MARCH 2013

On-Post
Quarterly Groundwater Monitoring Report

Prepared For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

July 2013

EXECUTIVE SUMMARY

- All five wells scheduled for sampling in March 2013 were sampled.
- Average groundwater elevations in March 2013 decreased 2.93 feet from the elevations measured in December 2012. Since May 1, 2012, the San Antonio area (Edwards Aquifer) has been in Stage 2 water restrictions. Locally around the CSSA area, the Trinity Glen Rose Groundwater Conservation District (TGRGCD) remains under Stage 2 severe drought water restrictions, which went into effect June 1, 2011. The average depth to water in the Lower Glen Rose (LGR) screened wells was 295.60 feet below top of casing (BTOC) or 958.29 feet above mean sea level (MSL).
- The maximum contaminant level (MCL) was exceeded in monitoring well CS-MW36-LGR for tetrachlorethene (PCE) and trichloroethene (TCE) in March 2013. These were the highest concentrations in this well since it was installed in 2011.
- No wells sampled had metals detections above the action level (AL), secondary standard (SS), or MCL in March 2013.
- No Westbay zones were sampled in March 2013. Long-term monitoring optimization (LTMO) selected zones will be sampled in June 2013.

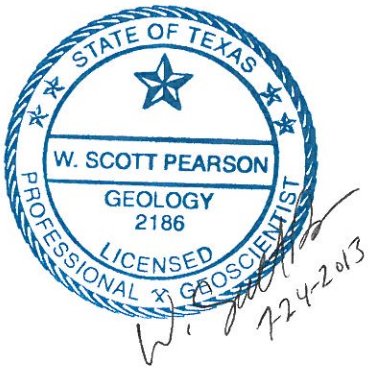
GEOSCIENTIST CERTIFICATION

March 2013 On-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 March 2013 On-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 Laboratories, and field data obtained during groundwater monitoring conducted at the site in March 2013, 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

7-24-2013
Date

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ACRONYMS AND ABBREVIATIONS

µg/L	Microgram per liter
1,1-DCE	1,1-dichloroethene
§3008(h) Order	RCRA 3008(h) Administrative Order on Consent
AL	Action Level
AOC	Area of Concern
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
BACT	Bacteriological
Bexar Met	Bexar Metropolitan Water District
BS	Bexar Shale
CC	Cow Creek
cis-1,2-DCE	*cis*-1,2-dichloroethene
COC	Contaminants of Concern
CSSA	Camp Stanley Storage Activity
DCP	Drought Contingency Plan
DQO	Data Quality Objectives
GAC	Granular Activated Carbon
GPM	Gallons per Minute
GUI	Groundwater Under the Influence (of Surface Water)
ISCO	In-Situ Chemical Oxidation
LGR	Lower Glen Rose
LTMO	Long Term Monitoring Optimization
MCL	Maximum contaminant limits
MDL	Method Detection Limit
MSL	Mean Sea Level
Parsons	Parsons Government Services, Inc.
PCE	Tetrachloroethene
Plan	CSSA Off-post Monitoring Program and Response Plan
QAPP	Quality Assurance Program Plan
RCRA	Resource Conservation Recovery Act
RL	Reporting Limit
SAWS	San Antonio Water System
SCADA	Supervisory Control and Data Acquisition
SS	Secondary Standard
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
TCEQ	Texas Commission on Environmental Quality
TGRGCD	Trinity-Glen Rose Groundwater Conservation District

ACRONYMS AND ABBREVIATIONS *(continued)*

TO	Task Order
trans-1,2-DCE	*trans*-1,2-dichloroethene
UGR	Upper Glen Rose
USEPA	United States Environmental Protection Agency
VOC	Volatile organic compound
WS	Weather Station

MARCH 2013
GROUNDWATER MONITORING REPORT
CAMP STANLEY STORAGE ACTIVITY, TEXAS

1.0 INTRODUCTION

This report presents results from the on-post quarterly sampling performed by Parsons Government Services, Inc. (Parsons) at Camp Stanley Storage Activity (CSSA) in March 2013. Laboratory analytical results are presented along with potentiometric contour figures. The purpose of this report is to present a summary of the March 2013 sampling results. Results from all four 2013 quarterly monitoring events (March, June, September, and December) will be described in detail in an Annual Report. 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. For this specific quarter, groundwater monitoring was performed March 4 through 27, 2013.

Current objectives of the groundwater monitoring program are to determine groundwater flow direction and elevations, determine groundwater contaminant concentrations for characterization purposes, and identify meteorological and seasonal variations in physical and chemical properties. **Appendix A** identifies the data quality objectives (DQO) for CSSA's groundwater monitoring program, along with an evaluation of whether each DQO was attained. The objectives listed in **Appendix A** also reference appropriate sections of the **3008(h) Administrative Order on Consent** (Order).

The CSSA groundwater monitoring program follows the provisions of the groundwater monitoring program DQOs as well as the recommendations of the **Three-Tiered Long Term Monitoring Network Optimization Evaluation (Parsons, 2010)** which provided recommendations for sampling based on a long-term monitoring optimization (LTMO) study performed for the CSSA groundwater monitoring program. LTMO study sampling frequencies were implemented on-post in December 2005, as approved by the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA). The LTMO evaluation was updated in 2010 using groundwater data from monitoring conducted between 2005 and 2009. It has been approved by the TCEQ and USEPA and was implemented on- and off-post in June 2011.

2.0 POST-WIDE FLOW DIRECTION AND GRADIENT

Fifty-five water level measurements were recorded on March 7, 2013 from on-post monitoring wells completed in the Lower Glen Rose (LGR), Bexar Shale (BS), and Cow Creek (CC) formations. The groundwater potentiometric surface maps illustrating groundwater elevations from the LGR, BS, and CC zones in March 2013 are shown in **Figures 2.1, 2.2, and 2.3**.

The March 2013 potentiometric surface map for LGR-screened wells **(Figure 2.1)** exhibited a wide range of groundwater elevations, from a minimum of 892.38 feet above mean sea level (MSL) at CS-MW11A-LGR to a maximum of 1017.01 feet above MSL at CS-MWH-LGR. Groundwater elevations are generally higher in the northern and central portions of CSSA, and decrease to the southwest and southeast. Average groundwater elevations in March 2013 decreased 2.93 feet from the elevations measured in December 2012. From January 1 to March 27, 2013, the southern weather station at AOC-65 (WS AOC-65) recorded 4.79 inches of rainfall during 19 rainfall events in this timeframe. The rainfall was sporadic with two events having greater than one inch of rainfall on consecutive days between January 8-9, 2013. A new weather station was installed in place of the northern weather station at SWMU B-3, and became active on October 17, 2012. That weather station measured 4.88 inches of precipitation for the same time period. The aquifer continued to decline after a significant rebound in early 2012. San Antonio fell back into stage 2 water restrictions on May 1, 2012 and the Trinity Glen Rose Groundwater Conservation District (TGRGCD) remains in stage 2 severe drought water restrictions, effective since June 1, 2011.

Well CS-MW4-LGR, located in the central portion of CSSA, typically has one of the highest groundwater elevations of LGR-screened wells. Under average and above-average aquifer elevations, the groundwater level is 20 to 30 feet higher than the nearest comparable wells (CS-MW2-LGR and CS-MW5-LGR), creating a pronounced groundwater mound in the central portion of the facility. In March 2013 this mounding effect was slightly muted, as the elevation in CS-MW4-LGR was only 8 and 13 feet higher than CS-MW2-LGR and CS-MW5-LGR, respectively. Long-term monitoring has ascertained that when groundwater in the vicinity of CS-MW4-LGR rises above about 970 feet msl, the mounding effect is evident. As measured in March 2013, the water elevation at CS-MW4-LGR was 979.64 feet msl, and the typical mounding effect was beginning to develop.

It should be noted that well pumping on and around CSSA affects the potentiometric surface. On-post wells CS-MW16-LGR, CS-MW16-CC, B3-EXW01, B3-EXW02, B3-EXW03, B3-EXW04, and B3-EXW05 are cyclically pumped as part of the Bioreactor remediation system at SWMU B-3. This continuous pumping action creates a notable “cone of depression” in the central portion of the post. These remediation wells provide groundwater to the Bioreactor system, and are automatically operated based upon water level within each well. CSSA drinking water wells CS-1, CS-10, and CS-12 are cycled on and off to maintain the drinking water system currently in place at CSSA. Influence from the pumping of wells CS-10, CS-12, B3-EXW01, and B3-EXW02 is evident in **Figure 2.1,** and CS-MW16-CC in **Figure 2-3**. Off-post water supply wells along Ralph Fair Road may also exert a subtle influence to gradients along the western and southern boundaries of the post.

Historical groundwater monitoring at CSSA has demonstrated that the aquifer gradient typically slopes in a south-southeast direction (**Figure 2.1**). The potentiometric surface in both the BS and CC members of the aquifer generally trend in a southerly direction (**Figures 2.2 and 2.3**). However, variable aquifer levels and well pumping scenarios all can affect the localized and regional gradients. In particular, pumping action at wells CS-1, CS-10, CS-MW16-LGR/CC, B3-EXW01 through B3-EXW05, CS-I, and even off-post wells (Fair Oaks Ranch) can significantly alter the LGR groundwater gradient. The regional gradient calculation, an overall groundwater gradient averaged across CSSA, is measured from CS-MWH-LGR to CS-MW21-LGR. For March 2013, the overall LGR groundwater gradient is to the south-southeast at 0.0060 ft/ft.

Groundwater elevations have been measured and recorded since 1992. Previous droughts resulted in water levels decreasing substantially in 1996, 1999, 2000, 2006, 2008, 2009, and 2011. The aquifer began to recover at the end of 2011 as rainfall increased, and continued through March 2012. However, 5 months of limited rainfall during the summer of 2012 put the aquifer level back into drought conditions. Another 12 inches of rain fell during the last 4 months of 2012, but only raised the aquifer elevation by 8 feet. In 2013, sparse rainfall through March 2013 has resulted in an aquifer decline of nearly 3 feet since December 2012. Currently the average aquifer level of 950 feet MSL is at an elevation that is comparable to lowest elevations of the 2006, 2008, 2009, and 2011 droughts.

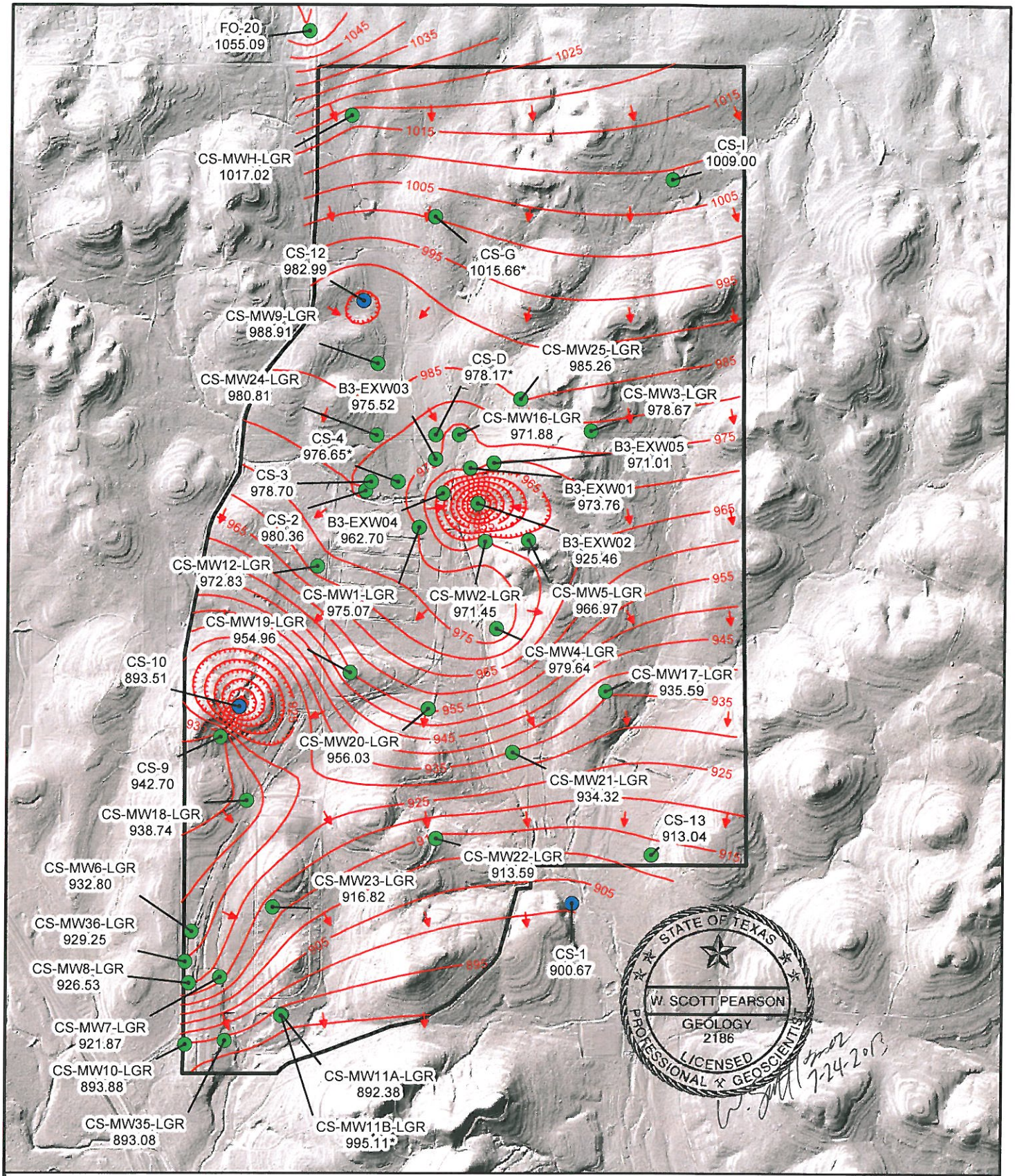

Figure 2.1

March 2013 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

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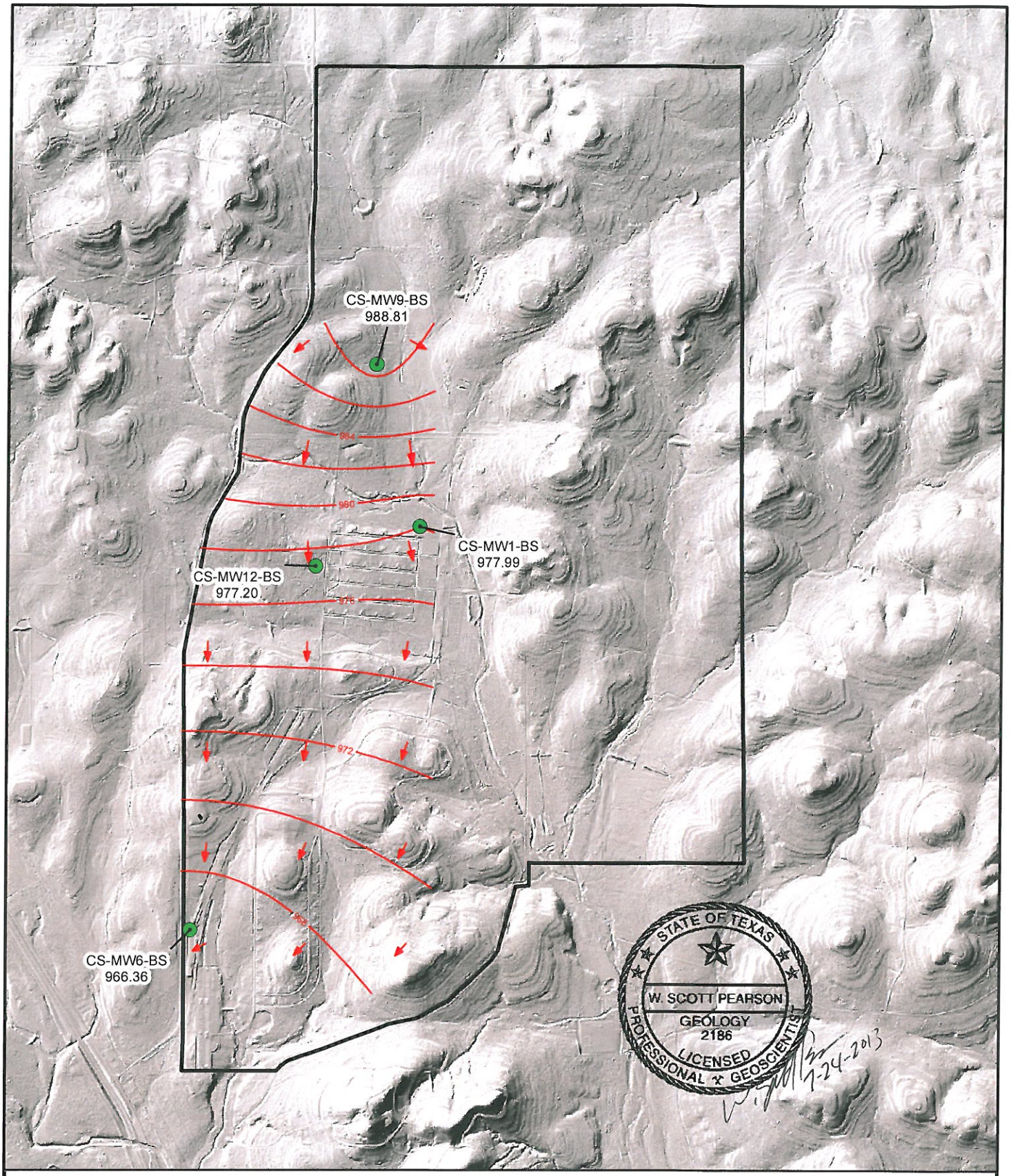

Figure 2.2

March 2013 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

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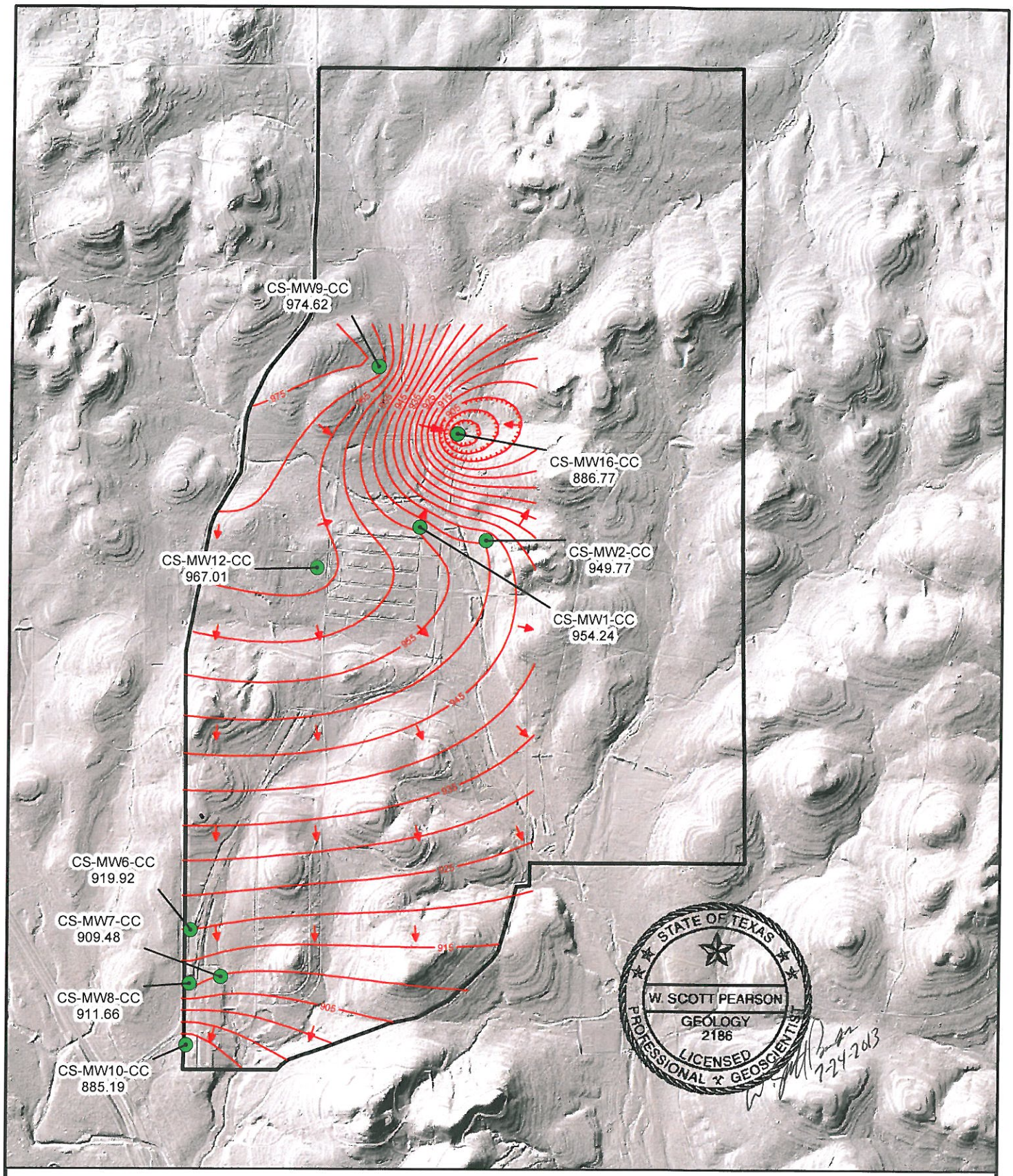

Figure 2.3

March 2013 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

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3.0 MARCH ANALYTICAL RESULTS

3.1 Monitoring Wells

Under the provisions of the groundwater monitoring DQOs and the 2010 LTMO evaluation, the schedule for sampling on-post in March 2013 included 5 wells. The samples included three production wells (CS-1, CS-10, and CS-12), one inactive production well (CS-9), and one on-post monitoring well (CS-MW36-LGR). CS-MW36-LGR has been retained on a quarterly basis because of its proximity to the AOC-65 in-situ chemical oxidation (ISCO) treatability study area to establish baseline conditions and monitor for affects of the ISCO applications. **Tables 3.1** and **3.2** provide a sampling overview for March 2013 and the schedule under the LTMO recommendations. CS-MW36-LGR was sampled using a dedicated low-flow gas-operated bladder pump. Wells CS-1, CS-9, CS-10, and CS-12, were sampled using dedicated submersible pumps. **Figure 3.1** shows well sampling locations.

Wells sampled by low-flow pumps were purged until the field parameters of pH, temperature, and conductivity stabilized. The on-post monitoring wells were sampled in March 2013 for the short list of volatile organic compounds (VOC) and metals (chromium, cadmium, lead, and mercury). Active and inactive drinking water wells CS-1, CS-9, CS-10, and CS-12 were analyzed for the short list VOCs and metals (arsenic, barium, chromium, copper, zinc, cadmium, mercury, and lead). Samples were analyzed by APPL Laboratories in Clovis, California. All detected concentrations of VOCs and metals are presented in **Table 3.3** and **Table 3.4**. Full analytical results are presented in **Appendix B**.

PCE and TCE were detected above the MCL in the one on-post well sampled this quarter, CS-MW36-LGR. In March 2013, well CS-9 did not detect mercury above the MCL, or lead above the AL.

Results from on-post monitoring wells are considered definitive data and are subject to data validation and verification under provisions of the CSSA Quality Assurance Project Plan (QAPP). Parsons data packages numbered 748350-#116 and -#119, containing the analytical results from this sampling event, were received on March 28 and April 18, 2013. Data validation was conducted and the data validation reports are presented in **Appendix C**.

3.2 Westbay-equipped Wells

Under the provisions of the groundwater monitoring LTMO recommendations, no AOC-65 Westbay wells (CS-WB01, CS-WB02, CS-WB03, and CS-WB04) were scheduled for sampling in March 2013. The UGR/LGR zones are sampled on a 9-month schedule, and the BS/CC zones are sampled on an 18-month schedule, as recommended in the LTMO. A total of 37 zones will be sampled in the upcoming June 2013 quarterly monitoring event.

There are four other Westbay wells (CS-WB05, CS-WB06, CS-WB07, and CS-WB08) that are located at the SWMU B-3 remediation site. Those wells are sampled on a separate schedule in association with the SWMU B-3 bioreactor monitoring. Results for those wells are presented in the SWMU B-3 Performance Status Reports.

Table 3.1
Overview of the On-Post Monitoring Program

Count	Well ID	*Analytes*	*Last Sample Date*	*Mar-13*	*Jun-13*	*Sep-13 (snapshot)*	*Dec-13*	*Sampling Frequency **
	CS-MW1-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW1-BS	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW1-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW2-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW2-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW3-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW4-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW5-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW6-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW6-BS	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW6-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW7-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW7-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW8-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW8-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW9-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW9-BS	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW9-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW10-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW10-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW11A-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW11B-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Sep-10	NS	NS	S	NS	Every 9 months
	CS-MW12-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW12-BS	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW12-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW16-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW16-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CW-MW17-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW18-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW19-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
1	CS-1	VOCs & metals (As,Ba,Cr, Cu,Cd,Hg,Pb,Zn)	Dec-12	S	S	S	S	Quarterly
	CS-2	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-4	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	S	S	NS	Semi-annual + 9 month snapshot
2	CS-9	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	S	S	S	S	Quarterly
3	CS-10	VOCs & metals (As,Ba,Cr, Cu,Cd,Hg,Pb,Zn)	Dec-12	S	S	S	S	Quarterly
4	CS-12	VOCs & metals (As,Ba,Cr, Cu,Cd,Hg,Pb,Zn)	Dec-12	S	S	S	S	Quarterly
	CS-13	VOCs & metals (As,Ba,Cr, Cu,Cd,Hg,Pb,Zn)						installation in progress
	CS-D	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MWG-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MWH-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-I	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	NS	NS	Every 18 months
	CS-MW20-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW21-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW22-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW23-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW24-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW25-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Every 9 months
	CS-MW35-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	NS	NS	S	NS	Semi-annual + 9 month snapshot
5	CS-MW36-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Dec-12	S	S	S	S	Quarterly

* New LTMO sampling frequency implemented June 2011
S = Sample
NS = No Sample
NSWL = No Sample due to low water level

Table 3.2
Westbay Sampling Frequency

Westbay Interval	Last Sample Date	Mar-13	Jun-13	Sep-13 (snapshot)	Dec-13	LTMO Sampling Frequency (as of June '11)
CS-WB01-UGR-01	Dec-04	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-01	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-02	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-03	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-04	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-05	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-06	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-07	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-08	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB01-LGR-09	Dec-12	NS	S	S	NS	Every 9 months + snapshot
CS-WB02-UGR-01	Dec-04	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-01	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-02	Mar-10	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-03	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-04	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-05	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-06	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-07	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-08	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB02-LGR-09	Dec-12	NS	S	S	NS	Every 9 months + snapshot
CS-WB03-UGR-01	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-01	Sep-10	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-02	Oct-07	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-03	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-04	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-05	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-06	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-07	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-08	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB03-LGR-09	Dec-12	NS	S	S	NS	Every 9 months + snapshot
CS-WB04-UGR-01	Mar-04	NS	S	NS	NS	Every 9 months
CS-WB04-LGR-01	Sep-12	NS	NS	NS	NS	Every 18 months
CS-WB04-LGR-02	Mar-10	NS	NS	NS	NS	Every 18 months
CS-WB04-LGR-03	Sep-12	NS	NS	NS	NS	Every 18 months
CS-WB04-LGR-04	Sep-12	NS	NS	NS	NS	Every 18 months
CS-WB04-LGR-06	Dec-12	NS	S	S	NS	Every 9 months + snapshot
CS-WB04-LGR-07	Dec-12	NS	S	S	NS	Every 9 months + snapshot
CS-WB04-LGR-08	Sep-12	NS	S	NS	NS	Every 9 months
CS-WB04-LGR-09	Dec-12	NS	S	S	NS	Every 9 months + snapshot
CS-WB04-LGR-10	Dec-12	NS	S	S	NS	Every 9 months + snapshot
CS-WB04-LGR-11	Dec-12	NS	S	S	NS	Every 9 months + snapshot
CS-WB04-BS-01	Sep-12	NS	NS	NS	NS	Every 18 months
CS-WB04-BS-02	Sep-12	NS	NS	NS	NS	Every 18 months
CS-WB04-CC-01	Sep-12	NS	NS	NS	NS	Every 18 months
CS-WB04-CC-02	Sep-12	NS	NS	NS	NS	Every 18 months
CS-WB04-CC-03	Sep-12	NS	NS	NS	NS	Every 18 months

Profiling performed quarterly, in conjunction with post wide water levels.

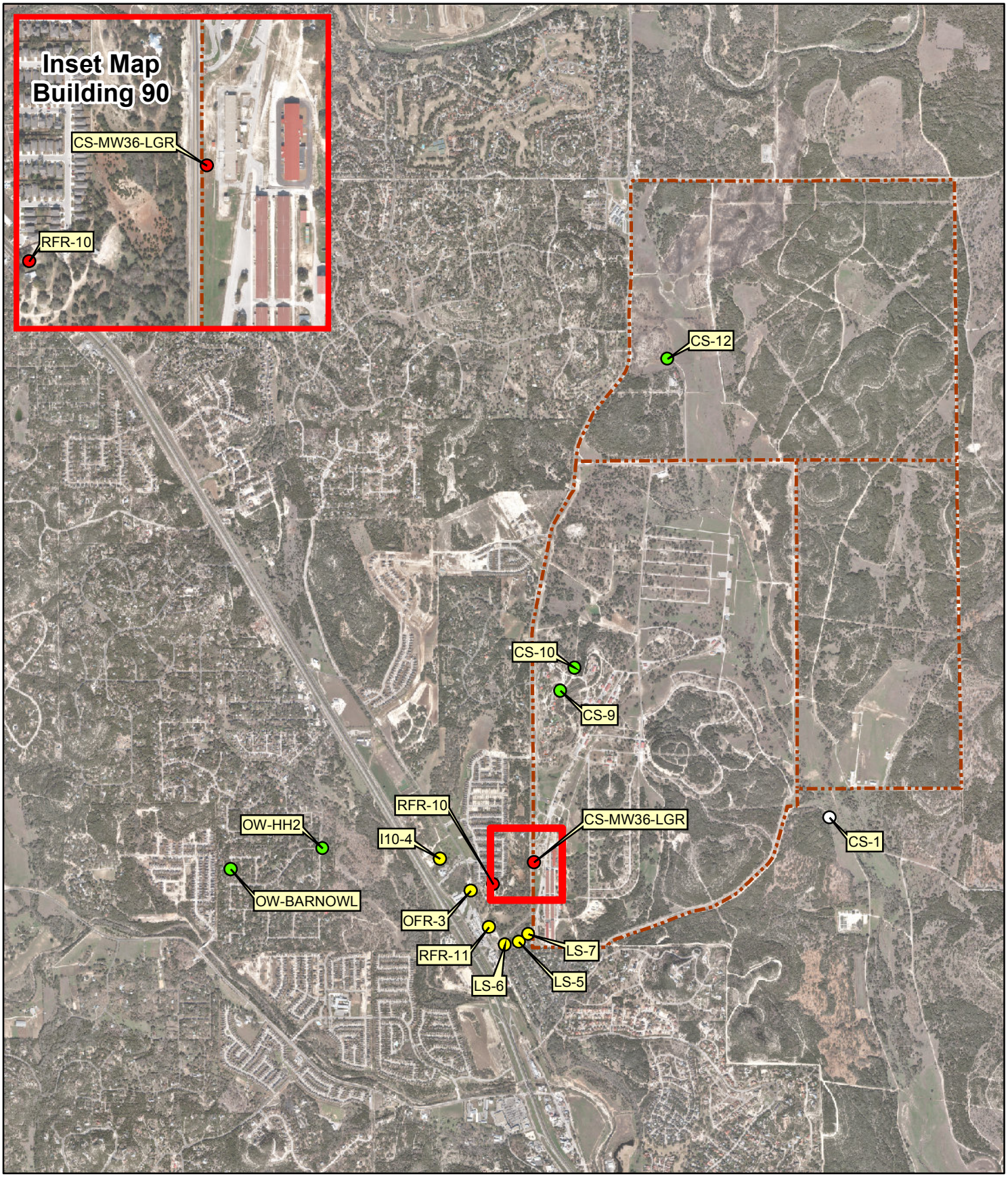

Figure 3.1

On-Post and Off-Post Well Sampling Locations for March 2013
Camp Stanley Storage Activity

PARSONS

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Table 3.3
March 2013 On-Post Quarterly Groundwater Results, Detected Analytes

Well ID	Sample Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Zinc	Mercury	Comments
CS-MW36-LGR	3/5/2013	NA	NA	--	--	NA	--	NA	--	Sporadic metals detections since 2011, all below MCL.
CS-9	3/4/2013	NA	NA	--	--	NA	**0.0040F**	NA	**0.0015**	Mercury & lead levels slightly down from last quarter.
CSSA Drinking Water Well System										
CS-1	3/27/2013	--	**0.0334**	--	--	**0.006F**	--	**0.288**	--	Active drinking water wells.
CS-1 FD	3/27/2013	--	**0.0328**	--	--	--	--	**0.266**	--	
CS-10	3/4/2013	--	**0.0406**	--	--	**0.004F**	--	**0.053**	--	
CS-12	3/4/2013	--	**0.0331**	--	--	**0.021**	--	**0.137**	--	
Comparison Criteria										
Method Detection Limit (MDL)		**0.00022**	**0.0003**	**0.0005**	**0.001**	**0.003**	**0.0019**	**0.008**	**0.0001**	
Reporting Limit (RL)		**0.03**	**0.005**	**0.007**	**0.01**	**0.01**	**0.025**	**0.05**	**0.001**	
Max. Contaminant Level (MCL)		**0.01**	**2**	**0.005**	**0.1**	**AL=1.3**	**AL=0.015**	**SS=5.0**	**0.002**	

Well ID	Sample Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl Chloride	Comments
CS-MW36-LGR	3/5/2013	--	**1.74**	--	**26.75**	**65.01**	--	Highest PCE, TCE, and *cis*-1,2-DCE detections since well was installed in Sept. 2011.
CS-9	3/4/2013	--	--	--	--	--	--	PCE last detected in June 2004.
CSSA Drinking Water Well System								
CS-1	3/27/2013	--	--	--	--	**0.18F**	--	No PCE detected since Dec. 2008.
CS-1 FD	3/27/2013	--	--	--	--	**0.18F**	--	
CS-10	3/4/2013	--	--	--	--	--	--	TCE last detected in this well in March 2010, below the RL.
CS-12	3/4/2013	--	--	--	--	--	--	No VOCs ever detected in this well.
Comparison Criteria								
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

Precipitation per Quarter (inches):	Mar-13
SWMU B-3 Weather Station (WS-B3):	4.88
AOC-65 Weather Station (WS-AOC65):	4.79

All samples were analyzed by APPL, Inc.
VOC data reported in ug/L & metals data reported in mg/L.

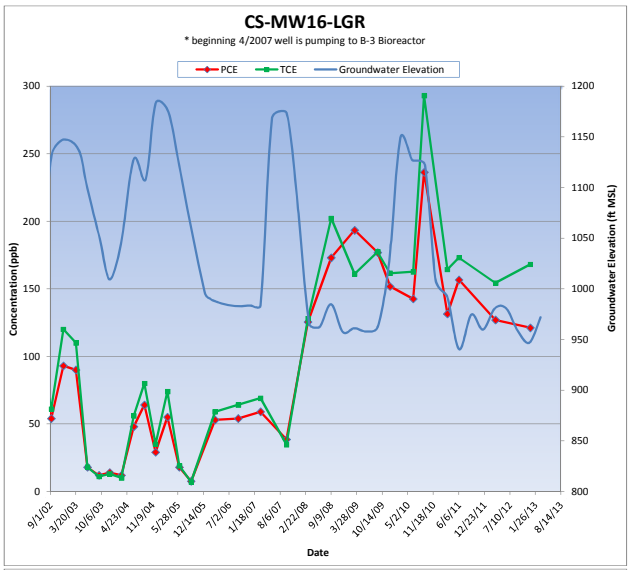
Abbreviations/Notes:

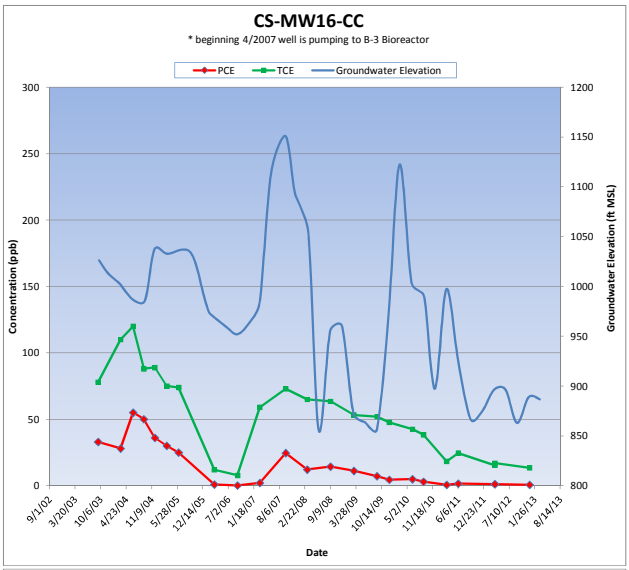
FD	Field Duplicate
TCE	Trichloroethene
PCE	Tetrachloroethene
DCE	Dichloroethene
AL	Action Level
SS	Secondary Standard
NA	Not Analyzed for this parameter

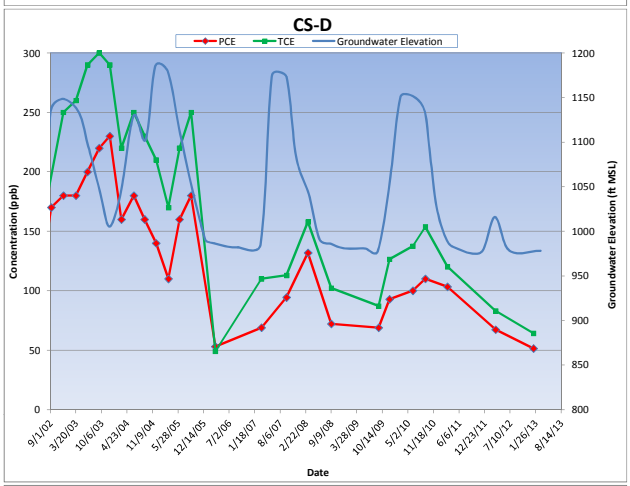
Data Qualifiers

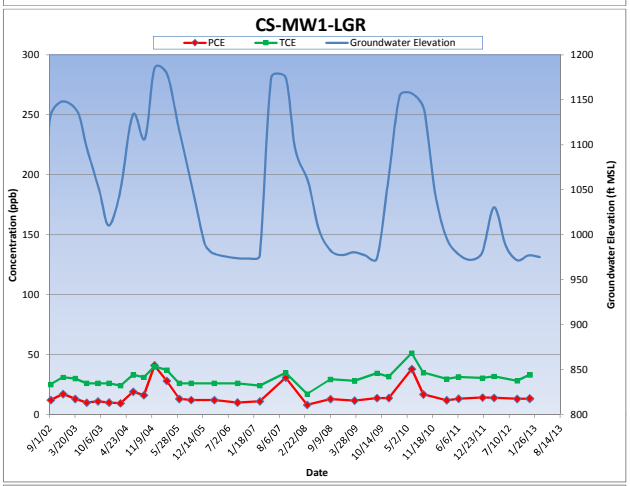
--The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F-The analyte was positively identified but the associated numerical value is below the RL.

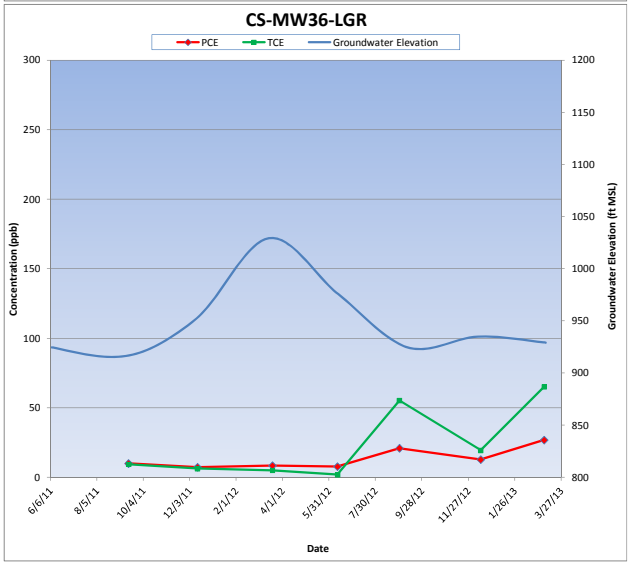
Figure 3.2
Cumulative VOC Concentrations vs Groundwater Elevations

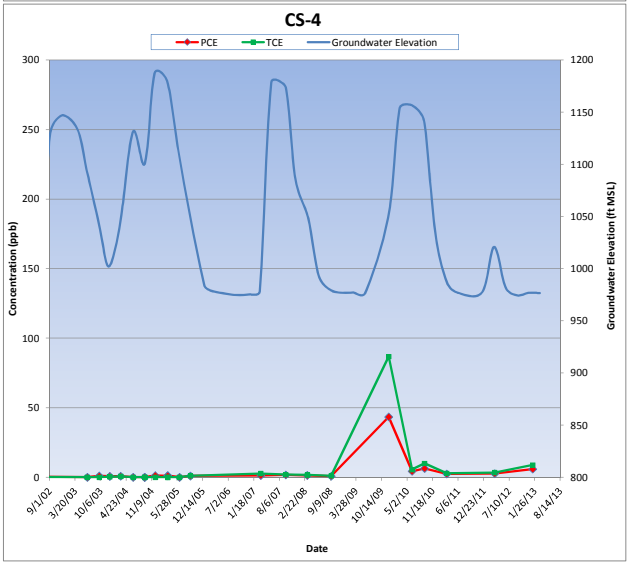












NOTE: Only CS-MW36-LGR was sampled during the March 2013 Event.

4.0 MARCH 2013 SUMMARY

- All five wells scheduled for sampling in March 2013 were sampled.
- From January 1 to March 27, 2013, CSSA's AOC-65 weather station recorded 4.79 inches of rain. The rainfall was sporadic with two events having greater than one inch of rainfall on consecutive days January 8-9, 2013. The SWMU B-3 weather station measured 4.88 inches of precipitation for the same time period.
- Water levels decreased an average of 2.93 feet per well since last quarter. Water levels continue to decline again after a slight rebound in December 2012. The average water level in March 2013 (excluding pumping wells) was 289.86 feet below top of casing.
- VOCs were detected above the MCL in well CS-MW36-LGR. The VOC levels in CS-MW36-LGR increased significantly to reach an all time high for PCE and TCE concentrations **(see Figure 3.2)**.
- No wells sampled had metals detections above the AL, SS, or MCL in March 2013.
- No zones in Westbay Wells (WB01-WB04) in the vicinity of AOC-65 were scheduled for sampling in March 2013. However, these wells were profiled to collect water level data in the area. The 8 LTMO selected zones are scheduled to be sampled in June 2013.

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, HSP, and LTMO recommendations.	All sampling was conducted in accordance with the procedures described in the project plans.	Yes.	NA
Characterization of Environmental Setting (Hydrogeology)	Prepare water-level contour and/or potentiometric maps for each formation of the Middle Trinity Aquifer (3.5.3).	Potentiometric surface maps were prepared based on water levels measured in each of CSSA's wells screened in three formations on March 7, 2013.	To the extent possible with data available. Due to the limited data available and the fact that wells are completed across multiple water-bearing units, potentiometric maps should only be used for regional water flow direction, not local. Ongoing pumping in the CSSA area likely affects the natural groundwater flow direction.	As additional wells are installed screened in distinct formations, future evaluations will eliminate reliance on wells screened across multiple formations.
	Describe the flow system, including the vertical and horizontal components of flow (2.1.9).	Potentiometric maps were created using March 7, 2013 water level data, and horizontal flow direction was tentatively identified. Insufficient data are currently available to determine vertical component of flow.	As described above, due to the lack of aquifer-specific water level information, potentiometric surface maps should only be used as an estimate of regional flow direction.	Same as above.
	Define formation(s) in the Middle Trinity Aquifer are impacted by the VOC contaminants (2.1.3).	Quarterly groundwater monitoring provides information on Middle Trinity Aquifer impacts. Monitoring wells equipped with Westbay® - multi-port samplers are sampled every 9 or 18 months and 8 selected zones are sampled during the 'snapshot' event.	Yes.	Continue sampling.

Activity	Objectives	Action	Objective Attained?	Recommendations
	Identify any temporal changes in hydraulic gradients due to seasonal influences (2.1.5).	Downloaded data from continuous-reading transducers in wells: CS-MW4-LGR, CS-MW21-LGR, and CS-MW24-LGR. Additional continuous reading transducers were added to the program through the SCADA project. The following wells can be uploaded to see real time water level data: CS-MW1-LGR, CS-MW1-BS, CS-MW1-CC, CS-MW16-LGR, CS-MW16-CC, CS-1, CS-12, and CS-10. Data was also downloaded from the AOC-65 weather station. Water levels will be graphed at these wells against precipitation data through December 2013 and included in the annual groundwater report.	Yes.	Continue collection of transducer data and possibly install transducers in other cluster wells.
Contamination Characterization (Ground Water Contamination)	Characterize the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the Facility (3.1.2).	Samples for laboratory analysis were collected from 5 of 46 CSSA wells. All 5 wells scheduled to be sampled in March 2013 were sampled.	The horizontal and vertical extent of groundwater contamination is continuously monitored.	Continue groundwater monitoring and construct additional wells as necessary.
	Determine the horizontal and vertical concentration profiles of all constituents of concern (COC) in the groundwater that are measured by USEPA-approved procedures (3.1.2). COCs are those chemicals that have been detected in groundwater in the past and their daughter (breakdown) products.	Groundwater samples were collected from wells: CS-MW36-LGR, CS-1, CS-10, CS-12, and CS-9. Samples were analyzed for the short list of VOCs using USEPA method SW8260B, and metals (cadmium, lead, mercury, chromium). The drinking water wells (CS-1, CS-10 and CS-12) were sampled for the short list of VOCs and additional metals (arsenic, barium, copper, and zinc). Analyses were conducted in accordance with the AFCEE QAPP and approved variances. All RLs were below MCLs, as listed below:	Yes.	Continue sampling.

Activity	Objectives	Action	Objective Attained?	Recommendations
		ANALYTE / **RL (µg /L)** / **MCL(µg/L)** 1,1-DCE 1.2 7 *cis*-1,2-DCE 1.2 70 *trans*-1,2-DCE 0.6 100 PCE 1.4 5 TCE 1.0 5 Vinyl chloride 1.1 2		
		ANALYTE / **RL (µg/L)** / **MCL/AL (µg /L)** Barium 5 2,000 Chromium 10 100 Copper 10 1,300 Zinc 50 5,000 Arsenic 30 10 Cadmium 7 5 Lead 25 15 Mercury 1 2		
Contamination Characterization (Ground Water Contamination) (Continued)	Meet AFCEE QAPP quality assurance requirements.	Samples were analyzed in accordance with the CSSA QAPP and approved variances. Parsons chemists verified all data.	Yes.	NA
		All data flagged with a "U," "J," "M," and "F" are usable for characterizing contamination. All "R" flagged data are considered unusable.	Yes.	NA

Activity	Objectives	Action	Objective Attained?	Recommendations
		Previously, a method detection limit (MDL) study for arsenic, cadmium, and lead was not performed within a year of the analyses, as required by the AFCEE QAPP.	The laboratory performed new MDL studies in February 2001 for these metals and the new MDL values were found to be almost identical to the previous MDLs and all met the associated AFCEE QAPP requirements. MDLs for these three metals are well below MCLs. In addition, the laboratory performed daily calibrations and RL verifications for these metals, both of which demonstrate the laboratory's ability to detect and quantitate these metals at RL levels. These daily analyses also indicate that concentrations above the laboratory RL for these compounds were not affected by the expired MDL study.	Use results for groundwater characterization purposes.
Remediation	Determine goals and create cost-effective and technologically appropriate methods for remediation (2.2.1).	Continued data collection will provide analytical results for accomplishing this objective.	Ongoing.	Continue sampling and evaluation, including quarterly groundwater monitoring teleconferences to address remediation.
	Determine placement of new wells for monitoring (2.3.1, 3.6)	Sampling frequency and sample locations to be monitored (including any new wells) will be based on trend data from monitoring event(s) (3.1.5).	Ongoing.	Continue quarterly groundwater teleconferences to discuss sampling frequency and placement of new monitor wells.
Project schedule/ Reporting	Produce a quarterly monitoring project schedule as a road map for sampling, analysis, validation, verification, reviews, and reports.	Prepare schedules and sampling guidelines prior to each quarterly sampling event.	Yes.	Continue sampling schedule preparation each quarter.

APPENDIX B

QUARTERLY ON-POST GROUNDWATER MONITORING ANALYTICAL RESULTS MARCH 2013

Appendix B
March 2013 Quarterly On-Post Groundwater Monitoring Analytical Results

Well ID	Sample Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Zinc	Mercury
CS-MW36-LGR	3/5/2013	NA	NA	0.0005U	0.0010U	NA	0.0019U	NA	0.0001U
CS-9	3/4/2013	NA	NA	0.0005U	0.0010U	NA	**0.0040F**	NA	**0.0015**
CSSA Drinking Water Well System									
CS-1	3/27/2013	0.0002U	**0.0334**	0.0005U	0.0010U	**0.006F**	0.0019U	**0.288**	0.0001U
CS-1 FD	3/27/2013	0.0002U	**0.0328**	0.0005U	0.0010U	0.003U	0.0019U	**0.266**	0.0001U
CS-10	3/4/2013	0.0002U	**0.0406**	0.0005U	0.0010U	**0.004F**	0.0019U	**0.053**	0.0001U
CS-12	3/4/2013	0.0002U	**0.0331**	0.0005U	0.0010U	**0.021**	0.0019U	**0.137**	0.0001U

Well ID	Sample Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl Chloride
CS-MW36-LGR	3/5/2013	0.12U	**1.74**	0.08U	**26.75**	**65.01**	0.08U
CS-9	3/4/2013	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
CSSA Drinking Water Well System							
CS-1	3/27/2013	0.12U	0.07U	0.08U	0.06U	**0.18F**	0.08U
CS-1 FD	3/27/2013	0.12U	0.07U	0.08U	0.06U	**0.18F**	0.08U
CS-10	3/4/2013	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
CS-12	3/4/2013	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 µg/L & metals data reported in mg/L.

Abbreviations/Notes:

FD	Field Duplicate
TCE	Trichloroethene
PCE	Tetrachloroethene
DCE	Dichloroethene
AL	Action Level
SS	Secondary Standard
NA	Not Analyzed for this parameter

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 REPORT

(Laboratory data packages are submitted to CSSA electronically.)

SDG 70076
SDG 70327

DATA VERIFICATION SUMMARY REPORT

for on-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-post Camp Stanley Storage Activity (CSSA) on March 4 & 5, 2013. The samples were assigned to the following Sample Delivery Group (SDG) and were analyzed for volatile organic compounds (VOCs) and selected metals including cadmium, chromium, lead and mercury.

70076

The field QC samples associated with this SDG included a pair of matrix spike/matrix spike duplicate (MS/MSD) and a trip blank (TB) which 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 3.0ºC, which was within the 2-6ºC range recommended by the CSSA QAPP.

EVALUATION CRITERIA

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

VOLATILES

General

The volatiles portion of this data package consisted of seven (7) samples, including four (4) on-post groundwater samples, one set of MS/MSD, and one TB. All samples were collected on March 4 and 5, 2013. All samples 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 analytical batch #175402 and injected to the GC/MS under one set of initial calibration (ICAL) with one instrument.

Accuracy

Accuracy was evaluated using the percent recovery (%R) obtained from the laboratory control spike (LCS) sample, MS/MSD, and the surrogate spikes. Sample CS-12 was designated as the parent sample for the MS/MSD analyses on the chain of custody (CoC).

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

Precision

Precision was evaluated based on the relative percent difference (%RPD) of the MS/MSD results.

All %RPDs were compliant.

Representativeness

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

- Comparing the COC procedures to those described in the CSSA QAPP;
- Comparing actual analytical procedures to those described in the CSSA QAPP;
- Evaluating 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 sample 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. No target VOC was detected at or above the associated MDL in the trip blank and method blank.

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 six (6) on-post groundwater samples including four on-post well samples and one set of MS/MSD. Samples were collected on March 4 & 5, 2013. All samples were analyzed for cadmium, chromium, and lead. Additional metals were included in the CS-10 and CS-12.

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 #175897. All analyses were performed undiluted.

Accuracy

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

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

Precision

Precision were evaluated based on the %RPD of MS/MSD results.

All %RPDs were compliant.

Representativeness

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

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

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

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

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

Completeness

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

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

MERCURY

General

The mercury portion of this SDG consisted of six (6) on-post groundwater samples including four on-post well samples and one set of MS/MSD. Samples were collected on March 4 and 5, 2013. All samples 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 #175686. 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 were evaluated based on the %RPD of MS/MSD results.

The %RPD 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%.

DATA VERIFICATION SUMMARY REPORT

for on-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-post Camp Stanley Storage Activity (CSSA) on March 27, 2013. The samples were assigned to the following Sample Delivery Group (SDG) and were analyzed for volatile organic compounds (VOCs) and selected metals including arsenic, barium, cadmium, chromium, copper, lead, zinc, and mercury.

70327

The field QC samples associated with this SDG included a pair of parent and field duplicate (FD) and a trip blank (TB) which 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 2.0ºC, which was within the 2-6ºC 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 three (3) samples, including one (1) on-post groundwater samples, one set of parent/FD, and one TB. All samples were collected on March 27, 2013. All samples 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 analytical batch #176080 and injected to the GC/MS under one set of initial calibration (ICAL) with one instrument.

Accuracy

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

All LCS and surrogate spike recoveries were within acceptance criteria.

Precision

Precision was evaluated based on the relative percent difference (%RPD) of the parent and FD sample results.

None of the target VOCs were detected at or above the reporting limits, therefore, the %RPD calculation was not applicable.

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 sample 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. No target VOC was detected at or above the associated MDL in the trip blank and method blank.

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 two (2) on-post groundwater samples including one on-post well sample and one FD. Samples were collected on March 27, 2013. Both samples were analyzed for arsenic, barium, cadmium, chromium, copper, lead, and zinc.

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 #176604. All analyses were performed undiluted.

Accuracy

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

All LCS recoveries were within acceptance criteria.

Precision

Precision were evaluated based on the %RPD of parent/FD sample results.

Only barium and zinc were detected above the reporting limits. Both %RPDs were compliant.

Representativeness

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

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

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

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

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

Completeness

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

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

MERCURY

General

The mercury portion of this SDG consisted of two (2) on-post groundwater samples including one on-post well sample and one FD. Samples were collected on March 27, 2013. Both samples 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 #176424. The analyses were performed undiluted.

Accuracy

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

The LCS recovery was within acceptance criteria.

Precision

Precision were evaluated based on the %RPD of parent/FD results.

Mercury was not detected in the parent and FD sample, therefore, the %RPD calculation was not applicable.

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%.