FINAL

2007 ANNUAL GROUNDWATER REPORT

Prepared For

Department of the Army
Camp Stanley Storage Activity
Boerne, Texas

January 2009

GEOSCIENTIST CERTIFICATION

2007 Annual Groundwater Monitoring Report

For

Department of the Army

Camp Stanley Storage Activity

Boerne, Texas

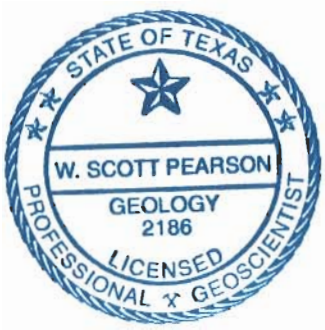
I, W. Scott Pearson, P.G., hereby certify that the 2007 Annual Groundwater Monitoring Report for the Camp Stanley Storage Activity installation in Boerne, Texas accurately represents the site conditions of the subject area. This certification is limited only to geoscientific products contained in the 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 TestAmerica (formerly known as STL), and field data obtained during groundwater monitoring conducted at the site in 2007, and is true and accurate to the best of my knowledge and belief.

W. Scott Pearson

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

1-29-09

Date



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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 2007 at Camp Stanley Storage Activity (CSSA). Groundwater monitoring was performed on-post and off-post during the months of March, June, September, and December 2007. 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 2007.

- 2007 was a wet year, with 53.17 inches of rain recording at CSSA (the annual average was 34.72 inches for 2000 through 2006). In fact, the CSSA 2007 rainfall total is greater than the maximum recorded annual rainfall recorded by the National Weather Service since 1907.

- Correspondingly, water levels in all three formations monitored at CSSA, the Lower Glen Rose, Bexar Shale, and the Cow Creek had increased by nearly 200 feet by October 2007, and remained more than 140 feet above the 2006 levels in December 2007.

- A total of 85 samples were collected from 46 on-post wells. Contaminant concentrations above drinking water standards were detected at 11 on-post wells. Four wells (MW16-LGR, MW16-CC, CS-D, MW1-LGR) exceeded drinking water standards for volatile organic compounds (VOCs) and seven wells (CS-9, CS-11, MW2-CC, MW9-BS, MW22-LGR, MW23-LGR, MW25-LGR) exceeded drinking water standards for metals. In 2006, 43 on-post wells were sampled and the same four wells exceeded MCLs for VOC.

- A total of 114 samples were collected from 42 off-post wells. VOC concentrations above drinking water standards were detected at 3 off-post wells (OFR-3, RFR-10, RFR-11). These three wells had GAC units installed in 2001. 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. In 2006, 47 off-post wells were sampled and only one well (RFR-10) exceeded MCLs for VOCs.

1.0 INTRODUCTION

This report provides an evaluation of results from groundwater monitoring conducted in 2007 at CSSA. Groundwater monitoring was performed on-post and off-post during the months of March, June, September, and December 2007. All wells considered for sampling in 2007 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 2007.

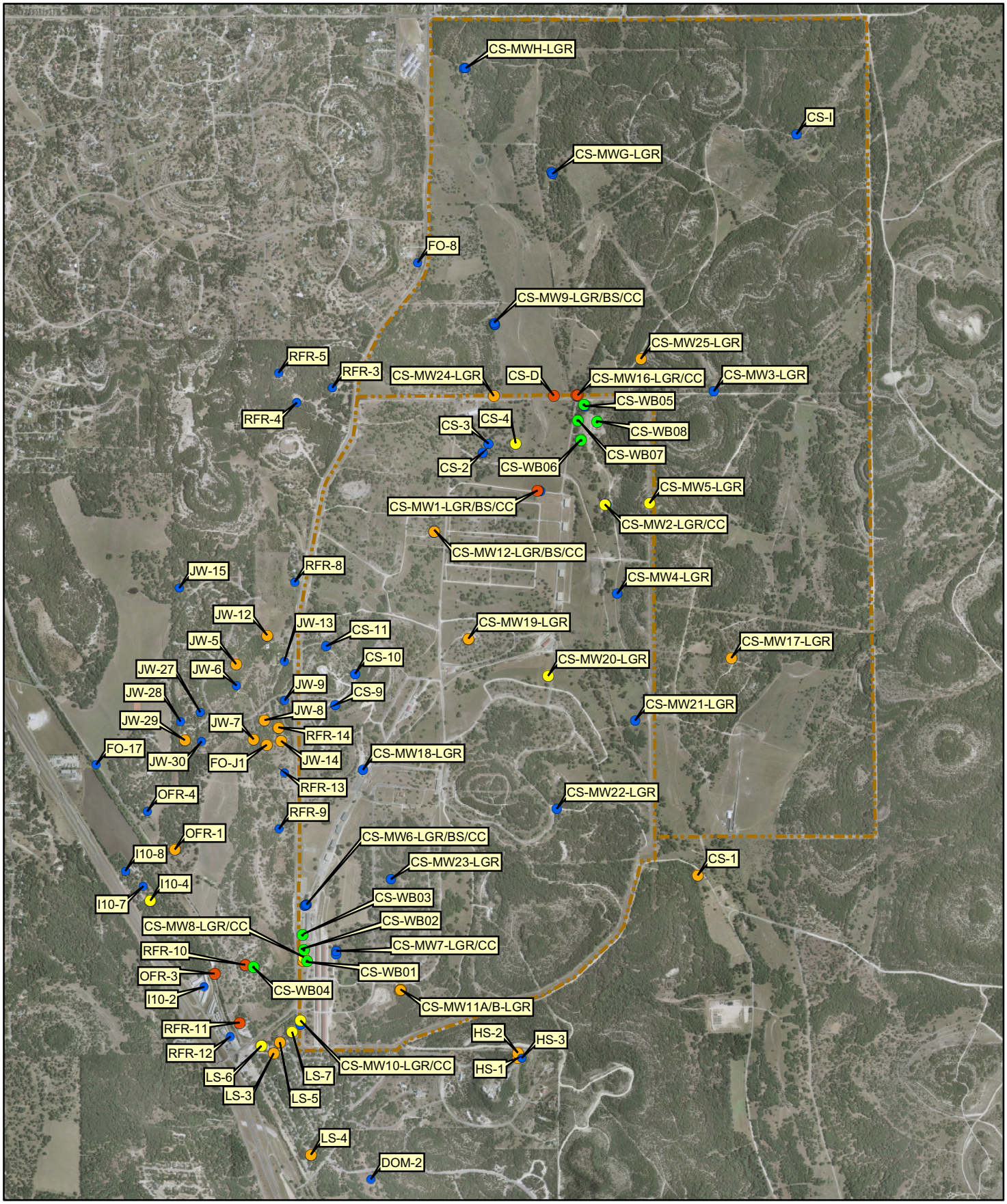
Groundwater monitoring conducted in 2007 was scoped under the Air Force Center for Engineering and the Environment (AFCEE) 4P/AE Contract 41624-03-D-8613, Task Order (TO) TO0207 for the March and June events. In September and December 2007 the groundwater monitoring was contracted by the U.S. Army Corps of Engineers (USACE) Fort Worth District (CESWF), Contract W91278-06-D-0026, Task Order (TO) DY02. This contract is 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 2007 was conducted in compliance with the applicable CSSA QAPP, DQOs, and Work Plans.



N
W E
S

0 2,000 4,000 Feet

2007 Sampled Wells

- Wells with VOC concentration > MCL
- Wells with VOC concentration between RL and MCL
- Wells with VOC concentration below RL
- Other Non-detect Wells
- Multi-Port Westbay Wells
- CSSA Fenceline

Figure 1.1

2007 Sampled On-Post and Off-Post Ground Water Wells Camp Stanley Storage Activity

PARSONS

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A comprehensive summary of the results from the 2007 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** discusses the activities and findings associated with the CS-9 well rehabilitation activities, and **Appendix E** includes the potentiometric groundwater maps.

The laboratory data packages and associated data validation reports for 2007 were submitted to AFCEE and 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 2007 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 2007 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 6 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 increased approximately 141 feet from January through December 2007. The unusually high amounts of rainfall evident in the CSSA area in early 2007 is indicated by the average groundwater elevation increase of 182.09 feet shown in June. Water levels continued to increase until the December event where they fell 70.45 feet. The last significant rainfall of more than 1.0 inch in 2007 was September 4th with 1.08 inches of rainfall.

Based on 2007 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). Typically, water levels measured at CSSA decrease in elevation from the LGR to the BS to the CC. In 2007, although the quarterly snapshots of the groundwater elevations do not show this typical pattern the average of the four quarterly events do.

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. Wells in the vicinity of AOC-65 (CS-MW6, MW7, MW8, and MW10 clusters) show closer water levels between the LGR and CC than wells located northward (CS-MW1, CS-MW2, CS-MW9 and MW12 clusters).

2.1.2 Weather Station and Transducer Data

Of the 47 wells listed on **Table 2.1,** 28 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, Weather Station North (WS-N), adjacent to well CS-MW16-LGR in the north-central region of CSSA,

Table 2.1
Summary of Groundwater Elevations and Changes, 2007

						Groundwater Elevation Change				Formations Screened		
Well ID	TOC elevation (ft MSL)	March 2007 Elevations	June 2007 Elevations	September 2007 Elevations	December 2007 Elevations	March minus December 06	June minus March	September minus June	December minus September	LGR	BS	CC
CS-1+	**1169.27**	**851.17**	**1019.70**	**1075.07**	**1054.87**	**37.81**	**168.53**	**55.37**	**-20.20**	**ALL**		
CS-2	**1237.59**	**980.64**	**1185.56**	**1174.35**	**1080.68**	**0.40**	**204.92**	**-11.21**	**-93.67**	**?**	**?**	
CS-3	1240.17	979.59	1179.06	1174.36	1085.09	3.44	199.47	-4.70	-89.27	**X**		
CS-4	**1229.28**	**978.09**	**1178.55**	**1174.40**	**1086.25**	**2.60**	**200.46**	**-4.15**	**-88.15**	**?**	**?**	
CS-9+	**1325.31**	**944.91**	**1167.91**	**1172.31**	**NA**	**3.97**	**223.00**	**4.40**	**NA**	**ALL**		
CS-10+	**1331.51**	**908.32**	**1161.21**	**1174.59**	**1069.51**	**46.84**	**252.89**	**13.38**	**-105.08**	**ALL**		
CS-11**	**1332.49**	**954.41**	**1176.59**	**1185.74**	**1089.13**	**5.05**	**222.18**	**9.15**	**-96.61**	**ALL**		
CS-D	1236.03	984.71	1174.71	1173.58	1083.59	NA	190.00	-1.13	-89.99	**X**		
CS-MWG-LGR	1328.14	1043.57	1144.96	1151.37	1152.41	13.92	101.39	6.41	1.04	**X**		
CS-MWH-LGR	1319.19	1026.86	1160.60	1180.41	1121.81	11.02	133.74	19.81	-58.60	**X**		
CS-I	1315.20	1018.13	1153.39	1170.50	1108.70	4.80	135.26	17.11	-61.80		**X**	
CS-MW1-LGR+	1220.73	976.47	1174.63	1175.41	1094.43	3.00	198.16	0.78	-80.98			**X**
CS-MW1-BS+	1221.09	989.91	1083.40	1155.61	1115.72	12.60	93.49	72.21	-39.89	**X**		
CS-MW1-CC+	1221.39	982.57	1116.49	1153.07	1092.90	20.56	133.92	36.58	-60.17			
CS-MW2-LGR*	1237.08	975.66	1159.04	1176.05	1111.97	3.17	183.38	17.01	-64.08	**X**		
CS-MW2-CC*	1240.11	983.83	1093.56	1142.49	1092.66	23.77	109.73	48.93	-49.83	**X**		
CS-MW3-LGR	1334.14	984.07	1153.37	1168.26	1104.05	-0.39	169.30	14.89	-64.21	**X**		
CS-MW4-LGR*	1209.71	982.22	1178.38	1185.28	1144.72	16.23	196.16	6.90	-40.56	**X**		
CS-MW5-LGR	1340.24	972.74	1149.17	1173.24	1117.14	2.85	176.43	24.07	-56.10		**X**	
CS-MW6-LGR+	1232.25	943.08	1156.40	1164.24	1091.91	18.22	213.32	7.84	-72.33			**X**
CS-MW6-BS+	1232.67	999.76	1124.81	1157.33	1090.71	19.84	125.05	32.52	-66.62	**X**		
CS-MW6-CC+	1233.21	946.11	1126.15	1156.87	1089.09	NA	180.04	30.72	-67.78			**X**
CS-MW7-LGR	1202.27	934.87	1155.36	1160.37	1084.00	22.91	220.49	5.01	-76.37	**X**		
CS-MW7-CC	1201.84	936.96	1131.13	1154.36	1086.13	38.86	194.17	23.23	-68.23			**X**
CS-MW8-LGR	1208.35	939.85	1152.37	1159.85	1088.81	25.64	212.52	7.48	-71.04	**X**		
CS-MW8-CC	1206.13	938.73	1130.01	1154.53	1086.77	39.14	191.28	24.52	-67.76		**X**	
CS-MW9-LGR+	1257.27	992.03	1180.74	1172.29	1085.97	1.85	188.71	-8.45	-86.32			**X**
CS-MW9-BS+	1256.73	996.79	1136.73	1180.67	1098.27	5.62	139.94	43.94	-82.40	**X**		
CS-MW9-CC+	1255.95	987.13	1133.80	1158.61	1092.33	16.51	146.67	24.81	-66.28			**X**
CS-MW10-LGR+	1189.53	905.35	1143.64	1147.92	1080.78	30.67	238.29	4.28	-67.14	**X**		
CS-MW10-CC+	1190.04	908.07	1143.93	1149.13	1079.20	31.01	235.86	5.20	-69.93	**X**		
CS-MW11A-LGR*	1204.03	913.96	1147.42	1150.83	1068.42	33.20	233.46	3.41	-82.41	**X**		
CS-MW11B-LGR*	1203.52	NA	1129.27	1147.55	1060.97	NA	NA	18.28	-86.58		**X**	
CS-MW12-LGR+	1259.07	973.33	1175.57	1175.32	1087.86	5.01	202.24	-0.25	-87.46			**X**
CS-MW12-BS+	1258.37	983.65	1132.49	1178.93	1100.07	13.13	148.84	46.44	-78.86	**X**		
CS-MW12-CC+	1257.31	980.90	1130.13	1158.11	1093.03	18.94	149.23	27.98	-65.08			**X**
CS-MW16-LGR+	1244.60	983.45	1168.58	1174.04	1097.61	-0.11	185.13	5.46	-76.43	**X**		
CS-MW16-CC+	1244.51	984.02	1114.90	1151.06	1092.00	19.76	130.88	36.16	-59.06	**X**		
CS-MW17-LGR*	1257.01	939.91	1156.31	1169.56	1089.49	3.31	216.40	13.25	-80.07	**X**		
CS-MW18-LGR*	1283.61	938.39	1172.52	1173.06	1085.94	-1.27	234.13	0.54	-87.12	**X**		
CS-MW19-LGR*	1255.53	959.07	1173.02	1177.17	1099.73	7.82	213.95	4.15	-77.44	**X**		
CS-MW20-LGR	1209.42	961.03	1171.27	1177.60	1105.24	NA	210.24	6.33	-72.36	**X**		
CS-MW21-LGR	1184.53	939.54	1161.23	1171.76	1088.58	NA	221.69	10.53	-83.18	**X**		
CS-MW22-LGR	1280.49	935.30	1166.12	1170.20	1082.80	NA	230.82	4.08	-87.40	**X**		
CS-MW23-LGR	1258.20	929.98	1160.25	1163.05	1078.72	NA	230.27	2.80	-84.33	**X**		
CS-MW24-LGR	1253.90	982.02	1182.10	1173.37	1082.34	NA	200.08	-8.73	-91.03	**X**		
CS-MW25-LGR	1293.01	991.81	1161.24	1168.99	1095.86	NA	169.43	7.75	-73.13	**X**		
Average groundwater elevation change:						**14.53**	**182.09**	**15.56**	**-70.45**			
Groundwater elevation change since December 2006:						**141.73**						

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 above Mean Sea Level (MSL).

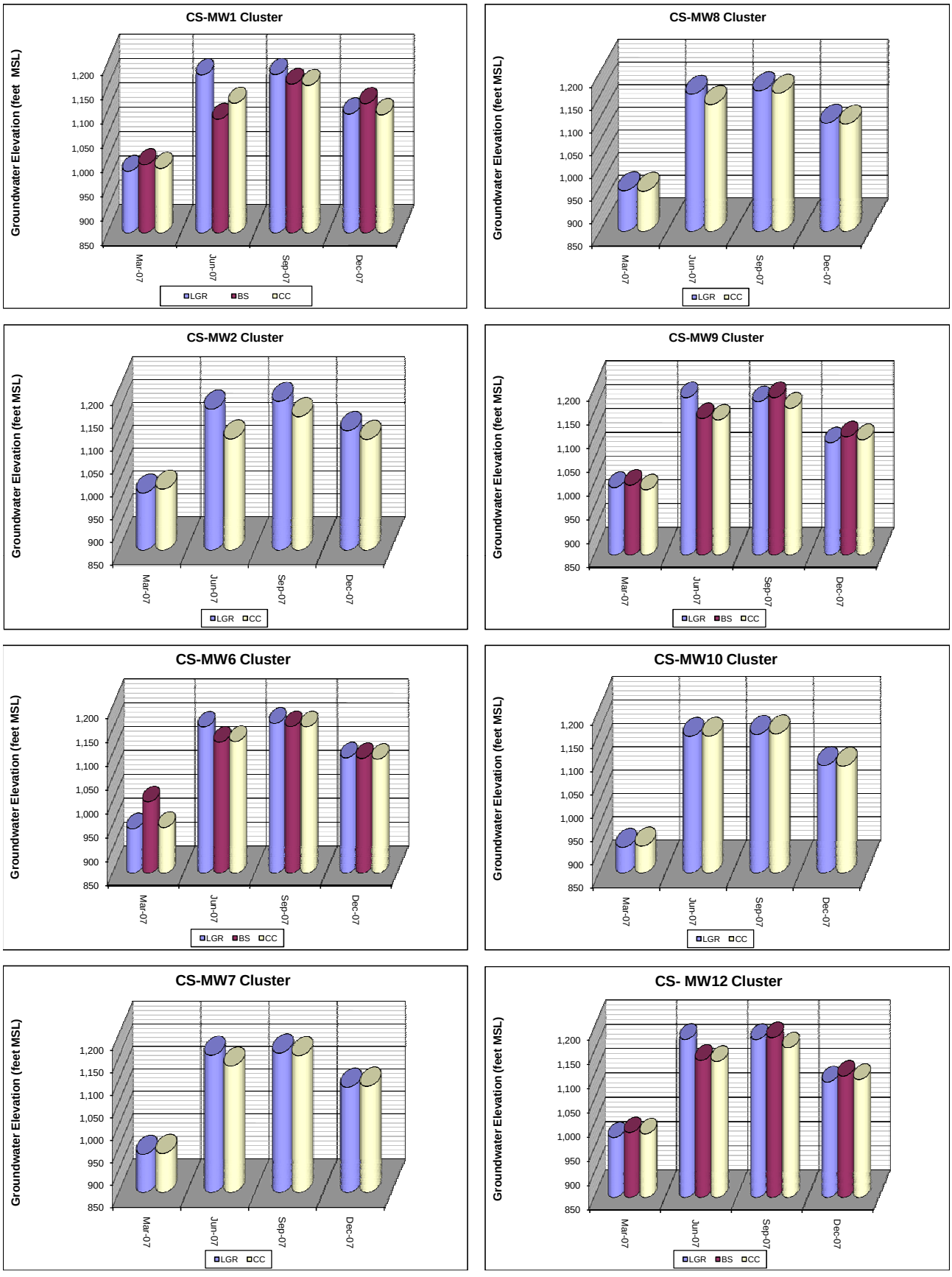
Table 2.2
Summary of Groundwater Elevation by Formation, 2007

Well ID	TOC elevation (ft MSL)	2007 Groundwater Elevations				Formations Screened		
		March	June	September	December	LGR	BS	CC
CS-1+	**1169.27**	**851.17**	**1019.70**	**1075.07**	**1054.87**	**ALL**		
CS-2	**1237.59**	**980.64**	**1185.56**	**1174.35**	**1080.68**	**?**	**?**	
CS-3	1240.17	979.59	1179.06	1174.36	1085.09	**X**		
CS-4	**1229.28**	**978.09**	**1178.55**	**1174.40**	**1086.25**	**?**	**?**	
CS-9+	**1325.31**	**944.91**	**1167.91**	**1172.31**	**NA**	**ALL**		
CS-10+	**1331.51**	**908.32**	**1161.21**	**1174.59**	**1069.51**	**ALL**		
CS-11**	**1332.49**	**954.41**	**1176.59**	**1185.74**	**1089.13**	**ALL**		
CS-D	1236.03	984.71	1174.71	1173.58	1083.59	**X**		
CS-MWG-LGR	1328.14	1043.57	1144.96	1151.37	1152.41	**X**		
CS-MWH-LGR	1319.19	1026.86	1160.60	1180.41	1121.81	**X**		
CS-I	1315.20	1018.13	1153.39	1170.50	1108.70	**X**		
CS-MW1-LGR+	1220.73	976.47	1174.63	1175.41	1094.43	**X**		
CS-MW1-BS+	1221.09	989.91	1083.40	1155.61	1115.72		**X**	
CS-MW1-CC+	1221.39	982.57	1116.49	1153.07	1092.90			**X**
CS-MW2-LGR*	1237.08	975.66	1159.04	1176.05	1111.97	**X**		
CS-MW2-CC*	1240.11	983.83	1093.56	1142.49	1092.66			
CS-MW3-LGR	1334.14	984.07	1153.37	1168.26	1104.05	**X**		
CS-MW4-LGR*	1209.71	982.22	1178.38	1185.28	1144.72	**X**		
CS-MW5-LGR	1340.24	972.74	1149.17	1173.24	1117.14	**X**		
CS-MW6-LGR+	1232.25	943.08	1156.40	1164.24	1091.91	**X**		
CS-MW6-BS+	1232.67	999.76	1124.81	1157.33	1090.71		**X**	
CS-MW6-CC+	1233.21	946.11	1126.15	1156.87	1089.09			**X**
CS-MW7-LGR	1202.27	934.87	1155.36	1160.37	1084.00	**X**		
CS-MW7-CC	1201.84	936.96	1131.13	1154.36	1086.13			**X**
CS-MW8-LGR	1208.35	939.85	1152.37	1159.85	1088.81	**X**		
CS-MW8-CC	1206.13	938.73	1130.01	1154.53	1086.77			**X**
CS-MW9-LGR+	1257.27	992.03	1180.74	1172.29	1085.97	**X**		
CS-MW9-BS+	1256.73	996.79	1136.73	1180.67	1098.27		**X**	
CS-MW9-CC+	1255.95	987.13	1133.80	1158.61	1092.33			**X**
CS-MW10-LGR+	1189.53	905.35	1143.64	1147.92	1080.78	**X**		
CS-MW10-CC+	1190.04	908.07	1143.93	1149.13	1079.20			**X**
CS-MW11A-LGR*	1204.03	913.96	1147.42	1150.83	1068.42	**X**		
CS-MW11B-LGR*	1203.52	NA	1129.27	1147.55	1060.97	**X**		
CS-MW12-LGR+	1259.07	973.33	1175.57	1175.32	1087.86	**X**		
CS-MW12-BS+	1258.37	983.65	1132.49	1178.93	1100.07		**X**	
CS-MW12-CC+	1257.31	980.90	1130.13	1158.11	1093.03			**X**
CS-MW16-LGR+	1244.60	983.45	1168.58	1174.04	1097.61	**X**		
CS-MW16-CC+	1244.51	984.02	1114.90	1151.06	1092.00			**X**
CS-MW17-LGR*	1257.01	939.91	1156.31	1169.56	1089.49	**X**		
CS-MW18-LGR*	1283.61	938.39	1172.52	1173.06	1085.94	**X**		
CS-MW19-LGR*	1255.53	959.07	1173.02	1177.17	1099.73	**X**		
CS-MW20-LGR	1209.42	961.03	1171.27	1177.60	1105.24	**X**		
CS-MW21-LGR	1184.53	939.54	1161.23	1171.76	1088.58	**X**		
CS-MW22-LGR	1280.49	935.30	1166.12	1170.20	1082.80	**X**		
CS-MW23-LGR	1258.20	929.98	1160.25	1163.05	1078.72	**X**		
CS-MW24-LGR	1253.90	982.02	1182.10	1173.37	1082.34	**X**		
CS-MW25-LGR	1293.01	991.81	1161.24	1168.99	1095.86	**X**		
Average groundwater elevation by formation, each event:	**LGR:**	**966.93**	**1162.17**	**1168.77**	**1095.68**	**Average groundwater elevation by formation all of 2007:**		**1098.39**
	BS:	**992.53**	**1119.36**	**1168.14**	**1101.19**			**1095.30**
	CC:	**958.06**	**1128.32**	**1154.47**	**1088.93**			**1082.44**

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 above Mean Sea Level (MSL).

Figure 2.1
Comparison of Groundwater Elevations within Well Clusters



and Weather Station South (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 evaluated to evaluate whether trends in rainfall and groundwater recharge are apparent.

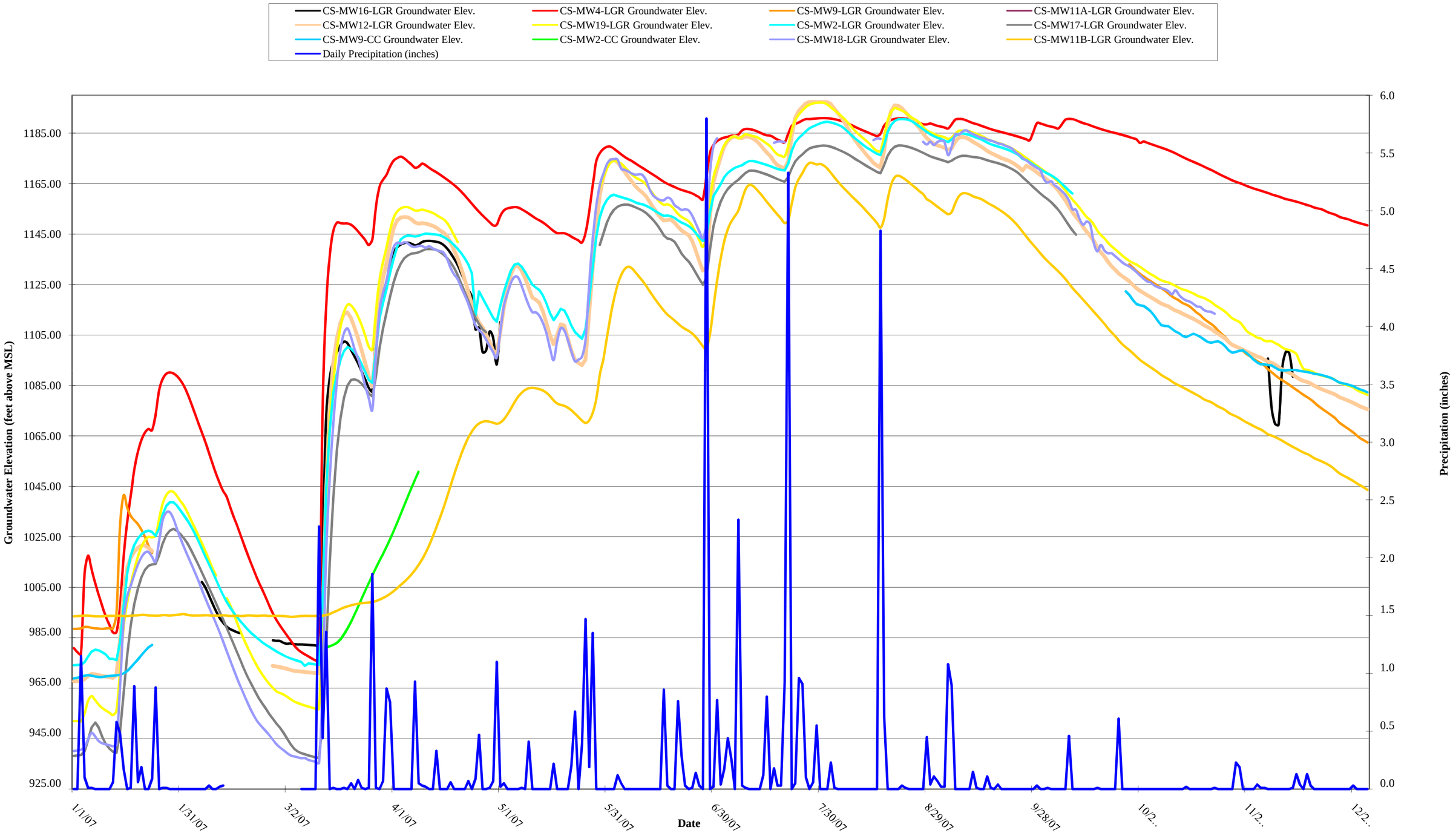
Continuous aquifer level data (January 2007 through December 31, 2007) collected from 12 wells specifically screened within the LGR and CC are presented on **Figure 2.2** as well as the corresponding daily precipitation values. The wells presented in this figure are equipped with transducers set to record 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 2007 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 implementation of the SCADA system. Although there is a large data gap in the CS-MW16-LGR data, this well began constant pumping April 24, 2007 to feed the Bioreactor study initiated at SWMU B-3.

Likewise, both weather stations (WS-N and WS-S) experienced outages due to the SCADA installation; this in turn caused data gaps within the weather station data. Therefore both weather stations daily precipitation totals were combined to give a more accurate display of the daily precipitation totals for the year. No data was recorded February 13 to March 5, 2007 from either CSSA weather station; therefore data from the Fair Oaks Ranch weather station (KTXFAIRO3) was inserted to fill this data gap. The weather stations reported 123 rainfall events with a total precipitation of 53.17 inches in 2007. Rainfall events during 2007 were sporadic, with a majority of the annual rainfall (20.63 inches) occurring from June 16 to July 29, 2007. After July, there were 2 significant rainfalls of 1 inch or more with rainfall events happening less frequently.

Based upon historical data, 2007 was an unseasonably "wet" 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 minimum annual rainfall occurred in 2005, with an annual total of 16.54 inches. 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. **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.

The groundwater elevations indicate recharge of the LGR formation immediately after precipitation. Rainfall of 1-2 inches within a 24-hour period in March, June, and July 2007 show an immediate increase in the groundwater elevations of LGR wells. As the rainfall totals increased the response from the LGR wells began to diminish due to saturation of the

Figure 2.2, Groundwater Elevations and Precipitation Data, 2007



CS-MW16-LGR elevation is 1243.4 feet MSL at top of casing.

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)	Average GW Elevation			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

GW = groundwater, ft MSL = feet above mean sea level, ft/ft = feet per foot

-- = Data not available due to weather station outage.

2007 precipitation data was combined to fill in data gaps due to multiple weather station outages during SCADA installation.

formation. After the first significant rain event in March, the data collected from CS-MW2-CC showed a less significant increase than the LGR formation with a longer lag time between the rainfall and the reaction from the CC zone.

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 low rainfall conditions at CSSA during 2006 recovered significantly with the 53.17 inches of rainfall in 2007. 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 2007 calculated LGR groundwater gradient is to the south-southeast at 0.0042 ft/ft. Depending which quadrant of the post the measurement is taken, the groundwater gradient varied seasonally from 0.00018 ft/ft (September 2007) to 0.0136 ft/ft (December 2007). General groundwater flow directions and average gradients calculated during past monitoring events are provided in **Table 2.3** for comparison.

Lower Glen Rose

The 2007 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. Common elements to each map include southeasterly flow in the southern portion of the post, and easterly flow in the North and East Pastures. 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 is not fully penetrating into the LGR and therefore is not considered within this map. The most notable feature in the 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. During the drought between March 2005 and March 2007, groundwater levels in LGR plummeted by an average of 210 feet from their pre-drought elevations. During the peak of the drought in September and December 2006, the mounding effect noted at CS-MW4-LGR was muted by the distressed aquifer levels. Upon its rebound, the mounding effect near Salado Creek resumed.

Groundwater in the inner cantonment shows a drawdown effect from the pumping of water supply wells CS-9 and CS-10 which is evident on the March 2007 potentiometric surface map in **Appendix E.1.** The addition of wells CS-MW20-LGR, CS-MW21-LGR, and CS-MW22-LGR in Spring 2007 have helped define the groundwater mounding to the south and southeast.

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 2007 are presented in **Appendix E.2, 5, 8 & 11**.

The 2007 potentiometric surface maps for BS-screened wells exhibited groundwater flow in different directions each quarter. In March 2007 groundwater flowed toward CS-MW12-BS from all directions. In June the groundwater flow was predominately toward the east and in September the flow remained toward the east and slightly toward the southeast. In December 2007, as the unusually high water levels decreased the flow changed direction to the west.

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 2007 potentiometric surface maps for CC-screened wells (**Appendix E.3 6, 9, & 12**) exhibited a southern flow in March 2007 and as rainfall accumulated in June and September the flow turned easterly. In December 2007 the flow returned to the typical southern direction.

2.2 Chemical Characteristics

2.2.1 On-Post Analytical Results

The LTMO study implemented in December 2005 on-post determines the frequency that wells are sampled. An overview of sampling frequencies for on-post wells only is given in **Table 2.4.** Eighty-five on-post samples were scheduled to be collected in 2007 (27 in March,

6 in June, 35 in September, and 17 in December). Four of the 85 samples could not be collected due to a pump outage in well CS-I (2 events), well rehabilitation of drinking water well CS-9 (1 event), and a low water level in monitoring well CS-MW11B-LGR (1 event). An additional sample was collected from monitoring well CS-MW9-LGR during the December sampling event to gather additional data for a drinking water test well being drilled in the area. 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 either Test America (formerly Severn Trent Laboratory (STL) in Arvada, Colorado or Agriculture & Priority Pollutants Laboratories, Inc. (APPL) of Fresno, California 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 to include only nickel, cadmium, and lead to be sampled on a quarterly basis.

In June 2007 the 6 newly installed monitoring wells (CS-MW20-LGR through CS-MW25-LGR) were sampled for the first time. Analyses included the full list of VOCs, 9 CSSA metals (arsenic, cadmium, lead, barium, chromium, copper, nickel, zinc, and mercury), cations (calcium, iron, potassium, magnesium, manganese, and sodium), anions (bromide, chloride, fluoride, nitrate, nitrite, sulfate, and phosphate), alkalinity (carbonate and bicarbonate), pH, TDS, and resistivity. These wells were scheduled be sampled for 3 additional consecutive quarters for VOCs (short list) and metals (Ni, Cd, and Pb). However, due to elevated metals results from the initial sampling event the metals list was expanded to include the 9 CSSA metals in the next 3 sampling events.

Parsons data packages containing the analytical results from the 2007 events are described in the quarterly reports for March, June, September, and December. Data validation was conducted and submitted to AFCEE, and all data packages from the 2007 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).

Table 2.4
Overview of On-Post Sampling, 2007

Well Count	Well ID	*Mar-07*	*Jun-07*	*Sep-07*	*Dec-07*	*Frequency*
Wells To Be Sampled		**under TO 0207**	**under TO 0207**	**under DY 02**	**under DY 02**	**under TO 0207**
1	**CS-1**	**VOC's (short list)**	**not sampled**	**not sampled**	**VOC's (short list) & metals (Ni, Cd, Pb)**	**Every 9 months***
2	CS-2	VOC's (short list)	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	Every 9 months*
3	CS-4	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
4	**CS-9**	**VOC's (short list)**	**not sampled**	**not sampled**	**VOC's (short list) & metals (Ni, Cd, Pb)**	**Every 9 months***
5	**CS-10**	**VOC's (short list)**	**not sampled**	**not sampled**	**VOC's (short list) & metals (Ni, Cd, Pb)**	**Every 9 months***
6	CS-11	VOC's (short list)	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	Every 9 months*
7	CS-D	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
8	CS-MWG-LGR	VOC's (short list)	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	Every 9 months*
9	CS-MWH-LGR	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
10	CS-I	VOC's (short list)	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	Every 9 months*
11	CS-MW1-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
12	CS-MW1-BS	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
13	CS-MW1-CC	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
14	CS-MW2-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
15	CS-MW2-CC	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
16	CS-MW3-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
17	CS-MW4-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
18	CS-MW5-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
19	CS-MW6-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
20	CS-MW6-BS	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
21	CS-MW6-CC	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
22	CS-MW7-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
23	CS-MW7-CC	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
24	CS-MW8-LGR	VOC's (short list)	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	Every 9 months*
25	CS-MW8-CC	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
26	CS-MW9-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
27	CS-MW9-BS	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
28	CS-MW9-CC	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
29	CS-MW10-LGR	VOC's (short list)	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	Every 9 months*
30	CS-MW10-CC	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
31	CS-MW11A-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
32	CS-MW11B-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
33	CS-MW12-LGR	VOC's (short list)	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	Every 9 months*
34	CS-MW12-BS	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
35	CS-MW12-CC	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Biennial
36	CS-MW16-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
37	CS-MW16-CC	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
38	CW-MW17-LGR	VOC's (short list)	not sampled	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	Every 9 months*
39	CS-MW18-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
40	CS-MW19-LGR	VOC's (short list)	not sampled	VOC's (short list) & metals (Ni, Cd, Pb)	not sampled	Semi-annual
41	CS-MW20-LGR	drilling/construction	VOC's (full list), metals (As, Cd, Pb, Hg, Ba, Cr, Cu, Ni, Zn), Bromide, chloride, flouride, nitrate, nitrite, sulfate, alkalinity (SW9046), TDS, pH, resisitivity, alkalinity, & bicorbonate (E310.1)	VOC's (short list) & metals (Ni, Cd, Pb)	VOC's (short list) & metals (Ni, Cd, Pb)	Quarterly**
42	CS-MW21-LGR	drilling/construction	VOC's (full list), metals (As, Cd, Pb, Hg, Ba, Cr, Cu, Ni, Zn), Bromide, chloride, flouride, nitrate, nitrite, sulfate, alkalinity (SW9046), TDS, pH, resisitivity, alkalinity, & bicorbonate (E310.1)	VOC's (short list) & metals (Ni, Cd, Pb)	VOC's (short list) & metals (Ni, Cd, Pb)	Quarterly**
43	CS-MW22-LGR	drilling/construction	VOC's (full list), metals (As, Cd, Pb, Hg, Ba, Cr, Cu, Ni, Zn), Bromide, chloride, flouride, nitrate, nitrite, sulfate, alkalinity (SW9046), TDS, pH, resisitivity, alkalinity, & bicorbonate (E310.1)	VOC's (short list) & metals (Ni, Cd, Pb)	VOC's (short list) & metals (Ni, Cd, Pb)	Quarterly**
44	CS-MW23-LGR	drilling/construction	VOC's (full list), metals (As, Cd, Pb, Hg, Ba, Cr, Cu, Ni, Zn), Bromide, chloride, flouride, nitrate, nitrite, sulfate, alkalinity (SW9046), TDS, pH, resisitivity, alkalinity, & bicorbonate (E310.1)	VOC's (short list) & metals (Ni, Cd, Pb)	VOC's (short list) & metals (Ni, Cd, Pb)	Quarterly**
45	CS-MW24-LGR	drilling/construction	VOC's (full list), metals (As, Cd, Pb, Hg, Ba, Cr, Cu, Ni, Zn), Bromide, chloride, flouride, nitrate, nitrite, sulfate, alkalinity (SW9046), TDS, pH, resisitivity, alkalinity, & bicorbonate (E310.1)	VOC's (short list) & metals (Ni, Cd, Pb)	VOC's (short list) & metals (Ni, Cd, Pb)	Quarterly**
46	CS-MW25-LGR	drilling/construction	VOC's (full list), metals (As, Cd, Pb, Hg, Ba, Cr, Cu, Ni, Zn), Bromide, chloride, flouride, nitrate, nitrite, sulfate, alkalinity (SW9046), TDS, pH, resisitivity, alkalinity, & bicorbonate (E310.1)	VOC's (short list) & metals (Ni, Cd, Pb)	VOC's (short list) & metals (Ni, Cd, Pb)	Quarterly**

*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.

biennial = every 2 years

semi annual = twice a year

Table 2.5
2007 On-Post Groundwater COCs and Metals 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)*	Trichloroethene *(ug/L)*	Vinyl chloride *(ug/L)*
CS-1	STL	3/6/2007	--	--	--	--	--	--
Duplicate	STL	3/6/2007	--	--	--	--	--	--
	APPL	12/13/2007	--	--	--	--	**0.24F**	--
CS-2	STL	3/8/2007	--	--	--	--	--	--
	APPL	12/13/2007	--	--	--	**0.32F**	--	--
CS-4	STL	3/13/2007	--	**2.1**	--	**1.3F**	**2.7**	--
	APPL	9/25/2007	--	**0.53F**	--	**1.74**	**1.92**	--
CS-9	APPL	12/13/2007	--	--	--	--	--	--
CS-10	STL	3/6/2007	--	--	--	--	--	--
	APPL	12/13/2007	--	--	--	--	--	--
CS-11	STL	3/6/2007	--	--	--	--	--	--
	APPL	12/13/2007	--	--	--	--	--	--
CS-MW16-LGR	STL	3/6/2007	--	**72**	**0.76**	**59**	**69**	--
	APPL	9/25/2007	--	**27.4**	**0.15F**	**38.5**	**34.66**	--
CS-MW16-CC	STL	3/6/2007	**0.68F**	**90**	**7.8**	**2.1**	**59**	**0.57F**
	APPL	9/25/2007	**0.60F**	**67.13**	**2.45**	**24.59**	**73.05**	**0.25F**
CS-D	STL	3/12/2007	--	**97**	**4.6**	**69**	**110**	--
	APPL	9/25/2007	--	**102.79**	**1.04**	**94.38**	**112.93**	--
CS-MWG-LGR	STL	3/16/2007	--	--	--	--	--	--
	TestAmerica	12/11/2007	--	--	--	--	--	--
CS-MWH-LGR	APPL	9/24/2007	--	--	--	--	--	--
CS-MW1-LGR	STL	3/6/2007	--	**17**	**0.33F**	**11**	**24**	--
	APPL	9/25/2007	--	**46.31**	**0.81**	**30.82**	**34.62**	--
CS-MW1-BS	APPL	9/25/2007	--	**0.81F**	--	--	--	--
CS-MW1-CC	APPL	9/25/2007	--	--	--	--	--	--
Duplicate	APPL	9/25/2007	--	--	--	--	--	--
CS-MW2-LGR	STL	3/7/2007	--	**0.98F**	--	--	--	--
	APPL	9/25/2007	--	**2.22**	--	**0.11F**	**0.10F**	--
CS-MW2-CC	APPL	9/25/2007	--	--	--	--	--	--
CS-MW3-LGR	STL	3/12/2007	--	--	--	--	--	--
	APPL	10/1/2007	--	--	--	--	--	--
CS-MW4-LGR	STL	3/13/2007	--	--	--	--	--	--
Duplicate	STL	3/13/2007	--	--	--	--	--	--
	APPL	9/27/2007	--	--	--	--	--	--
CS-MW5-LGR	STL	3/7/2007	--	**1.2**	--	**0.65F**	**0.87F**	--
	APPL	9/27/2007	--	**1.15F**	--	**0.63F**	**0.75F**	--
CS-MW6-LGR	STL	3/7/2007	--	--	--	--	--	--
	APPL	10/2/2007	--	--	--	--	--	--
Duplicate	APPL	10/2/2007	--	--	--	--	--	--
CS-MW6-BS	APPL	10/2/2007	--	--	--	--	--	--
CS-MW6-CC	APPL	10/2/2007	--	--	--	--	--	--
CS-MW7-LGR	STL	3/7/2007	--	--	--	--	--	--
	APPL	10/2/2007	--	--	--	--	--	--
CS-MW7-CC	APPL	10/2/2007	--	--	--	--	--	--
CS-MW8-LGR	STL	3/16/2007	--	--	--	**1.0F**	--	--
	APPL	12/12/2007	--	--	--	**1.41**	--	--
CS-MW8-CC	APPL	10/2/2007	--	--	--	**0.65F**	**0.08F**	--
CS-MW9-LGR	STL	3/16/2007	--	--	--	--	--	--
	APPL	9/25/2007	--	--	--	--	--	--
	TestAmerica	12/13/2007	--	--	--	--	--	--
CS-MW9-BS	APPL	9/25/2007	--	--	--	--	--	--
CS-MW9-CC	APPL	9/25/2007	--	--	--	--	--	--
CS-MW10-LGR	STL	3/7/2007	--	--	--	**1.3F**	**0.37F**	--
	APPL	12/13/2007	--	--	--	**1.84**	**0.52F**	--
CS-MW10-CC	APPL	10/2/2007	--	--	--	--	--	--
CS-MW11A-LGR	STL	3/8/2007	--	--	--	**1.1F**	--	--
	APPL	9/27/2007	--	--	--	**0.60F**	--	--
Duplicate	APPL	9/27/2007	--	--	--	**0.65F**	--	--
CS-MW11B-LGR	APPL	9/27/2007	--	--	--	**1.29F**	--	--
CS-MW12-LGR	STL	3/8/2007	--	--	--	--	--	--
	APPL	12/13/2007	--	--	--	--	--	--
Duplicate	APPL	12/13/2007	--	--	--	--	--	--
CS-MW12-BS	APPL	9/27/2007	--	--	--	--	--	**0.13F**
CS-MW12-CC	APPL	9/27/2007	--	--	--	--	--	--
CS-MW17-LGR	STL	3/16/2007	--	--	--	**0.31F**	--	--
	APPL	12/11/2007	--	--	--	**0.33F**	--	--
CS-MW18-LGR	STL	3/13/2007	--	--	--	--	--	--
	APPL	10/2/2007	--	--	--	--	--	--
Duplicate	APPL	10/2/2007	--	--	--	--	--	--
CS-MW19-LGR	STL	3/12/2007	--	--	--	**0.38F**	--	--
	APPL	9/27/2007	--	--	--	**0.48F**	--	--
Comparison		MCL	7	70	100	5	5	2
Criteria		GW-INA	70	100	5			2
	TestAmerica	RL	1.2	1.2	0.6	1.4	1.0	1.1
	TestAmerica	MDL	0.074	0.098	0.056	0.14	0.1	0.078

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Notes:
- ug/L = micrograms per liter
- FD = field duplicate
- 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.
- R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- M = Indicates a failure on the matrix spike and/or matrix spike duplicate samples.
- NA = Not analyzed for this parameter.

Samples analyzed by Test America (formerly Severn Trent Laboratories) & APPL, Inc.
Samples analyzed by method SW8260B.

Table 2.5
2007 On-Post Groundwater COCs and Metals Analytical Results, Detections Only

Well ID	CS-MW20-LGR			CS-MW21-LGR			CS-MW22-LGR				CS-MW23-LGR			CS-MW24-LGR				CS-MW25-LGR		
Sample Date	6/6/07	10/1/07	12/12/07	6/7/07	10/1/07	12/12/07	6/7/07	10/1/07	12/13/07	12/13/07	6/5/07	10/1/07	12/12/07	6/6/07	6/6/07	10/1/07	12/12/07	6/5/07	10/1/07	12/11/07
Analytes (ug/L)										*FD*					*FD*					
Benzene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Bromo-dichloro-methane *	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Bromoform	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Bromo-benzene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Bromo-chloro-methane	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Bromo-methane	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Butylbenzene, N-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Butylbenzene, sec-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Butylbenzene, tert-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Carbon tetrachloride	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Chloro-benzene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Chloro-ethane	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Chloroform	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Chlorohexane, 1-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Chloro- methane	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Chloro-toluene, 2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Chlorotoluene, 4-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dibromo-3-chloropropane, 1,2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dibromo-chloro-methane *	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dibromomethane	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichlorobenzene, 1,2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichlorobenzene, 1,3-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichlorobenzene, 1,4-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichlorodifluoromethane	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichloroethane, 1,2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichloro-ethane, 1,1	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichloro-ethene, 1,1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.074M**
Dichloro-ethene, *cis* -1,2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloro-ethene, *trans* -1,2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Dichloro-methane (methylene chloride)	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	**0.3F**	--	NA	NA	**0.33F**	NA	NA
Dichloropropane, 1,2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichloropropane, 1,3-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichloropropane, 2,2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichloropropene, 1,1-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichloropropene, cis-1,3-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Dichloropropene, trans-1,3-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Ethylbenzene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Ethylene dibromide	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Hexachlorobutadiene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Isopropylbenzene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Isopropyltoluene, 4- (Cymene, p-)	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Naphthalene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Propylbenzene, N-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Styrene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Tetrachloroethane, 1,1,1,2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Tetrachloroethane, 1,1,2,2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Tetra-chloroethene	**1.7**	**1.8**	**1.8**	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Toluene	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Trichlorobenzene, 1,2,3-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Trichlorobenzene, 1,2,4-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Trichloroethene	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trichloroethane, 1,1,1-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Trichloroethane, 1,1,2-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Trichlorofluoromethane	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Trichloropropane, 1,2,3-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Trimethylbenzene, 1,2,4-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Trimethylbenzene, 1,3,5-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Vinyl chloride	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Xylene, m,p-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA
Xylene, o-	--	NA	NA	--	NA	NA	--	NA	NA	NA	--	NA	NA	--	--	NA	NA	--	NA	NA

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Notes:
- ug/L = micrograms per liter
- FD = field duplicate
- 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.
- R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- M = Indicates a failure on the matrix spike and/or matrix spike duplicate samples.
- NA = Not analyzed for this parameter.

Samples analyzed by Test America (formerly Severn Trent Laboratories)
Samples analyzed by method SW8260B.

Table 2.5
2007 On-Post Groundwater COCs and Metals Analytical Results, Detections Only

Well ID	Laboratory	Sample Date	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Zinc (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	pH	Alkalinity, Bicarbonate (mg/L)	Alkalinity, Carbonate (mg/L)	Alkalinity, Total (as CACO3) (mg/L)	Phosphorus, Total Orthophosphate (mg/L)
CS-1	APPL	12/13/2007	NA	NA	--	NA	NA	NA	**0.0017F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.29	NA	NA	NA	NA
CS-2	APPL	12/13/2007	NA	NA	--	NA	NA	NA	**0.0002F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.08	NA	NA	NA	NA
CS-4	APPL	9/25/2007	NA	NA	**0.0004F**	NA	NA	NA	**0.0015F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.84	NA	NA	NA	NA
CS-9	APPL	12/13/2007	NA	NA	--	NA	NA	NA	**0.0362**	NA	NA	NA	**0.022**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.98	NA	NA	NA	NA
CS-10	APPL	12/13/2007	NA	NA	--	NA	NA	NA	**0.0049**	NA	NA	NA	**0.004F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.03	NA	NA	NA	NA
CS-11	APPL	12/13/2007	NA	NA	--	NA	NA	NA	**0.0359**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.22	NA	NA	NA	NA
CS-MW16-LGR	APPL	9/25/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0007F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.79	NA	NA	NA	NA
CS-MW16-CC	APPL	9/25/2007	NA	NA	**0.0015F**	NA	NA	NA	**0.0072**	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.87	NA	NA	NA	NA
CS-D	APPL	9/25/2007	NA	NA	**0.0018F**	NA	NA	NA	**0.0016F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.87	NA	NA	NA	NA
CS-MWG-LGR	TestAmerica	12/11/2007	**0.00023F**	**0.022**	--	NA	--	--	--	NA	NA	NA	--	NA	NA	**0.018F**	NA	NA	NA	NA	NA	NA	7.11	NA	NA	NA	NA
CS-MWH-LGR	APPL	9/24/2007	NA	NA	**0.0014F**	NA	NA	NA	**0.009**	NA	NA	NA	**0.0005F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.65	NA	NA	NA	NA
CS-MW1-LGR	APPL	9/25/2007	NA	NA	**0.0036F**	NA	NA	NA	**0.0063**	NA	NA	NA	**0.066**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.82	NA	NA	NA	NA
CS-MW1-BS	APPL	9/25/2007	NA	NA	**0.0012F**	NA	NA	NA	**0.0047**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.59	NA	NA	NA	NA
CS-MW1-CC	APPL	9/25/2007	NA	NA	**0.0007F**	NA	NA	NA	**0.0014F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.13	NA	NA	NA	NA
Duplicate	APPL	9/5/2007	NA	NA	**0.0006F**	NA	NA	NA	**0.0005F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.13	NA	NA	NA	NA
CS-MW2-LGR	APPL	9/25/2007	NA	NA	**0.0004F**	NA	NA	NA	**0.0049**	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.93	NA	NA	NA	NA
CS-MW2-CC	APPL	9/25/2007	NA	NA	**0.0073**	NA	NA	NA	**0.0051**	NA	NA	NA	**0.011**	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.23	NA	NA	NA	NA
CS-MW3-LGR	APPL	10/1/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0004F**	NA	NA	NA	**0.006F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.06	NA	NA	NA	NA
CS-MW4-LGR	APPL	9/27/2007	NA	NA	**0.0005F**	NA	NA	NA	**0.0008F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.82	NA	NA	NA	NA
CS-MW5-LGR	APPL	9/27/2007	NA	NA	--	NA	NA	NA	**0.0016F**	NA	NA	NA	**0.008F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.81	NA	NA	NA	NA
CS-MW6-LGR	APPL	10/2/2007	NA	NA	--	NA	NA	NA	--	NA	NA	NA	**0.028**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.94	NA	NA	NA	NA
Duplicate	APPL	10/2/2007	NA	NA	**0.0002F**	NA	NA	NA	**0.0004F**	NA	NA	NA	**0.027**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.94	NA	NA	NA	NA
CS-MW6-BS	APPL	10/2/2007	NA	NA	--	NA	NA	NA	--	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5	NA	NA	NA	NA
CS-MW6-CC	APPL	10/2/2007	NA	NA	**0.0004F**	NA	NA	NA	**0.0004F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.16	NA	NA	NA	NA
CS-MW7-LGR	APPL	10/2/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0004F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.74	NA	NA	NA	NA
CS-MW7-CC	APPL	10/2/2007	NA	NA	--	NA	NA	NA	--	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.02	NA	NA	NA	NA
CS-MW8-LGR	APPL	12/12/2007	NA	NA	--	NA	NA	NA	--	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.85	NA	NA	NA	NA
CS-MW8-CC	APPL	10/2/2007	NA	NA	**0.0002F**	NA	NA	NA	--	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.42	NA	NA	NA	NA
CS-MW9-LGR	APPL	9/25/2007	NA	NA	**0.0012F**	NA	NA	NA	**0.0048**	NA	NA	NA	**0.032**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.77	NA	NA	NA	NA
	TestAmerica	12/13/2007	**0.0017F**	**0.034**	--	NA	**0.034**	--	0.00038F	NA	NA	NA	**0.021**	NA	NA	**0.012F**	NA	NA	NA	NA	NA	NA	6.99	NA	NA	NA	NA
CS-MW9-BS	APPL	9/25/2007	NA	NA	**0.0019F**	NA	NA	NA	**0.1065**	NA	NA	NA	**0.019**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.22	NA	NA	NA	NA
CS-MW9-CC	APPL	9/25/2007	NA	NA	**0.0002F**	NA	NA	NA	**0.0009F**	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.04	NA	NA	NA	NA
CS-MW10-LGR	APPL	12/13/2007	NA	NA	--	NA	NA	NA	**0.0004F**	NA	NA	NA	**0.006F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.84	NA	NA	NA	NA
CS-MW10-CC	APPL	10/2/2007	NA	NA	**0.0004F**	NA	NA	NA	**0.0004F**	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.21	NA	NA	NA	NA
CS-MW11A-LGR	APPL	9/27/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0005F**	NA	NA	NA	**0.005F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.83	NA	NA	NA	NA
Duplicate	APPL	9/27/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0008F**	NA	NA	NA	**0.005F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.83	NA	NA	NA	NA
CS-MW11B-LGR	APPL	9/27/2007	NA	NA	**0.0009F**	NA	NA	NA	**0.0013F**	NA	NA	NA	**0.007F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.75	NA	NA	NA	NA
CS-MW12-LGR	APPL	12/13/2007	NA	NA	--	NA	NA	NA	**0.0005F**	NA	NA	NA	**0.035**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.14	NA	NA	NA	NA
Duplicate	APPL	12/13/2007	NA	NA	--	NA	NA	NA	**0.0005F**	NA	NA	NA	**0.034**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.14	NA	NA	NA	NA
CS-MW12-BS	APPL	9/27/2007	NA	NA	**0.0002F**	NA	NA	NA	--	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.25	NA	NA	NA	NA
CS-MW12-CC	APPL	9/27/2007	NA	NA	--	NA	NA	NA	--	NA	NA	NA	--	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.94	NA	NA	NA	NA
CS-MW17-LGR	APPL	12/11/2007	NA	NA	--	NA	NA	NA	--	NA	NA	NA	**0.004F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.97	NA	NA	NA	NA
CS-MW18-LGR	APPL	10/2/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0006F**	NA	NA	NA	**0.007F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.98	NA	NA	NA	NA
Duplicate	APPL	10/2/2007	NA	NA	**0.0009F**	NA	NA	NA	**0.0008F**	NA	NA	NA	**0.007F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.98	NA	NA	NA	NA
CS-MW19-LGR	APPL	9/27/2007	NA	NA	**0.0006F**	NA	NA	NA	**0.0009F**	NA	NA	NA	**0.134**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.02	NA	NA	NA	NA
CS-MW20-LGR	TestAmerica	6/6/2007	**0.00092F**	**0.13**	--	**97**	**0.0027F**	--	**0.001F**	--	**17**	**0.0038F**	**0.02**	**2.2**	**9.1**	**0.065**	**0.13F**	**12**	**0.32F**	**2.7**	--	**17M**	6.98	**280**	--	**280**	--
	TestAmerica	10/1/2007	**0.00081F**	**0.15**	--	NA	--	--	**0.00065F**	--	NA	NA	--	NA	NA	**0.029F**	NA	NA	NA	NA	NA	NA	6.73	NA	NA	NA	NA
	TestAmerica	12/12/2007	**0.00035F**	**0.14**	--	NA	--	--	**0.00021F**	NA	NA	NA	--	NA	NA	**0.013F**	NA	NA	NA	NA	NA	NA	6.82	NA	NA	NA	NA
CS-MW21-LGR	TestAmerica	6/7/2007	**0.0038F**	**0.081**	--	**59**	--	--	**0.0029**	--	**30**	**0.0097**	--	**2.3**	**7.3**	**0.47**	--	**7.3**	**0.64F**	--	--	**16**	7.14	**280**	--	**280**	--
	TestAmerica	10/1/2007	**0.0034F**	**0.091**	--	NA	--	--	**0.0013F**	--	NA	NA	--	NA	NA	**0.34**	NA	NA	NA	NA	NA	NA	6.88	NA	NA	NA	NA
	TestAmerica	12/12/2007	**0.00054F**	**0.083**	--	NA	--	--	**0.00021F**	NA	NA	NA	--	NA	NA	**0.18**	NA	NA	NA	NA	NA	NA	6.99	NA	NA	NA	NA
CS-MW22-LGR	TestAmerica	6/7/2007	**0.0045F**	**0.073**	**0.00012F**	**70**	**0.017**	**0.029**	**0.091**	**0.000079F**	**28**	**0.067**	**0.028**	**3.5**	**11.0**	**8.0**	--	**9.1**	**0.82F**	--	--	**28**	7.14	**270**	--	**270**	--
	TestAmerica	10/1/2007	**0.0056F**	**0.093**	**0.00013F**	NA	**0.023**	**0.026**	**0.086**	**0.00012F**	NA	NA	**0.037**	NA	NA	**6.7**	NA	NA	NA	NA	NA	NA	6.98	NA	NA	NA	NA
	TestAmerica	12/13/2007	**0.0024F**	**0.06**	**0.000056F**	NA	**0.0027F**	--	**0.011**	NA	NA	NA	**0.013**	NA	NA	**2**	NA	NA	NA	NA	NA	NA	7.07	NA	NA	NA	NA
Duplicate	TestAmerica	12/13/2007	**0.0023F**	**0.063**	**0.000047F**	NA	**0.0028F**	--	**0.011**	NA	NA	NA	**0.013**	NA	NA	**2.1**	NA	NA	NA	NA	NA	NA	7.07	NA	NA	NA	NA
CS-MW23-LGR	TestAmerica	6/5/2007	**0.0015F**	**0.051**	**0.000058F**	**86**	--	**0.0061F**	**0.0032**	**0.0078**	**29**	**0.024**	--	**2.2**	**6.7**	**0.59**	--	**8.4**	**0.54F**	**0.14F**	**0.069F**	**18M**	7.18	**260**	--	**260**	--
	TestAmerica	10/1/2007	**0.0011F**	**0.054**	**0.000046F**	NA	--	**0.0046F**	**0.0018F**	--	NA	NA	--	NA	NA	**0.28**	NA	NA	NA	NA	NA	NA	6.97	NA	NA	NA	NA
	TestAmerica	12/12/2007	**0.00069F**	**0.047**	--	NA	--	--	--	NA	NA	NA	--	NA	NA	**0.16**	NA	NA	NA	NA	NA	NA	7.05	NA	NA	NA	NA
CS-MW24-LGR	TestAmerica	6/6/2007	**0.00085F**	**0.032**	--	**68**	--	--	**0.0016F**	--	**33**	**0.0059**	**0.011**	**2.4**	**7.8**	**0.22**	--	**9.9**	**0.64F**	**0.63F**	--	**30M**	7.18	**250**	--	**250**	--
Duplicate	TestAmerica	6/6/2007	**0.00088F**	**0.032**	--	**67**	--	--	**0.0015F**	--	**33**	**0.0046F**	**0.0088F**	**2.4**	**7.7**	**0.2**	--	**10**	**0.65F**	**0.64F**	--	**30M**	7.18	**250**	--	**250**	--
	TestAmerica	10/1/2007	**0.00081F**	**0.033**	--	NA	--	--	**0.00085F**	--	NA	NA	--	NA	NA	**0.11**	NA	NA	NA	NA	NA	NA	6.94	NA	NA	NA	NA
	TestAmerica	12/12/2007	**0.00045F**	**0.031**	--	NA	--	--	**0.00018F**	NA	NA	NA	--	NA	NA	**0.089**	NA	NA	NA	NA	NA	NA	7.13	NA	NA	NA	NA
CS-MW25-LGR	TestAmerica	6/5/2007	**0.0031F**	**0.044**	**0.000087F**	**120**	**0.065**	**0.032**	**0.017**	--	**26**	**0.041**	**0.064**	**3.0**	**31.0**	**1.8**	--	**22**	**0.47F**	**0.73F**	--	**33M**	7.21	**270**	--	**270**	--
	TestAmerica	10/1/2007	**0.0044F**	**0.063**	**0.00016F**	NA	**0.24**	**0.065**	**0.032**	--	NA	NA	**0.14**	NA	NA	**2.2**	NA	NA	NA	NA	NA	NA	7.05	NA	NA	NA	NA
	TestAmerica	12/11/2007	**0.0039F**	**0.045**	**0.00015F**	NA	**0.22**	**0.03**	**0.023**	NA	NA	NA	**0.078**	NA	NA	**1.5**	NA	NA	NA	NA	NA	NA	7.39	NA	NA	NA	NA
Comparison		MCL	0.01	2.0	0.005	--	0.1	1.3	0.015	0.002	--	0.05 (SS)	--	--	--	5.0 (SS)	--	--	4	10	1.0	--	6.5-8.5	--	--	--	--
Criteria		GW-Ind	0.05	2.0	0.005	--	0.1	1.3	0.015	0.002	--	--	0.1	--	--	31	--	--	--	--	--	--	--	--	--	--	
	APPL	RL	0.005	0.005	0.001	1.1	0.01	0.01	0.005	0.001	0.1	0.005	0.01	1.0	1.0	0.05	--	--	--	--	--	--	--	--	--	--	
	APPL	MDL	0.0008	0.0003	0.0001	0.02	0.001	0.003	0.0008	0.0001	0.005	0.0003	0.001	0.02	0.02	0.008	--	--	--	--	--	--	--	--	--	--	
	TestAmerica	RL	0.02	0.005	0.002	1.1	0.01	0.01	0.002	0.001	0.1	0.005	0.01	1.0	1.0	0.05	0.5	1.0	1.0	1.0	1.0	1.0	--	5.0	10	10	1.0
	TestAmerica	MDL	0.00021	0.001	0.00004	0.034	0.00026	0.0045	0.00018	0.000027	0.043	0.0018	0.0078	0.24	0.092	0.0045	0.11	0.25	0.06	0.042	0.049	0.23	--	1.1	1.1	1.1	0.19

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Notes:
- mg/L = milligrams 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.
- R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- M = Indicates a failure on the matrix spike and/or matrix spike duplicate samples.
- NA = Not analyzed for this parameter.

Samples analyzed by Test America (formerly Severn Trent Laboratories) & APPL, Inc.

Wells not sampled in 2007 were: CS-I scheduled in March and December 2007, was not sampled due to a pump outage. The pump is scheduled to be replaced in 2008. Drinking water well CS-9 scheduled in March 2007 was not sampled due to well rehabilitation. Monitoring well CS-MW11B-LGR was not sampled in March 2007 due to low water levels. See **Table 2.4** for the Overview of On-Post Sampling in 2007.

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, and CS-D in 2007. The respective comparison criteria (MCLs, SS, or AL) for each compound are included in **Table 2.5**. New wells (CS-MW20-LGR through CS-MW25-LGR) also included sampling for full list VOC and inorganic parameters during the 2007 calendar year. 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 2007. *Trans*-1,2-DCE was detected below its MCL. Metals detected in September 2007 were cadmium and lead, both below respective MCLs and RLs.
- **CS-MW16-LGR** – Concentrations of PCE and TCE exceeded their MCLs during the March and September sampling events. *Cis*-1,2-DCE was above the MCL in March but dropped back below the MCL in September. *Trans*-1,2-DCE was detected below the MCL in March and September 2007. Metals detected in September 2007 were cadmium and lead, both below respective MCLs and RLs. 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 pumping continuously since pumping began in April.
- **CS-MW16-CC** – Concentrations of TCE and *cis*-1,2-DCE exceeded their respective MCLs in March and PCE and TCE exceeded their respective MCLs in September 2007. *Trans*-1,2-DCE, 1,1-DCE, and vinyl chloride were also detected, but below their MCLs. Metals detected in September 2007 were lead, just above the RL, and nickel and cadmium, below respective RLs. The pump in well CS-MW16-CC has been run sporadically since April 25, 2007 this pump is also inline to pump water onto the SWMU B-3 Bioreactor. During drought conditions when water levels in CS-MW16-LGR approach the pump depth, CS-MW16-CC will be engaged to allow shut down of the CS-MW16-LGR well.
- **CS-MW1-LGR** – PCE and TCE concentrations were above their MCLs in March and September 2007. *Cis*-1,2-DCE and *trans*-1,2-DCE were detected below their MCLs in March and September 2007. In September 2007 nickel, cadmium, and lead were detected below the respective MCL/AL.
- **CS-MW2-CC** – No VOCs were reported in this well in 2007. However, cadmium exceeded the MCL of 0.005 mg/L in September 2007. Lead and nickel were also detected below applicable MCL/AL.

- **CS-MW9-BS** - No VOCs were reported in this well in 2007. However, lead exceeded the AL of 0.015 mg/L in September 2007. Cadmium was also detected below the MCL and nickel was detected just above the RL.
- **CS-MW22-LGR** – As a newly installed well, this location was sampled for full-list VOCs and inorganics in 2007. No VOCs were reported in this well in 2007. However lead, manganese, and zinc exceeded their respective Secondary Standards (SS)/ALs in June 2007. Arsenic, barium, cadmium, calcium, chromium, copper, mercury, magnesium, nickel, potassium, sodium, chloride, fluoride and sulfate were also detected below their respective MCL/ALs. In October 2007 lead and zinc again exceeded their applicable SS/ALs. Also detected were arsenic, barium, cadmium, chromium, copper, mercury and nickel, below their applicable MCL/SS/ALs. Similar results were reported in December 2007 with decreasing levels and no MCL/SS/AL exceedances.
- **CS-MW23-LGR** - As a newly installed well, this location was sampled for full-list VOCs and inorganics in 2007. No VOCs were reported in this well in 2007. However mercury exceeded its MCL in June 2007. In addition arsenic, barium, cadmium, calcium, copper, lead, magnesium, manganese, potassium, sodium, zinc, chloride, fluoride, nitrate, nitrite and sulfate were also detected below their respective MCL/SS/ALs in June 2007. In October 2007 arsenic, barium, cadmium, copper, lead, and zinc were detected below their applicable MCL/SS/ALs. In December 2007, arsenic, barium and zinc were detected, but at levels below respective MCL/SS/AL.
- **CS-MW25-LGR** - As a newly installed well, this location was sampled for full-list VOCs and inorganics in 2007. Methylene chloride was detected below the RL in June 2007. Methylene chloride is a common laboratory contaminant. Concentrations of 1,1-DCE were detected below the RL in December 2007. Lead exceeded the MCL/AL in all three 2007 sampling events while chromium exceeded MCLs in October and December. Other metals detected were arsenic, barium, cadmium, calcium, copper, magnesium, manganese, nickel, potassium, sodium, zinc, chloride, fluoride, nitrate and sulfate, all below their applicable MCL/SS/AL.

2.2.1.2 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-MW1-BS, CS-MW2-LGR, CS-MW5-LGR, CS-MW8-LGR, CS-MW8-CC, CS-MW10-LGR, CS-MW11A-LGR, CS-MW11B-LGR, CS-MW12-BS, CS-MW17-LGR, CS-MW19-LGR, CS-MW20-LGR, CS-MW24-LGR and CS-MW25-LGR. The detections below the MCLs are summarized as follows:

- **CS-2** – Concentrations of PCE were detected below the RL in December 2007. Also detected was lead below the RL.
- **CS-4** – Concentrations of PCE, TCE, and *cis*-1,2-DCE were reported below the MCL in the March and September 2007 events. Other metals detected were lead and cadmium, both below the respective RLs.

- **CS-MWG-LGR** – No VOCs were detected in this well in 2007. However, barium was detected above the RL, and arsenic and zinc were reported below respective RLs.
- **CS-MWH-LGR** – No VOCs were detected in this well in 2007. However, lead was detected above the RL; cadmium and nickel were reported below respective RLs.
- **CS-MW1-BS** – Concentrations of *cis*-1,2-DCE were reported below the RL in September 2007. Cadmium and lead were also reported below the MCL/AL in September 2007.
- **CS-MW1-CC** – No VOCs were detected in the well in 2007. However, lead and cadmium were detected below their respective MCL/AL in September 2007. The field duplicated reported similar results.
- **CS-MW2-LGR** – Concentrations of *cis*-1,2-DCE were detected below the MCL in March 2007. In September 2007 *cis*-1,2-DCE, PCE and TCE were detected below their respective MCLs. Nickel, cadmium, and lead were also detected below applicable MCL/AL.
- **CS-MW3-LGR** – No VOCs were detected in this well in 2007. However, cadmium, nickel, and lead were reported below respective RLs in October 2007.
- **CS-MW4-LGR** – No VOCs were reported in this well in 2007. Lead and cadmium were reported below respective RLs in September 2007.
- **CS-MW5-LGR** – Concentrations of PCE, TCE, and *cis*-1,2-DCE were detected below the MCL in March and September 2007. Low levels of lead and nickel were also detected below respective RLs in September 2007.
- **CS-MW6-LGR** - No VOCs were reported in this well in 2007. Nickel was detected above the RL in October 2007. The field duplicate reported slightly different results with low levels of cadmium and lead also present in this sample.
- **CS-MW6-CC** – No VOCs were detected in this well in 2007. Low levels of cadmium and lead were detected in October 2007, below applicable RLs.
- **CS-MW7-LGR** - No VOCs were detected in this well in 2007. Low levels of cadmium and lead were detected in October 2007, below applicable RLs.
- **CS-MW8-LGR** – Concentrations of PCE were detected in below the MCL in March and December 2007. No metals were detected in this well in 2007.
- **CS-MW8-CC** – Concentrations of PCE and TCE were detected below the MCL in October 2007. Low levels of cadmium and nickel were also detected, below applicable RLs.
- **CS-MW9-LGR** – No VOCs were reported in this well in 2007. However nickel, cadmium, and lead were detected in September 2007, below applicable MCL/RLs. Also, in December 2007 arsenic, barium, chromium, lead, nickel, and zinc were detected below respective MCL/RLs.

- **CS-MW9-CC** - No VOCs were reported in this well in 2007. Low levels of cadmium and lead were reported below respective MCL/AL.
- **CS-MW10-LGR** – Concentrations of PCE and TCE below the MCL were detected in March and December 2007. Also reported below respective RLs were lead and nickel.
- **CS-MW10-CC** - No VOCs were reported in this well in 2007. Nickel, cadmium, and lead were reported below respective RLs.
- **CS-MW11A-LGR** – Concentrations of PCE were detected below the MCL in March and September 2007. Also in September 2007, nickel, cadmium, and lead were reported below respective RLs. The field duplicate reported similar results.
- **CS-MW11B-LGR** – Concentrations of PCE were detected below the MCL in September 2007. Also in September 2007, nickel, cadmium, and lead were reported below respective RLs.
- **CS-MW12-LGR** - No VOCs were reported in this well in 2007. However, nickel was reported above the RL and lead was detected below the RL in December 2007. The field duplicate reported similar results.
- **CS-MW12-BS** – Concentrations of vinyl chloride were detected below the MCL in September 2007. Cadmium and nickel were also detected below applicable RLs.
- **CS-MW17-LGR** – Concentrations of PCE below the MCL were detected in March and December 2007. Also, in December 2007, nickel was detected below the RL.
- **CS-MW18-LGR** - No VOCs were reported in this well in 2007. However low levels of nickel, cadmium, and lead were detected in October 2007, below applicable RLs. The field duplicated reported similar results.
- **CS-MW19-LGR** – Concentrations of PCE were below the MCL in March and September 2007. Also in September 2007 nickel was reported above the RL and cadmium and lead were detected below respective RLs.
- **CS-MW20-LGR** – As a newly installed well, this location was sampled for full-list VOCs and inorganics in 2007. Concentrations of PCE were detected below the MCL in June, October, and December 2007. In June 2007 arsenic, calcium, chromium, lead, magnesium, manganese, nickel, potassium, sodium, zinc, bromide, chloride, fluoride, nitrate, and sulfate were reported below respective MCL/ALs. In October and December 2007 arsenic, barium, lead, and zinc were detected below respective MCL/ALs.
- **CS-MW21-LGR** – As a newly installed well, this location was sampled for full-list VOCs and inorganics in 2007. No VOCs were detected in this well in 2007. However arsenic, barium calcium, lead, magnesium, manganese, potassium, sodium, zinc, chloride and fluoride were detected in June 2007. In October 2007, arsenic, barium, lead, and zinc were again reported below respective MCL/RLs. These same metals were reported in December 2007 with slightly lower levels.

- **CS-MW24-LGR** – As a newly installed well, this location was sampled for full-list VOCs and inorganics in 2007. Methylene chloride was detected below the RL in June 2007 but not in the field duplicate. Methylene chloride is a common laboratory contaminant. Arsenic, barium, calcium, lead, magnesium, manganese, nickel, potassium, sodium, zinc, chloride, fluoride, nitrate, and sulfate were detected in 2007, but at levels below applicable MCL/SS/AL.

2.2.1.3 Monitoring Wells with No COC Detections

Wells CS-MW6-BS, CS-MW7-CC and CS-MW12-CC had no COC detections when sampled in 2007. Details on the reporting limits (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 and former CSSA drinking water supply wells CS-1, CS-9, CS-10, and CS-11 were analyzed for VOCs in March and December 2007 and metals (Ni, Cd, Pb) in December 2007. Under the LTMO study, the drinking water supply wells are sampled every nine months (**Table 2.4**). The detections are summarized as follows:

- **CS-1** – Concentrations of TCE were detected below the RL in December 2007. Also lead was detected below the RL.
- **CS-9** – No VOCs were detected in 2007. However, lead was detected above the AL of 0.015 mg/L and nickel was detected below the MCL.
- **CS-10** – No VOCs were detected in 2007. Lead was also detected in this well below the AL but above the RL. Nickel was detected below the RL.
- **CS-11** – No VOCs were detected in 2007. Lead was detected in December 2007 above the AL. 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 (pipe casing) 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 pipe debris present in the bottom of the borehole in order to eliminate contact with the water producing zones. Initial sampling shows that metals levels are below MCLs. After the pump was installed, well CS-9 was reconnected to the CSSA system. A more in-depth summary of the rehabilitation of Well CS-9 is included in **Section 3** and **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 2007. 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 March 2007. Samples were collected from all multiport zones (UGR, LGR, BS, and CC) during the October 2007 event. Due to a decrease in groundwater elevations, certain zones (CS-WB01-UGR-01, CS-WB02-UGR-01, CS-WB02-LGR-02, CS-WB03-UGR-01, CS-WB03-LGR-01, CS-WB03-LGR-02, and CS-WB04-UGR-01) could not be sampled in October or March because they were dry. Zone CS-WB04-LGR-05 was not sampled due to a non-operational sampling port. The remaining 39 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 October 2007, 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 DHL Analytical, Inc., in Round Rock, Texas. Per DQOs, the Westbay® data are used for screening purposes only. No quality assurance/quality control samples were collected with the Westbay® samples in 2007. 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-02, -LGR-03, -LGR-04, -LGR-09, CS-WB03-UGR-01, -LGR-02 through -LGR-09, CS-WB04-LGR-06, -LGR-07, and -LGR-09 reported detections of PCE and/or TCE above the MCL in 2007.

Figure 2.3 presents the vertical distribution of the plume within the multi-port wells for the most pervasive contaminant, PCE. The contaminant conditions in **Figure 2.3** occurred during an above-average saturation in the aquifer, where the post had received more than 50 inches of rainfall between months January and October 2007. The following discussion presents general observations that have been noted since the inception of Westbay monitoring at AOC-65.

Table 2.6
2007 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	0.2	0.6	0.2	0.1	0.078	0.074
Reporting Limit	RL	1.2	1.4	0.6	1	1.1	1.2
Max. Contaminant Level	MCL	70	5	100	5	2	7
CS-WB01-UGR-01	14-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	4-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB01-LGR-01	14-Mar-07	--	**4.6**	--	**0.26F**	--	--
	4-Oct-07	--	**6.2**	--	--	--	--
CS-WB01-LGR-02	14-Mar-07	--	**6.8**	--	**3.2**	--	--
	5-Oct-07	--	**12**	--	**4.8**	--	--
CS-WB01-LGR-03	14-Mar-07	--	**1.1F**	--	**3.3**	--	--
	5-Oct-07	--	**2.2**	--	**7.7**	--	--
CS-WB01-LGR-04	14-Mar-07	--	--	--	--	--	--
	5-Oct-07	--	**0.38J**	--	**0.40J**	--	--
CS-WB01-LGR-05	14-Mar-07	--	--	--	**0.17F**	--	--
	5-Oct-07	--	**0.32J**	--	**0.77J**	--	--
CS-WB01-LGR-06	14-Mar-07	--	**0.26F**	--	**0.41F**	--	--
	5-Oct-07	--	**0.48J**	--	**1.8**	--	--
CS-WB01-LGR-07	14-Mar-07	--	**11**	--	**9.5**	--	--
	5-Oct-07	--	**16**	--	**15**	--	--
CS-WB01-LGR-08	14-Mar-07	--	**0.35F**	--	**0.74F**	--	--
	5-Oct-07	**0.25J**	**0.96J**	--	**1.9**	--	--
CS-WB01-LGR-09	14-Mar-07	**0.44F**	**10**	--	**20**	--	--
	5-Oct-07	**0.42J**	**21**	--	**32**	--	--
CS-WB02-UGR-01	14-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	3-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB02-LGR-01	14-Mar-07	--	**3.8**	--	**2.6**	--	--
	3-Oct-07	--	**8.2**	--	**2**	--	--
CS-WB02-LGR-02	14-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	3-Oct-07	--	**5.1**	--	**0.68J**	--	--
CS-WB02-LGR-03	14-Mar-07	--	**4.5**	--	**3.1**	--	--
	3-Oct-07	--	**7.8**	--	**1.2**	--	--
CS-WB02-LGR-04	14-Mar-07	--	**2.0**	--	**10**	--	--
	3-Oct-07	--	**2.2**	--	**9.2**	--	--
CS-WB02-LGR-05	14-Mar-07	--	**0.53F**	--	**3.1**	--	--
	3-Oct-07	--	**0.90J**	--	**3.6**	--	--
CS-WB02-LGR-06	14-Mar-07	--	**0.86F**	--	**3.8**	--	--
	3-Oct-07	--	**3.3**	--	**4.2**	--	--
CS-WB02-LGR-07	14-Mar-07	--	**0.59F**	--	**0.46F**	--	--
	3-Oct-07	--	**1.9**	--	**1.5**	--	--
CS-WB02-LGR-08	14-Mar-07	--	**1.3F**	--	**1.3**	--	--
	3-Oct-07	--	**3.4**	--	**2.2**	--	--
CS-WB02-LGR-09	14-Mar-07	**0.24F**	**6.6**	--	**9.8**	--	--
	3-Oct-07	**0.25J**	**9.3**	--	**10**	--	--
CS-WB03-UGR-01	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	4-Oct-07	**7.6**	**22,000***	**0.22J**	**450J***	--	**0.39J**
CS-WB03-LGR-01	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	4-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB03-LGR-02	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	4-Oct-07	--	**140***	--	**11**	--	--

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Table 2.6
2007 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	0.2	0.6	0.2	0.1	0.078	0.074
Reporting Limit	RL	1.2	1.4	0.6	1	1.1	1.2
Max. Contaminant Level	MCL	70	5	100	5	2	7
CS-WB03-LGR-03	15-Mar-07	**0.31F**	**17**	--	**9.4**	--	--
	4-Oct-07	--	**24**	--	**9.8**	--	--
CS-WB03-LGR-04	15-Mar-07	--	**15**	--	**7.5**	--	--
	4-Oct-07	--	**35**	--	**12**	--	--
CS-WB03-LGR-05	15-Mar-07	--	**13**	--	**6.4**	--	--
	4-Oct-07	--	**33**	--	**9.7**	--	--
CS-WB03-LGR-06	15-Mar-07	--	**9**	--	**1.5**	--	--
	4-Oct-07	--	**16**	--	**2.3**	--	--
CS-WB03-LGR-07	15-Mar-07	--	**5.7**	--	**1.7**	--	--
	4-Oct-07	**0.73J**	**31**	--	**28**	--	--
CS-WB03-LGR-08	15-Mar-07	--	**13**	--	**1.3**	--	--
	4-Oct-07	--	**21**	--	**2.0**	--	--
CS-WB03-LGR-09	15-Mar-07	--	**7.1**	--	**0.85F**	--	--
	4-Oct-07	--	**13**	--	**11.0**	--	--
CS-WB04-UGR-01	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	3-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-01	15-Mar-07	--	**0.24F**	--	--	--	--
	3-Oct-07	--	**0.28J**	--	--	--	--
CS-WB04-LGR-02	15-Mar-07	--	--	--	--	--	--
	3-Oct-07	--	**0.30J**	--	--	--	--
CS-WB04-LGR-03	15-Mar-07	--	--	--	--	--	--
	3-Oct-07	--	--	--	--	--	--
CS-WB04-LGR-04	15-Mar-07	--	--	--	--	--	--
	3-Oct-07	--	--	--	--	--	--
CS-WB04-LGR-05	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	3-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-06	15-Mar-07	**3.0**	**2.1**	**0.24F**	**11**	--	--
	3-Oct-07	**2.9**	**1.4**	**0.36J**	**9.1**	--	--
CS-WB04-LGR-07	15-Mar-07	**2.9**	**1.3F**	**0.20F**	**8.8**	--	--
	3-Oct-07	**2.2**	**1.4**	--	**8.0**	--	--
CS-WB04-LGR-08	15-Mar-07	--	--	--	**0.65F**	--	--
	3-Oct-07	--	**0.33J**	--	**1.1**	--	--
CS-WB04-LGR-09	15-Mar-07	--	**7.7**	--	**8.2**	--	--
	3-Oct-07	--	**12**	--	**11**	--	--
CS-WB04-LGR10	15-Mar-07	--	**0.47F**	--	**0.48F**	--	--
	3-Oct-07	--	**0.82J**	--	**1.2**	--	--
CS-WB04-LGR-11	15-Mar-07	--	--	--	--	--	--
	3-Oct-07	--	--	--	--	--	--
CS-WB04-BS-01	3-Oct-07	--	--	--	--	--	--
CS-WB04-BS-02	3-Oct-07	**0.25J**	--	--	--	--	--
CS-WB04-CC-01	3-Oct-07	**0.48J**	--	--	**0.19J**	--	--
CS-WB04-CC-02	3-Oct-07	--	--	--	--	--	--
CS-WB04-CC-03	3-Oct-07	--	--	--	--	--	--

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Data Qualifiers:
F- The analyte was positively identified but the associated numerical value is below the RL.
J - The analyte was positively identified, the quantitation is an estimation.
U - The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
All values are reported in µg/L.
* - A dilution run was performed on the sample.
All samples were analyzed by DHL Analytical as screening data.

NORTH

SOUTH/EAST

WEST

CS-WB03

CS-WB02

CS-WB01

CS-WB04

1280

1200

1120

1040

960

880

800

720

640

10,000

1,000

100

20

10

5

1

22,000

DRY

140

24

35

33

16

31

21

13

DRY

8.2

5.1

7.8

2.2

0.9

3.3

1.9

3.4

9.3

DRY

6.2

12

2.2

0.58

0.32

0.48

16

0.96

21

DRY

0.28

0.3

ND

ND

1.4

1.4

0.33

12

0.82

ND

ND

ND

ND

ND

ND

Upper Glen Rose

UGR-01

Lower Glen Rose

LGR-01

LGR-02

LGR-03

LGR-04

LGR-05

LGR-06

LGR-07

LGR-08

LGR-09

LGR-10

LGR-11

Bexar Shale

BS-01

BS-02

Cow Creek

CC-01

CC-02

CC-03

Hammett Shale

Index Map

Legend

Casing

Boring

Packer

Sample Port

ND Not Detected (MDL=0.15 µg/L)

80

40

0

0 60 120

horz. scale: 1"=120'

vert. scale: 1"=80'

STATE OF TEXAS

W. SCOTT PEARSON

GEOLOGY

2186

LICENSED

PROFESSIONAL GEOSCIENTIST

743322 CSSA-CONXS-PCE-1007.DWG

Figure 2.3

Vertical Distribution of PCE within Multi-port Wells - October 2007

Camp Stanley Storage Activity, Texas

PARSONS

CS-WB03 is located closest to the Building 90 source area, and consistently records the highest concentrations of contaminants. The uppermost three zones (CS-WB03-UGR01, -LGR01, and –LGR02 are typically dry except during extreme precipitation events. However, when groundwater is present in these zones, PCE concentrations have ranged between 140 µg/L (CS-WB03-LGR02) and 22,000 µg/L. The results indicate that a persistent source still exists, and that period flushing by intense rainfall can mobilize these perched contaminants that are probably otherwise bound to the matrix during the rest of the year. 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.

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.

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 6 µg/L and 13 µg/L. 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.

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-one off-post wells were sampled during the 2007 quarterly monitoring events, and their locations are illustrated on **Figure 2.1**. Off-post wells sampled during the quarterly monitoring events were selected based on

Table 2.7
Off-Post Sampling Rationale for 2007

Well ID	2007 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	NS	As needed, once annually
FO-J1					Qtrly, 1 year thru Dec 08
HS-1					Qtrly, 1 year thru Dec 08
HS-2					Qtrly, 1 year thru Dec 08
HS-3	NS		NS	NS	As needed, once annually
I10-2		NS	NS	NS	As needed, once annually
I10-4		NS	NS	NS	Plugged & abandoned
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 March 08
JW-6	NS		NS	NS	As needed, once annually
JW-7					Qtrly, 1 year thru Dec. 08
JW-8					Qtrly, 1 year thru Dec. 08
JW-9		NS	NS	NS	As needed, once annually
JW-9-A2*	NS	NS	NS	NS	As needed
JW-12	NS	NS			Qtrly, 1 year thru Sept. 08
JW-13	NS		NS	NS	As needed, once annually
JW-14					Qtrly, 1 year thru March 08
JW-15		NS	NS	NS	As needed, once annually
JW-26	NS	NS	NS	NS	As needed, once annually
JW-27				NS	Qtrly, 1 year thru Mar 08
JW-28			NS	NS	Wellowner declined access.
JW-29					Qtrly, due to location
JW-30					Qtrly, 1 year thru June 08
LS-1	NS	NS	NS	NS	Well is offline
LS-2	NS	NS	NS	NS	Well is offline
LS-2/LS-3-A1		NS	NS	NS	Well is offline
LS-3		NS	NS	NS	Well is offline
LS-2/LS-3-A2		NS	NS	NS	Well is offline
LS-4		NS	NS	NS	Well is offline
LS-5					Qtrly, 1 year thru Dec 08
LS-6					Qtrly, 1 year thru Dec 08
LS-6-A2		NS		NS	Biannually (Mar & Sept)
LS-7					Qtrly, 1 year thru Dec. 08
LS-7-A2		NS		NS	Biannually (Mar & Sept)
OFR-1					Qtrly, 1 year thru Dec 08
OFR-2	NS	NS	NS	NS	Well was P&A by Centex
OFR-3					Qtrly, 1 year thru Dec. 08
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	NS	As needed, once annually
RFR-5		NS	NS	NS	As needed, once annually
RFR-6	NS	NS	NS	NS	Well to be abandoned by owner
RFR-7	NS	NS	NS	NS	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. 08
RFR-10-A2		NS		NS	Biannually (Mar & Sept)
RFR-10-B2		NS		NS	Biannually (Mar & Sept)
RFR-11					Qtrly, 1 year thru Dec. 08
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 Dec 08

	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.
	VOCs detected are less than 80% of the MCL (<4.0 ppb and >0.11 ppb for PCE & <4.0 ppb >0.14 ppb for TCE). After four quarters of stable results the well can be removed from quarterly sampling.
	No VOCs detected. Sample on an as needed basis.
	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.
NS	Not sampled for that event.

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.

Off-post wells sampled in 2007 include (see **Figure 2.1** for well locations):

- One privately owned well in the Dominion (DOM-2);
- Three public supply wells in the Fair Oaks area (FO-8, FO-J1, and FO-17);
- 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 public wells: LS-3, 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 LS1, LS-2, LS-3, and LS-4 in the Bexar Metropolitan 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. 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 Agriculture and Priority Pollutants Laboratory (APPL) in Fresno, California 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 2007 sampling events were reviewed and verified according to the guidelines outlined in the CSSA QAPP. After the data packages were received by Parsons, data verification reports were submitted to AFCEE chemists and the data packages were approved.

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 2007 are presented in **Table 2.8**. Full analytical results from the 2007 sampling events are presented in **Appendix F**. Concentration trends are illustrated on **Figure 2.4** for wells LS-2, LS-3, 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 2.4** also includes precipitation data from the weather stations located at CSSA, WS-N and WS-S. **Figure 2.5** 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 2007, wells OFR-3, RFR-10 and RFR-11 had concentrations exceeding the MCL. Well RFR-10 concentrations exceeded the MCLs for PCE during all four events in 2007. TCE exceeded the MCL in June and December 2007. Concentrations of *cis*-1,2-DCE were also detected in RFR-10. PCE exceeded the MCL in March 2007 in well OFR-3 and well RFR-11 in June 2007. Post-GAC samples were all below the MCL. An evaluation of concentration trends through 2007 are included in **Figures 2.4 and 2.5**.

Table 2.8
2007 Off-Post Groundwater COC Analytical Results, Detections Only

Community	Well ID	Sample Date	*cis* -1,2-Dichloro-ethene	*trans* -1,2-Dichloro-ethene	Tetra-chloroethene	Trichloroethene
Dominion Subdivision	DOM-2	3/22/2007	--	--	--	--
Fair Oaks Ranch	FO-8	3/20/2007	--	--	--	--
	FO-17	6/12/2007	--	--	--	--
	FO-J1	3/22/2007	--	--	**0.16F**	--
		6/12/2007	**0.60F**	--	--	--
		9/18/2007	--	--	--	--
		12/4/2007	--	--	**0.14F**	--
Hidden Springs	HS-1	3/21/2007	--	--	**0.15F**	--
		6/14/2007	--	--	**0.16F**	--
		9/20/2007	--	--	--	--
		12/6/2007	--	--	**0.18F**	--
	Duplicate	12/6/2007	--	--	**0.18F**	--
	HS-2	3/21/2007	--	--	**0.16F**	--
	Duplicate	3/21/2007	--	--	**0.16F**	--
		6/14/2007	--	--	--	--
		9/20/2007	--	--	**0.18F**	--
		12/6/2007	--	--	**0.08F**	--
	HS-3	6/14/2007	--	--	--	--
IH-10 Area	I10-2	3/20/2007	--	--	--	--
	I10-4	3/22/2007	--	--	**2.31**	**1.11**
	I10-7	3/20/2007	--	--	--	--
	Duplicate	3/20/2007	--	--	--	--
		6/12/2007	--	--	--	--
		9/18/2007	--	--	--	--
		12/4/2007	--	--	--	--
	I10-8	12/4/2007	--	--	--	--
Jackson Woods Subdivision	JW-5	3/20/2007	--	--	**0.07F**	--
		6/12/2007	--	--	--	--
		9/20/2007	--	--	--	--
		12/5/2007	--	--	--	--
	JW-6	6/13/2007	--	--	--	--
	JW-7	3/21/2007	--	--	**0.39F**	--
		6/12/2007	--	--	**0.44F**	--
		9/18/2007	--	--	**0.34F**	--
		12/11/2007	--	--	**0.32F**	--
	JW-8	3/21/2007	**0.12F**	--	**0.31F**	--
		6/13/2007	**0.40F**	--	--	--
		9/19/2007	--	--	--	--
	Duplicate	9/19/2007	--	--	--	--
		12/6/2007	--	--	**0.14F**	--
	JW-9	3/20/2007	--	--	--	--
	JW-12	9/20/2007	--	--	**0.21F**	--
		12/4/2007	--	--	--	--
	Duplicate	12/4/2007	--	--	--	--
	JW-13	6/14/2007	--	--	--	--
	JW-14	3/22/2007	--	--	**0.16F**	--
		6/14/2007	--	--	--	--
		9/18/2007	--	--	--	--
		12/5/2007	--	--	--	--
	JW-15	3/20/2007	--	--	--	--
	JW-27	3/21/2007	--	--	--	--
		6/13/2007	--	--	--	--
	Duplicate	6/13/2007	--	--	--	--
		9/18/2007	--	--	--	--
	JW-28	3/21/2007	--	--	--	--
		6/13/2007	--	--	--	--
	JW-29	3/20/2007	--	--	--	--
		6/13/2007	--	--	--	--
		9/20/2007	--	--	**0.16F**	--
	Duplicate	9/20/2007	--	--	--	--
		12/5/2007	--	--	--	--
	Duplicate	12/5/2007	--	--	--	--
	JW-30	3/22/2007	--	--	--	--
	Duplicate	3/22/2007	--	--	--	--
		6/12/2007	**0.65F**	--	--	--
	Duplicate	6/12/2007	**0.64F**	--	--	--
		9/18/2007	--	--	--	--
		12/5/2007	--	--	--	--
Comparison Criteria	**Method Detection Limit**	**MDL**	**0.07**	**0.08**	**0.06**	**0.05**
	Reporting Limit	**RL**	**1.2**	**0.6**	**1.4**	**1.0**
	Max. Contaminant Level	**MCL**	**70**	**100**	**5.0**	**5.0**

Notes:
All VOCs analyzed by method SW 8260B by APPL Laboratory.
All results given in micrograms per liter (ug/L)
M = failure of the matrix spike and/or matrix spike duplicate samples.
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.
R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
U = The analyte was analyzed for, but not detected. The associated numerical value is at or below The method detection.

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

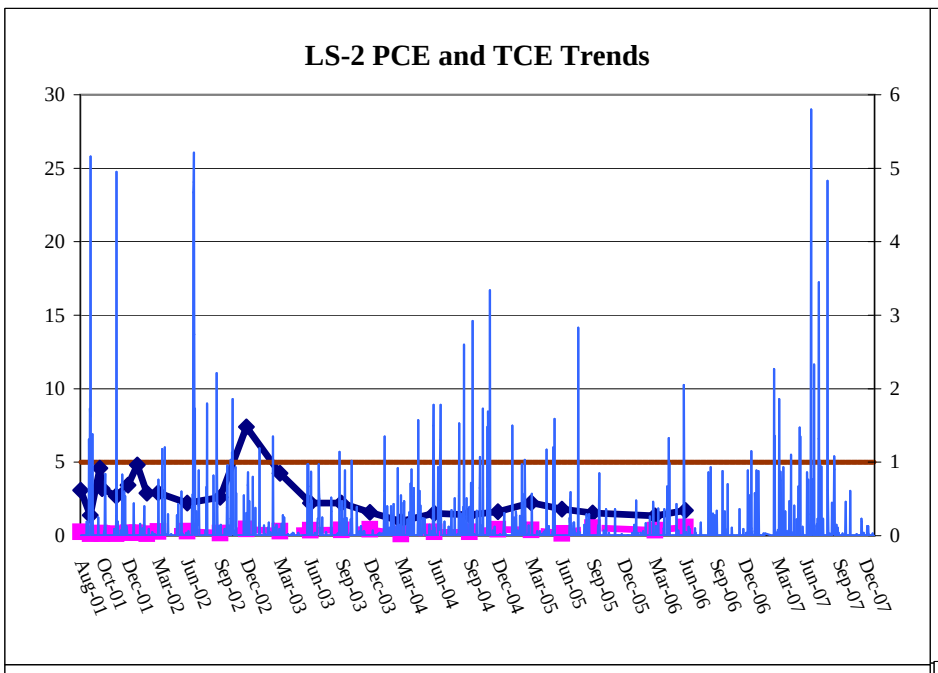
Table 2.8
2007 Off-Post Groundwater COC Analytical Results, Detections Only

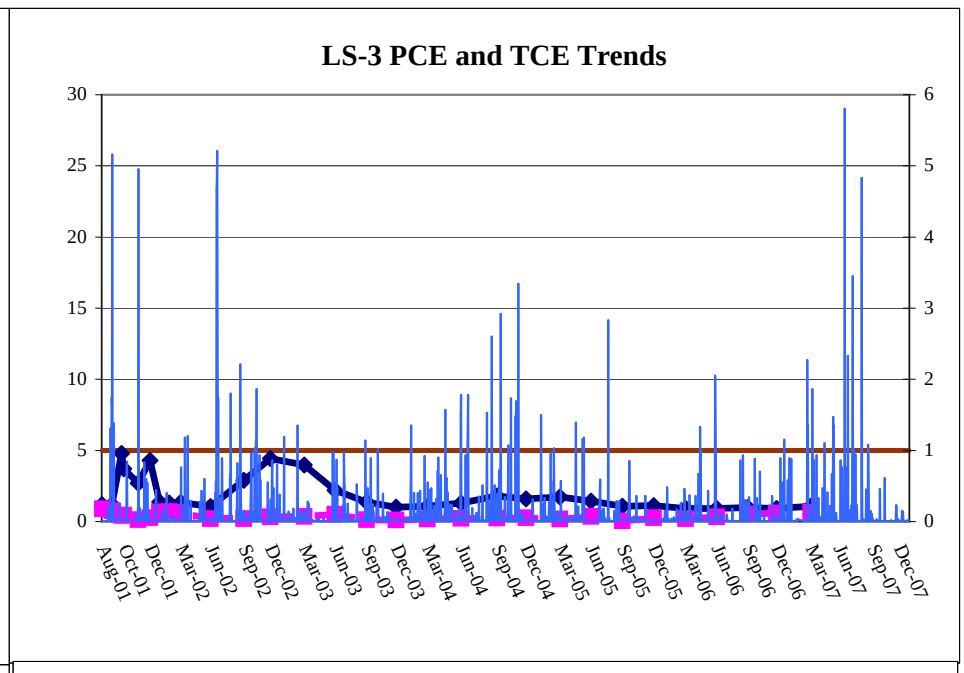
Community	Well ID	Sample Date	*cis* -1,2-Dichloro-ethene	*trans* -1,2-Dichloro-ethene	Tetra-chloroethene	Trichloroethene
Leon Springs Estates	LS-2/LS-3-A1	3/21/2007	--	--	--	0.19F
	LS-2/LS-3-A2	3/21/2007	--	--	--	--
	LS-3	3/21/2007	--	--	1.08F	0.66F
	LS-4	3/21/2007	--	--	0.22F	--
	LS-5	3/19/2007	--	--	--	0.15F
		6/11/2007	--	--	--	0.25F
		9/17/2007	--	--	--	--
	Duplicate	9/17/2007	--	--	--	--
		12/3/2007	--	--	0.12F	0.39F
	LS-6	3/19/2007	--	--	2.33	0.11F
	Duplicate	3/19/2007	--	--	2.51	0.13F
		6/11/2007	--	--	2.98	0.21F
		9/17/2007	--	--	1.5	0.68F
		12/3/2007	--	--	1.56	0.13F
	LS-6-A2	3/19/2007	--	--	--	--
		9/17/2007	--	--	--	--
	LS-7	3/19/2007	--	--	2.1	0.41F
		6/11/2007	--	--	1.84	0.74F
		9/17/2007	--	--	2.5	--
		12/3/2007	--	--	2.07	0.43F
	LS-7-A2	3/19/2007	--	--	--	--
		9/17/2007	--	--	--	--
Old Fredericksburg Road	OFR-1	3/20/2007	--	--	0.35F	--
		6/12/2007	--	--	--	--
		9/19/2007	--	--	--	--
		12/4/2007	--	--	0.29F	--
	OFR-3	3/19/2007	0.18F	--	8.15	4.8
		6/11/2007	--	--	2.78	2.13
		9/17/2007	--	--	1.1F	1.2
		12/3/2007	--	--	2.92	1.94
	OFR-3-A2	3/19/2007	--	--	--	--
		9/17/2007	--	--	--	--
	OFR-4	3/20/2007	--	--	--	--
Ralph Fair Road	RFR-3	12/5/2007	--	--	--	--
	RFR-4	3/21/2007	--	--	--	--
	RFR-5	3/21/2007	--	--	--	--
	RFR-8	6/14/2007	--	--	--	--
	RFR-9	9/20/2007	--	--	--	--
	RFR-10	3/19/2007	0.13F	--	11.64	4.57
		6/11/2007	0.34F	--	10.55	5.91
		9/17/2007	0.34F	--	8.4	4.5
		12/3/2007	0.38F	--	10.04	5.39
	RFR-10-A2	3/19/2007	--	--	--	--
		9/17/2007	--	--	--	--
	RFR-10-B2	3/19/2007	--	--	--	--
		9/17/2007	--	--	--	--
	RFR-11	3/19/2007	--	--	3.84	--
		6/11/2007	--	--	7.53	0.32F
		9/17/2007	--	--	1.5	1.1
		12/3/2007	--	--	1.31F	1.17
	RFR-11-A2	3/19/2007	--	--	--	--
		9/17/2007	--	--	--	--
	RFR-12	3/20/2007	--	--	--	--
	RFR-13	6/14/2007	--	--	--	--
	Duplicate	6/14/2007	--	--	--	--
	RFR-14	3/21/2007	--	--	0.10F	--
		6/14/2007	0.27F	--	--	--
		9/18/2007	--	--	--	--
		12/5/2007	--	--	0.18F	--
Comparison Criteria	Method Detection Limit	MDL	0.07	0.08	0.06	0.05
	Reporting Limit	RL	1.2	0.6	1.4	1.0
	Max. Contaminant Level	MCL	70	100	5.0	5.0

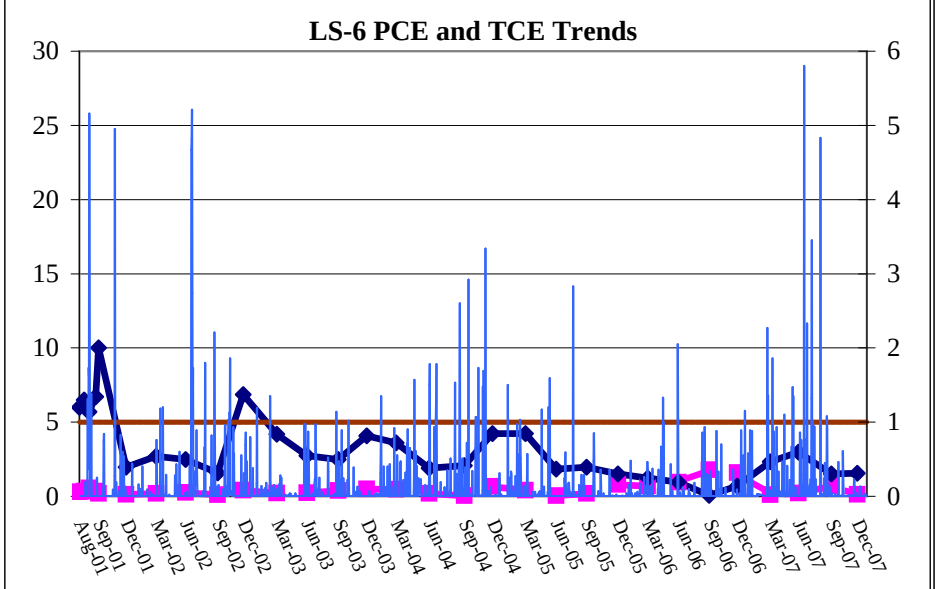
Notes:
All VOCs analyzed by method SW 8260B by APPL Laboratory.
All results given in micrograms per liter (ug/L)
M = failure of the matrix spike and/or matrix spike duplicate samples.
F = The analyte was positively identified but The associated numerical value is below The RL.
J = The analyte was positively identified below quantitation limits; the quantitation is an estimate.
R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
U = The analyte was analyzed for, but not detected. The associated numerical value is at or below The method detection.

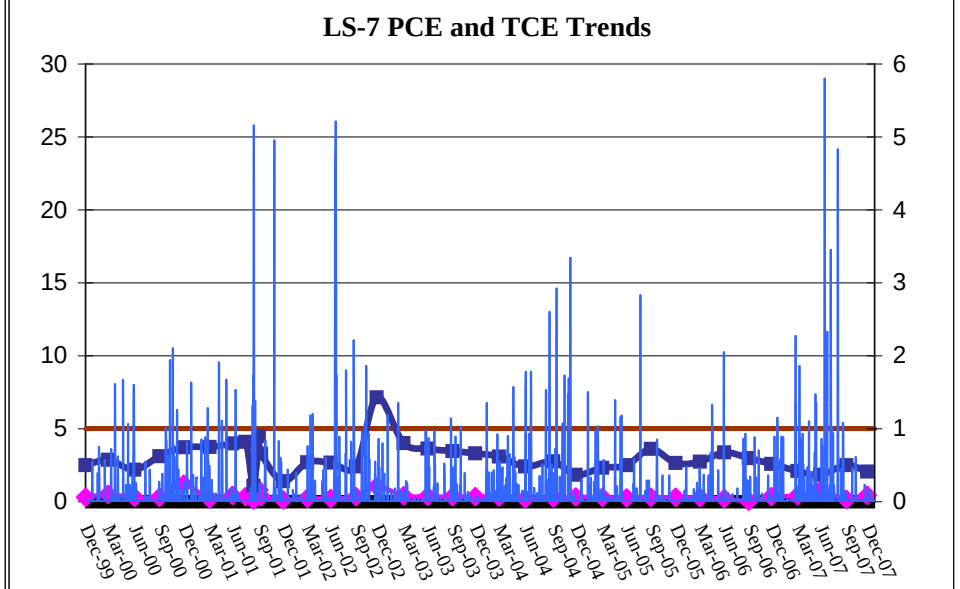
BOLD Value > or = MCL
BOLD MCL > Value > or = RL
BOLD RL > Value > MDL

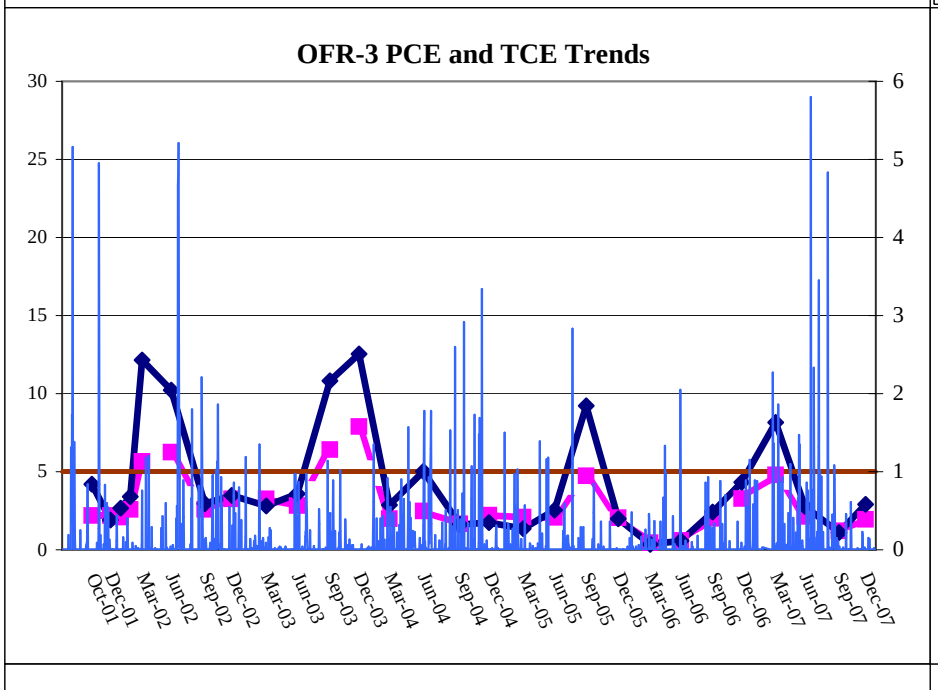
Figure 2.4, PCE and TCE Concentration Trends and Precipitation

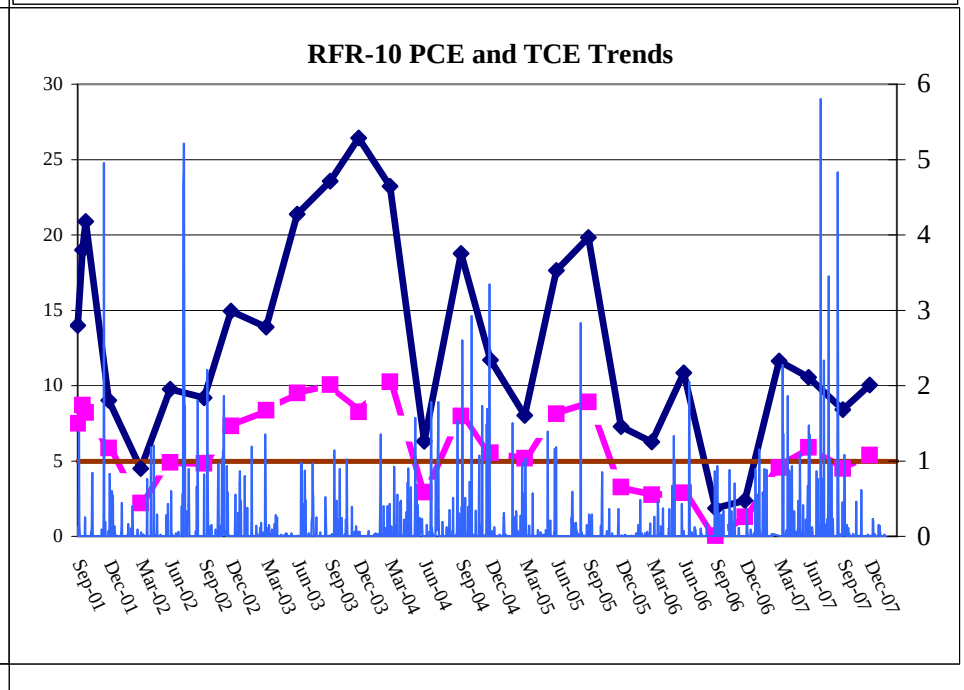


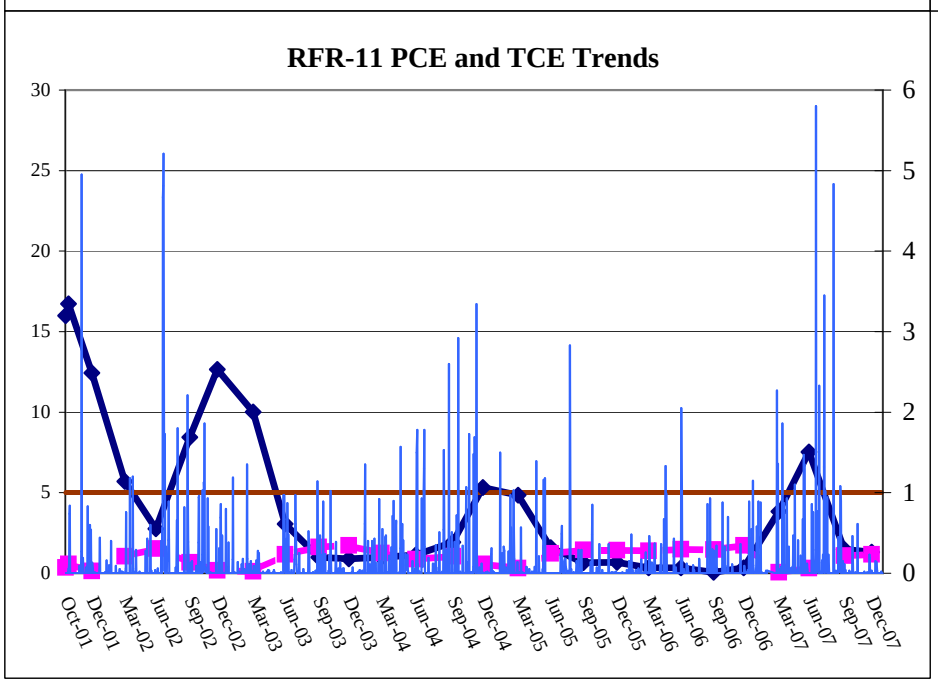












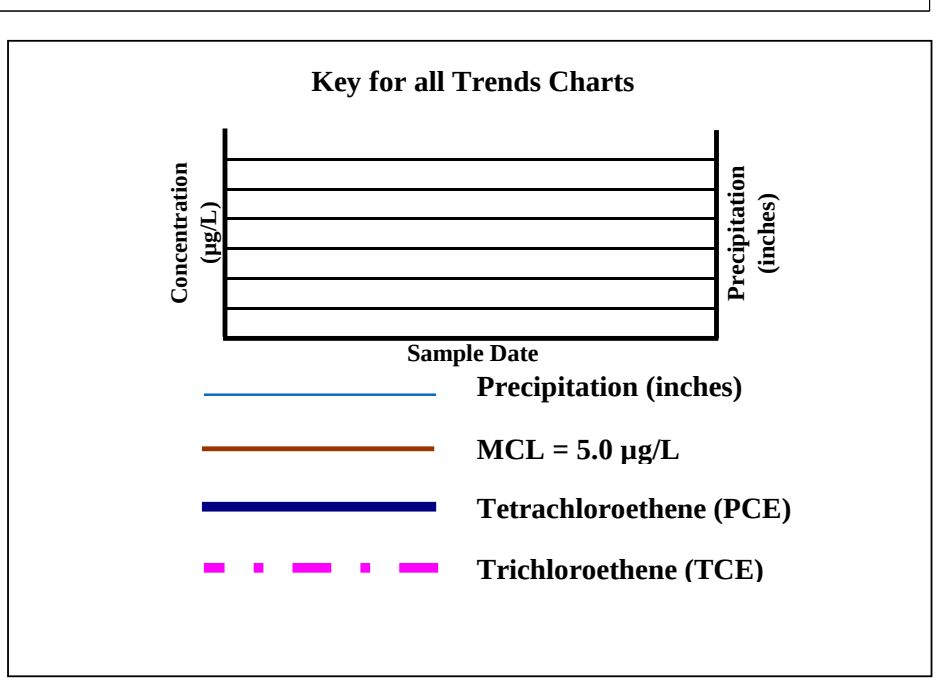
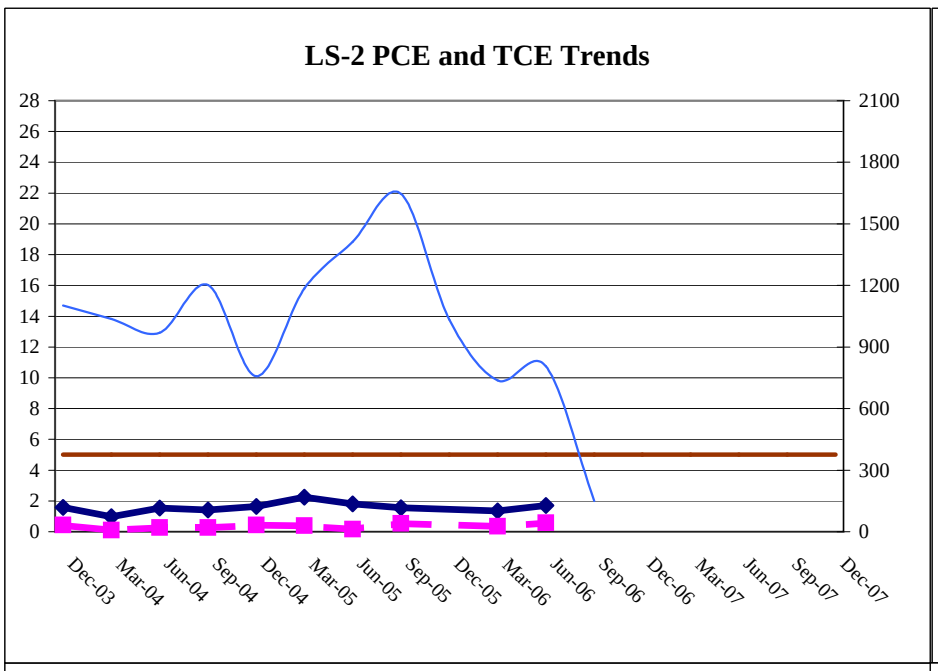
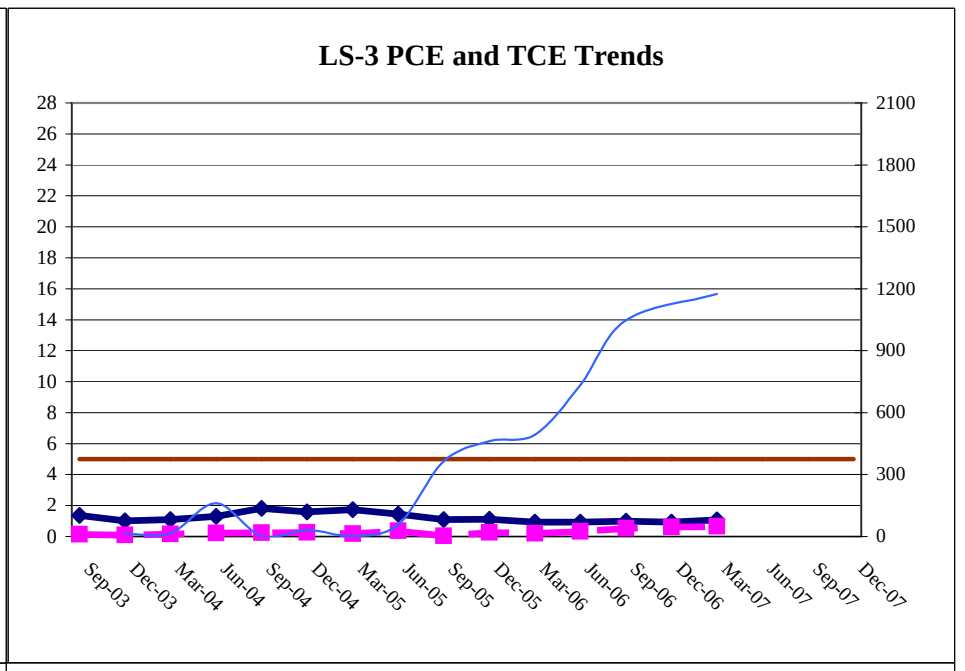
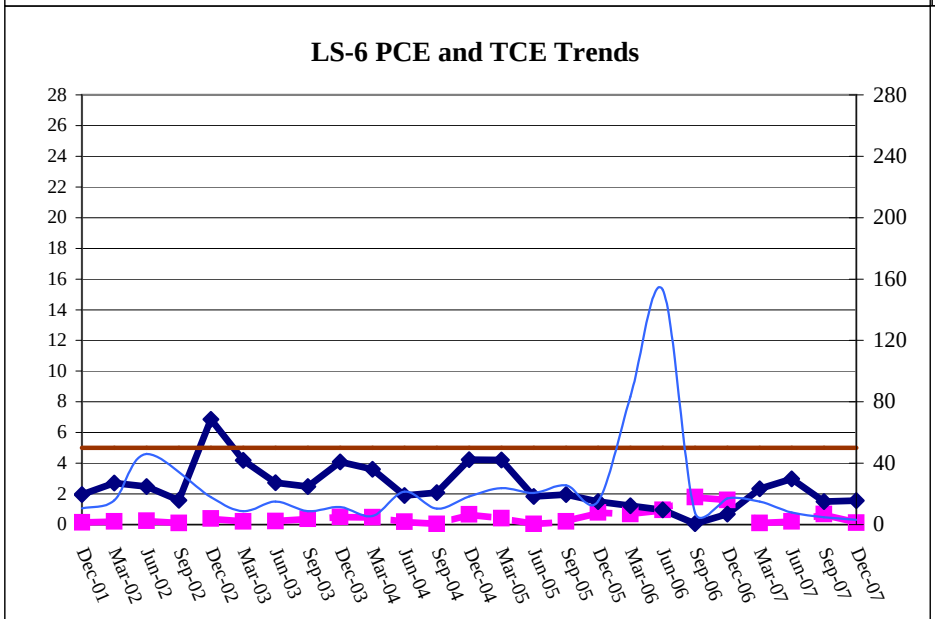


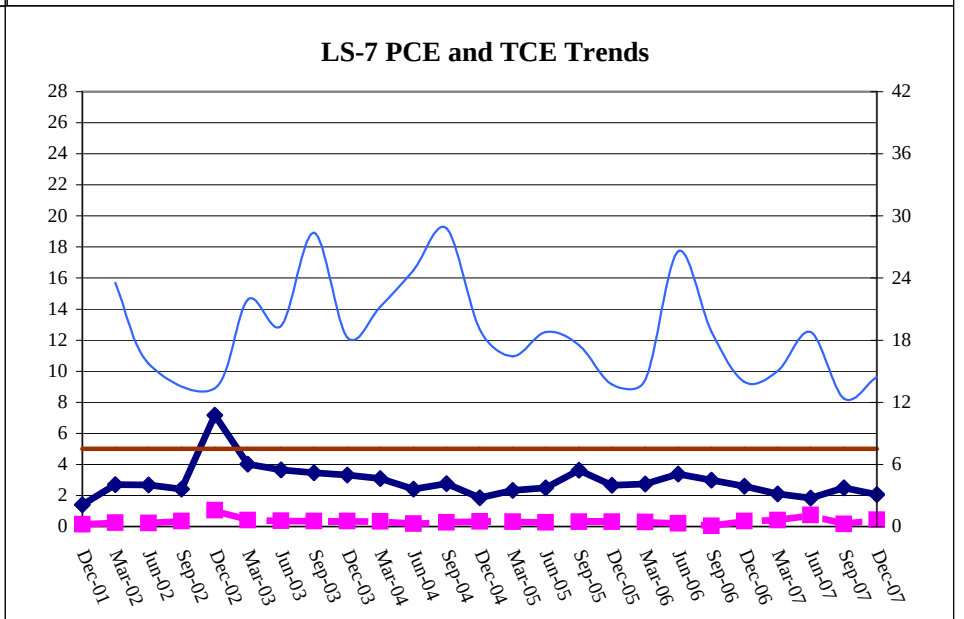
Fig 2.4 and 2.5 Conc trend GAC flows.xls

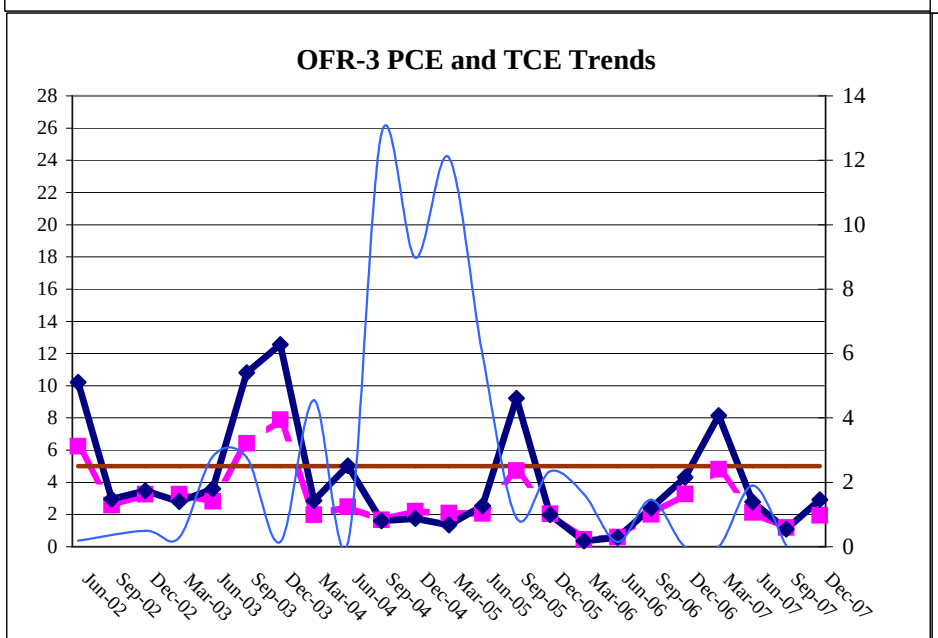
Figure 2.5, PCE and TCE Concentration Trends and Monthly Water Usage

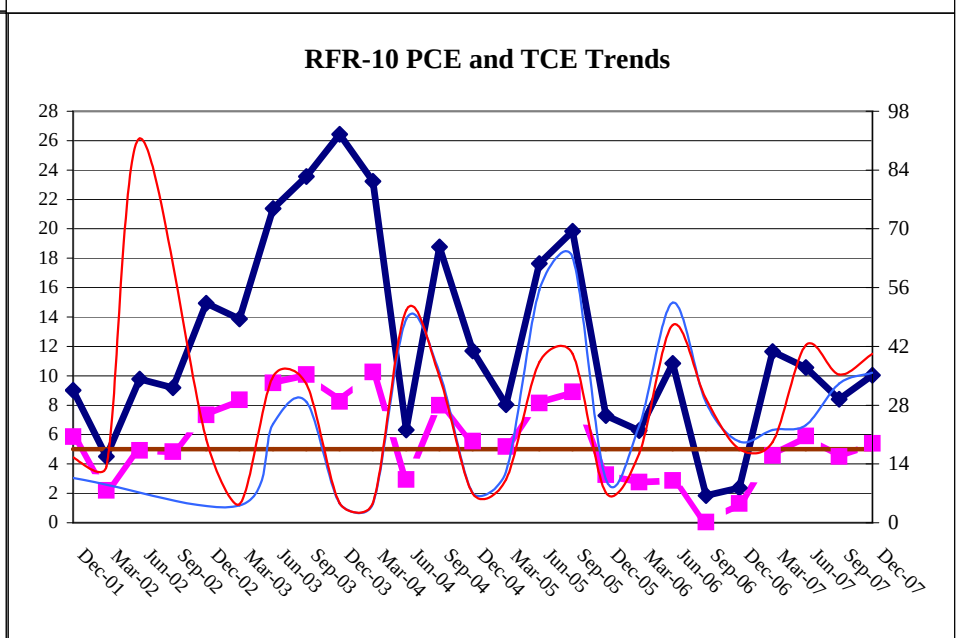


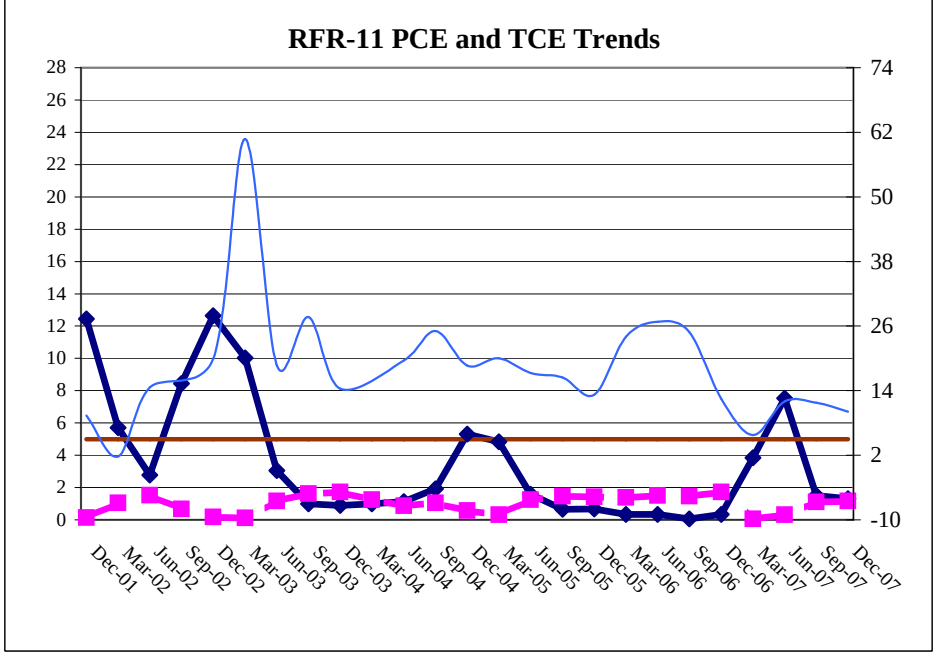












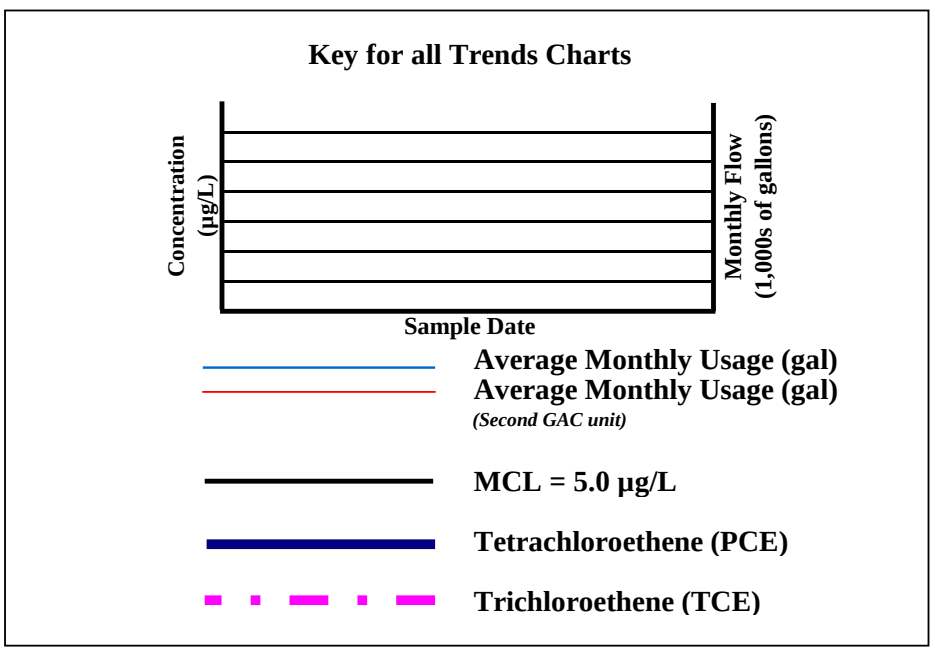


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Table 2.9 GAC Filtration Systems Installed

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

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 2007 events in accordance with project DQOs. See **Appendix G** for pre and post-GAC sample comparisons.

Regular maintenance was scheduled in 2007 to change the carbon in the single well GAC filtration systems (LS-6, LS-7, OFR-3, RFR-10, and RFR-11) on May 9 and December 5, 2007. 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 I10-4, LS-6, and LS-7. The detections below the MCL and above the RL are summarized as follows:

- **I10-4** –Concentration of PCE and TCE exceeded the RL in March 2007;
- **LS-6** – Concentrations of PCE exceeded the RL in all four events in 2007;
- **LS-7** – Concentrations of PCE exceeded the RL from all samples in 2007.

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 2007, this included wells FO-J1, HS-1, HS-2, JW-5, JW-7, JW-8, JW-12, JW-14, JW-29, JW-30,

LS-2/LS-3-A1, LS-3, LS-4, LS-5, 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 March and December, concentrations of *cis*-1,2-DCE in June 2007;
- **HS-1** and **HS-2** – Concentrations of PCE detected below the RL in March, June, and December in HS-1 and PCE was detected in HS-2 in March, September, and December 2007;
- **JW-5** – Concentrations of PCE detected below the RL in March 2007;
- **JW-7** – Concentrations of PCE detected below the RL in all of 2007;
- **JW-8** – Concentrations of PCE and/or *cis*-1,2-DCE detected below the RL in March, June, and December 2007;
- **JW-12** – Concentrations of PCE detected below the RL in September 2007;
- **JW-14** – Concentrations of PCE detected in March 2007;
- **JW-29** – Concentrations of PCE detected in September 2007;
- **JW-30** – Concentrations of *cis*-1,2-DCE detected below the RL in June;
- **LS-2/LS-3-A1** – Concentrations of TCE detected in post-GAC sample in March 2007;
- **LS-3** – Concentrations of PCE and TCE detected below the RL in March 2007;
- **LS-4** – Concentrations of PCE detected below the RL in March 2007;
- **LS-5** – Concentrations of PCE and TCE detected below the RL in March, June, and December;
- **OFR-1** – Concentrations of PCE detected below the RL in March and December 2007; and
- **RFR-14** – Concentrations of PCE or *cis*-1,2-DCE detected below the RL in March, June, and December 2007.

2.2.3 Concentration Contours

The maximum concentration detected during any event from 2007 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 2.6, 2.7 and 2.8** to illustrate the extent of contamination as measured from analytical results and inferred from those results.

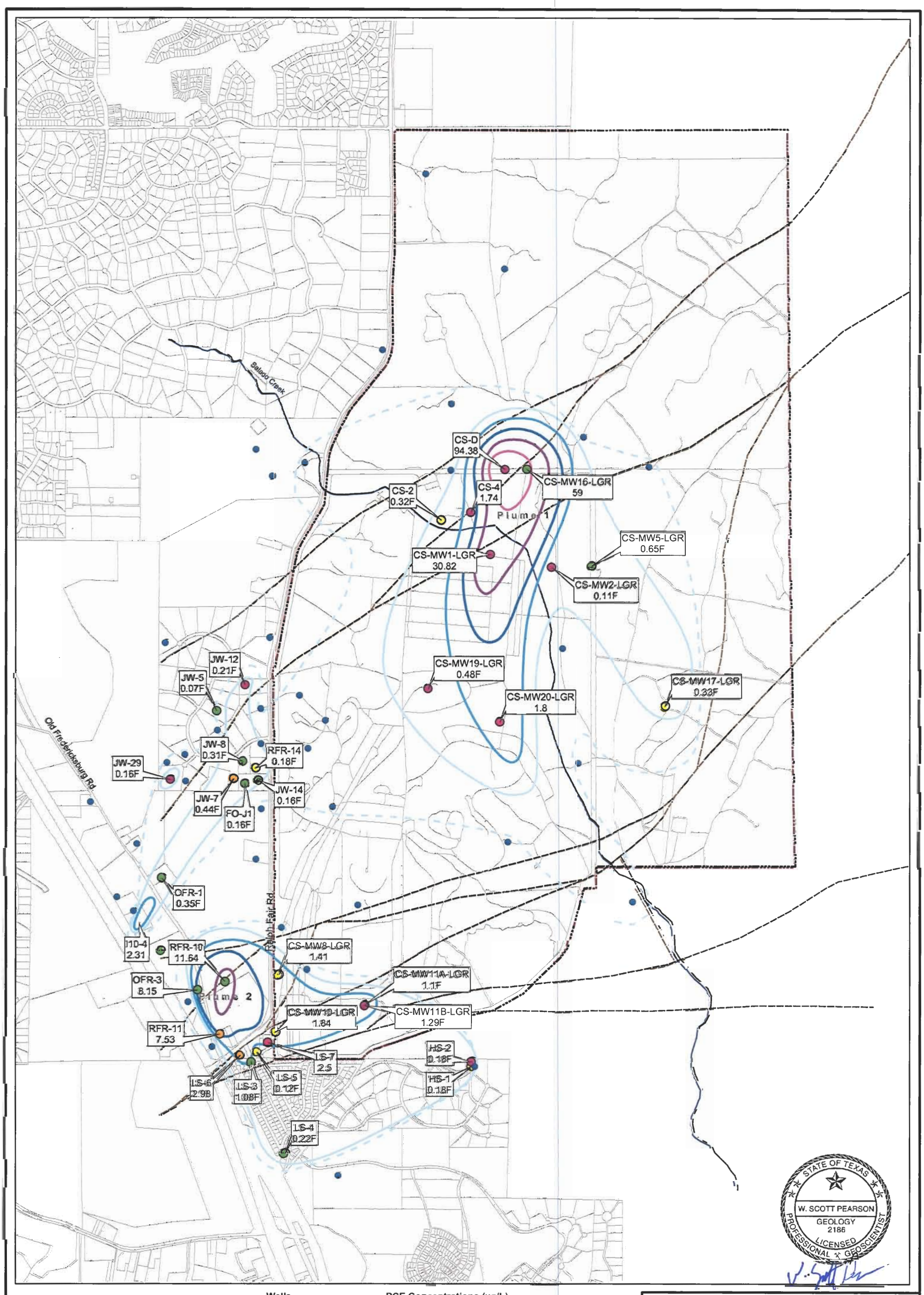

Figure 2.6

PCE Concentrations for LGR Wells, Max 2007

PARSONS

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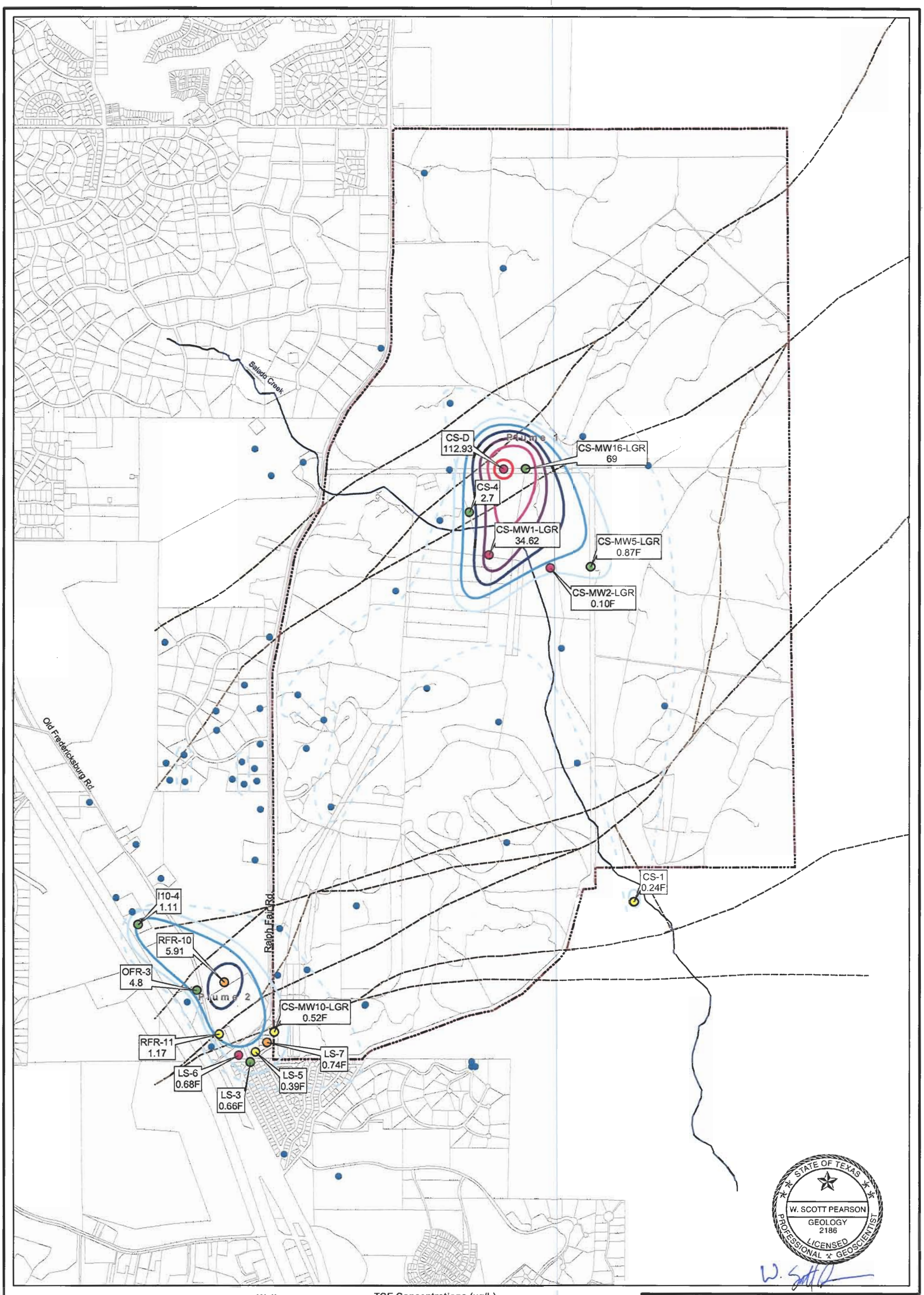

Figure 2.7

TCE Concentrations for LGR Wells, Max 2007

PARSONS

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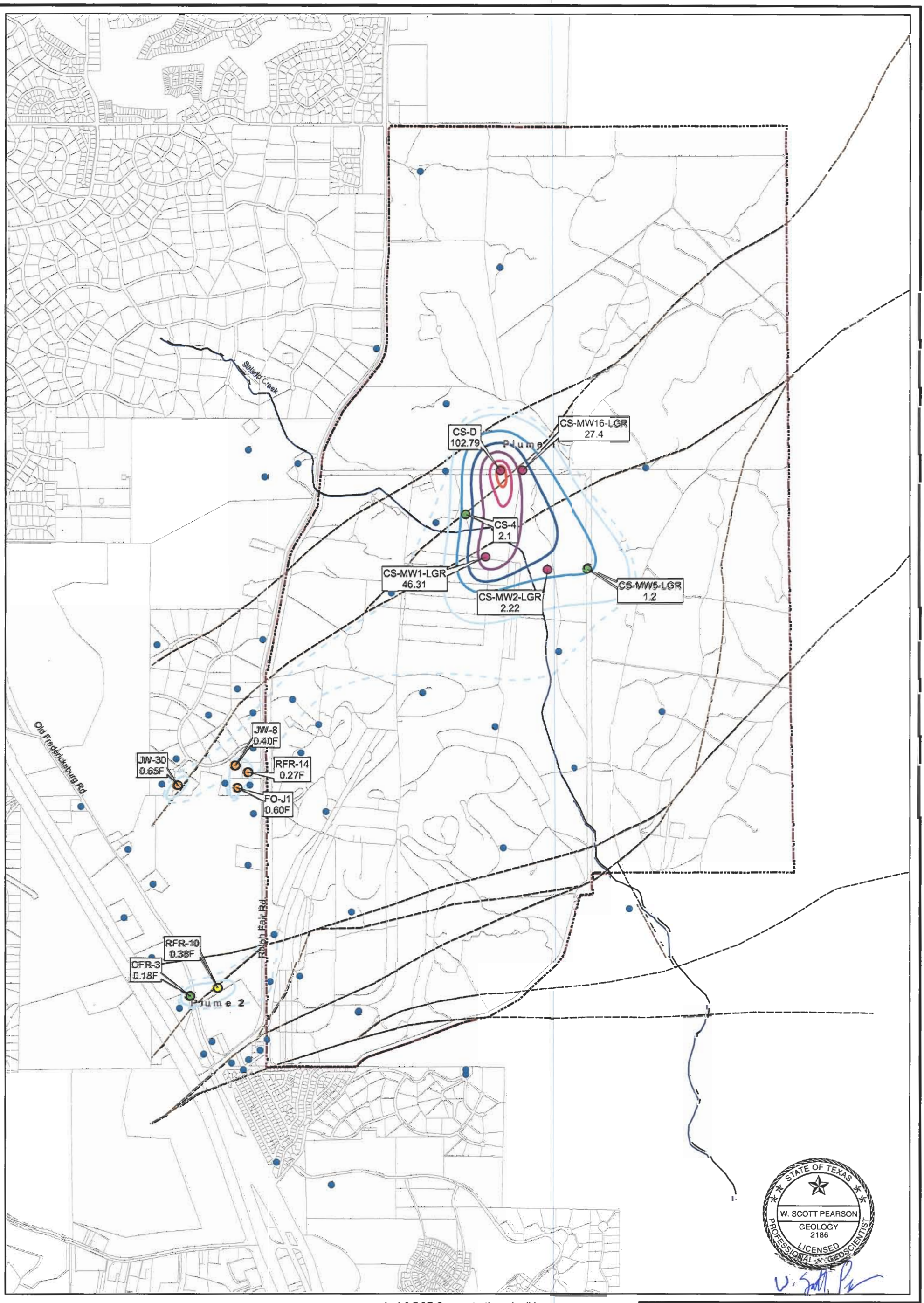

Figure 2.8

cis-1,2-DCE Concentrations for LGR Wells, Max 2007

PARSONS

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The 2007 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-MW11A-LGR, CS-MW11B-LGR, and CS-MW10-LGR (**Figure 2.6**). Off-post detections of PCE above 1.0 µg/L include I10-4, LS-3, LS-6, LS-7, OFR-3, RFR-10, I10-4 and RFR-11. TCE has been detected above 1.0 µg/L in the same wells on- and off-post except for wells CS-MW8-LGR, CS-MW10-LGR, CS-MW11A-LGR, CS-MW11B-LGR, LS-3, LS-6 and LS-7 (**Figure 2.7**). *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-4, CS-D, CS-MW16-LGR, CS-MW1-LGR, CS-MW2-LGR and CS-MW5-LGR (**Figure 2.8**).

Isoconcentration maps have also been prepared based on analytical data collected in 2006. Those isoconcentration maps are available for review in the CSSA Environmental Encyclopedia, Volume 5 Groundwater, (CSSA 2007) in the *2006 Annual Groundwater Report*. By comparison of 2007 isoconcentrations to 2006 isoconcentrations, the PCE plume extent appears to have increased in 2007. With the addition of the 6 new monitoring wells, the southern end of Plume 1 has been further defined. The TCE and *cis*-1,2-DCE isoconcentration maps remain similar to the 2006 figures. As discussed in Section 2.1.1, the increased rainfall affected CSSA throughout 2007. The high water levels increased the documented extent of contaminants and contributed to higher detections in laboratory results. This correlation between increased groundwater elevations and increases in COC detections has been observed at CSSA in historical monitoring.

3.0 CONTINUED WELL CS-9 REHABILITATION

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 process included replacing all pumping equipment, the cleaning and deepening of the wellbores, and installing new surface casing as warranted. The surface completions at each well were re-constructed to meet current regulatory requirements. 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.

3.2 2006 Activities

At Well CS-9, 21 feet of old, deteriorated 8-inch diameter casing was removed and replaced with 180 feet of new, 10-inch diameter steel casing (April 2006). The annular space of the new casing was grouted in by positive displacement exterior method using a cement and 3-5% bentonite powder mix. After the new surface casing was installed, the remainder of the wellbore was reamed with a nominal 10-inch bit to widen the borehole and remove sections of borehole wall which had become unstable during the service life of the well.

During this reaming phase, a section of old piping was encountered lodged at the bottom of the CS-9 borehole. 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. The well was disinfected, purged, and bacteriological samples were collected on 3 consecutive days showing "Not Present" results.

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. **Table 3.1** presents analytical results from well CS-9 during the well rehabilitation process.

Table 3.1
Well CS-9 Water Sampling Analyses Summary (µg/L)
September 2005 - December 2007

		9/5/2005		6/13/2006	9/13/2006	9/28/2006	10/23/2006	10/23/2006		4/6/2007	4/18/2007	12/13/2007
Parameter	**MCL**	**Pre-rehab Quarterly Monitoring**	Rehabilitation Work	**Routine Quarterly Sampling***	**Routine Quarterly Sampling**	**TCEQ Sampling (LCRA-ELS)**	**After 2.5 minutes of purging**	**After 60 minutes of purging**	Cement grouted over debris, reinstalled new pump and pipe	**Post-rehab Quality Sampling**	**Post-rehab Quality Sampling**	**Routine Quarterly Sampling**
Aluminum	200[1]					35.50						
Antimony	6					ND						
Arsenic	10	0.42		1.10	0.36	ND	ND	0.49				
Barium	2,000	39		34.0	36.0	32.10	41.0	38.00				
Beryllium	4					ND						
Cadmium	5	ND		0.07	0.11	ND	ND	0.05				ND
Calcium	N/A					86,900						
Chromium	100	2.6		8.80	ND	7.12	ND	ND				
Copper	1,300[2]	12		28.00	7.90	5.86	21.0	ND				
Iron	300[1]					569						
Lead	15	1.1		**18.00**	**28.00**	**35.10**	9.10	**17.00**		1.83	3.04	**36.20**
magnesium	na					26,700						
Manganese	50[1]					4.19						
Mercury	2	ND		**5.90**	0.36	0.38	0.23	0.51		0.42	0.188	
Nickel	100	1.2		8.0	ND	4.01	ND	ND				22
Selenium	50					ND						
Siver	100[1]					ND						
Sodium	250,000[3]					9,130						
Thallium	2					0.41				ND	ND	
Zinc	5,000[1]	62		3,400	1,700	2,430	4,400	690		555	598	

1 SMCL

2 Action Level

3 Guideline

blank = not analyzed

* Well removed from service upon receipt of results

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 MCLs. No metals were found above MCLs in concurrent sampling of CS-10 water. Further sampling throughout 2006 (**Table 3.1**) continued to show lead above the action level, ranging in concentrations between 9.1 µg/L and 35.1 µg/L. While mercury was still reported in CS-9 groundwater in 2006 (0.23 µg/L to 0.51 µg/L), it remained below the MCL of 2.0 µg/L. Because of the elevated concentrations of lead, well CS-9 was not used during the remainder of 2006.

3.3 2007 Activities

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 (**Table 3.1**) showed lead and mercury detections below MCLs and slightly above reporting limits (RL), the highest levels being 3.04 µg/L and 0.42 µg/L, respectively.

In May 2007, well CS-9 passed the bacteriological testing and the required 24-pumping test was performed. As of June 2007, well CS-9 has been approved for service by the TCEQ. SCADA controls and automation were subsequently installed in July 2007. However, it generally was not operated during year remainder of the year because of concerns with lead and mercury detections near the AL/MCL thresholds. In December 2007, CS-9 was sampled as part of the routine groundwater sampling program. The sample yielded 36.2 µg/L of lead in groundwater (**Table 3.1**). After this data was received, further use of CS-9 water for drinking water was suspended and purge and test strategy was developed to determine if the well could produce water that met drinking water standards. This plan was executed in 2008.

Well CS-10 continued to produce groundwater without lead contamination throughout 2007. CSSA can produce adequate water supply utilizing wells CS-1 and CS-10, and can supplement their supply in times of need with well CS-9.

4.0 GROUNDWATER MONITORING PROGRAM CHANGES

4.1 Access Agreements Obtained in 2007

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 43 wells on the sampling schedule 8 agreements are still outstanding. An attempt to contact these well owners will continue to be made on a quarterly basis.

Of the right-of-entry agreements mailed out, two well owners (JW-26 and JW-28) have decided to terminate access and sampling of their wells. 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 owners JW-28 and JW-26 have requested to be removed from the sampling program and have declined to sign the right-of-entry agreement. Since that time, the owners of JW-28 have reconsidered and have since been reinstated in the off-post sampling program in June 2008.

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 2007, the following conclusions and recommendations can be made:

- On-post wells CS-MW16-LGR, CS-MW16-CC, CS-D, and CS-MW1-LGR all exceeded MCLs in 2007 and should remain on the sampling schedule in the future.
- 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 2007. 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.
- Wells OFR-3, RFR-10 and RFR-11 exceeded the MCL for PCE in 2007 off-post. These wells, along with wells LS-2/LS-3, LS-6, and LS-7, are equipped with a GAC filtration system and these wells should remain on the quarterly sampling schedule in the future. The GAC filtration systems will continue to be maintained by CSSA.
- 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.
- Off-post wells LS-2 and LS-3, along with the GAC system, will be removed from future sampling due to removal of these wells from the drinking water supply system. Sampling of private drinking water wells JW-26 and JW-28 will be discontinued by request of the well owners.
- The sampling of offline wells LS-1 and LS-4 will remain in the sampling program after the installation of dedicated low flow QED gas operated bladder pumps are installed. The pumps were installed in June 2008.
- 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.

- Overall contaminant concentrations are higher than historically measured values. It appears that the higher concentrations are somewhat related to increased rainfall totals during 2007. The southern extent of the PCE fraction of Plume 1 has been expanded and become more defined with the addition of the 6 new monitoring wells in 2007.

6.0 REFERENCES

CSSA 2002. *CSSA Quality Assurance Program Plan*

CSSA 2007. *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 2007.	To the extent possible with data available. Due to the limited data available and the fact that wells are completed across multiple water-bearing units, potentiometric maps should only be used for regional water flow direction, not local. Ongoing pumping in the CSSA area likely affects the natural groundwater flow direction.	As additional wells are installed screened in distinct formations, future evaluations will eliminate reliance on wells screened across multiple formations.
	Describe the flow system, including the vertical and horizontal components of flow (2.1.9).	Potentiometric maps were created using 2007 water level data, and horizontal flow direction was tentatively identified. Insufficient data are currently available to determine vertical component of flow.	As described above, due to the lack of aquifer-specific water level information, potentiometric surface maps should only be used as an estimate of regional flow direction.	Same as above.
	Define formation(s) in the Middle Trinity Aquifer are impacted by the VOC contaminants (2.1.3).	Quarterly groundwater monitoring provides information on Middle Trinity Aquifer impacts. Monitoring wells equipped with Westbay® - multi-port samplers are sampled semiannually and will be sampled again during the March 2008 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-MW2-LGR, CS-MW2-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-MW11A-LGR, CS-MW11B-LGR, CS-MW12-LGR, CS-MW12-BS, CS-MW12-CC, CS-MW16-LGR, CS-MW16-CC, CS-MW18-LGR, CS-MW19-LGR, CS-MW16-CC, CS-MW21-LGR, CS-MW22-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 2007 and included in the annual groundwater report.	Yes.	Continue collection of transducer data and possibly install transducers in other cluster wells.
Contamination Characterization (Ground Water Contamination)	Characterize the horizontal and vertical extent of any immiscible or dissolved plume(s) originating from the Facility (3.1.2).	Samples for laboratory analysis were collected from 45 of 47 CSSA wells. Of the 85 samples scheduled to be collected in 2007 3 wells or 4 samples (CS-I, CS-9, and CS-MW11B-LGR) were not sampled due to pump outages, well rehabilitation, and the water level falling below the dedicated low-flow pump. Well CS-MW9-LGR was added to the sampling schedule in December 2007 to collect additional data for the new drinking water supply well being drilled 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 (Ni, Cd, Pb). 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.

APPENDIX B

2007 QUARTERLY ON-POST GROUNDWATER ANALYTICAL RESULTS

Appendix B
2007 Quaterly On-Post Groundwater Monitoring Analytical Results

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)	Trichloroethene (ug/L)	Vinyl chloride (ug/L)
CS-1	STL	3/6/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
Duplicate	STL	3/6/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	12/13/2007	0.074U	0.098U	0.056U	0.14U	**0.24F**	0.078U
CS-2	STL	3/8/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	12/13/2007	0.074U	0.098U	0.056U	**0.32F**	0.10U	0.078U
CS-4	STL	3/13/2007	0.074U	**2.1**	0.056U	**1.3F**	**2.7**	0.078U
	APPL	9/25/2007	0.074U	**0.53F**	0.056U	**1.74**	**1.92**	0.078U
CS-9	APPL	12/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-10	STL	3/6/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	12/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-11	STL	3/6/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	12/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW16-LGR	STL	3/6/2007	0.074U	**72**	**0.76**	**59**	**69**	0.078U
	APPL	9/25/2007	0.074U	**27.4**	**0.15F**	**38.5**	**34.66**	0.078U
CS-MW16-CC	STL	3/6/2007	**0.68F**	**90**	**7.8**	**2.1**	**59**	**0.57F**
	APPL	9/25/2007	**0.60F**	**67.13**	**2.45**	**24.59**	**73.05**	**0.25F**
CS-D	STL	3/12/2007	0.074U	**97**	**4.6**	**69**	**110**	0.078U
	APPL	9/25/2007	0.074U	**102.79**	**1.04**	**94.38**	**112.93**	0.078U
CS-MWG-LGR	STL	3/16/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	TestAmerica	12/11/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MWH-LGR	APPL	9/24/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW1-LGR	STL	3/6/2007	0.074U	**17**	**0.33F**	**11**	**24**	0.078U
	APPL	9/25/2007	0.074U	**46.31**	**0.81**	**30.82**	**34.62**	0.078U
CS-MW1-BS	APPL	9/25/2007	0.074U	**0.81F**	0.056U	0.14U	0.10U	0.078U
CS-MW1-CC	APPL	9/25/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
Duplicate	APPL	9/25/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW2-LGR	STL	3/7/2007	0.074U	**0.98F**	0.056U	0.14U	0.10U	0.078U
	APPL	9/25/2007	0.074U	**2.22**	0.056U	**0.11F**	**0.10F**	0.078U
CS-MW2-CC	APPL	9/25/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW3-LGR	STL	3/12/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	10/1/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW4-LGR	STL	3/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
Duplicate	STL	3/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	9/27/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW5-LGR	STL	3/7/2007	0.074U	**1.2**	0.056U	**0.65F**	**0.87F**	0.078U
	APPL	9/27/2007	0.074U	**1.15F**	0.056U	**0.63F**	**0.75F**	0.078U
CS-MW6-LGR	STL	3/7/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
Duplicate	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW6-BS	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW6-CC	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW7-LGR	STL	3/7/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW7-CC	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW8-LGR	STL	3/16/2007	0.074U	0.098U	0.056U	**1.0F**	0.10U	0.078U
	APPL	12/12/2007	0.074U	0.098U	0.056U	**1.41**	0.10U	0.078U
CS-MW8-CC	APPL	10/2/2007	0.074U	0.098U	0.056U	**0.65F**	**0.08F**	0.078U
CS-MW9-LGR	STL	3/16/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	9/25/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	TestAmerica	12/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW9-BS	APPL	9/25/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW9-CC	APPL	9/25/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW10-LGR	STL	3/7/2007	0.074U	0.098U	0.056U	**1.3F**	**0.37F**	0.078U
	APPL	12/13/2007	0.074U	0.098U	0.056U	**1.84**	**0.52F**	0.078U
CS-MW10-CC	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW11A-LGR	STL	3/8/2007	0.074U	0.098U	0.056U	**1.1F**	0.10U	0.078U
	APPL	9/27/2007	0.074U	0.098U	0.056U	**0.60F**	0.10U	0.078U
Duplicate	APPL	9/27/2007	0.074U	0.098U	0.056U	**0.65F**	0.10U	0.078U
CS-MW11B-LGR	APPL	9/27/2007	0.074U	0.098U	0.056U	**1.29F**	0.10U	0.078U
CS-MW12-LGR	STL	3/8/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	12/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
Duplicate	APPL	12/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW12-BS	APPL	9/27/2007	0.074U	0.098U	0.056U	0.14U	0.10U	**0.13F**
CS-MW12-CC	APPL	9/27/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW17-LGR	STL	3/16/2007	0.074U	0.098U	0.056U	**0.31F**	0.10U	0.078U
	APPL	12/11/2007	0.074U	0.098U	0.056U	**0.33F**	0.10U	0.078U
CS-MW18-LGR	STL	3/13/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
Duplicate	APPL	10/2/2007	0.074U	0.098U	0.056U	0.14U	0.10U	0.078U
CS-MW19-LGR	STL	3/12/2007	0.074U	0.098U	0.056U	**0.38F**	0.10U	0.078U
	APPL	9/27/2007	0.074U	0.098U	0.056U	**0.48F**	0.10U	0.078U

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Notes:
- ug/L = micrograms per liter
- FD = field duplicate
- 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.
- R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- M = Indicates a failure on the matrix spike and/or matrix spike duplicate samples.
- NA = Not analyzed for this parameter.

Samples analyzed by Test America (formerly Severn Trent Laboratories) & APPL, Inc.
Samples analyzed by method SW8260B.

Appendix B
2007 Quaterly On-Post Groundwater Monitoring Analytical Results

Well ID	CS-MW20-LGR			CS-MW21-LGR			CS-MW22-LGR				CS-MW23-LGR			CS-MW24-LGR				CS-MW25-LGR		
Sample Date	6/6/07	10/1/07	12/12/07	6/7/07	10/1/07	12/12/07	6/7/07	10/1/07	12/13/07	12/13/07	6/5/07	10/1/07	12/12/07	6/6/07	6/6/07	10/1/07	12/12/07	6/5/07	10/1/07	12/11/07
Analytes (ug/L)									*FD*						*FD*					
Benzene	0.13U	NA	NA	0.13U	NA	NA	0.13U	NA	NA	NA	0.13U	NA	NA	0.13U	0.13U	NA	NA	0.13U	NA	NA
Bromo-dichloro-methane *	0.21U	NA	NA	0.21U	NA	NA	0.21U	NA	NA	NA	0.21U	NA	NA	0.21U	0.21U	NA	NA	0.21U	NA	NA
Bromoform	0.22U	NA	NA	0.22U	NA	NA	0.22U	NA	NA	NA	0.22U	NA	NA	0.22U	0.22U	NA	NA	0.22U	NA	NA
Bromo-benzene	0.066U	NA	NA	0.066U	NA	NA	0.066U	NA	NA	NA	0.066U	NA	NA	0.066U	0.066U	NA	NA	0.066U	NA	NA
Bromo-chloro-methane	0.21U	NA	NA	0.21U	NA	NA	0.21U	NA	NA	NA	0.21U	NA	NA	0.21U	0.21U	NA	NA	0.21U	NA	NA
Bromo-methane	0.083U	NA	NA	0.083U	NA	NA	0.083U	NA	NA	NA	0.083U	NA	NA	0.083U	0.083U	NA	NA	0.083U	NA	NA
Butylbenzene, N-	0.12U	NA	NA	0.12U	NA	NA	0.12U	NA	NA	NA	0.12U	NA	NA	0.12U	0.12U	NA	NA	0.12U	NA	NA
Butylbenzene, sec-	0.18U	NA	NA	0.18U	NA	NA	0.18U	NA	NA	NA	0.18U	NA	NA	0.18U	0.18U	NA	NA	0.18U	NA	NA
Butylbenzene, tert-	0.099U	NA	NA	0.099U	NA	NA	0.099U	NA	NA	NA	0.099U	NA	NA	0.099U	0.099U	NA	NA	0.099U	NA	NA
Carbon tetrachloride	0.11U	NA	NA	0.11U	NA	NA	0.11U	NA	NA	NA	0.11U	NA	NA	0.11U	0.11U	NA	NA	0.11U	NA	NA
Chloro-benzene	0.076U	NA	NA	0.076U	NA	NA	0.076U	NA	NA	NA	0.076U	NA	NA	0.076U	0.076U	NA	NA	0.076U	NA	NA
Chloro-ethane	0.13U	NA	NA	0.13U	NA	NA	0.13U	NA	NA	NA	0.13U	NA	NA	0.13U	0.13U	NA	NA	0.13U	NA	NA
Chloroform	0.052U	NA	NA	0.052U	NA	NA	0.052U	NA	NA	NA	0.052U	NA	NA	0.052U	0.052U	NA	NA	0.052U	NA	NA
Chlorohexane, 1-	0.11U	NA	NA	0.11U	NA	NA	0.11U	NA	NA	NA	0.11U	NA	NA	0.11U	0.11U	NA	NA	0.11U	NA	NA
Chloro- methane	0.083U	NA	NA	0.083U	NA	NA	0.083U	NA	NA	NA	0.083U	NA	NA	0.083U	0.083U	NA	NA	0.083U	NA	NA
Chloro-toluene, 2-	0.088U	NA	NA	0.088U	NA	NA	0.088U	NA	NA	NA	0.088U	NA	NA	0.088U	0.088U	NA	NA	0.088U	NA	NA
Chlorotoluene, 4-	0.083U	NA	NA	0.083U	NA	NA	0.083U	NA	NA	NA	0.083U	NA	NA	0.083U	0.083U	NA	NA	0.083U	NA	NA
Dibromo-3-chloropropane, 1,2-	0.71U	NA	NA	0.71U	NA	NA	0.71U	NA	NA	NA	0.71U	NA	NA	0.71U	0.71U	NA	NA	0.71U	NA	NA
Dibromo-chloro-methane *	0.046U	NA	NA	0.046U	NA	NA	0.046U	NA	NA	NA	0.046U	NA	NA	0.046U	0.046U	NA	NA	0.046U	NA	NA
Dibromomethane	0.17U	NA	NA	0.17U	NA	NA	0.17U	NA	NA	NA	0.17U	NA	NA	0.17U	0.17U	NA	NA	0.17U	NA	NA
Dichlorobenzene, 1,2-	0.11U	NA	NA	0.11U	NA	NA	0.11U	NA	NA	NA	0.11U	NA	NA	0.11U	0.11U	NA	NA	0.11U	NA	NA
Dichlorobenzene, 1,3-	0.14U	NA	NA	0.14U	NA	NA	0.14U	NA	NA	NA	0.14U	NA	NA	0.14U	0.14U	NA	NA	0.14U	NA	NA
Dichlorobenzene, 1,4-	0.12U	NA	NA	0.12U	NA	NA	0.12U	NA	NA	NA	0.12U	NA	NA	0.12U	0.12U	NA	NA	0.12U	NA	NA
Dichlorodifluoromethane	0.049U	NA	NA	0.049U	NA	NA	0.049U	NA	NA	NA	0.049U	NA	NA	0.049U	0.049U	NA	NA	0.049U	NA	NA
Dichloroethane, 1,2-	0.068U	NA	NA	0.068U	NA	NA	0.068U	NA	NA	NA	0.068U	NA	NA	0.068U	0.068U	NA	NA	0.068U	NA	NA
Dichloro-ethane, 1,1	0.057U	NA	NA	0.057U	NA	NA	0.057U	NA	NA	NA	0.057U	NA	NA	0.057U	0.057U	NA	NA	0.057U	NA	NA
Dichloro-ethene, 1,1	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	0.074U	**0.074M**
Dichloro-ethene, *cis* -1,2	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U	0.098U
Dichloro-ethene, *trans* -1,2	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U	0.056U
Dichloro-methane (methylene chloride)	0.21U	NA	NA	0.21U	NA	NA	0.21U	NA	NA	NA	0.21U	NA	NA	**0.3F**	0.21U	NA	NA	**0.33F**	NA	NA
Dichloropropane, 1,2-	0.078U	NA	NA	0.078U	NA	NA	0.078U	NA	NA	NA	0.078U	NA	NA	0.078U	0.078U	NA	NA	0.078U	NA	NA
Dichloropropane, 1,3-	0.077U	NA	NA	0.077U	NA	NA	0.077U	NA	NA	NA	0.077U	NA	NA	0.077U	0.077U	NA	NA	0.077U	NA	NA
Dichloropropane, 2,2-	0.18U	NA	NA	0.18U	NA	NA	0.18U	NA	NA	NA	0.18U	NA	NA	0.18U	0.18U	NA	NA	0.18U	NA	NA
Dichloropropene, 1,1-	0.08U	NA	NA	0.08U	NA	NA	0.08U	NA	NA	NA	0.08U	NA	NA	0.08U	0.08U	NA	NA	0.08U	NA	NA
Dichloropropene, cis-1,3-	0.078U	NA	NA	0.078U	NA	NA	0.078U	NA	NA	NA	0.078U	NA	NA	0.078U	0.078U	NA	NA	0.078U	NA	NA
Dichloropropene, trans-1,3-	0.065U	NA	NA	0.065U	NA	NA	0.065U	NA	NA	NA	0.065U	NA	NA	0.065U	0.065U	NA	NA	0.065U	NA	NA
Ethylbenzene	0.099U	NA	NA	0.099U	NA	NA	0.099U	NA	NA	NA	0.099U	NA	NA	0.099U	0.099U	NA	NA	0.099U	NA	NA
Ethylene dibromide	0.18U	NA	NA	0.18U	NA	NA	0.18U	NA	NA	NA	0.18U	NA	NA	0.18U	0.18U	NA	NA	0.18U	NA	NA
Hexachlorobutadiene	0.16U	NA	NA	0.16U	NA	NA	0.16U	NA	NA	NA	0.16U	NA	NA	0.16U	0.16U	NA	NA	0.16U	NA	NA
Isopropylbenzene	0.12U	NA	NA	0.12U	NA	NA	0.12U	NA	NA	NA	0.12U	NA	NA	0.12U	0.12U	NA	NA	0.12U	NA	NA
Isopropyltoluene, 4- (Cymene, p-)	0.1U	NA	NA	0.1U	NA	NA	0.1U	NA	NA	NA	0.1U	NA	NA	0.1U	0.1U	NA	NA	0.1U	NA	NA
Naphthalene	0.25U	NA	NA	0.25U	NA	NA	0.25U	NA	NA	NA	0.25U	NA	NA	0.25U	0.25U	NA	NA	0.25U	NA	NA
Propylbenzene, N-	0.13U	NA	NA	0.13U	NA	NA	0.13U	NA	NA	NA	0.13U	NA	NA	0.13U	0.13U	NA	NA	0.13U	NA	NA
Styrene	0.066U	NA	NA	0.066U	NA	NA	0.066U	NA	NA	NA	0.066U	NA	NA	0.066U	0.066U	NA	NA	0.066U	NA	NA
Tetrachloroethane, 1,1,1,2-	0.14U	NA	NA	0.14U	NA	NA	0.14U	NA	NA	NA	0.14U	NA	NA	0.14U	0.14U	NA	NA	0.14U	NA	NA
Tetrachloroethane, 1,1,2,2-	0.15U	NA	NA	0.15U	NA	NA	0.15U	NA	NA	NA	0.15U	NA	NA	0.15U	0.15U	NA	NA	0.15U	NA	NA
Tetra-chloroethene	**1.7**	**1.8**	**1.8**	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U	0.14U
Toluene	0.068U	NA	NA	0.068U	NA	NA	0.068U	NA	NA	NA	0.068U	NA	NA	0.068U	0.068U	NA	NA	0.068U	NA	NA
Trichlorobenzene, 1,2,3-	0.16U	NA	NA	0.16U	NA	NA	0.16U	NA	NA	NA	0.16U	NA	NA	0.16U	0.16U	NA	NA	0.16U	NA	NA
Trichlorobenzene, 1,2,4-	0.14U	NA	NA	0.14U	NA	NA	0.14U	NA	NA	NA	0.14U	NA	NA	0.14U	0.14U	NA	NA	0.14U	NA	NA
Trichloroethene	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U	0.10U
Trichloroethane, 1,1,1-	0.053U	NA	NA	0.053U	NA	NA	0.053U	NA	NA	NA	0.053U	NA	NA	0.053U	0.053U	NA	NA	0.053U	NA	NA
Trichloroethane, 1,1,2-	0.13U	NA	NA	0.13U	NA	NA	0.13U	NA	NA	NA	0.13U	NA	NA	0.13U	0.13U	NA	NA	0.13U	NA	NA
Trichlorofluoromethane	0.067U	NA	NA	0.067U	NA	NA	0.067U	NA	NA	NA	0.067U	NA	NA	0.067U	0.067U	NA	NA	0.067U	NA	NA
Trichloropropane, 1,2,3-	0.27U	NA	NA	0.27U	NA	NA	0.27U	NA	NA	NA	0.27U	NA	NA	0.27U	0.27U	NA	NA	0.27U	NA	NA
Trimethylbenzene, 1,2,4-	0.081U	NA	NA	0.081U	NA	NA	0.081U	NA	NA	NA	0.081U	NA	NA	0.081U	0.081U	NA	NA	0.081U	NA	NA
Trimethylbenzene, 1,3,5-	0.083U	NA	NA	0.083U	NA	NA	0.083U	NA	NA	NA	0.083U	NA	NA	0.083U	0.083U	NA	NA	0.083U	NA	NA
Vinyl chloride	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U	0.078U
Xylene, m,p-	0.1U	NA	NA	0.1U	NA	NA	0.1U	NA	NA	NA	0.1U	NA	NA	0.1U	0.1U	NA	NA	0.1U	NA	NA
Xylene, o-	0.087U	NA	NA	0.087U	NA	NA	0.087U	NA	NA	NA	0.087U	NA	NA	0.087U	0.087U	NA	NA	0.087U	NA	NA

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Notes:
- ug/L = micrograms per liter
- FD = field duplicate
- 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.
- R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- M = Indicates a failure on the matrix spike and/or matrix spike duplicate samples.
- NA = Not analyzed for this parameter.

Samples analyzed by Test America (formerly Severn Trent Laboratories)
Samples analyzed by method SW8260B.

Appendix B
2007 Quarterly On-Post Groundwater Monitoring Analytical Results

Well ID	Laboratory	Sample Date	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Calcium (mg/L)	Chromium (mg/L)	Copper (mg/L)	Lead (mg/L)	Mercury (mg/L)	Magnesium (mg/L)	Manganese (mg/L)	Nickel (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Zinc (mg/L)	Bromide (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	Sulfate (mg/L)	pH	Alkalinity, Bicarbonate (mg/L)	Alkalinity, Carbonate (mg/L)	Alkalinity, Total (as CACO3) (mg/L)	Phosphorus, Total Orthophosphate (mg/L)
CS-1	APPL	12/13/2007	NA	NA	0.00004U	NA	NA	NA	**0.0017F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.29	NA	NA	NA	NA
CS-2	APPL	12/13/2007	NA	NA	0.00004U	NA	NA	NA	**0.0002F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.08	NA	NA	NA	NA
CS-4	APPL	9/25/2007	NA	NA	**0.0004F**	NA	NA	NA	**0.0015F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.84	NA	NA	NA	NA
CS-9	APPL	12/13/2007	NA	NA	0.00004U	NA	NA	NA	**0.0362**	NA	NA	NA	**0.022**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.98	NA	NA	NA	NA
CS-10	APPL	12/13/2007	NA	NA	0.00004U	NA	NA	NA	**0.0049**	NA	NA	NA	**0.004F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.03	NA	NA	NA	NA
CS-11	APPL	12/13/2007	NA	NA	0.00004U	NA	NA	NA	**0.0359**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.22	NA	NA	NA	NA
CS-MW16-LGR	APPL	9/25/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0007F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.79	NA	NA	NA	NA
CS-MW16-CC	APPL	9/25/2007	NA	NA	**0.0015F**	NA	NA	NA	**0.0072**	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.87	NA	NA	NA	NA
CS-D	APPL	9/25/2007	NA	NA	**0.0018F**	NA	NA	NA	**0.0016F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.87	NA	NA	NA	NA
CS-MWG-LGR	TestAmerica	12/11/2007	**0.00023F**	**0.022**	0.00004U	NA	0.00026U	0.0045U	0.00018U	NA	NA	NA	0.0078U	NA	NA	**0.018F**	NA	NA	NA	NA	NA	NA	7.11	NA	NA	NA	NA
CS-MWH-LGR	APPL	9/24/2007	NA	NA	**0.0014F**	NA	NA	NA	**0.009**	NA	NA	NA	**0.0005F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.65	NA	NA	NA	NA
CS-MW1-LGR	APPL	9/25/2007	NA	NA	**0.0036F**	NA	NA	NA	**0.0063**	NA	NA	NA	**0.066**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.82	NA	NA	NA	NA
CS-MW1-BS	APPL	9/25/2007	NA	NA	**0.0012F**	NA	NA	NA	**0.0047**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.59	NA	NA	NA	NA
CS-MW1-CC	APPL	9/25/2007	NA	NA	**0.0007F**	NA	NA	NA	**0.0014F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.13	NA	NA	NA	NA
Duplicate	APPL	9/5/2007	NA	NA	**0.0006F**	NA	NA	NA	**0.0005F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.13	NA	NA	NA	NA
CS-MW2-LGR	APPL	9/25/2007	NA	NA	**0.0004F**	NA	NA	NA	**0.0049**	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.93	NA	NA	NA	NA
CS-MW2-CC	APPL	9/25/2007	NA	NA	**0.0073**	NA	NA	NA	**0.0051**	NA	NA	NA	**0.011**	NA	NA	NA	NA	NA	NA	NA	NA	NA	9.23	NA	NA	NA	NA
CS-MW3-LGR	APPL	10/1/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0004F**	NA	NA	NA	**0.006F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.06	NA	NA	NA	NA
CS-MW4-LGR	APPL	9/27/2007	NA	NA	**0.0005F**	NA	NA	NA	**0.0008F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.82	NA	NA	NA	NA
CS-MW5-LGR	APPL	9/27/2007	NA	NA	0.00004U	NA	NA	NA	**0.0016F**	NA	NA	NA	**0.008F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.81	NA	NA	NA	NA
CS-MW6-LGR	APPL	10/2/2007	NA	NA	0.00004U	NA	NA	NA	0.00018U	NA	NA	NA	**0.028**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.94	NA	NA	NA	NA
Duplicate	APPL	10/2/2007	NA	NA	**0.0002F**	NA	NA	NA	**0.0004F**	NA	NA	NA	**0.027**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.94	NA	NA	NA	NA
CS-MW6-BS	APPL	10/2/2007	NA	NA	0.00004U	NA	NA	NA	0.00018U	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.5	NA	NA	NA	NA
CS-MW6-CC	APPL	10/2/2007	NA	NA	**0.0004F**	NA	NA	NA	**0.0004F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.16	NA	NA	NA	NA
CS-MW7-LGR	APPL	10/2/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0004F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.74	NA	NA	NA	NA
CS-MW7-CC	APPL	10/2/2007	NA	NA	0.00004U	NA	NA	NA	0.00018U	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.02	NA	NA	NA	NA
CS-MW8-LGR	APPL	12/12/2007	NA	NA	0.00004U	NA	NA	NA	0.00018U	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.85	NA	NA	NA	NA
CS-MW8-CC	APPL	10/2/2007	NA	NA	**0.0002F**	NA	NA	NA	0.00018U	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.42	NA	NA	NA	NA
CS-MW9-LGR	APPL	9/25/2007	NA	NA	**0.0012F**	NA	NA	NA	**0.0048**	NA	NA	NA	**0.032**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.77	NA	NA	NA	NA
	TestAmerica	12/13/2007	**0.0017F**	**0.034**	0.00004U	NA	**0.034**	0.0045U	**0.00038F**	NA	NA	NA	**0.021**	NA	NA	**0.012F**	NA	NA	NA	NA	NA	NA	6.99	NA	NA	NA	NA
CS-MW9-BS	APPL	9/25/2007	NA	NA	**0.0019F**	NA	NA	NA	**0.1065**	NA	NA	NA	**0.019**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.22	NA	NA	NA	NA
CS-MW9-CC	APPL	9/25/2007	NA	NA	**0.0002F**	NA	NA	NA	**0.0009F**	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.04	NA	NA	NA	NA
CS-MW10-LGR	APPL	12/13/2007	NA	NA	0.00004U	NA	NA	NA	**0.0004F**	NA	NA	NA	**0.006F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.84	NA	NA	NA	NA
CS-MW10-CC	APPL	10/2/2007	NA	NA	**0.0004F**	NA	NA	NA	**0.0004F**	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.21	NA	NA	NA	NA
CS-MW11A-LGR	APPL	9/27/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0005F**	NA	NA	NA	**0.005F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.83	NA	NA	NA	NA
Duplicate	APPL	9/27/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0008F**	NA	NA	NA	**0.005F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.83	NA	NA	NA	NA
CS-MW11B-LGR	APPL	9/27/2007	NA	NA	**0.0009F**	NA	NA	NA	**0.0013F**	NA	NA	NA	**0.007F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.75	NA	NA	NA	NA
CS-MW12-LGR	APPL	12/13/2007	NA	NA	0.00004U	NA	NA	NA	**0.0005F**	NA	NA	NA	**0.035**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.14	NA	NA	NA	NA
Duplicate	APPL	12/13/2007	NA	NA	0.00004U	NA	NA	NA	**0.0005F**	NA	NA	NA	**0.034**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.14	NA	NA	NA	NA
CS-MW12-BS	APPL	9/27/2007	NA	NA	**0.0002F**	NA	NA	NA	0.00018U	NA	NA	NA	**0.003F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	8.25	NA	NA	NA	NA
CS-MW12-CC	APPL	9/27/2007	NA	NA	0.00004U	NA	NA	NA	0.00018U	NA	NA	NA	0.0078U	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.94	NA	NA	NA	NA
CS-MW17-LGR	APPL	12/11/2007	NA	NA	0.00004U	NA	NA	NA	0.00018U	NA	NA	NA	**0.004F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.97	NA	NA	NA	NA
CS-MW18-LGR	APPL	10/2/2007	NA	NA	**0.0003F**	NA	NA	NA	**0.0006F**	NA	NA	NA	**0.007F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.98	NA	NA	NA	NA
Duplicate	APPL	10/2/2007	NA	NA	**0.0009F**	NA	NA	NA	**0.0008F**	NA	NA	NA	**0.007F**	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.98	NA	NA	NA	NA
CS-MW19-LGR	APPL	9/27/2007	NA	NA	**0.0006F**	NA	NA	NA	**0.0009F**	NA	NA	NA	**0.134**	NA	NA	NA	NA	NA	NA	NA	NA	NA	7.02	NA	NA	NA	NA
CS-MW20-LGR	TestAmerica	6/6/2007	**0.00092F**	**0.13**	0.00004U	**97**	**0.0027F**	0.0045U	**0.001F**	0.000027U	**17**	**0.0038F**	**0.02**	**2.2**	**9.1**	**0.065**	**0.13F**	**12**	**0.32F**	**2.7**	0.049U	**17M**	6.98	**280**	1.1U	**280**	0.19U
	TestAmerica	10/1/2007	**0.00081F**	**0.15**	0.00004U	NA	0.0026U	0.0045U	**0.00065F**	0.000027U	NA	NA	0.0078U	NA	NA	**0.029F**	NA	NA	NA	NA	NA	NA	6.73	NA	NA	NA	NA
	TestAmerica	12/12/2007	**0.00035F**	**0.14**	0.00004U	NA	0.00026U	0.0045U	**0.00021F**	NA	NA	NA	0.0078U	NA	NA	**0.013F**	NA	NA	NA	NA	NA	NA	6.82	NA	NA	NA	NA
CS-MW21-LGR	TestAmerica	6/7/2007	**0.0038F**	**0.081**	0.00004U	**59**	0.0026U	0.0045U	**0.0029**	0.000027U	**30**	**0.0097**	0.0078U	**2.3**	**7.3**	**0.47**	0.11U	**7.3**	**0.64F**	0.042U	0.049U	**16**	7.14	**280**	1.1U	**280**	0.19U
	TestAmerica	10/1/2007	**0.0034F**	**0.091**	0.00004U	NA	0.0026U	0.0045U	**0.0013F**	0.000027U	NA	NA	0.0078U	NA	NA	**0.34**	NA	NA	NA	NA	NA	NA	6.88	NA	NA	NA	NA
	TestAmerica	12/12/2007	**0.00054F**	**0.083**	0.00004U	NA	0.00026U	0.0045U	**0.00021F**	NA	NA	NA	0.0078U	NA	NA	**0.18**	NA	NA	NA	NA	NA	NA	6.99	NA	NA	NA	NA
CS-MW22-LGR	TestAmerica	6/7/2007	**0.0045F**	**0.073**	**0.00012F**	**70**	**0.017**	**0.029**	**0.091**	**0.000079F**	**28**	**0.067**	**0.028**	**3.5**	**11.0**	**8.0**	0.11U	**9.1**	**0.82F**	0.042U	0.049U	**28**	7.14	**270**	1.1U	**270**	0.19U
	TestAmerica	10/1/2007	**0.0056F**	**0.093**	**0.00013F**	NA	**0.023**	**0.026**	**0.086**	**0.00012F**	NA	NA	**0.037**	NA	NA	**6.7**	NA	NA	NA	NA	NA	NA	6.98	NA	NA	NA	NA
	TestAmerica	12/13/2007	**0.0024F**	**0.06**	**0.000056F**	NA	**0.0027F**	0.0045U	**0.011**	NA	NA	NA	**0.013**	NA	NA	**2**	NA	NA	NA	NA	NA	NA	7.07	NA	NA	NA	NA
Duplicate	TestAmerica	12/13/2007	**0.0023F**	**0.063**	**0.000047F**	NA	**0.0028F**	0.0045U	**0.011**	NA	NA	NA	**0.013**	NA	NA	**2.1**	NA	NA	NA	NA	NA	NA	7.07	NA	NA	NA	NA
CS-MW23-LGR	TestAmerica	6/5/2007	**0.0015F**	**0.051**	**0.000058F**	**86**	0.0026U	**0.0061F**	**0.0032**	**0.0078**	**29**	**0.024**	0.0078U	**2.2**	**6.7**	**0.59**	0.11U	**8.4**	**0.54F**	**0.14F**	**0.069F**	**18M**	7.18	**260**	1.1U	**260**	0.19U
	TestAmerica	10/1/2007	**0.0011F**	**0.054**	**0.000046F**	NA	0.0026U	**0.0046F**	**0.0018F**	0.000027U	NA	NA	0.0078U	NA	NA	**0.28**	NA	NA	NA	NA	NA	NA	NA	6.97	NA	NA	NA	NA
	TestAmerica	12/12/2007	**0.00069F**	**0.047**	0.00004U	NA	0.00026U	0.0045U	0.00018U	NA	NA	NA	0.0078U	NA	NA	**0.16**	NA	NA	NA	NA	NA	NA	7.05	NA	NA	NA	NA
CS-MW24-LGR	TestAmerica	6/6/2007	**0.00085F**	**0.032**	0.00004U	**68**	0.0026U	0.0045U	**0.0016F**	0.000027U	**33**	**0.0059**	**0.011**	**2.4**	**7.8**	**0.22**	0.11U	**9.9**	**0.64F**	**0.63F**	0.049U	**30M**	7.18	**250**	1.1U	**250**	0.19U
Duplicate	TestAmerica	6/6/2007	**0.00088F**	**0.032**	0.00004U	**67**	0.0026U	0.0045U	**0.0015F**	0.000027U	**33**	**0.0046F**	**0.0088F**	**2.4**	**7.7**	**0.2**	0.11U	**10**	**0.65F**	**0.64F**	0.049U	**30M**	7.18	**250**	1.1U	**250**	0.19U
	TestAmerica	10/1/2007	**0.00081F**	**0.033**	0.00004U	NA	0.0026U	0.0045U	**0.00085F**	0.000027U	NA	NA	0.0078U	NA	NA	**0.11**	NA	NA	NA	NA	NA	NA	6.94	NA	NA	NA	NA
	TestAmerica	12/12/2007	**0.00045F**	**0.031**	0.00004U	NA	0.00026U	0.0045U	**0.00018F**	NA	NA	NA	0.0078U	NA	NA	**0.089**	NA	NA	NA	NA	NA	NA	7.13	NA	NA	NA	NA
CS-MW25-LGR	TestAmerica	6/5/2007	**0.0031F**	**0.044**	**0.000087F**	**120**	**0.065**	**0.032**	**0.017**	0.000027U	**26**	**0.041**	**0.064**	**3.0**	**31.0**	**1.8**	0.11U	**22**	**0.47F**	**0.73F**	0.049U	**33M**	7.21	**270**	1.1U	**270**	0.19U
	TestAmerica	10/1/2007	**0.0044F**	**0.063**	**0.00016F**	NA	**0.24**	**0.065**	**0.032**	0.000027U	NA	NA	**0.14**	NA	NA	**2.2**	NA	NA	NA	NA	NA	NA	7.05	NA	NA	NA	NA
	TestAmerica	12/11/2007	**0.0039F**	**0.045**	**0.00015F**	NA	**0.22**	**0.03**	**0.023**	NA	NA	NA	**0.078**	NA	NA	**1.5**	NA	NA	NA	NA	NA	NA	7.39	NA	NA	NA	NA

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Notes:
- mg/L = milligrams per liter
- FD = field duplicate
- 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.
- R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
- U = The analyte was analyzed for, but not detected. The associated numerical value is at or below the method detection.
- M = Indicates a failure on the matrix spike and/or matrix spike duplicate samples.
- NA = Not analyzed for this parameter.

Samples analyzed by Test America (formerly Severn Trent Laboratories) & APPL, Inc.

APPENDIX C

2007 WESTBAY® ANALYTICAL RESULTS

Appendix C
2007 Westbay Analytical Results

Well ID	Date	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	Vinyl Chloride	1,1-DCE
CS-WB01-UGR-01	14-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	4-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB01-LGR-01	14-Mar-07	0.098U	**4.6**	0.056U	**0.26F**	0.078U	0.074U
	4-Oct-07	0.16U	**6.2**	0.19U	0.16U	0.23U	0.3U
CS-WB01-LGR-02	14-Mar-07	0.098U	**6.8**	0.056U	**3.2**	0.078U	0.074U
	5-Oct-07	0.16U	**12**	0.19U	**4.8**	0.23U	0.3U
CS-WB01-LGR-03	14-Mar-07	0.098U	**1.1F**	0.056U	**3.3**	0.078U	0.074U
	5-Oct-07	0.16U	**2.2**	0.19U	**7.7**	0.23U	0.3U
CS-WB01-LGR-04	14-Mar-07	0.098U	0.14U	0.056U	0.10U	0.078U	0.074U
	5-Oct-07	0.16U	**0.38J**	0.19U	**0.40J**	0.23U	0.3U
CS-WB01-LGR-05	14-Mar-07	0.098U	0.14U	0.056U	**0.17F**	0.078U	0.074U
	5-Oct-07	0.16U	**0.32J**	0.19U	**0.77J**	0.23U	0.3U
CS-WB01-LGR-06	14-Mar-07	0.098U	**0.26F**	0.056U	**0.41F**	0.078U	0.074U
	5-Oct-07	0.16U	**0.48J**	0.19U	**1.8**	0.23U	0.3U
CS-WB01-LGR-07	14-Mar-07	0.098U	**11**	0.056U	**9.5**	0.078U	0.074U
	5-Oct-07	0.16U	**16**	0.19U	**15**	0.23U	0.3U
CS-WB01-LGR-08	14-Mar-07	0.098U	**0.35F**	0.056U	**0.74F**	0.078U	0.074U
	5-Oct-07	**0.25J**	**0.96J**	0.19U	**1.9**	0.23U	0.3U
CS-WB01-LGR-09	14-Mar-07	**0.44F**	**10**	0.056U	**20**	0.078U	0.074U
	5-Oct-07	**0.42J**	**21**	0.19U	**32**	0.23U	0.3U
CS-WB02-UGR-01	14-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	3-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB02-LGR-01	14-Mar-07	0.098U	**3.8**	0.056U	**2.6**	0.078U	0.074U
	3-Oct-07	0.16U	**8.2**	0.19U	**2**	0.23U	0.3U
CS-WB02-LGR-02	14-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	3-Oct-07	0.16U	**5.1**	0.19U	**0.68J**	0.23U	0.3U
CS-WB02-LGR-03	14-Mar-07	0.098U	**4.5**	0.056U	**3.1**	0.078U	0.074U
	3-Oct-07	0.16U	**7.8**	0.19U	**1.2**	0.23U	0.3U
CS-WB02-LGR-04	14-Mar-07	0.098U	**2.0**	0.056U	**10**	0.078U	0.074U
	3-Oct-07	0.16U	**2.2**	0.19U	**9.2**	0.23U	0.3U
CS-WB02-LGR-05	14-Mar-07	0.098U	**0.53F**	0.056U	**3.1**	0.078U	0.074U
	3-Oct-07	0.16U	**0.90J**	0.19U	**3.6**	0.23U	0.3U
CS-WB02-LGR-06	14-Mar-07	0.098U	**0.86F**	0.056U	**3.8**	0.078U	0.074U
	3-Oct-07	0.16U	**3.3**	0.19U	**4.2**	0.23U	0.3U
CS-WB02-LGR-07	14-Mar-07	0.098U	**0.59F**	0.056U	**0.46F**	0.078U	0.074U
	3-Oct-07	0.16U	**1.9**	0.19U	**1.5**	0.23U	0.3U
CS-WB02-LGR-08	14-Mar-07	0.098U	**1.3F**	0.056U	**1.3**	0.078U	0.074U
	3-Oct-07	0.16U	**3.4**	0.19U	**2.2**	0.23U	0.3U
CS-WB02-LGR-09	14-Mar-07	**0.24F**	**6.6**	0.056U	**9.8**	0.078U	0.074U
	3-Oct-07	**0.25J**	**9.3**	0.19U	**10**	0.23U	0.3U
CS-WB03-UGR-01	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	4-Oct-07	**7.6**	**22,000***	**0.22J**	**450J***	0.23U	**0.39J**
CS-WB03-LGR-01	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	4-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB03-LGR-02	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	4-Oct-07	0.16U	**140***	0.19U	**11**	0.23U	0.3U

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Appendix C
2007 Westbay Analytical Results

Well ID	Date	cis-1,2-DCE	PCE	trans-1,2-DCE	TCE	Vinyl Chloride	1,1-DCE
CS-WB03-LGR-03	15-Mar-07	**0.31F**	**17**	0.056U	**9.4**	0.078U	0.074U
	4-Oct-07	0.16U	**24**	0.19U	**9.8**	0.23U	0.3U
CS-WB03-LGR-04	15-Mar-07	0.098U	**15**	0.056U	**7.5**	0.078U	0.074U
	4-Oct-07	0.16U	**35**	0.19U	**12**	0.23U	0.3U
CS-WB03-LGR-05	15-Mar-07	0.098U	**13**	0.056U	**6.4**	0.078U	0.074U
	4-Oct-07	0.16U	**33**	0.19U	**9.7**	0.23U	0.3U
CS-WB03-LGR-06	15-Mar-07	0.098U	**9**	0.056U	**1.5**	0.078U	0.074U
	4-Oct-07	0.16U	**16**	0.19U	**2.3**	0.23U	0.3U
CS-WB03-LGR-07	15-Mar-07	0.098U	**5.7**	0.056U	**1.7**	0.078U	0.074U
	4-Oct-07	**0.73J**	**31**	0.19U	**28**	0.23U	0.3U
CS-WB03-LGR-08	15-Mar-07	0.098U	**13**	0.056U	**1.3**	0.078U	0.074U
	4-Oct-07	0.16U	**21**	0.19U	**2.0**	0.23U	0.3U
CS-WB03-LGR-09	15-Mar-07	0.098U	**7.1**	0.056U	**0.85F**	0.078U	0.074U
	4-Oct-07	0.16U	**13**	0.19U	**11.0**	0.23U	0.3U
CS-WB04-UGR-01	15-Mar-07	Dry	Dry	Dry	Dry	Dry	Dry
	3-Oct-07	Dry	Dry	Dry	Dry	Dry	Dry
CS-WB04-LGR-01	15-Mar-07	0.098U	**0.24F**	0.056U	0.10U	0.078U	0.074U
	3-Oct-07	0.16U	**0.28J**	0.19U	0.16U	0.23U	0.3U
CS-WB04-LGR-02	15-Mar-07	0.098U	0.14U	0.056U	0.10U	0.078U	0.074U
	3-Oct-07	0.16U	**0.30J**	0.19U	0.16U	0.23U	0.3U
CS-WB04-LGR-03	15-Mar-07	0.098U	0.14U	0.056U	0.10U	0.078U	0.074U
	3-Oct-07	0.16U	0.15U	0.19U	0.16U	0.23U	0.3U
CS-WB04-LGR-04	15-Mar-07	0.098U	0.14U	0.056U	0.10U	0.078U	0.074U
	3-Oct-07	0.16U	0.15U	0.19U	0.16U	0.23U	0.3U
CS-WB04-LGR-06	15-Mar-07	**3.0**	**2.1**	**0.24F**	**11**	0.078U	0.074U
	3-Oct-07	**2.9**	**1.4**	**0.36J**	**9.1**	0.23U	0.3U
CS-WB04-LGR-07	15-Mar-07	**2.9**	**1.3F**	**0.20F**	**8.8**	0.078U	0.074U
	3-Oct-07	**2.2**	**1.4**	0.19U	**8.0**	0.23U	0.3U
CS-WB04-LGR-08	15-Mar-07	0.098U	0.14U	0.056U	**0.65F**	0.078U	0.074U
	3-Oct-07	0.16U	**0.33J**	0.19U	**1.1**	0.23U	0.3U
CS-WB04-LGR-09	15-Mar-07	0.098U	**7.7**	0.056U	**8.2**	0.078U	0.074U
	3-Oct-07	0.16U	**12**	0.19U	**11**	0.23U	0.3U
CS-WB04-LGR10	15-Mar-07	0.098U	**0.47F**	0.056U	**0.48F**	0.078U	0.074U
	3-Oct-07	0.16U	**0.82J**	0.19U	**1.2**	0.23U	0.3U
CS-WB04-LGR-11	15-Mar-07	0.098U	0.14U	0.056U	0.10U	0.078U	0.074U
	3-Oct-07	0.16U	0.15U	0.19U	0.16U	0.23U	0.3U
CS-WB04-BS-01	3-Oct-07	0.16U	0.15U	0.19U	0.16U	0.23U	0.3U
CS-WB04-BS-02	3-Oct-07	**0.25J**	0.15U	0.19U	0.16U	0.23U	0.3U
CS-WB04-CC-01	3-Oct-07	**0.48J**	0.15U	0.19U	**0.19J**	0.23U	0.3U
CS-WB04-CC-02	3-Oct-07	0.16U	0.15U	0.19U	0.16U	0.23U	0.3U
CS-WB04-CC-03	3-Oct-07	0.16U	0.15U	0.19U	0.16U	0.23U	0.3U

Bold	Value > or = MCL
Bold	MCL > Value > or = RL
Bold	RL > Value > MDL

Data Qualifiers:
F- The analyte was positively identified but the associated numerical value is below the RL.
J - The analyte was positively identified, the quantitation is an estimation.
U - The analyte was analyzed for, but not detected. The associated numerical value is at or below the MDL.
All values are reported in µg/L.
* - A dilution run was performed on the sample.
All samples were analyzed by DHL Analytical as screening data.

APPENDIX D

WELL CS-9 REHABILITATION SUMMARY

DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, MCAAP
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

August 16, 2007

U-104-07

Mr. David Laughlin
Texas Commission on Environmental Quality
Water Supply Division
P.O. Box 13087 (MC-153)
Austin, TX 78711-3087

Subject: Rehabilitation of Groundwater Supply Wells CS-9 and -10, Camp Stanley Storage Activity, Boerne, Texas, Public Water System, I.D. #0150117, TCEQ Plan Review Log Number: 200604-031

Dear Mr. Laughlin:

The Camp Stanley Storage Activity (CSSA), McAlester Army Ammunition Plant, US Army Field Support Command, Army Materiel Command, U.S. Army is submitting notification that the groundwater supply well rehabilitations (subject PWS and Review Team Log #) at CSSA Supply Wells CS-9 and CS-10 have been completed as of June 1, 2007.

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. Work tasks were completed as outlined in the Plan submittal, in accordance with AWWA standards, and met the TCEQ's 30 TAC Chapter §290 - Rules and Regulations for Public Water Systems (Rules). The well service contractor is a licensed water well driller and pump installer (License No. 2525). Table 1 shows a summary of the upgraded construction data (unchanged information such as maps and original driller's log not included). Original laboratory reports for water analyses are available for inspection in the CSSA files. Copies of the laboratory reports are included as part of this submittal.

Table 1. Rework Completion Data

Well	Steel Casing	Annular Cement	Borehole		Pumps	Formations
			Diameter	Depth		
CS-9	10in. diameter to 178 ft.	0-178 ft. *	14¾ in.	2-176 ft.	20 hp 90 gpm rated	Middle Trinity (no change)
			13¾ in.	176-485 ft.		
			12¼ in.	485-548 ft. (TD)		
CS-10	no change	no change	no change	580 ft. (TD)	20 hp 90 gpm rated	Middle Trinity (no change)

*Positive displacement exterior method.

Well CS-10 rehabilitation was accomplished as planned and with no difficulty. The old pump and column pipe were removed. A video inspection of the existing casing interior determined it to be sound. The existing 8-inch diameter steel casing extends to 392 feet below ground surface (bgs), whereas earlier records indicated casing to 390 feet. Below the casing the wellbore is open in the Lower Glen Rose, Bexar Shale, and Cow Creek members of the Middle Trinity Aquifer. During cleaning of the borehole approximately 30 feet of soft infilling was airlifted out. The finished total depth of the well is now 580 feet bgs. Some historical records indicate the original drilled depth of Well CS-10 was 590 feet and was first drilled in 1918. After airlifting was completed, a new 20 hp pump and column piping were installed at CS-10. The surface completion and related appurtenances were upgraded to meet current Rules and standards as per the Plan submittal. The well was chlorinated and left idle for 24 hours, then flushed and sampled. Bacteriological samples collected on 3 consecutive days showed "Not Present" results.

A modified pumping test was performed at Well CS-10 as per §290.41(c)(3)(G), *TCEQ Technical Guideline II, Hydrologic Testing*, and *TCEQ Staff Guidance: Pumping Test For Public Water Wells* on June 18, 2007. The well was idle for 2 days prior to the test. Graphical pumping test data is attached. The pumping rate was maintained at 110 gallons per minute (gpm) for 8 hours and 51 minutes. Total drawdown was 86.56 feet at the end of pumping. After pumping stopped, the non-pumping water level had recovered by 50% after 27 minutes, and 75% after 3 hours. CSSA operators generally rotate daily pumping among 3 base supply wells, and a well is normally pumping not more than 8 hours per day. The modified pumping test was performed several months after the upgrade was finished and after drought conditions had abated, as requested in the Plan submittal. Basic hydraulic properties have been determined through previous pumping tests and are available for viewing at *http://www.stanley.army.mil/Volume5/GW_pumping_tests/TOC.htm*.

At Well CS-9, 21 feet of old, deteriorated 8-inch diameter casing was removed and replaced with 180 feet (178 feet bgs and 2 feet above ground level) of new, 10-inch diameter steel casing. The annular space of the new casing was grouted in by positive displacement exterior method using a cement and 3-5% bentonite powder mix. After the new surface casing was installed, a section of old piping was encountered lodged near the bottom of the borehole. 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. Collection of one CS-9 water sample, after the downhole debris had been disturbed, showed a concentration of (5.9 mg/l) of mercury (Hg) above the drinking water MCL (2.0 mg/l). Based on this finding, it was determined that the debris was the source for the elevated concentrations above drinking water MCLs. No metals were found above MCLs in concurrent sampling of CS-10 water. Removal of the debris proved economically infeasible. The bottom of CS-9 was pressure grouted up to 548.8 feet with neat cement by tremie pipe and positive

displacement, sealing the debris in cement and from contact with the remaining open portion of the CS-9 borehole. Neat cement was prepared according to AWWA definitions. Purge water containing metals above MCLs was contained, characterized, and discharged to the CSSA wastewater treatment plant in compliance with the CSSA TPDES permit. After cementing, Well CS-9 was again purged and sampled. Two subsequent raw water analyses (results attached) showed Pb and Hg detections far below MCLs and slightly above reporting limits (RL), the highest levels being 0.00304 and 0.00042 *mg/l*, respectively. Table 2 shows a summary of recent Well CS-9 metals analyses results. A laboratory report of contained Well CS-9 purge water is attached showing negative results for PCBs, SVOCs, and VOCs. 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. The well was disinfected, purged, and bacteriological samples were collected on 3 consecutive days showing "Not Present" results.

A modified pumping test was performed at Well CS-9 in May 2007 and test data is graphically provided in the attachments. The well was idle for several days prior to the test. The well was pumped at a rate of 58 gpm for 24 hours. About 5 hours before the end of the test the water level recovered 3 feet over the course of an hour, before resuming a steady shallow decline. About the same time, storms developed in the region depositing 1.5 inches of rain within a very short time in some places. The power system in the CSSA area occasionally experiences fleeting power interruptions and surges during storms. The slight water level rise could be attributed to either small power fluctuations, or a recharge pulse resulting from sudden heavy area precipitation. The maximum drawdown of 72.08 feet was achieved after 19 hours and 5 minutes of pumping. The net drawdown after 24 hours was 70.11 feet. After pumping stopped, the well recovered by 50% within 19 minutes, 75% after 71 minutes, and 100% recovery was attained after 20 hours and 2 minutes of rest.

As per the TCEQ *Public Well Completion Data Checklist*, the following items relative to completed upgrade work at Wells CS-9 and CS-10 are submitted:

1. Copy of recorded deed and map - **on file at TCEQ;**
2. New construction data summary on upgraded Wells CS-9 and CS-10 (below);
3. USGS topographic map - **on file at TCEQ;**
4. Records of post-rework pumping tests (attached);
5. Bacteriological analyses reports (attached);
6. Chemical analyses reports - **on file at TCEQ**, selected pages of recent supplementary analyses reports attached (see narrative for explanation);

Table 2

CSSA Well CS-9 Selected Raw Water Sampling Analyses Summary
September 2005 - April 2007
(µg/ liter)

		09/08/05		06/13/06	09/13/06	09/28/06	10/23/06	10/23/06		04/06/07	04/18/07
Parameter	**MCL**	Pre-rehab quarterly monitoring	Rehabilitation work	Routine Quarterly Sampling*	Routine Quarterly Sampling	TCEQ sampling (LCRA-ELS)	after 2.5 mins purge (120 gal)	after 60 mins purge (2,880 gal)	Cement grouted over debris, reinstalled new pump and pipe	Post-rehab Quality Sampling	Post-rehab Quality Verification
Aluminum	200[1]					35.50					
Antimony	6					ND					
Arsenic	10	0.42		1.10	0.36	ND	ND	0.49			
Barium	2000	39		34.0	36.0	32.10	41.0	38.00			
Beryllium	4					ND					
Cadmium	5	ND		0.07	0.11	ND	ND	0.05			
Calcium	n/a					86,900					
Chromium	100	2.6		8.80	ND	7.12	ND	ND			
Copper	1300[2]	12		28.0	7.90	5.86	21.0	ND			
Iron	300[1]					569					
Lead	**15**	1.1		**18.00**	**28.00**	**35.10**	9.10	**17.00**		1.83	3.04
Magnesium	n/a					26,700					
Manganese	50[1]					4.19					
Mercury	**2**	ND		**5.90**	0.36	0.38	0.23	0.51		0.42	0.188
Nickel	100	1.2		8.0	ND	4.01	ND	ND			
Selenium	50					ND					
Silver	100[1]					ND					
Sodium	250000[3]					9,130					
Thallium	2					0.41				ND	ND
Zinc	5000[1]	62		3,400	1,700	2,430	4,400	690		555	598

XX.00 = above MCL
1 = SMCL
2 = Action level
3 = guideline
blank = not analyzed

* Well removed from service upon receipt of results.

7. Final approval sampling - not immediately required, a substantial chemical history of the wells is already established and **on file at TCEQ**. Routine annual and triennial inspection and sampling by TCEQ continues;

8. Checklist acknowledgement (attached).

If you have any questions, if you require additional information, or if we can be of any other assistance, please contact Glaré Sanchez, Environmental Program Manager, at (210) 698-5208.

Sincerely,

Jason D. Shirley
Installation Manager

Attachments

cc: Ms. Glare Sanchez, CSSA Environmental Program Manager
Mr. Greg Lyssy, EPA Region 6
Mr. Sonny Rayos, TCEQ Central Office
Ms. Mary Knipfer, TCEQ Central Office
Ms. Abigail Power, TCEQ Region 13
Ms. Julie Burdey, Parsons
Ms. Kimberly Vaughn, Parsons

ATTACHMENTS

Checklist

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
WATER SUPPLY DIVISION, UTIL. CREA[illegible] & PLAN REV. TEAM MC-153
P.O. BOX 13087, AUSTIN, TEXAS 78711-3087

PUBLIC WATER SYSTEM ID No.: 0150117
TC LOG NO: 200604-031
OWNER'S WELL ID NO. or Name wells CS-9 and CS-10

PUBLIC WELL COMPLETION DATA CHECKLIST FOR INTERIM APPROVAL

Any well proposed as a source of water for a public water supply must have plans approved for construction by the TCEQ. Plans are reviewed for compliance with Rules and Regulations for Public Water Systems Title 30 TAC Chapter 290.38-290.49. After the well is drilled, the well completion data listed below must be submitted for TCEQ evaluation. Based on this submitted data, interim approval may be given for use of the well. Please include the TCEQ Log No. and owner's well name when submitting well completion information.

(Small print references in parentheses are to Rules and Regulations for Public Water Systems Title 30 TAC Chapter 290.38-290.49)

1. ☒ N/A Copies of ordinance or a recorded deed and map showing ownership and/or sanitary control easements as filed at the county courthouse (bearing the county clerk's stamp), covering all areas within 150 feet of the well owned by the system that will convey to others and neighboring tract not owned by the system(for a sample easement see 30 TAC 290.47(c), or contact the TCEQ Austin office or a Regional office. (Section 290.41(c)(1)(F) of the rules.)

2. ☑ Construction data on the completed well, including:
   - ☑ Casing size, bore hole diameter (at least 3-in wider than casing OD), total well depth, casing material (e.g. steel, PVC-SDR17), casing length, and cementing depth and method (one of the methods in AWWA Standard A-100-(latest rev'n), Appendix. C, *excluding* the dump bailer and tremie methods);
   - ☒ N/A Driller's geologic log of strata penetrated during drilling of the well;
   - ☒ N/A Copy of the official State of Texas Well Report filled out by the water well driller (some of the preceding data is included on the Water Well Report form. (Section 290.41(c)(3)(A),(B),(C) & (G) of the rules.)
   - ☑ Cementing certificate (Railroad Commission or company format). (Section 290.41(c)(3)(A))

3. ☒ N/A A U.S. Geological Survey 7.5-minute topographic quadrangle map (include quadrangle name and number), or a legible copy, with "cross-hairs" showing the location of the completed well. (Section 290.41(c)(3)(A) of the rules.) ACCURACY: All locations collected shall maintain a minimum level of accuracy of at least 25 meters (82 feet). TCEQ OPP 8.11.02)

4. ☑ Record of a 36 hour pump test on the well showing stable production at the well's rated capacity (Section 290.41(c)(3)(A) & (G) of the rules). Include the final well pump capacity in gpm and feet, t.d.h.

5. ☑ Three bacteriological analysis reports showing raw well water to be free of coliform bacterial contamination; reports must be for samples of raw (untreated) water from the disinfected well, collected on three successive days, and submitted to a laboratory certified by TCEQ. (Section 290.41(c)(3)(A) & (F) of the rules.)

6. ☑ Chemical analysis reports for well water samples showing the water to be of acceptable quality for at least, the most problematic contaminants listed below (Section 290.41(c)(3)(A) & (G) of the rules, and Section 290.104 and 290.105 of Drinking Water Standards). Reports from a private, non-certified laboratory may be accepted by TCEQ for interim use of the well. Maximum contaminant level (MCL) and secondary contaminant level (SCL) units are in mg/l (except arsenic).

MCL	PRIMARY	SCL	SECONDARY	SCL	SECONDARY	SCL	SECONDARY
10 (as N)	Nitrate	0.2	Aluminum	5.0	Zinc	300	Sulfate
1 (asN)	Nitrite	1.0	Copper	1,000	Total Dissolved Solids	300	Chloride
10 µg/l	Arsenic	0.3	Iron	2.0	Fluoride	≥7.0	pH
4.0	Fluoride	0.05	Manganese				

15 Gross alpha (pCi/liter)*
5 Radium-226/228 (pCi/liter)*
50 Beta particle (pCi/liter)*
30 Uranium (µg/liter)*

(WHERE: pCi/liter=pico curies per liter, µg/liter=micrograms per liter)

*Radionuclide water analyses required only in selected counties listed on the back of this checklist. For more guidance see "How to Conduct Radionuclide Testing for Well Completion Interim Approval" at:

http://www.tceq.state.tx.us/permitting/water_supply/pdw/chemicals/radionuclides/pdw_rad.html

7. ☑ By checking this box, submitter agrees to contact the Drinking Water Quality Team at 512/239-4691 within 120 days of receiving interim approval to schedule final approval sampling. These will be collected by TCEQ contractors, analyzed by a certified lab, and paid for by the Public Water Supply.

8. ☑ By checking this box, submitter acknowledges that Public Water Supply systems are subject to applicable Texas Administrative Code 30 Chapters 290, 291, 292 and 293. More information can be found at 512/239-4691, http://www.tceq.state.tx.us/nav/util_water/, and http://www.tnrcc.state.tx.us/oprd/rules/index.html.

N/A = Not Applicable; data already on file at TCEQ.

Water Quality Analyses

DHL Analytical

Date: *02-Nov-06*

CLIENT:	CSSA Environmental Group	**Client Sample ID:**	CS-9 Purge Water
Project:	CS-9 Purge/CSSA	**Lab ID:**	0610205-01
Project No:	CSSA	**Collection Date:**	10/25/2006 2:30:00 PM
Lab Order:	0610205	**Matrix:**	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
608 PESTICIDE/PCB BY GC		**E608**					Analyst: **DO**
Aroclor 1016	ND	0.100	0.250		µg/L	1	10/31/2006 11:41:49 PM
Aroclor 1221	ND	0.100	0.250		µg/L	1	10/31/2006 11:41:49 PM
Aroclor 1232	ND	0.100	0.250		µg/L	1	10/31/2006 11:41:49 PM
Aroclor 1242	ND	0.100	0.250		µg/L	1	10/31/2006 11:41:49 PM
Aroclor 1248	ND	0.100	0.250		µg/L	1	10/31/2006 11:41:49 PM
Aroclor 1254	ND	0.100	0.250		µg/L	1	10/31/2006 11:41:49 PM
Aroclor 1260	ND	0.100	0.250		µg/L	1	10/31/2006 11:41:49 PM
Surr: Decachlorobiphenyl	110	0	40-130		%REC	1	10/31/2006 11:41:49 PM
Surr: Tetrachloro-m-xylene	56.9	0	40-130		%REC	1	10/31/2006 11:41:49 PM
TOTAL METALS: ICP-MS		**E200.8**					Analyst: **JWC**
Aluminum	89.0	10.0	30.0		µg/L	1	10/30/2006 8:00:00 PM
Antimony	ND	0.800	2.50		µg/L	1	10/30/2006 8:00:00 PM
Arsenic	ND	2.00	6.00		µg/L	1	10/30/2006 8:00:00 PM
Barium	42.3	3.00	10.0		µg/L	1	10/30/2006 8:00:00 PM
Beryllium	ND	0.300	0.800		µg/L	1	10/30/2006 8:00:00 PM
Cadmium	0.309	0.300	1.00	J	µg/L	1	10/30/2006 8:00:00 PM
Chromium	ND	2.00	6.00		µg/L	1	10/30/2006 8:00:00 PM
Copper	ND	2.00	10.0		µg/L	1	10/30/2006 8:00:00 PM
Lead	6.25	0.300	1.00		µg/L	1	10/30/2006 8:00:00 PM
Nickel	ND	3.00	10.0		µg/L	1	10/31/2006 10:05:00 AM
Selenium	2.13	2.00	6.00	J	µg/L	1	10/30/2006 8:00:00 PM
Silver	ND	1.00	2.00		µg/L	1	10/30/2006 8:00:00 PM
Thallium	3.59	0.500	1.50		µg/L	1	10/30/2006 8:00:00 PM
Zinc	928	2.00	5.00		µg/L	1	10/30/2006 8:00:00 PM
AQUEOUS MERCURY, TOTAL		**E245.1**					Analyst: **KC**
Mercury	0.175	0.0800	0.200	J	µg/L	1	10/30/2006 2:28:00 PM
625 SEMIVOLATILE WATER		**E625**					Analyst: **DO**
Benzidine	ND	5.00	50.0		µg/L	1	10/27/2006 9:56:00 PM
Benzo[a]anthracene	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM
Benzo[a]pyrene	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM
Chrysene	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM
2,4-Dimethylphenol	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM
2-Methylphenol	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM
4,6-Dinitro-2-methylphenol	ND	2.00	50.0		µg/L	1	10/27/2006 9:56:00 PM
4-Chloro-3-methylphenol	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM
4-Methylphenol	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM
1,4-Dichlorobenzene	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM
Hexachlorobenzene	ND	2.00	10.0		µg/L	1	10/27/2006 9:56:00 PM

Qualifiers	B	Analyte detected in the associated Method Blank	C	Sample Result or QC discussed in the Case Narrative
	DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
	J	Analyte detected between MDL and RL	MDL	Method Detection Limit
	N	Parameter not NELAC certified	ND	Not Detected at the Method Detection Limit
	RL	Reporting Limit	S	Spike Recovery outside control limits

DHL Analytical

Date: *11-Apr-07*

CLIENT:	Parsons, Inc.	**Client Sample ID:**	CS-9
Project:	CSSA	**Lab ID:**	0704056-02
Project No:	745251.04000	**Collection Date:**	04/06/07 10:02 AM
Lab Order:	0704056	**Matrix:**	AQUEOUS

Analyses	Result	SQL	RL	Qual	Units	DF	Date Analyzed
TOTAL MERCURY: AQUEOUS		**SW7470A**					Analyst: **KDT**
Mercury	0.000420	0.0000800	0.000200		mg/L	1	04/10/07 02:31 PM
TRACE METALS: ICP-MS - WATER		**SW6020**					Analyst: **JWC**
Lead	0.00183	0.000300	0.00100		mg/L	1	04/10/07 05:49 PM
Thallium	ND	0.000500	0.00150		mg/L	1	04/10/07 05:49 PM
Zinc	0.555	0.00200	0.00500		mg/L	1	04/10/07 05:49 PM

Qualifiers:

ND - Not Detected at the SQL
J - Analyte detected between SQL and RL
B - Analyte detected in the associated Method Blank
DF- Dilution Factor
N - Parameter not NELAC certified
See Final Page of Report for MQLs and MDLs
S - Spike Recovery outside control limits
C - Sample Result or QC discussed in Case Narrative
RL - Reporting Limit (MQL adjusted for moisture and sample size)
SQL - Sample Quantitation Limit
E - TPH pattern not Gas or Diesel Range Pattern

DHL Analytical

Date: *20-Apr-07*

CLIENT:	Parsons, Inc.	Client Sample ID:	CS-9
Project:	CSSA	Lab ID:	0704156-01
Project No:	743322.10	Alternate ID:	CS-9_041807_N1540
Lab Order:	0704156	Collection Date:	04/18/07 03:40 PM
		Matrix:	AQUEOUS

Analyses	Result	MDL	RL	Qual	Units	DF	Date Analyzed
TOTAL METALS: ICP-MS		**E200.8**					Analyst: **JWC**
Lead	0.00304	0.000300	0.00100		mg/L	1	04/19/07 05:53 PM
Thallium	ND	0.000500	0.00150		mg/L	1	04/19/07 05:53 PM
Zinc	0.598	0.00200	0.00500		mg/L	1	04/19/07 05:53 PM
AQUEOUS MERCURY, TOTAL		**E245.1**					Analyst: **KDT**
Mercury	0.000188	0.0000800	0.000200	J	mg/L	1	04/19/07 01:01 PM

Qualifiers:

B	Analyte detected in the associated Method Blank	C	Sample Result or QC discussed in the Case Narrative
DF	Dilution Factor	E	TPH pattern not Gas or Diesel Range Pattern
J	Analyte detected between MDL and RL	MDL	Method Detection Limit
N	Parameter not NELAC certified	ND	Not Detected at the Method Detection Limit
RL	Reporting Limit	S	Spike Recovery outside control limits

Bacteriology Reports

SAN ANTONIO TESTING LABORATORY, INC.

Camp Stanley Storage Activity

25800 Ralph Fair Rd.
Boerne, TX 78015-4800
ATTN: Eric Tennyson

Date/Time Received: 5/23/2007 3:44 PM

Date Reported: 5/25/2007

Project Name: Camp Stanley
Project No.: 745 006 04

Additional Info:

Report No.: 0705-210

REPORT OF MICROBIOLOGICAL ANALYSIS

Sample ID #: 1 CS-9(1)

Sampling Method: Grab

Sample Type: Drinking Water

Date/Time Collected: 5/23/2007 3:00 P

Parameter	Results	Units	Analysis Method	Start Date/Time	Read Date/Time	Analyst
Total Coliform	Not Found	F/NF	SM9223	5/23/2007 / 4:01 PM	5/24/2007 / 4:05 PM	ID
E Coli	Not Found	F/NF	SM9223	5/23/2007 / 4:01 PM	5/24/2007 / 4:05 PM	ID

SAN ANTONIO
TESTING LABORATORY, INC.

Camp Stanley Storage Activity

25800 Ralph Fair Rd.
Boerne, TX 78015-4800
ATTN: Eric Tennyson

Date/Time Received: 5/24/2007 3:56 PM

Date Reported: 5/30/2007

Project Name: Camp Stanley
Project No.: 74500G.04

Additional Info:

Report No.: 0705-227

REPORT OF MICROBIOLOGICAL ANALYSIS

Sample ID #: 1 CS-9 (2)

Sampling Method: Grab

Sample Type: Liquid

Date/Time Collected: 5/24/2007 3:00 P

Parameter	Results	Units	Analysis Method	Start Date/Time	Read Date/Time	Analyst
Total Coliform	Not Found	F/NF	SM9223	5/24/2007 / 4:34 PM	5/25/2007 / 4:37 PM	ID
E Coli	Not Found	F/NF	SM9223	5/24/2007 / 4:34 PM	5/25/2007 / 4:37 PM	ID

SAN ANTONIO TESTING LABORATORY, INC.

Camp Stanley Storage Activity

25800 Ralph Fair Rd.
Boerne, TX 78015-4800
ATTN: Eric Tennyson

Date/Time Received: 5/25/2007 3:42 PM

Date Reported: 5/30/2007

Project Name: Camp Stanley
Project No.: 745006.04

Additional Info:

Report No.: 0705-248

REPORT OF MICROBIOLOGICAL ANALYSIS

Sample ID #: 1 CS-9(3)

Sampling Method: Grab

Sample Type: Liquid

Date/Time Collected: 5/25/2007 3:00 P

Parameter	Results	Units	Analysis Method	Start Date/Time	Read Date/Time	Analyst
Total Coliform	Not Found	F/NF	SM9223	5/25/2007 / 4:05 PM	5/26/2007 / 4:09 PM	ID
E Coli	Not Found	F/NF	SM9223	5/25/2007 / 4:05 PM	5/26/2007 / 4:09 PM	ID

SAN ANTONIO TESTING LABORATORY, INC.

1

Camp Stanley Storage Activity

25800 Ralph Fair Rd.
Boerne, TX 78015
ATTN: Env. Office

Date/Time Received: 6/26/2006 9:01 AM

Date Reported: 6/27/2006

Project Name: State
Project No.: 0150117

Additional Info:

Report No.: 0606-187

REPORT OF MICROBIOLOGICAL ANALYSIS

Sample ID #: 1 CSSA Well CS -10

Sample Type: Drinking Water

Date/Time Collected: 6/25/2006 3:00 P

Parameter	Results	Units	Analysis Method	Start Date/Time	Read Date/Time	Analyst
Total Coliform	Not Found	F/NF	SM9223	6/26/2006 / 2:15 PM	6/27/2006 / 2:30 PM	SA
E Coli	Not Found	F/NF	SM9223	6/26/2006 / 2:15 PM	6/27/2006 / 2:30 PM	SA

SAN ANTONIO TESTING LABORATORY, INC.

2

Camp Stanley Storage Activity

25800 Ralph Fair Rd.
Boerne, TX 78015
ATTN: Env. Office

Date/Time Received: 6/26/2006 3:59 PM

Date Reported: 6/27/2006

Project Name: State
Project No.: 0150117

Additional Info:

Report No.: 0606-200

REPORT OF MICROBIOLOGICAL ANALYSIS

Sample ID #: 1 CSSA Well CS-10

Sample Type: Drinking Water

Date/Time Collected: 6/26/2006 3:15 P

Parameter	Results	Units	Analysis Method	Start Date/Time	Read Date/Time	Analyst
Total Coliform	Not Found	F/NF	SM9223	6/26/2006 / 2:15 PM	6/27/2006 / 2:15 PM	SA
E Coli	Not Found	F/NF	SM9223	6/26/2006 / 2:15 PM	6/27/2006 / 2:15 PM	SA

SAN ANTONIO TESTING LABORATORY, INC.

3

Camp Stanley Storage Activity

25800 Ralph Fair Rd.
Boerne, TX 78015
ATTN: Env. Office

Date/Time Received: 6/27/2006 4:15 PM

Date Reported: 6/29/2006

Project Name: State
Project No.: 0150117

Additional Info:

Report No.: 0606-208

REPORT OF MICROBIOLOGICAL ANALYSIS

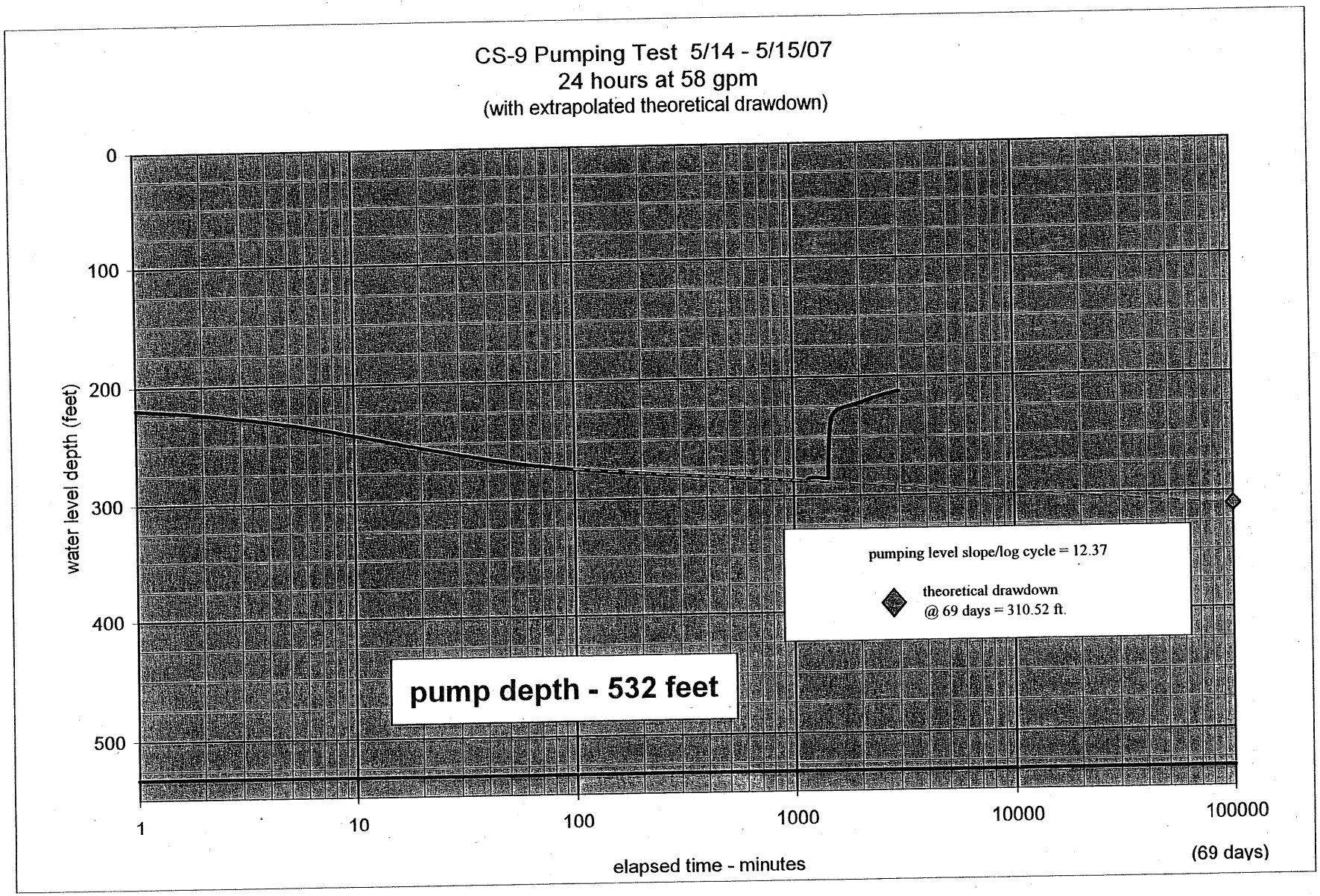
Sample ID #: 1 Well CS-10 (3 of 3)

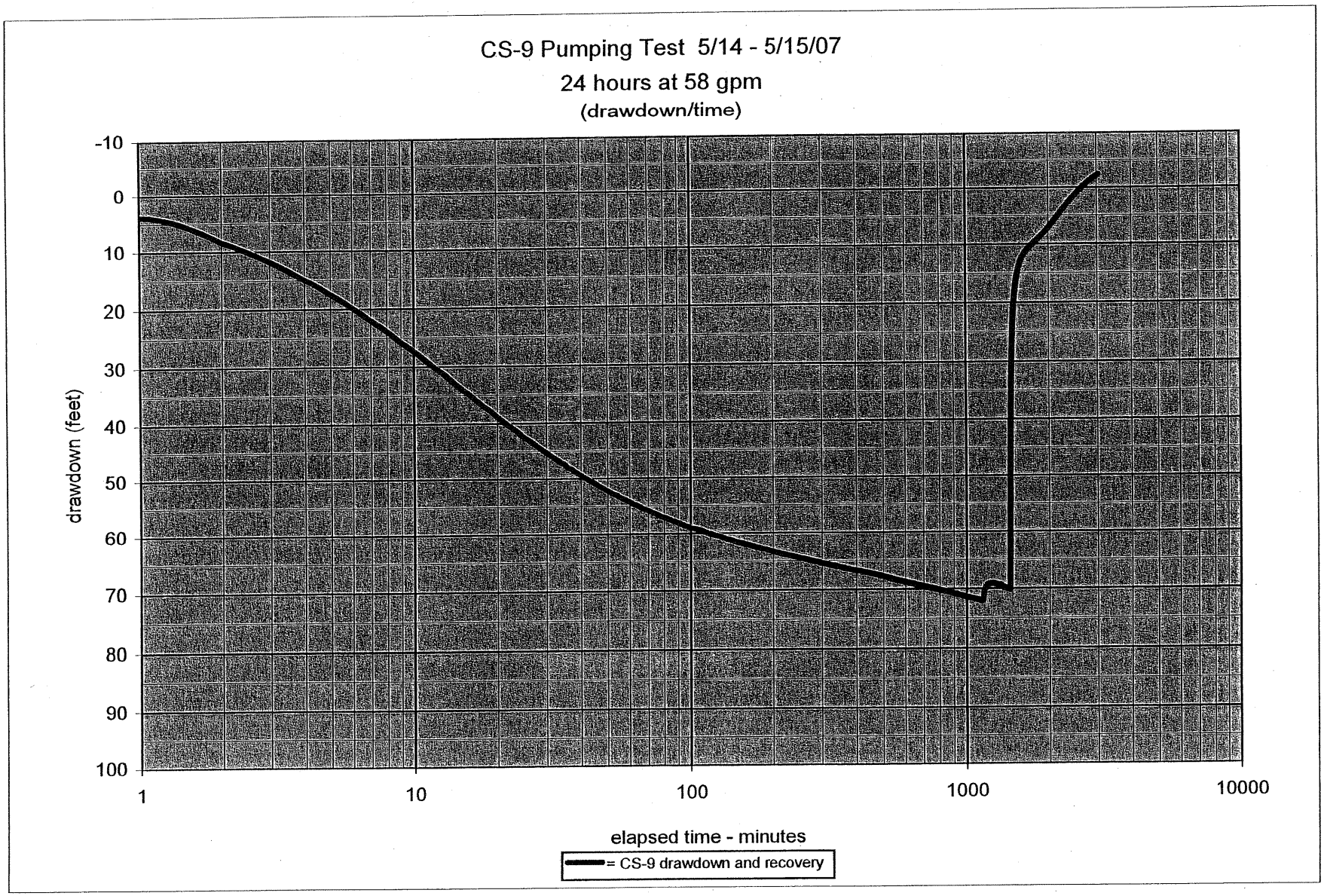
Sample Type: Drinking Water

Date/Time Collected: 6/27/2006 3:15 P

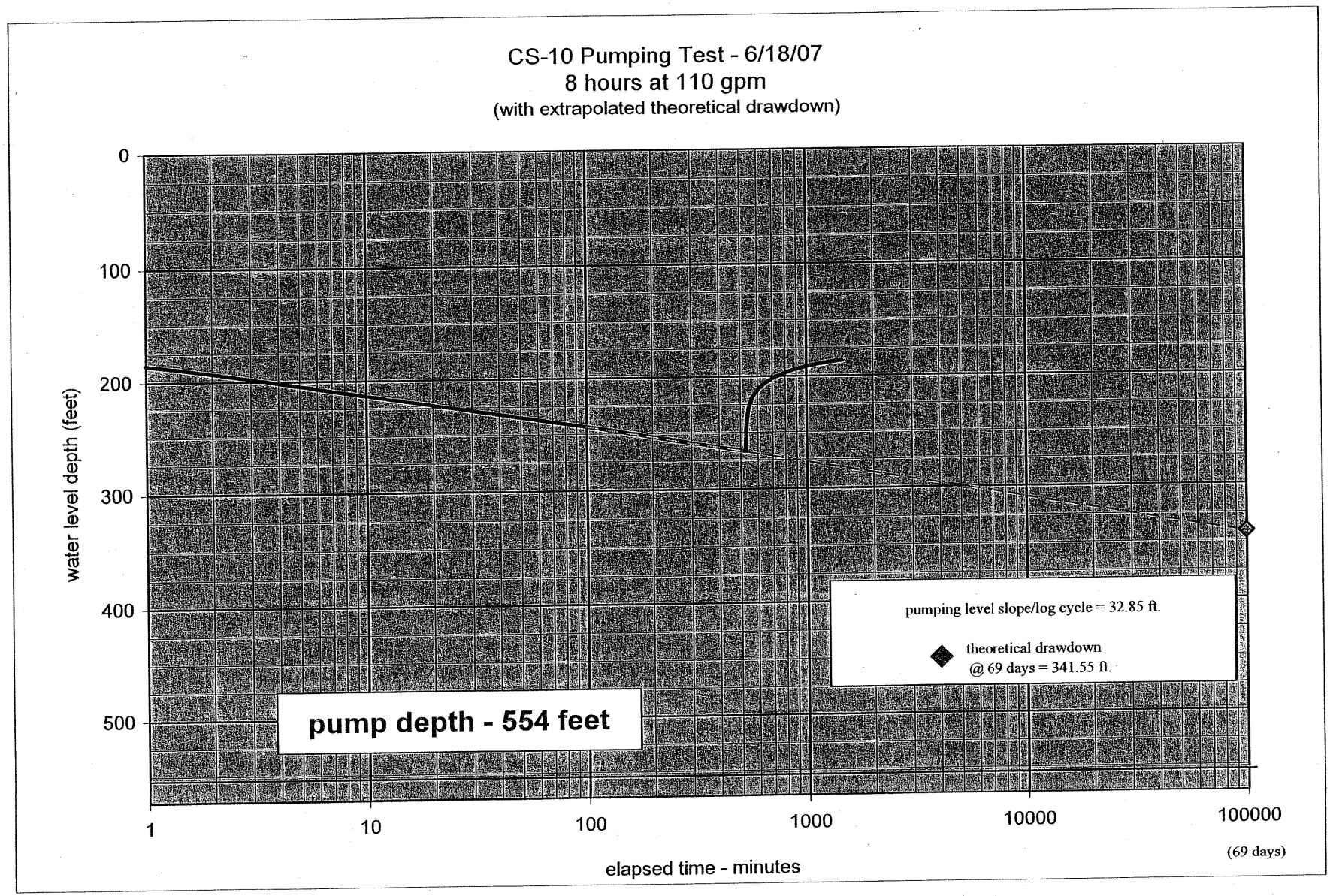
Parameter	Results	Units	Analysis Method	Start Date/Time	Read Date/Time	Analyst
Total Coliform	Not Found	F/NF	SM9223	6/27/2006 / 4:30 PM	6/28/2006 / 4:35 PM	ID
E Coli	Not Found	F/NF	SM9223	6/27/2006 / 4:30 PM	6/28/2006 / 4:35 PM	ID

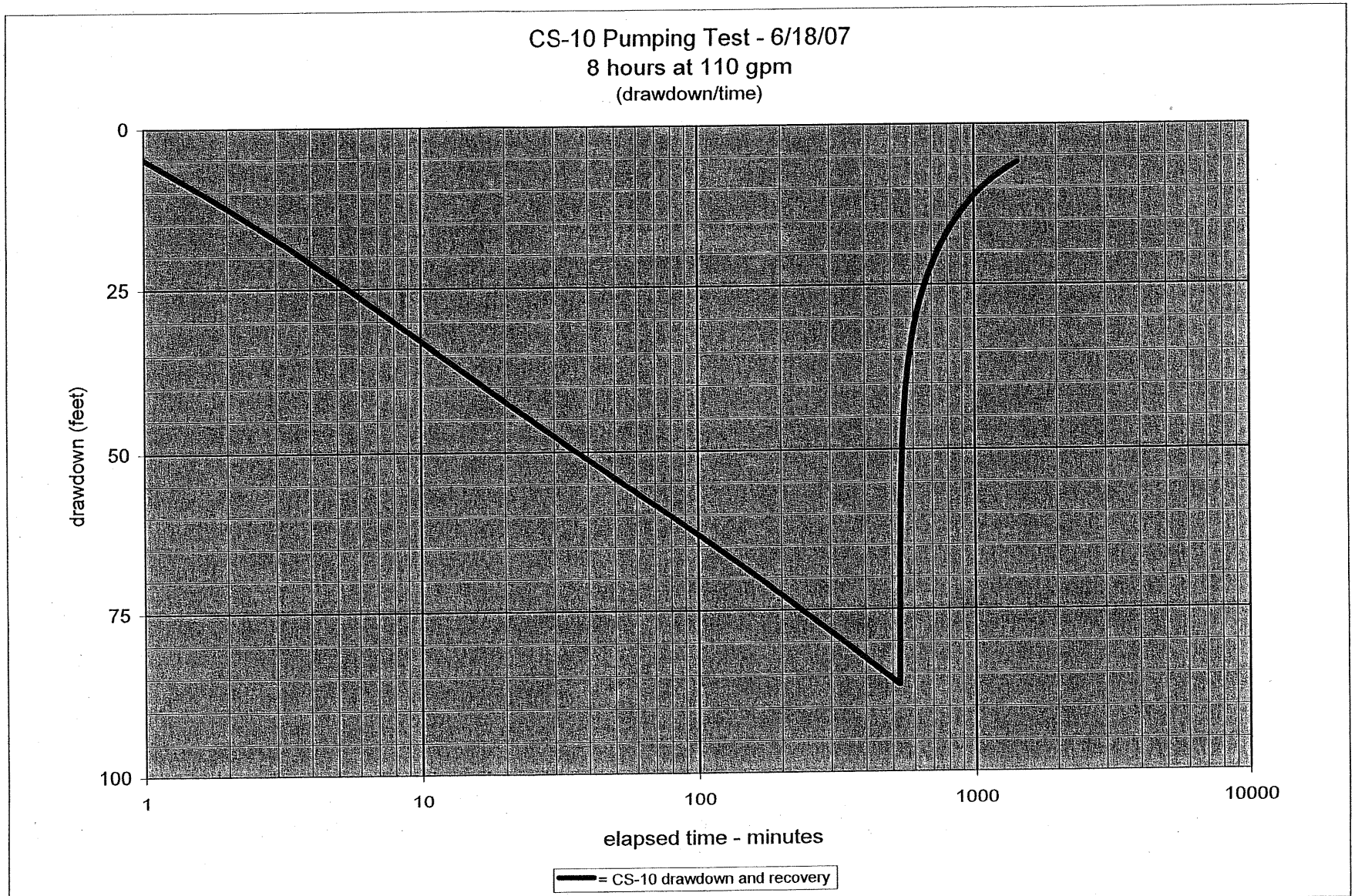
CS-9 Pumping Test Graphs


CS-9 Pumping Test 5/14 - 5/15/07
24 hours at 58 gpm
(with extrapolated theoretical drawdown)
water level depth (feet)
0
100
200
300
400
500
1
10
100
1000
10000
100000
(69 days)
elapsed time - minutes
pumping level slope/log cycle = 12.37
theoretical drawdown
@ 69 days = 310.52 ft.
pump depth - 532 feet


CS-9 Pumping Test 5/14 - 5/15/07
24 hours at 58 gpm
(drawdown/time)
drawdown (feet)
-10
0
10
20
30
40
50
60
70
80
90
100
1
10
100
1000
10000
elapsed time - minutes
= CS-9 drawdown and recovery

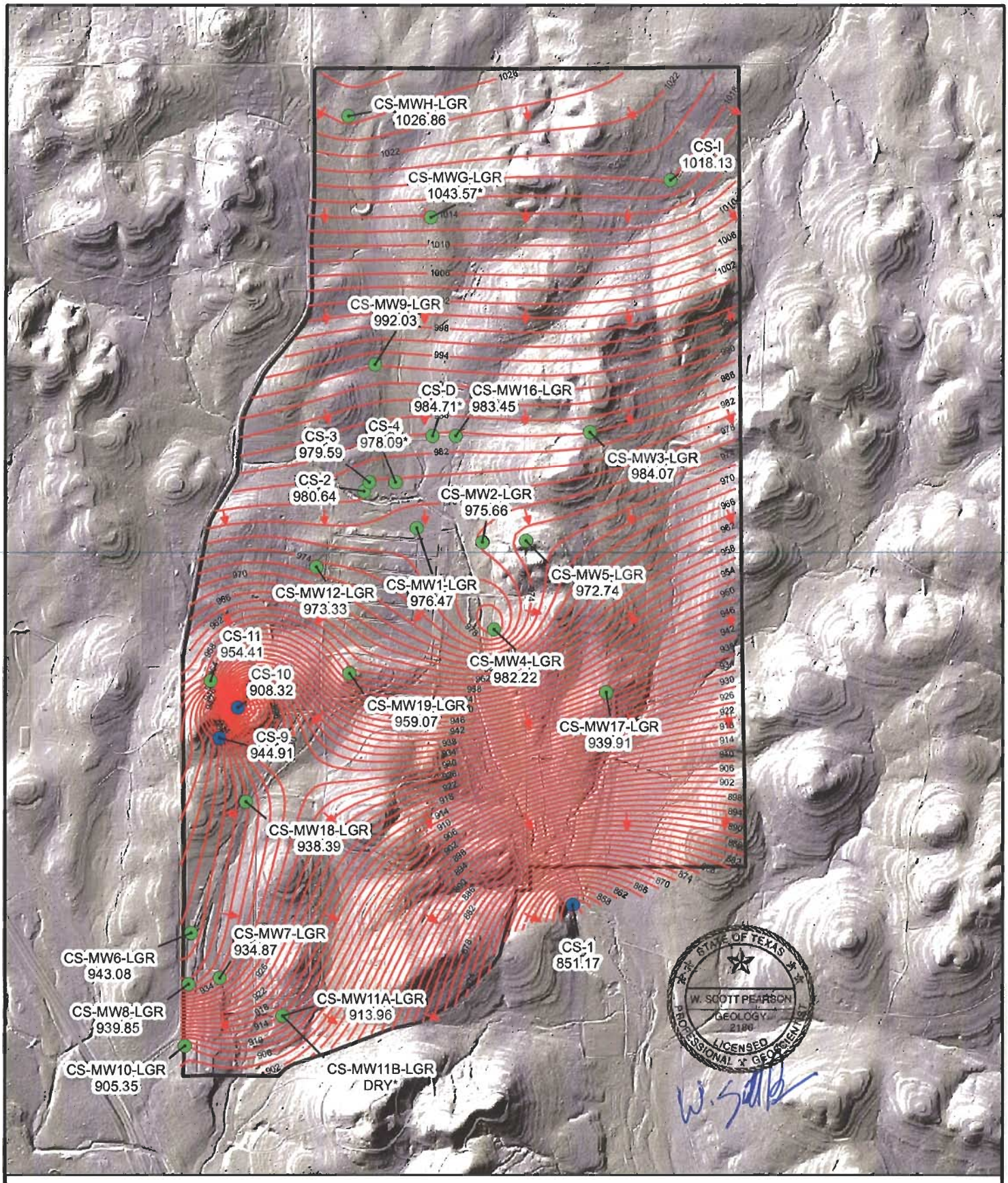
CS-10 Pumping Test Graphs


CS-10 Pumping Test - 6/18/07
8 hours at 110 gpm
(with extrapolated theoretical drawdown)
water level depth (feet)
0
100
200
300
400
500
pump depth - 554 feet
pumping level slope/log cycle = 32.85 ft.
theoretical drawdown
@ 69 days = 341.55 ft.
1
10
100
1000
10000
100000
(69 days)
elapsed time - minutes


CS-10 Pumping Test - 6/18/07
8 hours at 110 gpm
(drawdown/time)
0
25
50
75
100
drawdown (feet)
1
10
100
1000
10000
elapsed time - minutes
= CS-10 drawdown and recovery

APPENDIX E

POTENTIOMETRIC MAPS FOR MARCH, JUNE, SEPTEMBER, DECEMBER 2007



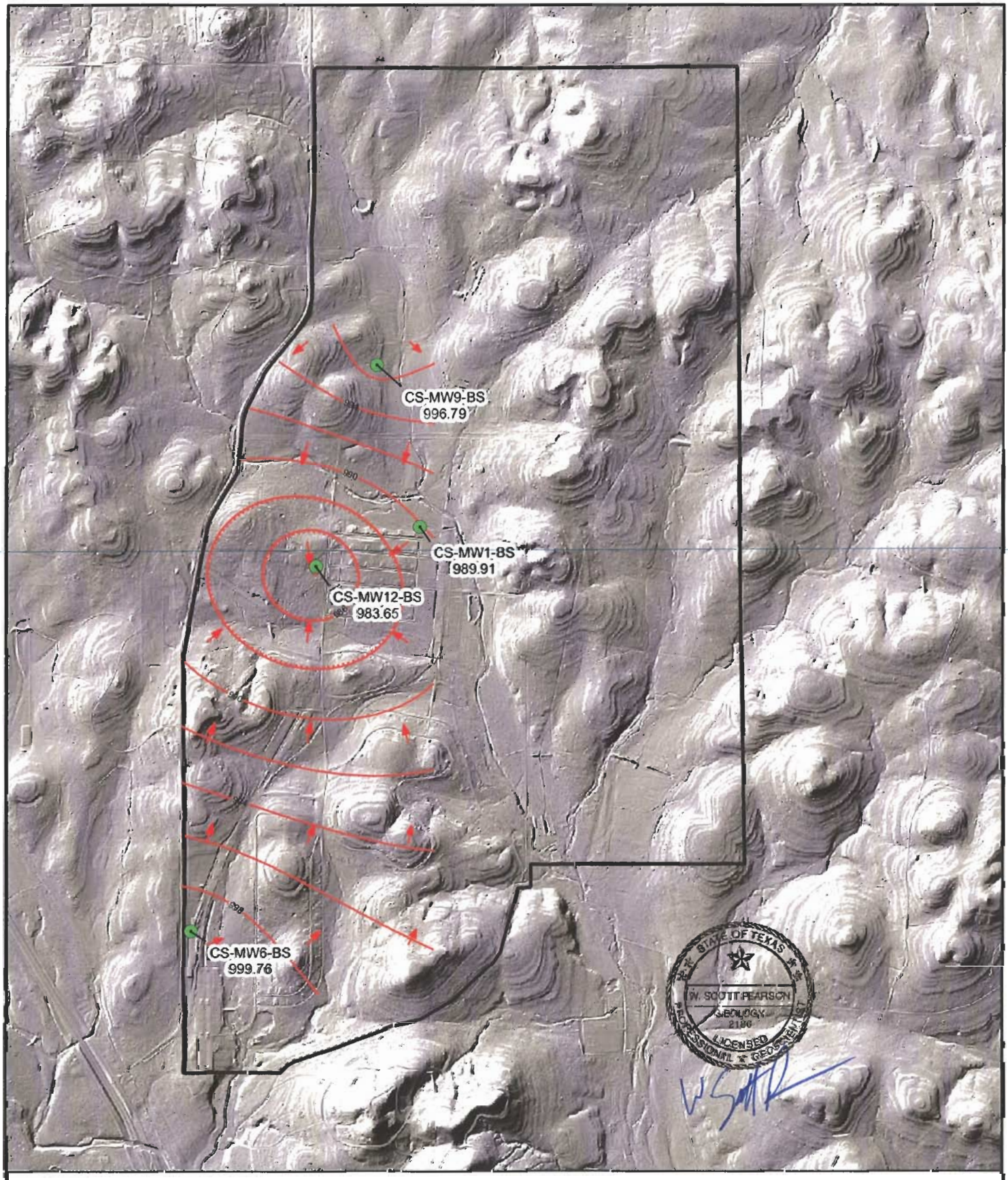
Appendix E.1

March 2007 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\Mar07_potentiometric_lgr.mxd - 4/2/2008 @ 4:21:50 PM

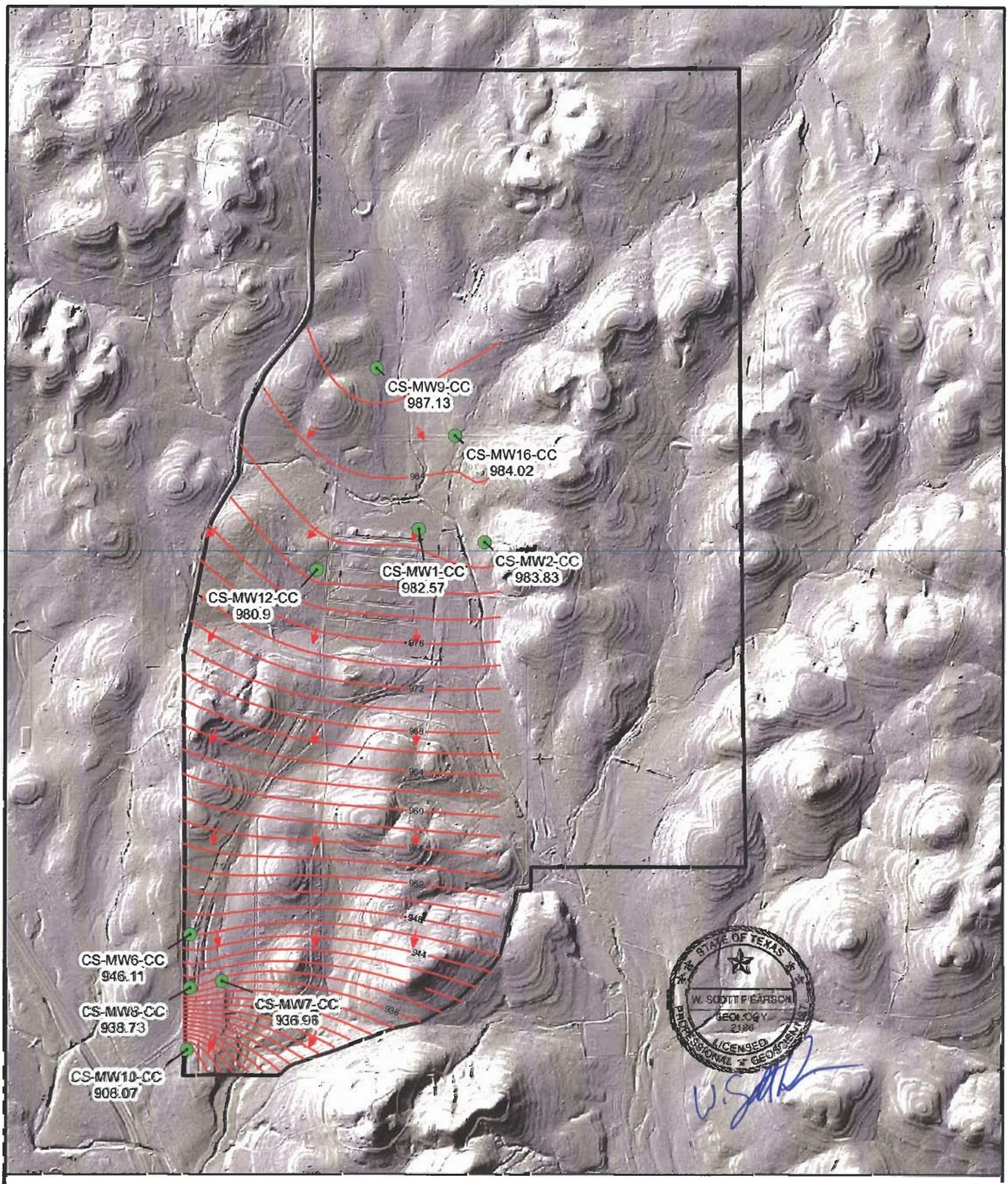


Appendix E.2

March 2007 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

PARSONS



Appendix E.3

March 2007 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

PARSONS

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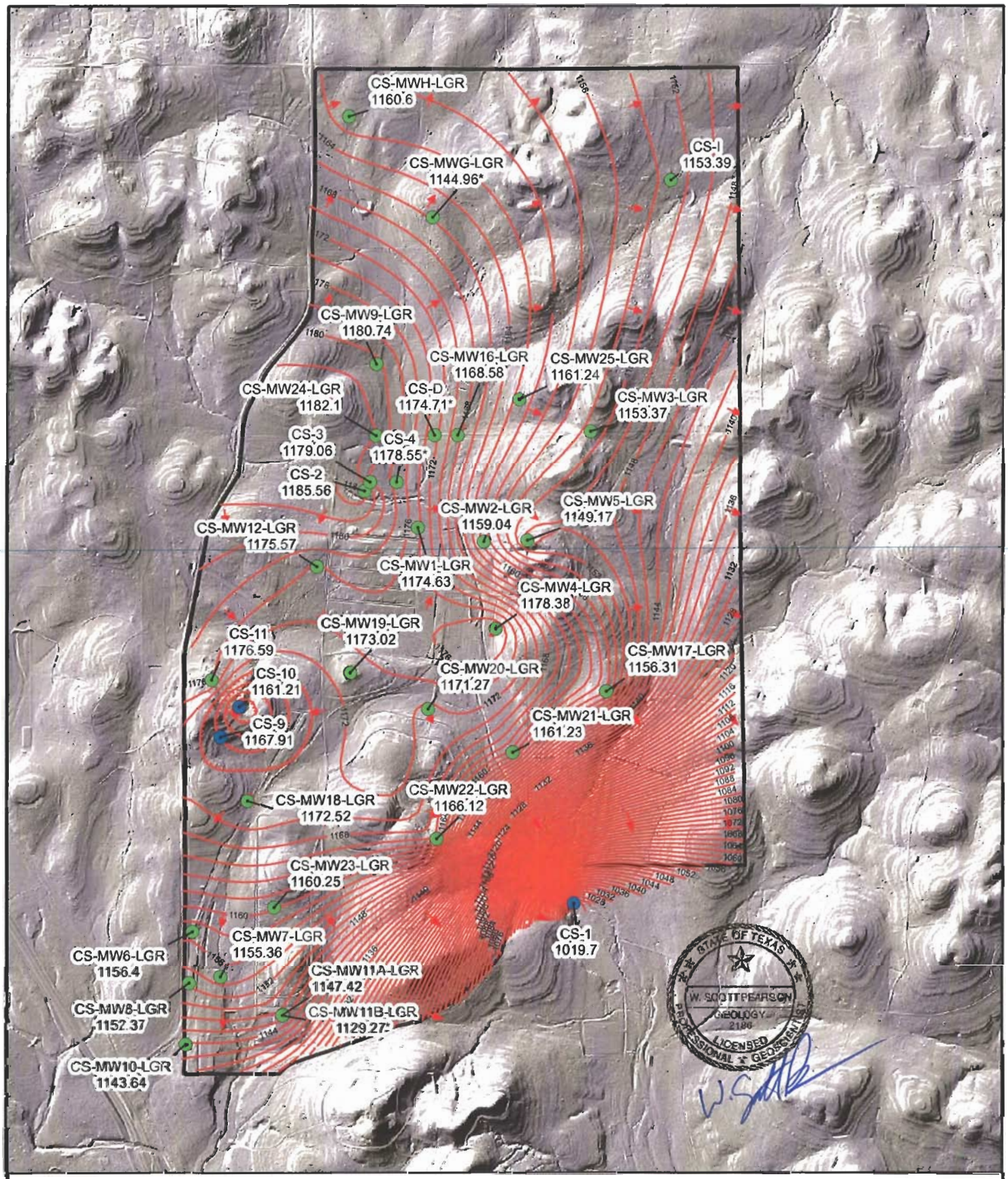

Appendix E.4

June 2007 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

PARSONS

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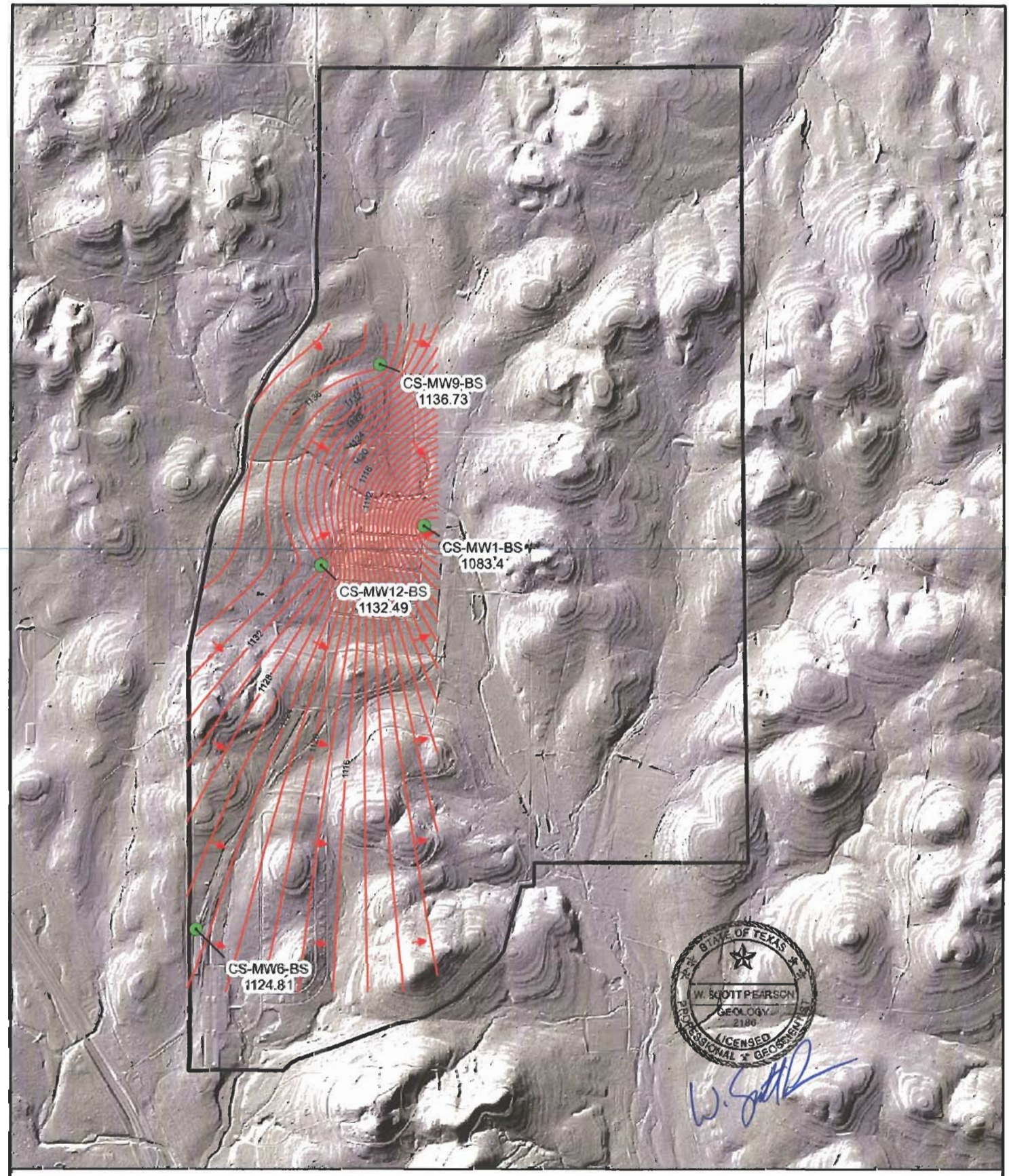


N
W E
S

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

Flow direction
BS Groundwater Contours
Outer fence
BS Wells

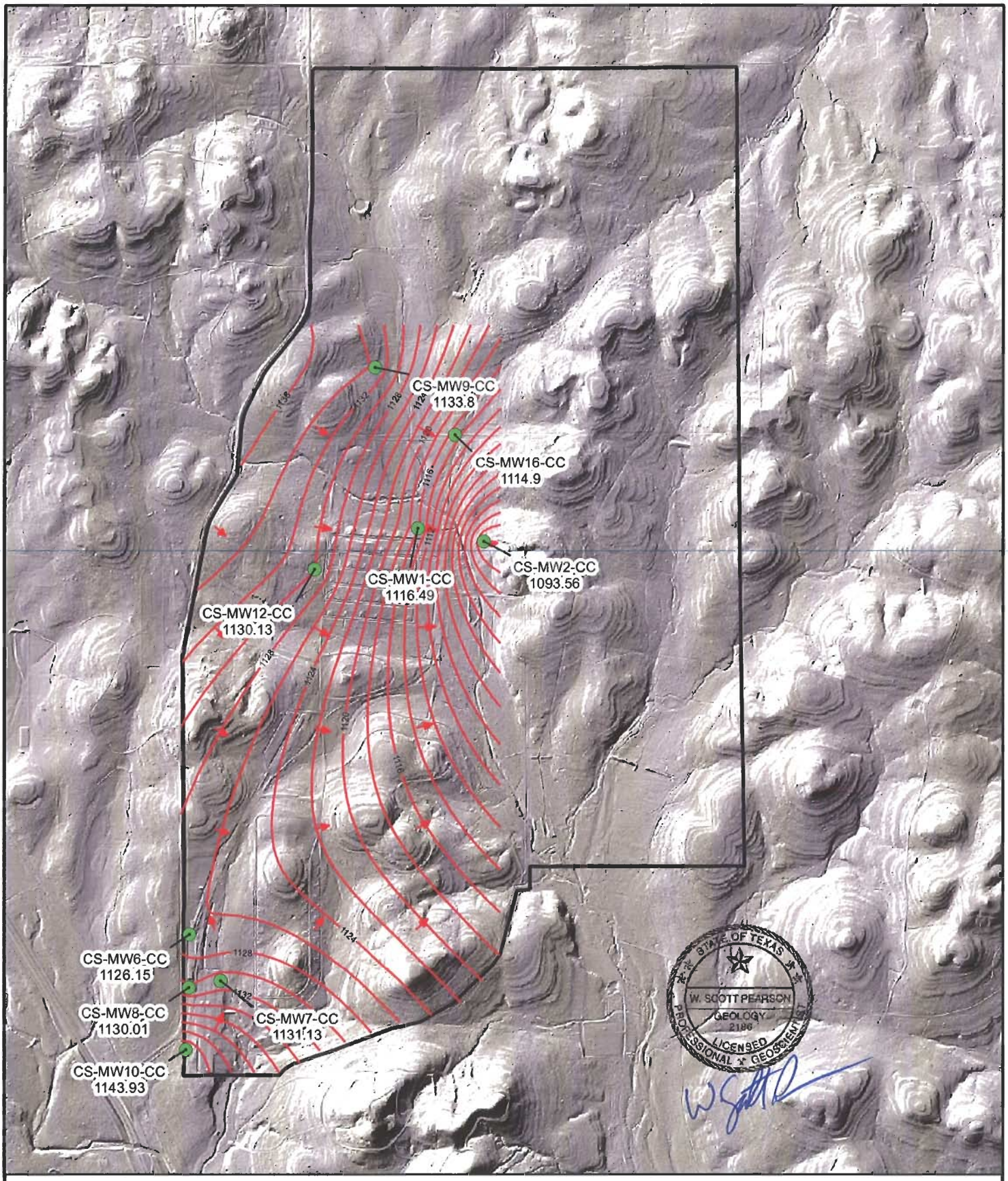
Appendix E.5

June 2007 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\June07_potentiometric_bs.mxd - 4/2/2008 @ 4:26:22 PM



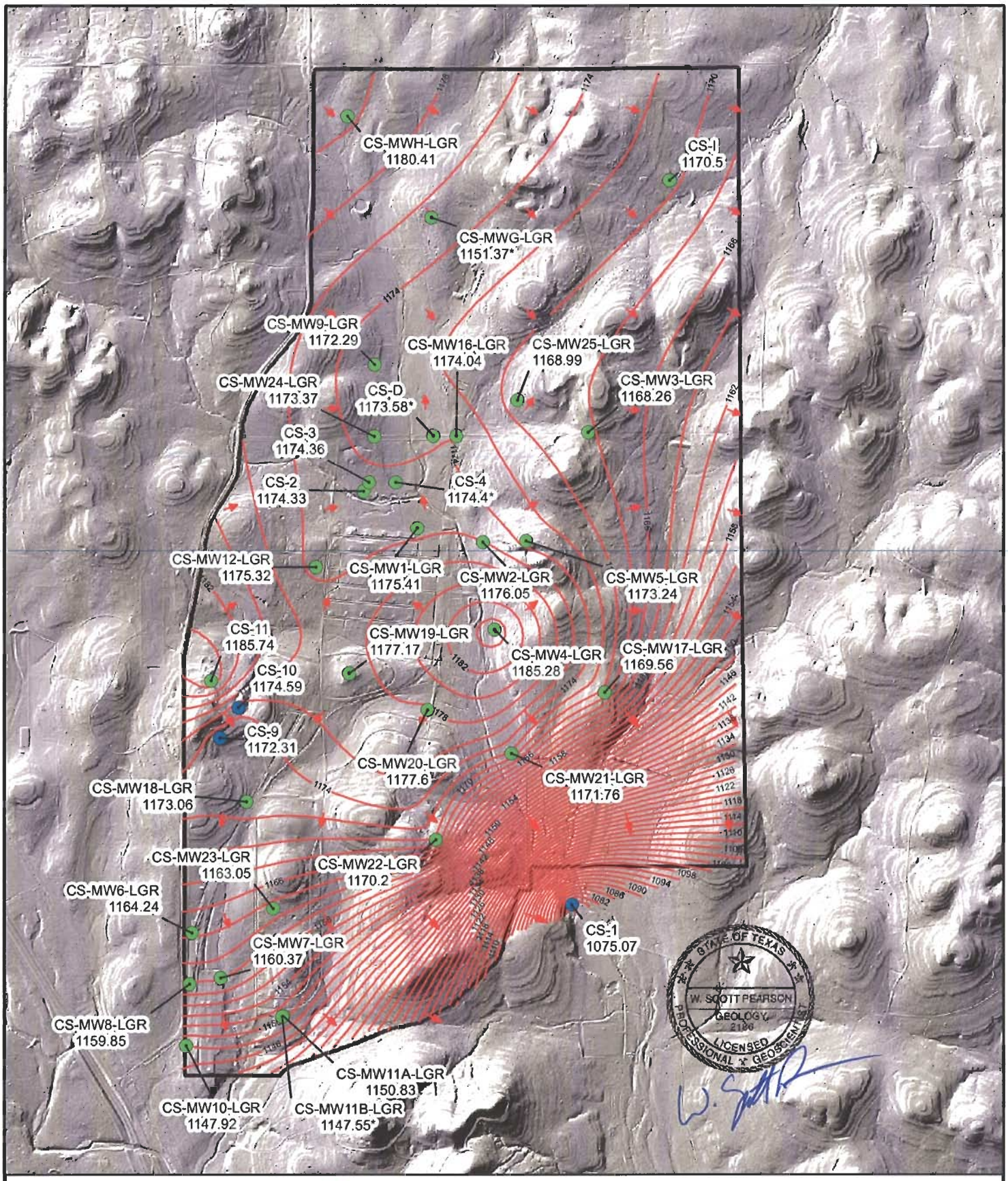
Appendix E.6

June 2007 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\June07_potentiometric_cc.mxd - 3/18/2008 @ 10:35 AM



Appendix E.7

September 2007 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

PARSONS

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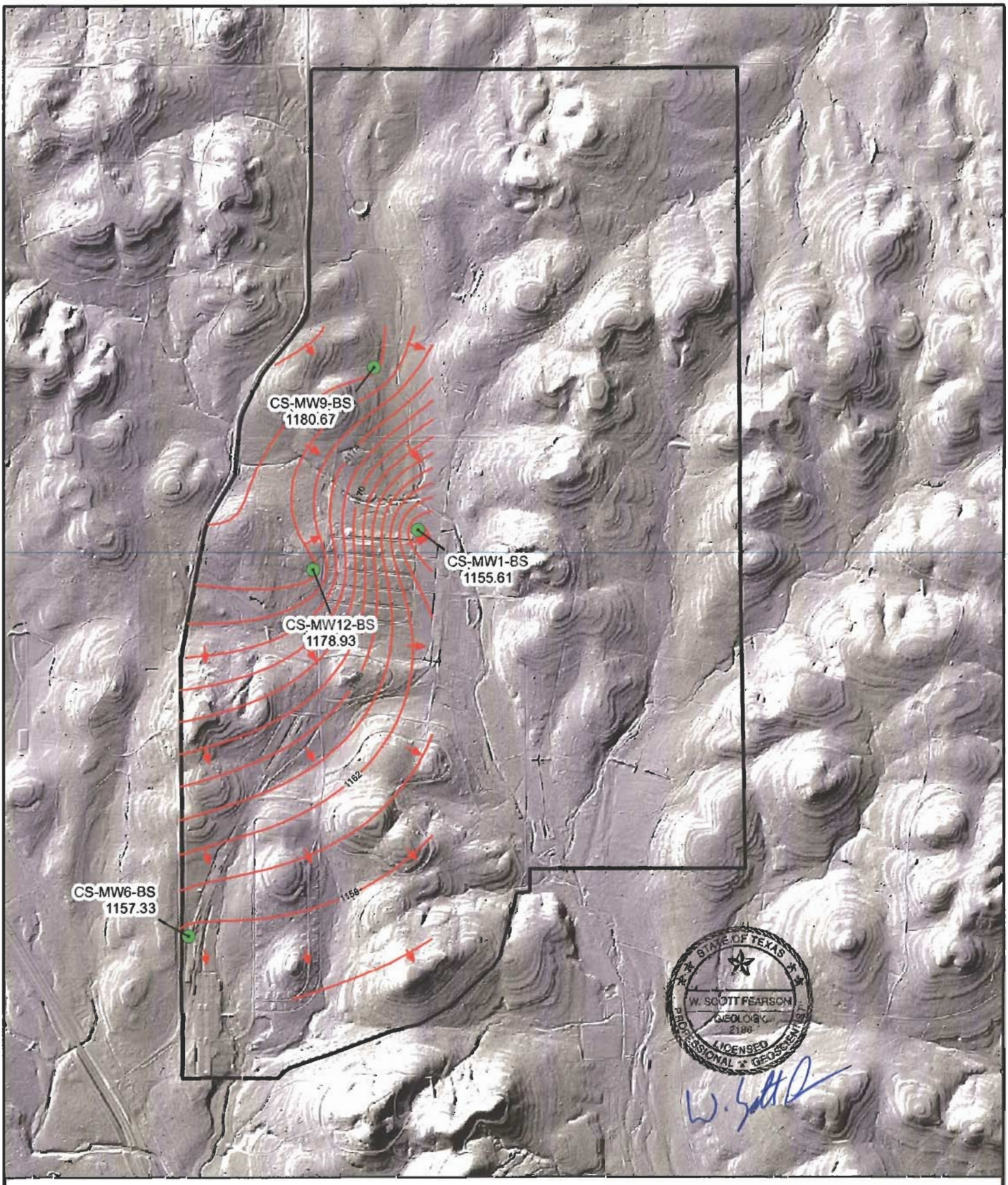

Appendix E.8

September 2007 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

PARSONS

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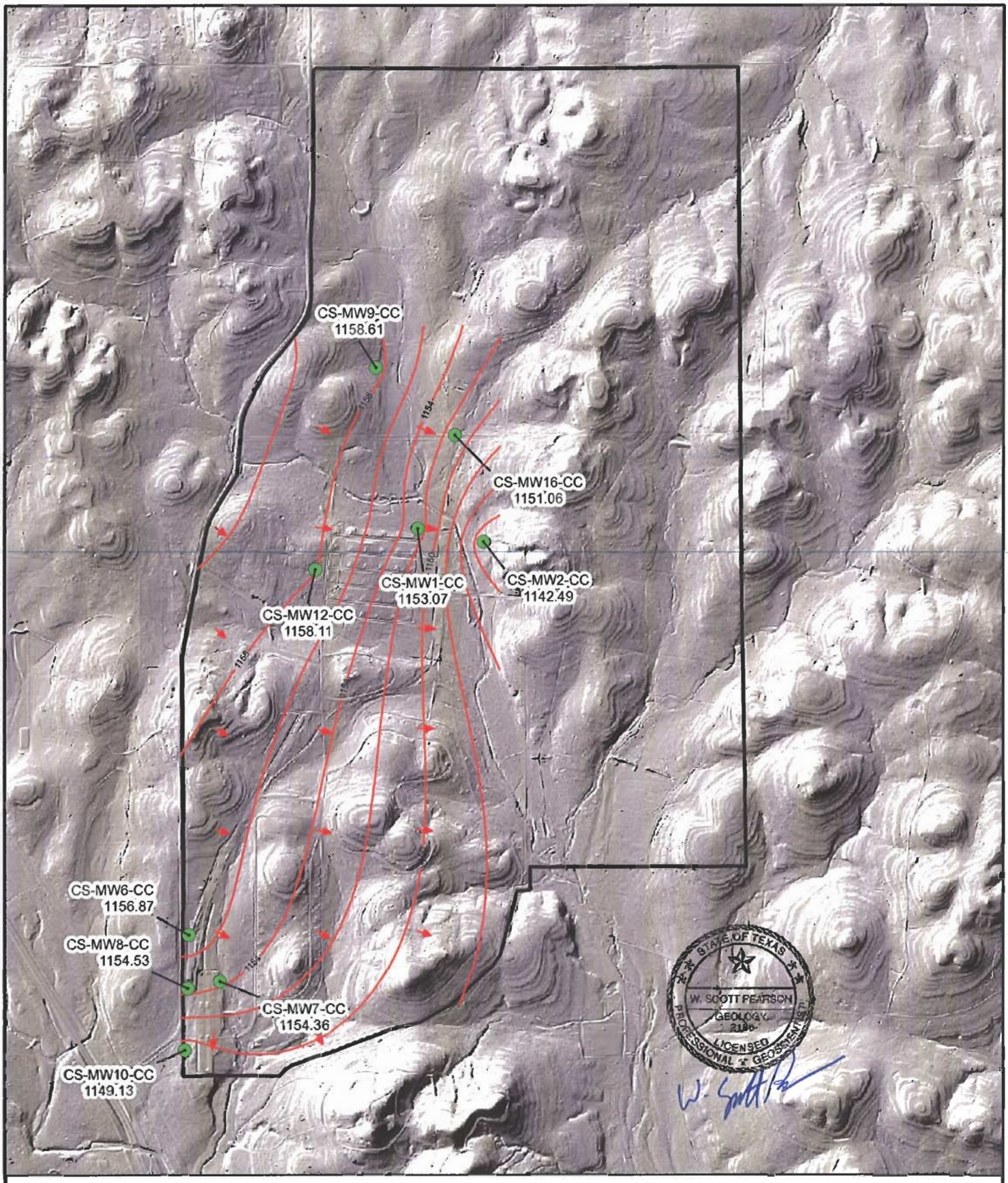

Appendix E.9

September 2007 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

PARSONS

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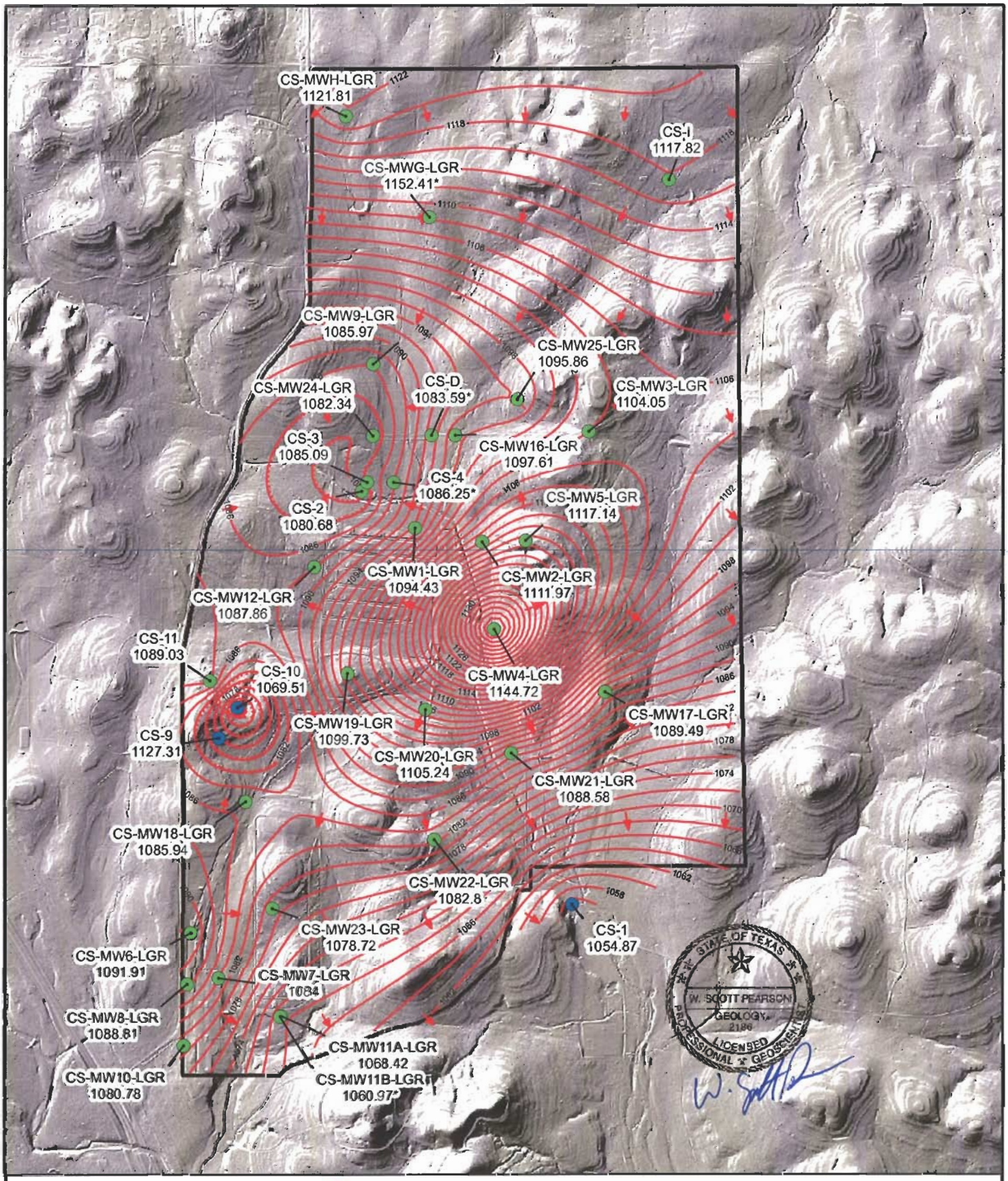

Appendix E.10

December 2007 Potentiometric Surface Map, LGR Wells

Camp Stanley Storage Activity

PARSONS

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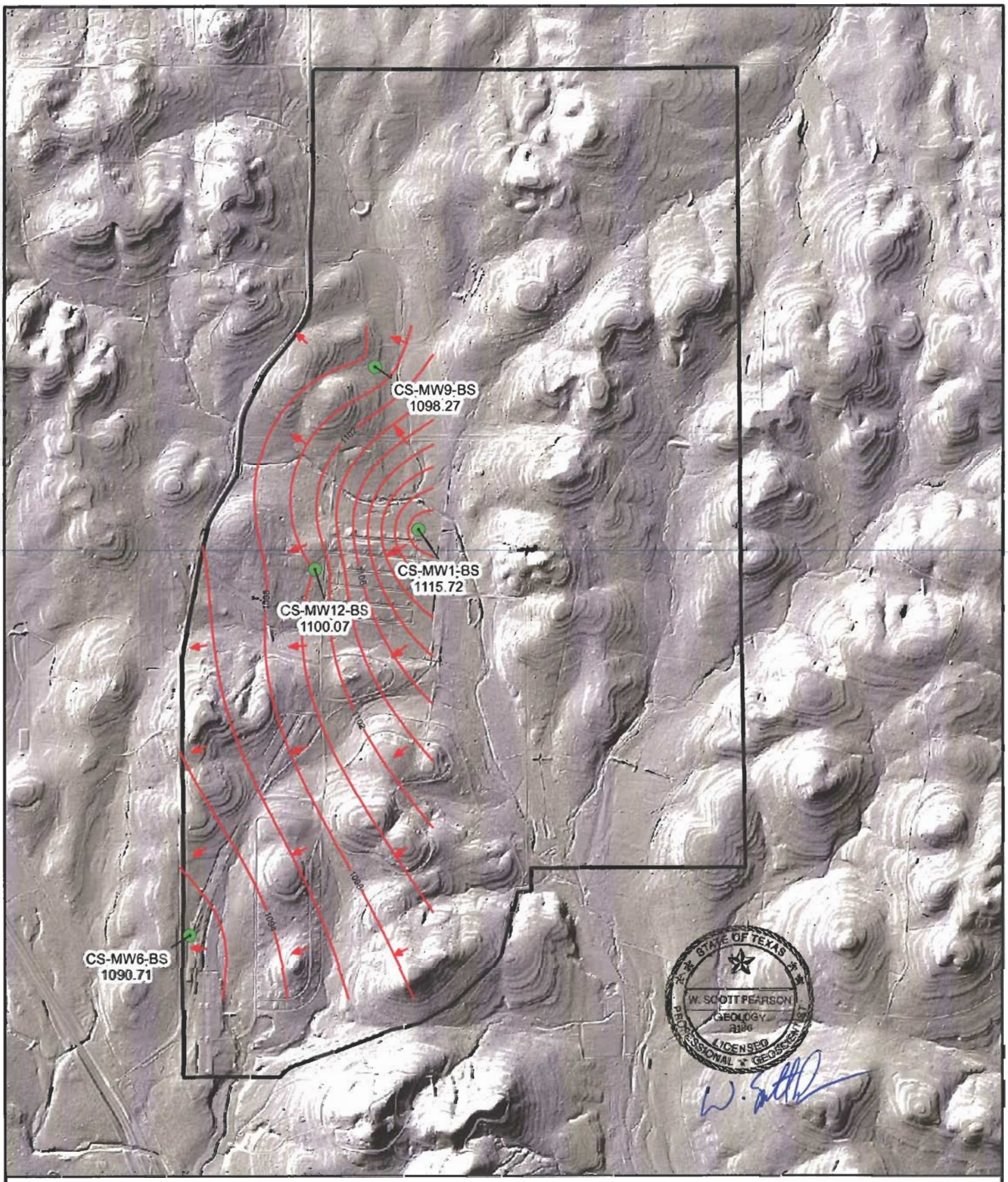

Appendix E.11

December 2007 Potentiometric Surface Map, BS Wells

Camp Stanley Storage Activity

PARSONS

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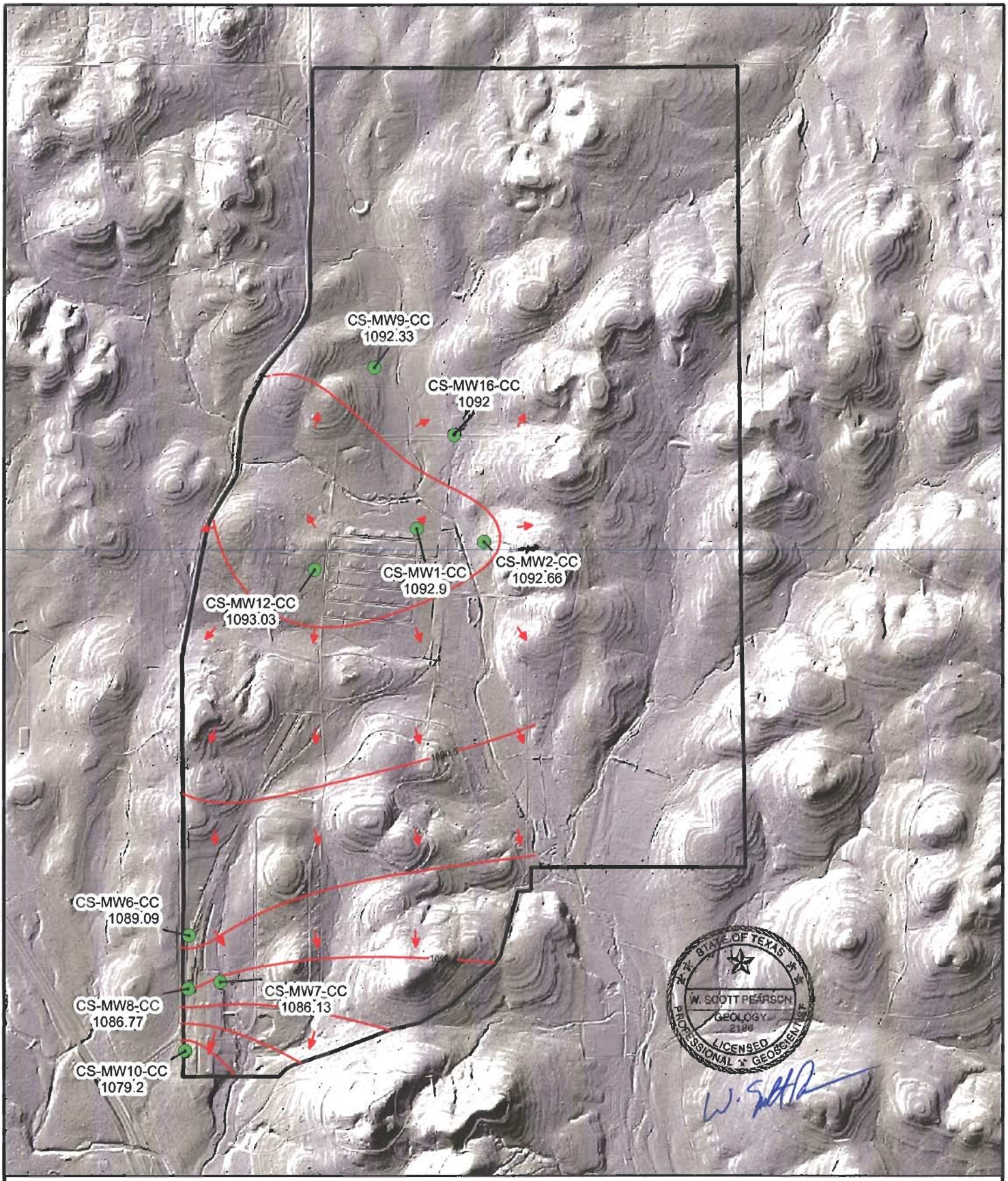

N
W E
S

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

Flow direction
CC Groundwater Contours
Outer fence
CC Wells

Appendix E.12

December 2007 Potentiometric Surface Map, CC Wells

Camp Stanley Storage Activity

PARSONS

J:\743\743322 CSSA TO 08\GIS\csm_figure_updates\Dec07_potentiometric_cc.mxd - 4/2/2008 @ 3:28:14 PM

APPENDIX F

2007 QUARTERLY OFF-POST GROUNDWATER ANALYTICAL RESULTS

Appendix F
2007 Off-Post Groundwater VOC Analytical Data

Well ID	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)
MCL		--	**7**	**70**	**100**	**5**	**5**	**2**
DOM-2	SW8260B	3/22/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
FO-8	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
FO-17	SW8260B	6/12/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
FO-J1	SW8260B	3/22/2007	0.12U	0.07U	0.08U	**0.16F**	0.05U	0.08U
	SW8260B	6/12/2007	0.12U	**0.60F**	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/18/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/4/2007	0.12U	0.07U	0.08U	**0.14F**	0.05U	0.08U
HS-1	SW8260B	3/21/2007	0.12U	0.07U	0.08U	**0.15F**	0.05U	0.08U
	SW8260B	6/14/2007	0.12U	0.07U	0.08U	**0.16F**	0.05U	0.08U
	SW8260B	9/20/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/6/2007	0.12U	0.07U	0.08U	**0.18F**	0.05U	0.08U
Duplicate	SW8260B	12/6/2007	0.12U	0.07U	0.08U	**0.18F**	0.05U	0.08U
HS-2	SW8260B	3/21/2007	0.12U	0.07U	0.08U	**0.16F**	0.05U	0.08U
Duplicate	SW8260B	3/21/2007	0.12U	0.07U	0.08U	**0.16F**	0.05U	0.08U
	SW8260B	6/14/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/20/2007	0.3U	0.16U	0.19U	**0.18F**	0.16U	0.23U
	SW8260B	12/6/2007	0.12U	0.07U	0.08U	**0.08F**	0.05U	0.08U
HS-3	SW8260B	6/14/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
I10-2	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
I10-4	SW8260B	3/22/2007	0.12U	0.07U	0.08U	**2.31**	**1.11**	0.08U
I10-7	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Duplicate	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	6/12/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/18/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/4/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
I10-8	SW8260B	12/4/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-5	SW8260B	3/20/2007	0.12U	0.07U	0.08U	**0.07F**	0.05U	0.08U
	SW8260B	6/12/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/20/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/5/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-6	SW8260B	6/13/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-7	SW8260B	3/21/2007	0.12U	0.07U	0.08U	**0.39F**	0.05U	0.08U
	SW8260B	6/12/2007	0.12U	0.07U	0.08U	**0.44F**	0.05U	0.08U
	SW8260B	9/18/2007	0.3U	0.16U	0.19U	**0.34F**	0.16U	0.23U
	SW8260B	12/11/2007	0.12U	0.07U	0.08U	**0.32F**	0.05U	0.08U
JW-8	SW8260B	3/21/2007	0.12U	**0.12F**	0.08U	**0.31F**	0.05U	0.08U
	SW8260B	6/13/2007	0.12U	**0.40F**	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/19/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
Duplicate	SW8260B	9/19/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/6/2007	0.12U	0.07U	0.08U	**0.14F**	0.05U	0.08U
JW-9	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-12	SW8260B	9/20/2007	0.3U	0.16U	0.19U	**0.21F**	0.16U	0.23U
	SW8260B	12/4/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Duplicate	SW8260B	12/4/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-13	SW8260B	6/14/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-14	SW8260B	3/22/2007	0.12U	0.07U	0.08U	**0.16F**	0.05U	0.08U
	SW8260B	6/14/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/18/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/5/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-15	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-27	SW8260B	3/21/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	6/13/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Duplicate	SW8260B	6/13/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/18/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
JW-28	SW8260B	3/21/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	6/13/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
JW-29	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	6/13/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/20/2007	0.3U	0.16U	0.19U	**0.16F**	0.16U	0.23U
Duplicate	SW8260B	9/20/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/5/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Duplicate	SW8260B	12/5/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U

Appendix F
2007 Off-Post Groundwater VOC Analytical Data

Well ID	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)
MCL		--	**7**	**70**	**100**	**5**	**5**	**2**
JW-30	SW8260B	3/22/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Duplicate	SW8260B	3/22/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	6/12/2007	0.12U	**0.65F**	0.08U	0.06U	0.05U	0.08U
Duplicate	SW8260B	6/12/2007	0.12U	**0.64F**	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/18/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/5/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
LS-2/LS-3-A1	SW8260B	3/21/2007	0.12U	0.07U	0.08U	0.06U	**0.19F**	0.08U
LS-2/LS-3-A2	SW8260B	3/21/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
LS-3	SW8260B	3/21/2007	0.12U	0.07U	0.08U	**1.08F**	**0.66F**	0.08U
LS-4	SW8260B	3/21/2007	0.12U	0.07U	0.08U	**0.22F**	0.05U	0.08U
LS-5	SW8260B	3/19/2007	0.12U	0.07U	0.08U	0.06U	**0.15F**	0.08U
	SW8260B	6/11/2007	0.12U	0.07U	0.08U	0.06U	**0.25F**	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
Duplicate	SW8260B	9/17/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/3/2007	0.12U	0.07U	0.08U	**0.12F**	**0.39F**	0.08U
LS-6	SW8260B	3/19/2007	0.12U	0.07U	0.08U	**2.33**	**0.11F**	0.08U
Duplicate	SW8260B	3/19/2007	0.12U	0.07U	0.08U	**2.51**	**0.13F**	0.08U
	SW8260B	6/11/2007	0.12U	0.07U	0.08U	**2.98**	**0.21F**	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	**1.5**	**0.68F**	0.23U
	SW8260B	12/3/2007	0.12U	0.07U	0.08U	**1.56**	**0.13F**	0.08U
LS-6-A2	SW8260B	3/19/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
LS-7	SW8260B	3/19/2007	0.12U	0.07U	0.08U	**2.1**	**0.41F**	0.08U
	SW8260B	6/11/2007	0.12U	0.07U	0.08U	**1.84**	**0.74F**	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	**2.5**	0.16U	0.23U
	SW8260B	12/3/2007	0.12U	0.07U	0.08U	**2.07**	**0.43F**	0.08U
LS-7-A2	SW8260B	3/19/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
OFR-1	SW8260B	3/20/2007	0.12U	0.07U	0.08U	**0.35F**	0.05U	0.08U
	SW8260B	6/12/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/19/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/4/2007	0.12U	0.07U	0.08U	**0.29F**	0.05U	0.08U
OFR-3	SW8260B	3/19/2007	0.12U	**0.18F**	0.08U	**8.15**	**4.8**	0.08U
	SW8260B	6/11/2007	0.12U	0.07U	0.08U	**2.78**	**2.13**	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	**1.1F**	**1.2**	0.23U
	SW8260B	12/3/2007	0.12U	0.07U	0.08U	**2.92**	**1.94**	0.08U
OFR-3-A2	SW8260B	3/19/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
OFR-4	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-3	SW8260B	12/5/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-4	SW8260B	3/21/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-5	SW8260B	3/21/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-8	SW8260B	6/14/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-9	SW8260B	9/20/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
RFR-10	SW8260B	3/19/2007	0.12U	**0.13F**	0.08U	**11.64**	**4.57**	0.08U
	SW8260B	6/11/2007	0.12U	**0.34F**	0.08U	**10.55**	**5.91**	0.08U
	SW8260B	9/17/2007	0.3U	**0.34F**	0.19U	**8.4**	**4.5**	0.23U
	SW8260B	12/3/2007	0.12U	**0.38F**	0.08U	**10.04**	**5.39**	0.08U
RFR-10-A2	SW8260B	3/19/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
RFR-10-B2	SW8260B	3/19/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
RFR-11	SW8260B	3/19/2007	0.12U	0.07U	0.08U	**3.84**	0.05U	0.08U
	SW8260B	6/11/2007	0.12U	0.07U	0.08U	**7.53**	**0.32F**	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	**1.5**	**1.1**	0.23U
	SW8260B	12/3/2007	0.12U	0.07U	0.08U	**1.31F**	**1.17**	0.08U
RFR-11-A2	SW8260B	3/19/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/17/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
RFR-12	SW8260B	3/20/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U

Appendix F
2007 Off-Post Groundwater VOC Analytical Data

Well ID	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)
MCL		--	**7**	**70**	**100**	**5**	**5**	**2**
RFR-13	SW8260B	6/14/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
Duplicate	SW8260B	6/14/2007	0.12U	0.07U	0.08U	0.06U	0.05U	0.08U
RFR-14	SW8260B	3/21/2007	0.12U	0.07U	0.08U	**0.10F**	0.05U	0.08U
	SW8260B	6/14/2007	0.12U	**0.27F**	0.08U	0.06U	0.05U	0.08U
	SW8260B	9/18/2007	0.3U	0.16U	0.19U	0.15U	0.16U	0.23U
	SW8260B	12/5/2007	0.12U	0.07U	0.08U	**0.18F**	0.05U	0.08U

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

Notes:
- ug/L = micrograms per liter
-B = Analyte was found in sample as well as associated blank.
- 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.
- R = The data are unusable with deficiencies in the ability to analyze the sample and meet QC criteria.
- M = Indicates a failure on the matrix spike and/or matrix spike duplicate samples.
- 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
- All samples were analyzed by APPL Laboratories.

APPENDIX G

PRE- AND POST-GAC SAMPLE COMPARISONS FOR WELLS LS-6, LS-7, RFR-10, RFR-11, LS-2/LS-3 AND OFR-3

APPENDIX G
PRE- AND POST-GAC SAMPLE COMPARISONS FOR WELLS LS-6, LS-7, RFR-10, RFR-11, LS-2/LS-3 AND OFR-3

LS-2/LS-3					LS-6				
	PCE (µg/L)		TCE (µg/L)			PCE (µg/L)		TCE (µg/L)	
Date	Pre	Post	Pre	Post	Date	Pre	Post	Pre	Post
3/21/07	NA/1.08	ND/ND	NA/ 0.66	0.19/ND	3/19/07 & FD	2.33/ 2.51	ND	0.11/0.13	ND
					6/11/07	2.98	NA	0.21	NA
					9/17/07	1.5	ND	0.68	ND
					12/3/07	1.56	NA	0.13	NA

LS-7					OFR-3				
	PCE (µg/L)		TCE (µg/L)			PCE (µg/L)		TCE (µg/L)	
Date	Pre	Post	Pre	Post	Date	Pre	Post	Pre	Post
3/19/07	2.1	ND	0.41	ND	3/19/07	8.15	ND	4.8	ND
6/11/07	1.84	NA	0.74	NA	6/11/07	2.78	NA	2.13	NA
9/17/07	2.5	ND	ND	ND	9/17/07	1.1	ND	1.2	ND
12/3/07	2.07	NA	0.43	NA	12/3/07	2.92	NA	1.94	NA

RFR-10					RFR-11				
	PCE (µg/L)		TCE (µg/L)			PCE (µg/L)		TCE (µg/L)	
Date	Pre	Post	Pre	Post	Date	Pre	Post	Pre	Post
3/19/07	11.64	ND/ND	4.57	ND/ND	3/19/07	3.84	ND	ND	ND
6/11/07	10.55	NA/NA	5.91	NA/NA	6/11/07	7.53	NA	0.32	NA
9/17/07	8.4	ND/ND	4.5	ND/ND	9/17/07	1.5	ND	1.1	ND
12/3/07	10.04	NA/NA	5.39	NA/NA	12/3/07	1.31	NA	1.17	ND

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