

FINAL
MARCH 2006

On-Post
Quarterly Groundwater Monitoring Report



Prepared For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

August 2006

GEOSCIENTIST CERTIFICATION

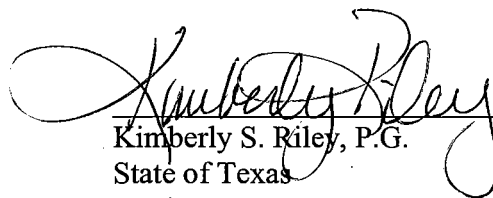
March 2006 On-post Quarterly Groundwater Monitoring Report

For

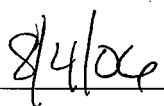
Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

I, Kimberly S. Riley, P.G., hereby certify that the March 2006 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 verbal information provided by the CSSA Environmental Office, laboratory data provided by APPL, and field data obtained during groundwater monitoring conducted at the site in March 2006, and is true and accurate to the best of my knowledge and belief.





Kimberly S. Riley, P.G.
State of Texas
Geology License No. 6068



Date

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MARCH 2006 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 March 2006 in accordance with the Administrative Order on Consent dated May 5, 1999. The previous on-post sampling event was performed in September 2005. Laboratory analytical results are presented along with potentiometric and isoconcentration contour figures. The purpose of this report is to present a summary of the sampling results. Similar reports will summarize the planned June and September 2006 sampling results. The results from all four 2006 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 scoped under the Air Force Center for Environmental Excellence (AFCEE) 4P/AE Contract 41624-03-D-8613, Task Order (TO) 0008, was performed March 13, 2006 through March 17, 2006, at CSSA. On-post groundwater monitoring conducted under this TO began with the September 2003 sampling event. Groundwater monitoring conducted prior to September 2003 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.

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 addition to the DQOs, 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 only in December 2005, as approved by the Texas Commission on Environmental Quality (TCEQ) and the United States Environmental Protection Agency (USEPA).

2.0 BASEWIDE FLOW DIRECTION AND GRADIENT

Forty water level measurements were recorded on March 13, 2006, from on-post wells completed in the Lower Glen Rose (LGR) formation. The groundwater potentiometric surface map illustrating groundwater elevations from March 2006 is shown in **Figure 2-1**.

The March 2006 potentiometric surface map for LGR-screened wells exhibited a wide range of groundwater elevations, from a minimum of 907.59 feet MSL at CS-MW10-LGR to a maximum 1049.49 feet 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. On average, groundwater elevations in March 2006 dropped 24.56 feet from the elevations measured in December 2005, reflecting the ongoing drought in the area. March 2006 groundwater elevations were some of the lowest elevations recorded since 1999 in the LGR wells. From December 17, 2005 to March 17, 2006 weather station south (WS-S) recorded 15 rainfall events with 1.11 inches and from January 3, 2006 to March 17, 2006 weather station north (WS-N) recorded 22 rainfall events totaling 2.26 inches of rain.

Well CS-MW4-LGR in the central portion of CSSA had one of the highest groundwater elevations (1004.30 feet MSL) of LGR screened wells measured in March 2006 (**Figure 2-1**). This elevation was 22 to 26 feet higher than the nearest comparable wells (CS-MW2-LGR and CS-MW5-LGR). The CS-MW4-LGR well consistently reports a higher groundwater elevation than other wells screened in the same formation. Unlike the general trend at CSSA, groundwater flow appears to radiate outward to the north, east, and south at CS-MW4-LGR.

An overall groundwater gradient averaged across CSSA is to the south-southwest at 0.0084 ft/ft. The groundwater gradient varies in direction and velocity in different areas of CSSA. Groundwater gradients calculated from different LGR wells ranged from 0.0039 ft/ft to 0.0143 ft/ft.

3.0 MARCH ANALYTICAL RESULTS

3.1 Monitoring Wells

Under the provisions of the groundwater monitoring DQOs and the LTMO study, the schedule for sampling on-post for March 2006 included sixteen on-post wells. **Table 3-1** provides a sampling overview for March 2006 and the schedule under the LTMO recommendations. Due to the decrease in groundwater elevations this event, five wells (CS-MW4-LGR, CS-MW5-LGR, CS-MW11B-LGR, CS-MW18-LGR, and CS-4) could not be sampled because the water level was below the pump depth. Two wells (CS-MW16-LGR and CS-MW16-CC) were sampled using the high capacity submersible pumps installed in the wells and the remaining nine wells (CS-MW1-LGR, CS-MW2-LGR, CS-MW3-LGR, CS-MW6-LGR, CS-MW7-LGR, CS-MW9-LGR, CS-MW11A-LGR, CS-MW19-LGR and CS-D) were sampled using low-flow pumps.

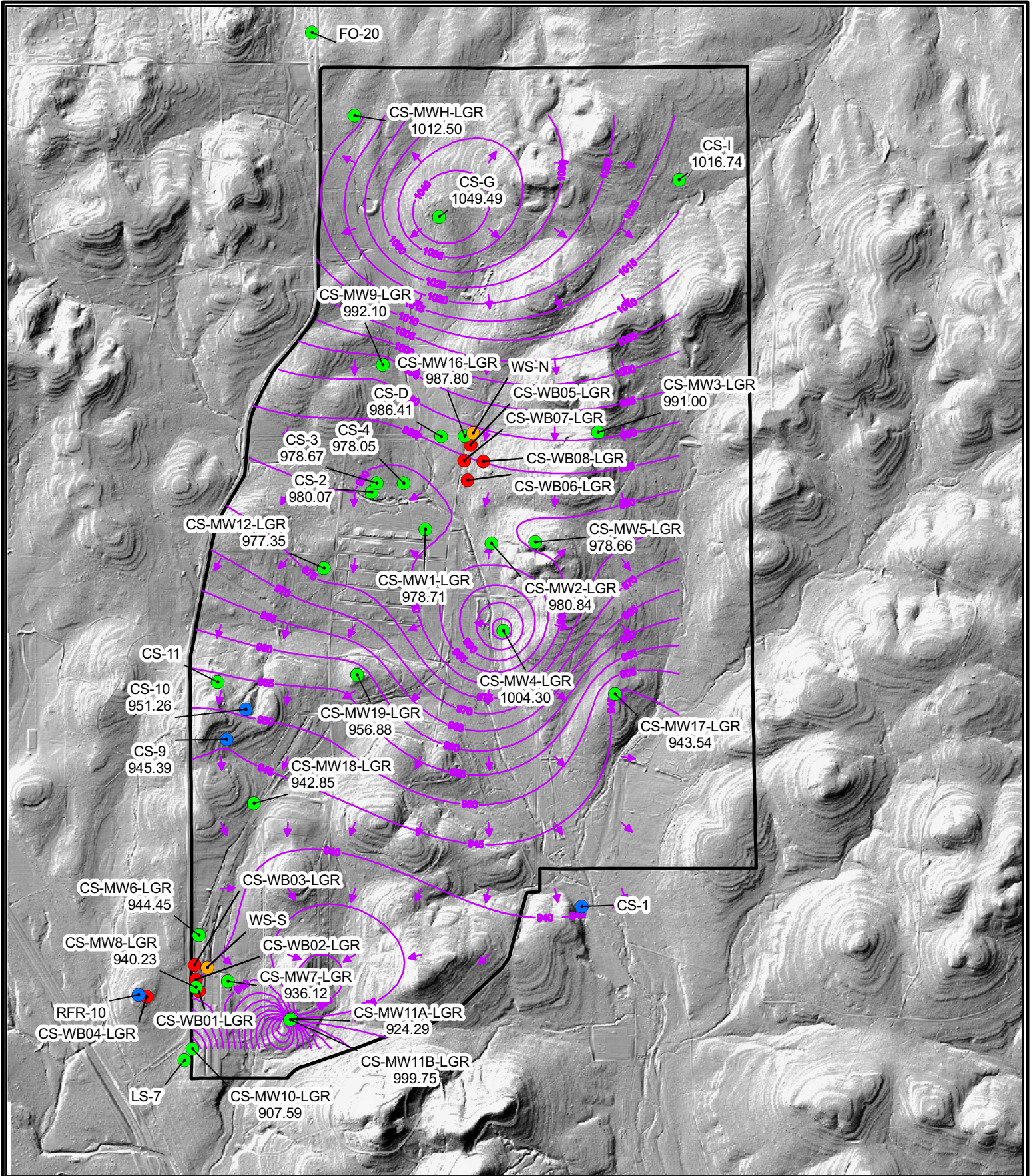


Figure 2.1
 March 2006 Potentiometric
 Surface Map, LGR Wells
 Camp Stanley Storage Activity

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

Count	Well ID	Analytes	Current Sample Date	Next Sample Date	LTMO Sampling Frequency
1	CS-MW1-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
2	CS-MW1-BS	(VOC on-post short list)	Sep-07	Sep-07	Biennial
3	CS-MW1-CC	(VOC on-post short list)	Sep-07	Sep-07	Biennial
4	CS-MW2-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
5	CS-MW2-CC	(VOC on-post short list)	Sep-07	Sep-07	Biennial
6	CS-MW3-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
7	CS-MW4-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
8	CS-MW5-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
9	CS-MW6-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
10	CS-MW6-BS	(VOC on-post short list)	Sep-07	Sep-07	Biennial
11	CS-MW6-CC	(VOC on-post short list)	Sep-07	Sep-07	Biennial
12	CS-MW7-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
13	CS-MW7-CC	(VOC on-post short list)	Sep-07	Sep-07	Biennial
14	CS-MW8-LGR	(VOC on-post short list)	Jun-06	Jun-06	Every 9 months*
15	CS-MW8-CC	(VOC on-post short list)	Sep-07	Sep-07	Biennial
16	CS-MW9-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
17	CS-MW9-BS	(VOC on-post short list)	Sep-07	Sep-07	Biennial
18	CS-MW9-CC	(VOC on-post short list)	Sep-07	Sep-07	Biennial
19	CS-MW10-LGR	(VOC on-post short list)	Jun-06	Jun-06	Every 9 months*
20	CS-MW10-CC	(VOC on-post short list)	Sep-07	Sep-07	Biennial
21	CS-MW11A-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
22	CS-MW11B-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
23	CS-MW12-LGR	(VOC on-post short list)	Jun-06	Jun-06	Every 9 months*
24	CS-MW12-BS	(VOC on-post short list)	Sep-07	Sep-07	Biennial
25	CS-MW12-CC	(VOC on-post short list)	Sep-07	Sep-07	Biennial
26	CS-MW16-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
27	CS-MW16-CC	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
28	CW-MW17-LGR	(VOC on-post short list)	Jun-06	Jun-06	Every 9 months*
29	CS-MW18-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
30	CS-MW19-LGR	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
31	CS-1	(VOC full list & metals)	Jun-06	Jun-06	Every 9 months*
32	CS-2	(VOC on-post short list)	Jun-06	Jun-06	Every 9 months*
33	CS-4	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
34	CS-9	(VOC full list & metals)	Jun-06	Jun-06	Every 9 months*
35	CS-10	(VOC full list & metals)	Jun-06	Jun-06	Every 9 months*
36	CS-11	(VOC on-post short list)	Jun-06	Jun-06	Every 9 months*
37	CS-D	(VOC on-post short list)	Mar-06	Sep-06	Semi-annual
38	CS-MWG-LGR	(VOC on-post short list)	Jun-06	Jun-06	Every 9 months*
39	CS-MWH-LGR	(VOC on-post short list)	Sep-07	Sep-07	Biennial
40	CS-I	(VOC on-post short list)	Jun-06	Jun-06	Every 9 months*

*Wells recommended for annual sampling frequency in the LTMO are scheduled every nine months (every third quarter) to gather Metals were last sampled in June 2005, and will be sampled annually for on-post monitoring wells and quarterly for on-post drinking water wells under the provisions of the DQOs.

Wells sampled by low-flow pump were purged until the field parameters stabilized. Field parameters including pH, temperature and conductivity were recorded to ensure stabilization during well purging. On-post monitoring wells were sampled in March 2006 for the volatile organic compounds (VOCs) bromodichloromethane, bromoform, chloroform, dibromochloromethane, dichlorodifluoromethane, 1,1-dichloroethene, *cis*-1,2-dichloroethene (*cis*-1,2-DCE), *trans*-1,2-dichloroethene (*trans*-1,2-DCE), methylene chloride, naphthalene, tetrachloroethene (PCE), trichloroethene (TCE), toluene, and vinyl chloride. Samples were analyzed by Severn Trent Laboratories in Arvada, CO. All detected concentrations of VOCs are presented in **Table 3-2**. Full analytical results are presented in **Appendix B**.

Results from on-post monitoring wells are considered definitive data and are subject to data validation and verification under the provisions of the CSSA Quality Assurance Project Plan (QAPP). Parsons data package numbers TO 0008 #189 and #190 containing the analytical results from this sampling event were received by Parsons March 28, 2006. Data validation was conducted and the data validation summary was submitted to AFCEE on April 27, 2006. AFCEE approved the data packages on May 9, 2006. 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 sampling on-post for March 2006 included selected zones from four Westbay-equipped wells. Due to the decrease in groundwater elevations, certain zones (CS-WB01-UGR-01, CS-WB02-UGR-01, CS-WB02-LGR-01, CS-WB02-LGR-02, CS-WB02-LGR-09, CS-WB03-UGR-01, CS-WB03-LGR-01, CS-WB03-LGR-02, CS-WB04-UGR-01, and CS-WB04-LGR-02) could not be sampled because they were dry. The remaining thirty-one zones contained water and were sampled. The Westbay-equipped wells are sampled using Westbay Instruments, Inc., equipment and sampling methods.

The Westbay well zones were sampled in March 2006 for the VOCs PCE, TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, isopropyl alcohol, acetone, toluene, and 2-butanone by DHL Analytical, Inc. Westbay data are used for screening purposes only. Trip blanks are analyzed, but other quality assurance/quality control (QA/QC) samples are not normally collected. All detected concentrations of VOCs are presented in **Table 3-3**. Full analytical results are presented in **Appendix C**.

Table 3-2
March 2006 On-Post Quarterly Groundwater Results, Detected Analytes

Well ID	Date Sampled	1,1-DCE	cis -1,2-DCE	Methylene chloride	Naphthalene	PCE	Toluene	trans -1,2-DCE	TCE	Vinyl Chloride	Comment
CS-MW1-LGR	3/14/06	--	20	0.19F	--	12	--	0.62	26	--	
CS-MW2-LGR	3/14/06	--	1.8	0.24F	--	0.32	2.5	--	0.22F	--	
CS-MW3-LGR	3/17/06	0.17M	--	0.25F	0.23M	--	--	--	--	--	
CS-MW6-LGR	3/15/06	--	--	--	--	--	--	--	--	--	
CS-MW7-LGR	3/15/06	--	--	--	--	--	--	--	--	--	
CS-MW9-LGR	3/17/06	--	--	--	--	0.20F	--	--	--	--	
CS-MW11A-LGR	3/17/06	0.17M	--	0.22F	0.23M	--	--	--	--	--	
CS-MW16-LGR	3/14/06	--	58	0.21F	--	53	--	1.5	59	--	
CS-MW16-CC	3/14/06	0.37F	68*	--	--	0.86F	160*	23	12	0.33F	Toluene possibly related to pump installation
CS-MW19-LGR	3/16/06	0.17M	--	0.35F	0.23M	0.37F	--	--	--	--	
CS-MW19-LGR FD	3/16/06	0.17M	--	0.19F	0.23M	0.33F	--	--	--	--	
CS-D	3/16/06	0.17M	52	0.19F	0.23M	53	--	0.88	49	--	
Laboratory Detection Limits											
Method Detection Limit	MDL	0.17	0.2	0.17	0.23	0.17	0.17	0.16	0.16	0.21	
Reporting Limit	RL	1.2	1.2	2	1	1.4	1.1	0.6	1	1.1	
Maximum Contaminant Level	MCL	7	70	5	--	5	1000	100	5	2	

Precipitation per Quarter:	March 2006
WS-S	1.11
WS-N	2.26

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

BOLD	Value > or = MCL
BOLD	MCL > Value > or = RL
BOLD	RL > Value > MDL

Table 3-3
March 2006 Westbay Groundwater Results, Detected Analytes

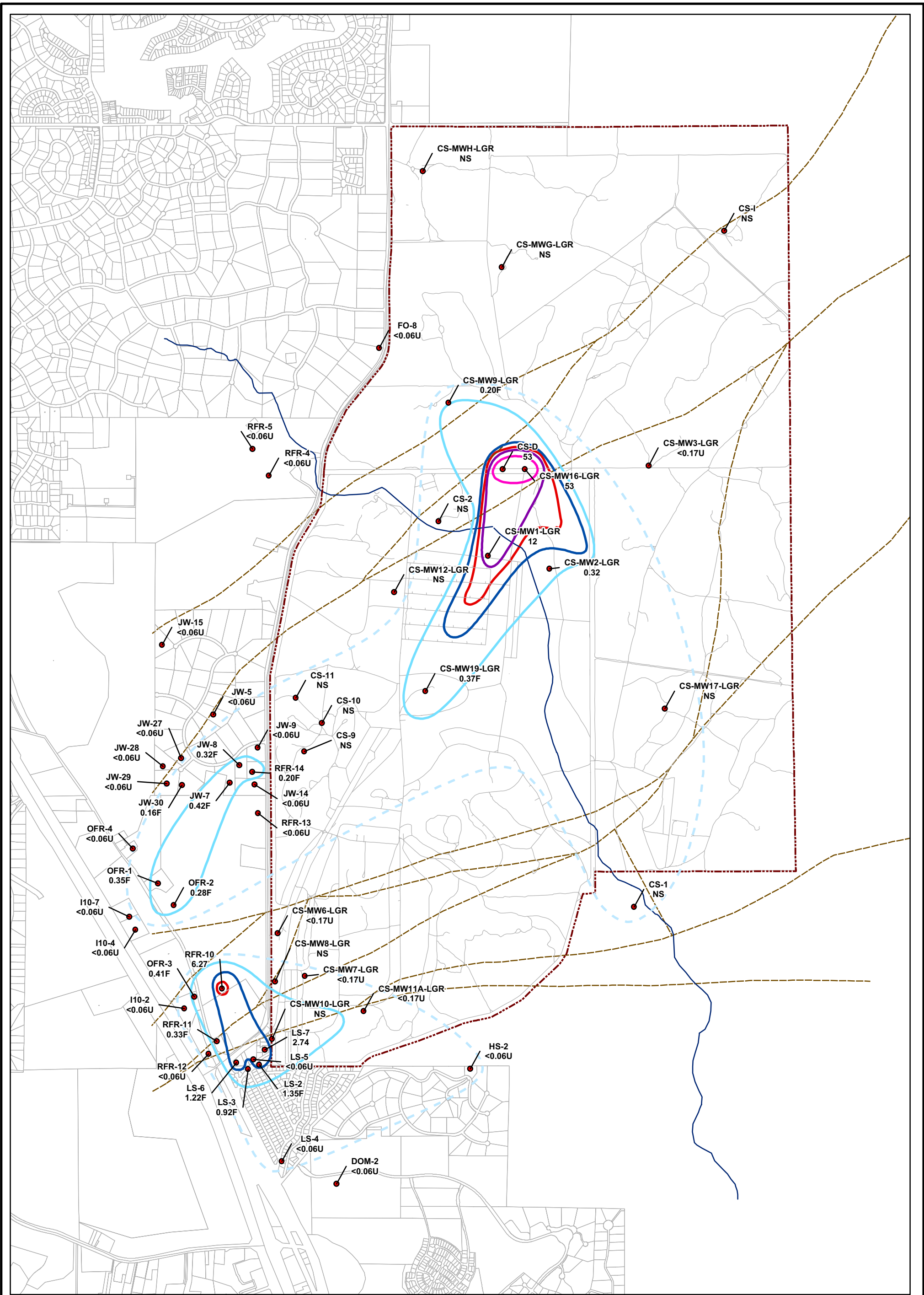
Well ID	Date Sampled	2-Butanone	Acetone	<i>cis</i> -1,2-DCE	Isopropyl alcohol	PCE	Toluene	<i>trans</i> -1,2-DCE	TCE
CS-WB01-LGR-01	3/14/06	--	--	--	--	4.35	--	--	--
CS-WB01-LGR-02	3/14/06	--	--	--	--	8.85	--	--	3.82
CS-WB01-LGR-03	3/14/06	--	21.2	--	--	2.37	--	--	5.7
CS-WB01-LGR-04	3/14/06	--	--	--	--	--	--	--	--
CS-WB01-LGR-05	3/14/06	--	--	--	--	--	--	--	--
CS-WB01-LGR-06	3/14/06	--	--	--	--	--	--	--	0.66
CS-WB01-LGR-07	3/14/06	--	5.62	--	--	9.95	--	--	9.97
CS-WB01-LGR-08	3/14/06	--	--	--	--	0.74	--	--	1.25
CS-WB01-LGR-09	3/14/06	--	--	0.41	--	12.1	--	--	18.7
CS-WB02-LGR-03	3/14/06	--	--	--	--	3.79	--	--	1.63
CS-WB02-LGR-04	3/14/06	--	--	--	--	2.8	--	--	9.55
CS-WB02-LGR-05	3/14/06	--	--	--	--	0.92	--	--	3.61
CS-WB02-LGR-06	3/14/06	--	--	--	--	1.13	--	--	3.55
CS-WB02-LGR-07	3/14/06	--	--	--	--	1.0	--	--	0.65
CS-WB02-LGR-08	3/14/06	--	--	--	--	2.4	--	--	1.99
CS-WB03-LGR-03	3/16/06	--	--	0.53	--	31.7	--	--	16.3
CS-WB03-LGR-04	3/16/06	--	--	0.2	--	25.1	--	--	11.3
CS-WB03-LGR-05	3/16/06	--	--	--	--	21.1	--	--	4.59
CS-WB03-LGR-06	3/16/06	--	--	--	--	21.1	--	--	2.9
CS-WB03-LGR-07	3/16/06	--	--	--	--	16.8	--	--	3.69
CS-WB03-LGR-08	3/16/06	--	--	--	--	20.4	--	--	1.95
CS-WB03-LGR-09	3/16/06	--	--	--	--	12.7	--	--	8.05
CS-WB04-LGR-01	3/21/06	--	--	--	--	--	--	--	--
CS-WB04-LGR-03	3/21/06	--	--	--	--	--	--	--	--
CS-WB04-LGR-04	3/21/06	--	--	--	--	--	--	--	--
CS-WB04-LGR-06	3/21/06	--	--	1.57	--	--	--	--	2.91
CS-WB04-LGR-07	3/21/06	--	--	0.71	--	1.14	--	--	2.09
CS-WB04-LGR-08	3/21/06	--	--	--	--	--	--	--	--
CS-WB04-LGR-09	3/21/06	--	--	0.21	--	7.99	--	--	7.89
CS-WB04-LGR-10	3/21/06	--	--	--	--	--	--	--	--
CS-WB04-LGR-11	3/21/06	--	--	--	--	--	--	--	--
Laboratory Detection Limits									
Method Detection Limit	MDL	5	5	0.2	5	0.6	0.6	0.2	0.6
Reporting Limit	RL	15	15	1	15	2	2	1	2
Maximum Contaminant Level	MCL	7	70	5	--	5	1000	100	5

BOLD	Value > or = MCL
BOLD	MCL > Value > or = RL
BOLD	RL > Value > MDL

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

4.0 SUMMARY

- PCE exceeded the MCL in wells CS-MW1-LGR, CS-MW16-LGR and CS-D.
- TCE exceeded the MCL in wells CS-MW1-LGR, CS-MW16-LGR, CS-MW16-CC and CS-D.
- *Cis*-1,2-DCE was detected below the MCL in wells CS-MW1-LGR, CS-MW2-LGR, CS-MW16-LGR, CS-MW16-CC and CS-D.
- *Trans*-1,2-DCE was detected below the MCL in wells CS-MW1-LGR, CS-MW16-LGR, CS-MW16-CC and CS-D.
- Vinyl chloride was detected below the reporting limit in well CS-MW16-CC. Vinyl chloride is a product in sequential dechlorination of chlorinated compounds.
- No VOCs were detected in wells CS-MW6-LGR and CS-MW7-LGR.
- Monitoring wells CS-MW4-LGR, CS-MW5-LGR, CS-MW11B-LGR, CS-MW18-LGR, and CS-4 were not sampled due to extremely low water levels.
- Toluene was detected at a concentration of 160 µg/L in well CS-MW16-CC in March 2006, above the RL. Toluene has been detected in this well previously however all detections were below the RL. The new pump installation may have contributed to the toluene level detected.
- Monitoring well CS-MW9-LGR reported a detection of PCE (0.20 µg/L), below the RL. PCE has not been detected in this well since March 2004.
- Plume maps showing PCE, TCE and *cis*-1,2-DCE detections for the LGR are illustrated in **Figure 4.1** through **Figure 4.3**.
- Water levels averaged from LGR, BS, and CC wells decreased 24.26 feet this quarter due to the lack of rainfall and the current drought conditions.
- Twenty-three Westbay[®] zones sampled contained VOCs. Thirteen Westbay[®] zones exceeded MCLs for PCE and/or TCE. WB-03, located due west of the AOC-65 area found the highest VOC levels (PCE, 31.7 µg/L). Eight Westbay[®] zones were non-detect.
- Westbay zones CS-WB01-UGR-01, CS-WB02-UGR-01, CS-WB02-LGR-01, CS-WB02-LGR-02, CS-WB02-LGR-09, CS-WB03-UGR-01, CS-WB03-LGR-01, CS-WB03-LGR-02, CS-WB04-UGR-01, CS-WB04-LGR-02 were dry during the March 2006 sampling event, therefore no samples were collected from these zones.
- Groundwater contamination levels in the SWMU B-3 area have fluctuated significantly since the last sampling event in 2005. VOC levels in CS-MW16-CC and CS-D have fallen sharply while VOC levels in CS-MW16-LGR have risen. These data suggest the groundwater plume may be shifting.



- Wells
 - Parcels
 - CSSA Boundary
 - Salado Creek
 - Faults
- PCE Concentrations (µg/L)**
- Estimated Plume Boundary Based on Historical Data
 - 0.2
 - 1.00
 - 5.00 (MCL)
 - 10.00
 - 50.00

Figure 4.1

PCE Concentrations for LGR Wells, March 2006

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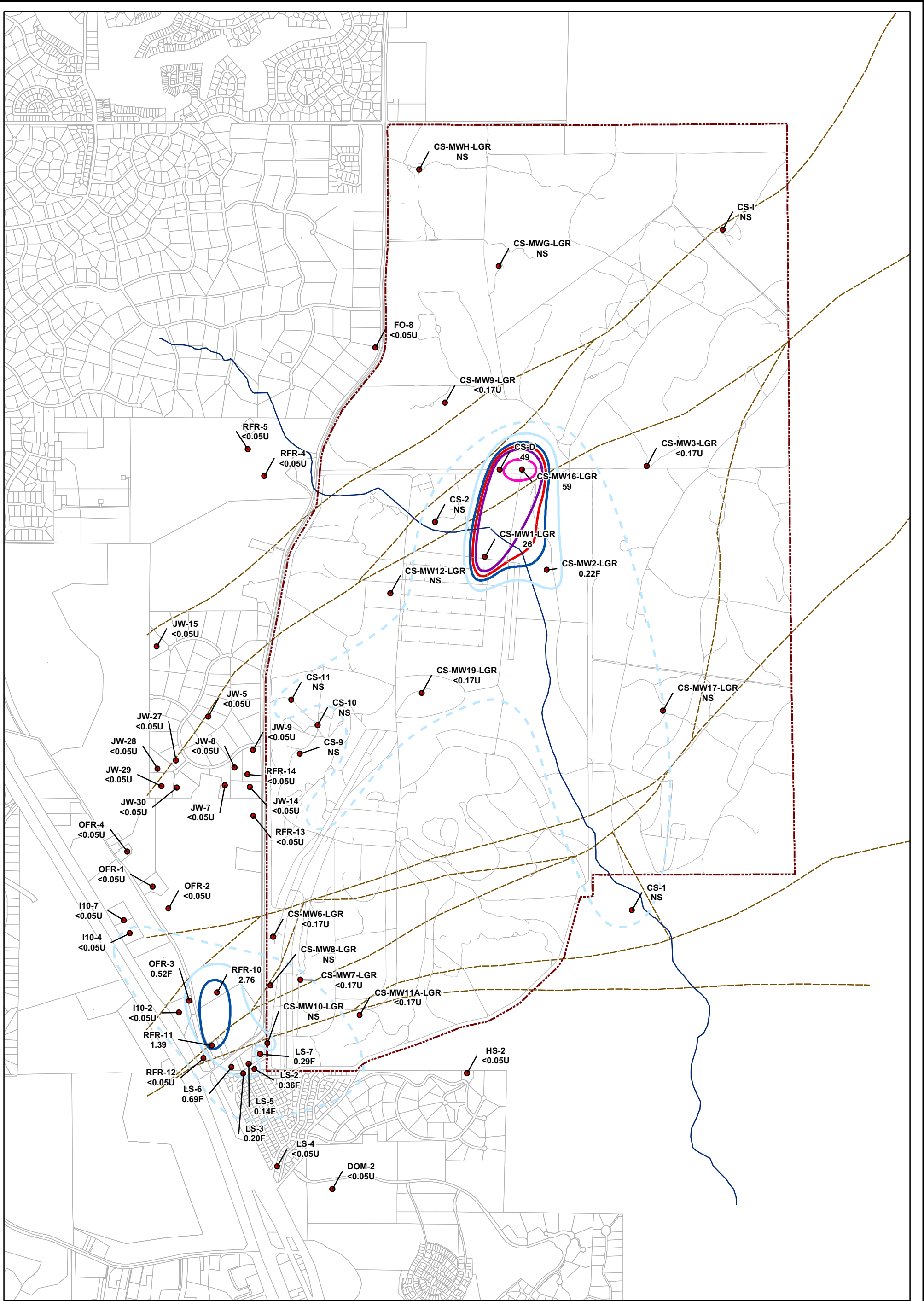


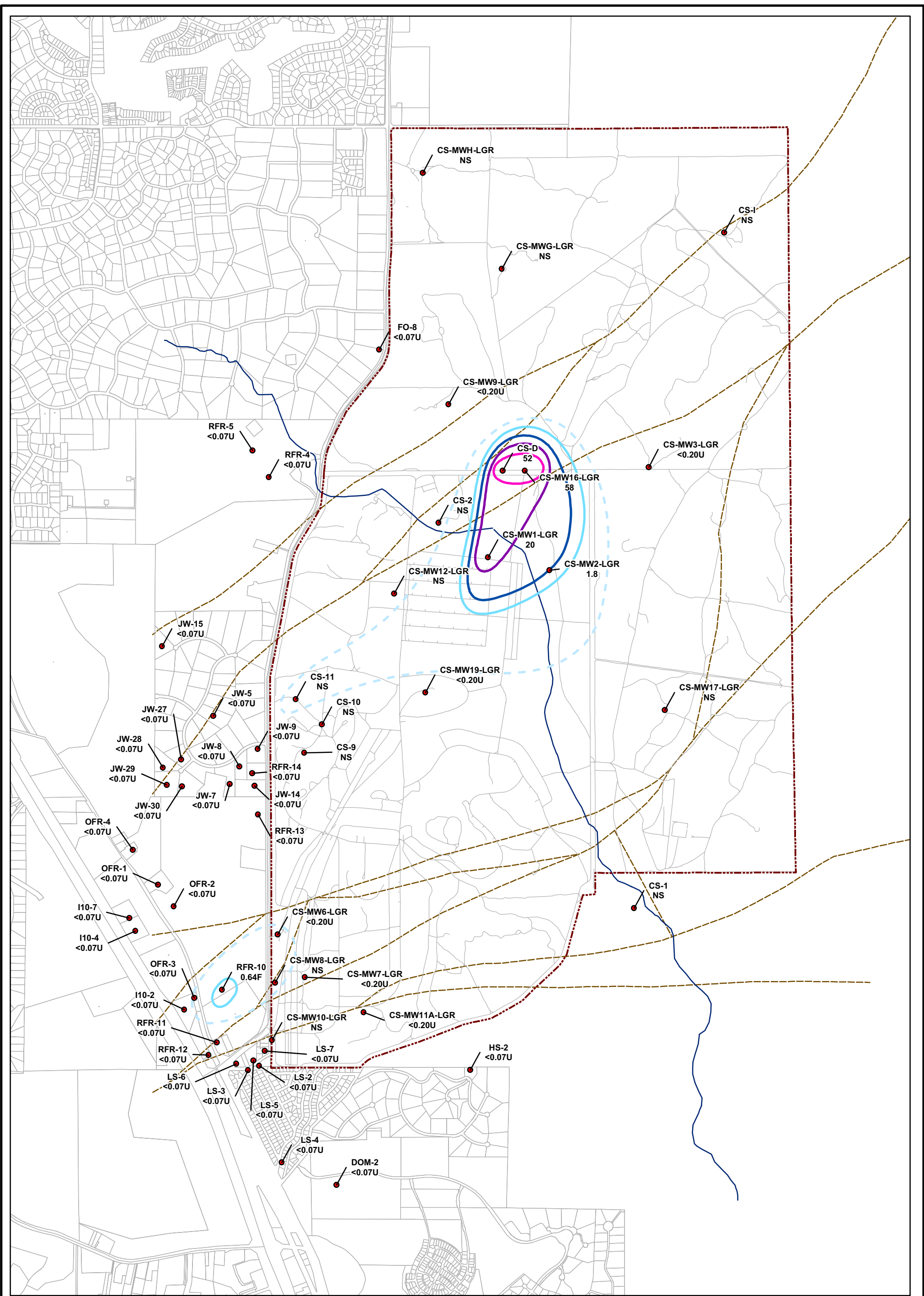
Figure 4.2

TCE Concentrations for LGR Wells, March 2006



- Wells
- Parcels
- CSSA Boundary
- Salado Creek
- Faults
- PCE Concentrations (µg/L)**
- Estimated Plume Boundary Based on Historical Data
- 0.2
- 1.00
- 5.00 (MCL)
- 10.00
- 50.00

0 2,000 4,000 Feet



0 2,000 4,000 Feet

- Wells
 - Parcels
 - CSSA Boundary
 - Salado Creek
 - Faults
- cis-1,2-DCE Concentrations (µg/L)**
- Estimated Plume Boundary Based on Historical Data
 - 0.2
 - 1.00
 - 10.00
 - 50.00

Figure 4.3

cis-1,2-DCE Concentrations for LGR Wells, March 2006



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 March 13, 2006.	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 13, 2006 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, as well as monitoring wells equipped with Westbay® - multi-port samples provide information on Middle Trinity Aquifer impacts.	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 transducer 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. 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 March 2006 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 11 of 41 CSSA wells. Of the 16 wells scheduled to be sampled in March 2006 five wells (CS-MW4-LGR, CS-MW5-LGR, CS-MW11B-LGR, CS-MW18-LGR, and CS-4) were not sampled due to the water levels falling below the low-flow pump.	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 (COCs) 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-D, CS-MW1-LGR, CS-MW2-LGR, CS-MW3-LGR, CS-MW6-LGR, CS-MW7-LGR, CS-MW9-LGR, CS-MW11A-LGR, CS-MW16-LGR, CS-MW16-CC and CS-MW19-LGR. Samples were analyzed for the selected VOCs using USEPA method SW8260B. 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																														
		<table border="1"> <thead> <tr> <th data-bbox="617 245 814 267">ANALYTE</th> <th data-bbox="835 245 953 267">RL (UG/L)</th> <th data-bbox="995 245 1131 267">MCL (UG/L)</th> </tr> </thead> <tbody> <tr> <td data-bbox="617 272 730 295">Chloroform</td> <td data-bbox="835 272 865 295">0.4</td> <td data-bbox="995 272 1045 295">100</td> </tr> <tr> <td data-bbox="617 300 758 323">Chloromethane</td> <td data-bbox="835 300 865 323">1.3</td> <td data-bbox="995 300 1024 323">--</td> </tr> <tr> <td data-bbox="617 328 827 350">Dibromochloromethane</td> <td data-bbox="835 328 865 350">0.5</td> <td data-bbox="995 328 1045 350">100</td> </tr> <tr> <td data-bbox="617 355 716 378">1,1-DCE</td> <td data-bbox="835 355 865 378">1.2</td> <td data-bbox="995 355 1024 378">7</td> </tr> <tr> <td data-bbox="617 383 743 406"><i>cis</i>-1,2-DCE</td> <td data-bbox="835 383 865 406">1.2</td> <td data-bbox="995 383 1024 406">70</td> </tr> <tr> <td data-bbox="617 410 743 433"><i>trans</i>-1,2-DCE</td> <td data-bbox="835 410 865 433">0.6</td> <td data-bbox="995 410 1045 433">100</td> </tr> <tr> <td data-bbox="617 438 793 461">Methylene Chloride</td> <td data-bbox="835 438 844 461">2</td> <td data-bbox="995 438 1024 461">5</td> </tr> <tr> <td data-bbox="617 466 667 488">PCE</td> <td data-bbox="835 466 865 488">1.4</td> <td data-bbox="995 466 1024 488">5</td> </tr> <tr> <td data-bbox="617 493 667 516">TCE</td> <td data-bbox="835 493 865 516">1.0</td> <td data-bbox="995 493 1024 516">5</td> </tr> </tbody> </table>	ANALYTE	RL (UG/L)	MCL (UG/L)	Chloroform	0.4	100	Chloromethane	1.3	--	Dibromochloromethane	0.5	100	1,1-DCE	1.2	7	<i>cis</i> -1,2-DCE	1.2	70	<i>trans</i> -1,2-DCE	0.6	100	Methylene Chloride	2	5	PCE	1.4	5	TCE	1.0	5		
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ANALYTE	RL (UG/L)	MCL (UG/L)																																
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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																														

Activity	Objectives	Action	Objective Attained?	Recommendations
		Previously, an 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 2006**

Appendix B
March 2006 On-Post Quarterly Groundwater Results

Well ID	Date Sampled	1,1-DCE	Bromo-dichloro-methane	Bromoform	Chloroform	cis -1,2-DCE	Dibromo-chloro-methane	Dichloro-difluoro-methane	Methylene chloride	Naph-thalene	PCE	Toluene	trans -1,2-DCE	TCE	Vinyl Chloride
CS-MW1-LGR	3/14/06	0.17U	0.19U	0.20U	0.15U	20	0.19U	0.19U	0.19F	0.23U	12	0.17U	0.62	26	0.21U
CS-MW2-LGR	3/14/06	0.17U	0.19U	0.20U	0.15U	1.8	0.19U	0.19U	0.24F	0.23U	0.32	2.5	0.22F		0.21U
CS-MW3-LGR	3/17/06	0.17M	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.25F	0.23M	0.17U	0.17U	0.16U	0.16U	0.21U
CS-MW6-LGR	3/15/06	0.17U	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.17U	0.23U	0.17U	0.17U	0.16U	0.16U	0.21U
CS-MW7-LGR	3/15/06	0.17U	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.17U	0.23U	0.17U	0.17U	0.16U	0.16U	0.21U
CS-MW9-LGR	3/17/06	0.17U	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.17U	0.23U	0.20F	0.17U	0.16U	0.16U	0.21U
CS-MW11A-LGR	3/17/06	0.17M	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.22F	0.23M	0.17U	0.17U	0.16U	0.16U	0.21U
CS-MW16-LGR	3/14/06	0.17U	0.19U	0.20U	0.15U	58	0.19U	0.19U	0.21F	0.23U	53	0.17U	1.5	59	0.21U
CS-MW16-CC	3/14/06	0.37F	0.19U	0.20U	0.15U	68*	0.19U	0.19U	0.17U	0.23U	0.86F	160*	23	12	0.33F
CS-MW19-LGR	3/16/06	0.17M	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.35F	0.23M	0.37F	0.17U	0.16U	0.16U	0.21U
CS-MW19-LGR FD	3/16/06	0.17M	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.19F	0.23M	0.33F	0.17U	0.16U	0.16U	0.21U
CS-D	3/16/06	0.17M	0.19U	0.20U	0.15U	52	0.19U	0.19U	0.19F	0.23M	53	0.17U	0.88	49	0.21U
Trip Blanks:															
TB-1	3/14/06	0.17U	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.32F	0.23U	0.17U	0.17U	0.16U	0.16U	0.21U
TB-1	3/16/06	0.17U	0.19U	0.20U	0.15U	0.20U	0.19U	0.19U	0.28F	0.23U	0.17U	0.17U	0.16U	0.16U	0.21U

This table presents all laboratory results.
 All samples were analyzed by Severn Trent Laboratories (STL).

Abbreviations/Notes:
 FD Field Duplicate

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

* = dilution run was performed
 All values are reported in µg/L

BOLD	Value > or = MCL
BOLD	MCL > Value > or = RL
BOLD	RL > Value > MDL

APPENDIX C

MARCH 2006 WESTBAY ANALYTICAL RESULTS

Appendix C
March 2006 Semi Annual Westbay Analytical Results

Well ID	Date Sampled	2-Butanone	Acetone	cis -1,2-DCE	Isopropyl alcohol	PCE	Toluene	trans -1,2-DCE	TCE
CS-WB01-LGR-01	3/14/06	<5	<5	<0.2	<5	4.35	<0.6	<0.2	<0.6
CS-WB01-LGR-02	3/14/06	<5	<5	<0.2	<5	8.85	<0.6	<0.2	3.82
CS-WB01-LGR-03	3/14/06	<5	21.2	<0.2	<5	2.37	<0.6	<0.2	5.7
CS-WB01-LGR-04	3/14/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	<0.6
CS-WB01-LGR-05	3/14/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	<0.6
CS-WB01-LGR-06	3/14/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	0.66
CS-WB01-LGR-07	3/14/06	<5	5.62	<0.2	<5	9.95	<0.6	<0.2	9.97
CS-WB01-LGR-08	3/14/06	<5	<5	<0.2	<5	0.74	<0.6	<0.2	1.25
CS-WB01-LGR-09	3/14/06	<5	<5	0.41	<5	12.1	<0.6	<0.2	18.7
CS-WB02-LGR-03	3/14/06	<5	<5	<0.2	<5	3.79	<0.6	<0.2	1.63
CS-WB02-LGR-04	3/14/06	<5	<5	<0.2	<5	2.8	<0.6	<0.2	9.55
CS-WB02-LGR-05	3/14/06	<5	<5	<0.2	<5	0.92	<0.6	<0.2	3.61
CS-WB02-LGR-06	3/14/06	<5	<5	<0.2	<5	1.13	<0.6	<0.2	3.55
CS-WB02-LGR-07	3/14/06	<5	<5	<0.2	<5	1.0	<0.6	<0.2	0.65
CS-WB02-LGR-08	3/14/06	<5	<5	<0.2	<5	2.4	<0.6	<0.2	1.99
CS-WB03-LGR-03	3/16/06	<5	<5	0.53	<5	31.7	<0.6	<0.2	16.3
CS-WB03-LGR-04	3/16/06	<5	<5	0.2	<5	25.1	<0.6	<0.2	11.3
CS-WB03-LGR-05	3/16/06	<5	<5	<0.2	<5	21.1	<0.6	<0.2	4.59
CS-WB03-LGR-06	3/16/06	<5	<5	<0.2	<5	21.1	<0.6	<0.2	2.9
CS-WB03-LGR-07	3/16/06	<5	<5	<0.2	<5	16.8	<0.6	<0.2	3.69
CS-WB03-LGR-08	3/16/06	<5	<5	<0.2	<5	20.4	<0.6	<0.2	1.95
CS-WB03-LGR-09	3/16/06	<5	<5	<0.2	<5	12.7	<0.6	<0.2	8.05
CS-WB04-LGR-01	3/21/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	<0.6
CS-WB04-LGR-03	3/21/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	<0.6
CS-WB04-LGR-04	3/21/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	<0.6
CS-WB04-LGR-06	3/21/06	<5	<5	1.57	<5	<0.6	<0.6	<0.2	2.91
CS-WB04-LGR-07	3/21/06	<5	<5	0.71	<5	1.14	<0.6	<0.2	2.09
CS-WB04-LGR-08	3/21/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	<0.6
CS-WB04-LGR-09	3/21/06	<5	<5	0.21	<5	7.99	<0.6	<0.2	7.89
CS-WB04-LGR-10	3/21/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	<0.6
CS-WB04-LGR-11	3/21/06	<5	<5	<0.2	<5	<0.6	<0.6	<0.2	<0.6
Laboratory Detection Limits									
Method Detection Limit	MDL	5	5	0.2	5	0.6	0.6	0.2	0.6
Reporting Limit	RL	15	15	1	15	2	2	1	2
Maximum Contaminant Level	MCL	7	70	5	--	5	1000	100	5

This table presents all laboratory results.
All samples were analyzed by DHL.

All values are reported in µg/L

BOLD	Value > or = MCL
BOLD	MCL > Value > or = RL
BOLD	RL > Value > MDL