SUPERFUND

MODESTO GROUNDWATER SUPERFUND SITE

Modesto, California

Quarterly Operations and Monitoring Report Groundwater Treatment and Soil Vapor Extraction Remediation Systems

Fourth Quarter 2012

Contract No. W91238-07-D-0006
Task Order 0004

MARCH 2013

URS

March 15, 2013

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SUBJECT: Contract No. W91238-07-D-0006, Task Order 0004, Modesto Groundwater Superfund Site, Modesto, California
Quarterly Operations and Monitoring Report, Fourth Quarter 2012

Dear Mr. Mackenzie:

Enclosed is the Quarterly Operations and Monitoring Report, Fourth Quarter 2012. Text and appendices are provided on a compact disk included at the end of the report.

If you have any questions or comments, please call me at (530) 893-9675.

Sincerely,

Scott Dressler

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QUARTERLY OPERATIONS AND MONITORING REPORT
GROUNDWATER TREATMENT AND SOIL VAPOR
EXTRACTION REMEDIATION SYSTEMS
FOURTH QUARTER 2012

MODESTO GROUNDWATER SUPERFUND SITE
MODESTO, CALIFORNIA

March 2013

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Prepared for:
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MODESTO GROUNDWATER SUPERFUND SITE
QUARTERLY OPERATIONS AND MONITORING REPORT
GROUNDWATER TREATMENT AND SOIL VAPOR
EXTRACTION REMEDIATION SYSTEMS
FOURTH QUARTER 2012

This report was prepared by URS Group, Inc. (URS) staff under our supervision. Interpretations, conclusions, and recommendations in the report are based on background information, design basis, and other data furnished to URS by the United States Environmental Protection Agency, United States Army Corps of Engineers, and/or third parties. URS has relied on this information as furnished and is neither responsible for nor has confirmed the accuracy of this information. Our experience and professional judgment governed the data interpretation, conclusions, and recommendations presented in the report.

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LIST OF ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
BOD	biochemical oxygen demand
City	City of Modesto
CPT	cone penetrometer test
DQO	data quality objective
EPA	United States Environmental Protection Agency
FB	field blank
FD	field duplicate
GAC	granular-activated carbon
gpm	gallons per minute
GWTS	groundwater treatment system
IX	ion exchange
LCS	laboratory control sample
LDC	Laboratory Data Consultants
LGAC	liquid-phase granular-activated carbon
MB	method blank
MCL	maximum contaminant level
MDL	method detection limit
msl	mean sea level
MS/MSD	matrix spike/matrix spike duplicate
MWH	MHW Americas, Inc.
NS	normal sample
O&M	operation and maintenance
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCE	tetrachloroethene
P&ID	process and instrumentation diagram
ppbv	parts per billion by volume
PQL	practical quantitation limit
QA	quality assurance
QC	quality control
RPD	relative percent difference
SAP	sampling and analysis plan
scfm	standard cubic feet per minute
SM	standard method
SOP	standard operating procedure
SVE	soil vapor extraction

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

TB	trip blank
TDS	total dissolved solid
TSS	total suspended solid
URS	URS Group, Inc.
VGAC	vapor-phase granular-activated carbon
VOC	volatile organic compound
µg/L	micrograms per liter
4Q12	fourth quarter 2012

1.0 INTRODUCTION

This *Fourth Quarter 2012* (4Q12) *Quarterly Operation and Monitoring* (O&M) *Report* for the Modesto Groundwater Superfund Site covers the reporting period of October 1 through December 31, 2012, and describes the monitoring and sampling program, summarizes the performance of the systems, and provides results of routine system operations. The remainder of this section provides an overview of the site history and report organization.

1.1 Site History

The City of Modesto (City) is in Stanislaus County, California, and is approximately 80 miles southeast of Sacramento (Figure 1-1). The Modesto Groundwater Superfund Site is in a commercial area on McHenry Avenue, south of Orangeburg Avenue, behind Halford's Cleaners (941 McHenry Avenue).

In 1984, through routine sampling of water supply wells, the City discovered contamination in Municipal Well 11 (Figure 1-2) at the corner of Magnolia and Mensinger avenues. Laboratory analysis of the Municipal Well 11 sample collected in 1984 indicated tetrachloroethene (PCE) in excess of the federal and state maximum contaminant level (MCL) of 5 micrograms per liter (µg/L). PCE is an industrial solvent commonly used in dry cleaning and was found to have originated at Halford's Cleaners, approximately 1,000 feet away from Municipal Well 11.

Municipal Well 11 was taken out of service by the City in 1984 and reactivated in April 1987 when levels of PCE and other chlorinated solvents were not detected at concentrations above MCLs. In February 1989, Municipal Well 11 was again taken out of service after PCE concentrations exceeded the MCL a second time. The well remained out of service until May 1991 when the City installed a wellhead granular-activated carbon (GAC) treatment system. The GAC system reduced the PCE concentration to below the MCL before the water entered the public supply system. Municipal Well 11 was returned to service in June 1991 and operated until October 1995, when the City indefinitely deactivated the well because naturally occurring uranium was detected above the MCL of 20 picoCuries per liter.

The Modesto Groundwater Superfund Site was placed on the United States Environmental Protection Agency's (EPA's) National Priorities List on March 31, 1989. In December 1989, the EPA's Emergency Response Section collected soil and soil vapor samples in the vicinity of Halford's Cleaners. Fifteen monitoring wells were installed and were sampled from 1992 to 1998. Based on the data obtained, the EPA selected the technology for treatment and removal of the contamination. A soil vapor extraction (SVE) system and a groundwater treatment system (GWTS) were installed on May 16, 2000, and June 12, 2000 respectively, to remediate the source area and contain the groundwater contamination plume.

Results from a site investigation conducted in 2007 and from a soil vapor rebound test conducted from late November 2006 through January 2007 identified significant vapor mass at the northwestern corner of the Halford's Cleaners building and possibly extending underneath the building (see *Soil Vapor Extraction System Optimization and Enhancement Methods, Modesto Groundwater Superfund Site* [MWH Americas, Inc. (MWH), 2008] for summary results). Initial sub-slab vapor sampling in buildings at and near the source area in February 2008 confirmed that high concentrations of PCE in vapor (up to 20,000 parts per billion by volume [ppbv]) were present under the concrete slab foundation of the Halford's Cleaners building (MWH, 2010a). An SVE optimization plan was implemented in November 2008 by installing and extracting vapor from three SVE wells (SVE-02, SVE-03, and SVE-04). The new wells were installed within what is considered to be a source area. SVE-01 was taken off-line and is monitored in the quarterly sampling program.

The groundwater monitoring well network was expanded in 2008 and in 2011. In 2008, 16 additional groundwater monitoring wells were installed to evaluate the lateral and vertical extents of the groundwater plume. Section 2.3 of the *Quarterly Operations and Monitoring Report, Fourth Quarter 2008* (MWH, 2009) describes a dense non-aqueous-phase liquid investigation (none was reported). Nine additional wells were installed in 2011 to help delineate the lateral and vertical extent of the PCE concentrations in groundwater that exceed the MCL. The letter report *Groundwater Monitoring Well Installations, Modesto Groundwater Superfund Site* (URS Group, Inc. [URS], 2011a) describes these installations and includes well construction and boring logs.

To address the PCE concentrations in groundwater that were migrating further downgradient, a cone penetrometer test (CPT) investigation was conducted in 2011 to identify an optimal location for an additional interim extraction well (URS, 2012b). An additional CPT investigation was conducted in June 2012 to further define and delineate concentrations detected in the 2011 investigation (URS, 2012d). The area investigated was segments of Griswold Avenue, Hintze Avenue, and private properties adjacent to Griswold Avenue. PCE results from the HydroPunch sample locations indicated that a plume exceeding 1,000 µg/L was present in the A zone beneath Griswold Avenue from approximately Geer Court to 250 feet east of McHenry Avenue. A new extraction well (EW-02) was installed in the area of high PCE concentrations in groundwater approximately 300 feet south of Halford’s Cleaners and approximately 50 feet north of Griswold Avenue and brought online in September 2012.

Beginning in July 2012, the responsibility of operating and maintain the groundwater treatment system for the site was transferred from the EPA to the California Department of Toxic Substances Control (DTSC).

1.1.1 Other Nearby PCE Plumes

Two other PCE groundwater plumes, herein referred to as the Elwood’s and McHenry Village plumes, have been identified within 1 mile of the Halford’s Cleaners site. The Elwood’s plume (located south of the site) is the more significant because of its close proximity to the Halford’s plume and the potential for commingling of the groundwater plumes. The source area of the Elwood’s plume is approximately 2,100 feet (0.4 mile) south of Halford’s Cleaners near the intersection of Morris and McHenry avenues. PCE has been detected at concentrations as high as 11,000 µg/L in samples from nine shallow monitoring wells at this location. The wells were originally installed to monitor a fuels release from a nearby 7-11 convenience store, which has subsequently closed with regard to fuels release cleanup. Elwood’s Dry Cleaners was identified as a responsible party for PCE contamination discovered in groundwater samples from the fuels site. PCE was detected at one well at 8,100 µg/L in September 2005 and at 1,500 µg/L in March 2011 (Tetra Tech, 2011). Three wells were installed between the Halford’s plume (Modesto Groundwater Superfund Site) and the Elwood’s plume in 2011. The two A zone wells indicate that the Halford’s plume is defined to the south in the A zone; however, concentrations at the B zone well exceeded the PCE MCL, indicating that there may be commingling of the Halford’s and Elwood’s plumes in the B zone.

The McHenry Village PCE plume is approximately 4,650 feet (0.9 mile) north of Halford’s Cleaners, at the intersection of McHenry and Briggsmore avenues. PCE from the McHenry Village site has impacted nearby Municipal Well 21. PCE is being actively remediated at this site and has been monitored in groundwater since approximately 1998 in several monitoring wells, including more recently in seven deeper wells screened in the equivalent to the B zone hydrostratigraphic interval. The most recent groundwater monitoring data from September 2008 show that PCE is present at concentrations as high as 64 µg/L in the deepest monitoring wells screened approximately 120 feet below ground surface (bgs). Thus, the vertical extent of the McHenry Village plume is not defined. Water levels from shallow monitoring wells at other cleanup sites in the region confirm the overall southeastern flow direction observed in the A and B zones at Halford's Cleaners. As such, it appears unlikely that PCE from the McHenry Village plume is affecting areas of the aquifer impacted by the Halford's release a mile south (MWH, 2010b).

1.2 Report Organization

This report is organized as follows:

Section 1.0 provides a brief history of the Modesto Groundwater Superfund Site.

Section 2.0 describes the remedial systems.

Section 3.0 describes the sampling programs.

Section 4.0 provides performance evaluations for the GWTS and SVE system, including a groundwater capture zone analysis.

Section 5.0 summarizes results and provides recommendations for the GWTS and SVE system O&M programs.

Section 6.0 provides an analytical data quality review.

Section 7.0 lists reference information for documents cited in this report.

Tables and figures are provided at the end of the report. The report is supported with the following appendices, which are provided on a compact disc at the end of the report:

Appendix A provides process and instrumentation diagrams (P&IDs) for the GWTS and SVE system.

Appendix B provides laboratory analytical data tables.

Appendix C provides a laboratory data validation report.

Appendix D provides system uptime and shutdown tables.

Appendix E provides O&M process logs.

Appendix F provides operational history, including a brief discussion of the routine and non-routine O&M performed on the GWTS and SVE system.

Appendix G provides historical data, as follows:

- G-1 Well Construction Details
- G-2 Groundwater Monitoring Well Table Elevations
- G-3 Searchable Historical and Current Analytical Data
- G-4 Historical PCE Concentration Trends in Groundwater Monitoring Wells
- G-5 PCE Mass Removed by the Groundwater Treatment System
- G-6 PCE Mass Removed by the Soil Vapor Extraction System

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2.0 DESCRIPTION OF REMEDIAL SYSTEM

The Modesto Groundwater Superfund Site GWTS and SVE system are behind Halford's Cleaners and between an auto repair shop and Season's Lodge (Figure 2-1). The SVE and GWTS process equipment is contained within two metal storage containers in a fenced and locked compound.

2.1 GWTS

The GWTS includes two operable extraction wells (EW-01R and EW-02), an equalization tank, particulate filters, an air stripper, two liquid-phase GAC (LGAC) vessels, one vapor-phase GAC (VGAC) vessel, and two ion exchange (IX) units, as well as piping and control systems. Appendix A includes GWTS P&ID diagrams.

Extracted groundwater is pumped from the equalization tank through the air stripper for primary treatment of PCE. The treated water is then pumped from the air stripper sump through the LGAC vessels to remove remaining PCE concentrations. The VGAC vessel treats the air stream from the air stripper. The IX units are installed in series after the LGAC vessels and treat a slip stream (portion) of the total system flow to remove low levels of naturally occurring uranium from the groundwater before discharge to the City's sewer collection system. The design flow rate of the system is 50 gallons per minute (gpm).

The components of the GWTS, except the VGAC vessel, are contained in an 8.5- by 8.5- by 20-foot metal storage container. The VGAC vessel is next to the container within the fenced compound. A secondary containment unit is underneath the storage container. Any water draining into the secondary containment is manually pumped to the equalization tank to be treated before it is discharged to the sewer. Additional information about the GWTS is available in the *Groundwater Treatment System and Soil Vapor Extraction System Operation and Maintenance Manual, Modesto Groundwater Superfund Site* (O&M Manual) (URS, 2010a), which details the operating equipment (manufacturers, models, standard settings, inspection frequency, troubleshooting, etc.).

The groundwater monitoring network consists of 40 wells throughout the site in residential and business communities (Figure 2-2). Table G-1 (Appendix G) includes well construction details.

2.2 SVE System

The SVE system includes three online extraction wells (SVE-02, SVE-03, and SVE-04), a blower, a condensate collection drum, air filters, silencers, one 2,000-pound VGAC vessel, conveyance piping, control systems, and an air conditioning unit. Appendix A includes SVE system P&ID diagrams.

The three extraction wells in operation (SVE-02, SVE-03, and SVE-04) are approximately 3 to 5 feet from the northwestern corner of Halford's Cleaners in the alley north of the building, within what is considered to be the source area. Nine monitoring points surrounding the SVE wells (including three offline SVE wells) are sampled quarterly. Figure 2-3 shows the locations of the SVE wells, the vapor monitoring wells, and the conveyance piping configuration.

To allow for continuous, 24-hour operation, the SVE system operating parameters are controlled by the on-site programmable logic controller. Its design flow rate is 180 standard cubic feet per minute (scfm). Extracted soil vapor passes through an air-water separator; liquid that accumulates in the condensate collection drum is pumped to the equalization tank in the GWTS for treatment before discharge to the sewer.

The aboveground system components (except the VGAC vessel) are contained within an 8- by 8.5- by 12.75-foot metal storage container. The VGAC vessel is next to the container within the fenced compound. Additional information about the SVE system is available in the O&M Manual (URS, 2010a), which details the operating equipment in the SVE trailer (manufacturers, models, standard settings, inspection frequency, troubleshooting, etc.).

3.0 SAMPLING AND MONITORING PROGRAM

Sampling and monitoring at the Modesto Groundwater Superfund Site is performed in accordance with the *Sampling and Analysis Plan, Modesto Groundwater Superfund Site* (SAP) (URS, 2010b). Table B-2 (Appendix B) includes sample locations and associated analytical test methods, phase (water, vapor, etc.), frequency, and date of sampling activity.

The quarterly sampling program consists of two types of sampling: site sampling (groundwater and soil vapor) and system sampling (SVE system). The GWTS sampling program is conducted by the State of California.

3.1 Site Sampling and Monitoring

Site sampling to monitor groundwater includes collecting groundwater samples from the network of 40 groundwater monitoring wells and 1 groundwater extraction well for analysis by EPA Method E524.2. Site sampling to monitor the vadose zone includes collecting vapor samples from the three operating SVE wells and nine vapor monitoring locations for analysis by EPA Method TO15. Subsections 3.1.1 and 3.1.2 describe sampling of groundwater and vapor wells, respectively, during 3Q12.

3.1.1 Groundwater Sampling and Monitoring

URS measured depths to groundwater on December 10 and 11, 2012, and collected groundwater samples from December 10 through 14, 2012. Depth-to-water measurements and groundwater samples were collected from 40 groundwater monitoring wells during the quarter to evaluate changes in the depth to water, the influence of groundwater extraction on the PCE plume and estimate the extent of contamination, horizontal flow directions, and groundwater capture (groundwater that flows into the extraction well). Figure 3-1, which shows a times series plot of groundwater elevations at six wells around the site, indicates that the groundwater elevation at the site has risen since 2010. Groundwater elevations are also used to evaluate potential vertical groundwater flow directions and to develop groundwater elevation contour maps. Depth to groundwater was measured from the top of casing using an electronic water level meter.

Groundwater samples were collected starting with the least contaminated groundwater monitoring well and continuing in order to the most contaminated groundwater monitoring well; the order of sampling is established using previous quarterly analytical results. Groundwater samples were collected using low-flow purge methods in 14 monitoring wells and using three-volume purge-and-sample methods in MW-03A and the 25 most recently installed monitoring wells. Samples from the operating extraction well (EW-02) were collected from sample port number 1 (SP-01) at the GWTS influent and analyzed for volatile organic compounds (VOCs) using EPA Method E524.2.

The SAP describes sampling procedures. Water purged from the groundwater monitoring wells was transferred through a bag filter into the GWTS equalization tank.

3.1.2 Soil Vapor Sampling and Monitoring

Soil vapor samples were collected from SVE and vapor monitoring wells on December 13, 2012, using 400-milliliter Summa canisters. Samples were analyzed using EPA Method TO15. Soil vapor sampling was conducted in accordance with the sampling procedures in the SAP. Analytical results from the 4Q12 sampling event are presented in Appendix B.

3.2 System Sampling and Monitoring

Sampling and monitoring of the GWTS and SVE system at the Modesto Groundwater Superfund Site were performed in accordance with the City of Modesto Conditional and Revocable Groundwater Discharge Permit Number GW 98-3 (City of Modesto, 2010) and the SAP (URS, 2010b). Generally, two categories of samples are collected from the remedial systems: compliance monitoring and performance monitoring. Compliance monitoring samples are collected to satisfy regulatory requirements; performance monitoring samples are collected to assess the contaminant removal processes of the remedial systems.

3.2.1 Groundwater System Sampling and Monitoring

Compliance monitoring samples for the GWTS are collected monthly and quarterly from the system influent and effluent as the system is operating. System effluent samples are analyzed monthly for VOCs (Method 524.2), total dissolved solids (TDS) (Method 2540C), total suspended solids (TSS) (Method 2540D), biochemical oxygen demand (BOD) (Method 5210B), quarterly for total uranium (Method D5174), and annually for bioassay. Performance samples are collected monthly to monitor and assess the performance and efficiency of the air stripper, LGAC, and IX media. The GWTS VOC performance monitoring samples (analyzed by Method E524.2) are collected from the carbon influent, carbon mid-bed, and carbon effluent. The GWTS uranium performance monitoring samples are collected from the post carbon/pre-IX, IX mid-bed, and IX effluent using Method D5174. Figures 1-1 and 1-2 in Appendix A illustrate the sampling port locations for the GWTS. Appendix B presents analytical data tables for the 4Q12 sampling event.

3.2.2 Soil Vapor System Sampling and Monitoring

Only system performance samples are collected at the SVE system. These samples are collected at the pre-GAC and stack sample ports to monitor VGAC usage. Samples are collected monthly for analysis by EPA Method TO15. Analytical results from monthly sampling during 4Q12 are presented in Appendix B. Figure 1-3 in Appendix A illustrates the sampling port locations for the SVE system.

4.0 PERFORMANCE EVALUATION

Sections 4.1 and 4.2 discuss site and system performance evaluations, respectively, based on current and historical analytical results. The site performance evaluation estimates the extent of contamination. System sampling helps evaluate the remedial progress of the GWTS and SVE system.

Section 6.0 provides a summary of the quality assurance (QA) and quality control (QC) results for the samples collected during 4Q12. Appendix B provides a complete set of validated analytical data for groundwater and soil vapor samples collected during the 4Q12 reporting period. Appendix C includes the laboratory data validation reports for this reporting period's analytical data.

4.1 Site Performance

Subsections 4.1.1 and 4.1.2 provide 4Q12 results of the groundwater and soil vapor well sampling events, respectively. Figure 4-1 shows a stratigraphic conceptual model. Subsection 4.1.3 presents an analysis of vertical gradients, and Subsection 4.1.4 provides a capture zone analysis.

4.1.1 Groundwater Monitoring and Sampling Results

Based on water levels measured on December 10 and 11, 2012, groundwater elevations ranged from 46.49 feet mean sea level (msl) at MW-21A and MW-22A to 50.03 feet msl at MW-11A in the A zone.

Groundwater elevations ranged from 46.53 feet msl at MW-25B to 48.45 feet msl at MW-09B in the B zone; and 46.14 feet msl at MW-20C to 48.36 feet msl at MW-04C in the C zone. Comparing 4Q12 and 3Q12 water levels, water elevations decreased an average of 0.73 feet in A zone wells across the site; water elevations decreased an average of 0.77 feet in B zone wells across the site; and water elevations in C zone wells increased an average of approximately 3.7 feet across the site. Appendix G presents historical and current water level measurements and analytical data.

Potentiometric surface data, groundwater flow directions, and PCE concentration data for the A, B, and C zones are shown on Figures 4-2, 4-3, and 4-4, respectively. Potentiometric contours indicate that groundwater in the A and B zones flows southeast across the site. EW-02 operated at an average of approximately 46 gpm during 4Q12. This well has been online since September 13, 2012. The average hydraulic gradient parallel to the direction of regional groundwater flow in the A zone was approximately 0.0015, or approximately 7.9 feet per mile. The average horizontal gradient in the B zone was approximately 0.0009, or 4.7 feet per mile. Groundwater in the C zone was flowing south-southeast (Figure 4-4) with a horizontal gradient of approximately 0.0025, or 13 feet per mile.

The primary gradient in the A zone across most of the site is southeast, which is consistent with previous quarters. The B and C zone gradients have been variable. The gradient in the B zone has been southeast every quarter except the third quarters of the year from 4Q10 through 4Q12. The gradient was east-southeast during 3Q10, 3Q11, and 3Q12. The more easterly flows during the third quarters may have been the result of increased pumping at municipal wells during the dryer months of the year.

The 4Q12 horizontal gradient in the C zone was south-southeast. In general, the gradient direction in the C zone has been observed to be more westerly during the third quarters (either southwest or south-southwest) and more easterly during the fourth and first quarters (southeast or south-southeast). Flow in the C zone has been variable during the second quarters: west in 2Q09, south-southwest in the northern site and southeast in the southern site in 2Q10, and south-southeast in 2Q11 and 2Q12. As discussed in previous groundwater reports for the site, the gradients in this deeper zone are strongly influenced by regional supply well pumping that increases during the spring and summer months (MWH, 2010a).

Pumping histories from January 2000 through August 2009 for City supply wells surrounding the site are compiled in Appendix B of the *Groundwater Remediation Optimization Methods, Modesto Groundwater Superfund Sites* (MWH, 2010b).

To evaluate the potential hydraulic influence on the extents of PCE plumes from operation of City of Modesto Municipal Water Supply Wells No. 6 and No. 7, URS installed transducers in six A zone, five B zone, and three C zone monitoring wells from June 28 through December 7, 2011. Evaluation of the data collected using the transducers indicated that municipal well pumping has a greater effect on C zone water levels than on A or B zone levels, and pumping at these municipal wells increases the prevailing downward gradient between the A zone and B zone and between the B zone and the C zone. Increases in the downward gradient can result in downward migration of PCE beneath portions of the site.

The southern portion of the plume is most likely to be influenced by municipal well pumping because Municipal Wells 6 and 7 are southeast and southwest, respectively, of the southern boundary of the plume. Municipal Well 7 may be impacted by PCE contamination before Municipal Well 6 because Municipal Well 7 operates at approximately twice the pumping rate of Municipal Well 6, and the B zone plume appears to be closer to Municipal Well 7 (Figure 4-7). Additional details on this evaluation are provided in the *Interpretation of Local Groundwater Level Changes and Influences from City of Modesto Municipal Water Supply Wells Nos. 6 and 7 Technical Memorandum* (URS, 2012a).

4.1.1.1 PCE

In 4Q12, PCE was detected at concentrations exceeding the MCL of 5 µg/L at EW-02 and 18 monitoring wells. The distribution of PCE concentrations greater than 5 µg/L in groundwater is illustrated with isoconcentration contour lines (lines of equal concentration) on Figures 4-2 and 4-3 for the A and B zones, respectively. There are no PCE isoconcentration contours drawn for the C zone on Figure 4-4 because there were no detections at the C zone wells that exceeded MCLs. The distribution of PCE concentrations is also illustrated on generalized geologic cross-sections that dissect the site along northwest to southeast (Figure 4-5) and west to east (Figure 4-6) lines. Table B-3 (Appendix B) includes current quarterly groundwater monitoring well analytical results. Figures G-4(a) through G-4(an) (Appendix G-4) show PCE time series plots for each monitoring well for the period from February 1992 through 4Q12.

Figures 4-5 and 4-6 also include data from CPT investigations performed in May 2011 (URS, 2012b) to identify the optimal location for an A zone extraction well and June 2012 (URS, 2012c) to further define and delineate concentrations detected in the May 2011 investigation.

A Zone

As depicted on Figure 4-2, the PCE MCL plume is approximately 1,700 feet long parallel to the primary gradient and 1,650 feet wide in the east-west, cross-gradient direction. The long axis of the A zone plume with concentrations greater than 50 µg/L parallel the primary groundwater gradient direction.

The concentration at MW-23A (31 µg/L) exceeded the MCL in 4Q12. This well is located on the western boundary of the plume; therefore, the plume is undefined in this direction. PCE concentrations have ranged from 25 to 41 µg/L and exceeded the MCL every quarter since this well began being sampled in 4Q11 (Figure G-4[ah]). However, PCE concentrations at MW-13A (2.3 µg/L) and MW-14A (3.5 µg/L) were less than the MCL in 4Q12; therefore, the MCL plume was drawn wider in the east-west direction along Griswold Avenue, though bounded to the north and south by MW-14A to the north and MW-13A to the south (Figure 4-2). PCE concentrations at MW-13A and MW-14A have fluctuated seasonally (Figures G-4[q and r]) from just above to below the PCE MCL, resulting in changes in the shape of the

A zone plume several times annually. Concentrations at these three wells indicate that the PCE plume is undefined to the northwest and southwest of MW-23A.

In previous reports (e.g., MWH, 2010a), concentration fluctuations at MW-13A and MW-14A were attributed to potential influences from pumping of municipal supply wells to the west or northwest, perhaps from Municipal Well 8, 14, or 17 (Figure 1-2). Municipal well pumping may be the cause of or may have contributed to the PCE concentration at MW-23A (31 µg/L). PCE was detected historically in Municipal Wells 14 and 8, located 2,375 feet (0.45 mile) west and 5,320 feet (1.0 mile) west-southwest of Halford's Cleaners. Municipal Wells 8 and 14 have been offline since 2007 and 2006, respectively (MWH, 2010b); however, the plume may have been drawn toward Municipal Wells 8 or 14 before they were shutdown. Municipal Well 17, which has remained in consistent operation, could have hydraulic influence on the plume because it has a 4-foot-long screened interval approximately 25 feet lower than the screened zones of MW-13A, MW-14A, and MW-23A; however, it is more than 3,500 feet northwest of the monitoring wells and data are insufficient to determine whether the hydraulic influence of pumping at Municipal Well 17 is affecting the PCE plume. Municipal Wells 6 and 7, alternatively, are closer to the plume than Municipal Wells 14 and 17 and are operating consistently; the *Interpretation of Local Groundwater Level Changes and Influences from City of Modesto Municipal Water Supply Wells Nos. 6 and 7 Technical Memorandum* (URS, 2012a) reports that water levels at some A zone monitoring wells had slight responses when Municipal Wells 6 and 7 were operating. Municipal Well 6 is screened in the A and B zones and, though Municipal Well 7 is screened below the A zone (in the B zone), pumping at Municipal Wells 6 and 7 may be affecting the A zone plume.

Another possible contributor to the PCE concentrations detected at MW-23A may be the sewer line that is located beneath Griswold Avenue just north of MW-23A. Discharges from Halford's Cleaners to the sewer line have been identified as a source of contamination to the subsurface. Sewer lines south of the former Elks Club and west of Halford's Cleaners were sampled during August 1985 (MWH, 2010b). A PCE concentration of 1,040 parts per million was reported in a sewer sediment sample collected at the manhole where the north-south sewer line intersects with east-west sewer line beneath Griswold Avenue. It is possible that PCE flowed down-sewer to that intersection and leaked from the sewer along Griswold Avenue resulting in the high concentrations exceeding 1,000 µg/L in HydroPunch samples collected along the east-west sewer line that is perpendicular to the southeast hydraulic gradient of the A zone. Westerly flow and releases along the Griswold Avenue sewer line may account for the PCE concentrations between 5 and 50 reported at the wells in the west portion of the A zone plume such as MW-23A (Figure 4-2).

The PCE concentration at MW-04A decreased from 1,200 µg/L in 3Q12 to 130 µg/L in 4Q12. From 2001 through 2011, concentrations at MW-04A have exceeded 500 µg/L. However, in 2012 PCE began decreasing at this well. The PCE concentration at MW-04A decreased from 2,200 µg/L in 4Q11 to 130 µg/L in 1Q12 and 71 µg/L in 2Q12 (Figure G-4 [d]). The concentration changes may represent the normal fluctuations associated with a decreasing overall trend in PCE concentration in this portion of the site.

The PCE concentration at EW-02 in October 2012 was 690 µg/L, which is more than 7 times the concentration of 98 µg/L at EW-01R in August 2012 indicating that much higher mass per unit volume of groundwater is being extracted since EW-02 was brought online in September 2012. EW-02 may have higher concentrations than EW-01R had because the new well's capture zone, extending further south than that of EW-01R, is drawing from portions of the A zone with higher concentrations that the capture zone of EW-01R was not influencing

B Zone

Figure 4-3 depicts the B zone PCE plume and potentiometric surface contours. In 4Q12, PCE was detected above the MCL at 10 of the B zone wells. The plume is approximately 2,600 feet long parallel to the primary gradient direction (northwest/southeast) and 1,900 feet wide. The PCE plume in the B zone is undefined in the western, northern, and southeastern directions (Figure 4-3).

Data from the B zone wells installed in 2011 indicate that the axis of the 50 to 99 µg/L plume trends northwest to southeast. The highest concentration of PCE in the B zone (85 µg/L) was reported at MW-24B, which is approximately 1,000 feet southeast of the source area. The PCE concentration at MW-16B decreased from 24 µg/L in 3Q12 (which was the highest reported at that well since its installation in 2008) to 14 µg/L in 4Q12. The concentration increase at MW-16B in 3Q12 was likely due to migration of the plume to the east as a result of increased pumping from Municipal Well 6, which occurs during the summer months. The PCE concentrations of 80 µg/L at MW-25B and 14 µg/L at MW-16B indicate that the B zone plume remains undefined in the south and southwestern directions, and is potentially commingled with the Elwood's plume in the B zone.

The B zone plume shape likely has been hydraulically influenced by pumping at municipal wells. The *Interpretation of Local Groundwater Level Changes and Influences from City of Modesto Municipal Water Supply Wells Nos. 6 and 7 Technical Memorandum* (URS, 2012a) indicates that water levels at most B zone monitoring wells had slight responses when Municipal Wells 6 and 7 were operating. The maximum observed water level changes were -0.24 and -0.19 feet at MW-09B and MW-17B, respectively, when pumping at Municipal Well 6 was evaluated and -0.19 and -0.32 feet at MW-16B and MW-19B, respectively, when pumping at Municipal Well 7 was evaluated. Municipal Well 6 is screened in the A and B zones and Municipal Well 7 is screened in B zone; therefore, pumping at Municipal Wells 6 and 7 may be hydraulically influencing the B zone plume.

C Zone

Figure 4-4 shows groundwater elevation contours and PCE concentration data for the C zone. There were no detections of PCE exceeding the MCL in 4Q12 among the samples from the five wells screened in the C zone; consequently, no PCE plume is shown on Figure 4-4. PCE concentrations at MW-16C have been less than 1 µg/L since 1Q09 (Figure G-4[v]). The 3Q12 concentration at MW-16C of 4.9 µg/L, which was close to the MCL, may have increased due to increased pumping from Municipal Well 6 during the summer months, as was hypothesized for the increased concentration at MW-16B. The only detection from the C zone wells that exceeded the MCL was 8.7 µg/L at MW-04C in 4Q08.

4.1.1.2 Other VOCs

Benzene was reported at six wells in 4Q12. A concentration of 5.1 µg/ exceeded the MCL (1.0 µg/L) at MW-26B. There were no detections at any wells during the 2Q10, 4Q10, 4Q11, or 3Q12 events. Benzene concentrations exceeded the MCL during the 3Q10, 1Q11, 2Q11, 3Q11, 1Q12, and 2Q12 sampling events.

The only other VOC concentration that exceeded its MCL during the 4Q12 sampling event was a 1,2-dichloroethane concentration of 0.6 µg/L reported at MW-15A. A 1,2-dichloroethane concentration of 0.7 µg/L was also reported at MW-15A in 3Q12. The MCL of 1,2-dichloroethane is 0.5 µg/L.

Halford's Cleaners likely is not the source of the benzene or 1,2-dichloroethane concentrations in groundwater because these VOCs have not been detected at MW-01A, MW-05A, or MW-08A—the wells nearest to Halford's Cleaners. For that reason, no further speculation about the sources of these VOCs in the monitoring wells at this site is provided, as this report is an evaluation of the contamination from Halford's Cleaners.

4.1.2 Soil Vapor Sampling Results

Samples were collected from the three operating SVE wells on December 13, 2012. Analytical results listed in Table B-3 (Appendix B) are summarized below and posted on Figure 4-7:

- SVE-02 (screened interval 7 to 12 bgs): PCE concentration decreased from 380 ppbv in 3Q12 to 180 ppbv in 4Q12.
- SVE-03 (screened interval 13 to 23 bgs): PCE concentration decreased from 220 ppbv in 3Q12 to 130 ppbv in 4Q12.
- SVE-04 (screened interval 28 to 38 bgs): PCE concentration decreased from 35 ppbv in 3Q12 to 23 ppbv in 4Q12.

Comparison of 4Q12 to 3Q12 soil vapor monitoring well PCE sample results shows a decrease at six wells (two were less than the detection limit), an increase at two wells, and the sample from one well continued to have a concentration less than the detection limit. During 2012, of 36 samples collected, only five were reported with PCE concentrations equal to or exceeding 100 ppbv: two results reported in OSVE-10 (160 ppbv and 370 ppbv), and one result each in DP-01A (110 ppbv), DP-01B (140 ppbv), and DP-06A (100 ppbv).

The highest concentration detected in a soil vapor monitoring well was 43 ppbv at DP-06A, which is a 16 feet bgs screened well east of Halfords' Cleaners (Figure 4-7). PCE concentrations detected at soil vapor monitoring wells screened deeper than 16 feet bgs ranged from not detected to 32 ppbv.

4.1.3 Analysis of Vertical Groundwater Gradients

Vertical gradients were calculated using 4Q12 data at one well pair with two screen intervals in the A zone, seven well pairs with screens in the A or B zones, and five well pairs with screens in the B or C zones (Table 4-1). For comparison, Table 4-1 also lists vertical gradients calculated for last quarter and last year.

There was a potential for an upward gradient within the A zone between MW-21A and MW-22A. One of the seven A zone–B zone well pairs indicated no gradient. Three A zone–B zone well pairs and one of the five B zone–C zone well pairs indicated a potential for an upward gradient. Three A zone–B zone well pairs and four B zone–C zone well pairs indicated a potential for a downward gradient. Three more A zone–B zone well pairs and one more B zone–C zone well pair in 4Q12 had potentials for upward gradients than in 4Q11. Figure 4-5 uses arrows to show directions of vertical gradients for some of these well pairs.

4.1.4 Extraction Well EW-02 Capture Zone Analysis

Figures 4-5 and 4-8 show estimates of groundwater plume capture from extraction well EW-02. Two lines of evidence (groundwater elevation contours developed based on 4Q12 data and particle tracks developed with the site's groundwater model) were used to estimate the extent of capture presented on Figure 4-5 and projected onto Figure 4-8. Comparing the empirical capture zone resulting from pumping at EW-01R and shown on Figure 4-8 of the 3Q12 Quarterly Report (URS, 2012c) to capture resulting from pumping at EW-02 (Figure 4-8), the areal extent of capture has increased from approximately 25 per cent to approximately 35 per cent of the A zone plume.

Groundwater elevations calculated from water levels measured at A, B, and C zone wells during 4Q12 were contoured using the Natural Neighbor function in ArcGIS 10 and adjusted using professional hydrogeologic judgment. A curved line consisting of the estimated stagnation points is the empirical capture zone illustrated in purple on Figure 4-8. The original groundwater flow model (MWH, 2009) was updated to represent 1Q11 conditions used to select the location for EW-02 (URS, 2012b). The A zone capture zone estimated with the model's simulation of EW-02 pumping at 50 gpm is illustrated on Figure 4-8 as the sweep of groundwater flow lines toward the well based on backward particle tracking (i.e., particles released at the well and modeled backwards to determine their starting points). The actual average operating flow rate at this well in 4Q12 was 46 gpm. The average operating flow rate is calculated by dividing the volume pumped from the well during the quarter by the operating time.

The horizontal interpreted extents of capture for EW-02, based on the two lines of evidence, are in good agreement, even at an actual flow rate of 46 gpm, which is 8 per cent less than the flow of 50 gpm on which particle tracking is based. The downgradient extent of capture is interpreted to extend to MW-10A (Figure 4-8).

Figure 4-5 shows an estimate of the vertical extent of capture by EW-02. The downgradient extent of capture depicted in profile view (extending to MW-10A) is based on the empirical and modeled lines of evidence. The vertical capture zone extent below the screen of EW-02 is an estimate based on water level data, modeling, and vertical gradients. Vertical gradients calculated using 4Q12 groundwater elevation data from wells near EW-02 (MW-04A, MW-04B well pair and MW-10A, MW-10B well pair [Figure 4-5]) were upward from the A to the B zone. There was also an upward gradient between MW-4B and MW-4C; however, there was a downgradient gradient between MW-10B and MW-10C. Therefore, the estimated capture zone has been drawn below the bottom of the screened interval of EW-02, between the screened intervals of MW-4B and MW-4C, and just below the bottom of the screened interval of MW-10A (Figure 4-5).

4.2 System Performance

System compliance and performance samples were collected to evaluate the effectiveness of the remedial systems. Water, vapor, and media samples were collected according to requirements in the SAP (URS, 2010b) and the City of Modesto Conditional and Revocable Groundwater Discharge Permit (Permit Number GW98 3) (City of Modesto, 2010). Treatment system effluent samples collected during the reporting period for vapor emissions and sewer discharge were below maximum allowable discharge limits.

4.2.1 GWTS Results

During 4Q12, the GWTS operated for approximately 2,144 hours (out of 2,208 hours possible during the quarter), an uptime of approximately 97 percent. Tables D-1 through D-3 (Appendix D) present the GWTS shutdown summaries for October, November, and December.

The GWTS treated a total of approximately 5.33 million gallons of water and removed approximately 32.5 pounds of PCE during this reporting period. To date (since August 2001), the system has treated approximately 203 million gallons of water and has removed approximately 550 pounds of PCE. Figure 4-9 is a graph illustrating the cumulative PCE mass removed by the GWTS since it was started.

During the 4Q12 reporting period, the GWTS pumped and treated groundwater from EW-02. The influent PCE concentrations were 840, 860, and 690 µg/L during October, November, and December, respectively. Samples were also analyzed for uranium. Table B-4 (Appendix B) provides a summary of treatment system analytical results for 4Q12. Table 4-2 summarizes PCE results for 4Q12.

4.2.2 SVE System Results

During 4Q12, the SVE system operated for 2,208 hours (out of 2,208 hours possible during the quarter), an uptime of 100 percent. Tables D-4, D-5, and D-6 (Appendix D) present the SVE shutdown summaries for October, November, and December, respectively.

The SVE system operated at an average flow rate of 133 scfm and removed approximately 3.2 pounds of VOCs during this quarter. To date (since June 2011), the total cumulative VOC mass removed through December 6, 2012, is approximately 3,468 pounds. Figure 4-10 is a graph illustrating the cumulative PCE mass removed by the SVE system since it was started.

The influent PCE concentrations ranged from 130 to 420 ppbv during 4Q12. Monthly SVE system samples collected in SUMMA canisters were sent to the EPA Region 9 laboratory in Richmond, California, for VOC analysis. Table B-3 (Appendix B) provides a summary of SVE treatment system analytical results; Table 4-3 provides PCE results for this reporting period.

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5.0 RECOMMENDATIONS

This section provides a summary of observations and recommendations for the GWTS and SVE system.

5.1 GWTS – Summary Observations and Recommendations

The PCE MCL plume is only partially captured in the A zone (Figures 4-5 and 4-8), though the extent of capture has improved since EW-02 was brought online in September 2012. Based on 4Q12 data, the known extent of the plume is approximately 1,650 feet wide (east-west) and 1,700 feet long in the A zone (Figure 4-2) and approximately 1,900 feet wide and 2,600 feet long in the B zone (Figure 4-3). The A and B zone plumes are shown overlain on Figure 5-1.

Data collected in 4Q12 and in previous quarters indicate that PCE concentrations are defined in the A zone except to the northwest and southwest of the MCL PCE plume. Concentrations at MW-13A and MW-14A, at approximately the southwestern and northwestern extents of the A zone plume, have historically fluctuated above and below the MCL from quarter to quarter (Figure G-4q and r [Appendix G]). Concentrations at both these wells were less than the MCL in 4Q12. However, the PCE concentration at MW-23A exceeded the MCL in 4Q12; therefore, is within the western extent of the A zone plume. The undefined extent of the western portion of the plume is a data gap in the conceptual site model. Two additional wells screened in the A zone are recommended: one west and one southwest of MW-23A to address the data gap. These recommended wells would also address the areas to the west of MW-13A and MW-14A, which exceed the MCL usually at least once annually and last exceeded the MCL in 2Q12.

The PCE plume exceeding the MCL in the B zone is undefined to the west, north, and southeast. Concentrations at MW-25B (south portion of the plume) and MW28B and MW-29B (west portion of the plume) all have exceeded the PCE MCL since their installation in September 2011, and the PCE concentration at MW-09B (in the northern portion of the plume) fluctuates quarterly from just above to just below the MCL (6.9 µg/L in 4Q12). Results from these wells suggest that the extent of the B zone plume, which is influenced by supply well pumping, is not defined. Therefore, five additional monitoring wells are recommended: two wells to the south and one well each to the north, northwest, and west to define the extent of concentrations exceeding the MCL in these directions.

There were no detections of PCE exceeding the MCL at wells screened in the C zone in 4Q12, and concentrations in this zone have been less than the MCL since 1Q09. Therefore, no additional wells are recommended in the C zone. However, the PCE concentration at MW-16C increased from no detection in 2Q12 to 4.9 µg/L in 3Q12, this change may be the result of the hydraulic effects of municipal well pumping on B zone plume. Though the concentration at MW-16C decreased to 0.4 µg/L in 4Q12, the flow rates at Municipal Wells 6 and 7 should be decreased to reduce potential for affecting PCE plume migration, and PCE concentrations should continue to be monitored at Municipal Wells 6 and 7 (URS, 2012a). The PCE concentration at B zone well MW-16B, which exceeds the MCL at 14 µg/L, also indicates the impact from Municipal Well 6.

EW-02 was installed near MW-04A, which was identified as the optimal location to extract groundwater with the highest PCE concentrations at the site, and brought online September 13, 2012. The increased concentration at EW-02 (690 µg/L in 4q12 compared to 98 µg/L at EW-01R in August 2012) may be the result of the capture zone, which extends farther south.

4Q12 groundwater sample results indicate that PCE concentrations are less than 200 µg/L in the A zone and less than 100 µg/L in the B zone. Groundwater analytical results from the HydroPunch groundwater samples collected during the May/June 2011 CPT investigation indicated that concentrations exceeding

1,000 µg/L were present at that time along Griswold Avenue, with its long axis trends (approximately 750 feet from east to west) almost perpendicular to the primary southeast gradient direction in the A zone (URS, 2012b). Because the vertical and horizontal extents of the PCE concentrations exceeding 1,000 µg/L in the A zone were not defined with the data from the 2011 CPT investigation, additional groundwater samples were collected in June 2012 from locations to the west, southwest, east, and south using CPT technology. Results from that investigation indicate that the vertical and horizontal extents of the PCE concentrations exceeding 1,000 µg/L in the A zone are defined. These data are documented in the *Final Letter Report, Additional CPT/HydroPunch Investigation* (URS, 2012d).

The installation of EW-02 is a continuation of the remediation efforts needed for the site. In addition to the operation of this well, the additional monitoring wells recommended in this section are needed to define the boundaries of the A and B zone PCE contamination in groundwater, after which additional groundwater extraction wells may be needed to prevent migration of the plume toward water supply wells. These alternatives are being evaluated in the draft feasibility study (URS, pending).

5.2 SVE – Summary Observations and Recommendations

The SVE treatment system's 4Q12 average influent sample concentrations were lower than the 3Q12 average. Monthly samples entering the treatment system had PCE concentrations of 420, 150, and 130 ppbv in October, November, and December, respectively. Concentrations at all three operating extraction wells were lower in 4Q12 than in 3Q12. The total PCE mass removed increased only slightly from 3.0 pounds in 3Q12 to 3.2 pounds in 4Q12.

The SVE system was installed to address soil gas concentrations at the source of the site contamination. The objective of SVE is to eliminate the source for groundwater contamination by removing contaminant mass in the vadose zone. By removing contaminant mass in the upper vadose zone (above 15 feet bgs), a secondary objective is met by reducing or eliminating human health risk due to shallow soil gas and vapor intrusion.

Soil vapor concentrations and mass removal rates curves for the SVE system have become asymptotic (Figure 4-10) causing the system to become inefficient. Good engineering practice dictates that shutdown of extraction wells is warranted, assuming that the shutdown would not have overriding negative effects. The system has been operated principally to reduce the risk to building occupants that could be posed by PCE vapor intrusion from the vadose zone. When well shutdown and rebound monitoring are implemented, monitoring of indoor air concentrations should be incorporated into the rebound monitoring process to assure indoor air risk does not reach unacceptable levels.

6.0 QUALITY CONTROL SUMMARY REPORT

6.1 Introduction

This section summarizes QA and QC results for the samples collected and data generated during the period of October through December 2012 (4Q12) at the Modesto Groundwater Superfund Site, Modesto, California. Sampling activity protocols are provided in the SAP (URS, 2010b). Based on the data review, all data collected during this period are of known and acceptable quality in relation to the data quality objectives (DQOs) of this project. All data are considered usable as qualified for the intended purposes.

Between October 11 and December 6, 2012, field samples, field duplicates (FDs), and field QC samples were collected for groundwater and air samples. Water samples were collected from the GWTS and existing monitoring wells. Air samples were collected from the GWTS and SVE system. Table B-1 (Appendix B) lists contaminants of concern at the Modesto Groundwater Superfund Site. Table B-2 (Appendix B) lists samples submitted for chemical analyses. Analyses performed include the following:

Site and system sampling and monitoring analyses:

ALS Laboratory (Formerly Columbia Analytical Services)

- TDS by Standard Method (SM) 2540C: 3 normal samples (NS), 1 FD
- TSS by SM2540D: 3 NS, 1 FD
- BOD by SM5210B: 3 NS, 1 FD
- VOCs in water by EPA Method 524.2: 13 NS, 1 FD, 3 trip blanks (TBs), and 1 matrix spike/matrix spike duplicates (MS/MSDs)

Eurofins Laboratory (Formerly Air Toxics, LTD.)

- VOCs in air by EPA Method TO15: 6 NS, 1 FD

EPA Region 9 Laboratory

- VOCs in air by EPA Method TO15: 18 NS and 3 FDs
- VOCs in water by EPA Method 524.2: 40 NS, 4 FDs, 1 TB, 1 field blanks (FBs) and 3 MS/MSDs

GEL Laboratories, LLC

- Total uranium by American Society for Testing and Materials D5174: 11 NS, 1 FD, and 3 MS/laboratory duplicates

Aquatic Bioassay Consulting Laboratories, Inc.

- Title 22: 1 NS

Sample results are summarized in Table B-3 (Long-Term Monitoring and SVE) and Table B-4 (GWTS) (Appendix B).

Analytical chemistry services are provided by the ALS Laboratory in Kelso, Washington; Eurofins Laboratory in Folsom, California; EPA Region 9 laboratory in Richmond, California; GEL Laboratories, LLC, in South Carolina; and Aquatic Bioassay Consulting Laboratories, Inc. in Ventura, California All laboratories are certified by the California Department of Health Services through the Environmental Laboratory Accreditation Program to perform hazardous waste analyses.

All EPA Region 9 analytical results were validated by Laboratory Data Consultants (LDC) using the criteria established in the SAP, analytical methods, and EPA Region 9 laboratory standard operating procedures (SOPs), as wells as the National Functional Guidelines for Superfund Organic Methods Data Review (EPA, 2008). The sample results validated by LDC were validated electronically. The URS project chemist reviewed all remaining data using criteria established in analytical methods and the laboratories SOPs. Appendix C provides data validation reports and qualified data tables. Several data validation flags were used in the validation process. The definitions of these qualifier flags are:

U Indicates the compound or analyte was analyzed for but not detected at or above the reported quantitation limit.

UJ Indicates the compound or analyte was analyzed for but not detected at or above the stated limit. The sample detection limit is an estimated value.

J Indicates the analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.

R QC indicates that the result is not usable. The presence or absence of the compound or analyte cannot be verified or the reported result is compromised as to be unusable.

6.2 DQOs

DQOs are qualitative and quantitative statements that specify the quality of the data required to meet the goals of site investigations and support decisions made in remedial response activities. Data quality was assessed in terms of its precision, accuracy, representativeness, completeness, and comparability (PARCC). These criteria are briefly defined in the following sections. The results of the field and laboratory QC checks are evaluated against the DQOs, and the quality of the data is assessed according to PARCC parameters. QC sample results that fall outside of these criteria serve to signal the production of unacceptable or biased data that could result in the implementation of corrective action or the qualification of data.

6.2.1 Precision

Precision is a measurement of mutual agreement among individual measurements of the same property, usually under prescribed conditions. Data evaluated to assess precision consist of results from the analysis of FD pairs and MS/MSD samples. The precision measurement is established using the relative percent difference (RPD) between the duplicate sample results, and is expressed as:

$$RPD = \frac{\lfloor X_1 - X_2 \rfloor}{[(X_1 + X_2 / 2)]} \times 100$$

where:

X_1 and X_2 represent the individual concentrations of the target analyte in the two replicate analyses.

6.2.2 Accuracy

Accuracy is defined as the proximity of the mean of a set of results to the true value. Accuracy is assessed through the evaluation of initial and continuing calibration data, as well as laboratory control sample (LCS) recoveries, surrogate standard recoveries, and MS recoveries, which are expressed as a percent recovery according to the following equation:

$$\text{percent recovery} = \frac{(\text{spiked sample conc.} - \text{sample conc.})}{\text{known conc. of spike}} \times 100$$

6.2.3 Representativeness

Representativeness is defined as the degree to which sample data accurately and precisely represent the characteristics of the site, parameter variations at a sampling point, or environmental conditions. Representativeness, in terms of sample integrity for this investigation, was qualitatively evaluated based on the analysis of TBs, FBs, and method blank (MB) samples. In addition, sample collection and handling methods and the cooler receipt forms were reviewed to confirm that samples were received under proper storage conditions.

6.2.4 Completeness

Two types of completeness have been evaluated for this project. Analytical completeness is the number of unqualified results related to the total number of results reported, expressed as a percentage. The analytical completeness goal is 90 percent. Technical completeness is the number of valid results related to the total number of results reported, expressed as a percentage. The technical completeness goal for this project is 95 percent.

6.2.5 Comparability

Data comparability is achieved by using standard analytical methods and reporting limits, and by using standard units of measurements, as specified in the methods. Comparability is a qualitative parameter.

6.3 Quality Control Results

The following sections summarize the data review process and results in terms of PARCC criteria, as defined in Subsection 2.2.5 of the SAP. Appendix C provides qualified data based on this review process.

6.3.1 Precision and Accuracy

Precision and accuracy were evaluated based on the results of QC samples collected by the field team and QC samples that originated in the laboratory. The calculated RPD for MS/MSDs and FD pairs provided information on the precision of sampling and analytical procedures. MS/MSD analyses were associated with all samples for this sampling event. All data were reviewed for accuracy based on the surrogate spike, MS/MSD, and LCS percent recoveries. In addition, initial and continuing calibration data were reviewed for analytical accuracy. The criteria used for the evaluation are provided in the quality assurance project plan in the SAP (URS, 2010b). Data validation findings are provided in Appendix C. FD results are included in the results summary table (Tables B-3 and B-4) in Appendix B.

6.3.2 Representativeness

Representativeness was evaluated through the analysis of FB, TB, and MB samples. Additionally, sample collection and handling methods and the cooler receipt forms were reviewed. All sample bottles were received in good condition and the chain-of-custody documents agreed with the sample labels.

TBs are required to accompany each cooler of aqueous samples sent to the laboratory for analysis of VOCs. One TB accompanied each cooler for each of the sampling dates. Tables B-3 and B-4 (Appendix B) list TB detections.

FBs are used to determine if potential sample contamination has occurred during the sample collection process. FBs are analyzed using the same analytical procedures as the associated samples. Table B-3 (Appendix B) provides FB detections.

MBs are processed through the same analytical procedures as the associated samples. MBs are analyzed with each batch of samples to provide information on contamination originating in the analytical process. MB detections are indicated in the data validation report provided in Appendix C.

6.3.3 Completeness

Completeness of data was evaluated by assuring that all analytical requests were met, samples were received in proper condition, and all analyses were performed within the appropriate holding times. Overall analytical completeness (97 percent) exceeded the project goal of 90 percent. Overall technical completeness for this data set (100 percent) exceeded the project goal of 95 percent. Refer to Appendix C for a breakdown of completeness by method.

6.3.4 Comparability

Comparability was evaluated for this sampling event by analyzing all samples according to the specified EPA analytical methods, which use standard units of measurement. Necessary sample dilutions, due to the presence of elevated target compound concentrations, did not affect data usability and comparability. Results for some analytes are reported below the practical quantitation limit (PQL) but above the method detection limit (MDL). The “J” flag has been applied to results reported between the MDL and the PQL.

6.4 Summary of Data Reliability

Based on this evaluation, all data collected during this period are of known and acceptable quality in relation to the DQOs of this project. All data are considered usable as qualified for the intended purposes.

7.0 REFERENCES

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URS, 2012d. *Final Letter Report, Additional CPT/HydroPunch Investigation, Modesto Groundwater Superfund Site***.** October 26.

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TABLES

Table 4-1. Vertical Gradients, Fourth Quarter 2012

Well No.	Monitoring Zone	Groundwater Elevation (feet msl)	4Q12 Vertical Gradient	3Q12 Vertical Gradient	4Q11 Vertical Gradient
MW-21A	A	46.07	0.0003	-0.0188	0.002
MW-22A	A	46.06			
MW-04A	A	46.63	0.0138	-0.0109	-0.0011
MW-04B	B	47.54			
MW-08A	A	48.17	-0.0037	-0.0077	-0.0005
MW-09B	B	47.9			
MW-10A	A	47.11	0.0018	-0.0066	-0.0013
MW-10B	B	47.26			
MW-16A	A	46.18	0	-0.0008	0
MW-16B	B	46.18			
MW-17A	A	46.57	0.0006	-0.0075	-0.0029
MW-17B	B	46.6			
MW-19A	A	46.97	-0.0108	0.0002	-0.0128
MW-19B1	B	46.47			
MW-20A	A	46.62	-0.0024	-0.0261	-0.0041
MW-20B	B	46.44			
MW-04B	B	47.54	0.0048	-0.0546	-0.0021
MW-04C	C	47.94			
MW-10B	B	47.26	-0.0039	-0.0741	-0.0084
MW-10C	C	47			
MW-16B	B	46.18	-0.004	-0.0442	-0.0073
MW-16C	C	45.79			
MW-17B	B	46.6	-0.0043	-0.0622	-0.0142
MW-17C	C	46.2			
MW-20B	B	46.44	-0.0096	-0.0575	-0.0082
MW-20C	C	45.74			

msl = mean sea level
4Q12 = fourth quarter 2012
negative gradient = downward
positive gradient = upward

Table 4-2. GWTS Sample Results: Fourth Quarter 2012					
Sample Port	**Location**	**Sample Date**	**Sample Code**	**pH**	**PCE (µg/L)**
SP-01	GWTS Influent	10/11/2012	N	7.24	840
		11/8/2012	N	7.18	860
		12/6/2012	N	6.96	690
SP-03	Carbon Influent	10/11/201	N	8.01	23
		11/8/2012	N	8.05	5.4
		12/6/2012	N	7.91	4.6
SP-04	Carbon Mid Bed	10/11	N	8.03	3.7
		10/11/2012	FD		3.2
		11/8/2012	N	8.00	1.4
		12/6/2012	N	7.85	1.8
SP-05	Post Carbon Pre-Ion Exchange	10/11/2012	N	7.90	0.33 J
SP-07	GWTS Effluent	10/11/2012	N	8.15	0.34 J
		11/8/2012	N	8.12	0.28 J
		12/6/2012	N	7.91	0.56

FD = field duplicate
GWTS = groundwater treatment system
J = estimated value
N = normal sample
PCE = tetrachloroethene
µg/L = micrograms per liter

Table 4-3. SVE System Sample Results: Fourth Quarter 2012				
Sample Port	**Location**	**Sample Date**	**Sample Code**	**PCE (ppbv)**
SP-11	SVE Pre-GAC	10/11/2012	N	420
		11/8/2012	N	150
		12/6/2012	N	130
SP-12	SVE Stack	10/11/12	N	<2.5
		11/8/2012	N	1.9 J
		12/6/2012	N	1.3 J

GAC = granular-activated carbon
J = estimated concentration
N = normal sample
PCE = tetrachloroethene
ppbv = parts per billion by volume
SVE = soil vapor extraction
< = less than

FIGURES

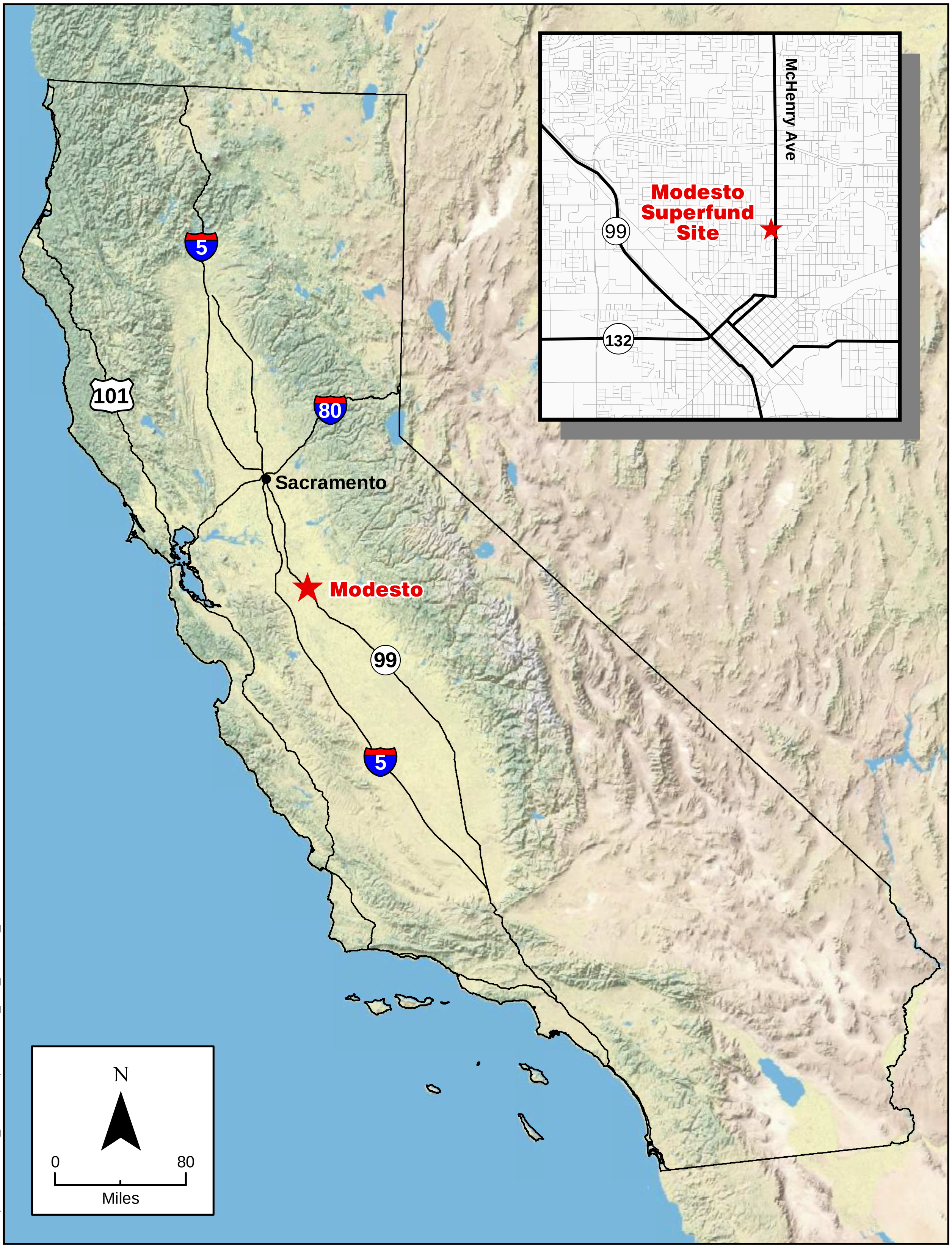

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Figure 1-1. Site Location, Modesto Groundwater Superfund Site, Modesto, California

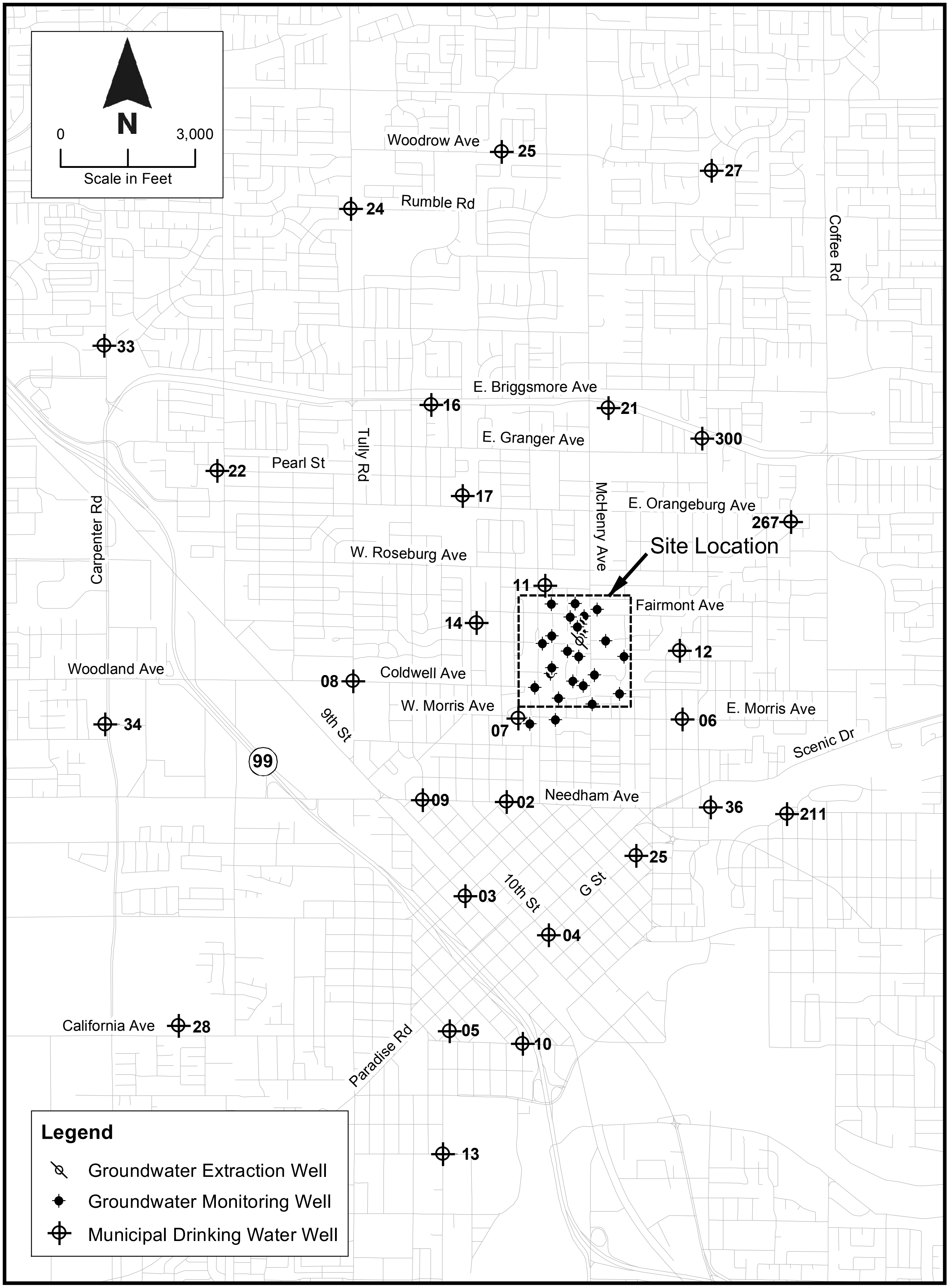

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Figure 1-2 Municipal Well Locations, Modesto Groundwater Superfund Site

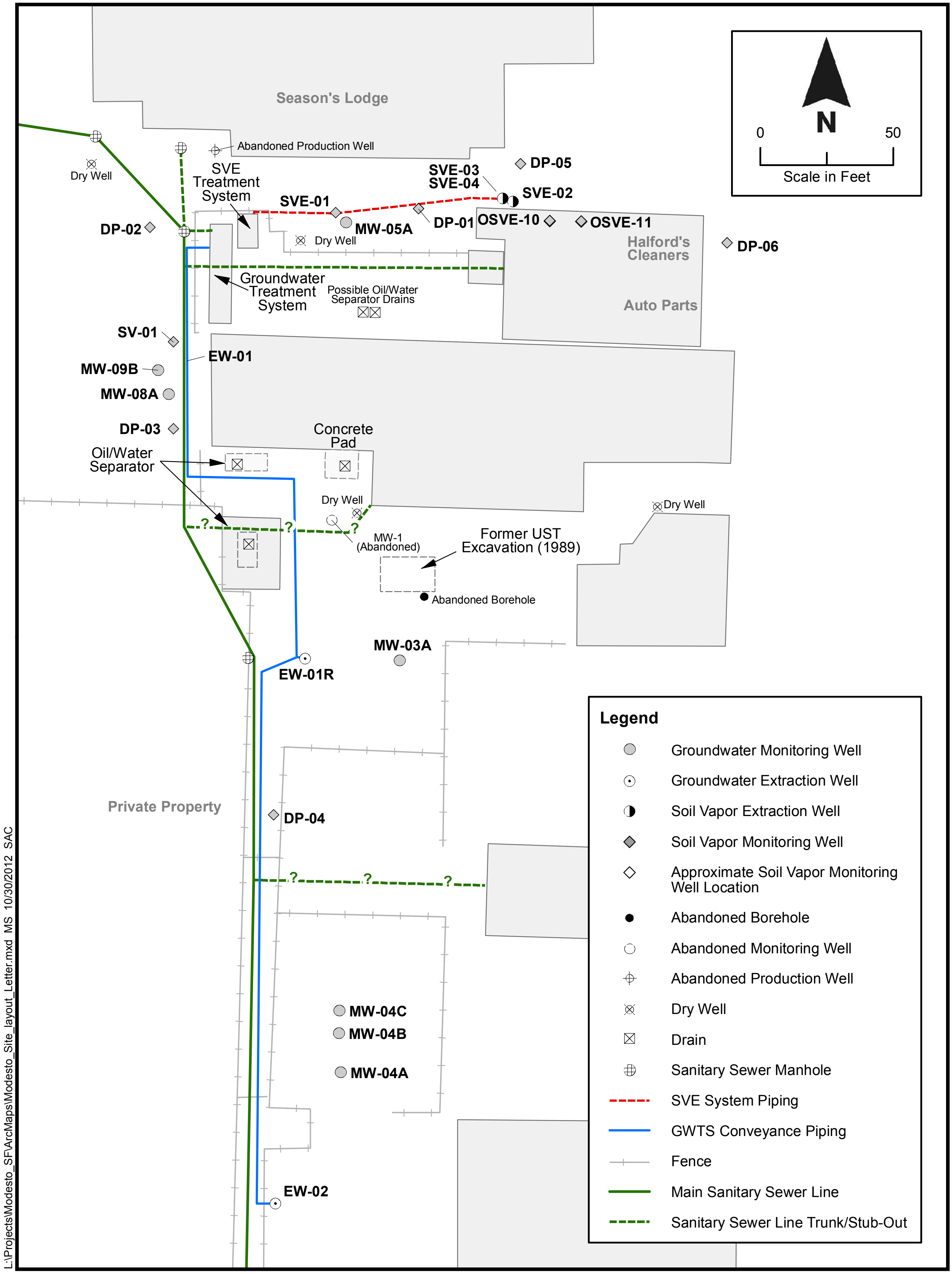

Figure 2-1. Site Layout
Modesto Groundwater Superfund Site

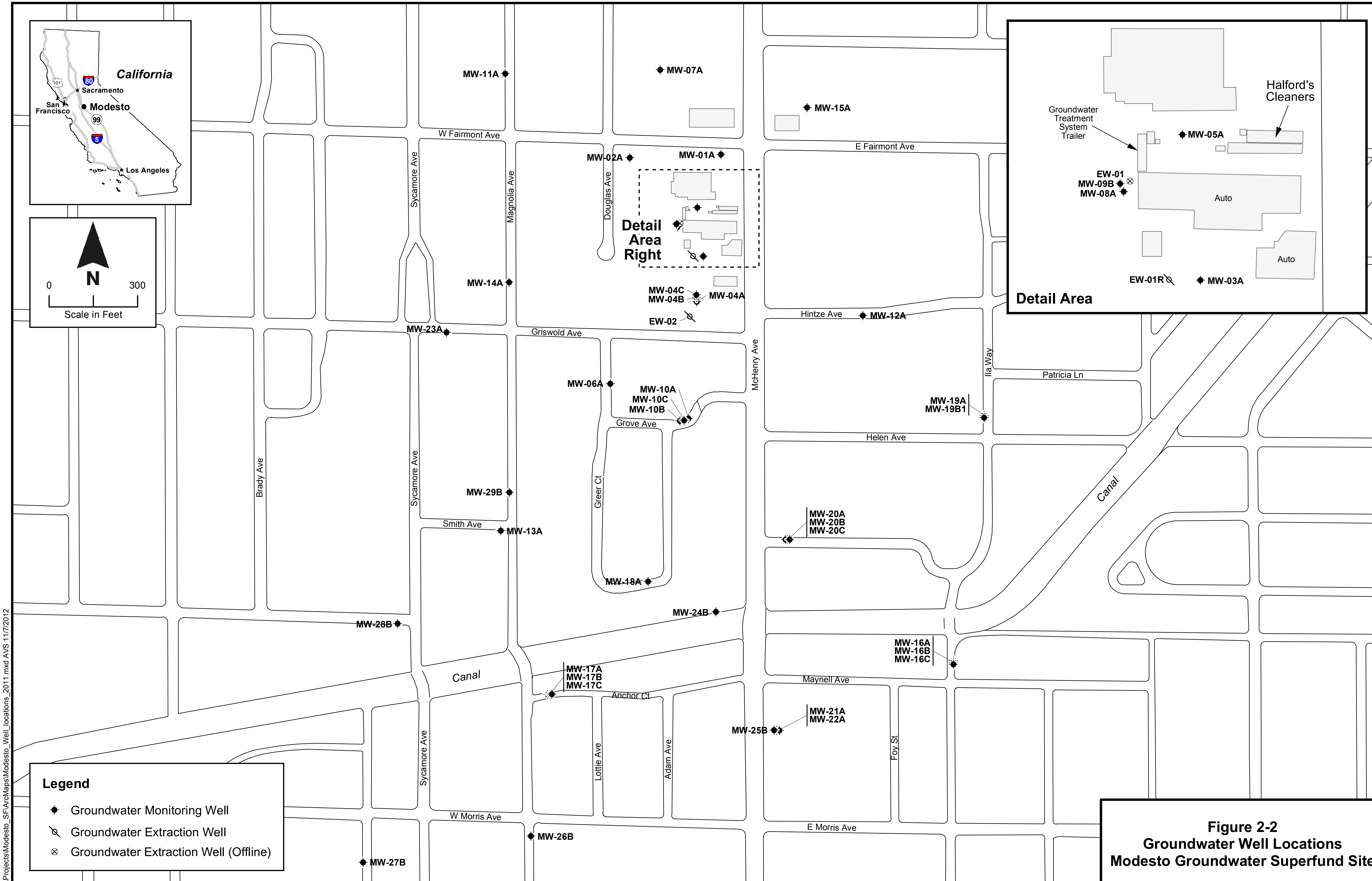

Figure 2-2
Groundwater Well Locations
Modesto Groundwater Superfund Site

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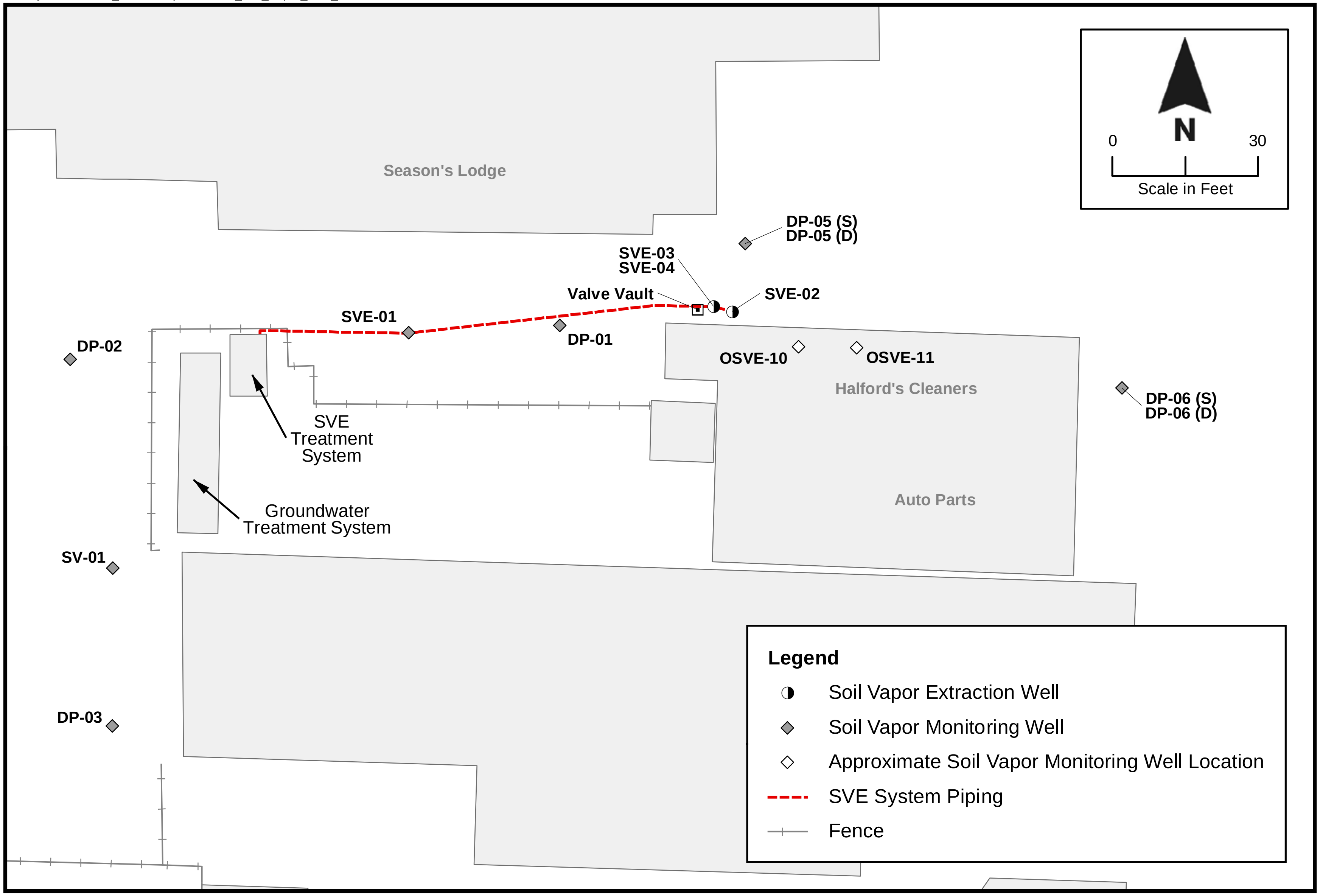


Figure 2-3. Soil Vapor Well Locations, Halford's Cleaners Area, Modesto Groundwater Superfund Site

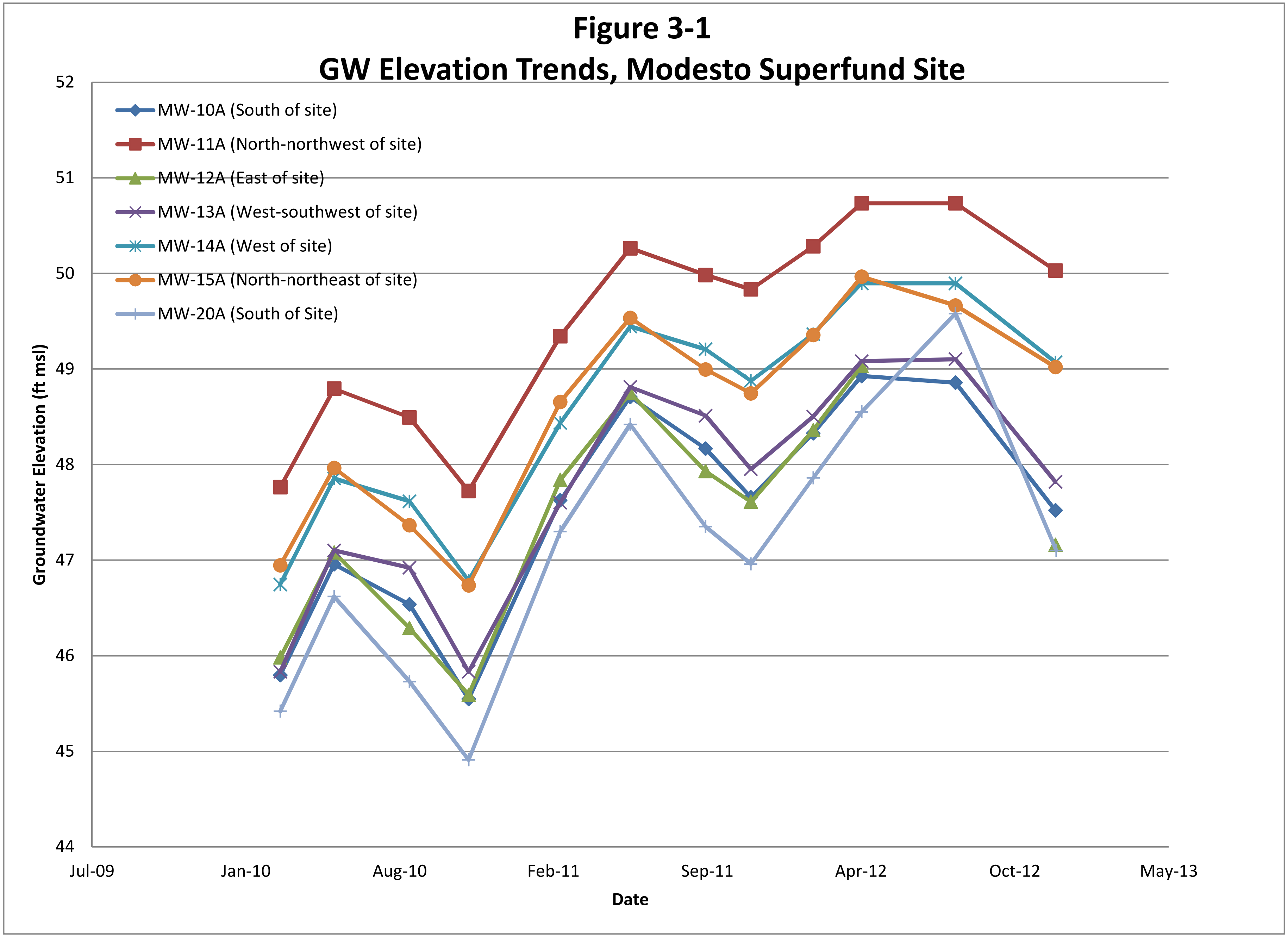
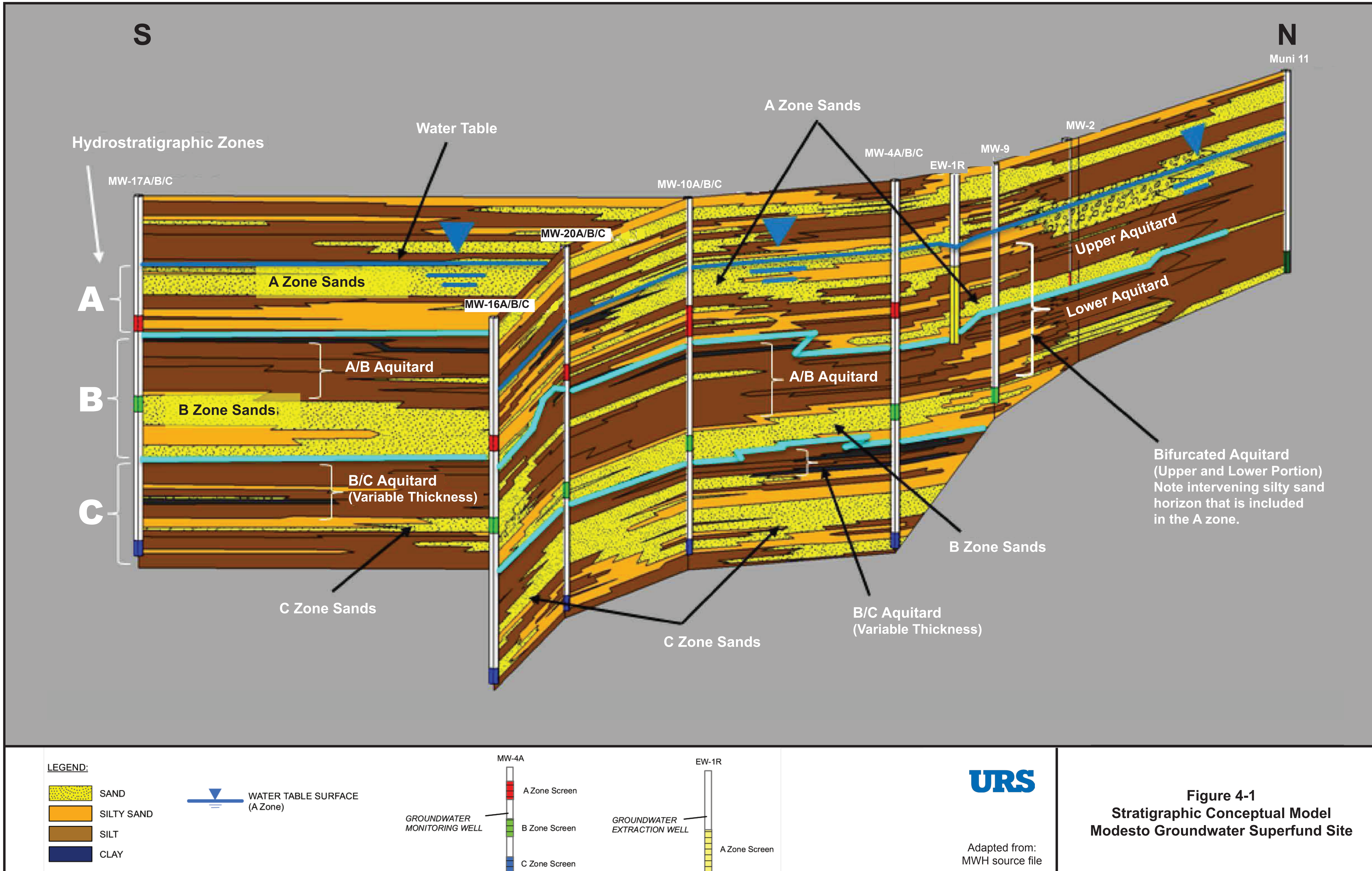


Figure 3-1
GW Elevation Trends, Modesto Superfund Site
MW-10A (South of site)
MW-11A (North-northwest of site)
MW-12A (East of site)
MW-13A (West-southwest of site)
MW-14A (West of site)
MW-15A (North-northeast of site)
MW-20A (South of Site)
Groundwater Elevation (ft msl)
52
51
50
49
48
47
46
45
44
Jul-09
Jan-10
Aug-10
Feb-11
Sep-11
Apr-12
Oct-12
May-13
Date



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Adapted from:
MWH source file

Figure 4-1
Stratigraphic Conceptual Model
Modesto Groundwater Superfund Site

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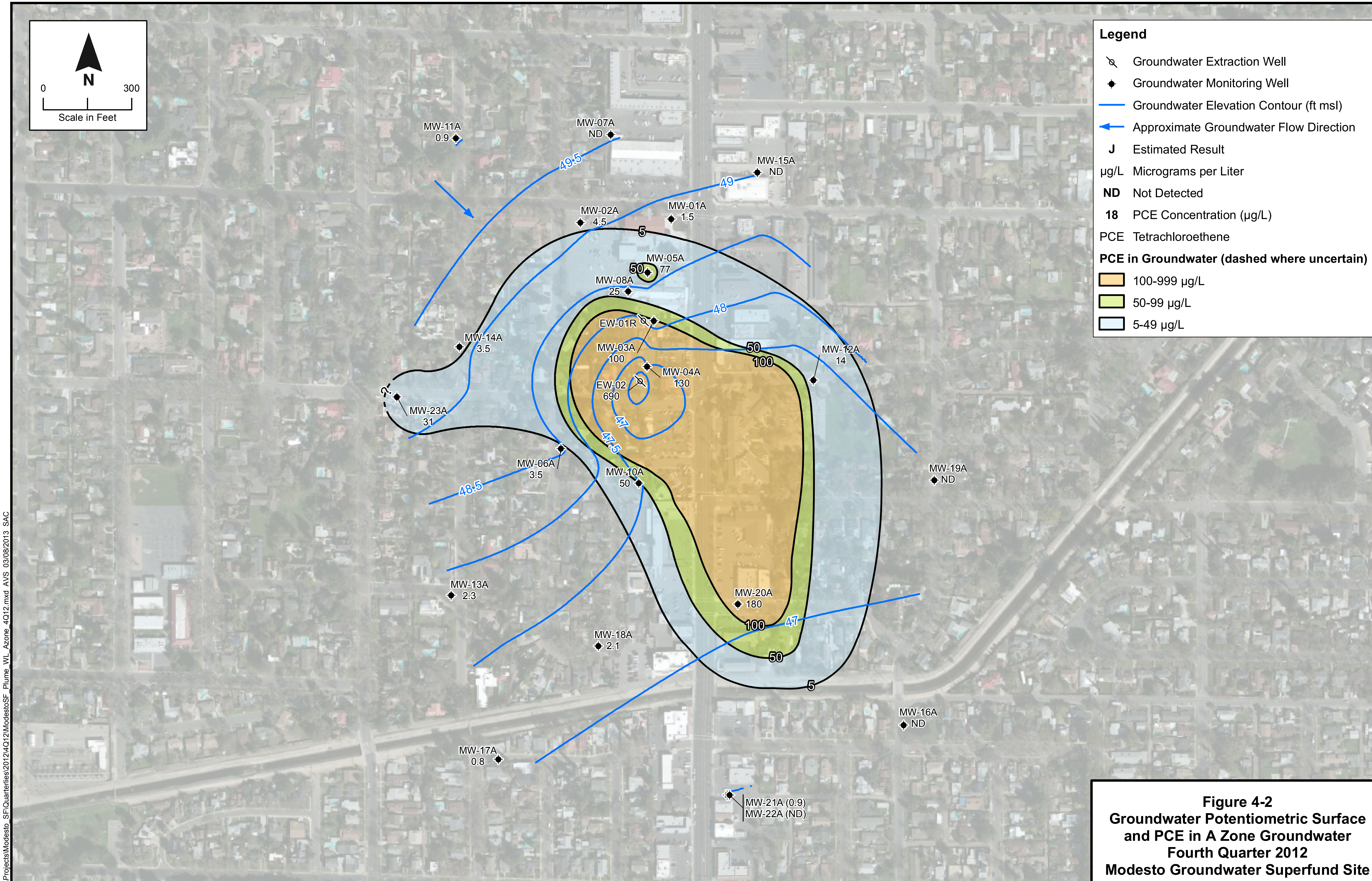

Figure 4-2
Groundwater Potentiometric Surface and PCE in A Zone Groundwater
Fourth Quarter 2012
Modesto Groundwater Superfund Site

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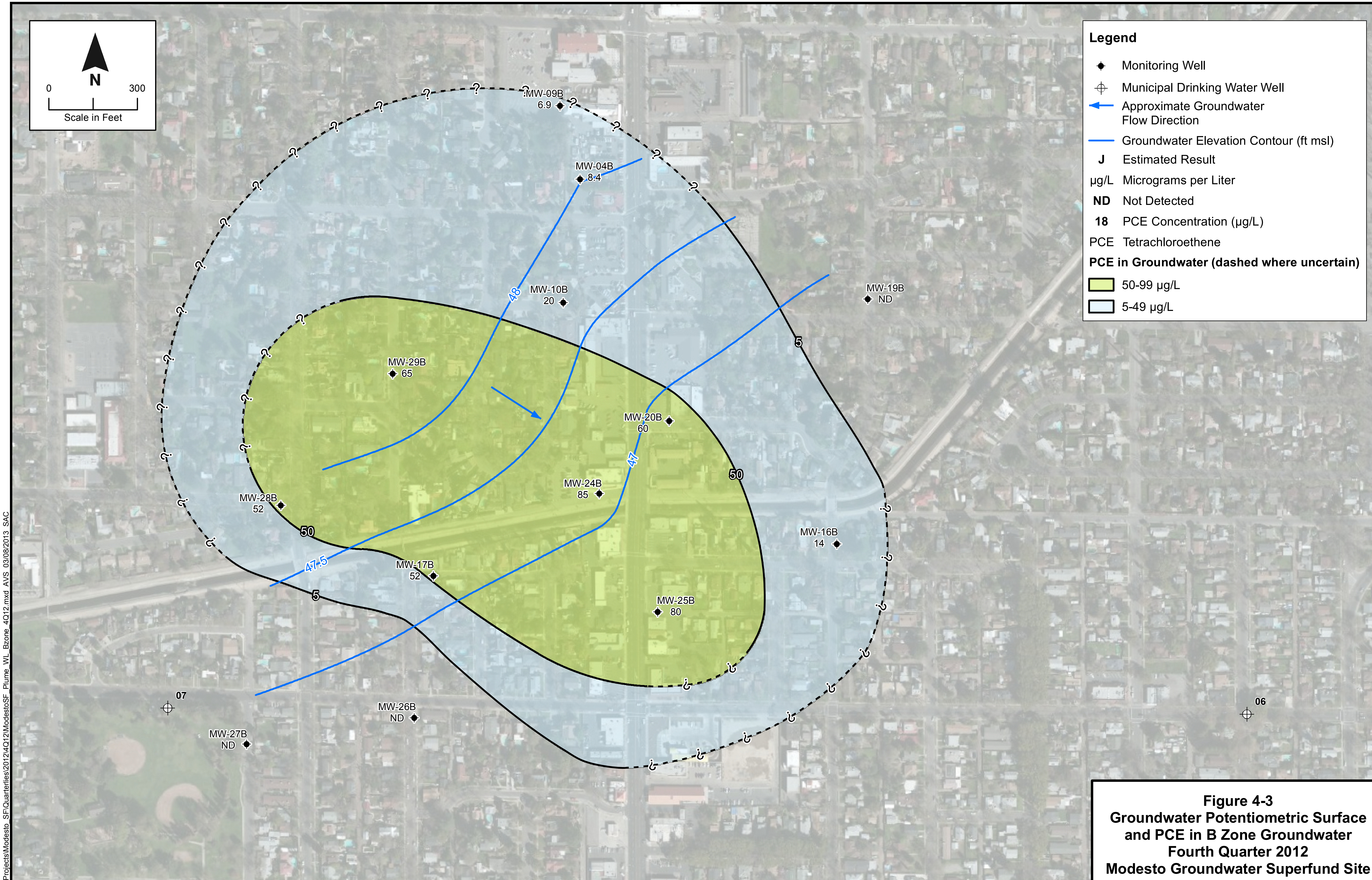

Figure 4-3
Groundwater Potentiometric Surface
and PCE in B Zone Groundwater
Fourth Quarter 2012
Modesto Groundwater Superfund Site

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Figure 4-4
Groundwater Potentiometric Surface and PCE in C Zone Groundwater
Fourth Quarter 2012
Modesto Groundwater Superfund Site

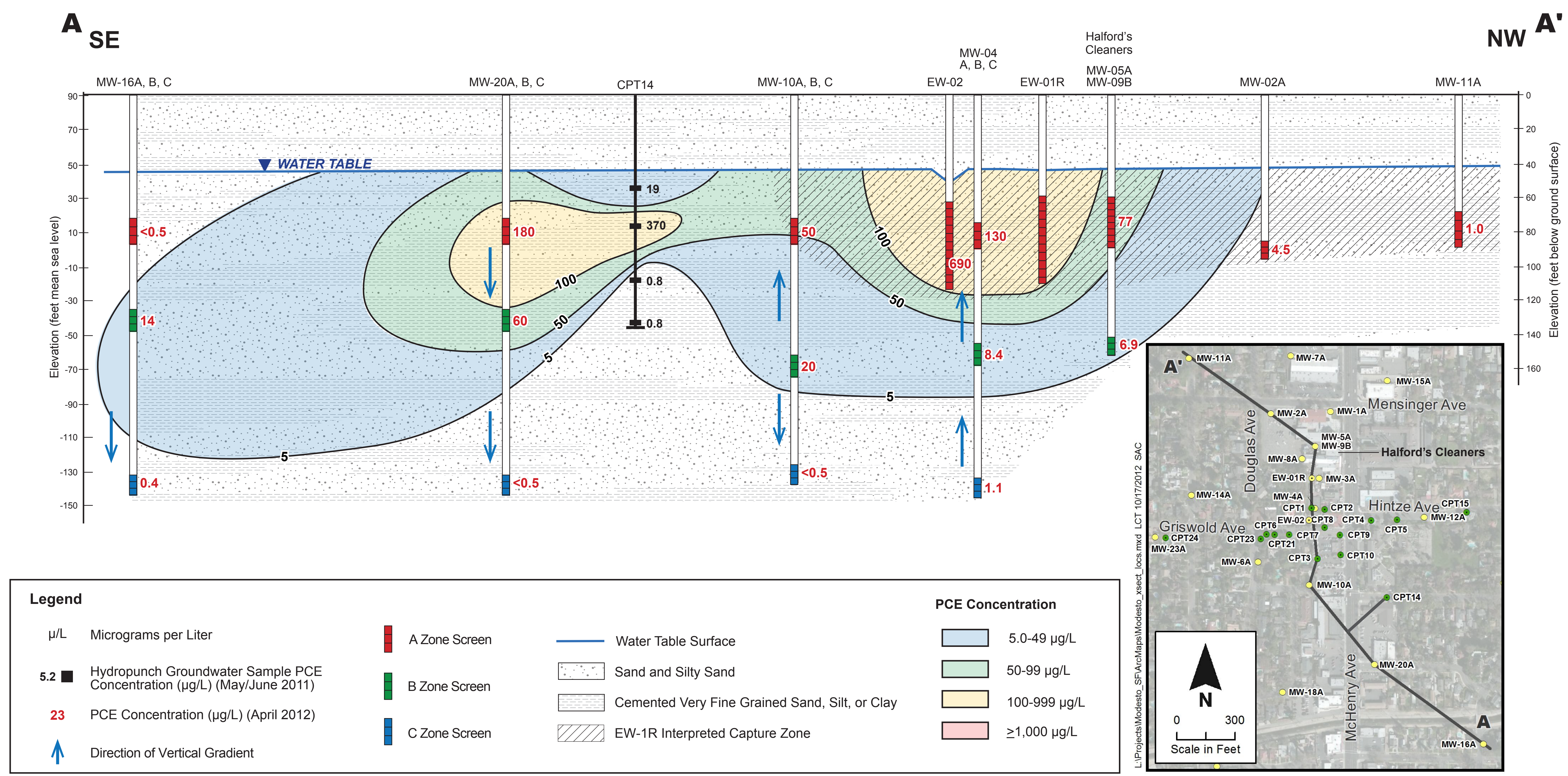

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Figure 4-5
Cross-Section A-A'
Extraction Well EW-02
Estimated Capture Zone
Fourth Quarter 2012
Modesto Groundwater Superfund Site

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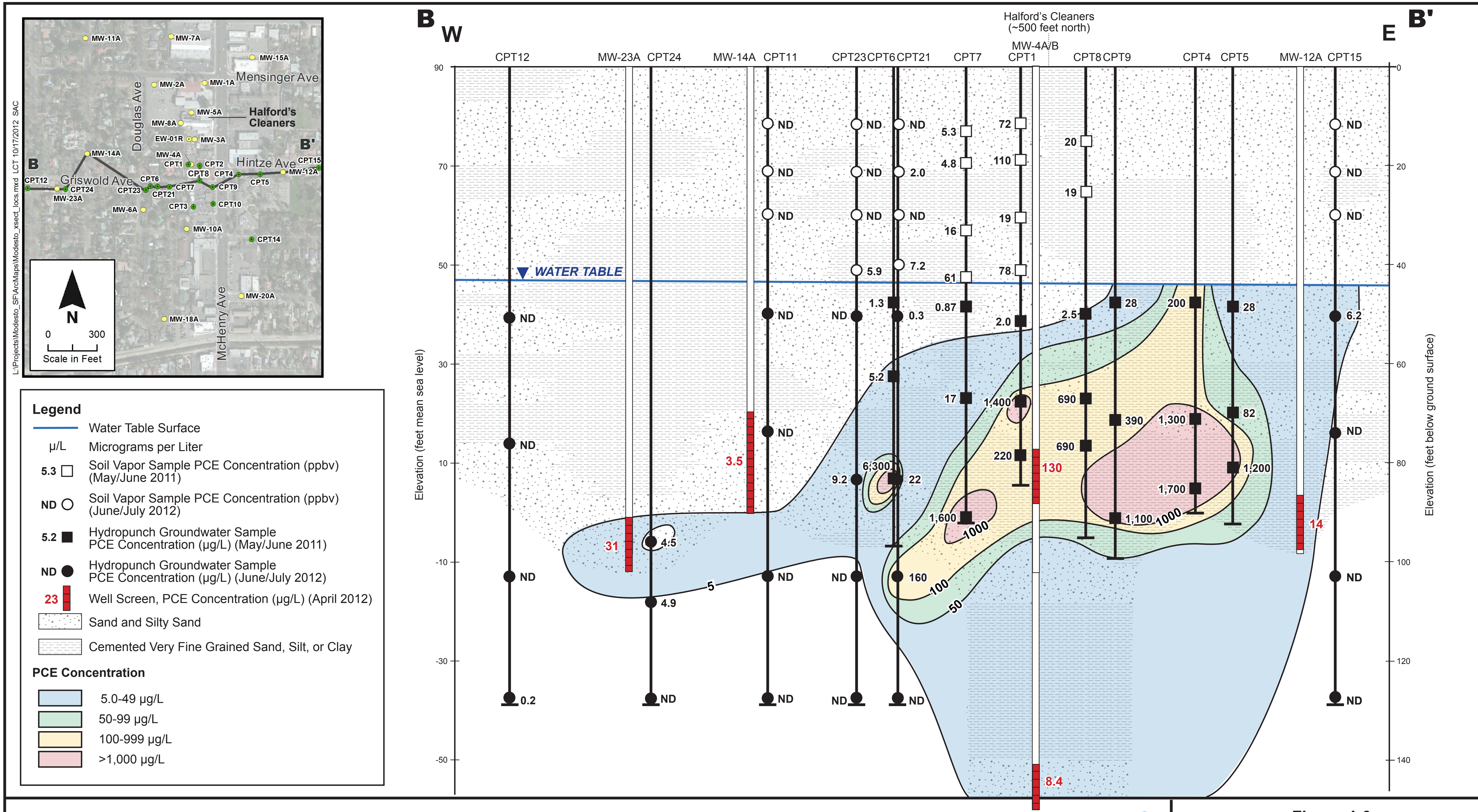

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Figure 4-6
Cross-Section B-B'
Fourth Quarter 2012
Modesto Groundwater Superfund Site

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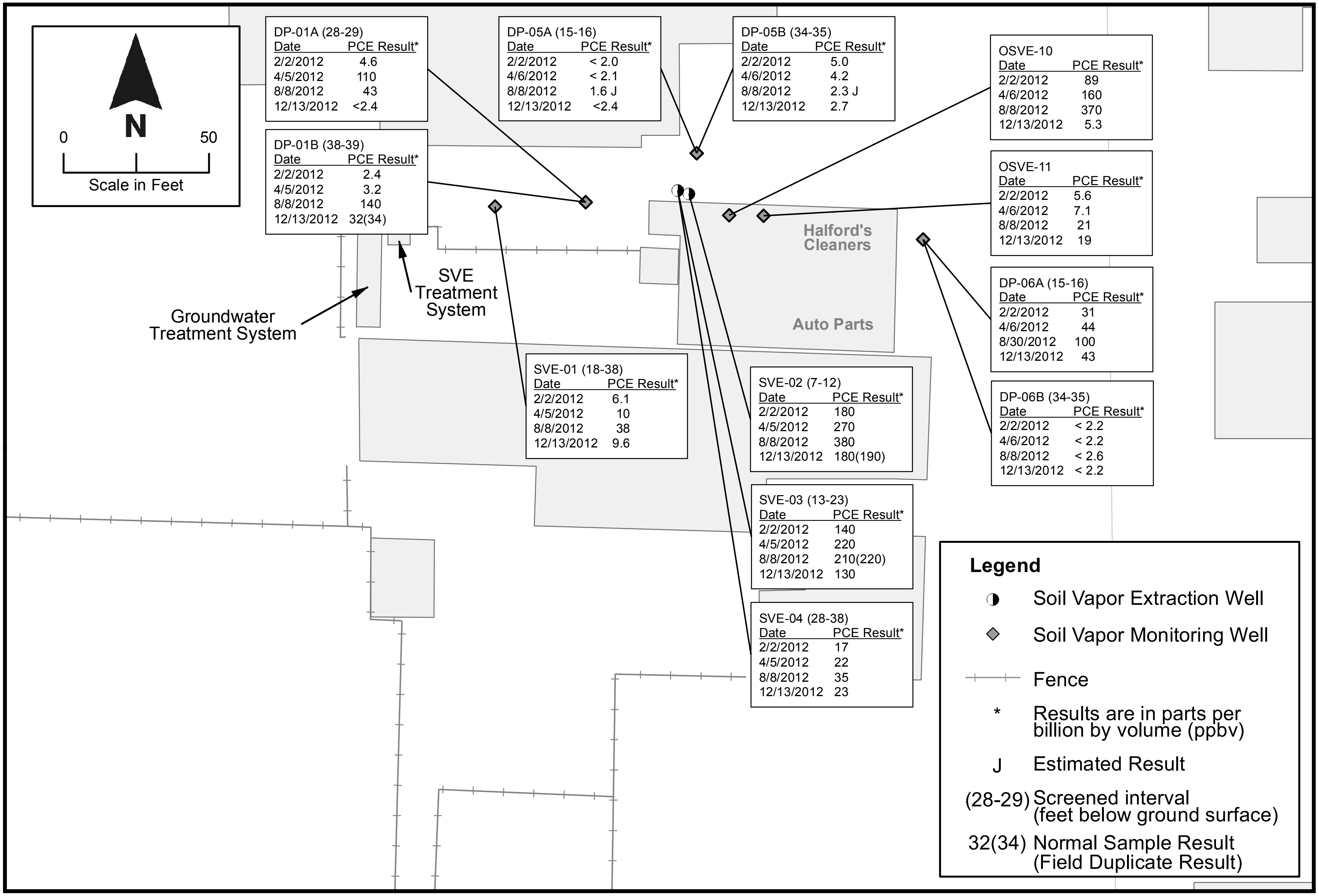


Figure 4-7. Soil Vapor Analytical Results, First Quarter 2012 through Fourth Quarter 2012 Modesto Groundwater Superfund Site

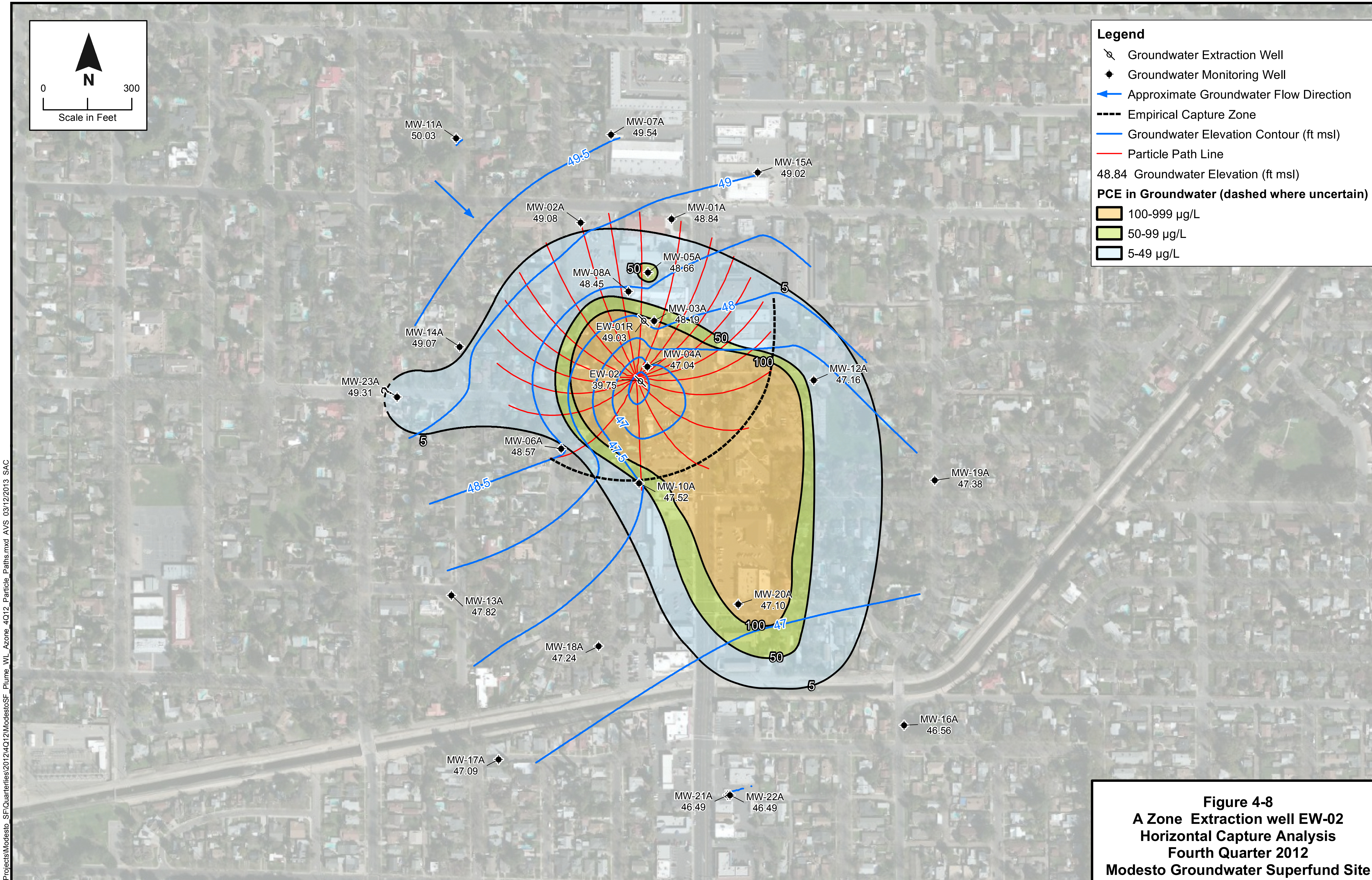
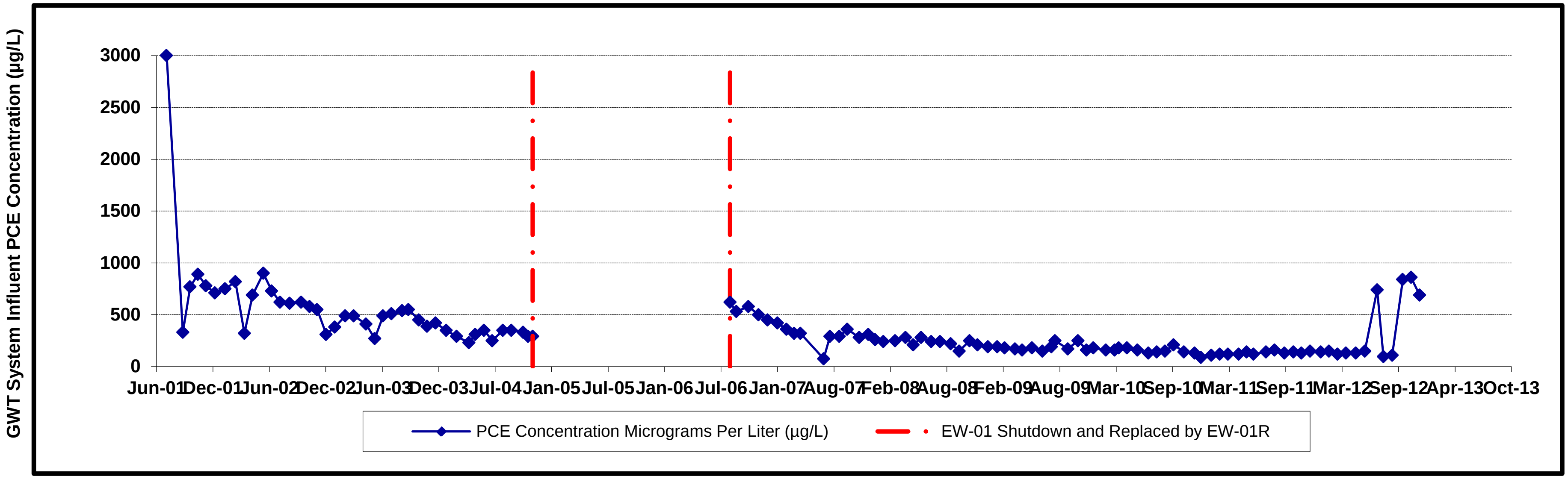


Figure 4-8
A Zone Extraction well EW-02
Horizontal Capture Analysis
Fourth Quarter 2012
Modesto Groundwater Superfund Site

Figure 4-9

Cumulative PCE Mass Removed by the Groundwater Treatment System
Modesto Groundwater Superfund Site



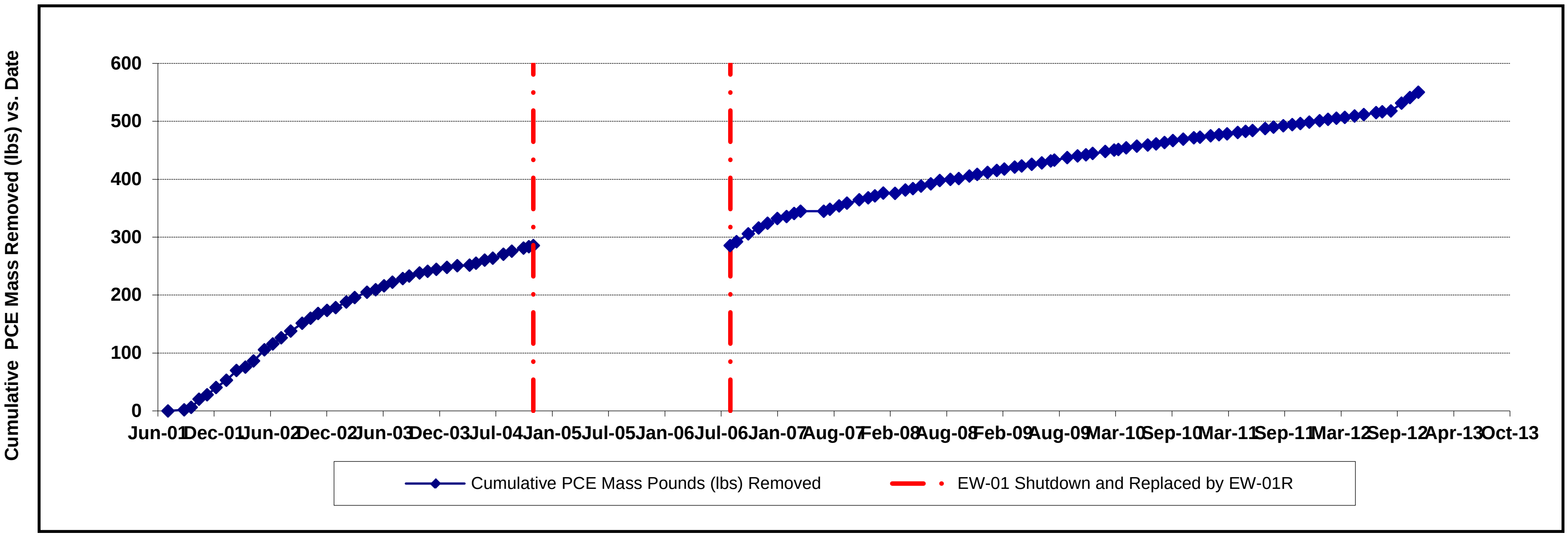
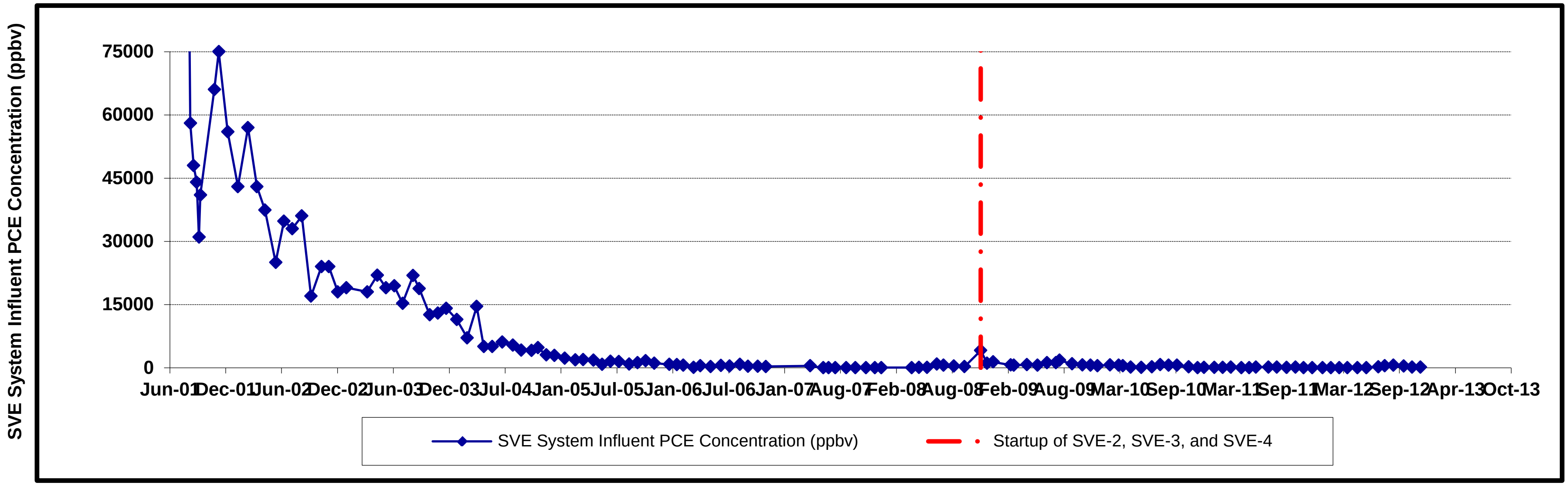
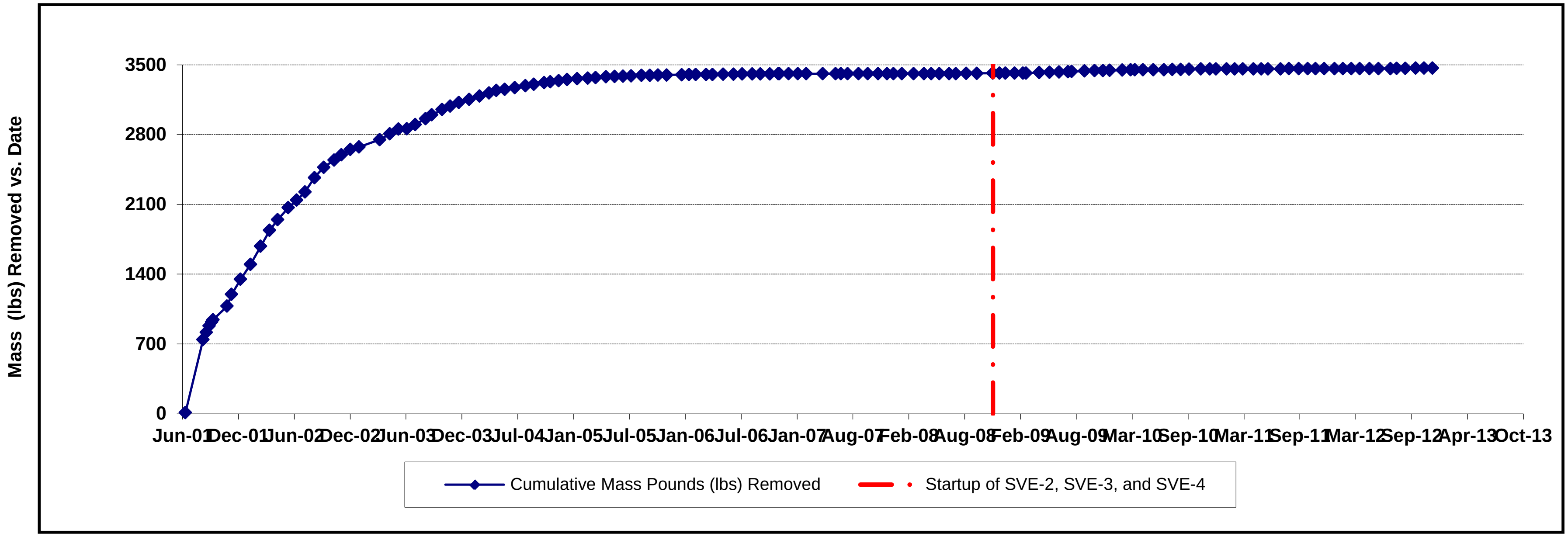


Figure 4-10
Cumulative Mass Removed by the Soil Vapor Extraction System
Modesto Groundwater Superfund Site





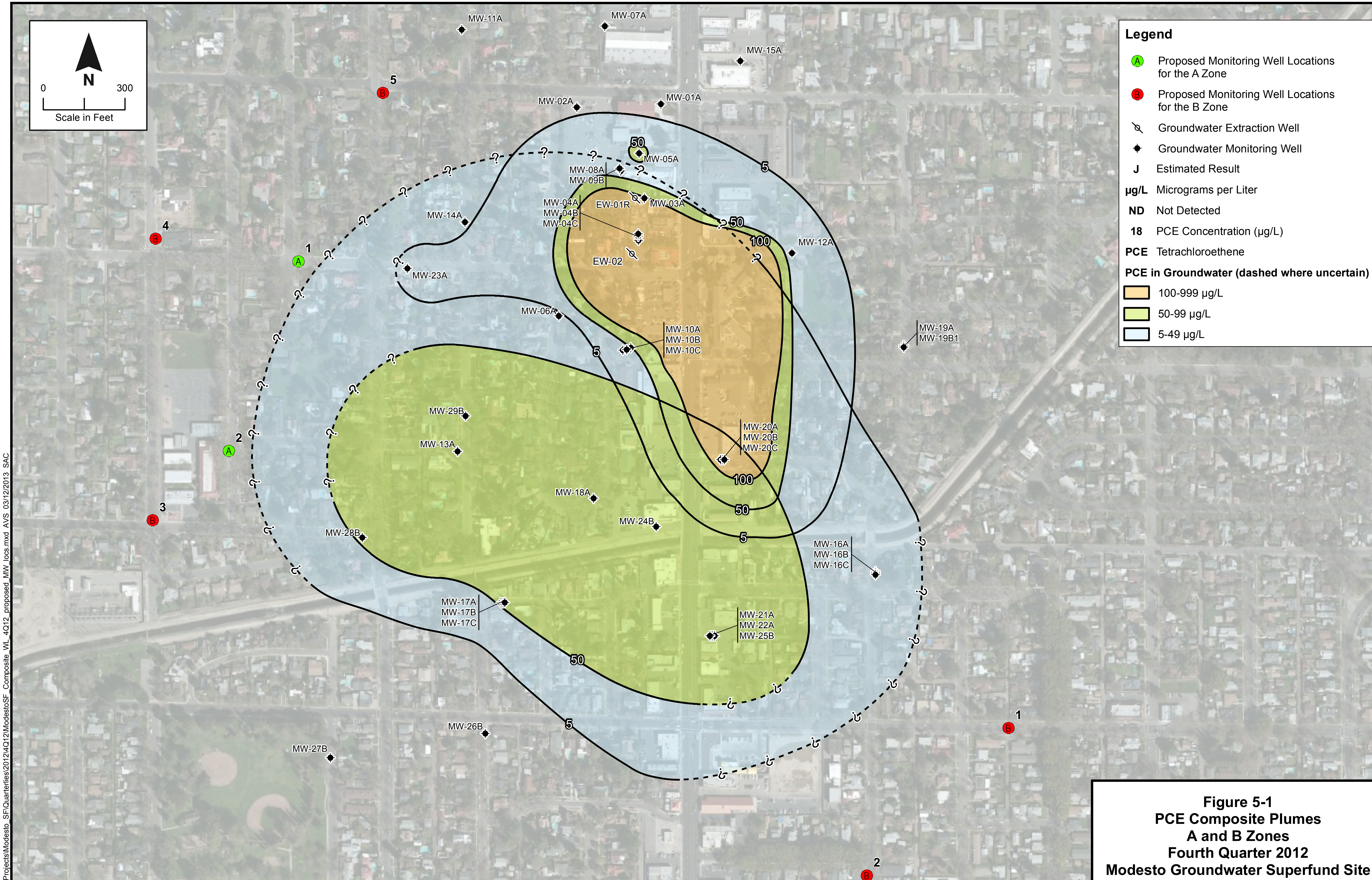


Figure 5-1
PCE Composite Plumes
A and B Zones
Fourth Quarter 2012
Modesto Groundwater Superfund Site

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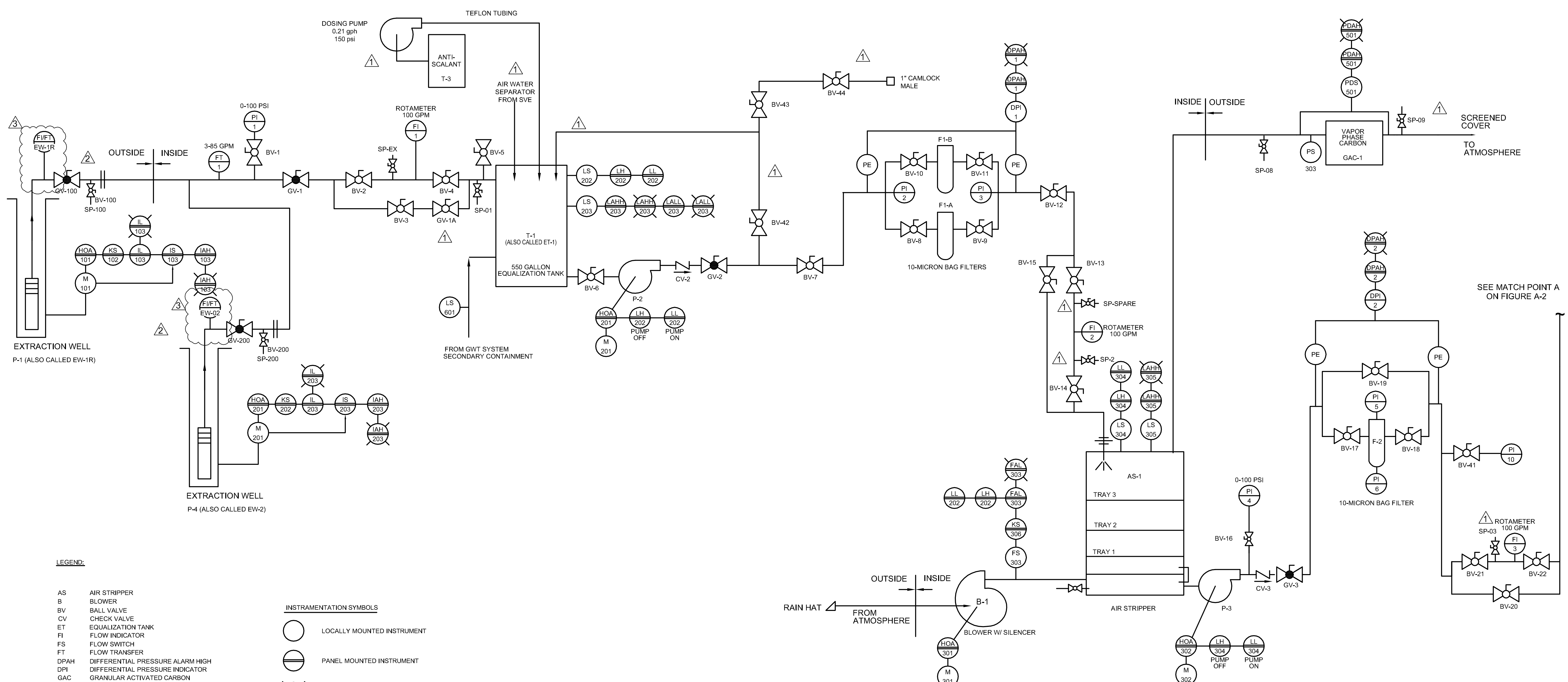
Appendix A

Treatment System Process and Instrumentation Diagrams



LEGEND:

AS	AIR STRIPPER
B	BLOWER
BV	BALL VALVE
CV	CHECK VALVE
ET	EQUALIZATION TANK
FI	FLOW INDICATOR
FS	FLOW SWITCH
FT	FLOW TRANSFER
DPAH	DIFFERENTIAL PRESSURE ALARM HIGH
DPI	DIFFERENTIAL PRESSURE INDICATOR
GAC	GRANULAR ACTIVATED CARBON
GV	GLOBE VALVE
HOA	HAND - OFF - AUTO
IAH	ELECTRICAL CURRENT ALARM HIGH
IEX	ION EXCHANGE
IL	ELECTRICAL CURRENT LOW
IS	ELECTRICAL CURRENT SWITCH
KS	TIME SWITCH
LAHH	LEVEL ALARM HIGH HIGH
LALL	LEVEL ALARM LOW LOW
LH	LEVEL HIGH
LL	LEVEL LOW
LS	LEVEL SWITCHES
M	MOTOR
P	PUMP
PDAH	PRESSURE DIFFERENTIAL ALARM HIGH
PDS	PRESSURE DIFFERENTIAL SWITCHES
PE	PRESSURE ELEMENT
PI	PRESSURE INDICATOR
SP	SAMPLE PORT
T	TANKS

INSTRAMENTATION SYMBOLS

- LOCALLY MOUNTED INSTRUMENT
- PANEL MOUNTED INSTRUMENT
- PANEL MOUNTED LIGHT
- FLANGED GLOBE VALVE
- BALL VALVE
- SAMPLE PORT
- CHECK VALVE
- UNION
- FLANGE

REFERENCES
TITLE

NOTE: REFERENCE
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TEL: (916) 679-2000
FAX: (916) 679-2900

MODESTO SUPERFUND SITE
EW-02 INSTALLATION
MODESTO, CALIFORNIA

GROUNDWATER TREATMENT P&ID

JOB NO. 17326524
CONTRACT/TASK ORDER NO. 03AA14C1
SHEET NO. **1-1**

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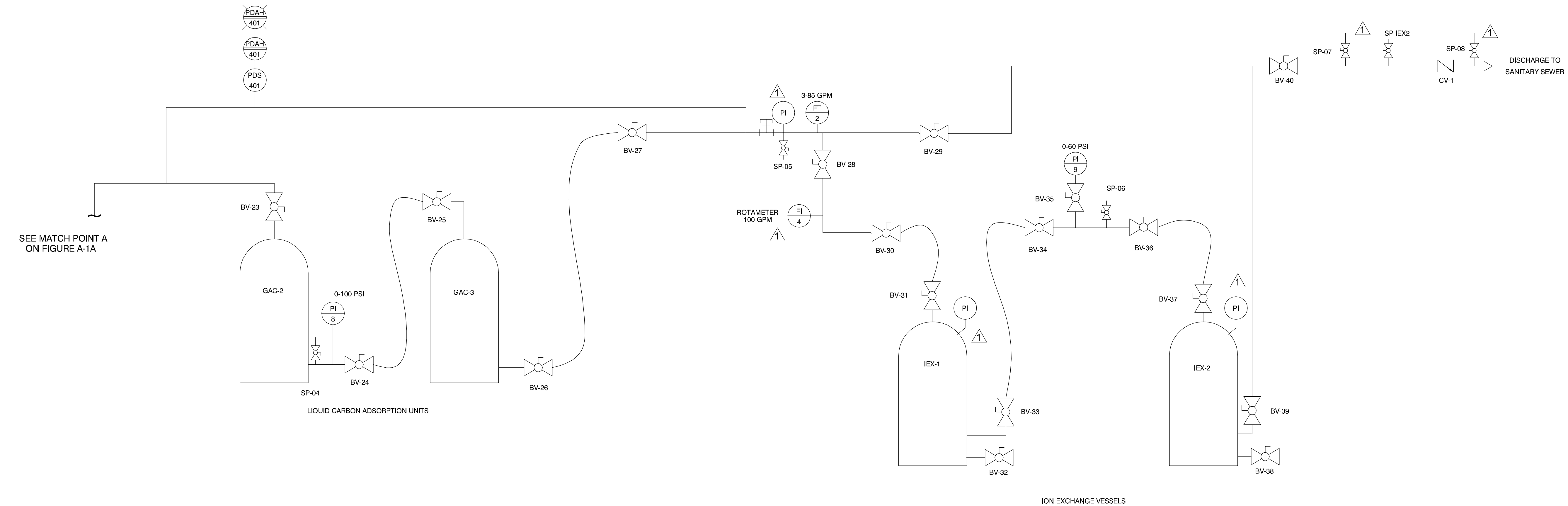

LEGEND:

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BV	BALL VALVE
CV	CHECK VALVE
ET	EQUALIZATION TANK
FI	FLOW INDICATOR
FS	FLOW SWITCH
FT	FLOW TRANSFER
DPAH	DIFFERENTIAL PRESSURE ALARM HIGH
DPI	DIFFERENTIAL PRESSURE INDICATOR
GAC	GRANULAR ACTIVATED CARBON
GV	GLOBE VALVE
HOA	HAND - OFF - AUTO
IAH	ELECTRICAL CURRENT ALARM HIGH
IEX	ION EXCHANGE
IL	ELECTRICAL CURRENT LOW
IS	ELECTRICAL CURRENT SWITCH
KS	TIME SWITCH
LAHH	LEVEL ALARM HIGH HIGH
LH	LEVEL HIGH
LL	LEVEL LOW
LS	LEVEL SWITCHES
M	MOTOR
P	PUMP
PDAH	PRESSURE DIFFERENTIAL ALARM HIGH
PDS	PRESSURE DIFFERENTIAL SWITCHES
PE	PRESSURE ELEMENT
PI	PRESSURE INDICATOR
SP	SAMPLE PORT
T	TANKS

INSTRUMENTATION SYBOLS

- LOCALLY MOUNTED INSTRUMENT
- PANEL MOUNTED INSTRUMENT
- PANEL MOUNTED LIGHT
- BALL VALVE
- SAMPLE PORT
- CHECK VALVE

REFERENCES
TITLE

NOTE: REFERENCE
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MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

GROUNDWATER TREATMENT P&ID

JOB NO.

PROJECT

SHEET NO.
1-2

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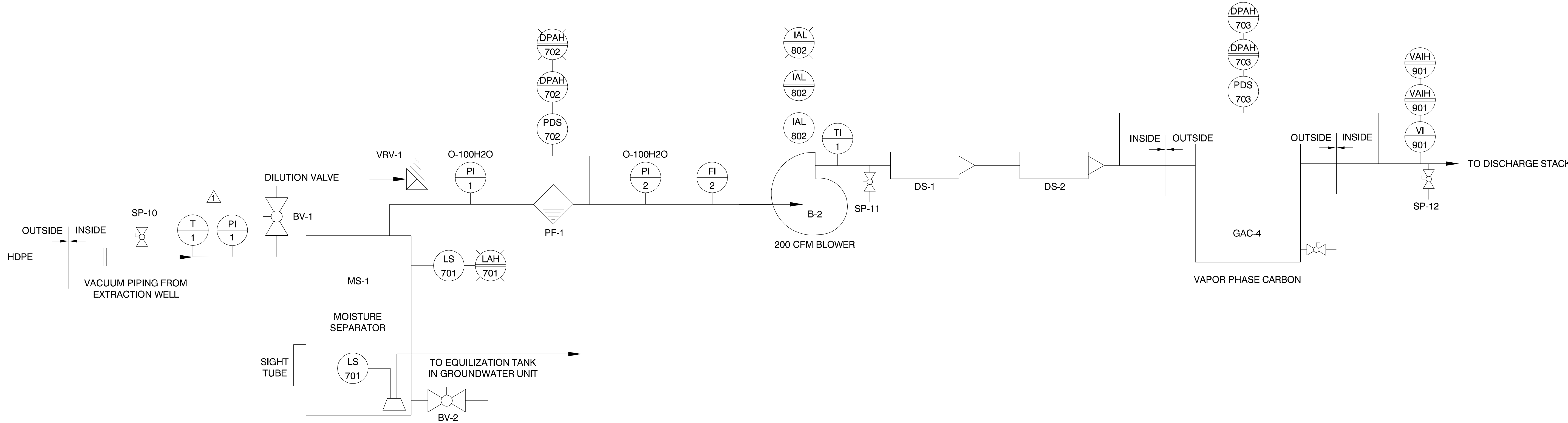

KEY
A ALARM, ACTIVATED
B BALL, BLOWER
C CARBON, CONTROL
D DISCHARGE,
DIFFERENTIAL
F FILTER, FLOW
G GRANULAR
E ELECTRIC
CURRENT,
I INDICATOR
L LEVEL, LIGHTING,
LOW
M MOTOR, MOISTURE
P PANEL,
PARTICULATE,
PORT, POWER,
PRESSURE R RELIEF
S SAMPLING,
SENSOR,
SEPARATOR,
SILENCER, SWITCH
T TEMPERATURE,
TRANSFORMER
V VALVE, VACUUM,
VOLATILE ORGANIC
COMPOUND

REFERENCES
TITLE

NOTE: REFERENCE
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Sacramento, CA 95833-3200
TEL: (916) 679-2000
FAX: (916) 679-2900

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MODESTO, CALIFORNIA

JOB NO.

PROJECT

SOIL VAPOR EXTRACTION P&ID

SHEET NO.
1-3

Appendix B

Laboratory Analytical Data Tables

Table B1	Site Contaminants of Concern
Table B2	Sample Cross Reference
Table B3	Results Summary for Long-Term Monitoring and Soil Vapor Extraction, Fourth Quarter 2012, Modesto Superfund Site
Table B4	Results Summary for the Groundwater Treatment System, Fourth Quarter 2012, Modesto Superfund Site

TABLE B1

SITE CONTAMINANTS OF CONCERN
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Contaminant of Concern	Discharge Limit
Tetrachloroethene (PCE)	0.5 μg/L
Toluene	15 μg/L
Uranium, total	20 pCi/L
pH	5-12

Notes:
μg/L - micrograms per liter
pCi/L - picoCuries per liter

TABLE B2

SAMPLE CROSS REFERENCE
MODESTO GROUNDWATER SUPERFUND SITE
MODESTO, CALIFORNIA

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Analytical Method
10/11/12	MW-111-1001	1210021-01	FD	TO-15
10/11/12	SVE Pre GAC-1001	1210021-02	N	TO-15
10/11/12	SVE Stack-1001	1210021-03	N	TO-15
11/08/12	SVE Pre GAC-1101	1211018-01	N	TO-15
11/08/12	SVE Stack-1101	1211018-02	N	TO-15
11/08/12	SVE Pre GAC-1101DUP	B2K0046-DUP1	DUP	TO-15
12/06/12	SVE Pre GAC-1201	1212016-01	N	TO-15
12/06/12	SVE Stack-1201	1212016-02	N	TO-15
12/06/12	SVE Pre GAC-1201DUP	B2L0036-DUP1	DUP	TO-15
12/10/12	MW-19A-4Q12	1212027-16	N	524.2
12/10/12	MW-19B-4Q12	1212027-17	N	524.2
12/10/12	MW-26B-4Q12	1212028-13	N	524.2
12/11/12	MW-10A-4Q12	1212027-01	N	524.2
12/11/12	MW-11A-4Q12	1212027-04	N	524.2
12/11/12	MW-12A-4Q12	1212027-05	N	524.2
12/11/12	MW-13A-4Q12	1212027-06	N	524.2
12/11/12	MW-14A-4Q12	1212027-07	N	524.2
12/11/12	MW-15A-4Q12	1212027-08	N	524.2
12/11/12	MW-16A-4Q12	1212027-09	N	524.2
12/11/12	MW-16B-4Q12	1212027-10	N	524.2
12/11/12	MW-16C-4Q12	1212027-11	N	524.2
12/11/12	MW-17A-4Q12	1212027-12	N	524.2
12/11/12	MW-17B-4Q12	1212027-13	N	524.2
12/11/12	MW-17C-4Q12	1212027-14	N	524.2
12/11/12	MW-18A-4Q12	1212027-15	N	524.2
12/11/12	MW-1A-4Q12	1212027-18	N	524.2
12/11/12	MW-4A-4Q12	1212027-20	N	524.2
12/11/12	MW-6A-4Q12	1212028-04	N	524.2
12/11/12	MW-7A-4Q12	1212028-05	N	524.2
12/11/12	MW-83A-4Q12	1212028-06	FD	524.2
12/11/12	MW-2A-4Q12	1212028-11	N	524.2
12/11/12	MW-27B-4Q12	1212028-12	N	524.2
12/11/12	MW-16B-4Q12MS	B2L0054-MS1	MS	524.2
12/11/12	MW-16B-4Q12MSD	B2L0054-MSD1	MSD	524.2
12/12/12	MW-10B-4Q12	1212027-02	N	524.2
12/12/12	MW-10C-4Q12	1212027-03	N	524.2
12/12/12	MW-401-4Q12	1212027-19	FB	524.2
12/12/12	MW-4B-4Q12	1212028-01	N	524.2
12/12/12	MW-4C-4Q12	1212028-02	N	524.2
12/12/12	MW-5A-4Q12	1212028-03	N	524.2
12/12/12	MW-8A-4Q12	1212028-07	N	524.2
12/12/12	MW-303-4Q12	1212028-08	TB	524.2
12/12/12	MW-91B-4Q12	1212028-09	FD	524.2
12/12/12	MW-9B-4Q12	1212028-10	N	524.2
12/12/12	MW-23A-4Q12	1212039-02	N	524.2
12/12/12	MW-28B-4Q12	1212039-05	N	524.2
12/12/12	MW-4C-4Q12MS	B2L0057-MS1	MS	524.2

TABLE B2

SAMPLE CROSS REFERENCE
MODESTO GROUNDWATER SUPERFUND SITE
MODESTO, CALIFORNIA

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Analytical Method
12/12/12	MW-4C-4Q12MSD	B2L0057-MSD1	MSD	524.2
12/13/12	MW-22A-4Q12	1212039-01	N	524.2
12/13/12	MW-24B-4Q12	1212039-03	N	524.2
12/13/12	MW-25B-4Q12	1212039-04	N	524.2
12/13/12	MW-29B-4Q12	1212039-06	N	524.2
12/13/12	MW-76B-4Q12	1212039-08	FD	524.2
12/13/12	MW-21A-4Q12	1212039-13	N	524.2
12/13/12	DP-1A-4Q12	1212040-01	N	TO-15
12/13/12	DP-1B-4Q12	1212040-02	N	TO-15
12/13/12	DP-5A-4Q12	1212040-03	N	TO-15
12/13/12	DP-5B-4Q12	1212040-04	N	TO-15
12/13/12	DP-6A-4Q12	1212040-05	N	TO-15
12/13/12	DP-6B-4Q12	1212040-06	N	TO-15
12/13/12	DP-99B-4Q12	1212040-07	FD	TO-15
12/13/12	OSVE-10-4Q12	1212040-08	N	TO-15
12/13/12	OSVE-11-4Q12	1212040-09	N	TO-15
12/13/12	SVE-1-4Q12	1212040-10	N	TO-15
12/13/12	SVE-2-4Q12	1212040-11	N	TO-15
12/13/12	SVE-3-4Q12	1212040-12	N	TO-15
12/13/12	SVE-4-4Q12	1212040-13	N	TO-15
12/13/12	SVE-98-4Q12	1212040-14	FD	TO-15
12/13/12	MW-22A-4Q12MS	B12L003-MS1	MS	524.2
12/13/12	MW-22A-4Q12MSD	B12L003-MSD1	MSD	524.2
12/13/12	SVE-98-4Q12DUP	B12L028-DUP1	DUP	TO-15
12/14/12	MW-3A-4Q12	1212039-07	N	524.2
12/14/12	MW-80A-4Q12	1212039-09	FD	524.2
12/14/12	MW-20A-4Q12	1212039-10	N	524.2
12/14/12	MW-20B-4Q12	1212039-11	N	524.2
12/14/12	MW-20C-4Q12	1212039-12	N	524.2

4Q12	= fourth quarter, 2012
DUP	= laboratory duplicate
EFF	= effluent
EW	= extraction well
FB	= field blank
FD	= field duplicate
GWT	= groundwater treatment
MS	= matrix spike
MSD	= matrix spike duplicate
MW	= monitoring well
NS	= normal sample
SVE	= soil vapor extraction
TB	= trip blank

TABLE B3. RESULTS SUMMARY FOR LONG-TERM MONITORING AND SOIL VAPOR EXTRACTION FOURTH QUARTER 2012, MODESTO GROUNDWATER SUPERFUND SITE

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
0000BLANK	MW-303-4Q12	WQ	E524.2	TB	12/12/2012	No Analytes Detected				
	MW-401-4Q12	WQ	E524.2	FB	12/12/2012	No Analytes Detected				
DP-1A	DP-1A-4Q12	GS	TO15	NS	12/13/2012	No Analytes Detected				
DP-1B	DP-1B-4Q12	GS	TO15	NS	12/13/2012	Tetrachloroethene	32	2.10	ppbv	
	DP-99B-4Q12	GS	TO15	FD	12/13/2012	Tetrachloroethene	34	2.30	ppbv	
DP-5A	DP-5A-4Q12	GS	TO15	NS	12/13/2012	No Analytes Detected				
DP-5B	DP-5B-4Q12	GS	TO15	NS	12/13/2012	Chloroform	3.40	2.30	ppbv	
						Tetrachloroethene	2.70	2.30	ppbv	
DP-6A	DP-6A-4Q12	GS	TO15	NS	12/13/2012	Tetrachloroethene	43	2.30	ppbv	
DP-6B	DP-6B-4Q12	GS	TO15	NS	12/13/2012	No Analytes Detected				
MW-01A	MW-1A-4Q12	WG	E524.2	NS	12/11/2012	2-Butanone (Mek)	2.60	4	µg/L	J
						Tetrachloroethene	1.50	0.500	µg/L	
MW-02A	MW-2A-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	2.20	0.500	µg/L	
						Tetrachloroethene	4.50	0.500	µg/L	
MW-03A	MW-3A-4Q12	WG	E524.2	NS	12/14/2012	Chloroform	1	0.500	µg/L	
						Tetrachloroethene	100	5	µg/L	
MW-04A	MW-4A-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	2	0.500	µg/L	
						Tetrachloroethene	130	10	µg/L	
MW-04B	MW-4B-4Q12	WG	E524.2	NS	12/12/2012	Tetrachloroethene	8.40	0.500	µg/L	
MW-04C	MW-4C-4Q12	WG	E524.2	NS	12/12/2012	Tetrachloroethene	1.10	0.500	µg/L	
MW-05A	MW-5A-4Q12	WG	E524.2	NS	12/12/2012	Chloroform	0.300	0.500	µg/L	J
						Tetrachloroethene	77	5	µg/L	
MW-06A	MW-6A-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	4.80	0.500	µg/L	
						Tetrachloroethene	3.50	0.500	µg/L	
MW-07A	MW-7A-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	1.60	0.500	µg/L	
MW-08A	MW-8A-4Q12	WG	E524.2	NS	12/12/2012	Bromodichloromethane	0.300	0.500	µg/L	J
						Chloroform	5	0.500	µg/L	
						Tetrachloroethene	25	0.500	µg/L	
MW-09B	MW-91B-4Q12	WG	E524.2	FD	12/12/2012	Tetrachloroethene	6.80	0.500	µg/L	

TABLE B3 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
MW-09B continued . . .										
	MW-9B-4Q12	WG	E524.2	NS	12/12/2012	Tetrachloroethene	6.90	0.500	µg/L	
MW-10A	MW-10A-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	4.70	0.500	µg/L	
						Tetrachloroethene	50	5	µg/L	
MW-10B	MW-10B-4Q12	WG	E524.2	NS	12/12/2012	Tetrachloroethene	20	0.500	µg/L	
MW-10C	MW-10C-4Q12	WG	E524.2	NS	12/12/2012	No Analytes Detected				
MW-11A	MW-11A-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	5.30	0.500	µg/L	
						Tetrachloroethene	0.900	0.500	µg/L	
MW-12A	MW-12A-4Q12	WG	E524.2	NS	12/11/2012	Bromodichloromethane	0.500	0.500	µg/L	
						Chloroform	10	0.500	µg/L	
						Tetrachloroethene	14	0.500	µg/L	
						Trichlorofluoromethane	0.400	0.500	µg/L	J
MW-13A	MW-13A-4Q12	WG	E524.2	NS	12/11/2012	Bromodichloromethane	0.300	0.500	µg/L	J
						Chloroform	7.30	0.500	µg/L	
						Tetrachloroethene	2.30	0.500	µg/L	
MW-14A	MW-14A-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	1.30	0.500	µg/L	
						Tetrachloroethene	3.50	0.500	µg/L	
MW-15A	MW-15A-4Q12	WG	E524.2	NS	12/11/2012	1,2-Dichloroethane	0.600	0.500	µg/L	
						2-Butanone (Mek)	2.10	4	µg/L	J
						Chloroform	1.40	0.500	µg/L	
MW-16A	MW-16A-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	1.10	0.500	µg/L	
MW-16B	MW-16B-4Q12	WG	E524.2	NS	12/11/2012	Chloroform	0.900	0.500	µg/L	
						Tetrachloroethene	14	0.500	µg/L	J+
MW-16C	MW-16C-4Q12	WG	E524.2	NS	12/11/2012	Tetrachloroethene	0.400	0.500	µg/L	J
MW-17A	MW-17A-4Q12	WG	E524.2	NS	12/11/2012	Bromodichloromethane	0.400	0.500	µg/L	J
						Chloroform	8	0.500	µg/L	
						Tetrachloroethene	0.800	0.500	µg/L	
MW-17B	MW-17B-4Q12	WG	E524.2	NS	12/11/2012	Acetone	6.40	4	µg/L	J+
						Chloroform	0.400	0.500	µg/L	J
						Tetrachloroethene	47	5	µg/L	

TABLE B3 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
MW-17B continued . . .										
	MW-83A-4Q12	WG	E524.2	FD	12/11/2012	Acetone	21	4	µg/L	
						Chloroform	0.300	0.500	µg/L	
						Tetrachloroethene	52	5	µg/L	
MW-17C	MW-17C-4Q12	WG	E524.2	NS	12/11/2012	No Analytes Detected				
MW-18A	MW-18A-4Q12	WG	E524.2	NS	12/11/2012	Benzene	0.300	0.500	µg/L	J
						Chloroform	3.60	0.500	µg/L	
						Tetrachloroethene	2.10	0.500	µg/L	
MW-19A	MW-19A-4Q12	WG	E524.2	NS	12/10/2012	Benzene	0.300	0.500	µg/L	J
						Chloroform	1.40	0.500	µg/L	
MW-19B1	MW-19B-4Q12	WG	E524.2	NS	12/10/2012	Benzene	0.400	0.500	µg/L	J
						M,P-Xylenes	0.600	1	µg/L	J
MW-20A	MW-20A-4Q12	WG	E524.2	NS	12/14/2012	Chloroform	6.80	0.500	µg/L	
						Dichlorodifluoromethane	3.40	0.500	µg/L	J
						Tetrachloroethene	180	10	µg/L	
	MW-80A-4Q12	WG	E524.2	FD	12/14/2012	Chloroform	6.70	0.500	µg/L	
						Dichlorodifluoromethane	3.60	0.500	µg/L	J
						Tetrachloroethene	160	10	µg/L	
MW-20B	MW-20B-4Q12	WG	E524.2	NS	12/14/2012	Tetrachloroethene	60	5	µg/L	
MW-20C	MW-20C-4Q12	WG	E524.2	NS	12/14/2012	Benzene	0.300	0.500	µg/L	J
MW-21A	MW-21A-4Q12	WG	E524.2	NS	12/13/2012	Chloroform	5	0.500	µg/L	
						Tetrachloroethene	0.900	0.500	µg/L	
MW-22A	MW-22A-4Q12	WG	E524.2	NS	12/13/2012	Bromodichloromethane	0.400	0.500	µg/L	J
						Chloroform	8.90	0.500	µg/L	
MW-23A	MW-23A-4Q12	WG	E524.2	NS	12/12/2012	Chloroform	3.40	0.500	µg/L	
						Tetrachloroethene	31	2.50	µg/L	
MW-24B	MW-24B-4Q12	WG	E524.2	NS	12/13/2012	Tetrachloroethene	85	5	µg/L	
	MW-76B-4Q12	WG	E524.2	FD	12/13/2012	Tetrachloroethene	81	5	µg/L	
MW-25B	MW-25B-4Q12	WG	E524.2	NS	12/13/2012	Tetrachloroethene	80	5	µg/L	
MW-26B	MW-26B-4Q12	WG	E524.2	NS	12/10/2012	1,2,4-Trimethylbenzene	0.500	0.500	µg/L	

TABLE B3 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
MW-26B continued . . .										
						Benzene	5.10	0.500	µg/L	
						Carbon Tetrachloride	0.300	0.500	µg/L	J
						Ethylbenzene	0.900	0.500	µg/L	
						M,P-Xylenes	2.40	1	µg/L	
						O-Xylene	0.600	0.500	µg/L	
						Toluene	0.600	0.500	µg/L	
MW-27B	MW-27B-4Q12	WG	E524.2	NS	12/11/2012	Benzene	0.300	0.500	µg/L	J
MW-28B	MW-28B-4Q12	WG	E524.2	NS	12/12/2012	Tetrachloroethene	52	2.50	µg/L	
MW-29B	MW-29B-4Q12	WG	E524.2	NS	12/13/2012	Tetrachloroethene	65	5	µg/L	
OSVE-10	OSVE-10-4Q12	GS	TO15	NS	12/13/2012	Tetrachloroethene	5.30	2.40	ppbv	
OSVE-11	OSVE-11-4Q12	GS	TO15	NS	12/13/2012	Tetrachloroethene	19	2.30	ppbv	
SP-11	MW-111-1001	GS	TO15	FD	10/11/2012	1,2-Dichlorobenzene	12	2.40	ppbv	
						1,4-Dichlorobenzene	2	2.40	ppbv	J
						Chloroform	12	2.40	ppbv	
						Cis-1,2-Dichloroethene	3	2.40	ppbv	
						Tetrachloroethene	420	30	ppbv	
						Trichloroethylene	19	2.40	ppbv	
	SVE Pre GAC-1001	GS	TO15	NS	10/11/2012	1,2-Dichlorobenzene	11	2.30	ppbv	
						1,4-Dichlorobenzene	1.90	2.30	ppbv	J
						Chloroform	12	2.30	ppbv	
						Cis-1,2-Dichloroethene	2.90	2.30	ppbv	
						Tetrachloroethene	420	37	ppbv	
						Trichloroethylene	18	2.30	ppbv	
	SVE Pre GAC-1101				11/8/2012	Chloroform	8.50	2.40	ppbv	
						Tetrachloroethene	150	24	ppbv	
	SVE Pre GAC-1201				12/6/2012	Chloroform	12	2.50	ppbv	
						Tetrachloroethene	130	25	ppbv	
SP-12	SVE Stack-1001	GS	TO15	NS	10/11/2012	1,2-Dichlorobenzene	1.60	2.50	ppbv	J
						Chloroform	23	2.50	ppbv	

TABLE B3 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
SP-12 continued . . .										
						Cis-1,2-Dichloroethene	1.80	2.50	ppbv	J
						M,P-Xylenes	2.70	4.90	ppbv	J
						Toluene	2.20	2.50	ppbv	J
						Trichlorofluoromethane	1.30	2.50	ppbv	J
	SVE Stack-1101				11/8/2012	1,2,4-Trimethylbenzene	1.20	2.20	ppbv	J
						1,2-Dichlorobenzene	4	2.20	ppbv	
						1,3,5-Trimethylbenzene	2.70	2.20	ppbv	
						1,4-Dichlorobenzene	1.60	2.20	ppbv	J
						Chloroform	26	2.20	ppbv	
						Cis-1,2-Dichloroethene	1.80	2.20	ppbv	J
						Tetrachloroethene	1.90	2.20	ppbv	J
						Trichloroethylene	5.80	2.20	ppbv	
	SVE Stack-1201				12/6/2012	Chloroform	19	2.60	ppbv	
						Cis-1,2-Dichloroethene	3.10	2.60	ppbv	
						Tetrachloroethene	1.30	2.60	ppbv	J
SVE-01	SVE-1-4Q12	GS	TO15	NS	12/13/2012	Tetrachloroethene	9.60	2.30	ppbv	
SVE-02	SVE-2-4Q12	GS	TO15	NS	12/13/2012	Cis-1,2-Dichloroethene	1.40	2.20	ppbv	J
						Tetrachloroethene	180	22	ppbv	
	SVE-98-4Q12	GS	TO15	FD	12/13/2012	Cis-1,2-Dichloroethene	1.60	2.30	ppbv	J
						Tetrachloroethene	190	23	ppbv	
SVE-03	SVE-3-4Q12	GS	TO15	NS	12/13/2012	Tetrachloroethene	130	24	ppbv	
SVE-04	SVE-4-4Q12	GS	TO15	NS	12/13/2012	Chloroform	23	2.40	ppbv	
						Tetrachloroethene	23	2.40	ppbv	

Matrix
GS = soil gas
WG = groundwater
WQ = water quality

TABLE B3 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result

Sample Type
FD = Field Duplicate
FB = Field Blank
NS = Normal Sample
TB = Trip Blank

Units
ppbv = parts per billion volume
µg/L = micrograms/Liter

Qualified Results
J = Analyte concentration considered an estimated value because one or more quality control specifications were not met.
J+ = Analyte concentration considered an estimated value because one or more quality control specifications were not met, potential high bias.

TABLE B4. RESULTS SUMMARY FOR THE GROUNDWATER TREATMENT SYSTEM FOURTH QUARTER 2012, MODESTO GROUNDWATER SUPERFUND SITE

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
0000BLANK	MW-301-4Q12	WQ	E524.2	TB1	10/11/2012	Toluene	0.160	0.500	µg/L	J
	MW-302-4Q12				11/8/2012	Chloroform	0.0500	0.500	µg/L	U
						Toluene	0.240	0.500	µg/L	J
	MW-304-4Q12				12/6/2012	Hexachlorobutadiene	0.0300	0.500	µg/L	J
						Toluene	0.180	0.500	µg/L	J
SP-01	GWTS-INF-1001	WG	D5174	NS1	10/11/2012	Uranium	49.8	1	pCi/L	
	GWTS-INF-1001	WG	E524.2	NS1	10/11/2012	1,1,1,2-Tetrachloroethane	0.230	0.500	µg/L	J
						Bromodichloromethane	0.110	0.500	µg/L	J
						Chlorobenzene	0.0600	0.500	µg/L	J
						Chloroform	3.60	0.500	µg/L	
						Chloromethane	0.0300	0.500	µg/L	J
						Cis-1,2-Dichloroethene	0.520	0.500	µg/L	
						Dichlorodifluoromethane	0.0600	0.500	µg/L	J
						Tetrachloroethene	840	25	µg/L	
						Toluene	0.230	0.500	µg/L	U
						Trichloroethylene	0.710	0.500	µg/L	
	GWTS-INF-1101				11/8/2012	1,1,1,2-Tetrachloroethane	0.260	0.500	µg/L	J
						Bromodichloromethane	0.130	0.500	µg/L	J
						Chlorobenzene	0.0600	0.500	µg/L	J
						Chloroform	4.10	0.500	µg/L	
						Cis-1,2-Dichloroethene	0.480	0.500	µg/L	J
						Dichlorodifluoromethane	0.0700	0.500	µg/L	J
						Tetrachloroethene	860	25	µg/L	
						Toluene	0.510	0.500	µg/L	U
						Trichloroethylene	0.700	0.500	µg/L	
	GWTS-INF-1201				12/6/2012	1,1,1,2-Tetrachloroethane	0.180	0.500	µg/L	J
						Bromodichloromethane	0.150	0.500	µg/L	J
						Chlorobenzene	0.0500	0.500	µg/L	J
						Chloroform	4.40	0.500	µg/L	

TABLE B4 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
SP-01 continued . . .										
						Chloromethane	0.0800	0.500	µg/L	J
						Cis-1,2-Dichloroethene	0.400	0.500	µg/L	J
						Dichlorodifluoromethane	0.0800	0.500	µg/L	J
						Tetrachloroethene	690	25	µg/L	
						Toluene	0.0600	0.500	µg/L	U
						Trichloroethylene	0.610	0.500	µg/L	
SP-03	CRB INF-1001	WG	E524.2	NS1	10/11/2012	Chloroform	0.260	0.500	µg/L	J
						Tetrachloroethene	23	0.500	µg/L	
						Toluene	0.360	0.500	µg/L	U
	CRB INF-1101				11/8/2012	Chloroform	0.150	0.500	µg/L	U
						Tetrachloroethene	5.40	0.500	µg/L	
						Toluene	0.570	0.500	µg/L	U
	CRB INF-1201				12/6/2012	Bromoform	0.0800	0.500	µg/L	U
						Chloroform	0.150	0.500	µg/L	J
						Chloromethane	0.0600	0.500	µg/L	J
						Tetrachloroethene	4.60	0.500	µg/L	
						Toluene	0.120	0.500	µg/L	U
SP-04	CRB Mid-1001	WG	E524.2	NS1	10/11/2012	Chloroform	0.260	0.500	µg/L	J
						Tetrachloroethene	3.70	0.500	µg/L	
						Toluene	0.180	0.500	µg/L	U
	CRB Mid-1101				11/8/2012	Chloroform	0.150	0.500	µg/L	U
						Tetrachloroethene	1.40	0.500	µg/L	
	CRB Mid-1201				12/6/2012	Bromoform	0.0700	0.500	µg/L	U
						Chloroform	0.150	0.500	µg/L	J
						Chloromethane	0.0500	0.500	µg/L	J
						Tetrachloroethene	1.80	0.500	µg/L	
						Toluene	0.0600	0.500	µg/L	U
	MW-104-1001	WG	E524.2	FD1	10/11/2012	Chloroform	0.230	0.500	µg/L	J
						Chloromethane	0.0300	0.500	µg/L	J

TABLE B4 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
SP-04 continued . . .										
						Tetrachloroethene	3.20	0.500	µg/L	
						Toluene	0.120	0.500	µg/L	U
SP-05	CRB EFF-1001	WG	E524.2	NS1	10/11/2012	Chloroform	0.230	0.500	µg/L	J
						Tetrachloroethene	0.330	0.500	µg/L	J
	MW-105-1001	WG	D5174	FD1	10/11/2012	Uranium	49	1	pCi/L	
	Pre IEX-1001	WG	D5174	NS1	10/11/2012	Uranium	48.6	1	pCi/L	
	Pre IEX-1101				11/8/2012	Uranium	49	1	pCi/L	
	Pre IEX-1201				12/6/2012	Uranium	55	1	pCi/L	
SP-06	IEX Mid-1001	WG	D5174	NS1	10/11/2012	Uranium	11.5	1	pCi/L	
	IEX Mid-1101				11/8/2012	Uranium	10	1	pCi/L	
	IEX Mid-1201				12/6/2012	Uranium	12.2	1	pCi/L	
SP-07	EFF-1001	WG	D5174	NS1	10/11/2012	Uranium	10.7	1	pCi/L	
	EFF-1001	WG	E524.2	NS1	10/11/2012	Chloroform	0.250	0.500	µg/L	J
						Tetrachloroethene	0.340	0.500	µg/L	J
						Toluene	0.230	0.500	µg/L	U
	EFF-1001	WG	SM2540C	NS1	10/11/2012	Total Dissolved Solids	621	10	mg/L	
	EFF-1001	WG	SM2540D	NS1	10/11/2012	No Analytes Detected				
	EFF-1001	WG	SM5210B	NS1	10/11/2012	No Analytes Detected				
	EFF-1101	WG	E524.2	NS1	11/8/2012	Chloroform	0.170	0.500	µg/L	U
						Tetrachloroethene	0.280	0.500	µg/L	J
						Toluene	0.230	0.500	µg/L	U
	EFF-1101	WG	SM2540C	NS1	11/8/2012	Total Dissolved Solids	613	10	mg/L	
	EFF-1101	WG	SM2540D	NS1	11/8/2012	No Analytes Detected				
	EFF-1101	WG	SM5210B	NS1	11/8/2012	No Analytes Detected				
	EFF-1101	WG	TITLE22	NS1	11/8/2012	96 Hour Fish Survival	750		mg/L	
	EFF-1201	WG	E524.2	NS1	12/6/2012	Chloroform	0.190	0.500	µg/L	J
						Chloromethane	0.0500	0.500	µg/L	J
						Tetrachloroethene	0.560	0.500	µg/L	
						Toluene	0.140	0.500	µg/L	U

TABLE B4 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
SP-07 continued . . .										
	EFF-1201	WG	SM2540C	NS1	12/6/2012	Total Dissolved Solids	590	10	mg/L	
	EFF-1201	WG	SM2540D	NS1	12/6/2012	No Analytes Detected				
	EFF-1201	WG	SM5210B	NS1	12/6/2012	No Analytes Detected				
	MW-107-1201	WG	SM2540C	FD1	12/6/2012	Total Dissolved Solids	600	10	mg/L	
	MW-107-1201	WG	SM2540D	FD1	12/6/2012	No Analytes Detected				
	MW-107-1201	WG	SM5210B	FD1	12/6/2012	No Analytes Detected				
SP-08	GWTS Pr GAC-1001	GS	TO15	NS1	10/11/2012	Chloroform	9.80	4.80	PPBV	
						M,P-Xylenes	1.10	4.80	PPBV	J
						Tetrachloroethene	1700	4.80	PPBV	
						Toluene	0.830	4.80	PPBV	J
	GWTS Pr GAC-1101				11/8/2012	1,2-Dichlorobenzene	1.90	6.80	PPBV	U
						Chloroform	10	6.80	PPBV	
						Tetrachloroethene	1600	6.80	PPBV	
	GWTS Pr GAC-1201				12/6/2012	1,4-Dichlorobenzene	0.400	4.90	PPBV	U
						Chloroform	13	4.90	PPBV	
						Tetrachloroethene	1600	4.90	PPBV	
						Trichloroethylene	4.40	4.90	PPBV	J
	MW-108-1101	GS	TO15	FD1	11/8/2012	Chloroform	9.10	6.80	PPBV	
						Tetrachloroethene	1600	6.80	PPBV	
SP-09	GWTS Stack-1001	GS	TO15	NS1	10/11/2012	1,2,4-Trimethylbenzene	0.440	1.20	PPBV	J
						1,2-Dichlorobenzene	0.640	1.20	PPBV	U
						1,3,5-Trimethylbenzene	0.400	1.20	PPBV	J
						1,4-Dichlorobenzene	0.230	1.20	PPBV	U
						Benzene	1.60	1.20	PPBV	
						Chloroform	8	1.20	PPBV	
						Cis-1,2-Dichloroethene	0.600	1.20	PPBV	J
						Dichlorodifluoromethane	0.660	1.20	PPBV	J
						Tetrachloroethene	160	1.20	PPBV	
						Toluene	0.190	1.20	PPBV	J

TABLE B4 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result
SP-09 continued . . .										
						Trichloroethylene	1.90	1.20	PPBV	
						Trichlorofluoromethane	0.260	1.20	PPBV	J
	GWTS Stack-1101				11/8/2012	1,2-Dichlorobenzene	0.240	1.10	PPBV	U
						Benzene	1.40	1.10	PPBV	
						Chloroform	8.50	1.10	PPBV	
						Cis-1,2-Dichloroethene	0.540	1.10	PPBV	J
						Dichlorodifluoromethane	0.530	1.10	PPBV	J
						Tetrachloroethene	200	1.10	PPBV	
						Toluene	0.0980	1.10	PPBV	U
						Trichlorofluoromethane	0.230	1.10	PPBV	J
	GWTS Stack-1201				12/6/2012	1,2-Dichlorobenzene	1.90	2.40	PPBV	U
						1,4-Dichlorobenzene	0.460	2.40	PPBV	U
						Benzene	1.40	2.40	PPBV	J
						Chloroform	12	2.40	PPBV	
						Cis-1,2-Dichloroethene	1.60	2.40	PPBV	J
						Dichlorodifluoromethane	0.690	2.40	PPBV	J
						Tetrachloroethene	600	2.40	PPBV	
						Trichloroethylene	6.30	2.40	PPBV	
SP-10	IEXEFF-1001	WG	D5174	NS1	10/11/2012	No Analytes Detected				
	IEXEFF-1101				11/8/2012	No Analytes Detected				
	IEXEFF-1201				12/6/2012	No Analytes Detected				

<u>Matrix</u>
GS = soil gas
WG = groundwater
WQ = water quality

TABLE B4 (Continued)

Location	Field Sample Identification	Matrix	Method	Sample Type	Date Sampled	Analyte	Result	Reporting Limit	Units	Qualified Result

<u>Sample Type</u>

FD = Field Duplicate
N = Normal Sample
TB = Trip Blank

<u>Units</u>

mg/L = milligrams/Liter
ppbv = parts per billion volume
pci/L = picoCuries/Liter
µg/L = micrograms/Liter

<u>Qualified Results</u>

J = Analyte concentration considered an estimated value because one or more quality control specifications were not met.
U = Analyte considered not detected due to external contamination.

Appendix C

Laboratory Data Validation Reports

- **Laboratory Data Consultants, Inc.**
- **URS Group, Inc.**

Laboratory Data Consultants, Inc.

Laboratory Data Consultants, Inc.
7750 El Camino Real, Ste. 2L Carlsbad, CA 92009
Phone 760.634.0437 **Web** www.lab-data.com **Fax** 760.634.0439

URS Corporation
2870 Gateway Oaks Drive, Suite 300
Sacramento, CA 95833
ATTN: Ms. Debbie Casagrande

January 21, 2013

SUBJECT: Modesto Superfund Site Quality Control Summary Report (QCSR) for Quarterly and Monthly Sampling Events, Staged Electronic Data Deliverables (SEDD) and Automated Data Review (ADR) deliverables – 4th Quarter 2012

Dear Ms. Casagrande,

Enclosed are the Quality Control Summary Report (QCSR), validation worksheets, Staged Electronic Data Deliverables (SEDD) and Automated Data Review (ADR) electronic deliverables for the seven EPA Region 9 Laboratory's sample delivery groups (SDG) listed below. The SDGs are associated with the sampling period of October 11 to December 14, 2012. Not all of the analytical methods may have been required in each of the laboratory SDGs.

LDC Project #: 28701, 28807, 28966, 28999, 29059	
SDG #	**Analytical Methods**
12286B 12314A 12342C 12349A 12349B 12353A 12353B	EPA Method 524.2 (EPA Region 9 SOP 354, revison 9) EPA Method TO-15 (EPA Region 9 SOP 311, revison 1)

The data validation was performed in accordance with the criteria specified in the EPA Region 9 Standard Operating Procedures (SOP), as well as the National Functional Guidelines for Superfund Organics Methods Data Review (2008). Where specific guidance was not available, the data have been evaluated in a conservative manner consistent with industry standards using professional experience.

The following QCSR deliverables and supporting documents are contained in this report:

- Sample ID Cross Reference and Data Review Level
- Primary and Field QC Samples by Method
- Detected Target Analytes
- Overall Qualified Results Summary
- Completeness Reports
- Reasons for Qualified Results
- Data Qualification Summary Reports
- Manual Data Validation Review Worksheets and ADR reports

If you have any questions, please feel free to contact us at (760) 634-0437.

Sincerely,

ERauto fa

Andrew Kong
Senior Chemist/Project Manager

Laboratory Data Consultants, Inc.
Quality Control Summary Report (QCSR)
Modesto Superfund Site
Quarterly and Monthly Sampling Events
Analytical Data for Samples Collected by URS
During the Period of
October 11 to December 14, 2012

Prepared for:

URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive
Suite 300
Sacramento, CA 95833

Prepared by:

Laboratory Data Consultants, Inc. (LDC)
7750 El Camino Real, Suite 2L
Carlsbad, CA 92009

Reported: January 21, 2013

Andrew Kong, Senior Chemist/Project Manager
Laboratory Data Consultants, Inc.

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APPENDICES

Appendix A DATA QUALIFICATION SUMMARY REPORTS
Appendix B MANUAL VALIDATION LEVEL III & IV WORKSHEETS AND ADR REPORTS

LIST OF ACRONYMS

ADR	**Automated Data Review**
CA	**California**
DU	**Sample Duplicate**
EPA	**US Environmental Protection Agency**
GW	**Groundwater**
GWMP	**Groundwater Monitoring Program**
LCS	**Laboratory Control Sample**
LDC	**Laboratory Data Consultants, Inc.**
MDL	**Method Detection Limit**
MS	**Matrix Spike**
MSD	**Matrix Spike Duplicate**
NFG	**National Functional Guidelines**
RL	**Reporting Limit**
ND	**Non-detected**
PCE	**Tetrachloroethene**
QCSR	**Quality Control Summary Report**
RL	**Reporting Limit**
RPD	**Relative Percent Difference**
SAP	**Sampling and Analysis Plan**
SDG	**Sample Delivery Group**
SEDD	**Staged Electronic Data Deliverables**
SM	**Standard Methods**
SOP	**Standard Operating Procedure**
SVE	**Soil Vapor Extraction**
URS	**URS Corporation**
VOCs	**Volatile Organic Compounds**

EXECUTIVE SUMMARY

This Quality Control Summary Report (QCSR) has been prepared by Laboratory Data Consultants, Inc. (LDC) for URS Corporation (URS) for the Modesto Superfund Site in Modesto, California (CA). The purpose of this report is to provide the data user with an independent evaluation of the results generated by the laboratory. The data reviewed in this report were analyzed by U.S. Environmental Protection Agency (EPA) Region 9 Laboratory located in Richmond, CA. The Region 9 laboratory is certified in the State of California by the Department of Health Services. URS Corporation located in Sacramento, CA, collected the samples analyzed for this report.

The data validation was performed in accordance with the EPA Region 9 Laboratory's internal control limits specified in the EPA Region 9 Laboratory's Standard Operating Procedures (SOPs), "Sampling and Analysis Plan, Modesto Groundwater Superfund Site, Modesto, California" (SAP), (June 2010, U.S. Army Corps of Engineers, Sacramento District, and URS), and the "National Functional Guidelines (NFG) for Superfund Organic Methods Data Review" (USEPA 2008).

Sixty one field samples, seven field duplicates, and three field Quality Control (QC) samples were reported in nine EPA Region 9 Laboratory's sample delivery groups (SDGs) for the R13S04 and R13S12 October-December 2012 Quarterly Groundwater Monitoring and Soil Vapor Extraction (SVE) sampling efforts.

The laboratory provided electronic data in Staged Electronic Data Deliverables (SEDD) files. The SEDD deliverable was processed through the Automated Data Review (ADR) program in order to produce SEDD and ADR deliverable formats, as requested by URS. Any resulting data validation qualifiers from ADR have been appended to the SEDD and ADR files.

Data review was based primarily on the EPA Region 9 Laboratory's internal control limits specified in the EPA Region 9 Laboratory's SOPs and the "Modesto Groundwater Superfund Site SAP" (June 2010) as well as the NFG for Superfund Organics Methods Data Review (USEPA 2008), using biased qualifiers. In the case where no QC acceptance criteria were specified for this analysis, data were evaluated against the appropriate method references and Standard Methods. Where additional guidance was needed, data were evaluated against QC and data validation criteria provided in the NFG for Superfund Organics Methods Data Review (USEPA 2008), using biased qualifiers. Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

For this review, approximately ten percent of project data were subjected to USEPA Level IV equivalent validation with raw data recalculations, and the remaining 90 percent were subjected to USEPA Level III equivalent validation. All sample results from the sampling period were subjected to automated and manual review through an evaluation of QC results, sample holding times, cooler temperatures, sample preservation, initial and continuing calibration, surrogate recoveries, matrix spikes/matrix spike duplicates, laboratory duplicates, laboratory control samples, method blanks, and reporting limits. Level IV equivalent validation was designated to the following: SDG 12314A (one sample for Volatile Organic Compounds (VOCs) by EPA Method TO-15), SDG 12349B (three samples for VOCs by EPA Method 524.2), SDG 12353A (four samples for VOCs by EPA Method 524.2), and SDG 12353B (one sample for VOCs by EPA Method TO-15). There were no significant findings in the Level IV equivalent validation. However, some sample data were qualified based upon the review of the instrument calibration data.

The following items were evaluated by automated review:

- Holding Times
- Cooler Temperatures
- Blanks
- Surrogates
- Matrix Spike/Matrix Spike Duplicates (MS/MSD) or Sample Duplicates (DUP)
- Laboratory Control Samples (LCS)
- Reporting Limits (RL)
- Field QC Samples

The evaluation of the associated initial and continuing instrument calibrations, internal standards, sample preservation, and Level IV recalculations and data verifications from the raw data packages were performed by manual review.

The ADR was performed using bias indicators and reason codes for data qualification, where applicable. Appendix A contains a summary of data qualifications and the reasons for qualified results. The results of the ADR are included in Appendix B of this report, along with manual validation worksheets.

Data Qualifier Definitions

Through the data review process, the data were assigned validation qualifiers. The qualifiers assigned by LDC are based on a technical assessment of the data and represent outliers from each of the data review components (blank contamination, holding time, etc.). The following are definitions of the data qualifiers that may appear in this report:

Data Qualifier	Definition
U	Indicates the compound or analyte was analyzed for, but not detected at or above the reported sample quantitation limit. The result is considered non-detected (ND) at the reported value. This qualifier is added before any additional qualifiers for all ND results.
UJ	Indicates the compound or analyte was analyzed for, but not detected. The sample detection limit is an estimated value due to QC failure or data limitations.
J	Indicates the compound or analyte is positively identified, but the reported concentration is an estimate due to QC failure or data limitations.
J+	Indicates the compound or analyte is positively identified, but the reported concentration is an estimate due to QC failure or data limitations. A high quantitative bias exists in the data.
J-	Indicates the compound or analyte is positively identified, but the reported concentration is an estimate due to QC failure or data limitations. A low quantitative bias exists in the data.
R	Quality control indicates the data is not usable. The presence or absence of the compound or analyte cannot be verified or the reported result is compromised as to be unusable.

Data qualified with the "R" qualifier are considered unusable or rejected. Data qualified with the "J" qualifier are considered as estimated. The data user must determine the appropriate use of estimated data.

The data quality assessment is summarized by reporting analytical completeness. The following equations were used to calculate completeness.

%Analytical Completeness = (Number of unqualified results/Number of reported results) X 100

The analytical completeness, which included all QC parameters, attained for the field samples in the sampling effort is presented in Table 5.

%Contract Compliance Completeness = (Number of contract compliant results/Number of reported results) X 100

The contract compliance completeness, which included all QC parameters, attained for the field samples in the sampling effort is presented in Table 6.

%Technical Completeness = (Number of results not rejected/Number of reported results) X 100

The technical completeness, which included all QC parameters, attained for the field samples in the sampling effort is presented in Table 7.

Based on review of the analytical data and associated QC results, the sample data were assessed to be valid with minor qualifications. A summary of the overall quality of data is as follows:

2.0 Quarterly and Monthly Sampling Events

Based on review of the analytical data and associated QC results, the overall analytical completeness (number of unqualified results divided by the number of reported results) for the sampling effort was 98.5%.

- VOCs by EPA Method 524.2 had analytical completeness of 98.9%,

- VOCs by EPA Method TO-15 had analytical completeness of 96.9%,

If data qualifiers due to trace values were excluded from this calculation, the analytical completeness would be 99.5% for VOCs by EPA Method 524.2 and 98.7% for VOCs by EPA Method TO-15.

The overall contract compliance completeness (number of contract compliant results divided by the number of reported results) for the sampling effort was 98.6%.

- VOCs by EPA Method 524.2 had analytical completeness of 99.1%,

- VOCs by EPA Method TO-15 had analytical completeness of 96.9%,

If data qualifiers due to trace values were excluded from this calculation, the analytical completeness would be 99.6% for VOCs by EPA Method 524.2 and 98.7% for VOCs by EPA Method TO-15.

The overall technical completeness (number of non-rejected results divided by the number of reported results) for the sampling effort was 100.0%.

- VOCs by EPA Method 524.2 had analytical completeness of 100.0%,

- VOCs by EPA Method TO-15 had analytical completeness of 100.0%

The analytical, contract compliance and technical completeness reports are in Tables 5, 6, and 7, respectively.

Appendix A presents a detailed description of the qualified sample results by analytical method.

The overall quality of data by analytical method is summarized below:

Volatile Organic Compounds by EPA 524.2 (EPA Region 9 SOP 354, revision 9)

The analytical completeness for VOCs by EPA 524.2 was 98.9%.

Eighteen of the 2898 sample results were qualified as estimated due to trace values reported between the method detection limit (MDL) and the RL. Two results were qualified as estimated due to initial calibration non-conformances and eight results were qualified as estimated due to continuing calibration non-conformances. Two results in sample MW-17B-4Q12 were qualified as estimated due to high surrogate recoveries above the control limit. The methyl-tert-butyl ether and tetrachloroethene results in sample MW-16B-4Q12 were qualified as estimated due to matrix spike/matrix spike duplicate recoveries and RPD above the control limit. Table 8 lists specific samples and reasons for all qualified results with the exception of results that are not assessed by ADR (internal standards, professional judgment, etc.).

MS/MSD analyses were performed on samples MW-16B-4Q12 (SDG 12349A), MW-4C-4Q12 (SDG 12349B), and MW-22A-4Q12 (SDG 12353A). All acceptance criteria were met with the exceptions noted above.

One trip blank sample and one field blank sample was collected and analyzed for VOCs. No contaminants were detected in the trip blank or field blank.

Sample MW-83A-4Q12 was identified as a field duplicate of sample MW-17B-4Q12 (SDG 12349A), sample MW-91B-4Q12 was identified as a field duplicate of sample MW-9B-4Q12 (SDG 12349B), sample MW-80A-4Q12 was identified as a field duplicate of sample MW-20A-4Q12 (SDG 12353A), and sample MW-76B-4Q12 was identified as a field duplicate of sample MW-24B-4Q12 (SDG 12353A). No data were qualified based upon the field duplicate result. The RPDs between the results were within the criteria in Table 2-10 of the SAP.

Volatile Organic Compounds by EPA TO-15 (EPA Region 9 SOP 311, revision 2)

The analytical completeness for VOCs by EPA TO-15 was 96.9%.

Fourteen of the 784 sample results were qualified as estimated due to trace values reported between the MDL and the RL. Six results were qualified as estimated due to initial calibration non-conformances, two results were qualified as estimated due to initial calibration verification non-conformances, and four results were qualified as estimated due to continuing calibration non-conformances. Table 8 lists specific samples and reasons for all qualified results with the exception of results that are not assessed by ADR (internal standards, professional judgment, etc.).

DUP analyses were performed on samples SVE Pre GAC-1101 (SDG 12314A), SVE Pre GAC-1201 (SDG 12342C), and SVE-98-4Q12 (SDG 12353B). All acceptance criteria were met.

Sample MW-111-1001 was identified as a field duplicate of sample SVE Pre GAC-1001 (SDG 12286B), sample DP-99B-4Q12 was identified as a field duplicate of sample DP-1B-4Q12 (SDG 12353B), and sample SVE-98-4Q12 was identified as a field duplicate of sample SVE-2-4Q12

(SDG 12353B). No data were qualified based upon the field duplicate result. The RPDs between the results were within the criteria in Table 2-10 of the SAP.

Table 1

Sample ID Cross Reference

Table 1: Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
11-Oct-2012	MW-111-1001	1210021-01	FD	None	TO-15	III
11-Oct-2012	SVE Stack-1001	1210021-03	N	None	TO-15	III
11-Oct-2012	SVE Pre GAC-1001	1210021-02	N	None	TO-15	III
08-Nov-2012	SVE Stack-1101	1211018-02	N	None	TO-15	III
08-Nov-2012	SVE Pre GAC-1101	1211018-01	N	None	TO-15	IV
08-Nov-2012	SVE Pre GAC-1101DUP	B2K0046-DUP1	DUP	None	TO-15	III
06-Dec-2012	SVE Stack-1201	1212016-02	N	None	TO-15	III
06-Dec-2012	SVE Pre GAC-1201	1212016-01	N	None	TO-15	III
06-Dec-2012	SVE Pre GAC-1201DUP	B2L0036-DUP1	DUP	None	TO-15	III
10-Dec-2012	MW-19A-4Q12	1212027-16	N	5030B	524.2	III
10-Dec-2012	MW-19B-4Q12	1212027-17	N	5030B	524.2	III
10-Dec-2012	MW-26B-4Q12	1212028-13	N	5030B	524.2	III
11-Dec-2012	MW-27B-4Q12	1212028-12	N	5030B	524.2	III
11-Dec-2012	MW-12A-4Q12	1212027-05	N	5030B	524.2	III
11-Dec-2012	MW-15A-4Q12	1212027-08	N	5030B	524.2	III
11-Dec-2012	MW-16A-4Q12	1212027-09	N	5030B	524.2	III
11-Dec-2012	MW-7A-4Q12	1212028-05	N	5030B	524.2	III
11-Dec-2012	MW-16B-4Q12	1212027-10	N	5030B	524.2	III
11-Dec-2012	MW-16B-4Q12MS	B2L0054-MS1	MS	5030B	524.2	III
11-Dec-2012	MW-16B-4Q12MSD	B2L0054-MSD1	MSD	5030B	524.2	III
11-Dec-2012	MW-2A-4Q12	1212028-11	N	5030B	524.2	III
11-Dec-2012	MW-16C-4Q12	1212027-11	N	5030B	524.2	III
11-Dec-2012	MW-1A-4Q12	1212027-18	N	5030B	524.2	III
11-Dec-2012	MW-11A-4Q12	1212027-04	N	5030B	524.2	III
11-Dec-2012	MW-17B-4Q12	1212027-13	N	5030B	524.2	III
11-Dec-2012	MW-83A-4Q12	1212028-06	FD	5030B	524.2	III

III = EPA Level 3 Data Review   N = Normal Sample   TB = Trip Blank   MS = Matrix Spike
IV = EPA Level 4 Data Validation   FD = Field Duplicate   FB = Field Blank   MSD = Matrix Spike Duplicate

Table 1: Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
11-Dec-2012	MW-14A-4Q12	1212027-07	N	5030B	524.2	III
11-Dec-2012	MW-13A-4Q12	1212027-06	N	5030B	524.2	III
11-Dec-2012	MW-17A-4Q12	1212027-12	N	5030B	524.2	III
11-Dec-2012	MW-10A-4Q12	1212027-01	N	5030B	524.2	III
11-Dec-2012	MW-17C-4Q12	1212027-14	N	5030B	524.2	III
11-Dec-2012	MW-6A-4Q12	1212028-04	N	5030B	524.2	IV
11-Dec-2012	MW-4A-4Q12	1212027-20	N	5030B	524.2	III
11-Dec-2012	MW-18A-4Q12	1212027-15	N	5030B	524.2	III
12-Dec-2012	MW-8A-4Q12	1212028-07	N	5030B	524.2	IV
12-Dec-2012	MW-303-4Q12	1212028-08	TB	5030B	524.2	III
12-Dec-2012	MW-9B-4Q12	1212028-10	N	5030B	524.2	III
12-Dec-2012	MW-4C-4Q12	1212028-02	N	5030B	524.2	IV
12-Dec-2012	MW-4C-4Q12MS	B2L0057-MS1	MS	5030B	524.2	IV
12-Dec-2012	MW-4C-4Q12MSD	B2L0057-MSD1	MSD	5030B	524.2	IV
12-Dec-2012	MW-5A-4Q12	1212028-03	N	5030B	524.2	III
12-Dec-2012	MW-4B-4Q12	1212028-01	N	5030B	524.2	III
12-Dec-2012	MW-401-4Q12	1212027-19	FB	5030B	524.2	III
12-Dec-2012	MW-91B-4Q12	1212028-09	FD	5030B	524.2	III
12-Dec-2012	MW-10C-4Q12	1212027-03	N	5030B	524.2	III
12-Dec-2012	MW-10B-4Q12	1212027-02	N	5030B	524.2	III
12-Dec-2012	MW-28B-4Q12	1212039-05	N	5030B	524.2	III
12-Dec-2012	MW-23A-4Q12	1212039-02	N	5030B	524.2	IV
13-Dec-2012	DP-5A-4Q12	1212040-03	N	None	TO-15	III
13-Dec-2012	DP-5B-4Q12	1212040-04	N	None	TO-15	III
13-Dec-2012	MW-24B-4Q12	1212039-03	N	5030B	524.2	IV
13-Dec-2012	MW-76B-4Q12	1212039-08	FD	5030B	524.2	III

III = EPA Level 3 Data Review *N = Normal Sample* *TB = Trip Blank* *MS = Matrix Spike*
IV = EPA Level 4 Data Validation *FD = Field Duplicate* *FB = Field Blank* *MSD = Matrix Spike Duplicate*

Table 1: Sample Cross Reference

Date Collected	Field Sample ID	Lab Sample ID	Sample Type	Prep Method	Analytical Method	Review Level
13-Dec-2012	SVE-1-4Q12	1212040-10	N	None	TO-15	III
13-Dec-2012	DP-1A-4Q12	1212040-01	N	None	TO-15	IV
13-Dec-2012	DP-1B-4Q12	1212040-02	N	None	TO-15	III
13-Dec-2012	MW-29B-4Q12	1212039-06	N	5030B	524.2	III
13-Dec-2012	SVE-3-4Q12	1212040-12	N	None	TO-15	III
13-Dec-2012	SVE-4-4Q12	1212040-13	N	None	TO-15	III
13-Dec-2012	SVE-2-4Q12	1212040-11	N	None	TO-15	III
13-Dec-2012	DP-99B-4Q12	1212040-07	FD	None	TO-15	III
13-Dec-2012	SVE-98-4Q12	1212040-14	FD	None	TO-15	III
13-Dec-2012	SVE-98-4Q12DUP	B12L028-DUP1	DUP	None	TO-15	III
13-Dec-2012	OSVE-11-4Q12	1212040-09	N	None	TO-15	III
13-Dec-2012	OSVE-10-4Q12	1212040-08	N	None	TO-15	III
13-Dec-2012	DP-6A-4Q12	1212040-05	N	None	TO-15	III
13-Dec-2012	DP-6B-4Q12	1212040-06	N	None	TO-15	III
13-Dec-2012	MW-21A-4Q12	1212039-13	N	5030B	524.2	III
13-Dec-2012	MW-22A-4Q12	1212039-01	N	5030B	524.2	IV
13-Dec-2012	MW-22A-4Q12MS	B12L003-MS1	MS	5030B	524.2	IV
13-Dec-2012	MW-22A-4Q12MSD	B12L003-MSD1	MSD	5030B	524.2	IV
13-Dec-2012	MW-25B-4Q12	1212039-04	N	5030B	524.2	IV
14-Dec-2012	MW-20C-4Q12	1212039-12	N	5030B	524.2	III
14-Dec-2012	MW-20B-4Q12	1212039-11	N	5030B	524.2	III
14-Dec-2012	MW-20A-4Q12	1212039-10	N	5030B	524.2	III
14-Dec-2012	MW-3A-4Q12	1212039-07	N	5030B	524.2	III
14-Dec-2012	MW-80A-4Q12	1212039-09	FD	5030B	524.2	III

III = EPA Level 3 Data Review *N = Normal Sample* *TB = Trip Blank* *MS = Matrix Spike*
IV = EPA Level 4 Data Validation *FD = Field Duplicate* *FB = Field Blank* *MSD = Matrix Spike Duplicate*

Table 2

Primary and Field QC Samples by Method

Table 2: Primary and Field QC Samples by Method

Analytical Method	Matrix	Primary Samples	Field Duplicates	Trip Blanks	Equipment Blanks	Field Blanks
524.2	Water	40	4	1	None	1
TO-15	Air	18	3	None	None	None

Table 3

Detected Target Analytes

Table 3: Detected Target Analytes

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Units
SDG: 12286B								
TO-15	MW-111-1001	Air	FD					
				1,2-DICHLOROBENZENE	2.4	12		ppbv
				1,4-DICHLOROBENZENE	2.4	2.0J		ppbv
				CHLOROFORM	2.4	12		ppbv
				CIS-1,2-DICHLOROETHENE	2.4	3.0		ppbv
				TETRACHLOROETHENE	30	420		ppbv
				TRICHLOROETHENE	2.4	19		ppbv
TO-15	SVE Pre GAC-1001	Air	N					
				1,2-DICHLOROBENZENE	2.3	11		ppbv
				1,4-DICHLOROBENZENE	2.3	1.9J		ppbv
				CHLOROFORM	2.3	12		ppbv
				CIS-1,2-DICHLOROETHENE	2.3	2.9		ppbv
				TETRACHLOROETHENE	37	420		ppbv
				TRICHLOROETHENE	2.3	18		ppbv
TO-15	SVE Stack-1001	Air	N					
				1,2-DICHLOROBENZENE	2.5	1.6J		ppbv
				CHLOROFORM	2.5	23		ppbv
				CIS-1,2-DICHLOROETHENE	2.5	1.8J		ppbv
				m&p-Xylene	4.9	2.7J		ppbv
				TOLUENE	2.5	2.2J		ppbv
				TRICHLOROFLUOROMETHANE	2.5	1.3J		ppbv
SDG: 12314A								
TO-15	SVE Pre GAC-1101	Air	N					
				CHLOROFORM	2.4	8.5		ppbv
				TETRACHLOROETHENE	24	150		ppbv
TO-15	SVE Stack-1101	Air	N					
				1,2,4-TRIMETHYLBENZENE	2.2	1.2J		ppbv
				1,2-DICHLOROBENZENE	2.2	4.0		ppbv
				1,3,5-TRIMETHYLBENZENE	2.2	2.7		ppbv
				1,4-DICHLOROBENZENE	2.2	1.6J		ppbv
				CHLOROFORM	2.2	26		ppbv
				CIS-1,2-DICHLOROETHENE	2.2	1.8J		ppbv
				TETRACHLOROETHENE	2.2	1.9J		ppbv
				TRICHLOROETHENE	2.2	5.8		ppbv
SDG: 12342C								
TO-15	SVE Pre GAC-1201	Air	N					
				CHLOROFORM	2.5	12		ppbv
				TETRACHLOROETHENE	25	130		ppbv
TO-15	SVE Stack-1201	Air	N					
				CHLOROFORM	2.6	19		ppbv
				CIS-1,2-DICHLOROETHENE	2.6	3.1		ppbv
				TETRACHLOROETHENE	2.6	1.3J		ppbv

**Note: This report excludes laboratory detects that were qualified as ND due to Blank Contamination*

N = Normal Sample *TB = Trip Blank*
FD = Field Duplicate *FB = Field Blank*

Table 3: Detected Target Analytes

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Units
SDG: 12349A								
524.2	MW-10A-4Q12	Water	N					
				CHLOROFORM	0.5	4.7		ug/L
				TETRACHLOROETHENE	5.0	50		ug/L
524.2	MW-10B-4Q12	Water	N					
				TETRACHLOROETHENE	0.5	20		ug/L
524.2	MW-11A-4Q12	Water	N					
				CHLOROFORM	0.5	5.3		ug/L
				TETRACHLOROETHENE	0.5	0.9		ug/L
524.2	MW-12A-4Q12	Water	N					
				BROMODICHLOROMETHANE	0.5	0.5		ug/L
				CHLOROFORM	0.5	10		ug/L
				TETRACHLOROETHENE	0.5	14		ug/L
				TRICHLOROFLUOROMETHANE	0.5	0.4J		ug/L
524.2	MW-13A-4Q12	Water	N					
				BROMODICHLOROMETHANE	0.5	0.3J		ug/L
				CHLOROFORM	0.5	7.3		ug/L
				TETRACHLOROETHENE	0.5	2.3		ug/L
524.2	MW-14A-4Q12	Water	N					
				CHLOROFORM	0.5	1.3		ug/L
				TETRACHLOROETHENE	0.5	3.5		ug/L
524.2	MW-15A-4Q12	Water	N					
				1,2-DICHLOROETHANE	0.5	0.6		ug/L
				2-BUTANONE	4.0	2.1J		ug/L
				CHLOROFORM	0.5	1.4		ug/L
524.2	MW-16A-4Q12	Water	N					
				CHLOROFORM	0.5	1.1		ug/L
524.2	MW-16B-4Q12	Water	N					
				CHLOROFORM	0.5	0.9		ug/L
				TETRACHLOROETHENE	0.5	14J+		ug/L
524.2	MW-16C-4Q12	Water	N					
				TETRACHLOROETHENE	0.5	0.4J		ug/L
524.2	MW-17A-4Q12	Water	N					
				BROMODICHLOROMETHANE	0.5	0.4J		ug/L
				CHLOROFORM	0.5	8.0		ug/L
				TETRACHLOROETHENE	0.5	0.8		ug/L
524.2	MW-17B-4Q12	Water	N					
				ACETONE	4.0	6.4J+		ug/L
				CHLOROFORM	0.5	0.4J		ug/L
				TETRACHLOROETHENE	5.0	47		ug/L
524.2	MW-18A-4Q12	Water	N					
				BENZENE	0.5	0.3J		ug/L
				CHLOROFORM	0.5	3.6		ug/L
				TETRACHLOROETHENE	0.5	2.1		ug/L

**Note: This report excludes laboratory detects that were qualified as ND due to Blank Contamination*

N = Normal Sample *TB = Trip Blank*
FD = Field Duplicate *FB = Field Blank*

Table 3: Detected Target Analytes

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Units
SDG: 12349A								
524.2	MW-19A-4Q12	Water	N					
				BENZENE	0.5	0.3J		ug/L
				CHLOROFORM	0.5	1.4		ug/L
524.2	MW-19B-4Q12	Water	N					
				BENZENE	0.5	0.4J		ug/L
				m&p-Xylene	1.0	0.6J		ug/L
524.2	MW-1A-4Q12	Water	N					
				2-BUTANONE	4.0	2.6J		ug/L
				TETRACHLOROETHENE	0.5	1.5		ug/L
524.2	MW-4A-4Q12	Water	N					
				CHLOROFORM	0.5	2.0		ug/L
				TETRACHLOROETHENE	10	130		ug/L

**Note: This report excludes laboratory detects that were qualified as ND due to Blank Contamination*

N = Normal Sample TB = Trip Blank
FD = Field Duplicate FB = Field Blank

Table 3: Detected Target Analytes

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Units
SDG: 12349B								
524.2	MW-26B-4Q12	Water	N					
				1,2,4-TRIMETHYLBENZENE	0.5	0.5		ug/L
				BENZENE	0.5	5.1		ug/L
				CARBON TETRACHLORIDE	0.5	0.3J		ug/L
				ETHYLBENZENE	0.5	0.9		ug/L
				m&p-Xylene	1.0	2.4		ug/L
				O-XYLENE	0.5	0.6		ug/L
				TOLUENE	0.5	0.6		ug/L
524.2	MW-27B-4Q12	Water	N					
				BENZENE	0.5	0.3J		ug/L
524.2	MW-2A-4Q12	Water	N					
				CHLOROFORM	0.5	2.2		ug/L
				TETRACHLOROETHENE	0.5	4.5		ug/L
524.2	MW-4B-4Q12	Water	N					
				TETRACHLOROETHENE	0.5	8.4		ug/L
524.2	MW-4C-4Q12	Water	N					
				TETRACHLOROETHENE	0.5	1.1		ug/L
524.2	MW-5A-4Q12	Water	N					
				CHLOROFORM	0.5	0.3J		ug/L
				TETRACHLOROETHENE	5.0	77		ug/L
524.2	MW-6A-4Q12	Water	N					
				CHLOROFORM	0.5	4.8		ug/L
				TETRACHLOROETHENE	0.5	3.5		ug/L
524.2	MW-7A-4Q12	Water	N					
				CHLOROFORM	0.5	1.6		ug/L
524.2	MW-83A-4Q12	Water	FD					
				ACETONE	4.0	21		ug/L
				CHLOROFORM	0.5	0.3J		ug/L
				TETRACHLOROETHENE	5.0	52		ug/L
524.2	MW-8A-4Q12	Water	N					
				BROMODICHLOROMETHANE	0.5	0.3J		ug/L
				CHLOROFORM	0.5	5.0		ug/L
				TETRACHLOROETHENE	0.5	25		ug/L
524.2	MW-91B-4Q12	Water	FD					
				TETRACHLOROETHENE	0.5	6.8		ug/L
524.2	MW-9B-4Q12	Water	N					
				TETRACHLOROETHENE	0.5	6.9		ug/L

**Note: This report excludes laboratory detects that were qualified as ND due to Blank Contamination*

N = Normal Sample　TB = Trip Blank
FD = Field Duplicate　FB = Field Blank

Table 3: Detected Target Analytes

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Units
SDG: 12353A								
524.2	MW-20A-4Q12	Water	N					
				CHLOROFORM	0.5	6.8		ug/L
				DICHLORODIFLUOROMETHANE	0.5	3.4J		ug/L
				TETRACHLOROETHENE	10	180		ug/L
524.2	MW-20B-4Q12	Water	N					
				TETRACHLOROETHENE	5.0	60		ug/L
524.2	MW-20C-4Q12	Water	N					
				BENZENE	0.5	0.3J		ug/L
524.2	MW-21A-4Q12	Water	N					
				CHLOROFORM	0.5	5.0		ug/L
				TETRACHLOROETHENE	0.5	0.9		ug/L
524.2	MW-22A-4Q12	Water	N					
				BROMODICHLOROMETHANE	0.5	0.4J		ug/L
				CHLOROFORM	0.5	8.9		ug/L
524.2	MW-23A-4Q12	Water	N					
				CHLOROFORM	0.5	3.4		ug/L
				TETRACHLOROETHENE	2.5	31		ug/L
524.2	MW-24B-4Q12	Water	N					
				TETRACHLOROETHENE	5.0	85		ug/L
524.2	MW-25B-4Q12	Water	N					
				TETRACHLOROETHENE	5.0	80		ug/L
524.2	MW-28B-4Q12	Water	N					
				TETRACHLOROETHENE	2.5	52		ug/L
524.2	MW-29B-4Q12	Water	N					
				TETRACHLOROETHENE	5.0	65		ug/L
524.2	MW-3A-4Q12	Water	N					
				CHLOROFORM	0.5	1.0		ug/L
				TETRACHLOROETHENE	5.0	100		ug/L
524.2	MW-76B-4Q12	Water	FD					
				TETRACHLOROETHENE	5.0	81		ug/L
524.2	MW-80A-4Q12	Water	FD					
				CHLOROFORM	0.5	6.7		ug/L
				DICHLORODIFLUOROMETHANE	0.5	3.6J		ug/L
				TETRACHLOROETHENE	10	160		ug/L

**Note: This report excludes laboratory detects that were qualified as ND due to Blank Contamination*

N = Normal Sample *TB = Trip Blank*
FD = Field Duplicate *FB = Field Blank*

Table 3: Detected Target Analytes

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Units
SDG: 12353B								
TO-15	DP-1B-4Q12	Air	N					
				TETRACHLOROETHENE	2.1	32		ppbv
TO-15	DP-5B-4Q12	Air	N					
				CHLOROFORM	2.3	3.4		ppbv
				TETRACHLOROETHENE	2.3	2.7		ppbv
TO-15	DP-6A-4Q12	Air	N					
				TETRACHLOROETHENE	2.3	43		ppbv
TO-15	DP-99B-4Q12	Air	FD					
				TETRACHLOROETHENE	2.3	34		ppbv
TO-15	OSVE-10-4Q12	Air	N					
				TETRACHLOROETHENE	2.4	5.3		ppbv
TO-15	OSVE-11-4Q12	Air	N					
				TETRACHLOROETHENE	2.3	19		ppbv
TO-15	SVE-1-4Q12	Air	N					
				TETRACHLOROETHENE	2.3	9.6		ppbv
TO-15	SVE-2-4Q12	Air	N					
				CIS-1,2-DICHLOROETHENE	2.2	1.4J		ppbv
				TETRACHLOROETHENE	22	180		ppbv
TO-15	SVE-3-4Q12	Air	N					
				TETRACHLOROETHENE	24	130		ppbv
TO-15	SVE-4-4Q12	Air	N					
				CHLOROFORM	2.4	23		ppbv
				TETRACHLOROETHENE	2.4	23		ppbv
TO-15	SVE-98-4Q12	Air	FD					
				CIS-1,2-DICHLOROETHENE	2.3	1.6J		ppbv
				TETRACHLOROETHENE	23	190		ppbv

**Note: This report excludes laboratory detects that were qualified as ND due to Blank Contamination*

N = Normal Sample TB = Trip Blank
FD = Field Duplicate FB = Field Blank

Table 4

Overall Qualified Results

Table 4: Overall Qualified Results

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Overall Qualifier	Units	Reason Code
SDG: 12286B										
TO-15	MW-111-1001	Air	FD							
				1,2-DICHLOROETHANE	2.4	2.4J,U,C3		UJ	ppbv	IcRsd
				1,4-DICHLOROBENZENE	2.4	2.0J,C1		J	ppbv	RI
				CIS-1,3-DICHLOROPROPENE	2.4	2.4J,U,C3		UJ	ppbv	IcRsd
TO-15	SVE Pre GAC-1001	Air	N							
				1,2-DICHLOROETHANE	2.3	2.3J,U,C3		UJ	ppbv	IcRsd
				1,4-DICHLOROBENZENE	2.3	1.9J,C1		J	ppbv	RI
				CIS-1,3-DICHLOROPROPENE	2.3	2.3J,U,C3		UJ	ppbv	IcRsd
TO-15	SVE Stack-1001	Air	N							
				1,2-DICHLOROBENZENE	2.5	1.6J,C1		J	ppbv	RI
				1,2-DICHLOROETHANE	2.5	2.5J,U,C3		UJ	ppbv	IcRsd
				CIS-1,2-DICHLOROETHENE	2.5	1.8J,C1		J	ppbv	RI
				CIS-1,3-DICHLOROPROPENE	2.5	2.5J,U,C3		UJ	ppbv	IcRsd
				m&p-Xylene	4.9	2.7J,C1		J	ppbv	RI
				TOLUENE	2.5	2.2J,C1		J	ppbv	RI
				TRICHLOROFLUOROMETHANE	2.5	1.3J,C1		J	ppbv	RI
SDG: 12314A										
TO-15	SVE Stack-1101	Air	N							
				1,2,4-TRIMETHYLBENZENE	2.2	1.2J,C1		J	ppbv	RI
				1,4-DICHLOROBENZENE	2.2	1.6J,C1		J	ppbv	RI
				CIS-1,2-DICHLOROETHENE	2.2	1.8J,C1		J	ppbv	RI
				TETRACHLOROETHENE	2.2	1.9J,C1		J	ppbv	RI

N = Normal Sample *TB = Trip Blank*
FD = Field Duplicate *FB = Field Blank*

Table 4: Overall Qualified Results

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Overall Qualifier	Units	Reason Code
SDG: 12342C										
TO-15	SVE Pre GAC-1201	Air	N							
				1,2,4-TRICHLOROBENZENE	2.5	2.5J,U,C 4		UJ	ppbv	Ccv
				HEXACHLOROBUTADIENE	2.5	2.5J,U,C 3,		UJ	ppbv	Icv, Ccv
TO-15	SVE Stack-1201	Air	N							
				1,2,4-TRICHLOROBENZENE	2.6	2.6J,U,C 4		UJ	ppbv	Ccv
				HEXACHLOROBUTADIENE	2.6	2.6J,U,C 3,		UJ	ppbv	Icv, Ccv
				TETRACHLOROETHENE	2.6	1.3J		J	ppbv	RI

N = Normal Sample *TB = Trip Blank*
FD = Field Duplicate *FB = Field Blank*

Table 4: Overall Qualified Results

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Overall Qualifier	Units	Reason Code
SDG: 12349A										
524.2	MW-12A-4Q12	Water	N							
				TRICHLOROFLUOROMETHANE	0.5	0.4J,C1		J	ug/L	RI
524.2	MW-13A-4Q12	Water	N							
				BROMODICHLOROMETHANE	0.5	0.3J,C1		J	ug/L	RI
524.2	MW-15A-4Q12	Water	N							
				2-BUTANONE	4.0	2.1J,C1		J	ug/L	RI
524.2	MW-16B-4Q12	Water	N							
				METHYL TERT-BUTYL ETHER	2.0	2.0J,U,Q 4,		UJ	ug/L	Ms
				TETRACHLOROETHENE	0.5	14		J+	ug/L	Ms
524.2	MW-16C-4Q12	Water	N							
				TETRACHLOROETHENE	0.5	0.4J,C1		J	ug/L	RI
524.2	MW-17A-4Q12	Water	N							
				BROMODICHLOROMETHANE	0.5	0.4J,C1		J	ug/L	RI
524.2	MW-17B-4Q12	Water	N							
				ACETONE	4.0	6.4J,Q3, Q7		J+	ug/L	Surr
				CHLOROFORM	0.5	0.4J,C1, Q7		J	ug/L	Surr, RI
524.2	MW-18A-4Q12	Water	N							
				BENZENE	0.5	0.3J,C1		J	ug/L	RI
524.2	MW-19A-4Q12	Water	N							
				BENZENE	0.5	0.3J,C1		J	ug/L	RI
524.2	MW-19B-4Q12	Water	N							
				BENZENE	0.5	0.4J,C1		J	ug/L	RI
				m&p-Xylene	1.0	0.6J,C1		J	ug/L	RI
524.2	MW-1A-4Q12	Water	N							
				2-BUTANONE	4.0	2.6J,C1		J	ug/L	RI

N = Normal Sample *TB = Trip Blank*
FD = Field Duplicate *FB = Field Blank*

Table 4: Overall Qualified Results

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Overall Qualifier	Units	Reason Code
SDG: 12349B										
524.2	MW-26B-4Q12	Water	N							
				1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.5	0.5U		UJ	ug/L	Ccv
				BROMOMETHANE	0.5	0.5J,U,C3		UJ	ug/L	IcRsd
				CARBON TETRACHLORIDE	0.5	0.3J,C1		J	ug/L	RI
524.2	MW-27B-4Q12	Water	N							
				BENZENE	0.5	0.3J,C1		J	ug/L	RI
524.2	MW-5A-4Q12	Water	N							
				CHLOROFORM	0.5	0.3J,C1		J	ug/L	RI
524.2	MW-83A-4Q12	Water	FD							
				CHLOROFORM	0.5	0.3J,C1		J	ug/L	RI
524.2	MW-8A-4Q12	Water	N							
				BROMODICHLOROMETHANE	0.5	0.3J,C1		J	ug/L	RI

N = Normal Sample *TB = Trip Blank*
FD = Field Duplicate *FB = Field Blank*

Table 4: Overall Qualified Results

Analytical Method	Field Sample ID	Matrix	Sample Type	Analyte	RL	Lab Result	Unc / Error	Overall Qualifier	Units	Reason Code
SDG: 12353A										
524.2	MW-20A-4Q12	Water	N							
				DICHLORODIFLUOROMETHANE	0.5	3.4J,C4		J	ug/L	Ccv
524.2	MW-20B-4Q12	Water	N							
				DICHLORODIFLUOROMETHANE	0.5	0.5J,U,C 4		UJ	ug/L	Ccv
524.2	MW-20C-4Q12	Water	N							
				BENZENE	0.5	0.3J,C1		J	ug/L	RI
524.2	MW-21A-4Q12	Water	N							
				DICHLORODIFLUOROMETHANE	0.5	0.5J,U,C 4		UJ	ug/L	Ccv
524.2	MW-22A-4Q12	Water	N							
				BROMODICHLOROMETHANE	0.5	0.4J,C1		J	ug/L	RI
524.2	MW-29B-4Q12	Water	N							
				1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.5	0.5U		UJ	ug/L	Ccv
				BROMOMETHANE	0.5	0.5J,U,C 3		UJ	ug/L	IcRsd
524.2	MW-3A-4Q12	Water	N							
				DICHLORODIFLUOROMETHANE	0.5	0.5J,U,C 4		UJ	ug/L	Ccv
524.2	MW-76B-4Q12	Water	FD							
				DICHLORODIFLUOROMETHANE	0.5	0.5J,U,C 4		UJ	ug/L	Ccv
524.2	MW-80A-4Q12	Water	FD							
				DICHLORODIFLUOROMETHANE	0.5	3.6J,C4		J	ug/L	Ccv
SDG: 12353B										
TO-15	SVE-2-4Q12	Air	N							
				CIS-1,2-DICHLOROETHENE	2.2	1.4J,C1		J	ppbv	RI
TO-15	SVE-98-4Q12	Air	FD							
				CIS-1,2-DICHLOROETHENE	2.3	1.6J,C1		J	ppbv	RI

N = Normal Sample *TB = Trip Blank*
FD = Field Duplicate *FB = Field Blank*

Table 5

Analytical Completeness

Analytical Completeness Report

Project No. / Name : *R13S04 / Modesto SVE Fall 2012 Sampling ; R13S12 / Modesto Groundwater Fall 2012 Qtrly Monitoring*

Analytical Method	Total Number of Analytes	Number of Qualified	Percent Completeness
524.2	2898	31	98.9
TO-15	784	24	96.9
Total	***3682***	***55***	***98.5***

Note:

$$\textit{Percent Completeness} = \frac{\textit{Number of Unqualified Results}}{\textit{Number of Reported Results}} * 100\ \%$$

Table 6

Contract Compliance Completeness

Contract Compliance Completeness Report

Project No. / Name : *R13S04 / Modesto SVE Fall 2012 Sampling ; R13S12 / Modesto Groundwater Fall 2012 Qtrly Monitoring*

Analytical Method	Total Number of Analytes	Number of Qualified	Percent Completeness
524.2	2898	27	99.1
TO-15	784	24	96.9
Total	***3682***	***51***	***98.6***

Table 7

Technical Completeness

Technical Completeness Report

Project No. / Name : *R13S04 / Modesto SVE Fall 2012 Sampling ; R13S12 / Modesto Groundwater Fall 2012 Qtrly Monitoring*

Analytical Method	Total Number of Analytes	Number of Rejects	Percent Completeness
524.2	2898	0	100.0
TO-15	784	0	100.0
Total	***3682***	***0***	***100.0***

Note:

*Percent Completeness = (Number of Useable Results / Number of Reported Results) * 100 %*

[Useable results are qualified but not Rejected data]

Table 8

Reasons for Qualified Results

URS, Inc.

Reason for Qualified Results

SDG Nos. : 12286B, 12314A, 12342C, 12349A, 12349B, 12353A, 12353B

Sample Del Group (SDG)	Sample ID	Test Method	CAS No.	Detected Qualifier	Non Detected Qualifier	Analyte Name	Reason
12286B	MW-111-1001	TO-15	107-06-2		J	1,2-DICHLOROETHANE	Initial calibration %RSD
12286B	MW-111-1001	TO-15	10061-01-5		J	CIS-1,3-DICHLOROPROPENE	Initial calibration %RSD
12286B	SVE Pre GAC-1001	TO-15	107-06-2		J	1,2-DICHLOROETHANE	Initial calibration %RSD
12286B	SVE Pre GAC-1001	TO-15	10061-01-5		J	CIS-1,3-DICHLOROPROPENE	Initial calibration %RSD
12286B	SVE Stack-1001	TO-15	107-06-2		J	1,2-DICHLOROETHANE	Initial calibration %RSD
12286B	SVE Stack-1001	TO-15	10061-01-5		J	CIS-1,3-DICHLOROPROPENE	Initial calibration %RSD
12342C	SVE Pre GAC-1201	TO-15	120-82-1		J	1,2,4-TRICHLOROBENZENE	Continuing calibration percent difference
12342C	SVE Pre GAC-1201	TO-15	87-68-3		J	HEXACHLOROBUTADIENE	Continuing calibration percent difference
12342C	SVE Pre GAC-1201	TO-15	87-68-3		J	HEXACHLOROBUTADIENE	Initial calibration verification percent difference
12342C	SVE Pre GAC-1201DUP	TO-15	67-66-3	J		CHLOROFORM	Lab Duplicate RPD
12342C	SVE Pre GAC-1201DUP	TO-15	127-18-4	J		TETRACHLOROETHENE	Lab Duplicate RPD
12342C	SVE Stack-1201	TO-15	120-82-1		J	1,2,4-TRICHLOROBENZENE	Continuing calibration percent difference
12342C	SVE Stack-1201	TO-15	87-68-3		J	HEXACHLOROBUTADIENE	Continuing calibration percent difference
12342C	SVE Stack-1201	TO-15	87-68-3		J	HEXACHLOROBUTADIENE	Initial calibration verification percent difference
12349A	MW-16B-4Q12	524.2	1634-04-4		J	METHYL TERT-BUTYL ETHER	Matrix spike recovery
12349A	MW-16B-4Q12	524.2	127-18-4	J+		TETRACHLOROETHENE	Matrix spike recovery
12349A	MW-17B-4Q12	524.2	67-64-1	J+		ACETONE	Surrogate recovery
12349A	MW-17B-4Q12	524.2	67-66-3	J+		CHLOROFORM	Surrogate recovery
12349B	MW-26B-4Q12	524.2	76-13-1		J	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	Continuing calibration percent difference
12349B	MW-26B-4Q12	524.2	74-83-9		J	BROMOMETHANE	Initial calibration %RSD
12353A	MW-20A-4Q12	524.2	75-71-8	J		DICHLORODIFLUOROMETHANE	Continuing calibration percent difference
12353A	MW-20B-4Q12	524.2	75-71-8		J	DICHLORODIFLUOROMETHANE	Continuing calibration percent difference
12353A	MW-21A-4Q12	524.2	75-71-8		J	DICHLORODIFLUOROMETHANE	Continuing calibration percent difference
12353A	MW-29B-4Q12	524.2	76-13-1		J	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	Continuing calibration percent difference
12353A	MW-29B-4Q12	524.2	74-83-9		J	BROMOMETHANE	Initial calibration %RSD
12353A	MW-3A-4Q12	524.2	75-71-8		J	DICHLORODIFLUOROMETHANE	Continuing calibration percent difference
12353A	MW-76B-4Q12	524.2	75-71-8		J	DICHLORODIFLUOROMETHANE	Continuing calibration percent difference
12353A	MW-80A-4Q12	524.2	75-71-8	J		DICHLORODIFLUOROMETHANE	Continuing calibration percent difference

Appendix A

Data Qualification Summary Report

SDG 12286B

Data Qualifier Summary

Lab Reporting Batch ID: 12286B **Laboratory: FALSE**

EDD Filename: 12286B_voc **eQAPP Name: Modesto_Site_062812**

Method Category: **VOA**

Method: **TO-15** ***Matrix:*** **Air**

Sample ID: **MW-111-1001** ***Collected:*** **10/11/2012 12:00:00** ***Analysis Type:*** Initial ***Dilution:*** 2.43

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
1,2-DICHLOROETHANE	2.4	J,U,C3	1.2	MDL	2.4	MRL	ppbv	UJ	IcRsd
1,4-DICHLOROBENZENE	2.0	J,C1	1.2	MDL	2.4	MRL	ppbv	J	Rl
CIS-1,3-DICHLOROPROPENE	2.4	J,U,C3	1.2	MDL	2.4	MRL	ppbv	UJ	IcRsd

Sample ID: **SVE Pre GAC-1001** ***Collected:*** **10/11/2012 12:20:00** ***Analysis Type:*** Initial ***Dilution:*** 2.28

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
1,2-DICHLOROETHANE	2.3	J,U,C3	1.1	MDL	2.3	MRL	ppbv	UJ	IcRsd
1,4-DICHLOROBENZENE	1.9	J,C1	1.1	MDL	2.3	MRL	ppbv	J	Rl
CIS-1,3-DICHLOROPROPENE	2.3	J,U,C3	1.1	MDL	2.3	MRL	ppbv	UJ	IcRsd

Sample ID: **SVE Stack-1001** ***Collected:*** **10/11/2012 12:14:00** ***Analysis Type:*** Initial- ***Dilution:*** 2.47

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
1,2-DICHLOROBENZENE	1.6	J,C1	1.2	MDL	2.5	MRL	ppbv	J	Rl
1,2-DICHLOROETHANE	2.5	J,U,C3	1.2	MDL	2.5	MRL	ppbv	UJ	IcRsd
CIS-1,2-DICHLOROETHENE	1.8	J,C1	1.2	MDL	2.5	MRL	ppbv	J	Rl
CIS-1,3-DICHLOROPROPENE	2.5	J,U,C3	1.2	MDL	2.5	MRL	ppbv	UJ	IcRsd
m&p-Xylene	2.7	J,C1	2.5	MDL	4.9	MRL	ppbv	J	Rl
TOLUENE	2.2	J,C1	1.2	MDL	2.5	MRL	ppbv	J	Rl
TRICHLOROFLUOROMETHANE	1.3	J,C1	1.2	MDL	2.5	MRL	ppbv	J	Rl

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 12286B **Laboratory: FALSE**

EDD Filename: 12286B_voc **eQAPP Name: Modesto_Site_062812**

Reason Code Legend

Reason Code	*Description*
IcRsd	Initial Calibration Percent Relative Standard Deviation
Rl	Reporting Limit Trace Value

* denotes a non-reportable result

Project Name and Number: R13S04 - Modesto SVE Fall 2012 Sampling

SDG 12314A

Data Qualifier Summary

Lab Reporting Batch ID: 12314A **Laboratory: FALSE**

EDD Filename: 12314A_VOC_SOILGAS_1211018 FINAL **eQAPP Name: Modesto_Site_062812**

Method Category: **VOA**

Method: **TO-15** ***Matrix:*** **Air**

Sample ID: **SVE Stack-1101** ***Collected:*** **11/8/2012 10:56:00** ***Analysis Type:*** **Initial** ***Dilution:*** **2.15**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,2,4-TRIMETHYLBENZENE	1.2	J,C1	1.1	MDL	2.2	MRL	ppbv	J	RI
1,4-DICHLOROBENZENE	1.6	J,C1	1.1	MDL	2.2	MRL	ppbv	J	RI
CIS-1,2-DICHLOROETHENE	1.8	J,C1	1.1	MDL	2.2	MRL	ppbv	J	RI
TETRACHLOROETHENE	1.9	J,C1	1.1	MDL	2.2	MRL	ppbv	J	RI

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 12314A **Laboratory: FALSE**

EDD Filename: 12314A_VOC_SOILGAS_1211018 FINAL **eQAPP Name: Modesto_Site_062812**

Reason Code Legend

Reason Code	*Description*
RI	Reporting Limit Trace Value

SDG 12342C

Data Qualifier Summary

Lab Reporting Batch ID: 12342C | **Laboratory: FALSE**

EDD Filename: 12342c_voc_air_1212016 FINAL_rev | **eQAPP Name: Modesto_Site_062812**

Method Category: **VOA**

Method: **TO-15** ***Matrix:*** **Air**

Sample ID: **SVE Pre GAC-1201** ***Collected:*** **12/6/2012 10:45:00** ***Analysis Type:*** **Reinjection-01-** ***Dilution:*** **2.52**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,2,4-TRICHLOROBENZENE	2.5	J,U,C4	1.3	MDL	2.5	MRL	ppbv	UJ	Ccv
HEXACHLOROBUTADIENE	2.5	J,U,C3,C4	1.3	MDL	2.5	MRL	ppbv	UJ	Icv, Ccv

Sample ID: **SVE Stack-1201** ***Collected:*** **12/6/2012 10:42:00** ***Analysis Type:*** **Initial-** ***Dilution:*** **2.58**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,2,4-TRICHLOROBENZENE	2.6	J,U,C4	1.3	MDL	2.6	MRL	ppbv	UJ	Ccv
HEXACHLOROBUTADIENE	2.6	J,U,C3,C4	1.3	MDL	2.6	MRL	ppbv	UJ	Icv, Ccv
TETRACHLOROETHENE	1.3	J	1.3	MDL	2.6	MRL	ppbv	J	RI

* denotes a non-reportable result

Project Name and Number: R13S04 - Modesto SVE Fall 2012 Sampling

Data Qualifier Summary

Lab Reporting Batch ID: 12342C **Laboratory: FALSE**

EDD Filename: 12342c_voc_air_1212016 FINAL_rev **eQAPP Name: Modesto_Site_062812**

Reason Code Legend

Reason Code	*Description*
Ccv	Continuing Calibration Verification Percent Difference Lower Estimation
Icv	Initial Calibration Verification Percent Difference Lower Estimation
Ld	Laboratory Duplicate Precision
Rl	Reporting Limit Trace Value

* denotes a non-reportable result

SDG 12349A

Data Qualifier Summary

Lab Reporting Batch ID: 12349A | **Laboratory: FALSE**

EDD Filename: 12349a_voc sedd 2a FINAL | **eQAPP Name: Modesto_Site_062812**

Method Category: VOA

Method: 524.2 *Matrix:* Water

***Sample ID:*MW-12A-4Q12** *Collected:* 12/11/2012 9:06:00 *Analysis Type:* Initial *Dilution:* 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TRICHLOROFLUOROMETHANE	0.4	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

***Sample ID:*MW-13A-4Q12** *Collected:* 12/11/2012 2:10:00 *Analysis Type:* Initial *Dilution:* 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BROMODICHLOROMETHANE	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

***Sample ID:*MW-15A-4Q12** *Collected:* 12/11/2012 9:47:00 *Analysis Type:* Initial *Dilution:* 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
2-BUTANONE	2.1	J,C1	2.0	MDL	4.0	MRL	ug/L	J	RI

***Sample ID:*MW-16B-4Q12** *Collected:* 12/11/2012 10:27:00 *Analysis Type:* Initial *Dilution:* 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
METHYL TERT-BUTYL ETHER	2.0	J,U,Q4,Q6	1.0	MDL	2.0	MRL	ug/L	UJ	Ms
TETRACHLOROETHENE	14		0.2	MDL	0.5	MRL	ug/L	J+	Ms

***Sample ID:*MW-16C-4Q12** *Collected:* 12/11/2012 11:15:00 *Analysis Type:* Initial *Dilution:* 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
TETRACHLOROETHENE	0.4	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

***Sample ID:*MW-17A-4Q12** *Collected:* 12/11/2012 2:25:00 *Analysis Type:* Initial *Dilution:* 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BROMODICHLOROMETHANE	0.4	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

***Sample ID:*MW-17B-4Q12** *Collected:* 12/11/2012 1:38:00 *Analysis Type:* Initial1 *Dilution:* 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
ACETONE	6.4	J,Q3,Q7	2.0	MDL	4.0	MRL	ug/L	J+	Surr
CHLOROFORM	0.4	J,C1,Q7	0.2	MDL	0.5	MRL	ug/L	J	RI, Surr

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 12349A | **Laboratory: FALSE**

EDD Filename: 12349a_voc sedd 2a FINAL | **eQAPP Name: Modesto_Site_062812**

Method Category: **VOA**

Method: **524.2** *Matrix:* **Water**

Sample ID: **MW-18A-4Q12** *Collected:* **12/11/2012 4:25:00** *Analysis Type:* **Initial** *Dilution:* **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BENZENE	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

Sample ID: **MW-19A-4Q12** *Collected:* **12/10/2012 11:55:00** *Analysis Type:* **Initial** *Dilution:* **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BENZENE	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

Sample ID: **MW-19B-4Q12** *Collected:* **12/10/2012 12:45:00** *Analysis Type:* **Initial** *Dilution:* **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BENZENE	0.4	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI
m&p-Xylene	0.6	J,C1	0.5	MDL	1.0	MRL	ug/L	J	RI

Sample ID: **MW-1A-4Q12** *Collected:* **12/11/2012 11:20:00** *Analysis Type:* **Initial** *Dilution:* **1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
2-BUTANONE	2.6	J,C1	2.0	MDL	4.0	MRL	ug/L	J	RI

Data Qualifier Summary

Lab Reporting Batch ID: 12349A **Laboratory: FALSE**

EDD Filename: 12349a_voc sedd 2a FINAL **eQAPP Name: Modesto_Site_062812**

Reason Code Legend

Reason Code	*Description*
Mb	Method Blank Contamination
Ms	Matrix Spike Lower Estimation
Ms	Matrix Spike Precision
Ms	Matrix Spike Upper Estimation
Rl	Reporting Limit Trace Value
Surr	Surrogate/Tracer Recovery Upper Estimation

* denotes a non-reportable result

SDG 12349B

Data Qualifier Summary

Lab Reporting Batch ID: 12349B | **Laboratory: FALSE**

EDD Filename: 12349b_voc sedd 2a FINAL_rev | **eQAPP Name: Modesto_Site_062812**

Method Category: VOA

Method: 524.2 **Matrix:** Water

Sample ID: **MW-26B-4Q12** ***Collected:*** **12/10/2012 3:40:00** ***Analysis Type:*** Initial ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.5	U	0.2	MDL	0.5	MRL	ug/L	UJ	Ccv
BROMOMETHANE	0.5	J,U,C3	0.2	MDL	0.5	MRL	ug/L	UJ	IcRsd
CARBON TETRACHLORIDE	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

Sample ID: **MW-27B-4Q12** ***Collected:*** **12/11/2012 8:46:00** ***Analysis Type:*** Initial ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BENZENE	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

Sample ID: **MW-5A-4Q12** ***Collected:*** **12/12/2012 9:45:00** ***Analysis Type:*** Initial1 ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
CHLOROFORM	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

Sample ID: **MW-83A-4Q12** ***Collected:*** **12/11/2012 1:38:00** ***Analysis Type:*** Reinjection-01 ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
CHLOROFORM	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

Sample ID: **MW-8A-4Q12** ***Collected:*** **12/12/2012 7:58:00** ***Analysis Type:*** Initial ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BROMODICHLOROMETHANE	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 12349B **Laboratory: FALSE**

EDD Filename: 12349b_voc sedd 2a FINAL_rev **eQAPP Name: Modesto_Site_062812**

Reason Code Legend

Reason Code	Description
Ccv	Continuing Calibration Verification Percent Difference Lower Estimation
IcRsd	Initial Calibration Percent Relative Standard Deviation
Mb	Method Blank Contamination
Rl	Reporting Limit Trace Value

SDG 12353A

Data Qualifier Summary

Lab Reporting Batch ID: 12353A | **Laboratory: FALSE**

EDD Filename: 12353A_VOC_gw_1212039 FINAL | **eQAPP Name: Modesto_Site_062812**

Method Category: VOA

Method: 524.2 ***Matrix:*** Water

Sample ID: **MW-20A-4Q12** ***Collected:*** 12/14/2012 9:33:00 ***Analysis Type:*** Initial2 ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
DICHLORODIFLUOROMETHANE	3.4	J,C4	0.2	MDL	0.5	MRL	ug/L	J	Ccv

Sample ID: **MW-20B-4Q12** ***Collected:*** 12/14/2012 9:07:00 ***Analysis Type:*** Initial1 ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
DICHLORODIFLUOROMETHANE	0.5	J,U,C4	0.2	MDL	0.5	MRL	ug/L	UJ	Ccv

Sample ID: **MW-20C-4Q12** ***Collected:*** 12/14/2012 8:27:00 ***Analysis Type:*** Initial ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BENZENE	0.3	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

Sample ID: **MW-21A-4Q12** ***Collected:*** 12/13/2012 3:17:00 ***Analysis Type:*** Initial ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
DICHLORODIFLUOROMETHANE	0.5	J,U,C4	0.2	MDL	0.5	MRL	ug/L	UJ	Ccv

Sample ID: **MW-22A-4Q12** ***Collected:*** 12/13/2012 3:37:00 ***Analysis Type:*** Initial ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
BROMODICHLOROMETHANE	0.4	J,C1	0.2	MDL	0.5	MRL	ug/L	J	RI

Sample ID: **MW-29B-4Q12** ***Collected:*** 12/13/2012 10:05:00 ***Analysis Type:*** Initial1 ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	0.5	U	0.2	MDL	0.5	MRL	ug/L	UJ	Ccv
BROMOMETHANE	0.5	J,U,C3	0.2	MDL	0.5	MRL	ug/L	UJ	IcRsd

Sample ID: **MW-3A-4Q12** ***Collected:*** 12/14/2012 9:55:00 ***Analysis Type:*** Initial ***Dilution:*** 1

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
DICHLORODIFLUOROMETHANE	0.5	J,U,C4	0.2	MDL	0.5	MRL	ug/L	UJ	Ccv

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 12353A **Laboratory: FALSE**

EDD Filename: 12353A_VOC_gw_1212039 FINAL **eQAPP Name: Modesto_Site_062812**

Method Category: VOA

Method: 524.2 *Matrix:* Water

***Sample ID:*MW-76B-4Q12** ***Collected:* 12/13/2012 9:00:00** ***Analysis Type:* Initial** ***Dilution:* 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
DICHLORODIFLUOROMETHANE	0.5	J,U,C4	0.2	MDL	0.5	MRL	ug/L	UJ	Ccv

***Sample ID:*MW-80A-4Q12** ***Collected:* 12/14/2012 12:00:00** ***Analysis Type:* Initial1** ***Dilution:* 1**

Analyte	Lab Result	Lab Qual	DL	DL Type	RL	RL Type	Units	Data Review Qual	Reason Code
DICHLORODIFLUOROMETHANE	3.6	J,C4	0.2	MDL	0.5	MRL	ug/L	J	Ccv

Data Qualifier Summary

Lab Reporting Batch ID: 12353A **Laboratory: FALSE**

EDD Filename: 12353A_VOC_gw_1212039 FINAL **eQAPP Name: Modesto_Site_062812**

Reason Code Legend

Reason Code	*Description*
Ccv	Continuing Calibration Verification Percent Difference Lower Estimation
IcRsd	Initial Calibration Percent Relative Standard Deviation
Mb	Method Blank Contamination
Rl	Reporting Limit Trace Value

* denotes a non-reportable result

SDG 12353B

Data Qualifier Summary

Lab Reporting Batch ID: 12353B — **Laboratory: FALSE**

EDD Filename: 12353b_voc_soilgas_1212040 FINAL — **eQAPP Name: Modesto_Site_062812**

Method Category: VOA

Method: TO-15 ***Matrix:*** Air

Sample ID: **SVE-2-4Q12** ***Collected:*** **12/13/2012 11:20:00** ***Analysis Type:*** Initial ***Dilution:*** 2.19

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
CIS-1,2-DICHLOROETHENE	1.4	J,C1	1.1	MDL	2.2	MRL	ppbv	J	RI

Sample ID: **SVE-98-4Q12** ***Collected:*** **12/13/2012 12:00:00** ***Analysis Type:*** Initial ***Dilution:*** 2.32

Analyte	*Lab Result*	*Lab Qual*	*DL*	*DL Type*	*RL*	*RL Type*	*Units*	*Data Review Qual*	*Reason Code*
CIS-1,2-DICHLOROETHENE	1.6	J,C1	1.2	MDL	2.3	MRL	ppbv	J	RI

* denotes a non-reportable result

Data Qualifier Summary

Lab Reporting Batch ID: 12353B **Laboratory: FALSE**

EDD Filename: 12353b_voc_soilgas_1212040 FINAL **eQAPP Name: Modesto_Site_062812**

Reason Code Legend

Reason Code	*Description*
RI	Reporting Limit Trace Value

* denotes a non-reportable result

Appendix B

Manual Validation Level III and IV Worksheets
and
ADR Reports

SDG 12286B

Reporting Limit Outliers

Lab Reporting Batch ID: 12286B

EDD Filename: 12286B_voc

Laboratory: FALSE

eQAPP Name: Modesto_Site_062812

Method: TO-15

Matrix: Air

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
MW-111-1001	1,4-DICHLOROBENZENE	J,C1	2.0	2.4	MRL	ppbv	J (all detects)
SVE Pre GAC-1001	1,4-DICHLOROBENZENE	J,C1	1.9	2.3	MRL	ppbv	J (all detects)
SVE Stack-1001	1,2-DICHLOROBENZENE	J,C1	1.6	2.5	MRL	ppbv	J (all detects)
	CIS-1,2-DICHLOROETHENE	J,C1	1.8	2.5	MRL	ppbv	
	m&p-Xylene	J,C1	2.7	4.9	MRL	ppbv	
	TOLUENE	J,C1	2.2	2.5	MRL	ppbv	
	TRICHLOROFLUOROMETHANE	J,C1	1.3	2.5	MRL	ppbv	

Field Duplicate RPD Report

Lab Reporting Batch ID: 12286B **Laboratory: FALSE**

EDD Filename: 12286B_voc_rev **eQAPP Name: Modesto_Site_062812**

Method: TO-15
Matrix: Air

Analyte	Concentration (ppbv)		Sample RPD	eQAPP RPD	Flag
	SVE Pre GAC-1001	MW-111-1001			
1,2-DICHLOROBENZENE	11	12	9	1.00	No Qualifiers Applied
1,4-DICHLOROBENZENE	1.9	2.0	5	1.00	
CHLOROFORM	12	12	0	1.00	
CIS-1,2-DICHLOROETHENE	2.9	3.0	3	1.00	
TETRACHLOROETHENE	420	420	0	1.00	
TRICHLOROETHENE	18	19	5	1.00	

LDC #: 28701A48
SDG #: 12286B
Laboratory: EPA Region 9 Laboratory

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 11/14/12
Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method TO-15)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	N	Sampling dates: 10/11/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD ≤ 30
IV.	Continuing calibration/ICV	A	ICV / CCV ≤ 30
V.	Blanks	N	
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates / Dup	N / N	
VIII.	Laboratory control samples	N	
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A ~~N~~	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A ~~N~~	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:

A:✓

+ 1	2=PCE MW-111-1001 TB	- 11	B2J0032-BLK1	21		31	
2	2=PCE SVE Pre GAC-1001	12		22		32	
3	SPCE SVE Stack-1001	13		23		33	
4	MW-111-1001DUP	14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method TO-15)

A. Chloromethane	S. Trichloroethene	KK. Trichlorofluoromethane	CCC. tert-Butylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	MMMM. Benzyl chloride
B. Bromomethane	T. Dibromochloromethane	LL. Methyl-tert-butyl ether	DDD. 1,2,4-Trimethylbenzene	VVV. 4-Ethyltoluene	
C. Vinyl choride	U. 1,1,2-Trichloroethane	MM. 1,2-Dibromo-3-chloropropane	EEE. sec-Butylbenzene	WWW. Ethanol	
D. Chloroethane	V. Benzene	NN. Diethyl ether	FFF. 1,3-Dichlorobenzene	XXX. Di-isopropyl ether	
E. Methylene chloride	W. trans-1,3-Dichloropropene	OO. 2,2-Dichloropropane	GGG. p-Isopropyltoluene	YYY. tert-Butanol	
F. Acetone	X. Bromoform	PP. Bromochloromethane	HHH. 1,4-Dichlorobenzene	ZZZ. tert-Butyl alcohol	
G. Carbon disulfide	Y. 4-Methyl-2-pentanone	QQ. 1,1-Dichloropropene	III. n-Butylbenzene	AAAA. Ethyl tert-butyl ether	
H. 1,1-Dichloroethene	Z. 2-Hexanone	RR. Dibromomethane	JJJ. 1,2-Dichlorobenzene	BBBB. tert-Amyl methyl ether	
I. 1,1-Dichloroethane	AA. Tetrachloroethene	SS. 1,3-Dichloropropane	KKK. 1,2,4-Trichlorobenzene	CCCC.1-Chlorohexane	
J. 1,2-Dichloroethene, total	BB. 1,1,2,2-Tetrachloroethane	TT. 1,2-Dibromoethane	LLL. Hexachlorobutadiene	DDDD. Isopropyl alcohol	
K. Chloroform	CC. Toluene	UU. 1,1,1,2-Tetrachloroethane	MMM. Naphthalene	EEEE. Acetonitrile	
L. 1,2-Dichloroethane	DD. Chlorobenzene	VV. Isopropylbenzene	NNN. 1,2,3-Trichlorobenzene	FFFF. Acrolein	
M. 2-Butanone	EE. Ethylbenzene	WW. Bromobenzene	OOO. 1,3,5-Trichlorobenzene	GGGG. Acrylonitrile	
N. 1,1,1-Trichloroethane	FF. Styrene	XX. 1,2,3-Trichloropropane	PPP. trans-1,2-Dichloroethene	HHHH. 1,4-Dioxane	
O. Carbon tetrachloride	GG. Xylenes, total	YY. n-Propylbenzene	QQQ. cis-1,2-Dichloroethene	IIII. Isobutyl alcohol	
P. Bromodichloromethane	HH. Vinyl acetate	ZZ. 2-Chlorotoluene	RRR. m,p-Xylenes	JJJJ. Methacrylonitrile	
Q. 1,2-Dichloropropane	II. 2-Chloroethylvinyl ether	AAA. 1,3,5-Trimethylbenzene	SSS. o-Xylene	KKKK. Propionitrile	
R. cis-1,3-Dichloropropene	JJ. Dichlorodifluoromethane	BBB. 4-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	LLLL. Ethyl ether	

LDC #: 28702A48

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method TO-15)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?

Y N N/A Were all percent relative standard deviations (%RSD) ≤ 30%?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	8/29/12	ICAL	L	31.61		All	J/UJ/P
			R	32.13		↓	↓

SDG 12314A

Reporting Limit Outliers

Lab Reporting Batch ID: 12314A **Laboratory: FALSE**

EDD Filename: 12314A_VOC_SOILGAS_1211018 FINAL **eQAPP Name: Modesto_Site_062812**

Method: **TO-15**

Matrix: **Air**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
SVE Stack-1101	1,2,4-TRIMETHYLBENZENE	J,C1	1.2	2.2	MRL	ppbv	J (all detects)
	1,4-DICHLOROBENZENE	J,C1	1.6	2.2	MRL	ppbv	
	CIS-1,2-DICHLOROETHENE	J,C1	1.8	2.2	MRL	ppbv	
	TETRACHLOROETHENE	J,C1	1.9	2.2	MRL	ppbv	

LDC #: 28807A48 **VALIDATION COMPLETENESS WORKSHEET** Date: 11/28/12
SDG #: 12314A ADR/IV Page: 1 of 1
Laboratory: EPA Region 9 Laboratory Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method TO-15)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/8/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD ≤ 30%
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 30%
V.	Blanks	N	Not reviewed for ADR validation.
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	Not reviewed for ADR validation.
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	Not reviewed for ADR validation.
XI.	Target compound identification	N	Not reviewed for ADR validation.
XII.	Compound quantitation/RL/LOQ/LODs	N	Not reviewed for ADR validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for ADR validation.
XIV.	System performance	N	Not reviewed for ADR validation.
XV.	Overall assessment of data	N	Not reviewed for ADR validation.
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation

1	SVE Pre GAC-1101**	11		21		31	
2	SVE Stack-1101	12		22		32	
3	SVE Pre GAC-1101DUP	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

Enclosure II

EPA Level IV Data Validation Reports

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Modesto
Collection Date:	November 8, 2012
LDC Report Date:	November 28, 2012
Matrix:	Air
Parameters:	Volatiles
Validation Level:	EPA Level IV
Laboratory:	EPA Region 9 Laboratory
Sample Delivery Group (SDG):	12314A

Sample Identification

SVE Pre GAC-1101

Introduction

This data review covers one air sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method TO-15 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U	Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
J	Indicates an estimated value.
R	Quality control indicates the data is not usable.
NJ	Presumptive evidence of presence of the compound at an estimated quantity.
UJ	Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
A	Indicates the finding is based upon technical validation criteria.
P	Indicates the finding is related to a protocol/contractual deviation.
None	Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 24 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

The percent differences (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

V. Blanks

Method blank analyses were performed at the required frequency. No volatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were not required by the method.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

Duplicate (DUP) sample analyses were analyzed at the required frequency. Results were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were analyzed at the required frequency. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria.

All compounds reported below the RL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 12314A	All compounds reported below the RL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Modesto
Volatiles - Data Qualification Summary - SDG 12314A

SDG	Sample	Compound	Flag	A or P	Reason
12314A	SVE Pre GAC-1101	All compounds reported below the RL.	J (all detects)	A	Compound quantitation and RLs

Modesto
Volatiles - Laboratory Blank Data Qualification Summary - SDG 12314A

No Sample Data Qualified in this SDG

Modesto
Volatiles - Field Blank Data Qualification Summary - SDG 12314A

No Sample Data Qualified in this SDG

LDC #: 28807A48

SDG #: 12314A

Laboratory: EPA Region 9 Laboratory

VALIDATION COMPLETENESS WORKSHEET

ADR/IV

Date: 11/28/12

Page: 1 of 1

Reviewer: BR

2nd Reviewer: C

METHOD: GC/MS Volatiles (EPA Method TO-15)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 11/8/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD ≤ 30%
IV.	Continuing calibration/ICV	~~SW~~ A	ICV/CCV ≤ 30%
V.	Blanks	A	~~Not reviewed for ADR validation.~~
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates / Lab Dup	~~N~~ A	
VIII.	Laboratory control samples	A	~~Not reviewed for ADR validation.~~ LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	~~Not reviewed for ADR validation.~~
XI.	Target compound identification	A	~~Not reviewed for ADR validation.~~
XII.	Compound quantitation/RL/LOQ/LODs	A	~~Not reviewed for ADR validation.~~
XIII.	Tentatively identified compounds (TICs)	N	~~Not reviewed for ADR validation.~~
XIV.	System performance	A	~~Not reviewed for ADR validation.~~
XV.	Overall assessment of data	A	~~Not reviewed for ADR validation.~~
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation

Air ✓

1	SVE Pre GAC-1101**	11		21		31	B2K0046-BLK1
2	~~SVE Stack-1101~~	12		22		32	
3	~~SVE Pre GAC-1101DUP~~	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

LDC #: 28807A48
SDG #: –

VALIDATION FINDINGS CHECKLIST

Reviewer:

2nd Reviewer:

Method: Volatiles (EPA Method TO-15)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Canister pressure criteria was met.	/			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	/			
Were all samples analyzed within the 12 hour clock criteria?	/			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	/			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	/			
Were all percent differences (%D) ≤ 30% and relative response factors (RRF) ≥ 0.05?	/			
V. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?			/	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
VII. Matrix spike/Matrix spike duplicates / Dup				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?	/			Dup
Were the ~~MS/MSD~~ Dup percent ~~recoveries (%R)~~ and the relative percent differences (RPD) within the QC limits?	/			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	/			
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			

LDC #: 28807A48
SDG #: -

VALIDATION FINDINGS CHECKLIST

Reviewer: JDR
2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		/		
Were the performance evaluation (PE) samples within the acceptance limits?			/	
X. Internal standards				
Were internal standard area counts within +/-40% from the associated calibration standard?	/			
Were retention times within +/- 20.0 seconds from the associated calibration standard?	/			
XI. Target compound identification				
Were relative retention times (RRT's) within $\pm$ 0.06 RRT units of the standard?	/			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	/			
Were chromatogram peaks verified and accounted for?	/			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			/	
Were relative intensities of the major ions within $\pm$ 20% between the sample and the reference spectra?			/	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			/	
XIV. System performance				
System performance was found to be acceptable.	/			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.		/		
Target compounds were detected in the field duplicates.			/	
XVII. Field blanks				
Field blanks were identified in this SDG.		/		
Target compounds were detected in the field blanks.			/	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method TO-15)

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. Iodomethane
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO. 1,1-Difluoroethane
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP. 2-Propanol
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC #: 28807A48

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [signature]

METHOD: GC/MS VOA (EPA Method TO-15)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of Compound — A_{is} = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound — C_{is} = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs — X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	11/9/2012	Chloroform (IS1)	2.168	2.168	2.320	2.320	7.77	7.77
	HP5973N		Trichloroethene (IS2)	0.367	0.367	0.376	0.376	4.66	4.69
			Tetrachloroethene (IS3)	0.633	0.633	0.661	0.661	4.34	4.32

Cis	Cx	Ax	Ais
21	10.2	563312	534914
21.8	10	382512	2271990
22	10	613283	2130188

Conc	Chloroform	Trichloroethene	Tetrachloroethen
1.00	2.647	0.401	0.714
2.00	2.410	0.356	0.641
5.00	2.252	0.360	0.652
10.00	2.168	0.367	0.633
15.00	2.230	0.383	0.662
20.00	2.212	0.388	0.664
X =	2.320	0.376	0.661
S =	0.180	0.018	0.029

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28807A48

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: A

METHOD: GC/MS VOA (EPA Method TO-15)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound,
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1			Chloroform (IS1)	See ICAL				
			Trichloroethene (IS2)	See ICAL				
			Tetrachloroethene (IS3)	See ICAL				

Cis	Cx	Compound	CCV1 Ax	CCV1 Ais	CCV2 Ax	CCV2 Ais
20.8	10.1	Chloroform (IS1)				
21.6	10.1	Trichloroethene (IS2)				
22	10.1	Tetrachloroethene (IS3)				

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28807A48
SDG #: Sec cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method TO-15)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 1 , AA :

AA = 150 ppbv
DF = 2.43

Conc. = $\frac{(304927)(22)(2.43)(10)}{(1636067)(0.661)(\;)(\;)}$

= 150.7378 ppbv

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

SDG 12342C

LDC #: 28966A48
SDG #: 12342C
Laboratory: EPA Region 9 Laboratory

VALIDATION COMPLETENESS WORKSHEET
ADR

Date: 12-31-12
Page: 1 of 1
Reviewer: MPL
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method TO-15)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	N	Sampling dates: 12-06-12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤30
IV.	Continuing calibration/ICV	SW	CCV/ICV ≤ 30%
V.	Blanks	N	
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A ~~N~~	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A ~~N~~	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Air

1 +	SVE Pre GAC-1201	11	B2L0036-BLK1	21		31	
2 +	SVE Stack-1201	12		22		32	
3 +	SVE Pre GAC-1101DUP	13		23		33	
4		14		24		34	
5		15		25		35	
6		16		26		36	
7		17		27		37	
8		18		28		38	
9		19		29		39	
10		20		30		40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method TO-15)

A. Chloromethane	S. Trichloroethene	KK. Trichlorofluoromethane	CCC. tert-Butylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	MMMM. Benzyl chloride
B. Bromomethane	T. Dibromochloromethane	LL. Methyl-tert-butyl ether	DDD. 1,2,4-Trimethylbenzene	VVV. 4-Ethyltoluene	
C. Vinyl choride	U. 1,1,2-Trichloroethane	MM. 1,2-Dibromo-3-chloropropane	EEE. sec-Butylbenzene	WWW. Ethanol	
D. Chloroethane	V. Benzene	NN. Diethyl ether	FFF. 1,3-Dichlorobenzene	XXX. Di-isopropyl ether	
E. Methylene chloride	W. trans-1,3-Dichloropropene	OO. 2,2-Dichloropropane	GGG. p-Isopropyltoluene	YYY. tert-Butanol	
F. Acetone	X. Bromoform	PP. Bromochloromethane	HHH. 1,4-Dichlorobenzene	ZZZ. tert-Butyl alcohol	
G. Carbon disulfide	Y. 4-Methyl-2-pentanone	QQ. 1,1-Dichloropropene	III. n-Butylbenzene	AAAA. Ethyl tert-butyl ether	
H. 1,1-Dichloroethene	Z. 2-Hexanone	RR. Dibromomethane	JJJ. 1,2-Dichlorobenzene	BBBB. tert-Amyl methyl ether	
I. 1,1-Dichloroethane	AA. Tetrachloroethene	SS. 1,3-Dichloropropane	KKK. 1,2,4-Trichlorobenzene	CCCC.1-Chlorohexane	
J. 1,2-Dichloroethene, total	BB. 1,1,2,2-Tetrachloroethane	TT. 1,2-Dibromoethane	LLL. Hexachlorobutadiene	DDDD. Isopropyl alcohol	
K. Chloroform	CC. Toluene	UU. 1,1,1,2-Tetrachloroethane	MMM. Naphthalene	EEEE. Acetonitrile	
L. 1,2-Dichloroethane	DD. Chlorobenzene	VV. Isopropylbenzene	NNN. 1,2,3-Trichlorobenzene	FFFF. Acrolein	
M. 2-Butanone	EE. Ethylbenzene	WW. Bromobenzene	OOO. 1,3,5-Trichlorobenzene	GGGG. Acrylonitrile	
N. 1,1,1-Trichloroethane	FF. Styrene	XX. 1,2,3-Trichloropropane	PPP. trans-1,2-Dichloroethene	HHHH. 1,4-Dioxane	
O. Carbon tetrachloride	GG. Xylenes, total	YY. n-Propylbenzene	QQQ. cis-1,2-Dichloroethene	IIII. Isobutyl alcohol	
P. Bromodichloromethane	HH. Vinyl acetate	ZZ. 2-Chlorotoluene	RRR. m,p-Xylenes	JJJJ. Methacrylonitrile	
Q. 1,2-Dichloropropane	II. 2-Chloroethylvinyl ether	AAA. 1,3,5-Trimethylbenzene	SSS. o-Xylene	KKKK. Propionitrile	
R. cis-1,3-Dichloropropene	JJ. Dichlorodifluoromethane	BBB. 4-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	LLLL. Ethyl ether	

LDC #: 28966A48
SDG #: 12342C

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: APL
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA TO-15)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A — Was a continuing calibration standard analyzed at least once every 24 hours for each instrument?
Y N N/A — Were all percent differences (%D) ≤ 30% (70-130)

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%) (70-130)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	11/15/12	2110028-SCV1	LLL	64 (70-130)		All	J/UJ/A
		(ICV)					
	12/11/12	2120031-CCV1	KKK	38.6		All	
		(CCV)	LLL	31.1			

SDG 12349A

Surrogate Outlier Report

Lab Reporting Batch ID: 12349A **Laboratory: FALSE**

EDD Filename: 12349a_voc sedd 2a FINAL **eQAPP Name: Modesto_Site_062812**

Method: **524.2**
Matrix: **Water**

Sample ID (Analysis Type)	*Surrogate*	*Sample % Recovery*	*% Recovery Limits*	*Affected Compounds*	*Flag*
MW-17B-4Q12 (Initial1)	1,2-DICHLOROETHANE-D4	159	76.00-130.00	All Target Analytes	J+ (all detects)

Matrix Spike/Matrix Spike Duplicate Outlier Report

Lab Reporting Batch ID: 12349A **Laboratory: FALSE**

EDD Filename: 12349a_voc sedd 2a FINAL **eQAPP Name: Modesto_Site_062812**

***Method:* 524.2**
***Matrix:* Water**

QC Sample ID (Associated Samples)	Compound	MS %R	MSD %R	%R Limits	RPD (Limits)	Affected Compounds	Flag
MW-16B-4Q12MS (MW-16B-4Q12)	METHYL TERT-BUTYL ETHER	-	42	50.00-140.00	32 (20.00)	METHYL TERT-BUTYL ETHER	J (all detects) UJ (all non-detects)
MW-16B-4Q12MS (MW-16B-4Q12)	TETRACHLOROETHENE	161	-	41.00-150.00	-	TETRACHLOROETHENE	J+(all detects)

Reporting Limit Outliers

Lab Reporting Batch ID: 12349A **Laboratory: FALSE**

EDD Filename: 12349a_voc sedd 2a FINAL **eQAPP Name: Modesto_Site_062812**

Method: 524.2

Matrix: Water

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
MW-12A-4Q12	TRICHLOROFLUOROMETHANE	J,C1	0.4	0.5	MRL	ug/L	J (all detects)
MW-13A-4Q12	BROMODICHLOROMETHANE	J,C1	0.3	0.5	MRL	ug/L	J (all detects)
MW-15A-4Q12	2-BUTANONE	J,C1	2.1	4.0	MRL	ug/L	J (all detects)
MW-16C-4Q12	TETRACHLOROETHENE	J,C1	0.4	0.5	MRL	ug/L	J (all detects)
MW-17A-4Q12	BROMODICHLOROMETHANE	J,C1	0.4	0.5	MRL	ug/L	J (all detects)
MW-17B-4Q12	CHLOROFORM	J,C1,Q7	0.4	0.5	MRL	ug/L	J (all detects)
MW-18A-4Q12	BENZENE	J,C1	0.3	0.5	MRL	ug/L	J (all detects)
MW-19A-4Q12	BENZENE	J,C1	0.3	0.5	MRL	ug/L	J (all detects)
MW-19B-4Q12	BENZENE m&p-Xylene	J,C1 J,C1	0.4 0.6	0.5 1.0	MRL MRL	ug/L ug/L	J (all detects)
MW-1A-4Q12	2-BUTANONE	J,C1	2.6	4.0	MRL	ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 12349A **Laboratory: FALSE**

EDD Filename: 12349a_voc sedd 2a FINAL **eQAPP Name: Modesto_Site_062812**

Method: 524.2
Matrix: Water

Analyte	Concentration (ug/L)		Sample RPD	eQAPP RPD	Flag
	MW-17B-4Q12	MW-83A-4Q12			
ACETONE	6.4	21.000000000	107	1.00	No Qualifiers Applied
CHLOROFORM	0.4	0.300000000	29	1.00	
TETRACHLOROETHENE	47	52.000000000	10	1.00	

LDC #: 28999A1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1-7-13
SDG #: 12349A ADR Page: 1 of 1
Laboratory: USEPA Region 9 Laboratory Reviewer: APL
2nd Reviewer: A

METHOD: GC/MS Volatiles (EPA Method 524.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	N	Sampling dates: 12/10-12/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	%RSD ≤ 30
IV.	Continuing calibration/ICV	A	CCV/ICV ≤ ~~25~~ 30 %
V.	Blanks	N	
VI.	Surrogate spikes	N	#13 surr 1,2-DCE-d4 ↑
VII.	Matrix spike/Matrix spike duplicates	N	#21/22 PCE ↑, MTBE ↓, RPD out
VIII.	Laboratory control samples	N	
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A ~~N~~	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	~~SW~~ ~~N~~ N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	~~SW~~ ~~N~~ A	
XVI.	Field duplicates	N	13 + MW-83A-4Q12 (SDG 12349B)
XVII.	Field blanks	N	FB = 19

Note: A = Acceptable ND = No compounds detected D = Duplicate
N = Not provided/applicable R = Rinsate TB = Trip blank
SW = See worksheet FB = Field blank EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation Water

1 +2	MW-10A-4Q12	11 +2	MW-16C-4Q12	21	MW-16B-4Q12MS	31	① ~~B12L003-BLK1~~
2 +2	MW-10B-4Q12	12 +2	MW-17A-4Q12	22	MW-16B-4Q12MSD	32	② B2L0054-BLK1
3 -2	MW-10C-4Q12	13 +3	MW-17B-4Q12	23 4	~~#1-RE DL~~	33	③ B2L0057-BLK1
4 +2	MW-11A-4Q12	14 +3	MW-17C-4Q12	24 4	#13 ~~RE~~ DL	34	④ B2L0063-BLK1
5 +2	MW-12A-4Q12	15 +3	MW-18A-4Q12	25 4	# ~~20 RE~~ DL	35	
6 +2	MW-13A-4Q12	16 +3	MW-19A-4Q12	26		36	
7 +2	MW-14A-4Q12	17 +3	MW-19B-4Q12	27		37	
8 +2	MW-15A-4Q12	18 +3	MW-1A-4Q12	28		38	
9 +2	MW-16A-4Q12	19 -3	MW-401~~A~~-4Q12	29		39	
10 +2	MW-16B-4Q12	20 +3	MW-4A-4Q12	30		40	

SDG 12349B

Reporting Limit Outliers

Lab Reporting Batch ID: 12349B | **Laboratory: FALSE**

EDD Filename: 12349b_voc sedd 2a FINAL | **eQAPP Name: Modesto_Site_062812**

Method: 524.2

Matrix: Water

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
MW-26B-4Q12	CARBON TETRACHLORIDE	J,C1	0.3	0.5	MRL	ug/L	J (all detects)
MW-27B-4Q12	BENZENE	J,C1	0.3	0.5	MRL	ug/L	J (all detects)
MW-5A-4Q12	CHLOROFORM	J,C1	0.3	0.5	MRL	ug/L	J (all detects)
MW-83A-4Q12	CHLOROFORM	J,C1	0.3	0.5	MRL	ug/L	J (all detects)
MW-8A-4Q12	BROMODICHLOROMETHANE	J,C1	0.3	0.5	MRL	ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 12349B **Laboratory: FALSE**

EDD Filename: 12349b_voc sedd 2a FINAL **eQAPP Name: Modesto_Site_062812**

Method: 524.2
Matrix: Water

Analyte	Concentration (ug/L)		Sample RPD	eQAPP RPD	Flag
	MW-9B-4Q12	MW-91B-4Q12			
TETRACHLOROETHENE	6.9	6.8	1	1.00	No Qualifiers Applied

LDC #: 28999B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/4/13

SDG #: 12349B ADR/Level IV Page: 1 of 1

Laboratory: USEPA Region 9 Laboratory Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method 524.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 12/11/12 - 12/12/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	% RSD ≤ 20
IV.	Continuing calibration/ICV	SW	ICV/CCV ≤ 30
V.	Blanks	SW	Not reviewed for ADR validation.
VI.	Surrogate spikes	A	Not reviewed for ADR validation.
VII.	Matrix spike/Matrix spike duplicates	A	Not reviewed for ADR validation.
VIII.	Laboratory control samples	A	Not reviewed for ADR validation. LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	Not reviewed for ADR validation.
XI.	Target compound identification	A	Not reviewed for ADR validation.
XII.	Compound quantitation/RL/LOQ/LODs	A	Not reviewed for ADR validation.
XIII.	Tentatively identified compounds (TICs)	N	Not reviewed for ADR validation.
XIV.	System performance	A	Not reviewed for ADR validation.
XV.	Overall assessment of data	A	Not reviewed for ADR validation.
XVI.	Field duplicates	N	6 + MW-17B-4Q12 (SDG 12349A), 9+10
XVII.	Field blanks	N	8 = TB, FB = MW-401-4Q12 (SDG 12349A)

Note: A = Acceptable; N = Not provided/applicable; SW = See worksheet; ND = No compounds detected; R = Rinsate; FB = Field blank; D = Duplicate; TB = Trip blank; EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation

water

1 1	MW-4B-4Q12	11 2	MW-2A-4Q12	21 1	B12L0057	31	
2 1	MW-4C-4Q12**	12 2	MW-27B-4Q12	22 2	B12L0063	32	
3 1	2 = AA MW-5A-4Q12	13 3	MW-26B-4Q12	23 3	B12L022	33	
4 2	MW-6A-4Q12**	14 1	MW-4C-4Q12MS	24 4	B12L003	34	
5 2	MW-7A-4Q12	15 1	MW-4C-4Q12MSD	25		35	
6 2	MW-83A-4Q12 FD	16		26		36	
7 2	MW-8A-4Q12**	17		27		37	
8 2	MW-303-4Q12	18		28		38	
9 2	MW-91B-4Q12	19		29		39	
10 2	MW-9B-4Q12	20		30		40	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC #: 28999B)
SDG #: see cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Were all percent relative standard deviations (%RSD) ≤ 20% ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤20.0%)	Associated Samples	Qualifications
	12/19/12	ICAL	B	29.11	B12L022-MB, 13	J/UJ/P

INICAL.1S5

LDC #: 28998 1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: PT
2nd Reviewer: R

METHOD: GC/MS VOA (EPA Method 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were all percent differences (%D) ≤ 30% ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤30.0%)	Associated Samples	Qualifications
+	12/20/12 12:51 PM	CCV	TTT	34.2	B122022-MB, 13	J/UJ/P

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Modesto
Collection Date:	December 11 through December 12, 2012
LDC Report Date:	January 7, 2013
Matrix:	Water
Parameters:	Volatiles
Validation Level:	EPA Level IV
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group (SDG):	12349B

Sample Identification

MW-4C-4Q12
MW-6A-4Q12
MW-8A-4Q12

Introduction

This data review covers 3 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks with the following exceptions:

Method Blank ID	Analysis Date	Compound TIC (RT in minutes)	Concentration	Associated Samples
B2 L0063-MB	12/18/12	Acetone	3.7 ug/L	MW-6A-4Q12 MW-8A-4Q12

Sample concentrations were compared to concentrations detected in the method blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated method blanks.

Sample MW-303-4Q12 was identified as a trip blank. No volatile contaminants were found.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Compound Quantitation and RLs

All compound quantitation and RLs were within validation criteria.

All compounds reported below the RL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 12349B	All compounds reported below the RL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Modesto
Volatiles - Data Qualification Summary - SDG 12349B

SDG	Sample	Compound	Flag	A or P	Reason
12349B	MW-4C-4Q12 MW-6A-4Q12 MW-8A-4Q12	All compounds reported below the RL.	J (all detects)	A	Compound quantitation and RLs

Modesto
Volatiles - Laboratory Blank Data Qualification Summary - SDG 12349B

No Sample Data Qualified in this SDG

Modesto
Volatiles - Field Blank Data Qualification Summary - SDG 12349B

No Sample Data Qualified in this SDG

LDC #: 28999B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/4/13

SDG #: 12349B ADR/Level IV Page: 1 of 1

Laboratory: USEPA Region 9 Laboratory Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method 524.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 12/11/12 - 12/12/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration A	~~SW~~	% RSD ≤ 20
IV.	Continuing calibration/ICV A	~~SW~~	ICV/CCV ≤ 30
V.	Blanks	SW	~~Not reviewed for ADR validation.~~
VI.	Surrogate spikes	A	~~Not reviewed for ADR validation.~~
VII.	Matrix spike/Matrix spike duplicates	A	~~Not reviewed for ADR validation.~~
VIII.	Laboratory control samples	A	~~Not reviewed for ADR validation.~~ LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	A	~~Not reviewed for ADR validation.~~
XI.	Target compound identification	A	~~Not reviewed for ADR validation.~~
XII.	Compound quantitation/RL/LOQ/LODs	A	~~Not reviewed for ADR validation.~~
XIII.	Tentatively identified compounds (TICs)	N	~~Not reviewed for ADR validation.~~
XIV.	System performance	A	~~Not reviewed for ADR validation.~~
XV.	Overall assessment of data	A	~~Not reviewed for ADR validation.~~
XVI.	Field duplicates	N	10 + 9
XVII.	Field blanks	ND	TB = 8

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation

water

1 1	~~MW-4B-4Q12~~	11 2	~~MW-2A-4Q12~~	21 1	B12L0057	31	
2 1	MW-4C-4Q12**	12 2	MW-27B-4Q12	22 2	B12L0063	32	
3 1	~~MW-5A-4Q12~~ 2 = AA	13 3	MW-26B-4Q12	23 3	B12L022	33	
4 2	MW-6A-4Q12**	14 1	MW-4C-4Q12MS	24 4	B12L003	34	
5 2	~~MW-7A-4Q12~~	15 1	~~MW-4C-4Q12MSD~~	25		35	
6 2	~~MW-83A-4Q12~~	16		26		36	
7 2	MW-8A-4Q12**	17		27		37	
8 2	~~MW-303-4Q12~~	18		28		38	
9 2	MW-91B-4Q12	19		29		39	
10 2	~~MW-9B-4Q12~~	20		30		40	

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 30%?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			

LDC #: 28999B1

VALIDATION FINDINGS CHECKLIST

Reviewer: PJ
2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within +/-40% from the associated calibration standard?	✓			
Were retention times within - 30% of the last continuing calibration or +/- 50% of the initial calibration?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within $\pm$ 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 25 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within $\pm$ 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?			✓	
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XVII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC #: 28999B1

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: FT
2nd Reviewer: A

METHOD: GC/MS VOA (EPA SW 846 Method 8260)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y/N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 12/18/12
Conc. units: ug/L
Associated Samples: 4, 7 (ND)

Compound	Blank ID	Sample Identification								
	B2L0063-MB									
F	3.7									

Blank analysis date:
Conc. units:
Associated Samples:

Compound	Blank ID	Sample Identification								

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 28999B1
SDG #:

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer: C

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (5.0 std)	Recalculated RRF (5.0 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/11/12	vinyl ~~Methylene~~ Chloride (1st Internal Standard)	3.584	3.584	3.489	3.489	3.94	3.94
			Trichloroethene (2nd Internal Standard)	0.251	0.251	0.252	0.252	3.76	3.76
			Bromoform (3rd Internal Standard)	0.101	0.101	0.099	0.099	10.16	10.16
2			MMM ~~Methylene Chloride~~ (~~1st~~ ~~4th~~ 3rd Internal Standard)	0.395	0.395	0.376	0.376	14.54	14.54
			~~Trichloroethene (2nd Internal Standard)~~						
			~~Bromoform (3rd Internal Standard)~~						
3			Methylene Chloride (1st Internal Standard)						
			Trichloroethene (2nd Internal Standard)						
			Bromoform (3rd Internal Standard)						
4			Methylene Chloride (1st Internal Standard)						
			Trichloroethene (2nd Internal Standard)						
			Bromoform (3rd Internal Standard)						

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 28999B/
~~SDG #:~~

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 1 of 1
Reviewer: F
2nd Reviewer: A

METHOD: GC/MS VOA (EPA Method 524.2)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compound identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = $(A_x)(C_{is})/(A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
A_x = Area of compound, A_{is} = Area of associated internal standard
C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	ccV 8:42	12/17/12	~~Methylene~~ Vinyl Chloride (1st Internal Standard)	3.489	2.967	2.967	15.0	15.0
			Trichloroethene (2nd Internal Standard)	0.252	0.236	0.236	6.3	6.3
			Bromoform (3rd Internal Standard)	0.099	0.095	0.095	4.0	4.0
2			~~Methylene Chloride~~ MMM (~~1st~~ 3rd Internal Standard)	0.376	0.398	0.398	5.9	5.9
			Trichloroethene (2nd Internal Standard)					
			Bromoform (3rd Internal Standard)					
3	ccV 10:28	12/18/12	~~Methylene~~ Vinyl Chloride (1st Internal Standard)		3.226	3.226	7.5	7.5
			Trichloroethene (2nd Internal Standard)		0.251	0.251	0.4	0.4
			Bromoform (3rd Internal Standard)		0.096	0.096	3.0	3.0
4			~~Methylene Chloride~~ MMM (~~1st~~ 3rd Internal Standard)		0.346	0.346	8.0	8.0
			Trichloroethene (2nd Internal Standard)					
			Bromoform (3rd Internal Standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

~~SDG #:~~ LDC # 28999B1

Surrogate Results Verification

Reviewer: [illegible]
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #2

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	5.0	4.979	100	100	0
Bromofluorobenzene	↓	4.633	93	93	↓
1,2-Dichlorobenzene-d4		4.515	~~104~~ 90	90	
1,2-Dichloroethane-d4 ~~Dibromofluoromethane~~		5.179	104	104	

Sample ID:___________

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID:___________

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID:___________

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

LDC #: 28999B1
SDG #: ~~_____~~

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: F
2nd Reviewer: A

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified belo using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Sample concentration

RPD = I MSC - MSDC I * 2/(MSC + MSDC)

MSC = Matrix spike percent recovery
MSDC = Matrix spike duplicate percent recovery

MS/MSD sample: 14 & 15

Compound	Spike Added (ug/L)		Sample Concentration (ug/L)	Spiked Sample Concentration (ug/L)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	5.0	5.0	ND	5.65	5.49	113	113	110	110	3	3
Trichloroethene	↓	↓	↓	5.22	5.12	104	104	102	102	2	2
Benzene				5.39	5.24	108	108	105	105	3	3
Toluene				5.35	5.28	107	107	106	106	1	1
Chlorobenzene				5.12	5.04	102	102	101	101	2	2

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 29971B1
SDG #: ______

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculate for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA   Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD)   LCS = Laboraotry control sample percent recovery   LCSD = Laboratory control sample duplicate percent recovery

LCS ID: B2L0057 LCS

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.0	NA	4.65	NA	93	93				
Trichloroethene			4.80		96	96				
Benzene			5.05		101	101				
Toluene			4.97		99	99				
Chlorobenzene			5.07		101	101	NA			

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of th recalculated results.

LDC #: 28999B1
~~SDG #:~~

Page: 1 of 1
Reviewer: FT
2nd reviewer: C

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: GC/MS VOA (EPA Method 524.2)

Compound results for AA reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample purged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. #2, AA:

Conc. = $\frac{(67863)(5.0)(\quad)}{(749859)(0.419)(\quad)(\quad)}$

= 1.1 ug/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)

SDG 12353A

Reporting Limit Outliers

Lab Reporting Batch ID: 12353A **Laboratory: FALSE**

EDD Filename: 12353A_VOC_gw_1212039 FINAL **eQAPP Name: Modesto_Site_062812**

Method: **524.2**

Matrix: **Water**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
MW-20C-4Q12	BENZENE	J,C1	0.3	0.5	MRL	ug/L	J (all detects)
MW-22A-4Q12	BROMODICHLOROMETHANE	J,C1	0.4	0.5	MRL	ug/L	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 12353A **Laboratory: FALSE**

EDD Filename: 12353A_VOC_gw_1212039 FINAL **eQAPP Name: Modesto_Site_062812**

Method: 524.2
Matrix: Water

Analyte	Concentration (ug/L)		Sample RPD	eQAPP RPD	Flag
	MW-20A-4Q12	MW-80A-4Q12			
CHLOROFORM	6.8	6.7	1	1.00	No Qualifiers Applied
DICHLORODIFLUOROMETHANE	3.4	3.6	6	1.00	
TETRACHLOROETHENE	180	160	12	1.00	

Analyte	Concentration (ug/L)		Sample RPD	eQAPP RPD	Flag
	MW-24B-4Q12	MW-76B-4Q12			
TETRACHLOROETHENE	85	81	5	1.00	No Qualifiers Applied

LDC #: 29059A1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/16/13
SDG #: 12353A ADR / 1√ Page: 1 of 1
Laboratory: USEPA Region 9 Laboratory Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Volatiles (EPA Method 524.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	N	Sampling dates: 12/13/12 - 12/14/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	SW	RSD ≤ 20%
IV.	Continuing calibration/ICV	SW	ICV/CCV ≤ 30%
V.	Blanks	N	
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	~~N~~ A	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A ~~N~~	
XVI.	Field duplicates		
XVII.	Field blanks		

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet
ND = No compounds detected
R = Rinsate
FB = Field blank
D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation

1 1	MW-22A-4Q12 **	11 3	4 = AA MW-20B-4Q12	21		31 1	B12L003-MB
2 1	2 = AA MW-23A-4Q12 **	12 4	MW-20C-4Q12	22		32 2	B12L022-MB
3 1	2 = AA MW-24B-4Q12 ** D	13 3	MW-21A-4Q12	23		33 3	B12L027-MB
4 1	2 = AA MW-25B-4Q12 **	14	MW-22A-4Q12MS	24		34 4	B12L029-MB
5 1	2 = AA MW-28B-4Q12	15	MW-22A-4Q12MSD	25		35	
6 2	3 = AA MW-29B-4Q12	16		26		36	
7 3	MW-3A-4Q12	17		27		37	
8 3	MW-76B-4Q12 D	18		28		38	
9 2	4 = AA MW-80A-4Q12 D2	19		29		39	
10 3	4 = AA MW-20A-4Q12 D2	20		30		40	

TARGET COMPOUND WORKSHEET

524.2

METHOD: VOA (~~EPA SW 846~~ Method ~~8260B~~)

A. Chloromethane*	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride**	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform*	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene**	BB. 1,1,2,2-Tetrachloroethane*	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane*	CC. Toluene**	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene*	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform**	EE. Ethylbenzene**	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane**	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

* = System performance check compounds (SPCC) for RRF ; ** = Calibration check compounds (CCC) for %RSD.

LDC #: 29059A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA ~~SW 846~~ Method ~~8260B~~ 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?________
Y N N/A Did the initial calibration meet the acceptance criteria?
Y N N/A Were all %RSDs and RRFs within the validation criteria of ≤~~30~~ 20 %RSD and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤~~30.0%~~ 20)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	12/19/12	ICAL-GCMS J	B	29.11		B121022-MB + 6	J/UJ/P

INICAL.wpd

LDC #: 29059A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: BR

2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA ~~SW 846~~ Method ~~8260B~~ 524.2)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?

Y N N/A Were all %D and RRFs within the validation criteria of ~~≤25~~ 30 %D and ≥0.05 RRF ?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤~~25.0~~ 30%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	12/20/12	CCV-122012J04	TTT	34.2		6 + B12L022-MB	J/UJ/P
	12/21/12	CCV-122112A04	JJ	41.9		7-11, 13 + B12L027-MB	J/UJ/P

LDC Report# 29059A1

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Modesto
Collection Date:	December 12 through December 13, 2012
LDC Report Date:	January 17, 2013
Matrix:	Water
Parameters:	Volatiles
Validation Level:	EPA Level IV
Laboratory:	USEPA Region 9 Laboratory
Sample Delivery Group (SDG):	12353A

Sample Identification

MW-22A-4Q12
MW-23A-4Q12
MW-24B-4Q12
MW-25B-4Q12

Introduction

This data review covers 4 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method 524.2 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodies were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Average relative response factors (RRF) for all compounds were within method and validation criteria.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were within the method criteria of less than or equal to 30.0% for all compounds.

The percent differences (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within method and validation criteria.

V. Blanks

Method blanks were reviewed for each matrix as applicable. No volatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were added to all samples and blanks as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) samples were reviewed for each matrix as applicable. Percent recoveries (%R) and relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Compound Quantitation

All compound quantitation were within validation criteria.

All compounds reported below the RL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 12353A	All compounds reported below the RL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

Samples MW-24B-4Q12 and MW-76B-4Q12 were identified as field duplicates. No volatiles were detected in any of the samples with the following exceptions:

Compound	Concentration (ug/L)		RPD
	MW-24B-4Q12	MW-76B-4Q12	
Tetrachloroethene	85	81	5

Modesto
Volatiles - Data Qualification Summary - SDG 12353A

SDG	Sample	Compound	Flag	A or P	Reason
12353A	MW-22A-4Q12 MW-23A-4Q12 MW-24B-4Q12 MW-25B-4Q12	All compounds reported below the RL.	J (all detects)	A	Compound quantitation and RLs

Modesto
Volatiles - Laboratory Blank Data Qualification Summary - SDG 12353A

No Sample Data Qualified in this SDG

Modesto
Volatiles - Field Blank Data Qualification Summary - SDG 12353A

No Sample Data Qualified in this SDG

LDC #: 29059A1 **VALIDATION COMPLETENESS WORKSHEET** Date: 1/16/13
SDG #: 12353A ADR / (IV) Page: 1 of 1
Laboratory: USEPA Region 9 Laboratory Reviewer: BR
2nd Reviewer: A

METHOD: GC/MS Volatiles (EPA Method 524.2)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	~~N~~ A	Sampling dates: 12/12/12 - 12/13/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD ≤ 20%
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 30%
V.	Blanks	~~N~~ A	
VI.	Surrogate spikes	~~N~~ A	
VII.	Matrix spike/Matrix spike duplicates	~~N~~ A	
VIII.	Laboratory control samples	~~N~~ A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	~~N~~ A	
XI.	Target compound identification	~~N~~ A	
XII.	Compound quantitation/RL/LOQ/LODs	~~N~~ A	
XIII.	Tentatively identified compounds (TICs)	~~N~~ N	
XIV.	System performance	~~N~~ A	
XV.	Overall assessment of data	~~N~~ A	
XVI.	Field duplicates	SW	FD = 3 + 8
XVII.	Field blanks	N	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples:** Indicates sample underwent Level IV validation

1 1	MW-22A-4Q12 **	11	~~MW-20B-4Q12~~	21		31 1	B12L003-MB
2 1	MW-23-4Q12 ** 2=AA	12	~~MW-20C-4Q12~~	22		32 2	B12L022-MB
3 1	MW-24B-4Q12 ** D 2=AA	13	~~MW-21A-4Q12~~	23		33 3	~~B12L027-MB~~
4 1	MW-25B-4Q12 ** 2=AA	14	MW-22A-4Q12MS	24		34	
5	~~MW-28B-4Q12~~	15	MW-22A-4Q12MSD	25		35	
6	MW-29B-4Q12	16		26		36	
7	MW-3A-4Q12	17		27		37	
8	MW-76B-4Q12 D	18		28		38	
9	MW-80A-4Q12	19		29		39	
10	~~MW-20A-4Q12~~	20		30		40	

LDC #: 29059A1

VALIDATION FINDINGS CHECKLIST

Reviewer: BR
2nd Reviewer: A

Method: Volatiles (EPA Method 524.2)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) < 20%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) < 30%?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			

LDC #: 29059A1

VALIDATION FINDINGS CHECKLIST

Reviewer: BK
2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within +/-40% from the associated calibration standard?	✓			
Were retention times within - 30% of the last continuing calibration or +/- 50% of the initial calibration?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 25 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		✓		
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.	✓			
Target compounds were detected in the field duplicates.	✓			
XVII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method 524.2)

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN.
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO.
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP.
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC#: 29059A1

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: BR
2nd Reviewer: A

METHOD: GC MS Volatiles (EPA SW 846 Method 524.2)

Y N NA Were field duplicate pairs identified in this SDG?
Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD
	3	8	
AA	85	81	5

\\LDCFILESERVER\Validation\FIELD DUPLICATES\29059A1.wpd

LDC #: 29059A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: A

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$ | A_x = Area of Compound | A_{is} = Area of associated internal standard

average RRF = sum of the RRFs/number of standards | C_x = Concentration of compound, | C_{is} = Concentration of internal standard

%RSD = 100 * (S/X) | S= Standard deviation of the RRFs, | X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 5 std)	Recalculated RRF (RRF 5 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	10/11/2012	1,1-Dichloroethene (IS1)	3.024	3.024	2.974	2.974	5.88	5.89
	MS-H		Trichloroethene (IS2)	0.251	0.251	0.252	0.252	3.76	3.79
			Tetrachloethane (IS3)	0.422	0.422	0.419	0.419	2.35	5.40

Cis/Cx	Ax	Ais
5/5	443691	146726
5/5	433133	1723778
5/5	492099	1166496

Conc	1,1-Dichloroethene	Trichloroethene	Tetrachloethane
0.5	2.777	0.249	0.392
1	2.773	0.243	0.406
2	3.021	0.244	0.408
5	3.024	0.251	0.422
10	3.016	0.256	0.432
25	3.234	0.269	0.456
X =	2.974	0.252	0.419
S =	0.1751	0.0096	0.0227

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 29059A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$ — A_x = Area of Compound — A_{is} = Area of associated internal standard

average RRF = sum of the RRFs/number of standards — C_x = Concentration of compound, — C_{is} = Concentration of internal standard

%RSD = 100 * (S/X) — S= Standard deviation of the RRFs, — X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 5 std)	Recalculated RRF (RRF 5 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	12/19/2012	Tetrachloroethene (IS1	0.516	0.516	0.538	0.538	8.08	8.12
	MS-J								

Cis/Cx	Ax	Ais
5/5	433337	840580

Conc	Tetrachloroethene (IS1)		
0.5	0.616		
1	0.546		
2	0.537		
5	0.516		
10	0.528		
25	0.485		
X =	0.538		
S =	0.0437		

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 29059A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: ✓

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound,
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1	121912h02	12/19/2012	1,1-Dichloroethene (IS1)	2.974	3.034	3.034	2.0	2.0
			Trichloroethene (IS2)	0.252	0.258	0.258	2.4	2.4
			Tetrachloethane (IS3)	0.419	0.442	0.442	5.5	5.5
2	122012j04	12/20/2012	Tetrachloethane (IS3)	0.538	0.578	0.578	7.4	7.4

	CCV1		CCV2	
Cis/Cx	Ax	Ais	Ax	Ais
5/5	364863	120270	520965	901532
5/5	332091	1287290		
5/5	364581	824255		

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 29051A1
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: BR
2nd reviewer: A

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 1

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8	5.000	4.923	98	98	0
Bromofluorobenzene	↓	4.587	92	92	0
1,2-Dichlorobenzene-d4		~~4.574~~ 4.574	91	91	0
~~Dibromofluoromethane~~ 1,2-Dichloroethane		5.135	103	103	0

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
			Reported	Recalculated	
Toluene-d8					
Bromofluorobenzene					
1,2-Dichlorobenzene-d4					
Dibromofluoromethane					

LDC#: 29059A1

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: BR

2nd Reviewer

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and relative percent differences (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 * (SSC - SC)/SA   Where: SSC = Spiked sample concentration   SC = Sample concentration
SA = Spike added

RPD = [MSC- MSDC] * 2) / (MSC + MSDC)*100   MSC = Matrix spike percent recovery   MSDC = Matrix spike duplicate percent recovery

MS/MSD samples: 14/15

Compound	Spike Added (µg/L)		Sample Conc. (µg/L)	Spiked Sample Concentration (µg/L)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	-------	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
1,1-Dichloroethene	5.00	5.00	0	5.57	5.59	111%	111%	112%	112%	0.5%	0.4%
Trichloroethene	5.00	5.00	0	5.40	5.29	108%	108%	106%	106%	2%	2%
Benzene	5.00	5.00	0	5.52	5.36	110%	110%	107%	107%	3%	3%
Toluene	5.00	5.00	0	5.39	5.38	108%	108%	108%	108%	0.3%	0.2%
Chlorobenzene	5.00	5.00	0	5.33	5.19	107%	107%	104%	104%	3%	3%

Comments: Refer to Matrix Spike/Matrix Spike Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 29059A1
SDG #: See cover

Reviewer: BR
2nd Reviewer: Q

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

METHOD: GC/MS VOA (EPA Method 524.2)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * SSC/SA   Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD)   LCS = Laboraotry control sample percent recovery   LCSD = Laboratory control sample duplicate percent recovery

LCS ID: BRL003-BS1

Compound	Spike Added (ug/L)		Spiked Sample Concentration (ug/L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	5.00	—	5.02	—	100	100				
Trichloroethene			5.2		104	104				
Benzene			5.17		103	103				
Toluene			5.28		106	106				
Chlorobenzene			5.14		103	103				

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 29059A1
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: BR
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 524.2)

Compound results for ~~AA~~ K reported with a positive detect were recalculated and verified using the following equation:

$$\text{Concentration} = \frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample purged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example: K ~~AA~~ K = 8.9 ug/L

Sample I.D. 1 , ~~AA~~ :

$$\text{Conc.} = \frac{(891259)(5)(\quad)}{(107680)(4.645)(\quad)(\quad)}$$

= 8.9095 ug/L

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)

SDG 12353B

Reporting Limit Outliers

Lab Reporting Batch ID: 12353B

Laboratory: FALSE

EDD Filename: 12353b_voc_soilgas_1212040 FINAL

eQAPP Name: Modesto_Site_062812

Method: **TO-15**

Matrix: **Air**

SampleID	Analyte	Lab Qual	Result	Reporting Limit	RL Type	Units	Flag
SVE-2-4Q12	CIS-1,2-DICHLOROETHENE	J,C1	1.4	2.2	MRL	ppbv	J (all detects)
SVE-98-4Q12	CIS-1,2-DICHLOROETHENE	J,C1	1.6	2.3	MRL	ppbv	J (all detects)

Field Duplicate RPD Report

Lab Reporting Batch ID: 12353B **Laboratory: FALSE**

EDD Filename: 12353b_voc_soilgas_1212040 **eQAPP Name: Modesto_Site_062812**

FINAL

Method: TO-15
Matrix: Air

Analyte	Concentration (ppbv)		Sample RPD	eQAPP RPD	Flag
	DP-1B-4Q12	DP-99B-4Q12			
TETRACHLOROETHENE	32	34	6	1.00	No Qualifiers Applied

Analyte	Concentration (ppbv)		Sample RPD	eQAPP RPD	Flag
	SVE-2-4Q12	SVE-98-4Q12			
CIS-1,2-DICHLOROETHENE	1.4	1.6	13	1.00	No Qualifiers Applied
TETRACHLOROETHENE	180	190	5	1.00	

LDC #: 29059B48

SDG #: 12353B

Laboratory: EPA Region 9 Laboratory

VALIDATION COMPLETENESS WORKSHEET

ADR / IV

Date: 1/16/13

Page: 1 of 1

Reviewer: ba

2nd Reviewer: A

METHOD: GC/MS Volatiles (EPA Method TO-15)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 12/13/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD ≤ 30%
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 30%
V.	Blanks	N	
VI.	Surrogate spikes	N	
VII.	Matrix spike/Matrix spike duplicates	N	
VIII.	Laboratory control samples	N	
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	N	
XI.	Target compound identification	N	
XII.	Compound quantitation/RL/LOQ/LODs	N	
XIII.	Tentatively identified compounds (TICs)	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A ~~N~~	
XVI.	Field duplicates	↓	
XVII.	Field blanks	↓	

Note: A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Air ✓

1 1	DP-1A-4Q12 **	11 2	SVE-2-4Q12 D2	21		31 1	B12L065-MB
2 1	DP-1B-4Q12 D1	12 2	SVE-3-4Q12	22		32 2	B12L028-MB
3 1	DP-5A-4Q12	13 2	SVE-4-4Q12	23		33	
4 1	DP-5B-4Q12	14 2	SVE-98-4Q12 D2	24		34	
5 1	DP-6A-4Q12	15	SVE-98-4Q12DUP	25		35	
6 1	DP-6B-4Q12	16		26		36	
7 1	DP-99B-4Q12 D1	17		27		37	
8 1	OSVE-10-4Q12	18		28		38	
9 2	OSVE-11-4Q12	19		29		39	
10 2	SVE-1-4Q12	20		30		40	

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name:	Modesto
Collection Date:	December 13, 2012
LDC Report Date:	January 16, 2013
Matrix:	Air
Parameters:	Volatiles
Validation Level:	EPA Level IV
Laboratory:	EPA Region 9 Laboratory
Sample Delivery Group (SDG):	12353B

Sample Identification

DP-1A-4Q12

Introduction

This data review covers one air sample listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA Method TO-15 for Volatiles.

This review follows a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review (June 2008).

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

The following are definitions of the data qualifiers:

U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.

J Indicates an estimated value.

R Quality control indicates the data is not usable.

NJ Presumptive evidence of presence of the compound at an estimated quantity.

UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.

A Indicates the finding is based upon technical validation criteria.

P Indicates the finding is related to a protocol/contractual deviation.

None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

Instrument performance was checked at 24 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration

Initial calibration was performed using required standard concentrations.

Percent relative standard deviations (%RSD) were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 30.0%.

The percent differences (%D) of the second source calibration standard were less than or equal to 30.0% for all compounds.

V. Blanks

Method blank analyses were performed at the required frequency. No volatile contaminants were found in the method blanks.

No field blanks were identified in this SDG.

VI. Surrogate Spikes

Surrogates were not required by the method.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

Duplicate (DUP) sample analyses were analyzed at the required frequency. Results were within QC limits.

VIII. Laboratory Control Samples (LCS)

Laboratory control samples were analyzed at the required frequency. Percent recoveries (%R) were within QC limits.

IX. Regional Quality Assurance and Quality Control

Not applicable.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Target Compound Identifications

All target compound identifications were within validation criteria.

XII. Compound Quantitation

All compound quantitation were within validation criteria.

All compounds reported below the RL were qualified as follows:

Sample	Finding	Flag	A or P
All samples in SDG 12353B	All compounds reported below the RL.	J (all detects)	A

XIII. Tentatively Identified Compounds (TICs)

Tentatively identified compounds were not reported by the laboratory.

XIV. System Performance

The system performance was acceptable.

XV. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XVI. Field Duplicates

No field duplicates were identified in this SDG.

Modesto
Volatiles - Data Qualification Summary - SDG 12353B

SDG	Sample	Compound	Flag	A or P	Reason
12353B	DP-1A-4Q12	All compounds reported below the RL.	J (all detects)	A	Compound quantitation and RLs

Modesto
Volatiles - Laboratory Blank Data Qualification Summary - SDG 12353B

No Sample Data Qualified in this SDG

Modesto
Volatiles - Field Blank Data Qualification Summary - SDG 12353B

No Sample Data Qualified in this SDG

LDC #: 29059B48

SDG #: 12353B

Laboratory: EPA Region 9 Laboratory

VALIDATION COMPLETENESS WORKSHEET

ADR / ✓

Date: 1/16/13

Page: 1 of 1

Reviewer: BR

2nd Reviewer: A

METHOD: GC/MS Volatiles (EPA Method TO-15)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 12/13/12
II.	GC/MS Instrument performance check	A	
III.	Initial calibration	A	RSD ≤ 30%
IV.	Continuing calibration/ICV	A	ICV/CCV ≤ 30%
V.	Blanks	~~N~~ A	
VI.	Surrogate spikes	~~N~~ N	Not required
VII.	Matrix spike/Matrix spike duplicates / DUP	~~N~~ N/A	Not ~~required~~
VIII.	Laboratory control samples	~~N~~ A	LCS
IX.	Regional Quality Assurance and Quality Control	N	
X.	Internal standards	~~N~~ A	
XI.	Target compound identification	~~N~~ A	
XII.	Compound quantitation/RL/LOQ/LODs	~~N~~ A	
XIII.	Tentatively identified compounds (TICs)	~~N~~ N	
XIV.	System performance	~~N~~ A	
XV.	Overall assessment of data	~~N~~ A	
XVI.	Field duplicates	N	
XVII.	Field blanks	N	

Note:
A = Acceptable
N = Not provided/applicable
SW = See worksheet

ND = No compounds detected
R = Rinsate
FB = Field blank

D = Duplicate
TB = Trip blank
EB = Equipment blank

Validated Samples: Air

1	DP-1A-4Q12 **	11	~~SVE-2-4Q12~~ D2	21		31	BR L005-MB
2	~~DP-1B-4Q12~~ D1	12	SVE-3-4Q12	22		32	
3	DP-5A-4Q12	13	SVE-4-4Q12	23		33	
4	DP-5B-4Q12	14	SVE-98-4Q12 D2	24		34	
5	DP-6A-4Q12	15	~~SVE-98-4Q12DUP~~	25		35	
6	DP-6B-4Q12	16		26		36	
7	DP-99B-4Q12 D1	17		27		37	
8	OSVE-10-4Q12	18		28		38	
9	OSVE-11-4Q12	19		29		39	
10	SVE-1-4Q12	20		30		40	

LDC #: 29059B48
SDG #: see cover

VALIDATION FINDINGS CHECKLIST

Reviewer: BR
2nd Reviewer: A

Method: Volatiles (EPA Method TO-15)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Canister pressure criteria was met.	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 30% and relative response factors (RRF) ≥ 0.05?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 30% and relative response factors (RRF) ≥ 0.05?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Surrogate spikes				
Were all surrogate %R within QC limits?			✓	
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	
VII. Matrix spike/Matrix spike duplicates				
Was a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for this SDG?		✓		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			

VALIDATION FINDINGS CHECKLIST

Reviewer: BR
2nd Reviewer: C

Validation Area	Yes	No	NA	Findings/Comments
IX. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Internal standards				
Were internal standard area counts within +/-40% from the associated calibration standard?	✓			
Were retention times within +/- 20.0 seconds from the associated calibration standard?	✓			
XI. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XII. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Tentatively identified compounds (TICs)				
Were the major ions (> 10 percent relative intensity) in the reference spectrum evaluated in sample spectrum?			✓	
Were relative intensities of the major ions within ± 20% between the sample and the reference spectra?			✓	
Did the raw data indicate that the laboratory performed a library search for all required peaks in the chromatograms (samples and blanks)?		✓		
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XVI. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XVII. Field blanks				
Field blanks were identified in this SDG.		✓		
Target compounds were detected in the field blanks.			✓	

TARGET COMPOUND WORKSHEET

METHOD: VOA (EPA Method TO-15)

A. Chloromethane	U. 1,1,2-Trichloroethane	OO. 2,2-Dichloropropane	III. n-Butylbenzene	CCCC.1-Chlorohexane
B. Bromomethane	V. Benzene	PP. Bromochloromethane	JJJ. 1,2-Dichlorobenzene	DDDD. Isopropyl alcohol
C. Vinyl choride	W. trans-1,3-Dichloropropene	QQ. 1,1-Dichloropropene	KKK. 1,2,4-Trichlorobenzene	EEEE. Acetonitrile
D. Chloroethane	X. Bromoform	RR. Dibromomethane	LLL. Hexachlorobutadiene	FFFF. Acrolein
E. Methylene chloride	Y. 4-Methyl-2-pentanone	SS. 1,3-Dichloropropane	MMM. Naphthalene	GGGG. Acrylonitrile
F. Acetone	Z. 2-Hexanone	TT. 1,2-Dibromoethane	NNN. 1,2,3-Trichlorobenzene	HHHH. 1,4-Dioxane
G. Carbon disulfide	AA. Tetrachloroethene	UU. 1,1,1,2-Tetrachloroethane	OOO. 1,3,5-Trichlorobenzene	IIII. Isobutyl alcohol
H. 1,1-Dichloroethene	BB. 1,1,2,2-Tetrachloroethane	VV. Isopropylbenzene	PPP. trans-1,2-Dichloroethene	JJJJ. Methacrylonitrile
I. 1,1-Dichloroethane	CC. Toluene	WW. Bromobenzene	QQQ. cis-1,2-Dichloroethene	KKKK. Propionitrile
J. 1,2-Dichloroethene, total	DD. Chlorobenzene	XX. 1,2,3-Trichloropropane	RRR. m,p-Xylenes	LLLL. Ethyl ether
K. Chloroform	EE. Ethylbenzene	YY. n-Propylbenzene	SSS. o-Xylene	MMMM. Benzyl chloride
L. 1,2-Dichloroethane	FF. Styrene	ZZ. 2-Chlorotoluene	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	NNNN. Iodomethane
M. 2-Butanone	GG. Xylenes, total	AAA. 1,3,5-Trimethylbenzene	UUU. 1,2-Dichlorotetrafluoroethane	OOOO. 1,1-Difluoroethane
N. 1,1,1-Trichloroethane	HH. Vinyl acetate	BBB. 4-Chlorotoluene	VVV. 4-Ethyltoluene	PPPP. 2-Propanol
O. Carbon tetrachloride	II. 2-Chloroethylvinyl ether	CCC. tert-Butylbenzene	WWW. Ethanol	QQQQ.
P. Bromodichloromethane	JJ. Dichlorodifluoromethane	DDD. 1,2,4-Trimethylbenzene	XXX. Di-isopropyl ether	RRRR.
Q. 1,2-Dichloropropane	KK. Trichlorofluoromethane	EEE. sec-Butylbenzene	YYY. tert-Butanol	SSSS.
R. cis-1,3-Dichloropropene	LL. Methyl-tert-butyl ether	FFF. 1,3-Dichlorobenzene	ZZZ. tert-Butyl alcohol	TTTT.
S. Trichloroethene	MM. 1,2-Dibromo-3-chloropropane	GGG. p-Isopropyltoluene	AAAA. Ethyl tert-butyl ether	UUUU.
T. Dibromochloromethane	NN. Methyl ethyl ketone	HHH. 1,4-Dichlorobenzene	BBBB. tert-Amyl methyl ether	VVVV.

LDC #: 29059A48

VALIDATION FINDINGS WORKSHEET

Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method TO-15)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of Compound
C_x = Concentration of compound
S= Standard deviation of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 10 std)	Recalculated RRF (RRF 10 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	12/19/2012	Chloroform (IS1)	1.688	1.689	1.656	1.656	11.41	11.42
	HP5973K		Trichloroethene (IS2)	0.349	0.349	0.337	0.337	10.78	10.80
			Tetrachloroethene (IS3)	0.506	0.507	0.476	0.476	13.10	13.08

Cis	Cx	Ax	Ais
20.4	10.2	149497	177068
21.20	10	68913	418492
22.00	10	92816	403115

Conc	Chloroform	Trichloroethene	Tetrachloroethen
1.00	1.865	0.376	0.527
2.00	1.612	0.325	0.464
5.00	1.309	0.270	0.356
10.00	1.688	0.349	0.506
15.00	1.720	0.350	0.495
20.00	1.743	0.349	0.507
X =	1.656	0.337	0.476
S =	0.189	0.036	0.062

Comments: Refer to Initial Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 29059A48

VALIDATION FINDINGS WORKSHEET

Continuing Calibration Calculation Verification

Page: 1 of 1
Reviewer: BR
2nd Reviewer: Q

METHOD: GC/MS VOA (EPA Method TO-15)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 * (ave. RRF - RRF)/ave. RRF
RRF = (Ax)(Cis)/(Ais)(Cx)

Where:
ave. RRF = initial calibration average RRF
RRF = continuing calibration RRF
Ax = Area of compound,
Cx = Concentration of compound,
Ais = Area of associated internal standard
Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1			Chloroform (IS1)	See ICAL				
			Trichloroethene (IS2)	See ICAL				
			Tetrachloroethene (IS3)	See ICAL				

Cis	Cx	Compound	CCV1 Ax	CCV1 Ais	CCV2 Ax	CCV2 Ais
20.8	10.1	Chloroform (IS1)				
21.6	10.1	Trichloroethene (IS2)				
22	10.1	Tetrachloroethene (IS3)				

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 29054B48
SDG #: See cover

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: BR
2nd reviewer: A

METHOD: GC/MS VOA (EPA Method TO-15)

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(DF)}{(A_{is})(RRF)(V_o)(\%S)}$$

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. 1 , All ND

Conc. = ( )( )( ) / ( )( )( )( )

=

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

URS Group, Inc.

C.0 QUALITY CONTROL SUMMARY REPORT

C.1 Introduction

This section summarizes QA and QC results for the samples collected and data generated during 4Q12 at the Modesto Groundwater Superfund Site, Modesto, California. Sampling activity protocols are provided in the SAP (URS, 2010b). Based on the data review, all data collected and analyzed during this period are of known and acceptable quality in relation to the data quality objectives (DQOs) of this project. All data are considered usable as qualified for the intended purposes.

Between October 11 and December 6, 2012, field samples, field duplicates (FDs), and field QC samples were collected and analyzed. Water and vapor samples were collected from the GWTS. Table B1 (Appendix B) lists contaminants of concern at the Modesto Groundwater Superfund Site.

The following laboratories performed system sampling and monitoring analyses during 4Q12:

ALS Laboratory (Formerly Columbia Analytical Services)

- TDS by SM2540C: 3 normal samples (NS), 1 FD
- TSS by SM2540D: 3 NS, 1 FD
- BOD by SM5210B: 3 NS, 1 FD
- VOCs in water by EPA Method 524.2: 13 NS, 1 FD, 3 trip blanks (TBs), and 1 matrix spike/matrix spike duplicate (MS/MSD)

Eurofins Laboratory (formerly Air Toxics, Ltd.)

- VOCs in air by EPA Method TO-15: 6 NS, 1 FD

GEL Laboratories, LLC

- Total uranium by ASTM D5174: 11 NS, 1 FD, and 3 MS/duplicates

Aquatic Bioassay Consulting Laboratories, Inc.

- Title 22: 1 NS

Table B4 (Appendix B) summarizes sample results.

Analytical chemistry services were performed by ALS Laboratory in Kelso, Washington, Eurofins Laboratory in Folsom, California, GEL Laboratories, LLC, in Charleston, South Carolina, and Aquatic Bioassay Consulting Laboratories, Inc. in Ventura, California. All laboratories are certified by the California Department of Health Services through the Environmental Laboratory Accreditation Program to perform hazardous waste analyses.

Data were reviewed and qualified by URS using method and laboratory criteria. Precision and accuracy were evaluated from field and laboratory QC samples. The calculated relative percent difference from MS/MSD and field and laboratory duplicate pairs provided information on the precision of chemical analyses and field sampling procedures. Evaluation of the percent recoveries of spiked analytes in laboratory control samples (LCSs), MS/MSDs, and surrogates were used to evaluate accuracy. External contamination was assessed through the evaluation of method blanks (MBs) and TBs. Comparability of the data was ensured by having project personnel follow standardized field procedures described in the SAP (URS, 2010b) and having laboratories follow analytical methods and standard operating procedures. The completeness of the data is the measure of the amount of valid data for each method and matrix (expressed as a percentage). Table C-1 provides the breakdown of completeness of the data sets by method. Completeness and integrity of data were evaluated by validating all the project data, ensuring that all the analytical requests were met, noting whether samples were received in proper condition, and verification that analyses were performed within the appropriated holding times.

- The completeness objective was met for 4Q12 sampling event: 100 percent of the data produced are usable. There are no rejected results.
- Of 1,010 results, 72 normal field results were qualified as estimated or not-detected values, because one or more QA objectives were not met.

Data validation flags were used in the validation process, as defined below:

U Indicates the compound or analyte was analyzed for but not detected at or above the reported method detection limit (MDL).

UJ Indicates the compound or analyte was analyzed for but not detected at or above the stated limit. The sample detection limit is considered an estimated value.

J Indicates the analyte was positively identified; the associated numerical value is an approximate concentration of the analyte in the sample.

C.2 Quality Control Results

Table C-1 summarizes the number of analyses performed, the number of estimated results, and the completeness of the data sets by method. Tables C-2 through C-4 provide summaries of all QC sample results for blanks, spikes and duplicates, respectively. Table C-5 presents a summary of the qualified data.

C.2.1 Precision and Accuracy

Precision and accuracy were evaluated based on the results of QC samples collected by the field team and QC samples that originated in the laboratory. The calculated relative percent difference (RPD) for MS/MSDs and FD pairs provided information on the precision of sampling and analytical procedures. MS/MSD analyses were associated with all samples for this sampling event. All data were reviewed for accuracy based on the surrogate spike, MS/MSD, and LCS percent recoveries. In addition, initial and continuing calibration data were reviewed for analytical accuracy. The criteria used for the evaluation are provided in the quality assurance project plan in the SAP (URS, 2010b). Table C-3 provides the summary of the QC for spikes, and Table C-4 provides the summary of QC for duplicates.

C.2.2 Representativeness

Representativeness was evaluated through the analysis of TB and MB samples along with the temperature blanks. Additionally, sample collection and handling methods and the cooler receipt forms were reviewed. All sample bottles were received in good condition and the chain-of-custody documents agreed with the sample labels.

TBs are required to accompany each cooler of aqueous samples sent to the laboratory for analysis of VOCs. One TB accompanied each cooler for each of the sampling dates. Table C-2 provides the QC results for blanks.

MBs are processed through the same analytical procedures as the associated samples. MBs are analyzed with each batch of samples to provide information on contamination originating in the analytical process.

C.2.3 Completeness

Completeness of data was evaluated by assuring that all analytical requests were met, samples were received in proper condition, and all analyses were performed within the appropriate holding times. Overall analytical completeness (100 percent) exceeded the project goal of 90 percent. Table C-1 provides the breakdown of completeness by method.

C.2.4 Comparability

Comparability was evaluated for this sampling event by analyzing all samples according to the specified EPA analytical methods, which use standard units of measurement. Necessary sample dilutions, due to the presence of elevated target compound concentrations, did not affect data usability and comparability. Results for some analytes are reported below the RL but above the DL. The “J” flag has been applied to results reported between the MDL and the RL to indicate variability at concentrations near the lower calibration level.

C.3 Summary of Data Usability

Based on the validation performed, all data for this effort are acceptable and can be used for data interpretation. Any limitations on data use are indicated by qualifier flags. Table C-5 presents the qualified data. The following items summarize data quality by all methods.

- **Method ASTM D5174:** No results for total uranium were qualified due to specific data quality concerns indicated by QC sample results.

- **Method SM2540C:** No results for TDS were qualified due to specific data quality concerns indicated by QC sample results.

- **Method SM2540D:** No results for TSS were qualified due to specific data quality concerns indicated by QC sample results.

- **Method SM5210B:** One BOD was reanalyzed outside holding time and is considered an estimated RL.

- **Method E524.2:** A total of 48 results are qualified. Thirty-two results are qualified as estimated concentrations because the result is reported between the DL and RL. Sixteen results are considered not detected due to external contamination.

- **Method TO-15:** A total of 23 results are qualified. Fifteen results are qualified as estimated concentrations because the result is reported between the DL and RL. Eight results are considered not detected due to external contamination.

Table C-1. Summary of Completeness by Method, 4Q12

Method	Number of Samples[a]	Number of Analytes	Total Number of Results	Number of Estimated Results	Number of Rejected Results	Percent Completeness
ASTM D5174 (water)	11	1	11	0	0	100
SM2540C (water)	3	1	3	0	0	100
SM2540D (water)	3	1	3	0	0	100
SM5210B (water)	3	1	3	1	0	100
E524.2 (water)	13	59	767	48	0	100
TO-15 (vapor)	6	37	222	23	0	100
Title 22 (water)	1	1	1	0	0	100

[a] This number includes normal field samples only

Table C-2. Summary of Quality Control Results for Blanks, 4Q12

Method	Number of Blanks	Analyte (Number of Occurrences)	Results
Reagent Blanks			
ASTM D5174	3	No analytes detected	NA
SM2540C	3	No analytes detected	NA
SM2540D	3	No analytes detected	NA
E524.2	5	n-Butylbenzene (1)	0.020 J µg/L
		Bromoform (1)	0.080 J µg/L
		Chloroform (2)	0.060 J µg/L
		Hexachlorobutadiene (3)	0.010 J - 0.060 J µg/L
		1,2,3-Trichlorobenzene (1)	0.05 J µg/L
		1,2,4-Trichlorobenzene (1)	0.060 J µg/L
TO-15	3	Bromomethane (1)	0.58 J ppbv
		Chlorobenzene (2)	0.69 J-0.33 J ppbv
		1,2-Dibromoethane (1)	0.095 J ppbv
		1,3-Dichlorobenzene (3)	0.18 J – 0.25 J ppbv
		1,4-Dichlorobenzene (3)	0.17 J – 0.24 J ppbv
		1,2-Dichlorobenzene (3)	0.14 J – 0.31 J ppbv
		t-1,3-Dichloropropene (1)	0.12 J ppbv
		Hexachlorobutadiene (3)	0.41 J – 0.56 J ppbv
		Toluene (1)	0.036 J ppbv
		1,2,4-Trichlorobenzene (3)	0.56 J – 0.76 J ppbv
		1,2,4-Trimethylbenzene (2)	0.11 J – 0.13 J ppbv
		1,3,5-Trimethylbenzene (1)	0.15 J ppbv
Trip Blanks			
E524.2	3	Chloroform (1)	0.050 J µg/L
		Hexachlorobutadiene (1)	0.030 J µg/L
		Toluene (2)	0.18 J – 0.24 J µg/L

ASTM = American Society of Testing and Materials
J = estimated concentration
NA = not applicable
ppbv = parts per billion by volume
µg/L = micrograms per liter
4Q12 = fourth quarter 2012

Table C-3. Summary of Quality Control Results for Spikes, 4Q12

Method	Number of Spikes	Analyte	Recovery Results (%)	Acceptance Criteria[a] (%)	Results Not Meeting Criteria[b]
Laboratory Control Spikes					
ASTM D5174	6	Uranium	96-104	75-125	0
SM2540C	5	Total dissolved solids	97-100	90-108	0
SM2540D	3	Total suspended solids	91-94	80-115	0
SM5210B	3	Biochemical oxygen demand	88-115	85-115	0
E524.2	5	59 Analytes	Varies	70-130	0
TO-15	6	37 Analytes	Varies	70-130	0
Matrix Spikes					
ASTM D5174	3	Uranium	95-110	75-125	0
E524.2	2	59 Analytes	Varies	70-130	0
Surrogate Spikes					
E524.2	13	4-Bromofluorobenzene	77 – 94	70 – 130	0
		Dibromofluoromethane	101 – 117	82 – 124	0
		Toluene-d8	85 - 105	82-124	0
TO-15	6	1,2-Dichloroethane-d4	96 – 102	70 – 130	0
		4-Bromofluorobenzene	94 – 117	70 – 130	0
		Toluene-d8	90 – 103	70 – 130	0

Note: Not detected sample results associated with a high-quality control sample result are considered not affected and are not qualified.

[a] The acceptance criteria represent the acceptable spike recovery ranges.

[b] Refers to individual analytical results, not overall sample results.

ASTM = American Society of Testing and Materials
4Q12 = fourth quarter 2012
% = percent

Table C-4. Summary of Quality Control Results for Duplicates, 4Q12

Method	Number of Duplicates	Analyte (Number of Detected Pairs)	Range of Results RPD (%)	Acceptance Criteria RPD[a] (%)	Results Not Meeting Criteria[b]
Field Duplicates[c]					
ASTM D5174	1	Uranium (1)	1.6	30	0
SM2450C	1	Total dissolved solids (1)	1.7	30	0
SM2540D	1	None	NA	30	NA
SM5210D	1	None	NA	30	0
E524.2	1	Chloroform (1)	12	30	0
		Tetrachloroethene (1)	14.5	30	0
TO-15	1	Chloroform (1)	9.4	30	0
		Tetrachloroethene (1)	0	30	0
Laboratory Control Spike Duplicates					
TO-15	3	37 Analytes	Varies	30	0
Matrix Spike Duplicates					
E524.2	1	59 Analytes	Varies	30	0

[a] The acceptance criterion represents the upper acceptable bound of the RPD for duplicates.
[b] Refers to individual analytical results, not overall sample results.
[c] RPDs were calculated only for pairs where both results were greater than the reporting limit.

ASTM = American Society of Testing and Materials
RPD = relative percent difference
4Q12 = fourth quarter 2012
< = less than
% = percent

Table C-5. Qualified Data for the GWTS 4Q12

Sample Port	Sample ID	Sample Date	Analyte	Result	Detection Limit	Reporting Limit	Units	EPA Flag	Reason Code
Method SM5210B									
SP-07	EFF-1201	12/6/2012	Biochemical Oxygen Demand	4	2	4	mg/L	UJ	4A
Method E524.2									
SP-01	GWTS-INF-1001	10/11/2012	1,1,1,2-Tetrachloroethane	0.23	0.071	0.5	µg/L	J	6G
			Bromodichloromethane	0.11	0.049	0.5	µg/L	J	6G
			Chlorobenzene	0.06	0.032	0.5	µg/L	J	6G
			Chloromethane	0.03	0.021	0.5	µg/L	J	6G
			Dichlorodifluoromethane	0.06	0.044	0.5	µg/L	J	6G
			Toluene	0.23	0.05	0.5	µg/L	U	1B
SP-03	CRB INF-1001	10/11/2012	Chloroform	0.26	0.032	0.5	µg/L	J	6G
			Toluene	0.36	0.05	0.5	µg/L	U	1B
SP-04	CRB Mid-1001	10/11/2012	Chloroform	0.26	0.032	0.5	µg/L	J	6G
			Toluene	0.18	0.05	0.5	µg/L	U	1B
SP-05	CRB EFF-1001	10/11/2012	Chloroform	0.23	0.032	0.5	µg/L	J	6G
			Tetrachloroethene	0.33	0.03	0.5	µg/L	J	6G
SP-07	EFF-1001	10/11/2012	Chloroform	0.25	0.032	0.5	µg/L	J	6G
			Tetrachloroethene	0.34	0.03	0.5	µg/L	J	6G
			Toluene	0.23	0.05	0.5	µg/L	U	1B
SP-01	GWTS-INF-1101	11/8/2012	1,1,1,2-Tetrachloroethane	0.26	0.071	0.5	µg/L	J	6G
			Bromodichloromethane	0.13	0.049	0.5	µg/L	J	6G
			Chlorobenzene	0.06	0.032	0.5	µg/L	J	6G
			Dichlorodifluoromethane	0.07	0.044	0.5	µg/L	J	6G
			Toluene	0.51	0.05	0.5	µg/L	U	1B
			cis-1,2-Dichloroethene	0.48	0.042	0.5	µg/L	J	6G
SP-03	CRB INF-1101	11/8/2012	Chloroform	0.15	0.032	0.5	µg/L	U	1A
			Toluene	0.57	0.05	0.5	µg/L	U	1B
SP-04	CRB Mid-1101	11/8/2012	Chloroform	0.15	0.032	0.5	µg/L	U	1A
SP-07	EFF-1101	11/8/2012	Chloroform	0.17	0.032	0.5	µg/L	U	1A
			Tetrachloroethene	0.28	0.03	0.5	µg/L	J	6G
			Toluene	0.23	0.05	0.5	µg/L	U	1B

Table C-5. (Continued)

Sample Port	Sample ID	Sample Date	Analyte	Result	Detection Limit	Reporting Limit	Units	EPA Flag	Reason Code
SP-01	GWTS-INF-1201	12/6/2012	1,1,1,2-Tetrachloroethane	0.18	0.071	0.5	µg/L	J	6G
			Bromodichloromethane	0.15	0.049	0.5	µg/L	J	6G
			Chlorobenzene	0.05	0.032	0.5	µg/L	J	6G
			Chloromethane	0.08	0.021	0.5	µg/L	J	6G
			Dichlorodifluoromethane	0.08	0.044	0.5	µg/L	J	6G
			Toluene	0.06	0.05	0.5	µg/L	U	1B
			cis-1,2-Dichloroethene	0.4	0.042	0.5	µg/L	J	6G
SP-03	CRB INF-1201	12/6/2012	Bromoform	0.08	0.066	0.5	µg/L	U	1A
			Chloroform	0.15	0.032	0.5	µg/L	J	6G
			Chloromethane	0.06	0.021	0.5	µg/L	J	6G
			Toluene	0.12	0.05	0.5	µg/L	U	1B
SP-04	CRB Mid-1201	12/6/2012	Bromoform	0.07	0.066	0.5	µg/L	U	1A
			Chloroform	0.15	0.032	0.5	µg/L	J	6G
			Chloromethane	0.05	0.021	0.5	µg/L	J	6G
			Toluene	0.06	0.05	0.5	µg/L	U	1B
SP-07	EFF-1201	12/6/2012	Chloroform	0.19	0.032	0.5	µg/L	J	6G
			Chloromethane	0.05	0.021	0.5	µg/L	J	6G
			Toluene	0.14	0.05	0.5	µg/L	U	1B
SP-01	GWTS-INF-1201	12/6/2012	1,1,1,2-Tetrachloroethane	0.18	0.071	0.5	µg/L	J	6G
		12/6/2012	Bromodichloromethane	0.15	0.049	0.5	µg/L	J	6G
		12/6/2012	Chlorobenzene	0.05	0.032	0.5	µg/L	J	6G
Method TO15									
SP-08	GWTS Pr GAC-1001	10/11/2012	Toluene	0.83	0.34	4.8	ppbv	J	6G
			m,p-Xylenes	1.1	1	4.8	ppbv	J	6G
SP-09	GWTS Stack-1001	10/11/2012	1,2,4-Trimethylbenzene	0.44	0.24	1.2	ppbv	J	6G
			1,2-Dichlorobenzene	0.64	0.22	1.2	ppbv	U	1A
			1,3,5-Trimethylbenzene	0.4	0.21	1.2	ppbv	J	6G
			1,4-Dichlorobenzene	0.23	0.18	1.2	ppbv	U	1A
			Dichlorodifluoromethane	0.66	0.16	1.2	ppbv	J	6G
			Toluene	0.19	0.081	1.2	ppbv	J	6G
			Trichlorofluoromethane	0.26	0.13	1.2	ppbv	J	6G
			cis-1,2-Dichloroethene	0.6	0.4	1.2	ppbv	J	6G
SP-08	GWTS Pr GAC-1101	11/8/2012	1,2-Dichlorobenzene	1.9	1.3	6.8	ppbv	U	1A

Table C-5. (Continued)

Sample Port	Sample ID	Sample Date	Analyte	Result	Detection Limit	Reporting Limit	Units	EPA Flag	Reason Code
SP-09	GWTS Stack-1101	11/8/2012	1,2-Dichlorobenzene	0.24	0.21	1.1	ppbv	U	1A
			Dichlorodifluoromethane	0.53	0.16	1.1	ppbv	J	6G
			Toluene	0.098	0.08	1.1	ppbv	U	1A
			Trichlorofluoromethane	0.23	0.13	1.1	ppbv	J	6G
			cis-1,2-Dichloroethene	0.54	0.39	1.1	ppbv	J	6G
SP-08	GWTS Pr GAC-1201	12/6/2012	1,4-Dichlorobenzene	0.4	0.37	4.9	ppbv	U	1A
			Trichloroethylene	4.4	1.1	4.9	ppbv	J	6G
SP-09	GWTS Stack-1201	12/6/2012	1,2-Dichlorobenzene	1.9	0.54	2.4	ppbv	U	1A
			1,4-Dichlorobenzene	0.46	0.18	2.4	ppbv	U	1A
			Benzene	1.4	0.4	2.4	ppbv	J	6G
			Dichlorodifluoromethane	0.69	0.34	2.4	ppbv	J	6G
			cis-1,2-Dichloroethene	1.6	1.1	2.4	ppbv	J	6G

EPA = United States Environmental Protection Agency
GWTS = groundwater treatment system
ID = identification
J = estimated concentration
mg/L = milligrams per liter
ppbv = part per billion by volume
U = not detected
UJ = estimated reporting limit
µg/L = micrograms per liter
4Q12 = fourth quarter 2012

Reason Code
1A = method blank contamination
1B = trip blank contamination
4A = holding time exceeded
6G = result reported between the detection limit and reporting limit

Appendix D

System Uptime and Shutdown Tables

Appendix D

System Uptime and Shutdown Tables

This section presents quantitative results on operational time for the groundwater treatment system (GWTS) and soil vapor extraction (SVE) systems. Operation time and percentage of uptime for this reporting period (October 1 through December 31, 2012) are as follows:

Remedial System	Total Operation Hours	Percentage of Operation
Groundwater Treatment	2,144	97%
Soil Vapor Extraction	2,208	100%

Tables D-1 through D-3 presents the GWTS shutdown summaries for October, November, and December 2012, respectively.

Table D-4 through D-6 presents the SVE systems shutdown summaries for October, November and December 2012, respectively.

Table D-1. GWTS Shutdown Summary, October 2012

Date	Duration, hours	Reason	
10/4/12 – 10/4/12	2.2	Plant shut down for influent tank cleanout.	
10/18/12 – 10/18/12	2.0	Plant shut down to install Timemark for EW-02.	
10/25/12 – 10/25/12	1.8	Plant shut down for stripper sump cleanout	
Total	6.0	Hours in month: 744	% operational: > 99

GWTS = groundwater treatment system
% = percent
> = greater than

Table D-2. GWTS Shutdown Summary, November 2012

Date	Duration, hours	Reason	
11/25/12 – 11/27/12	23.3	Plant shut down due to leaking hose. Replaced four hoses: two at the influent and effluent of the post airstripper bag filter housing, one at the GAC-2 (lead vessel) influent, and one at the GAC-3 (lag LGAC vessel) effluent.	
Total	23.3	Hours in month: 720	% operational: 96.8

GAC = granular activated carbon
GWTS = groundwater treatment system
LGAC = liquid-phase granular activated carbon
% = percent

Table D-3 GWTS Shutdown Summary, December 2012

Date	Duration, hours	Reason	
12/1/12 – 12/3/12	35.2	Plant shut down to pump water out of vaults due to extraction well vaults high flood shutoff.	
Total	35.2	Hours in month: 744	% operational: 95.3

GWTS = groundwater treatment system
% = percent

Table D-4. SVE System Shutdown Summary, October 2012			
Date	**Duration, hours**	**Reason**	
—	—	No plant shutdowns reported.	
Total	—	Hours in month: 744	% operational: 100

SVE = soil vapor extraction
% = percent

Table D-5. SVE System Shutdown Summary, November 2012			
Date	**Duration, hours**	**Reason**	
—	—	No plant shutdowns reported.	
Total	—	Hours in month: 720	% operational: 100

SVE = soil vapor extraction
% = percent

Table D-6 SVE System Shutdown Summary, December 2012			
Date	**Duration, hours**	**Reason**	
—	—	No plant shutdowns reported.	
Total	—	Hours in month: 744	% operational: 100

SVE = soil vapor extraction
% = percent

Appendix E

Operation and Maintenance Process Logs

Appendix E

Process and Monitoring Logs

This section presents process and monitoring logs recorded during weekly routine and non-routine visits during this reporting period (October 1 through December 31, 2012) for both the groundwater treatment system (GWTS) and soil vapor extraction (SVE) system. Process readings, (flow rates, pressures, and vapor concentrations) pertaining to individual treatment units (air stripper, liquid granular-activated carbon (GAC), and ion exchange) are recorded to document trends in each treatment process and establish typical operating ranges. These process and monitoring logs are working documents that will be updated as necessary to accommodate changes and modifications to the treatment systems.

URS Corporation
Modesto, Superfund Site
Process Data Sheet

Groundwater Treatment System

			Hour Meter	Utility Power		System Influent: Flow	System Influent: Pressure	System Influent: Total Flow	System Influent: pH	Anti-Scalent Sequestrant	Air Stripper Water: Influent Pressure	Air Stripper Water: Effluent Pressure	Air Stripper Water: Flow	Air Stripper Water: Pressure	Air Stripper Water: Influent Pressure	Air Stripper Water: Effluent Pressure	Air Stripper Water: Flow
										T-3	Bag Filter F-1			Pump P-3	Bag Filter F-2		
Initials	Date	Time	Hrs.	kW	kWh	GPM	PSI	Gallons	pH	Gallons	PSI	PSI	GPM	PSI	PSI	PSI	GPM
TH	10/4/12	0800	54100	15.98	19496	46	15	49709	7.33	26	9.5	6.4	58	45	46.2	44.2	60
TH	10/11/12	0900	54265	15.98	21121	46	16	52431	7.24	22	9.3	6.0	58	45	46.0	43.8	59
TH	10/18/12	0755	54433	15.98	22737	46	16	53233	7.27	18	9.6	6.2	58	45	46.5	43.8	60
TH	10/25/12	0845	54600	15.98	23188	46	18	53261	7.28	17.5	8.5	5.3	58	47	46.3	44.4	60
Design Range or Target Value				10.0-30	N/A	3.0-35	30-50	n/a	5.0-12.0	3.0-25	30-50	30-50	40-70	30-50	30-50	30-50	40-70

GroundWater Treatment System

DP

Air Stripper Vapor: Sump Pressure	Air Stripper Vapor: Effluent Pressure	Air Stripper Vapor: Influent P.I.D.	Air Stripper Vapor: Effluent P.I.D.	Air Stripper Vapor: Temp	Air Stripper Vapor: Flow	Liquid Carbon: Influent Pressure	Liquid Carbon: Mid-Bed Pressure	Liquid Carbon: Effluent Pressure	Ion Exchange: Influent Pressure	Ion Exchange: Mid-Bed Pressure	Ion Exchange: Flow	System Effluent: Flow	System Effluent: Pressure	System Effluent: pH	System Effluent: Effluent Total Flow	Radiation Meter: Outside GWTS	Radiation Meter: Inside GWTS
Air Stripper Trays		VGAC Vessel		Stack													
In. H2O	In. H20	ppm	ppm	°F	CFM	PSI	PSI	PSI	PSI	PSI	GPM	Gpm	in H2O	pH	Gallons	mR/hr Peak	mR/hr Peak
11.5	3.5	1.8	0.0	69.4	655	40	35	29	21.5	11	45	55	0	7.98	37021	0	0
DP -7	–	0.0	0.0	68.7	630	40	34	29	21.5	11	44	54	0	8.15	41524	0	0
-6	–	0.0	0.0	68.9	555	40	34	28	21.5	10.5	44	54	0	7.88	46010	0	0
8		0.0	0.0	69.2	656	41.5	35.5	30	21.5	11	44	54	0	7.64	46229	0	0
5.0-25	5.0-25	0-100	0-10	65-75	550-650	25-70	25-60	25-50	1.0-10	1.0-10	3.0-60	3.0-50	1.0-5	5.0-12	N/A	0-1	0-1

Soil Vapor Extraction System

		SVE Influent: Pressure	SVE Influent: Temp	SVE Influent: Flow	SVE Influent: Dilution	Blower: Hour Meter	Blower: Effluent Pressure	Blower: Temp	Blower: Flow	Filter: Influent Pressure	Filter: Effluent Pressure	Vapor: Influent P.I.D.	Vapor: Effluent P.I.D.	Vapor: Temp	Vapor: Flow	Radiation Meter: Outside SVE	Radiation Meter: Inside SVE
												VGAC Vessel		Stack			
Date	Time	In. H2O	°F	CFM	Yes/No	Hrs.	in. H2O	°F	CFM	in. H2O	in. H2O	ppm	ppm	°F	CFM	mR/hr Peak	mR/hr Peak
10/4/12	0845	-62	79.3	170	N	13835	3	193.1	161	-67	-71	0	0	193.1	161	0	0
10/11/12	1220	-63	75.5	166	N	14007	3	190.3	158	-68	-72	0	0	190.3	158	0	0
10/18/12	0820	-63	72.2	170	N	14171	3	187.8	159	-67	-71	0	0	187.8	159	0	0
10/25/12	1115	-63	71.5	172	N	14342	3	186.2	158	-67	-71	0	0	186.2	158	0	0
		25-70	65-75	100-200	NO	N/A	2.0-10	65-75	100-200	N/A	N/A	0-100	0-10	65-75	100-200	0-1	0-1

Note: For pressures measured relative to atmospheric (barometric) pressure, use (-) for vacuum.

Reviewed By: ____________ Date: ____________

SVE	KW	KWh
10/4/12	9.09	20789
10/11/12	9.09	22270
10/18/12	9.09	23734
10/25/12	9.09	25214

URS Corporation
Modesto Superfund Site
Site Inspections

Task Description	10/4/12 TH	10/11/12 TH	10/18/12 TH	10/25/12 TH	/ /
WEEKLY	Task Performed (Technician Initials or Value)				
	Groundwater TreatmentSystem				
Record Process Logs	✓	✓	✓	✓	
Check Blowers and motors for heat, noise, and vibration	✓	✓	✓	✓	
Check Air Stripper Feed pump/motor (P-2) for heat, noise, and vibration.	✓	✓	✓	✓	
Inspect all process piping for leaks	✓	✓	✓	✓	
Inspect all process hoses/fittings for leaks	✓	✓	✓	✓	
Check Air Stripper Effluent pump/motor (P-3) for heat, noise, and vibration.	✓	✓	✓	✓	
Inspect Sump (Pump as Necessary).	✓	✓	✓	✓	
Check Air Stripper sump level site glass. Clean as necessary	✓	✓	✓	✓	
Inspect IX system influent vacuum break for leaks	✓	✓	✓	✓	
Clean up compound area	✓	✓	✓	✓	
Drain VGAC condensate	✓	✓	✓	✓	
Perform autodialer operational check	✓	✓	✓	✓	
Autodialer battery check	✓	✓	✓	✓	
Perform inspection of EW-1R pipeline	✓	✓	✓	✓	
Inspection of Spill Response Kit	✓	✓	✓	✓	
Inspection of Emergency Response Plan/MSDS Binder	✓	✓	✓	✓	
	Soil Vapor Extraction System				
Record Process Logs	✓	✓	✓	✓	
Check Blowers and motors for heat, noise, and vibration	✓	✓	✓	✓	
Inspect all process piping for leaks	✓	✓	✓	✓	
Clean up compound area	✓	✓	✓	✓	
Drain VGAC condensate	✓	✓	✓	✓	
Perform autodialer operational check	✓	✓	✓	✓	
Inspection of Spill Response Kit	✓	✓	✓	✓	
Inspection of Emergency Response Plan/MSDS Binder	✓	✓	✓	✓	

Task Description	Performed		
MONTHLY	Date	Initials	Reading
Check fire extinguisher	10/4/12	TH	
Inspect EW-1R vault			
Inspect VI Mitigation operations - "Part House"			
Replace Auto Dialer Batteries (If necessary)			
Quarterly			
Interlock Checks Groundwater			
Interlock Checks SVE			
Collect Well Flow read at SVE-02			
Collect Well Flow read at SVE-03			
Collect Well Flow read at SVE-04			
ANNUAL			
Collect Amp radings			
Instrument Calibration			
System Effluent Flow Meter (Performed in June and December)			

Notes:

Reviewed by:________ Date:________

URS Group
Preventative and Corrective Maintenance Log
Modesto Superfund Site

Site Name:__________________

Period:_______________to_______________

(month/day/year) (month\day\year)

Date	Initials	Hour Meter	Maintenance Performed	LOTO Required	LOTO Description (Where?Why?)	LOCK ON (Date/Time)	Zero Energy Check	LOCK OFF (Date/Time)	LOCK ID (Lock No.)
10/4/12	TH	54100	vaccum out inf. tank and Stripper Sump	Y / N	Control panel to prevent Start up	10/4/12 0915	Y / N	10/4/12 1135	green
10/18/12	TH	54434	Install Tiermark	Y / N	control panel to prevent shock	10/18/12 0820	Y / N	10/18/12 1015	green
10/25/12	TH	54600	vaccum out stripper sump	Y / N	control panel to prevent start up	10/25/12 0915	Y / N	10/25/12 1100	green
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		

URS Group
Preventative and Corrective Maintenance Log
Modesto Superfund Site

Site Name:__________________

Shutdown Date:_______________ Startup Date:_______________
Shutdown Time:_______________ Startup Time:_______________
Shutdown Purpose or Cause:

Corrective Actions Taken (if shutdown was unplanned):

Performed By:_________

Shutdown Date:_______________ Startup Date:_______________
Shutdown Time:_______________ Startup Time:_______________
Shutdown Purpose or Cause:

Corrective Actions Taken (if shutdown was unplanned):

Performed By:_________

Shutdown Date:_______________ Startup Date:_______________
Shutdown Time:_______________ Startup Time:_______________
Shutdown Purpose or Cause:

Corrective Actions Taken (if shutdown was unplanned):

Performed By:_________

Shutdown Date:_______________ Startup Date:_______________
Shutdown Time:_______________ Startup Time:_______________
Shutdown Purpose or Cause:

Corrective Actions Taken (if shutdown was unplanned):

Performed By:_________

Reviewed by:________ Date: ___________

SAMPLE COLLECTION RECORD
MODESTO SUPERFUND SITE

Date: 10/11/12
Weather: Overcast
Sampler: TH

Time	Description	Totalizer Reading (gallons)	Flow (gpm)
0900	GWTS Effluent	41524	54

Time	Sample Location - Test Method	Sample Description	LOCID	No. of Containers	Container Type	Preservative	pH	Cond	Temp
0945	EFF-1001 E524.2	Effluent-NS	SP-07	3	40 ml VOA	HCl	8.15	1.01	20.0
"	EFF-1001 SM2540C	Effluent-NS	SP-07	1	250 ml Poly	None	"	"	"
"	EFF-1001 SM5210B, SM2540D	Effluent-NS	SP-07	1	500 ml Poly	None	8.08	.98	—
	~~EFF-1 SM2540D~~	~~Effluent-NS~~	~~SP-07~~	~~1~~	~~500 ml Poly~~	~~None~~			
1005	IEXEFF-1001 D5174	IEX Eff-1001	SP-10	1	1 Liter Poly	HNO3	7.87	.97	19.9
1010	IEX Mid-1001 D5174	IEX Mid-1001	SP-06	1	1 Liter Poly	HNO3	7.88	.98	19.9
1030	Pre IEX-1001 D5174	Pre IEX-1001	SP-05	1	1 Liter Poly	HNO3	8.00	.98	19.9
1125	GWTS-INF-1001 E524.2, D1574	Influent-NS	SP-01	3, 1	40 ml VOA 1L Poly	HCl HNO3	7.24	.99	20.0
1200	MW-104-NS E524.2	CRB MID FD	SP-~~01~~04	3	40 ml VOA	HCl	—	FD	—
0830	MW-301-4Q12 E524.2	TB	TB	~~2~~ 2	40 ml VOA	HCl	—	TB	—
1155	GWTS Stack-1001 TO-15	GWTP VGAC Effluent-NS	SP-09	1	1 Liter Summa	None	-30	can #	25207
1158	GWTS Pr GAC-1001 TO-15	GWTP VGAC Influent-NS	SP-08	1	1 Liter Summa	None	-30	can #	31795
1214	SVE Stack-1001 TO-15	SVE VGAC Effluent-NS	SP-12	1	400ml Summa	None	-29.5	can #	657
1220	SVE Pre GAC-1001 TO-15	SVE VGAC Influent-NS	SP-11	1	400ml Summa	None	-30	can #	854
1200	MW-105-NS	Pre IEX FD	SP-05	1	1L Poly	HNO3	—	FD	—

Sampler Signature: [signature]

Date: 10/11/12

Notes:
1036 CRB EFF-1001 3 40mL VOAS PH 7.90 Cond. .97 Temp. 20.0
1100 - CRB INF-1001 " 8.01 .97 20.0
1050 - CRB MID-1001 " 8.03 .97 20.2
1200 - MW-111-1001 FD for SVE PreGAC -30 can# 867

FD = Field Duplicate
FB = Field Blank (ambient)
NS = Normal Sample
TB = Trip Blank

Scan COCs to:
URS Attn: Debbie Casagrande (916) 679-2040

URS Corporation
Modesto, Superfund Site
Process Data Sheet

Groundwater Treatment System

			Hour Meter	Utility Power		System Influent Flow	System Influent Pressure	System Influent Total Flow	System Influent pH	Anti-Scalent Sequestrant	Air Stripper Water Influent Pressure	Air Stripper Water Effluent Pressure	Air Stripper Water Flow	Air Stripper Water Pressure	Air Stripper Water Influent Pressure	Air Stripper Water Effluent Pressure	Air Stripper Water Flow
										T-3	Bag Filter F-1			Pump P-3	Bag Filter F-2		
Initials	Date	Time	Hrs.	kW	kWh	GPM	PSI	Gallons	pH	Gallons	PSI	PSI	GPM	PSI	PSI	PSI	GPM
TH	11/1/12	0800	54766	15.98	24803	46	16	53385	7.08	34.5	9.2	6.0	58	46	46.6	44.2	60
TH	11/8/12	0910	54936	15.98	26450	46	16	—	7.18	31	8.9	5.9	~~68~~ 58	46	46.4	44.1	60
TH	11/14/12	0910	55080	15.98	27858	46	17	—	6.91	32	8.8	5.1	58	46	46.3	43.7	60
TH	11/20/12	0800	55223	15.98	29235	46	17	—	7.10	29	9.2	5.6	58	46	46.5	44.4	60
TH	11/29/12	0800	55393	15.98	30897	46	14	—	6.97	26	9.0	5.8	58	46	45.3	43.6	60
Design Range or Target Value				10.0-30	N/A	3.0-85	30-50	n/a	5.0-12.0	3.0-25	30-50	30-50	40-70	30-50	30-50	30-50	40-70

GroundWater Treatment System

DP

Air Stripper Vapor Sump Pressure	Air Stripper Vapor Effluent Pressure	Air Stripper Vapor Influent P.I.D.	Air Stripper Vapor Effluent P.I.D.	Temp	Flow	Liquid Carbon Influent Pressure	Liquid Carbon Mid-Bed Pressure	Liquid Carbon Effluent Pressure	Ion Exchange Influent Pressure	Ion Exchange Mid-Bed Pressure	Ion Exchange Flow	System Effluent Flow	System Effluent Pressure	System Effluent pH	Effluent Total Flow	Radiation Meter Outside GWTS	Radiation Meter Inside GWTS
Air Stripper Trays		VGAC Vessel		Stack													
in. H2O	in. H20	ppm	ppm	°F	CFM	PSI	PSI	PSI	PSI	PSI	GPM	Gpm	in H2O	pH	Gallons	mR/hr Peak	mR/hr Peak
10	—	0	0	68.6	630	40	35	29	21.5	11	44	54	0	7.92	50683	0	0
10	—	0	0	68.4	650	41	35	29	21.5	11	44	54	0	8.12	55235	0	0
10	—	0	0.4	68.1	650	41	35	29	21.5	11	44	54	0	7.81	59087	0	0
9.5	—	0	0	68.3	645	41	35	29	21.5	11	44	54	0	7.80	62913	0	0
10	—	0	0	67.5	650	41	35	29	22	11.5	44	54	0	7.78	67580	0	0
5.0-25	5.0-25	0-100	0-10	65-75	550-650	25-70	25-60	25-50	1.0-10	1.0-10	3.0-60	3.0-50	1.0-5	5.0-12	N/A	0-1	0-1

Soil Vapor Extraction System

		SVE Influent Pressure	SVE Influent Temp	SVE Influent Flow	SVE Influent Dilution	Blower Hour Meter	Blower Effluent Pressure	Blower Temp	Blower Flow	Filter Influent Pressure	Filter Effluent Pressure	Vapor Influent P.I.D.	Vapor Effluent P.I.D.	Vapor Temp	Vapor Flow	Radiation Meter Outside SVE	Radiation Meter Inside SVE
												VGAC Vessel		Stack			
Date	Time	In. H2O	°F	CFM	Yes/No	Hrs.	in. H2O	°F	CFM	in. H2O	in. H2O	ppm	ppm	°F	CFM	mR/hr Peak	mR/hr Peak
11/1/12	0910	-63	71.3	170	N	14508	3	186.4	164	-68	-72	0	0	186.4	164	0	0
11/8/12	1100	-63	71.1	169	N	14678	3	189.6	170	-67	-71	0	0	189.6	170	0	0
11/14/12	1040	-63	66.9	168	N	14822	3	183.8	168	-67.5	-72	0	0	183.8	168	0	0
11/20/12	0835	-63	66.4	169	N	14964	3	181.5	169	-68	-72	0	0	181.5	169	0	0
11/29/12	0835	-63	64.5	171	N	15179	3	181.6	170	-68	-72	0	0	181.6	170	0	0
		25-70	65-75	100-200	NO	N/A	2.0-10	65-75	100-200	N/A	N/A	0-100	0-10	65-75	100-200	0-1	0-1

Note: For pressures measured relative to atmospheric (barometric) pressure, use (-) for vacuum.

Reviewed By: ____________ Date: ____________

SVE	KW	KWh			
11/1/12	9.09	26675	11/20	9.09	30562
11/8/12	9.09	28167	11/29	9.09	32363
11/14/12	9.09	29370			

URS Corporation
Modesto Superfund Site
Site Inspections

Task Description	11/1/12 TH	11/8/12 TH	11/14/12 TH	11/24/12 TH	11/29/12
WEEKLY	Task Performed (Technician Initials or Value)				
Groundwater TreatmentSystem					
Record Process Logs	✓	✓	✓	✓	✓
Check Blowers and motors for heat, noise, and vibration	✓	✓	✓	✓	✓
Check Air Stripper Feed pump/motor (P-2) for heat, noise, and vibration.	✓	✓	✓	✓	✓
Inspect all process piping for leaks	✓	✓	✓	✓	✓
Inspect all process hoses/fittings for leaks	✓	✓	✓	✓	✓
Check Air Stripper Effluent pump/motor (P-3) for heat, noise, and vibration.	✓	✓	✓	✓	✓
Inspect Sump (Pump as Necessary).	✓	✓	✓	✓	✓
Check Air Stripper sump level site glass. Clean as necessary	✓	✓	✓	✓	✓
Inspect IX system influent vacuum break for leaks	✓	✓	✓	✓	✓
Clean up compound area	✓	✓	✓	✓	✓
Drain VGAC condensate	✓	✓	✓	✓	✓
Perform autodialer operational check	✓	✓	✓	✓	✓
Autodialer battery check	✓	✓	✓	✓	✓
Perform inspection of EW-1R pipeline	✓	✓	✓	✓	✓
Inspection of Spill Response Kit	✓	✓	✓	✓	✓
Inspection of Emergency Response Plan/MSDS Binder	✓	✓	✓	✓	✓
Soil Vapor Extraction System					
Record Process Logs	✓	✓	✓	✓	✓
Check Blowers and motors for heat, noise, and vibration	✓	✓	✓	✓	✓
Inspect all process piping for leaks	✓	✓	✓	✓	✓
Clean up compound area	✓	✓	✓	✓	✓
Drain VGAC condensate	✓	✓	✓	✓	✓
Perform autodialer operational check	✓	✓	✓	✓	✓
Inspection of Spill Response Kit	✓	✓	✓	✓	✓
Inspection of Emergency Response Plan/MSDS Binder	✓	✓	✓	✓	✓

Task Description	Performed		
MONTHLY	Date	Initials	Reading
Check fire extinguisher	11/8/12	TH	
Inspect EW-1R vault + EW-02	11/14/12	TH	
Inspect VI Mitigation operations - "Part House"	11/20/12	TH	
Replace Auto Dialer Batteries (if necessary)	N/A	TH	
Quarterly			
Interlock Checks Groundwater ~ Semi annual	—	—	
Interlock Checks SVE - Semi annual	11/20/12	TH GB	
Collect Well Flow read at SVE-02 - annual	—	—	—
Collect Well Flow read at SVE-03 - annual	—	—	—
Collect Well Flow read at SVE-04 - annual	—	—	—
ANNUAL			
Collect Amp radings			
Instrument Calibration			
System Effluent Flow Meter (Performed in June and December)			

Notes:

Reviewed by:________ Date:________

URS Group
Preventative and Corrective Maintenance Log
Modesto Superfund Site

Site Name:
Period: ____ to ____
(month/day/year) (month\day\year)

Date	Initials	Hour Meter	Maintenance Performed	LOTO Required	LOTO Description (Where?Why?)	LOCK ON (Date/Time)	Zero Energy Check	LOCK OFF (Date/Time)	LOCK ID (Lock No.)
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		

URS Group
Preventative and Corrective Maintenance Log
Modesto Superfund Site

Site Name:

Shutdown Date: 11/25/12 Startup Date: 11/27/12
Shutdown Time: 1300 Startup Time: 1220
Shutdown Purpose or Cause: Secondary containment High High. Leak in Secondary LGAC Effluent hose.
Corrective Actions Taken (if shutdown was unplanned): GB ordered and replaced bad hose plus Influent and Effluent bag filter hoses after stripper and Influent hose to primary LGAC.
Performed By:

Shutdown Date: Startup Date:
Shutdown Time: Startup Time:
Shutdown Purpose or Cause:
Corrective Actions Taken (if shutdown was unplanned):
Performed By:

Shutdown Date: Startup Date:
Shutdown Time: Startup Time:
Shutdown Purpose or Cause:
Corrective Actions Taken (if shutdown was unplanned):
Performed By:

Shutdown Date: Startup Date:
Shutdown Time: Startup Time:
Shutdown Purpose or Cause:
Corrective Actions Taken (if shutdown was unplanned):
Performed By:

Reviewed by: ____ Date: ____

Modesto Superfund Site Interlock Check List

Tested By: TH / GO

Alarm		Set Point		Actual		Date Tested
SVE						
Knockout Drum High/High Level						
Filter High DP		10 in H_2O		0		11/20/12
Blower Motor Power Failure		Not working				11/20/12
Carbon High Influent Pressure		8 in H_2O		0		11/20/12
High VOC Concentration (NOT ACTIVE)		—		—		—

Date: 11/8/12
Weather: Sunny
Sampler: TH

SAMPLE COLLECTION RECORD
MODESTO SUPERFUND SITE

Time	Description	Totalizer Reading (gallons)	Flow (gpm)
0800	GWTS Effluent	55202	54

Time	Sample Location - Test Method	Sample Description	LOCID	No. of Containers	Container Type	Preservative	pH	Cond	Temp
0807	EFF-1101 E524.2	Effluent-NS	SP-07	3	40 ml VOA	HCl	8.12	.98	19.2
0807	EFF-1101 SM2540C	Effluent-NS	SP-07	1	1L ~~250 ml~~ Poly	None	8.12	.98	19.2
0822	EFF-1101 SM5210B, SM2540D	Effluent-NS	SP-07	1	1L ~~500 ml~~ Poly	None	8.20	1.05	3.7
0807	EFF-1101 ~~SM2540D~~ Title 22 HAZ WASTE	Effluent-NS	SP-07	1	1L 250mL Jar ~~500 ml Poly~~	None	8.12	.98	19.2
0828	IEXEFF-1101 D5174	IEX Eff-	SP-10	1	1 Liter Poly	HNO3	7.91	.95	18.9
0831	IEX Mid-1101 D5174	IEX Mid-	SP-06	1	1 Liter Poly	HNO3	7.93	.95	19.3
0835	Pre IEX-1101 D5174	Pre IEX-	SP-05	1	1 Liter Poly	HNO3	7.93	.95	19.1
0900	GWTS-INF-1101 E524.2	Influent-NS	SP-01	3	40 ml VOA	HCl	7.18	.97	19.5
1200	MW-108-~~NS~~-1101 ~~E524.2~~ TO15	GWTS Pr GAC FD	SP-08	~~3~~ 1	1L can ~~40 ml VOA~~	None ~~HCl~~	-29 in Hg	can #	12031
0800	MW-302-4Q12 E524.2	TB	TB	3	40 ml VOA	HCl	—	—	—
1023	GWTS Stack-1101 TO-15	GWTP VGAC Effluent-NS	SP-09	1	1 Liter Summa	None	-30 in Hg	can #	36428
1029	GWTS Pr GAC-1101 TO-15	GWTP VGAC Influent-NS	SP-08	1	1 Liter Summa	None	-29 "	can #	2180
1056	SVE Stack-1101 TO-15	SVE VGAC Effluent-NS	SP-12	1	400ml Summa	None	-29 "	can #	891
1059	SVE Pre GAC-1101 TO-15	SVE VGAC Influent-NS	SP-11	1	400ml Summa	None	-30 "	can #	892

Sampler Signature	Date

Notes:
0853 CRB INF-1101 E524.2 SP-03 pH - 8.05 cond - .97 Temp - 18.8
0843 CRB Mid-1101 E524.2 SP-04 pH - 8.00 cond - .94 Temp - 19.2

FD = Field Duplicate
FB = Field Blank (ambient)
NS = Normal Sample
TB = Trip Blank

Scan COCs to:
URS Attn: Debbie Casagrande (916) 679-2040

URS Corporation
Modesto, Superfund Site
Process Data Sheet

Groundwater Treatment System

			Hour Meter	Utility Power		System Influent				Anti-Scalent Sequestrant	Air Stripper Water						
						Flow	Pressure	Total Flow	pH	T-3	Influent Pressure	Efffluent Pressure	Flow	Pressure	Influent Pressure	Effluent Pressure	Flow
											Bag Filter F-1			Pump P-3	Bag Filter F-2		
Initials	Date	Time	Hrs.	kW	kWh	GPM	PSI	Gallons	pH	Gallons	PSI	PSI	GPM	PSI	PSI	PSI	GPM
TH	12/6/12	1015	55528	15.98	32226	47	13	—	6.96	23.5	9.3	5.9	58	45	45.7	43.2	60
TH	12/13/12	0845	55694	15.98	33869	48	14	—	6.88	26.5	8.7	5.0	58	45	46.2	42.9	60
TH	12/20/12	0900	55862	15.98	35509	48	14	—	7.12	23.5	8.2	4.4	58	46	46.6	44.3	60
GB	12/27/12	0800	56030	15.98	37065	48	14	—	7.22	31	8.5	5.0	58	47	45.6	43.8	60
Design Range or Target Value				10.0-30	N/A	3.0-85	30-50	n/a	5.0-12.0	3.0-25	30-50	30-50	40-70	30-50	30-50	30-50	40-70

GroundWater Treatment System

Air Stripper Vapor						Liquid Carbon			Ion Exchange			System Effluent				Radiation Meter	
Sump Pressure	Effluent Pressure	Influent P.I.D.	Effluent P.I.D.	Temp	Flow	Influent Pressure	Mid-Bed Pressure	Effluent Pressure	Influent Pressure	Mid-Bed Pressure	Flow	Flow	Pressure	pH	Effluent Total Flow	Outside GWTS	Inside GWTS
Air Stripper Trays		VGAC Vessel		Stack													
in. H2O	in. H20	ppm	ppm	°F	CFM	PSI	PSI	PSI	PSI	PSI	GPM	Gpm	in H2O	pH	Gallons	mR/hr Peak	mR/hr Peak
10		0	0	68.6	675	40	34	29	21.5	11	43	53	0	7.91	71314	0	0
10		0	0	67.5	655	40	34	28.5	21	10.5	43	53	0	7.72	75904	0	0
10		0	0	67.5	650	41	34	29	21	10.5	43	53	0	7.73	80542	0	0
10		0	0	67.1	595	41	34	29	22	11	43	54	0	7.69	85161	0	0
5.0-25	5.0-25	0-100	0-10	65-75	550-650	25-70	25-60	25-30	1.0-10	1.0-10	3.0-60	3.0-50	1.0-5	5.0-12	N/A	0-1	0-1

Soil Vapor Extraction System

		SVE Influent				Blower				Filter		Vapor				Radiation Meter	
		Pressure	Temp	Flow	Dilution	Hour Meter	Effluent Pressure	Temp	Flow	Influent Pressure	Effluent Pressure	Influent P.I.D.	Effluent P.I.D.	Temp	Flow	Outside SVE	Inside SVE
												VGAC Vessel		Stack			
Date	Time	In. H2O	°F	CFM	Yes/No	Hrs.	in. H2O	°F	CFM	in. H2O	in. H2O	ppm	ppm	°F	CFM	mR/hr Peak	mR/hr Peak
12/6/12	1035	-63	65.5	170	N	15349	3	185.4	169	-68	-72	0	0	185.4	169	0	0
12/13/12	1135	-63	63.1	167	N	15518	3	182.1	167	-69	-73	0	0	182.1	167	0	0
12/20/12	1000	-63	61.8	168	N	15685	3	175.4	170	-68	-72	0	0	175.4	170	0	0
12/27/12	0840	-63	61.2	159	N	15851	2	181.6	155	-68	-72	0	0	181.6	155	0	0
		25-70	65-75	100-200	NO	N/A	2.0-10	65-75	100-200	N/A	N/A	0-100	0-10	65-75	100-200	0-1	0-1

Note: For pressures measured relative to atmospheric (barometric) pressure, use (-) for vacuum.

Reviewed By: ____________ Date: ____________

SVE

12/6 — 9.09 / 33774

12/13 — 9.09 35160

12/20 — 9.09 36571

12/27 - 9.09 37960

URS Corporation
Modesto Superfund Site
Site Inspections

Task Description	12/6/12 TH	12/13/12 TH	12/20/12 TH	12/27/12 GB	/ /
WEEKLY	Task Performed (Technician Initials or Value)				
Groundwater TreatmentSystem					
Record Process Logs	✓	✓	✓	✓	
Check Blowers and motors for heat, noise, and vibration	✓	✓	✓	✓	
Check Air Stripper Feed pump/motor (P-2) for heat, noise, and vibration.	✓	✓	✓	✓	
Inspect all process piping for leaks	✓	✓	✓	✓	
Inspect all process hoses/fittings for leaks	✓	✓	✓	✓	
Check Air Stripper Effluent pump/motor (P-3) for heat, noise, and vibration.	✓	✓	✓	✓	
Inspect Sump (Pump as Necessary).	✓	✓	✓	✓	
Check Air Stripper sump level site glass. Clean as necessary	✓	✓	✓	✓	
Inspect IX system influent vacuum break for leaks	✓	✓	✓	✓	
Clean up compound area	✓	✓	✓	✓	
Drain VGAC condensate	✓	✓	✓	✓	
Perform autodialer operational check	✓	✓	✓	✓	
Autodialer battery check	✓	✓	✓	✓	
Perform inspection of EW-1R pipeline	✓	✓	✓	✓	
Inspection of Spill Response Kit	✓	✓	✓	✓	
Inspection of Emergency Response Plan/MSDS Binder	✓	✓	✓	✓	
Soil Vapor Extraction System					
Record Process Logs	✓	✓	✓	✓	
Check Blowers and motors for heat, noise, and vibration	✓	✓	✓	✓	
Inspect all process piping for leaks	✓	✓	✓	✓	
Clean up compound area	✓	✓	✓	✓	
Drain VGAC condensate	✓	✓	✓	✓	
Perform autodialer operational check	✓	✓	✓	✓	
Inspection of Spill Response Kit	✓	✓	✓	✓	
Inspection of Emergency Response Plan/MSDS Binder	✓	✓	✓	✓	

Task Description	Performed		
MONTHLY	Date	Initials	Reading
Check fire extinguisher	✓ 12/6/12	TH	
Inspect EW-1R vault	12/3/12	TH	
Inspect VI Mitigation operations - "Part House"	12/20/12	TH	
Replace Auto Dialer Batteries (if necessary)	N/A	—	
~~Quarterly~~ Semi-annual			
Interlock Checks Groundwater	—	—	
Interlock Checks SVE	—	—	
Collect Well Flow read at SVE-02	—	—	—
Collect Well Flow read at SVE-03	—	—	—
Collect Well Flow read at SVE-04	—	—	—
ANNUAL			
Collect Amp radings			
Instrument Calibration			
System Effluent Flow Meter (Performed in June and December)	12/11/12	TH	

Notes:

Reviewed by:________ Date:________

URS Group
Preventative and Corrective Maintenance Log
Modesto Superfund Site

Site Name:________________
Period:______________to______________
(month/day/year) (month\day\year)

Date	Initials	Hour Meter	Maintenance Performed	LOTO Required	LOTO Description (Where?Why?)	LOCK ON (Date/Time)	Zero Energy Check	LOCK OFF (Date/Time)	LOCK ID (Lock No.)
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		
				Y / N			Y / N		

URS Group
Preventative and Corrective Maintenance Log
Modesto Superfund Site

Site Name:________________

Shutdown Date: 12/1/12 Startup Date: 12/3/12
Shutdown Time: 2130 Startup Time: 0840
Shutdown Purpose or Cause: Extraction well vaults high flood shut off
Corrective Actions Taken (if shutdown was unplanned): pumped water out of vaults.
Performed By:________

Shutdown Date:____________ Startup Date:____________
Shutdown Time:____________ Startup Time:____________
Shutdown Purpose or Cause:
Corrective Actions Taken (if shutdown was unplanned):
Performed By:________

Shutdown Date:____________ Startup Date:____________
Shutdown Time:____________ Startup Time:____________
Shutdown Purpose or Cause:
Corrective Actions Taken (if shutdown was unplanned):
Performed By:________

Shutdown Date:____________ Startup Date:____________
Shutdown Time:____________ Startup Time:____________
Shutdown Purpose or Cause:
Corrective Actions Taken (if shutdown was unplanned):
Performed By:________

Reviewed by:________ Date: __________

Date: Thursday, December 06, 2012
Weather: Overcast
Sampler: Tamrah Headrick

SAMPLE COLLECTION RECORD
MODESTO SUPERFUND SITE

Time	Description	Totalizer Reading (gallons)	Flow (gpm)
1015	GWTS Effluent	71314	53

Time	Sample Location - Test Method	Sample Description	LOCID	No. of Containers	Container Type	Preservative	pH	Cond	Temp
825	EFF-1201 E524.2	Effluent-NS	SP-07	3	40 ml VOA	HCL	7.91	0.98	20
825	EFF-1201 SM2540C	Effluent-NS	SP-07	1	250 ml Poly	None	7.91	0.98	20
838	EFF-1201 SM5210B, SM5210D	Effluent-NS	SP-07	1	500 ml Poly	None	8.02	1.07	3.5
856	CRB Mid-1201 E524.2	CRB Mid	SP-04	3	500 ml Poly	HCL	7.85	0.96	19.4
902	CRB INF-1201 E524.2	CRB INF	SP-03	3	40 ml VOA	HCL	7.91	0.96	19.7
845	IEXEFF-1201 D5174	IEX Eff-1201	SP-10	1	1 Liter Poly	HNO3	7.77	0.97	18.3
848	IEX Mid-1201 D5174	IEX Mid-1201	SP-06	1	1 Liter Poly	HNO3	7.79	0.97	19.4
851	Pre IEX-1201 D5174	Pre IEX-1201	SP-05	1	1 Liter Poly	HNO3	7.79	0.97	19.5
910	GWTS-INF-1201 E524.2	Influent-NS	SP-01	3	40 ml VOA	HCL	6.96	0.99	19.7
1200	MW-107-NS SM2540C	FD	SP-07	1	1 Liter Poly	None	7.91	0.98	20
1200	MW-107-NS SM5210B, SM2540D	FD	SP-07	1	2 Liter Poly	None	8.02	1.07	3.5
800	MW-304-4Q12 E524.2	TB	TB	2	40 ml VOA	HCL	--	--	--
936	GWTS Stack-1201 TO-15	GWTP VGAC Effluent-NS	SP-09	1	1 Liter Summa	None	-29.5 in. Hg	can # 37772	
940	GWTS Pr GAC-1201 TO-15	GWTP VGAC Influent-NS	SP-08	1	1 Liter Summa	None	-29 in. Hg	can # 36460	
1042	SVE Stack-1201 TO-15	SVE VGAC Effluent-NS	SP-12	1	400ml Summa	None	-29 in. Hg	can # 851	
1045	SVE Pre GAC-1201 TO-15	SVE VGAC Influent-NS	SP-11	1	400ml Summa	None	-29 in. Hg	can # 895	

Sampler Signature	Date
	12/6/12

Notes:

FD = Field Duplicate
FB = Field Blank (ambient)
NS = Normal Sample
TB = Trip Blank

Scan COCs to:
URS Attn: Debbie Casagrande (916) 679-2040

Appendix F

Operational History

Appendix F

Operational History

This section presents a summary of operation and maintenance events performed on the remedial treatment systems. Table F-1(a) (July 1, 2012 through January 31, 2010) lists the event, start and end dates, and the type of maintenance (Routine, Non-routine, Reimbursable, or Optimization) that was performed. Table F-1(b) (March 1, 2010 through December 31, 2012) lists the event and start and end dates.

TABLE F-1(a)

OPERATIONAL HISTORY
GROUNDWATER TREATMENT AND SOIL VAPOR EXTRACTION SYSTEM
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

No.	Event	Start Date	End Date	Type of Maintenance
1	Start up of groundwater treatment and soil vapor extraction system	05-Jul-01		Routine
2	Replaced motor starter in 7.5 horsepower transfer pump	07-Jul-01	16-Jul-01	Reimbursable
3	Installed hour meter in SVE system	17-Jul-01	17-Jul-01	Reimbursable
4	Replaced equalization tank float assembly	26-Jul-01	31-Jul-01	Reimbursable
5	Moved vacuum breaker to location after ion exchange vessels	31-Jul-01	31-Jul-01	Reimbursable
6	Repaired faulty pipe joint in SVE system	08-Aug-01	09-Aug-01	Reimbursable
7	Installed duplex bag filters	11-Aug-01	27-Aug-01	Reimbursable
8	Switched 5.0 horsepower and 7.5 horsepower transfer pump	11-Aug-01	27-Aug-01	Reimbursable
9	Replaced ruptured 1/4 inch hose on the liquid GAC vessels	29-Aug-01	30-Aug-01	Reimbursable
10	Programmed duplex bag filters into PLC logic	06-Sep-01	06-Sep-01	Reimbursable
11	Backflushed lead ion exchange vessel	11-Sep-01	11-Sep-01	Routine
12	Carbon change out for SVE vapor GAC	18-Sep-01	27-Sep-01	Routine
13	Bypassed lead ion exchange vessel	20-Sep-01	20-Sep-01	Routine
14	Water chemistry data collected from GWT system	25-Sep-01	25-Sep-01	Reimbursable
15	Repair of PID meter in SVE system	09-Oct-01	26-Oct-01	Reimbursable
16	Cabon change out for GWT vapor GAC	23-Oct-01	23-Oct-01	Routine
17	Replaced anti-scalant with Redux-300	02-Nov-01	02-Nov-01	Routine
18	Installed pulsation damper after filter #2	07-Nov-01	07-Nov-01	Reimbursable
19	Carbon change out for SVE vapor GAC	05-Dec-01	19-Dec-01	Routine
20	Installed polishing ion exchange vessel using virgin resin. Sixty (60) percent of flow through ion exchange and 40 percent bypassed.	13-Dec-01	13-Dec-01	Routine
21	Cabon change out for GWT vapor GAC	19-Dec-01	19-Dec-01	Routine
22	SVE Vapor Carbon Changeout	06-Feb-02	06-Feb-02	Routine
23	Air Stripper Annual Inspection. No abnormal conditions were reported	28-Mar-02	28-Mar-02	Routine
24	Installed air conditioning unit inside SVE treatment system trailer.	04-Jun-02	04-Jun-02	Optimization
25	Optimization of GWT system 1) Switched location of vapor GAC and liquid GAC vessel. 2) Replace filter unit with 10-micron bag filter after air stripper. 3) Insulated vapor GAC vessel. 4) Added two additional phone lines. 5) Addition of floor drains. 6) Installed cooling/air conditioning unit in GWT and SVE control panel.	11-Jun-02	14-Jun-02	Optimization
26	Carbon change out for GWT vapor GAC	14-Jun-02	14-Jun-02	Routine
27	Removed and replaced leaking hoses in GWT system. Bag Filter 2 to GAC-2 manifold and GAC-3 to effluent manifold.	26-Jun-02	26-Jun-02	Reimbursable
29	SVE Vapor Carbon Changeout	17-Jul-02	17-Jul-02	Routine
30	GWT Liquid Carbon Changeouts (Lead and Lag Vessels)	12-Oct-02	12-Oct-02	Routine
31	SVE Vapor Carbon Changeout	13-Dec-02	13-Dec-02	Routine
32	Cabon Changeout for GWT Vapor GAC	23-Apr-03	23-Apr-03	Routine
33	GWT Ion Exchange Changeout	23-Apr-03	23-Apr-03	Routine
34	Replaced P-2 Motor Starter. Fixed EQ Tank Level Indicators	07-May-03	07-May-03	Non Routine
35	Calibrated pH meter and repaired MiniRAE PID	07-Jul-03	07-Jul-03	Non Routine
36	Emptied and cleaned chemical dry tank, and cleaned CMI pump.	17-Jul-03	17-Jul-03	Non Routine

TABLE F-1(a)

OPERATIONAL HISTORY
GROUNDWATER TREATMENT AND SOIL VAPOR EXTRACTION SYSTEM
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

No.	Event	Start Date	End Date	Type of Maintenance
37	SVE Vapor Carbon changeout.	13-Aug-03	13-Aug-03	Routine
38	Exhaust fan not working. Fan was removed and replaced.	04-Sep-03	25-Sep-03	Non Routine
39	Disassembled, inspected and cleaned P-2.	11-Sep-03	11-Sep-03	Non Routine
40	Redeveloped EW-1 and replaced the EW-1 submersible pump	17-Mar-04	06-Apr-04	Non Routine
41	Replaced influent and effluent totalizers.	07-Apr-04	07-Apr-04	Non Routine
42	Replaced broken lead GAC vessel camlock fitting	16-May-04	17-May-04	Non Routine
43	Removed lag GAC vessel from service due to leak in vessel	17-May-04	17-May-04	Non Routine
44	GWT Liquid Carbon Changeouts (Lead Vessel)	03-Jun-04	03-Jun-04	Routine
45	GWT Ion Exchange Changeout (Lead Vessel)	18-Jun-04	18-Jun-04	Routine
46	Installed refurbished lag GAC vessel with fresh carbon	08-Oct-04	08-Oct-04	Non Routine
47	GWT system shutdown because of a high current alarm. The system was left off line and not repaired as requested by USACE	04-Nov-04	04-Nov-04	Non Routine
48	Replaced GWT system effluent flow meter (new baseline - 870 gallons), calibrated digital display meter.	09-Jun-05	09-Jun-05	Non Routine
49	Repaired air conditioning unit in SVE trailer	02-Jun-05	28-Jun-05	Non Routine
50	Repaired vent fan unit in GWTS trailer.	21-Jul-05	28-Jul-05	Non Routine
51	SVE System GAC changeout.	03-Nov-05	03-Nov-05	Routine
52	Drill and developed extraction well EW-1R, located adjacent to MW-3. This well replaces failed extraction well EW-1	21-Jun-06	28-Jun-06	Non Routine
53	Start up of groundwater treatment system with replacement well EW-1R	24-Aug-06	24-Aug-06	Non Routine
54	Installed new digital display for effluent flow totalizer on GWTS.	22-Sep-06	22-Sep-06	Non Routine
55	Replaced effluent sample port on the GWTS.	20-Oct-06	20-Oct-06	Non Routine
56	Replaced Filters F1 and F2 on the GWTS.	24-Oct-06	24-Oct-06	Routine
57	Replaced bag filters on GWTS	13-Jan-07	13-Jan-07	Routine
58	Replaced hoses mid-GAC on GWTS	22-Jan-07	22-Jan-07	Non Routine
59	Replaced piping on SVE (post-stack)	12-Mar-07	16-Apr-07	Non Routine
60	Changed ion exchange resin filters on GWTS	25-Jun-07	02-Jul-07	Non Routine
61	Repaired SVE control system	19-Jul-07	31-Jul-07	Non Routine
62	Replaced hour meter	27-Aug-07	27-Aug-07	Non Routine
63	Replaced detective float switch	05-Sep-07	05-Sep-07	Non Routine
64	Replaced Influent bag filters for GWTS	22-Oct-07	22-Oct-07	Routine
65	Pressure sensors cleaned and replaced on GWTS	23-Oct-07	23-Oct-07	Non Routine
66	GWTS Carbon change out (water and vapor phase)	19-Nov-07	19-Nov-07	Routine
67	Replaced filter socks on 3 filter vessels	14-Mar-08	14-Mar-08	Routine
68	Replaced the broken effluent valve	05-Apr-08	07-Apr-08	Non Routine
69	Replaced gasket on GAC vessel #1	16-Aug-08	16-Aug-08	Routine
70	Replaced gasket on GAC vessel #1	21-Aug-08	21-Aug-08	Routine
71	SVE System Carbon change-out	05-Oct-08	5-Oct-08	Routine
72	Replaced filter bags in 3 canisters on the GWTS.	24-Feb-09	24-Feb-09	Routine
73	Replaced air stripper sump pump flow meter on GWTS.	13-Mar-09	13-Mar-09	Non-routine
74	Replace PVC pipe with iron pipe on SVE effluent/blower.	19-Mar-09	19-Mar-09	Non-routine
75	Changed out carbon in the GAC filter vessels (GWTS).	25-Jun-09	26-Jun-09	Routine
76	Replace 2" ball valve at groundwater treatment system (GWTS).	25-Sep-09	02-Oct-09	Non-routine

TABLE F-1(a)

OPERATIONAL HISTORY
GROUNDWATER TREATMENT AND SOIL VAPOR EXTRACTION SYSTEM
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

No.	Event	Start Date	End Date	Type of Maintenance
77	Replace broken 2" ball valve, re-piped effluent piping system, added piping reinforcement (GWTS).	15-Oct-09	16-Oct-09	Non-routine
78	Replace broken one-way ball check valve (GWTS).	17-Nov-09	19-Nov-09	Non-routine
79	Repaired a loose wire at the GWTS secondary containment alarm system.	20-Jan-10	20-Jan-10	Non-routine

Notes:

GAC - Granular Activate Carbon

GWTS - Groundwater Treatment System

PID - Photoionization Detector

PLC - Programmable Logic Controller

SVE - Soil Vapor Extraction

TABLE F-1(b)

OPERATIONAL HISTORY
GROUNDWATER TREATMENT AND SOIL VAPOR EXTRACTION SYSTEM
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

No.	Event	Start Date	End Date
1	URS Corporation Inc. begins operation and maintenance activities.	01-Mar-10	
2	Reprogrammed emergency call-out system with URS contact information	01-Mar-10	01-Mar-10
3	Installed a vacuum break anti-syphon valve at effluent of the LGAC vessels.	18-Mar-10	18-Mar-10
4	Performed a backwash of the primary LGAC vessel.	01-Apr-10	01-Apr-10
5	Performed a backwash of the secondary LGAC vessel.	29-Apr-10	29-Apr-10
6	Replaced a dry disconnect coupling at the effluent of the primary IX vessel.	27-May-10	27-May-10
7	Calibrated and certified the sewer outfall flow meter.	09-Jun-10	09-Jun-10
8	Installed an automatic composite sampler at GWTS effluent.	20-Jul-10	20-Jul-10
9	Performed a changeout of the GWTS airstripper and SVE system VGAC.	19-Aug-10	19-Aug-10
10	Performed a backwash of the primary LGAC vessel.	21-Oct-10	21-Oct-10
11	Tested GWTS interlock controls.	03-Nov-10	03-Nov-10
12	Tested SVE system interlock controls.	03-Nov-10	03-Nov-10
13	Performed a changeout of the resin in the primary IX system vessel.	09-Dec-10	09-Dec-10
14	Calibrated and certified the sewer outfall flow meter.	09-Dec-10	09-Dec-10
15	Lubricated all pumps and motors.	21-Jan-11	21-Jan-11
16	Performed a changeout of the resin in the primary and secondary IX system vessel.	24-Feb-11	24-Feb-11
17	Calibrated the pressure sensors on the GWTS bag filters.	24-Feb-11	24-Feb-11
18	Performed a backwash of the primary LGAC vessel.	26-May-11	26-May-11
19	Calibrated and certified the sewer outfall flow meter.	04-Jun-11	04-Jun-11
20	Replaced sequestrant relay and cleared chemical blockage in pump and tubing.	06-Sep-11	06-Sep-11
21	Replaced all tubing on sequestrant delivery system. Disassembled chemical dosing pump. Cleaned out pump and tank and reassembled. Filtered existing sequestrant product for reuse.	08-Sep-11	08-Sep-11
22	Replaced gasket on primary LGAC.	28-Nov-11	28-Nov-11
23	Performed a changeout of the resin in the primary IX system vessel.	15-Dec-11	15-Dec-11
24	Calibrated and certified the sewer outfall flow meter.	21-Dec-11	21-Dec-11
25	Inspected IX resin vessels and installed new lid gaskets.	16-Feb-12	16-Feb-12
26	Changed bag filters.	08-Mar-12	08-Mar-12
27	Changed bag filters.	15-Mar-12	15-Mar-12
28	Replaced high level float switch in influent equalization tank.	20-Mar-12	20-Mar-12
29	New stainless steel float switches installed in influent equalization tank.	16-Mar-12	20-Mar-12
30	Changed bag filters.	02-Apr-12	02-Apr-12
31	Changed bag filters.	09-Apr-12	09-Apr-12
32	Changed bag filters.	24-Apr-12	24-Apr-12
33	Performed a changeout of the resin in the secondary IX system vessel.	17-May-12	17-May-12
34	Performed interlock alarm testing for proper functionality.	24-May-12	24-May-12
35	Replaced high level float switch in influent equalization tank.	30-May-12	30-May-12
36	Replaced all IX vessel hose connections.	14-Jun-12	14-Jun-12
37	Replaced effluent Y-strainer.	18-Jun-12	18-Jun-12
38	Cleaned out all flow indicators and meters.	19-Jun-12	19-Jun-12
39	Disassembled and cleaned airstripper.	20-Jun-12	20-Jun-12
40	Added air filter element to external air stripper inlet port.	21-Jun-12	21-Jun-12
41	Utility power meter replaced to separate usage billing for SVE unit.	25-Jun-12	25-Jun-12

TABLE F-1(b)

OPERATIONAL HISTORY
GROUNDWATER TREATMENT AND SOIL VAPOR EXTRACTION SYSTEM
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

No.	Event	Start Date	End Date
42	Installed new effluent pump in GWTS.	03-Jul-12	03-Jul-12
43	Installed external filtering system to process quarterly monitoring purge water.	25-Jul-12	25-Jul-12
44	Installation of EW-02 included new well, electrical, vault, and conveyance line. Work will continue in August.	01-Jul-12	31-Jul-12
45	Completed electrical, vault, and conveyance line for EW-02.	01-Aug-12	31-Aug-12
46	Shut off EW-01R to discharge from EW-02 frac tank.	01-Aug-12	01-Aug-12
47	Shut down system due to leak in hose between LGACs. Repaired hose and restarted.	09-Aug-12	09-Aug-12
48	Changed bag filters.	06-Sep-12	06-Sep-12
49	Shut down system for electrical modification to EW-02.	13-Sep-12	13-Sep-12
50	Changed bag filters and replaced sight glass tubing for stripper.	13-Sep-12	13-Sep-12
51	Changed bag filters.	20-Sep-12	20-Sep-12
52	Changed bag filters.	21-Sep-12	21-Sep-12
53	Replaced three floats in the stripper sump and changed bag filters.	25-Sep-12	25-Sep-12
54	Shut down for influent tank cleanout.	04-Oct-12	04-Oct-12
55	Shut down system to install Timemark at EW-02.	18-Oct-12	18-Oct-12
56	Shut down system to clean out stripper sump.	25-Oct-12	25-Oct-12
57	Changed bag filters.	01-Nov-12	01-Nov-12
58	Changed bag filters.	14-Nov-12	14-Nov-12
59	Replaced four hoses: two at the influent and effluent of the post airstripper bag filter housing, one at the GAC-2 (lead LGAC vessel) influent, and one at the GAC-3 (lag LGAC vessel) effluent.	27-Nov-12	27-Nov-12
60	Changed bag filters.	29-Nov-12	29-Nov-12
61	Calibrated the sewer outfall flow meter. Changed bag filters.	11-Dec-12	11-Dec-12
62	Changed bag filters due to processing purge water from sampling event.	14-Dec-12	14-Dec-12
63	Installed new exhaust fan/motor assembly in GWTS trailer. Changed bag filters due to processing water from sampling event.	20-Dec-12	20-Dec-12

Notes:
GWTS = groundwater treatment system
IX = ion exchange
LGAC = liquid-phase granular activated carbon
VGAC = vapor-phase granular activated carbon
SVE = soil vapor extraction

Appendix G

Historical Well Construction, Analytical, and Mass Removed Data

Table G-1. Well Construction Details

Well No.	Casing Diameter (inches)	Boring Depth (ft bgs)	Screen Interval (ft bgs)	Top of Casing Elevation (ft msl)[a]
Groundwater Monitoring Wells				
MW-01A	4	101	91-101	91.61
MW-02A	4	96	86-96	90.88[b]
MW-03A	4	94	84-94	91.49[b]
MW-04A	4	89	78-88	91.13
MW-04B	2	154	144-154	91.11
MW-04C	2	237	227-237	91.25
MW-05A	2	90	60-90	90.74
MW-06A	2	90	60-90	89.72[b]
MW-07A	2	90	60-90	91.24
MW-08A	2	90	60-90	91.44
MW-09A	2	155	144-154	91.20[b]
MW-09B		155	144-154	91.19
MW-10A	2	91	60-89	90.48
MW-10B	2	160	153-163	90.21
MW-10C	2	230	220-230	90.5
MW-11A	2	92	70-90	89.91
MW-12A	2	99	87-97	91.15[b]
MW-13A	2	99	77-97	89.27
MW-14A	2	92	70-90	89.79
MW-15A	2	102	80-100	91.76
MW-16A	2	86	76-86	91.89
MW-16B	2	139	129-139	91.82
MW-16C	2	236	226-236	91.64
MW-17A	2	88	77-87	89.64
MW-17B	2	140	129-139	89.69
MW-17C	2	232	222-232	89.76
MW-18A	2	66	56-66	90.14
MW-19A	2	101	91-101	91.22
MW-19B1	2	147	137-147	91.08
MW-20A	2	86	76-86	90.7
MW-20B		162	152-162	90.65
MW-20C		235	225-235	90.79
MW-21A	2	102	90-100	91.75[c]
MW-22A	2	62	50-60	91.69[c]
MW-23A	2	102	89-99	90.26[c]
MW-24B	2	157	145-155	92.93[c]
MW-25B	2	157	145-155	91.78[c]
MW-26B	2	157	145-155	89.71[c]
MW-27B	2	157	145-155	89.34[c]
MW-28B	2	157	145-155	89.21[c]
MW-29B	2	157	145-155	89.74[c]
EW-01	5	115	65-95	89.54
EW-01R	6	120	59-109	90.65[b]
EW-02	6	116	60.5-110.5	91.64[d]

Table G-1. (Continued)

Well No.	Casing Diameter (inches)	Boring Depth (ft bgs)	Screen Interval (ft bgs)	Top of Casing Elevation (ft msl)[a]
Soil Vapor Wells				
SVE-01	2	40	18-38	89.84
SVE-02	2	13	7-12	91.36
SVE-03	2	39	13-23	91.38
SVE-04	2	39	28-38	91.38
DP-1				91.44
DP-1A	1	40	28-29	
DP-1B	1	40	38-39	
DP-2			-	91.27
DP-2A	1	40	15-16	
DP-2B	1	40	34-35	
DP-3			-	91.86
DP-3A	1	40	19-20	
DP-3B	1	40	29-30	
DP-4			-	91.92
DP-4A	1	40	23-24	
DP-4B	1	40	38.5-39.5	
DP-5			-	91.27
DP-5A	2	37	15-16	
DP-5B	2	37	34-35	
DP-6			-	91.69
DP-6A	2	36	15-16	
DP-6B	2	36	34-35	

[a] Wells resurveyed in February 2003.

[b] Wells resurveyed in September 2006.

[c] Wells installed and surveyed in September 2011.

[d] Well installed June 2012 and surveyed August 2012

bgs = below ground surface

ft = feet

msl = mean sea level

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-1A	101	91 - 101	89.14	Apr-00[a]	NA	50.62
			89.14	Aug-00[a]	NA	50.34
			89.14	Nov-00[a]	NA	48.92
			89.14	Feb-01[a]	NA	50.28
			89.14	Aug-01	42.71	46.43
			89.14	Oct-01	44.55	44.59
			89.14	Nov-01	44.41	44.73
			89.14	Feb-02	43.17	45.97
			89.14	May-02	42.44	46.70
			89.14	Aug-02	45.60	43.54
			89.14	Nov-02	46.00	43.14
			89.14	Feb-03	44.95	44.19
			91.611	May-03	44.15	47.46
			91.61	Aug-03	45.55	46.06
			91.61	Nov-03	46.15	45.46
			91.61	Feb-04	44.70	46.91
			91.61	May-04	43.95	47.66
			91.61	Aug-04	46.20	45.41
			91.61	Nov-04	45.70	45.91
			91.61	Feb-05	44.30	47.31
			91.61	May-05	42.60	49.01
			91.61	Aug-05	43.40	48.21
			91.61	Nov-05	44.40	47.21
			91.61	Feb-06	43.04	48.57
			91.61	May-06	41.65	49.96
			91.61	Aug-06	42.53	49.08
			91.61	Aug-06[b]	43.07	48.54
			91.61	Nov-06	43.66	47.95
			91.61	Feb-07	42.34	49.27
			91.61	May-07	40.94	50.67
			91.61	Aug-07	43.25	48.36
			91.61	Nov-07	43.85	47.76
			91.61	Feb-08	42.73	48.88
			91.61	May-08	42.10	49.51
			91.61	Aug-08	43.45	48.16
			91.61	Dec-08	44.28	47.33
			91.61	Feb-09	43.71	47.90
			91.61	Jun-09	43.88	47.73
			91.61	Aug-09	49.45	42.16
			91.61	Nov-09	46.45	45.16
MW-2A	96	86 - 96	88.63	Apr-00[a]	NA	50.48
			88.63	Aug-00[a]	NA	50.19
			88.63	Nov-00[a]	NA	48.80
			88.63	Feb-01[a]	NA	50.32
			88.63	Aug-01	42.00	46.63
			88.63	Oct-01	44.30	44.33
			88.63	Nov-01	44.20	44.43
			88.63	Feb-02	42.77	45.86
			88.63	May-02	42.10	46.53
			88.63	Aug-02	45.50	43.13
			88.63	Nov-02	45.70	42.93
			88.63	Feb-03	44.60	44.03
			90.911	May-03	43.75	47.16
			90.91	Aug-03	45.10	45.81
			90.91	Nov-03	45.65	45.26
			90.91	Feb-04	44.13	46.78

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			90.91	May-04	43.10	47.81
			90.91	Aug-04	45.81	45.10
			90.91	Nov-04	45.14	45.77
			90.91	Feb-05	43.43	47.48
			90.91	May-05	41.93	48.98
			90.91	Aug-05	42.90	48.01
			90.91	Nov-05	43.75	47.16
			90.91	Feb-06	42.25	48.66
			90.91	May-06	40.97	49.94
			90.882	Aug-06	41.52	49.36
			90.88	Aug-06[b]	44.20	46.68
			90.88	Nov-06	42.90	47.98
			90.88	Feb-07	41.61	49.27
			90.88	May-07	40.20	50.68
			90.88	Aug-07	42.52	48.36
			90.88	Nov-07	43.10	47.78
			90.88	Feb-08	42.01	48.87
			90.88	May-08	41.35	49.53
			90.88	Aug-08	42.65	48.23
			90.88	Dec-08	43.48	47.40
			90.88	Feb-09	42.94	47.94
			90.88	Jun-09	43.25	47.63
			90.88	Aug-09	44.63	46.25
			90.88	Nov-09	45.57	45.31
MW-3A	94	84 - 94	89.42	Apr-00[a]	NA	50.75
			88.42	Aug-00[a]	NA	50.12
			89.42	Nov-00[a]	NA	48.62
			88.42	Feb-01[a]	NA	50.22
			89.42	Aug-01	43.00	46.42
			88.42	Oct-01	45.35	44.07
			89.42	Nov-01	44.09	45.33
			88.42	Feb-02	43.98	45.44
			89.42	May-02	43.14	46.28
			88.42	Aug-02	46.55	42.87
			89.42	Nov-02	46.70	42.72
			88.42	Feb-03	45.80	43.62
			91.591	May-03	44.10	47.49
			91.59	Aug-03	46.25	45.34
			91.59	Nov-03	47.95	43.64
			91.59	Feb-04	45.25	46.34
			91.59	May-04	44.35	47.24
			91.59	Aug-04	47.05	44.54
			91.59	Nov-04	46.52	45.07
			91.59	Feb-05	44.85	46.74
			91.59	May-05	43.20	48.39
			91.59	Aug-05	44.27	47.32
			91.59	Nov-05	46.25	45.34
			91.59	Feb-06	44.65	46.94
			91.59	May-06	43.25	48.34
			91.492	Aug-06	43.82	47.67
			91.49	Aug-06[b]	45.64	45.85
			91.49	Nov-06	46.61	44.88
			91.49	Feb-07	45.91	45.58
			91.49	May-07	41.19	50.30
			91.49	Aug-07	46.53	44.96
			91.49	Nov-07	47.2	44.29
			91.49	Feb-08	46.1	45.39
			91.49	May-08	45.25	46.24
			91.49	Aug-08	46.6	44.89

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			91.49	Dec-08	46.36	45.13
			91.49	Feb-09	46.18	45.31
			91.49	Jun-09	46.28	45.21
			91.49	Aug-09	47.73	43.76
			91.49	Nov-09	48.5	42.99
MW-4A	89	78 - 88	88.66	Apr-00[a]	NA	50.15
			88.66	Aug-00[a]	NA	50.01
			88.66	Nov-00[a]	NA	48.11
			88.66	Feb-01[a]	NA	49.74
			88.66	Aug-01	43.50	45.16
			88.66	Oct-01	44.11	44.55
			88.66	Nov-01	44.46	44.20
			88.66	Feb-02	43.21	45.45
			88.66	May-02	42.13	46.53
			88.66	Aug-02	44.80	43.86
			88.66	Nov-02	45.50	43.16
			88.66	Feb-03	44.35	44.31
			91.131	May-03	44.05	47.08
			91.13	Aug-03	45.10	46.03
			91.13	Nov-03	46.25	44.88
			91.13	Feb-04	44.85	46.28
			91.13	May-04	44.25	46.88
			91.13	Aug-04	45.90	45.23
			91.13	Nov-04	46.32	44.81
			91.13	Feb-05	44.68	46.45
			91.13	May-05	42.90	48.23
			91.13	Aug-05	43.75	47.38
			91.13	Nov-05	44.80	46.33
			91.13	Feb-06	43.36	47.77
			91.13	May-06	41.80	49.33
			91.13	Aug-06	42.34	48.79
			91.13	Aug-06[b]	43.17	47.96
			91.13	Nov-06	44.05	47.08
			91.13	Feb-07	43.03	48.10
			91.13	May-07	40.83	50.30
			91.13	Aug-07	43.53	47.60
			91.13	Nov-07	44.39	46.74
			91.13	Feb-08	43.30	47.83
			91.13	May-08	42.36	48.77
			91.13	Aug-08	43.64	47.49
			91.13	Dec-08	44.79	46.34
			91.13	Feb-09	44.21	46.92
			91.13	Jun-09	44.18	46.95
			91.13	Aug-09	45.62	45.51
			91.13	Nov-09	46.89	44.24
MW-4B	154	144-154	91.11	Dec-08	44.73	46.38
			91.11	Feb-09	43.78	47.33
			91.11	Jun-09	44.80	46.31
			91.11	Aug-09	46.72	44.39
			91.11	Nov-09	46.73	44.38
MW-4C	237	227-237	91.25	Dec-08	44.35	46.90
			91.25	Feb-09	42.76	48.49
			91.25	Jun-09	49.75	41.50
			91.25	Aug-09	53.94	37.31
			91.25	Nov-09	46.00	45.25

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-5A	90	60 - 90	90.61	Apr-00[a]	NA	50.39
			90.61	Aug-00[a]	NA	50.45
			90.61	Nov-00[a]	NA	48.41
			90.61	Feb-01[a]	NA	50.11
			90.61	Aug-01	42.44	48.17
			90.61	Oct-01	43.75	46.86
			90.61	Nov-01	43.86	46.75
			90.61	Feb-02	42.65	47.96
			90.61	May-02	41.62	48.99
			90.61	Aug-02	44.60	46.01
			90.61	Nov-02	45.60	45.01
			90.61	Feb-03	44.35	46.26
			90.741	May-03	43.30	47.44
			90.74	Aug-03	44.45	46.29
			90.74	Nov-03	45.55	45.19
			90.74	Feb-04	44.13	46.61
			90.74	May-04	43.10	47.64
			90.74	Aug-04	45.12	45.62
			90.74	Nov-04	45.25	45.49
			90.74	Feb-05	43.55	47.19
			90.74	May-05	41.93	48.81
			90.74	Aug-05	42.70	48.04
			90.74	Nov-05	43.75	46.99
			90.74	Feb-06	42.36	48.38
			90.74	May-06	40.90	49.84
			90.74	Aug-06	41.47	49.27
			90.74	Aug-06[b]	42.07	48.67
			90.74	Nov-06	43.15	47.59
			90.74	Feb-07	41.95	48.79
			90.74	May-07	40.21	50.53
			90.74	Aug-07	42.55	48.19
			90.74	Nov-07	43.35	47.39
			90.74	Feb-08	42.34	48.40
			90.74	May-08	41.50	49.24
			90.74	Aug-08	42.68	48.06
			90.74	Dec-08	43.81	46.93
			90.74	Feb-09	43.33	47.41
			90.74	Jun-09	43.19	47.55
			90.74	Aug-09	44.68	46.06
			90.74	Nov-09	45.97	44.77
MW-6A	90	60 - 90	89.98	Apr-00[a]	NA	50.23
			89.98	Aug-00[a]	NA	50.21
			89.98	Nov-00[a]	NA	47.96
			89.98	Feb-01[a]	NA	49.78
			89.98	Aug-01	41.30	48.68
			89.98	Oct-01	42.90	47.08
			89.98	Nov-01	43.48	46.50
			89.98	Feb-02	41.98	48.00
			89.98	May-02	40.87	49.11
			89.98	Aug-02	44.20	45.78
			89.98	Nov-02	44.50	45.48
			89.98	Feb-03	43.65	46.33
			89.481	May-03	42.60	46.88
			89.48	Aug-03	44.10	45.38
			89.48	Nov-03	45.22	44.26

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			89.48	Feb-04	43.45	46.03
			89.48	May-04	42.85	46.63
			89.48	Aug-04	44.62	44.86
			89.48	Nov-04	45.25	44.23
			89.48	Feb-05	43.60	45.88
			89.48	May-05	41.81	47.67
			89.48	Aug-05	42.65	46.83
			89.48	Nov-05	43.78	45.70
			89.48	Feb-06	42.35	47.13
			89.48	May-06	40.71	48.77
			89.722	Aug-06	40.86	48.86
			89.72	Aug-06[b]	41.16	48.56
			89.72	Nov-06	42.20	47.52
			89.72	Feb-07	40.94	48.78
			89.72	May-07	39.52	50.20
			89.72	Aug-07	41.61	48.11
			89.72	Nov-07	42.56	47.16
			89.72	Feb-08	41.42	48.30
			89.72	May-08	40.44	49.28
			89.72	Aug-08	41.75	47.97
			89.72	Dec-08	42.98	46.74
			89.72	Feb-09	42.32	47.40
			89.72	Jun-09	42.23	47.49
			89.72	Aug-09	43.61	46.11
			89.72	Nov-09	44.89	44.83
MW-7A	90	60 - 90	91.23	Apr-00[a]	NA	50.86
			91.23	Aug-00[a]	NA	51.06
			91.23	Nov-00[a]	NA	49.24
			91.23	Feb-01[a]	NA	50.73
			91.23	Aug-01	41.33	49.90
			91.23	Oct-01	42.72	48.51
			91.23	Nov-01	43.07	48.16
			91.23	Feb-02	41.96	49.27
			91.23	May-02	40.67	50.56
			91.23	Aug-02	43.70	47.53
			91.23	Nov-02	44.60	46.63
			91.23	Feb-03	43.60	47.63
			91.241	May-03	42.65	48.59
			91.24	Aug-03	43.85	47.39
			91.24	Nov-03	45.05	46.19
			91.24	Feb-04	43.70	47.54
			91.24	May-04	42.80	48.44
			91.24	Aug-04	44.30	46.94
			91.24	Nov-04	44.98	46.26
			91.24	Feb-05	43.38	47.86
			91.24	May-05	41.82	49.42
			91.24	Aug-05	42.35	48.89
			91.24	Nov-05	43.40	47.84
			91.24	Feb-06	42.17	49.07
			91.24	May-06	40.82	50.42
			91.24	Aug-06	41.31	49.93
			91.24	Aug-06[b]	41.50	49.74
			91.24	Nov-06	42.53	48.71
			91.24	Feb-07	41.46	49.78
			91.24	May-07	40.21	51.03
			91.24	Aug-07	41.77	49.47

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			91.24	Nov-07	42.63	48.61
			91.24	Feb-08	41.82	49.42
			91.24	May-08	40.96	50.28
			91.24	Aug-08	41.98	49.26
			91.24	Dec-08	43.15	48.09
			91.24	Feb-09	NA	NA
			91.24	Jun-09	42.65	48.59
			91.24	Aug-09	43.92	47.32
			91.24	Nov-09	45.29	45.95
MW-8A	90	60 - 90	91.53	Apr-00	NA	50.52
			91.53	Aug-00	NA	50.42
			91.53	Nov-00	NA	48.54
			91.53	Feb-01	NA	50.25
			91.53	Aug-01	42.41	49.12
			91.53	Oct-01	45.60	45.93
			91.53	Nov-01	45.68	45.85
			91.53	Feb-02	44.36	47.17
			91.53	May-02	43.31	48.22
			91.53	Aug-02	46.20	45.33
			91.53	Nov-02	47.50	44.03
			91.53	Feb-03	45.65	45.88
			91.441	May-03	44.40	47.04
			91.44	Aug-03	45.40	46.04
			91.44	Nov-03	46.57	44.87
			91.44	Feb-04	45.22	46.22
			91.44	May-04	43.85	47.59
			91.44	Aug-04	46.15	45.29
			91.44	Nov-04	45.97	45.47
			91.44	Feb-05	44.35	47.09
			91.44	May-05	42.75	48.69
			91.44	Aug-05	43.39	48.05
			91.44	Nov-05	44.47	46.97
			91.44	Feb-06	43.14	48.30
			91.44	May-06	41.61	49.83
			91.44	Aug-06	42.21	49.23
			91.44	Aug-06	42.94	48.50
			91.44	Nov-06	44.03	47.41
			91.44	Feb-07	42.88	48.56
			91.44	May-07	40.96	50.48
			91.44	Aug-07	43.43	48.01
			91.44	Nov-07	44.28	47.16
			91.44	Feb-08	43.32	48.12
			91.44	May-08	42.41	49.03
			91.44	Aug-08	43.53	47.91
			91.44	Dec-08	44.73	46.71
			91.44	Feb-09	44.28	47.16
			91.44	Jun-09	44.08	47.36
			91.44	Aug-09	45.55	45.89
			91.44	Nov-09	46.91	44.53
MW-9B	155	144 - 154	91.19	Apr-00[a]	NA	50.24
			91.19	Aug-00[a]	NA	48.38
			91.19	Nov-00[a]	NA	47.72
			91.19	Feb-01[a]	NA	50.05
			91.19	Aug-01	44.04	47.15
			91.19	Oct-01	45.17	46.02

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			91.19	Nov-01	44.76	46.43
			91.19	Feb-02	42.64	48.55
			91.19	May-02	42.72	48.47
			91.19	Aug-02	47.05	44.14
			91.19	Nov-02	45.90	45.29
			91.19	Feb-03	44.45	46.74
			91.181	May-03	44.20	46.98
			91.18	Aug-03	47.00	44.18
			91.18	Nov-03	46.55	44.63
			91.18	Feb-04	44.37	46.81
			91.18	May-04	44.55	46.63
			91.18	Aug-04	47.25	43.93
			91.18	Nov-04	46.42	44.76
			91.18	Feb-05	44.45	46.73
			91.18	May-05	43.15	48.03
			91.18	Aug-05	45.25	45.93
			91.18	Nov-05	45.40	45.78
			91.18	Feb-06	43.31	47.87
			91.18	May-06	42.30	48.88
			91.202	Aug-06	43.51	47.69
			91.2	Aug-06[b]	43.98	47.22
			91.20	Nov-06	43.80	47.40
			91.20	Feb-07	42.14	49.06
			91.20	May-07	40.52	50.68
			91.20	Aug-07	44.37	46.83
			91.20	Nov-07	44.05	47.15
			91.20	Feb-08	42.45	48.75
			91.20	May-08	42.54	48.66
			91.20	Aug-08	44.50	46.70
			91.20	Dec-08	44.47	46.73
			91.20	Feb-09	43.62	47.58
			91.20	Jun-09	44.52	46.68
			91.20	Aug-09	46.54	44.66
			91.20	Nov-09	46.52	44.68
MW-10A	91	60 - 89	90.47	Apr-00[a]	NA	49.66
			90.47	Aug-00[a]	NA	50.67
			90.47	Nov-00[a]	NA	46.94
			90.47	Feb-01[a]	NA	49.03
			90.47	Aug-01	42.54	47.93
			90.47	Oct-01	44.19	46.28
			90.47	Nov-01	44.51	45.96
			90.47	Feb-02	42.93	47.54
			90.47	May-02	41.86	48.61
			90.47	Aug-02	45.20	45.27
			90.47	Nov-02	46.00	44.47
			90.47	Feb-03	44.70	45.77
			90.481	May-03	43.55	46.93
			90.48	Aug-03	45.20	45.28
			90.48	Nov-03	46.35	44.13
			90.48	Feb-04	44.70	45.78
			90.48	May-04	43.85	46.63
			90.48	Aug-04	45.81	44.67
			90.48	Nov-04	46.48	44.00
			90.48	Feb-05	44.74	45.74
			90.48	May-05	42.87	47.61
			90.48	Aug-05	43.90	46.58

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			90.48	Nov-05	45.07	45.41
			90.48	Feb-06	43.45	47.03
			90.48	May-06	41.70	48.78
			90.48	Aug-06	42.33	48.15
			90.48	Aug-06[b]	42.59	47.89
			90.48	Nov-06	43.51	46.97
			90.48	Feb-07	42.21	48.27
			90.48	May-07	40.81	49.67
			90.48	Aug-07	43.03	47.45
			90.48	Nov-07	43.96	46.52
			90.48	Feb-08	42.70	47.78
			90.48	May-08	41.77	48.71
			90.48	Aug-08	43.24	47.24
			90.48	Dec-08	44.40	46.08
			90.48	Feb-09	43.69	46.79
			90.48	Jun-09	43.55	46.93
			90.48	Aug-09	45.02	45.46
			90.48	Nov-09	46.34	44.14
MW-10B	163	153-163	90.21	Dec-08	44.12	46.09
			90.21	Feb-09	43.18	47.03
			90.21	Jun-09	43.90	46.31
			90.21	Aug-09	45.81	44.40
			90.21	Nov-09	46.07	44.14
			90.21	Mar-10	44.01	46.20
MW-10C	230	220-230	90.5	Dec-08	44.13	46.37
			90.5	Feb-09	42.50	48.00
			90.5	Jun-09	48.50	42.00
			90.5	Aug-09	53.44	37.06
			90.5	Nov-09	45.75	44.75
MW-11A	92	70 - 90	89.91	Apr-00[a]	NA	50.83
			89.91	Aug-00[a]	NA	50.64
			89.91	Nov-00[a]	NA	49.38
			89.91	Feb-01[a]	NA	50.93
			89.91	Aug-01	40.32	49.59
			89.91	Oct-01	41.50	48.41
			89.91	Nov-01	43.12	46.79
			89.91	Feb-02	40.15	49.76
			89.91	May-02	39.56	50.35
			89.91	Aug-02	42.60	47.31
			89.91	Nov-02	43.90	46.01
			89.91	Feb-03	41.90	48.01
			89.911	May-03	41.15	48.76
			89.91	Aug-03	42.65	47.26
			89.91	Nov-03	43.52	46.39
			89.91	Feb-04	42.00	47.91
			89.91	May-04	41.35	48.56
			89.91	Aug-04	42.86	47.05
			89.91	Nov-04	43.35	46.56
			89.91	Feb-05	41.75	48.16
			89.91	May-05	40.22	49.69
			89.91	Aug-05	40.85	49.06
			89.91	Nov-05	41.80	48.11
			89.91	Feb-06	40.53	49.38
			89.91	May-06	39.27	50.64

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			89.91	Aug-06	39.86	50.05
			89.91	Aug-06[b]	40.05	49.86
			89.91	Nov-06	40.90	49.01
			89.91	Feb-07	39.79	50.12
			89.91	May-07	38.74	51.17
			89.91	Aug-07	40.34	49.57
			89.91	Nov-07	41.07	48.84
			89.91	Feb-08	40.11	49.80
			89.91	May-08	39.38	50.53
			89.91	Aug-08	40.47	49.44
			89.91	Dec-08	41.47	48.44
			89.91	Feb-09	41.01	48.90
			89.91	Jun-09	41.12	48.79
			89.91	Aug-09	42.44	47.47
			89.91	Nov-09	43.52	46.39
MW-12A	99	87 - 97	91.17	Apr-00[a]	NA	50.01
			91.17	Aug-00[a]	NA	49.45
			91.17	Nov-00[a]	NA	47.28
			91.17	Feb-01[a]	NA	49.51
			91.17	Aug-01	43.18	47.99
			91.17	Oct-01	44.63	46.54
			91.17	Nov-01	44.86	46.31
			91.17	Feb-02	43.21	47.96
			91.17	May-02	42.04	49.13
			91.17	Aug-02	46.10	45.07
			91.17	Nov-02	46.30	44.87
			91.17	Feb-03	45.05	46.12
			91.151	May-03	44.50	46.65
			91.15	Aug-03	46.20	44.95
			91.15	Nov-03	46.88	44.27
			91.15	Feb-04	44.95	46.20
			91.15	May-04	44.50	46.65
			91.15	Aug-04	46.75	44.40
			91.15	Nov-04	47.02	44.13
			91.15	Feb-05	45.10	46.05
			91.15	May-05	43.52	47.63
			91.15	Aug-05	44.95	46.20
			91.15	Nov-05	45.80	45.35
			91.15	Feb-06	44.01	47.14
			91.15	May-06	42.41	48.74
			91.152	Aug-06	43.22	47.93
			91.15	Aug-06[b]	43.51	47.64
			91.15	Nov-06	44.05	47.10
			91.15	Feb-07	42.61	48.54
			91.15	May-07	41.44	49.71
			91.15	Aug-07	43.91	47.24
			91.15	Nov-07	44.43	46.72
			91.15	Feb-08	43.02	48.13
			91.15	May-08	42.45	48.70
			91.15	Aug-08	44.15	47.00
			91.15	Dec-08	44.90	46.25
			91.15	Feb-09	44.14	47.01
			91.15	Jun-09	44.27	46.88
			91.15	Aug-09	46.04	45.11
			91.15	Nov-09	47.02	44.13

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-13A	99	77 - 97	89.33	Apr-00[a]	NA	49.21
			89.33	Aug-00[a]	NA	49.30
			89.33	Nov-00[a]	NA	46.88
			89.33	Feb-01[a]	NA	48.67
			89.33	Aug-01	41.68	47.65
			89.33	Oct-01	43.23	46.10
			89.33	Nov-01	43.64	45.69
			89.33	Feb-02	41.99	47.34
			89.33	May-02	40.82	48.51
			89.33	Aug-02	44.10	45.23
			89.33	Nov-02	44.70	44.63
			89.33	Feb-03	43.60	45.73
			89.271	May-03	42.35	46.92
			89.27	Aug-03	43.80	45.47
			89.27	Nov-03	45.25	44.02
			89.27	Feb-04	43.72	45.55
			89.27	May-04	42.65	46.62
			89.27	Aug-04	42.65	46.62
			89.27	Nov-04	45.30	43.97
			89.27	Feb-05	43.63	45.64
			89.27	May-05	41.75	47.52
			89.27	Aug-05	42.45	46.82
			89.27	Nov-05	43.70	45.57
			89.27	Feb-06	42.31	46.96
			89.27	May-06	40.52	48.75
			89.27	Aug-06	40.92	48.35
			89.27	Aug-06[b]	41.08	48.19
			89.27	Nov-06	42.15	47.12
			89.27	Feb-07	40.99	48.28
			89.27	May-07	39.68	49.59
			89.27	Aug-07	41.80	47.47
			89.27	Nov-07	42.64	46.63
			89.27	Feb-08	41.48	47.79
			89.27	May-08	40.38	48.89
			89.27	Aug-08	41.66	47.61
			89.27	Dec-08	43.01	46.26
			89.27	Feb-09	42.40	46.87
			89.27	Jun-09	42.25	47.02
			89.27	Aug-09	43.40	45.87
			89.27	Nov-09	44.84	44.43
MW-14A	92	70 - 90	89.81	Apr-00[a]	NA	50.19
			89.81	Aug-00[a]	NA	49.93
			89.81	Nov-00[a]	NA	48.39
			89.81	Feb-01[a]	NA	49.95
			89.81	Aug-01	41.21	48.60
			89.81	Oct-01	42.57	47.24
			89.81	Nov-01	42.89	46.92
			89.81	Feb-02	41.35	48.46
			89.81	May-02	40.60	49.21
			89.81	Aug-02	43.80	46.01
			89.81	Nov-02	44.00	45.81
			89.81	Feb-03	43.10	46.71
			89.791	May-03	42.15	47.64
			89.79	Aug-03	43.30	46.49
			89.79	Nov-03	44.60	45.19
			89.79	Feb-04	43.03	46.76

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			89.79	May-04	42.33	47.46
			89.79	Aug-04	43.85	45.94
			89.79	Nov-04	44.40	45.39
			89.79	Feb-05	42.87	46.92
			89.79	May-05	41.20	48.59
			89.79	Aug-05	41.85	47.94
			89.79	Nov-05	42.90	46.89
			89.79	Feb-06	41.60	48.19
			89.79	May-06	40.15	49.64
			89.79	Aug-06	40.49	49.30
			89.79	Aug-06[b]	40.72	49.07
			89.79	Nov-06	41.72	48.07
			89.79	Feb-07	40.60	49.19
			89.79	May-07	39.31	50.48
			89.79	Aug-07	41.18	48.61
			89.79	Nov-07	42.03	47.76
			89.79	Feb-08	41.05	48.74
			89.79	May-08	40.15	49.64
			89.79	Aug-08	41.35	48.44
			89.79	Dec-08	42.45	47.34
			89.79	Feb-09	41.92	47.87
			89.79	Jun-09	41.95	47.84
			89.79	Aug-09	43.18	46.61
			89.79	Nov-09	44.40	45.39
MW-15A	102	80 - 100	91.75	Apr-00[a]	NA	50.80
			91.75	Aug-00[a]	NA	50.40
			91.75	Nov-00[a]	NA	48.76
			91.75	Feb-01[a]	NA	50.55
			91.75	Aug-01	42.48	49.27
			91.75	Oct-01	43.88	47.87
			91.75	Nov-01	44.05	47.70
			91.75	Feb-02	42.73	49.02
			91.75	May-02	41.92	49.83
			91.75	Aug-02	45.10	46.65
			91.75	Nov-02	45.60	46.15
			91.75	Feb-03	44.45	47.30
			91.761	May-03	44.05	47.71
			91.76	Aug-03	45.25	46.51
			91.76	Nov-03	46.05	45.71
			91.76	Feb-04	44.46	47.30
			91.76	May-04	43.85	47.91
			91.76	Aug-04	45.82	45.94
			91.76	Nov-04	46.05	45.71
			91.76	Feb-05	44.30	47.46
			91.76	May-05	42.85	48.91
			91.76	Aug-05	43.95	47.81
			91.76	Nov-05	44.80	46.96
			91.76	Feb-06	43.26	48.50
			91.76	May-06	41.92	49.84
			91.76	Aug-06	42.66	49.10
			91.76	Aug-06[b]	42.90	48.86
			91.76	Nov-06	43.55	48.21
			91.76	Feb-07	42.30	49.46
			91.76	May-07	41.09	50.67
			91.76	Aug-07	43.20	48.56
			91.76	Nov-07	43.80	47.96
			91.76	Feb-08	42.65	49.11

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
			91.76	May-08	42.05	49.71
			91.76	Aug-08	43.40	48.36
			91.76	Dec-08	44.25	47.51
			91.76	Feb-09	43.68	48.08
			91.76	Jun-09	43.86	47.90
			91.76	Aug-09	45.47	46.29
			91.76	Nov-09	46.46	45.30
MW-16A	86	76-86	91.89	Dec-08	47.01	44.88
			91.89	Feb-09	45.81	46.08
			91.89	Jun-09	46.43	45.46
			91.89	Aug-09	48.65	43.24
			91.89	Nov-09	48.95	42.94
MW-16B	139	129-139	91.82	Dec-08	46.98	44.84
			91.82	Feb-09	45.75	46.07
			91.82	Jun-09	46.40	45.42
			91.82	Aug-09	48.67	43.15
			91.82	Nov-09	48.90	42.92
MW-16C	236	226-236	91.64	Dec-08	46.70	44.94
			91.64	Feb-09	45.01	46.63
			91.64	Jun-09	50.05	41.59
			91.64	Aug-09	54.46	37.18
			91.64	Nov-09	48.52	43.12
MW-17A	88	77-87	89.64	Dec-08	44.20	45.44
			89.64	Feb-09	43.45	46.19
			89.64	Jun-09	43.25	46.39
			89.64	Aug-09	44.43	45.21
			89.64	Nov-09	46.03	43.61
MW-17B	140	129-139	89.69	Dec-08	44.39	45.30
			89.69	Feb-09	43.41	46.28
			89.69	Jun-09	43.60	46.09
			89.69	Aug-09	45.29	44.40
			89.69	Nov-09	46.20	43.49
MW-17C	232	222-232	89.76	Dec-08	44.33	45.43
			89.76	Feb-09	42.55	47.21
			89.76	Jun-09	48.68	41.08
			89.76	Aug-09	52.98	36.78
			89.76	Nov-09	45.91	43.85
MW-18A	66	56-66	90.14	Dec-08	44.47	45.67
			90.14	Feb-09	43.70	46.44
			90.14	Jun-09	43.57	46.57
			90.14	Aug-09	45.03	45.11
			90.14	Nov-09	46.35	43.79
MW-19A	101	91-101	91.22	Dec-08	45.51	45.71
			91.22	Feb-09	44.55	46.67
			91.22	Jun-09	45.45	45.77
			91.22	Aug-09	47.14	44.08
			91.22	Nov-09	47.50	43.72
MW-19B	147	137-147	91.08	Dec-08	45.89	45.19
			91.08	Feb-09	44.76	46.32
			91.08	Jun-09	46.07	45.01
			91.08	Aug-09	48.26	42.82
			91.08	Nov-09	47.92	43.16

TABLE G-2(a)

GROUNDWATER MONITORING WELL WATER TABLE ELEVATION
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

Monitoring Well Number	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-20A	86	76-86	90.70	Dec-08	45.27	45.43
			90.70	Feb-09	44.31	46.39
			90.70	Jun-09	44.56	46.14
			90.70	Aug-09	47.12	43.58
			90.70	Nov-09	47.26	43.44
MW-20B	162	152-162	90.65	Dec-08	45.45	45.20
			90.65	Feb-09	44.36	46.29
			90.65	Jun-09	45.08	45.57
			90.65	Aug-09	48.22	42.43
			90.65	Nov-09	47.40	43.25
MW-20C	235	225-235	90.79	Dec-08	45.01	45.78
			90.79	Feb-09	43.53	47.26
			90.79	Jun-09	48.60	42.19
			90.79	Aug-09	53.44	37.35
			90.79	Nov-09	46.73	44.06
EW-1			89.54	Nov-06	43.40	46.14
			89.54	Feb-07	42.21	47.33
			89.54	May-07	40.28	49.26
			89.54	Aug-07	42.90	46.64
			89.54	Feb-08	42.48	47.06
			89.54	May-08	41.75	47.79
			89.54	Aug-08	42.99	47.66
			89.54	Feb-09	43.55	45.99
			89.54	Jun-09	43.34	46.20
			89.54	Aug-09	44.99	44.55
			89.54	Nov-09	46.16	43.38
EW-1R[3]	114	59-109	90.65	Aug-06	41.80	48.85
			90.65	Aug-06[b]	48.70	41.95
			90.65	Nov-06	49.40	41.25
			90.65	Feb-07	48.24	42.41
			90.65	May-07	40.33	50.32
			90.65	Aug-07	48.60	42.05
			90.65	Nov-07	49.50	41.15
			90.65	Feb-08	49.98	40.67
			90.65	May-08	49.50	41.15
			90.65	Aug-08	51.51	39.14
			90.65	Dec-08	52.16	38.49
			90.65	Feb-09	53.88	36.77
			90.65	Jun-09	52.04	38.61
			90.65	Aug-09	54.86	35.79
			90.65	Nov-09	55.82	34.83

Notes:

[1]Wells re-surveyed in May 2003.

[2]Wells re-surveyed in September 2006

[3]EW-1R is the replacement extraction well. It was installed in August 2006 and started on August 24,

[a]Historical data from Ecology and Environment

[b]Second round of Aug. 2006 water levels recorded after the start of EW-1R

ft bgs - feet below ground surface
MSL - Mean Sea Level
MW- Monitoring Well
NA - Not Applicable
TOC - Top of Casing

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
EW-01R (SP-01)	120	59 - 109	92.03	Mar-10	54.23	37.8
EW-01R (SP-01)	120	59 - 109	92.03	Nov-10	55.82	36.21
EW-01R (SP-01)	120	59 - 109	92.03	Mar-11	54.27	37.76
EW-01R (SP-01)	120	59 - 109	92.03	Jun-11	53.82	38.21
EW-01R (SP-01)	120	59 - 109	92.03	Sep-11	54.52	37.51
EW-01R (SP-01)	120	59 - 109	92.03	Nov-11	56.14	35.89
EW-01R (SP-01)	120	59 - 109	92.03	Jan-12	55.58	36.45
EW-01R (SP-01)	120	59 - 109	92.03	Apr-12	41.18	50.85
EW-01R (SP-01)	120	59 - 109	92.03	Aug-12	54.89	37.14
EW-01R (SP-01)	120	59 - 109	90.65	Dec-12	42.82	47.83
EW-02		-	91.64	Dec-12	53.07	38.57
MW-01A	101	91 - 101	91.61	Mar-10	44.81	46.8
MW-01A	101	91 - 101	91.61	May-10	43.78	47.83
MW-01A	101	91 - 101	91.610846	Aug-10	44.41	47.200846
MW-01A	101	91 - 101	91.610846	Nov-10	44.98	46.630846
MW-01A	101	91 - 101	91.610846	Mar-11	43.11	48.500846
MW-01A	101	91 - 101	91.610846	Jun-11	42.2	49.410846
MW-01A	101	91 - 101	91.610846	Sep-11	42.73	48.880846
MW-01A	101	91 - 101	91.610846	Nov-11	42.97	48.640846
MW-01A	101	91 - 101	91.610846	Jan-12	42.19	49.420846
MW-01A	101	91 - 101	91.610846	Apr-12	41.51	50.100846
MW-01A	101	91 - 101	91.610846	Aug-12	42	49.610846
MW-01A	101	91 - 101	91.61	Dec-12	42.94	48.67
MW-02A	96	86 - 96	90.88	Mar-10	44.02	46.86
MW-02A	96	86 - 96	90.88	May-10	43.03	47.85
MW-02A	96	86 - 96	90.88	Aug-10	43.52	47.36
MW-02A	96	86 - 96	90.88	Nov-10	44.21	46.67
MW-02A	96	86 - 96	90.88	Mar-11	42.38	48.5
MW-02A	96	86 - 96	90.88	Jun-11	41.44	49.44
MW-02A	96	86 - 96	90.88	Sep-11	41.9	48.98
MW-02A	96	86 - 96	90.88	Nov-11	42.12	48.76
MW-02A	96	86 - 96	90.88	Jan-12	41.52	49.36
MW-02A	96	86 - 96	90.88	Apr-12	40.8	50.08
MW-02A	96	86 - 96	90.88	Aug-12	41.15	49.73
MW-02A	96	86 - 96	90.88	Dec-12	42.13	48.75
MW-03A	94	84 - 94	91.49	Mar-10	46.77	44.72
MW-03A	94	84 - 94	91.49	May-10	45.76	45.73
MW-03A	94	84 - 94	91.49	Aug-10	46.38	45.11
MW-03A	94	84 - 94	91.49	Nov-10	46.89	44.6
MW-03A	94	84 - 94	91.49	Mar-11	44.95	46.54
MW-03A	94	84 - 94	91.49	Jun-11	44	47.49
MW-03A	94	84 - 94	91.49	Sep-11	44.56	46.93
MW-03A	94	84 - 94	91.49	Nov-11	44.89	46.6
MW-03A	94	84 - 94	91.49	Jan-12	44.19	47.3
MW-03A	94	84 - 94	91.49	Apr-12	41.84	49.65
MW-03A	94	84 - 94	91.49	Aug-12	43.82	47.67
MW-03A	94	84 - 94	91.49	Dec-12	43.76	47.73
MW-04A	89	78 - 88	91.13	Mar-10	45.39	45.74

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-04A	89	78 - 88	91.13	May-10	44.23	46.9
MW-04A	89	78 - 88	91.130153	Aug-10	44.58	46.550153
MW-04A	89	78 - 88	91.130153	Nov-10	45.47	45.660153
MW-04A	89	78 - 88	91.130153	Mar-11	43.51	47.620153
MW-04A	89	78 - 88	91.130153	Jun-11	42.47	48.660153
MW-04A	89	78 - 88	91.130153	Sep-11	42.94	48.190153
MW-04A	89	78 - 88	91.130153	Nov-11	43.33	47.800153
MW-04A	89	78 - 88	91.130153	Jan-12	42.74	48.390153
MW-04A	89	78 - 88	91.130153	Apr-12	41.9	49.230153
MW-04A	89	78 - 88	91.130153	Aug-12	42.1	49.030153
MW-04A	89	78 - 88	91.130153	Dec-12	44.5	46.630153
MW-04B	154	144 - 154	91.11	Mar-10	44.7	46.41
MW-04B	154	144 - 154	91.11	May-10	43.82	47.29
MW-04B	154	144 - 154	91.11	Aug-10	45.31	45.8
MW-04B	154	144 - 154	91.11	Nov-10	45.24	45.87
MW-04B	154	144 - 154	91.11	Mar-11	43.08	48.03
MW-04B	154	144 - 154	91.11	Jun-11	42.18	48.93
MW-04B	154	144 - 154	91.11	Sep-11	43.48	47.63
MW-04B	154	144 - 154	91.11	Nov-11	43.38	47.73
MW-04B	154	144 - 154	91.11	Jan-12	42.44	48.67
MW-04B	154	144 - 154	91.11	Apr-12	41.83	49.28
MW-04B	154	144 - 154	91.11	Aug-12	42.8	48.31
MW-04B	154	144 - 154	91.11	Dec-12	43.57	47.54
MW-04C	237	227 - 237	91.25	Mar-10	43.15	48.1
MW-04C	237	227 - 237	91.25	May-10	44.64	46.61
MW-04C	237	227 - 237	91.25	Aug-10	50.22	41.03
MW-04C	237	227 - 237	91.25	Nov-10	45.22	46.03
MW-04C	237	227 - 237	91.25	Mar-11	42.86	48.39
MW-04C	237	227 - 237	91.25	Jun-11	42.75	48.5
MW-04C	237	227 - 237	91.25	Sep-11	47.15	44.1
MW-04C	237	227 - 237	91.25	Nov-11	43.69	47.56
MW-04C	237	227 - 237	91.25	Jan-12	41.94	49.31
MW-04C	237	227 - 237	91.25	Apr-12	41.49	49.76
MW-04C	237	227 - 237	91.25	Aug-12	47.47	43.78
MW-04C	237	227 - 237	91.25	Dec-12	43.31	47.94
MW-05A	90	60 - 90	90.74	Mar-10	44.43	46.31
MW-05A	90	60 - 90	90.74	May-10	43.39	47.35
MW-05A	90	60 - 90	90.74	Aug-10	43.72	47.02
MW-05A	90	60 - 90	90.74	Nov-10	44.6	46.14
MW-05A	90	60 - 90	90.74	Mar-11	42.71	48.03
MW-05A	90	60 - 90	90.74	Jun-11	41.75	48.99
MW-05A	90	60 - 90	90.74	Sep-11	42.08	48.66
MW-05A	90	60 - 90	90.74	Nov-11	42.48	48.26
MW-05A	90	60 - 90	90.74	Jan-12	41.87	48.87
MW-05A	90	60 - 90	90.74	Apr-12	41.09	49.65
MW-05A	90	60 - 90	90.74	Aug-12	41.34	49.4
MW-05A	90	60 - 90	90.74	Dec-12	42.38	48.36
MW-06A	90	60 - 90	89.72	Mar-10	43.49	46.23

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-06A	90	60 - 90	89.72	May-10	42.24	47.48
MW-06A	90	60 - 90	89.72	Aug-10	42.53	47.19
MW-06A	90	60 - 90	89.72	Nov-10	43.54	46.18
MW-06A	90	60 - 90	89.72	Mar-11	41.66	48.06
MW-06A	90	60 - 90	89.72	Jun-11	40.5	49.22
MW-06A	90	60 - 90	89.72	Sep-11	40.96	48.76
MW-06A	90	60 - 90	89.72	Nov-11	41.4	48.32
MW-06A	90	60 - 90	89.72	Jan-12	40.81	48.91
MW-06A	90	60 - 90	89.72	Apr-12	40.24	49.48
MW-06A	90	60 - 90	89.72	Aug-12	40.27	49.45
MW-06A	90	60 - 90	89.72	Dec-12	41.9	47.82
MW-07A	90	60 - 90	91.24	Mar-10	43.89	47.35
MW-07A	90	60 - 90	91.24	May-10	42.89	48.35
MW-07A	90	60 - 90	91.23817	Aug-10	43	48.23817
MW-07A	90	60 - 90	91.23817	Nov-10	43.97	47.26817
MW-07A	90	60 - 90	91.23817	Mar-11	42.3	48.93817
MW-07A	90	60 - 90	91.23817	Jun-11	41.36	49.87817
MW-07A	90	60 - 90	91.23817	Sep-11	41.55	49.68817
MW-07A	90	60 - 90	91.23817	Nov-11	41.85	49.38817
MW-07A	90	60 - 90	91.23817	Jan-12	41.4	49.83817
MW-07A	90	60 - 90	91.23817	Apr-12	40.92	50.31817
MW-07A	90	60 - 90	91.23817	Aug-12	40.82	50.41817
MW-07A	90	60 - 90	91.23817	Dec-12	41.99	49.24817
MW-08A	90	60 - 90	91.44	Mar-10	45.39	46.05
MW-08A	90	60 - 90	91.44	May-10	44.33	47.11
MW-08A	90	60 - 90	91.439673	Aug-10	44.64	46.799673
MW-08A	90	60 - 90	91.439673	Nov-10	45.53	45.909673
MW-08A	90	60 - 90	91.439673	Mar-11	43.69	47.749673
MW-08A	90	60 - 90	91.439673	Jun-11	42.66	48.779673
MW-08A	90	60 - 90	91.439673	Sep-11	42.98	48.459673
MW-08A	90	60 - 90	91.439673	Nov-11	43.38	48.059673
MW-08A	90	60 - 90	91.439673	Jan-12	42.8	48.639673
MW-08A	90	60 - 90	91.439673	Apr-12	41.91	49.529673
MW-08A	90	60 - 90	91.439673	Aug-12	42.28	49.159673
MW-08A	90	60 - 90	91.439673	Dec-12	43.27	48.169673
MW-09B	155	144 - 154	91.2	Mar-10	44.47	46.73
MW-09B	155	144 - 154	91.2	May-10	43.68	47.52
MW-09B	155	144 - 154	91.2	Aug-10	45.13	46.07
MW-09B	155	144 - 154	91.2	Nov-10	45.16	46.04
MW-09B	155	144 - 154	91.2	Mar-11	42.91	48.29
MW-09B	155	144 - 154	91.2	Jun-11	42.07	49.13
MW-09B	155	144 - 154	91.2	Sep-11	43.33	47.87
MW-09B	155	144 - 154	91.2	Nov-11	43.18	48.02
MW-09B	155	144 - 154	91.2	Jan-12	42.31	48.89
MW-09B	155	144 - 154	91.2	Apr-12	41.6	49.6
MW-09B	155	144 - 154	91.2	Aug-12	42.61	48.59
MW-09B	155	144 - 154	91.19	Dec-12	43.3	47.89
MW-10A	91	60 - 89	90.48	Mar-10	44.68	45.8

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-10A	91	60 - 89	90.48	May-10	43.52	46.96
MW-10A	91	60 - 89	90.476695	Aug-10	43.94	46.536695
MW-10A	91	60 - 89	90.476695	Nov-10	44.93	45.546695
MW-10A	91	60 - 89	90.476695	Mar-11	42.85	47.626695
MW-10A	91	60 - 89	90.476695	Jun-11	41.77	48.706695
MW-10A	91	60 - 89	90.476695	Sep-11	42.31	48.166695
MW-10A	91	60 - 89	90.476695	Nov-11	42.82	47.656695
MW-10A	91	60 - 89	90.476695	Jan-12	42.15	48.326695
MW-10A	91	60 - 89	90.476695	Apr-12	41.55	48.926695
MW-10A	91	60 - 89	90.476695	Aug-12	41.62	48.856695
MW-10A	91	60 - 89	90.476695	Dec-12	43.37	47.106695
MW-10B	160	153 - 163	90.21	Mar-10	44.01	46.2
MW-10B	160	153 - 163	90.21	May-10	43.08	47.13
MW-10B	160	153 - 163	90.21	Aug-10	44.44	45.77
MW-10B	160	153 - 163	90.21	Nov-10	44.55	45.66
MW-10B	160	153 - 163	90.21	Mar-11	42.37	47.84
MW-10B	160	153 - 163	90.21	Jun-11	41.37	48.84
MW-10B	160	153 - 163	90.21	Sep-11	42.66	47.55
MW-10B	160	153 - 163	90.21	Nov-11	42.66	47.55
MW-10B	160	153 - 163	90.21	Jan-12	41.72	48.49
MW-10B	160	153 - 163	90.21	Apr-12	41.11	49.1
MW-10B	160	153 - 163	90.21	Aug-12	41.9	48.31
MW-10B	160	153 - 163	90.21	Dec-12	42.95	47.26
MW-10C	230	220 - 230	90.5	Mar-10	42.87	47.63
MW-10C	230	220 - 230	90.5	May-10	44.22	46.28
MW-10C	230	220 - 230	90.5	Aug-10	49.92	40.58
MW-10C	230	220 - 230	90.5	Nov-10	44.88	45.62
MW-10C	230	220 - 230	90.5	Mar-11	42.47	48.03
MW-10C	230	220 - 230	90.5	Jun-11	42.2	48.3
MW-10C	230	220 - 230	90.5	Sep-11	46.99	43.51
MW-10C	230	220 - 230	90.5	Nov-11	43.51	46.99
MW-10C	230	220 - 230	90.5	Jan-12	41.65	48.85
MW-10C	230	220 - 230	90.5	Apr-12	41.3	49.2
MW-10C	230	220 - 230	90.5	Aug-12	47.14	43.36
MW-10C	230	220 - 230	90.5	Dec-12	43.5	47
MW-11A	92	70 - 90	89.91	Mar-10	42.15	47.76
MW-11A	92	70 - 90	89.91	May-10	41.12	48.79
MW-11A	92	70 - 90	89.913277	Aug-10	41.42	48.493277
MW-11A	92	70 - 90	89.913277	Nov-10	42.19	47.723277
MW-11A	92	70 - 90	89.913277	Mar-11	40.57	49.343277
MW-11A	92	70 - 90	89.913277	Jun-11	39.65	50.263277
MW-11A	92	70 - 90	89.913277	Sep-11	39.93	49.983277
MW-11A	92	70 - 90	89.913277	Nov-11	40.08	49.833277
MW-11A	92	70 - 90	89.913277	Jan-12	39.63	50.283277
MW-11A	92	70 - 90	89.913277	Apr-12	39.18	50.733277
MW-11A	92	70 - 90	89.913277	Aug-12	39.18	50.733277
MW-11A	92	70 - 90	89.913277	Dec-12	40.24	49.673277
MW-12A	99	87 - 97	91.15	Mar-10	45.17	45.98

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-12A	99	87 - 97	91.15	May-10	44.07	47.08
MW-12A	99	87 - 97	91.15	Aug-10	44.86	46.29
MW-12A	99	87 - 97	91.15	Nov-10	45.56	45.59
MW-12A	99	87 - 97	91.15	Mar-11	43.31	47.84
MW-12A	99	87 - 97	91.15	Jun-11	42.4	48.75
MW-12A	99	87 - 97	91.15	Sep-11	43.22	47.93
MW-12A	99	87 - 97	91.15	Nov-11	43.54	47.61
MW-12A	99	87 - 97	91.15	Jan-12	42.79	48.36
MW-12A	99	87 - 97	91.15	Apr-12	42.12	49.03
MW-12A	99	87 - 97	91.15	Aug-12	46.93	44.22
MW-12A	99	87 - 97	91.15	Dec-12	43.49	47.66
MW-13A	99	77 - 97	89.27	Mar-10	43.44	45.83
MW-13A	99	77 - 97	89.27	May-10	42.17	47.1
MW-13A	99	77 - 97	89.271675	Aug-10	42.35	46.921675
MW-13A	99	77 - 97	89.271675	Nov-10	43.44	45.831675
MW-13A	99	77 - 97	89.271675	Mar-11	41.67	47.601675
MW-13A	99	77 - 97	89.271675	Jun-11	40.46	48.811675
MW-13A	99	77 - 97	89.271675	Sep-11	40.76	48.511675
MW-13A	99	77 - 97	89.271675	Nov-11	41.32	47.951675
MW-13A	99	77 - 97	89.271675	Jan-12	40.77	48.501675
MW-13A	99	77 - 97	89.271675	Apr-12	40.19	49.081675
MW-13A	99	77 - 97	89.271675	Aug-12	40.17	49.101675
MW-13A	99	77 - 97	89.271675	Dec-12	41.87	47.401675
MW-14A	92	70 - 90	89.79	Mar-10	43.04	46.75
MW-14A	92	70 - 90	89.79	May-10	41.93	47.86
MW-14A	92	70 - 90	89.785398	Aug-10	42.17	47.615398
MW-14A	92	70 - 90	89.785398	Nov-10	43	46.785398
MW-14A	92	70 - 90	89.785398	Mar-11	41.35	48.435398
MW-14A	92	70 - 90	89.785398	Jun-11	40.34	49.445398
MW-14A	92	70 - 90	89.785398	Sep-11	40.58	49.205398
MW-14A	92	70 - 90	89.785398	Nov-11	40.91	48.875398
MW-14A	92	70 - 90	89.785398	Jan-12	40.42	49.365398
MW-14A	92	70 - 90	89.785398	Apr-12	39.89	49.895398
MW-14A	92	70 - 90	89.785398	Aug-12	39.89	49.895398
MW-14A	92	70 - 90	89.785398	Dec-12	41.25	48.535398
MW-15A	102	80 - 100	91.76	Mar-10	44.82	46.94
MW-15A	102	80 - 100	91.76	May-10	43.8	47.96
MW-15A	102	80 - 100	91.764875	Aug-10	44.4	47.364875
MW-15A	102	80 - 100	91.764875	Nov-10	45.03	46.734875
MW-15A	102	80 - 100	91.764875	Mar-11	43.11	48.654875
MW-15A	102	80 - 100	91.764875	Jun-11	42.23	49.534875
MW-15A	102	80 - 100	91.764875	Sep-11	42.77	48.994875
MW-15A	102	80 - 100	91.764875	Nov-11	43.02	48.744875
MW-15A	102	80 - 100	91.764875	Jan-12	42.41	49.354875
MW-15A	102	80 - 100	91.764875	Apr-12	41.8	49.964875
MW-15A	102	80 - 100	91.764875	Aug-12	42.1	49.664875
MW-15A	102	80 - 100	91.764875	Dec-12	43.1	48.664875
MW-16A	86	76 - 86	91.89	Mar-10	46.55	45.34

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-16A	86	76 - 86	91.89	May-10	45.41	46.48
MW-16A	86	76 - 86	91.89	Aug-10	47.34	44.55
MW-16A	86	76 - 86	91.89	Nov-10	47.4	44.49
MW-16A	86	76 - 86	91.89	Mar-11	44.62	47.27
MW-16A	86	76 - 86	91.89	Jun-11	43.58	48.31
MW-16A	86	76 - 86	91.89	Sep-11	45.51	46.38
MW-16A	86	76 - 86	91.89	Nov-11	45.53	46.36
MW-16A	86	76 - 86	91.89	Jan-12	44.29	47.6
MW-16A	86	76 - 86	91.89	Apr-12	43.54	48.35
MW-16A	86	76 - 86	91.89	Aug-12	44.46	47.43
MW-16A	86	76 - 86	91.89	Dec-12	45.71	46.18
MW-16B	139	129 - 139	91.82	Mar-10	46.48	45.34
MW-16B	139	129 - 139	91.82	May-10	45.33	46.49
MW-16B	139	129 - 139	91.82	Aug-10	47.32	44.5
MW-16B	139	129 - 139	91.82	Nov-10	47.34	44.48
MW-16B	139	129 - 139	91.82	Mar-11	44.6	47.22
MW-16B	139	129 - 139	91.82	Jun-11	43.53	48.29
MW-16B	139	129 - 139	91.82	Sep-11	45.43	46.39
MW-16B	139	129 - 139	91.82	Nov-11	45.46	46.36
MW-16B	139	129 - 139	91.82	Jan-12	44.24	47.58
MW-16B	139	129 - 139	91.82	Apr-12	43.51	48.31
MW-16B	139	129 - 139	91.82	Aug-12	44.43	47.39
MW-16B	139	129 - 139	91.82	Dec-12	45.64	46.18
MW-16C	236	226 - 236	91.64	Mar-10	45.51	46.13
MW-16C	236	226 - 236	91.64	May-10	46.22	45.42
MW-16C	236	226 - 236	91.64	Aug-10	52.77	38.87
MW-16C	236	226 - 236	91.64	Nov-10	47.4	44.24
MW-16C	236	226 - 236	91.64	Mar-11	44.73	46.91
MW-16C	236	226 - 236	91.64	Jun-11	44.07	47.57
MW-16C	236	226 - 236	91.64	Sep-11	49.02	42.62
MW-16C	236	226 - 236	91.64	Nov-11	45.99	45.65
MW-16C	236	226 - 236	91.64	Jan-12	44.12	47.52
MW-16C	236	226 - 236	91.64	Apr-12	43.39	48.25
MW-16C	236	226 - 236	91.64	Aug-12	48.55	43.09
MW-16C	236	226 - 236	91.64	Dec-12	45.85	45.79
MW-17A	88	77 - 87	89.64	Mar-10	44.36	45.28
MW-17A	88	77 - 87	89.64	May-10	43.01	46.63
MW-17A	88	77 - 87	89.64	Aug-10	43.42	46.22
MW-17A	88	77 - 87	89.64	Nov-10	44.48	45.16
MW-17A	88	77 - 87	89.64	Mar-11	42.51	47.13
MW-17A	88	77 - 87	89.64	Jun-11	41.15	48.49
MW-17A	88	77 - 87	89.64	Sep-11	41.81	47.83
MW-17A	88	77 - 87	89.64	Nov-11	42.48	47.16
MW-17A	88	77 - 87	89.64	Jan-12	41.75	47.89
MW-17A	88	77 - 87	89.64	Apr-12	41.04	48.6
MW-17A	88	77 - 87	89.64	Aug-12	41.1	48.54
MW-17A	88	77 - 87	89.64	Dec-12	43.07	46.57
MW-17B	140	129 - 139	89.69	Mar-10	44.21	45.48

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-17B	140	129 - 139	89.69	May-10	43.02	46.67
MW-17B	140	129 - 139	89.69	Aug-10	43.98	45.71
MW-17B	140	129 - 139	89.69	Nov-10	44.6	45.09
MW-17B	140	129 - 139	89.69	Mar-11	42.42	47.27
MW-17B	140	129 - 139	89.69	Jun-11	41.17	48.52
MW-17B	140	129 - 139	89.69	Sep-11	42.31	47.38
MW-17B	140	129 - 139	89.69	Nov-11	42.68	47.01
MW-17B	140	129 - 139	89.69	Jan-12	41.7	47.99
MW-17B	140	129 - 139	89.69	Apr-12	41.06	48.63
MW-17B	140	129 - 139	89.69	Aug-12	41.54	48.15
MW-17B	140	129 - 139	89.69	Dec-12	43.09	46.6
MW-17C	232	222 - 232	89.76	Mar-10	43.06	46.7
MW-17C	232	222 - 232	89.76	May-10	44.1	45.66
MW-17C	232	222 - 232	89.76	Aug-10	51.62	38.14
MW-17C	232	222 - 232	89.76	Nov-10	45.08	44.68
MW-17C	232	222 - 232	89.76	Mar-11	42.36	47.4
MW-17C	232	222 - 232	89.76	Jun-11	41.85	47.91
MW-17C	232	222 - 232	89.76	Sep-11	43.3	46.46
MW-17C	232	222 - 232	89.76	Nov-11	44.07	45.69
MW-17C	232	222 - 232	89.76	Jan-12	41.6	48.16
MW-17C	232	222 - 232	89.76	Apr-12	40.97	48.79
MW-17C	232	222 - 232	89.76	Aug-12	47.4	42.36
MW-17C	232	222 - 232	89.76	Dec-12	43.56	46.2
MW-18A	66	56 - 66	90.14	Mar-10	44.58	45.56
MW-18A	66	56 - 66	90.14	May-10	43.39	46.75
MW-18A	66	56 - 66	90.14	Aug-10	43.89	46.25
MW-18A	66	56 - 66	90.14	Nov-10	44	46.14
MW-18A	66	56 - 66	90.14	Mar-11	42.77	47.37
MW-18A	66	56 - 66	90.14	Jun-11	41.56	48.58
MW-18A	66	56 - 66	90.14	Sep-11	42.28	47.86
MW-18A	66	56 - 66	90.14	Nov-11	42.83	47.31
MW-18A	66	56 - 66	90.14	Jan-12	42.11	48.03
MW-18A	66	56 - 66	90.14	Apr-12	41.48	48.66
MW-18A	66	56 - 66	90.14	Aug-12	41.57	48.57
MW-18A	66	56 - 66	90.14	Dec-12	43.3	46.84
MW-19A	101	91 - 101	91.22	Mar-10	45.43	45.79
MW-19A	101	91 - 101	91.22	May-10	44.37	46.85
MW-19A	101	91 - 101	91.22	Aug-10	45.83	45.39
MW-19A	101	91 - 101	91.22	Nov-10	46.02	45.2
MW-19A	101	91 - 101	91.22	Mar-11	43.65	47.57
MW-19A	101	91 - 101	91.22	Jun-11	42.63	48.59
MW-19A	101	91 - 101	91.22	Sep-11	44.07	47.15
MW-19A	101	91 - 101	91.22	Nov-11	44.14	47.08
MW-19A	101	91 - 101	91.22	Jan-12	43.18	48.04
MW-19A	101	91 - 101	91.22	Apr-12	42.58	48.64
MW-19A	101	91 - 101	91.22	Aug-12	44.18	47.04
MW-19A	101	91 - 101	91.22	Dec-12	44.25	46.97
MW-19B1	147	137 - 147	91.08	Mar-10	45.55	45.53

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-19B1	147	137 - 147	91.08	May-10	44.68	46.4
MW-19B1	147	137 - 147	91.08	Aug-10	46.78	44.3
MW-19B1	147	137 - 147	91.08	Nov-10	46.42	44.66
MW-19B1	147	137 - 147	91.08	Mar-11	43.84	47.24
MW-19B1	147	137 - 147	91.08	Jun-11	42.93	48.15
MW-19B1	147	137 - 147	91.08	Sep-11	44.85	46.23
MW-19B1	147	137 - 147	91.08	Nov-11	44.59	46.49
MW-19B1	147	137 - 147	91.08	Jan-12	43.45	47.63
MW-19B1	147	137 - 147	91.08	Apr-12	42.81	48.27
MW-19B1	147	137 - 147	91.08	Aug-12	44.03	47.05
MW-19B1	147	137 - 147	91.08	Dec-12	44.61	46.47
MW-20A	86	76 - 86	90.7	Mar-10	45.28	45.42
MW-20A	86	76 - 86	90.7	May-10	44.08	46.62
MW-20A	86	76 - 86	90.7	Aug-10	44.97	45.73
MW-20A	86	76 - 86	90.7	Nov-10	45.79	44.91
MW-20A	86	76 - 86	90.7	Mar-11	43.4	47.3
MW-20A	86	76 - 86	90.7	Jun-11	42.28	48.42
MW-20A	86	76 - 86	90.7	Sep-11	43.35	47.35
MW-20A	86	76 - 86	90.7	Nov-11	43.74	46.96
MW-20A	86	76 - 86	90.7	Jan-12	42.84	47.86
MW-20A	86	76 - 86	90.7	Apr-12	42.15	48.55
MW-20A	86	76 - 86	90.7	Aug-12	41.12	49.58
MW-20A	86	76 - 86	90.7	Dec-12	44.08	46.62
MW-20B	162	152 - 162	90.65	Mar-10	45.19	45.46
MW-20B	162	152 - 162	90.65	May-10	44.11	46.54
MW-20B	162	152 - 162	90.65	Aug-10	45.74	44.91
MW-20B	162	152 - 162	90.65	Nov-10	45.96	44.69
MW-20B	162	152 - 162	90.65	Mar-11	43.38	47.27
MW-20B	162	152 - 162	90.65	Jun-11	42.34	48.31
MW-20B	162	152 - 162	90.65	Sep-11	43.94	46.71
MW-20B	162	152 - 162	90.65	Nov-11	44	46.65
MW-20B	162	152 - 162	90.65	Jan-12	42.69	47.96
MW-20B	162	152 - 162	90.65	Apr-12	42.21	48.44
MW-20B	162	152 - 162	90.65	Aug-12	43.06	47.59
MW-20B	162	152 - 162	90.65	Dec-12	44.21	46.44
MW-20C	235	225 - 235	90.79	Mar-10	43.84	46.95
MW-20C	235	225 - 235	90.79	May-10	44.42	46.37
MW-20C	235	225 - 235	90.79	Aug-10	50.67	40.12
MW-20C	235	225 - 235	90.79	Nov-10	45.78	45.01
MW-20C	235	225 - 235	90.79	Mar-11	43.14	47.65
MW-20C	235	225 - 235	90.79	Jun-11	42.65	48.14
MW-20C	235	225 - 235	90.79	Sep-11	47.52	43.27
MW-20C	235	225 - 235	90.79	Nov-11	44.74	46.05
MW-20C	235	225 - 235	90.79	Jan-12	42.48	48.31
MW-20C	235	225 - 235	90.79	Apr-12	41.89	48.9
MW-20C	235	225 - 235	90.79	Aug-12	47.39	43.4
MW-20C	235	225 - 235	90.79	Dec-12	45.05	45.74
MW-21A	102	90 - 100	91.75	Nov-11	45.34	46.41

Table G-2(b) MODESTO SUPERFUND SITE
HISTORICAL GROUNDWATER ELEVATIONS 1Q10 THROUGH CURRENT

Well Identification	Well Depth (ft bgs)	Screened Interval (ft bgs)	Top of Casing Elevation (ft bgs)	Date	Depth to Water (feet from TOC)	Water Table Elevation (feet above MSL)
MW-21A	102	90 - 100	91.75	Jan-12	44.62	47.13
MW-21A	102	90 - 100	91.75	Apr-12	43.42	48.33
MW-21A	102	90 - 100	91.75	Aug-12	44.83	46.92
MW-21A	102	90 - 100	91.75	Dec-12	45.68	46.07
MW-22A	62	50 - 60	91.69	Nov-11	45.36	46.33
MW-22A	62	50 - 60	91.69	Jan-12	44.2	47.49
MW-22A	62	50 - 60	91.69	Apr-12	43.45	48.24
MW-22A	62	50 - 60	91.69	Aug-12	44.02	47.67
MW-22A	62	50 - 60	91.69	Dec-12	45.63	46.06
MW-23A	102	89 - 99	90.26	Nov-11	40.85	49.41
MW-23A	102	89 - 99	90.26	Jan-12	40.71	49.55
MW-23A	102	89 - 99	90.26	Apr-12	40.19	50.07
MW-23A	102	89 - 99	90.26	Aug-12	40.26	50
MW-23A	102	89 - 99	90.26	Dec-12	41.33	48.93
MW-24B	157	145 - 155	92.93	Nov-11	45.94	46.99
MW-24B	157	145 - 155	92.93	Jan-12	44.89	48.04
MW-24B	157	145 - 155	92.93	Apr-12	44.21	48.72
MW-24B	157	145 - 155	92.93	Aug-12	44.91	48.02
MW-24B	157	145 - 155	92.93	Dec-12	46.2	46.73
MW-25B	157	145 - 155	91.78	Nov-11	45.4	46.38
MW-25B	157	145 - 155	91.78	Jan-12	44.27	47.51
MW-25B	157	145 - 155	91.78	Apr-12	43.44	48.34
MW-25B	157	145 - 155	91.78	Aug-12	44.12	47.66
MW-25B	157	145 - 155	91.78	Dec-12	45.62	46.16
MW-26B	157	145 - 155	89.71	Nov-11	43.03	46.68
MW-26B	157	145 - 155	89.71	Jan-12	41.95	47.76
MW-26B	157	145 - 155	89.71	Apr-12	41.23	48.48
MW-26B	157	145 - 155	89.71	Aug-12	41.78	47.93
MW-26B	157	145 - 155	89.71	Dec-12	43.5	46.21
MW-27B	157	145 - 155	89.34	Nov-11	42.36	46.98
MW-27B	157	145 - 155	89.34	Jan-12	41.4	47.94
MW-27B	157	145 - 155	89.34	Apr-12	40.7	48.64
MW-27B	157	145 - 155	89.34	Aug-12	41.19	48.15
MW-27B	157	145 - 155	89.34	Dec-12	42.89	46.45
MW-28B	157	145 - 155	89.21	Nov-11	41.4	47.81
MW-28B	157	145 - 155	89.21	Jan-12	40.62	48.59
MW-28B	157	145 - 155	89.21	Apr-12	40.06	49.15
MW-28B	157	145 - 155	89.21	Aug-12	40.52	48.69
MW-28B	157	145 - 155	89.21	Dec-12	41.91	47.3
MW-29B	157	145 - 155	89.74	Nov-11	41.45	48.29
MW-29B	157	145 - 155	89.74	Jan-12	40.72	49.02
MW-29B	157	145 - 155	89.74	Apr-12	40.15	49.59
MW-29B	157	145 - 155	89.74	Aug-12	40.63	49.11
MW-29B	157	145 - 155	89.74	Dec-12	41.74	48

Table G-3. Historical through Current Analytical Data

Included as excel file on this CD.

FIGURE G-4(a)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

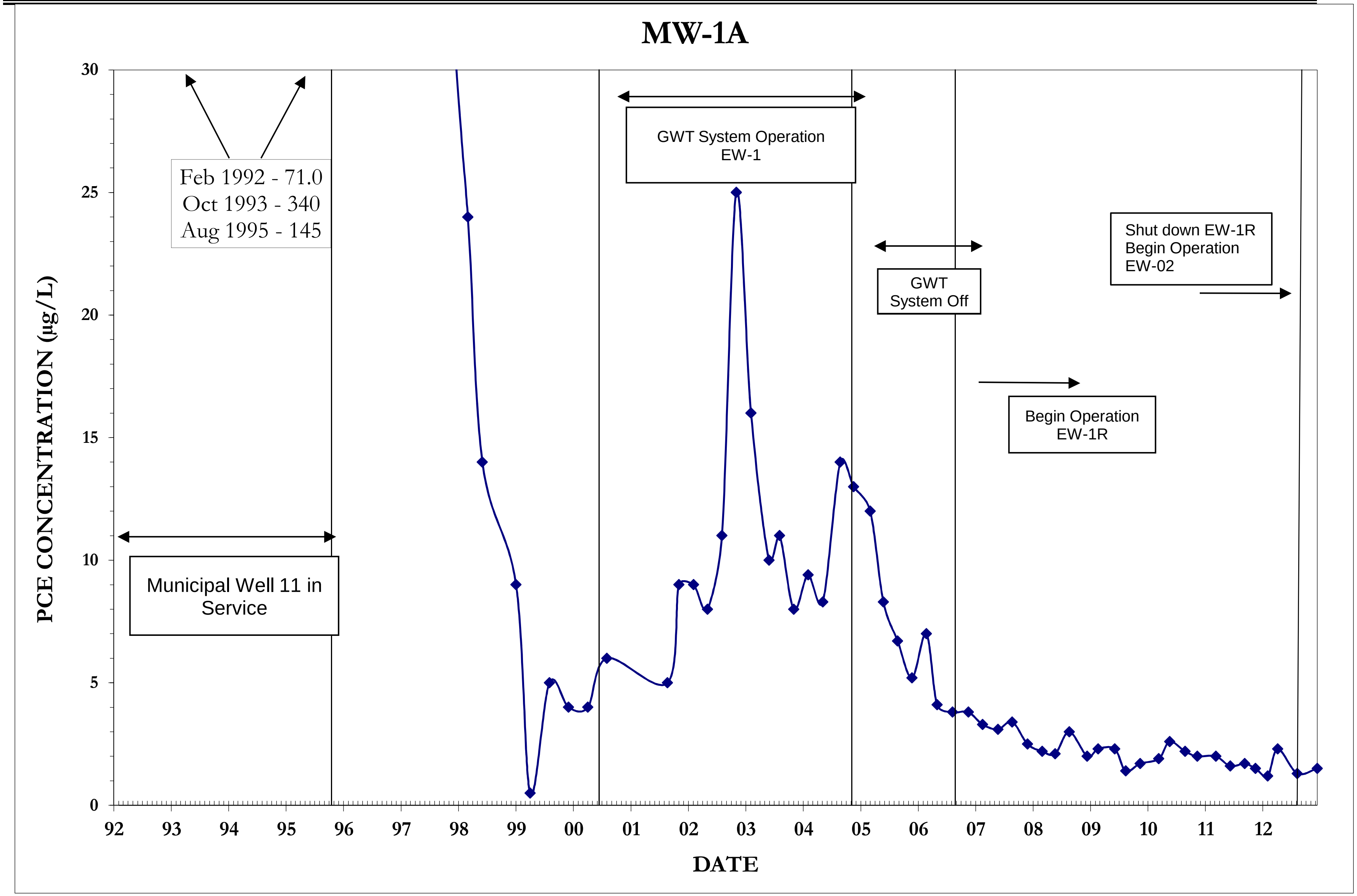

FIGURE G-4(b)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

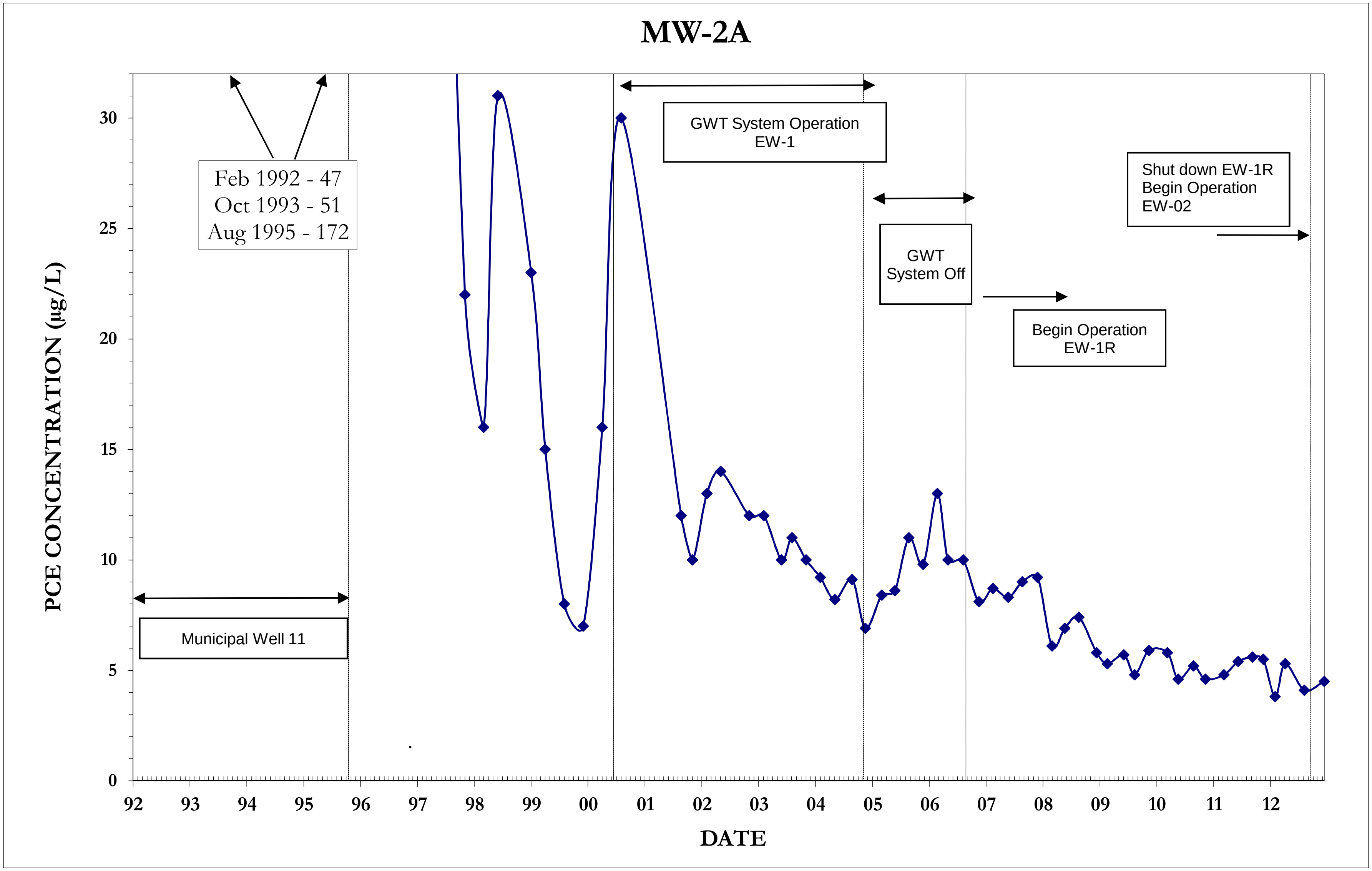

FIGURE G-4(c)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

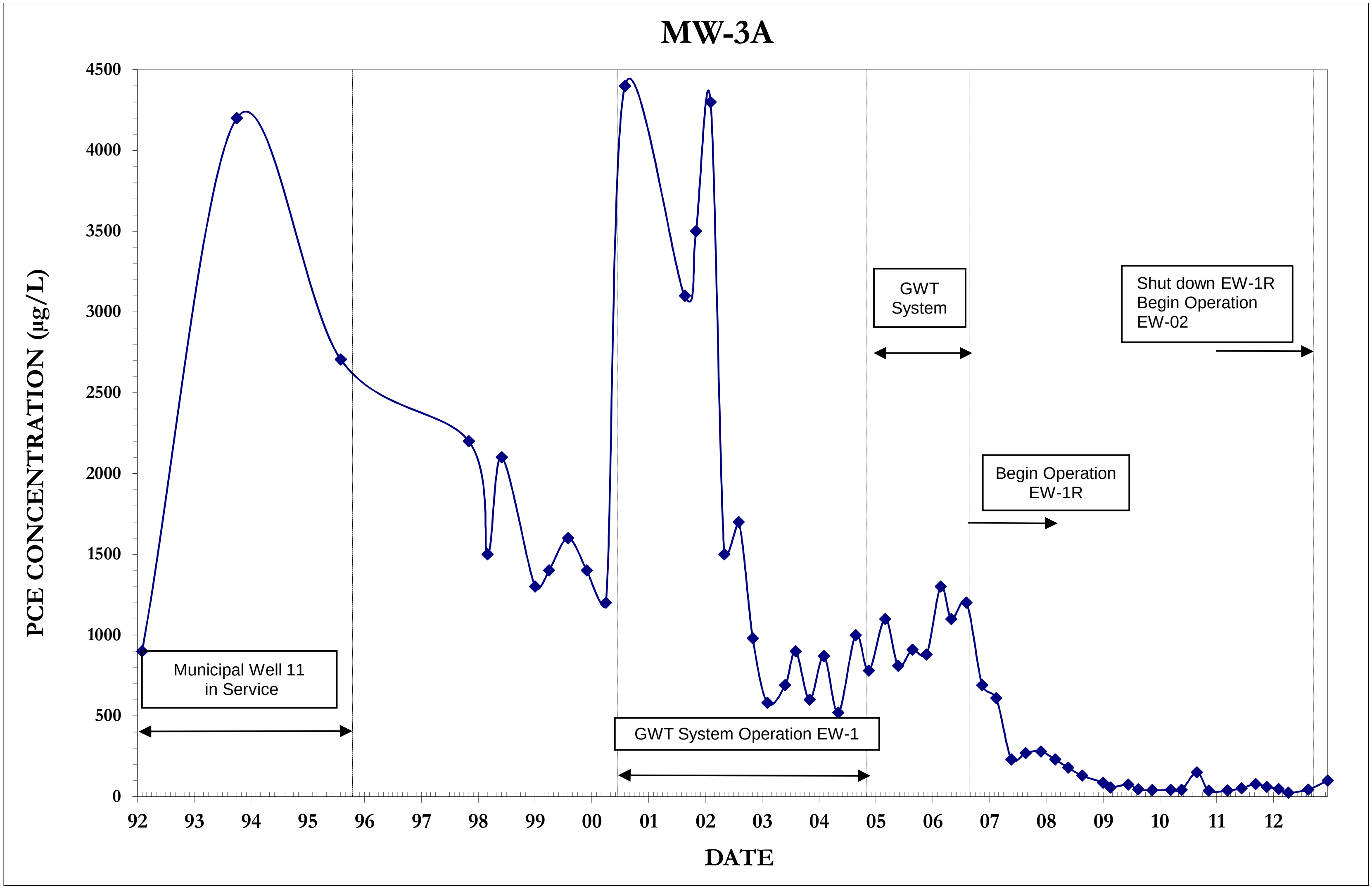

FIGURE G-4(d)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

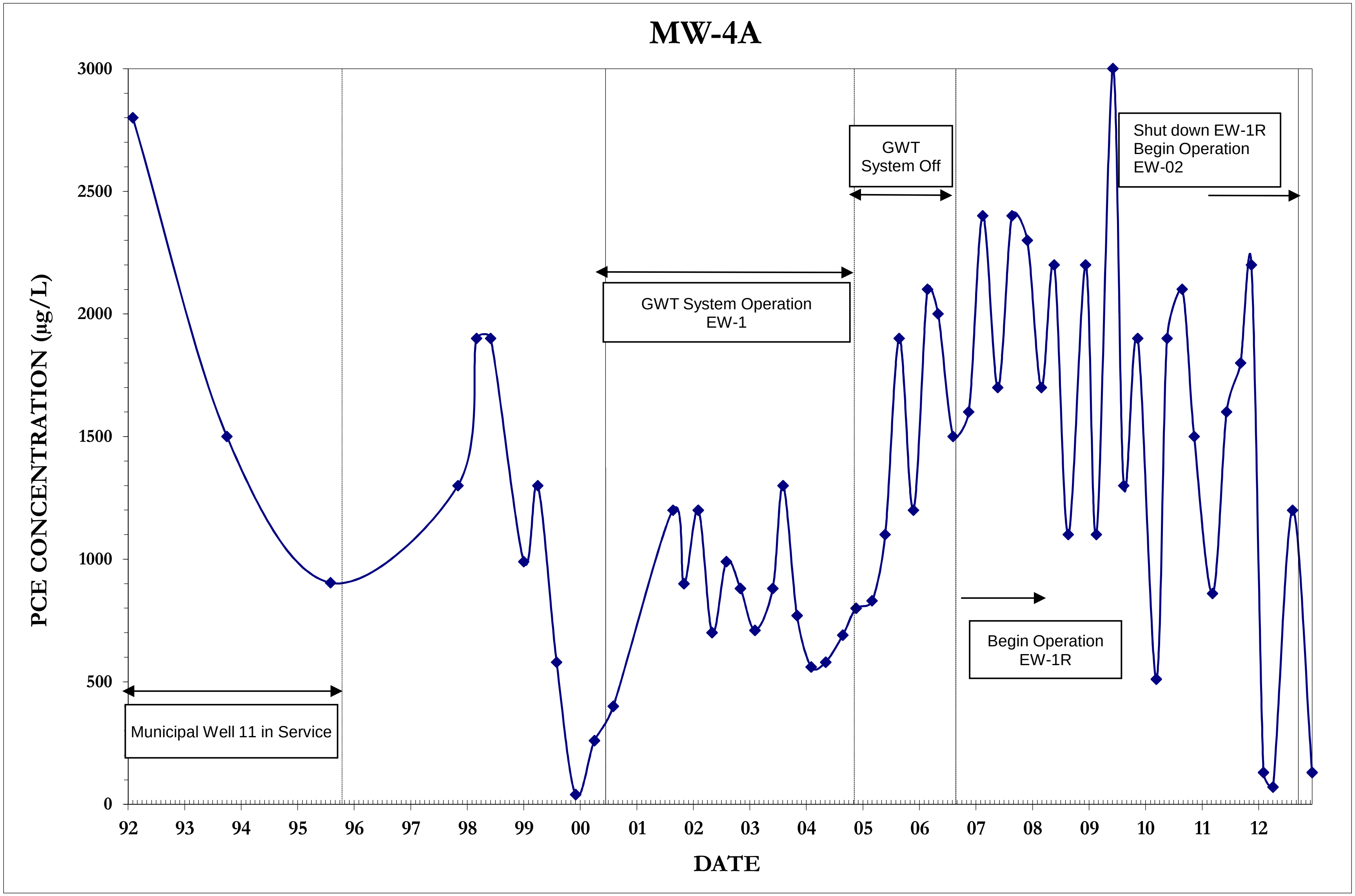

FIGURE G-4(e)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

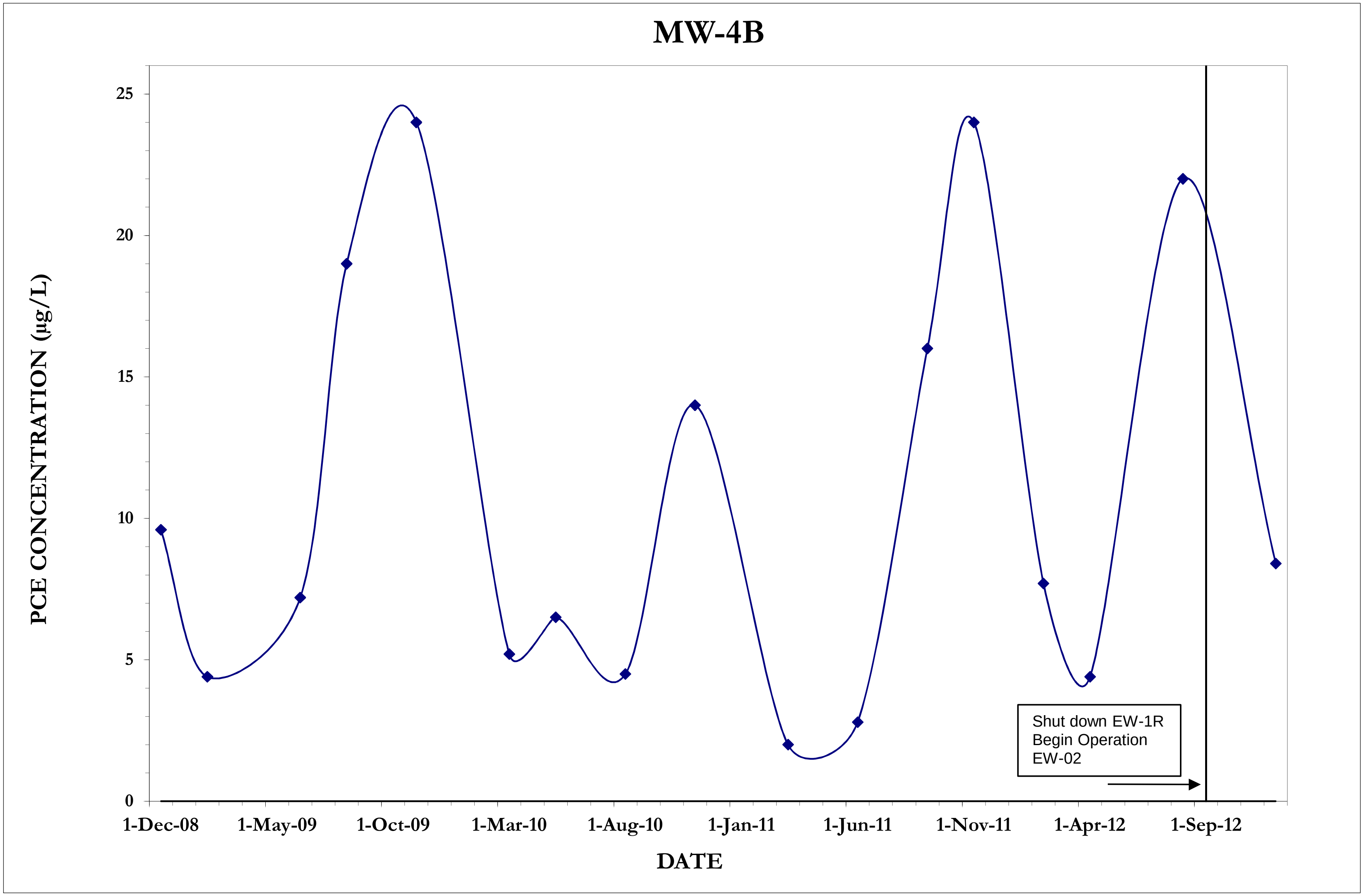

FIGURE G-4(f)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

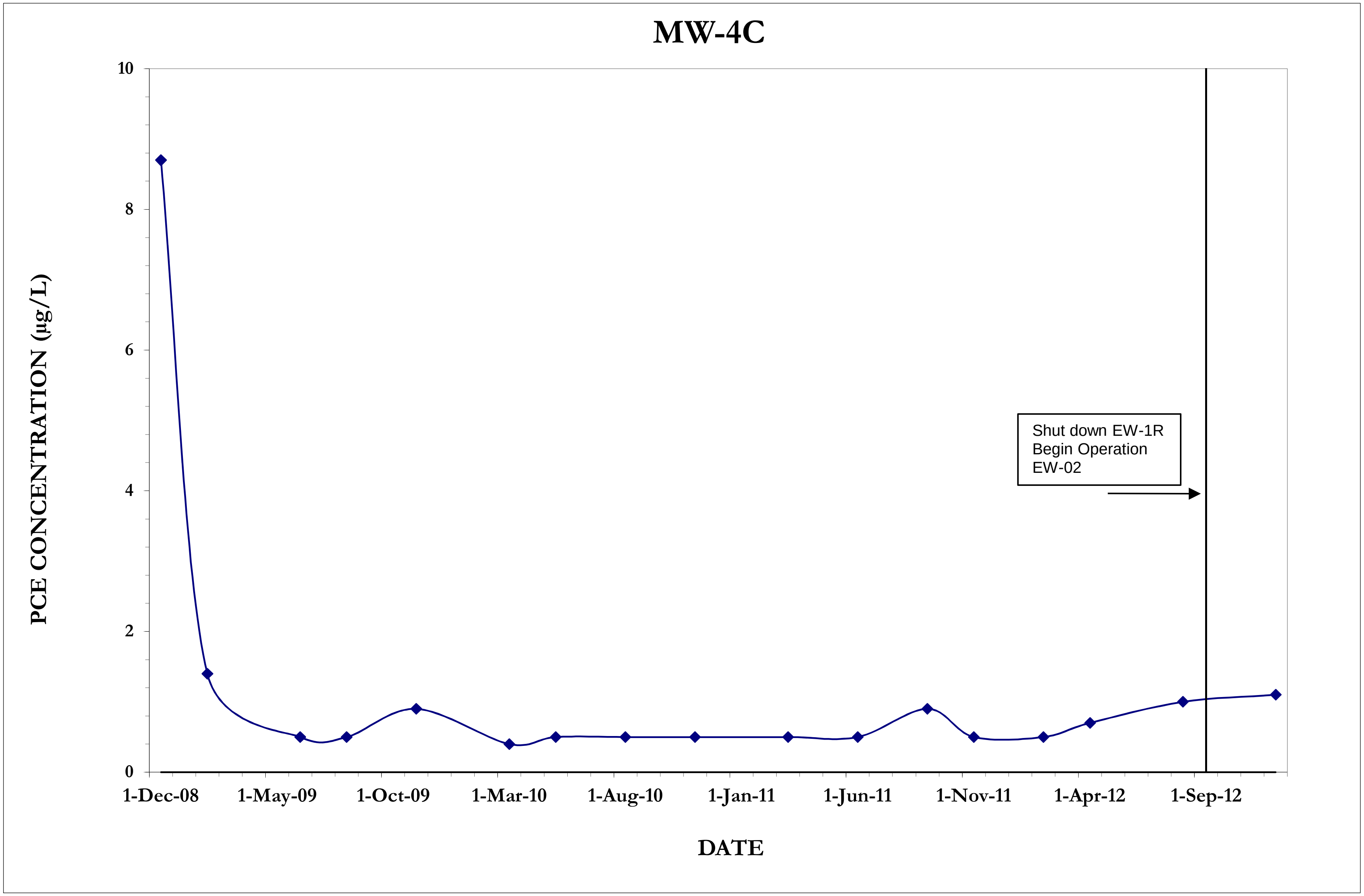

FIGURE G-4(g)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

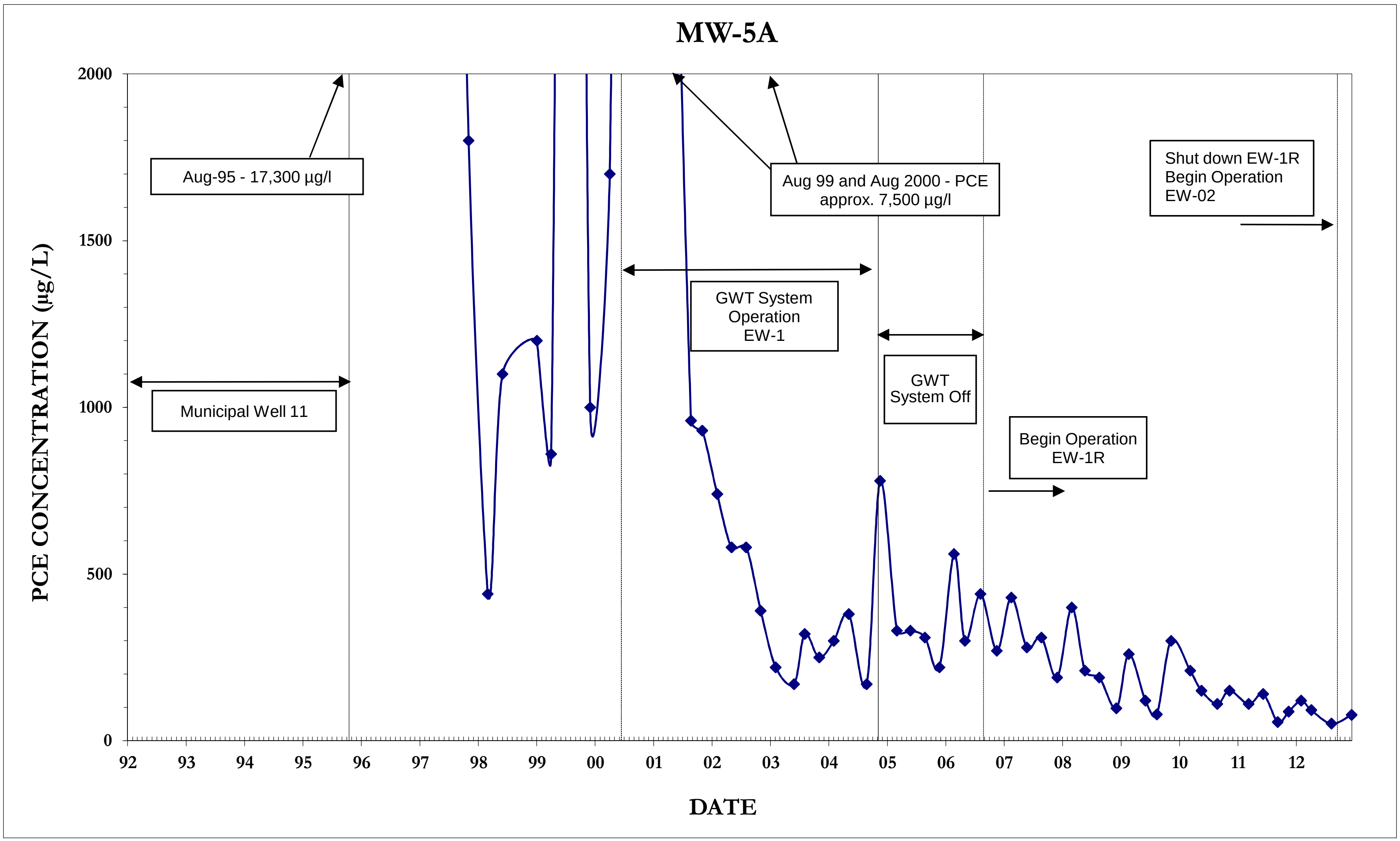

FIGURE G-4(h)

HISTORICAL PCE CONCENTRATION IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

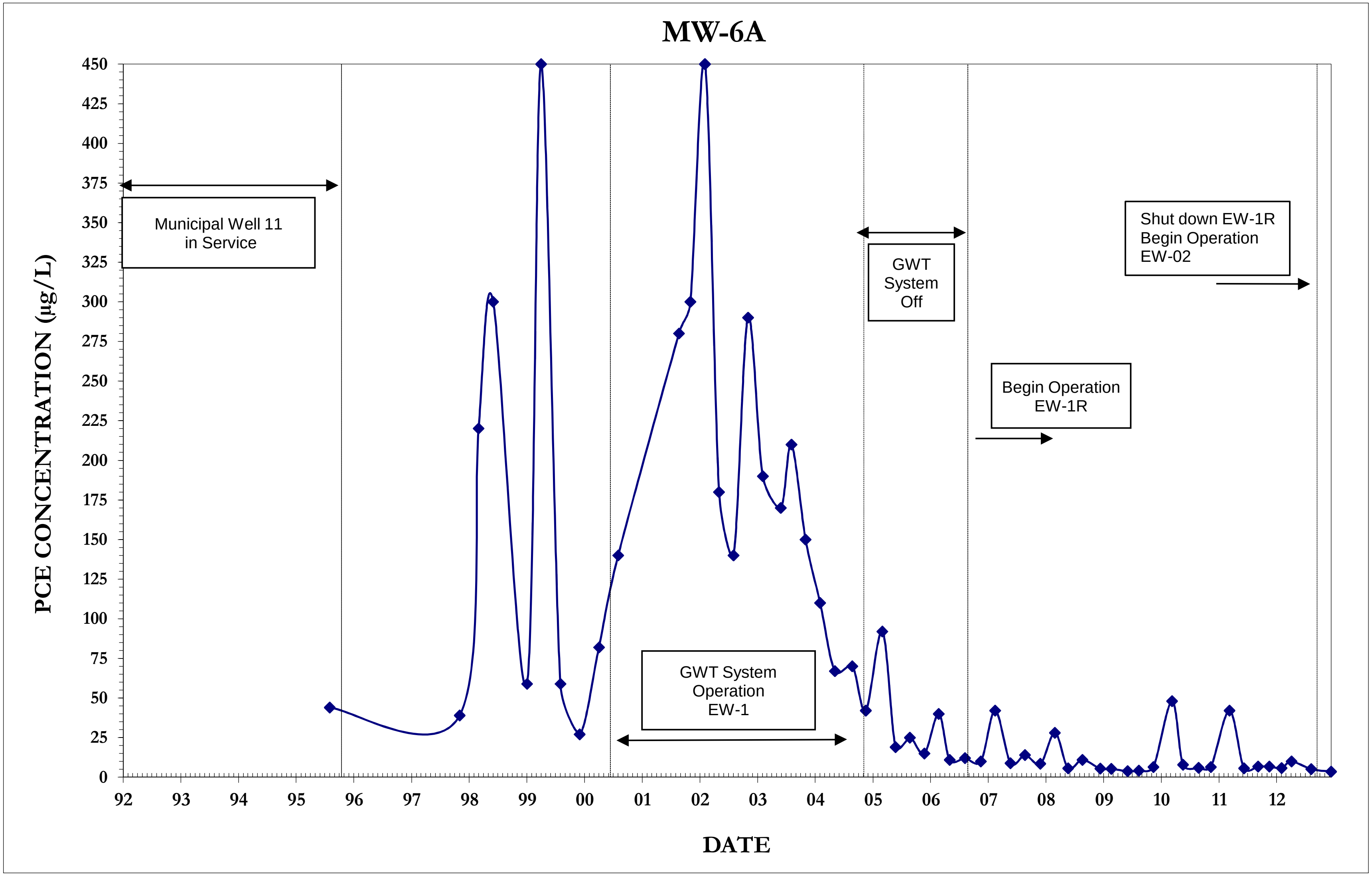

FIGURE G-4(i)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

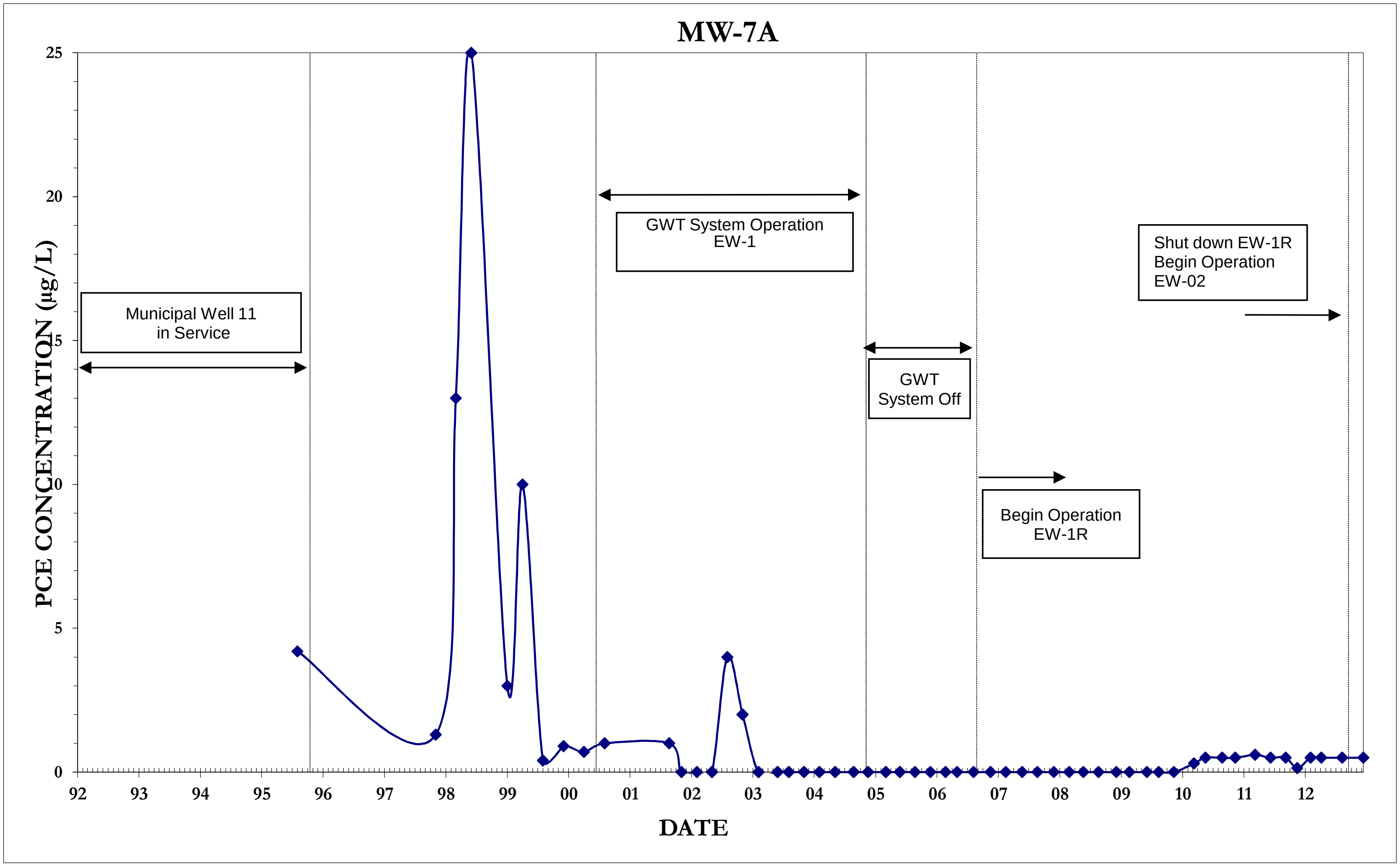

FIGURE G-4(j)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

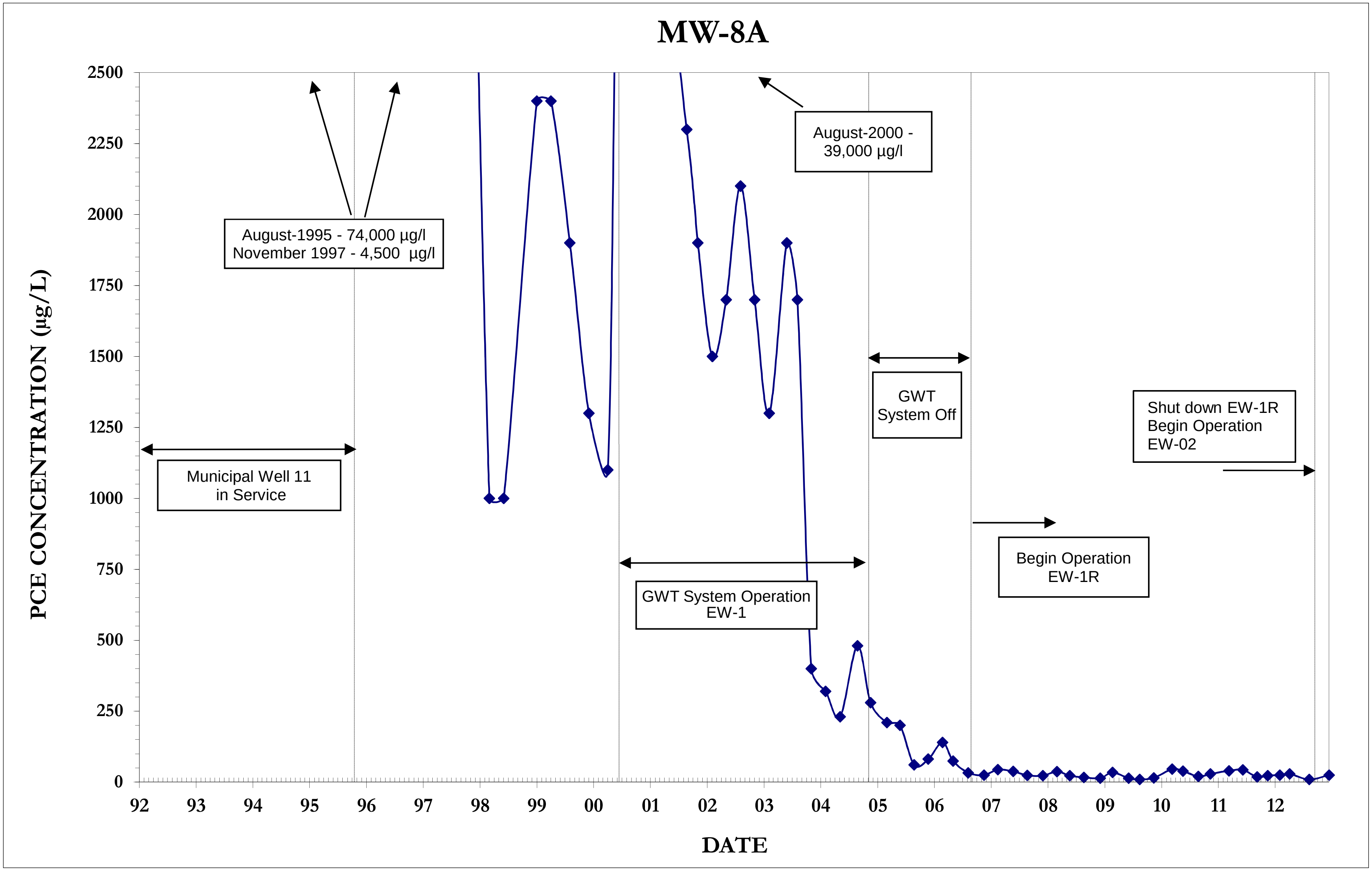

FIGURE G-4(k)

HISTORICAL PCE CONCENTRATIONS IN
GROUDNWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

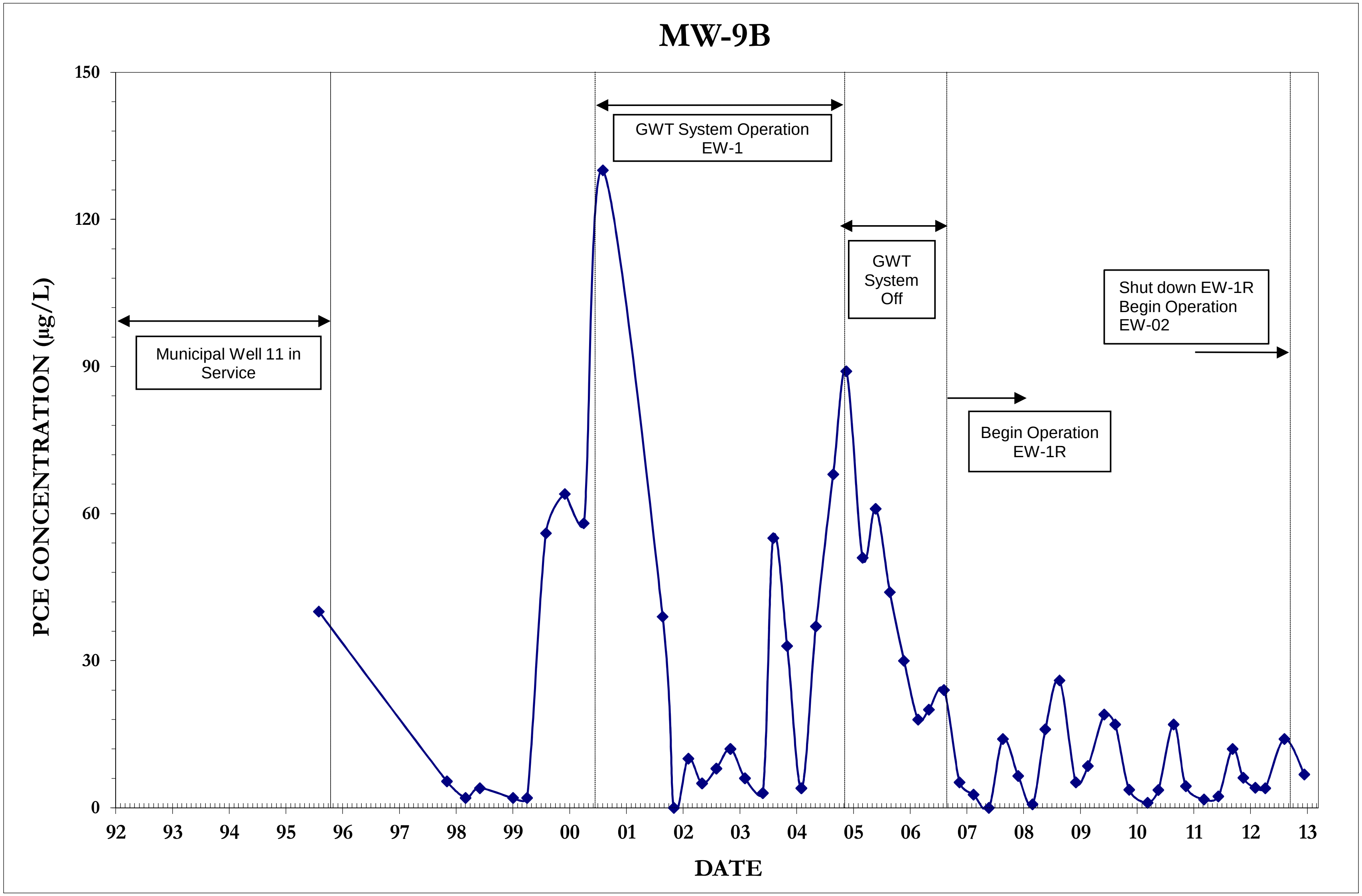

FIGURE G-4(l)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

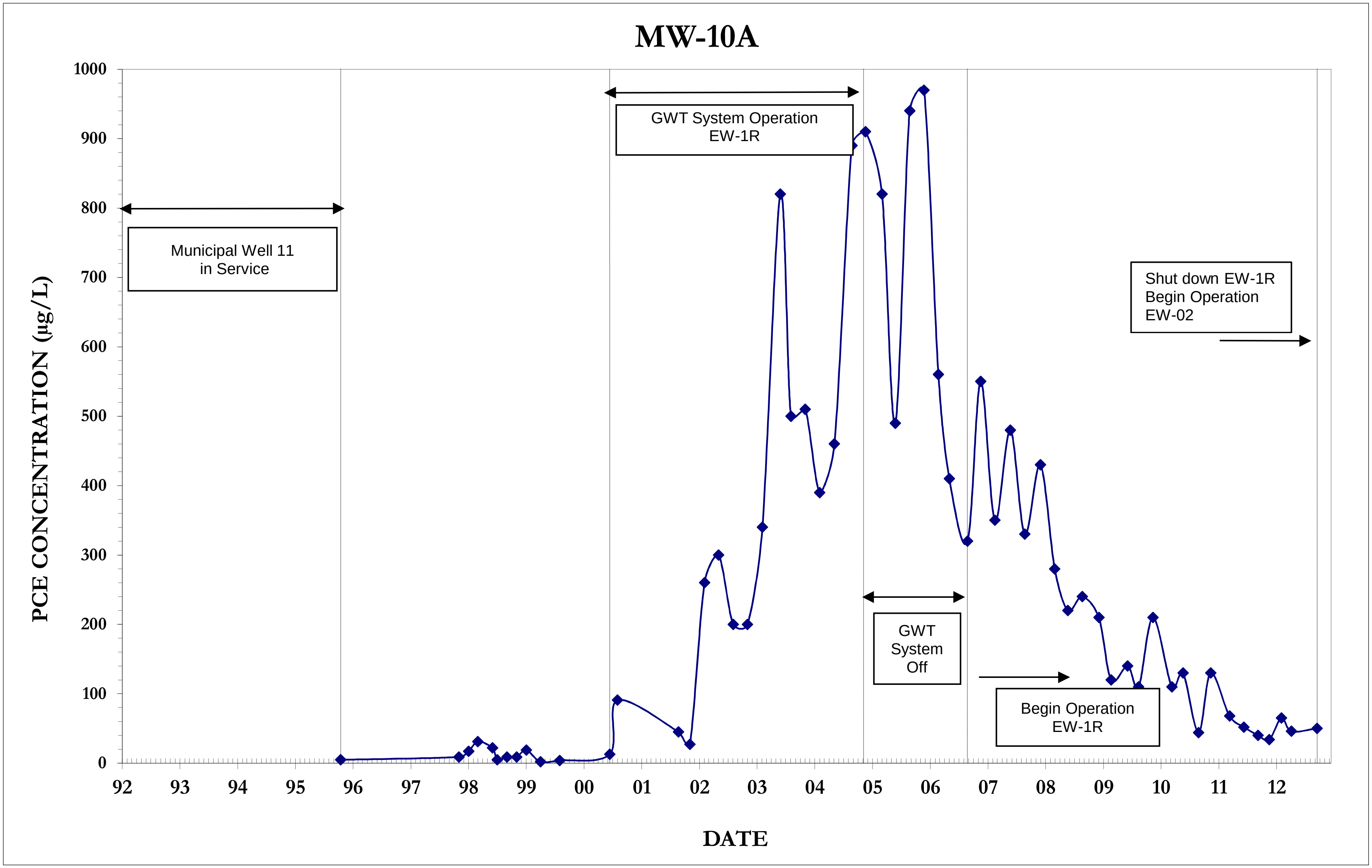

FIGURE G-4(m)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

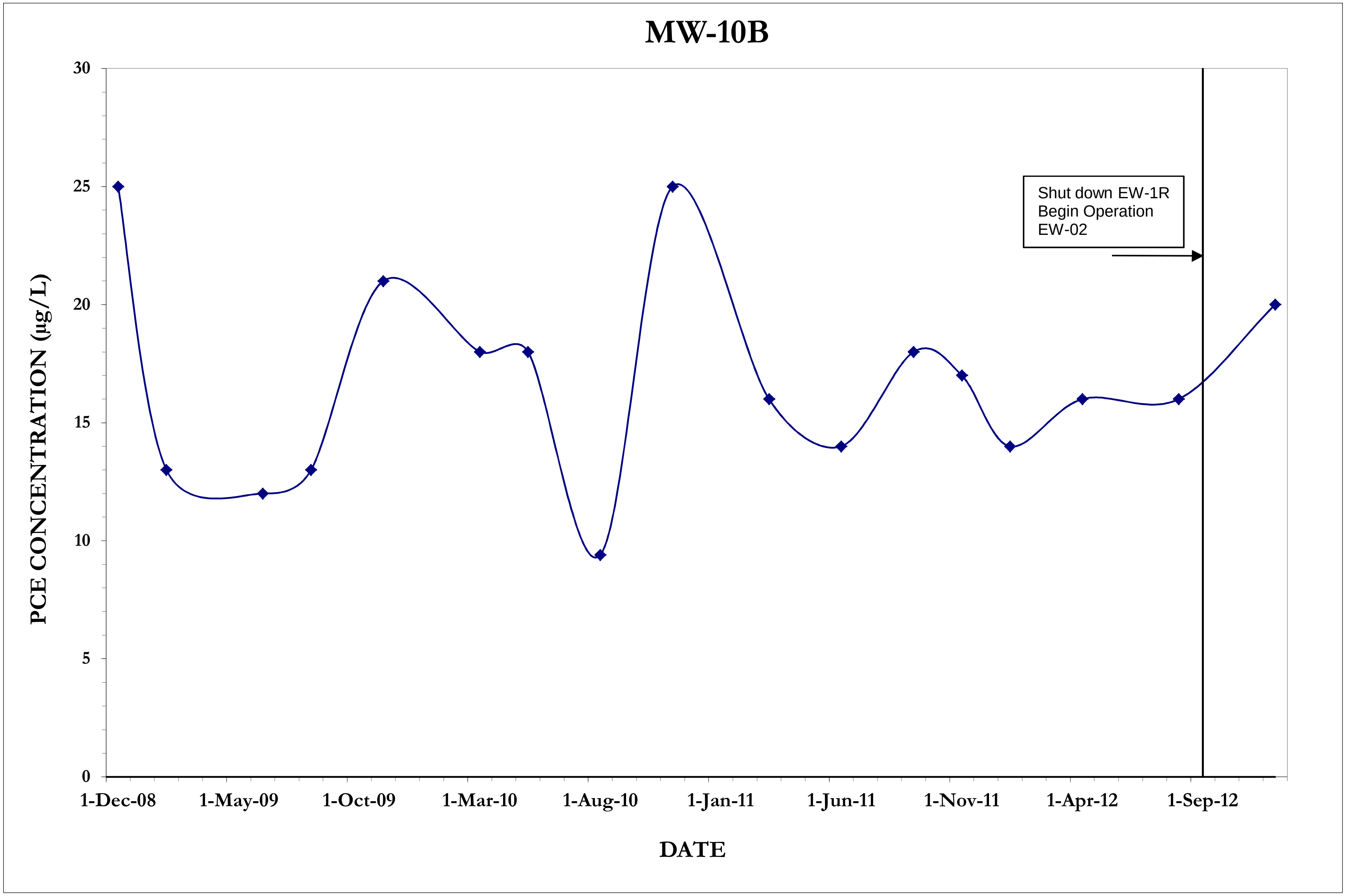

FIGURE G-4(n)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

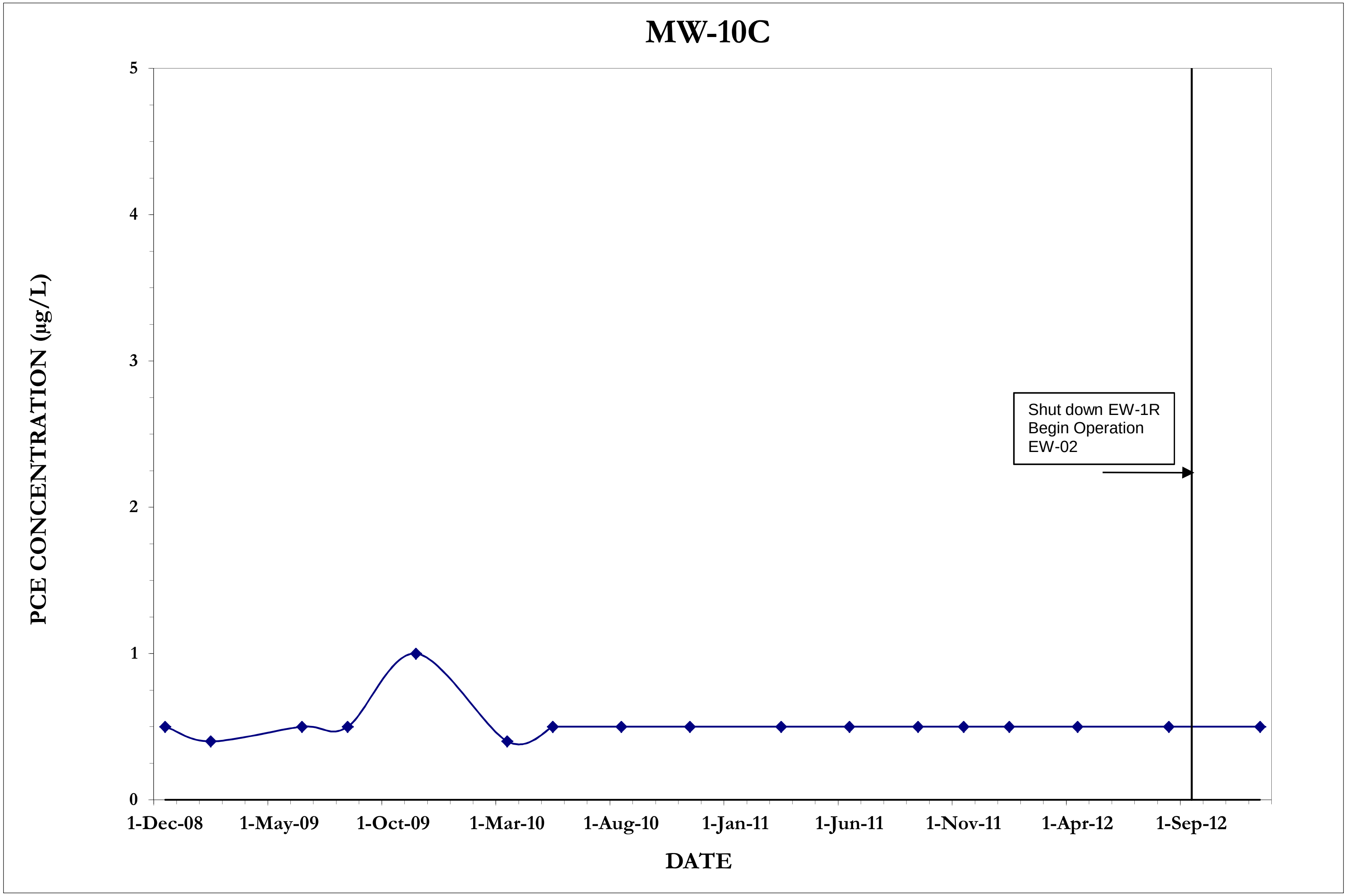

FIGURE G-4(o)

**HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA**

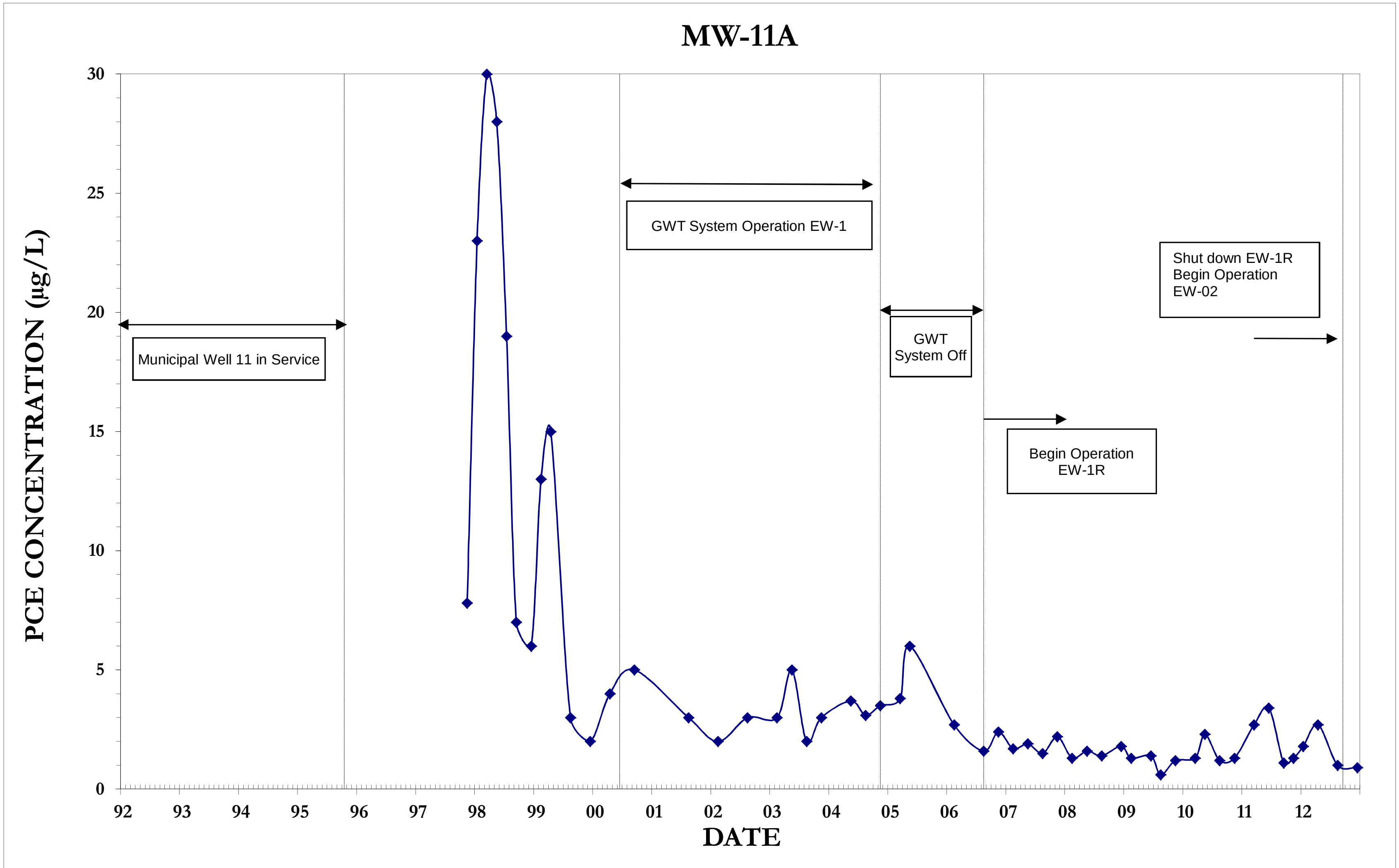

FIGURE G-4(p)

**HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA**

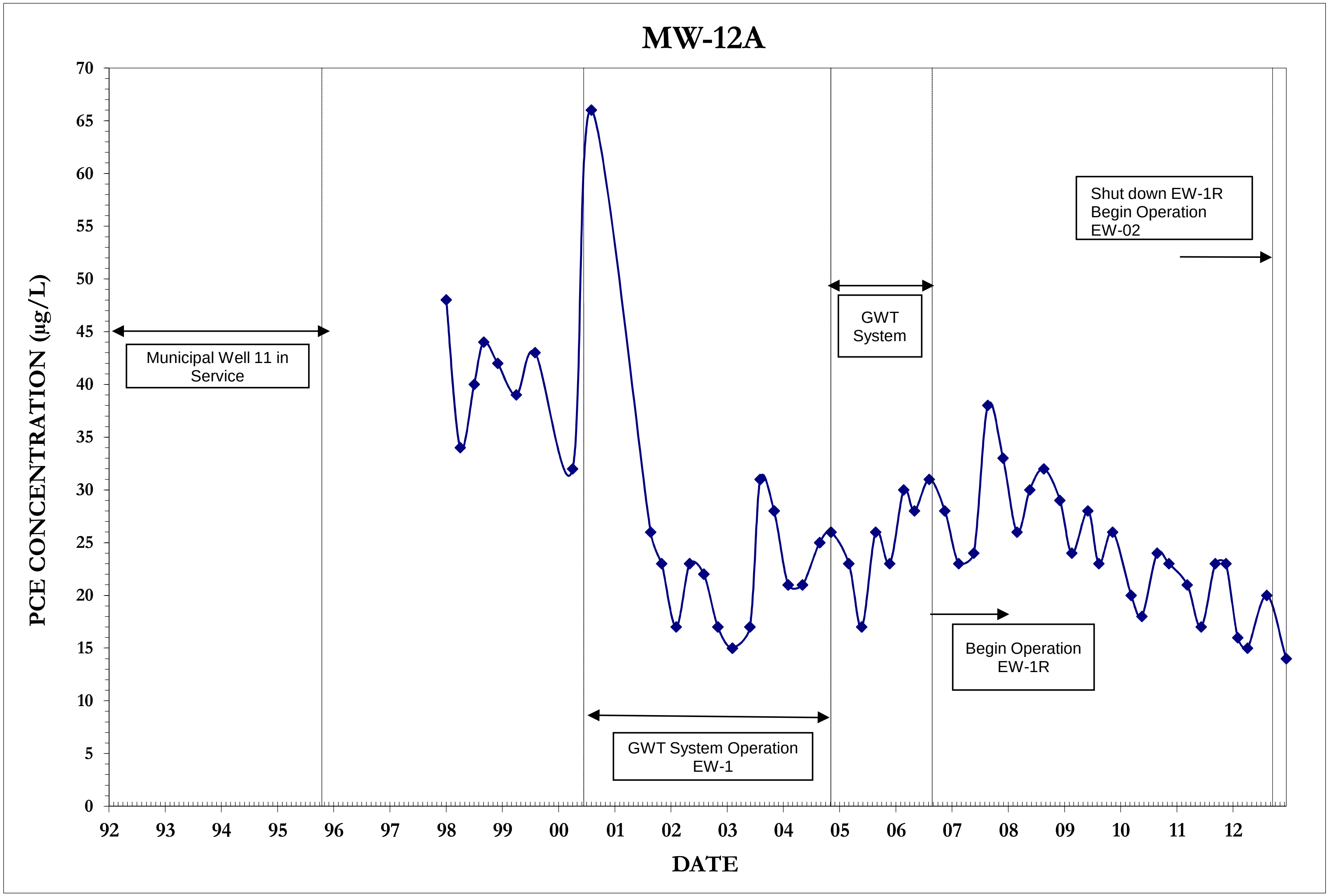

FIGURE G-4(q)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

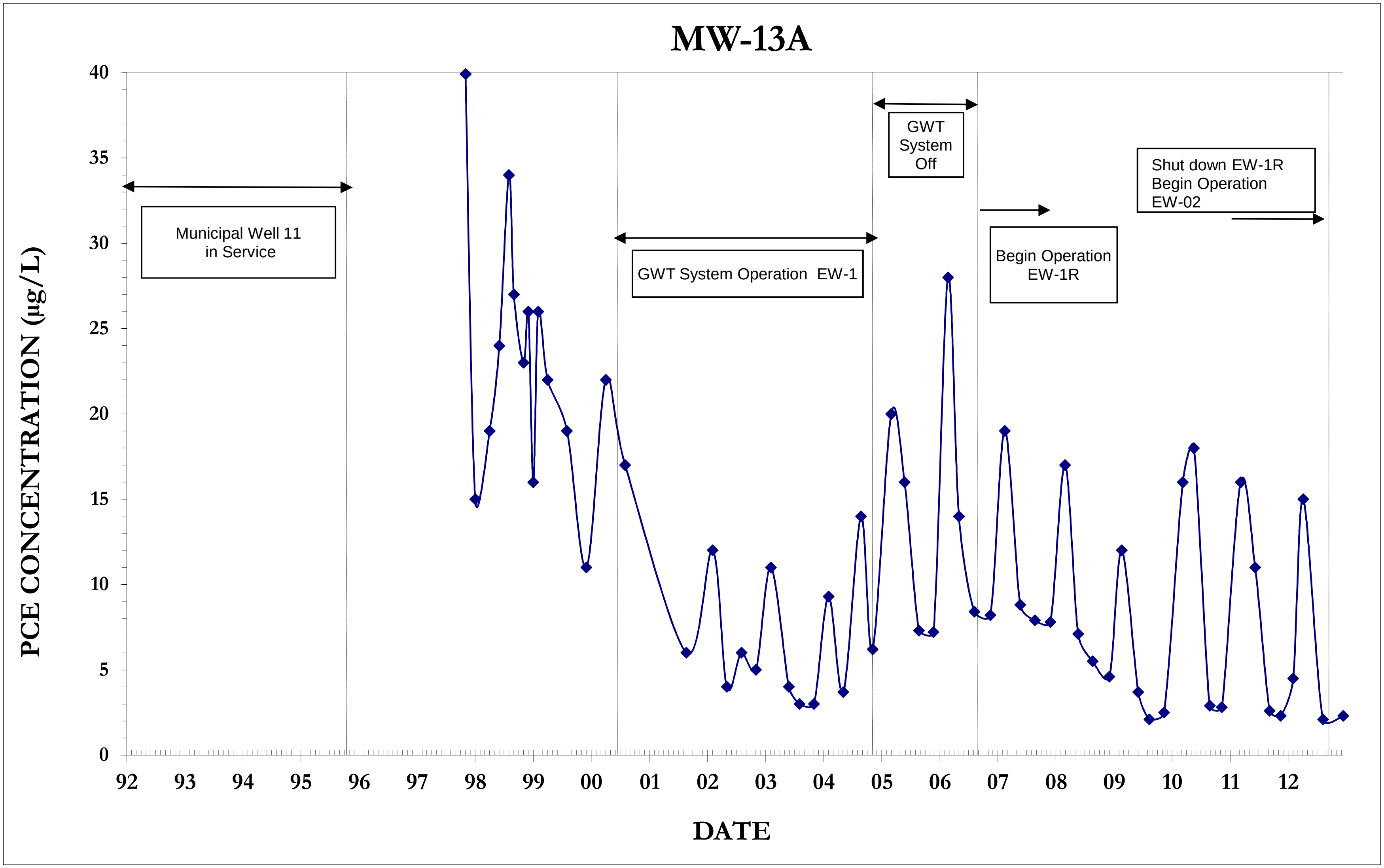

FIGURE G-4(r)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

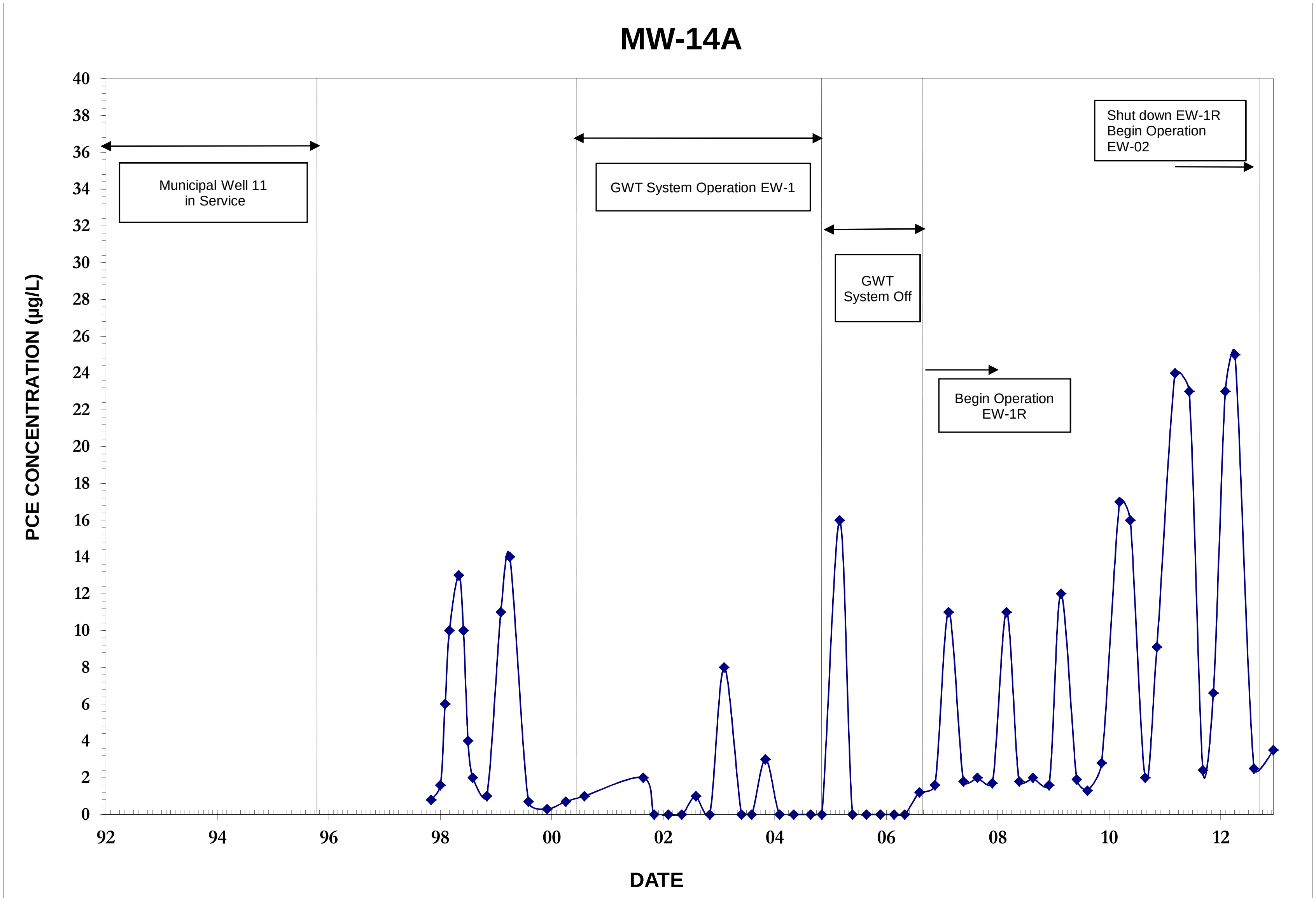

FIGURE G-4(s)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

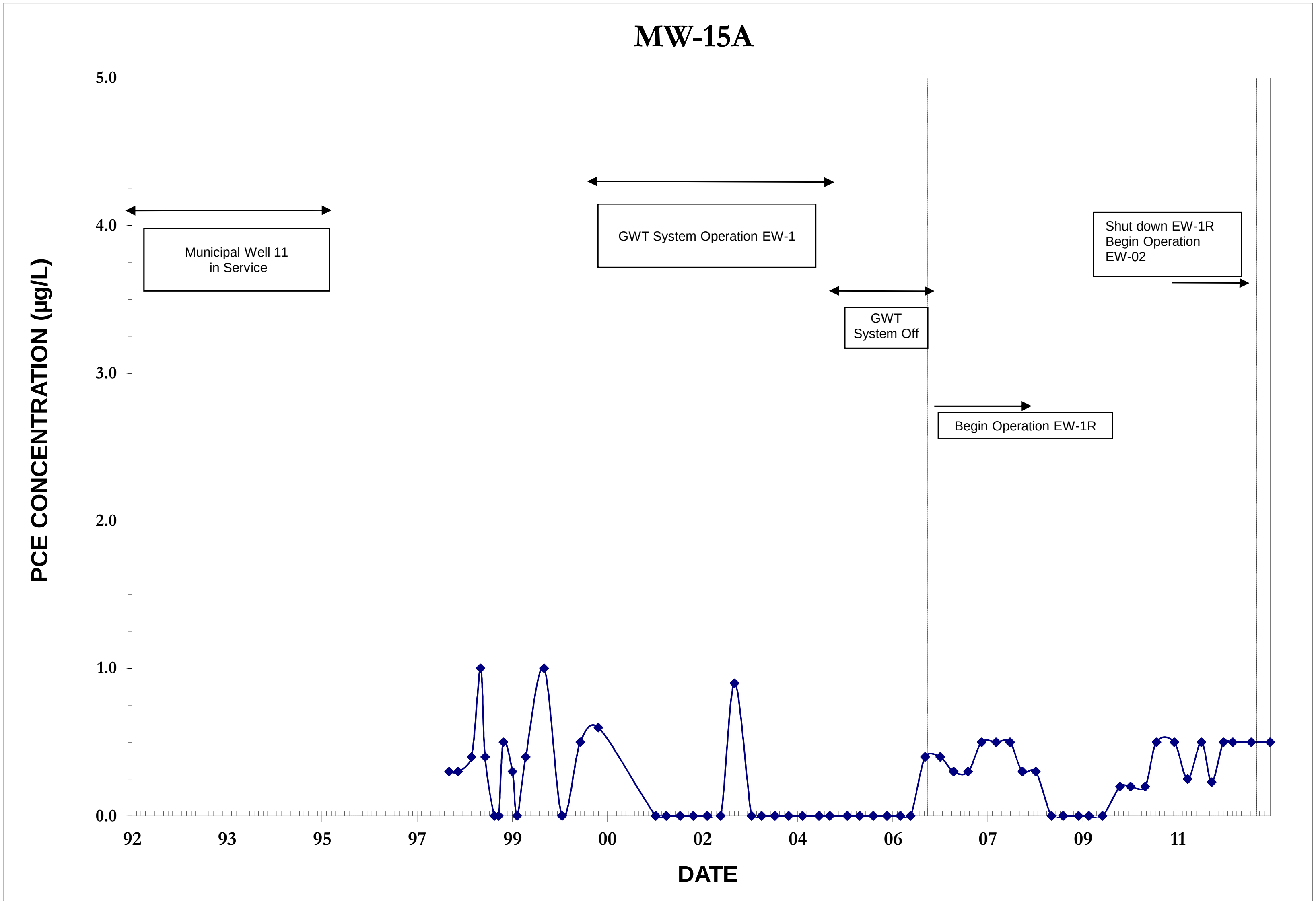

FIGURE G-4(t)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

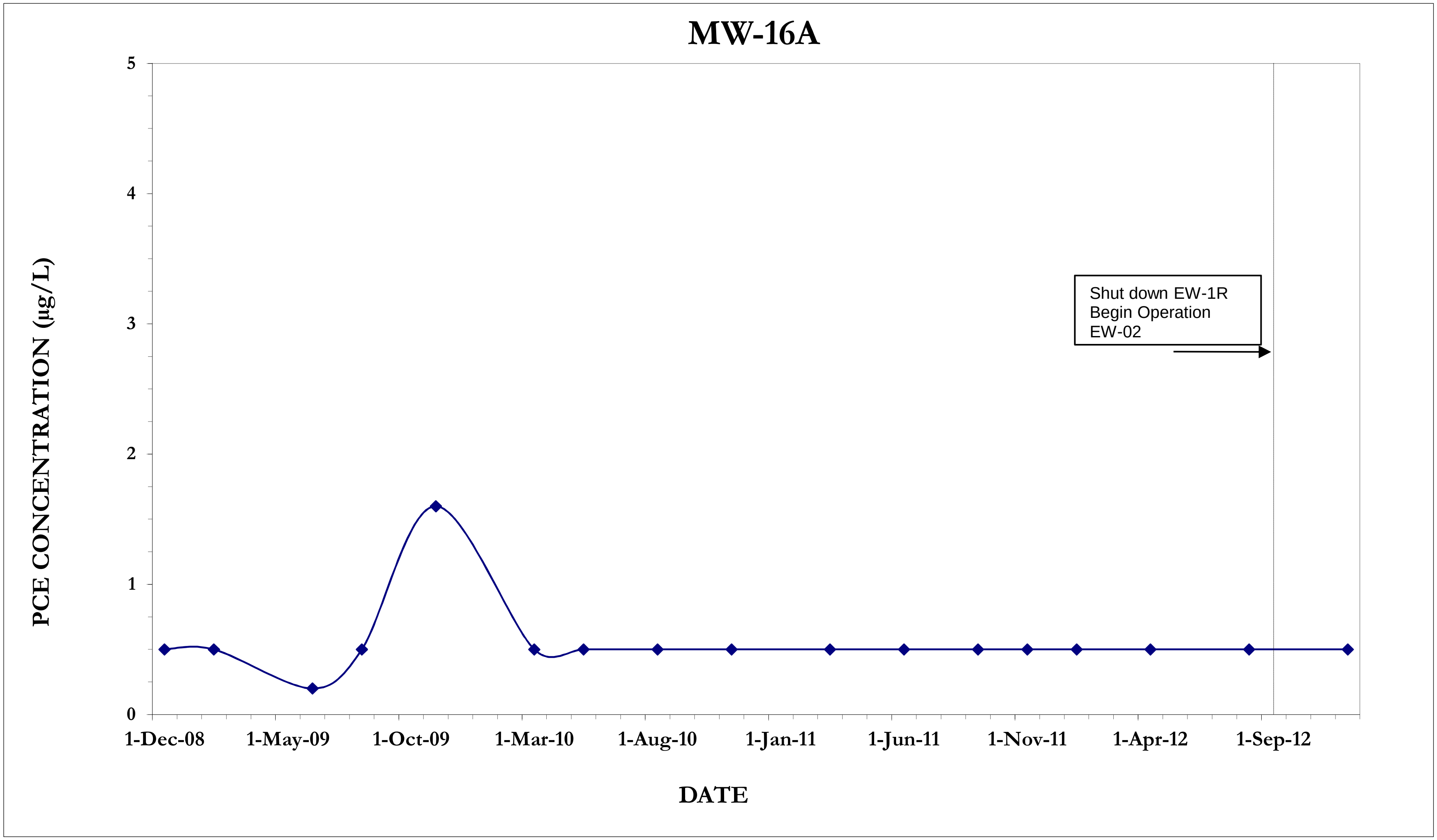

FIGURE G-4(u)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

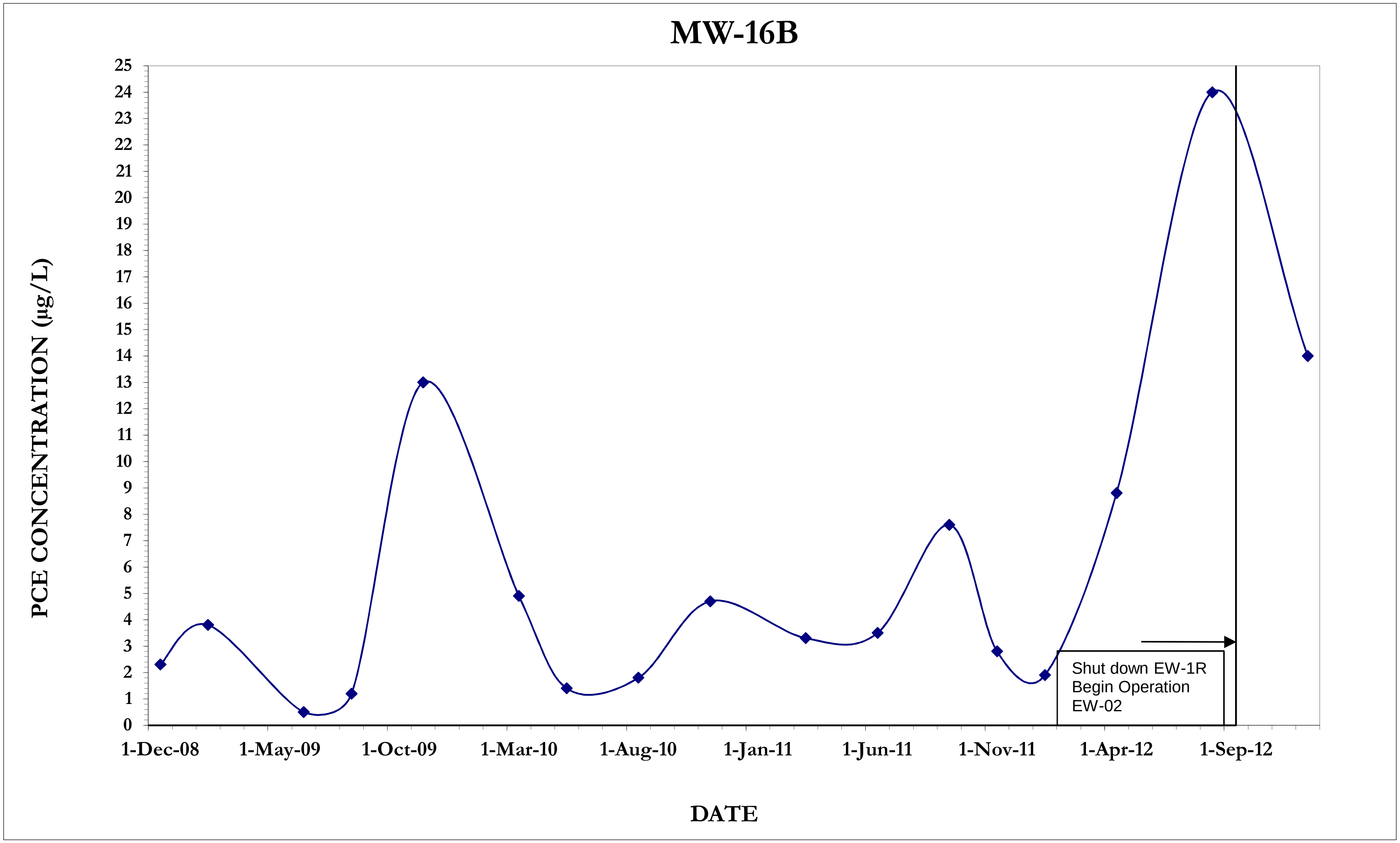

FIGURE G-4(v)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

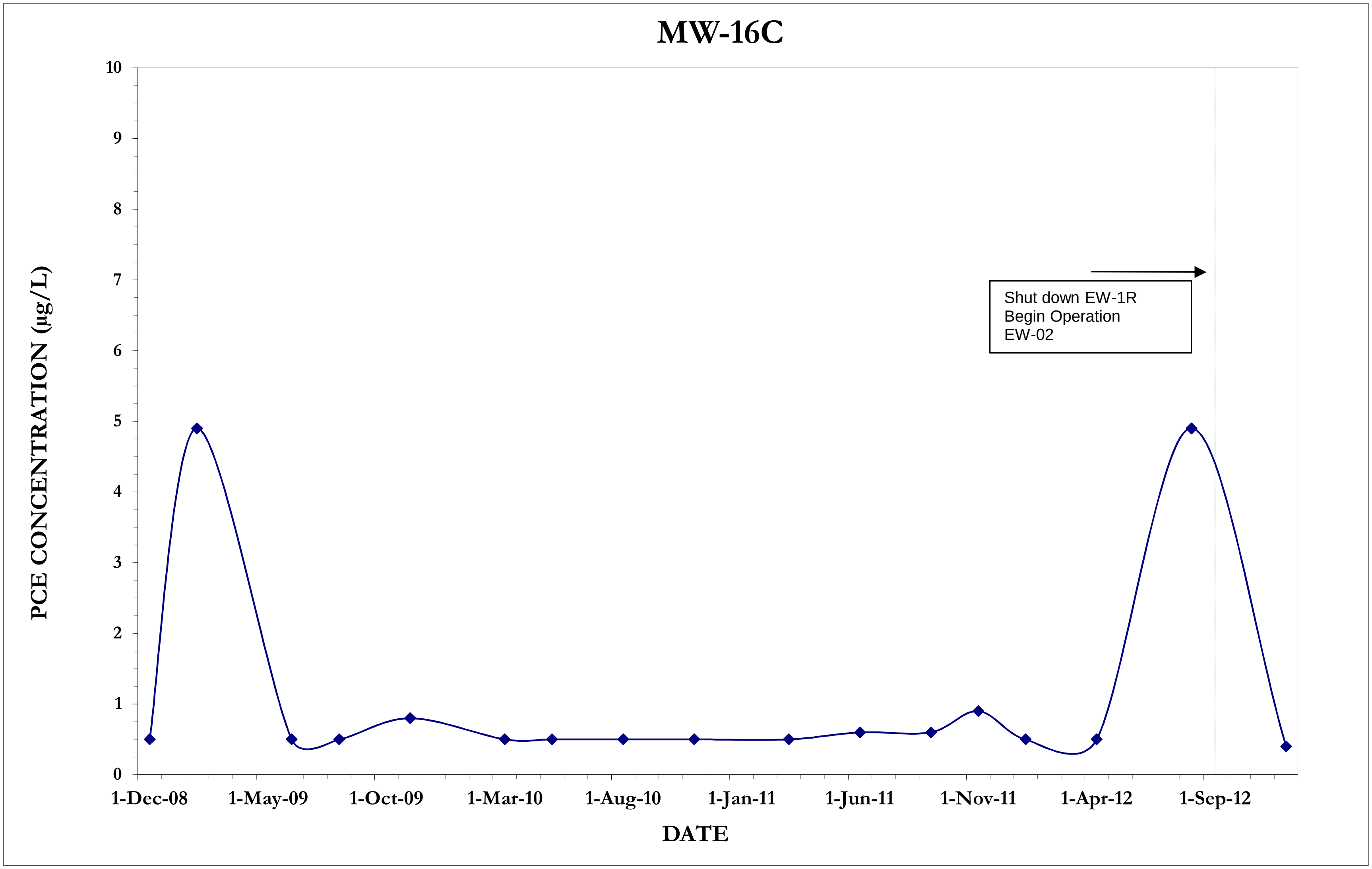

FIGURE G-4(w)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

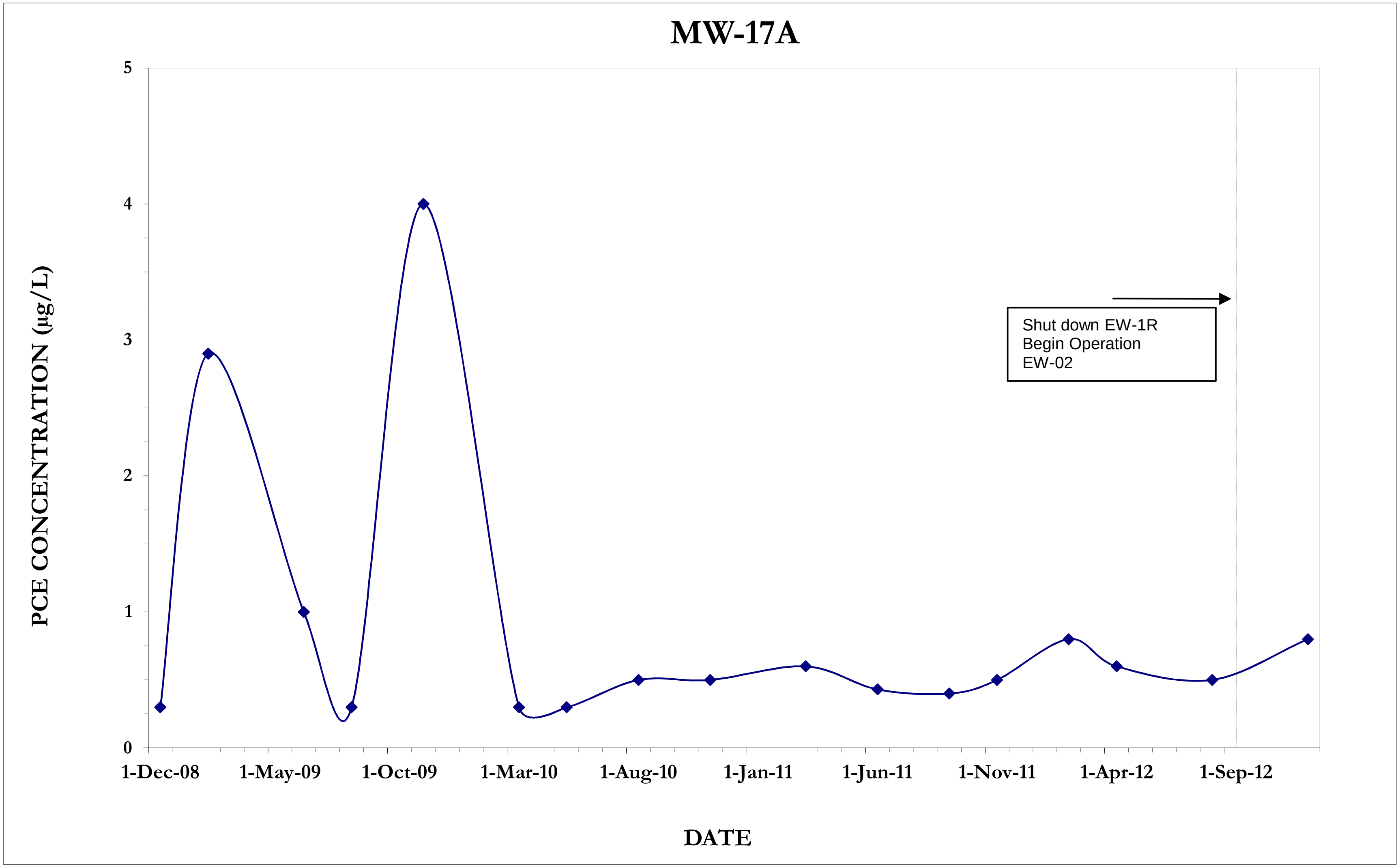

FIGURE G-4(x)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

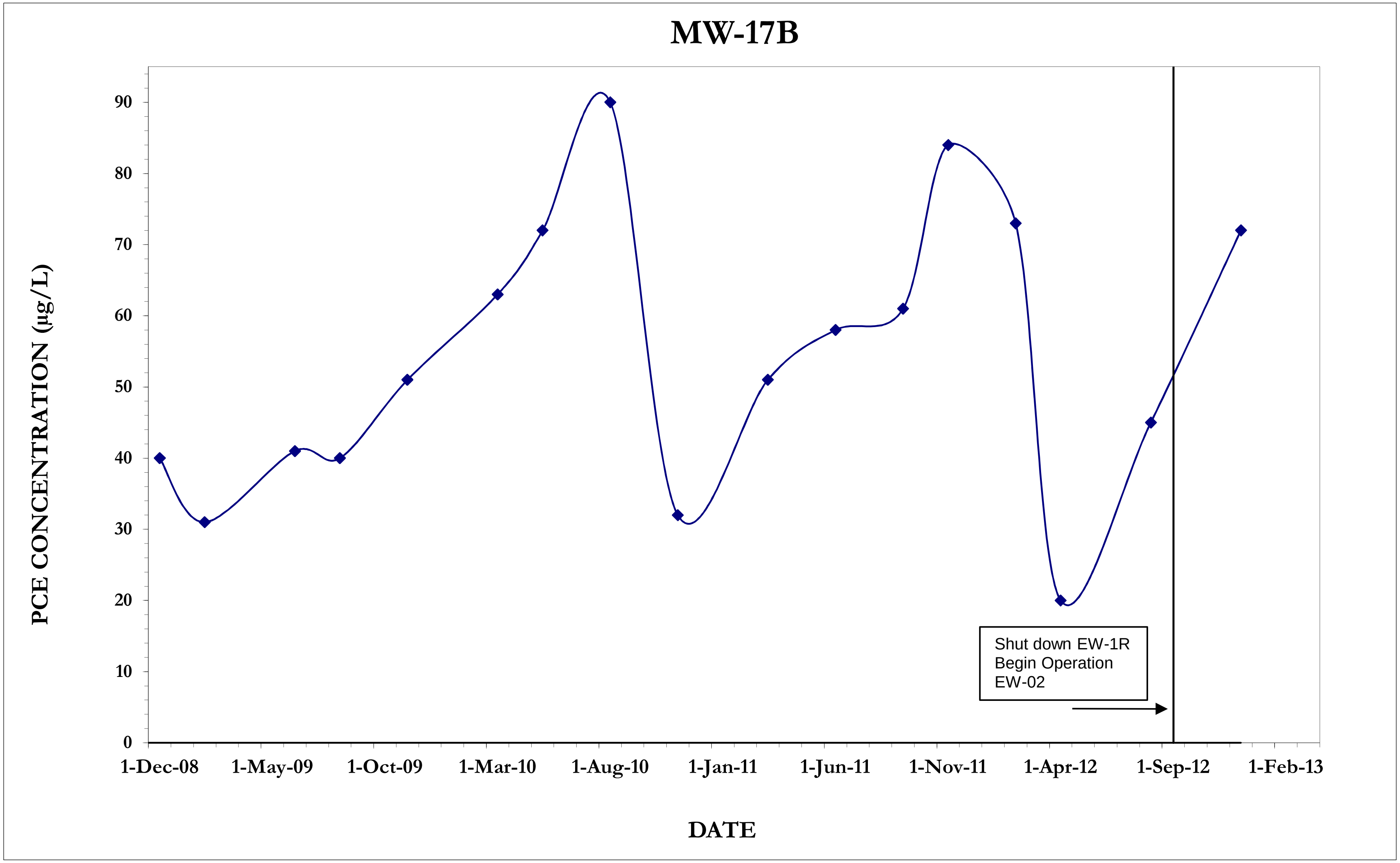

FIGURE G-4(y)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

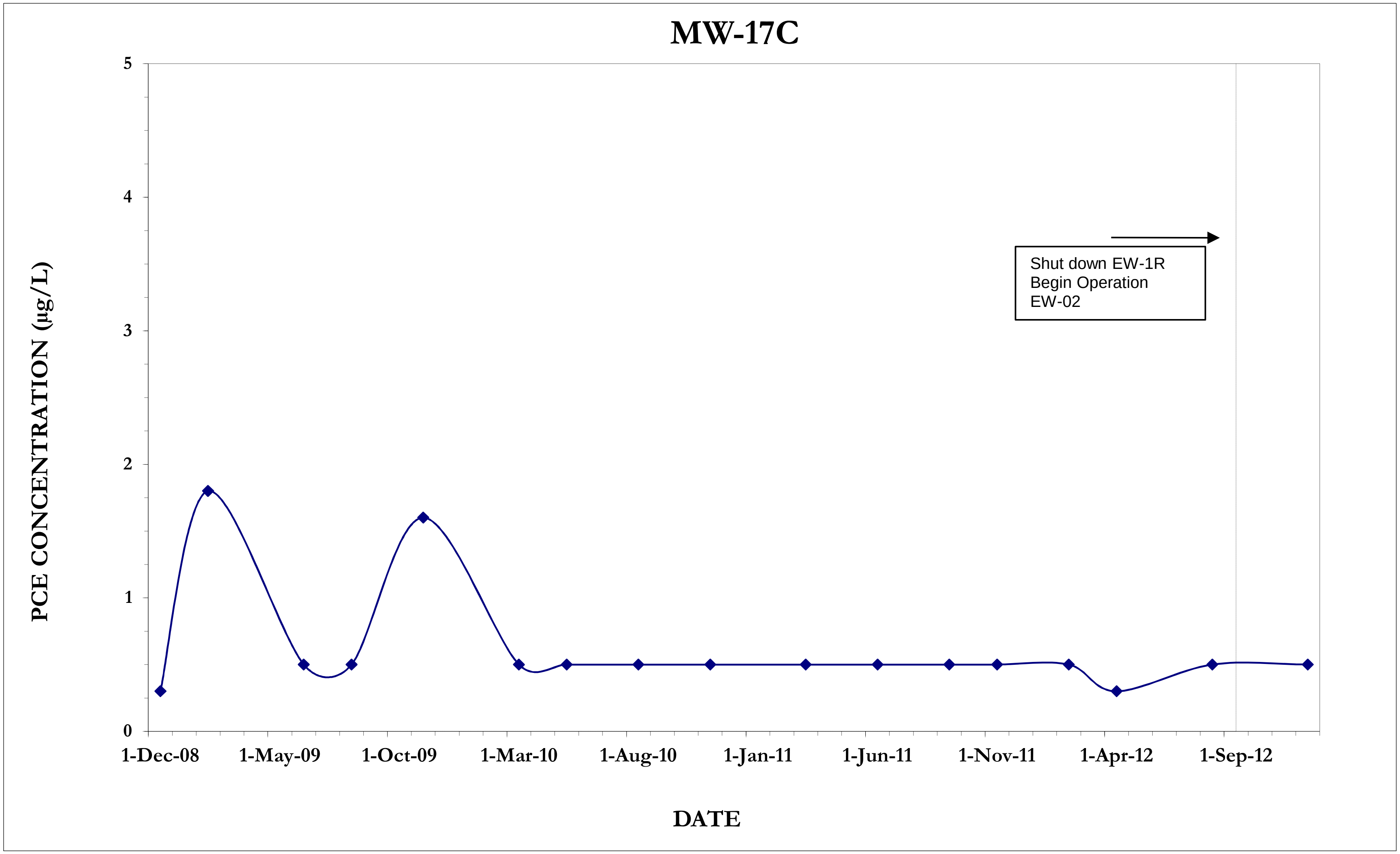

FIGURE G-4(z)

**HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA**

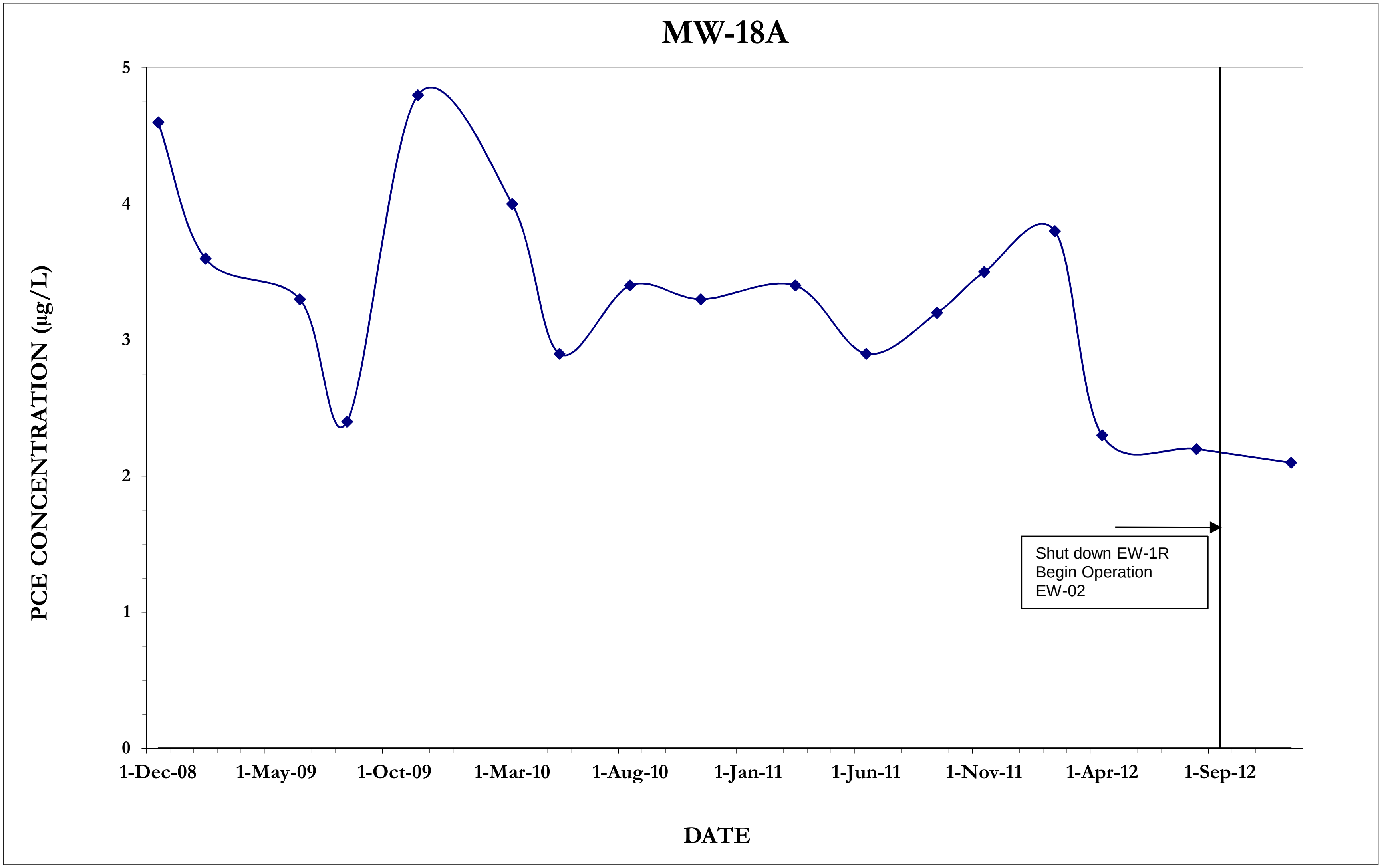

FIGURE G-4(aa)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

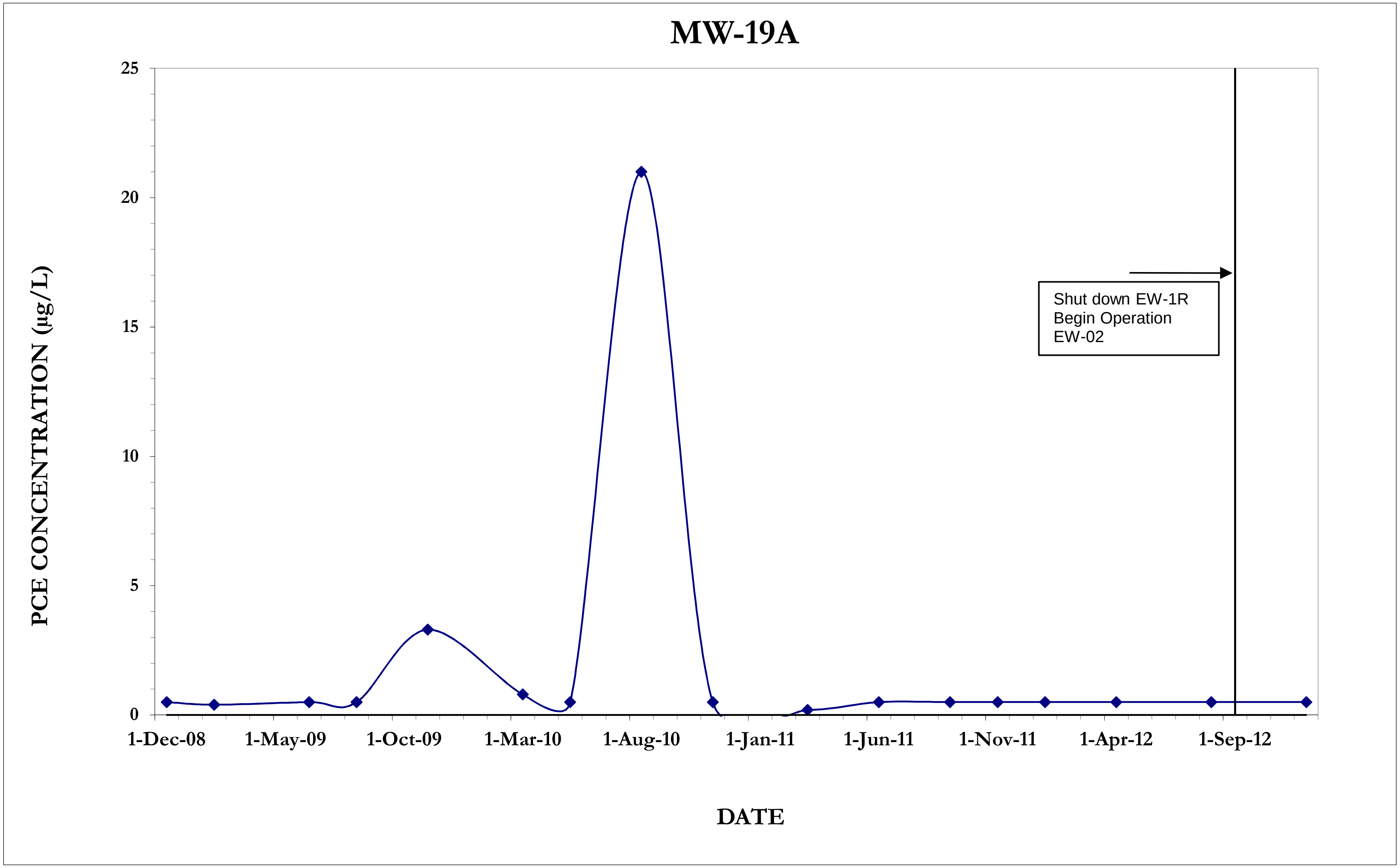

FIGURE G-4(ab)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

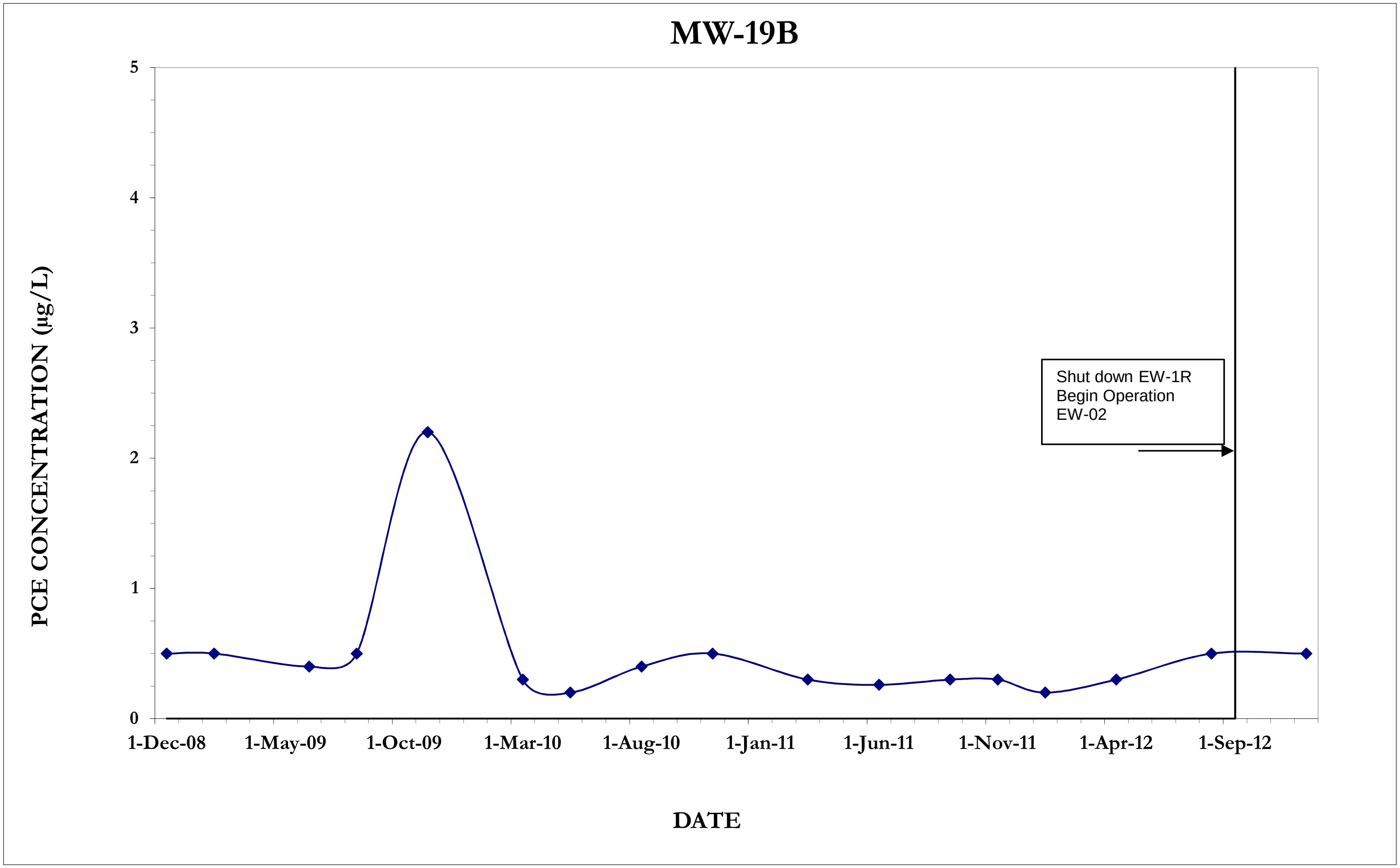

FIGURE G-4(ac)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

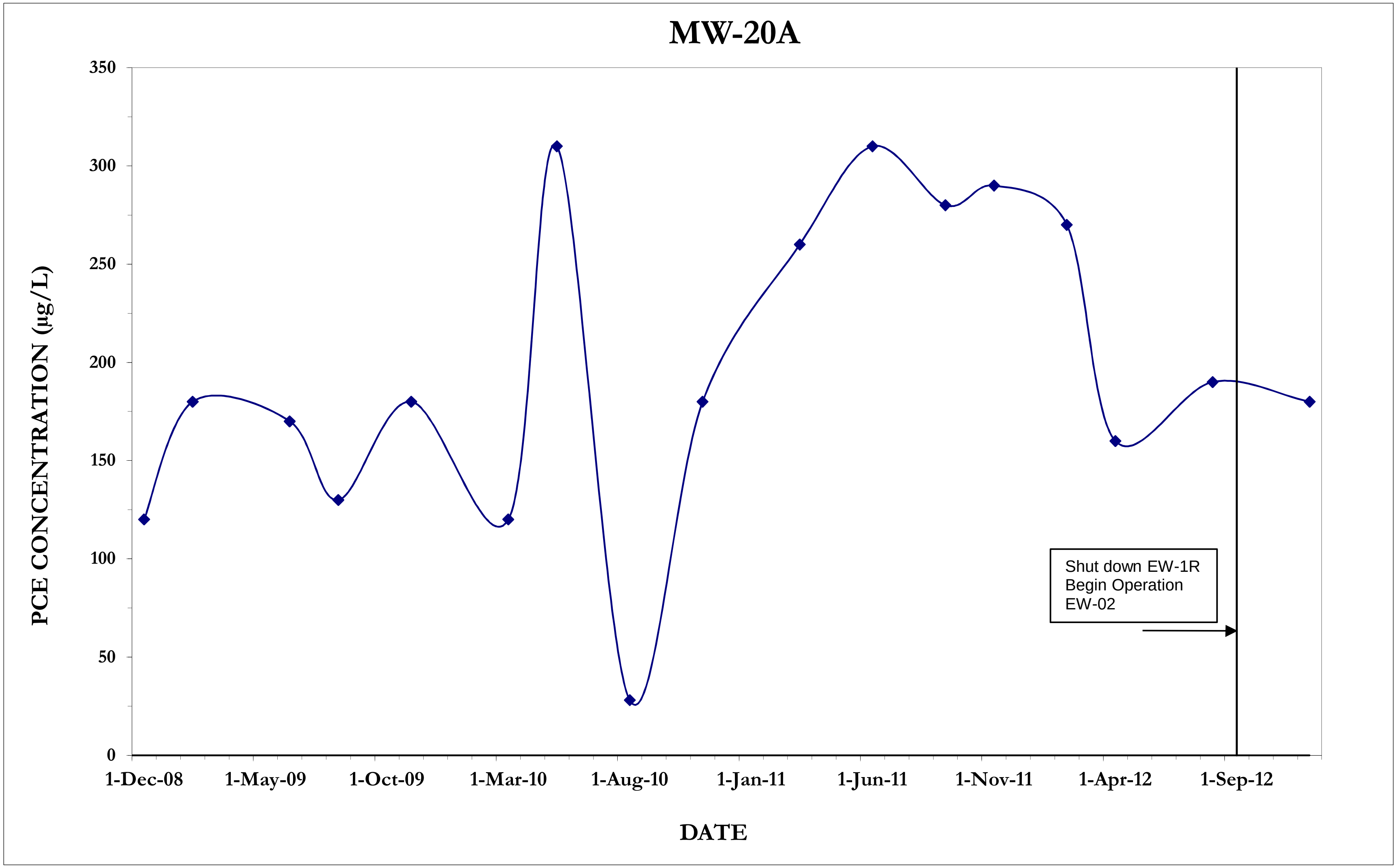

FIGURE G-4(ad)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

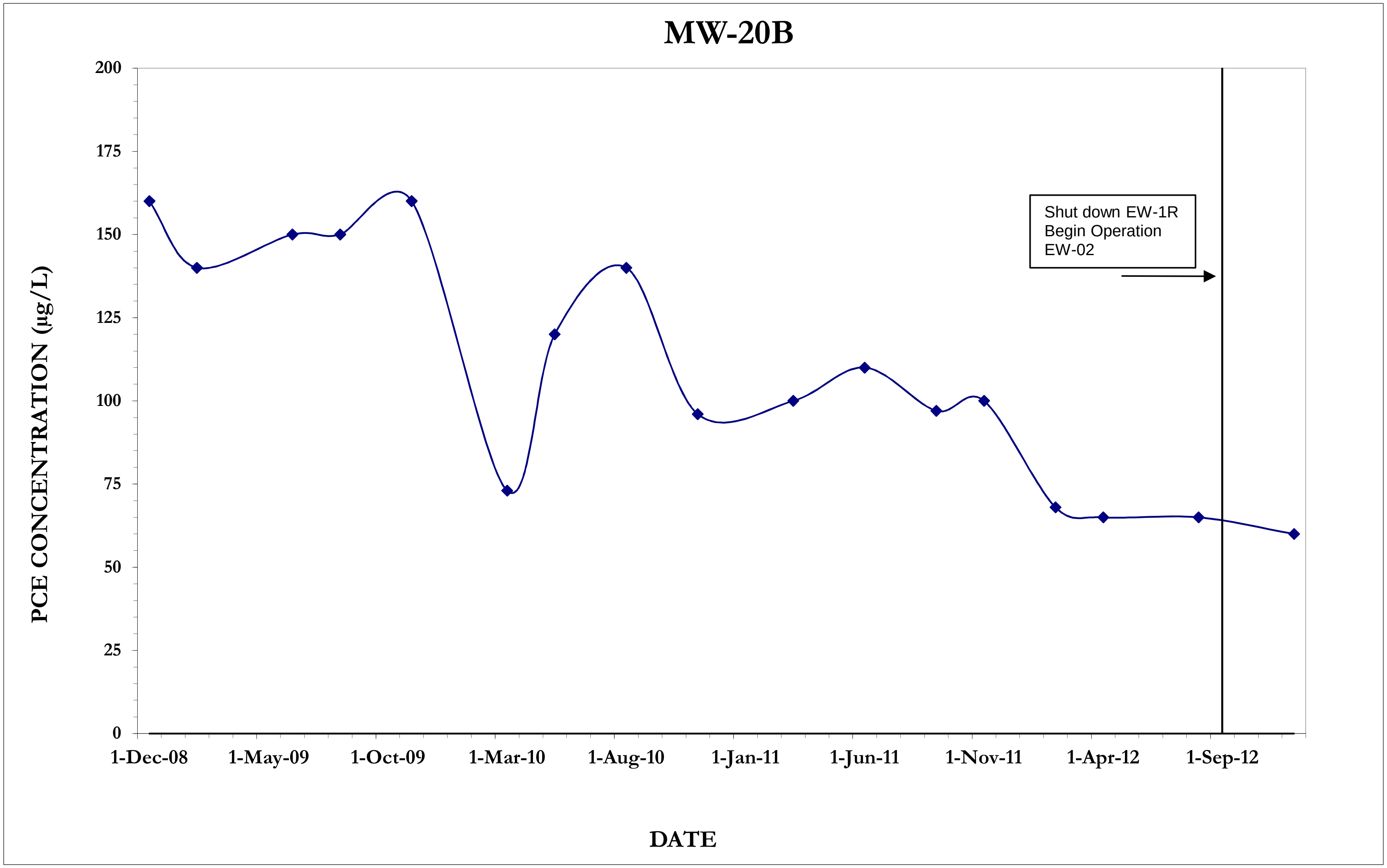

FIGURE G-4(ae)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

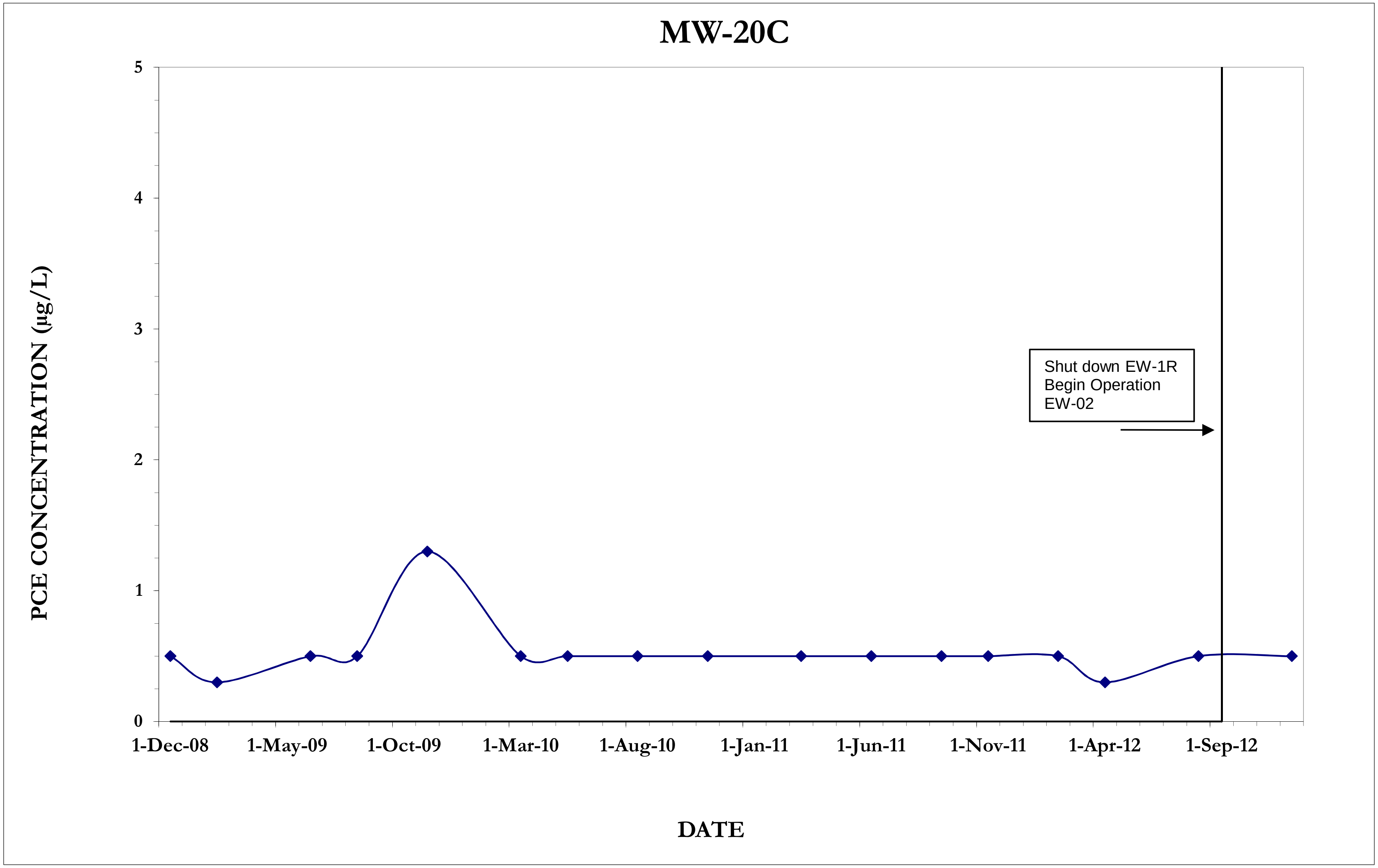

FIGURE G-4(af)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

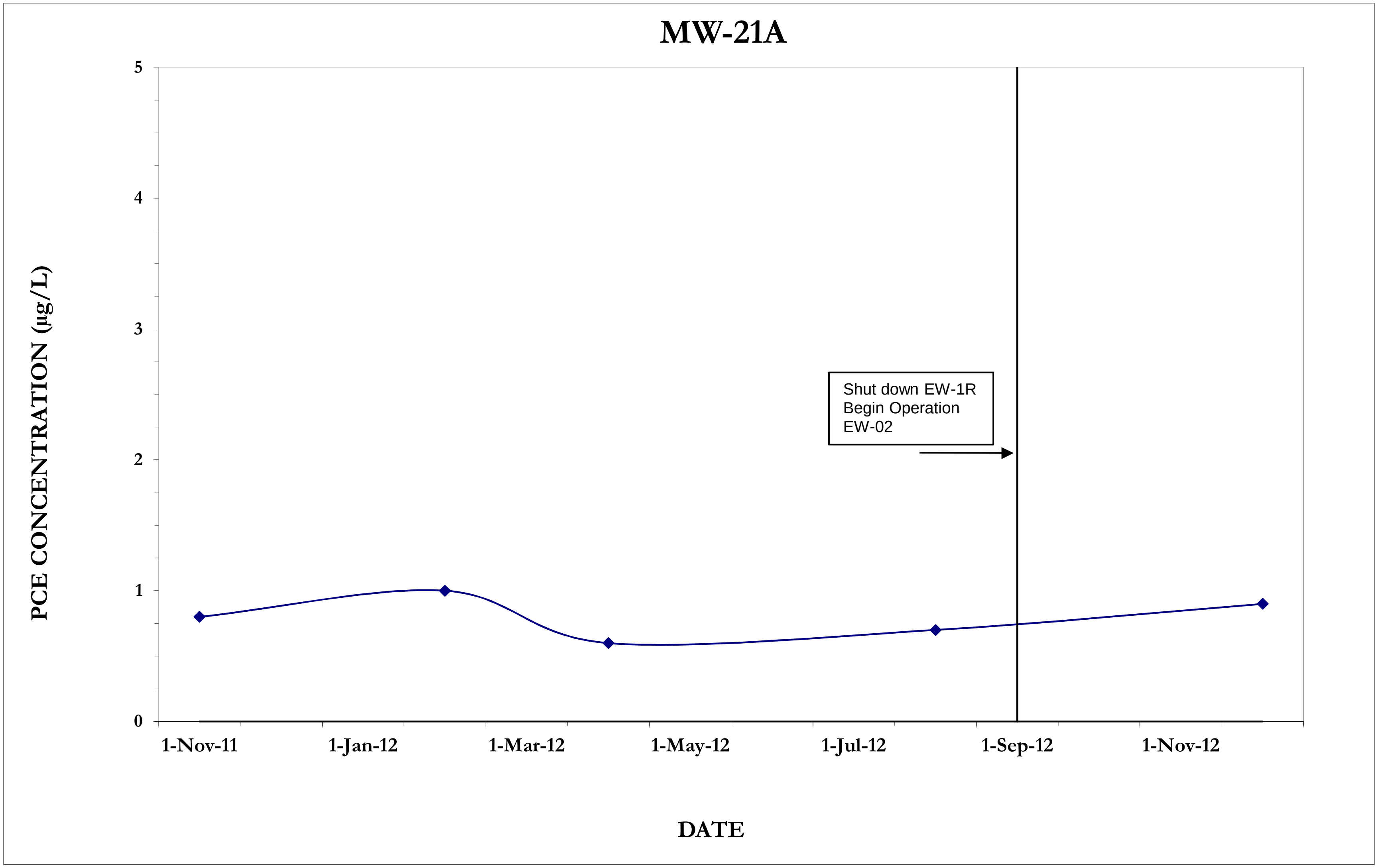

FIGURE G-4(ag)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

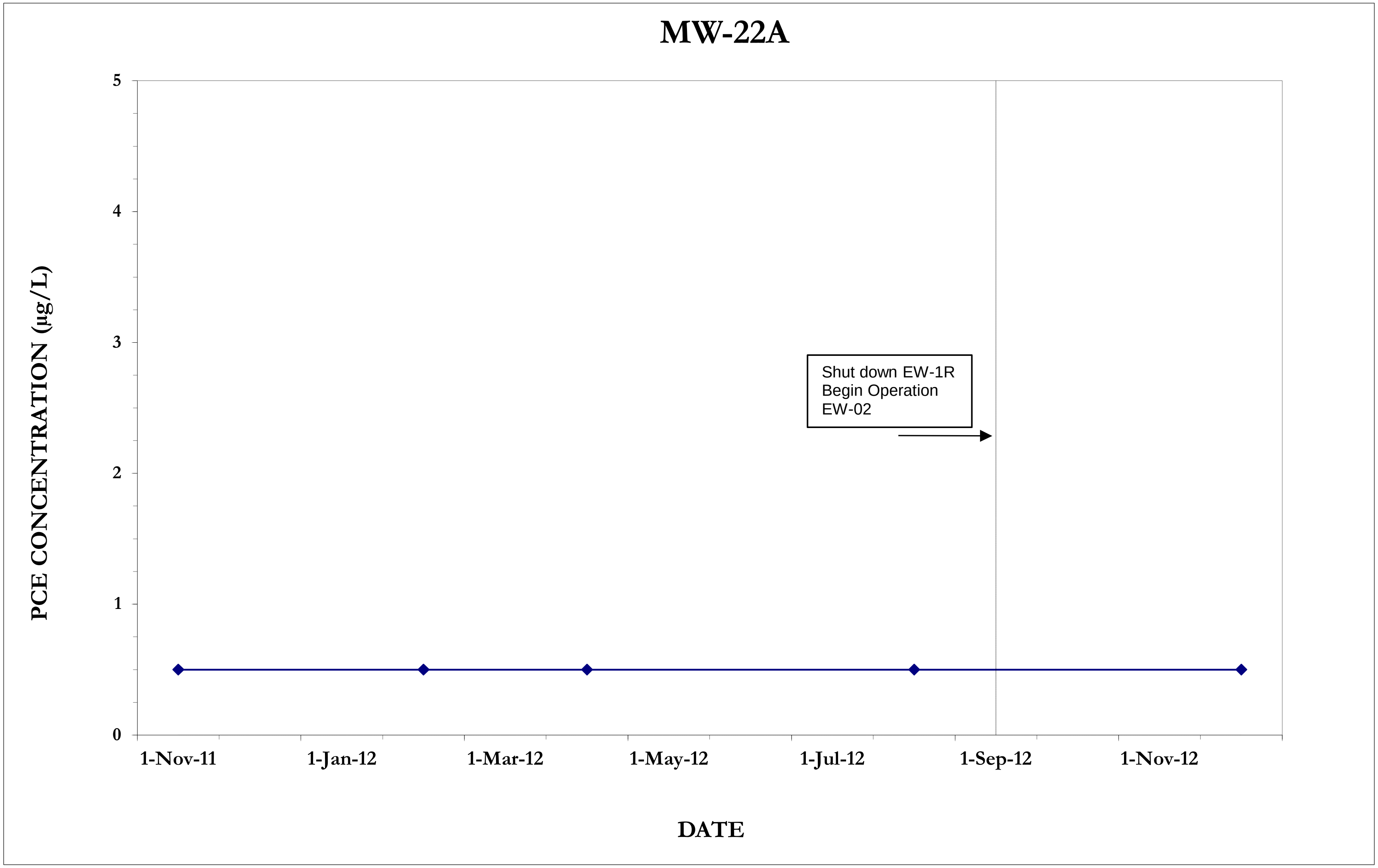

FIGURE G-4(ah)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

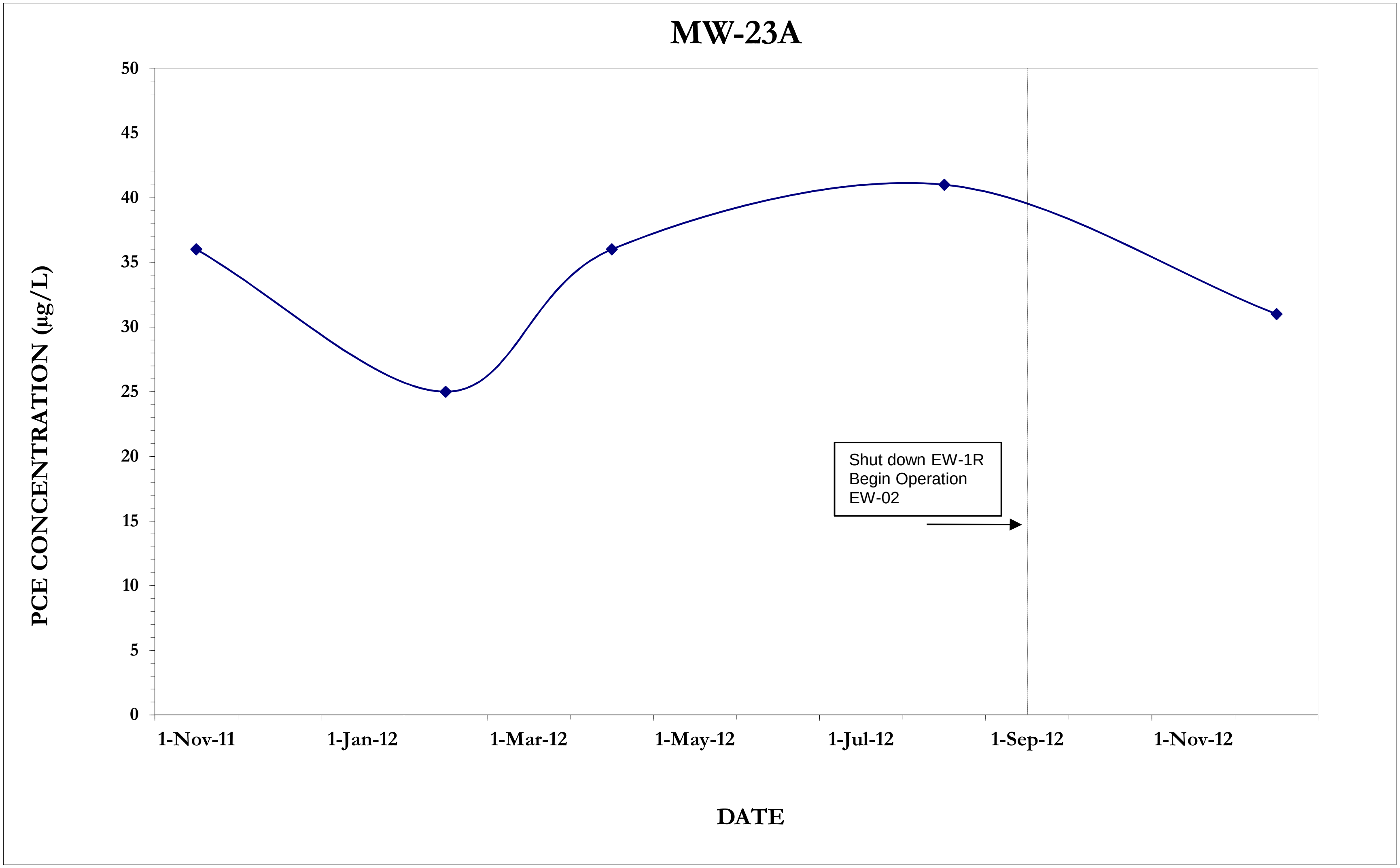

FIGURE G-4(ai)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

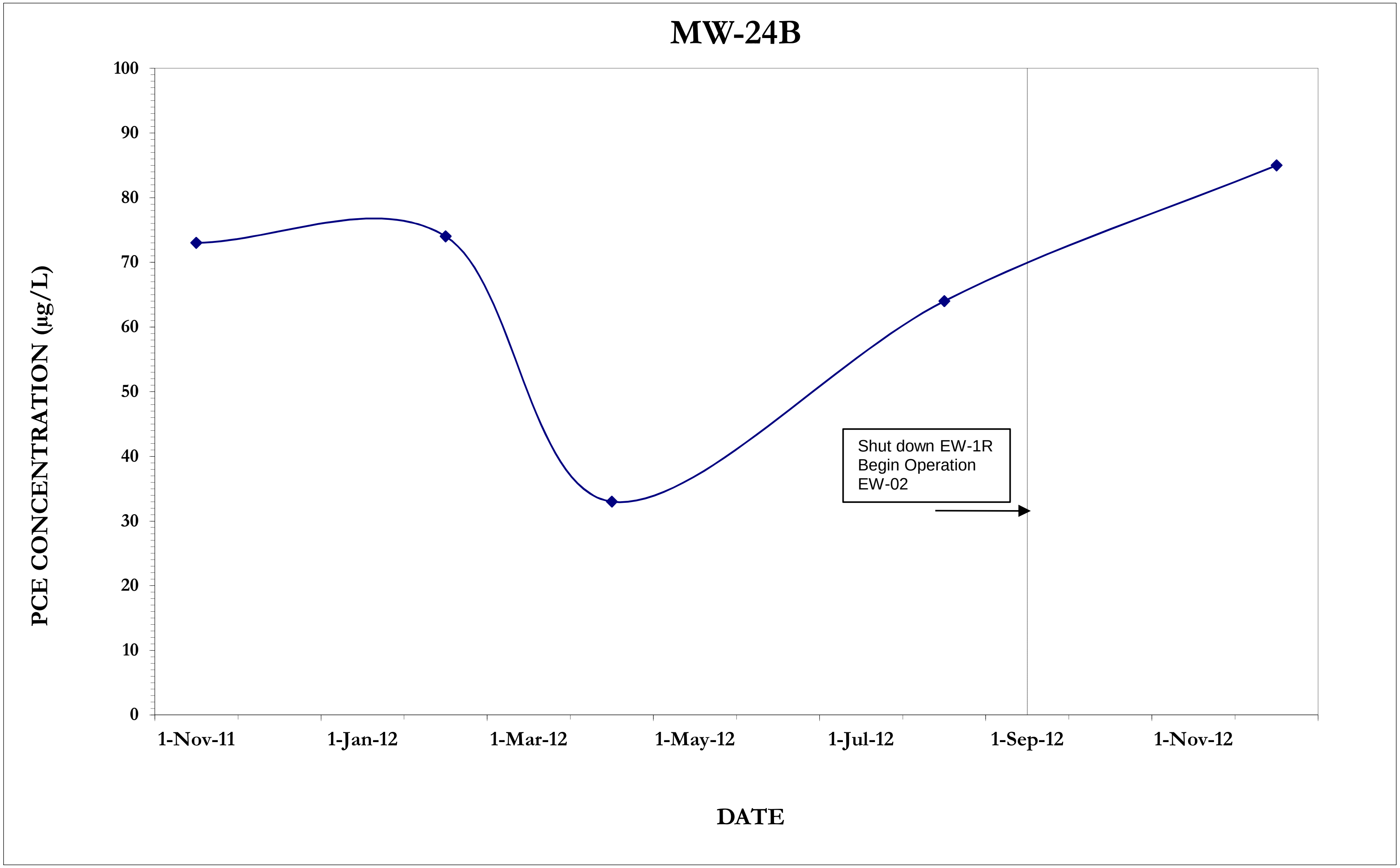

FIGURE G-4(aj)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

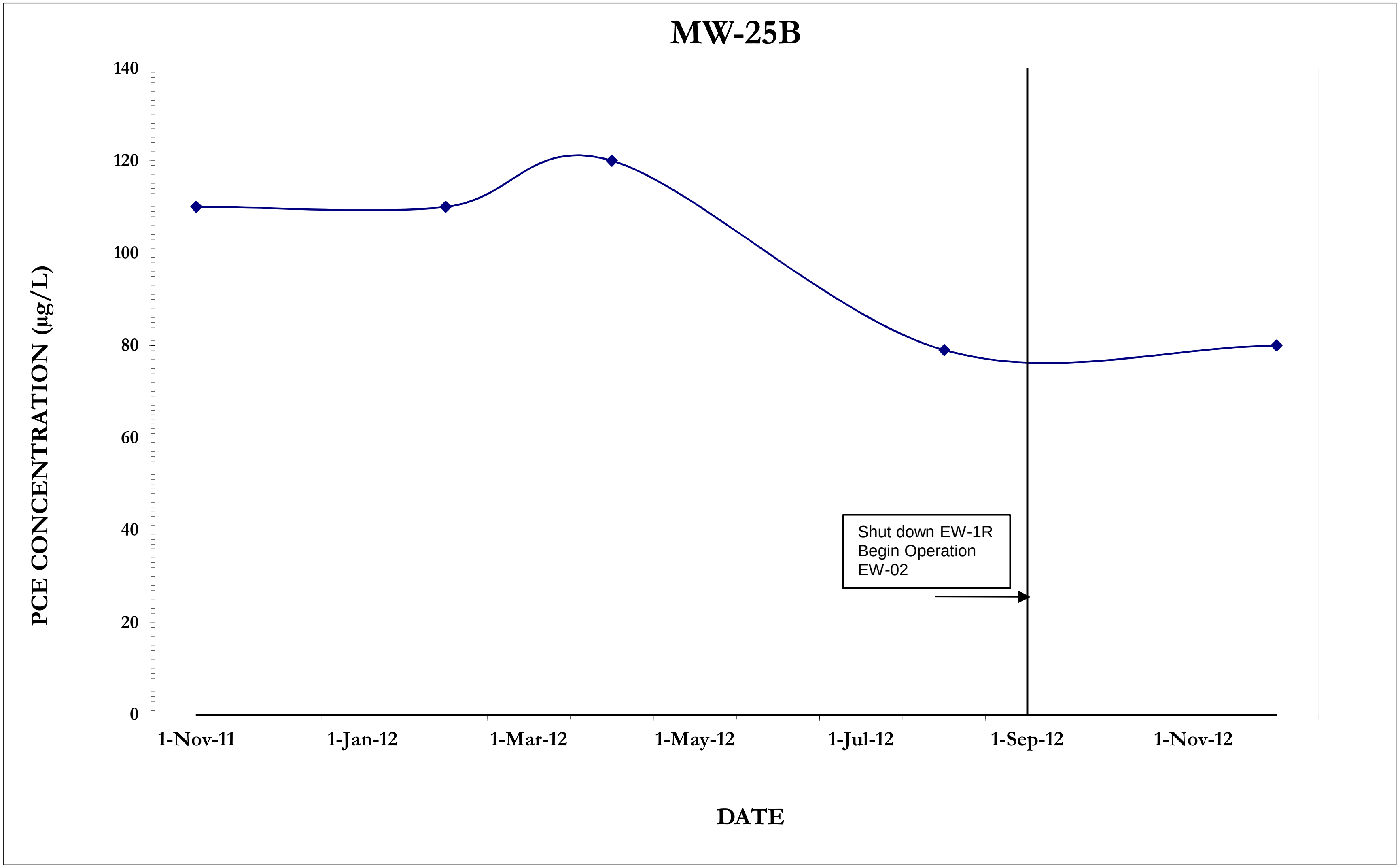

FIGURE G-4(ak)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

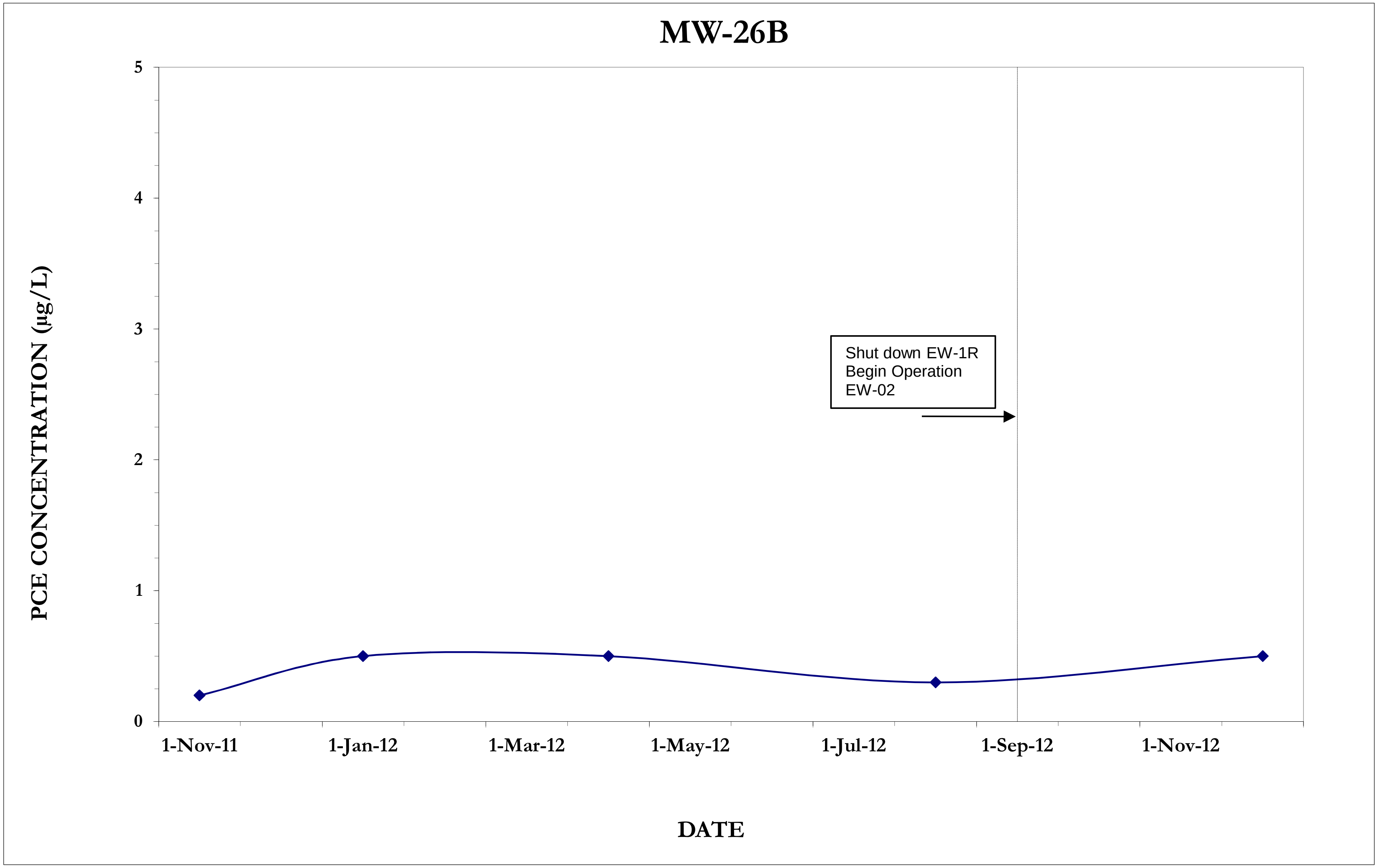

FIGURE G-4(al)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

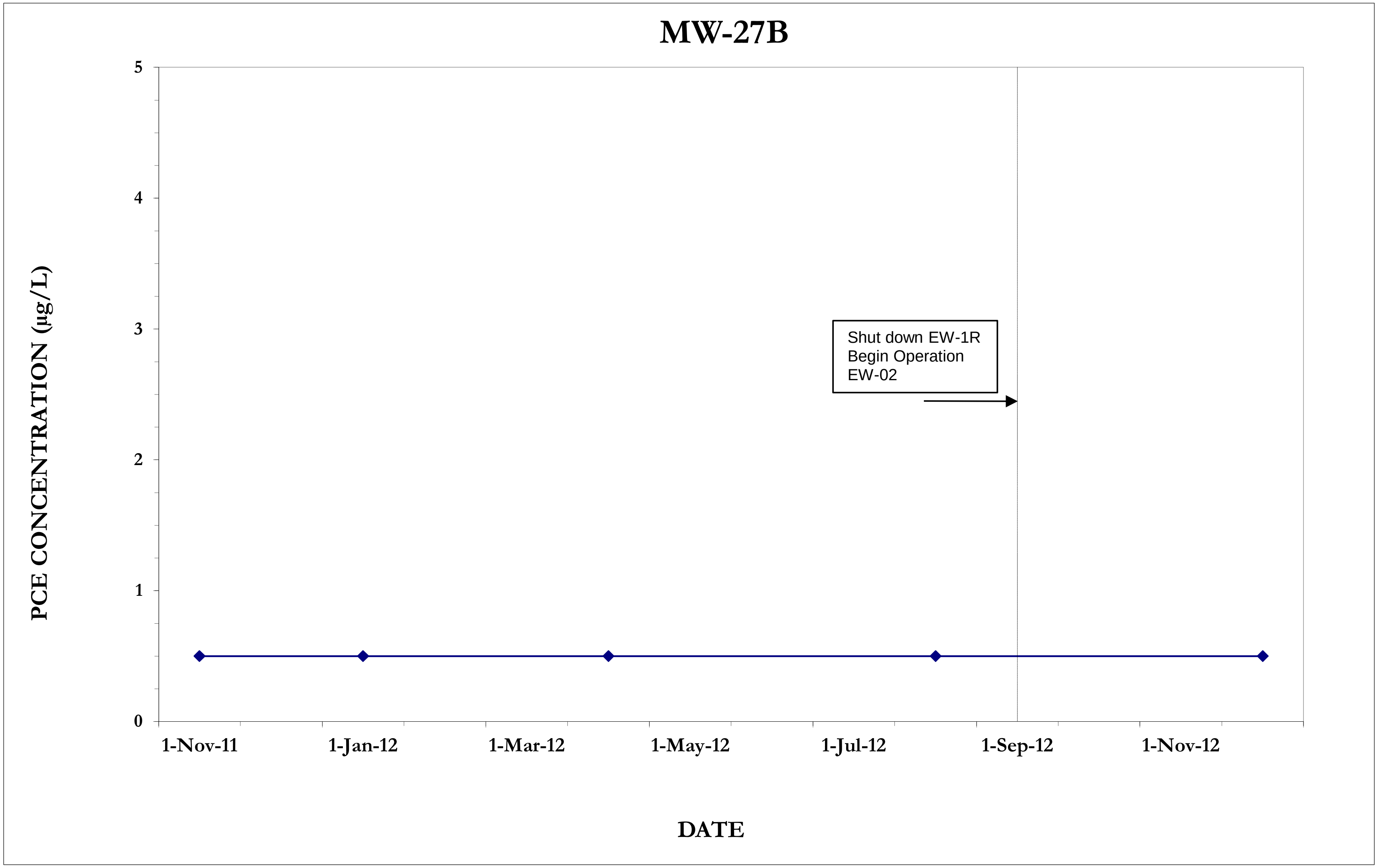

FIGURE G-4(am)

HISTORICAL PCE CONCENTRATIONS IN
GROUNDWATER MONITORING WELLS
MODESTO SUPERFUND SITE
MODESTO, CALIFORNIA

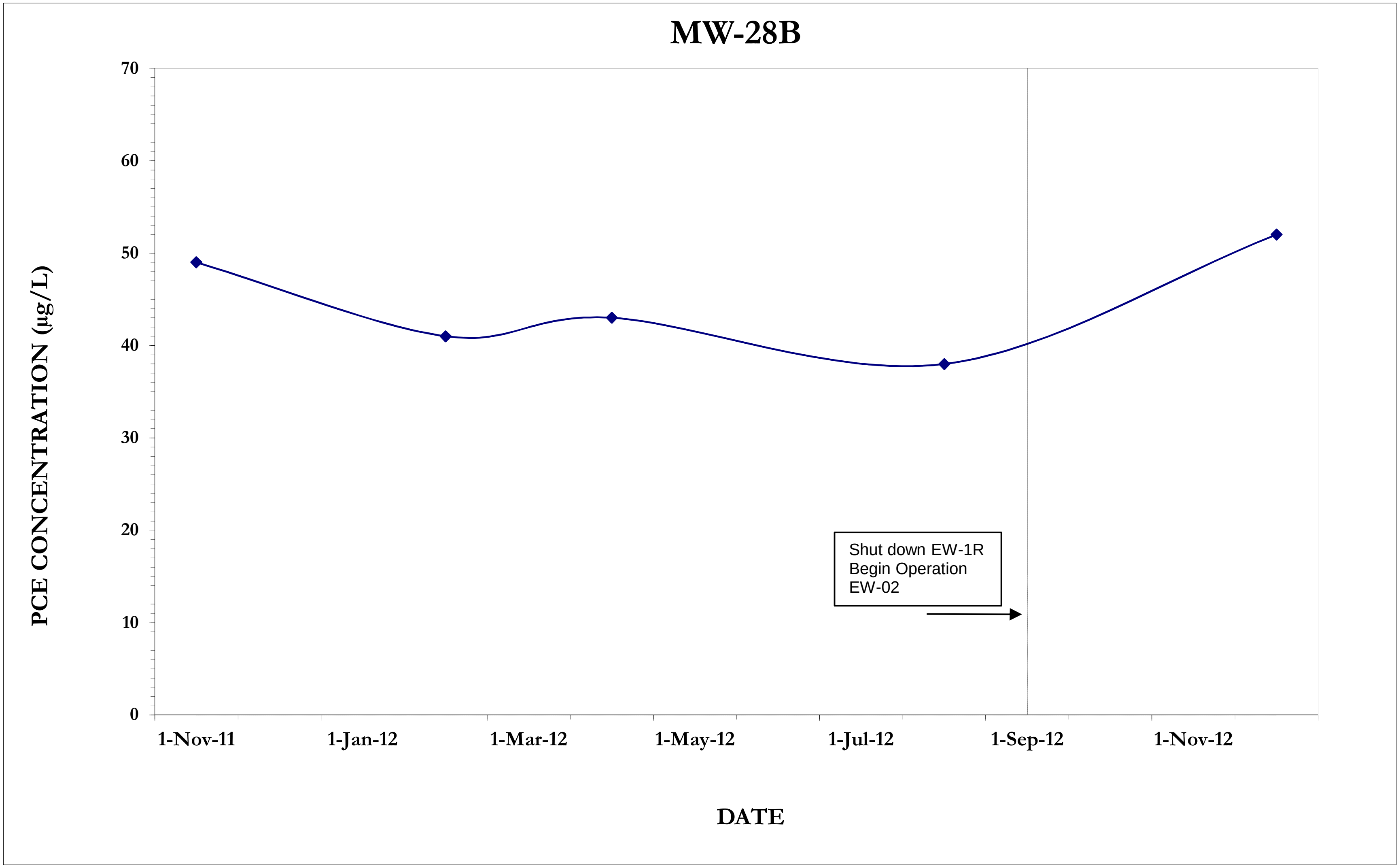

FIGURE G-4(an)

HISTORICAL PCE CONCENTRATIONS IN GROUNDWATER MONITORING WELLS MODESTO SUPERFUND SITE MODESTO, CALIFORNIA

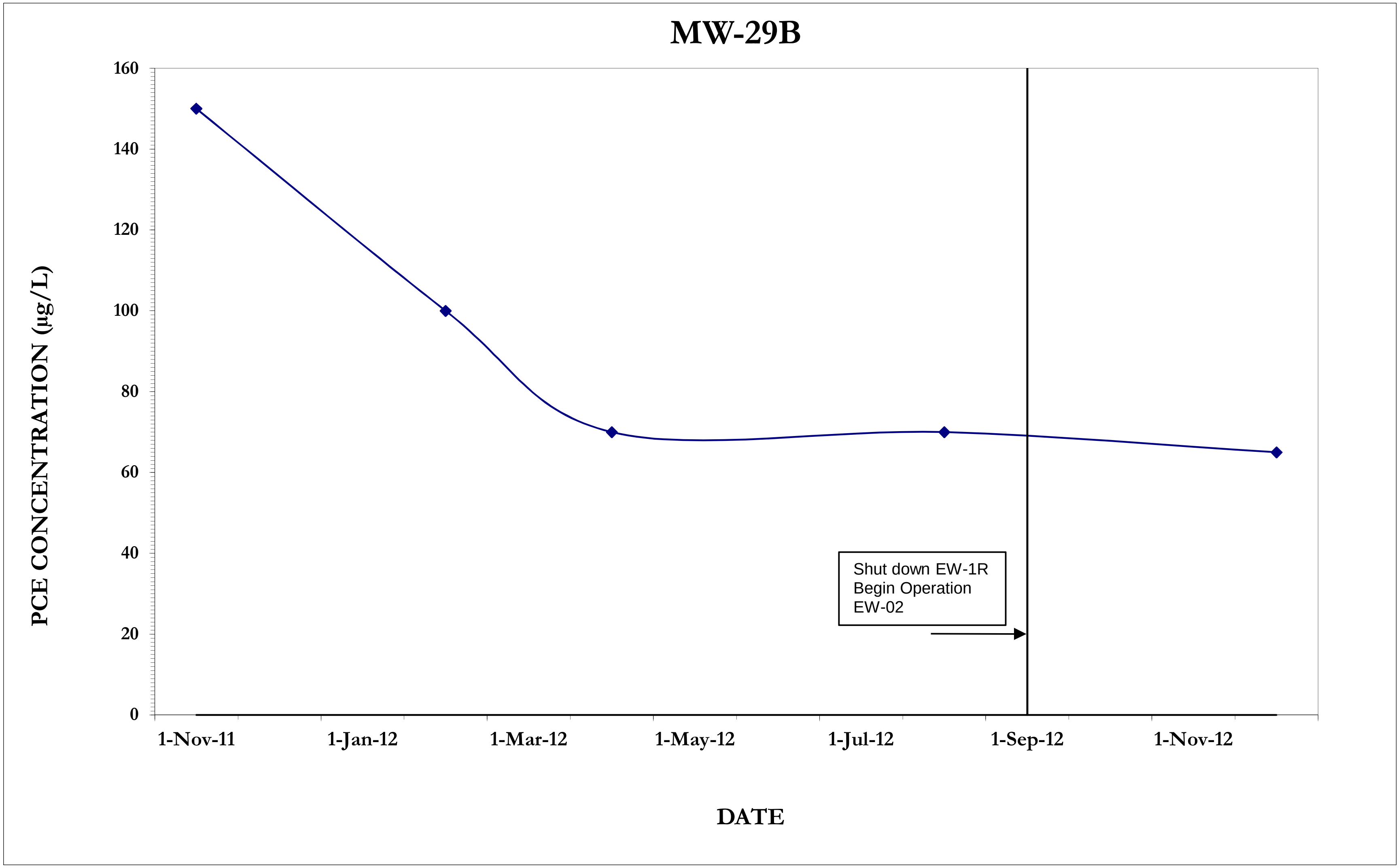

TABLE G-5 PCE MASS REMOVED BY GROUNDWATER TREATMENT SYSTEMMODESTO SUPERFUND SITEMODESTO, CALIFORNIA(Page 1 of 3)

Sample Date	Volume of Water Treated Since Previous sample (gallons)	Total Volume of Water Treated (gallons)	Influent PCE concentration (µg/L)	Mass of PCE Removed Since Previous sample (lbs)	Cumulative Mass of PCE Removed (lbs)
28-Aug-01	701,200	701,200	330	1.93	1.93
21-Sep-01	673,100	1,374,300	770	4.33	6.26
17-Oct-01	1,842,900	3,217,200	890	13.69	19.95
13-Nov-01	1,208,800	4,426,000	780	7.87	27.81
13-Dec-01	2,126,600	6,552,600	710	12.60	40.42
16-Jan-02	1,992,550	8,545,150	750	12.47	52.89
19-Feb-02	2,435,550	10,980,700	820	16.67	69.56
21-Mar-02	2,144,100	13,124,800	321	5.74	75.30
17-Apr-02	1,908,400	15,033,200	690	10.99	86.29
23-May-02	2,543,200	17,576,400	900	19.10	105.39
20-Jun-02	1,699,600	19,276,000	730	10.35	115.75
18-Jul-02	1,989,500	21,265,500	620	10.29	126.04
19-Aug-02	2,289,500	23,555,000	610	11.66	137.70
26-Sep-02	2,659,200	26,214,200	620	13.76	151.46
24-Oct-02	1,769,600	27,983,800	580	8.57	160.02
18-Nov-02	1,764,700	29,748,500	550	8.10	168.12
18-Dec-02	2,086,100	31,834,600	310	5.40	173.52
16-Jan-03	1,503,500	33,338,100	380	4.77	178.29
20-Feb-03	2,377,800	35,715,900	490	9.72	188.01
20-Mar-03	1,877,700	37,593,600	490	7.68	195.69
30-Apr-03	2,701,900	40,295,500	410	9.25	204.94
29-May-03	1,794,800	42,090,300	270	4.04	208.98
26-Jun-03	1,679,200	43,769,500	490	6.87	215.85
24-Jul-03	1,470,800	45,240,300	510	6.26	222.11
28-Aug-03	1,402,800	46,643,100	540	6.32	228.43
18-Sep-03	902,600	47,545,700	550	4.14	232.58
23-Oct-03	1,420,900	48,966,600	450	5.34	237.91
19-Nov-03	962,500	49,929,100	390	3.13	241.05
18-Dec-03	870,100	50,799,200	420	3.05	244.10
22-Jan-04	1,210,000	52,009,200	350	3.53	247.63
26-Feb-04	1,191,800	53,201,000	290	2.88	250.51
8-Apr-04	431,700	53,632,700	230	0.83	251.34
22-Apr-04	1,369,164	55,001,864	310	3.54	254.89
20-May-04	1,844,450	56,846,313	350	5.39	260.27
23-Jun-04	1,502,110	58,348,423	250	3.13	263.41
29-Jul-04	2,355,600	60,704,023	350	6.88	270.29
26-Aug-04	1,767,150	62,471,173	350	5.16	275.45
4-Oct-04	1,931,540	64,402,713	330	5.32	280.77
21-Oct-04	1,168,970	65,571,683	290	2.83	283.60
24-Aug-06	0	0	620.00	0.00	285.42
28-Sep-06	1,460,060	67,784,613	530.00	6.46	291.88
24-Oct-06	2,861,570	70,646,183	580	13.85	305.73
15-Nov-06	2,370,250	73,016,433	500	9.89	315.62
27-Dec-06	2,139,250	75,155,683	450	8.03	323.66
29-Jan-07	2,365,450	77,521,133	420.0	8.29	331.95
28-Feb-07	1,240,000	78,761,133	360.0	3.73	335.67
26-Mar-07	1,847,900	80,609,033	320.0	4.94	340.61

TABLE G-5 PCE MASS REMOVED BY GROUNDWATER TREATMENT SYSTEMMODESTO SUPERFUND SITEMODESTO, CALIFORNIA(Page 2 of 3)

Sample Date	Volume of Water Treated Since Previous sample (gallons)	Total Volume of Water Treated (gallons)	Influent PCE concentration (µg/L)	Mass of PCE Removed Since Previous sample (lbs)	Cumulative Mass of PCE Removed (lbs)
16-Apr-07	1,521,900	82,130,933	320.0	4.06	344.67
2-Jul-07	0	82,130,933	76.0	0.00	344.67
23-Jul-07	1,281,000	83,411,933	290.0	3.10	347.77
23-Aug-07	2,451,700	85,863,633	290.0	5.93	353.71
18-Sep-07	1,554,100	87,417,733	360.0	4.67	358.38
29-Oct-07	2,562,300	89,980,033	280.0	5.99	364.36
28-Nov-07	1,285,700	91,265,733	310.0	3.33	367.69
20-Dec-07	1,538,400	92,804,133	260.0	3.34	371.03
17-Jan-08	2,473,700	95,277,833	240.0	4.95	375.98
25-Feb-08	2,249,000	97,526,833	250.0	4.69	375.72
31-Mar-08	2,318,700	99,845,533	280.0	5.42	381.14
25-Apr-08	1,569,600	101,415,133	210.0	2.75	383.89
22-May-08	1,761,600	103,176,733	280.0	4.12	388.01
24-Jun-08	2,024,600	105,201,333	240.0	4.06	392.06
23-Jul-08	2,905,200	108,106,533	240.0	5.82	397.88
28-Aug-08	1,045,500	109,152,033	220.0	1.92	399.80
25-Sep-08	1,148,600	110,300,633	150.0	1.44	401.24
30-Oct-08	2,067,400	112,368,033	250.0	4.31	405.55
25-Nov-08	1,437,600	113,805,633	210.0	2.52	408.07
30-Dec-08	2,350,906	116,156,539	190.0	3.73	411.80
30-Jan-09	2,004,294	118,160,833	190.0	3.18	414.98
24-Feb-09	1,677,300	119,838,133	180.0	2.52	417.50
30-Mar-09	2,266,700	122,104,833	170.0	3.22	420.72
23-Apr-09	1,565,200	123,670,033	160.0	2.09	422.81
26-May-09	2,045,500	125,715,533	180.0	3.07	425.88
29-Jun-09	1,844,200	127,559,733	150.0	2.31	428.19
29-Jul-09	1,952,600	129,512,333	190.0	3.10	431.28
10-Aug-09	793,600	130,305,933	250.0	1.66	432.94
22-Sep-09	2,874,700	133,180,633	170.0	4.08	437.02
26-Oct-09	1,407,400	134,588,033	250.0	2.94	439.95
23-Nov-09	1,712,600	136,300,633	160.0	2.29	442.24
16-Dec-09	1,351,400	137,652,033	180.0	2.03	444.27
27-Jan-10	2,585,600	140,237,633	160.0	3.45	447.72
25-Feb-10	1,771,800	142,009,433	160.0	2.37	450.09
11-Mar-10	882,600	142,892,033	180.0	1.33	451.42
7-Apr-10	1,743,300	144,635,333	180.0	2.62	454.03
12-May-10	2,337,600	146,972,933	160.0	3.12	457.16
17-Jun-10	1,527,400	148,500,333	130.0	1.66	458.81
15-Jul-10	1,846,600	150,346,933	140.0	2.16	460.97
12-Aug-10	1,846,600	152,193,533	150.0	2.31	463.28
9-Sep-10	1,832,100	154,025,633	210.0	3.21	466.49
14-Oct-10	2,295,600	156,321,233	140.0	2.68	469.18
18-Nov-10	2,268,500	158,589,733	130.0	2.46	471.64
9-Dec-10	1,365,000	159,954,733	88.0	1.00	472.64
13-Jan-11	2,271,000	162,225,733	110.0	2.08	474.72
10-Feb-11	1,850,600	164,076,333	120.0	1.85	476.58
9-Mar-11	1,747,400	165,823,733	120.0	1.75	478.33
14-Apr-11	2,373,000	168,196,733	120.0	2.38	480.70
10-May-11	1,730,400	169,927,133	140.0	2.02	482.73
2-Jun-11	1,516,100	171,443,233	120.0	1.52	484.25
14-Jul-11	2,753,400	174,196,633	140.0	3.22	487.46
11-Aug-11	1,833,700	176,030,333	160.0	2.45	489.91
13-Sep-11	1,966,400	177,996,733	130.0	2.13	492.04
13-Oct-11	1,960,000	179,956,733	140.0	2.29	494.33

TABLE G-5 PCE MASS REMOVED BY GROUNDWATER TREATMENT SYSTEMMODESTO SUPERFUND SITEMODESTO, CALIFORNIA(Page 3 of 3)

Sample Date	Volume of Water Treated Since Previous sample (gallons)	Total Volume of Water Treated (gallons)	Influent PCE concentration (µg/L)	Mass of PCE Removed Since Previous sample (lbs)	Cumulative Mass of PCE Removed (lbs)
9-Nov-11	1,761,100	181,717,833	130.0	1.91	496.25
8-Dec-11	1,745,200	183,463,033	150.0	2.18	498.43
12-Jan-12	2,269,900	185,732,933	140.0	2.65	501.08
9-Feb-12	1,811,900	187,544,833	150.0	2.27	503.35
8-Mar-12	1,794,700	189,339,533	120.0	1.80	505.15
5-Apr-12	1,448,800	190,788,333	130.0	1.57	506.72
8-May-12	2,039,800	192,828,133	130.0	2.21	508.93
7-Jun-12	1,932,900	194,761,033	150.0	2.42	511.35
18-Jul-12	592,700	195,353,733	740.0	3.66	515.01
8-Aug-12	1,363,800	196,717,533	97.0	1.10	516.12
6-Sep-12	1,837,500	198,555,033	110.0	1.69	517.80
11-Oct-12	1,907,200	200,462,233	840.0	13.37	531.17
8-Nov-12	1,367,800	201,830,033	860.0	9.82	540.99
6-Dec-12	1,611,200	203,441,233	690.0	9.28	550.27

Notes:

µg/L - micrograms per liter

lbs - pounds

PCE - Tetrachloroethene

TABLE G-6 PCE MASS REMOVED BY SOIL VAPOR EXTRACTION SYSTEMMODESTO SUPERFUND SITEMODESTO, CALIFORNIA(Page 1 of 5)

Date Sampled	Cumulative Hours of Operation	Cumulative Days of Operation	Mass Extraction Rate (lbs/day)	Cumulative Mass Extracted (a) (lbs)
6/11/2001	5.8	0.2	53.0	12.70
8/9/2001	590.8	24.6	7.0	744.00
8/20/2001	854.8	35.6	6.4	817.63
8/30/2001	1,094.8	45.6	6.2	880.30
9/7/2001	1,286.8	53.6	3.9	920.57
9/12/2001	1,406.8	58.6	4.9	942.62
10/29/2001	1,920.0	80.0	7.9	1,079.84
11/13/2001	2,272.0	94.7	8.1	1,197.56
12/13/2001	2,787.8	116.2	6.0	1,348.99
1/16/2002	3,469.3	144.6	4.6	1,498.66
2/19/2002	4,283.8	178.5	6.1	1,679.54
3/21/2002	5,003.8	208.5	4.6	1,839.44
4/17/2002	5,603.8	233.5	4.0	1,946.39
5/23/2002	6,467.8	269.5	2.7	2,066.49
6/20/2002	7,039.0	293.3	3.7	2,142.61
7/18/2002	7,526.0	313.6	4.3	2,223.90
8/19/2002	8,294.0	345.6	4.7	2,367.84
9/19/2002	9,037.0	376.5	2.0	2,471.06
10/24/2002	9,839.6	410.0	2.3	2,542.57
11/18/2002	10,441.0	435.0	2.0	2,596.51
12/18/2002	11,167.0	465.3	1.6	2,650.80
1/16/2003	11,519.0	480.0	1.8	2,675.27
3/27/2003	12,578.0	524.1	1.6	2,748.88
4/30/2003	13,390.1	557.9	1.8	2,806.77
5/29/2003	14,037.2	584.9	1.7	2,854.55
6/26/2003	14,067.7	586.2	1.7	2,856.70
7/24/2003	14,737.8	614.1	1.5	2,901.48
8/28/2003	15,502.0	645.9	2.0	2,958.25
9/18/2003	15,980.8	665.9	1.9	2,997.31
10/23/2003	16,797.6	699.9	1.3	3,050.65

TABLE G-6 PCE MASS REMOVED BY SOIL VAPOR EXTRACTION SYSTEMMODESTO SUPERFUND SITEMODESTO, CALIFORNIA(Page 2 of 5)

Date Sampled	Cumulative Hours of Operation	Cumulative Days of Operation	Mass Extraction Rate (lbs/day)	Cumulative Mass Extracted (a) (lbs)
11/19/2003	17,448.4	727.0	1.3	3,085.25
12/18/2003	18,092.9	753.9	1.4	3,121.56
1/22/2004	18,688.3	778.7	1.1	3,153.22
2/26/2004	19,529.0	813.7	0.7	3,185.64
3/29/2004	20,245.3	843.6	1.4	3,217.84
4/22/2004	20,872.0	869.7	0.5	3,242.93
5/20/2004	21,408.8	892.0	0.5	3,253.44
6/23/2004	22,174.7	923.9	0.6	3,269.99
7/29/2004	22,976.8	957.4	0.6	3,289.24
8/26/2004	23,644.1	985.2	0.5	3,303.77
9/30/2004	24,481.0	1020.0	0.4	3,319.59
10/21/2004	24,988.4	1041.2	0.5	3,329.59
11/18/2004	25,653.5	1068.9	0.3	3,341.19
12/16/2004	26,349.7	1097.9	0.3	3,350.62
1/19/2005	27,140.5	1130.9	0.2	3,359.30
2/24/2005	28,011.5	1167.1	0.2	3,366.49
3/22/2005	28,628.3	1192.8	0.2	3,371.23
4/26/2005	29,759.6	1240.0	0.2	3,379.36
5/25/2005	30,455.6	1269.0	0.07	3,382.64
6/22/2005	31,175.6	1299.0	0.13	3,385.63
7/20/2005	31,847.6	1327.0	0.13	3,389.39
8/24/2005	32,663.6	1361.0	0.07	3,392.81
9/21/2005	33,335.6	1389.0	0.09	3,394.98
10/18/2005	33,672.0	1403.0	0.13	3,396.49
11/16/2005	33,985.0	1416.0	0.08	3,397.84
1/6/2006	34,992.1	1458.0	0.06	3,399.62
1/31/2006	35,760.1	1490.0	0.06	3,401.52
2/22/2006	36,288.1	1512.0	0.04	3,402.03

TABLE G-6 PCE MASS REMOVED BY SOIL VAPOR EXTRACTION SYSTEMMODESTO SUPERFUND SITEMODESTO, CALIFORNIA(Page 3 of 5)

Date Sampled	Cumulative Hours of Operation	Cumulative Days of Operation	Mass Extraction Rate (lbs/day)	Cumulative Mass Extracted (a) (lbs)
3/29/2006	37,128.1	1547.0	0.01	3,402.92
4/20/2006	37,703.0	1571.0	0.04	3,403.50
5/25/2006	38,543.6	1606.0	0.02	3,404.62
6/29/2006	39,260.2	1635.8	0.05	3,405.63
7/28/2006	39,954.0	1664.8	0.03	3,406.78
8/31/2006	40,099.3	1670.8	0.06	3,407.06
9/28/2006	40,602.1	1691.8	0.03	3,407.94
10/30/2006	41,216.9	1717.4	0.02	3,408.57
11/27/2006	41,986.1	1749.4	0.04	3,409.58
12/1/2006	41,986.1	1749.4	0.00	3,409.58
1/1/2007	41,986.1	1749.4	0.00	3,409.58
2/1/2007	41,986.1	1749.4	0.00	3,409.58
3/1/2007	41,986.1	1749.4	0.00	3,409.58
4/25/2007	41,998.1	1749.9	0.05	3,409.60
6/8/2007	43,030.1	1792.9	0.003	3,410.65
6/26/2007	43,460.5	1810.9	0.00	3,410.68
7/18/2007	43,988.5	1832.9	0.00	3,410.68
8/24/2007	44,540.5	1855.9	0.00	3,410.68
9/24/2007	45,308.5	1887.9	0.00	3,410.69
10/29/2007	46,148.5	1922.9	0.001	3,410.71
11/28/2007	46,868.5	1952.9	0.000	3,410.73
12/20/2007	47,396.5	1974.9	0.001	3,410.75
1/17/2008	48,068.5	2002.9	0.000	3,410.76
2/25/2008	49,004.5	2041.9	0.000	3,410.76
3/31/2008	49,844.5	2076.9	0.001	3,410.77
4/25/2008	50,444.5	2101.9	0.001	3,410.80
5/22/2008	51,092.5	2128.9	0.001	3,410.82
6/24/2008	51,884.5	2161.9	0.012	3,411.03
7/16/2008	52,412.5	2183.9	0.047	3,411.67

TABLE G-6 PCE MASS REMOVED BY SOIL VAPOR EXTRACTION SYSTEMMODESTO SUPERFUND SITEMODESTO, CALIFORNIA(Page 4 of 5)

Date Sampled	Cumulative Hours of Operation	Cumulative Days of Operation	Mass Extraction Rate (lbs/day)	Cumulative Mass Extracted (a) (lbs)
8/20/2008	53,252.5	2218.9	0.032	3,413.06
9/25/2008	54,116.5	2254.9	0.019	3,413.98
11/18/2008	55,412.5	2308.9	0.038	3,415.50
12/10/2008	55,940.5	2330.9	0.012	3,416.04
12/30/2008	56,420.5	2350.9	0.001	3,416.16
1/30/2009	57,164.5	2381.9	0.000	3,416.18
2/27/2009	57,836.5	2409.9	0.050	3,416.89
3/10/2009	58,100.5	2420.9	0.057	3,417.48
4/23/2009	59,156.5	2464.9	0.088	3,420.68
5/28/2009	59,996.5	2499.9	0.067	3,423.39
6/29/2009	60,764.5	2531.9	0.122	3,426.40
7/29/2009	61,484.5	2561.9	0.122	3,430.06
8/10/2009	61,772.5	2573.9	0.184	3,431.90
9/22/2009	62,804.5	2616.9	0.097	3,437.94
10/26/2009	63,620.5	2650.9	0.071	3,440.79
11/23/2009	64,292.5	2678.9	0.063	3,442.66
12/16/2009	64,844.5	2701.9	0.051	3,443.97
1/27/2010	65,852.5	2743.9	0.077	3,446.66
2/25/2010	66,548.5	2772.9	0.060	3,448.65
3/11/2010	66,884.5	2786.9	0.001	3,449.08
4/7/2010	67,532.5	2813.9	0.012	3,449.27
5/12/2010	68,372.5	2848.9	0.012	3,449.70
6/17/2010	69,236.5	2884.9	0.024	3,450.35
7/15/2010	69,908.5	2912.9	0.076	3,451.76
8/12/2010	70,580.5	2940.9	0.059	3,453.65
9/9/2010	71,252.5	2968.9	0.063	3,455.36
10/19/2010	72,212.5	3008.9	0.024	3,457.11
11/18/2010	72,932.5	3038.9	0.004	3,457.54
12/9/2010	73,436.5	3059.9	0.007	3,457.66

TABLE G-6 PCE MASS REMOVED BY SOIL VAPOR EXTRACTION SYSTEMMODESTO SUPERFUND SITEMODESTO, CALIFORNIA(Page 5 of 5)

Date Sampled	Cumulative Hours of Operation	Cumulative Days of Operation	Mass Extraction Rate (lbs/day)	Cumulative Mass Extracted (a) (lbs)
1/13/2011	74,276.5	3094.9	0.008	3,457.93
2/10/2011	74,948.5	3122.9	0.010	3,458.17
3/9/2011	75,596.5	3149.9	0.016	3,458.51
4/14/2011	76,460.5	3185.9	0.0003	3,458.79
5/10/2011	77,084.5	3211.9	0.0002	3,458.80
6/2/2011	77,636.5	3234.9	0.009	3,458.90
7/14/2011	78,644.5	3276.9	0.017	3,459.44
8/11/2011	79,316.5	3304.9	0.016	3,459.90
9/13/2011	80,108.5	3337.9	0.015	3,460.41
10/13/2011	80,828.5	3367.9	0.014	3,460.84
11/9/2011	81,476.5	3394.9	0.0003	3,461.04
12/8/2011	82,128.7	3422.0	0.003	3,461.07
1/12/2012	82,968.7	3457.0	0.001	3,461.14
2/9/2012	83,640.7	3485.0	0.003	3,461.20
3/8/2012	84,312.7	3513.0	0.004	3,461.29
4/5/2012	84,984.7	3541.0	0.004	3,461.40
5/8/2012	85,776.7	3574.0	0.005	3,461.55
6/7/2012	86,496.7	3604.0	0.001	3,461.63
7/18/2012	87,480.7	3645.0	0.021	3,462.07
8/8/2012	87,984.7	3666.0	0.053	3,462.84
9/6/2012	88,680.7	3695.0	0.073	3,464.67
10/11/2012	89,520.7	3730.0	0.040	3,466.66
11/8/2012	90,192.7	3758.0	0.015	3,467.43
12/6/2012	90,864.7	3786.0	0.013	3,467.82
TOTAL	**90,864.7**	**3,786.0**		**3,467.82**

Notes:

(a) Cumulative mass extracted was determined by multiplying the average mass extraction rate times the days of operation.

lbs - pounds

lbs/day - pounds per day