FINAL

2008 ANNUAL GROUNDWATER REPORT

Prepared For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

November 2009

GEOSCIENTIST CERTIFICATION

2008 Annual Groundwater Monitoring Report

For

Department of the Army

Camp Stanley Storage Activity

Boerne, Texas

I, W. Scott Pearson, P.G., hereby certify that the 2008 Annual Groundwater Monitoring Report for the Camp Stanley Storage Activity installation in Boerne, Texas accurately represents the site conditions of the subject area. This certification is limited only to geoscientific products contained in the subject report and is made on the basis of written and oral information provided by the Camp Stanley Storage Activity Environmental Office, laboratory data provided by APPL, and field data obtained during groundwater monitoring conducted at the site in 2008, and is true and accurate to the best of my knowledge and belief.

W. Scott Pearson, P.G.
State of Texas
Geology License No. 2186

November 2, 2009
Date

STATE OF TEXAS
W. SCOTT PEARSON
GEOLOGY
2186
LICENSED
PROFESSIONAL GEOSCIENTIST

TABLE OF CONTENTS

LIST OF TABLES .... **iii**
LIST OF FIGURES .... **iii**
LIST OF APPENDICES .... **iv**
ACRONYMS AND ABBREVIATIONS .... **v**
EXECUTIVE SUMMARY **1**
1.0 INTRODUCTION **2**
1.1 On-Post Groundwater Monitoring 2
1.2 Off-Post Groundwater Monitoring 4
2.0 GROUNDWATER MONITORING RESULTS **6**
2.1 Physical Characteristics 6
2.1.1 Water Level Measurements 6
2.1.2 Weather Station and Transducer Data 10
2.1.3 Potentiometric Data 13
2.1.4 Post-wide Flow Direction and Gradient 13
2.2 Chemical Characteristics 15
2.2.1 On-Post Analytical Results 15
2.2.1.1 On-Post Monitoring Wells with COC Detections above the MCL 17
2.2.1.2 On-Post Monitoring Wells with COC Detections below the MCL 21
2.2.1.3 On-Post Monitoring Wells with No COC Detections 23
2.2.1.4 Drinking Water Supply Well Results 23
2.2.1.5 Westbay®-equipped Well Results 24
2.2.2 Off-Post Analytical Results 32
2.2.2.1 Off-Post Wells with COC Detections above the MCL 35
2.2.2.2 GAC Filtration Systems 40
2.2.2.3 Off-Post Wells with COC Detections below the MCL 40
2.2.2.4 Off-Post Wells with COC Detections below the Reporting Limits 41
2.2.3 Concentration Contours 42
2.2.3.1 PCE, TCE, and cis-1,2-DCE 42
2.2.3.2 Lead 42
3.0 CONTINUED WELL CS-9 ACTIVITIES **48**
3.1 Background 48
3.2 2006 Activities 48
3.3 2007 Activities 48
3.4 2008 Activities 49
4.0 GROUNDWATER MONITORING PROGRAM CHANGES **51**
4.1 Access Agreements Obtained in 2008 51

4.2 Wells Added to or Removed From Program 51
4.3 Bexar Metropolitan Water System Sale 51
5.0 CONCLUSIONS AND RECOMMENDATIONS 52
6.0 REFERENCES 54

LIST OF TABLES

Table 2.1 Summary of Groundwater Elevations and Changes, 2008 7
Table 2.2 Summary of Groundwater Elevations by Formation, 2008 8
Table 2.3 Precipitation, Groundwater Elevation and Gradient, 2008 12
Table 2.4 Overview of On-Post Sampling for 2008 16
Table 2.5 2008 On-post Groundwater COCs and Metals Analytical Results, Detections Only 19
Table 2.6 2008 Westbay® Groundwater COCs Analytical Results, Detections Only 26
Table 2.7 2008 Off-Post Groundwater Sampling Rationale 33
Table 2.8 2008 Off-Post Groundwater COCs Analytical Results, Detections Only 36
Table 2.9 GAC Filtration Systems Installed 40
Table 2.10 Comparison of 2007 & 2008 PCE, TCE, and *cis*-1,2-DCE Max. Levels 46
Table 3.1 Well CS-9 Analyses Summary: February - December 2008 50

LIST OF FIGURES

Figure 1.1 On-Post and Off-Post Well Sampling Locations 2008 3
Figure 2.1 Comparisons of Groundwater Elevations within Cluster Wells 9
Figure 2.2 2008 Groundwater Elevations and Precipitation Data 11
Figure 2.3 Vertical Distribution of PCE in Multi-port Wells – March 2008 28
Figure 2.4 Vertical Distribution of PCE in Multi-port Wells – September 2008 29
Figure 2.5 Vertical Distribution of TCE in Multi-port Wells – March 2008 30
Figure 2.6 Vertical Distribution of TCE in Multi-port Wells – September 2008 31
Figure 2.7 Off-Post PCE and TCE Concentration Trends and Precipitation 38
Figure 2.8 Off-Post PCE and TCE Concentration Trends and Monthly Water Usage 39
Figure 2.9 PCE Concentrations for LGR Wells, Max 2008 43
Figure 2.10 TCE Concentrations for LGR Wells, Max 2008 44
Figure 2.11 *Cis*-1,2-DCE Concentrations for LGR Wells, Max 2008 45
Figure 2.12 Lead Concentrations for LGR Wells, Max 2008 47

LIST OF APPENDICES

Appendix A On- and Off-Post Evaluation of Data Quality Objectives Attainment

Appendix B 2008 Quarterly On-Post Groundwater Monitoring Analytical Results

Appendix C 2008 Westbay® Analytical Results

Appendix D Revised Drought Contingency Plan Triggers

Appendix E Potentiometric Maps for March, June, September & December 2008

Appendix F 2008 Quarterly Off-Post Groundwater Monitoring Analytical Results

Appendix G Pre- and Post-GAC Sample Comparisons for Wells LS-6, LS-7, RFR-10, RFR-11 and OFR-3

ACRONYMS AND ABBREVIATIONS

µg/L	microgram per liter
1,1-DCE	1,1-dichloroethene
AFCEE	Air Force Center for Engineering and the Environment
AL	Action Level
AOC	Area of Concern
APPL	Agriculture and Priority Pollutants Laboratories, Inc.
Bexar Met	Bexar Metropolitan Water District
BS	Bexar Shale
CC	Cow Creek
cis-1,2-DCE	*cis*-1,2-dichloroethene
COC	contaminants of concern
CSSA	Camp Stanley Storage Activity
DQO	Data Quality Objectives
GAC	granular activated carbon
LGR	Lower Glen Rose
LTMO	Long Term Monitoring Optimization
MCL	Maximum contaminant limits
MDL	method detection limit
MSL	mean sea level
NWS	National Weather Service
Order	RCRA 3008(h) Administrative Order on Consent
PCE	tetrachloroethene
Plan	CSSA Off-post Monitoring Program and Response Plan
QAPP	Quality Assurance Program Plan
RCRA	Resource Conservation Recovery Act
RL	Reporting limit
SAWS	San Antonio Water Systems
SCADA	Supervisory Control and Data Acquisition
SS	Secondary standard
STL	Severn Trent Laboratories
SWMU	Solid Waste Management Units
TA	Test America Laboratories
TCE	trichloroethene
TCEQ	Texas Commission on Environmental Quality
TO	Task Order
trans-1,2-DCE	*trans*-1,2-dichloroethene
UGR	Upper Glen Rose
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
WS-N	weather station north
WS-S	weather station south

EXECUTIVE SUMMARY

This report provides an evaluation of results from groundwater monitoring conducted in 2008 at Camp Stanley Storage Activity (CSSA). Groundwater monitoring was performed on-post and off-post during the months of March, June, September, and December 2008. The CSSA groundwater monitoring program objectives 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. This report describes the physical and chemical characteristics of the groundwater monitoring results and changes occurring to the program during 2008.

- 2008 was an extremely dry year, with an average recorded rainfall of 12.76 inches at CSSA (the annual average was 34.72 inches for 2000 through 2006). In fact, the San Antonio region experienced its driest year since 1954 according to the National Weather Service (NWS) records.

- Correspondingly, water levels in all three formations monitored at CSSA, the Lower Glen Rose (LGR), Bexar Shale (BS), and the Cow Creek (CC) have decreased by nearly 140 feet by December 2008.

- A total of 71 samples were collected from 46 on-post wells and the reservoir. Contaminant concentrations above drinking water standards were detected at 7 on-post wells. Four wells (CS-MW16-LGR, CS-MW16-CC, CS-D, and CS-MW1-LGR) exceeded drinking water standards for volatile organic compounds (VOCs) and three wells (CS-9, CS-11, and MW22-LGR) exceeded drinking water standards for metals. In 2007, 46 on-post wells were sampled and the same four wells exceeded MCLs for VOC.

- A total of 119 samples were collected from 43 off-post wells. VOC concentrations above drinking water standards were detected at 3 off-post wells (OFR-3, RFR-10, and I10-4). OFR-3 and RFR-10 had GAC units installed in 2001 and I10-4 is not currently being used as a drinking water source. Analysis of post-GAC samples continued to show that all VOCs are being removed and that the treatment continues to be effective. Off-post wells were not sampled for metals content.

1.0 INTRODUCTION

This report provides an evaluation of results from groundwater monitoring conducted in 2008 at CSSA. Groundwater monitoring was performed on-post and off-post during the months of March, June, September, and December 2008. All wells considered for sampling in 2008 are shown on **Figure 1.1.** This report describes the physical and chemical characteristics of the groundwater monitoring results and changes occurring to the program during 2008.

Groundwater monitoring conducted in 2008 was scoped under the U.S. Army Corps of Engineers (USACE) Fort Worth District (CESWF), Contract W91278-06-D-0026, Task Order (TO) DY02. This contract was funded through December 2008.

1.1 On-Post Groundwater Monitoring

The current objectives of Camp Stanley Storage Activity's (CSSA) on-post groundwater monitoring program are to monitor groundwater flow direction trends and elevations, determine groundwater contaminant concentrations for characterization purposes, and identify meteorological and seasonal variations in physical and chemical properties of the groundwater. The objectives incorporate and comply with the Resource Conservation Recovery Act (RCRA) 3008(h) Administrative Order on Consent (the Order) issued by the United States Environmental Protection Agency (USEPA) on May 5, 1999.

On-post groundwater monitoring was initiated in 1992 in response to volatile organic compound (VOC) contamination detected in CSSA drinking water supply well CS-MW16-LGR (formerly named "Well 16") and continued periodically until the current CSSA quarterly groundwater monitoring program for on-post wells was initiated in December 1999.

The CSSA groundwater monitoring program follows the provisions of the Final Data Quality Objectives (DQO) for the Groundwater Monitoring Program (Parsons 2006) in **Appendix A**, as well as the recommendations of the *Three-Tiered Long Term Monitoring Network Optimization Evaluation* (Parsons 2005). The latter document provides recommendations for sampling based on the Long Term Monitoring Optimization (LTMO) study performed for the CSSA groundwater monitoring program. The LTMO sampling frequencies were implemented on-post in December 2005, as approved by the Texas Commission on Environmental Quality (TCEQ) and USEPA. The ongoing groundwater monitoring program complies with the CSSA Quality Assurance Program Plan (QAPP) (CSSA 2002) and the Sampling and Analysis Plans and Work Plans prepared for each groundwater monitoring task order. The sampling conducted in 2008 was conducted in compliance with the applicable CSSA QAPP, DQOs, and Work Plans.

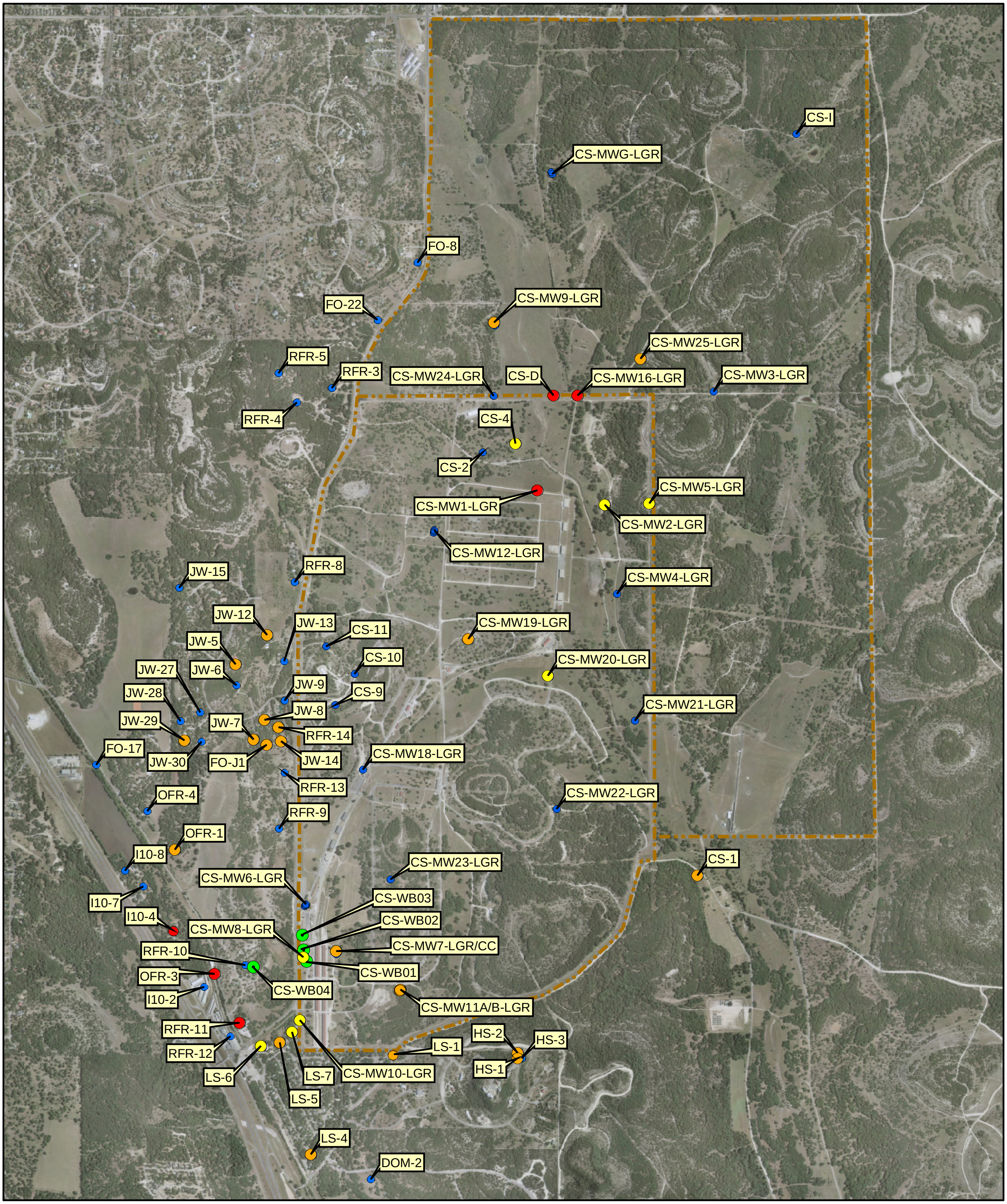


Figure 1.1

2008 Sampled On-Post and Off-Post Ground Water Wells
Camp Stanley Storage Activity

P a r s o n s

J:\745\745953 CSSA DY02\GIS\2008_sampled_wells.mxd - 4/7/2009 @ 4:30:56 PM

A comprehensive summary of the results from the 2008 on-post groundwater sampling events is presented in **Appendices B and C**, respectively. Abbreviated tables showing only the detected compounds are included in the groundwater results discussions in Section 2.2.1 of this report. **Appendix D** presents the draft version of the proposed Drought Contingency Plan trigger levels, and **Appendix E** includes the potentiometric groundwater maps.

The laboratory data packages and associated data validation reports for 2008 were submitted to CSSA separately from this report.

1.2 Off-Post Groundwater Monitoring

The primary objective of the off-post groundwater monitoring program is to determine whether concentrations of VOCs detected in off-post public and private drinking water wells exceed safe drinking water standards. A secondary objective of the off-post groundwater monitoring program is to determine the lateral and vertical extent of the contaminant plumes associated with past releases near Area of Concern (AOC)-65 or from Solid Waste Management Units (SWMU) B-3 and O-1. A third objective of the off-post groundwater monitoring program is to assess whether there are apparent trends in contaminant levels (decreasing or increasing) over time in the sampled wells.

CSSA was required by the Order to identify and locate both privately and publicly owned groundwater wells within ¼-mile of CSSA. The *Offsite Well Survey Report* (Parsons 2001) was submitted to fulfill this requirement. As part of its ongoing groundwater monitoring program, CSSA extended the sampling of off-post wells beyond the ¼-mile boundary required under the Order. Additional background information regarding off-post private and public water supply wells is located in the CSSA Environmental Encyclopedia, Volume 5 Groundwater (CSSA 2007). Some off-post wells were initially sampled in 1995 and quarterly sampling of off-post wells began in 2001 in accordance with the *Off-Post Monitoring Program and Response Plan* (the Plan) (CSSA 2002a).

Under the Plan, the following criteria are used to determine the action levels for detected VOCs and to determine which off-post wells are sampled:

- If VOC contaminant levels are ≥90 percent of the maximum contaminant levels (MCL) for tetrachloroethene [PCE] and trichloroethene [TCE]) (≥4.5 micrograms per liter [µg/L] based on preliminary data received from the laboratory, and the well is used as a potable water source, the well will be taken offline, bottled water will be supplied within 24 hours after receipt of the data, and a confirmation sample will be collected from the well within 14 days of receipt of the final validated analytical report. If the confirmation sample confirms contaminants of concern (COC) are at or above 90 percent of the MCLs, the well will be evaluated, and either installation of an appropriate method for wellhead treatment or connection to an alternative water source will be performed.
- If VOC contaminant levels are ≥80 but ≤90 percent of the MCL (>4.0 and ≤ 4.5 µg/L for PCE and TCE) during any single monitoring event based on preliminary

data from the laboratory, and the well is used as a potable water source, it will be monitored monthly. If the monthly follow-up sampling confirms that COCs are ≥80 but ≤90 percent of the MCL, it will continue to be sampled monthly until the VOC levels fall below the 80 percent value.

- If any COC is detected at levels greater than or equal to the analytical method detection limit (MDL) (historically 0.06 µg/L for PCE and 0.05 µg/L for TCE), and <80 percent of the MCL, the well will be sampled on a quarterly basis. This sampling will be conducted concurrently with on-post sampling events and will be used to develop historical trends in the area. Quarterly sampling will continue for a minimum of 1 year, after which the sampling frequency will be reviewed and may be decreased.

- If COCs are not detected during the initial sampling event (*i.e.*, no VOC contaminant levels above the MDL), further sampling of the well will be reconsidered. A well with no detectable VOCs may be removed from the sampling list. However, if analytical data suggest future plume migration could negatively influence the well, it will be re-sampled as needed. The well owner, USEPA, and TCEQ will be apprised of any re-sampling decisions regarding the non-detect wells.

- For wells where a wellhead treatment system has been installed, post-treatment samples will be collected and analyzed after initial system start-up and at 6-month intervals to confirm the system is effectively removing VOCs.

A comprehensive summary of the results from the 2008 off-post groundwater sampling events is presented in **Appendix F**. Abbreviated tables showing only the detected compounds are included in the groundwater results discussions in Section 2.2.2 of this report. **Appendix G** summarizes pre- and post-granular activated carbon (GAC) filtration system sampling results.

The cumulative historical results from both on- and off-post groundwater monitoring are presented in summary tables located in the *Introduction to the On-Post and Off-Post Quarterly Groundwater Monitoring Program* (Tables 6 through 9), CSSA Environmental Encyclopedia, Volume 5 Groundwater (CSSA 2007).

2.0 GROUNDWATER MONITORING RESULTS

2.1 Physical Characteristics

2.1.1 Water Level Measurements

Water level measurements were recorded prior to sampling during the March, June, September, and December 2008 events. Water level measurements made at all monitoring wells and drinking water wells listed in **Table 2.1,** a total of 47 wells. Water levels were measured by either e-line indicator or collected from a permanently installed transducer.

Water level elevations and quarterly elevations are summarized in **Table 2.1.** The average groundwater elevation measurements for each of the Lower Glen Rose (LGR), Bexar Shale (BS), and Cow Creek (CC) formations are provided in **Table 2.2**. The averages were calculated using groundwater elevations from wells screened in only one of the three formations. Water elevations from 7 wells completed with open boreholes over multiple formations were not used. As shown in **Table 2.1**, overall groundwater levels in the Middle Trinity Aquifer decreased approximately 137.13 feet from January through December 2007. Water levels decreased throughout the year, with a more significant drop during the March and June events. During the current drought, the aquifer level decreased approximately 208 feet between September 2007 and December 2008. Toward the end of the year the overall groundwater elevation, while still dropping, began to level off. The last significant daily rainfall of more than 1.0 inch in 2008 was August 12th with 1.24 inches of rainfall at the Weather Station-North (WS-N) and 1.38 inches at the Weather Station-South (WS-S).

Based on 2008 quarterly aquifer level measurements, **Figure 2.1** shows the relationships of the water level in each portion of the aquifer at CSSA cluster wells (CS-MW1, CS-MW2, CS-MW6, CS-MW7, CS-MW8, CS-MW9, CS-MW10, and CS-MW12). The general trend in **Figure 2.1** shows that at an individual location, the head in the LGR well is typically greater than in the CC well. The amount of dissimilarity between water levels within a cluster is a good indicator to the degree of hydraulic separation between the formational units. Theoretically, intervals that are well connected hydraulically will have the same or very similar groundwater elevation.

Under more favorable hydrologic conditions, the groundwater elevation in the BS typically falls between the LGR and CC elevations. However, as shown in most of the 2008 data, the BS groundwater elevation is generally higher than both of its counterparts. This phenomenon has been observed before in the cluster wells, and is attributed to the low draining potential of the less permeable BS matrix during continual aquifer declines. Conversely, during recharge events the groundwater BS wells will lag behind the LGR and CC wells, and seems to be typical for the area.

Table 2.1
Summary of Groundwater Elevations and Changes, 2008

						Groundwater Elevation Change				Formations Screened		
Well ID	TOC elevation (ft MSL)	March 2008 Elevations	June 2008 Elevations	September 2008 Elevations	December 2008 Elevations	March minus December 07	June minus March	September minus June	December minus September	LGR	BS	CC
CS-1+	**1169.27**	**963.27**	**914.17**	**933.17**	**820.66**	**-91.60**	**-49.10**	**19.00**	**-112.51**	**ALL**		
CS-2	**1237.59**	**1042.86**	**985.96**	**980.54**	**980.00**	**-37.82**	**-56.90**	**-5.42**	**-0.54**	**?**	**?**	
CS-3	1240.17	1047.04	991.77	980.27	977.78	-38.05	-55.27	-11.50	-2.49	X		
CS-4	**1229.28**	**1048.28**	**993.33**	**979.74**	**977.03**	**-37.97**	**-54.95**	**-13.59**	**-2.71**	**?**	**?**	
CS-9+	**1325.31**	**NA**	**982.48**	**944.76**	**943.21**	**NA**	**NA**	**-37.72**	**-1.55**	**ALL**		
CS-10+	**1331.51**	**997.51**	**983.57**	**948.97**	**924.56**	**-72.00**	**-13.94**	**-34.60**	**-24.41**	**ALL**		
CS-11**	**1332.49**	**1046.89**	**985.01**	**950.44**	**952.71**	**-42.24**	**-61.88**	**-34.57**	**2.27**	**ALL**		
CS-D	1236.03	1040.59	991.24	985.88	981.13	-57.02	-49.35	-5.36	-4.75	X		
CS-MWG-LGR	1328.14	1124.06	1064.19	1044.84	1035.29	32.06	-59.87	-19.35	-9.55	X		
CS-MWH-LGR	1319.19	1058.77	1024.23	1012.01	1015.44	-24.82	-34.54	-12.22	3.43	X		
CS-I	1315.20	1066.12	1031.72	1049.60	1013.93	-86.29	-34.40	17.88	-35.67		X	
CS-MW1-LGR+	1220.73	1058.54	1006.48	982.58	977.18	-63.27	-52.06	-23.90	-5.40			X
CS-MW1-BS+	1221.09	1066.26	1029.63	987.74	981.45	-42.44	-36.63	-41.89	-6.29	X		
CS-MW1-CC+	1221.39	1053.94	964.21	965.43	959.74	-40.49	-89.73	1.22	-5.69			
CS-MW2-LGR	1237.08	1065.56	1016.99	985.54	977.44	-50.16	-48.57	-31.45	-8.10	X		
CS-MW2-CC	1240.11	1055.09	975.16	963.47	952.68	-37.81	-79.93	-11.69	-10.79	X		
CS-MW3-LGR	1334.14	1056.59	1009.23	991.27	986.67	-55.38	-47.36	-17.96	-4.60	X		
CS-MW4-LGR*	1209.71	1083.40	1034.27	991.14	972.33	-9.26	-49.13	-43.13	-18.81	X		
CS-MW5-LGR	1340.24	1062.49	1015.35	982.34	973.64	-41.56	-47.14	-33.01	-8.70		X	
CS-MW6-LGR+	1232.25	1057.54	990.76	958.90	932.24	-87.18	-66.78	-31.86	-26.66			X
CS-MW6-BS+	1232.67	1043.95	1003.51	1003.79	978.09	-73.19	-40.44	0.28	-25.70	X		
CS-MW6-CC+	1233.21	1043.96	1001.39	947.41	916.81	-47.95	-42.57	-53.98	-30.60			X
CS-MW7-LGR	1202.27	1048.09	995.32	950.81	920.88	-42.62	-52.77	-44.51	-29.93	X		
CS-MW7-CC	1201.84	1042.37	987.86	943.00	907.54	-46.72	-54.51	-44.86	-35.46			X
CS-MW8-LGR	1208.35	1054.23	998.15	959.38	925.23	-29.77	-56.08	-38.77	-34.15	X		
CS-MW8-CC	1206.13	1042.56	988.53	943.79	909.33	-43.57	-54.03	-44.74	-34.46		X	
CS-MW9-LGR+	1257.27	1047.24	993.62	993.07	992.12	-41.57	-53.62	-0.55	-0.95			X
CS-MW9-BS+	1256.73	1051.67	1014.65	995.18	993.21	-35.10	-37.02	-19.47	-1.97	X		
CS-MW9-CC+	1255.95	1053.45	982.49	973.95	969.10	-32.52	-70.96	-8.54	-4.85			X
CS-MW10-LGR+	1189.53	1042.36	981.47	938.50	894.33	-55.91	-60.89	-42.97	-44.17	X		
CS-MW10-CC+	1190.04	1038.43	975.82	928.99	887.19	-53.90	-62.61	-46.83	-41.80	X		
CS-MW11A-LGR	1204.03	1029.00	984.66	940.03	893.41	-51.78	-44.34	-44.63	-46.62	X		
CS-MW11B-LGR	1203.52	1013.34	1005.91	999.62	996.29	-65.86	-7.43	-6.29	-3.33		X	
CS-MW12-LGR+	1259.07	1048.69	993.01	973.45	970.49	-19.73	-55.68	-19.56	-2.96			X
CS-MW12-BS+	1258.37	1053.17	1015.91	979.77	974.27	-7.80	-37.26	-36.14	-5.50	X		
CS-MW12-CC+	1257.31	1053.81	977.11	969.28	963.77	-34.05	-76.70	-7.83	-5.51			X
CS-MW16-LGR+	1244.60	965.65	962.08	984.75	957.45	-134.42	-3.57	22.67	-27.30	X		
CS-MW16-CC+	1244.51	1053.70	855.93	955.41	960.60	-39.33	-197.77	99.48	5.19	X		
CS-MW17-LGR	1257.01	1049.31	998.87	948.24	936.96	-40.18	-50.44	-50.63	-11.28	X		
CS-MW18-LGR*	1283.61	1042.72	990.25	944.45	939.39	-43.22	-52.47	-45.80	-5.06	X		
CS-MW19-LGR	1255.53	1055.45	1001.33	959.19	952.18	-44.28	-54.12	-42.14	-7.01	X		
CS-MW20-LGR	1209.42	1058.43	1005.71	962.56	952.52	-46.81	-52.72	-43.15	-10.04	X		
CS-MW21-LGR*	1184.53	1048.80	998.02	947.15	934.54	-39.78	-50.78	-50.87	-12.61	X		
CS-MW22-LGR	1280.49	1043.71	993.13	943.34	910.79	-39.09	-50.58	-49.79	-32.55	X		
CS-MW23-LGR	1258.20	1039.80	994.72	943.10	916.20	-38.92	-45.08	-51.62	-26.90	X		
CS-MW24-LGR*	1253.90	1043.95	988.04	981.82	980.11	-38.39	-55.91	-6.22	-1.71	X		
CS-MW25-LGR	1293.01	1054.84	1007.78	999.31	994.79	-41.02	-47.06	-8.47	-4.52	X		
FO-20		1083.80	1046.13	1047.35	1042.32	-45.65	-37.67	1.22	-5.03	ALL		
Average groundwater elevation change:						**-42.45**	**-51.71**	**-27.49**	**-15.48**			
Groundwater elevation change since December 2007:						**-137.13**						

Notes:
Average groundwater elevation change is calculated from wells screened in only one formation.
Bold wells: CS-1, CS-2, CS-4, CS-9, CS-10, and CS-11 are open boreholes across more than one of the formations and are not included in average groundwater elevation calculations. CS-1, CS-9, CS-10 and CS-11 are current and former drinking water wells.
*Wells equipped with a transducer
** Well equipped with a USGS monitored transducer
+ Wells equipped with a SCADA transducer
NA = Data not available
?=Exact screening information unknown for this well.
All measurements given in feet.

Table 2.2
Summary of Groundwater Elevation by Formation, 2008

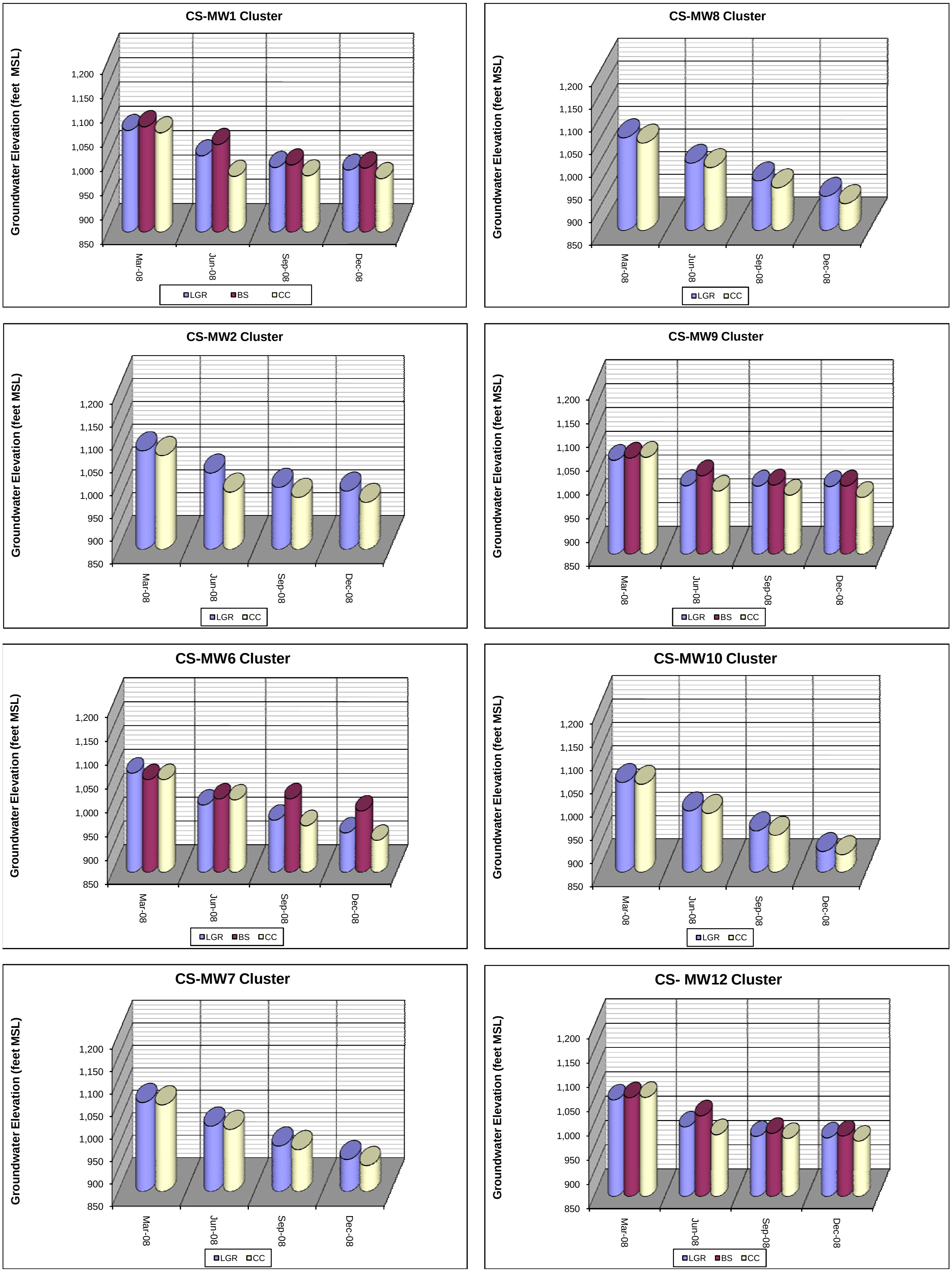
Well ID	TOC elevation (ft MSL)	2008 Groundwater Elevations: March	June	September	December	Formations Screened: LGR	BS	CC
CS-1+	**1169.27**	**963.27**	**914.17**	**933.17**	**820.66**	**ALL**		
CS-2	**1237.59**	**1042.86**	**985.96**	**980.54**	**980.00**	**?**	**?**	
CS-3	1240.17	1047.04	991.77	980.27	977.78	**X**		
CS-4	**1229.28**	**1048.28**	**993.33**	**979.74**	**977.03**	**?**	**?**	
CS-9+	**1325.31**	**NA**	**982.48**	**944.76**	**943.21**	**ALL**		
CS-10+	**1331.51**	**997.51**	**983.57**	**948.97**	**924.56**	**ALL**		
CS-11**	**1332.49**	**1046.89**	**985.01**	**950.44**	**952.71**	**ALL**		
CS-D	1236.03	1040.59	991.24	985.88	981.13	**X**		
CS-MWG-LGR	1328.14	1124.06	1064.19	1044.84	1035.29	**X**		
CS-MWH-LGR	1319.19	1058.77	1024.23	1012.01	1015.44	**X**		
CS-I	1315.20	1066.12	1031.72	1049.60	1013.93	**X**		
CS-MW1-LGR+	1220.73	1058.54	1006.48	982.58	977.18	**X**		
CS-MW1-BS+	1221.09	1066.26	1029.63	987.74	981.45		**X**	
CS-MW1-CC+	1221.39	1053.94	964.21	965.43	959.74			**X**
CS-MW2-LGR	1237.08	1065.56	1016.99	985.54	977.44	**X**		
CS-MW2-CC	1240.11	1055.09	975.16	963.47	952.68			
CS-MW3-LGR	1334.14	1056.59	1009.23	991.27	986.67	**X**		
CS-MW4-LGR*	1209.71	1083.40	1034.27	991.14	972.33	**X**		
CS-MW5-LGR	1340.24	1062.49	1015.35	982.34	973.64	**X**		
CS-MW6-LGR+	1232.25	1057.54	990.76	958.90	932.24	**X**		
CS-MW6-BS+	1232.67	1043.95	1003.51	1003.79	978.09		**X**	
CS-MW6-CC+	1233.21	1043.96	1001.39	947.41	916.81			**X**
CS-MW7-LGR	1202.27	1048.09	995.32	950.81	920.88	**X**		
CS-MW7-CC	1201.84	1042.37	987.86	943.00	907.54			**X**
CS-MW8-LGR	1208.35	1054.23	998.15	959.38	925.23	**X**		
CS-MW8-CC	1206.13	1042.56	988.53	943.79	909.33			**X**
CS-MW9-LGR+	1257.27	1047.24	993.62	993.07	992.12	**X**		
CS-MW9-BS+	1256.73	1051.67	1014.65	995.18	993.21		**X**	
CS-MW9-CC+	1255.95	1053.45	982.49	973.95	969.10			**X**
CS-MW10-LGR+	1189.53	1042.36	981.47	938.50	894.33	**X**		
CS-MW10-CC+	1190.04	1038.43	975.82	928.99	887.19			**X**
CS-MW11A-LGR	1204.03	1029.00	984.66	940.03	893.41	**X**		
CS-MW11B-LGR	1203.52	1013.34	1005.91	999.62	996.29	**X**		
CS-MW12-LGR+	1259.07	1048.69	993.01	973.45	970.49	**X**		
CS-MW12-BS+	1258.37	1053.17	1015.91	979.77	974.27		**X**	
CS-MW12-CC+	1257.31	1053.81	977.11	969.28	963.77			**X**
CS-MW16-LGR+	1244.60	965.65	962.08	984.75	957.45	**X**		
CS-MW16-CC+	1244.51	1053.70	855.93	955.41	960.60			**X**
CS-MW17-LGR	1257.01	1049.31	998.87	948.24	936.96	**X**		
CS-MW18-LGR*	1283.61	1042.72	990.25	944.45	939.39	**X**		
CS-MW19-LGR	1255.53	1055.45	1001.33	959.19	952.18	**X**		
CS-MW20-LGR	1209.42	1058.43	1005.71	962.56	952.52	**X**		
CS-MW21-LGR*	1184.53	1048.80	998.02	947.15	934.54	**X**		
CS-MW22-LGR	1280.49	1043.71	993.13	943.34	910.79	**X**		
CS-MW23-LGR	1258.20	1039.80	994.72	943.10	916.20	**X**		
CS-MW24-LGR*	1253.90	1043.95	988.04	981.82	980.11	**X**		
CS-MW25-LGR	1293.01	1054.84	1007.78	999.31	994.79	**X**		
FO-20	NA	1083.80	1046.13	1047.35	1042.32	**ALL**		
Average groundwater elevation by formation, each event:	**LGR:**	**1050.23**	**1002.44**	**976.18**	**961.10**	**Average groundwater elevation by formation all of 2008:**		**997.49**
	BS:	**1053.76**	**1015.93**	**991.62**	**981.76**			**1010.77**
	CC:	**1047.78**	**966.67**	**953.41**	**934.26**			**975.53**

Notes:
Average groundwater elevation change is calculated from wells screened in only one formation.

Bold wells: CS-1, CS-2, CS-4, CS-9, CS-10, and CS-11 are open boreholes across more than one of the formations and are not included in average groundwater elevation calculations. CS-1, CS-9, CS-10 and CS-11 are current and former drinking water wells.
*Wells equipped with a transducer
** Well equipped with a USGS monitored transducer
+ Wells equipped with a SCADA transducer
NA = Data not available
?=Exact screening information unknown for this well.
All measurements given in feet.

J:\745\745953 CSSA DY02\01000 GWM\Annual GW Report 2008\Table 2-1 & 2-2 GW Elevations.xls

Figure 2.1
Comparison of Groundwater Elevations within Well Clusters



2.1.2 Weather Station and Transducer Data

Of the 47 wells listed on **Table 2.1,** 30 are equipped with transducers to continuously log groundwater levels, 19 are providing telemetry directly to the Supervisory Control and Data Acquisition (SCADA) system. Two weather stations are in place at CSSA, WS-N adjacent to well CS-MW16-LGR in the north-central region of CSSA, and WS-S in the southeast corner of CSSA adjacent to AOC-65. Both weather stations record meteorological data, including precipitation, wind speed, wind direction, temperature, etc. The data are recorded to evaluate whether trends in rainfall and groundwater recharge are apparent.

Continuous aquifer level data (January 2008 through December 31, 2008) collected from 11 wells specifically screened within the LGR, BS, and CC are presented on **Figure 2.2** as well as the corresponding daily precipitation values. The wells presented in this figure are equipped with transducers set to record water level measurements on a daily basis with increased monitoring during significant rain events. Additional LGR, BS, and CC wells are also equipped with transducers, however minimal data was collected in 2008 due to outages for SCADA installation or battery and/or equipment failure. The data gaps occurring in **Figure 2.2** are due to transducer battery failure, routine transducer maintenance, or the errors within the SCADA system. Both CS-16-LGR and CS-MW16-CC are omitted from this graphic since they are actively pumping wells for the Bioreactor system, and therefore do not reflect static aquifer conditions.

Weather Station North (WS-N) reported 71 rainfall events with a total precipitation of 11.82 inches in 2008. Weather Station South (WS-S) recorded 67 rainfall events with a total precipitation of 13.69 inches in 2008. Rainfall events during 2008 were sporadic, with only 4 rain events (March 10, July 24, August 12, and October 15) of one inch or more per day.

Based upon historical data, 2008 was an unseasonably "dry" year. In comparison, the 2000 to 2006 annual precipitation for the San Antonio, Texas area averaged 32.93 inches, as recorded by the weather station operated by the National Weather Service (NWS). The record all time low in San Antonio was set in 1917 with 10.11 inches of rainfall and the record maximum rainfall was recorded in 1973 with 52.28 inches by the NWS. 2008 represents the least amount of precipitation received at CSSA since 1999 (16.99 inches). Clearly, the drought that began in September 2007 and has continued throughout 2008 is a significant climatic event that is adversely affecting the entire region. According to the NWS data, 2008 has been the driest year since 1954 in San Antonio.

Table 2.3 shows the total precipitation received each quarter, average groundwater elevations in each formation, the average groundwater elevation change in each formation, the approximate gradient, and approximate gradient flow direction for all monitoring events. As in the past, the groundwater elevations indicate recharge of the LGR formation immediately after precipitation. However, rainfall deficit has clearly taken its toll on the groundwater level and storage capacity of the Middle Trinity Aquifer.

Figure 2-2, Selected Wells Groundwater Elevations vs Precipitation Data

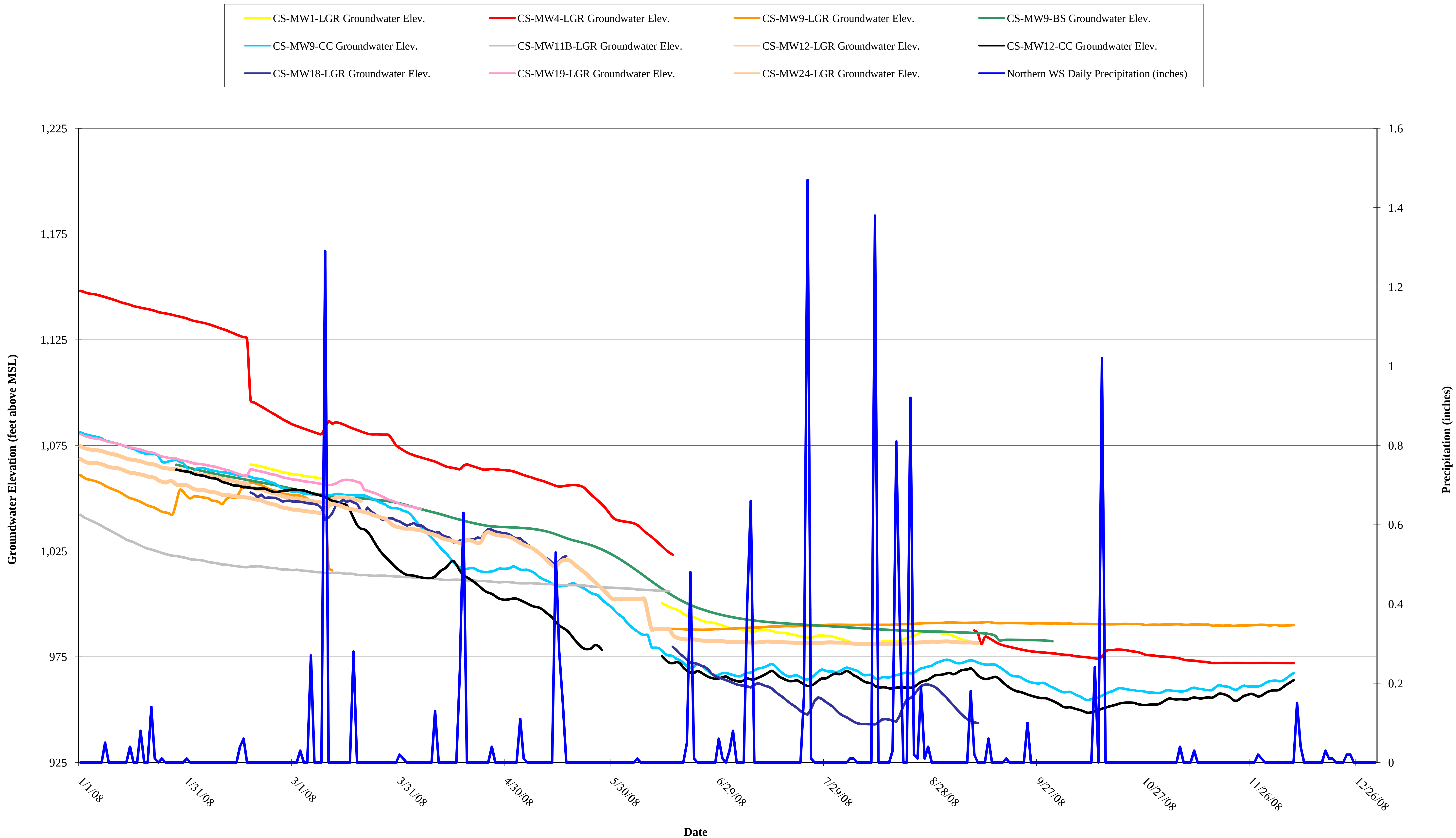


Table 2.3
Precipitation, Groundwater Elevation and Gradient

Quarterly Report (Month, year)	Quarterly precipitation (inches) North WS	Quarterly precipitation (inches) South WS	Average GW elevation Change (feet)	CS-MW16-LGR GW Elevation Change (feet)	in each Formation (ft/MSL)			Approximate gradient (ft/ft)	Approximate gradient flow direction
					Lower Glen Rose	Bexar Shale	Cow Creek		
September-99	7.52	--	-188.4	-136.82	979.80	--	--	0.007	Southwest
December-99	2.84	--	-4.9	-8.13	973.10	--	--	0.004	Southwest
March-00	3.58	--	-9.3	-1.28	970.94	--	--	0.009	South-southeast
June-00	11.1	--	11.77	0.29	976.27	--	--	0.006	Southeast
September-00	1.96	--	-6.34	-13.28	967.03	--	--	0.006	Southeast
December-00	14.48	--	122.99	142.19	1118.59	--	--	0.005	South-southeast
March-01	10.13	--	53.19	48.07	1157.20	--	--	0.0125	Southeast
June-01	6.58	--	-47.5	-48.04	1104.00	1106.85	1093.89	0.007	Southeast
September-01	14.73	--	23.96	13.44	1140.55	1098.18	1095.75	0.0067	Southeast
December-01	10.16	--	15.46	28.21	1149.68	1131.36	1125.63	0.0092	Southeast
March-02	2.25	--	-70.97	-74.03	1077.91	1064.46	1059.27	0.0086	Southeast
June-02	4.46	--	-48.29	-53.41	1030.51	1022.51	994.02	0.0137	South-southeast
September-02	30.98	--	104.5	113.27	1130.87	1129.21	1098.34	0.017	South-southeast
December-02	12.91	--	19.48	33.89	1143.98	1148.26	1133.11	0.0061	South-southeast
March-03	6.22	6.68	-8.47	-10.11	1135.18	1140.52	1122.95	0.012	South-southeast
June-03	4.67	4.64	-41.08	-37.1	1097.87	1095.36	1069.02	0.0022	South-southwest
September-03	8.05	10.28	-52.85	-52.21	1046.77	1060.39	1025.61	0.0045	South-southwest
December-03	2.79	2.92	-32.85	-38.68	1011.38	1029.39	1002.07	0.0095	South-southwest
March-04	6.35	5.93	22.89	34.07	1043.68	1026.20	1017.98	0.0046	South-southwest
June-04	12.95	12.33	71.91	84.31	1121.80	1101.85	1074.56	0.0012	South-southwest
September-04	14.3	14.57	-8.05	-19.31	1106.43	1110.17	1074.96	0.003	South-southeast
December-04	21.04	23.12	63.07	74.82	1173.98	1159.46	1135.16	0.004	South-southeast
March-05	7.38	6.48	-6.47	-7.67	1168.46	1151.60	1127.58	0.00436	South-southeast
June-05	NA	5.29	-45.93	-53.66	1119.19	1125.27	1082.40	0.0041	South-southeast
September-05	NA	5.93	-61.24	-62.95	1054.88	1077.87	1033.65	0.0068	South-southwest
December-05	NA	2.41	-57.9	-63.86	994.23	1023.45	980.25	0.0054	South-southwest
March-06	2.52	1.11	-24.81	-7.16	974.10	990.23	948.80	0.0084	South-southwest
June-06	7.65	11.18	-9.46	-3.57	966.16	983.47	933.59	0.0104	South-southwest
September-06	3.42	3.12	-6.66	-1.42	961.07	979.78	922.34	0.0099	South
December-06	4.68	5.9	2.48	0.75	958.87	979.73	933.37	0.0099	South
March-07	9.83		14.53	-0.11	969.87	992.53	958.06	0.0079	South
June-07	11.99		182.09	185.13	1162.17	1119.36	1128.32	0.0016	Southeast
September-07	29.4		15.56	5.46	1168.77	1168.14	1154.47	0.0019	South
December-07	1.95		-70.45	-76.43	1095.68	1101.19	1088.93	0.0052	South-southeast
March-08	2.17	2.31	-42.45	*-134.42	1050.23	1053.76	1047.78	0.0072	South
June-08	1.9	2.69	-51.71	*-3.57	1002.44	1015.93	966.67	0.0047	South
September-08	6.06	6.95	-27.49	*22.67	976.18	991.62	953.41	0.0058	South
December-08	1.69	1.74	-15.48	*-27.30	961.10	981.76	934.26	0.0080	South-southeast

GW = groundwater, ft MSL = feet above mean sea level, ft/ft = feet per foot
NA = Data not available due to weather station outage.
* Well is pumping constantly to the B-3 Bioreactor
2007 precipitation data was combined to fill in data gaps due to multiple weather station outages during SCADA installation.

J:\745\745953 CSSA DY02\01000 GWM\Annual GW Report 2008\Table 2-3 summary of elevation changes.xls

The hydrographs show a steady and dramatic decline in aquifer level until mid-June 2008. At that time, the decline notably "flat lines" and remains relatively stable for the remainder of 2008. It would seem that stable aquifer condition was partly a result of the increased frequency of precipitation events in the latter half of 2008, accounting for nearly two-thirds of the annual 12 inches of precipitation received locally. Another factor that may contribute to the pseudo-equilibrium of the aquifer is that the water table has eventually declined into the "production interval" of the LGR. This section of the aquifer has a significantly higher capacity for groundwater storage and therefore is less susceptible to regional decline than the overlying (and less permeable) strata. However, with continued drought conditions the storage capacity of the production interval is also being exceeded, as noted by the diminished yield from the CSSA production wells.

2.1.3 Potentiometric Data

The groundwater gradient/potentiometric surface figures presented **Appendix E** incorporate measured groundwater elevations from the LGR, BS, and CC screened wells. The drought conditions which began in September 2007 continued through the duration of 2008. As shown in **Appendix E**, water levels at CSSA can vary greatly. This variability is associated with several factors:

- Differences in well completion depths and formations screened;
- Differences in recharge rates due to increased secondary porosity associated with the Salado Creek area;
- Differences in recharge rates due to increased secondary porosity associated with local fault zones;
- Pumping from on- and off-post public and private water supply wells; and
- Locations of major faults or fractures.

2.1.4 Post-wide Flow Direction and Gradient

An overall average 2008 calculated LGR groundwater gradient is to the south-southeast at 0.0064 ft/ft. Depending which quadrant of the post the measurement is taken, the groundwater gradient varied seasonally from 0.00015 ft/ft (June 2008) to 0.0140 ft/ft (December 2008). General groundwater flow directions and average gradients calculated during past monitoring events are provided in **Table 2.3** for comparison.

Lower Glen Rose

The 2008 potentiometric surface maps for LGR-screened wells **(Appendix E.1, 4, 7 & 10)** exhibited a wide range of groundwater elevations. Groundwater elevations are generally higher in the northern and central portions of CSSA, and decrease to the southwest and southeast. This is consistent with the natural dip of the formations and the greater fault displacement in the southern portion of CSSA. The removal of well CS-G from the gridding process negates mounding effect is present at well CS-G that disrupts the normal southerly and easterly components of the North Pasture. This well, along with CS-D, CS-2, and CS-4 are not fully penetrating into the LGR and therefore is not considered within this map.

The progression of quarterly monitoring events illustrates the effect of the current drought with declining groundwater elevations in excess of 100 feet in 2008. The most notable feature in the March and June 2008 LGR potentiometric maps is the groundwater mounding in the vicinity of CS-MW4-LGR. Well CS-MW4-LGR in the central portion of CSSA consistently has the highest groundwater elevation of LGR screened wells. This elevation was approximately 10 to 20 feet higher than the nearest comparable wells (CS-MW2-LGR and CS-MW5-LGR). Unlike the general trend at CSSA, groundwater flow appears to radiate outward from CS-MW4-LGR. However as the drought progressed through 2008 the mounding effect noted at CS-MW4-LGR was muted by the distressed aquifer levels. This phenomenon has been observed before, most notably during the drought of 2006. Upon its rebound, the mounding effect near Salado Creek resumed.

The groundwater drawdown due to the continual pumping of CS-16-LGR (Bioreactor System) is reoccurring feature in the central portion of the post. Depending on the current pumping level at the time of measurement, groundwater in the vicinity of the Bioreactor may be depressed by as much as 75 feet (March 2008). Groundwater in the inner cantonment also shows a drawdown effect from the pumping of water supply well CS-10, and is most notable in March 2008 potentiometric surface map in **Appendix E.1.**

Bexar Shale

Currently, groundwater head information is limited to four data points (CS-MW1-BS, CS-MW6-BS, CS-MW9-BS, and CS-MW12-BS). At best, the BS groundwater maps should be considered qualitative. The BS appears to have very limited groundwater that is likely associated with fracturing. Fractured bedrock such as this often results in discordant water levels between neighboring points. The appropriateness of preparing potentiometric surface maps for the BS is debatable, but these maps have been generated for completeness. Potentiometric maps for the Bexar Shale in 2008 are presented in **Appendix E.2, 5, 8 & 11**.

In typical fashion, the 2008 potentiometric surface maps for BS-screened wells exhibited groundwater flow in multiple directions throughout 2008. The March and June 2008 measurements (**Figures E.2 and E.5**) indicate a predominately southwesterly flow radiating from well CS-MW1-BS. For the remainder of the year, the focal point of the map is based upon well CS-MW12-BS. In June and December 2008 (**Figures E.8 and E.11**) that well appears to act as "groundwater sink" within the BS. This mimics the effect that was noted in March 2007 when BS groundwater seemingly flowed toward CS-MW12-BS from all directions.

Cow Creek

As with the BS, the postwide monitoring of the CC groundwater is limited due to the small number of wells completed only in the CC. Four of the nine CC wells are concentrated in the vicinity of AOC-65. The 2008 potentiometric surface maps for CC-screened wells (**Appendix E.3 6, 9, & 12**) exhibited a southern flow in all quarters except June 2008. In

June 2008, and to a lesser extent in September 2008, the effects of continual pumping at the Bioreactor well CS-MW16-CC influenced groundwater gradients significantly in the CC interval. Prior studies have shown measurable pumping influence within the CC at distances of more than 2000 feet from a CC pumping well. In December 2008 the CS-MW16-CC well was not being utilized by the Bioreactor system, hence the map reflects the natural gradient of the interval in the typical southern direction.

2.2 Chemical Characteristics

2.2.1 On-Post Analytical Results

The LTMO study implemented in December 2005 determines the frequency that on-post wells are sampled. An overview of sampling frequencies for on-post wells only is given in **Table 2.4.** Sixty-seven on-post samples were scheduled to be collected in 2008 (22 in March, 6 in June, 33 in September, and 6 in December). Five of the 67 samples could not be collected due to a pump outage in well CS-I and low water levels in monitoring wells CS-MW11B-LGR, CS-MW4-LGR, CS-MW17-LGR, and CS-MW18-LGR. Nine additional samples were collected in 2008. The three drinking water wells were added in June (two samples from well CS-9 in June) and September to monitor the lead detections in well CS-9, well CS-MW9-LGR was added in June to gather additional data for a drinking water test well being drilled in the area, and the reservoir was sampled in September for metals. The wells were sampled using either dedicated low-flow pumps, high capacity submersible pumps, or dedicated solar-powered submersible pump. Samples were collected after field parameters (pH, temperature, conductivity) stabilized during well purging. Field parameters were recorded in the field logbook for each sampling event.

Groundwater samples were submitted to Agriculture & Priority Pollutants Laboratories, Inc. (APPL) of Clovis, California and TestAmerica of Arvada, Colorado (March event only) for analysis. The analytical program for on-post monitoring wells includes short-list VOC analysis and metals. The short list of VOC analytes included: 1,1-DCE, *cis*-1,2-DCE, *trans*-1,2-DCE, PCE, TCE, and vinyl chloride.

Under the provisions of the groundwater monitoring LTMO study and DQOs, the analytical metals list was reduced in September 2007 to include only nickel, cadmium, and lead to be sampled on a quarterly basis. Due to metals results in the new monitoring wells the analytical metals list was revised in the July 2008 meeting with the regulators to include only chromium, cadmium, mercury and lead, nickel was dropped from the list. The six newly installed monitoring wells were sampled for the 9 CSSA metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, zinc) through June 2008, in accordance with the DQOs.

Table 2.4
Overview of On-Post Sampling, 2008

Well Count	Well ID	*Mar-08*	*Jun-08*	*Sep-08*	*Dec-08*	*Frequency*
Wells To Be Sampled Under:		**DY02**	**DY02**	**DY02**	**DY02**	**under TO 0207**
1	**CS-1**	**not sampled**	**not sampled**	**VOCs (short list) & metals (As,Cs,Cu,Ba,Cr,Pb,Hg,Zn)**	**not sampled**	**Every 9 months***
2	CS-2	not sampled	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Every 9 months*
3	CS-4	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
4	**CS-9**	**not sampled**	**not sampled**	**VOCs (short list) & metals (As,Cs,Cu,Ba,Cr,Pb,Hg,Zn)**	**not sampled**	**Every 9 months***
5	**CS-10**	**not sampled**	**not sampled**	**VOCs (short list) & metals (As,Cs,Cu,Ba,Cr,Pb,Hg,Zn)**	**not sampled**	**Every 9 months***
6	CS-11	not sampled	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Every 9 months*
7	CS-D	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
8	CS-MWG-LGR	not sampled	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Every 9 months*
9	CS-MWH-LGR	not sampled	not sampled	not sampled	not sampled	Biennial
10	CS-I	not sampled	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Every 9 months*
11	CS-MW1-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
12	CS-MW1-BS	not sampled	not sampled	not sampled	not sampled	Biennial
13	CS-MW1-CC	not sampled	not sampled	not sampled	not sampled	Biennial
14	CS-MW2-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
15	CS-MW2-CC	not sampled	not sampled	not sampled	not sampled	Biennial
16	CS-MW3-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
17	CS-MW4-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
18	CS-MW5-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
19	CS-MW6-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
20	CS-MW6-BS	not sampled	not sampled	not sampled	not sampled	Biennial
21	CS-MW6-CC	not sampled	not sampled	not sampled	not sampled	Biennial
22	CS-MW7-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
23	CS-MW7-CC	not sampled	not sampled	not sampled	not sampled	Biennial
24	CS-MW8-LGR	not sampled	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Every 9 months*
25	CS-MW8-CC	not sampled	not sampled	not sampled	not sampled	Biennial
26	CS-MW9-LGR	VOCs (short list) & metals (9 CSSA Metals)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
27	CS-MW9-BS	not sampled	not sampled	not sampled	not sampled	Biennial
28	CS-MW9-CC	not sampled	not sampled	not sampled	not sampled	Biennial
29	CS-MW10-LGR	not sampled	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Every 9 months*
30	CS-MW10-CC	not sampled	not sampled	not sampled	not sampled	Biennial
31	CS-MW11A-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
32	CS-MW11B-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
33	CS-MW12-LGR	not sampled	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Every 9 months*
34	CS-MW12-BS	not sampled	not sampled	not sampled	not sampled	Biennial
35	CS-MW12-CC	not sampled	not sampled	not sampled	not sampled	Biennial
36	CS-MW16-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
37	CS-MW16-CC	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
38	CW-MW17-LGR	not sampled	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Every 9 months*
39	CS-MW18-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
40	CS-MW19-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	not sampled	Semi-annual
41	CS-MW20-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	VOCs (short list) & metals (9 CSSA Metals)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	Quarterly**
42	CS-MW21-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	VOCs (short list) & metals (9 CSSA Metals)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	Quarterly**
43	CS-MW22-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	VOCs (short list) & metals (9 CSSA Metals)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	Quarterly**
44	CS-MW23-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	VOCs (short list) & metals (9 CSSA Metals)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	Quarterly**
45	CS-MW24-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	VOCs (short list) & metals (9 CSSA Metals)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	Quarterly**
46	CS-MW25-LGR	VOC's (short list) & metals (Ni, Cd, Pb)	VOCs (short list) & metals (9 CSSA Metals)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	VOC's (short list) & metals (Cd,Cr,Pb,Hg)	Quarterly**
47	CS-WB01-LGR	VOC's short list (UGR & LGR zones only)	not sampled	VOC's short list (UGR & LGR zones only)	not sampled	UGR & LGR zones = Semi-annual, CC zones = Bienniel
48	CS-WB02-LGR	VOC's short list (UGR & LGR zones only)	not sampled	VOC's short list (UGR & LGR zones only)	not sampled	UGR & LGR zones = Semi-annual, CC zones = Bienniel
49	CS-WB03-LGR	VOC's short list (UGR & LGR zones only)	not sampled	VOC's short list (UGR & LGR zones only)	not sampled	UGR & LGR zones = Semi-annual, CC zones = Bienniel
50	CS-WB04-LGR	VOC's short list (UGR & LGR zones only)	not sampled	VOC's short list (UGR & LGR zones only)	not sampled	UGR & LGR zones = Semi-annual, CC zones = Bienniel

*Wells recommended for annual sampling frequency in the LTMO are scheduled every nine months (every third quarter) to gather seasonal data.
**Quarterly until LTMO Update study can recommend a frequency
9 CSSA Metals = As, Cd, Cu, Ni, Zn, Ba, Cr, Hg, Pb
biennial = every 2 years
semi annual = twice a year

J:\745\745953 CSSA DY02\01000 GWM\Annual GW Report 2008\Table 2.4 On-Post Sampling rationale.xls

Each sample is evaluated against either being qualitatively detected in trace amounts above the method detection limit (MDL [F-flagged data]), quantitatively detected above the laboratory reporting limit (RL), or in exceedance of regulatory maximum contaminant level (MCL) or action level (AL) standards. It is important to note that the RL value is significantly less than the promulgated groundwater standard criteria, and therefore the occurrence of a constituent above the RL does not necessarily indicate that there is an immediate concern, especially with the naturally occurring inorganics (metals) in groundwater. The only exception to this generalization is lead, where the RL (0.025 mg/L) is less than the AL (0.015 mg/L).

Parsons data packages containing the analytical results from the 2008 events are described in the quarterly reports for March, June, and September. The data collected in December is included in this annual report. Data validation was conducted, a summary report is submitted to Camp Stanley, and all data packages from the 2008 groundwater sampling events were reviewed and approved. All detected concentrations of VOCs and metals are presented in **Table 2.5**. Full analytical results are presented in **Appendix B**. Cumulative analytical results can be found in the CSSA Environmental Encyclopedia in Tables 6 and 7 of the *Introduction to the On-Post and Off-Post Quarterly Groundwater Monitoring Program*, Volume 5 Groundwater (CSSA 2007).

Wells not sampled in 2008 were: CS-I scheduled in September 2008 but was not sampled due to a pump outage. The pump was replaced in October and is now operating. Monitoring wells CS-MW11B-LGR, CS-MW4-LGR, CS-MW17-LGR, and CS-MW18-LGR were not sampled in September 2008 due to low water levels. See **Table 2.4** for the Overview of On-Post Sampling in 2008.

2.2.1.1 On-Post Monitoring Wells with COC Detections above the MCL

Some wells sampled had concentrations detected that exceeded MCLs. The MCLs for some COCs were exceeded in wells CS-MW16-LGR, CS-MW16-CC, CS-MW1-LGR, CS-D and CS-MW22-LGR in 2008. The respective comparison criteria (MCLs, SS, or AL) for each compound are included in **Table 2.5**. The detected concentrations are summarized as follows:

- **CS-D** – Concentrations of PCE, TCE, and *cis*-1,2-DCE exceeded their MCLs in March and September 2008. *Trans*-1,2-DCE was detected below its MCL. Metals detected in 2008 were nickel and lead, both below respective MCLs and RLs.
- **CS-MW16-LGR** – Concentrations of PCE, TCE, and *cis*-1,2-DCE exceeded their MCLs during the March and September sampling events. *Trans*-1,2-DCE was detected below the MCL in March and September 2008. Lead was detected in September 2008, below respective AL and RL. The pump in well CS-MW16-LGR was engaged April 24, 2007 to pump water onto the SWMU B-3 Bioreactor. The well has been cycling continuously since pumping was initiated in April. The pumping rate averaged about 15.63 gpm with a range of 7.64 gpm to 33.6 gpm. The pumping rate was adjusted

throughout the year to maximize the cycle lengths and the amount of water extracted from this well.

- **CS-MW16-CC** – Concentrations of PCE, TCE, and *cis*-1,2-DCE exceeded their respective MCLs in March and September 2008. *Trans*-1,2-DCE, 1,1-DCE, and vinyl chloride were also detected, but below their MCLs. Metals detected in 2008 were lead and nickel, both below the respective RLs. The pump in well CS-MW16-CC was engaged April 24, 2007 to pump water onto the SWMU B-3 Bioreactor. The well has been cycling continuously along with CS-MW16-LGR since pumping began in April. The pumping rate averaged about 20.69 gpm with a range of 13.27 to 60.67 gpm.
- **CS-MW1-LGR** – PCE and TCE concentrations were above their MCLs in March and September 2008. *Cis*-1,2-DCE and *trans*-1,2-DCE were detected below their MCLs in March and September 2008. In 2008 nickel, lead, and chromium were detected below the respective MCL/AL.
- **CS-MW22-LGR** – No VOCs were reported in this well in 2008. However lead exceeded the AL in March 2008. Arsenic, barium, cadmium, chromium, copper, mercury, nickel, and zinc were detected below their respective MCL/SS/ALs in March 2008. Only barium, nickel, and zinc were detected in June. In September lead was reported below the RL and by December no metals were detected in this well.

Table 2.5
2008 On-post Groundwater Analytical Results, Detections Only

Well ID	Laboratory	Sample Date	Dichloro-ethene, 1,1 (ug/L)	Dichloro-ethene, *cis*-1,2 (ug/L)	Dichloro-ethene, *trans*-1,2 (ug/L)	Tetra-chloroethene (ug/L)	Tri-chloroethene (ug/L)	Vinyl chloride (ug/L)	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Nickel (mg/L)	Zinc (mg/L)	pH	Temp. (deg. C)	Conductivity (mS/cm)
																		Field Measurements		
Method Detection Limit		MDL	0.12	0.07	0.08	0.06	0.05	0.08	0.00022	0.0003	0.0005	0.001	0.003	0.0019	0.0001	0.001	0.008			
Reporting Limit		RL	1.2	1.2	0.6	1.4	1.0	1.1	0.03	0.005	0.007	0.01	0.01	0.025	0.001	0.01	0.05			
Max. Contaminant Level		MCL	7	70	100	5	5	2	0.01	2	0.005	0.1	AL=1.3	AL=0.015	0.002	--	SS=5.0			
CS-1	APPL	6/27/2008	--	--	--	--	0.17F	--	--	0.0371	--	--	0.005F	--	0.0004F	--	0.159	7.04	22.35	0.542
	APPL	9/18/2008	--	--	--	--	--	--	0.00222F	0.0376	--	--	--	--	--	NA	0.067	6.87	22.51	0.580
	APPL	12/10/2008	--	--	--	0.12F	--	--	--	0.0374	--	--	0.006F	--	--	NA	0.072	7.20	21.79	0.454
CS-2	APPL	9/11/2008	--	--	--	0.64F	--	--	NA	NA	--	--	NA	0.003F	--	NA	NA	7.10	22.20	0.485
CS-4	APPL	3/12/2008	--	0.25F	--	1.36F	1.61	--	NA	NA	--	NA	NA	0.0028F	NA	--	NA	7.13	21.03	0.575
	APPL	9/15/2008	--	--	--	0.75F	1.08	--	NA	NA	--	--	NA	0.0026F	--	NA	NA	7.22	23.29	0.525
CS-9 sample time 1317	APPL	6/27/2008	--	--	--	--	--	--	0.00058F	0.0383	--	--	0.012	0.0067F	0.0012	0.002F	0.983	7.14	24.04	0.68
sample time 1356	APPL	6/27/2008	--	--	--	--	--	--	--	0.038	--	--	0.047	0.0541	0.0015	--	0.519	6.99	23.95	0.603
	APPL	9/16/2008	--	--	--	--	--	--	0.00197F	0.0394	--	--	--	0.0088F	0.0082J	NA	2.42	7.53	22.00	0.623
Duplicate	APPL	9/16/2008	--	--	--	--	--	--	0.00196F	0.0384	--	--	--	0.0083F	0.0066J	NA	2.242	7.53	22.00	0.623
	APPL	12/10/2008	--	--	--	--	--	--	NA	NA	--	--	NA	0.0066F	0.0047	NA	NA	7.14	21.12	0.491
CS-10	APPL	6/27/2008	--	--	--	--	--	--	0.00085F	0.0418	--	--	0.006F	--	0.0003F	0.002F	0.261	7.06	23.12	0.604
	APPL	9/16/2008	--	--	--	--	--	--	0.00338F	0.0393	--	--	--	0.0054F	--	NA	0.184	7.13	22.91	0.604
	APPL	12/10/2008	--	--	--	--	--	--	--	0.0375	--	--	--	--	--	NA	0.103	7.26	21.99	0.465
Duplicate	APPL	12/10/2008	--	--	--	--	--	--	--	0.0378	--	--	--	--	--	NA	0.101	7.26	21.99	0.465
CS-11	APPL	9/15/2008	--	--	--	--	--	--	NA	NA	--	0.02	NA	0.1972	--	NA	NA	8.19	20.87	0.321
CS-MW16-LGR	APPL	3/11/2008	--	117.14	0.28F	125.51	127.92	--	NA	NA	--	NA	NA	--	NA	--	NA	6.27	21.90	0.605
	APPL	9/9/2008	--	179.24	0.72	172.98	202.14	--	NA	NA	--	--	NA	0.0043F	--	NA	NA	6.49	22.33	0.550
CS-MW16-CC	APPL	3/11/2008	0.46F	78.17	3.17	12.13	64.97	0.33F	NA	NA	--	NA	NA	--	NA	0.004F	NA	6.83	21.94	0.695
	APPL	9/9/2008	0.38F	51.07	2.11	14.3	63.51	--	NA	NA	--	--	NA	0.0029F	--	NA	NA	7.14	23.14	0.631
CS-D	APPL	3/11/2008	--	137.48	0.94	131.9	157.89	--	NA	NA	--	NA	NA	--	NA	0.003F	NA	6.89	21.01	0.592
	APPL	9/9/2008	--	93.66	0.8	72.16	102.32	--	NA	NA	--	--	NA	0.0038F	--	NA	NA	7.31	21.95	0.531
CS-MWG-LGR	APPL	9/16/2008	--	--	--	--	--	--	NA	NA	0.0006F	--	NA	0.0102F	--	NA	NA	7.24	20.53	0.454
CS-MW1-LGR	APPL	3/11/2008	--	14.59	0.18F	8.03	17	--	NA	NA	--	NA	NA	--	NA	0.032	NA	7.48	21.12	0.560
Duplicate	APPL	3/11/2008	--	14.56	0.14F	8.71	18.39	--	NA	NA	--	NA	NA	--	NA	0.024	NA	7.48	21.12	0.560
	APPL	9/9/2008	--	16.3	0.26F	12.87	29.33	--	NA	NA	--	0.023	NA	0.0027F	--	NA	NA	7.04	21.79	0.524
CS-MW2-LGR	APPL	3/11/2008	--	1.55	--	--	0.06F	--	NA	NA	--	NA	NA	--	NA	0.003F	NA	8.96	21.36	0.443
	APPL	9/16/2008	--	0.58F	--	--	--	--	NA	NA	--	--	NA	0.0034F	--	NA	NA	11.66	22.04	1.23
CS-MW3-LGR	APPL	3/11/2008	--	--	--	--	--	--	NA	NA	--	NA	NA	--	NA	0.005F	NA	7.18	21.87	0.543
	APPL	9/16/2008	--	--	--	--	--	--	NA	NA	--	--	NA	0.0024F	--	NA	NA	7.37	22.8	0.509
CS-MW4-LGR	APPL	3/12/2008	--	0.14F	--	--	--	--	NA	NA	--	NA	NA	--	NA	--	NA	7.14	21.39	0.694
CS-MW5-LGR	APPL	3/11/2008	--	1.14F	--	0.66F	0.86F	--	NA	NA	--	NA	NA	--	NA	0.007F	NA	6.91	21.09	0.559
	APPL	9/11/2008	--	1.24	--	0.68F	1.01	--	NA	NA	--	0.002F	NA	0.005F	--	NA	NA	7.14	25.9	0.497
CS-MW6-LGR	APPL	3/12/2008	--	--	--	--	--	--	NA	NA	--	NA	NA	--	NA	0.02	NA	7.07	21.75	0.690
	APPL	9/10/2008	--	--	--	--	--	--	NA	NA	--	0.005F	NA	0.0043F	--	NA	NA	7.23	22.75	0.554
CS-MW7-LGR	APPL	3/12/2008	--	--	--	--	--	--	NA	NA	--	NA	NA	--	NA	--	NA	7.03	20.92	0.690
	APPL	9/9/2008	--	--	--	0.22F	--	--	NA	NA	--	0.002F	NA	--	--	NA	NA	6.64	21.56	0.637
CS-MW8-LGR	APPL	9/10/2008	--	--	--	1.66	--	--	NA	NA	0.0007F	0.002F	NA	0.0027F	--	NA	NA	7.10	22.88	0.672
CS-MW9-LGR	TestAmerica	3/17/2008	--	--	--	--	--	--	0.0004F	0.029	--	0.0026F	--	--	0.000058F	0.0093F	0.011F	7.05	20.82	0.526
	APPL	6/10/2008	--	--	--	0.26F	--	--	0.00582F	0.0372	--	0.007F	--	--	0.0004F	0.006F	--	7.11	21.89	0.515
	APPL	9/16/2008	--	--	--	--	--	--	NA	NA	--	0.002F	NA	0.0022F	--	NA	NA	7.16	20.96	0.528
Duplicate	APPL	9/16/2008	--	--	--	--	--	--	NA	NA	--	0.002F	NA	0.0038F	--	NA	NA	7.16	20.96	0.528
CS-MW10-LGR	APPL	9/15/2008	--	--	--	1.94	0.50F	--	NA	NA	--	0.016	NA	0.0025F	--	NA	NA	7.05	22.31	0.615
Duplicate	APPL	9/15/2008	--	--	--	2.08	0.39F	--	NA	NA	--	0.014	NA	0.0023F	--	NA	NA	7.05	22.31	0.615
CS-MW11A-LGR	APPL	3/12/2008	--	--	--	0.53F	--	--	NA	NA	--	NA	NA	--	NA	0.002F	NA	7.17	20.49	0.566
	APPL	9/15/2008	--	--	--	1.59	--	--	NA	NA	0.0008F	--	NA	0.0023F	--	NA	NA	6.93	21.69	0.592
CS-MW11B-LGR	APPL	3/12/2008	--	--	--	1.24F	--	--	NA	NA	--	NA	NA	0.0021F	NA	0.013	NA	7.24	20.24	0.550
CS-MW12-LGR	APPL	9/11/2008	--	--	--	--	--	--	NA	NA	--	--	NA	0.0026F	--	NA	NA	7.22	23.00	0.547
CS-MW18-LGR	APPL	3/12/2008	--	--	--	--	--	--	NA	NA	--	NA	NA	0.0022F	NA	0.007F	NA	7.47	21.83	0.547
CS-MW19-LGR	APPL	3/12/2008	--	--	--	0.39F	--	--	NA	NA	--	NA	NA	--	NA	0.053	NA	7.11	21.52	0.667
	APPL	9/11/2008	--	--	--	0.40F	--	--	NA	NA	--	0.002F	NA	0.0037F	--	NA	NA	7.19	22.10	0.595
CS-MW20-LGR	TestAmerica	3/13/2008	--	--	--	1.6	--	--	0.00078F	0.140	0.00021F	--	--	0.00019F	--	--	0.0080F	6.87	20.85	0.538
	APPL	6/24/2008	--	--	--	1.95	--	--	--	0.1448	--	--	--	--	--	--	0.057	7.16	23.90	0.583
	APPL	9/15/2008	--	--	--	1.88	--	--	NA	NA	0.0008F	0.002F	NA	0.0029F	--	NA	NA	6.98	21.90	0.603
	APPL	12/9/2008	--	--	--	2.09	--	--	NA	NA	--	--	NA	--	--	NA	NA	7.00	21.61	0.454

Table 2.5
2008 On-post Groundwater Analytical Results, Detections Only

Well ID	Laboratory	Sample Date	Dichloro-ethene, 1,1 (ug/L)	Dichloro-ethene, *cis*-1,2 (ug/L)	Dichloro-ethene, *trans*-1,2 (ug/L)	Tetra-chloroethene (ug/L)	Tri-chloroethene (ug/L)	Vinyl chloride (ug/L)	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Nickel (mg/L)	Zinc (mg/L)	pH (Field Measurements)	Temp. (deg. C) (Field Measurements)	Conductivity (mS/cm) (Field Measurements)
Method Detection Limit		**MDL**	0.12	0.07	0.08	0.06	0.05	0.08	0.00022	0.0003	0.0005	0.001	0.003	0.0019	0.0001	0.001	0.008			
Reporting Limit		**RL**	**1.2**	**1.2**	**0.6**	**1.4**	**1.0**	**1.1**	**0.03**	**0.005**	**0.007**	**0.01**	**0.01**	**0.025**	**0.001**	**0.01**	**0.05**			
Max. Contaminant Level		**MCL**	**7**	**70**	**100**	**5**	**5**	**2**	**0.01**	**2**	**0.005**	**0.1**	**AL=1.3**	**AL=0.015**	**0.002**	**--**	**SS=5.0**			
CS-MW21-LGR	TestAmerica	3/13/2008	--	--	--	--	--	--	**0.00062F**	**0.085**	--	--	--	**0.00081F**	--	--	**0.15**	7.05	21.10	0.500
	APPL	6/24/2008	--	--	--	--	--	--	--	**0.091**	--	--	--	--	--	**0.002F**	**0.142**	7.23	22.40	0.531
	APPL	9/15/2008	--	--	--	--	--	--	NA	NA	--	--	NA	**0.0032F**	--	NA	NA	7.18	21.68	0.551
	APPL	12/10/2008	--	--	--	--	--	--	NA	NA	--	--	NA	--	--	NA	NA	7.24	20.61	0.416
CS-MW22-LGR	TestAmerica	3/13/2008	--	--	--	--	--	--	**0.0038F**	**0.079**	**0.000067F**	**0.017**	**0.013**	**0.04**	**0.00013F**	**0.022**	**4.9**	7.11	20.25	0.494
Duplicate	TestAmerica	3/13/2008	--	--	--	--	--	--	**0.0036F**	**0.077**	**0.00008F**	**0.016**	**0.012**	**0.038**	**0.00012F**	**0.022**	**4.7**	7.11	20.25	0.494
	APPL	6/24/2008	--	--	--	--	--	--	--	**0.0651**	--	--	--	--	--	**0.006F**	**1.701**	7.22	22.31	0.564
Duplicate	APPL	6/24/2008	--	--	--	--	--	--	--	**0.0658**	--	--	--	--	--	**0.006F**	**1.732**	7.22	22.31	0.564
	APPL	9/15/2008	--	--	--	--	--	--	NA	NA	--	--	NA	**0.0037F**	--	NA	NA	7.29	22.26	0.561
	APPL	12/10/2008	--	--	--	--	--	--	NA	NA	--	--	NA	--	--	NA	NA	7.24	19.50	0.433
CS-MW23-LGR	TestAmerica	3/13/2008	--	--	--	--	--	--	**0.0008F**	**0.046**	--	--	--	**0.00023F**	--	--	**0.1**	7.04	20.85	0.472
	APPL	6/24/2008	--	--	--	--	--	--	--	**0.0528**	--	--	--	--	--	**0.035**	**0.133**	7.16	22.11	0.529
	APPL	9/15/2008	--	--	--	--	--	--	NA	NA	**0.0006F**	**0.004F**	NA	**0.0079F**	--	NA	NA	7.30	22.12	0.529
	APPL	12/10/2008	--	--	--	--	--	--	NA	NA	--	--	NA	--	--	NA	NA	7.28	19.62	0.399
CS-MW24-LGR	TestAmerica	3/17/2008	--	--	--	--	--	--	**0.00039F**	**0.03**	--	--	--	--	**0.00006F**	--	**0.074**	7.12	21.33	0.562
	APPL	6/24/2008	--	--	--	--	--	--	--	**0.0334**	--	--	--	--	0.0001M	--	**0.132**	7.25	22.10	0.520
	APPL	9/10/2008	--	--	--	--	--	--	NA	NA	--	**0.002F**	NA	**0.0035F**	--	NA	NA	7.27	22.02	0.672
	APPL	12/9/2008	--	--	--	--	--	--	NA	NA	--	--	NA	--	--	NA	NA	7.27	21.53	0.418
CS-MW25-LGR	TestAmerica	3/17/2008	--	--	--	--	--	--	**0.0010F**	**0.032**	**0.000043F**	**0.038**	--	**0.0026**	**0.00006F**	**0.014**	**0.24**	7.19	21.54	0.550
	APPL	6/10/2008	--	--	--	--	--	--	**0.00274F**	**0.0333**	--	**0.012**	**0.004F**	--	**0.0005F**	**0.009F**	**0.297**	7.27	22.43	0.508
	APPL	9/16/2008	--	--	--	--	--	--	NA	NA	--	**0.002F**	NA	**0.0035F**	--	NA	NA	7.32	21.93	0.496
	APPL	12/9/2008	--	--	--	--	--	--	NA	NA	--	**0.026**	NA	--	--	NA	NA	7.43	21.73	0.374
Reservoir	APPL	9/18/2008	NA	NA	NA	NA	NA	NA	**0.00222F**	**0.0389**	--	--	--	--	0.0001U	NA	**0.166**			

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

Notes:
- ug/L = micrograms per liter
- mg/L = miligrams per liter
- "--" = analyte not detected
- AL = action level
- SS = secondary standard
- VOCs analyzed using laboratory method SW8260B.
- F = The analyte was positively identified but the associated numerical value is below the RL.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- NA = Not analyzed for this parameter.
- APPL = Agriculture & Priority Pollutants Laboratories, Inc. of Clovis, CA

J:\745\745953 CSSA DY02\01000 GWM\Annual GW Report 2008\Table 2-5 & Appendix B 08 On-Post Analytical.xls

2.2.1.2 On-Post Monitoring Wells with COC Detections below the MCL

Groundwater monitoring results included wells where COCs were detected at levels below the applicable MCLs. These included wells CS-2, CS-4, CS-MWG-LGR, CS-MW2-LGR, CS-MW3-LGR, CS-MW4-LGR, CS-MW5-LGR, CS-MW6-LGR, CS-MW7-LGR, CS-MW8-LGR, CS-MW9-LGR, CS-MW10-LGR, CS-MW11A-LGR, CS-MW11B-LGR, CS-MW12-LGR, CS-MW18-LGR, CS-MW19-LGR, CS-MW20-LGR, CS-MW21-LGR, CS-MW23-LGR, CS-MW24-LGR, CS-MW25-LGR and the reservoir. The detections below the MCLs are summarized as follows:

- **CS-2** – Concentrations of PCE were detected below the RL in September 2008. Lead was also detected below the RL.
- **CS-4** – Concentrations of PCE, TCE, and *cis*-1,2-DCE were reported below the MCL in the March and September 2008 events. Lead was also detected both quarters, below the RL/MCL.
- **CS-MWG-LGR** – No VOCs were detected in this well in 2008. Cadmium and zinc were reported below respective RLs.
- **CS-MW2-LGR** – Concentrations of *cis*-1,2-DCE and TCE were detected below the MCL in 2008. Nickel and lead were also detected below their applicable RLs. The pH at the time of sampling was 8.96 and 11.66 respectively, for the March and September 2008 sampling events. This well was upgraded in September 2002, the pH has been unusually high every since. Grout contamination from the CC twin well (CS-MW2-CC) installed in 2002 is suspected to have played a role in the elevated pH measurements now present in CS-MW2-LGR.
- **CS-MW3-LGR** – No VOCs were detected in this well in 2008. However, nickel and lead were reported below respective RLs in March and September 2008.
- **CS-MW4-LGR** – *Cis*-1,2-DCE was detected below the RL in March 2008. No metals were reported in this well in 2008.
- **CS-MW5-LGR** – Concentrations of PCE, TCE, and *cis*-1,2-DCE were detected below the MCL in March and September 2008. Low levels of chromium, lead, and nickel were also detected below respective RLs in 2008.
- **CS-MW6-LGR** - No VOCs were reported in this well in 2008. Nickel was detected above the RL in March 2008. Low levels of chromium and lead were present in September 2008, while the nickel concentrations dropped to non-detect.
- **CS-MW7-LGR** – PCE was detected below the RL in September 2008. Low levels of chromium were also detected in September, below applicable RLs.
- **CS-MW8-LGR** – Concentrations of PCE were detected below the MCL in September 2008. Cadmium, chromium, and lead were also detected in this well, below their respective RLs.

- **CS-MW9-LGR** – Concentrations of PCE were reported in this well in June 2008, below the RL. Arsenic, barium, chromium, mercury, nickel, and zinc were below their applicable SS/MCLs in March and June 2008. By September 2008 chromium and lead were the only COCs detected in groundwater at this location, each below their respective RLs.
- **CS-MW10-LGR** – Concentrations of PCE and TCE, below the MCL, were detected in September 2008. Also reported below respective MCLs/ALs were lead and chromium.
- **CS-MW11A-LGR** – Concentrations of PCE were detected below the MCL in March and September 2008. In September 2008, cadmium and lead were reported below respective RLs and in March nickel was reported below the RL.
- **CS-MW11B-LGR** – Concentrations of PCE were detected below the MCL in March 2008. Also in March 2008, nickel and lead were reported below respective MCLs/ALs. This well was not sampled in September 2008 due to groundwater levels falling below the pump.
- **CS-MW12-LGR** - No VOCs were reported in this well in 2008. However, lead was reported below the RL in September 2008.
- **CS-MW18-LGR** - No VOCs were reported in this well in 2008. However low levels of nickel and lead were detected in March 2008, below applicable RLs. This well was not sampled in September 2008 due to groundwater levels falling below the pump.
- **CS-MW19-LGR** – Concentrations of PCE were below the RL in March and September 2008. Also in March 2008 nickel was reported above the RL. By September 2008 only chromium and lead were detected, both below their respective RLs.
- **CS-MW20-LGR** – Concentrations of PCE were detected below the MCL in March, June, September, and December 2008. In 2008 metals detections were sporadic, with arsenic, barium, cadmium, lead, and zinc detected below the respective MCLs/SS/ALs in March. In June, only barium and zinc were detected above the RLs. In September, cadmium, chromium and lead were reported below respective RLs. By December no metals were reported in this well.
- **CS-MW21-LGR** – No VOCs were detected in this well in 2008. However arsenic, barium, lead, nickel, and zinc were detected in March and June 2008. In September 2008, only lead was still present, below the RL and by December no metals were detected.
- **CS-MW23-LGR** - No VOCs were reported in this well in 2008. However arsenic, barium, lead, and zinc concentrations were detected in March 2008, all below their applicable MCL/SS/ALs. In June, barium, nickel, and zinc were all detected above their respective RLs. In September, cadmium, chromium and lead were detected below the RLs and by December no metals were detected in this well.
- **CS-MW24-LGR** – No VOCs were reported in this well in 2008. However arsenic, barium, mercury, and zinc concentrations were reported in March 2008, all below their

applicable MCL/SS/ALs. In June, barium and zinc were detected above their respective RLs. In September, chromium and lead were detected below the RLs and by December no metals were detected in this well.

- **CS-MW25-LGR** - No VOCs were reported in this well in 2008. However arsenic, barium, cadmium, chromium, lead, mercury, nickel, and zinc concentrations were reported in March 2008, all below their applicable MCL/SS/ALs. In June, arsenic, barium, chromium, copper, mercury, nickel, and zinc were detected below their respective MCL/SS/ALs. In September, chromium and lead were detected below the RLs and by December only chromium was detected above the RL.
- **Reservoir** – The reservoir is part of CSSA drinking water system. The reservoir was sampled to collect additional metals data in the area. Barium and zinc concentrations were above the RL but below the applicable SS/MCLs.

2.2.1.3 On-Post Monitoring Wells with No COC Detections

Of the 27 monitoring wells sampled in 2008 all wells reported COC detections. Wells CS-MWH-LGR, CS-MW1-BS, CS-MW1-CC, CS-MW2-CC, CS-MW6-BS, CS-MW6-CC, CS-MW7-CC, CS-MW8-CC, CS-MW9-BS, CS-MW9-CC, CS-MW10-CC, CS-MW12-BS, and CS-MW12-CC were not sampled in 2008, in accordance with the LTMO study. Details on the RL, MDLs, field duplicates, MCLs, *etc.*, are described in the tables of detections (**Table 2.5**) and in **Appendix B**.

2.2.1.4 Drinking Water Supply Well Results

Current CSSA drinking water supply wells CS-1, CS-9, and CS-10 were analyzed for VOCs and the 9 CSSA metals in 2008. Under the LTMO study, the drinking water supply wells are scheduled to be sampled every nine months (**Table 2.4**). However, due to increased metals concentrations in well CS-9 after well rehabilitation the sampling frequency was increased (June, September, and December). Former drinking water well CS-11 remained on the nine month schedule. The detections are summarized as follows:

- **CS-1** – Concentrations of TCE and PCE were detected, below the RL, in June and December 2008, respectively. Arsenic, barium, copper, mercury, and zinc were all detected below the applicable MCL/SS/ALs in 2008.
- **CS-9** – No VOCs were detected in 2008. However, lead was detected above the AL of 0.015 mg/L in June 2008 after the well had been pumped for 40 minutes. The initial sample, collected as soon as the pump was engaged, reported lead concentrations below the RL. Mercury was reported above the MCL in September and December 2008. Arsenic, barium, copper, mercury, nickel, and zinc were also detected below the applicable SS/MCLs.
- **CS-10** – No VOCs were detected in 2008. Arsenic, barium, copper, lead, mercury, nickel, and zinc were all detected in this well, below the applicable MCL/SS/ALs, in 2008.

- **CS-11** – This former drinking water well was sampled in September 2008 and no VOCs were detected. Lead was detected above the AL and chromium was above the RL but below the MCL. This well is offline and not being used in the CSSA water supply system due to bacterial contamination issues in the past.

As of June 2007 the groundwater supply well CS-9 rehabilitation was completed. Initially, the investigation indicated debris (believed to be either old well casing, column pipe and/or an old broken pump) present in the bottom of the well borehole was the suspected source for the elevated lead and mercury detections noted after the initial well rehabilitation effort. The well was pressure-grouted to seal the debris present in the bottom of the borehole in order to eliminate contact with the water producing zones. The initial sampling indicated that metals levels were below MCLs. However, continued sampling in 2008 has shown that lead and mercury in excess of groundwater standards can still be present in the groundwater. Therefore, well CS-9 continues to be an inactive component of the CSSA distribution system. A more in-depth summary of the rehabilitation of Well CS-9 is included in **Section 3.**

As a result of the prolonged drought of 2008, CSSA revised the “trigger levels” for their postwide Drought Contingency Plan. The proposed trigger levels are now based solely on the pumping level of production well CS-10. This is a revision to the previous averaging of water levels from multiple monitoring wells throughout the facility. The proposed plan is based upon performance and known production capacity of well CS-10, which is the primary provider of potable water for the facility. The Drought Contingency Plan triggers is included in **Appendix D**.

2.2.1.5 Westbay®-equipped Well Results

Eight wells equipped with the Westbay multi-port interval sampling equipment have been installed at CSSA. Four wells (CS-WB05, CS-WB06, CS-WB07, and CS-WB08) are sampled as part of the SWMU B-3 bioreactor treatability study and are not addressed in this report. Four (CS-WB01, CS-WB02, CS-WB03, and CS-WB04) are included in the groundwater monitoring program and were sampled in 2008. Under the provisions of the groundwater monitoring DQOs and the LTMO study, the schedule for sampling the UGR and LGR zones in the four Westbay-equipped wells is semi-annual. The schedule for sampling the BS and CC zones in Westbay well CS-WB04 is biennial. Samples were collected from UGR and LGR zones with water during the March and September 2008 events. Due to a decrease in groundwater elevations, certain zones (CS-WB01-UGR-01, CS-WB02-UGR-01, CS-WB02-LGR-02, CS-WB03-LGR-02, and CS-WB04-UGR-01) could not be sampled in March or September because they were dry. Zone CS-WB04-LGR-02 was not sampled in September because it was dry. Zone CS-WB04-LGR-05 was not sampled due to a non-operational sampling port. The remaining 35 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 and September 2008, in accordance with the LTMO study findings and the groundwater DQOs. Samples were analyzed for PCE, TCE, *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1-DCE, vinyl chloride and analyzed by APPL. Per

DQOs, the Westbay data are used for screening purposes only. No quality assurance/quality control samples were collected with the Westbay samples in 2008. All intervals with detections of COCs are presented in **Table 2.6**. Full analytical results are presented in **Appendix C**.

Westbay intervals CS-WB01-LGR-01, -LGR-02, -LGR-03, -LGR-07, -LGR-09, CS-WB02-LGR-01, -LGR-03, -LGR-04, -LGR-08, -LGR-09, CS-WB03-UGR-01, -LGR-03 through -LGR-09, CS-WB04-LGR-06, -LGR-07, and -LGR-09 reported detections of PCE and/or TCE above the MCL in 2008.

Figures 2.3, 2.4, 25, and **2.6** present the vertical distribution of the VOC plume within the multi-port wells for the most pervasive contaminants, PCE and TCE. The contaminant conditions in the profiles occurred during a below-average saturation in the aquifer, where the post had received less than 13 inches of rainfall in 2008. The following discussion presents general observations that have been noted since the inception of Westbay monitoring at AOC-65.

In 2008, the VOC plume originating from AOC-65 is generally similar in concentration and distribution as in prior years. Near the source area (CS-WB03 and –WB02), the solvent contamination is persistent throughout the entire thickness of the LGR, with the greatest concentrations near the land surface. As the plume disperses to the south and west, the contaminants seem to preferentially migrate in stratified lobes (LGR-01, -02, and 03), (LGR-06 and -07) and LGR-09. Although the BS and CC zones at CS-WB04 were not sampled in 2008, they generally have little to no contamination present.

CS-WB03 is located closest to the Building 90 source area, and consistently records the highest concentrations of contaminants. The uppermost zones (CS-WB03-UGR01, and -LGR01) were dry from September 2003 to October 2004 as well as March of 2006 and 2007, but managed to be saturated enough to collect samples during the March and September 2008 sampling events. When groundwater is present in these zones, PCE concentrations have ranged between 300 µg/L (CS-WB03-LGR01) and 30,000 µg/L (CS-WB03-UGR01) in 2008. The results indicate that a persistent source still exists, and that periodic flushing by intense rainfall, suspected plumbing and air condition condensation leaks from Building 90 can mobilize these perched contaminants that are probably otherwise bound to the matrix during the rest of the year. WB01-, WB02-, and WB04-UGR zones were all dry during the 2008 sampling events, this is further indication that something more than just rainfall is mobilizing the high concentrations of contaminants to the WB03-UGR zone. In lower zones at CS-WB03 typically range between 20 µg/L and 40 µg/L of PCE, with significantly lesser amounts of TCE being reported. In general, the results found in CS-WB03 are consistent with those results from prior years.

Table 2.6
2008 Westbay® Groundwater COCs Analytical Results, Detections Only

Well ID	Date	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	Vinyl Chloride	1,1-DCE
Method Detection Limit	MDL	0.16	0.15	0.19	0.16	0.23	0.3
Current Reporting Limit	RL	1.2	1.4	0.6	1.0	1.1	1.2
Max. Contaminant Level	MCL	70	5.0	100	5.0	2.0	7.0
CS-WB01-UGR-01	18-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	17-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB01-LGR-01	18-Mar-08	--	**5.1**	--	**0.43J**	--	--
	17-Sep-08	--	**6.5**	--	**0.34J**	--	--
CS-WB01-LGR-02	18-Mar-08	--	**7.9**	--	**3.2**	--	--
	17-Sep-08	--	**9.3**	--	**3.4**	--	--
CS-WB01-LGR-03	18-Mar-08	**0.16J**	**2.6**	--	**5.0**	--	--
	17-Sep-08	--	**5.8**	--	**15.0**	--	--
CS-WB01-LGR-04	18-Mar-08	--	**0.33J**	--	**0.25J**	--	--
	17-Sep-08	--	--	--	**0.25J**	--	--
CS-WB01-LGR-05	18-Mar-08	--	**0.44J**	--	**0.33J**	--	--
	17-Sep-08	--	**0.18J**	--	**0.24J**	--	--
CS-WB01-LGR-06	18-Mar-08	--	**0.82J**	--	**1.0**	--	--
	17-Sep-08	--	**0.38J**	--	**0.71J**	--	--
CS-WB01-LGR-07	18-Mar-08	--	**14**	--	**12**	--	--
	17-Sep-08	--	**10**	--	**10**	--	--
CS-WB01-LGR-08	18-Mar-08	--	**1.1J**	--	**1.9**	--	--
	17-Sep-08	--	**0.53J**	--	**1.4**	**0.33J**	--
CS-WB01-LGR-09	18-Mar-08	**0.45J**	**18**	--	**23**	--	--
	17-Sep-08	**0.45J**	**17**	--	**22**	--	--
CS-WB02-UGR-01	18-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	17-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB02-LGR-01	18-Mar-08	--	**7.7**	--	**2.2**	--	--
	17-Sep-08	--	**3.3**	--	**3.5**	--	--
CS-WB02-LGR-02	18-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	17-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB02-LGR-03	18-Mar-08	--	**9.8**	--	**1.4**	--	--
	17-Sep-08	--	**7.1**	--	**2.0**	--	--
CS-WB02-LGR-04	18-Mar-08	--	**4.5**	--	**9.7**	--	--
	17-Sep-08	--	**4.2**	--	**14**	--	--
CS-WB02-LGR-05	18-Mar-08	--	**1.7**	--	**3.4**	--	--
	17-Sep-08	--	**1.1J**	--	**4.4**	--	--
CS-WB02-LGR-06	18-Mar-08	**0.43J**	**2.1**	**0.93**	**3.6**	--	--
	17-Sep-08	--	**1.3J**	--	**4.6**	--	--
CS-WB02-LGR-07	18-Mar-08	--	**4.2**	--	**1.4**	--	--
	17-Sep-08	--	**0.83J**	--	**1.0**	--	--
CS-WB02-LGR-08	18-Mar-08	--	**6.7**	--	**2.2**	--	--
	17-Sep-08	--	**2.2**	--	**1.6**	--	--
CS-WB02-LGR-09	18-Mar-08	**0.23J**	**32**	--	**12**	--	--
	17-Sep-08	**0.33J**	**15**	--	**13**	--	--
CS-WB03-UGR-01	17-Mar-08	--	**30,000**	--	**500**	--	--
	17-Sep-08	--	**3,900**	--	**54J**	--	--

Bold	= Above the MDL
Bold (blue shading)	= Above the RL
Bold (red shading)	= Above the MCL

Table 2.6
2008 Westbay® Groundwater COCs Analytical Results, Detections Only

Well ID	Date	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	Vinyl Chloride	1,1-DCE
Method Detection Limit	MDL	0.16	0.15	0.19	0.16	0.23	0.3
Current Reporting Limit	RL	1.2	1.4	0.6	1.0	1.1	1.2
Max. Contaminant Level	MCL	70	5.0	100	5.0	2.0	7.0
CS-WB03-LGR-01	17-Mar-08	**0.29J**	**390**	--	**14**	--	--
	17-Sep-08	**0.35J**	**2,500**	--	**19**	--	--
CS-WB03-LGR-02	17-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	17-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB03-LGR-03	17-Mar-08	**0.16J**	**17**	--	**7.6**	--	--
	17-Sep-08	**0.37J**	**24**	--	**11**	--	--
CS-WB03-LGR-04	17-Mar-08	**0.23J**	**20**	--	**6.8**	--	--
	17-Sep-08	--	**22**	--	**8.8**	--	--
CS-WB03-LGR-05	17-Mar-08	--	**22**	--	**6.0**	--	--
	17-Sep-08	--	**20**	--	**6.0**	--	--
CS-WB03-LGR-06	17-Mar-08	--	**15**	--	**1.7**	--	--
	17-Sep-08	--	**9.2**	--	**1.3**	--	--
CS-WB03-LGR-07	17-Mar-08	**0.41J**	**16**	--	**11**	--	--
	17-Sep-08	**0.18J**	**10**	--	**4.2**	--	--
CS-WB03-LGR-08	17-Mar-08	--	**19**	--	**1.8**	--	--
	17-Sep-08	--	**14**	--	**1.5**	--	--
CS-WB03-LGR-09	17-Mar-08	--	**8.7**	--	**10**	--	--
	17-Sep-08	--	**16**	--	**4.8**	--	--
CS-WB04-UGR-01	17-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	18-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-01	19-Mar-08	--	**0.54J**	--	--	--	--
	18-Sep-08	--	**0.54J**	--	--	--	--
CS-WB04-LGR-02	19-Mar-08	--	**0.25J**	--	--	--	--
	18-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-03	19-Mar-08	--	**0.21J**	--	--	--	--
	18-Sep-08	--	--	--	--	--	--
CS-WB04-LGR-04	19-Mar-08	--	**0.17J**	--	--	--	--
	18-Sep-08	--	--	--	--	--	--
CS-WB04-LGR-06	19-Mar-08	**4.2**	**1.5**	**0.35J**	**12**	--	--
	18-Sep-08	**3.8**	**6.5**	**0.33J**	**16**	--	--
CS-WB04-LGR-07	19-Mar-08	**6.2**	**0.34J**	**0.33J**	**8.4**	--	--
	18-Sep-08	**3.6**	**6**	**0.22J**	**15**	--	--
CS-WB04-LGR-08	19-Mar-08	--	**0.40J**	--	**0.79J**	--	--
	18-Sep-08	--	**0.42J**	--	**0.64J**	--	--
CS-WB04-LGR-09	19-Mar-08	**0.21J**	**14**	--	**8.6**	--	--
	18-Sep-08	--	**10**	--	**8.8**	--	--
CS-WB04-LGR10	19-Mar-08	--	**0.74J**	--	**0.64J**	--	--
	18-Sep-08	--	**0.91J**	--	**0.68J**	--	--
CS-WB04-LGR-11	19-Mar-08	--	**0.87J**	--	--	--	--
	18-Sep-08	--	**3.5**	--	--	--	--

Bold	= Above the MDL
Bold (blue)	= Above the RL
Bold (red)	= Above the MCL

Notes:
- ug/L = micrograms per liter
- "--" = analyte not detected
- VOCs analyzed as screening data using laboratory method SW8260B.
- J = The analyte was positively identified, the quantitation is an estimation.
- APPL = Agriculture & Priority Pollutants Laboratories, Inc. of Clovis, CA

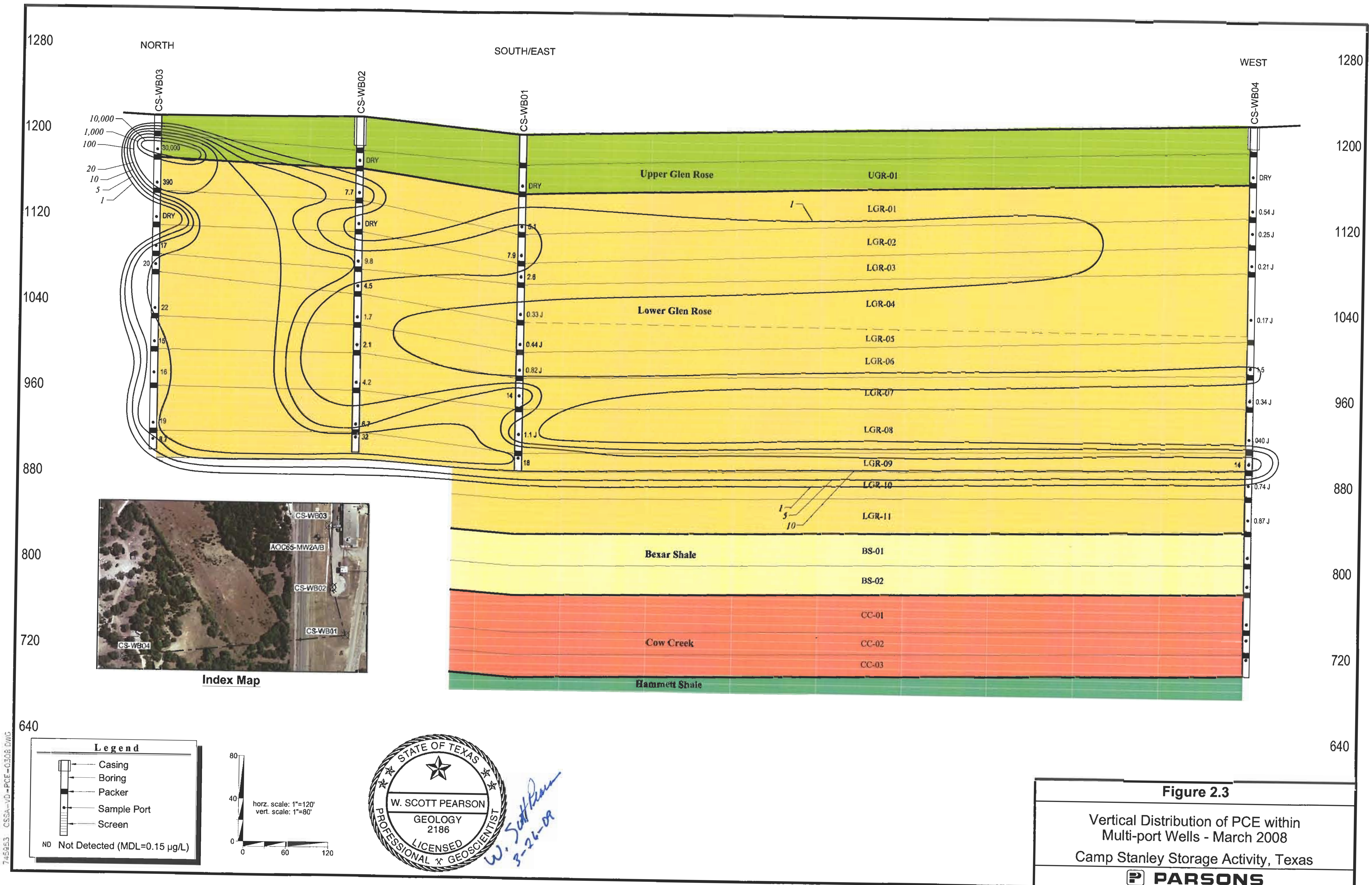


Figure 2.3

Vertical Distribution of PCE within Multi-port Wells - March 2008

Camp Stanley Storage Activity, Texas

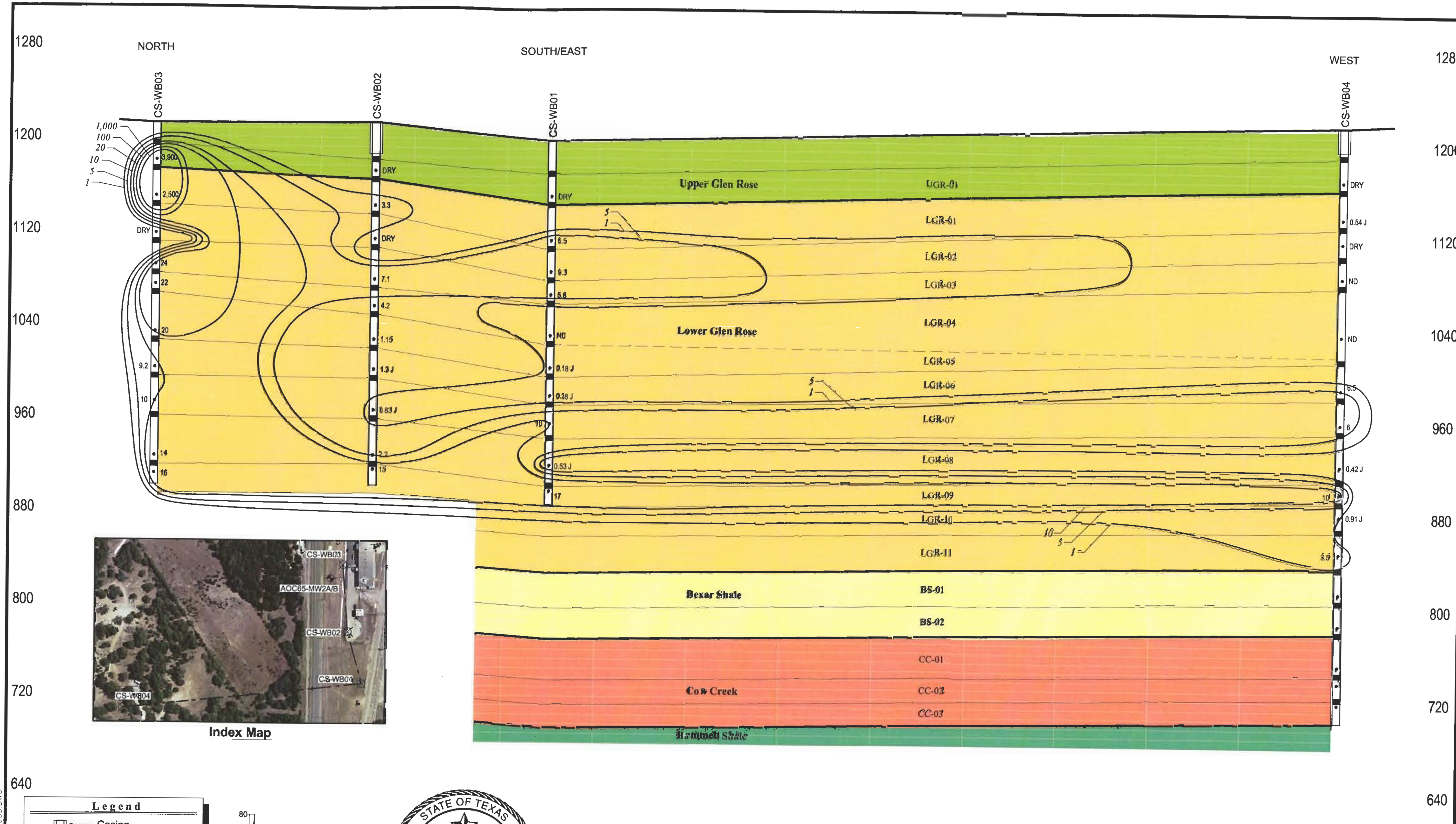


Figure 2.4

Vertical Distribution of PCE within Multi-port Wells - September 2008

Camp Stanley Storage Activity, Texas

PARSONS

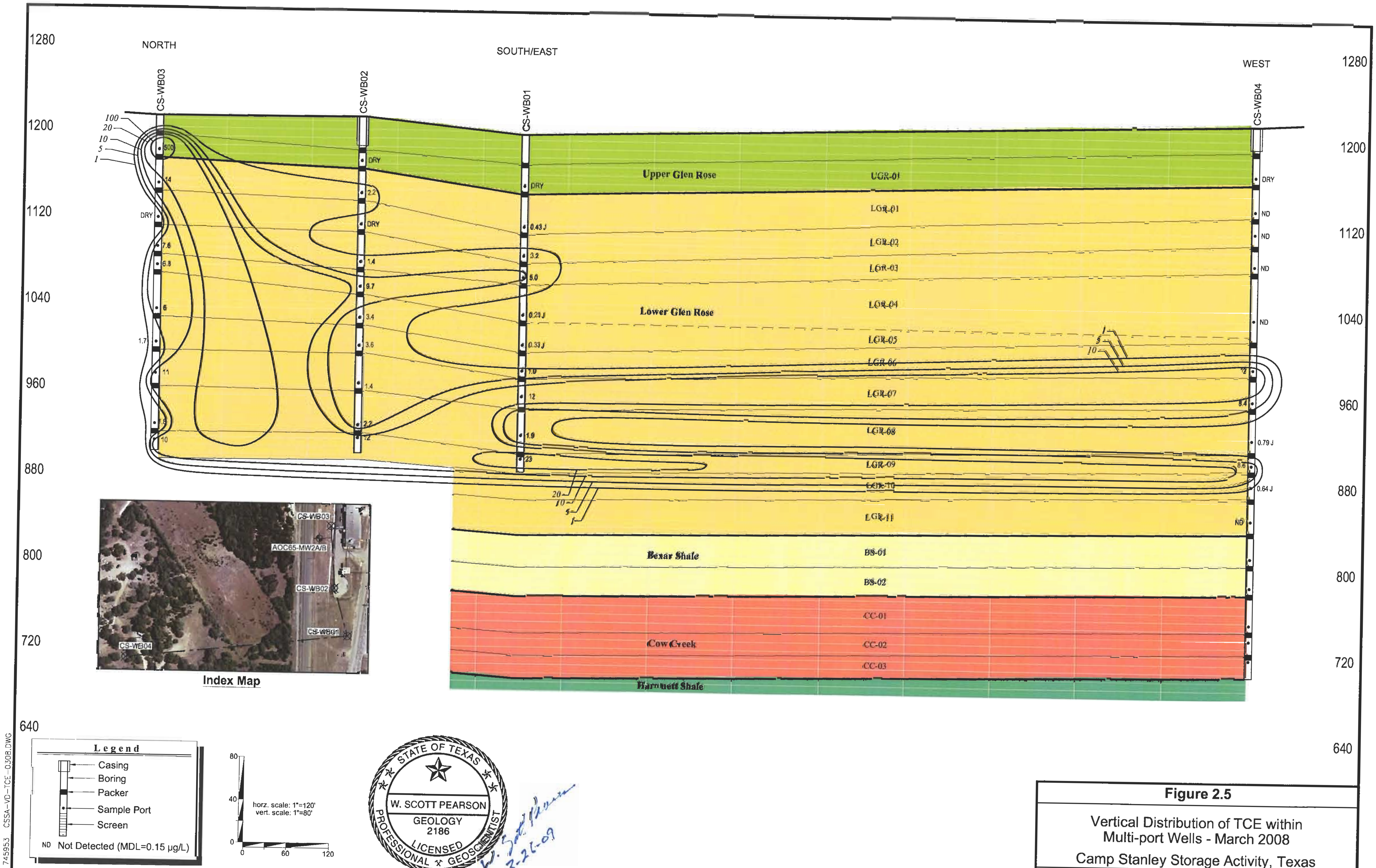


Figure 2.5

Vertical Distribution of TCE within Multi-port Wells - March 2008

Camp Stanley Storage Activity, Texas

PARSONS

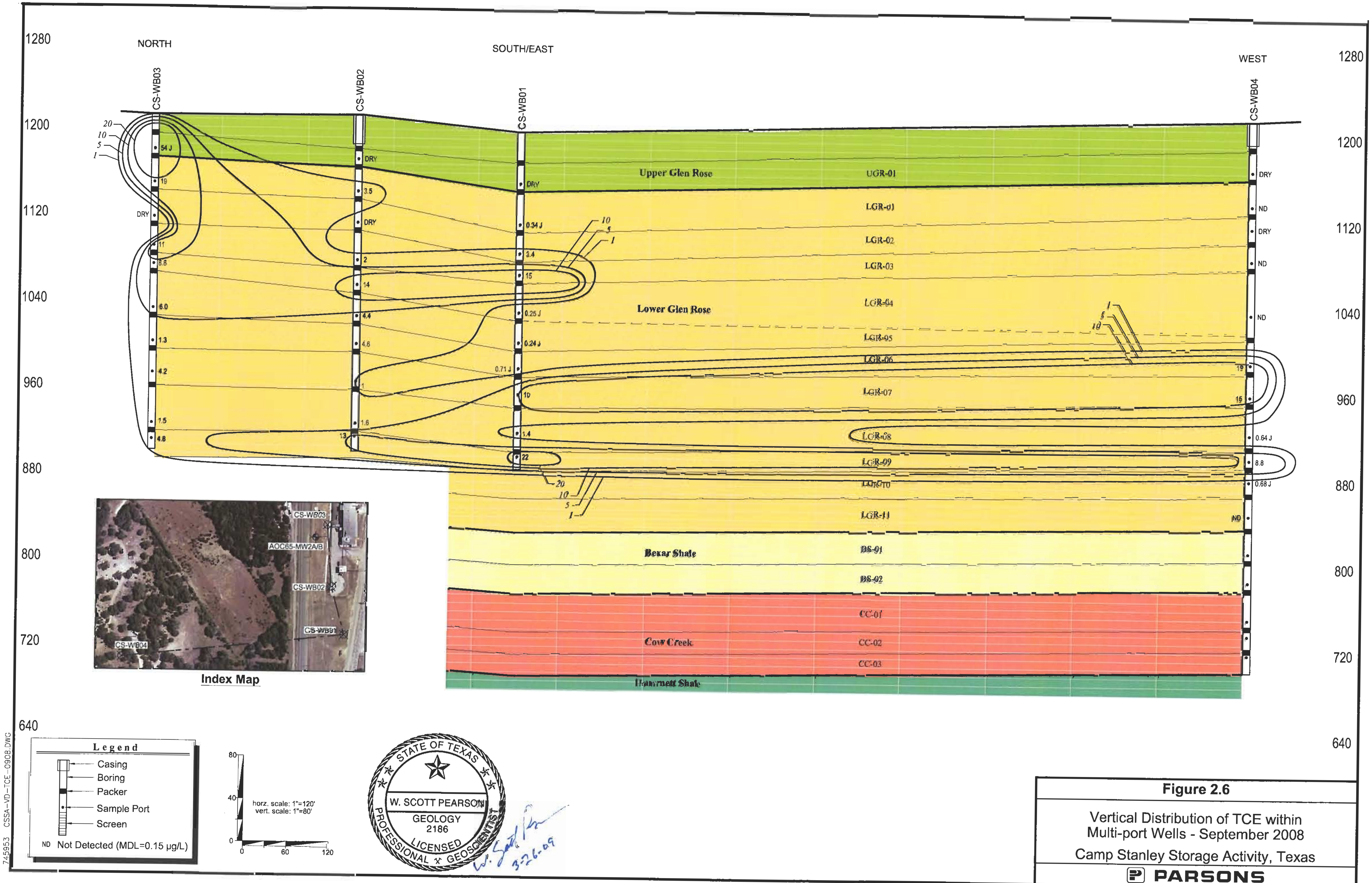


Figure 2.6

Vertical Distribution of TCE within Multi-port Wells - September 2008

Camp Stanley Storage Activity, Texas

CS-WB02 was installed nearly 300 feet south of CS-WB03 and the Building 90 source area. Compared to CS-WB03 and CS-WB01, relatively equal levels of PCE and TCE are present throughout the CS-WB02 vertical profile. Historically, PCE and TCE concentrations range between 15 μg/L to less than 5 μg/L in any given CS-WB02 monitoring interval.

Multi-port well CS-WB01 is located approximately 500 ft south of CS-WB03 and the Building 90 source area. Once again, for the zones that are normally saturated, historical PCE and TCE are present at concentrations less than 35 μg/L. Since mid-2005, there has been a steady trend of increasing contaminant concentrations in zones CS-WB02, -LGR02, -LGR07, and -LGR09. These increases correspond with increases observed in several upgradient CS-WB02 zones, and may be associated with a "flushing" event in which a slug of contaminated groundwater is moving downgradient away from the source zone. At CS-WB01, the trend has been that TCE concentrations generally exceed PCE for most zones. The zone with the relatively highest concentration is LGR09. The results of CS-WB01 indicate that the contamination becomes preferentially stratified such that greater contamination is found above and below zones LGR-04 and -05, to the south and west.

Off-post at CS-WB04, the zone with the greatest contamination is CS-WB04-LGR09. Nearly equivalent levels of PCE and TCE are found at concentrations that generally range above the MCL between 8 μg/L and 14 μg/L in 2008. Below this depth, any solvent contamination in the remainder of the LGR, BS, and CC are at concentrations less than 1.5 μg/L. Since the wellbore has stabilized, only isolated minimal detections of PCE have been reported in the LGR11 zone, and the BS zones have essentially been contaminant-free, except for a single occurrence of *cis*-1,2-DCE (0.25 μg/L). *Cis*-1,2-DCE is consistently reported in interval CC01, otherwise isolated PCE detections below 1.50 μg/L have detected in either CC02 or CC03. As part of the LTMO program, neither the BS nor CC intervals were sampled in 2008.

2.2.2 Off-Post Analytical Results

The LTMO study implemented on-post has not been applied to sampling frequencies for off-post monitoring performed by CSSA. The frequencies for sampling an off-post well are determined by compliance with the Plan and project DQOs. An overview of sampling frequencies for off-post wells is given in **Table 2.7**. Forty-three off-post wells were sampled during the 2008 quarterly monitoring events, and their locations are illustrated on Figure 1.1. Off-post wells sampled during the quarterly monitoring events were selected based on previous sampling results and proximity to both the CSSA boundary and wells with detections of PCE and TCE. Public and private supply wells located west and south of CSSA were selected for these events. Samples were also collected from the off-post well granular activated carbon (GAC) filtration systems after treatment during the March and September events.

Table 2.7
2008 Off-post Groundwater Sampling Rationale

Well ID	2008 Mar	June	Sept	Dec	Sampling Frequency:
DOM-2		NS	NS	NS	As needed, once annually
FO-8		NS	NS	NS	As needed, once annually
FO-17	NS		NS	NS	As needed, once annually
FO-22		NS	NS	NS	As needed, once annually
FO-J1					Qtrly, 1 year thru Sept 09
HS-1					Qtrly, 1 year thru Sept 09
HS-2					Qtrly, 1 year thru Sept 09
HS-3	NS		NS	NS	As needed, once annually
I10-2		NS	NS	NS	As needed, once annually
I10-4	NA	NA	NA		Qtrly, due to location
I10-5	NS	NS	NS	NS	As needed, once annually
I10-7					Qtrly, for delineation
I10-8	NS	NS	NS		As needed, once annually
JW-5					Qtrly, 1 year thru Mar 09
JW-6	NS		NS	NS	As needed, once annually
JW-7					Qtrly, 1 year thru Dec 09
JW-8					Qtrly, 1 year thru June 09
JW-9		NS	NS	NS	As needed, once annually
JW-9-A2*	NS	NS	NS	NS	As needed
JW-12	NS		NS	NS	Qtrly, 1 year thru Dec 09
JW-13	NS		NS	NS	As needed, once annually
JW-14					Qtrly, due to location
JW-15		NS	NS	NS	As needed, once annually
JW-26	NA	NA	NA	NA	Wellowner declined access.
JW-27					Qtrly, 1 year thru Mar 09
JW-28	NS				Qtrly, due to location
JW-29					Qtrly, due to location
JW-30					Qtrly, 1 year thru Mar 09
LS-1	NS				QED low flow pump installed
LS-2	NS	NS	NS	NS	Well is offline
LS-2/LS-3-A1	NS	NS	NS	NS	GAC unit removed from service
LS-3	NS	NS	NS	NS	Well is offline
LS-2/LS-3-A2	NS	NS	NS	NS	GAC unit removed from service
LS-4	NS				QED low flow pump installed
LS-5					Qtrly, 1 year thru Dec 09
LS-6					Qtrly, 1 year thru Dec 09
LS-6-A2		NS		NS	Biannually (Mar & Sept)
LS-7					Qtrly, 1 year thru Dec 09
LS-7-A2		NS		NS	Biannually (Mar & Sept)
OFR-1					Qtrly, 1 year thru Mar 09
OFR-2	NA	NA	NA	NA	Well was P&A by Centex
OFR-3					Qtrly, 1 year thru Dec 09
OFR-3-A2		NS		NS	Biannually (Mar & Sept)
OFR-4		NS	NS	NS	As needed, once annually
RFR-3	NS	NS	NS		As needed, once annually
RFR-4		NS	NS		As needed, once annually
RFR-5		NS	NS		As needed, once annually
RFR-6	NA	NA	NA	NA	Plugged & abandoned
RFR-7	NA	NA	NA	NA	Plugged & abandoned
RFR-8	NS		NS	NS	As needed, once annually
RFR-9	NS	NS		NS	As needed, once annually
RFR-10					Qtrly, 1 year thru Dec 09
RFR-10-A2		NS		NS	Biannually (Mar & Sept)
RFR-10-B2		NS		NS	Biannually (Mar & Sept)
RFR-11					Qtrly, 1 year thru Dec 09
RFR-11-A2		NS		NS	Biannually (Mar & Sept)
RFR-12		NS	NS	NS	As needed, once annually
RFR-13	NS		NS	NS	As needed, once annually
RFR-14					Qtrly, 1 year thru Sept 09

	VOCs detected are greater than 90% of the MCL. Sample monthly; quarterly after GAC installation.
	VOCs detected are greater than 80% of the MCL. The well will be placed on a monthly sampling schedule until GAC installation then quarterly sampling after GAC installation.
	VOCs detected are less than 80% of the MCL (<4.0 ppb and >0.06 ppb for PCE & <4.0 ppb >0.05 ppb for TCE). After four quarters of stable results the well can be removed from quarterly sampling.
	This well has a GAC filtration unit installed by CSSA. Post GAC samples are collected every six months. A1 - after GAC canister #1 A2 - after GAC canister #2 *JW-9-A2 is the well owner's system, not a CSSA GAC.
Yes	To be sampled in September 2008.
NS	Not sampled for that event.
	No VOCs detected. Sample on an as needed basis.
NA	Not applicable, samples can no longer be collected from this locaiton due to P&A or declined right-of-entry.

Off-post wells sampled in 2008 include (see **Figure 1.1** for well locations):

- One privately owned well in the Dominion (DOM-2);
- Four public supply wells in the Fair Oaks area (FO-8, FO-J1, FO-17, and FO-22);
- Three public wells in the Hidden Springs Estates subdivision (HS-1, HS-2 & HS-3);
- Two wells used by the general public (I10-2 & I10-8) and two privately-owned wells in the Interstate I-10 area (I10-4 & I10-7);
- Thirteen privately-owned wells in the Jackson Woods subdivision (JW-5, JW-6, JW-7, JW-8, JW-9, JW-12, JW-13, JW-14, JW-15, JW-27, JW-28, JW-29, and JW-30);
- Five wells in the Leon Springs Villa area (two wells removed from service: LS-1, and LS-4; and three privately-owned wells: LS-5, LS-6, and LS-7);
- Privately-owned wells on Old Fredericksburg Road (OFR-1, OFR-3, & OFR-4); and
- Ten privately-owned wells in the Ralph Fair Road area (RFR-3, RFR-4, RFR-5, RFR-8, RFR-9, RFR-10, RFR-11, RFR-12, RFR-13, and RFR-14).

All wells were sampled from a tap located as close to the wellhead as possible. Most taps were installed by CSSA to obtain a representative groundwater sample before pressurization, storage, or the water supply distribution system. Water was purged to engage the well pump prior to sample collection. Conductivity, pH, and temperature readings were recorded to confirm adequate purging while the well was pumping. Purging measurements were recorded in the field logbook for each sampling event.

The use of wells LS-1, LS-2, LS-3, and LS-4 in the Bexar Metropolitan (Bexar Met) water system has been discontinued due to purchase of this water system by SAWS. These wells are still owned by Bexar Met but have been taken offline and are no longer used to supply water to residents. The local residences are now supplied with drinking water from the SAWS system which is sourced elsewhere. The GAC system used for wells LS-2 and LS-3 was traded from CSSA to Bexar Met for access to sampling of wells LS-1 and LS-4. Wells LS-2 and LS-3 are expected to be plugged and abandoned in the near future as part of a new sewer line installation in the area. Low flow QED bladder pumps have been installed within LS-1 and LS-4 for obtaining groundwater samples. The monitoring of these two wells will continue on a quarterly basis. Wells HS-1, HS-2, HS-3, and HS-4 previously owned by Bexar Met have been taken over by SAWS and are still included in the quarterly monitoring program.

All groundwater samples were submitted to APPL for analysis. Groundwater samples were analyzed for the short list of VOCs using SW-846 Method 8260B. As a result of the LTMO study findings and revised DQOs, the VOC list includes: *cis*-1,2-DCE, *trans*-1,2-DCE, 1,1-DCE, PCE, TCE, and vinyl chloride. Off-post wells were not analyzed for metals.

The data packages containing the analytical results for the 2008 sampling events were reviewed and verified according to the guidelines outlined in the CSSA QAPP. After the data packages were received by Parsons, quarterly data verification reports were submitted to Camp Stanley.

Based on historical detections, the lateral extent of VOC contamination extends approximately 0.5 mile beyond the south and west boundaries of CSSA (well I10-7 to the west and LS-4 to the south). Information such as well depth, pump depth, and other pertinent data necessary to properly characterize the vertical extent of migration is not readily available for most off-post wells. However, the typical well construction for the area is open borehole completions that penetrate the full thickness of the Middle Trinity aquifer (Lower Glen Rose Limestone, Bexar Shale, and Cow Creek Limestone).

Concentrations of VOCs detected in 2008 are presented in **Table 2.8**. Full analytical results from the 2008 sampling events are presented in **Appendix F**. Concentration trends are illustrated on **Figure 2.7** for wells LS-6, LS-7, OFR-3, RFR-10, and RFR-11 for PCE and TCE. These wells were selected because they have had detections of PCE and TCE that approach and/or exceed MCLs. **Figure 2.7** also includes precipitation data from the weather stations located at CSSA, WS-N and WS-S. **Figure 2.8** shows PCE and TCE concentrations with monthly water usage at each off-post well. The off-post GAC systems are equipped with flow meters tracking the gallons pumped. The record of gallons processed through the GAC each month helps estimate when the carbon canisters will need replacement.

2.2.2.1 Off-Post Wells with COC Detections above the MCL

All wells that historically exceeded MCLs off-post were equipped with GAC filtration systems in the past. These wells, and the date the filtration system was installed, are listed in **Table 2.9**. CSSA maintains these GAC filtration systems and will continue to do so. These wells had detections above the MCL in the past.

During 2008, wells I10-4, OFR-3, and RFR-10 had concentrations exceeding the MCL. Well RFR-10 concentrations exceeded the MCL for PCE during June, September, and December. TCE exceeded the MCL in June along with the field duplicate in 2008. PCE exceeded the MCL in June and September 2008 in well OFR-3, TCE also exceeded the MCL in June. Concentrations of *cis*-1,2-DCE were also detected in RFR-10 and OFR-3. Post-GAC samples were all below the MCL. An evaluation of concentration trends through 2008 are included in **Figures 2.7 and 2.8**.

Table 2.8
2008 Off-post Groundwater COCs Analytical Results, Detections Only

Subdivision	Well ID	Sample Date	1,1-Dichloro-ethene (ug/L)	*cis*-1,2-Dichloro-ethene (ug/L)	*trans*-1,2-Dichloro-ethene (ug/L)	Tetra-chloroethene (ug/L)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)	Field Measurements		
	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	1.0	1.1		Temperature	Conductivity
	Max. Contaminant Level	MCL	7	70	100	5	5	2	pH	(°C)	(mS/cm)
Dominion Subdivision	**DOM-2**	3/6/2008	--	--	--	--	--	--	7.33	22.04	0.351
Fair Oaks Ranch	**FO-8**	3/3/2008	--	--	--	--	--	--	6.97	22.04	0.526
	FO-17	6/4/2008	--	--	--	--	--	--	6.95	21.86	0.549
	FO-22	3/3/2008	--	--	--	--	--	--	7.00	22.42	0.568
	FO-J1	3/3/2008	--	--	--	--	--	--	6.90	21.89	0.549
	Duplicate	3/3/2008	--	--	--	--	--	--	6.90	21.89	0.549
		6/4/2008	--	--	--	--	--	--	7.14	21.98	0.535
		9/4/2008	--	--	--	**0.27F**	--	--	7.08	22.04	0.588
		12/3/2008	--	--	--	--	--	--	7.01	21.85	0.396
Hidden Springs Estates	**HS-1**	3/6/2008	--	--	--	**0.2F**	--	--	7.01	22.53	0.558
		6/3/2008	--	--	--	--	--	--	7.12	23.69	0.533
		9/10/2008	--	--	--	**0.21F**	--	--	7.11	23.81	0.569
		12/4/2008	--	--	--	--	--	--	7.26	23.39	0.436
	HS-2	3/6/2008	--	--	--	**0.17F**	--	--	7.00	22.05	0.530
		6/3/2008	--	--	--	--	--	--	7.17	23.82	0.501
		9/10/2008	--	--	--	**0.12F**	--	--	7.05	23.38	0.68
		12/4/2008	--	--	--	--	--	--	7.14	23.49	0.41
	HS-3	6/3/2008	--	--	--	--	--	--	7.16	24.16	0.534
IH-10	**I10-2**	3/4/2008	--	--	--	--	--	--	6.98	22.12	0.544
	I10-4	12/10/2008	--	--	--	5.92	2.24	--	7.21	19.57	0.568
	I10-7	3/4/2008	--	--	--	--	--	--	7.19	22.14	0.546
		6/4/2008	--	--	--	--	--	--	7.03	21.93	0.520
		9/3/2008	--	--	--	--	--	--	7.02	22.32	0.592
	Duplicate	9/3/2008	--	--	--	--	--	--	7.02	22.32	0.592
		12/2/2008	--	--	--	--	--	--	7.12	22.27	0.598
	I10-8	12/2/2008	--	--	--	--	--	--	7.01	22.55	0.597
	Duplicate	12/2/2008	--	--	--	--	--	--	7.01	22.55	0.597
Jackson Woods Estates	**JW-5**	3/5/2008	--	--	--	**0.11F**	--	--	7.24	18.15	0.477
		6/4/2008	--	--	--	--	--	--	7.03	24.29	0.493
		9/3/2008	--	--	--	--	--	--	7.21	25.63	0.564
		12/4/2008	--	--	--	--	--	--	7.08	15.36	0.389
	Duplicate	12/4/2008	--	--	--	--	--	--	7.08	15.36	0.389
	JW-6	6/4/2008	--	--	--	--	--	--	7.01	21.71	0.514
	JW-7	3/6/2008	--	--	--	**0.26F**	--	--	6.92	20.64	0.501
		6/6/2008	--	--	--	**0.38F**	--	--	7.04	20.94	0.533
		9/4/2008	--	--	--	**0.54F**	--	--	6.95	21.2	0.567
		12/4/2008	--	--	--	**0.58F**	--	--	7.18	20.92	0.389
	JW-8	3/6/2008	--	--	--	**0.29F**	--	--	6.78	21.19	0.527
		6/5/2008	--	--	--	**0.30F**	--	--	7.11	21.11	0.553
		9/3/2008	--	--	--	--	--	--	7.27	21.77	0.584
		12/3/2008	--	--	--	--	--	--	6.97	20.87	0.395
	Duplicate	12/3/2008	--	--	--	--	--	--	6.97	20.87	0.395
	JW-9	3/6/2008	--	--	--	--	--	--	6.94	21.53	0.529
	Duplicate	3/6/2008	--	--	--	--	--	--	6.94	21.53	0.529
	JW-12	6/6/2008	--	--	--	--	--	--	6.97	21.64	0.626
	JW-13	6/5/2008	--	--	--	--	--	--	7.08	22.41	0.532
	JW-14	3/6/2008	--	--	--	--	--	--	6.93	21.63	0.590
		6/4/2008	--	--	--	--	--	--	7.08	22.03	0.568
		9/4/2008	--	--	--	**0.11F**	--	--	7.07	22.05	0.645
		12/3/2008	--	--	--	--	--	--	7.02	22.12	0.404
	JW-15	3/4/2008	--	--	--	--	--	--	7.00	20.90	0.534
	JW-27	3/6/2008	--	--	--	**0.12F**	--	--	7.07	20.86	0.564
	Duplicate	3/6/2008	--	--	--	**0.07F**	--	--	7.07	20.86	0.564
		6/4/2008	--	--	--	--	--	--	6.94	20.97	0.549
		9/3/2008	--	--	--	--	--	--	6.88	21.11	0.628
		12/3/2008	--	--	--	--	--	--	7.00	21.09	0.439
	JW-28	6/4/2008	--	--	--	--	--	--	6.95	21.51	0.566
		9/3/2008	--	--	--	--	--	--	6.06	21.81	0.639
		12/3/2008	--	--	--	--	--	--	6.84	21.71	0.446
	JW-29	3/4/2008	--	--	--	**0.1F**	--	--	6.92	21.18	0.580
		6/4/2008	--	--	--	--	--	--	6.92	21.18	0.560
		9/4/2008	--	--	--	**0.13F**	--	--	6.85	22.26	0.636
		12/4/2008	--	--	--	--	--	--	6.83	19.7	0.439
	JW-30	3/4/2008	--	--	--	**0.16F**	--	--	6.90	20.95	0.533
		6/4/2008	--	--	--	--	--	--	7.03	21.35	0.515
		9/3/2008	--	--	--	--	--	--	7.11	22.66	0.587
	Duplicate	9/3/2008	--	--	--	--	--	--	7.11	22.66	0.587
		12/4/2008	--	--	--	--	--	--	6.96	20.99	0.409

Table 2.8
2008 Off-post Groundwater COCs Analytical Results, Detections Only

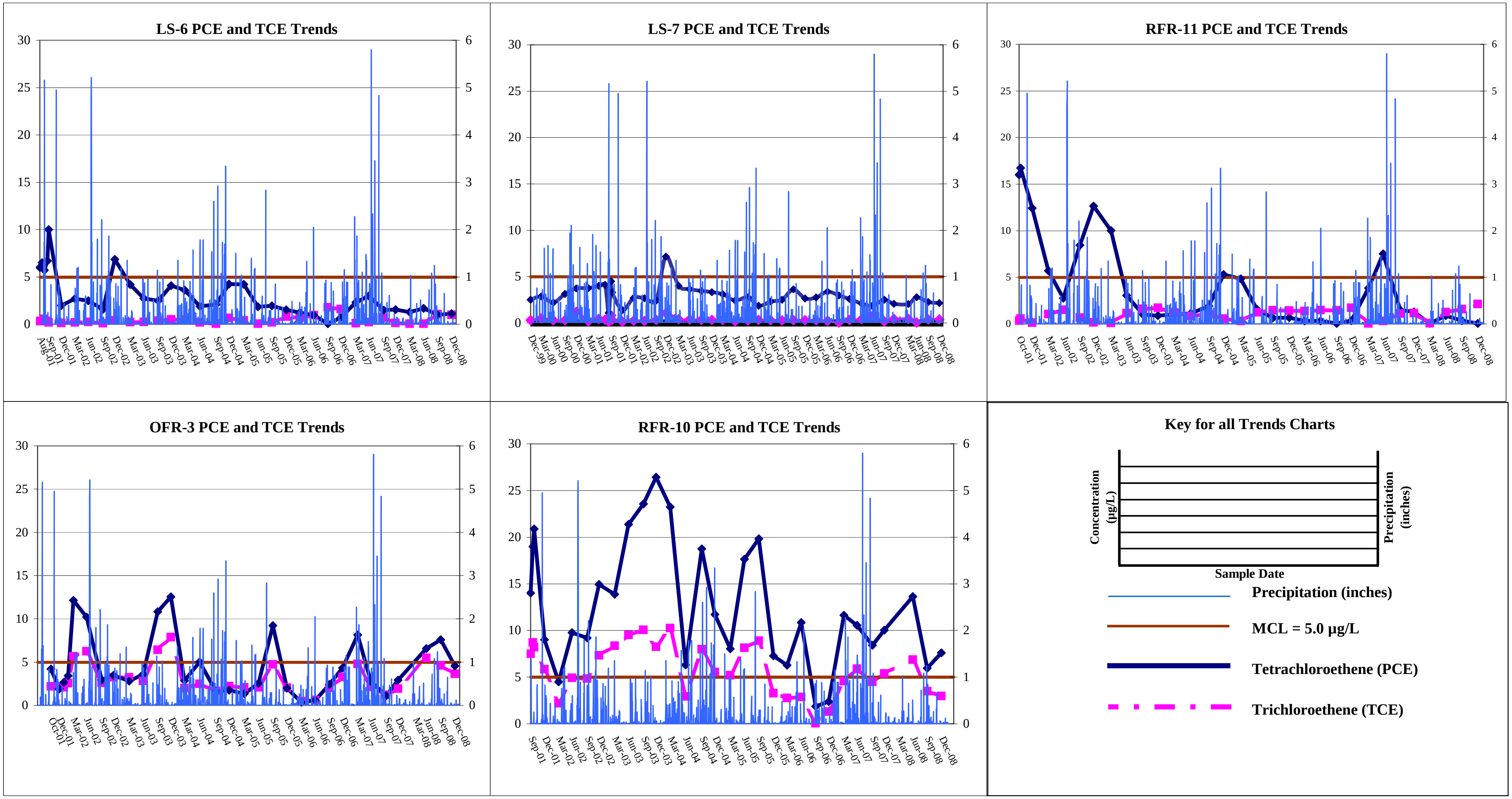
Subdivision	Well ID	Sample Date	1,1-Dichloro-ethene (ug/L)	*cis*-1,2-Dichloro-ethene (ug/L)	*trans*-1,2-Dichloro-ethene (ug/L)	Tetra-chloroethene (ug/L)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)	Field Measurements		
Leon Springs Villas	LS-1	6/5/2008	--	--	--	--	--	--	7.49	26.13	0.433
		9/5/2008	--	--	--	--	--	--	7.41	28.05	0.510
		12/4/2008	--	--	--	**0.62F**	**0.2F**	--	7.16	19.35	0.436
	LS-4	6/5/2008	--	--	--	--	--	--	7.28	22.96	0.606
	Duplicate	6/5/2008	--	--	--	--	--	--	7.28	22.96	0.606
		9/5/2008	--	--	--	--	--	--	7.10	23.04	0.674
		12/5/2008	--	--	--	**0.12F**	--	--	7.16	20.01	0.509
	LS-5	3/3/2008	--	--	--	--	**0.85F**	--	6.84	21.67	0.727
		6/2/2008	--	--	--	**0.82F**	**1.4**	--	7.07	22.26	0.688
		9/2/2008	--	--	--	**0.64F**	**1.84**	--	6.9	22.55	0.713
		12/1/2008	--	--	--	**0.96F**	**2.12**	--	6.96	21.37	0.692
	LS-6	3/3/2008	--	--	--	**1.27F**	--	--	6.90	21.73	0.654
		6/2/2008	--	--	--	**1.68**	--	--	6.86	22.45	0.646
		9/2/2008	--	--	--	**0.99F**	**1.07**	--	7.03	22.23	0.673
		12/1/2008	--	--	--	**1.11F**	**1.00**	--	6.95	22.08	0.662
	LS-6-A2	3/3/2008	--	--	--	--	--	--	NA	NA	NA
		9/2/2008	--	--	--	--	--	--	NA	NA	NA
	LS-7	3/3/2008	--	--	--	**2.05**	**0.43F**	--	7.06	22.54	0.651
		6/2/2008	--	--	--	**2.78**	--	--	6.90	22.57	0.636
		9/2/2008	--	--	--	**2.27**	**0.39F**	--	6.72	22.70	0.673
		12/1/2008	--	--	--	**2.14**	**0.38F**	--	6.84	22.56	0.669
	LS-7-A2	3/3/2008	--	--	--	--	--	--	NA	NA	NA
		9/2/2008	--	--	--	--	--	--	NA	NA	NA
Old Fredericksburg Rd	OFR-1	3/6/2008	--	--	--	**0.26F**	--	--	7.09	21.50	0.547
		6/4/2008	--	--	--	--	--	--	7.06	21.83	0.522
	Duplicate	6/4/2008	--	--	--	--	--	--	7.06	21.83	0.522
		9/3/2008	--	--	--	--	--	--	6.98	21.79	0.593
		12/2/2008	--	--	--	--	--	--	7.02	21.90	0.600
	OFR-3	3/3/2008	--	--	--	**4.41**	**3.38**	--	6.92	21.79	0.563
		6/2/2008	--	--	--	**6.56**	**5.5**	--	7.02	22.68	0.566
		9/2/2008	--	**0.11F**	--	**7.59**	**4.61**	--	6.93	22.61	0.617
		12/1/2008	--	--	--	**4.54**	**3.66**	--	7.06	21.93	0.607
	OFR-3-A2	3/3/2008	--	--	--	--	--	--	NA	NA	NA
		9/2/2008	--	--	--	--	--	--	NA	NA	NA
	OFR-4	3/6/2008	--	--	--	--	--	--	6.91	22.00	0.530
Ralph Fair Road	RFR-3	12/3/2008	--	--	--	--	--	--	7.05	21.32	0.387
	RFR-4	3/4/2008	--	--	--	--	--	--	6.98	21.87	0.612
	Duplicate	3/4/2008	--	--	--	--	--	--	6.98	21.87	0.612
		12/3/2008	--	--	--	--	--	--	6.82	20.91	0.453
	RFR-5	3/4/2008	--	--	--	--	--	--	7.15	20.92	0.544
		12/3/2008	--	--	--	--	--	--	7.05	21.70	0.395
	RFR-8	6/5/2008	--	--	--	--	--	--	7.14	22.40	0.531
	RFR-9	9/9/2008	--	--	--	--	--	--	7.03	22.65	0.526
	RFR-10	3/3/2008	--	--	--	**4.43**	**3.27**	--	6.93	22.20	0.672
		6/2/2008	--	--	--	**13.63**	**6.87**	--	7.02	22.80	0.610
	Duplicate	6/2/2008	--	--	--	**13.11**	**6.93**	--	7.02	22.80	0.610
		9/2/2008	--	**0.46F**	--	**5.94**	**3.5**	--	7.00	23.08	0.687
		12/1/2008	--	**0.28F**	--	**7.59**	**2.97**	--	7.18	22.59	0.693
	RFR-10-A2	3/3/2008	--	--	--	--	--	--	NA	NA	NA
		9/2/2008	--	--	--	--	--	--	NA	NA	NA
	RFR-10-B2	3/3/2008	--	--	--	--	--	--	NA	NA	NA
		9/2/2008	--	--	--	--	--	--	NA	NA	NA
	RFR-11	3/3/2008	--	--	--	--	**0.08F**	--	6.91	22.17	0.601
		6/2/2008	--	--	--	**0.88F**	**1.28**	--	7.02	23.96	0.853
		9/2/2008	--	--	--	**0.34F**	**1.61**	--	7.12	22.90	0.601
		12/1/2008	--	--	--	--	**2.15**	--	7.02	23.7	0.608
	RFR-11-A2	3/3/2008	--	--	--	--	--	--	NA	NA	NA
		9/2/2008	--	--	--	--	--	--	NA	NA	NA
	RFR-12	3/4/2008	--	--	--	--	--	--	7.00	22.44	0.547
	RFR-13	6/4/2008	--	--	--	--	--	--	7.21	26.42	0.513
	RFR-14	3/6/2008	--	--	--	**0.18F**	--	--	6.93	20.96	0.521
		6/5/2008	--	--	--	**0.26F**	--	--	7.15	24.03	0.558
		9/4/2008	--	--	--	**0.27F**	--	--	7.07	23.62	0.586
	Duplicate	9/4/2008	--	--	--	**0.23F**	--	--	7.07	23.62	0.586
		12/4/2008	--	--	--	--	--	--	7.14	19.51	0.396

Bold	= Above the MDL (F flagged)
Bold (blue)	= Above the RL
Bold (red)	= Above the MCL

Notes:
- ug/L = micrograms per liter
- "--" = analyte not detected
- VOCs analyzed using laboratory method SW8260B.
- F = The analyte was positively identified but the associated numerical value is below the RL.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- NA = Not analyzed for this parameter.
- APPL = Agriculture & Priority Pollutants Laboratories, Inc. of Clovis, CA

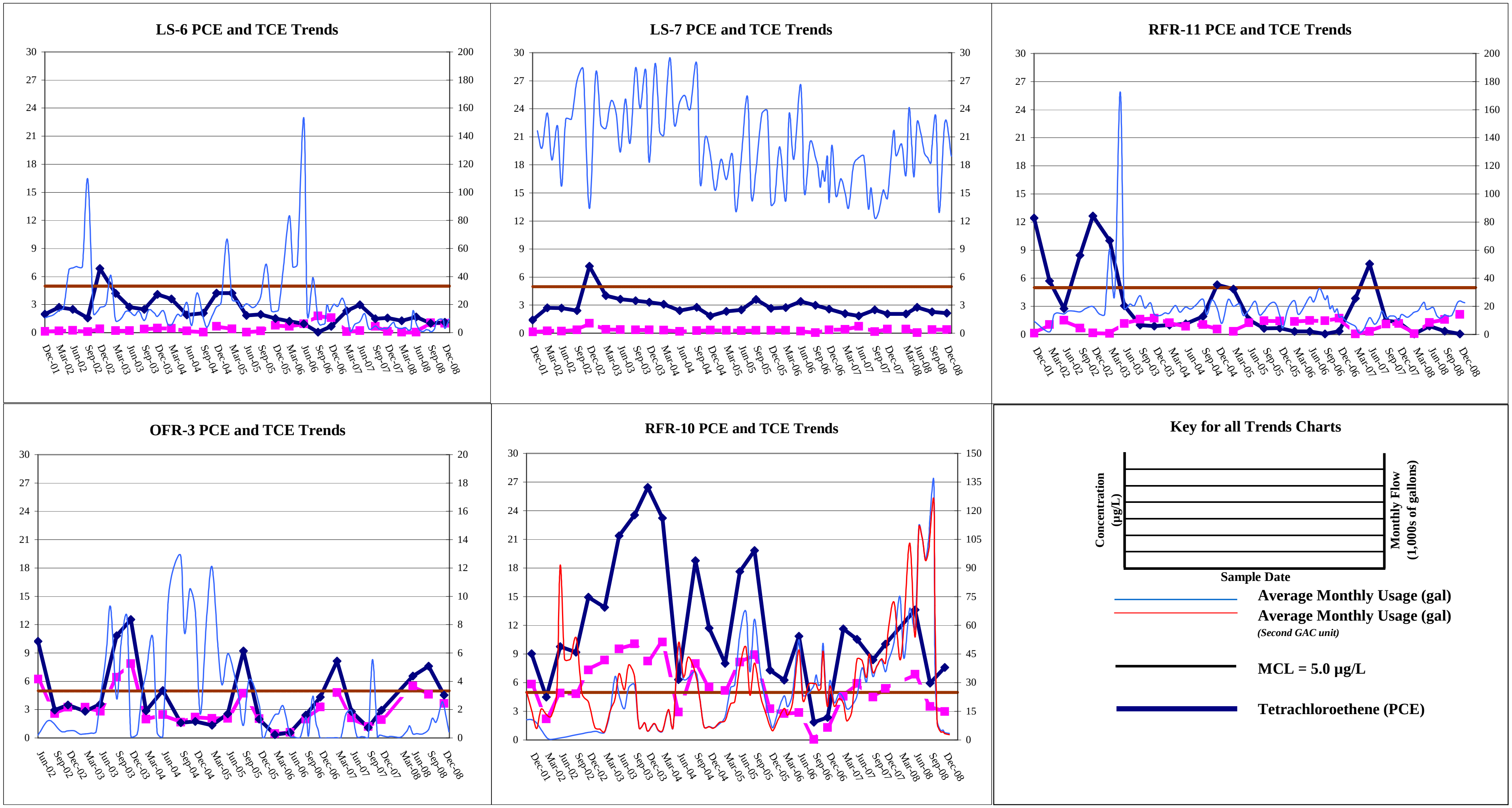
J:\745\745953 CSSA DY02\01000 GWM\Annual GW Report 2008\Table 2.8 & Appendix F Off-Post Data.xls

Figure 2.7, PCE and TCE Concentration Trends and Precipitation



J:\745\745953 CSSA DY02\01000 GWM\Annual GW Report 2008\Fig 2.7 & 2.8 Conc trend GAC flows.xls

Figure 2.8, PCE and TCE Concentration Trends and Monthly Water Usage



J:\745\745953 CSSA DY02\01000 GWM\Annual GW Report 2008\Fig 2.7 & 2.8 Conc trend GAC flows.xls

Table 2.9 GAC Filtration Systems Installed

Well	Date Installed
LS-2/LS-3	April 2002
LS-6	August 2001
LS-7	August 2001
OFR-3	April 2002
RFR-10	October 2001
RFR-11	October 2001

Well I10-4 fell off the sampling schedule in June 2007 due to pending sale of the property and information from the well owner that the well would be plugged and abandoned in the near future. In December 2008, after following up on the status of the plug and abandon report, it was discovered that the well was still intact. After speaking to the well owner, an access agreement was signed and an agreement was reached to not plug the well so it could remain in the CSSA quarterly groundwater monitoring program. Although the electricity and pump have been removed from the well, samples can be collected using a bailer sampling device. PCE was above the MCL in December 2008, normally a GAC filtration system would be installed on this well. However, since the well is not being used as a drinking water source a GAC unit will not installed at this time. If at any point the status of the well changes appropriate action will be taken to ensure that the land owner receives drinking water that meets EPA drinking water standards.

2.2.2.2 GAC Filtration Systems

Semi-annual post-GAC confirmation samples are collected from all wells equipped with GAC filtration systems (**Appendix G**). The samples confirm that the GAC filtration systems are working effectively and that VOCs are reduced to concentrations below the applicable drinking water MCLs.

To date, no COCs have been detected above RLs in the post-GAC samples. Post-GAC samples were collected during the March and September 2008 events in accordance with project DQOs. See **Appendix G** for pre and post-GAC sample comparisons.

Regular maintenance was scheduled in 2008 to change the carbon in the GAC filtration systems (LS-6, LS-7, OFR-3, RFR-10, and RFR-11) on May 20 and November 20, 2008. A CSSA representative inspected each GAC filtration system approximately every 3 weeks to change pre-filters and/or troubleshoot problems occurring with the systems.

2.2.2.3 Off-Post Wells with COC Detections below the MCL

Detections from all wells sampled off-post are presented in **Table 2.8** and complete historical results are included in **Appendix F**. The groundwater monitoring results include wells where COCs were detected at levels below applicable MCLs. These detections occurred in wells LS-5, LS-6, LS-7, and RFR-11. The detections below the MCL and above the RL are summarized as follows:

- **LS-5** –Concentration of TCE exceeded the RL in June, September, and December 2008, PCE was also detected below the RL during these sampling events;
- **LS-6** – Concentrations of PCE exceeded the RL in June and TCE exceeded the RL in September and December 2008;
- **LS-7** – Concentrations of PCE exceeded the RL from all samples in 2008. TCE was reported below the RL in all sampling events except June 2008;
- **RFR-11** - Concentration of TCE exceeded the RL in June, September, and December 2008. PCE was also detected below the RL in June and September 2008.

2.2.2.4 Off-Post Wells with COC Detections below the Reporting Limits

The off-post results include detections in wells for which the analyte is identified, but at a level below the RL. These results are assigned an "F" flag under the CSSA QAPP. In 2008, this included wells FO-J1, HS-1, HS-2, JW-5, JW-7, JW-8, JW-14, JW-27, JW-29, JW-30, LS-1, LS-4, OFR-1, and RFR-14. The detections below the reporting limit are summarized as follows:

- **FO-J1** – Concentrations of PCE detected below the RL in September 2008;
- **HS-1** and **HS-2** – Concentrations of PCE detected below the RL in March and September for both wells in 2008;
- **JW-5** – Concentrations of PCE detected below the RL in March 2008;
- **JW-7** – Concentrations of PCE detected below the RL in all of 2008;
- **JW-8** – Concentrations of PCE detected below the RL in March and June 2008;
- **JW-14** – Concentrations of PCE detected in September 2008;
- **JW-27** - Concentrations of PCE detected below the RL in March 2008, the field duplicate reported similar results;
- **JW-29** – Concentrations of PCE detected in March and September 2008;
- **JW-30** – Concentrations of PCE detected below the RL in March;
- **LS-1** – Concentrations of PCE and TCE detected below the RL in December 2008;
- **LS-4** – Concentrations of PCE detected below the RL in December 2008;
- **OFR-1** – Concentrations of PCE detected below the RL in March 2008; and
- **RFR-14** – Concentrations of PCE detected below the RL in March, June, and September 2008.

2.2.3 Concentration Contours

2.2.3.1 PCE, TCE, and cis-1,2-DCE

The maximum concentration detected during any event from 2008 for each of PCE, TCE, and *cis*-1,2-DCE in the LGR wells on-post and all wells off-post were contoured in three isoconcentration contour maps. These isoconcentration maps are provided in **Figures 2.9, 2.10, and 2.11** to illustrate the extent of contamination as measured from analytical results and inferred from those results.

The 2008 extent of COCs above 1.0 µg/L for each of PCE, TCE and *cis*-1,2-DCE can be determined by reviewing the figures. PCE concentrations above 1.0 µg/L are detected on-post in wells CS-4, CS-MW16-LGR, CS-D, CS-MW1-LGR, CS-MW20-LGR, CS-MW8-LGR, CS-MW10-LGR, and CS-MW11A-LGR (**Figure 2.9**). Off-post detections of PCE above 1.0 µg/L include I10-4, LS-6, LS-7, OFR-3, and RFR-10.

TCE follows a similar pattern, and has been detected above 1.0 µg/L in Plume 1 wells CS-4, CS-D, CS-MW16-LGR, CS-MW5-LGR, and CS-MW1-LGR (**Figure 2.10**). On-post wells within Plume 2 were not above 1.0 µg/L TCE during 2008. Rather, the occurrence of TCE above this concentration is located off-post in private wells I10-4, OFR-3, RFR-10, RFR-11, LS-5, and LS-6.

Cis-1,2-DCE was not detected off-post above 1.0 µg/L, but was detected above 1.0 µg/L in on-post wells CS-D, CS-MW16-LGR, and CS-MW1-LGR (**Figure 2.11**).

Isoconcentration maps have also been prepared based on analytical data collected in 2006 and 2007. Those isoconcentration maps are available for review in the CSSA Environmental Encyclopedia, Volume 5 Groundwater, (CSSA 2007) in the *2006 and 2007 Annual Groundwater Reports*. In general, the plume extent and geometry is consistent with 2007 data. Some differences in the plume distribution are an artifact of the LTMO sampling process. For example, CS-MW17-LGR was not sampled in 2008 thereby minimizing the eastern lobe of Plume 1. Also, the location of off-post well I10-4 has been re-surveyed by GPS, re-locating its position 750 to the southeast. This change in position realigns the contamination in this well more proximal to Plume 2 rather than a downgradient extension of Plume 1. Finally, the maximum annual concentrations detected near the plume centers are generally higher than 2007. See Table 2.10 for comparison of the 2007 and 2008 data near the plume centers.

2.2.3.2 Lead

Lead has primarily been a COC associated with soil clean-up efforts at CSSA. However, CSSA also routinely monitors for lead in groundwater. While there is not a federally-mandated MCL for lead, the occurrence of lead in groundwater is regulated by an

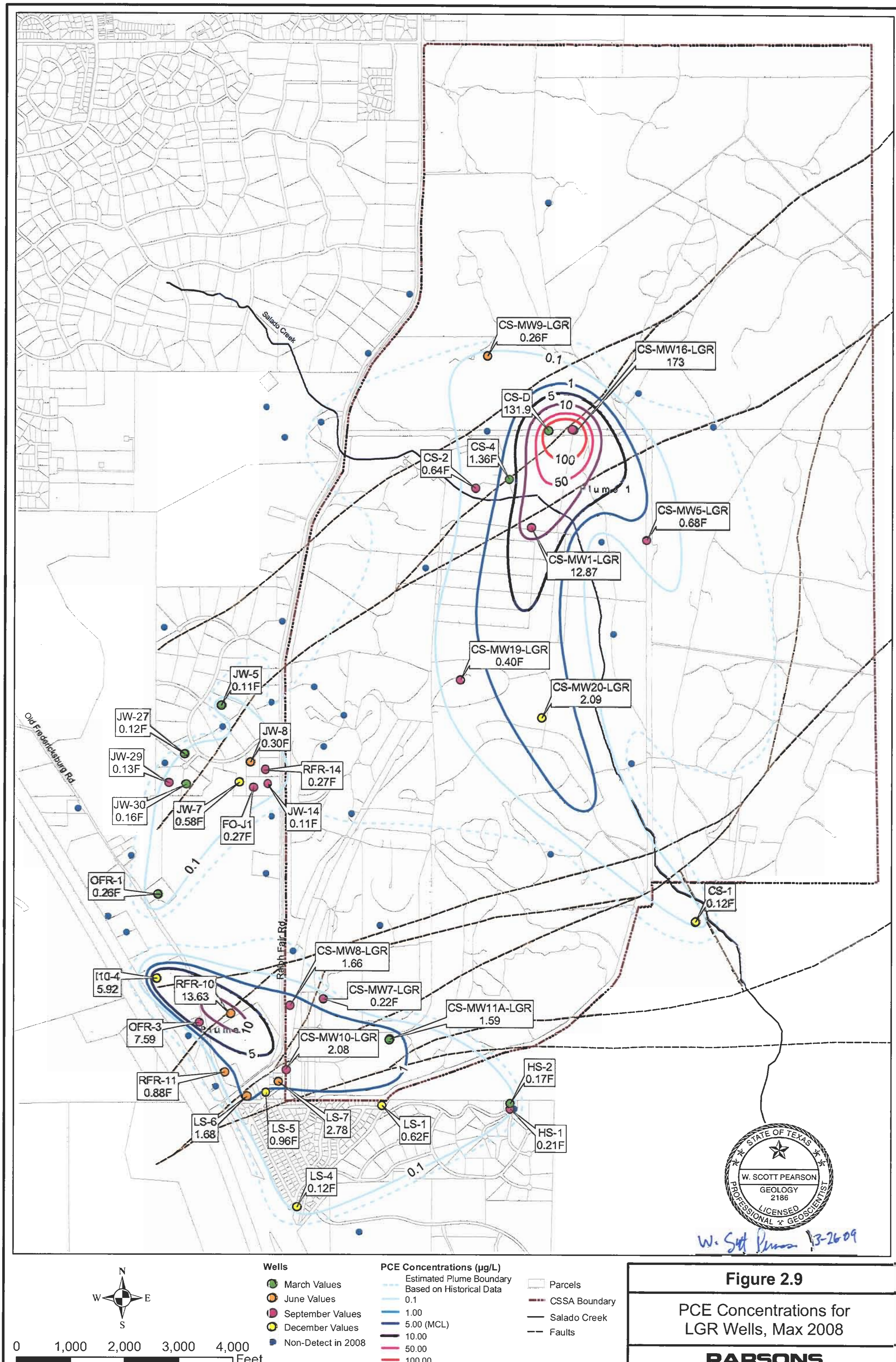


Figure 2.9

PCE Concentrations for LGR Wells, Max 2008

J:\745\745953 CSSA DY02\GIS\max_08_concentrations_lgr_pce.mxd - 3/25/2009 @ 11:15:04 AM

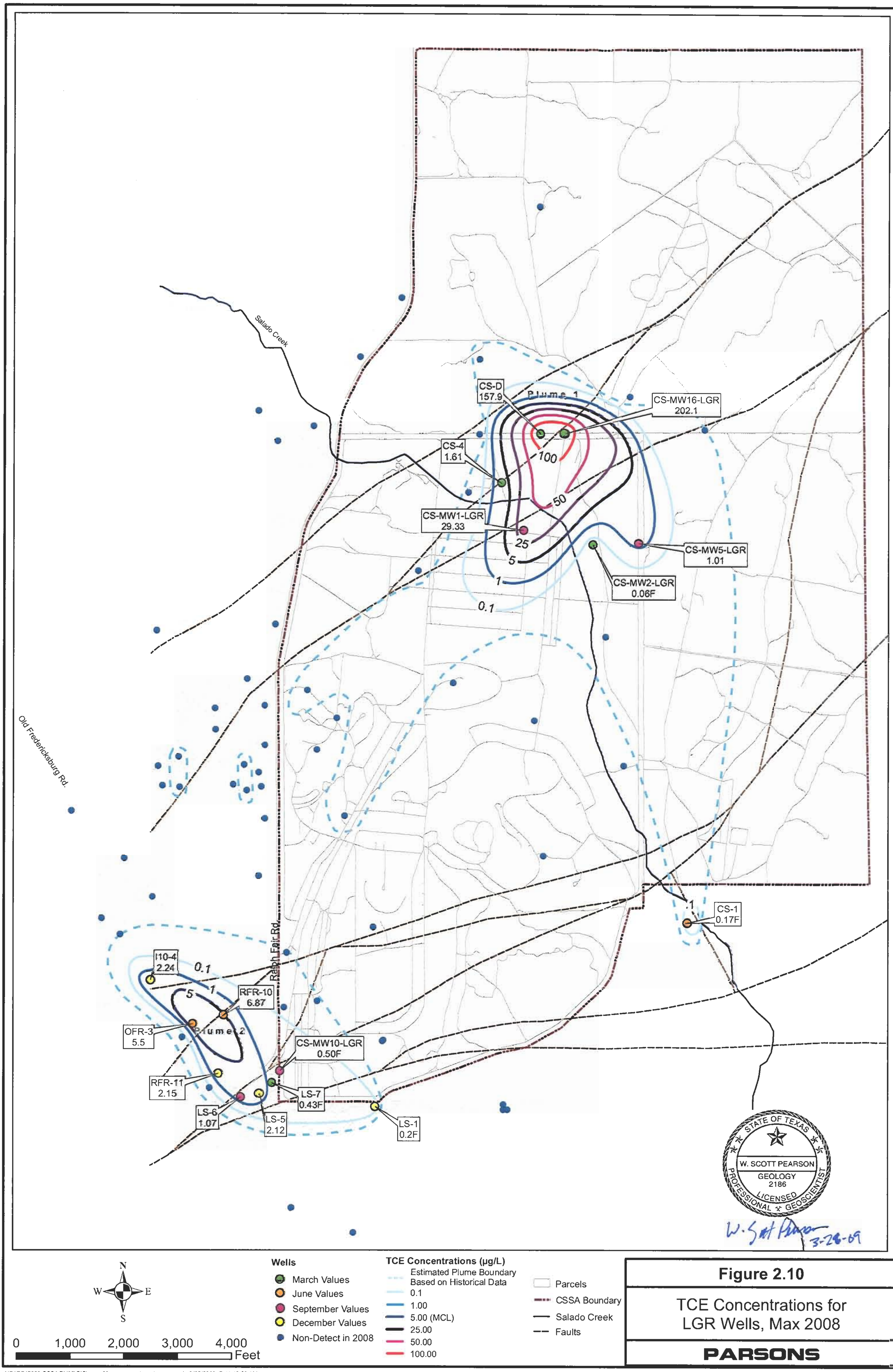


Figure 2.10

TCE Concentrations for LGR Wells, Max 2008

J:\745\745953 CSSA DY02\GIS\max_08_concentrations_lgr_tce.mxd - 3/25/2009 @ 11:13:33 AM

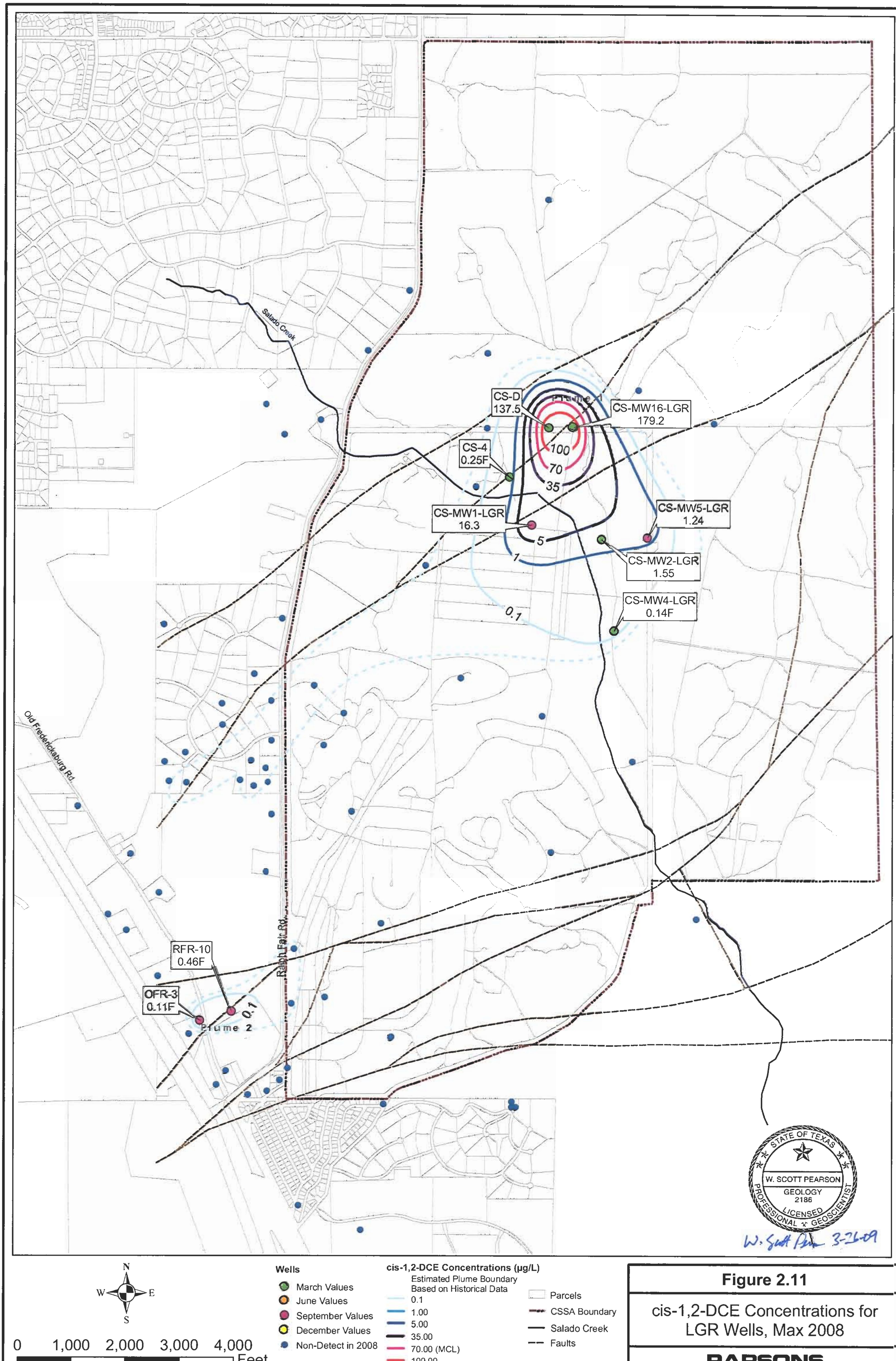


Figure 2.11

cis-1,2-DCE Concentrations for LGR Wells, Max 2008

J:\745\745953 CSSA DY02\GIS\max_08_concentrations_lgr_cis.mxd - 3/25/2009 @ 11:11:55 AM

"Action Level" (AL) which requires systems to apply a treatment technique to control the corrosiveness of their water. If more than 10% of tap water samples exceed the AL, water systems must steps to mitigate the exposure to lead. For lead, the AL is 0.015 mg/L.

Table 2.10 Comparison of 2007 & 2008 PCE, TCE, and *cis*-1,2-DCE Max. Levels

	PCE		TCE		*cis*-1,2-DCE	
	2007	*2008*	*2007*	*2008*	*2007*	*2008*
B-3 Plume						
CS-MW16-LGR	59	173	69	202.1	72	179.2
CS-D	94.38	131.9	112.93	157.9	102.79	137.5
CS-MW1-LGR	30.82	12.87	34.62	29.33	46.31	16.3
AOC-65 Plume						
RFR-10	11.64	13.63	5.91	6.87	0.38	0.46
OFR-3	8.15	7.59	4.8	5.5	0.18	0.11
I10-4	2.31	5.92	1.11	2.24	ND	ND

Figure 2.12 presents a map depicting the distribution of lead in LGR groundwater below CSSA. While no background concentration for lead in groundwater has been established for CSSA or the Middle Trinity aquifer, the laboratory (APPL) can positively identify the presence of lead to concentrations of 0.0019 mg/L (MDL). **Figure 2.12** shows that most of the LGR groundwater has lead concentrations between the MDL and 0.005 mg/L. One region in the south-central portion of the facility does indicate an area of LGR groundwater that appears to be above the "ambient" concentration present to the north and east. This area is generally demarcated by triangle between CS-11, CS-MW22-LGR and CS-MW23-LGR, and includes wells in excess of 0.005 mg/L. This encompasses three wells on post have been shown to exceed the lead AL of 0.015 mg/L, and include CS-MW22-LGR, CS-9, and CS-11. Lead concentrations in CS-MW22-LGR and CS-9 are approximately three times the prescribed AL, while the lead concentration at CS-11 is 0.1972 mg/L (13 times) the AL. CS-9 and CS-11 are no longer used as part of the CSSA potable water system.

It is worth noting that the CSSA QAPP requires a RL of 0.25 mg/L. In this particular case, the associated AL for lead (0.015 mg/L) is less than the CSSA QAPP RL of 0.025 mg/L. This means that all results less than the RL are qualitatively identified but the resulting value is less than the quantitation limit, including those that exceed the AL up to 0.025 mg/L.

The source of the lead is currently unknown. However, it has been recognized by the regulatory agencies that well construction or pumping well components/materials (pumps, pipe, etc.) can contribute to the presence of lead within a well.

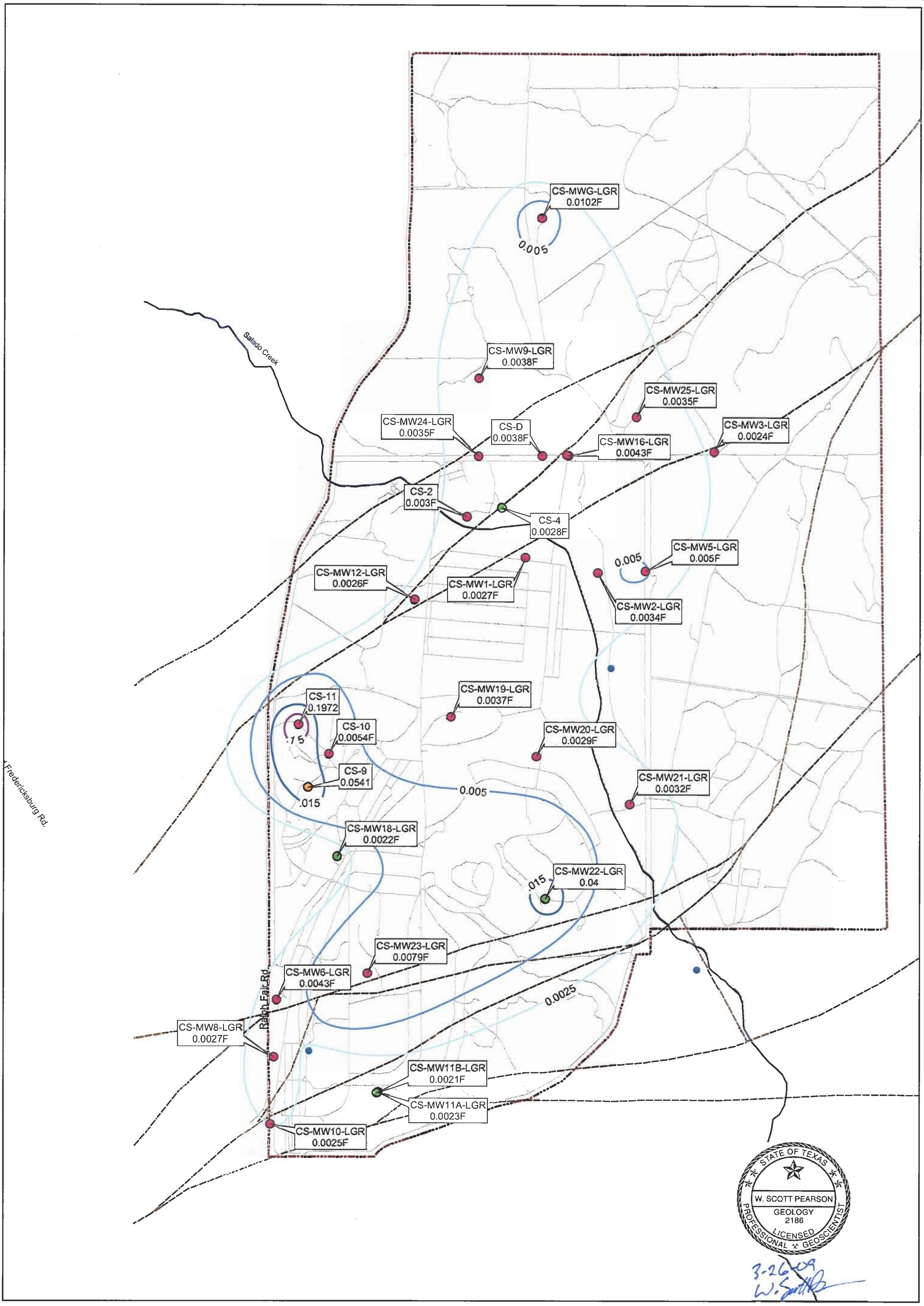


Figure 2.12

Lead Concentrations for LGR Wells, Max 2008

PARSONS

J:\745\745953 CSSA DY02\GIS\max_08_concentrations_lgr_lead.mxd - 3/25/2009 @ 11:02:02 AM

3.0 CONTINUED WELL CS-9 ACTIVITIES

3.1 Background

In early 2006, CS-9 was experiencing production problems associated with air entrainment and declining well efficiencies. To address these problems, CSSA undertook a well rehabilitation action at CS-9 in April 2006. The rehabilitation plans in CSSA's original Water System Plan (Plan) submittal (April 10, 2006) and a supplemental submittal (April 21, 2006) were conditionally approved by TCEQ April 13 and 27, 2006, respectively. This work was initiated in April 2006 and was completed by June 2007.

The process included replacing all pumping equipment, the cleaning and deepening of the wellbore, and installing new surface casing as warranted. The surface completion at the well was re-constructed to meet current regulatory requirements. At well CS-9, a section of abandoned pipe was encountered in the borehole during the cleaning and deepening process. Clearly the section of pipe was associated with the original construction of the well which had broken off and silted in at the bottom of the well. The top of the object was at a depth of 553 feet bgs. It was surmised that this debris originated from either old well casing, column pipe, and/or pump that broke and fell to the bottom of the well sometime in the past. A new 20-hp pump and piping were installed in Well CS-9 and the surface completion and related appurtenances were upgraded to current standards.

3.2 2006 Activities

The next quarterly groundwater monitoring event (June 2006) showed that a concentration of 5.9 µg/L of mercury above the drinking water MCL (2.0 µg/L). At the same time, lead (18 µg/L) was also reported above the action level of 15 µg/L. Prior to the rehabilitation effort, neither of these constituents were contaminants of concern. Well CS-9 was immediately taken offline from the CSSA drinking water system until the issue could be further addressed.

3.3 2007 Activities

Based on this finding, it was suspected that the old pipe debris and sediments uncovered during the well deepening was the source for the elevated concentrations above drinking water standards. The presence of the pipe debris that had been uncovered during the 2006 well rehabilitation activities was suspected to have caused the sudden detections of lead and mercury in the groundwater. However, the removal of the old metallic pipe/casing from CS-9 proved to economically infeasible. In April 2007, the well pump was removed and the bottom of CS-9 was pressure grouted up to 548.8 feet with neat cement by tremie pipe and positive displacement, sealing the pipe debris in cement and from contact with the remaining open portion of the CS-9 borehole. After cementing, the pump was re-installed and well CS-9 was again purged and sampled. Two subsequent raw water analyses showed lead and mercury detections below drinking water standards and slightly above reporting limits (RL), the highest levels being 3.04 µg/L and 0.42 µg/L, respectively.

3.4 2008 Activities

In 2008, Parsons and CSSA performed additional studies at well CS-9 to better determine the nature of the occurrence of lead and mercury in groundwater at this location. Several tests were conducted to determine if contaminant occurrence and concentration corresponded to well idleness or pumping conditions. **Table 3.1** lists the results of these tests and other routine groundwater sampling collected from CS-9 during 2008.

The first test was conducted by CSSA on 12 February 2008, and involved collecting five inorganic (metals) samples from the well over the course of 6 hours of continuous pumping. One sample was collected immediately after the well was turned on (no purge), and successive samples were collected every 1 to 2 hours. During the course of the test, more than 31,000 gallons of groundwater was purged from the well. The results of this test indicated that lead decreased in concentration from 0.0325 mg/L to 0.0043 mg/L during the course of the 6 hour purge. While the initial sample was more than twice the AL for lead, this value had decreased below the 0.015 mg/L threshold within an hour of the initial pumping activities. Likewise, mercury was detected in the first two samples, but was not present above the MDL during the last 4 hours of sampling (3 samples).

The test was repeated by CSSA on 22 February 2008 for lead only. For this test, 6 samples were obtained over a pumping duration of two hours. Four samples were obtained during the first 35 minutes of purging and the remaining samples were collected at 1 hour and 2 hours, respectively. Again, this follow-on test showed that lead concentrations successively decreased in concentration from 0.0141 mg/L to 0.00295 mg/L. For this test, the initial lead concentration was not above the AL groundwater standard. The results of the "purge" tests initially indicated that lead and mercury concentration in CS-9 groundwater could be a function of well idleness/stagnation and could be attenuated by active pumping measures.

Routine quarterly samples for inorganic analyses were also collected from CS-9 in June, September, and December 2008. The June sampling event included collecting two samples within 30 minutes in a similar fashion to the February 2008 testing. However, this yielded the opposite results of the prior testing. The initial "no purge" samples yielded lower concentrations for both lead and mercury than the subsequent sample collect 34 minutes later after evacuating 3,220 gallons from the well. Lead concentrations increased from 0.0067 mg/L to 0.0541 mg/L, which is nearly four times the specified AL. While both mercury results were slightly below the MCL (0.002 mg/L), the sampling did show an increase in concentration from 0.0012 mg/L to 0.0015 mg/L. In this instance, the notion that contaminant concentrations were attenuated by pumping was not substantiated.

Additional quarterly sampling in September 2008 showed that lead was below the AL at 0.0088 mg/L, but that mercury was 0.0082 mg/L (~four times the MCL). The December 2008 event yielded similar results with lead at 0.0066 mg/L and mercury at 0.0047 mg/L (~twice the MCL). The September and December 2008 sampling event did not utilize any temporal sampling strategies, and generally represent borehole conditions that were present within the initial 1,000-gallon purge volume.

Table 3.1
Well CS-9 Inorganic Sampling Analyses Summary:
February - December 2008

Sample Date	Sample Time	Purge Duration	Gallons Purged	Laboratory	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Nickel (mg/L)	Zinc (mg/L)	pH (Field Measurements)	Temp. (deg. C) (Field Measurements)	Conductivity (mS/cm) (Field Measurements)
2/12/2008	9:45:00 AM	0:10	710	DHL	NA	NA	NA	NA	NA	**0.0325**	**0.00144**	NA	NA			
	11:10:00 AM	1:10	6,490	DHL	NA	NA	NA	NA	NA	**0.00951F**	**0.000129**	NA	NA			
	12:00:00 PM	2:00	10,780	DHL	NA	NA	NA	NA	NA	**0.00711F**	--	NA	NA			
	1:15:00 PM	3:15	17,050	DHL	NA	NA	NA	NA	NA	**0.00527F**	--	NA	NA			
	4:00:00 PM	5:30	31,530	DHL	NA	NA	NA	NA	NA	**0.0043F**	--	NA	NA			
2/22/2008	8:25:00 AM	0:10	580	DHL	NA	NA	NA	NA	NA	**0.0141F**	NA	NA	NA			
	8:30:00 AM	0:15	1,590	DHL	NA	NA	NA	NA	NA	**0.0108F**	NA	NA	NA			
	8:40:00 AM	0:25	2,430	DHL	NA	NA	NA	NA	NA	**0.00827F**	NA	NA	NA			
	8:50:00 AM	0:35	3,690	DHL	NA	NA	NA	NA	NA	**0.00642F**	NA	NA	NA			
	9:15:00 AM	1:00	5,480	DHL	NA	NA	NA	NA	NA	**0.00515F**	NA	NA	NA			
	10:15:00 AM	2:00	11,580	DHL	NA	NA	NA	NA	NA	**0.00295F**	NA	NA	NA			
6/27/2008		<0:05	500	APPL	**0.00058F**	**0.0383**	--	--	**0.012**	**0.0067F**	**0.0012**	**0.002F**	**0.983**	7.14	24.04	0.68
6/27/2008		0:39	3,220	APPL	--	**0.038**	--	--	**0.047**	**0.0541**	**0.0015**	--	**0.519**	6.99	23.95	0.603
9/16/2008		<0:15	<1,000	APPL	**0.00197F**	**0.0394**	--	--	--	**0.0088F**	**0.0082J**	NA	**2.42**	7.53	22.00	0.623
9/16/2008	Duplicate	<0:15	<1,000	APPL	**0.00196F**	**0.0384**	--	--	--	**0.0083F**	**0.0066J**	NA	**2.242**	7.53	22.00	0.623
12/10/2008		<0:15	<1,000	APPL	NA	NA	--	--	NA	**0.0066F**	**0.0047**	NA	NA	7.14	21.12	0.491

		Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Zinc
Method Detection Limit	**MDL**	**0.00022**	**0.0003**	**0.0005**	**0.001**	**0.003**	**0.0019**	**0.0001**	**0.001**	**0.008**
Reporting Limit	**RL**	**0.03**	**0.005**	**0.007**	**0.01**	**0.01**	**0.025**	**0.001**	**0.01**	**0.05**
Max. Contaminant Level	**MCL/AL**	**0.01**	**2**	**0.005**	**0.1**	**AL=1.3**	**AL=0.015**	**0.002**	**--**	**SS=5.0**

Notes:
- ug/L = micrograms per liter
- mg/L = miligrams per liter
- "--" = analyte not detected
- AL = action level
- SS = secondary standard
- VOCs analyzed using laboratory method SW8260B.
- F = The analyte was positively identified but the associated numerical value is below the RL.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- NA = Not analyzed for this parameter.
- APPL = Agriculture & Priority Pollutants Laboratories, Inc. of Clovis, CA
- DHL = DHL Laboratories of Round Rock, TX

4.0 GROUNDWATER MONITORING PROGRAM CHANGES

4.1 Access Agreements Obtained in 2008

Access agreements are signed by off-post well owners to grant permission to CSSA to collect groundwater samples from each well. Most access agreements were signed for a 3-year term. During 2007, most of the current access agreements expired. In September 2007 CSSA mailed out new right-of-entry agreements to owners to solicit new access agreements. Of the 32 wells owners, owning 45 wells, on the sampling schedule 8 agreements were still outstanding at the end of 2007.

In 2008 all outstanding agreements were received by CSSA with the exception of I10-7. The well owner was contacted via telephone and verbal permission to sample this well was given while either a new access agreement is received or the initial agreement is located. The well owner of JW-28 who initially decided to terminate sampling in December 2007 has reconsidered and was added back to the quarterly monitoring schedule in March 2008.

Of the right-of-entry agreements mailed out, one well owner (JW-26) has decided to terminate access and sampling of their well. A termination of sampling letter was mailed out in 2008.

4.2 Wells Added to or Removed From Program

Wells LS-1, LS-2, LS-3 and LS-4 were been removed from service in 2007. Wells LS-1 and LS-4 will remain in the quarterly sampling program when the low flow QED pumps are installed (June 2008). Wells LS-2 and LS-3 will no longer be sampled as part of the CSSA groundwater monitoring program.

Well owner JW-26 has requested to be removed from the sampling program and have declined to sign the right-of-entry agreement.

The well owner of I10-4 was contacted in 2008 to follow up on the plug and abandon report that CSSA never received. After further investigation it was discovered that this well was never plugged but the pump and surrounding utilities had been removed. This well will be added back to the monitoring program with the permission of the well owner.

4.3 Bexar Metropolitan Water System Sale

Bexar Met has owned and operated eight off-post wells in Hidden Springs Estates (HS-1, HS-2, HS-3, and HS-4) and Leon Springs Villa (LS-1, LS-2, LS-3, and LS-4) currently included in the quarterly groundwater monitoring program. The sale of the Bexar Met wells to San Antonio Water System (SAWS) was finalized in 2007. The GAC system installed at wells LS-2 and LS-3 was traded by CSSA to Bexar Met for access to wells LS-1 and LS-4 for sampling purposes. Wells HS-1 though HS-4 have been taken over by SAWS and remain a part of the quarterly groundwater monitoring program. The Hidden Springs Estates wells continue to provide potable water to those residents.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the evaluation of the on- and off-post groundwater monitoring program data collected in 2008, the following conclusions and recommendations can be made:

- On-post wells CS-MW16-LGR, CS-MW16-CC, CS-D, CS-MW1-LGR, CS-9, CS-11, and CS-MW22-LGR all exceeded MCLs in 2008 and should remain on the sampling schedule in the future. Increases in VOC concentrations in the B-3 area could likely be attributed to the vadose zone flushing beneath the Bioreactor.
- While the LTMO process has been useful and cost effective, it does preclude the possibility of collecting sitewide samples from all wells to provide a "snapshot" of the plume relative concentrations and geometry. Parsons is recommending that ALL wells (on- and off-post) be sampled during a single quarterly monitoring event on an annual basis. These annual events will be compared to prior and future events for changes in concentration and plume morphology.
- Twenty-two Westbay intervals had detections above the MCL in 2008. These intervals should remain on the semi-annual sampling schedule in the future as recommended in the LTMO study.
- The Westbay wells at AOC-65 continue to indicate the strong presence of contamination near the source area (CS-WB03). Significant contamination above the MCLs continues to exist near-surface and in the lower-yielding upper strata of aquifer. In most cases throughout the post, VOC contamination in the main portion of aquifer remains at concentrations below the MCLs. An investigation into the source of the UGR water near Building 90 is recommended.
- Wells OFR-3 and RFR-10 exceeded the MCL for PCE and TCE in 2008 off-post. These wells, along with wells LS-6 and LS-7, are equipped with a GAC filtration system and should remain on the quarterly sampling schedule in the future. The GAC filtration systems will continue to be maintained by CSSA. Off-post well I10-4 also exceeded the MCL for PCE in 2008; however it is not equipped with a GAC unit because this well is not currently being used as drinking water. In the future if this well is put back into service it will require installation of a GAC unit.
- If additional private/or public wells are installed to the west and southwest of CSSA, CSSA will attempt to add them to future sampling events. A new well survey to capture all wells within ½ mile of the post will be scheduled in 2010.
- Off-post wells with detections of VOCs below the MCL will continue to be sampled on a quarterly basis in accordance with DQO requirements. Depending on concurrence by regulatory agencies, the sampling frequency may be reduced following one year of consistent detection levels.
- For future sampling events, off-post wells where no VOCs were detected will be sampled as needed, depending on historical detections.

- Production well CS-9 continues to have lead and mercury issues above regulatory standards. Two rounds of testing in February 2008 indicated that lead and mercury concentrations attenuated below these standards after minimal purging of the wellbore. However, these results were contradicted by a similar test in June 2008. Since then, the well has not been pumped. The last two rounds of sampling in September and December 2008 indicate that lead is still present below the action level, but mercury exceeded the MCL in both sampling rounds. Well CS-9 continues to be un-used for potable water supply.

6.0 REFERENCES

CSSA 2002. *CSSA Quality Assurance Program Plan*

CSSA 2008. *CSSA Environmental Encyclopedia*, www.stanley.army.mil

CSSA June 2002. *Off-Post Monitoring Program and Response Plan*

Parsons 2001. *Offsite Well Survey Report*

Parsons 2005. *Final Three-Tiered Long Term Monitoring Network Optimization Evaluation*

Parsons 2006. *Final Data Quality Objectives for the Groundwater Monitoring Program*

NOAA, National Weather Service Forecast Office, Monthly/Annual/Average Precipitation San Antonio, Texas (1871 - February 2008), www.srh.noaa.gov/ewx/html/cli/sat/satmonpcpn.htm

APPENDIX A

ON- AND OFF-POST EVALUATION OF DATA QUALITY OBJECTIVES ATTAINMENT

Appendix A. On-Post 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 in 2008.	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 2008 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 March 2009 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 transducer in wells: CS-1, CS-9, CS-10, CS-11, CS-MW1-LGR, CS-MW1-BS, CS-MW1-CC, CS-MW4-LGR, CS-MW6-LGR, CS-MW6-BS, CS-MW6-CC, CS-MW9-LGR, CS-MW9-BS, CS-MW9-CC, CS-MW10-LGR, CS-MW10-CC, CS-MW12-LGR, CS-MW12-BS, CS-MW12-CC, CS-MW16-LGR, CS-MW16-CC, CS-MW18-LGR, , CS-MW21-LGR, and CS-MW24-LGR. 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 through 2008 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 31 of 47 CSSA wells. Of the 67 samples scheduled to be collected in 2008 5 wells (CS-I, CS-MW4-LGR, CS-MW17-LGR, CS-MW18-LGR, and CS-MW11B-LGR) were not sampled due to pump outages and the water levels falling below the dedicated low-flow pump. Drinking water wells CS-9, CS-10, and CS-1 were added to the sampling schedules in June and December 2008 as well as 1 reservoir sample in September to collect additional metals data in the area.	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 (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 not listed above. Samples were analyzed for the selected VOCs using USEPA method SW8260B and metals (As, Ba, Cd, Cr, Cu, Pb, Hg, Ni, Zn). 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 (UG/L)** **MCL (UG/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 (UG/L)** **MCL (UG/L)** Barium 5 2000 Chromium 10 100 Copper 10 1300 Nickel 10 100 Zinc 10 11000 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," "M," and "F" are usable for characterizing contamination. All "R" flagged data are considered unusable.	Yes.	NA
		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.

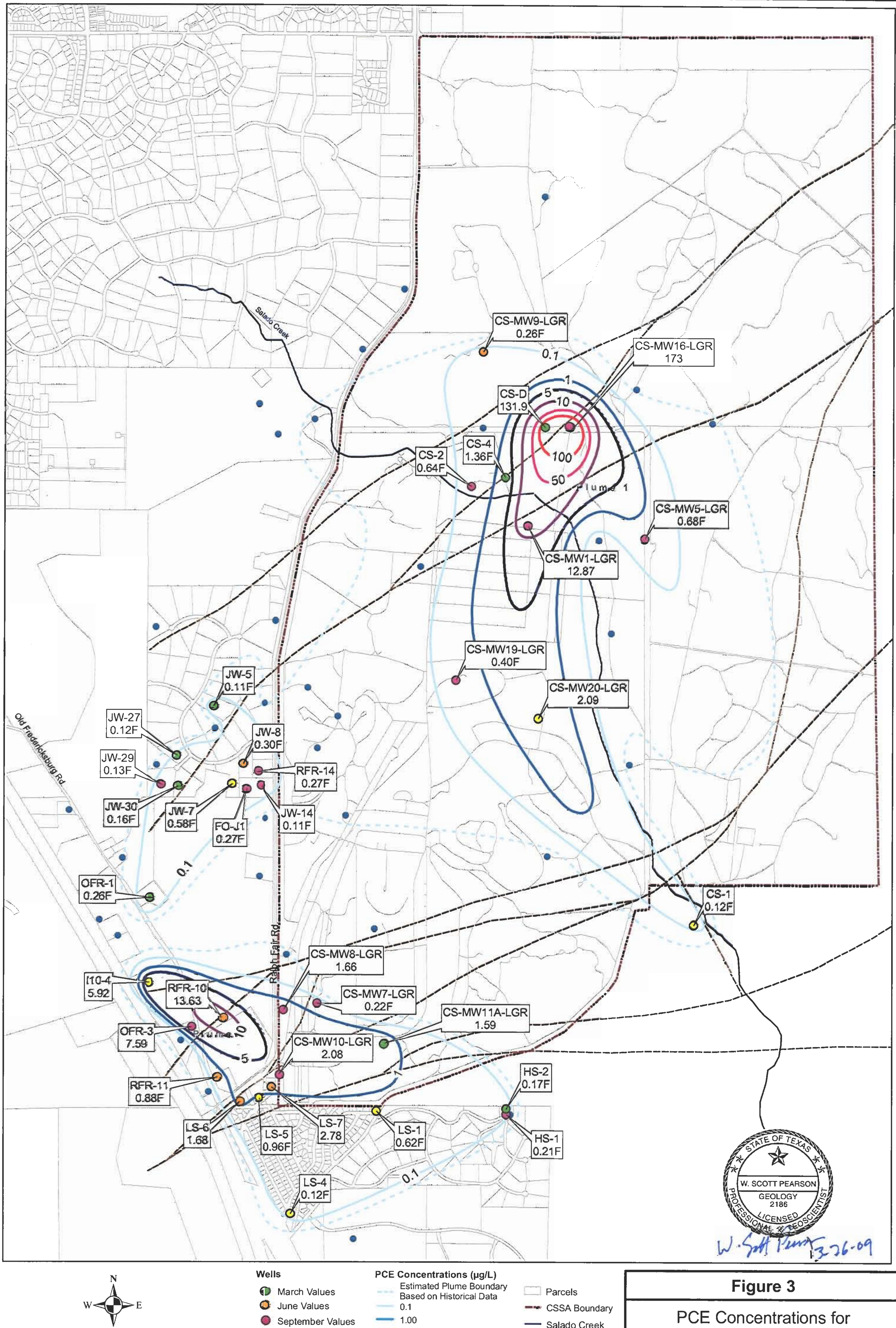
Activity	Objectives	Action	Objective Attained?	Recommendations
Project schedule/ Reporting	Produce a quarterly monitoring project schedule as a road map for sampling, analysis, validation, verification, reviews, and reports.	Prepare schedules and sampling guidelines prior to each quarterly sampling event.	Yes.	Continue sampling schedule preparation each quarter.

Appendix A Off-Post Evaluation of Data Quality Objectives Attainment

Activity	Objectives	Action	Objective Attained?	Recommendations
Field Sampling	Conduct field sampling in accordance with procedures defined in the project work plan, SAP, QAPP, and HSP.	All sampling was conducted in accordance with the procedures described in the project plans.	Yes	NA
Contamination Characterization (Groundwater Contamination)	Determine the potential extent of off-post contamination (§2.3.1 of the DQOs for the Groundwater Contamination Investigation, revised November 2003).	Samples for laboratory analysis were collected from selected off-post public and private wells, which are located within a ½ mile radius of CSSA.	Partially	Replace wells where no VOCs were detected with wells that may be identified in the future, located to the west and southwest of AOC-65 to provide better definition of plume 2. Continue sampling of wells to the west of plume 1 (Fair Oaks and Jackson Woods) to confirm any detections possibly related to plume 1.
	Meet CSSA QAPP quality assurance requirements.	Samples were analyzed in accordance with the CSSA QAPP, and approved variances. A chemist verified all data.	Yes	NA
		All data flagged with a "U", "M", and "J" are usable for characterizing contamination.	Yes	NA

Activity	Objectives	Action	Objective Attained?	Recommendations
	Evaluate CSSA monitoring program and expand as necessary (§2.3.1 of the DQOs for the Groundwater Contamination Investigation, revised November 2003). Determine locations of future monitoring locations.	Evaluation of data collected is ongoing and is reported in this quarterly groundwater report and will be reported in future quarterly groundwater reports. Additional information covering the CSSA monitoring program is available in Volume 5, CSSA Environmental Encyclopedia.	Yes	Continue data evaluation and quarterly teleconferences for evaluation of the monitoring program. Each teleconference/planning session covers expansion of the quarterly monitoring program, if necessary.
Project schedule/ Reporting	The quarterly monitoring project schedule shall provide a schedule for sampling, analysis, validation, verification, reviews, and reports for monitoring events off-post.	A schedule for sampling, analysis, validation, and verification and data review and reports is provided in this quarterly groundwater report and will be reported in future quarterly groundwater reports. Additional information covering the CSSA monitoring program is available in Volume 5, CSSA Environmental Encyclopedia.	Yes	Continue quarterly reporting to include a schedule for sampling, analysis, validation, and verification and data review and data reports.

Activity	Objectives	Action	Objective Attained?	Recommendations
Remediation	Evaluate the effectiveness of GACs (§3.2.3) and install as needed (§3.2.5 both of the DQOs for the Groundwater Contamination Investigation, revised November 2003).	Perform maintenance as needed. Install new GACs as needed.	Yes	Maintenance to the off-post GAC systems to be continued by Parsons' personnel approximately every 3 weeks. Semi annual (or as needed) maintenance to the off-post GAC systems by additional subcontractors to continue. Evaluations of future sampling results for installation of new GAC systems will occur as needed.



Wells
- March Values
- June Values
- September Values
- December Values
- Non-Detect in 2008

PCE Concentrations (µg/L)
- Estimated Plume Boundary Based on Historical Data
- 0.1
- 1.00
- 5.00 (MCL)
- 10.00
- 50.00
- 100.00

- Parcels
- CSSA Boundary
- Salado Creek
- Faults

Figure 3

PCE Concentrations for LGR Wells, Max 2008

PARSONS

J:\745\745953 CSSA DY02\GIS\max_08_concentrations_lgr_pce.mxd - 3/25/2009 @ 11:15:04 AM

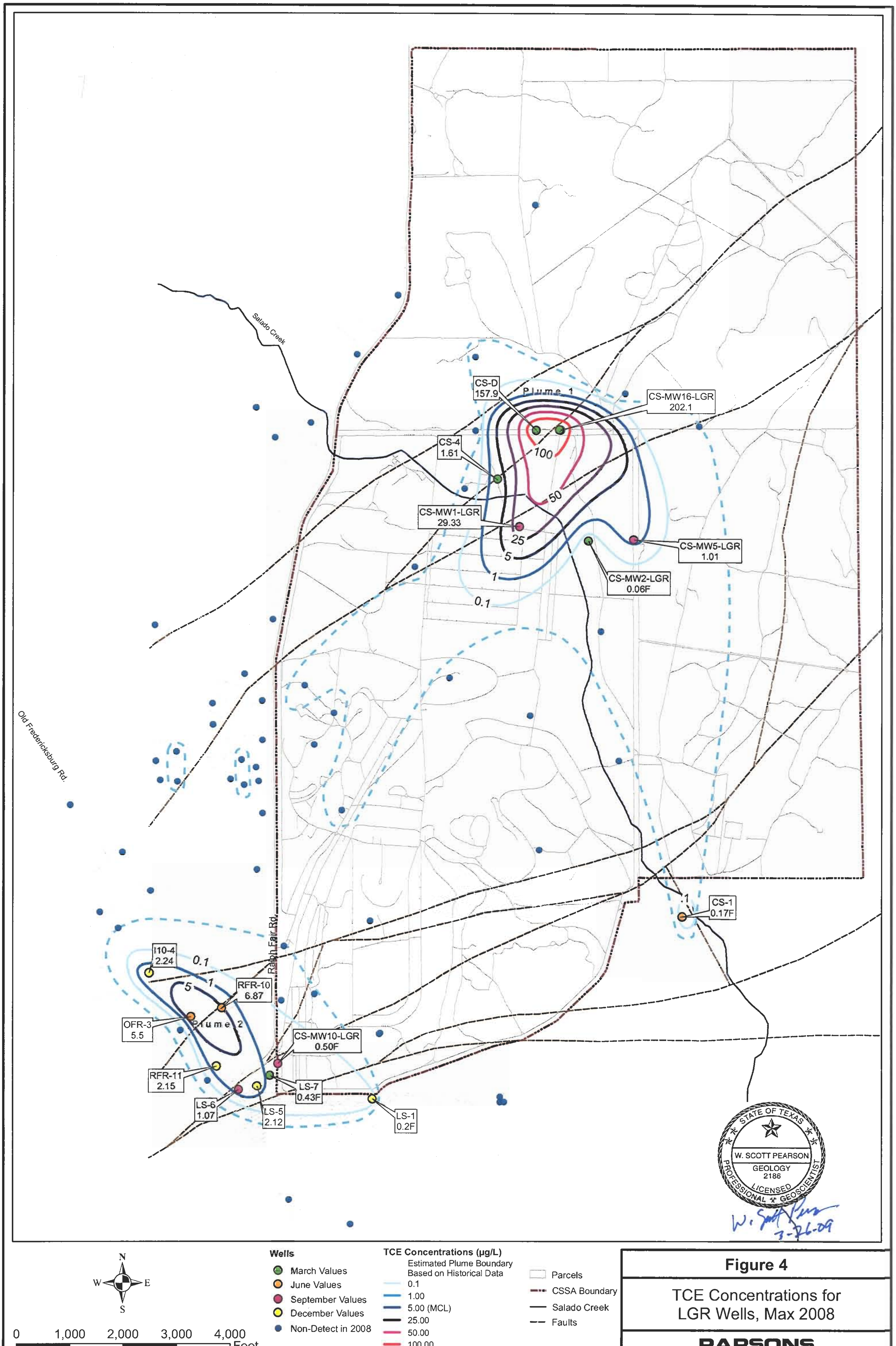


Figure 4

TCE Concentrations for LGR Wells, Max 2008

J:\745\745953 CSSA DY02\GIS\max_08_concentrations_lgr_tce.mxd - 3/25/2009 @ 11:13:33 AM

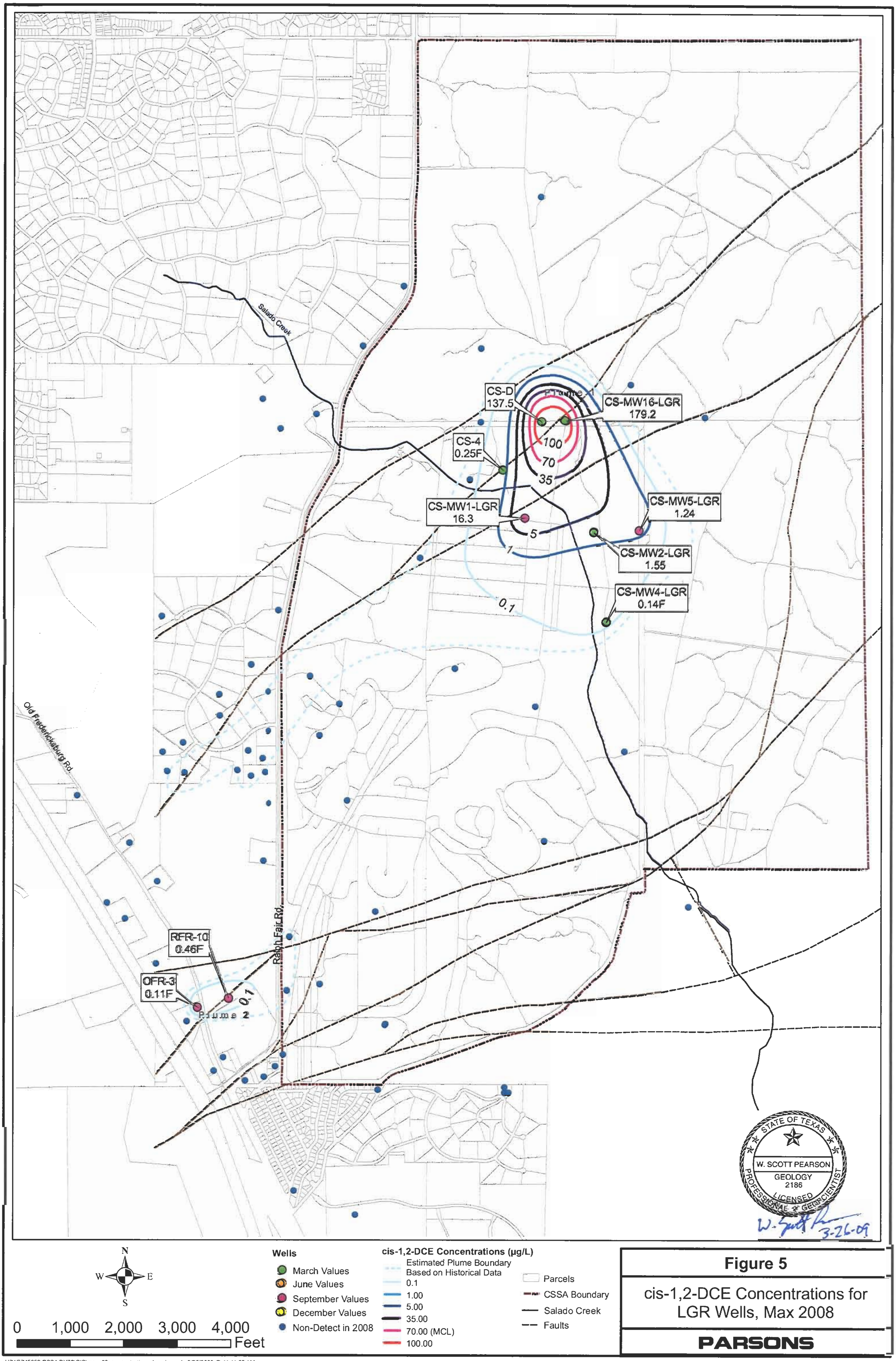


Figure 5

cis-1,2-DCE Concentrations for LGR Wells, Max 2008

APPENDIX B

2008 QUARTERLY ON-POST GROUNDWATER ANALYTICAL RESULTS

Appendix B
2008 Quarterly On-Post Groundwater Monitoring Analytical Results

Well ID	Laboratory	Analytical Method	Sample Date	Dichloro-ethene, 1,1 (ug/L)	Dichloro-ethene, *cis* -1,2 (ug/L)	Dichloro-ethene, *trans* -1,2 (ug/L)	Tetra-chloroethene (ug/L)	Tri-chloroethene (ug/L)	Vinyl chloride (ug/L)	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Nickel (mg/L)	Zinc (mg/L)	pH	Temp. (deg. C)	Conductivity (mS/cm)
																			Field Measurements		
CS-1	APPL	SW8260B	6/27/2008	0.12U	0.07U	0.08U	0.06U	**0.17F**	0.08U	0.00022U	**0.0371**	0.0005U	0.001U	**0.005F**	0.0019U	**0.0004F**	0.001U	**0.159**	7.04	22.35	0.542
	APPL	SW8260B	9/18/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	**0.00222F**	**0.0376**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	NA	**0.067**	6.87	22.51	0.580
	APPL	SW8260B	12/10/2008	0.12U	0.07U	0.08U	**0.12F**	0.05U	0.08U	0.00022U	**0.0374**	0.0005U	0.001U	**0.006F**	0.0019U	0.0001U	NA	**0.072**	7.20	21.79	0.454
CS-2	APPL	SW8260B	9/11/2008	0.12U	0.07U	0.08U	**0.64F**	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	**0.003F**	0.0001U	NA	NA	7.10	22.20	0.485
CS-4	APPL	SW8260B	3/12/2008	0.12U	**0.25F**	0.08U	**1.36F**	**1.61**	0.08U	NA	NA	0.0005U	NA	NA	**0.0028F**	NA	0.0010U	NA	7.13	21.03	0.575
	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	**0.75F**	**1.08**	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0026F**	0.0001U	NA	NA	7.22	23.29	0.525
CS-9 sample time 1317	APPL	EPA8260B	6/27/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	**0.00058F**	**0.0383**	0.0005U	0.001U	**0.012**	**0.0067F**	**0.0012**	**0.002F**	**0.983**	7.14	24.04	0.68
sample time 1356	APPL	EPA8260B	6/27/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	0.00022U	**0.038**	0.0005U	0.001U	**0.047**	**0.0541**	**0.0015**	0.001U	**0.519**	6.99	23.95	0.603
	APPL	SW8260B	9/16/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	**0.00197F**	**0.0394**	0.0005U	0.001U	0.003U	**0.0088F**	**0.0082J**	NA	**2.42**	7.53	22.00	0.623
Duplicate	APPL	SW8260B	9/16/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	**0.00196F**	**0.0384**	0.0005U	0.001U	0.003U	**0.0083F**	**0.0066J**	NA	**2.242**	7.53	22.00	0.623
	APPL	SW8260B	12/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0066F**	**0.0047**	NA	NA	7.14	21.12	0.491
CS-10	APPL	EPA8260B	6/27/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	**0.00085F**	**0.0418**	0.0005U	0.001U	**0.006F**	0.0019U	**0.0003F**	**0.002F**	**0.261**	7.06	23.12	0.604
	APPL	SW8260B	9/16/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	**0.00338F**	**0.0393**	0.0005U	0.001U	0.003U	**0.0054F**	0.0001U	NA	**0.184**	7.13	22.91	0.604
	APPL	SW8260B	12/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	0.00022U	**0.0375**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	NA	**0.103**	7.26	21.99	0.465
Duplicate	APPL	SW8260B	12/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	0.00022U	**0.0378**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	NA	**0.101**	7.26	21.99	0.465
CS-11	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	**0.02**	NA	**0.1972**	0.0001U	NA	NA	8.19	20.87	0.321
CS-MW16-LGR	APPL	SW8260B	3/11/2008	0.12U	**117.14**	**0.28F**	**125.51**	**127.92**	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	0.0010U	NA	6.27	21.90	0.605
	APPL	SW8260B	9/9/2008	0.12U	**179.24**	**0.72**	**172.98**	**202.14**	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0043F**	0.0001U	NA	NA	6.49	22.33	0.550
CS-MW16-CC	APPL	SW8260B	3/11/2008	**0.46F**	**78.17**	**3.17**	**12.13**	**64.97**	**0.33F**	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.004F**	NA	6.83	21.94	0.695
	APPL	SW8260B	9/9/2008	**0.38F**	**51.07**	**2.11**	**14.3**	**63.51**	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0029F**	0.0001U	NA	NA	7.14	23.14	0.631
CS-D	APPL	SW8260B	3/11/2008	0.12U	**137.48**	**0.94**	**131.9**	**157.89**	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.003F**	NA	6.89	21.01	0.592
	APPL	SW8260B	9/9/2008	0.12U	**93.66**	**0.8**	**72.16**	**102.32**	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0038F**	0.0001U	NA	NA	7.31	21.95	0.531
CS-MWG-LGR	APPL	SW8260B	9/16/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	**0.0006F**	0.001U	NA	**0.0102F**	0.0001U	NA	NA	7.24	20.53	0.454
CS-MW1-LGR	APPL	SW8260B	3/11/2008	0.12U	**14.59**	**0.18F**	**8.03**	**17**	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.032**	NA	7.48	21.12	0.560
Duplicate	APPL	SW8260B	3/11/2008	0.12U	**14.56**	**0.14F**	**8.71**	**18.39**	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.024**	NA	7.48	21.12	0.560
	APPL	SW8260B	9/9/2008	0.12U	**16.3**	**0.26F**	**12.87**	**29.33**	0.08U	NA	NA	0.0005U	**0.023**	NA	**0.0027F**	0.0001U	NA	NA	7.04	21.79	0.524
CS-MW2-LGR	APPL	SW8260B	3/11/2008	0.12U	**1.55**	0.08U	0.06U	**0.06F**	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.003F**	NA	8.96	21.36	0.443
	APPL	SW8260B	9/16/2008	0.12U	**0.58F**	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0034F**	0.0001U	NA	NA	11.66	22.04	1.23
CS-MW3-LGR	APPL	SW8260B	3/11/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.005F**	NA	7.18	21.87	0.543
	APPL	SW8260B	9/16/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0024F**	0.0001U	NA	NA	7.37	22.8	0.509
CS-MW4-LGR	APPL	SW8260B	3/12/2008	0.12U	**0.14F**	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	0.0010U	NA	7.14	21.39	0.694
CS-MW5-LGR	APPL	SW8260B	3/11/2008	0.12U	**1.14F**	0.08U	**0.66F**	**0.86F**	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.007F**	NA	6.91	21.09	0.559
	APPL	SW8260B	9/11/2008	0.12U	**1.24**	0.08U	**0.68F**	**1.01**	0.08U	NA	NA	0.0005U	**0.002F**	NA	**0.005F**	0.0001U	NA	NA	7.14	25.9	0.497
CS-MW6-LGR	APPL	SW8260B	3/12/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.02**	NA	7.07	21.75	0.690
	APPL	SW8260B	9/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	**0.005F**	NA	**0.0043F**	0.0001U	NA	NA	7.23	22.75	0.554
CS-MW7-LGR	APPL	SW8260B	3/12/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	0.0010U	NA	7.03	20.92	0.690
	APPL	SW8260B	9/9/2008	0.12U	0.07U	0.08U	**0.22F**	0.05U	0.08U	NA	NA	0.0005U	**0.002F**	NA	0.0019U	0.0001U	NA	NA	6.64	21.56	0.637
CS-MW8-LGR	APPL	SW8260B	9/10/2008	0.12U	0.07U	0.08U	**1.66**	0.05U	0.08U	NA	NA	**0.0007F**	**0.002F**	NA	**0.0027F**	0.0001U	NA	NA	7.10	22.88	0.672
CS-MW9-LGR	TestAmerica	SW8260B	3/17/2008	0.074U	0.098U	0.056U	0.14U	0.1U	0.078U	**0.0004F**	**0.029**	0.00004U	**0.0026F**	0.0045U	0.00018U	**0.000058F**	**0.0093F**	**0.011F**	7.05	20.82	0.526
	APPL	EPA8260B	6/10/2008	0.12U	0.07U	0.08U	**0.26F**	0.05U	0.08U	**0.00582F**	**0.0372**	0.0005U	**0.007F**	0.003U	0.0019U	**0.0004F**	**0.006F**	0.008U	7.11	21.89	0.515
	APPL	SW8260B	9/16/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	**0.002F**	NA	**0.0022F**	0.0001U	NA	NA	7.16	20.96	0.528
Duplicate	APPL	SW8260B	9/16/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	**0.002F**	NA	**0.0038F**	0.0001U	NA	NA	7.16	20.96	0.528
CS-MW10-LGR	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	**1.94**	**0.50F**	0.08U	NA	NA	0.0005U	**0.016**	NA	**0.0025F**	0.0001U	NA	NA	7.05	22.31	0.615
Duplicate	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	**2.08**	**0.39F**	0.08U	NA	NA	0.0005U	**0.014**	NA	**0.0023F**	0.0001U	NA	NA	7.05	22.31	0.615
CS-MW11A-LGR	APPL	SW8260B	3/12/2008	0.12U	0.07U	0.08U	**0.53F**	0.05U	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.002F**	NA	7.17	20.49	0.566
	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	**1.59**	0.05U	0.08U	NA	NA	**0.0008F**	0.001U	NA	**0.0023F**	0.0001U	NA	NA	6.93	21.69	0.592
CS-MW11B-LGR	APPL	SW8260B	3/12/2008	0.12U	0.07U	0.08U	**1.24F**	0.05U	0.08U	NA	NA	0.0005U	NA	NA	**0.0021F**	NA	**0.013**	NA	7.24	20.24	0.550
CS-MW12-LGR	APPL	SW8260B	9/11/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0026F**	0.0001U	NA	NA	7.22	23.00	0.547
CS-MW18-LGR	APPL	SW8260B	3/12/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	NA	NA	**0.0022F**	NA	**0.007F**	NA	7.47	21.83	0.547
CS-MW19-LGR	APPL	SW8260B	3/12/2008	0.12U	0.07U	0.08U	**0.39F**	0.05U	0.08U	NA	NA	0.0005U	NA	NA	0.0019U	NA	**0.053**	NA	7.11	21.52	0.667
	APPL	SW8260B	9/11/2008	0.12U	0.07U	0.08U	**0.40F**	0.05U	0.08U	NA	NA	0.0005U	**0.002F**	NA	**0.0037F**	0.0001U	NA	NA	7.19	22.10	0.595
CS-MW20-LGR	TestAmerica	SW8260B	3/13/2008	0.074U	0.098U	0.056U	**1.6**	0.1U	0.078U	**0.00078F**	**0.140**	**0.00021F**	0.0026U	0.0045U	**0.00019F**	0.000027U	0.0078U	**0.0080F**	6.87	20.85	0.538
	APPL	SW8260B	6/24/2008	0.12U	0.07U	0.08U	**1.95**	0.05U	0.08U	0.00022U	**0.1448**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	0.001U	**0.057**	7.16	23.90	0.583
	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	**1.88**	0.05U	0.08U	NA	NA	**0.0008F**	**0.002F**	NA	**0.0029F**	0.0001U	NA	NA	6.98	21.90	0.603
	APPL	SW8260B	12/9/2008	0.12U	0.07U	0.08U	**2.09**	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	0.0019U	0.0001U	NA	NA	7.00	21.61	0.454
CS-MW21-LGR	TestAmerica	SW8260B	3/13/2008	0.074U	0.098U	0.056U	0.14U	0.1U	0.078U	**0.00062F**	**0.085**	0.00004U	0.0026U	0.0045U	**0.00081F**	0.000027U	0.0078U	**0.15**	7.05	21.10	0.500
	APPL	SW8260B	6/24/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	0.00022U	**0.091**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	**0.002F**	**0.142**	7.23	22.40	0.531
	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0032F**	0.0001U	NA	NA	7.18	21.68	0.551
	APPL	SW8260B	12/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	0.0019U	0.0001U	NA	NA	7.24	20.61	0.416

Appendix B
2008 Quarterly On-Post Groundwater Monitoring Analytical Results

Well ID	Laboratory	Analytical Method	Sample Date	Dichloro-ethene, 1,1 (ug/L)	Dichloro-ethene, *cis*-1,2 (ug/L)	Dichloro-ethene, *trans*-1,2 (ug/L)	Tetra-chloroethene (ug/L)	Tri-chloroethene (ug/L)	Vinyl chloride (ug/L)	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Nickel (mg/L)	Zinc (mg/L)	pH	Temp. (deg. C)	Conductivity (mS/cm)
																			Field Measurements		
CS-MW22-LGR	TestAmerica	SW8260B	3/13/2008	0.074U	0.098U	0.056U	0.14U	0.1U	0.078U	**0.0038F**	**0.079**	**0.000067F**	**0.017**	**0.013**	**0.04**	**0.00013F**	**0.022**	**4.9**	7.11	20.25	0.494
Duplicate	TestAmerica	SW8260B	3/13/2008	0.074U	0.098U	0.056U	0.14U	0.1U	0.078U	**0.0036F**	**0.077**	**0.00008F**	**0.016**	**0.012**	**0.038**	**0.00012F**	**0.022**	**4.7**	7.11	20.25	0.494
	APPL	SW8260B	6/24/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	0.00022U	**0.0651**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	**0.006F**	**1.701**	7.22	22.31	0.564
Duplicate	APPL	SW8260B	6/24/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	0.00022U	**0.0658**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	**0.006F**	**1.732**	7.22	22.31	0.564
	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	**0.0037F**	0.0001U	NA	NA	7.29	22.26	0.561
	APPL	SW8260B	12/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	0.0019U	0.0001U	NA	NA	7.24	19.50	0.433
CS-MW23-LGR	TestAmerica	SW8260B	3/13/2008	0.074U	0.098U	0.056U	0.14U	0.1U	0.078U	**0.0008F**	**0.046**	0.00004U	0.0026U	0.0045U	**0.00023F**	0.000027U	0.0078U	**0.1**	7.04	20.85	0.472
	APPL	SW8260B	6/24/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	0.00022U	**0.0528**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	**0.035**	**0.133**	7.16	22.11	0.529
	APPL	SW8260B	9/15/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	**0.0006F**	**0.004F**	NA	**0.0079F**	0.0001U	NA	NA	7.30	22.12	0.529
	APPL	SW8260B	12/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	0.0019U	0.0001U	NA	NA	7.28	19.62	0.399
CS-MW24-LGR	TestAmerica	SW8260B	3/17/2008	0.074U	0.098U	0.056U	0.14U	0.1U	0.078U	**0.00039F**	**0.03**	0.00004U	0.0026U	0.0045U	0.00018U	**0.00006F**	0.0078U	**0.074**	7.12	21.33	0.562
	APPL	SW8260B	6/24/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	0.00022U	**0.0334**	0.0005U	0.001U	0.003U	0.0019U	0.0001M	0.001U	**0.132**	7.25	22.10	0.520
	APPL	SW8260B	9/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	**0.002F**	NA	**0.0035F**	0.0001U	NA	NA	7.27	22.02	0.672
	APPL	SW8260B	12/9/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	0.001U	NA	0.0019U	0.0001U	NA	NA	7.27	21.53	0.418
CS-MW25-LGR	TestAmerica	SW8260B	3/17/2008	0.074U	0.098U	0.056U	0.14U	0.1U	0.078U	**0.0010F**	**0.032**	**0.000043F**	**0.038**	0.0045U	**0.0026**	**0.00006F**	**0.014**	**0.24**	7.19	21.54	0.550
	APPL	SW8260B	6/10/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	**0.00274F**	**0.0333**	0.0005U	**0.012**	**0.004F**	0.0019U	**0.0005F**	**0.009F**	**0.297**	7.27	22.43	0.508
	APPL	SW8260B	9/16/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	**0.002F**	NA	**0.0035F**	0.0001U	NA	NA	7.32	21.93	0.496
	APPL	SW8260B	12/9/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	0.0005U	**0.026**	NA	0.0019U	0.0001U	NA	NA	7.43	21.73	0.374
Reservoir	APPL		9/18/2008	NA	NA	NA	NA	NA	NA	**0.00222F**	**0.0389**	0.0005U	0.001U	0.003U	0.0019U	0.0001U	NA	**0.166**			

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

Notes:
- ug/L = micrograms per liter
- mg/L = miligrams per liter
- "--" = analyte not detected
- AL = action level
- SS = secondary standard
- VOCs analyzed using laboratory method SW8260B.
- F = The analyte was positively identified but the associated numerical value is below the RL.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- NA = Not analyzed for this parameter.
- APPL = Agriculture & Priority Pollutants Laboratories, Inc. of Clovis, CA

APPENDIX C

2008 WESTBAY® ANALYTICAL RESULTS

Appendix C
2008 Westbay® Analytical Results

Well ID	Date	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	Vinyl Chloride	1,1-DCE
Method Detection Limit	MDL	0.16	0.15	0.19	0.16	0.23	0.3
Current Reporting Limit	RL	1.2	1.4	0.6	1.0	1.1	1.2
Max. Contaminant Level	MCL	70	5.0	100	5.0	2.0	7.0
CS-WB01-UGR-01	18-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	17-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB01-LGR-01	18-Mar-08	<0.16	**5.1**	<0.19	**0.43J**	<0.23	<0.3
	17-Sep-08	<0.16	**6.5**	<0.19	**0.34J**	<0.23	<0.3
CS-WB01-LGR-02	18-Mar-08	<0.16	**7.9**	<0.19	**3.2**	<0.23	<0.3
	17-Sep-08	<0.16	**9.3**	<0.19	**3.4**	<0.23	<0.3
CS-WB01-LGR-03	18-Mar-08	**0.16J**	**2.6**	<0.19	**5.0**	<0.23	<0.3
	17-Sep-08	<0.16	**5.8**	<0.19	**15.0**	<0.23	<0.3
CS-WB01-LGR-04	18-Mar-08	<0.16	**0.33J**	<0.19	**0.25J**	<0.23	<0.3
	17-Sep-08	<0.16	<0.15	<0.19	**0.25J**	<0.23	<0.3
CS-WB01-LGR-05	18-Mar-08	<0.16	**0.44J**	<0.19	**0.33J**	<0.23	<0.3
	17-Sep-08	<0.16	**0.18J**	<0.19	**0.24J**	<0.23	<0.3
CS-WB01-LGR-06	18-Mar-08	<0.16	**0.82J**	<0.19	**1.0**	<0.23	<0.3
	17-Sep-08	<0.16	**0.38J**	<0.19	**0.71J**	<0.23	<0.3
CS-WB01-LGR-07	18-Mar-08	<0.16	**14**	<0.19	**12**	<0.23	<0.3
	17-Sep-08	<0.16	**10**	<0.19	**10**	<0.23	<0.3
CS-WB01-LGR-08	18-Mar-08	<0.16	**1.1J**	<0.19	**1.9**	<0.23	<0.3
	17-Sep-08	<0.16	**0.53J**	<0.19	**1.4**	**0.33J**	<0.3
CS-WB01-LGR-09	18-Mar-08	**0.45J**	**18**	<0.19	**23**	<0.23	<0.3
	17-Sep-08	**0.45J**	**17**	<0.19	**22**	<0.23	<0.3
CS-WB02-UGR-01	18-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	17-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB02-LGR-01	18-Mar-08	<0.16	**7.7**	<0.19	**2.2**	<0.23	<0.3
	17-Sep-08	<0.16	**3.3**	<0.19	**3.5**	<0.23	<0.3
CS-WB02-LGR-02	18-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	17-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB02-LGR-03	18-Mar-08	<0.16	**9.8**	<0.19	**1.4**	<0.23	<0.3
	17-Sep-08	<0.16	**7.1**	<0.19	**2.0**	<0.23	<0.3
CS-WB02-LGR-04	18-Mar-08	<0.16	**4.5**	<0.19	**9.7**	<0.23	<0.3
	17-Sep-08	<0.16	**4.2**	<0.19	**14**	<0.23	<0.3
CS-WB02-LGR-05	18-Mar-08	<0.16	**1.7**	<0.19	**3.4**	<0.23	<0.3
	17-Sep-08	<0.16	**1.1J**	<0.19	**4.4**	<0.23	<0.3
CS-WB02-LGR-06	18-Mar-08	**0.43J**	**2.1**	**0.93**	**3.6**	<0.23	<0.3
	17-Sep-08	<0.16	**1.3J**	<0.19	**4.6**	<0.23	<0.3
CS-WB02-LGR-07	18-Mar-08	<0.16	**4.2**	<0.19	**1.4**	<0.23	<0.3
	17-Sep-08	<0.16	**0.83J**	<0.19	**1.0**	<0.23	<0.3
CS-WB02-LGR-08	18-Mar-08	<0.16	**6.7**	<0.19	**2.2**	<0.23	<0.3
	17-Sep-08	<0.16	**2.2**	<0.19	**1.6**	<0.23	<0.3
CS-WB02-LGR-09	18-Mar-08	**0.23J**	**32**	<0.19	**12**	<0.23	<0.3
	17-Sep-08	**0.33J**	**15**	<0.19	**13**	<0.23	<0.3
CS-WB03-UGR-01	17-Mar-08	<0.16	**30,000**	<0.19	**500**	<0.23	<0.3
	17-Sep-08	<0.16	**3,900**	<0.19	**54J**	<0.23	<0.3
CS-WB03-LGR-01	17-Mar-08	**0.29J**	**390**	<0.19	**14**	<0.23	<0.3
	17-Sep-08	**0.35J**	**2,500**	<0.19	**19**	<0.23	<0.3
CS-WB03-LGR-02	17-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	17-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry

Bold	= Above the MDL
Bold	= Above the RL
Bold	= Above the MCL

Appendix C
2008 Westbay® Analytical Results

CS-WB03-LGR-03	17-Mar-08	**0.16J**	**17**	<0.19	**7.6**	<0.23	<0.3
	17-Sep-08	**0.37J**	**24**	<0.19	**11**	<0.23	<0.3
CS-WB03-LGR-04	17-Mar-08	**0.23J**	**20**	<0.19	**6.8**	<0.23	<0.3
	17-Sep-08	<0.16	**22**	<0.19	**8.8**	<0.23	<0.3
CS-WB03-LGR-05	17-Mar-08	<0.16	**22**	<0.19	**6.0**	<0.23	<0.3
	17-Sep-08	<0.16	**20**	<0.19	**6.0**	<0.23	<0.3
CS-WB03-LGR-06	17-Mar-08	<0.16	**15**	<0.19	**1.7**	<0.23	<0.3
	17-Sep-08	<0.16	**9.2**	<0.19	**1.3**	<0.23	<0.3
CS-WB03-LGR-07	17-Mar-08	**0.41J**	**16**	<0.19	**11**	<0.23	<0.3
	17-Sep-08	**0.18J**	**10**	<0.19	**4.2**	<0.23	<0.3
CS-WB03-LGR-08	17-Mar-08	<0.16	**19**	<0.19	**1.8**	<0.23	<0.3
	17-Sep-08	<0.16	**14**	<0.19	**1.5**	<0.23	<0.3
CS-WB03-LGR-09	17-Mar-08	<0.16	**8.7**	<0.19	**10**	<0.23	<0.3
	17-Sep-08	<0.16	**16**	<0.19	**4.8**	<0.23	<0.3
CS-WB04-UGR-01	17-Mar-08	Dry	Dry	Dry	Dry	Dry	Dry
	18-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-01	19-Mar-08	<0.16	**0.54J**	<0.19	<0.16	<0.23	<0.3
	18-Sep-08	<0.16	**0.54J**	<0.19	<0.16	<0.23	<0.3
CS-WB04-LGR-02	19-Mar-08	<0.16	**0.25J**	<0.19	<0.16	<0.23	<0.3
	18-Sep-08	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-03	19-Mar-08	<0.16	**0.21J**	<0.19	<0.16	<0.23	<0.3
	18-Sep-08	<0.16	<0.15	<0.19	<0.16	<0.23	<0.3
CS-WB04-LGR-04	19-Mar-08	<0.16	**0.17J**	<0.19	<0.16	<0.23	<0.3
	18-Sep-08	<0.16	<0.15	<0.19	<0.16	<0.23	<0.3
CS-WB04-LGR-06	19-Mar-08	**4.2**	**1.5**	**0.35J**	**12**	<0.23	<0.3
	18-Sep-08	**3.8**	**6.5**	**0.33J**	**16**	<0.23	<0.3
CS-WB04-LGR-07	19-Mar-08	**6.2**	**0.34J**	**0.33J**	**8.4**	<0.23	<0.3
	18-Sep-08	**3.6**	**6**	**0.22J**	**15**	<0.23	<0.3
CS-WB04-LGR-08	19-Mar-08	<0.16	**0.40J**	<0.19	**0.79J**	<0.23	<0.3
	18-Sep-08	<0.16	**0.42J**	<0.19	**0.64J**	<0.23	<0.3
CS-WB04-LGR-09	19-Mar-08	**0.21J**	**14**	<0.19	**8.6**	<0.23	<0.3
	18-Sep-08	<0.16	**10**	<0.19	**8.8**	<0.23	<0.3
CS-WB04-LGR10	19-Mar-08	<0.16	**0.74J**	<0.19	**0.64J**	<0.23	<0.3
	18-Sep-08	<0.16	**0.91J**	<0.19	**0.68J**	<0.23	<0.3
CS-WB04-LGR-11	19-Mar-08	<0.16	**0.87J**	<0.19	<0.16	<0.23	<0.3
	18-Sep-08	<0.16	**3.5**	<0.19	<0.16	<0.23	<0.3

Bold	= Above the MDL
Bold	= Above the RL
Bold	= Above the MCL

Notes:
- ug/L = micrograms per liter
- VOCs analyzed as screening data using laboratory method SW8260B.
- J = The analyte was positively identified, the quantitation is an estimation.
- APPL = Agriculture & Priority Pollutants Laboratories, Inc. of Clovis, CA

APPENDIX D

REVISED DROUGHT CONTINGENCY PLAN TRIGGERS

CSSA Drought Contingency Plan

Triggering Conditions	***Stage***	***Restrictions***
CS-9 water level > 300 ft bgl.	1) ***Mild*** Water Shortage	Voluntary Restrictions • Discontinue flushing water mains as practical/prudent. • No landscape watering between 1000 to 2000 hours • No car washing at homes (except during watering times), use CSSA car wash that recycles water. • CSSA Car Wash to be operated in water recycling mode. • Water customers encouraged to practice water conservation and minimize or discontinue non-essential water use. • Construction contractors required to quantify water use.
CS-10 Ambient water level > 330 ft bgl.	2) ***Moderate*** Water Shortage	Mandatory Restrictions • All of Stage 1 restrictions apply and • Sprinkler watering reduced to 15 minutes per segment, 2 days/week. • Hand water allowed before 1000 and after 2000. • No water use for ornamental outdoor fountains. • Water for construction work allowed under special permit. • Construction contractors limited to 90% of documented water use.
CS-10 Ambient water level > 360 ft bgl.	3) ***Severe*** Water Shortage	Mandatory Restrictions • All of Stage 1 & 2 restrictions apply and • Sprinkler watering reduced to 15 minutes per segment, 1 day/week. • Hand water allowed before 0700 and after 2100. • Construction contractors limited to 80% of documented water use.
CS-10 Ambient water level > 391 ft bgl.	4) ***Critical*** Water Shortage	Mandatory Restrictions • All of Stage 1, 2 & 3 restrictions apply and • Sprinkler watering reduced to 7 minutes per segment, 1 day/week. • Hand water of ornamental plants, shrubs, & trees allowed between 0700 and 1100. No hand held watering of turf or grass. • Construction contractors limited to 50% of documented water use
CS-10 Drawdown water level > 475 ft bgl. or major water line break, pump malfunction, etc.	5) ***Emergency*** Water Shortage	Mandatory Restrictions • All of Stage 1, 2, 3, & 4 restrictions apply and • No sprinkler use. No hand watering. • Use of water for construction projects considered on case by case basis. • CSSA Installation Manager, Branch Managers, and post residents to meet within 48 hours to consider and adopt rules restricting non-discretionary and discretionary water use.

Drought Plan Triggers

The original CSSA Drought Plan triggers were based on ambient ground water levels in "Index" wells that are not pumped and were not near production wells. The new proposed drought triggers are based on production in our drinking water wells.

- **Stage 1 – *Mild Drought Conditions*** - CS-9 can no longer support sustained pumping. This begins when the ambient water level in CS-9 is 300 ft below ground level (bgl). *(Based on this plan, CSSA triggered Stage 1 in late April).*

- **Stage 2 – *Moderate Drought Conditions*** - CS-10 ambient water level is at 330 ft bgl. *(Based on this plan, CSSA triggered Stage 2 in Mid May).*

- **Stage 3 – *Severe Drought Conditions*** - CS-10 ambient water level is at 360 ft bgl. *(Based on this plan, CSSA has triggered Stage 3. Ambient water levels in CS-10 are currently ~372 ft bgl).*

- **Stage 4 – *Critical Drought Conditions*** - CS-10 ambient water level is at 391 ft. This is the top of the "Kahuna" portion of the aquifer. The "Kahuna" is the most productive portion of the Lower Glen Rose formation and is approximately 60 ft thick. *(Based on this plan, Stage 4 will be triggered when aquifer drops 19 more ft) . Ambient water levels in CS-10 are ~ 372 ft bgl).*

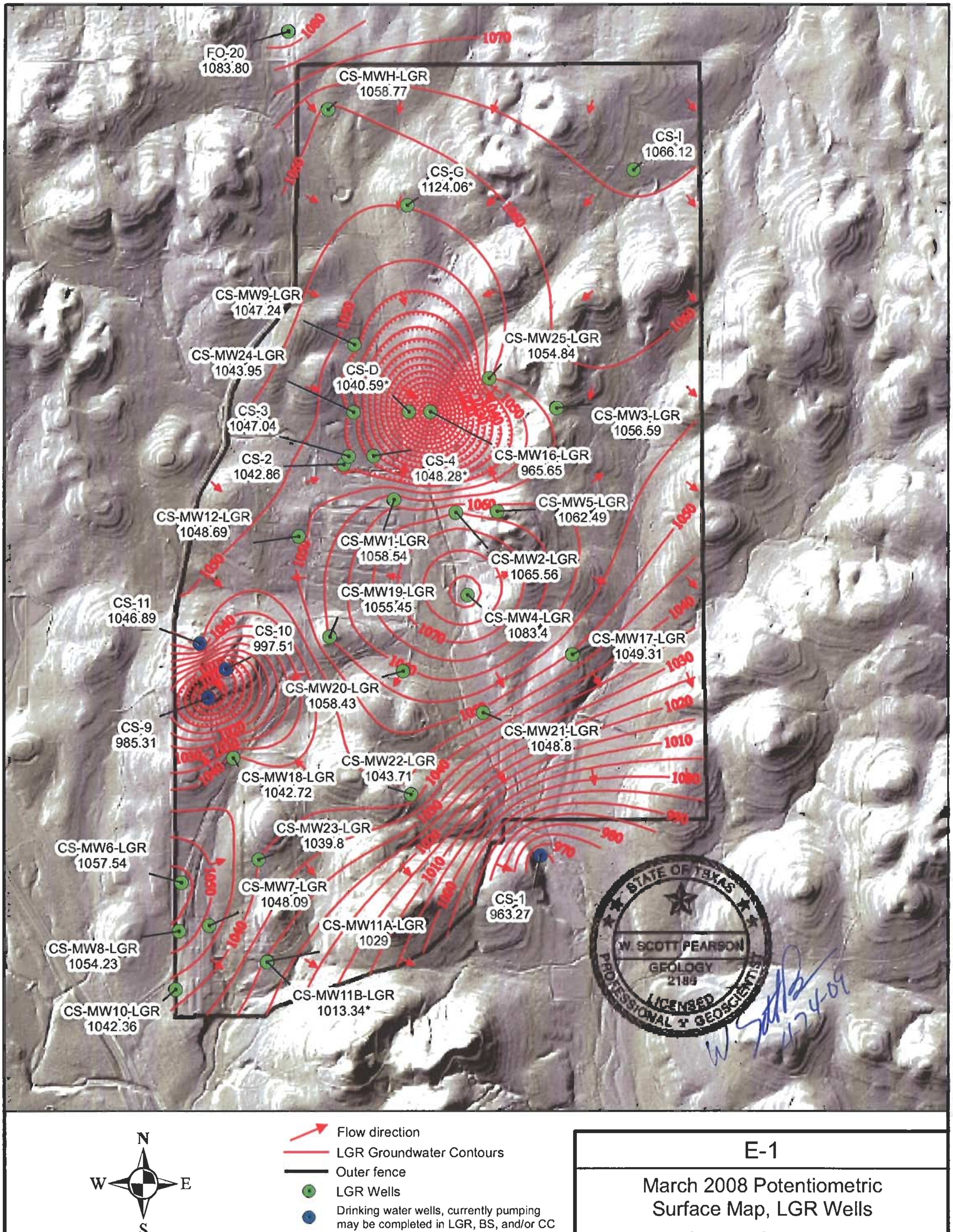
- **Stage 5 - *Emergency Shortage*** – Two trigger events for this stage:

    1. The drawdown in CS-10 reaches 475 ft. That leaves 50 ft of groundwater above the pump. (CS-10 pump is set at 525 ft bgl). The pump drawdown can be measured using the CSSA SCADA system. *(The current drawdown at CS-10 after 2 hours of pumping is ~36 ft or 416 ft bgl).*
    2. Mechanical/technical problems leave only one viable well active.

CS-10 is our most productive well. Under almost any conditions, it can sustain approximately 90-100 gallons per minute (gpm). CS-9 also pumps at 90-100 gpm, but is severely limited during drought conditions. CS-1 may be our most reliable well. It pumps at 70-80 gpm and tends to have higher ground water water levels.

APPENDIX E

POTENTIOMETRIC MAPS FOR MARCH, JUNE, SEPTEMBER, DECEMBER 2008



Flow direction
LGR Groundwater Contours
Outer fence
LGR Wells
Drinking water wells, currently pumping may be completed in LGR, BS, and/or CC

* Not a fully penetrating well into LGR. Groundwater elevation not used in contouring

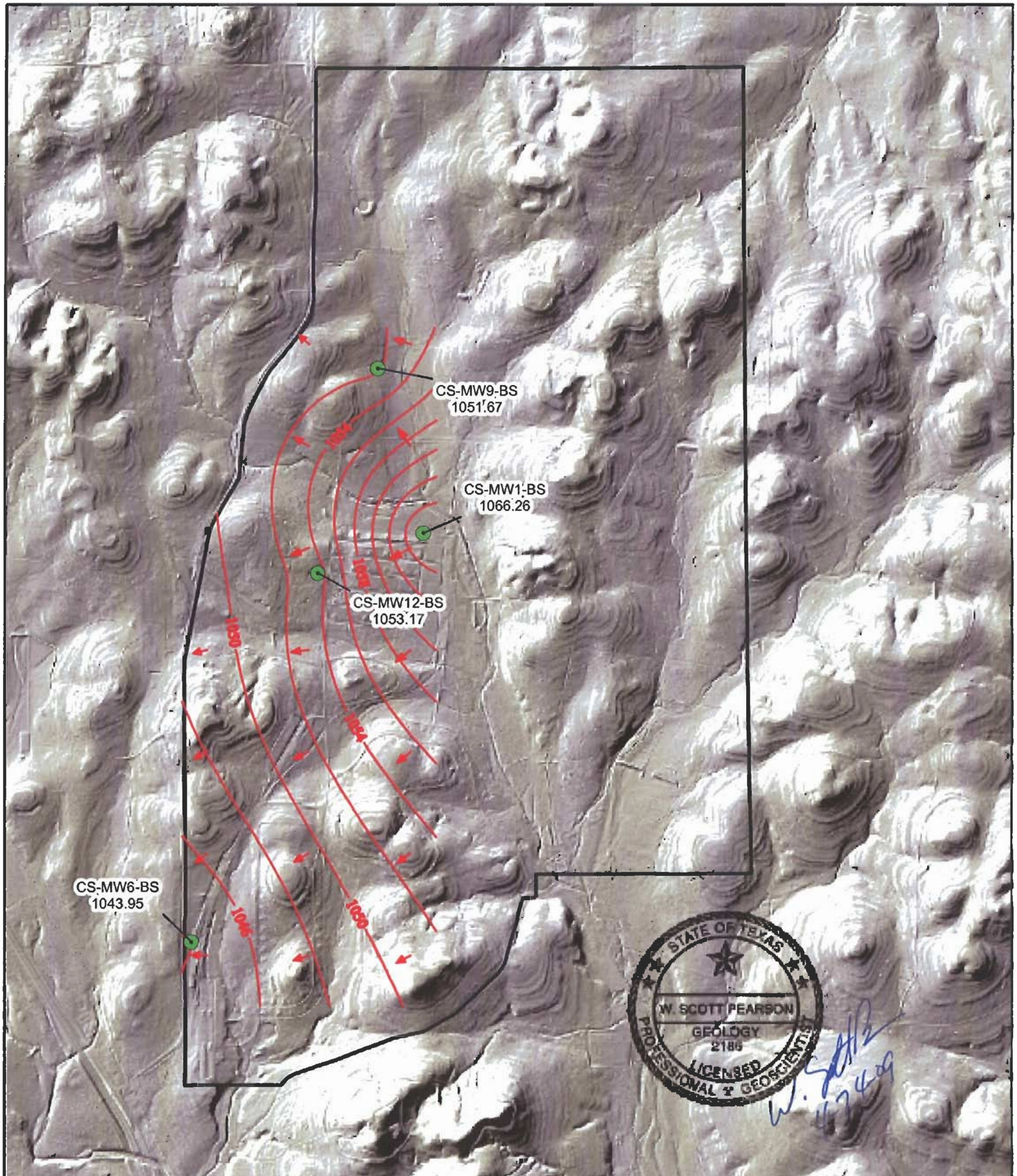
E-1

March 2008 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\Mar08_potentiometric_lgr.mxd - 4/21/2009 @ 2:45:28 PM



N
W E
S

0 1,200 2,400 3,600 4,800
Feet

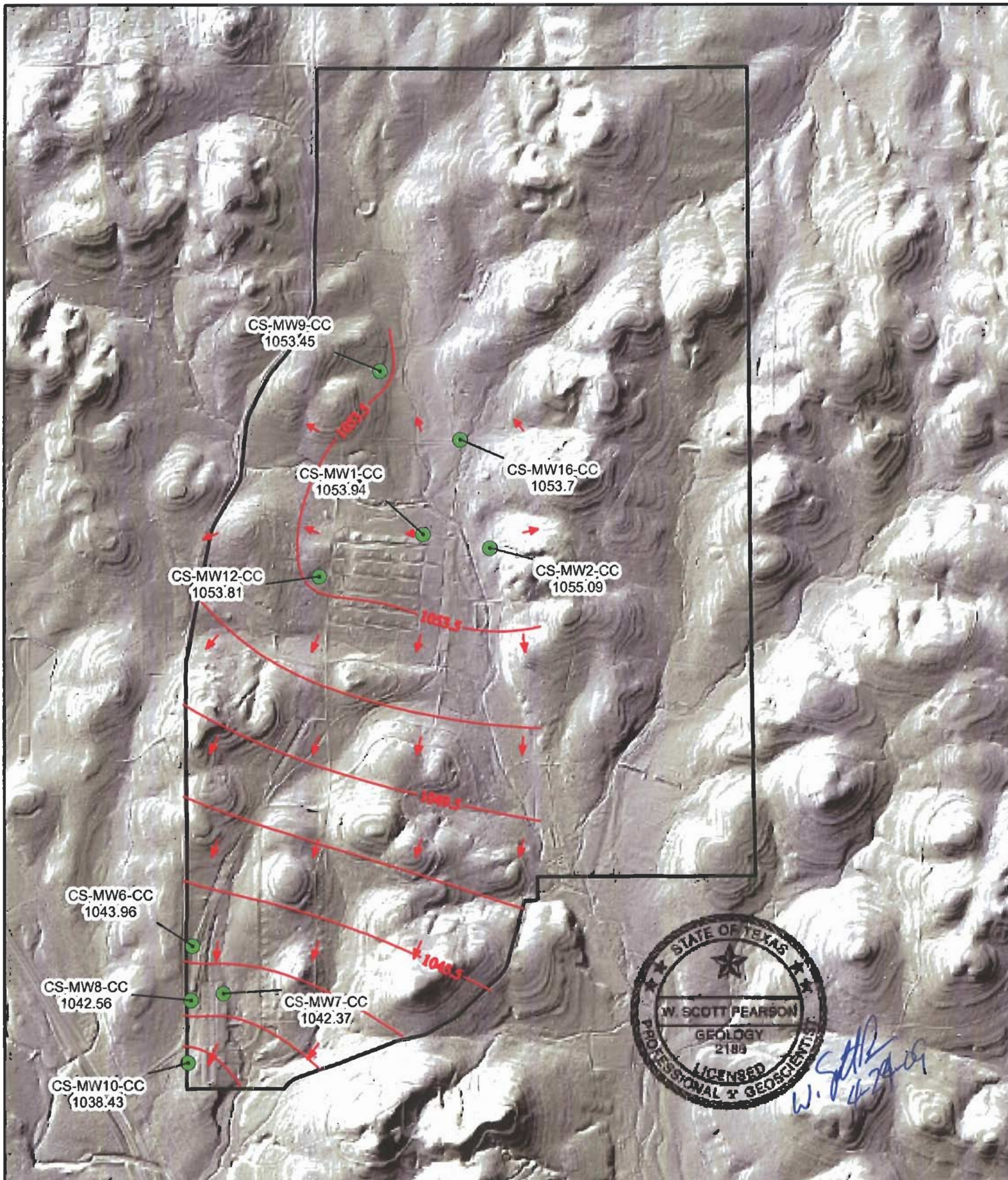
Flow direction
BS Groundwater Contours
Outer fence
BS Wells

E-2

March 2008 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

PARSONS



N
W E
S

0 1,200 2,400 3,600 4,800
Feet

- Flow direction
- CC Groundwater Contours
- Outer fence
- CC Wells

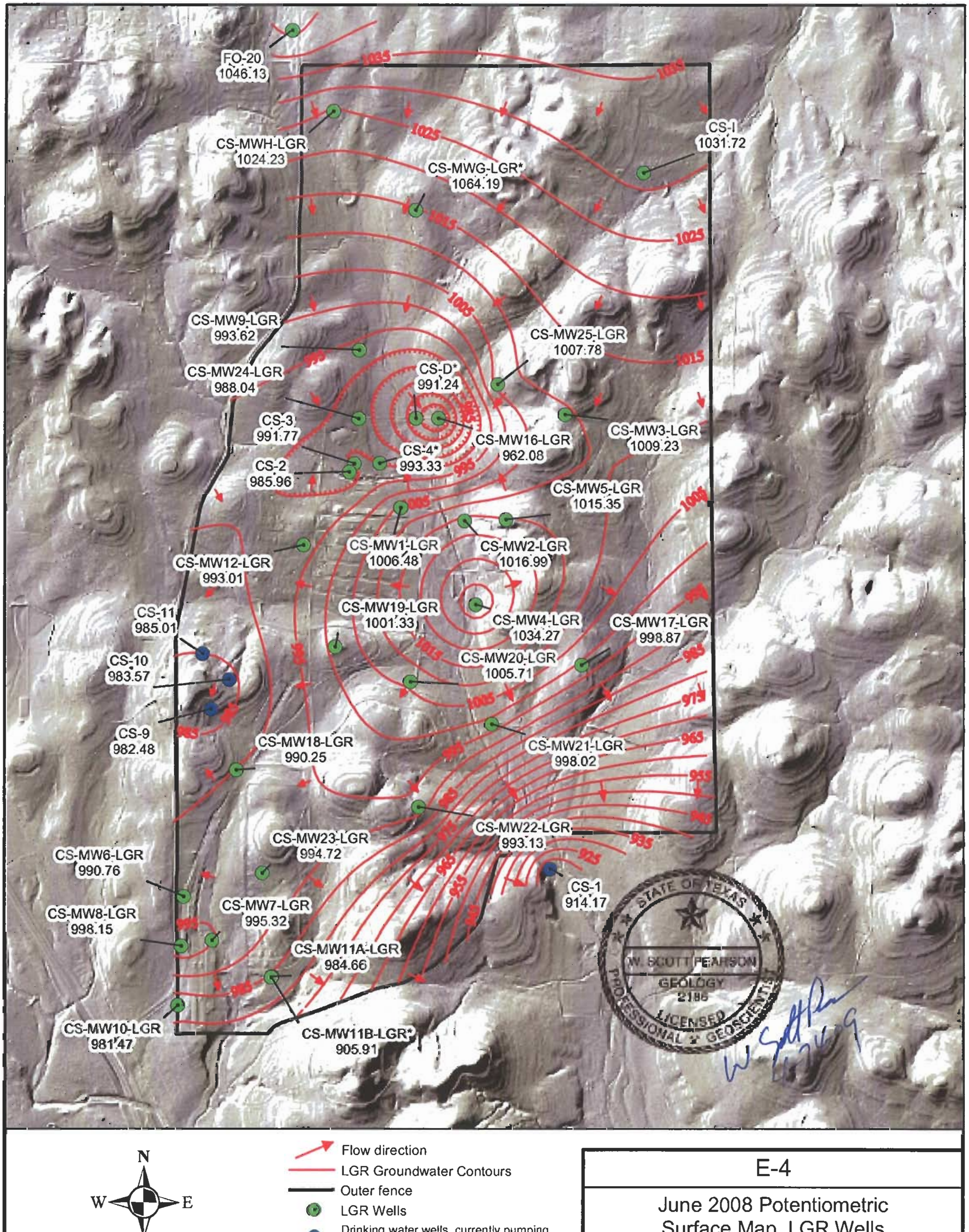
E-3

March 2008 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\Mar08_potentiometric_cc.mxd - 4/21/2009 @ 2:30:56 PM



Flow direction

LGR Groundwater Contours

Outer fence

LGR Wells

Drinking water wells, currently pumping may be completed in LGR, BS, and/or CC

* Not a fully penetrating well into LGR. Groundwater elevation not used in contouring

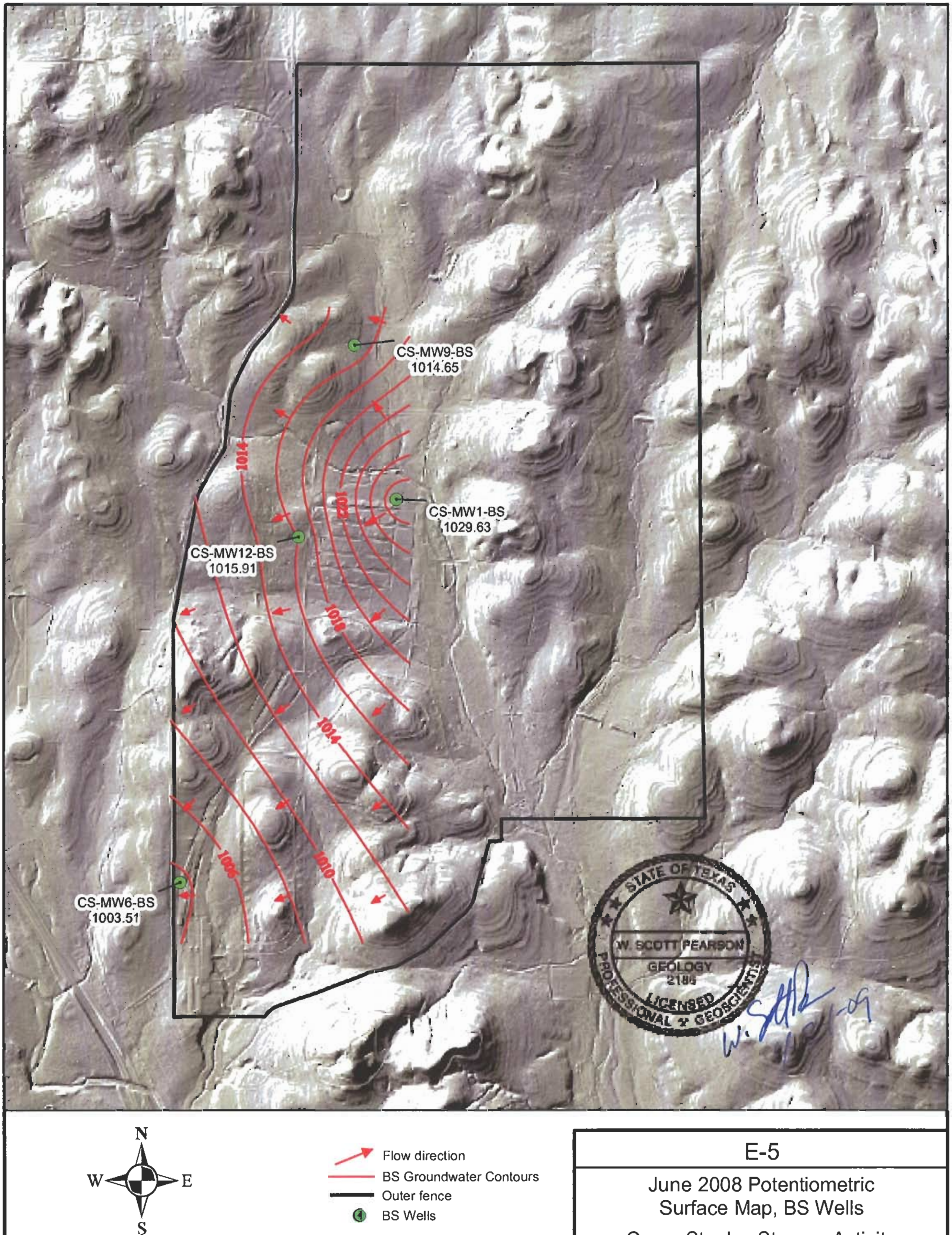
E-4

June 2008 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\June08_potentiometric_lgr.mxd - 4/21/2009 @ 3:02:53 PM



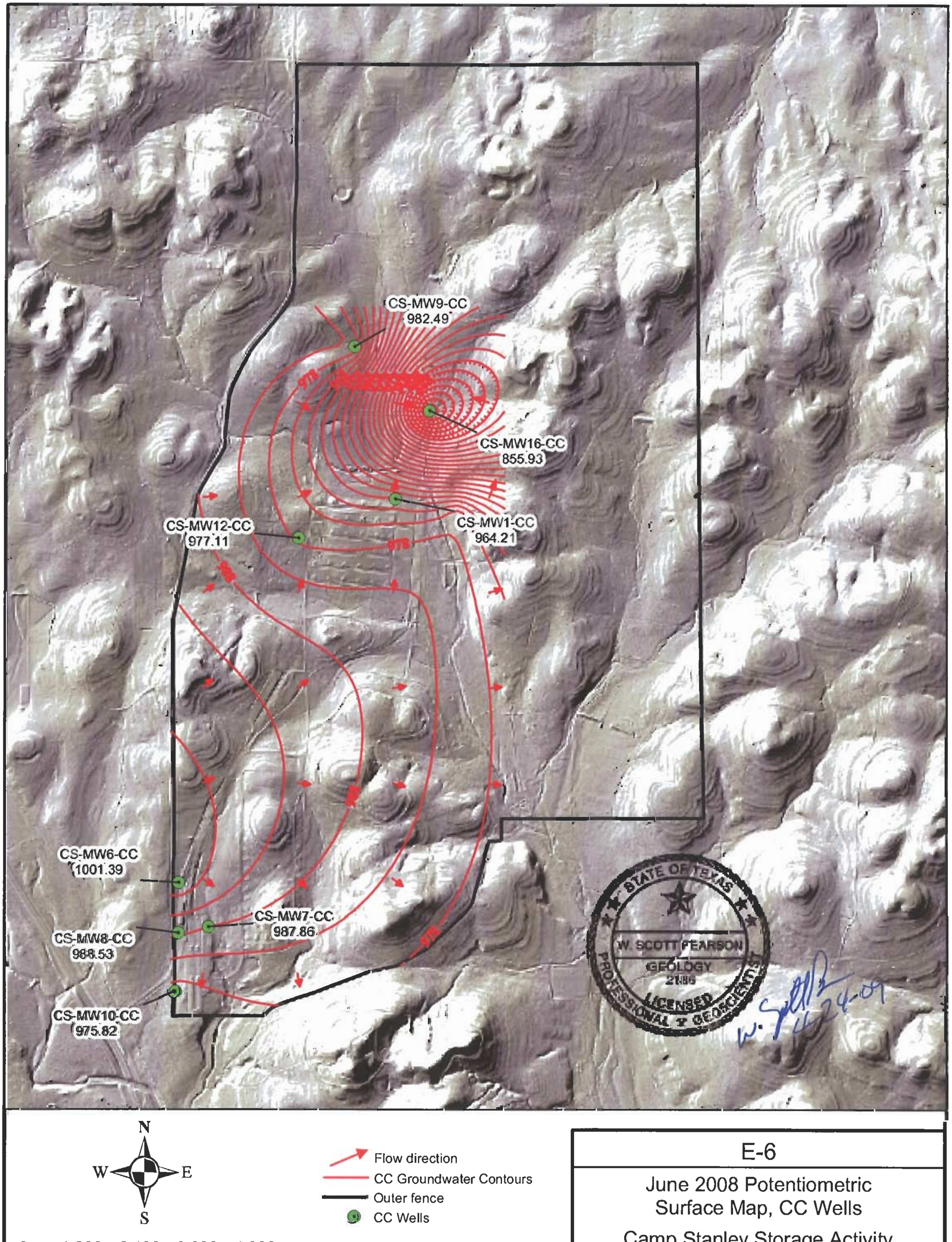
E-5

June 2008 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\June08_potentiometric_bs.mxd - 4/21/2009 @ 2:47:26 PM



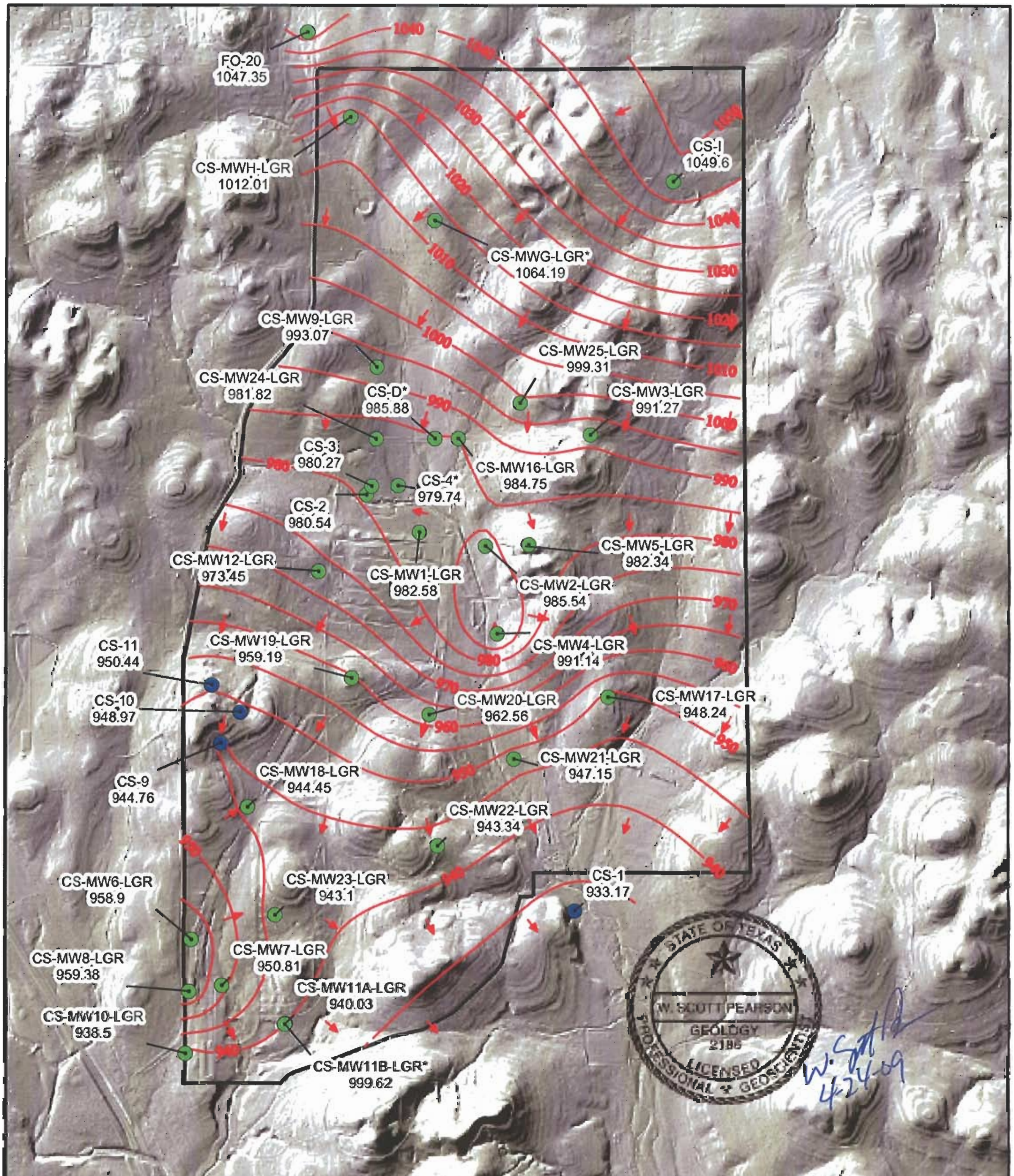
E-6

June 2008 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\June08_potentiometric_cc.mxd - 4/21/2009 @ 2:38:58 PM



N
W E
S

0 1,200 2,400 3,600 4,800 Feet

- Flow direction
- LGR Groundwater Contours
- Outer fence
- LGR Wells
- Drinking water wells, currently pumping may be completed in LGR, BS, and/or CC

* Not a fully penetrating well into LGR. Groundwater elevation not used in contouring

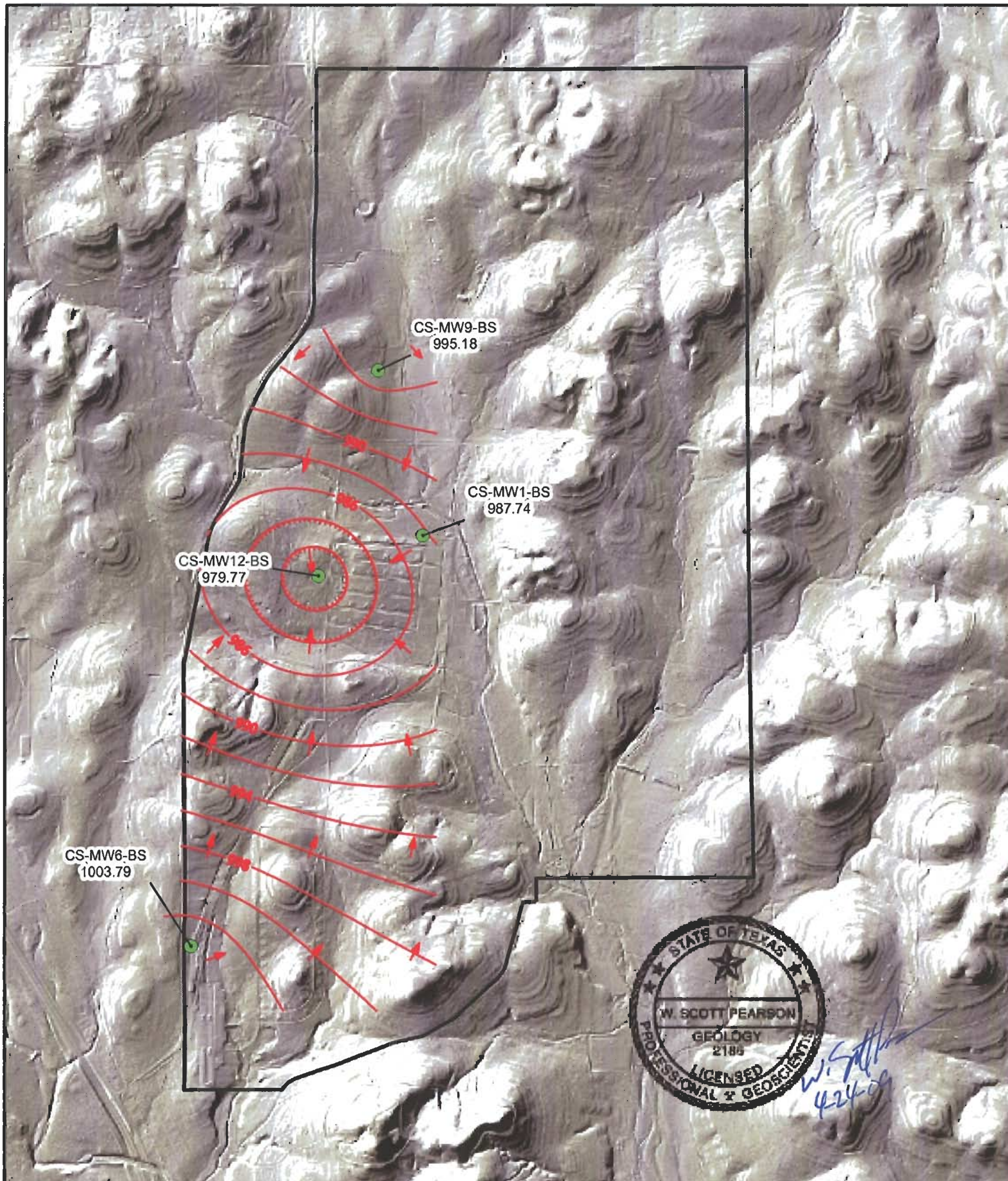
E-7

September 2008 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\Sept08_potentiometric_lgr.mxd - 4/21/2009 @ 3:24:33 PM



N
W E
S

0 1,250 2,500 3,750 5,000
Feet

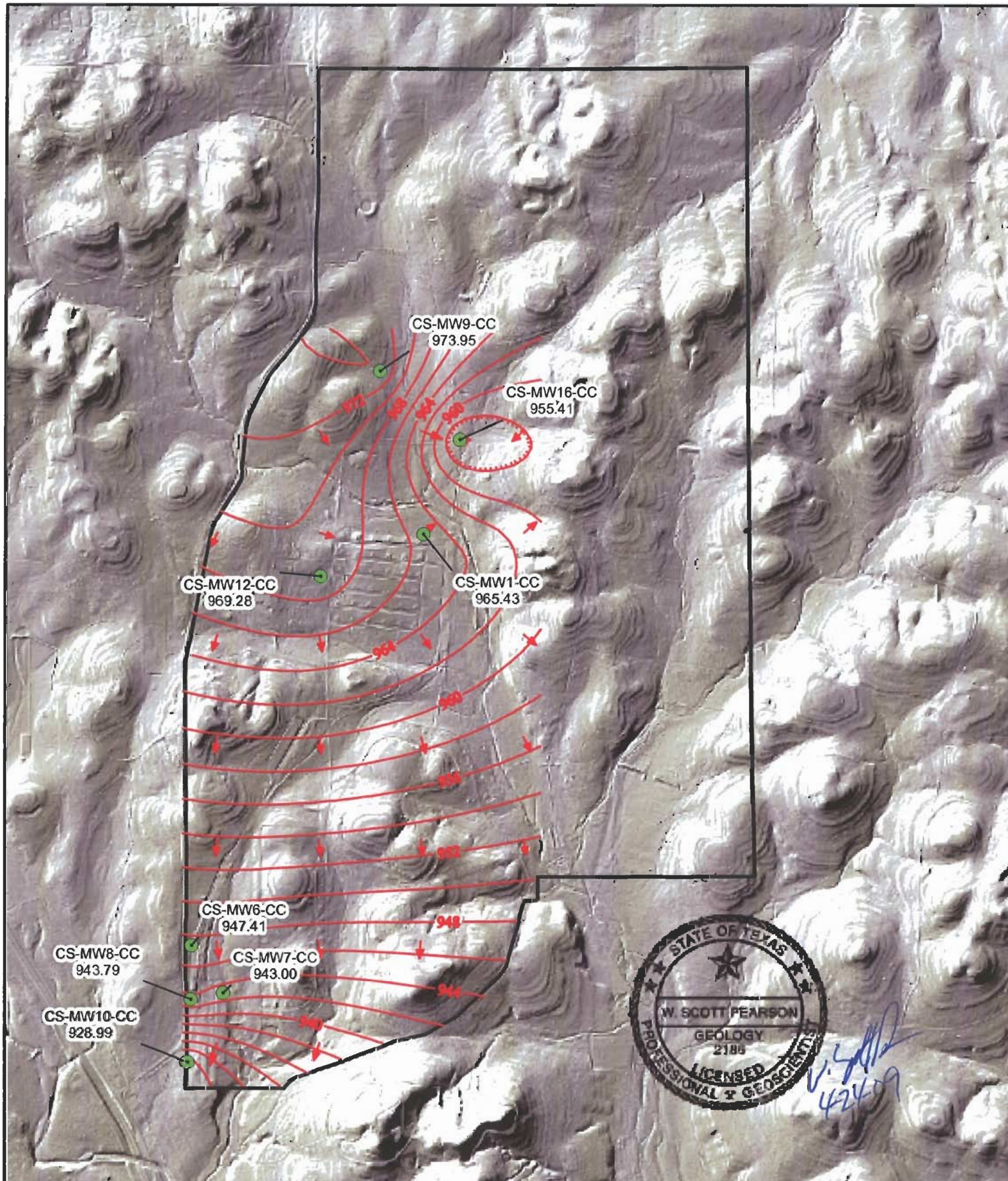
Flow direction
BS Groundwater Contours
Outer fence
BS Wells

E-8

September 2008 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

PARSONS



N
W E
S

0 1,200 2,400 3,600 4,800
Feet

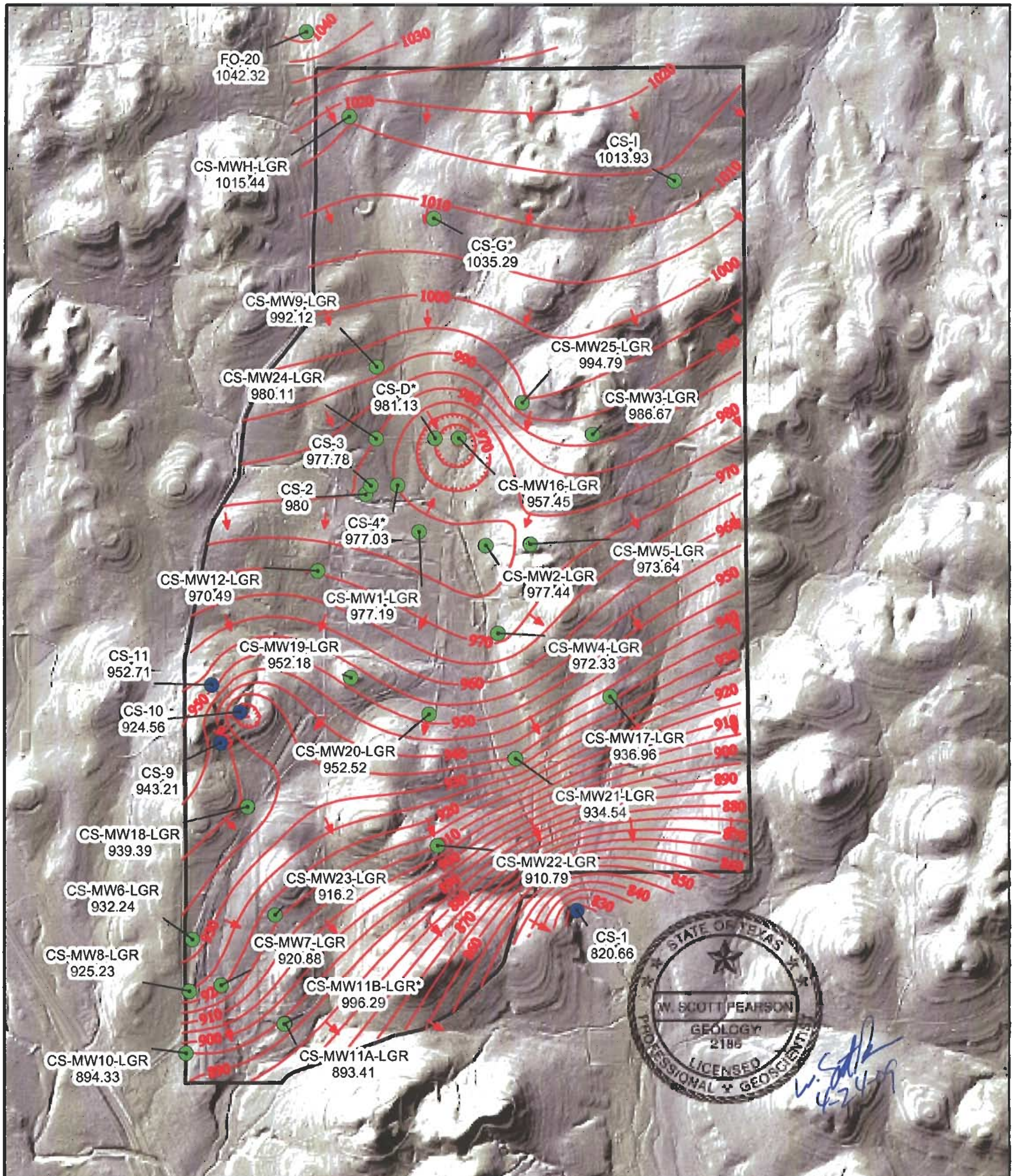
- Flow direction
- CC Groundwater Contours
- Outer fence
- CC Wells

E-9

September 2008 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

PARSONS



N
W E
S

0 1,200 2,400 3,600 4,800 Feet

- Flow direction
- LGR Groundwater Contours
- Outer fence
- LGR Wells
- Drinking water wells, currently pumping may be completed in LGR, BS, and/or CC

* Not a fully penetrating well into LGR. Groundwater elevation not used in contouring

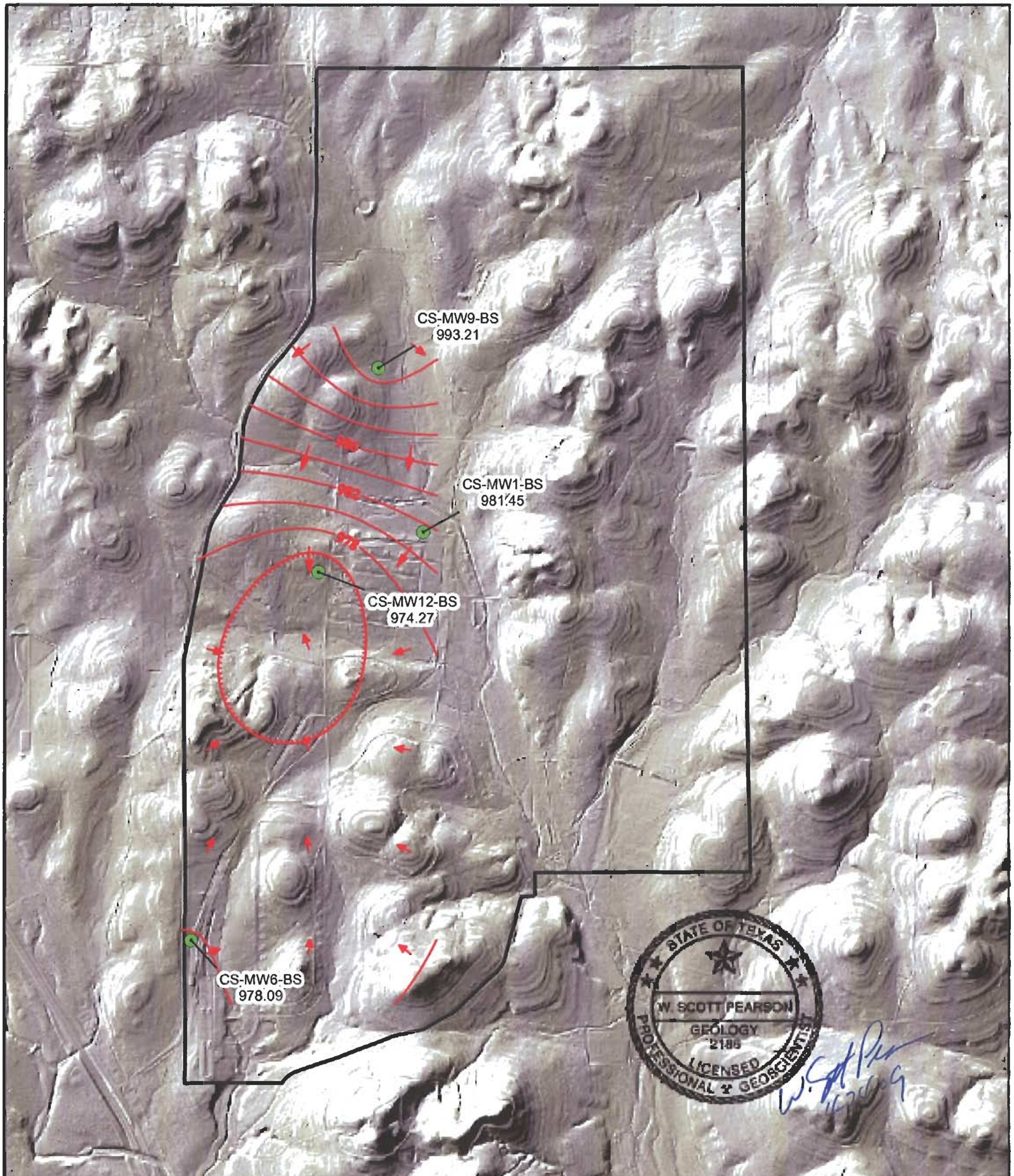
E-10

December 2008 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\Dec08_potentiometric_lgr.mxd - 4/21/2009 @ 3:39:28 PM



N
W E
S

0 1,200 2,400 3,600 4,800 Feet

Flow direction
BS Groundwater Contours
Outer fence
BS Wells

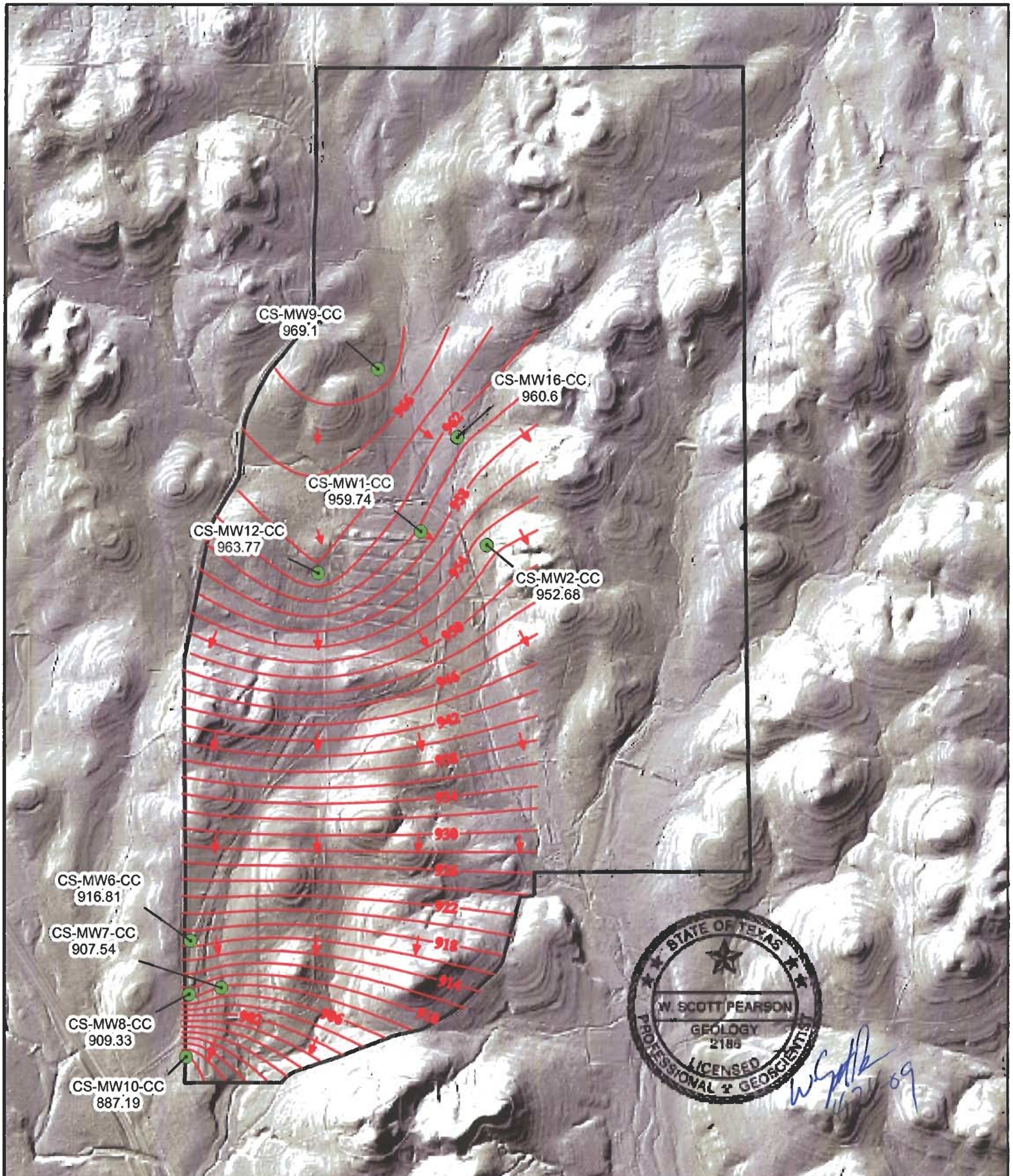
E-11

December 2008 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\Dec08_potentiometric_bs.mxd - 4/21/2009 @ 3:48:01 PM



N
W E
S

0 1,200 2,400 3,600 4,800 Feet

Flow direction
CC Groundwater Contours
Outer fence
CC Wells

E-12

December 2008 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\Dec08_potentiometric_cc.mxd - 4/21/2009 @ 3:52:38 PM

APPENDIX F

2008 QUARTERLY OFF-POST GROUNDWATER ANALYTICAL RESULTS

Appendix F
2008 Quarterly Off-Post Groundwater Monitoring Analytical Results

Well ID	Laboratory	Analytical Method	Sample Date	1,1-Dichloro-ethene (ug/L)	*cis* -1,2-Dichloro-ethene (ug/L)	*trans* -1,2-Dichloro-ethene (ug/L)	Tetra-chloroethene (ug/L)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)	pH	Temperature (°C)	Conductivity (mS/cm)
MCL	--		--	**7**	**70**	**100**	**5**	**5**	**2**	**Field Measurements**		
DOM-2	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.33	22.04	0.351
FO-8	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.97	22.04	0.526
FO-17	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.95	21.86	0.549
FO-22	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.00	22.42	0.568
FO-J1	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.90	21.89	0.549
Duplicate	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.90	21.89	0.549
	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.14	21.98	0.535
	APPL	SW8260B	9/4/2008	0.12U	0.07U	0.08U	**0.27F**	0.05U	0.08U	7.08	22.04	0.588
	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.01	21.85	0.396
HS-1	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	**0.2F**	0.05U	0.08U	7.01	22.53	0.558
	APPL	SW8260B	6/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.12	23.69	0.533
	APPL	SW8260B	9/10/2008	0.12U	0.07U	0.08U	**0.21F**	0.05U	0.08U	7.11	23.81	0.569
	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.26	23.39	0.436
HS-2	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	**0.17F**	0.05U	0.08U	7.00	22.05	0.530
	APPL	SW8260B	6/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.17	23.82	0.501
	APPL	SW8260B	9/10/2008	0.12U	0.07U	0.08U	**0.12F**	0.05U	0.08U	7.05	23.38	0.68
	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.14	23.49	0.41
HS-3	APPL	SW8260B	6/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.16	24.16	0.534
I10-2	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.98	22.12	0.544
I10-4	APPL	SW8260B	12/10/2008	0.12U	0.07U	0.08U	**5.92**	**2.24**	0.08U	7.21	19.57	0.568
I10-7	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.19	22.14	0.546
	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.03	21.93	0.520
	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.02	22.32	0.592
Duplicate	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.02	22.32	0.592
	APPL	SW8260B	12/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.12	22.27	0.598
I10-8	APPL	SW8260B	12/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.01	22.55	0.597
Duplicate	APPL	SW8260B	12/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.01	22.55	0.597
JW-5	APPL	SW8260B	3/5/2008	0.12U	0.07U	0.08U	**0.11F**	0.05U	0.08U	7.24	18.15	0.477
	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.03	24.29	0.493
	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.21	25.63	0.564
	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.08	15.36	0.389
Duplicate	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.08	15.36	0.389
JW-6	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.01	21.71	0.514
JW-7	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	**0.26F**	0.05U	0.08U	6.92	20.64	0.501
	APPL	SW8260B	6/6/2008	0.12U	0.07U	0.08U	**0.38F**	0.05U	0.08U	7.04	20.94	0.533
	APPL	SW8260B	9/4/2008	0.12U	0.07U	0.08U	**0.54F**	0.05U	0.08U	6.95	21.2	0.567
	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	**0.58F**	0.05U	0.08U	7.18	20.92	0.389
JW-8	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	**0.29F**	0.05U	0.08U	6.78	21.19	0.527
	APPL	SW8260B	6/5/2008	0.12U	0.07U	0.08U	**0.30F**	0.05U	0.08U	7.11	21.11	0.553
	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.27	21.77	0.584
	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.97	20.87	0.395
Duplicate	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.97	20.87	0.395
JW-9	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.94	21.53	0.529
Duplicate	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.94	21.53	0.529
JW-12	APPL	SW8260B	6/6/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.97	21.64	0.626
JW-13	APPL	SW8260B	6/5/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.08	22.41	0.532

Appendix F
2008 Quarterly Off-Post Groundwater Monitoring Analytical Results

Well ID	Laboratory	Analytical Method	Sample Date	1,1-Dichloro-ethene (ug/L)	*cis* -1,2-Dichloro-ethene (ug/L)	*trans* -1,2-Dichloro-ethene (ug/L)	Tetra-chloroethene (ug/L)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)	pH	Temperature (°C)	Conductivity (mS/cm)
MCL	--		--	**7**	**70**	**100**	**5**	**5**	**2**	**Field Measurements**		
JW-14	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.93	21.63	0.590
	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.08	22.03	0.568
	APPL	SW8260B	9/4/2008	0.12U	0.07U	0.08U	**0.11F**	0.05U	0.08U	7.07	22.05	0.645
	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.02	22.12	0.404
JW-15	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.00	20.90	0.534
JW-27	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	**0.12F**	0.05U	0.08U	7.07	20.86	0.564
Duplicate	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	**0.07F**	0.05U	0.08U	7.07	20.86	0.564
	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.94	20.97	0.549
	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.88	21.11	0.628
	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.00	21.09	0.439
JW-28	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.95	21.51	0.566
	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.06	21.81	0.639
	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.84	21.71	0.446
JW-29	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	**0.1F**	0.05U	0.08U	6.92	21.18	0.580
	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.92	21.18	0.560
	APPL	SW8260B	9/4/2008	0.12U	0.07U	0.08U	**0.13F**	0.05U	0.08U	6.85	22.26	0.636
	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.83	19.7	0.439
JW-30	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	**0.16F**	0.05U	0.08U	6.90	20.95	0.533
	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.03	21.35	0.515
	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.11	22.66	0.587
Duplicate	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.11	22.66	0.587
	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.96	20.99	0.409
LS-1	APPL	SW8260	6/5/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.49	26.13	0.433
	APPL	SW8260B	9/5/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.41	28.05	0.510
	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	**0.62F**	**0.2F**	0.08U	7.16	19.35	0.436
LS-4	APPL	SW8260B	6/5/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.28	22.96	0.606
Duplicate	APPL	SW8260B	6/5/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.28	22.96	0.606
	APPL	SW8260B	9/5/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.10	23.04	0.674
	APPL	SW8260B	12/5/2008	0.12U	0.07U	0.08U	**0.12F**	0.05U	0.08U	7.16	20.01	0.509
LS-5	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	**0.85F**	0.08U	6.84	21.67	0.727
	APPL	SW8260B	6/2/2008	0.12U	0.07U	0.08U	**0.82F**	**1.4**	0.08U	7.07	22.26	0.688
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	**0.64F**	**1.84**	0.08U	6.9	22.55	0.713
	APPL	SW8260B	12/1/2008	0.12U	0.07U	0.08U	**0.96F**	**2.12**	0.08U	6.96	21.37	0.692
LS-6	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	**1.27F**	0.05U	0.08U	6.90	21.73	0.654
	APPL	SW8260B	6/2/2008	0.12U	0.07U	0.08U	**1.68**	0.05U	0.08U	6.86	22.45	0.646
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	**0.99F**	**1.07**	0.08U	7.03	22.23	0.673
	APPL	SW8260B	12/1/2008	0.12U	0.07U	0.08U	**1.11F**	**1.00**	0.08U	6.95	22.08	0.662
LS-6-A2	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
LS-7	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	**2.05**	**0.43F**	0.08U	7.06	22.54	0.651
	APPL	SW8260B	6/2/2008	0.12U	0.07U	0.08U	**2.78**	0.05U	0.08U	6.90	22.57	0.636
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	**2.27**	**0.39F**	0.08U	6.72	22.70	0.673
	APPL	SW8260B	12/1/2008	0.12U	0.07U	0.08U	**2.14**	**0.38F**	0.08U	6.84	22.56	0.669
LS-7-A2	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA

Appendix F
2008 Quarterly Off-Post Groundwater Monitoring Analytical Results

Well ID	Laboratory	Analytical Method	Sample Date	1,1-Dichloro-ethene (ug/L)	*cis*-1,2-Dichloro-ethene (ug/L)	*trans*-1,2-Dichloro-ethene (ug/L)	Tetra-chloroethene (ug/L)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)	pH	Temperature (°C)	Conductivity (mS/cm)
MCL	--		--	7	70	100	5	5	2	Field Measurements		
OFR-1	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	**0.26F**	0.05U	0.08U	7.09	21.50	0.547
	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.06	21.83	0.522
Duplicate	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.06	21.83	0.522
	APPL	SW8260B	9/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.98	21.79	0.593
	APPL	SW8260B	12/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.02	21.90	0.600
OFR-3	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	**4.41**	**3.38**	0.08U	6.92	21.79	0.563
	APPL	SW8260B	6/2/2008	0.12U	0.07U	0.08U	**6.56**	**5.5**	0.08U	7.02	22.68	0.566
	APPL	SW8260B	9/2/2008	0.12U	**0.11F**	0.08U	**7.59**	**4.61**	0.08U	6.93	22.61	0.617
	APPL	SW8260B	12/1/2008	0.12U	0.07U	0.08U	**4.54**	**3.66**	0.08U	7.06	21.93	0.607
OFR-3-A2	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
OFR-4	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.91	22.00	0.530
RFR-3	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.05	21.32	0.387
RFR-4	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.98	21.87	0.612
Duplicate	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.98	21.87	0.612
	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	6.82	20.91	0.453
RFR-5	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.15	20.92	0.544
	APPL	SW8260B	12/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.05	21.70	0.395
RFR-8	APPL	SW8260	6/5/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.14	22.40	0.531
RFR-9	APPL	SW8260B	9/9/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.03	22.65	0.526
RFR-10	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	**4.43**	**3.27**	0.08U	6.93	22.20	0.672
	APPL	SW8260B	6/2/2008	0.12U	0.07U	0.08U	**13.63**	**6.87**	0.08U	7.02	22.80	0.610
Duplicate	APPL	SW8260B	6/2/2008	0.12U	0.07U	0.08U	**13.11**	**6.93**	0.08U	7.02	22.80	0.610
	APPL	SW8260B	9/2/2008	0.12U	**0.46F**	0.08U	**5.94**	**3.5**	0.08U	7.00	23.08	0.687
	APPL	SW8260B	12/1/2008	0.12U	**0.28F**	0.08U	**7.59**	**2.97**	0.08U	7.18	22.59	0.693
RFR-10-A2	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
RFR-10-B2	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
RFR-11	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	**0.08F**	0.08U	6.91	22.17	0.601
	APPL	SW8260B	6/2/2008	0.12U	0.07U	0.08U	**0.88F**	**1.28**	0.08U	7.02	23.96	0.853
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	**0.34F**	**1.61**	0.08U	7.12	22.90	0.601
	APPL	SW8260B	12/1/2008	0.12U	0.07U	0.08U	0.06U	**2.15**	0.08U	7.02	23.7	0.608
RFR-11-A2	APPL	SW8260B	3/3/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
	APPL	SW8260B	9/2/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	NA	NA	NA
RFR-12	APPL	SW8260B	3/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.00	22.44	0.547
RFR-13	APPL	SW8260B	6/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.21	26.42	0.513
RFR-14	APPL	SW8260B	3/6/2008	0.12U	0.07U	0.08U	**0.18F**	0.05U	0.08U	6.93	20.96	0.521
	APPL	SW8260B	6/5/2008	0.12U	0.07U	0.08U	**0.26F**	0.05U	0.08U	7.15	24.03	0.558
	APPL	SW8260B	9/4/2008	0.12U	0.07U	0.08U	**0.27F**	0.05U	0.08U	7.07	23.62	0.586
Duplicate	APPL	SW8260B	9/4/2008	0.12U	0.07U	0.08U	**0.23F**	0.05U	0.08U	7.07	23.62	0.586
	APPL	SW8260B	12/4/2008	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U	7.14	19.51	0.396

Bold	= Above the MDL (F flagged)
Bold (boxed)	= Above the RL
Bold (shaded)	= Above the MCL

Notes:
- ug/L = micrograms per liter
- F = The analyte was positively identified but the associated numerical value is below the RL.
- J = The analyte was positively identified below quantitation limits; the quantitation is an estimate.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- NA = Not analyzed for this parameter.
- All VOCs analyzed by method SW 8260B
- APPL = Agriculture & Priority Pollutants Laboratories, Inc. of Clovis, CA

APPENDIX G

PRE- AND POST-GAC SAMPLE COMPARISONS FOR WELLS LS-6, LS-7, RFR-10, RFR-11 AND OFR-3

APPENDIX G
PRE- AND POST-GAC SAMPLE COMPARISONS FOR WELLS LS-6, LS-7, RFR-10, RFR-11 AND OFR-3

LS-6					LS-7				
	PCE (µg/L)		TCE (µg/L)			PCE (µg/L)		TCE (µg/L)	
Date	Pre	Post	Pre	Post	Date	Pre	Post	Pre	Post
3/3/2008	1.27	ND	ND	ND	3/3/2008	2.05	ND	0.43F	ND
6/2/2008	1.68	NA	ND	NA	6/2/2008	2.78	NA	--	NA
9/2/2008	0.99	ND	1.07	ND	9/2/2008	2.27	ND	0.39F	ND
12/1/2008	1.11	NA	1.00	NA	12/1/2008	2.14	NA	0.38F	NA

OFR-3					RFR-11				
	PCE (µg/L)		TCE (µg/L)			PCE (µg/L)		TCE (µg/L)	
Date	Pre	Post	Pre	Post	Date	Pre	Post	Pre	Post
3/3/2008	4.41	ND	3.38	ND	3/3/2008	ND	ND	0.08	ND
6/2/2008	6.56	NA	5.5	NA	6/2/2008	0.88	NA	1.28	NA
9/2/2008	7.59	ND	4.61	ND	9/2/2008	0.34	ND	1.61	ND
12/1/2008	4.54	NA	3.66	NA	12/1/2008	ND	NA	2.15	NA

RFR-10				
	PCE (µg/L)		TCE (µg/L)	
Date	Pre	Post	Pre	Post
3/3/2008	4.43	ND/ND	3.27	ND/ND
6/2/2008 & FD	13.63/13.11	NA/NA	6.87/6.93	NA/NA
9/2/2008	5.94	ND/ND	3.5	ND/ND
12/1/2008	7.59	NA/NA	2.97	NA/NA

NA – not applicable (post-GAC not sampled during this event) ND – indicates analyte was not detected at or above the MDL.
FD – field duplicate sample collected