FINAL

JUNE 2007

On-Post
Quarterly Groundwater Monitoring Report

Prepared For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

May 2008

GEOSCIENTIST CERTIFICATION

June 2007 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 2007 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 TestAmerica, and field data obtained during groundwater monitoring conducted at the site in June 2007, and is true and accurate to the best of my knowledge and belief.

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

_____
Date

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JUNE 2007
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 2007. Laboratory analytical results are presented along with potentiometric figures. The purpose of this report is to present a summary of the wells sampled and sampling results. Similar reports will summarize the planned September 2007 and December 2007 sampling results. Results from all four 2007 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 at CSSA, scoped under the Air Force Center for Engineering and the Environment (AFCEE) 4P/AE Contract 41624-03-D-8613, Task Order (TO) 0207, was performed June 4, 2007 through June 8, 2007. On-post groundwater monitoring conducted under this TO began with the September 2006 sampling event and under the frequencies recommended for sampling no wells were to be sampled in June 2007 under TO 0207. Six newly installed wells were sampled under the scope of work of AFCEE 4P/AE Contract 41624-03-D-8613, TO008. Groundwater monitoring conducted prior to September 2006 was conducted under various TOs as shown in **Table 1** of the **Introduction to the Groundwater Monitoring Program, Volume 5** of the **CSSA Environmental Encyclopedia**. AFCEE provides technical oversight of the monitoring program conducted under TO 0207.

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) in effect at CSSA.

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 2005)** 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).

2.0 BASE-WIDE FLOW DIRECTION AND GRADIENT

Forty-seven water level measurements were recorded on June 4, 2007, from on-post monitoring wells completed in the Lower Glen Rose (LGR), Bexar Shale (BS), and Cow Creek (CC) formations. The groundwater potentiometric surface map illustrating groundwater elevations from the LGR zones in June 2007 is shown in **Figure 2-1**.

The June 2007 potentiometric surface map for LGR-screened wells exhibited a wide range of groundwater elevations, from a minimum of 1143.64 feet above mean sea level (MSL) at CS-MW10-LGR to a maximum 1180.74 feet MSL at CS-MW9-LGR. Groundwater elevations are generally higher in the northern and central portions of CSSA, and decrease to the southwest and southeast. Groundwater elevations in June 2007 increased 176.59 feet from the elevations measured in March 2007, reflecting increased precipitation measured this quarter following the drought conditions present in 2205 and 2006 in the area. From March 22, 2007, to June 15, 2007, weather station south (WS-S) recorded 25 rainfall events with a total 11.96 inches, and weather station north (WS-N) recorded no data during this time due to a SCADA installation activities. These rainfall totals are not complete because both WS-S and WS-N were not operational during the SCADA installation from February 13, 2007 to March 4, 2007.

Well CS-MW4-LGR in the central portion of CSSA usually has one of the highest groundwater elevations of LGR screened wells. The elevation is usually 20 to 40 feet higher than the nearest comparable wells (CS-MW2-LGR and CS-MW5-LGR). In the presence of increased rainfall in the area these elevations do reflect the general historical trend. The highest elevations were measured in well CS-MW9-LGR (1180.74' MSL) and CS-MW4-LGR (1178.38' MSL).

An overall groundwater gradient averaged across CSSA is to the southeast at 0.0016 ft/ft. The groundwater gradient varies in direction and velocity in different areas of CSSA. Groundwater gradients calculated from different LGR wells ranged from 0.00018 ft/ft to 0.0055 ft/ft.

Historical groundwater elevations have been recorded since 1992. Previous drought conditions resulted in water levels decreasing substantially in 1996 and 1999/2000. Average groundwater elevations decreased each quarter from March 2005 through September 2006. The September 2006 average groundwater elevations are the lowest recorded at CSSA since the monitoring program began in 1992 and are lower than those recorded in previous droughts during 1996 and 1999. Increased precipitation resulted in an average groundwater elevation increase of 291.7 feet measured from December 2006 to March 2007 and an increase of 176.6 feet measured from March until June 2007.

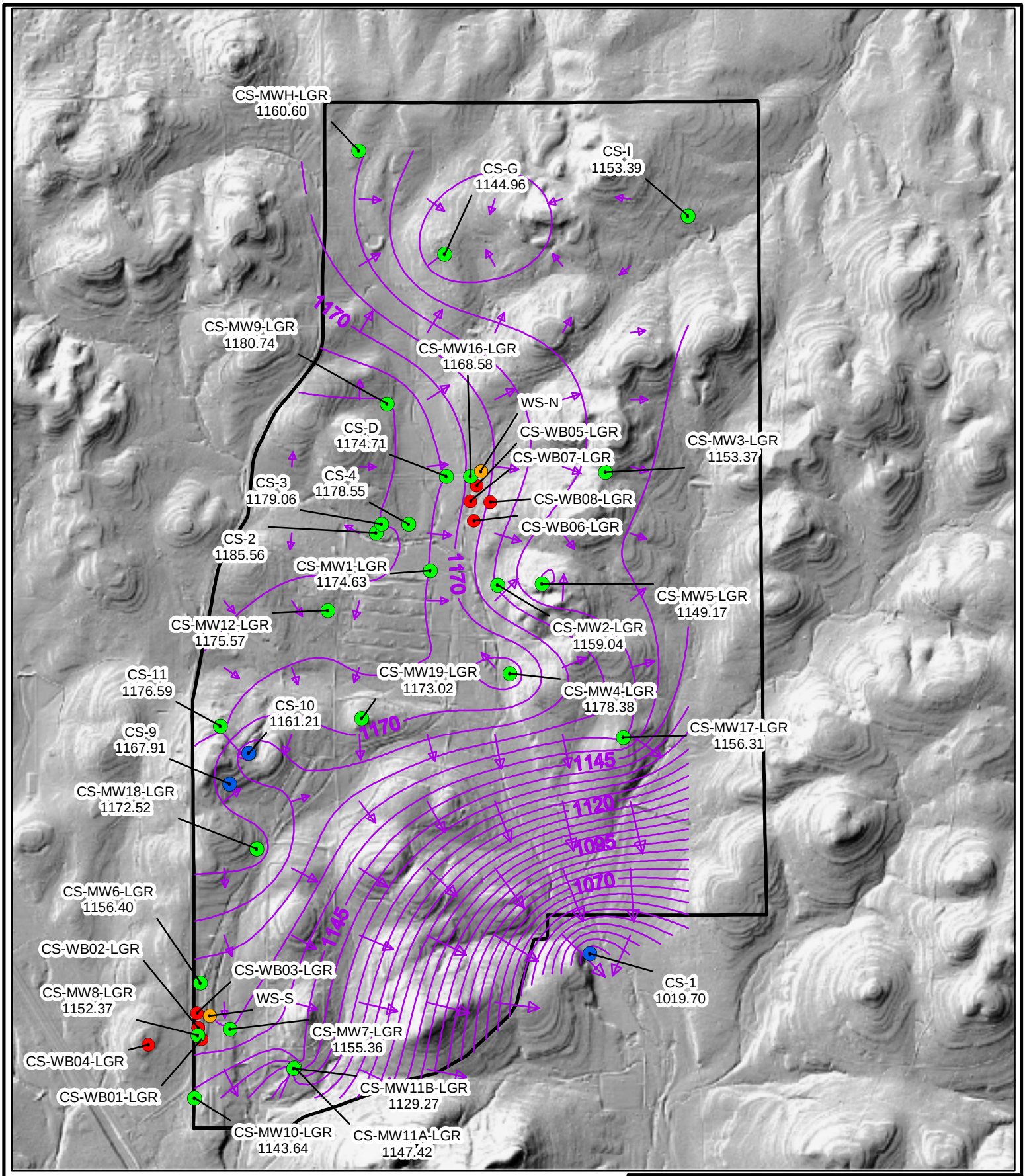

Figure 2.1

June 2007 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

P a r s o n s

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3.0 JUNE ANALYTICAL RESULTS

3.1 Monitoring Wells

Under the provisions of the groundwater monitoring DQOs and the LTMO study, the schedule for sampling on-post in June 2007 included 6 newly installed on-post monitoring wells. **Table 3-1** provides a well list and the schedule for sampling under the LTMO recommendations. The newly installed monitoring wells (CS-MW20-LGR, CS-MW21-LGR, CS-MW22-LGR, CS-MW23-LGR, CS-MW24-LGR and CS-MW25-LGR) were sampled using dedicated low-flow gas operated bladder pumps. Unlike the ongoing groundwater monitoring at CSSA which was funded through June under TO0207, the first four events of sampling until March 2008 for the newly installed monitoring wells are funded under TO008.

Wells sampled by low-flow pumps were purged until the field parameters stabilized. Field parameters including pH, temperature, and conductivity, were recorded to ensure stabilization during well purging. The newly installed on-post monitoring wells were sampled in June 2007 for the full list of volatile organic compounds (VOC), metals (barium, chromium, magnesium, sodium, zinc, calcium, copper, potassium, manganese, nickel, iron, cadmium, arsenic, lead, and mercury), and natural water quality parameters (carbonate, bicarbonate, bromide, fluoride, nitrate, sulfate, chloride, nitrite, and phosphate). Samples were analyzed by TestAmerica (formerly Severn Trent Laboratories) in Arvada, Colorado. All detected concentrations of VOCs and metals are presented in **Table 3-2**. Full analytical results are presented in **Appendix B**.

Results for lead in wells CS-MW22-LGR and CS-MW25-LGR were 91 µg/L and 17 µg/L, respectively. These results exceed the action level for lead of 15 µg/L. The action level promulgated by the USEPA requires a treatment technique be utilized by drinking water systems to control the corrosiveness of their water. These wells are environmental monitoring wells and do not contribute to CSSA drinking water supplies. Sampling in September 2007 will provide additional results and trends will be evaluated. Lead has been detected historically on-post and it is a regularly analyzed COC of the on-post groundwater monitoring program.

Results for well CS-MW23-LGR reported mercury above the MCL of 2 µg/L, at a concentration of 7.8 µg/L. Mercury has not historically been detected on-post and is not a regularly analyzed COC. Additional sampling in September 2007 will be conducted to evaluate this result over time and identify whether this result is an anomaly. This well is an environmental monitoring well and does not contribute to CSSA drinking water supplies.

All sampled wells, with the exception of CS-MW20-LGR, exceeded the secondary standard for iron, which is 300 ug/L. Well CS-MW22-LGR exceeded the secondary standard for manganese, with a concentration of 67 ug/L. This well also exceeded the secondary standard for zinc with a concentration of 8,000 ug/L. The Secondary Drinking Water Standard promulgated by the USEPA are non-enforceable guidelines regulating contaminants that may cause cosmetic effects or aesthetic effects (such as tooth discoloration or affect the taste, odor or color of drinking water). Again, these wells are environmental monitoring wells and do not contribute to CSSA drinking water supplies.

Table 3-1
Overview of the On-Post Monitoring Program

Count	Well ID	*Analytes*	*Current Sample Date*	*Next Sample Date*	*Sampling Frequency*
1	CS-MW1-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
2	CS-MW1-BS	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
3	CS-MW1-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
4	CS-MW2-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
5	CS-MW2-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
6	CS-MW3-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
7	CS-MW4-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
8	CS-MW5-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
9	CS-MW6-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
10	CS-MW6-BS	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
11	CS-MW6-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
12	CS-MW7-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
13	CS-MW7-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
14	CS-MW8-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Dec-07	Sep-08	Every 9 months*
15	CS-MW8-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
16	CS-MW9-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
17	CS-MW9-BS	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
18	CS-MW9-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
19	CS-MW10-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Dec-07	Sep-08	Every 9 months*
20	CS-MW10-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
21	CS-MW11A-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
22	CS-MW11B-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
23	CS-MW12-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Dec-07	Sep-08	Every 9 months*
24	CS-MW12-BS	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
25	CS-MW12-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
26	CS-MW16-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
27	CS-MW16-CC	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
28	CW-MW17-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Dec-07	Sep-08	Every 9 months*
29	CS-MW18-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
30	CS-MW19-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
31	**CS-1**	**VOC on-post short list & metals (Pb, Cd, Ni)**	Dec-07	Sep-08	Every 9 months*
32	CS-2	VOC on-post short list & metals (Pb, Cd, Ni)	Dec-07	Sep-08	Every 9 months*
33	CS-4	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
34	**CS-9**	**VOC on-post short list & metals (Pb, Cd, Ni)**	Dec-07	Sep-08	Every 9 months*
35	**CS-10**	**VOC on-post short list & metals (Pb, Cd, Ni)**	Dec-07	Sep-08	Every 9 months*
36	CS-11	VOC on-post short list & metals (Pb, Cd, Ni)	Dec-07	Sep-08	Every 9 months*
37	CS-D	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Mar-08	Semi-annual
38	CS-MWG-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Dec-07	Sep-08	Every 9 months*
39	CS-MWH-LGR	VOC on-post short list & metals (Pb, Cd, Ni)	Sep-07	Sep-09	Biennial
40	CS-I	VOC on-post short list & metals (Pb, Cd, Ni)	Dec-07	Sep-08	Every 9 months*
41	CS-MW20-LGR	**New well analyte list	**Jun-07**	Sep-07	Quarterly until Mar 08
42	CS-MW21-LGR	**New well analyte list	**Jun-07**	Sep-07	Quarterly until Mar 08
43	CS-MW22-LGR	**New well analyte list	**Jun-07**	Sep-07	Quarterly until Mar 08
44	CS-MW23-LGR	**New well analyte list	**Jun-07**	Sep-07	Quarterly until Mar 08
45	CS-MW24-LGR	**New well analyte list	**Jun-07**	Sep-07	Quarterly until Mar 08
46	CS-MW25-LGR	**New well analyte list	**Jun-07**	Sep-07	Quarterly until Mar 08

*Wells recommended for annual sampling frequency in the LTMO are scheduled every nine months (every third quarter) to gather seasonal data.

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 under TO008 (the laboratory subcontract project) containing the analytical results from this sampling event were received by Parsons July 3 and 5, 2007. Data validation was conducted and the data validation summary was submitted to AFCEE on July 12, 2007. AFCEE approval for the data packages was issued August 2, 2007. Cumulative historical analytical results can be found in **Tables 6** and **7** of the **Introduction to the Quarterly Groundwater Monitoring Program** (Parsons 2001) (**Volume 5, Groundwater**).

3.2 Westbay-equipped Wells

Under the provisions of the groundwater monitoring DQOs and the LTMO study, the schedule for on-post sampling in June 2007 did not include the four Westbay wells CS-WB01, CS-WB02, CS-WB03 and CS-WB04. These wells are sampled on a semi-annual frequency under the LTMO study and were sampled during September 2007. Westbay wells CS-WB05, CS-WB06, CS-WB07, and CS-WB08 are not sampled as part of the groundwater monitoring program but are sampled under the solid waste management unit B-3 bioreactor monitoring conducted under CSSA TO0006. Results for those wells are presented in a separate report.

4.0 SUMMARY

- The new on-post monitoring wells (CS-MW20-LGR, CS-MW21-LGR, CS-MW22-LGR, CS-MW23-LGR, CS-MW24-LGR, and CS-MW25-LGR) were sampled in June 2007 for the first time. These wells will be sampled four consecutive quarters.
- The MCL was not exceeded for PCE, TCE, and *cis*-1,2-DCE in any of the wells sampled during the June 2007 event.
- PCE was detected above the RL but below the MCL in CS-MW20-LGR.
- TCE, *cis*-1,2-DCE, and *trans*-1,2-DCE were not detected in any of the new monitoring wells.
- The action level for lead was exceeded in wells CS-MW23-LGR and CS-MW25-LGR in the June 2007 event. Follow up sampling in September 2007 will confirm these results.
- The MCL for mercury was exceeded in well CS-MW23-LGR, at a concentration of 7.8 ug/L. Follow up sampling in September 2007 will confirm these results.
- Methylene chloride was detected in wells CS-MW24-LGR and CS-MW25-LGR, below the RL, during the June 2007 event.
- WS-S recorded 11.96 inches from 25 rainfall events March 22 to June 15, 2007. The largest rainfall event, over 4.0 inches, occurred from May 21-27, 2007. WS-N was not operating during this timeframe due to SCADA outages.
- Water levels increased an average of 176.59 feet per well this quarter. The water levels have recovered significantly since 2006, which recorded the lowest groundwater elevations since the groundwater monitoring program began in 1992.
- Westbay wells are sampled on a semi annual frequency under the LTMO study and will be sampled again during the September 2007 event.

Table 3-2
June 2007 Quarterly On-Post Groundwater Results, Detected Analytes

				Sample ID	CS-MW20-LGR	CS-MW21-LGR	CS-MW22-LGR	CS-MW23-LGR	CS-MW24-LGR	CS-MW24-LGR	CS-MW25-LGR
				Sample Date	6/6/2007	6/7/2007	6/7/2007	6/5/2007	6/6/2007	6/6/2007	6/5/2007
				Sample Type	N	N	N	N	N	FD	N
Analytical Method	Laboratory Detection Limits										
Analyte	**MDL**	**RL**	**MCL/AL/SS**								
E310.1 (mg/L)											
Alkalinity, Bicarbonate	1.1	5	--		**280**	**280**	**270**	**260**	**250**	**250**	**270**
Alkalinity, Total (as CACO3)	1.1	10	--		**280**	**280**	**270**	**260**	**250**	**250**	**270**
SW6010B (ug/L)											
Chromium	2.6	10	100		**2.7F**	--	**17**	--	--	--	**65**
Barium	1	5	2000		**130**	**81**	**73**	**51**	**32**	**32**	**44**
Calcium	34	1100	--		**97,000**	**59,000**	**70,000**	**86,000**	**68,000**	**67,000**	**120,000**
Copper	4.5	10	AL=1300		--	--	**29**	**6.1F**	--	--	**32**
Iron	22	200	SS=300		**220**	**450**	**7300M**	**1100**	**470**	**380**	**3900**
Magnesium	43	100	--		**17,000**	**30,000**	**28,000**	**29,000**	**33,000**	**33,000**	**26,000**
Manganese	1.8	5	SS=50		**3.8F**	**9.7**	**67**	**24**	**5.9**	**4.6F**	**41**
Nickel	7.8	10	--		**20**	--	**28**	--	**11**	**8.8F**	**64**
Potassium	240	1000	--		**2,200**	**2,300**	**3,500**	**2,200**	**2,400**	**2,400**	**3,000**
Sodium	92	1000	--		**9,100**	**7,300**	**11,000**	**6,700**	**7,800**	**7,700**	**31,000**
Zinc	4.5	50	SS=5000		**65**	**470**	**8000**	**590**	**220**	**200**	**1800**
SW6020 (ug/L)											
Arsenic	0.21	20	10		**0.92F**	**3.8F**	**4.5F**	**1.5F**	**0.85F**	**0.88F**	**3.1F**
Cadmium	0.04	2	5		--	--	**0.12F**	**0.058F**	--	--	**0.087F**
Lead	0.18	2	AL=15		**1F**	**2.9**	**91**	**3.2**	**1.6F**	**1.5F**	**17**
SW7470A (ug/L)											
Mercury	0.027	1	2		--	--	**0.079F**	**7.8**	--	--	--
SW8260B (ug/L)											
Methylene chloride	0.21	2	5		--	--	--	--	**0.3F**	--	**0.33F**
Tetrachloroethene	0.14	1.4	5		**1.7**	--	--	--	--	--	--
SW9056 (mg/L)											
Sulfate	0.23	1	--		**17M**	**16**	**28**	**18M**	**30M**	**30M**	**33M**
Chloride	0.25	1	--		**12**	**7.3**	**9.1**	**8.4**	**9.9**	**10**	**22**
Fluoride	0.06	1	4		**0.32F**	**0.64F**	**0.82F**	**0.54F**	**0.64F**	**0.65F**	**0.47F**
Bromide	0.11	0.5	--		**0.13F**	--	--	--	--	--	--
Nitrate	0.042	1	10		**2.7**	--	--	**0.14F**	**0.63F**	**0.64F**	**0.73F**
Nitrite	0.049	1	1		--	--	--	**0.069F**	--	--	--

Precipitation per Quarter:	**Mar-07***	**Jun-07**
WS-S	9.86	11.96
WS-N	9.00	--
* Due to SCADA installation no data recorded 2/13/07 to 3/4/07		
-- weather station down due to SCADA installation		

BOLD	= Above the MCL
BOLD	= Above the RL
BOLD	= Above the MDL (F flagged)

Data Qualifiers:
F- The analyte was positively identified but the associated numerical value is below the RL.
J - The analyte was positively identified, the quantitation is an estimation.
U - The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
M- Matrix Effect Present

"--" indicates the result was non-detect
All values are reported in µg/L

SS = Secondary Standard
MCL = Maximum Contaminant Level
AL = Action Level
MDL = method detection limit
RL = reporting limit
N = normal sample
FD = field duplicate

APPENDIX A

EVALUATION OF DATA QUALITY OBJECTIVES ATTAINMENT

Appendix A Evaluation of Data Quality Objectives Attainment

Activity	Objectives	Action	Objective Attained?	Recommendations
Field Sampling	Conduct field sampling in accordance with procedures defined in the project work plan, SAP, QAPP, and HSP.	All sampling was conducted in accordance with the procedures described in the project plans.	Yes.	NA
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, 2007.	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, 2007 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 semiannually and will be sampled again during the September 2007 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-MW16-LGR, CS-MW4-LGR, CS-MW9-LGR, CS-MW9-BS, CS-MW9-CC, CS-MW11A-LGR, CS-MW11B-LGR, CS-MW18-LGR, CS-MW1-LGR, CS-MW1-CC, CS-MW2-LGR, CS-MW2-CC, CS-MW12-LGR, CS-MW12-CC, CS-MW17-LGR, CS-MW19-LGR, and CS-MW16-CC. 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-MW9-LGR, CS-MW9-BS, CS-MW9-CC, CS-MW16-LGR, CS-MW16-CC, CS-MW1-LGR, CS-MW1-BS, CS-MW1-CC, CS-MW12-LGR, CS-MW12-BS, CS-MW12-CC, CS-MW10-LGR, CS-MW10-CC, CS-MW6-LGR, CS-MW6-BS, CS-MW6-CC, CS-1, 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 and season through June 2007 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. All 6 of the wells scheduled to be sampled in June 2007 were sampled.	The horizontal and vertical extent of groundwater contamination is continuously monitored.	Continue groundwater monitoring and construct additional wells as necessary.

Activity	Objectives	Action	Objective Attained?	Recommendations
	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-MW20-LGR, CS-MW21-LGR, CS-MW22-LGR, CS-MW23-LGR, CS-MW24-LGR, and CS-MW25-LGR. Samples were analyzed for the full list of VOCs using USEPA method SW8260B, metals (barium, chromium, magnesium, sodium, zinc, calcium, copper, potassium, manganese, nickel, iron, cadmium, arsenic, lead, and mercury), and natural water quality parameters (carbonate, bicarbonate, bromide, fluoride, nitrate, sulfate, chloride, nitrite, and phosphate). Analyses were conducted in accordance with the AFCEE QAPP and approved variances. All RLs were below MCLs, as listed below:	Yes.	Continue sampling.
		ANALYTE / **RL (µg /L)** / **MCL(µg/L)** Chloroform 0.4 100 Chloromethane 1.3 -- Dibromochloromethane 0.5 100 1,1-DCE 1.2 7 *cis*-1,2-DCE 1.2 70 *trans*-1,2-DCE 0.6 100 Methylene Chloride 2 5 PCE 1.4 5 TCE 1.0 5		
		ANALYTE / **RL (µg/L)** / **MCL (µg /L)** Barium 5 2,000 Chromium 10 100 Copper 10 1,300 Nickel 10 100 Zinc 10 11,000 Arsenic 5 50 Cadmium 1 3 Lead 2 15 Mercury 1 2		

Activity	Objectives	Action	Objective Attained?	Recommendations
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, and AFCEE approval was obtained.	Yes.	NA
		All data flagged with a "U," "J," and "F" are usable for characterizing contamination. All "R" flagged data are considered unusable.	Yes.	NA
		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.

Activity	Objectives	Action	Objective Attained?	Recommendations
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
June 2007 Quarterly On-Post Groundwater Analytical Results

Sample ID	CS-MW20-LGR	CS-MW21-LGR	CS-MW22-LGR	CS-MW23-LGR	CS-MW24-LGR	CS-MW24-LGR	CS-MW25-LGR
Sample Date	6/6/2007	6/7/2007	6/7/2007	6/5/2007	6/6/2007	6/6/2007	6/5/2007
Sample Type	N	N	N	N	N	FD	N
Analytical Method							
Analyte							
E310.1 (mg/L)							
Alkalinity, Bicarbonate	**280**	**280**	**270**	**260**	**250**	**250**	**270**
Alkalinity, Carbonate	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U	1.1U
Alkalinity, Total (as CACO3)	**280**	**280**	**270**	**260**	**250**	**250**	**270**
SW6010B (ug/L)							
Chromium	**2.7F**	2.6U	**17**	2.6U	2.6U	2.6U	**65**
Barium	**130**	**81**	**73**	**51**	**32**	**32**	**44**
Calcium	**97000**	**59000**	**70000**	**86000**	**68000**	**67000**	**120000**
Copper	4.5U	4.5U	**29**	**6.1F**	4.5U	4.5U	**32**
Iron	**220**	**450**	**7300M**	**1100**	**470**	**380**	**3900**
Magnesium	**17,000**	**30,000**	**28,000**	**29,000**	**33,000**	**33,000**	**26,000**
Manganese	**3.8F**	**9.7**	**67**	**24**	**5.9**	**4.6F**	**41**
Nickel	**20**	7.8U	**28**	7.8U	**11**	**8.8F**	**64**
Potassium	**2,200**	**2,300**	**3,500**	**2,200**	**2,400**	**2,400**	**3,000**
Sodium	**9,100**	**7,300**	**11,000**	**6,700**	**7,800**	**7,700**	**31,000**
Zinc	**65**	**470**	**8000**	**590**	**220**	**200**	**1800**
SW6020 (ug/L)							
Lead	**1F**	**2.9**	**91**	**3.2**	**1.6F**	**1.5F**	**17**
Arsenic	**0.92F**	**3.8F**	**4.5F**	**1.5F**	**0.85F**	**0.88F**	**3.1F**
Cadmium	0.04U	0.04U	**0.12F**	**0.058F**	0.04U	0.04U	**0.087F**
SW7470A (ug/L)							
Mercury	0.027U	0.027U	**0.079F**	**7.8**	0.027U	0.027U	0.027U
SW8260B (ug/L)							
Benzene	0.13U	0.13U	0.13U	0.13U	0.13U	0.13U	0.13U
Bromobenzene	0.066U	0.066U	0.066U	0.066U	0.066U	0.066U	0.066U
Bromochloromethane	0.21U	0.21U	0.21U	0.21U	0.21U	0.21U	0.21U
Bromodichloromethane	0.21U	0.21U	0.21U	0.21U	0.21U	0.21U	0.21U
Bromoform	0.22U	0.22U	0.22U	0.22U	0.22U	0.22U	0.22U
Bromomethane	0.083U	0.083U	0.083U	0.083U	0.083U	0.083U	0.083U
Butylbenzene, N-	0.12U	0.12U	0.12U	0.12U	0.12U	0.12U	0.12U
Butylbenzene, sec-	0.18U	0.18U	0.18U	0.18U	0.18U	0.18U	0.18U
Butylbenzene, tert-	0.099U	0.099U	0.099U	0.099U	0.099U	0.099U	0.099U
Carbon tetrachloride	0.11U	0.11U	0.11U	0.11U	0.11U	0.11U	0.11U
Chlorobenzene	0.076U	0.076U	0.076U	0.076U	0.076U	0.076U	0.076U
Chloroethane	0.13U	0.13U	0.13U	0.13U	0.13U	0.13U	0.13U
Chloroform	0.052U	0.052U	0.052U	0.052U	0.052U	0.052U	0.052U
Chlorohexane, 1-	0.11U	0.11U	0.11U	0.11U	0.11U	0.11U	0.11U

Appendix B
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Sample ID	CS-MW20-LGR	CS-MW21-LGR	CS-MW22-LGR	CS-MW23-LGR	CS-MW24-LGR	CS-MW24-LGR	CS-MW25-LGR
Sample Date	6/6/2007	6/7/2007	6/7/2007	6/5/2007	6/6/2007	6/6/2007	6/5/2007
Sample Type	N	N	N	N	N	FD	N
Analytical Method							
Analyte							
Chloromethane	0.083U	0.083U	0.083U	0.083U	0.083U	0.083U	0.083U
Chlorotoluene, 2-	0.088U	0.088U	0.088U	0.088U	0.088U	0.088U	0.088U
Chlorotoluene, 4-	0.083U	0.083U	0.083U	0.083U	0.083U	0.083U	0.083U
Dibromo-3-chloropropane, 1,2-	0.71U	0.71U	0.71U	0.71U	0.71U	0.71U	0.71U
Dibromochloromethane	0.046U	0.046U	0.046U	0.046U	0.046U	0.046U	0.046U
Dibromomethane	0.17U	0.17U	0.17U	0.17U	0.17U	0.17U	0.17U
Dichlorobenzene, 1,2-	0.11U	0.11U	0.11U	0.11U	0.11U	0.11U	0.11U
Dichlorobenzene, 1,3-	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U
Dichlorobenzene, 1,4-	0.12U	0.12U	0.12U	0.12U	0.12U	0.12U	0.12U
Dichlorodifluoromethane	0.049U	0.049U	0.049U	0.049U	0.049U	0.049U	0.049U
Dichloroethane, 1,1-	0.057U	0.057U	0.057U	0.057U	0.057U	0.057U	0.057U
Dichloroethane, 1,2-	0.068U	0.068U	0.068U	0.068U	0.068U	0.068U	0.068U
Dichloroethene, 1,1-	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U
Dichloroethene, cis-1,2-	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U
Dichloroethene, trans-1,2-	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U
Dichloropropane, 1,2-	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U
Dichloropropane, 1,3-	0.077U	0.077U	0.077U	0.077U	0.077U	0.077U	0.077U
Dichloropropane, 2,2-	0.18U	0.18U	0.18U	0.18U	0.18U	0.18U	0.18U
Dichloropropene, 1,1-	0.08U	0.08U	0.08U	0.08U	0.08U	0.08U	0.08U
Dichloropropene, cis-1,3-	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U
Dichloropropene, trans-1,3-	0.065U	0.065U	0.065U	0.065U	0.065U	0.065U	0.065U
Ethylbenzene	0.099U	0.099U	0.099U	0.099U	0.099U	0.099U	0.099U
Ethylene dibromide	0.18U	0.18U	0.18U	0.18U	0.18U	0.18U	0.18U
Hexachlorobutadiene	0.16U	0.16U	0.16U	0.16U	0.16U	0.16U	0.16U
Isopropylbenzene	0.12U	0.12U	0.12U	0.12U	0.12U	0.12U	0.12U
Isopropyltoluene, 4- (Cymene, p-)	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U
Methylene chloride	0.21U	0.21U	0.21U	0.21U	**0.3F**	0.21U	**0.33F**
Naphthalene	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U	0.25U
Propylbenzene, N-	0.13U	0.13U	0.13U	0.13U	0.13U	0.13U	0.13U
Styrene	0.066U	0.066U	0.066U	0.066U	0.066U	0.066U	0.066U
Tetrachloroethane, 1,1,1,2-	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U
Tetrachloroethane, 1,1,2,2-	0.15U	0.15U	0.15U	0.15U	0.15U	0.15U	0.15U
Tetrachloroethene	**1.7**	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U
Toluene	0.068U	0.068U	0.068U	0.068U	0.068U	0.068U	0.068U
Trichlorobenzene, 1,2,3-	0.16U	0.16U	0.16U	0.16U	0.16U	0.16U	0.16U
Trichlorobenzene, 1,2,4-	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U
Trichloroethane, 1,1,1-	0.053U	0.053U	0.053U	0.053U	0.053U	0.053U	0.053U
Trichloroethane, 1,1,2-	0.13U	0.13U	0.13U	0.13U	0.13U	0.13U	0.13U

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Sample ID	CS-MW20-LGR	CS-MW21-LGR	CS-MW22-LGR	CS-MW23-LGR	CS-MW24-LGR	CS-MW24-LGR	CS-MW25-LGR
Sample Date	6/6/2007	6/7/2007	6/7/2007	6/5/2007	6/6/2007	6/6/2007	6/5/2007
Sample Type	N	N	N	N	N	FD	N
Analytical Method							
Analyte							
Trichloroethene	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U
Trichlorofluoromethane	0.067U	0.067U	0.067U	0.067U	0.067U	0.067U	0.067U
Trichloropropane, 1,2,3-	0.27U	0.27U	0.27U	0.27U	0.27U	0.27U	0.27U
Trimethylbenzene, 1,2,4-	0.081U	0.081U	0.081U	0.081U	0.081U	0.081U	0.081U
Trimethylbenzene, 1,3,5-	0.083U	0.083U	0.083U	0.083U	0.083U	0.083U	0.083U
Vinyl chloride	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U
Xylene, m,p-	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U	0.1U
Xylene, o-	0.087U	0.087U	0.087U	0.087U	0.087U	0.087U	0.087U
SW9056 (mg/L)							
Sulfate	**17M**	**16**	**28**	**18M**	**30M**	**30M**	**33M**
Chloride	**12**	**7.3**	**9.1**	**8.4**	**9.9**	**10**	**22**
Fluoride	**0.32F**	**0.64F**	**0.82F**	**0.54F**	**0.64F**	**0.65F**	**0.47F**
Bromide	**0.13F**	0.11U	0.11U	0.11U	0.11U	0.11U	0.11U
Phosphorus, Total Orthophosphate	0.19U	0.19U	0.19U	0.19U	0.19U	0.19U	0.19U
Nitrate	**2.7**	0.042U	0.042U	**0.14F**	**0.63F**	**0.64F**	**0.73F**
Nitrite	0.049U	0.049U	0.049U	**0.069F**	0.049U	0.049U	0.049U

Data Qualifiers:
F- The analyte was positively identified but the associated numerical value is below the RL.
J - The analyte was positively identified, the quantitation is an estimation.
U - The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
M- Matrix Effect Present

"--" indicates the result was non-detect
All values are reported in µg/L
* = dilution run was performed. Values are in ug/L.

BOLD, BOXED & SHADED	= Above the MCL
BOLD & BOXED	= Above the RL
BOLD	= Above the MDL (F flagged)