JUNE 2012

On-Post
Quarterly Groundwater Monitoring Report

Prepared For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

October 2012

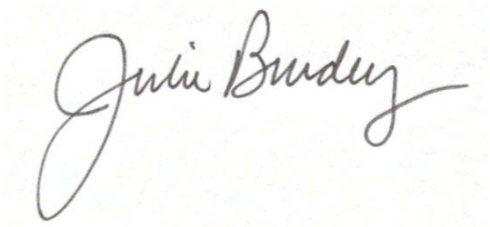
GEOSCIENTIST CERTIFICATION

June 2012 On-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 June 2012 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 June 2012, and is true and accurate to the best of my knowledge and belief.



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

10/4/12
Date

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EXECUTIVE SUMMARY

- Six of the six wells scheduled for sampling in June 2012 were sampled.
- Average groundwater elevations in June 2012 decreased 30.64 feet from the elevations measured in March 2012. In San Antonio, water restrictions are currently at Stage 2 in the San Antonio area; as of May 1, 2012. The Trinity Glen Rose Groundwater Conservation District 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 267.53 feet below top of casing (BTOC) or 984.23 feet above mean sea level (msl).
- The MCL was exceeded in monitoring well CS-MW36-LGR for tetrachlorethene (PCE) in June 2012.
- Of the 6 wells sampled in June 2012, no wells had metals detections above the maximum contaminant level (MCL), action level (AL), or secondary standard (SS).
- There were no detections of 1,1-dichloroethene (1,1-DCE), *cis*-1,2-dichloroethene (DCE), *trans*-1,2-DCE, or vinyl chloride in June 2012.
- No zones in Westbay Wells (WB01-WB04) in the vicinity of AOC-65 were sampled in June 2012. However, these wells were profiled to collect water level data in the area. All 46 Westbay zones are scheduled for sampling in September 2012.

JUNE 2012
GROUNDWATER MONITORING REPORT
CAMP STANLEY STORAGE ACTIVITY, TEXAS

1.0 INTRODUCTION

This report presents results from the on-post quarterly sampling performed at Camp Stanley Storage Activity (CSSA) in June 2012. Laboratory analytical results are presented along with potentiometric contour figures. The purpose of this report is to present a summary of the June 2012 sampling results. Results from all four 2012 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. Groundwater monitoring was performed June 4 through 19, 2012.

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-four water level measurements were recorded on June 12, 2012 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 June 2012 are shown in **Figures 2-1, 2-2, and 2-3**.

The June 2012 potentiometric surface map for LGR-screened wells **(Figure 2-1)** exhibited a wide range of groundwater elevations, from a minimum of 956.80 feet above mean sea level (msl) at CS-MW10-LGR to a maximum of 1021.40 feet above msl at CS-MWG-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 June 2012 decreased 30.64 feet from the elevations measured in March 2012. From March 22 to June 19, 2012, weather station north (WS-N) did not record a complete set of data due to voltage problems and, weather station south (WS-S) recorded 5.83 inches of rainfall during 21 rainfall events in this timeframe. The rainfall was sporadic with only one event (May 6th = 2.11 inches) with greater than one inch of rainfall. The aquifer began to decline after a significant rebound in early 2012. San Antonio fell back into stage 2 water restrictions and the Trinity Glen Rose Groundwater Conservation District remains in stage 2 severe drought water restrictions, effective since June 1, 2011. WS-N is in the process of repaired and relocated near building 606. A new weather station installation is underway at SWMU B-3.

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 June 2012 this mounding effect was pronounced, as the elevation in CS-MW4-LGR was 29 and 32 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 June 2012, the water elevation at CS-MW4-LGR was 1020.71 feet msl, and typical mounding effect was present. It is postulated that perched groundwater associated with the Salado Creek drainage is hydraulically connected to the main aquifer body in this location.

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, and B3-EXW02 were pumped periodically to the SWMU B-3 Bioreactor between March and June 2012. 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-12, CS-MW16-LGR, 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, B3-EXW02, 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 June 2012, the overall LGR groundwater gradient is to the south-southeast at 0.00327 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, and 2009. In late 2009 recovery from the effects of the 2008/2009 drought began. In September 2010, water levels began to drop at a significant rate and continued to fall through September 2011. Water levels in September 2011 were below those measured during the 2006 drought, and correspond closely to historical drought levels reported during 2009. The aquifer began to recover at the end of 2011 as rainfall increased. Continued rainfall in early 2012 allowed the aquifer to recover dramatically. However, rainfall amounts dropped again in April 2012, with only 0.06 inches falling the entire month.

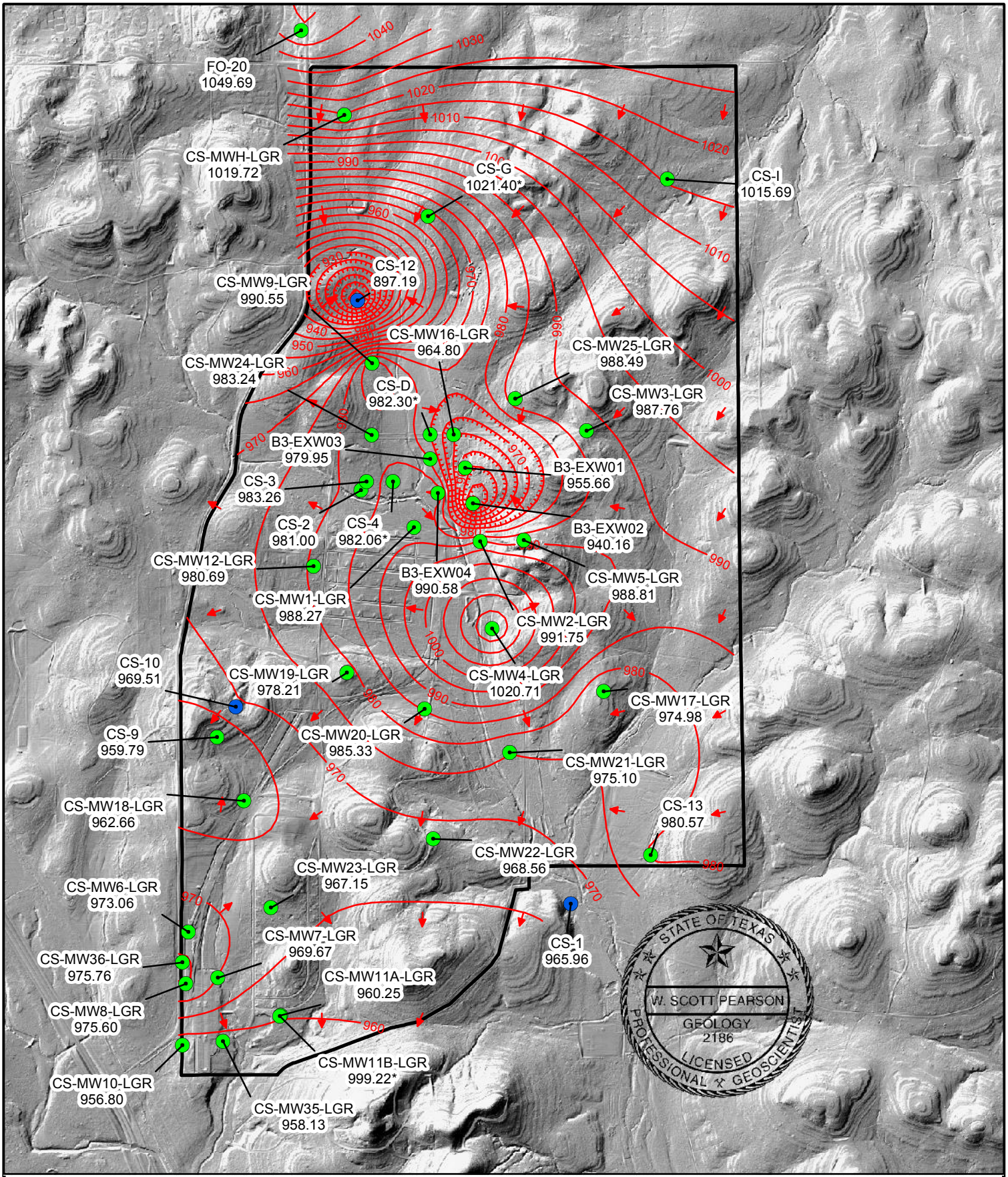

Figure 2-1

June 2012 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

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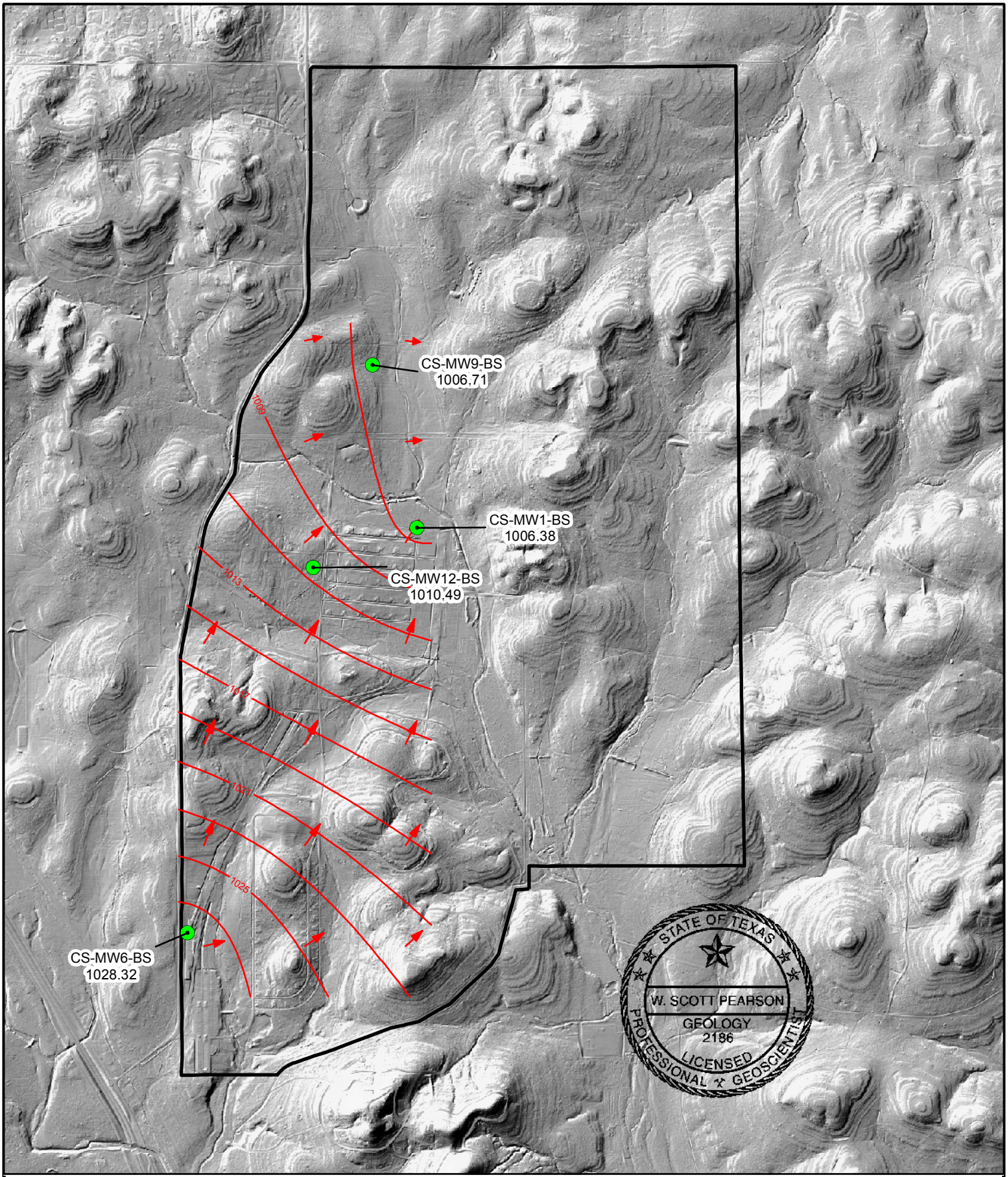

Figure 2-2

June 2012 Potentiometric Surface Map, BS Wells

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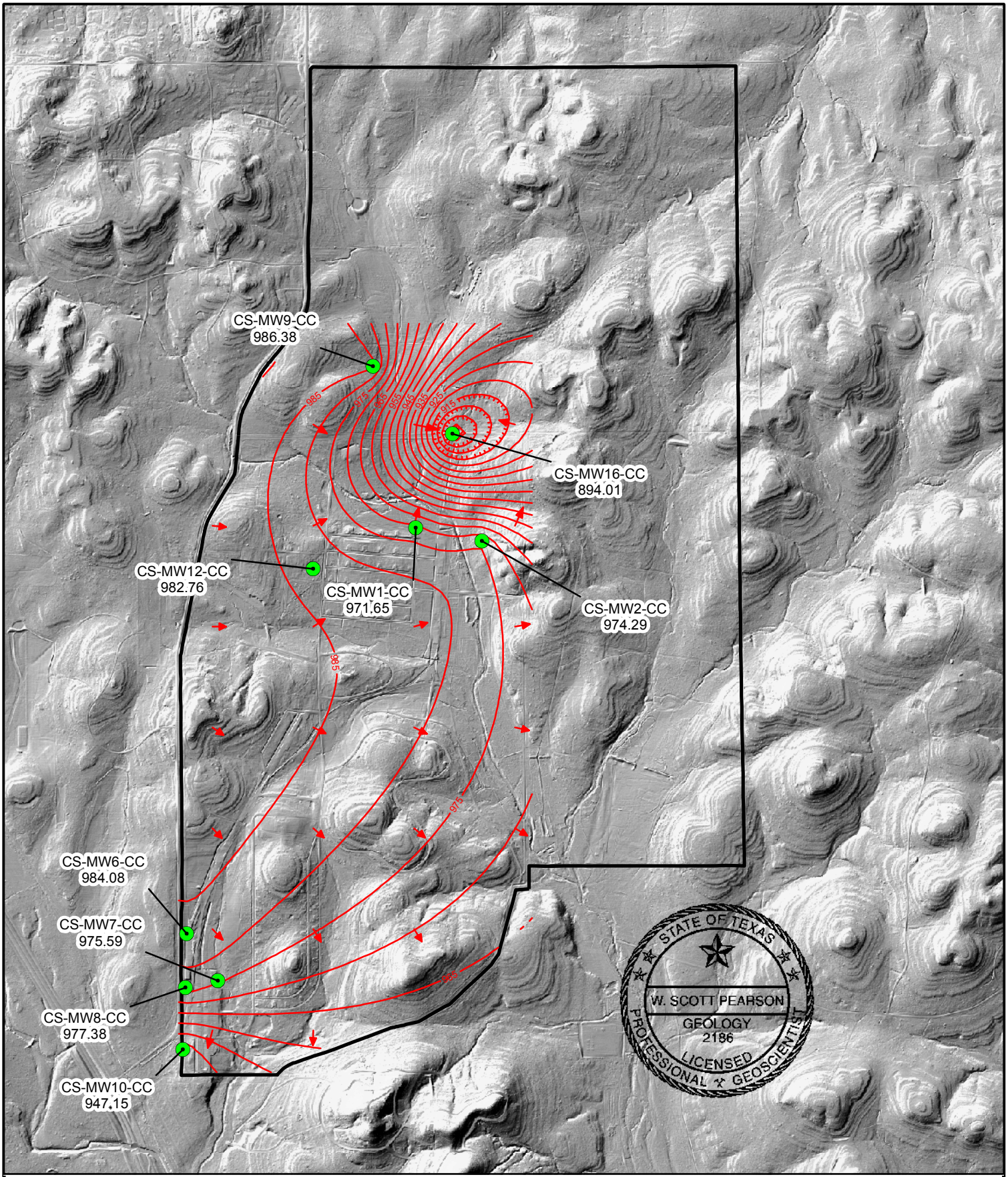

Figure 2-3

June 2012 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

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3.0 JUNE 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 June 2012 included 6 wells, which were all successfully collected. **Tables 3-1** and **3-2** provide a sampling overview for June 2012 and the schedule under the LTMO recommendations. All monitoring wells were sampled using dedicated low-flow gas-operated bladder pumps. 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 June 2012 for the short list of volatile organic compounds (VOC) and metals (chromium, cadmium, lead, and mercury). Drinking water wells CS-1, 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**. Full analytical results are presented in **Appendix B**.

PCE was detected above the MCL in one on-post well sampled this quarter, CS-MW36-LGR. No metals were detected above the MCL, AL, or SS in wells sampled in June 2012.

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-#60, containing the analytical results from this sampling event were received by Parsons June 27, 2012. 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 Westbay Well zones were scheduled for sampling in June 2012. However, these wells were profiled to capture water level readings. Westbay wells (CS-WB01, CS-WB02, CS-WB03, and CS-WB04) are located in the vicinity of AOC-65 and are sampled on a 9-month schedule as recommended in the LTMO evaluation and will be sampled again during the September 2012 event.

Westbay wells CS-WB05, CS-WB06, CS-WB07, and CS-WB08 are not sampled as part of the groundwater monitoring program but are sampled as part of 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*	*June-11 (snapshot)*	*Sep-11*	*Dec-11*	*Mar-12 (snapshot)*	*Jun-12*	*Sampling Frequency **
	CS-MW1-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW1-BS	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-MW1-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-MW2-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW2-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Sep-10	NSWL	NS	NS	NS	NS	Every 18 months
	CS-MW3-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW4-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	NSWL	NS	NS	S	NS	Every 9 months
	CS-MW5-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW6-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	NSWL	NS	NS	S	NS	Every 9 months
	CS-MW6-BS	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-MW6-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Sep-10	NSWL	NS	NS	NS	NS	Every 18 months
	CS-MW7-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW7-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Sep-10	NSWL	NS	NS	NS	NS	Every 18 months
	CS-MW8-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW8-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-MW9-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-MW9-BS	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW9-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	NSWL	NS	NS	S	NS	Every 9 months
	CS-MW10-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	NSWL	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW10-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Sep-10	NSWL	NS	NS	NS	NS	Every 18 months
	CS-MW11A-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW11B-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Sep-10	NSWL	NS	NS	NSWL	NS	Every 9 months
	CS-MW12-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW12-BS	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-MW12-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Sep-10	NSWL	NS	NS	NS	NS	Every 18 months
	CS-MW16-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW16-CC	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CW-MW17-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	NSWL	NS	NS	S	NS	Every 9 months
	CS-MW18-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	NSWL	NS	NS	S	NS	Every 9 months
	CS-MW19-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
1	CS-1	VOCs & metals (As,Ba,Cr, Cu,Cd,Hg,Pb,Zn)	Mar-12	S	S	S	S	S	Quarterly
	CS-2	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-3	sampled as needed, no pump	Dec-99	NS	NS	NS	NS		NS
	CS-4	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	NSWL	NS	NSWL	S	NS	Semi-annual + 9 month snapshot
2	CS-9	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	S	S	S	S	Quarterly
3	CS-10	VOCs & metals (As,Ba,Cr, Cu,Cd,Hg,Pb,Zn)	Mar-12	S	S	S	S	S	Quarterly
	CS-11	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-09	NS	NS	NS	NS		NS
4	CS-12	VOCs & metals (As,Ba,Cr, Cu,Cd,Hg,Pb,Zn)	Mar-12	S	S	S	S	S	Quarterly
	CS-D	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	NSWL	NS	NSWL	S	NS	Semi-annual + 9 month snapshot
	CS-MWG-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-MWH-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-I	VOCs & metals (Cr, Cd, Hg, Pb)	Jun-11	S	NS	NS	NS	NS	Every 18 months
	CS-MW20-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW21-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW22-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW23-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
	CS-MW24-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	S	S	NS	Semi-annual + 9 month snapshot
	CS-MW25-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12	S	NS	NS	S	NS	Every 9 months
5	CS-MW35-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12		S	S	S	S	
6	CS-MW36-LGR	VOCs & metals (Cr, Cd, Hg, Pb)	Mar-12		S	S	S	S	

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

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

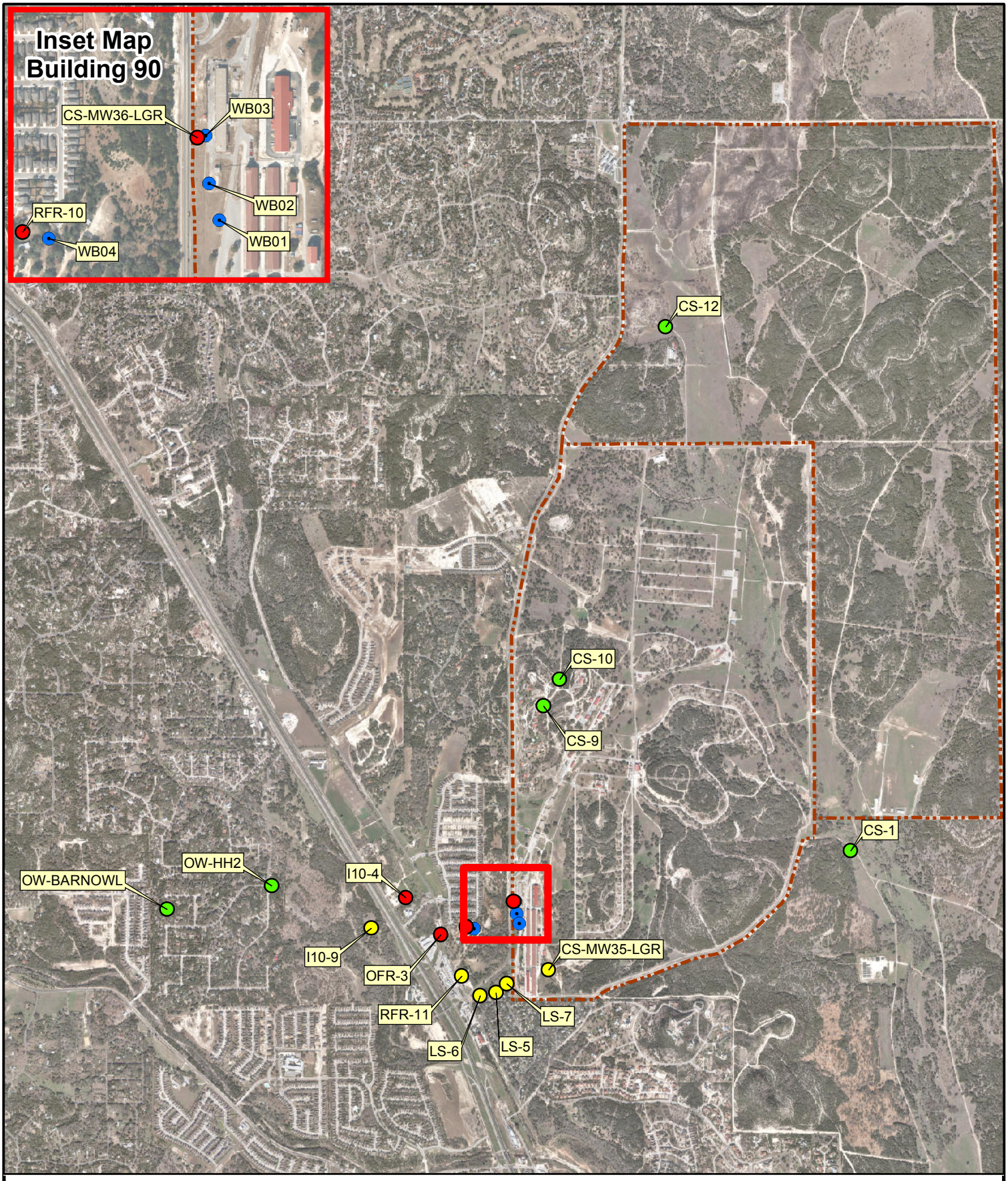

Figure 3-1

On-Post and Off-Post Well Sampling Locations for June 2012
Camp Stanley Storage Activity

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Table 3-3
June 2012 On-post Quarterly Groundwater Results, Detected Analytes

Well ID	Sample Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Zinc	Mercury	Comments
CS-MW35-LGR	6/11/2012	NA	NA	--	--	NA	**0.0030F**	NA	--	Fourth consecutive sampling event for these wells, lead detected in 12/2011 below the RL in both wells.
CS-MW36-LGR	6/11/2012	NA	NA	--	--	NA	**0.0027F**	NA	--	
CS-9	6/11/2012	NA	NA	--	--	NA	**0.0104F**	NA	**0.0015**	Lead & mercury last above the AL/MCL in 12/2011.
CSSA Drinking Water Well System										
CS-1	6/11/2012	--	**0.0358**	--	--	**0.004F**	**0.0062F**	**0.214**	--	Lead last above the AL in 11/2011.
CS-1 FD	6/11/2012	--	**0.0361**	--	--	**0.005F**	**0.0060F**	**0.218**	--	
CS-10	6/11/2012	--	**0.0386**	--	--	**0.006F**	--	**0.08**	--	Consistent barium and zinc detections.
CS-12	6/11/2012	--	**0.0307**	--	--	**0.036**	**0.0050F**	**0.19**	--	Lead last above the AL in 12/2010.
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-MW35-LGR	6/11/2012	--	--	--	**2.78**	--	--	Highest PCE concentration since well was first sampled in 6/2011.
CS-MW36-LGR	6/11/2012	--	--	--	**7.71**	**1.85**	--	Consistent PCE and TCE detections.
CS-9	6/11/2012	--	--	--	--	--	--	Last PCE detection was in 2004, below the RL.
CSSA Drinking Water Well System								
CS-1	6/11/2012	--	--	--	--	--	--	Last VOC (TCE) detection was in 12/2011, below the RL.
CS-1 FD	6/11/2012	--	--	--	--	--	--	
CS-10	6/11/2012	--	--	--	--	--	--	Last VOC (TCE) detection was in 6/2010, below the RL.
CS-12	6/11/2012	--	--	--	--	--	--	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:	Mar-12	Jun-12
Weather Station South (WS-N):	NA	NA
Weather Station North (WS-S):	8.58	5.83

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

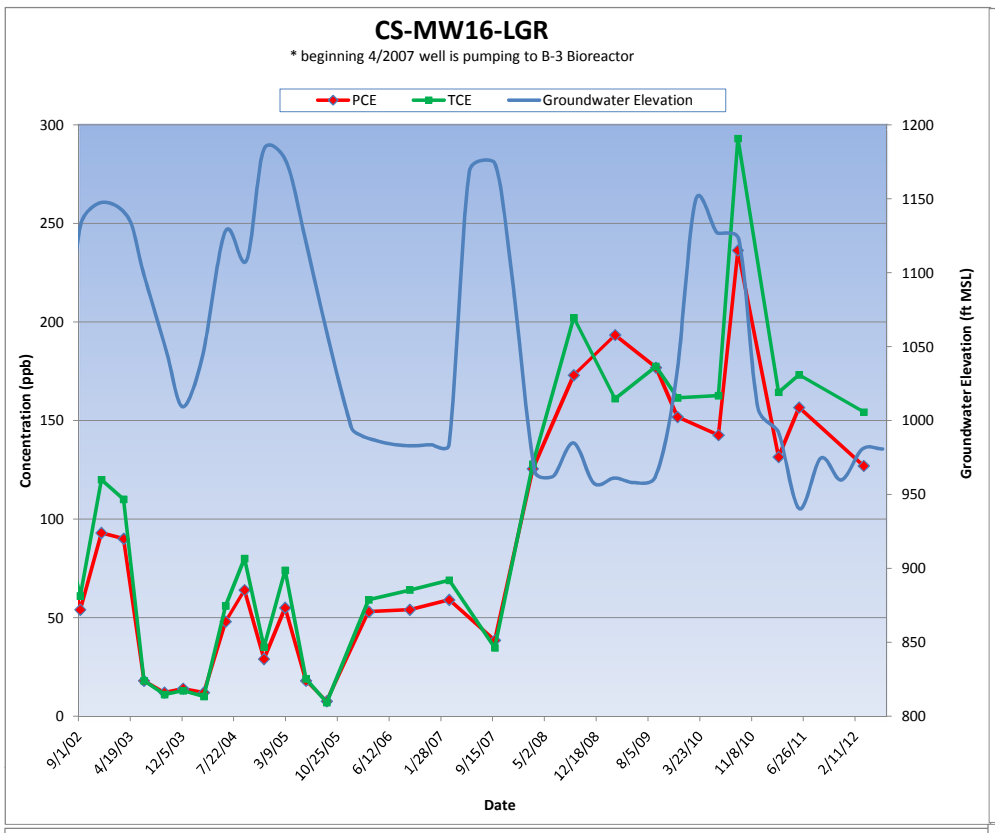
Abbreviations/Notes:

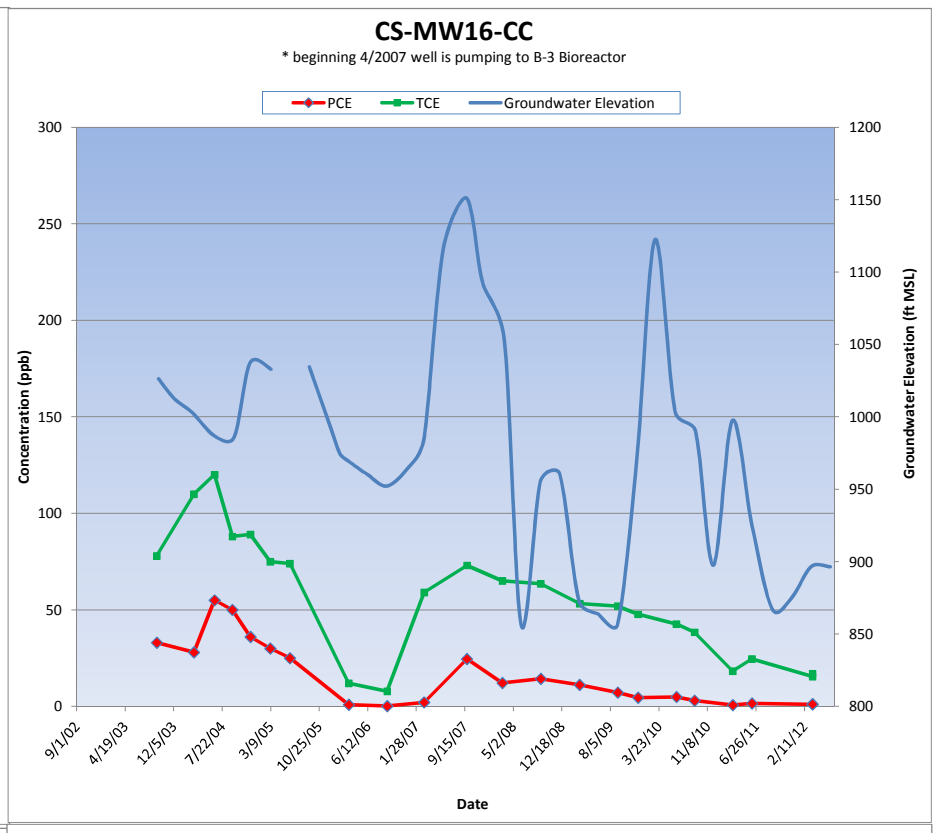
FD	Field Duplicate
TCE	Trichloroethene
PCE	Tetrachloroethene
DCE	Dichloroethene
AL	Action Level
SS	Secondary Standard
NA	Not Analyzed for this parameter

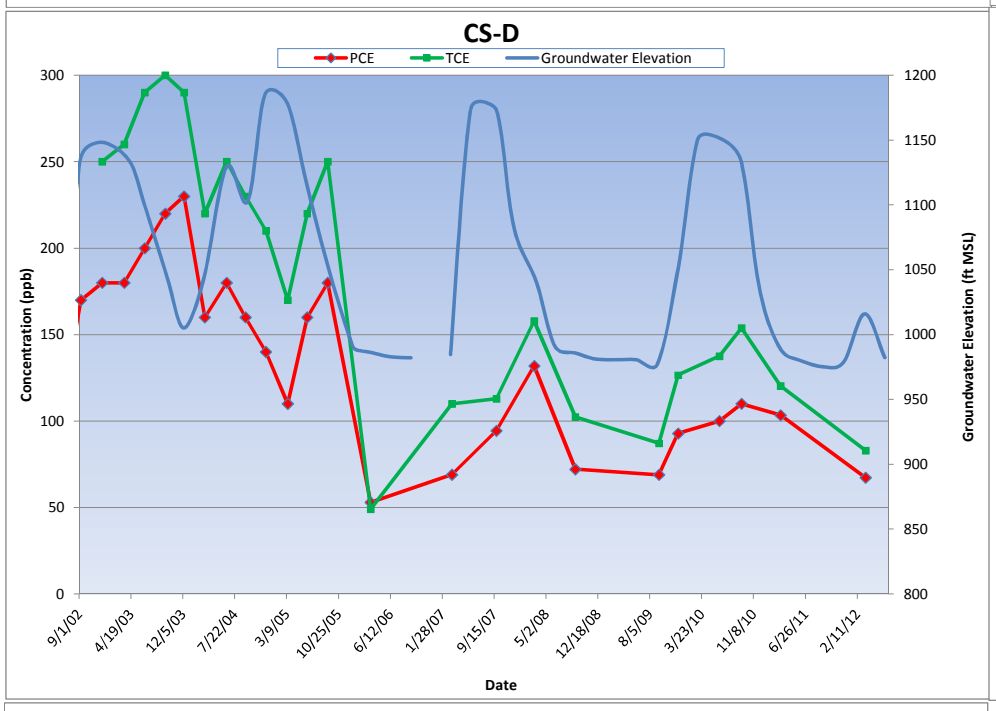
Data Qualifiers:

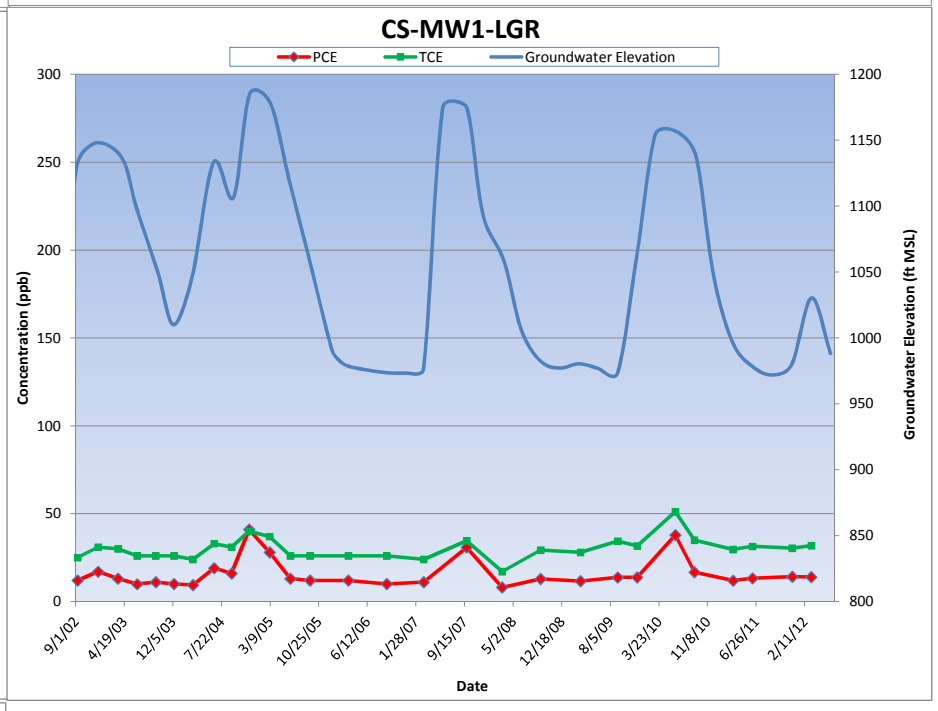
--The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
F-The analyte was positively identified but the associated numerical value is below the RL.

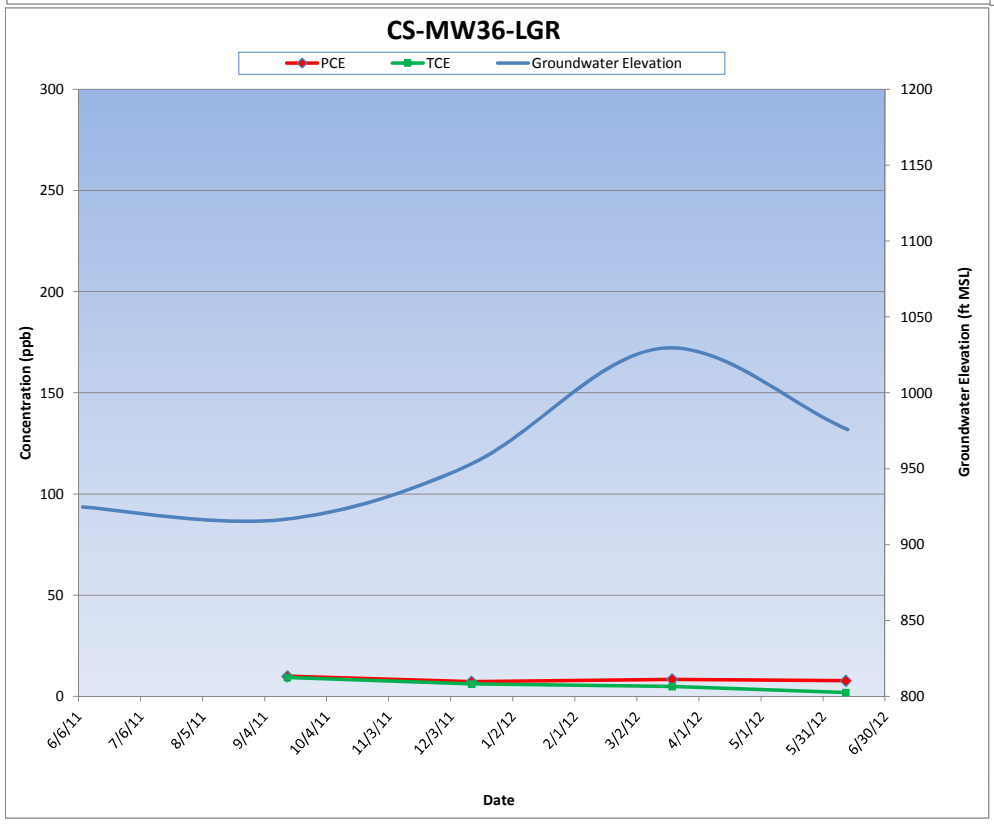
Figure 3-2
Cumulative VOC Concentrations vs Groundwater Elevations











4.0 JUNE 2012 SUMMARY

- Six wells were scheduled for sampling in June 2012, and all six were sampled.
- From March 22 to June 19, 2012, CSSA's south weather station recorded 5.83 inches of rain. The north weather station did not record a complete set of data due to voltage problems.
- Well CS-13 was surveyed in August and has now been incorporated into the potentiometric map **(Figure 2-1)**. A majority of the rain fell from May 6th through the 15th, 5.18 inches. The largest one day rain event occurred on May 6th, 2.11 inches.
- Water levels decreased an average of 30.64 feet per well since last quarter. Water levels have begun to decline again after a significant rebound in early 2012. The average water level in June 2012 (excluding pumping wells) was 260.20 feet below top of casing.
- Monitoring wells CS-MW35-LGR and CS-MW36-LGR were sampled for the fourth consecutive quarter. CS-MW36-LGR had a detection of PCE above the MCL and TCE above the RL. CS-MW35-LGR had a detection of PCE below the RL.
- VOCs were detected above the MCL in 1 of the 6 wells sampled in June 2012. Well CS-MW36-LGR was above the MCL for PCE, see **Figure 3-2**.
- VOCs 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride were not detected in any of the 6 wells sampled in June 2012.
- No metals were detected above the MCL, AL, or SS in the 6 wells sampled in June 2012.
- No zones in Westbay Wells (WB01-WB04) in the vicinity of AOC-65 were sampled in June 2012. However, these wells were profiled to collect water level data in the area. All 46 zones are scheduled to be sampled in September 2012.

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 June 12, 2012.	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 June 12, 2012 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 northern and southern continuous-reading weather stations WS-N and WS-S. Water levels will be graphed at these wells against precipitation data through December 2012 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 6 of 46 CSSA wells. Of the 6 wells scheduled to be sampled in June 2012 all 6 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-MW35-LGR, CS-MW36-LGR, 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 JUNE 2012

Appendix B
June 2012 Quarterly On-Post Groundwater Monitoring Analytical Results

Well ID	Sample Date	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Zinc	Mercury
CS-MW35-LGR	6/11/2012	NA	NA	0.0005U	0.001U	NA	**0.0030F**	NA	0.0001U
CS-MW36-LGR	6/11/2012	NA	NA	0.0005U	0.001U	NA	**0.0027F**	NA	0.0001U
CS-9	6/11/2012	NA	NA	0.0005U	0.001U	NA	**0.0104F**	NA	**0.0015**
CSSA Drinking Water Well System									
CS-1	6/11/2012	0.0002U	**0.0358**	0.0005U	0.001U	**0.004F**	**0.0062F**	**0.214**	0.0001U
CS-1 FD	6/11/2012	0.0002U	**0.0361**	0.0005U	0.001U	**0.005F**	**0.0060F**	**0.218**	0.0001U
CS-10	6/11/2012	0.0002U	**0.0386**	0.0005U	0.001U	**0.006F**	0.0019U	**0.08**	0.0001U
CS-12	6/11/2012	0.0002U	**0.0307**	0.0005U	0.001U	**0.036**	**0.0050F**	**0.19**	0.0001U

Well ID	Sample Date	1,1-DCE	cis-1,2-DCE	trans-1,2-DCE	PCE	TCE	Vinyl Chloride
CS-MW35-LGR	6/11/2012	0.12U	0.07U	0.08U	**2.78**	0.05U	0.08U
CS-MW36-LGR	6/11/2012	0.12U	0.07U	0.08U	**7.71**	**1.85**	0.08U
CS-9	6/11/2012	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
CSSA Drinking Water Well System							
CS-1	6/11/2012	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
CS-1 FD	6/11/2012	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
CS-10	6/11/2012	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
CS-12	6/11/2012	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 & 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 68021

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 six quarterly groundwater samples and the associated field quality control (QC) samples collected from on-post Camp Stanley Storage Activity (CSSA) on June 11, 2012. The samples in the following Sample Delivery Group (SDG) were analyzed for a reduced list of volatile organic compounds (VOCs) and metals:

68021

The field QC samples associated with this SDG included one field duplicate (FD), one set of matrix spike/matrix spike duplicate (MS/MSD) 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 QC samples were analyzed for the same parameters as the parent sample and TB was analyzed for VOC only.

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 4.0ºC, 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 packages included sample results; field and laboratory quality control samples; calibrations; case narratives; raw data; chain-of-custody (COC) forms and the sample receipt checklist. The findings presented in this report are based on the reviewed information, and whether the guidelines in the CSSA QAPP, Version 1.0, were met.

VOLATILES

General

The volatiles portion of this data package consisted of ten (10) samples, including six (6) on-post groundwater samples, one (1) FD, one (1) pair of MS/MSD, and one (1) TB. The samples were collected on June 11, 2012 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 one batch (#168223) under one set of initial calibration (ICALs). 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 sample (LCS), MS/MSD, and the surrogate spikes. Sample CS-10 was designated as the parent sample for the MS/MSD analysis by Parsons.

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

Precision

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

None of the target VOCs were detected at or above the reporting limit in the parent and FD samples, therefore, 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 blank 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 one method blank 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%.

ICP-AES METALS

General

The ICP-AES portion of this SDG consisted of nine (9) on-post groundwater samples including one (1) FD and one (1) pair of MS/MSD. All samples were collected on June 11, 2012 and were analyzed for metals. Samples CS-9, CS-MW36-LGR, and CS-MW35-LGR were analyzed for cadmium, chromium and lead, all other samples were analyzed for arsenic, barium, cadmium, chromium, copper, lead, and zinc.

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

The samples for ICP-AES metals were digested in one batch (#168130). The samples were analyzed in one batch under a single ICAL. All analyses were performed undiluted.

Accuracy

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

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

Precision

Precision was evaluated based on the %RPD of parent/FD and MS/MSD results.

All %RPDs of MS/MSD were compliant.

CS-1

Metals	Parent, mg/L	FD, mg/L	%RPD	Criteria, %RPD
Barium	0.0358	0.0361	0.83	≤20
Zinc	0.214	0.218	0.92	

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 in this SDG 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 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 nine (9) on-post groundwater samples including six (6) groundwater samples, one (1) FD, and one (1) pair of MS/MSD which were collected on June 11, 2012 and were analyzed for mercury.

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

The mercury samples were prepared in one batch (#168163). The samples were analyzed in a one batch under a single ICAL. All analyses were performed undiluted.

Accuracy

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

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

Precision

Precision was evaluated based on the %RPD of parent/FD and MS/MSD results.

The %RPD of MS/MSD was compliant.

Mercury was not detected at or above the RL in the parent and FD samples, therefore, the %RPD calculation were 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.

The samples in this SDG were analyzed following the COC and the analytical procedures described in the CSSA QAPP. All samples were 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 results for the samples in this SDG were considered usable. The completeness for the mercury portion of this SDG is 100%, which meets the minimum acceptance criteria of 90%.