooler. The cooler was received by the laboratory at a temperature of 2.0°C, which was within the 2-6°C range recommended by the CSSA QAPP.

**EVALUATION CRITERIA**

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

## **VOLATILES**

### **General**

The volatiles portion of this data package consisted of twelve (12) samples, including five (5) on-site groundwater samples, two (2) off-site groundwater samples, two (2) FD, one pair of MS/MSD and one (1) TB. All samples were collected on March 4 and 5, 2014 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 batch (#185167) 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, one set of MS/MSD, and the surrogate spikes. Sample CS-1 was designated as the parent sample for the MS/MSD analyses on the chain of custody.

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

### **Precision**

Precision was evaluated based on the relative percent difference (%RPD) of MS/MSD and two pairs of parent/FD samples. Samples CS-10 and SLD-01 were collected in duplicate.

Since none of the target compounds had concentrations greater than the reporting limits (RLs) in the parent/FD samples, the %RPD calculations were not applicable.

All %RPDs of MS/MSD were compliant.

### **Representativeness**

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

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating holding times; and
- Examining 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. 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. Both blanks were non-detect for all target VOCs. No target VOC was detected at or above the associated MDL in the blanks.

### **Completeness**

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

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

## **ICP-AES METALS**

### **General**

The ICP-AES portion of this SDG consisted of eight (8) on-post groundwater samples including one FD and one set of MS/MSD which were collected on March 4 and 5, 2014 and were analyzed for arsenic, barium, cadmium, chromium, copper, lead, and zinc. Samples CS-MW1-LGR, CS-MW11A-LGR and CS-MW2-LGR were only analyzed for cadmium, chromium, and lead.

The ICP-AES metals analyses were performed using USEPA SW846 Method 6010B. These on-post well samples were analyzed following the procedures outlined in the CSSA QAPP and were prepared and analyzed within the holding time required by the method.

The samples for ICP-AES metals were digested in batch #185370. All analyses were performed undiluted.

### **Accuracy**

Accuracy was evaluated using the percent recovery obtained from the LCS, MS, and MSD. Sample CS-1 was designated as the parent sample for the MS/MSD analyses.

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

### Precision

Precision was evaluated based on the %RPDs of the parent/FD set of sample CS-10 and the MS/MSD results.

All %RPDs of MS/MSD were compliant.

Only barium and zinc were detected at or above the reporting limit in the parent/FD samples, therefore, the %RPD calculation was only applied to these two metal results.

#### CS-10

Metals	Parent, mg/L	FD, mg/L	%RPD	Criteria, %RPD
Barium	0.0397	0.0408	2.7	≤ 20
Zinc	0.063	0.065	3.1	

### Representativeness

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

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

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

- All initial calibration criteria were met.
- All second source verification criteria were met. The ICV was prepared using a secondary source.
- All CCV criteria were met.
- All interference check (ICSA/ICSAB) criteria were met.
- No dilution test was required, as per the CSSA QAPP.

One method blank and several calibration blanks were analyzed in association with the ICP-AES analyses in this SDG. All blanks were free of target metals at or above the RL.

### Completeness

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

All ICP-AES metals results for the samples in this SDG were considered usable.

The completeness for the ICP metals portion of this SDG is 100%, which meets the minimum acceptance criteria of 95%.

## **MERCURY**

### **General**

The ICP-AES portion of this SDG consisted of eight (8) on-post groundwater samples including one FD and one set of MS/MSD which were collected on March 4 and 5, 2014 and were analyzed for mercury.

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

The mercury samples were prepared in batch #185383. The analyses were performed undiluted.

### **Accuracy**

Accuracy was evaluated using the percent recovery obtained from the LCS, MS, and MSD.

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

### **Precision**

Precision was evaluated based on the %RPDs of the parent/FD samples and MS/MSD. Sample CS-10 was collected in duplicate.

Mercury was not detected above the RL in both parent and FD samples.

%RPD of MS/MSD was compliant.

### **Representativeness**

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

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

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

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



- All calibration verification criteria were met.

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

### **Completeness**

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

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