DEPARTMENT OF
ECOLOGY
State of Washington

Yakima Railroad Area PCE Contamination

Groundwater Quality Performance Monitoring Data Summary 2017

July 2018

Publication No. 18-03-027

Publication and Contact Information

This report is available on the Department of Ecology's website at
https://fortress.wa.gov/ecy/publications/SummaryPages/1803027.html

Data for this project are available at Ecology's Environmental Information Management (EIM) website www.ecology.wa.gov/eim/index.htm. Search Study ID: YRRA.

The Activity Tracker Code for this study is 12-049.

For more information contact:

Publications Coordinator
Environmental Assessment Program
P.O. Box 47600, Olympia, WA 98504-7600
Phone: (360) 407-7680

Washington State Department of Ecology - ecology.wa.gov

○	Headquarters, Olympia	(360) 407-6000
○	Northwest Regional Office, Bellevue	(425) 649-7000
○	Southwest Regional Office, Olympia	(360) 407-6300
○	Central Regional Office, Union Gap	(509) 575-2490
○	Eastern Regional Office, Spokane	(509) 329-3400

This report was prepared by a licensed hydrogeologist. A signed and stamped copy of the report is available upon request.

Yakima Railroad Area PCE Contamination

Groundwater Quality Performance Monitoring, Data Summary 2017

by

Pamela B. Marti, LHG

Environmental Assessment Program
Washington State Department of Ecology
Olympia, Washington 98504-7710

Water Resource Inventory Area (WRIA) and 8-digit Hydrologic Unit Code (HUC) numbers for the study area:

WRIA
- 37

HUC number
- 17030003

This page is purposely left blank

Table of Contents

List of Figures and Tables

Page

Figures

Tables

Abstract

In 2017, the Washington State Department of Ecology conducted semi-annual sampling of the Yakima Railroad Area (YRRA) groundwater monitoring network. The YRRA is a six-square-mile area located along the railroad corridor in the cities of Yakima and Union Gap. Groundwater within the project area is contaminated with tetrachloroethene (PCE). This contamination is attributed to numerous local sources. Since the YRRA was defined in 1991, cleanup activities have occurred at several of the source areas and appear to have been effective in reducing contaminant concentrations.

Of the 38 wells sampled in 2017, 15 wells (39%) had PCE concentrations above the Model Toxics Control Act (MTCA) cleanup level of 5 ug/L. The maximum PCE concentrations in the sampled wells ranged from 5 to 9110 ug/L.

The elevated PCE concentrations primarily occurred in shallow wells at 3 of the source areas: Goodwill - City of Yakima, Cameron Yakima, and Frank Wear Cleaners. Two of the shallow Remedial Investigation (RI) wells located along the western edge of the YRRA also had elevated concentrations. The source of contamination for the RI wells is in the process of being identified.

Although not sampled during 2017, higher PCE concentrations have also been detected in the deeper Washington Central Railroad Roundhouse (WCRR) wells. In 2016, PCE concentrations were approximately 12 ug/L. PCE concentrations in these wells indicate the contaminant plume has a vertical component that reaches the deep, water-bearing zone in this portion of the YRRA.

The 2017 data confirm that PCE contamination continues to be detected throughout the project area. Concentrations have decreased at some of the identified source areas; however, high PCE concentrations are still detected at sites located in the central portion of the YRRA.

Introduction

During routine inspections of industrial facilities in the 1980s, PCE-contaminated soil and groundwater were discovered at multiple locations in the Yakima area (Secor, 1998). The U.S. Environmental Protection Agency (EPA) referred these findings to the State of Washington. After numerous investigations, the Washington State Department of Ecology (Ecology) defined the potentially affected area as the "Yakima Railroad Area" in 1991.

Ecology identified 13 commercial or industrial facilities as potential sources of tetrachloroethene (PCE) contamination to groundwater within the YRRA. The YRRA encompasses approximately 6 square miles of mixed industrial/commercial and residential property adjacent to the rail corridor in the cities of Yakima and Union Gap (Figure 1). The identified sources include dry cleaners, machine shops, a carbon regeneration facility, and a former pesticide formulation plant.

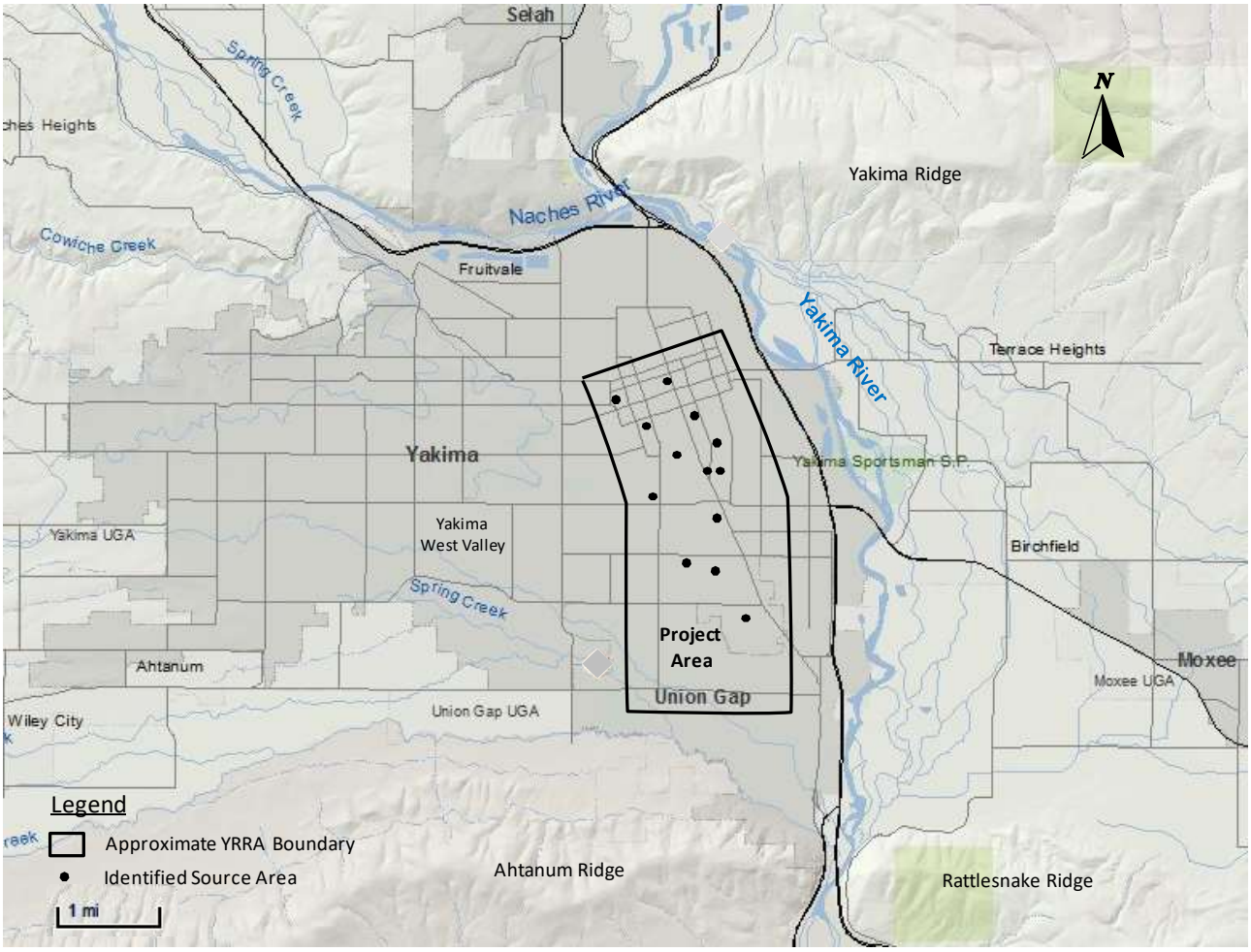

Figure 1. Yakima Railroad Area (YRRA) Project Location Map, Yakima, WA.

During the 1990s, cleanup activities were conducted at many of the facilities. An area-wide remedial investigation (RI) for the YRRA was completed in 1998 (Secor, 1998). From 1999 to 2012, 59 monitoring wells were routinely sampled during an ongoing program to characterize groundwater PCE concentrations within the YRRA. Results indicated that some of the highest PCE concentrations continued to be found near known sources. There was also evidence that PCE was present in the shallow aquifer in areas where no known source has been identified.

Ecology's Environmental Assessment Program (EAP) assumed responsibility for the area-wide monitoring program in 2013. In consultation with Ecology's Toxics Cleanup Program (TCP), a subset of 36 wells was selected for continued monitoring. In 2017, 10 additional wells were added to the monitoring program. These wells are located at the Frank Wear Cleaners site at the north end of the project area. The goal of the current monitoring effort is to provide TCP with groundwater quality data to assist in evaluating the effectiveness of remedial actions taken at the identified source areas under the Model Toxics Control Act (MTCA). These data may also be used to identify additional areas of contamination within the YRRA that require further investigation and action.

Physical Setting

The YRRA is located within the flood plain of the Yakima River and is underlain in most areas by Quaternary-age alluvium and unconsolidated terrace deposits. The alluvium is composed of unconsolidated silt, sand, gravel, and cobble. It ranges in thickness from 0 to 120 feet with an average thickness of 20 feet (USGS, 2009). The underlying terrace deposits consist of coarse-grained gravel with discontinuous layers of silt, clay, sand, or cemented gravel. The terrace gravels generally occur at the surface away from the river, and beneath the alluvium adjacent to the river. The thickness of this unit ranges from 0 to 350 feet with an average thickness of 90 feet (USGS, 2009). These unconsolidated Quaternary deposits are overlain in some areas by artificial fill material up to 20 feet deep, and are underlain by consolidated, Tertiary-age, continental sediments, primarily of the Upper Ellensburg Formation.

PCE monitoring in the YRRA focuses on groundwater in the upper portion of the shallow, unconfined aquifer in the unconsolidated sands and gravels. This portion of the aquifer is highly permeable near the Yakima River; however, fine-grained material and cemented gravels are more prevalent in the north and west portions of the project area, resulting in units of contrasting permeability. For this reason, both shallow and deep water-bearing zones were identified for the project area in the YRRA RI/Feasibility Study (Secor, 1998). The shallow and deep water-bearing zones appear to be hydraulically separate in the northern portion of the YRRA and interconnected in the southern portion of the project area.

Groundwater within the YRRA is encountered from about 3 to 30 feet below the ground surface depending on the topography and seasonal irrigation practices. The depth to groundwater is greatest to the north and least to the south in the YRRA. The Yakima Valley is heavily irrigated with surface water from area rivers between late March and early October. Accordingly, the water table is typically deeper in the spring before irrigation begins and shallower in the fall. Groundwater levels fluctuate seasonally between 1 and 12 feet.

At the time of the RI, the direction of groundwater flow in the shallow water-bearing zone was defined as being to the southeast with an approximate horizontal gradient of 0.005 ft/ft across the YRRA. The estimated direction of groundwater flow in the deep water-bearing zone is also primarily to the southeast with an approximate gradient of 0.004 ft/ft across the site. Overall, the vertical gradient across the project area is downward. The downward gradients between the shallow and deep water-bearing zones ranged from -0.278 ft/ft in the northern portion of the project area to -0.005 ft/ft in the southern portion of the project area (Secor, 1998).

Methods

Groundwater Sampling

When choosing the 36 wells for continued sampling in 2013 (Figure 2), Ecology excluded wells that had consistently shown low or no detections for chlorinated volatile organic compounds (cVOCs) during previous sampling events. The cVOC compounds include tetrachloroethene (PCE), and decay products trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride.

Monitoring frequency of the 36 wells was adjusted in 2015. Previously, all wells had been sampled semi-annually. To improve cost-effectiveness of the monitoring program, the new sample frequency was determined by PCE concentration, seasonal pattern, and temporal trend for each well. Seven wells displayed higher PCE concentrations in the spring, 13 wells had higher PCE concentrations in the fall, and 16 wells displayed no seasonal pattern. Based on these patterns, Ecology sampled 16 of the wells in April 2017 and 15 wells in September 2017. In 2017, 10 additional wells were added to the monitoring network. These wells are located at the Frank Wear Cleaners site at the north end of the project area. At this time, the 10 wells are being sampled semi-annually; that may change if seasonal patterns or trends can be established.

Thirty-seven of the sampled wells are associated with the following facilities: Goodwill - City of Yakima, Nu-Way Cleaners, Southgate Laundry, Fifth Wheel Truck Repair, Agri-Tech/Yakima Steel, Cameron Yakima, and Frank Wear Cleaners. The wells at the Washington Central Railroad Roundhouse (WCRR) were not sampled in 2017 because access was temporarily postponed until safety training could be completed. Wells at all these locations are monitored to evaluate the effectiveness of site-specific cleanup activities.

The remaining 9 wells were installed during the YRRA Remedial Investigation (RI). RI wells selected for continued monitoring are primarily located in the western and southern areas of the YRRA. Data collected from these wells may be used to identify areas of groundwater contamination that require further investigation and action within the YRRA.

Construction details for the sampled wells are provided in Appendix A, Table A-1.

Ecology sampled all wells in accordance with Ecology's SOPs EAP052 (Marti, 2009) and EAP078 (Marti, 2014), as well as the site-specific Quality Assurance Project Plan (Marti, 2013).

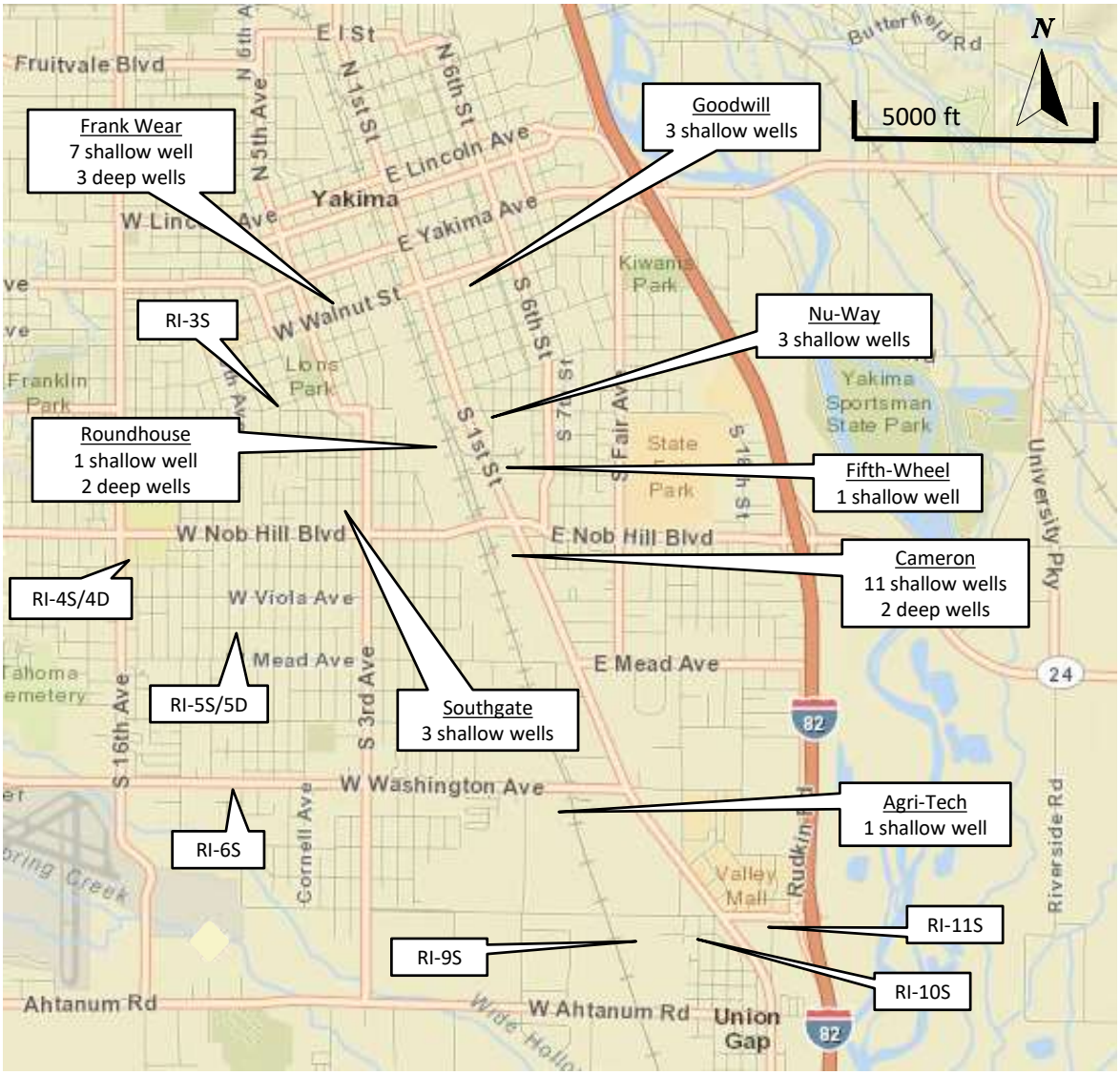

Figure 2. YRRA Sample Location Map

Analysis

Samples were submitted to Ecology's Manchester Environmental Laboratory for analysis of volatile organic compounds (VOCs) to determine chlorinated VOCs concentrations throughout the YRRA project area. Samples were analyzed following a modification of EPA SW-846 Method 8260C.

Results

Field Observations

Ecology measured depth-to-water in each of the monitoring wells prior to purging. The end-of-purge temperature, pH, dissolved oxygen, oxidation-reduction potential (ORP), and specific conductance readings are listed in Appendix A, Table A-2.

During the spring, depth-to-water below ground surface ranged from approximately 36 feet at the northern end of the project area to 6 feet at the southern end; in the fall, depth-to-water ranged from 24 to 5 feet at the northern and southern ends of the project area, respectively. The overall flow direction for the shallow groundwater appears to be consistently to the southeast, toward the Yakima River in both spring and fall. There were not enough measurement points during the monitoring period to determine the groundwater flow direction in the deep water-bearing zone, but previous investigations have described it as also being to the southeast (Kane, 2011).

Field measurement data are summarized in Table 1. Measurements were within expected ranges. Of special note are the dissolved oxygen measurements. The majority of the wells had measurements that ranged from about 2 to 9 mg/L, indicating aerobic conditions in both the shallow and deep wells. In contrast, dissolved oxygen in three of the Frank Wear wells (FWMW-10, FWMW-16, and FWMW-20) had measurements below 1 mg/L which is indicative of an anaerobic environment.

Table 1. Summary of YRRA Stable Field Measurements, 2017

Parameter	Number of Samples	Minimum	Maximum	25th Percentile	Median	75th Percentile
Temperature (°C)	51	13.8	19	15.6	16	17.2
pH (Std Units)	51	5.3	8.1	6.4	6.6	7.0
Conductivity (uS/cm@25°C)	51	218	1232	307	382	476
Dissolved Oxygen (mg/L)	51	0.04	9.1	4.1	5.7	7.4
Oxidation Reduction Potential (mV)	51	-144	268	101	183	206

Analytical Results

The 2017 analytical results are presented and discussed by contaminant source areas and are summarized in the associated site figures below. Analytes that were detected are presented in bold; those that exceed applicable MTCA Method A cleanup levels for groundwater are shaded.

Potential sampling bias and overall analytical precision was assessed by collecting field quality control samples which consisted of blind field replicates, equipment blanks, and trip blanks. All replicate results met the measurement quality objectives established in the Quality Assurance Project Plan (Marti, 2013). The equipment blanks collected in April 2017 had no detectable concentrations of the target analytes. The equipment blank collected in September 2017 had an estimated PCE concentration of 2.11 ug/L and TCE of 3.23 ug/L. The affected data has been "B" qualified. None of the target analytes were detected in any of the trip blanks.

All data are considered to be of good quality and are usable as presented here without further qualification. See Appendix B for further details.

Historical groundwater data for the wells in the monitoring program are available in Appendix C. Long-term project data are also presented as time series graphs in Appendix C.

Goodwill - City of Yakima

The Goodwill - City of Yakima site is the present location of the City of Yakima Police and Justice Center (Figure 2) and is located at the northern end of the YRRA project area. Contaminated soil was removed from this site during an interim action in 1995 (Huntingdon Engineering, 1995).

Tetrachloroethene (PCE) was the only chlorinated solvent detected during the 2017 monitoring period (Figure 3). The other contaminants of concern – trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride (VC) – were not detected.

PCE was detected in downgradient well GMW-2 at concentrations above the MTCA Method A cleanup level of 5 ug/L in both April and September of 2017. Although PCE concentrations in this well fluctuate, they continue to exceed the cleanup level with no evident decrease in concentrations (Figure C-2).

PCE was detected at concentrations near the reporting limit of 1 ug/L in upgradient well GMW-1 and downgradient well GMW-4. PCE concentrations continue to be below the cleanup level in both of these wells (Figures C-1 and C-3).

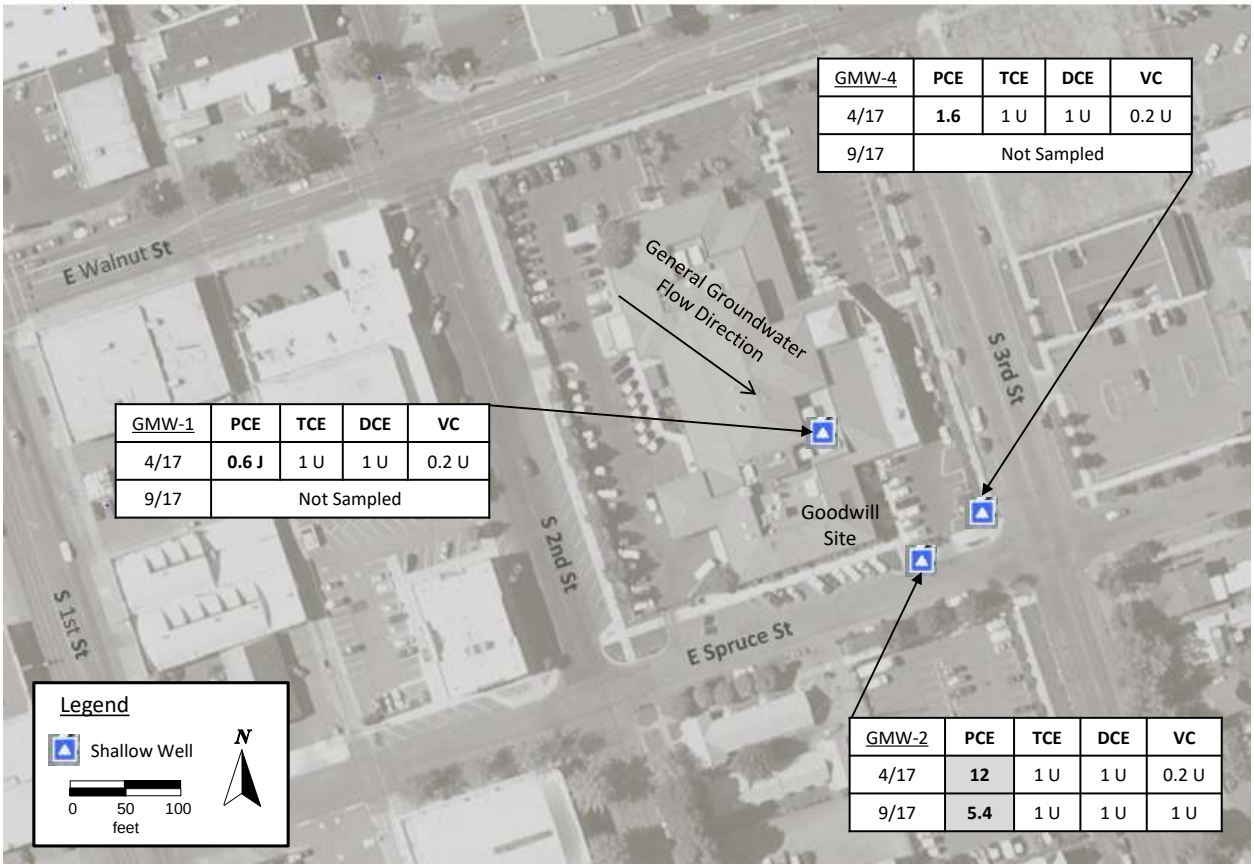

Figure 3. Goodwill - City of Yakima Well Locations and cVOC Results (ug/L) for 2017

Nu-Way Cleaners

Nu-Way Cleaners site is located approximately 0.5 miles southeast of the Goodwill site (Figure 2). Source removal activities occurred at this site in 1996 (Enviros, 1996).

During the 2017 monitoring period, wells NMW-1 and NMW-3 were sampled. PCE was detected in both wells at concentrations below the MTCA cleanup level of 5 ug/L (Figure 4). TCE was detected in well NMW-1 at a concentrations below the reporting limit of 1 ug/L.

Well NMW-2 is no longer part of the monitoring program and was decommissioned in 2016.

With a few exceptions, PCE concentrations have consistently been below the cleanup level in all 3 wells since regular monitoring began in 1997 (Figures C-4, C-5, and C-6). PCE concentrations have ranged from less than 1 to 5.5 ug/L (Table C-2). Downgradient PCE concentrations at this site have been consistent with upgradient conditions, indicating that this site no longer appears to pose a significant source of contamination to the larger YRRA plume.

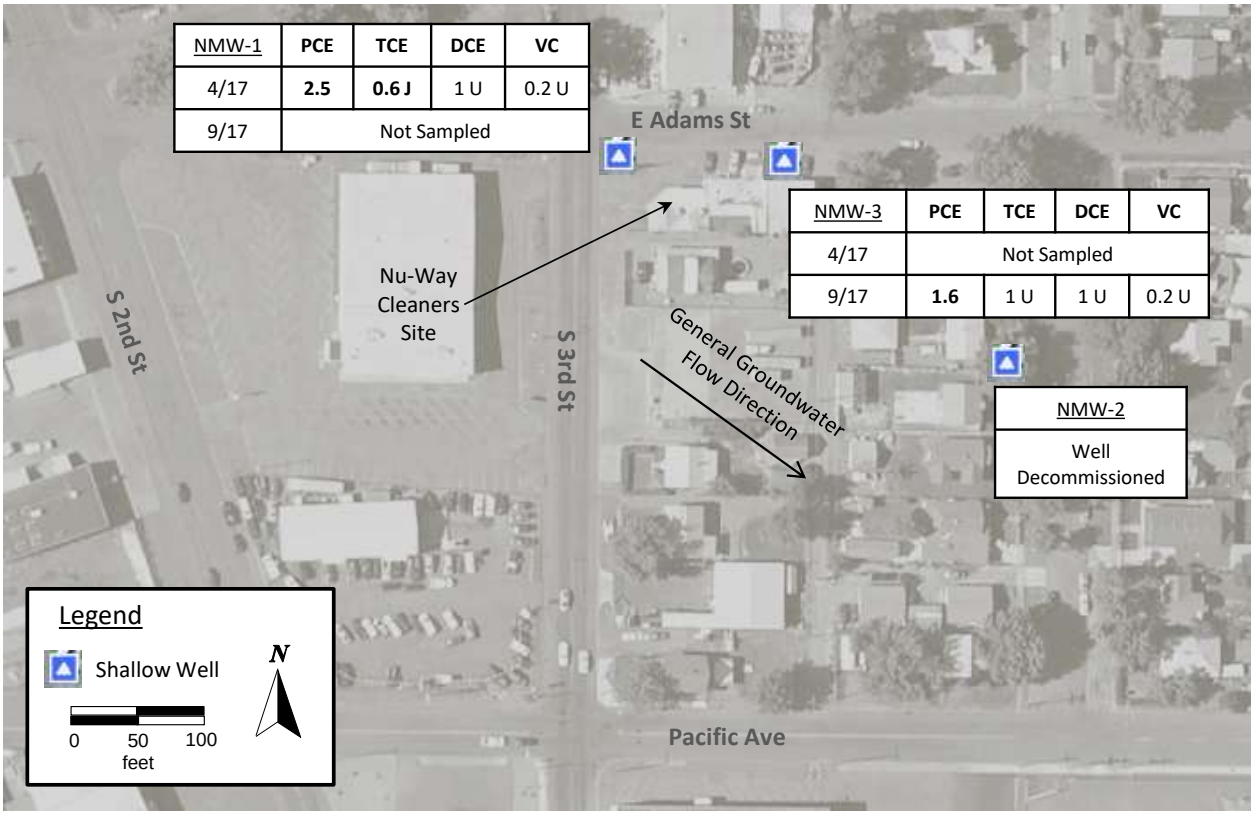

Figure 4. Nu-Way Cleaners Well Locations and cVOC Results (ug/L) for 2017

Southgate Laundry

Southgate Laundry is located west of the railroad tracks along Nob Hill Road (Figure 2). Contaminated soils were removed from the Southgate Laundry site in 1997 as part of an interim action (Maxim Technologies, 1998).

PCE was the only contaminant detected in the sampled wells at Southgate Laundry in 2017 (Figure 5). PCE concentrations were near the reporting limit of 1 ug/L in both downgradient wells SGMW-2 and SGMW-3, well below the MTCA cleanup level. No cVOCs were detected in upgradient well SGMW-1.

The historic results for upgradient well SGMW-1 show that PCE concentrations have consistently been below the MTCA cleanup level (Figure C-7). PCE concentrations in downgradient wells SGMW-2 (Figure C-8) and SGMW-3 (Figure C-9) were often above the cleanup level until 2005 with concentrations ranging from about 2 to 29 ug/L. Since 2006, PCE concentrations have decreased to values ranging from less than 1 to 4.5 ug/L. This suggests that past source-removal activities have been successful in reducing the PCE groundwater concentrations at the site.

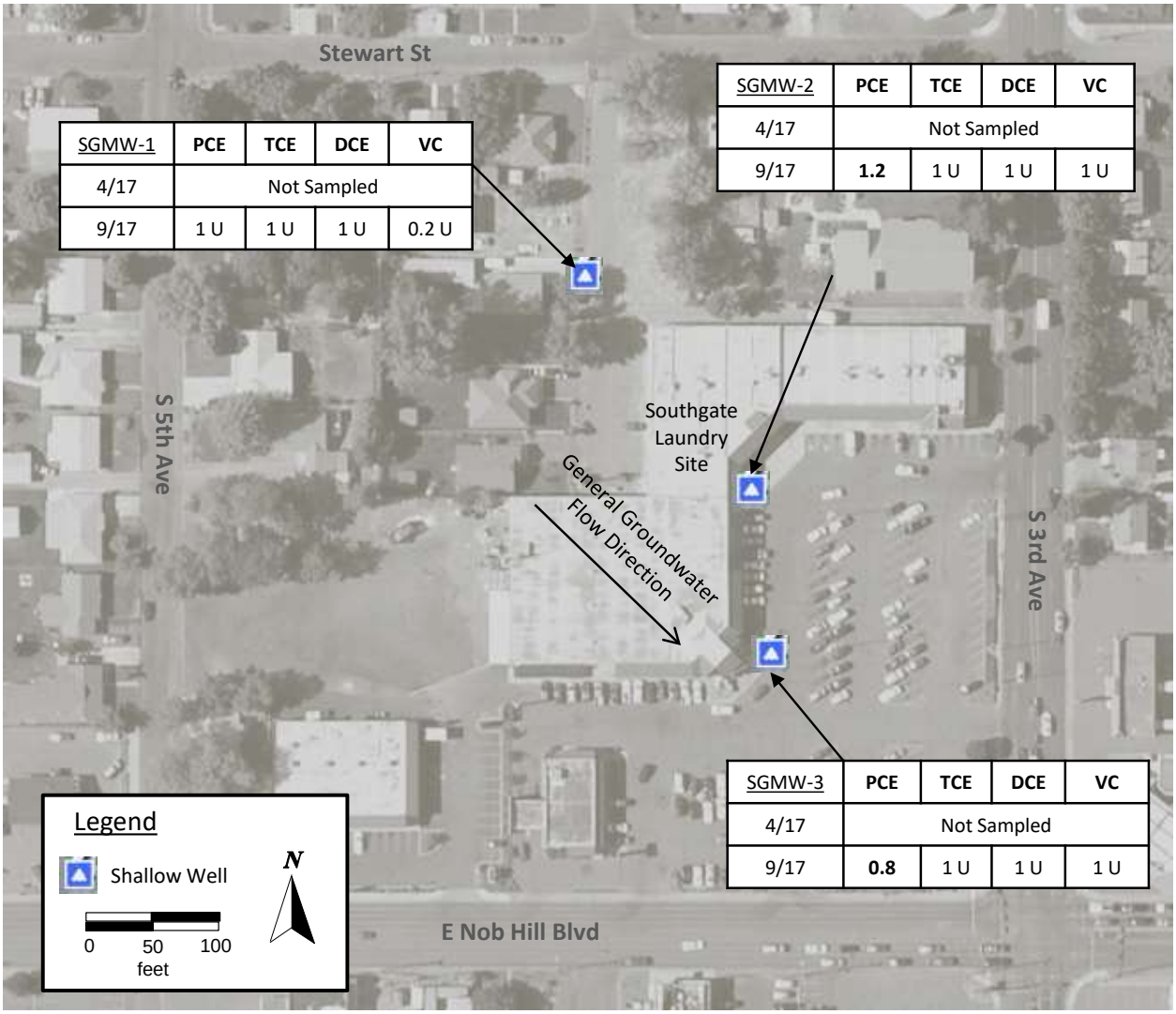

Figure 5. Southgate Laundry Well Locations and cVOC Results (ug/L) for 2017

Washington Central Railroad Roundhouse

The Washington Central Railroad Roundhouse (WCRR) is located in the central portion of the YRRA (Figure 2). There is no record of direct remediation having occurred at this site to address PCE contamination. The 3 WCRR wells are clustered (Figure 6) and are completed at approximately 30 feet (WDOE-3S), 58 feet (WDOE-3I), and 100 feet (WDOE-3D) depth. These wells have some of the highest contaminant concentrations in the YRRA.

Due to access issues, these wells were not sampled in 2017.

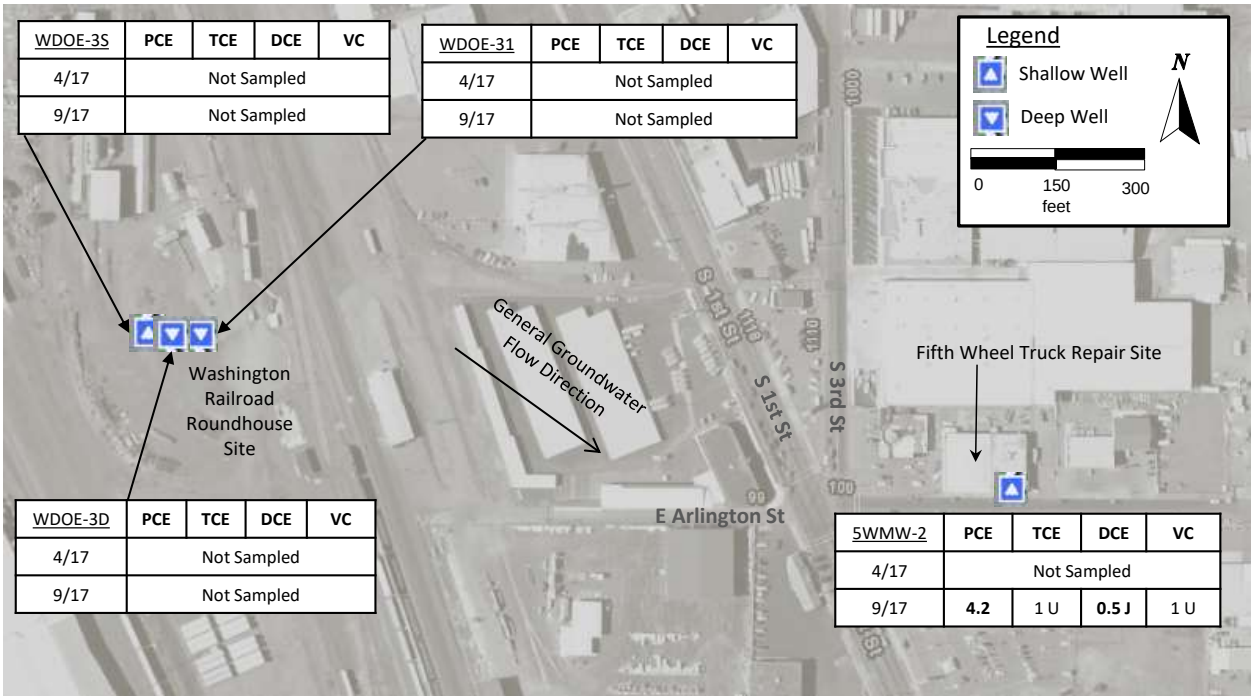

Figure 6. Washington Central Railroad Roundhouse and Fifth Wheel Truck Repair Well Locations and cVOC Results (ug/L) for 2017

Since 1997, PCE concentrations in the 3 wells have ranged from approximately 5 to 90 ug/L (WDOE-3S), 0.1 to 42 ug/L (WDOE-3I), and 2 to 16 ug/L (WDOE-3D). PCE concentrations decreased substantially in the shallow (WDOE-3S) and intermediate (WDOE-3I) wells after June 2000 to 5 to 19 ug/L and less than 1 to 18 ug/L, respectively (Table C-4). The reason for the decrease is unknown since no cleanup activities have occurred at this site. PCE concentrations in both wells continue to exceed the cleanup level in the fall (Figures C-10 and C-11) when higher PCE concentrations tend to occur. PCE concentrations in the deep well (WDOE-3D) have been more constant, ranging from about 6 to 16 ug/L (Figure C-12), with concentrations also slightly higher in the fall.

PCE metabolic breakdown products are typically detected in all three wells. TCE, cis-1,2-DCE, and VC have consistently been detected in wells WDOE-3I and WDOE-3D; this is an indication that natural biodegradation is occurring.

With a few exceptions, TCE has been detected below the cleanup level of 5 ug/L in wells WDOE-3I and WDOE-3D (Table C-4) with concentrations ranging from 1 to 4.8 ug/L; however, TCE concentrations in well WDOE-3I appear to be increasing (Figure C-13).

Vinyl chloride is consistently detected in well WDOE-3I and WDOE-3D usually at concentrations exceeding the MTCA cleanup level of 0.2 ug/L.

Contaminant concentrations in wells WDOE-3I and WDOE-3D indicate that the plume has a vertical component that reaches the deep water-bearing zone in this portion of the YRRA.

The data indicate that the WCRR facility continues to act as a significant source of chlorinated solvent contamination to groundwater, including to deeper portions of the aquifer system.

Fifth Wheel Truck Repair

Fifth Wheel Truck Repair is located approximately 0.3 miles east (cross-gradient) of the WCRR wells (Figure 2). Cleanup activities at this site occurred from 1991 to 2001 (Maxim Technologies, 1996).

Ecology sampled one downgradient well at the site. PCE was detected in 2017 at a concentration just below the MTCA cleanup level (Figure 6 above). Groundwater monitoring data has been collected from well 5WMW-2 from 1999 to the present. During that time, PCE concentrations have ranged from less than 1 ug/L to 11 ug/L, with higher concentrations consistently occurring in the fall. PCE concentrations appear to be gradually decreasing; however, they still exceed the cleanup level on occasion (Figure C-14).

Cis-1,2-DCE was also detected in this well at a concentration below the reporting limit of 1 ug/L.

Cameron Yakima, Inc.

Cameron Yakima is located in the central portion of the YRRA, approximately 0.5 miles southeast (downgradient) of the WCRR wells (Figure 2). Cleanup activities occurred at this site from 1998 to 2001.

In 2017, Ecology collected groundwater samples from 10 wells on the Cameron Yakima site. PCE was detected in 9 of the wells at concentrations ranging from 1.4 to 13 ug/L (Figure 7).

PCE was detected in the 2 upgradient wells (CYIMW106S and CYIMW107S) at concentrations ranging from approximately 1 to 6 ug/L during the 2017 monitoring period. Concentrations exceeded the cleanup level of 5 ug/L in well CYIMW107S during the spring sample event and well CYIMW106S during the fall sample event. Since the 2000 cleanup activities, PCE concentrations have been decreasing but continue to exceed the cleanup level (Figures C-19 and C-20). PCE concentrations are consistently higher in the fall than in the spring for well CYIMW106S, but no seasonal concentration pattern is seen in well CYIMW107S. Consistently elevated PCE concentrations in both upgradient wells may indicate continued contamination from sources upgradient of the Cameron site.

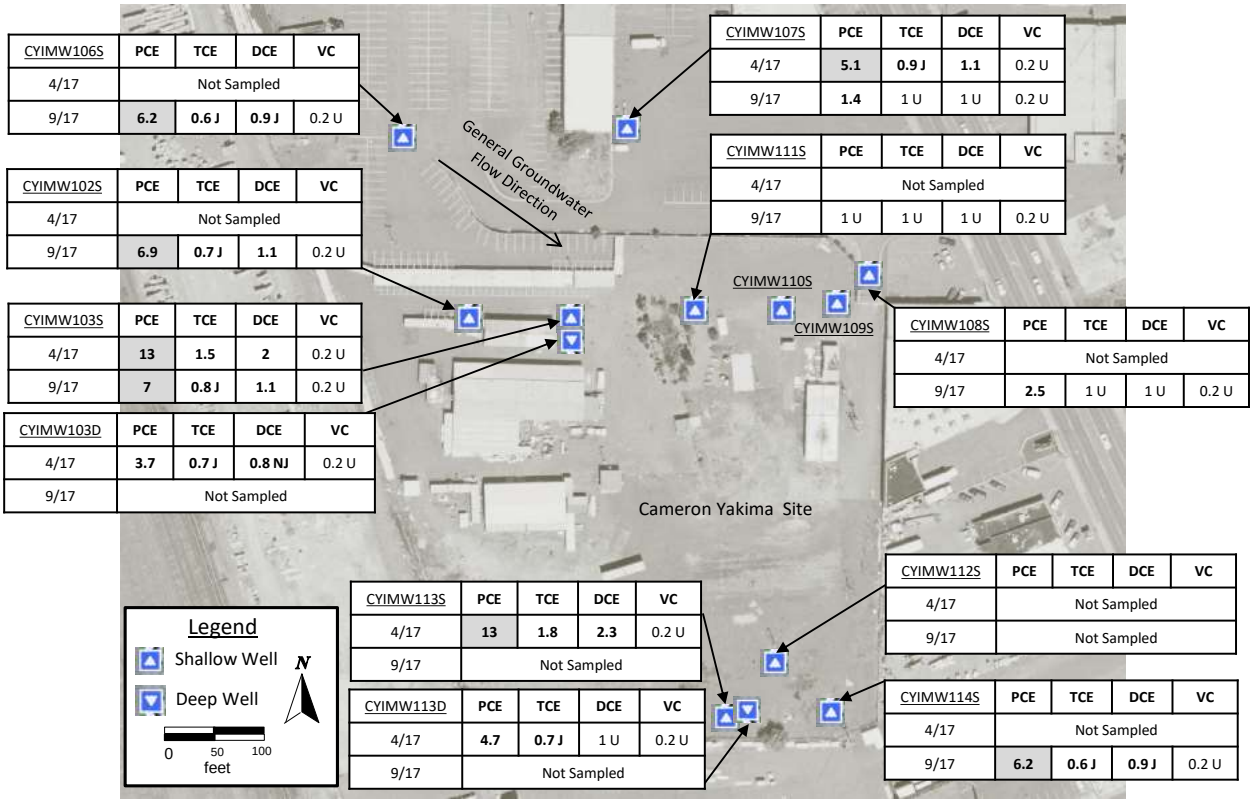

Figure 7. Cameron Yakima Well Locations and cVOC Results (ug/L) for 2017

Wells CYIMW102S, CYIMW103S, and CYIMW103D are located in the northwest corner of the Cameron site. PCE concentrations in the two shallow wells ranged from 7 to 13 ug/L in 2017, consistently exceeding the cleanup level. Prior to soil removal, these wells had some of the highest PCE concentrations in the YRRA at 72 ug/L (CYIMW102S) and 139 ug/L (CYIMW103S) (Table C-6). PCE concentrations decreased substantially after 2000, with maximum concentrations of 17 ug/L and 57 ug/L, respectively (Figures C-16 and C-17). Although PCE concentrations continue to exceed the cleanup level in the 2 shallow wells, concentrations have continued to decrease to near or below 10 ug/L since 2006. PCE concentrations in the deep well (CYIMW103D) are more constant at approximately 4 ug/L in 2017. Since monitoring began in 1997, the PCE range for well CYIMW103D has been 1.9 to 5.2 ug/L (Figure C-18).

Wells CYIMW108S and CYIMW111S are located in the northeast corner of the site. PCE concentrations in these wells have always been low compared to other wells at the site (Table C-6). Overall, concentrations have deceased to below the cleanup level of 5 ug/L since the interim action in 2000, including the 2017 data (Figures C-21, C-24).

Wells CYIMW112S, CYIMW113S, CYIMW113D, and CYIMW114S are located in the southeast corner of the property. PCE concentrations in the 2 shallow wells that were sampled (CYIMW113S and CYIMW114S) exceeded the cleanup level with approximate concentrations of 6 and 13 ug/L. Well CYIMW112S was not sampled in 2017. Contaminant concentrations in these 3 wells gradually decreased after the 2000 cleanup activities but have displayed an increasing trend since 2009 (Figures C-25, C-26, C-28). PCE concentrations are now

consistently above the MTCA cleanup level of 5 ug/L. The elevated PCE concentrations along the downgradient boundary of the site indicate possible off-site migration of the contaminant plume. PCE concentrations in the deep well (CYIMW113D) have remained within the range of 3 to 6 ug/L from 1998 to 2017 (Figure C-27).

TCE and cis-1,2-DCE were detected in the Cameron wells at concentration ranges of non-detect to 1.8 ug/L and non-detect to 2.3 ug/L, respectively. Concentrations for 2017 were within the range of historical data collected since 1997.

Vinyl chloride has remained undetected at this site since sampling began in 1997 (Table C-6).

Agri-Tech/Yakima Steel

The Agri-Tech/Yakima Steel site is located in the south-central end of the YRRA (Figure 2). A remedial investigation was completed in 2004. A variety of contaminants were identified in the site soils and groundwater, including solvents, pesticides, petroleum, and heavy metals (Farallon, 2011). Groundwater monitoring data have been collected from well AT-MW4 since 1999 (Table C-5).

PCE was detected in 2017 at a concentration just below the cleanup level of 5 ug/L (Figure 8). Concentrations were within the range of historical data which have remained fairly consistent since 1999 (Figure C-15).

Cis-1,2-DCE was also detected in the Agri-Tech well at a concentration near the reporting limit of 1 ug/L.

YRRA Remedial Investigation Wells

Eight Remedial Investigation (RI) wells were sampled in 2017: 6 shallow and 2 deep wells. These wells were installed throughout the YRRA to determine the extent of the PCE contaminated groundwater away from known source areas. The YRRA RI wells were installed as shallow and deep pairs to characterize groundwater quality in the upper and lower water-bearing zones. Nine wells were selected for continued monitoring and are primarily located along the western and southern edges of the YRRA (Figure 2).

PCE was detected in all 8 RI wells in 2017. Concentrations in 4 of the shallow wells and the 2 deep wells ranged from approximately 0.9 to 4.2 ug/L (Figure 8).

Well RI-3S is the farthest upgradient RI well currently being sampled. PCE was detected in this well at a concentration below the reporting limit of 1 ug/L. Low concentrations of PCE (ranging from 0.2 to 2.5 ug/L) have been detected in this well since monitoring began in 1999 (Figure C-29). Because PCE is not naturally occurring, the low concentrations detected in this well indicate that a low level source of PCE to the shallow aquifer exists at the upgradient end of the YRRA.

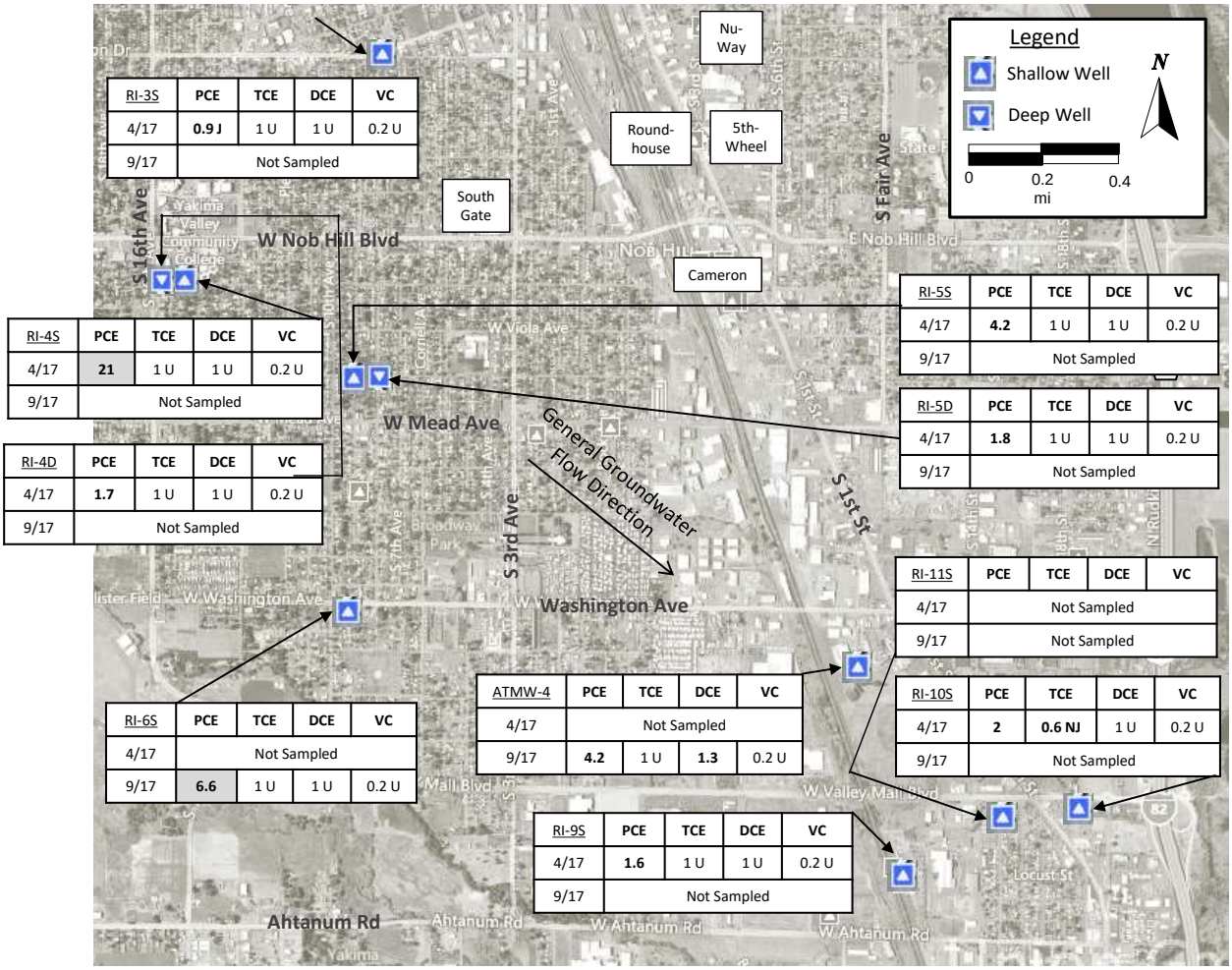

Figure 8. YRRA Remedial Investigation Well Locations and cVOC Results (ug/L) for 2017

Wells RI-4S and RI-4D are located on the western edge of the YRRA. Well RI-4S continues to have the highest PCE concentrations of all the RI wells. In the spring of 2017, the reported concentration was 21 ug/L. Although concentrations have been fairly stable over most of the monitoring period, they appear to be increasing since 2009 (Figure C-30). PCE was also detected in the deep well (RI-4D) at a concentration near the reporting limit of 1 ug/L (Figure C-31). Fine-grained materials identified in this portion of the project area may be preventing the downward migration of the contaminants. The source area for contamination in these wells is under investigation. Data from these wells indicate that the western extent of the YRRA PCE plume is still undefined.

Wells RI-5S and RI-5D are located in a residential area, approximately 0.7 miles southeast (downgradient) of wells RI-4S/4D. Low levels of PCE continue to be detected in both wells, with a range of 1.8 to 4.2 ug/L (Figures C-32 and C-33). Concentrations are typically slightly higher in the shallow well, which exhibits a seasonal pattern of spring maximums. Concentrations in both wells appear to be increasing. Because these wells are in a residential area, the low PCE levels are most likely from an upgradient source.

Well RI-6S is located in the southeast portion of the project area. PCE continues to be detected above the cleanup level in the fall samples with a reported concentration of 6.6 ug/L. PCE concentrations in this well appear to be increasing and have a seasonal pattern with higher concentrations occurring in the fall (Figure C-34). Currently, there is no known source area for the contamination in this well. The extent of PCE contamination in the shallow aquifer needs to be better characterized in this portion of the YRRA.

Wells RI-9S, RI-10S, and RI-11S are located at the southern boundary of the study area and are the farthest downgradient wells being sampled. These wells continue to have low levels of PCE, ranging from about 0.5 to 3 ug/L between 1999 and 2017 (Figures C-35, C-36, C-37). Well RI-11S was not sampled in 2017 because it was inaccessible.

Frank Wear Cleaners

In 2017, the Frank Wear Cleaners site was added to the YRRA monitoring program. Frank Wear is located at the northern end of the YRRA project area, approximately 0.7 miles upgradient of the WCRR wells (Figure 2).

The dry cleaning operation had a history of dangerous waste violations and was identified as a YRRA source area in 1991. Site soils and groundwater were found to be highly contaminated with PCE in 1995 (Maxim, 1996). That year, a series of cleanup activities were initiated including: removal of contaminated soil, removal of the Frank Wear building in 2001, and installation of a soil vapor extraction (SVE) system in 2012 and a groundwater recirculation system (GRS) in 2014. Due to financial constraints, the GRS system was shut down in 2016.

In 2017, Ecology collected groundwater samples from 10 of the 24 site monitoring wells at Frank Wear: 7 shallow and 3 deep wells. PCE was detected in 9 of the wells at concentrations ranging from 0.6 to 9110 ug/L (Figure 9). Breakdown products, TCE, cis-1,2-DCE, and VC were also detected in the 7 shallow wells.

Shallow well FWMW-16 and deep well FWMW-17 are located in the northwest corner of the Frank Wear site. PCE concentrations in well FWMW-16 ranged from 14 to 28 ug/L in 2017, continuing to exceed the cleanup level of 5 ug/L (Table C-8). During operation of the SVE and GRS, PCE concentrations in this well reached 100 ug/L (Figure C-46). The 2017 results are substantially lower than those previously reported. TCE, DCE and VC were also detected in this well in 2017 (Figure C-47). TCE exceeded the cleanup level of 5 ug/L in the spring at a concentration of 12 ug/L. Vinyl chloride concentrations ranged from about 9 to 54 ug/L exceeding the cleanup level of 0.2 ug/L. This is the first exceedance of vinyl chloride for this well. PCE, TCE and cis-1,2-DCE in the deep well (FWMW-17) were detected at concentrations below the reporting limit of 1 ug/L.

Wells FWMW-5 and FWMW-6 are also located in the northwest edge of the site. In the spring of 2017, PCE exceeded the cleanup level in well FWMW-5 with a concentration of 30 ug/L. TCE, cis-1,2-DCE, and VC were detected at concentrations of 43 to 46 ug/L (Table C-8). In the fall of 2017, only PCE and TCE were detected at estimated concentrations of 1 to 3 ug/L. These results are B qualified, which indicates potential blank contamination. Historically, cVOC

concentrations in well FWMW-6 exceeded all the applicable cleanup levels (Table C-8). Results from 2017 were either non-detect or below 5 ug/L. Both FWMW-5 (Figures C-40, C-41) and FWMW-6 (Figures C-42, C-43) showed a spike in contaminant concentrations in 2014, which may be associated with the operation of the GRS.

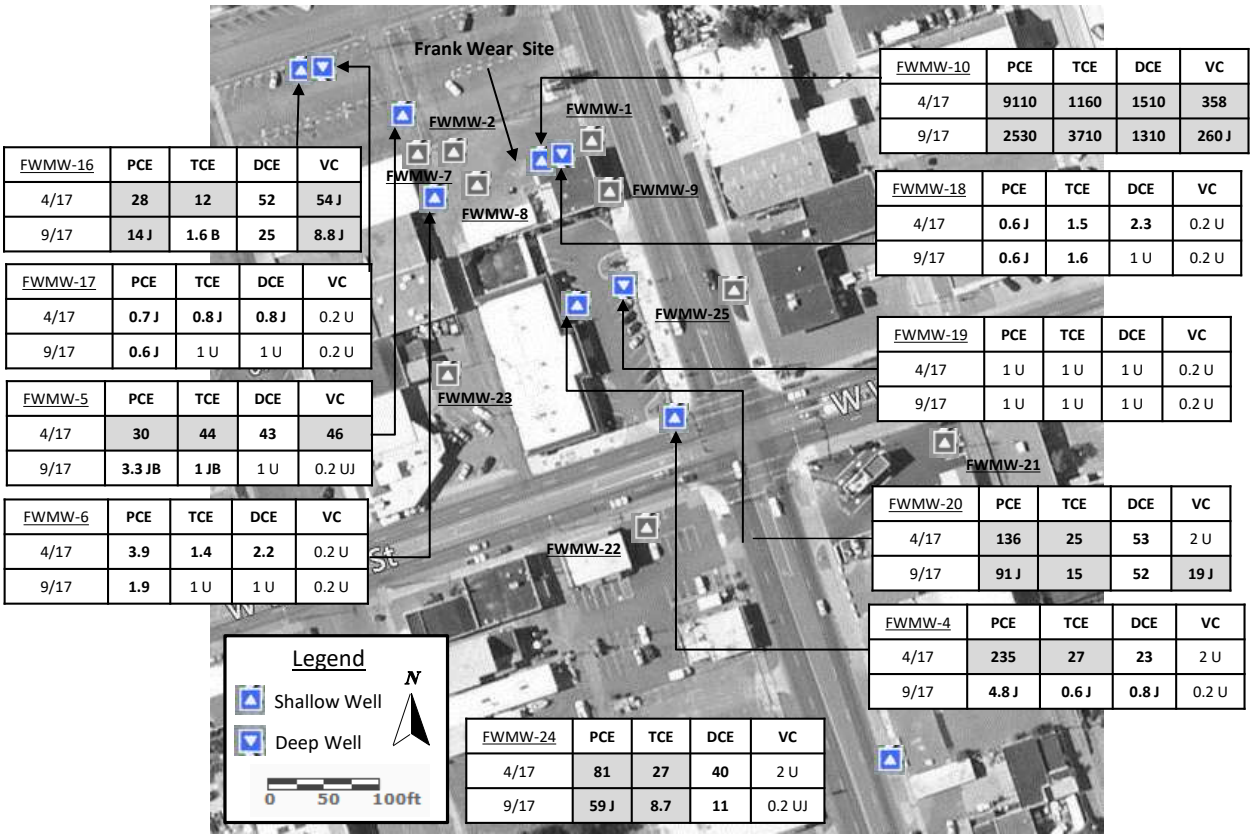

Figure 9. Frank Wear Well Locations and cVOC Results (ug/L) for 2017

Shallow well FWMW-10 and deep well FWMW-18 are located where the former Frank Wears Cleaners building was sited. Well FWMW-10 has the highest contaminant concentrations of all the wells in the YRRA project area. In 2017, PCE concentrations ranged from 2530 to 9110 ug/L (Figure C-44). TCE, cis-1,2-DCE, and VC concentrations also far exceed the applicable cleanup standards. Since 2014, PCE concentrations in this well have been decreasing from a maximum of 44,000 ug/L, while the breakdown product concentrations have been increasing (Figure C-45). PCE, TCE and cis-1,2-DCE in the deep well (FWMW-18) were detected at concentrations near or below the reporting limit of 1 ug/L.

The nearest downgradient wells are shallow well FWMW-20 and deep well FWMW-19. PCE continues to be detected in well FWMW-20 at a concentration range of 91 to 136 ug/L in 2017 (Figure C-48). TCE and VC were also detected at concentrations exceeding the applicable cleanup levels (Figure C-49). Contaminant concentrations in well FWMW-20 also showed a spike in 2014. No cVOCs were detected in deep well FWMW-19.

Wells FWMW-4 and FWMW-24 are located about 265 feet and 640 feet downgradient of well FWMW-10. In the spring of 2017, PCE and TCE concentrations exceeded the applicable cleanup levels in well FWMW-4 at concentrations of 235 ug/L and 27 ug/L. Concentrations decreased to below the cleanup levels in the fall of 2017. Well FWMW-24 is the farthest downgradient well. PCE and TCE were detected at concentrations exceeding applicable cleanup levels at ranges of 59 to 81 ug/L (PCE) and 9 to 27 ug/L (TCE). Vinyl chloride had been detected in both of these wells beginning in 2014 to 2016, but was not detected in 2017.

Operation of the cleanup systems appear to have resulted in a substantial reduction in the contaminant mass at Frank Wear Cleaners. While operating the GRS, Hart Crowser (2015) also noted that there was evidence that PCE had been mobilized from the soil matrix and that moderate reducing conditions had been generated to stimulate complete reductive dechlorination.

However, high concentrations of PCE, TCE and vinyl chloride continue to be detected in both the shallow onsite and downgradient off-site wells. Groundwater concentrations continue to exceed their applicable cleanup levels at this site. cVOC concentrations in the sampled wells indicate that the full extent of the plume beyond the current monitoring well network is still unknown.

This site is a substantial source of PCE contamination to the project area.

Results Summary

Of the 38 wells sampled in 2017, 15 wells (39%) had PCE concentrations above the cleanup level of 5 ug/L (Table 2). These wells are located at Goodwill - City of Yakima, Frank Wear Cleaners, and Cameron Yakima. Two of the YRRA RI wells along the western edge of the study area also had elevated PCE concentrations.

Figure 10 shows maximum PCE concentration in shallow groundwater for the 2017 monitoring period. All of the wells with elevated PCE are screened in the shallow, water-bearing zone and range in depth from approximately 26 to 40 feet below ground surface (bgs). The maximum PCE concentrations in these wells ranged from about 5 to 9110 ug/L.

Frank Wear Cleaners was added to the monitoring program in 2017. Six of the 7 shallow wells sampled had elevated PCE concentrations ranging from 14 to 9110 ug/L. These wells also consistently have PCE metabolic breakdown products: TCE, cis-1,2-DCE and VC. The vinyl chloride concentrations for these wells ranged from approximately 19 to 358 ug/L, far exceeding the 0.2 ug/L cleanup level. Although this site is undergoing continued remediation, it is still a substantial source of PCE to the project area.

PCE, TCE, cis1,2-DCE and VC have been consistently detected in the WCRR wells. These wells were not sampled in 2017 due to limited access.

PCE breakdown products were also observed in the Cameron Yakima wells (Table 2) but at concentrations below the MTCA cleanup levels.

Current and past data from the Frank Wear, WCRR and Cameron wells confirm that the shallow groundwater in the central portion of the YRRA remains contaminated with elevated concentrations of PCE (Table 2, Figure 10). It is not clear whether the contaminant plumes are separate or co-mingled.

Table 2. 2017 Monitoring Results for Wells with cVOC Concentrations (ug/L) above MTCA Method A Cleanup Levels for Groundwater.

Analyte:	**PCE**		**TCE**		**Cis-1,2-DCE**		**VC**	
MTCA Cleanup Level:	**5 ug/L**		**5 ug/L**		**70 ug/L**		**0.2 ug/L**	
Date:	**Spring**	**Fall**	**Spring**	**Fall**	**Spring**	**Fall**	**Spring**	**Fall**
Goodwill - City of Yakima								
GMW-2	**12**	**5.4**	1 U	1 U	1 U	1 U	0.2 U	1 U
Frank Wear Cleaners								
FWMW-4	**235**	**4.8 J**	**27**	**0.64 J**	**23**	**0.85 J**	2 U	0.2 U
FWMW-5	**30**	**3.3 JB**	**44**	**0.99 JB**	**43**	1 U	**46**	0.2 UJ
FWMW-10	**9110**	**2530**	**1160**	**3710**	**1510**	**1310**	**358**	**260 J**
FWMW-16	**28**	**14 J**	**12**	**1.6 B**	**52**	**25**	**54 J**	**8.8 J**
FWMW-20	**136**	**91 J**	**25**	**15**	**53**	**52**	2 U	**19 J**
FWMW-24	**81**	**59 J**	**27**	**8.7**	**40**	**11**	2 U	0.2 UJ
Cameron Yakima								
CYIMW102S	--	**6.9**	--	**0.75 J**	--	**1.1**	--	0.2 U
CYIMW103S	**13**	**7**	**1.5**	**0.81 J**	**2**	**1.1**	0.2 U	0.2 U
CYIMW106S	--	**6.2**	--	**0.65 J**	--	**0.89 J**	--	0.2 U
CYIMW107S	**5.1**	**1.4**	**0.92 J**	1 U	**1.1**	1 U	0.2 U	0.2 U
CYIMW113S	**13**	--	**1.8**	--	**2.3**	--	0.2 U	--
CYIMW114S	--	**6.2**	--	**0.63 J**	--	**0.95 J**	--	0.2 U
Remedial Investigation Wells								
RI-4S	**21**	--	1 U	--	1 U	--	0.2 U	--
RI-6S	--	**6.6**	--	1 U	--	1 U	--	0.2 U

U: Analyte was not detected at or above the reported value.
J: Analyte was positively identified. The associated numerical result is an estimate.
B: Analyte was detected in the sample and a blank. Reported result is sample concentrations without blank correction.
Bold: Analyte was detected.
Shade: Values are greater than MTCA cleanup levels.

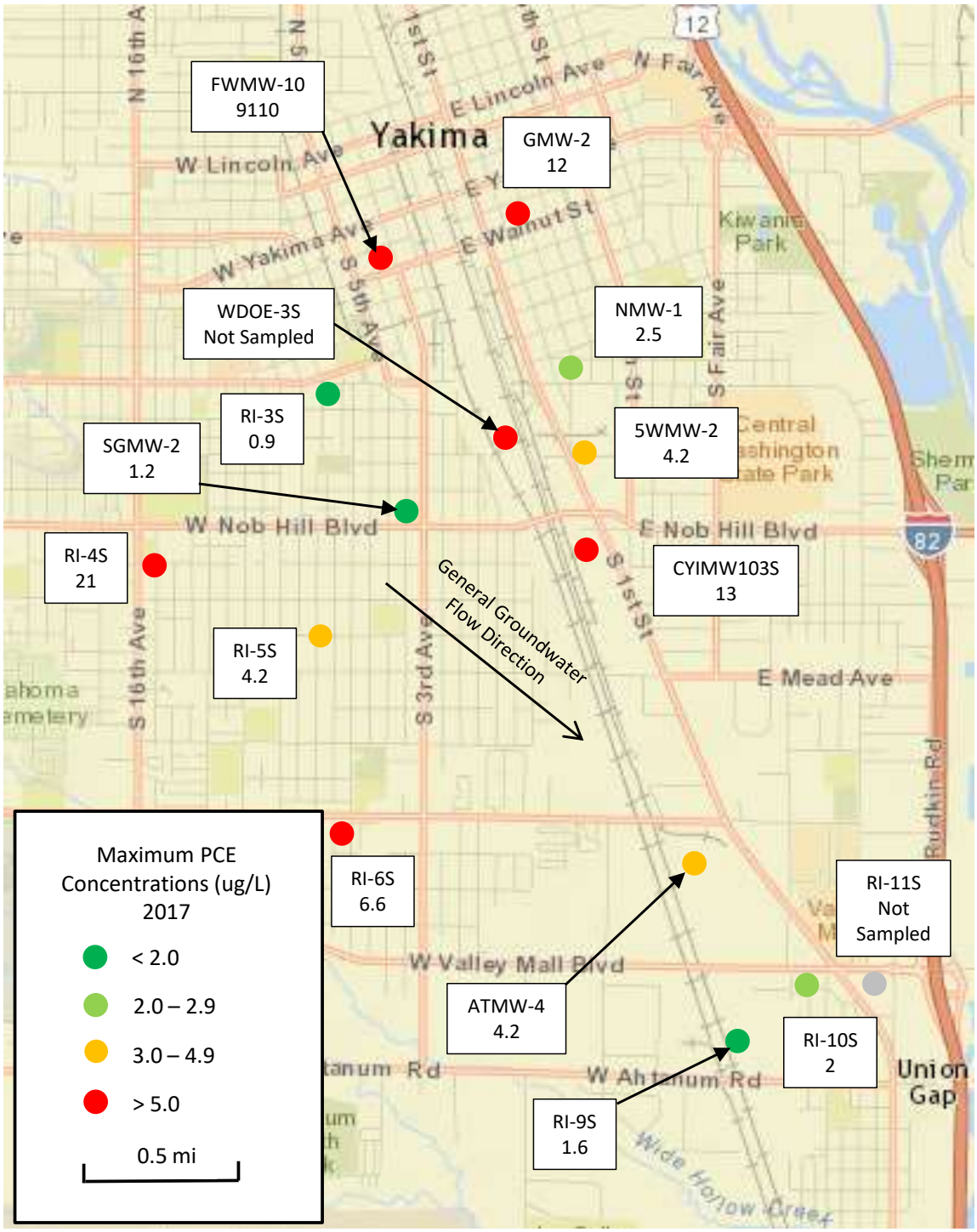

Figure 10. Shallow Zone Maximum PCE Concentrations (ug/L), 2017

Discussion and Conclusions

Dissolved tetrachloroethene (PCE) continues to be present in the shallow, unconfined aquifer throughout the YRRA project area. Cleanup activities over the years appear to have been effective in reducing contaminant concentrations in groundwater at many of the identified source areas; however, there are still areas where contaminant concentrations continue to exceed (not meet) the MTCA cleanup levels.

There are 59 monitoring wells in the YRRA long-term monitoring program. In 2013, Ecology selected a subset of 36 wells for continued monitoring. Wells were removed from the active monitoring program if they consistently showed low or no detections of the contaminants of concern, primarily PCE. In 2017, Ecology collected groundwater samples from 28 of the 36 wells. The selected subset of wells continues to provide monitoring points to evaluate groundwater conditions throughout the project area.

Twenty-seven of the 36 wells selected for continued monitoring are associated with 7 identified source areas. Five of the source areas have undergone some level of cleanup to address PCE contamination: Goodwill - City of Yakima, Nu-Way Cleaners, Southgate Laundry, Fifth Wheel Truck Repair, and Cameron Yakima. Cleanup activities at Nu-Way Cleaners, Southgate Laundry, and Fifth Wheel Truck Repair appear to have eliminated or reduced these areas as ongoing sources of PCE contamination.

There is no record of any direct remediation at the Washington Central Railroad Roundhouse site. The 3 wells at this site, which were installed as a well cluster of varying depths, have some of the highest contaminant concentrations in the YRRA. PCE concentrations in the shallow to deep wells indicate that the contaminant plume has a vertical component that reaches the deep water-bearing zone in this portion of the YRRA. PCE metabolic breakdown products are also present at this site in the two deeper wells, indicating that natural biodegradation is occurring. TCE and cis-1,2-DCE are typically detected at low concentrations, while vinyl chloride has consistently been detected at concentrations above the cleanup level. The Washington Central Railroad Roundhouse facility continues to act as a significant source of chlorinated solvent contamination to groundwater, including to deeper portions of the aquifer system.

In 2017, the Frank Wear Cleaners site was added to the YRRA monitoring program. Ecology collected groundwater samples from 10 of the 24 site wells, 7 shallow and 3 deep. Although remediation processes have resulted in a reduction in the contaminant mass, this site continues to be a substantial source of PCE contamination to the project area. PCE metabolic breakdown products also occur at significant concentrations at this site. Elevated cVOC concentrations in both the shallow onsite and downgradient off-site wells indicate that the full extent of the plume beyond the current monitoring well network is still unknown. cVOCs were detected at concentrations near or below the reporting limit of 1 ug/L in two of the deep wells, suggesting limited vertical migration at depth.

The 2017 data show that the highest contaminant concentrations continue to occur in the central portion of the YRRA. These include Frank Wear Cleaners, Washington Central Railroad Roundhouse, and Cameron Yakima. Although cleanup activities have occurred at 2 of these

locations, the lateral and vertical extent of the contaminant plumes is still poorly defined. Further investigation is needed at each of these sites to determine the full extent of the PCE plumes and whether the plumes have co-mingled, as possibly indicated by the groundwater flow direction.

In 1997, 29 wells were installed for the YRRA Remedial Investigation. The wells were installed as shallow and deep pairs at 14 locations throughout the project area to characterize aquifer properties and determine the lateral and vertical extent of PCE contamination in the groundwater. Nine of these wells were sampled during the 2016 monitoring period. The 9 wells selected for continued monitoring are primarily located along the western and southern edges of the YRRA.

PCE was detected at concentrations below the cleanup level in 6 of the 9 RI wells. Because PCE is not naturally occurring, the low concentrations detected in these wells indicate that low level sources of PCE continue to exist and contribute to the contamination of the YRRA.

The other two wells, RI-4S and RI-6S, which are located on the western edge of project area, consistently have elevated PCE concentrations that appear to be increasing. The data from these wells show there are areas in the YRRA that are contaminated with PCE; the source areas are still being identified and require remedial actions. In addition to source identification and remedial action, the western extent of the YRRA PCE contamination still needs to be defined in this part of the study area.

Of the 38 wells sampled, 9 are screened in the deeper zone (60-120 feet). Only the 2 wells at the Washington Central Railroad Roundhouse site have contaminant concentrations that exceeded the MTCA cleanup levels. PCE concentrations in the 7 other deep wells are consistently below the cleanup levels and have remained fairly constant over the monitoring period from 1997 to 2017. Three of these wells are located at the Frank Wear site, 2 at the Cameron site, and 2 are RI wells located in the western portion of the project area.

Because groundwater within the YRRA continues to be contaminated by both identified and unidentified sources, cleanup activities and investigations continue to be conducted across the project area.

Recommendations

Based on the 2017 monitoring results for the YRRA, the following recommendations are provided:

- Additional investigations should be conducted at the Washington Central Railroad Roundhouse and Cameron Yakima sites to determine the full lateral and vertical extent of the contaminant plumes, since off-site contaminant migration at these two sites is most likely occurring.
- Continued investigation of the Frank Wear Cleaners site, because the PCE contaminant plume extends beyond the current site monitoring well network.
- Continued investigation into the potential source areas for PCE contamination detected in Remedial Investigation wells RI-4S/4D and RI-6S.
- Continued monitoring of the YRRA well network based on seasonal PCE concentrations. The reduction in the sample frequency will continue to improve the cost effectiveness of the program while still providing the necessary data to evaluate groundwater conditions throughout the project area.

References

Ecology, 2016. Manchester Environmental Laboratory Lab Users Manual, Tenth Edition. Manchester Environmental Laboratory, Washington State Department of Ecology, Manchester, WA.

Enviros, 1996. Remedial Action and Feasibility Study, Nu-Way Cleaners, 801 South Third Street Yakima, WA. June 30, 1996 E1/950109.

Farallon Consulting, 2011. Feasibility Study Work Plan, Agri-Tech and Yakima Steel Fabricators, Yakima Washington. PN: 765-001. May 2011.

Hart Crowser, 2015. Annual Performance Report, Former Frank Wear Cleaners Site, Yakima Washington. PN: 17800-23/Task 9. April 2, 2015.

Huntingdon Engineering and Environmental, 1995. Phase III Environmental Remediation, Yakima Goodwill Industries Site. Project No: 194-1969 and 194-1969-1. February 1995.

Kane, 2011. YRRA June 2011 Ground Water and PCE Data. Memo to Jason Shira (Washington State Department of Ecology). PF-YRRA 29044-54506.

Marti, P., 2009. Standard Operating Procedure for Manual Well-Depth and Depth-to-Water Measurements. Washington State Department of Ecology, Olympia, WA. SOP Number EAP052, Version 1.0. www.ecology.wa.gov/programs/eap/quality.html.

Marti, P., 2013. Quality Assurance Project Plan: Yakima Railroad Area Groundwater Performance Monitoring. Washington State Department of Ecology, Olympia, WA. Publication No. 13-03-113. https://fortress.wa.gov/ecy/publications/SummaryPages/1303113.html

Marti, P., 2014. Standard Operating Procedure for Purging and Sampling Monitoring Wells plus *Guidance on Collecting Samples for Volatile and other Organic Compounds.* Washington State Department of Ecology, Environmental Assessment Program, EAP078, Version 2.0. www.ecology.wa.gov/programs/eap/quality.html.

Maxim Technologies, Inc., 1996. Environmental Investigation and Remediation, Fifth Wheel Truck Repair Facility, Yakima Washington. Project No. 5609500619. May 1996.

Maxim Technologies, Inc., 1998. Yakima Railroad Area Remedial Investigation Interim Action Soil Removal/ Groundwater Investigation, Southgate Laundry South Third Avenue and Nob Hill Blvd. Yakima WA. January 1998.

Secor, 1998. Draft Remedial Investigation Yakima Railroad Area; Yakima, Washington. Secor PN: 00378-001-02. December 1998.

U.S. Geological Survey (USGS), 2009. Hydrogeologic Framework of the Yakima River Basin Aquifer System, Washington. Scientific Investigation Report 2009-5152.

Appendices

Appendix A. Well Details and Field Measurements

Table A-1. Well Construction Details.

Well ID	Well Installation Date	Well Tag ID	Latitude (decimal degrees)	Longitude (decimal degrees)	TOC Elevation (feet)	TOC Stickup (feet)	Ground Surface Elevation (feet)	Casing Diameter (inches)	Well Depth from TOC (feet)	Screen Depth (from TOC)	
										Top (feet)	Bottom (feet)
GMW-1	4/1994	ABJ993	46.59949	-120.5019	1063.00	-1.44	1064.44	2	23	13	23
GMW-2	4/1994	ABJ994	46.59911	-120.50169	1055.42	-0.27	1055.69	2	23	13	23
GMW-4	1/1996	BIN804	46.59924	-120.50151	1056.94	-0.34	1057.28	2	30	10	30
NMW-1	6/1995	ABJ918	46.59366	-120.49867	1044.00	-0.29	1044.29	2	24.1	15	25
NMW-2	6/1995	ABJ919	46.59322	-120.49748	1044.21	-0.23	1044.44	2	23.6	10	25
NMW-3	6/1995	ABJ920	46.59362	-120.49820	1043.83	--	--	2	23.8	15	25
SGMW-1	4/1996	BIN801	46.58660	-120.51086	1056.90	-0.26	1057.16	2	43.7	15	45
SGMW-2	4/1996	BIN803	46.58617	-120.51034	1056.47	-0.35	1056.82	2	44.2	15	45
SGMW-3	4/1996	BIN802	46.58583	-120.51027	1054.77	-0.49	1055.26	2	45	15	45
WDOE-3S	--	BIN819	46.58963	-120.50341	1053.32	2.82	1050.50	2	29.9	--	--
WDOE-3I	--	BIN817	46.58963	-120.50325	1053.27	2.87	1050.40	2	58.5	--	--
WDOE-3D	--	BIN818	46.58962	-120.50332	1053.12	2.81	1050.31	2	100	--	--
5WMW-2	2/1995	BIN808	46.58887	-120.49778	1039.22	-0.55	1039.77	2	33.6	15	35
CYIMW102S	--	BIN810	46.58388	-120.49798	1030.74	-0.29	1031.03	2	30	10	30
CYIMW103S	--	BIN809	46.58388	-120.49757	1030.65	-0.54	1031.19	2	29.5	10	30
CYIMW103D	1/2003	AHR176	46.58386	-120.49757	1030.66	-0.35	1031.01	2	60	50	60
CYIMW106S	--	BIN806	46.58439	-120.49839	1033.46	-0.46	1033.92	2	29.2	10	30
CYIMW107S	8/1998	BIN805	46.58436	-120.49738	1033.85	-0.15	1034.00	2	29.3	10	30
CYIMW108S	8/1998	BIN807	46.58405	-120.49637	1031.45	-0.64	1032.09	2	30	10	30
CYIMW109S	8/1998	BIN815	46.58394	-120.49649	1029.19	-0.97	1030.16	2	29	10	30
CYIMW110S	8/1998	--	46.58389	-120.49678	1028.50	--	--	2	29	10	30
CYIMW111S	8/1998	--	46.58389	-120.49711	1029.33	--	--	2	31	10	30
CYIMW112S	8/1998	BIN811	46.58298	-120.49679	1028.84	-0.69	1029.53	2	29	10	30
CYIMW113S	8/1998	BIN814	46.58275	-120.49690	1028.38	-1.15	1029.53	2	30	11	31
CYIMW113D	8/1998	BIN813	46.58276	-120.49689	1028.19	-0.89	1029.08	2	59.5	50	60
CYIMW114S	8/1998	BIN812	46.58275	-120.49652	1028.18	-1.34	1029.52	2	30.7	10	30

Well ID	Well Installation Date	Well Tag ID	Latitude (decimal degrees)	Longitude (decimal degrees)	TOC Elevation (feet)	TOC Stickup (feet)	Ground Surface Elevation (feet)	Casing Diameter (inches)	Well Depth from TOC (feet)	Screen Depth (from TOC)	
										Top (feet)	Bottom (feet)
ATMW-4	10/1997	BIN816	46.56834	-120.48978	1000.82	-0.27	1001.09	2	30	10	30
RI-3S	10/1997	AEB112	46.59247	-120.51698	1071.39	-0.72	1072.11	2	47.2	33	48
RI-4S	11/1997	AEB126	46.58349	-120.52999	1051.91	-0.89	1052.80	6	35	20	35
RI-4D	11/1997	AEB125	46.58349	-120.53005	1052.48	-0.30	1052.78	6	126	116	126
RI-5S	10/1997	AEB114	46.57982	-120.51812	1044.51	-0.41	1044.92	2	38.4	24	39
RI-5D	10/1997	AEB113	46.57982	-120.51819	1044.54	-0.32	1044.86	2	119	109	119
RI-6S	11/1997	AEB122	46.57047	-120.51879	1033.50	-0.37	1033.87	2	38.9	25	40
RI-9S	10/1997	AEB116	46.56028	-120.48761	988.30	-0.54	988.84	2	28.8	15	30
RI-10S	11/1997	AEB128	46.56235	-120.48152	989.05	-0.62	989.67	2	33.3	20	35
RI-11S	11/1997	AEB130	46.56268	-120.47698	988.53	-0.41	988.94	2	38.6	23	38
FWMW-4	2/1995	NA	46.598239	-120.511674	1064.45	-0.5	1064.95	2	35	10	35
FWMW-5	1997	NA	46.598980	-120.512588	1067.68	-0.48	1068.16	2	35	15	35
FWMW-6	5/2005	AKN055	46.598796	-120.512500	1066.99	-0.2	1067.19	2	35	15	35
FWMW-10	5/2005	AKN059	46.598930	-120.512011	1066.00	-0.44	1066.44	2	35	15	35
FWMW-16	5/2012	BHH289	46.599146	-120.512846	1068.92	-0.54	1069.46	2	35	30	35
FWMW-20	6/2012	BHH293	46.598578	-120.511961	1063.97	-0.28	1064.25	4	35	30	35
FWMW-24	6/2012	BHH293	46.597386	-120.510840	1062.22	--	1062.22	4	35	25	35
FWMW-17	5/2012	BHH290	46.599155	-120.512816	1069.10	-0.34	1069.44	2	93	88	93
FWMW-18	6/2012	BHH291	46.598908	-120.512083	1066.07	-0.52	1063.93	2	92	87	92
FWMW-19	6/2012	BHH292	46.598569	-120.511805	1064.07	-0.47	1062.02	2	93	88	93

--: Information not available.
VERTICAL DATUM: NAVD88. Vertical accuracy measure +/- 10 ft (3m).
HORIZONTAL DATUM: NAD83 HARN. Horizontal accuracy measure +/- 10 ft (3m).
TOC: Top of well casing.

Table A-2. Field Parameter Measurements, 2017.

Well ID	Well Tag ID	Sample Date	Depth to Groundwater (ft below ground surface)	Temp (deg C)	pH (standard units)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Conductivity (umhos/cm)
Goodwill - City of Yakima								
GMW-1	ABJ993	4/26/2017	19.77	14.7	6.8	9.1	227	219
GMW-2	ABJ994	4/24/2017	17.89	15.2	6.7	8.5	178	304
		9/25/2017	16.35	16.8	6.6	5.5	93	239
GMW-4	BIN804	4/24/2017	18.52	16.2	6.6	7.8	182	471
Nu-Way Cleaners								
NMW-1	ABJ918	4/24/2017	18.8	14.7	6.4	7.9	209	479
NMW-3	ABJ920	9/26/2017	15.35	16.6	6.2	6.0	268	309
Southgate Laundry								
SGMW-1	BIN801	9/26/2017	23.16	15.9	6.8	8.2	166	335
SGMW-2	BIN803	9/25/2017	24.04	15.8	6.6	8.2	71	365
SGMW-3	BIN802	9/25/2017	22.39	15.8	6.4	7.5	103	367
Washington Central Railroad Roundhouse								
WDOE-3S	BIN819	9/2017	--	--	--	--	--	--
WDOE-3I	BIN817	9/2017	--	--	--	--	--	--
WDOE-3D	BIN818	9/2017	--	--	--	--	--	--
Fifth Wheel Truck Repair								
5WMW-2	BIN808	9/25/2017	16.14	18.2	6.4	5.1	99	487
Cameron Yakima Inc.								
CYIMW102S	BIN810	9/26/2017	14.44	17.7	6.5	6.2	254	521
CYIMW103S	BIN809	4/26/2017	18.86	15.2	6.5	7.6	201	432
		9/26/2017	15.03	18.2	6.6	6.9	256	510
CYIMW103D	AHR176	4/26/2017	19.38	15.7	6.9	4.0	186	338
CYIMW106S	BIN806	9/27/2017	16.51	17.5	6.3	6.2	259	541
CYIMW107S	BIN805	4/24/2017	21.77	15.2	6.6	7.9	186	351
		9/27/2017	17.78	17.6	6.7	8.2	221	305
CYIMW108S	BIN807	9/26/2017	16.38	18.1	6.7	7.3	216	373
CYIMW111S	--	9/26/2017	14.42	16.9	7.0	7.5	150	218
CYIMW112S	BIN811	9/2017	--	--	--	--	--	--
CYIMW113S	BIN814	4/26/2017	17.42	15.0	6.4	5.7	224	502

Well ID	Well Tag ID	Sample Date	Depth to Groundwater (ft below ground surface)	Temp (deg C)	pH (standard units)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Conductivity (umhos/cm)
CYIMW113D	BIN813	4/26/2017	18.75	15.9	7.0	5.0	193	303
CYIMW114S	BIN812	9/26/2017	14.38	17.9	6.5	6.7	255	490
Agri-Tech/Yakima Steel Fabricators								
ATMW-4	BIN816	9/27/2017	4.46	19.0	6.4	4.1	203	426
YRRA Remedial Investigation Wells								
RI-3S	AEB112	4/24/2017	36.21	15.8	6.8	7.7	168	420
RI-4S	AEB126	4/26/2017	13.3	15.7	7.4	5.2	182	739
RI-4D	AEB125	4/26/2017	11.97	15.5	8.1	7.4	159	289
RI-5S	AEB114	4/25/2017	17.16	14.6	6.7	7.4	181	460
RI-5D	AEB113	4/25/2017	21.93	15.3	7.5	6.2	156	526
RI-6S	AEB122	9/26/2017	7.29	15.7	7.2	5.8	153	771
RI-9S	AEB116	4/25/2017	5.97	13.8	6.6	4.1	191	375
RI-10S	AEB128	4/24/2017	10.11	14.2	6.4	5.2	195	431
RI-11S	AEB130	4/2017	--	--	--	--	--	--
Frank Wear Cleaners								
FWMW-4	--	4/27/2017	22.51	16.1	6.4	5.0	219	473
		9/27/2017	15.86	18.1	6.5	6.9	177	498
FWMW-5	--	4/27/2017	21.65	16.0	6.7	1.3	73	439
		9/29/2017	15.78	18.4	6.5	5.3	197	340
FWMW-6	AKN055	4/27/2017	21.89	15.9	6.4	6.9	245	414
		9/27/2017	16.05	18.7	6.4	6.8	186	346
FWMW-10	AKN059	4/27/2017	21.33	15.5	6.9	0.04	-65	382
		9/28/2017	16.34	16.3	7.0	0.1	-77	333
FWMW-16	BHH289	4/27/2017	22.72	16.4	5.3	0.5	-21	1061
		9/28/2017	18.49	17.3	5.7	0.5	-82	1232
FWMW-17	BHH290	4/25/2017	28.92	15.6	7.7	3.1	202	255
		9/25/2017	24.02	16.2	7.5	3.5	90	262
FWMW-18	BHH291	4/25/2017	25.97	15.4	7.8	4.2	190	246
		9/25/2017	21.74	15.9	7.4	4.3	95	259
FWMW-19	BHH292	4/25/2017	25.08	15.8	7.8	4.2	183	243
		9/25/2017	20.25	16.5	7.6	4.0	71	254

Well ID	Well Tag ID	Sample Date	Depth to Groundwater (ft below ground surface)	Temp (deg C)	pH (standard units)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Conductivity (umhos/cm)
FWMW-20	BHH293	4/26/2017	21.09	16.4	6.2	0.1	-144	392
		9/28/2017	14.51	17.0	5.8	0.2	-115	402
FWMW-24	BHH297	4/27/2017	21.53	16.6	6.4	1.8	220	343
		9/27/2017	14.31	17.7	6.3	4.4	191	390

--: Not measured.

Appendix B. Quality Assurance Review

Data Quality Assessment – 2017 Data

To ensure data of good quality, all wells were sampled using standard procedures as specified in the project's quality assurance plan (Marti, 2013) and Ecology's SOP EAP078 (Marti, 2014). Monitoring wells were sampled with a stainless steel bladder pump with dedicated Teflon-lined tubing using standard low-flow sampling techniques. Samples were collected in pre-preserved 40-mL glass vials supplied by the Manchester Environmental Laboratory. Samples were labeled and stored in clean ice-filled coolers pending their arrival at the laboratory. Sample chain-of-custody procedures were followed throughout the project.

Samples were submitted to Ecology's Manchester Environmental Laboratory for analysis of volatile organic compounds (VOCs) to determine chlorinated VOCs concentrations throughout the YRRA project area. Samples were analyzed following a modification of EPA SW-846 Method 8260C.

Field quality control samples for this project consisted of blind field replicates, equipment blanks, and transport blanks.

Over the 2017 monitoring period, field replicates were collected from wells GMW-2, SGMW-2, CYIMW103S, RI-6S, RI-10S, FWMW-4, and FWMW-10. These wells were selected because they represent the range of concentrations found over the YRRA study area.

All replicate results met the measurement quality objectives established in the QAPP (Marti, 2013) and listed in Table B-1. The data are considered good and usable as qualified (Table B-2).

Table B-1. Laboratory Analyte Measurement Quality Objectives.

Parameter	LCS% Recovery Limits	Laboratory Replicates (RPD)	Matrix Spikes% Recoveries	Matrix Spikes Duplicates (RPD)	Required Reporting Limit[1]
cVOCs	30-174%	30%	30-174%	30%	1-5 ug/L

LCS: Laboratory Control Standard
RPD: Relative Percent Difference
[1] RL may vary depending on dilutions, matrix interference, etc.

Equipment blanks were collected from the bladder pump following decontamination procedures. The equipment blanks collected in April 2017 had no detectable concentrations of the target analytes. The equipment blank collected in September 2017 had an estimated PCE concentration of 2.11 ug/L and TCE of 3.23 ug/L. The affected data has been "B" qualified.

Transport blanks were also submitted for analysis for each monitoring event. None of the target analytes were detected.

The Manchester Environmental Laboratory follows strict quality assurance procedures to both ensure and later evaluate the quality of their analytical results (Ecology, 2016). A review of the data quality control and quality assurance from laboratory case narratives indicates that overall analytical performance was good. The reviews include descriptions of analytical methods, holding times, instrument calibration checks, blank results, surrogate recoveries, and laboratory control samples.

A September 2017 laboratory control sample exceeded the QC limit for PCE, and a continuing calibration exceeded the QC limit for vinyl chloride. The associated data for these laboratory QA samples are reported as estimates. None of the reported problems compromised the usefulness or validity of the sample results. All results are usable as qualified.

Quality assurance case narratives and laboratory reporting sheets are available upon request.

All field measurements and analytical result data are available in electronic format from Ecology's EIM data management system: www.ecology.wa.gov/eim/index.htm. Search Study ID: YRRA.

Table B-1. Summary of field replicate data quality for the Yakima Railroad Area study.

Laboratory Analyte:		PCE		TCE		Cis-1,2-DCE		VC	
Field Replicate RPD Limits[1]:		≤ 30%		≤ 30%		≤ 30%		≤ 30%	
Site	Date	Relative Percent Difference or Absolute Difference[2]							
RI-10S	4/24/2014	1.9	0.1	1 U	0.00	1 U	0.00	1 U	0.00
RI-10SR		2.0		1 U		1 U		1 U	
CYIMW103S	4/22/2014	10	0%	0.78 J	0.01	0.60 J	0.01	1 U	0.00
CYIMW103SR		10		0.79 J		0.59 J		1 U	
RI-4S	4/24/2014	16	0%	1 U	0.00	1 U	0.00	1 U	0.00
RI-4SR		16		1 U		1 U		1 U	
WDOE-3I	4/25/2014	1.6	0.00	3.0	0.1	2.5	0.00	8.9	3%
WDOE-3IR		1.6		2.9		2.5		8.6	
Equipment Blk	4/25/2014	1 U		1 U		1 U		1 U	
RI-10S	10/22/2014	2.0	0.1	1 U	0.00	1 U	0.00	0.2 U	0.00
QA2		2.1		1 U		1 U		0.2 U	
CYIMW103S	10/22/2014	12	8%	2.3	0.1	15	0%	0.2 U	0.00
QA1		13		2.4		15		0.2 U	
RI-4S	10/24/2014	16	6%	1 U	0.00	1 U	0.00	0.2 U	0.00
QA4		17		1 U		1 U		0.2 U	
WDOE-3D	10/23/2014	15	6%	5	0%	8.7	2%	0.56	0.00
QA3		16		5		8.5		0.56	
Equipment Blk	10/24/2014	1 U		1 U		1 U		0.2 U	
RI-10S	4/28/2015	2.2 J	0.4	1 UJ	0.00	1 UJ	0.00	0.2 UJ	0.00
QA3		1.8		1 U		1 U		0.2 U	
GMW-2	4/28/2015	10 J	18%	1 UJ	0.00	1 UJ	0.00	0.2 UJ	0.00
QA1		12		1 U		1 U		0.2 U	
CYIMW103S	4/29/2015	14	0%	1.2	0.1	10	0%	0.2 U	0.00

Laboratory Analyte:		PCE		TCE		Cis-1,2-DCE		VC	
Field Replicate RPD Limits[1]:		≤ 30%		≤ 30%		≤ 30%		≤ 30%	
Site	Date	Relative Percent Difference or Absolute Difference[2]							
QA2		14		1.1		10		0.2 U	
Equipment Blk	4/29/2015	1 U		1 U		1 U		0.2 U	
Transport Blk	4/27/2015	1 U		1 U		1 U		0.2 U	
SGMW-2	10/26/2015	1.8	0.00	1 U	0.00	1 U	0.00	0.2 U	0.00
SGMW-2R		1.8		1 U		1 U		0.2 U	
RI-6S	10/26/2015	8.5	0%	1 U	0.00	1 U	0.00	0.2 U	0.00
RI-6SR		8.5		1 U		1 U		0.2 U	
WDOE-3D	10/28/2015	13	0%	3.9	0.1	7.1	4%	3.9 J	0.1
WDOE-3DR		13		3.8		6.8		3.8 J	
Equipment Blk	10/28/2015	1 U		1 U		1 U		0.2 U	
Transport Blk	10/28/2015	1 U		1 U		1 U		0.2 U	
RI-10S	4/18/2016	1.42	0.02	1 U	0.00	1 U	0.00	0.2 U	0.00
QA1		1.44		1 U		1 U		0.2 U	
GMW-2	4/19/2016	6.6	0%	1 U	0.00	1 U	0.00	0.2 U	0.00
QA2		6.6		1 U		1 U		0.2 U	
CYIMW103S	4/19/2016	12.3	4%	0.97 J	0.05	3.12	0.09	0.2 U	0.00
QA3		11.8		0.92 J		3.03		0.2 U	
Equipment Blk	4/20/2016	1 U		1 U		1 U		0.2 U	
Transport Blk	4/20/2016	1 U		1 U		1 U		0.2 U	
SGMW-2	10/26/2016	1.72 J	0.00	1 U	0.00	1 U	0.00	0.2 U	0.00
QA1		1.72 J		1 U		1 U		0.2 U	
RI-6	10/24/2016	8.25 J	1%	1 U	0.00	1 U	0.00	0.2 U	0.00
QA2		8.31 J		1 U		1 U		0.2 U	
WDOE-3D	10/26/2016	11.0	1%	3.77	0.12	4.56	0.21	0.53	0.02
QA3		11.1		3.65		4.35		0.55	
Equipment Blk	10/26/2016	1 U		1 U		1 U		0.2 U	
Transport Blk	10/27/2016	1 U		1 U		1 U		0.2 U	
RI-10S	4/24/2017	2	0.02	0.6 NJ	0.4	1 U	0.00	0.2 U	0.00
QA1		1.98		1 U		1 U		0.2 U	
GMW-2	4/24/2017	11.9	9%	1 U	0.00	1 U	0.00	0.2 U	0.00
QA2		11.2		1 U		1 U		0.2 U	
CYIMW103S	4/26/2017	13.3	7%	1.51	0.05	2.01	0.12	0.2 U	0.00
QA3		14.2		1.56		2.13		0.2 U	
FWMW-10	4/27/2017	9110	5%	1160	5%	1510	5%	358	3%
QA4		8660		1100		1440		348	
Equipment Blk	4/28/2017	1 U		1 U		1 U		0.2 U	
Transport Blk	4/28/2017	1 UJ		1 UJ		1 UJ		0.2 UJ	
SGMW-2	9/25/2017	1.19	0.15	1 U	0.00	1 U	0.00	1 U	0.00
QA1		1.34		1 U		1 U		1 U	

Laboratory Analyte:		PCE		TCE		Cis-1,2-DCE		VC	
Field Replicate RPD Limits[1]:		≤ 30%		≤ 30%		≤ 30%		≤ 30%	
Site	Date	Relative Percent Difference or Absolute Difference[2]							
RI-6	9/27/2017	6.55	3%	1 U	0.00	1 U	0.00	0.2 U	0.00
QA2		6.76		1 U		1 U		0.2 U	
FWMW-4	9/27/2017	4.8 J	0.05	0.64 J	0.05	0.85 J	0.04	0.2 UJ	0.00
QA3		4.85 J		0.59 J		0.89 NJ		0.2 UJ	
FWMW-10	9/28/2017	2530	0.4%	3710	3%	1310	4%	260 J	0%
QA4		2540		3830		1370		260 J	
Equipment Blk	9/28/2017	**2.11 J**		**3.23**		1 U		0.2 UJ	
Transport Blk	9/28/2017	1 UJ		1 UJ		1 UJ		0.2 UJ	

[1] RPD limits are applicable if concentrations are greater than 5 times the method reporting limit (MRL). For results less than 5 times the MRL, the absolute difference between the sample and replicate must be less than the MRL. MRL may vary depending on dilutions performed by the laboratory during analysis.

[2] Shaded cells indicate absolute difference values.

U: Analyte was not detected at or above the reported value.

J: Analyte was positively identified. The associated numerical result is an estimate.

NJ: Analyte was tentatively identified. The associated numerical result is an estimate.

Appendix C. Project Results, December 1997 to September 2017

Table C-1: Summary of Analytical Results (ug/L) for Goodwill - City of Yakima, December 1997 to September 2017.

Date	GMW-1				GMW-2				GMW-4			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	**1.4**	**0.18**	2 U	2 U	**9.8**	2 U	2 U	2 U	**7**	2 U	2 U	2 U
3/3/98	**0.92 J**	1 U	1 U	1 U	**12**	1 U	1 U	1 U	**1.9**	1 U	1 U	1 U
6/1/98	**1.6**	1 U	1 U	1 UJ	**7.7**	1 U	1 U	1 UJ	**7.3**	1 U	1 U	1 UJ
8/31/98	**0.56 J**	**0.34 J**	1 U	1 UJ	**8.2 J**	**0.44 J**	1 UJ	1 UJ	**130 E**	**0.22 J**	**0.061 J**	1 UJ
6/2/99	**3.43**	0.15 U	0.1 U	0.14 U	**5.36**	0.15 U	0.1 U	0.14 U	**4.18**	0.15 U	0.1 U	0.14 U
9/8/99	0.25 U	0.15 U	0.1 U	0.14 U	**8.01**	0.15 U	0.1 U	0.14 U	**15.4**	0.15 U	0.1 U	0.14 U
12/7/99	**0.77 J**	0.15 U	0.1 U	0.14 U	**14.2**	0.15 U	0.1 U	0.14 U	**2.23**	0.15 U	0.1 U	0.14 U
3/9/00	**1**	0.15 U	0.1 U	0.14 U	**10.4**	0.15 U	0.1 U	0.14 U	**1.7**	0.15 U	0.1 U	0.14 U
6/7/00	--	--	--	--	**4.4**	0.15 U	0.1 U	0.14 U	**5.6**	0.15 U	0.1 U	0.14 U
8/30/00	--	--	--	--	**8.3**	0.15 U	0.1 U	0.14 U	**68**	**0.39**	0.1 U	0.14 U
12/12/00	--	--	--	--	**11**	0.15 U	0.1 U	0.14 U	**2.5**	0.15 U	0.1 U	0.14 U
3/6/01	**3.6**	0.15 U	0.1 U	0.14 U	**14**	0.15 U	0.1 U	0.14 U	**2.2**	0.15 U	0.1 U	0.14 U
9/10/01	**4.7**	0.2 U	0.2 U	0.2 U	**6.8**	0.2 U	0.2 U	0.2 U	**19**	**0.22**	0.2 U	0.2 U
3/4/02	**3**	0.2 U	0.2 U	0.2 U	**12**	0.2 U	0.2 U	0.2 U	**1.9**	0.2 U	0.2 U	0.2 U
9/9/02	**4.3**	0.2 U	0.2 U	0.2 U	**11**	0.2 U	0.2 U	0.2 U	**8.3**	0.2 U	0.2 U	0.2 U
3/11/03	**3.3**	0.2 U	0.2 U	0.2 U	**10**	0.2 U	0.2 U	0.2 U	**2.6**	0.2 U	0.2 U	0.2 U
9/9/03	**4.6**	0.2 U	0.2 U	0.2 U	**8.4**	0.2 U	0.2 U	0.2 U	**6.4**	0.2 U	0.2 U	0.2 U
3/9/04	**2.4**	0.2 U	0.2 U	0.2 U	**16**	0.2 U	0.2 U	0.2 U	**2.3**	0.2 U	0.2 U	0.2 U
10/5/04	**2.6**	0.2 U	0.2 U	0.2 U	**5**	0.2 U	0.2 U	0.2 U	**3.8**	0.2 U	0.2 U	0.2 U
3/15/05	**2.8**	0.2 U	0.2 U	0.2 U	**18**	**0.29**	0.2 U	0.2 U	**2.4**	0.2 U	0.2 U	0.2 U
10/12/05	REJ				**25**	0.2 U	0.2 U	0.2 U	**11**	0.2 U	0.2 U	0.2 U
12/14/05	**1.5**	0.2 U	0.2 U	0.2 U	--	--	--	--	--	--	--	--
4/19/06	**12**	0.2 U	0.2 U	0.2 U	**1.7**	0.2 U	0.2 U	0.2 U	**2.1**	0.2 U	0.2 U	0.2 U
10/18/06	**1.9**	0.2 U	0.2 U	0.2 U	**11**	0.2 U	0.2 U	0.2 U	**2.1**	0.2 U	0.2 U	0.2 U
4/18/07	**11**	0.2 U	0.2 U	0.2 U	**2**	0.2 U	0.2 U	0.2 U	**2.1**	0.2 U	0.2 U	0.2 U
10/17/07	**2.4**	0.2 U	0.2 U	0.2 U	**11**	0.2 U	0.2 U	0.2 U	**2.2**	0.2 U	0.2 U	0.2 U
4/15/08	**8.7**	0.2 U	0.2 U	0.2 U	**11**	0.2 U	0.2 U	0.2 U	**2**	0.2 U	0.2 U	0.2 U
10/14/08	--	--	--	--	**7.5**	**7.5**	1 U	0.2 U	**2.6**	1 U	1 U	0.2 U
4/7/09	**7.5**	1 U	1 U	0.2 U	**1.1**	1 U	1 U	0.2 U	**1.7**	1 U	1 U	0.2 U
10/6/09	**3**	1 U	1 U	0.2 U	**6.6**	1 U	1 U	0.2 U	**1.9**	1 U	1 U	0.2 U
4/21/10	**1.1**	1 U	1 U	1 U	**11**	1 U	1 U	0.2 U	**1.8**	1 U	1 U	1 U
6/7/11	**3.4**	1 U	1 U	0.2 U	**11**	1 U	1 U	0.2 U	**1.8**	1 U	1 U	0.2 U
10/11/11	**1**	0.2 U	0.2 U	0.2 U	**6.9**	0.2 U	0.2 U	0.2 U	**1.2**	0.2 U	0.2 U	0.2 U
4/23/12	**1.5**	0.2 U	0.2 U	0.2 U	**9.4**	0.2 U	0.2 U	0.2 U	**1.4**	0.2 U	0.2 U	0.2 U
10/11/12	**1.3**	0.2 U	0.2 U	0.2 U	**2.6**	0.2 U	0.2 U	0.2 U	**1.3**	0.2 U	0.2 U	0.2 U
5/2013	1 U	1 U	1 U	1 U	**10**	1 U	1 U	1 U	**1.5**	1 U	1 U	1 U
10/2013	1 U	1 U	1 U	1 U	**14**	1 U	1 U	1 U	**1.1**	1 U	1 U	1 U
4/2014	**0.77 J**	1 U	1 U	1 U	**11 J**	1 U	1 U	1 U	**1.9 J**	1 U	1 U	1 U
10/2014	**0.54 J**	1 U	1 U	0.2 U	**2.3**	1 U	1 U	0.2 U	**1.3**	1 U	1 U	0.2 U

Date	GMW-1				GMW-2				GMW-4			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2015	**0.68 J**	1 UJ	1 UJ	0.2 UJ	**10 J**	1 UJ	1 UJ	0.2 UJ	**1.8**	1 U	1 U	0.2 U
10/2015	--	--	--	--	**0.98 J**	1 U	1 U	0.2 U	--	--	--	--
4/2016	**0.2 J**	1 U	1 U	0.2 U	**6.6**	1 U	1 U	0.2 U	**1.0**	1 U	1 U	0.2 U
10/2016	--	--	--	--	**0.8 J**	1 U	1 U	0.2 U	--	--	--	--
4/2017	**0.57 J**	1 U	1 U	0.2 U	**12**	1 U	1 U	0.2 U	**1.6**	1 U	1 U	0.2 U
9/2017	--	--	--	--	**5.4**	1 U	1 U	1 U	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

U: Analyte was not detected at or above the reported value.
J: Analyte was positively identified. The associated numerical result is an estimate.
UJ: The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte in the sample.
E: Reported result is an estimate because it exceeds the calibration range.
REJ: Rejected. Result considered suspect due to possible cross-contamination. Well re-sampled in December 2005.
Bold: Analyte was detected.
Shade: Values are greater than MTCA cleanup levels.
--: Not Sampled.

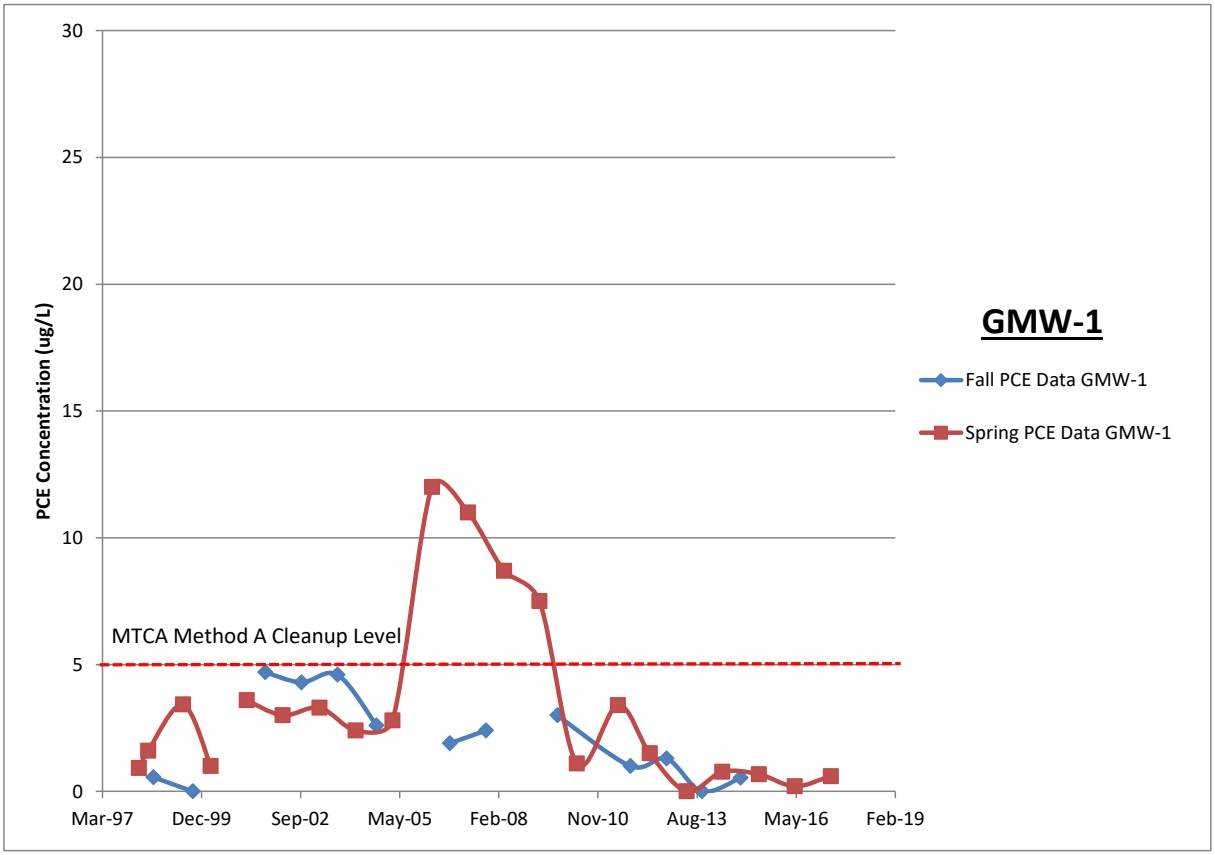

Figure C-1. Goodwill, Well GMW-1 PCE Results (ug/L), March 1998 to April 2017.

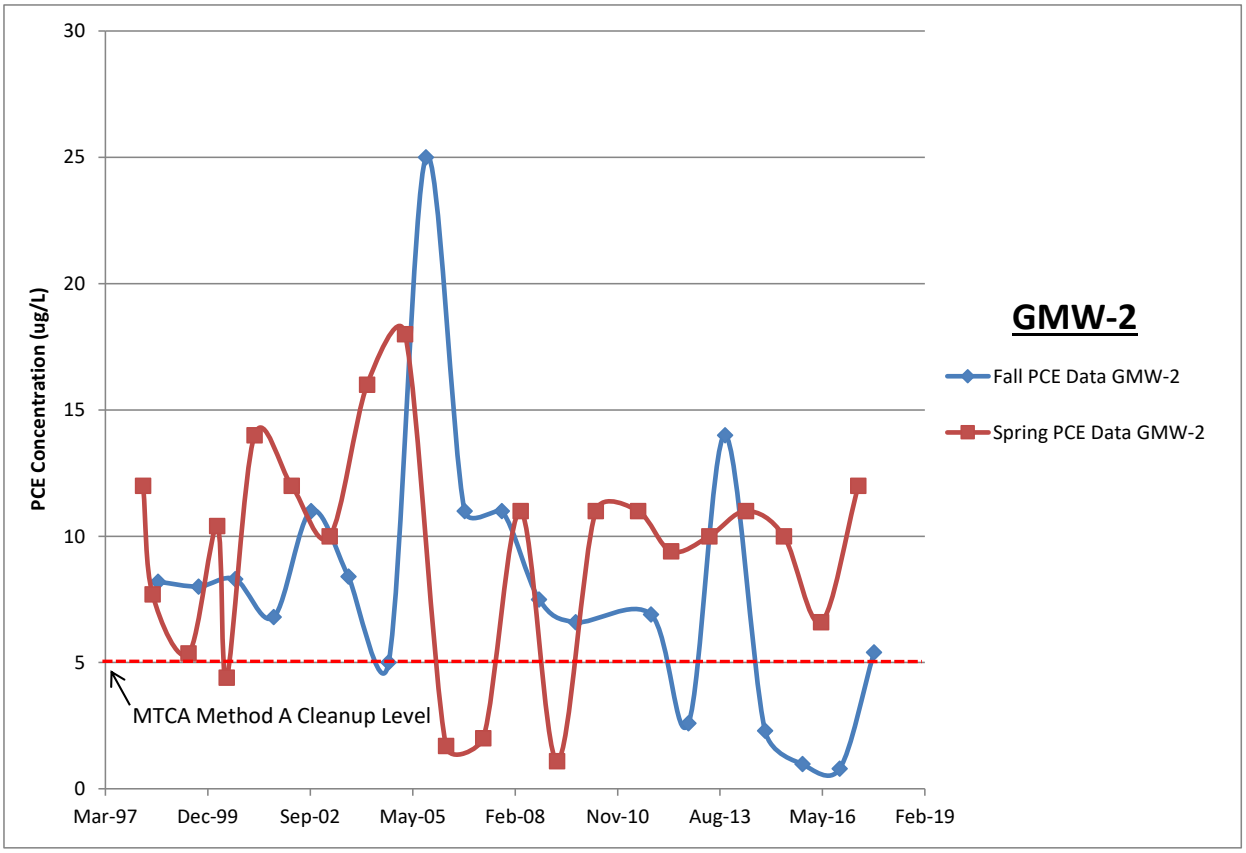

Figure C-2. Goodwill, Well GMW-2 PCE Results (ug/L), March 1998 to September 2017.

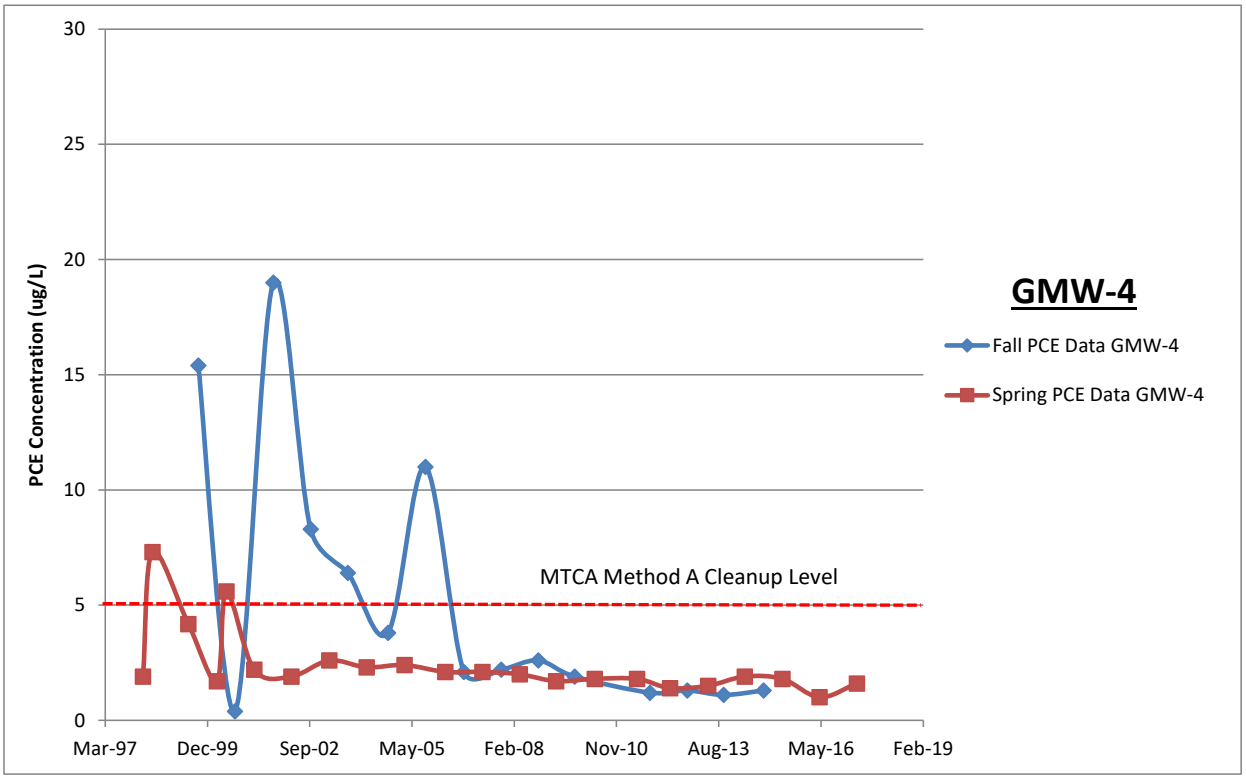

Figure C-3. Goodwill, Well GMW-4 PCE Results (ug/L), March 1998 to April 2017.

Table C-2: Summary of Analytical Results (ug/L) for Nu-Way Cleaners, December 1997 to September 2017.

Date	NMW-1				NMW-2				NMW-3			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	**1.8**	2 U	2 U	2 U	**2**	2 U	2 U	2 U	**3**	2 U	2 U	2 U
3/3/98	**4.4**	1 U	1 U	1 U	**3.4**	1 U	1 U	1 U	**3.7**	1 U	1 U	1 U
6/1/98	**4.4**	1 U	1 U	1 UJ	1 U	1 U	1 U	1 UJ	**3.8**	1 U	1 U	1 UJ
8/31/98	**1.7 J**	1 U	1 U	1 UJ	**1.1 J**	1 UJ	1 UJ	1 UJ	**2.3 J**	1 UJ	1 UJ	1 UJ
6/2/99	**5.28**	0.15 U	0.1 U	0.14 U	**2.9**	0.15 U	0.1 U	0.14 U	0.25 U	0.15 U	0.1 U	0.14 U
9/8/99	**2.72**	0.15 U	0.1 U	0.14 U	**1.1**	0.15 U	0.1 U	0.14 U	**3.17**	0.15 U	0.1 U	0.14 U
12/7/99	**3.28**	0.15 U	0.1 U	0.14 U	**3.31**	0.15 U	0.1 U	0.14 U	**5.11**	0.15 U	0.1 U	0.14 U
3/7/00	**2.63**	0.15 U	0.1 U	0.14 U	**2.9**	0.15 U	0.1 U	0.14 U	**5.36**	0.15 U	0.1 U	0.14 U
6/7/00	**4.2**	0.15 U	0.1 U	0.14 U	**2.7**	0.15 U	0.1 U	0.14 U	**3.2**	0.15 U	0.1 U	0.14 U
8/30/00	**1.8**	0.15 U	0.1 U	0.14 U	**1.5**	0.15 U	0.1 U	0.14 U	**2.1**	0.15 U	0.1 U	0.14 U
12/12/00	**3.2**	0.15 U	0.1 U	0.14 U	**3.1**	0.15 U	0.1 U	0.14 U	**5.3**	0.15 U	0.1 U	0.14 U
3/6/01	**2.1**	0.15 U	0.1 U	0.14 U	**2.3**	0.15 U	0.1 U	0.14 U	**3.6**	0.15 U	0.1 U	0.14 U
9/10/01	**1.5**	0.2 U	0.2 U	0.2 U	**1.1**	0.2 U	0.2 U	0.2 U	**1.8**	0.2 U	0.2 U	0.2 U
3/4/02	**1.1**	0.2 U	0.2 U	0.2 U	**1.5**	0.2 U	0.2 U	0.2 U	**2.3**	0.2 U	0.2 U	0.2 U
9/9/02	**2**	0.2 U	0.2 U	0.2 U	**1.6**	0.2 U	0.2 U	0.2 U	**1.8**	0.2 U	0.2 U	0.2 U
3/11/03	**4.1**	0.2 U	0.2 U	0.2 U	**3.3**	0.2 U	0.2 U	0.2 U	**5.5**	0.2 U	0.2 U	0.2 U
9/9/03	**2**	0.2 U	0.2 U	0.2 U	**1.5**	0.2 U	0.2 U	0.2 U	**2.1**	0.2 U	0.2 U	0.2 U
3/9/04	**3.3**	0.2 U	0.2 U	0.2 U	**3.4**	0.2 U	0.2 U	0.2 U	**3.5**	0.2 U	0.2 U	0.2 U
10/5/04	**0.99**	0.2 U	0.2 U	0.2 U	**1.1**	0.2 U	0.2 U	0.2 U	**1.3**	0.2 U	0.2 U	0.2 U
3/15/05	**2.1**	**0.24**	0.2 U	0.2 U	**2.4**	0.2 U	0.2 U	0.2 U	**3.6**	0.2 U	0.2 U	0.2 U
10/11/05	REJ				REJ				REJ			
12/13/05	**2.4**	0.2 U	0.2 U	0.2 U	**1.8**	0.2 U	0.2 U	0.2 U	**2.2**	0.2 U	0.2 U	0.2 U
4/18/06	**3.2**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**2.2**	0.2 U	0.2 U	0.2 U
10/17/06	**0.63**	0.2 U	0.2 U	0.2 U	**0.67**	0.2 U	0.2 U	0.2 U	**0.9**	0.2 U	0.2 U	0.2 U
4/17/07	**0.79**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.47**	0.2 U	0.2 U	0.2 U
10/16/07	**1.3**	0.2 U	0.2 U	0.2 U	**0.66**	0.2 U	0.2 U	0.2 U	**1.3**	0.2 U	0.2 U	0.2 U
4/15/08	**0.38**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	**0.24**	0.2 U	0.2 U	0.2 U
10/13/08	**0.63**	1 U	1 U	0.2 U	0.8 U	1 U	1 U	0.2 U	**1.7**	1 U	1 U	0.2 U
4/7/09	**1.8**	1 U	1 U	0.2 U	**1.9**	1 U	1 U	0.2 U	**1.3**	1 U	1 U	0.2 U
10/5/09	**1.7**	1 U	1 U	0.2 U	**1.3**	1 U	1 U	0.2 U	**1.8**	1 U	1 U	0.2 U
4/19/10	**2.3**	1 U	1 U	0.2 U	**2.4**	1 U	1 U	0.2 U	**4.8**	1 U	1 U	0.2 U
6/7/11	**5.5**	1 U	1 U	0.2 U	**4**	1 U	1 U	0.2 U	**3.7**	1 U	1 U	0.2 U
10/11/11	**1.1**	0.2 U	0.2 U	0.2 U	**0.93**	0.2 U	0.2 U	0.2 U	**1.2**	0.2 U	0.2 U	0.2 U
4/24/12	**2.1**	0.2 U	0.2 U	0.2 U	**1.5**	0.2 U	0.2 U	0.2 U	**2.7**	0.2 U	0.2 U	0.2 U
10/10/12	**1.6**	0.2 U	0.2 U	0.2 U	**1.2**	0.2 U	0.2 U	0.2 U	**1.3**	0.2 U	0.2 U	0.2 U
5/2013	**1.6**	1 U	1 U	1 U	NS				--	--	--	--
10/2013	**2.3**	1 U	1 U	1 U	**1.6**	1 U	1 U	1 U	--	--	--	--

Date	NMW-1				NMW-2				NMW-3			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**2.3 J**	1 U	1 U	1 U	NS				--	--	--	--
10/2014	**2.1**	1 U	1 U	0.2 U	--	--	--	--	--	--	--	--
4/2015	**2.1 J**	1 UJ	1 UJ	0.2 UJ	NS				--	--	--	--
10/2015	--	--	--	--	--	--	--	--	--	--	--	--
4/2016	**2.6**	1 U	1 U	0.2 U	NS				--	--	--	--
10/2016	--	--	--	--	Well Decommissioned				--	--	--	--
4/2017	**2.5**	**0.59 J**	1 U	0.2 U					--	--	--	--
9/2017	--	--	--	--					**1.6**	1 U	1 U	0.2 U
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

U: Analyte was not detected at or above the reported value.
J: Analyte was positively identified. The associated numerical result is an estimate.
UJ: The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte in the sample.
REJ: Rejected. Result considered suspect due to possible cross-contamination. Well re-sampled in December 2005.
NS: Not sampled due to a low water level and/or insufficient volume of water.
Bold: Analyte was detected.
Shade: Values are greater than MTCA cleanup levels.
--: Not Sampled.

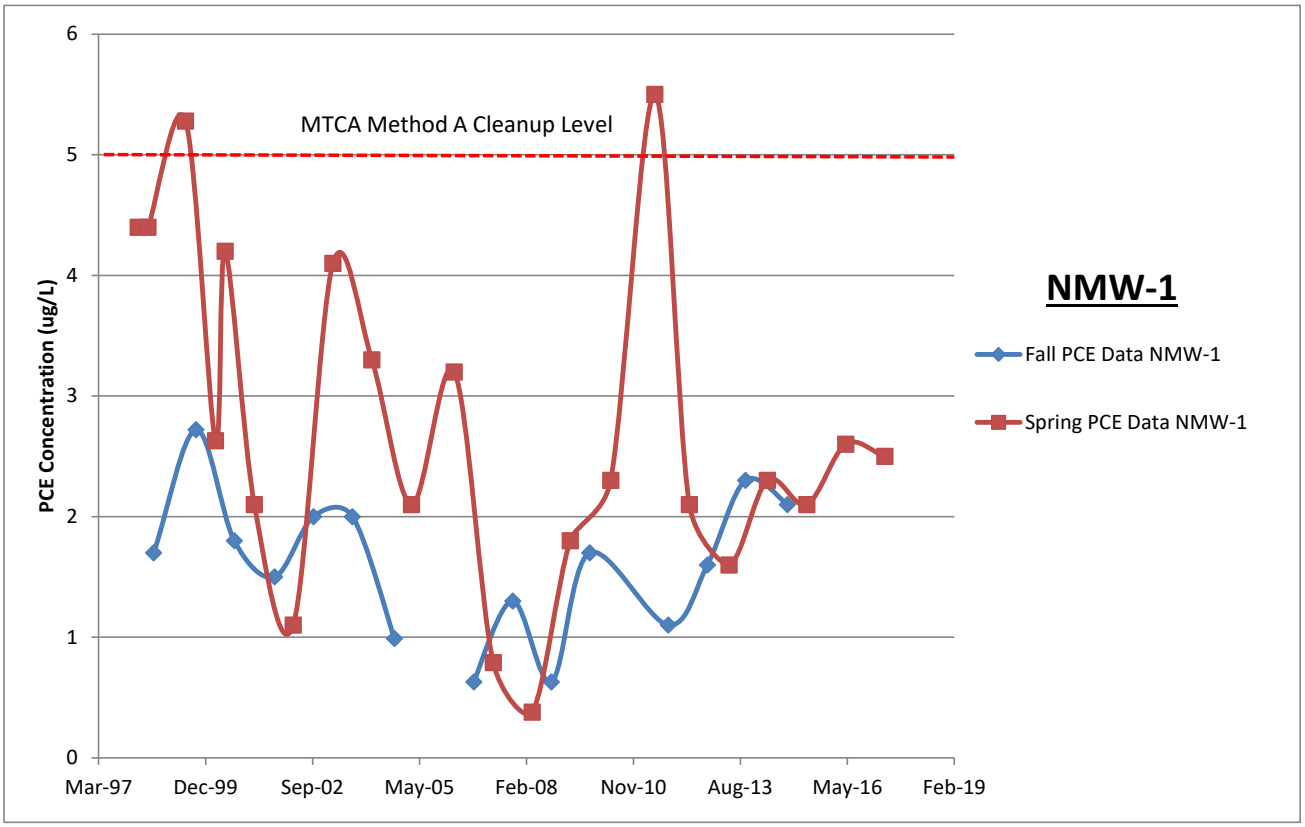

Figure C-4. Nu-Way Cleaners, Well NMW-1 PCE Results (ug/L), March 1998 to April 2017.

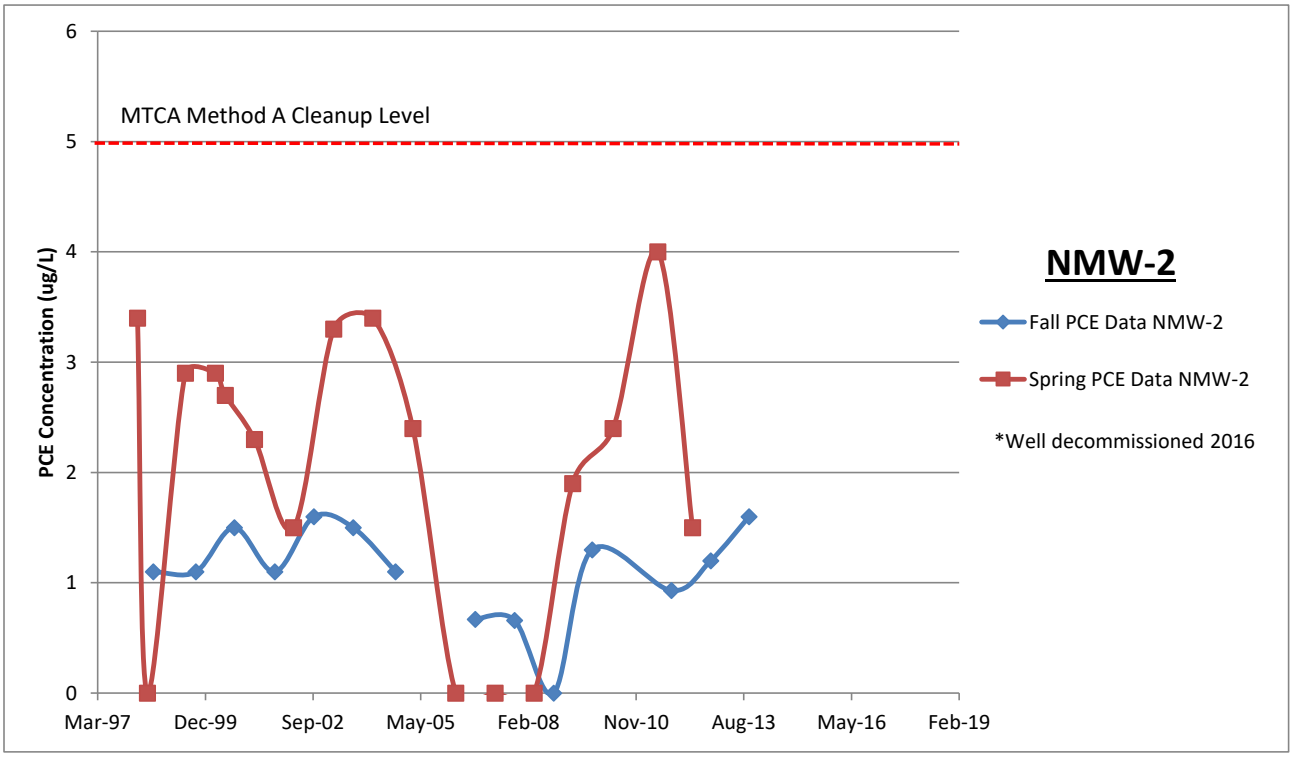

Figure C-5. Nu-Way Cleaners, Well NMW-2 PCE Results (ug/L), March 1998 to October 2013.

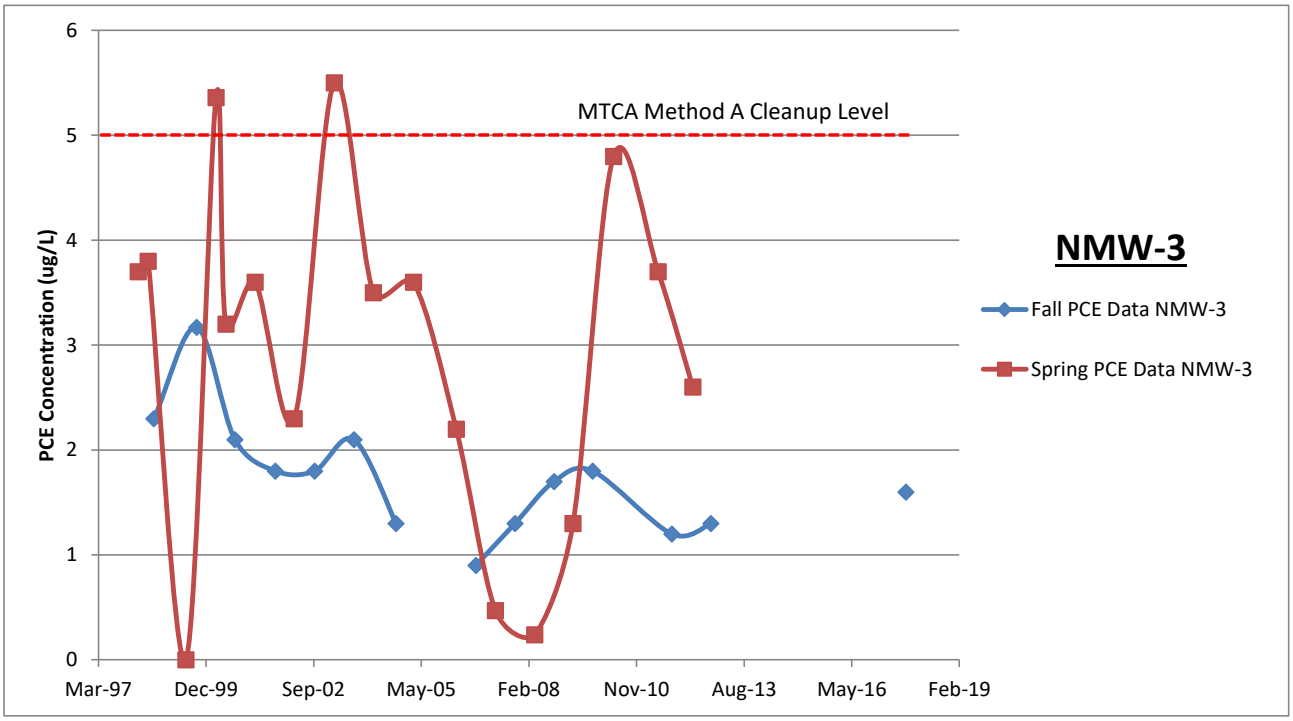

Figure C-6. Nu-Way Cleaners, Well NMW-3 PCE Results (ug/L), March 1998 to September 2017.

Table C-3: Summary of Analytical Results (ug/L) for Southgate Laundry, June 1999 to September 2017.

Date	SGMW-1				SGMW-2				SGMW-3			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	--	--	--	--	--	--	--	--	--	--	--	--
3/3/98	--	--	--	--	--	--	--	--	--	--	--	--
6/1/98	--	--	--	--	--	--	--	--	--	--	--	--
8/31/98	--	--	--	--	--	--	--	--	--	--	--	--
6/2/99	**2.23**	0.15 U	0.1 U	0.14 U	**27.4**	0.15 U	0.1 U	0.14 U	**21.2**	0.15 U	0.1 U	0.14 U
9/8/99	0.25 U	0.15 U	0.1 U	0.14 U	**8.54**	0.15 U	0.1 U	0.14 U	**6.35**	0.15 U	0.1 U	0.14 U
12/7/99	**1.54**	0.15 U	0.1 U	0.14 U	**4.72**	**0.65 J**	0.1 U	0.14 U	**4.39**	**0.37 J**	0.1 U	0.14 U
3/9/00	**0.34 J**	0.15 U	0.1 U	0.14 U	**2.13**	0.15 U	0.1 U	0.14 U	**10.2**	0.15 U	0.1 U	0.14 U
6/7/00	**1.2**	0.15 U	0.1 U	0.14 U	**26**	0.15 U	0.1 U	0.14 U	**29**	0.15 U	0.1 U	0.14 U
8/30/00	**0.37**	0.15 U	0.1 U	0.14 U	**7.1**	0.15 U	0.1 U	0.14 U	**21**	0.15 U	0.1 U	0.14 U
12/12/00	**0.82**	0.15 U	0.1 U	0.14 U	**5.5**	0.15 U	0.1 U	0.14 U	**3.5**	0.15 U	0.1 U	0.14 U
3/6/01	**0.87**	0.15 U	0.1 U	0.14 U	**2.4**	0.15 U	0.1 U	0.14 U	**5.6**	0.15 U	0.1 U	0.14 U
9/10/01	**0.34**	0.2 U	0.2 U	0.2 U	**8.6**	0.2 U	0.2 U	0.2 U	**15**	0.2 U	0.2 U	0.2 U
3/4/02	**0.29**	0.2 U	0.2 U	0.2 U	**2.5**	0.2 U	0.2 U	0.2 U	**4.6**	0.2 U	0.2 U	0.2 U
9/9/02	**0.38**	0.2 U	0.2 U	0.2 U	**11**	0.2 U	0.2 U	0.2 U	**16**	0.2 U	0.2 U	0.2 U
3/11/03	**0.38**	0.2 U	0.2 U	0.2 U	**1.5**	0.2 U	0.2 U	0.2 U	**4.7**	0.2 U	0.2 U	0.2 U
9/9/03	**0.51**	0.2 U	0.2 U	0.2 U	**8.1**	0.2 U	0.2 U	0.2 U	**22**	0.2 U	0.2 U	0.2 U
3/9/04	**1.6**	0.2 U	0.2 U	0.2 U	**1.6**	0.2 U	0.2 U	0.2 U	**7.6**	0.2 U	0.2 U	0.2 U
10/5/04	**0.34**	0.2 U	0.2 U	0.2 U	**5.2**	0.2 U	0.2 U	0.2 U	**2.1**	0.2 U	0.2 U	0.2 U
3/15/05	**4.8**	0.2 U	0.2 U	0.2 U	**6.4**	**0.23**	0.2 U	0.2 U	**8.1**	**0.21**	0.2 U	0.2 U
10/12/05	REJ				**10**	0.2 U	0.2 U	0.2 U	**4**	0.2 U	0.2 U	0.2 U
12/14/05	**0.35**	0.2 U	0.2 U	0.2 U	--	--	--	--	--	--	--	--
4/19/06	**0.33**	0.2 U	0.2 U	0.2 U	**0.79**	0.2 U	0.2 U	0.2 U	**2.4**	0.2 U	0.2 U	0.2 U
10/18/06	**0.35**	0.2 U	0.2 U	0.2 U	**2.6**	0.2 U	0.2 U	0.2 U	**3.8**	0.2 U	0.2 U	0.2 U
4/18/07	**0.49**	0.2 U	0.2 U	0.2 U	**0.82**	0.2 U	0.2 U	0.2 U	**4**	0.2 U	0.2 U	0.2 U
10/17/07	**0.38**	0.2 U	0.2 U	0.2 U	**2.6**	0.2 U	0.2 U	0.2 U	**4.4**	0.2 U	0.2 U	0.2 U
4/15/08	**0.31**	0.2 U	0.2 U	0.2 U	**0.5**	0.2 U	0.2 U	0.2 U	**1.9**	0.2 U	0.2 U	0.2 U
10/14/08	0.8 U	1 U	1 U	0.2 U	**2.7**	1 U	1 U	0.2 U	**1.8**	1 U	1 U	0.2 U
4/7/09	1 U	1 U	1 U	0.2 U	**0.6 J**	1 U	1 U	0.2 U	**3.2**	1 U	1 U	0.2 U
10/6/09	1 U	1 U	1 U	0.2 U	**2.3**	1 U	1 U	0.2 U	**1.6**	1 U	1 U	0.2 U
4/21/10	1 U	1 U	1 U	0.2 U	1 U	1 U	1 U	0.2 U	**2.8**	1 U	1 U	0.2 U
6/7/11	1 U	1 U	1 U	0.2 U	**4.5**	1 U	1 U	0.2 U	**3.4**	1 U	1 U	0.2 U
10/11/11	0.2 U	0.2 U	0.2 U	0.2 U	**2.1**	0.2 U	0.2 U	0.2 U	**1.7**	0.2 U	0.2 U	0.2 U
4/23/12	**0.23**	0.2 U	0.2 U	0.2 U	**0.34**	0.2 U	0.2 U	0.2 U	**1.9**	0.2 U	0.2 U	0.2 U
10/11/12	0.2 U	0.2 U	0.2 U	0.2 U	**2**	0.2 U	0.2 U	0.2 U	--	--	--	--
5/2013	1 U	1 U	1 U	1 U	**1.5**	1 U	1 U	1 U	**1.7**	1 U	1 U	1 U
10/2013	1 U	1 U	1 U	1 U	**1.9**	1 U	1 U	1 U	**2.4**	1 U	1 U	1 U

Date	SGMW-1				SGMW-2				SGMW-3			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**0.83 J**	1 U	1 U	1 U	**0.89 J**	1 U	1 U	1 U	**1.9 J**	1 U	1 U	1 U
10/2014	1 U	1 U	1 U	0.2 U	**1.9**	1 U	1 U	0.2 U	**1.6**	1 U	1 U	0.2 U
4/2015	--	--	--	--	--	--	--	--	--	--	--	--
10/2015	**0.34 J**	1 U	1 U	0.2 U	**1.8**	1 U	1 U	0.2 U	--	--	--	--
4/2016	--	--	--	--	--	--	--	--	--	--	--	--
10/2016	--	--	--	--	**1.7 J**	1 U	1 U	0.2 U	**1.7 J**	1 U	1 U	0.2 U
4/2017	--	--	--	--	--	--	--	--	--	--	--	--
9/2017	1 U	1 U	1 U	0.2 U	**1.2**	1 U	1 U	1 U	**0.82 J**	1 U	1 U	1 U
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

U: Analyte was not detected at or above the reported value.
J: Analyte was positively identified. The associated numerical result is an estimate.
REJ: Rejected. Result considered suspect due to possible cross-contamination. Well re-sampled in December 2005.
Bold: Analyte was detected.
Shade: Values are greater than MTCA cleanup levels.
--: Not Sampled.

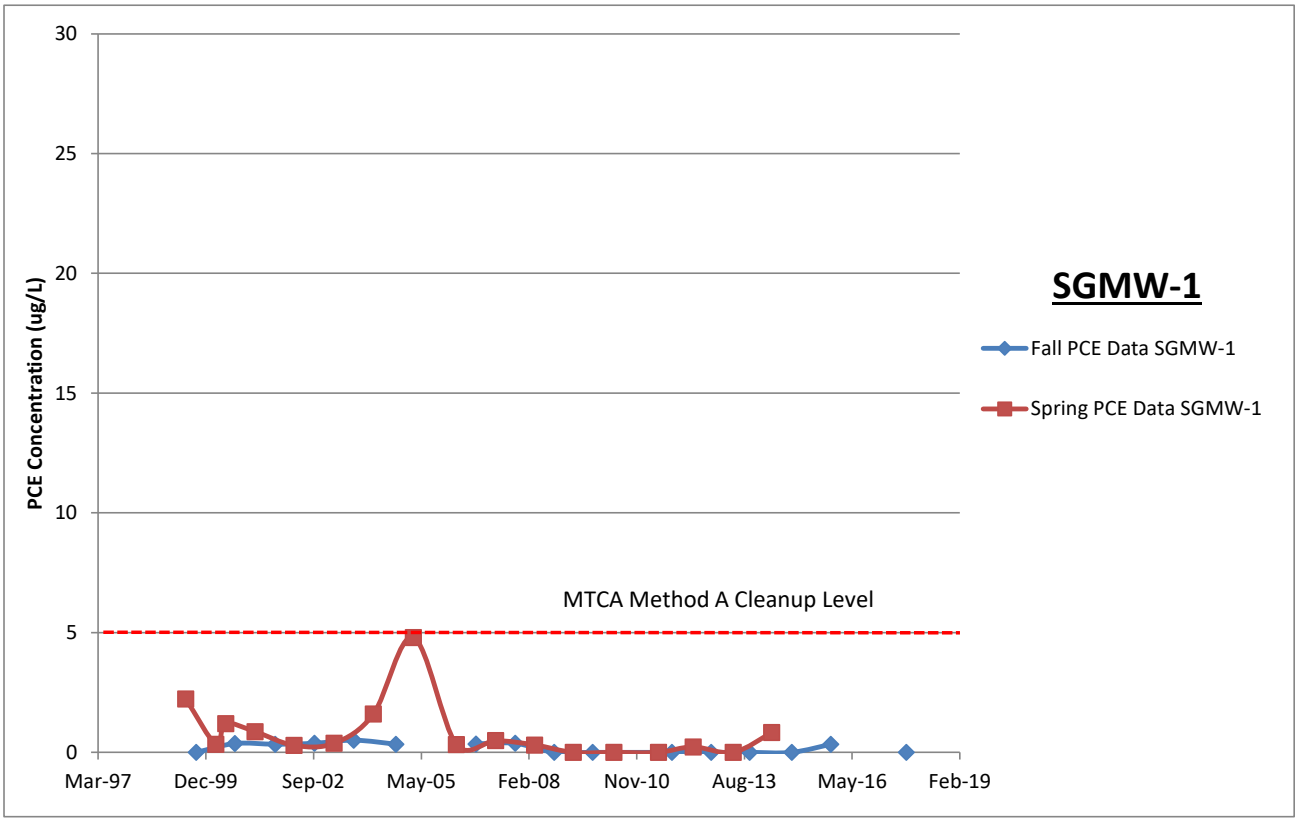

Figure C-7. Southgate Laundry, Well SGMW-1 PCE Results (ug/L), June 1999 to September 2017.

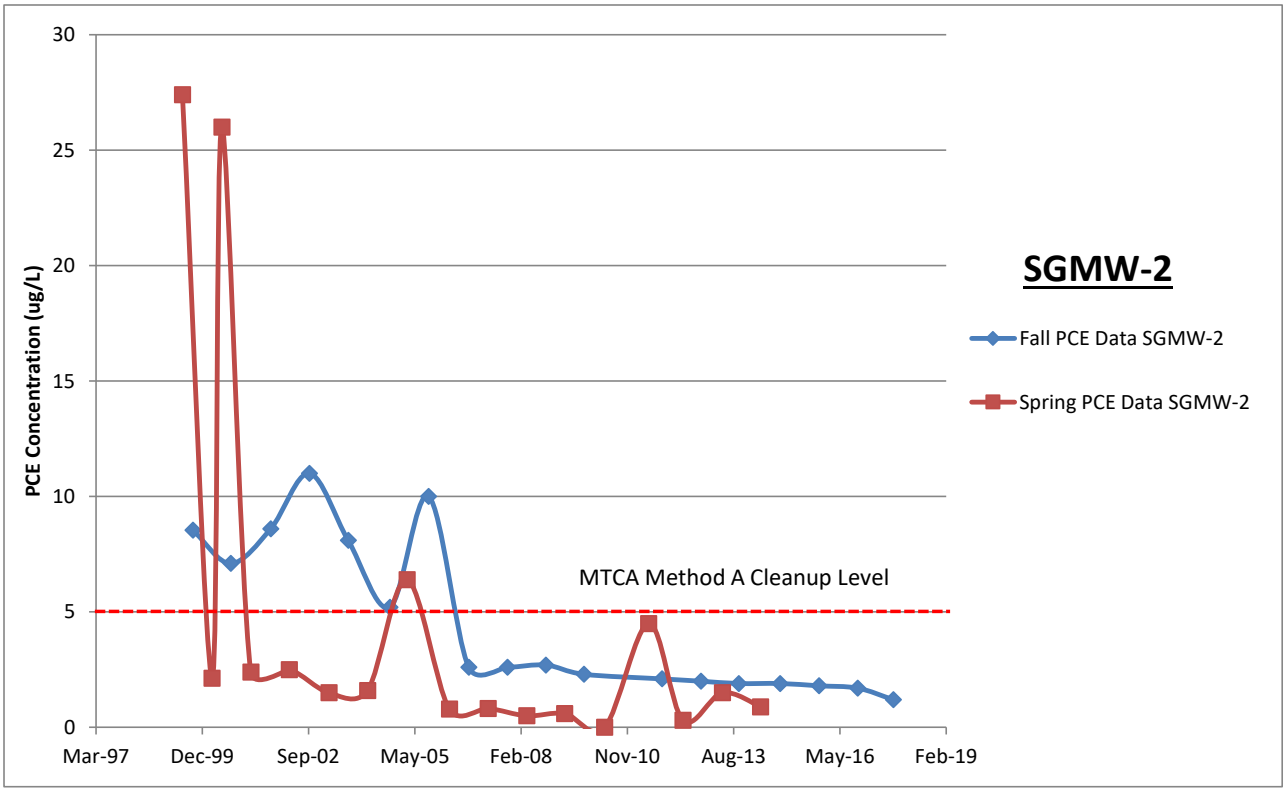

Figure C-8. Southgate Laundry, Well SGMW-2 PCE Results (ug/L), June 1999 to September 2017.

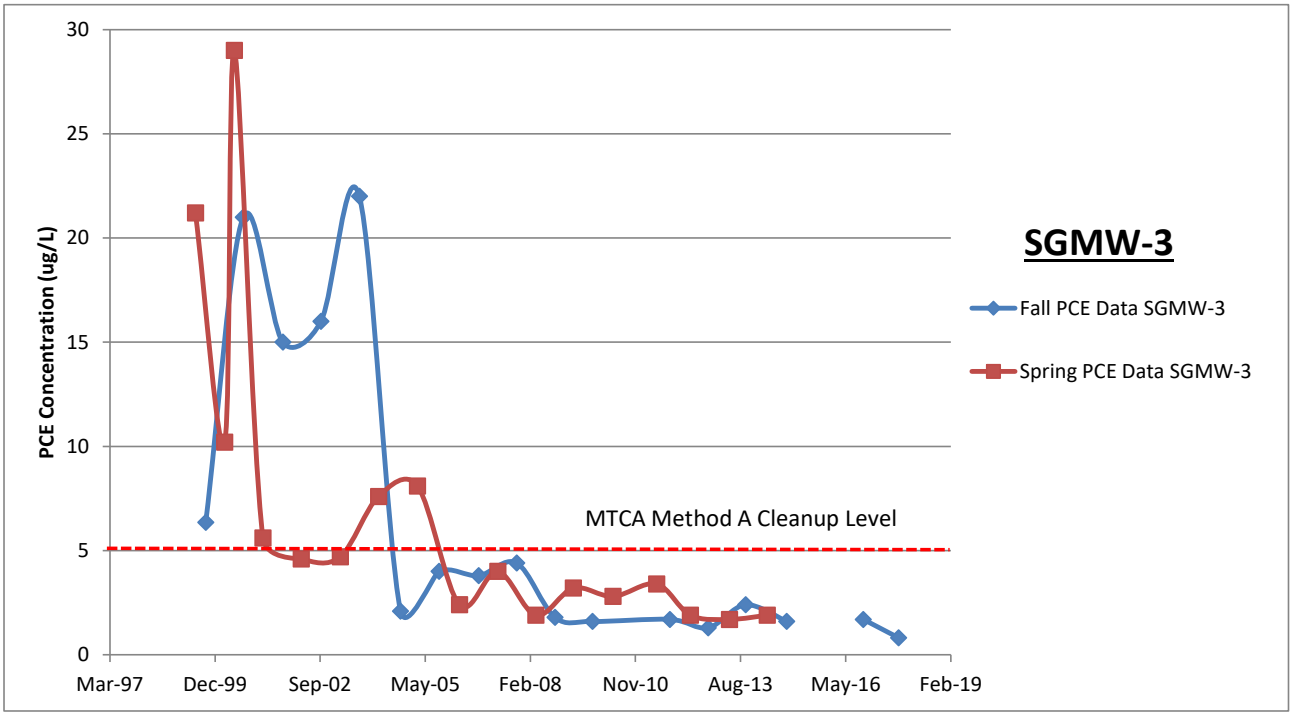

Figure C-9. Southgate Laundry, Well SGMW-3 PCE Results (ug/L), June 1999 to September 2017.

Table C-4: Summary of Analytical Results (ug/L) for Washington Central Railroad Roundhouse, December 1997 to September 2017.

Date	WDOE-3S				WDOE-3I				WDOE-3D			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	--	--	--	--	**11**	**1.2 J**	**0.25 J**	**0.59 J**	--	--	--	--
3/3/98	--	--	--	--	**4.1**	**1.3**	**0.88 J**	**2.7**	--	--	--	--
6/1/98	--	--	--	--	**20**	**1.3**	1 U	1 UJ	--	--	--	--
8/31/98	--	--	--	--	**18**	**0.88 J**	**0.04 J**	1 UJ	--	--	--	--
6/2/99	**50.9**	ND	ND	ND	**35.1**	**2.17**	ND	**0.23 J**	**16.4**	**1.76**	ND	**0.98 J**
9/8/99	**21.2**	ND	ND	ND	**28.2**	**0.93 J**	ND	ND	**13.3**	**1.75**	ND	**1.19**
12/7/99	**40.8**	ND	ND	ND	**17.4**	**2.86**	**0.91 J**	**2.03**	**15.3**	**2.23**	**0.77 J**	**1.55**
3/7/00	NS				**0.61 J**	ND	**0.68 J**	**3.24**	**7.99**	**1.54**	ND	**2.03**
6/7/00	**90**	**0.71**	ND	ND	**42**	**1.9**	**0.27**	**0.36**	**1.6**	**3.2**	**0.3**	**0.62**
8/30/00	**11**	ND	ND	ND	**20**	**1.1**	**0.2**	**0.21**	**12**	**2**	**0.59**	**1.2**
12/12/00	--	--	--	--	--	--	--	--	--	--	--	--
3/6/01	--	--	--	--	**1.2**	**0.45**	**0.54**	**7.5**	**8.1**	**1.7**	**0.61**	**3.6**
9/10/01	**9.3**	< 0.2	< 0.2	< 0.2	**15**	**1.6**	**0.33**	**0.5**	**9.4**	**1.8**	**0.46**	**1.1**
3/4/02	NS				**0.74**	**0.51**	**0.35**	**3**	**7.3**	**1.6**	**0.38**	**1.4**
9/9/02	**8.7**	< 0.2	< 0.2	< 0.2	**15**	**1.2**	**0.27**	**0.26**	**9.4**	**1.7**	**0.48**	**0.74**
3/11/03	NS				< 0.2	**1**	**0.58**	**2.2**	**7.8**	**1.7**	**0.35**	**1.1**
9/9/03	**9.1**	< 0.2	< 0.2	< 0.2	**15**	**1.8**	**0.34**	**0.64**	**12**	**1.9**	**0.32**	**0.89**
3/9/04	NS				< 0.2	**0.47**	**0.32**	**2.8**	**9.1**	**1.8**	**0.4**	**1**
10/5/04	**5.5**	< 0.2	< 0.2	< 0.2	**8.8**	**1.9**	**0.47**	**0.99**	**7.7**	**1.9**	**0.38**	**1.1**
3/15/05	NS				**0.32**	**0.35**	**0.37**	**3.5**	**11**	**1.9**	**0.48**	**1.1**
10/11/05	**13**	< 0.2	< 0.2	< 0.2	**18**	**1.1**	**0.36**	**0.65**	**9**	**1.4**	**0.39**	**0.92**
12/13/05	--	--	--	--	--	--	--	--	--	--	--	--
4/18/06	NS				**0.22**	**0.46**	**0.45**	**4.5**	**5.8**	**1.8**	**0.5**	**1.5**
10/17/06	**4.5**	< 0.2	< 0.2	< 0.2	**9.1**	**1.3**	**0.42**	**0.47**	**7.3**	**1.6**	**0.39**	**0.62**
4/17/07	NS				**0.5**	**0.74**	**0.76**	**4.4**	**6.5**	**2**	**0.56**	**0.87**
10/16/07	**5.5**	< 0.2	< 0.2	< 0.2	**11**	**1.1**	**0.41**	**0.41**	**8.5**	**1.7**	**0.41**	**0.59**
4/15/08	NS				**0.61**	**0.53**	**0.69**	**5.7**	**6.3**	**1.7**	**0.45**	**0.92**
10/13/08	**7.9**	1 U	1 U	0.2 U	**11**	**1.3**	1 U	0.2 U	**8.8**	**1.7**	1 U	0.2 U
4/7/09	NS				**0.13 J**	**0.69 J**	**3.1**	0.2 U	**9.9**	**2.9**	**2.9**	0.2 U
10/8/09	**11**	1 U	1 U	0.2 U	**13**	**2.2**	1 U	**0.85**	**11**	**2.3**	1 U	**0.5**
4/19/10	NS				**2.4**	**1.1**	1 U	**3.8**	**8.9**	**2.5**	1 U	1 U
6/7/11	REJ				REJ				REJ			
10/11/11	**8.8**	0.2 U	0.2 U	0.2 U	**7.9**	**4.1**	**1.8**	**1.2**	**9.6**	**2**	**0.42**	0.2 U
4/24/12	--	--	--	--	**1.1**	**1.1**	**1.3**	**4.2**	**7.1**	**2.1**	**0.54**	**0.27**
10/10/12	**8.7**	0.2 U	0.2 U	0.2 U	**6.9**	**5.5**	**2.1**	**0.99**	**9.7**	**2.1**	**0.4**	0.2 U
5/2013	NS				**4.3**	**3.2**	**2.6**	**6.4**	**13**	**3.4**	**1**	**0.49 J**
10/2013	**19**	1 U	1 U	1 U	**8.2**	**4.8**	**3.5**	**3.1**	**15**	**2.5**	**0.36 J**	1 U

Date	WDOE-3S				WDOE-3I				WDOE-3D			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	NS				**1.6 J**	**3**	**2.5**	**8.9**	**11 J**	**3.5**	**1**	**0.46 J**
10/2014	**12**	**1.8**	**16**	0.2 U	**10**	**15**	**48**	**4.2**	**15**	**5**	**8.7**	**0.56**
4/2015	--	--	--	--	--	--	--	--	--	--	--	--
10/2015	**11**	**1.1**	**4.1**	**0.11 J**	**5.6**	**4.5**	**12**	**41 J**	**13**	**3.9**	**7.1**	**3.9 J**
4/2016	--	--	--	--	--	--	--	--	--	--	--	--
10/2016	**10**	**1.1**	**1.8**	0.2 U	**12**	**4.6**	**6.4**	**3.7 J**	**11**	**3.8**	**4.6**	**0.53**
4/2017	--	--	--	--	--	--	--	--	--	--	--	--
9/2017	--	--	--	--	--	--	--	--	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

ND: Analyte was not detected.
NS: Not sampled due to a low water level or insufficient volume of water.
U: Analyte was not detected at or above the reported value.
J: Analyte was positively identified. The associated numerical result is an estimate.
UJ: The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte in the sample.
Bold: Analyte was detected.
Shade: Values are greater than MTCA cleanup levels.
--: Not Sampled.

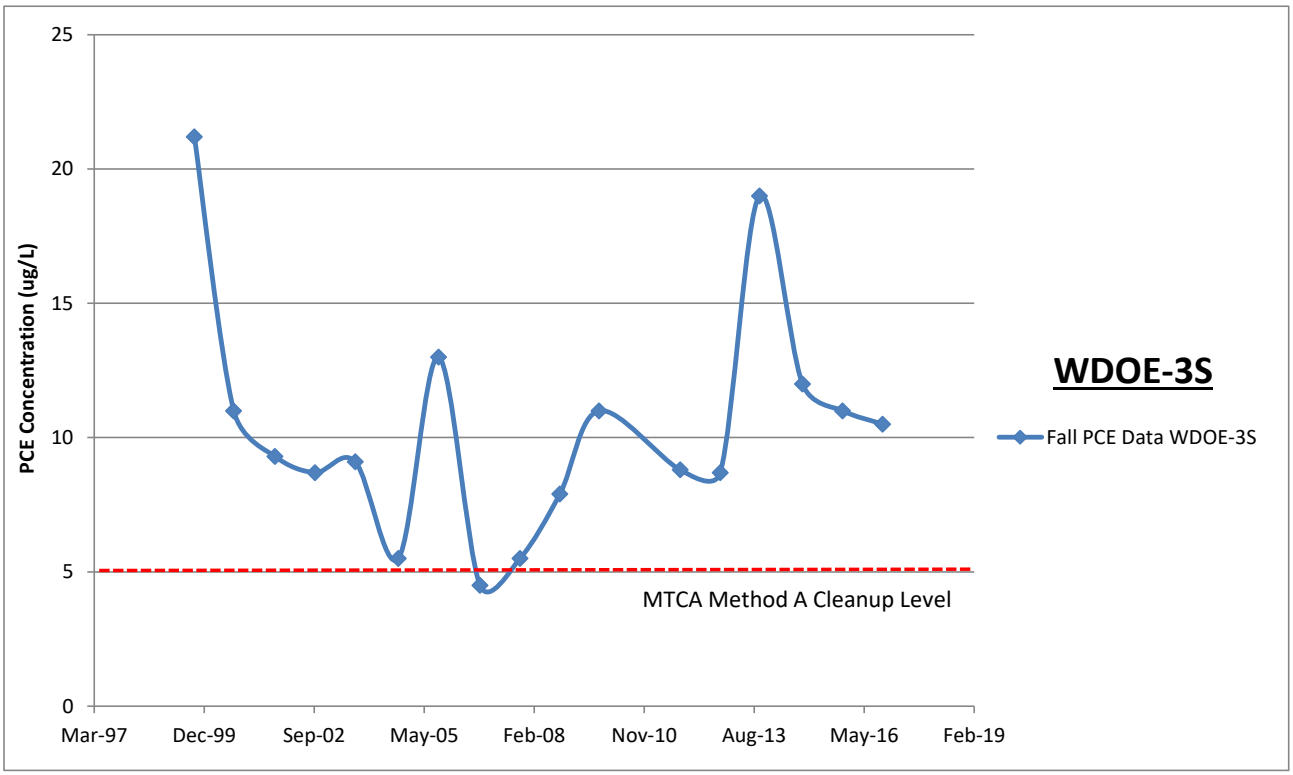

Figure C-10. Washington Central Railroad Roundhouse, Well WDOE-3S PCE Results (ug/L), September 1999 to October 2016.

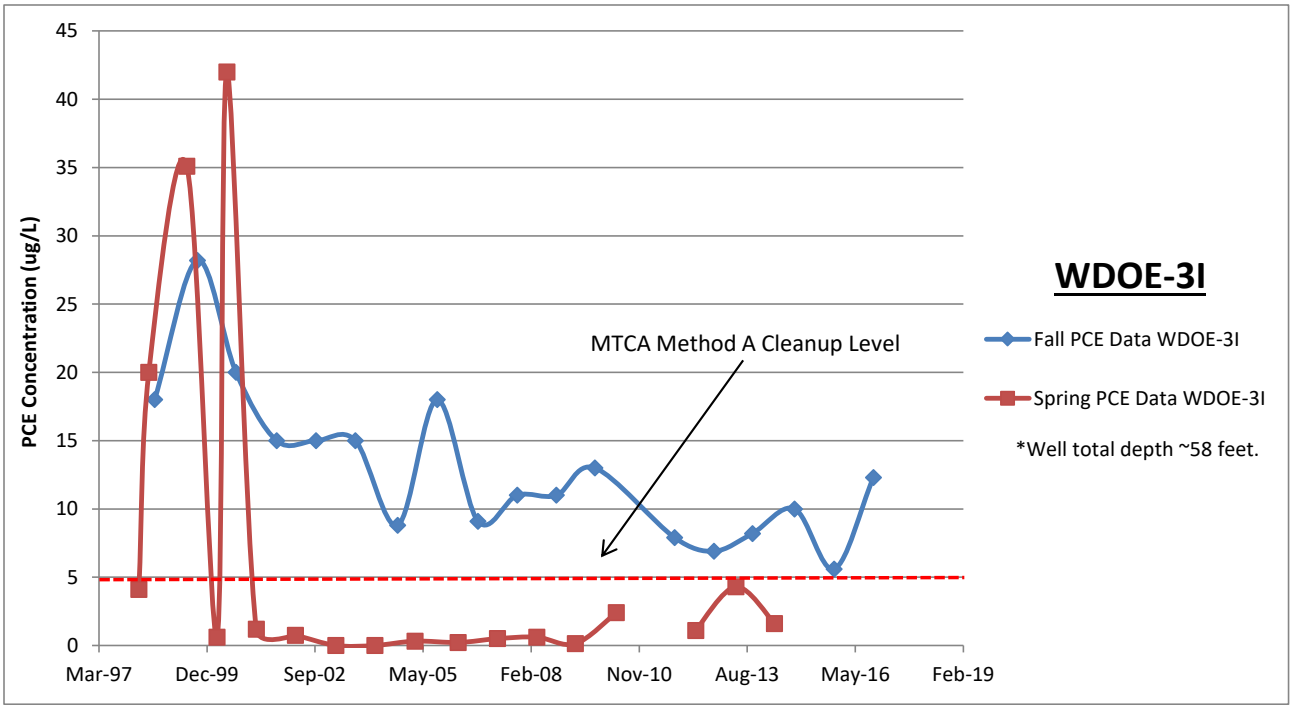

Figure C-11. Washington Central Railroad Roundhouse, Well WDOE-3I PCE Results (ug/L), March 1998 to October 2016.

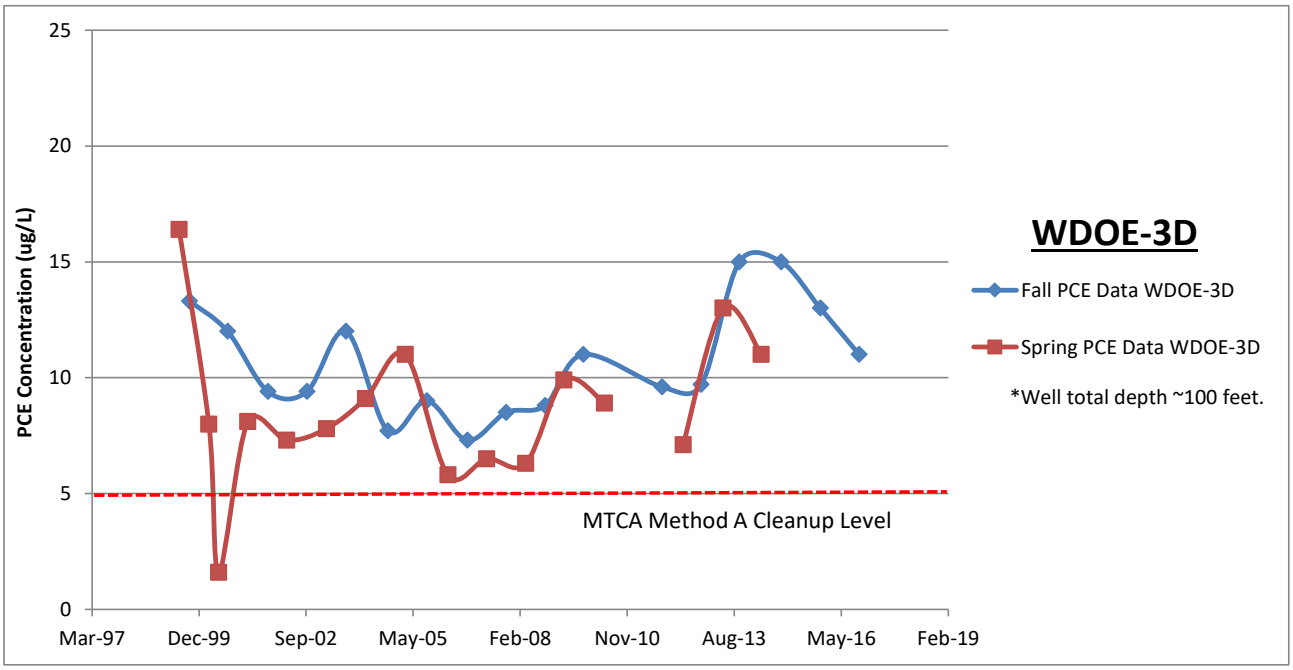

Figure C-12. Washington Central Railroad Roundhouse, Well WDOE-3D PCE Results (ug/L), June 1999 to October 2016.

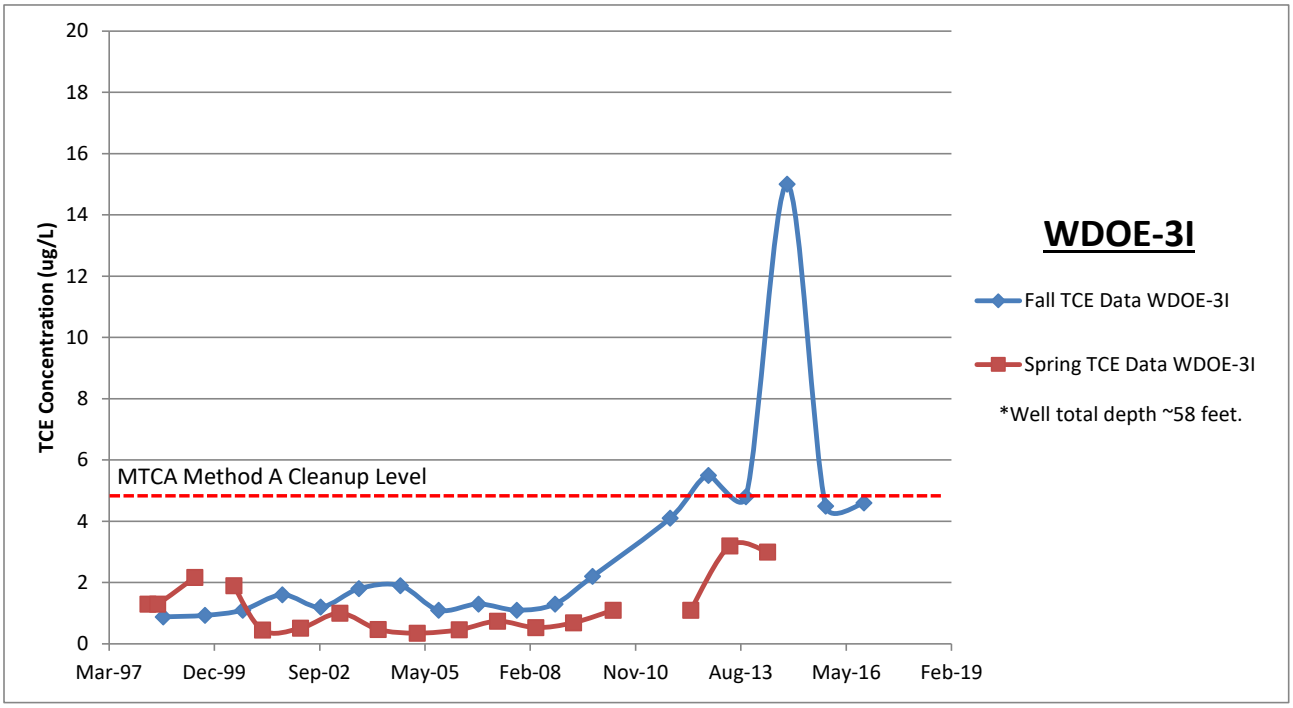

Figure C-13. Washington Central Railroad Roundhouse, Well WDOE-3I TCE Results (ug/L), June 1999 to October 2016.

Table C-5: Summary of Analytical Results (ug/L) for Fifth Wheel Truck Repair and Agri-Tech/Yakima Steel, June 1999 to September 2017.

Date	5WMW-2				ATMW-4			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
6/2/99	**3.74**	ND	ND	ND	**2.04**	ND	**2.15**	ND
9/8/99	**11.3**	ND	ND	ND	**4.07**	**0.73 J**	**4.95**	ND
12/7/99	**8.1**	**0.19 J**	ND	ND	**3.93**	**0.94 J**	**4.77**	ND
3/7/00	**4.17**	ND	ND	ND	**3.11**	ND	**3.32**	ND
6/7/00	ND	ND	ND	ND	**4.3**	**0.66**	**2.8**	ND
8/30/00	**5.3**	ND	ND	ND	**3.8**	**1.1**	**5.7**	ND
12/12/00	**7.7**	ND	ND	ND	**5.7**	**1.3**	**1.4**	ND
3/6/01	**4.3**	ND	ND	ND	**4.1**	**0.94**	**1.5**	ND
9/10/01	**8.1**	< 0.2	< 0.2	< 0.2	**4.3**	**1.3**	**1.8**	< 0.2
3/4/02	**3.2**	< 0.2	< 0.2	< 0.2	**4**	**0.94**	**0.68**	< 0.2
9/9/02	**6.8**	< 0.2	< 0.2	< 0.2	**5.2**	**1.2**	**1**	< 0.2
3/11/03	**3.5**	< 0.2	< 0.2	< 0.2	**4.2**	**0.84**	**2**	< 0.2
9/9/03	**8.8**	< 0.2	< 0.2	< 0.2	**6.8**	**1.1**	**3**	< 0.2
3/9/04	**3.1**	**0.59**	< 0.2	< 0.2	**0.23**	< 0.2	**0.59**	< 0.2
10/5/04	**1.9**	< 0.2	< 0.2	< 0.2	**5.4**	**0.69**	**2.2**	< 0.2
3/15/05	**2.8**	< 0.2	< 0.2	< 0.2	**5**	**0.71**	**2.2**	< 0.2
10/11/05	REJ				REJ			
12/13/05	**3.7**	**0.59**	**0.32**	< 0.2	**6.3**	**0.66**	**0.29**	< 0.2
4/18/06	**0.21**	**0.35**	**1.2**	< 0.2	**4.3**	**0.54**	**0.68**	< 0.2
10/17/06	**6.6**	**0.27**	< 0.2	< 0.2	**5**	**0.76**	**2.6**	< 0.2
4/17/07	**2**	< 0.2	< 0.2	< 0.2	**4.1**	**0.52**	**1.4**	< 0.2
10/16/07	**7.8**	< 0.2	< 0.2	< 0.2	**6**	**0.6**	**1.3**	< 0.2
4/15/08	**1.8**	< 0.2	< 0.2	< 0.2	**3.4**	**0.48**	**1.7**	< 0.2
10/13/08	**6.1**	1 U	1 U	0.2 U	**5.9**	1 U	1 U	0.2 U
4/7/09	**1.3**	1 U	1 U	0.2 U	**4.8**	**0.64 J**	**4.2**	0.2 U
10/5/09	**7.5**	1 U	1 U	0.2 U	**6.1**	1 U	**1.4**	0.2 U
4/19/10	**1.9**	1 U	1 U	0.2 U	**3.9**	1 U	1 U	0.2 U
6/7/11	**2.7**	1 U	1 U	0.2 U	**5.7**	1 U	**1**	0.2 U
10/11/11	**3.8**	0.2 U	0.2 U	0.2 U	**4.8**	**0.39**	**0.46**	0.2 U
4/24/12	**1.1**	0.2 U	0.2 U	0.2 U	**3.2**	**0.61**	**2.3**	0.2 U
10/10/12	**3.5**	**0.21**	0.2 U	0.2 U	**3**	**0.26**	**0.87**	0.2 U
5/2013	**1.5**	1 U	1 U	1 U	**3**	**0.52 J**	**3.1**	1 U
10/2013	**5.9**	1 U	1 U	1 U	**6.5**	1 U	**0.62 J**	1 U

Date	5WMW-2				ATMW-4			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**1.9 J**	1 U	1 U	1 U	**2.7 J**	**0.67 J**	**3.6**	1 U
10/2014	**7.6**	**2**	**18**	0.2 U	**6.3**	**0.51 J**	**1.2**	0.2 U
4/2015	--	--	--	--	--	--	--	--
10/2015	**5.5**	**0.96 J**	**3.3**	0.2 U	**6.1**	**0.59 J**	**2.6**	0.2 U
4/2016	--	--	--	--	--	--	--	--
10/2016	**7.5 J**	**0.82 J**	**1.1**	0.2 U	--	--	--	--
4/2017	--	--	--	--	--	--	--	--
9/2017	**4.2**	1 U	**0.53 J**	1 U	**4.2**	1 U	**1.3**	0.2 U
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

ND: Analyte was not detected.
U: Analyte was not detected at or above the reported value.
J: Analyte was positively identified. The associated numerical result is an estimate.
REJ: Rejected. Result considered suspect due to possible cross-contamination. Well re-sampled in December 2005.
Bold: Analyte was detected.
Shade: Values are greater than MTCA cleanup levels.
--: Not Sampled.

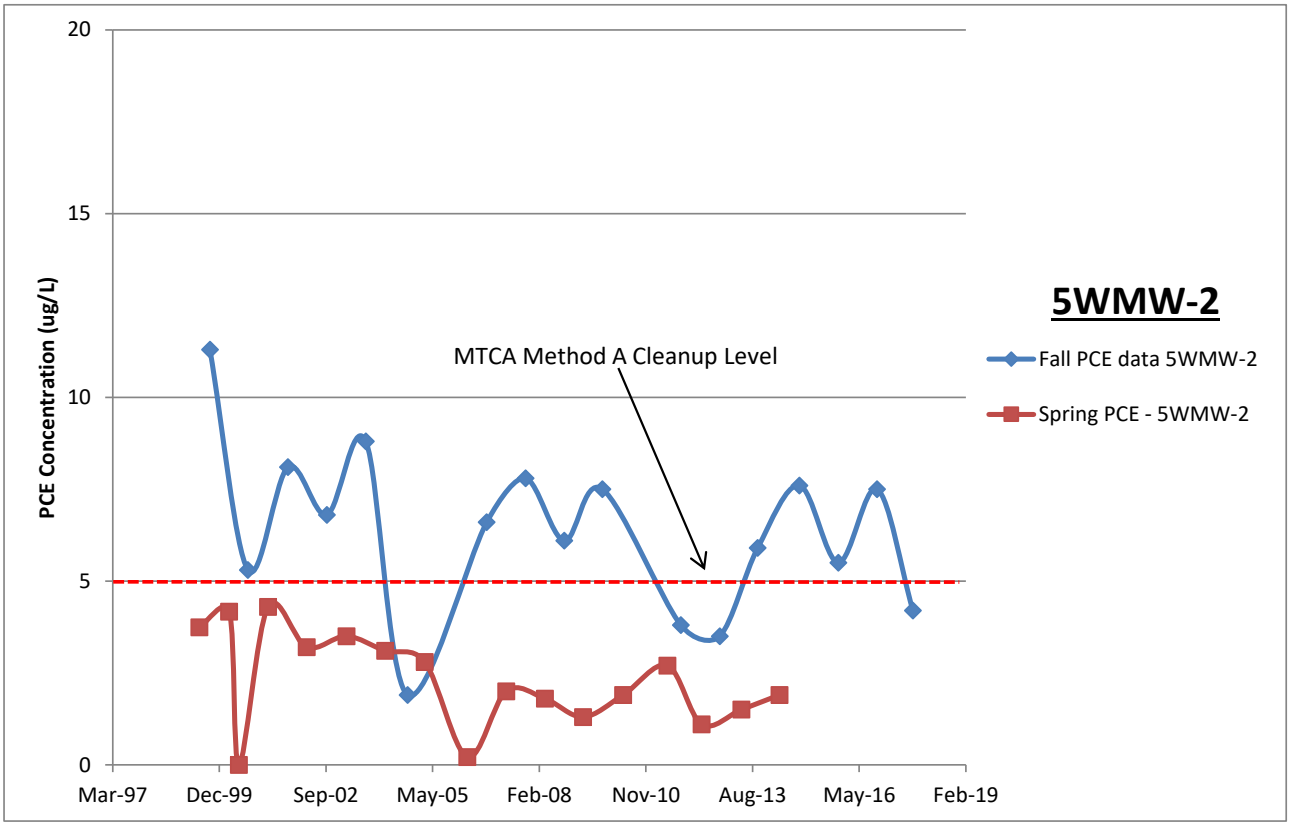

Figure C-14. Fifth Wheel Truck Repair, Well 5WMW-2 PCE Results (ug/L), June 1999 to September 2017.

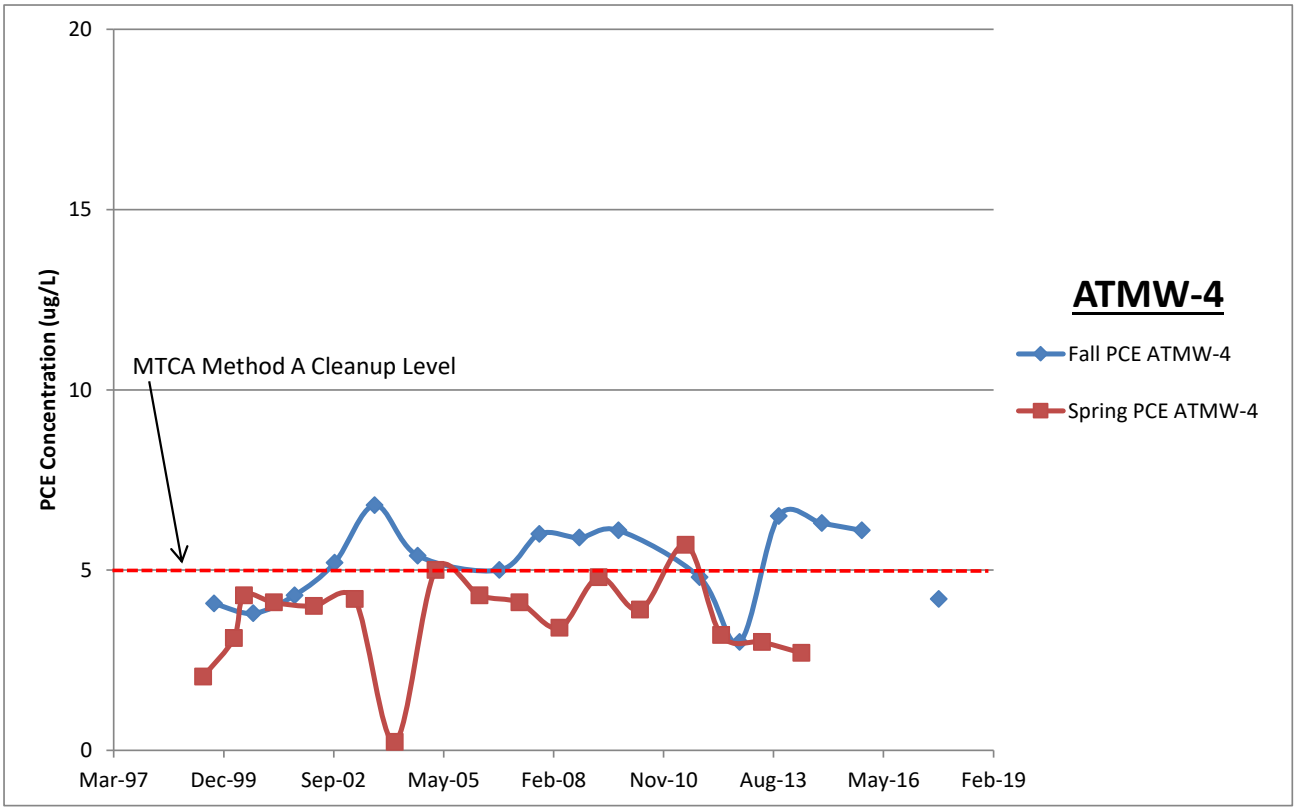

Figure C-15. Agri-Tech/Yakima Steel, Well AT-MW4 PCE Results (ug/L), June 1999 to September 2017.

Table C-6: Summary of Analytical Results (ug/L) for Cameron Yakima, Inc., December 1997 to September 2017.

Date	CYIMW102S				CYIMW103S				CYIMW103D			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	**11**	**0.47 J**	2 U	2 U	**26**	**1.2 J**	**2.6**	2 U	**2.6**	2 U	2 U	2 U
3/3/98	**11**	**0.5 J**	**0.2 J**	1 U	**91 E**	**3.8**	**16**	1 U	**3.3**	1 U	1 U	1 U
6/1/98	**11**	**0.66 J**	**1.7**	1 U	**64 E**	**4.1**	**90 E**	1 U	**5**	**0.11 J**	**0.23 J**	1 U
8/31/98	**70 E**	**4.9 J**	**45**	2 UJ	**118 E**	**4 J**	**26 J**	1 UJ	**3.9 J**	1 UJ	1 UJ	1 UJ
6/2/99	**15.3**	**0.93 J**	**3.61**	ND	**55.3**	**3.9**	**31.3**	ND	**5.23**	**0.25 J**	ND	**0.23 J**
9/8/99	**71.6**	**3.4**	**12.6**	ND	**139**	**4.54**	**17**	ND	**4.85**	ND	ND	ND
12/7/99	--	--	--	--	--	--	--	--	--	--	--	--
3/7/00	--	--	--	--	--	--	--	--	--	--	--	--
6/7/00	**6.3**	**0.35**	ND	ND	**27**	ND	**2.6**	ND	**5.1**	ND	ND	ND
8/30/00	**16**	**0.55**	ND	ND	**6.8**	**0.27**	**0.55**	ND	**4.3**	ND	ND	ND
12/12/00	**17**	**0.48**	ND	ND	**30**	**1**	**1.1**	ND	**5**	ND	ND	ND
3/6/01	**12**	**0.48**	ND	ND	**57**	**2.5**	**4.4**	ND	**4.4**	ND	ND	ND
9/10/01	**13**	**0.49**	< 0.2	< 0.2	**33**	**1.2**	**0.98**	< 0.2	**4.1**	< 0.2	< 0.2	< 0.2
3/4/02	**7.9**	**0.33**	< 0.2	< 0.2	**31**	**1.6**	**1.6**	< 0.2	**3.7**	< 0.2	< 0.2	< 0.2
9/9/02	**12**	**0.41**	< 0.2	< 0.2	**21**	**0.76**	**0.57**	< 0.2	--	--	--	--
3/11/03	**6.8**	**0.29**	< 0.2	< 0.2	**26**	**1.2**	**0.92**	< 0.2	**4**	< 0.2	< 0.2	< 0.2
9/9/03	**12**	**0.42**	< 0.2	< 0.2	**16**	**0.57**	< 0.2	< 0.2	**4.4**	< 0.2	< 0.2	< 0.2
3/9/04	**8.6**	**0.32**	< 0.2	< 0.2	**25**	**0.8**	**0.69**	< 0.2	**3.7**	**0.2**	< 0.2	< 0.2
10/5/04	--	--	--	--	**15**	**0.35**	< 0.2	< 0.2	**3.8**	< 0.2	< 0.2	< 0.2
3/15/05	**11**	**0.47**	< 0.2	< 0.2	**18**	**0.8**	**0.71**	< 0.2	**3.8**	< 0.2	< 0.2	< 0.2
10/11/05	**15**	**0.29**	0.2 U	0.2 U	**16**	**0.32**	0.2 U	0.2 U	**4**	0.2 U	0.2 U	0.2 U
12/13/05	--	--	--	--	--	--	--	--	--	--	--	--
4/18/06	**6.6**	**0.28**	< 0.2	< 0.2	**13**	**0.52**	**0.44**	< 0.2	**3.3**	< 0.2	< 0.2	< 0.2
10/17/06	**8.3**	**0.24**	0.2 U	0.2 U	**9.7**	**0.26**	< 0.2	< 0.2	**3**	0.2 U	0.2 U	0.2 U
4/17/07	**5.2**	**0.22**	0.2 U	0.2 U	**13**	**0.52**	**0.47**	0.2 U	**3.5**	0.2 U	0.2 U	0.2 U
10/16/07	**9.3**	**0.27**	0.2 U	0.2 U	**9**	**0.26**	0.2 U	0.2 U	**3**	0.2 U	0.2 U	0.2 U
4/15/08	**5.1**	< 0.2	< 0.2	< 0.2	**10**	**0.38**	**0.38**	< 0.2	**2.3**	< 0.2	< 0.2	< 0.2
10/13/08	**6.3**	1 U	1 U	0.2 U	**5.9**	1 U	1 U	0.2 U	**2.7**	1 U	1 U	0.2 U
4/7/09	**5.8**	1 U	1 U	0.2 U	**12**	1 U	**2.7**	0.2 U	**3.1**	1 U	1 U	0.2 U
10/8/09	**11**	1 U	1 U	0.2 U	**12**	1 U	1 U	0.2 U	**3**	1 U	1 U	0.2 U
4/19/10	**8**	1 U	1 U	1 U	**7.2**	1 U	1 U	1 U	**2.5**	1 U	1 U	1 U
6/7/11	**7.7**	1 U	1 U	0.2 U	**3.6**	1 U	1 U	0.2 U	**4.8**	1 U	1 U	0.2 U
10/11/11	**8.5**	**0.22**	0.2 U	0.2 U	**8.3**	**0.37**	0.2 U	0.2 U	**2.3**	0.2 U	0.2 U	0.2 U
4/24/12	**5.8**	**0.24**	0.2 U	0.2 U	**8.7**	**0.44**	**0.23**	0.2 U	**1.9**	0.2 U	0.2 U	0.2 U
10/10/12	**9.3**	0.2 U	0.2 U	0.2 U	**7.9**	**0.3**	0.2 U	0.2 U	**2.6**	0.2 U	0.2 U	0.2 U
5/2013	**4.6**	1 U	1 U	1 U	**12**	**0.63 J**	**0.63 J**	1 U	**3.1**	1 U	1 U	1 U
10/2013	**11**	1 U	1 U	1 U	**10**	1 U	1 U	1 U	**2.9**	1 U	1 U	1 U

Date	CYIMW102S				CYIMW103S				CYIMW103D			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**5.1 J**	**0.53 J**	1 U	1 U	**10 J**	**0.78 J**	**0.6 J**	1 U	**3 J**	**0.36 J**	1 U	1 U
10/2014	**15 J**	**3.5**	**26**	0.2 U	**12**	**2.3**	**15**	0.2 U	**3.5**	1 U	**0.91 J**	0.2 U
4/2015	--	--	--	--	**14**	**1.2**	**10**	0.2 U	**3.4 J**	1 UJ	**0.93 J**	0.2 UJ
10/2015	**10**	**1.6**	**6.6**	0.2 U	**10**	**1.4**	**5.1**	0.2 U	--	--	--	--
4/2016	--	--	--	--	**12**	**0.97 J**	**3.1**	0.2 U	**2.6**	**0.13 J**	**0.31 J**	0.2 U
10/2016	**12**	**1.4**	**2.3**	0.2 U	**10**	**1.2**	**1.9**	0.2 U	--	--	--	--
4/2017	--	--	--	--	**13**	**1.5**	**2**	0.2 U	**3.7**	**0.69 J**	**0.78 NJ**	0.2 U
9/2017	**6.9**	**0.75 J**	**1.1**	0.2 U	**7**	**0.81 J**	**1.1**	0.2 U	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

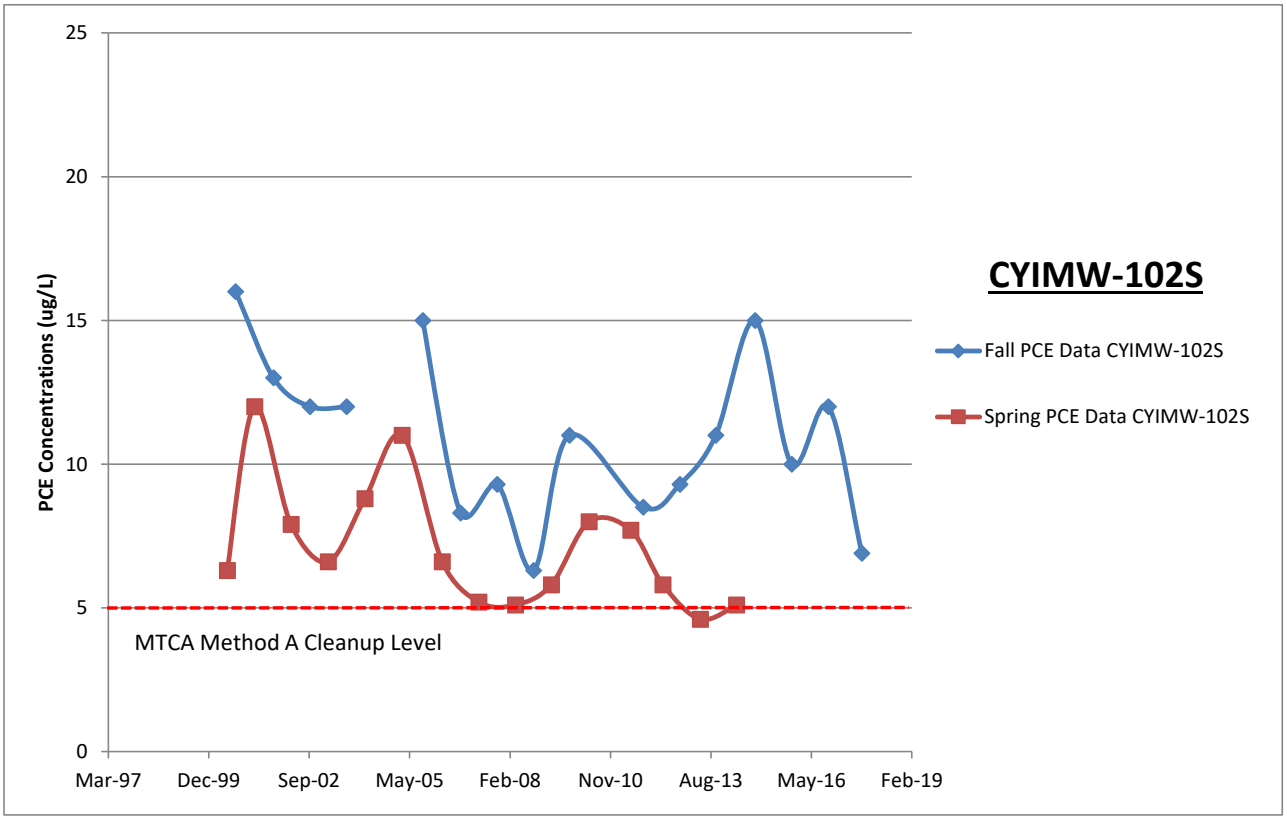

Figure C-16. Cameron Yakima, Well CYIMW-102S PCE Results (ug/L), June 2000 to September 2017.

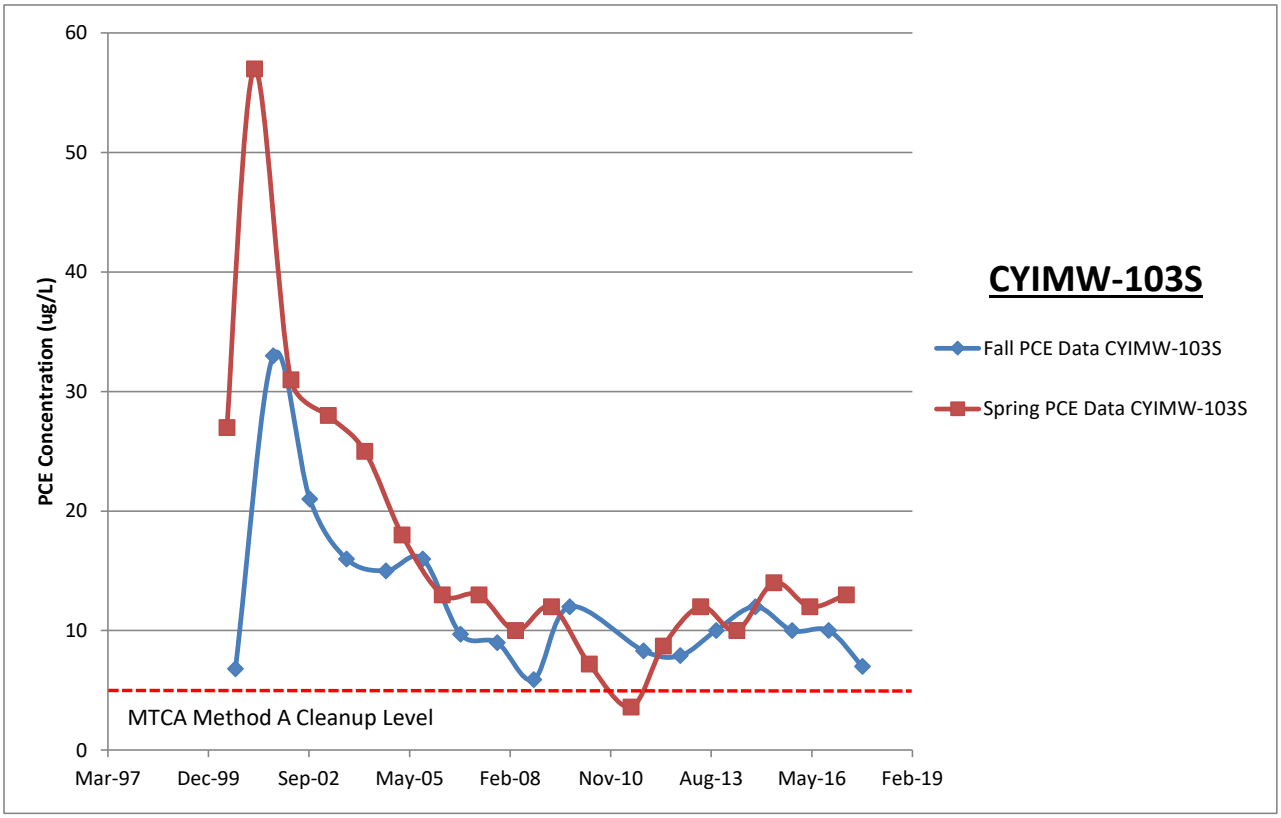

Figure C-17. Cameron Yakima, Well CYIMW-103S PCE Results (ug/L), June 2000 to September 2017.

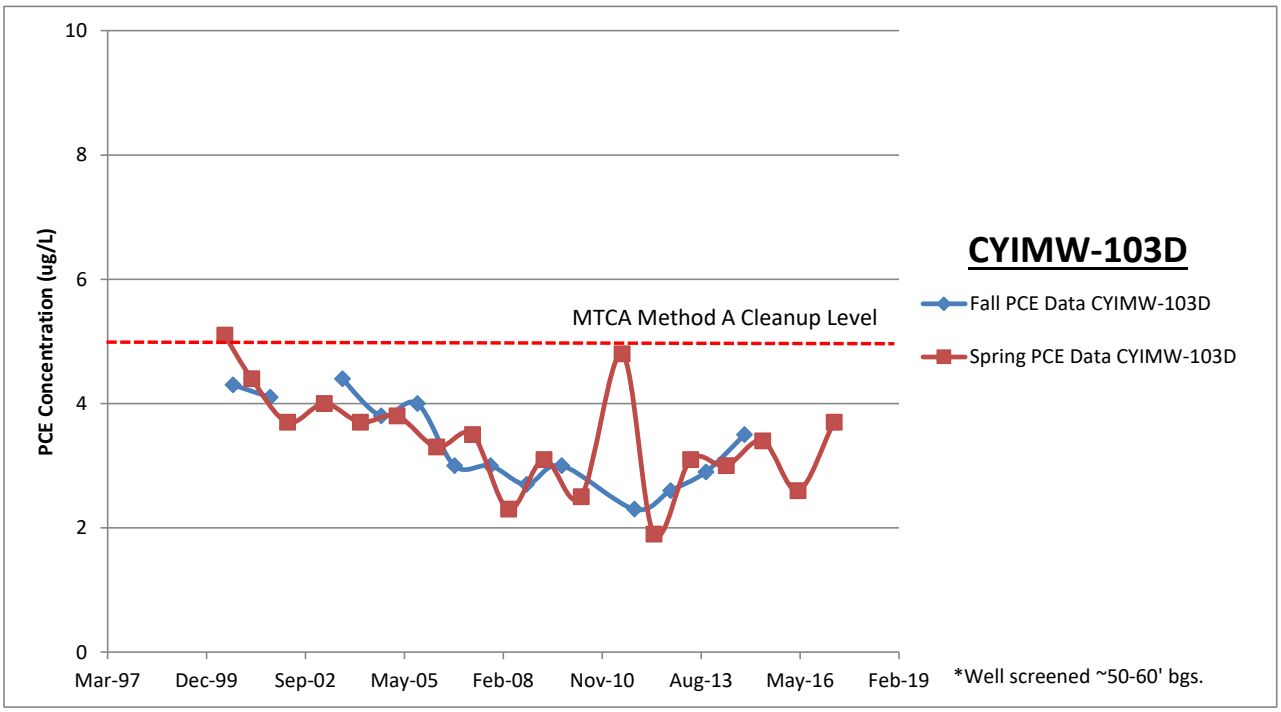

Figure C-18. Cameron Yakima, Well CYIMW-103D PCE Results (ug/L), June 2000 to April 2017.

Table C-6: Continued.

Date	CYIMW106S				CYIMW107S				CYIMW108S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	**27 J**	**1.2 J**	**2.6**	2 U	--	--	--	--	--	--	--	--
3/3/98	**12**	**0.43 J**	**0.2 J**	1 U	--	--	--	--	--	--	--	--
6/1/98	**8.8**	**0.35 J**	**1.7**	1 UJ	--	--	--	--	--	--	--	--
8/31/98	**8.3 J**	**0.36 J**	**7.4 J**	1 UJ	**18 J**	**0.02 J**	**0.06 J**	1 UJ	**7.8 J**	1 UJ	1 UJ	1 UJ
6/2/99	**7.79**	**0.43 J**	ND	ND	**27**	**0.81 J**	**1.02**	ND	**2.88**	ND	ND	ND
9/8/99	**19**	**0.4 J**	ND	ND	**17.3**	**0.55 J**	ND	ND	**5.29**	ND	ND	ND
12/7/99	--	--	--	--	--	--	--	--	--	--	--	--
3/7/00	--	--	--	--	--	--	--	--	--	--	--	--
6/7/00	**6.2**	**0.28**	ND	ND	**10**	**0.22**	ND	ND	**1.4**	ND	ND	ND
8/30/00	**20**	**0.7**	ND	ND	**14**	**0.48**	**0.22**	ND	**3.8**	ND	ND	ND
12/12/00	**12**	**0.35**	ND	ND	**16**	**0.39**	ND	ND	**3**	ND	ND	ND
3/6/01	**11**	**0.3**	ND	ND	**12**	**0.35**	ND	ND	**0.97**	ND	ND	ND
9/10/01	**13**	**0.4**	< 0.2	< 0.2	**9.2**	**0.27**	< 0.2	< 0.2	**3.7**	< 0.2	< 0.2	< 0.2
3/4/02	**6.9**	**0.24**	< 0.2	< 0.2	**8.3**	**0.27**	< 0.2	< 0.2	**0.89**	< 0.2	< 0.2	< 0.2
9/9/02	**12**	**0.31**	< 0.2	< 0.2	**8.4**	< 0.2	< 0.2	< 0.2	**3.3**	< 0.2	< 0.2	< 0.2
3/11/03	**5.4**	< 0.2	< 0.2	< 0.2	**7.7**	**0.21**	< 0.2	< 0.2	**1.3**	< 0.2	< 0.2	< 0.2
9/9/03	**13**	**0.31**	< 0.2	< 0.2	**9.5**	< 0.2	< 0.2	< 0.2	**3.5**	< 0.2	< 0.2	< 0.2
3/9/04	**8.3**	**0.26**	< 0.2	< 0.2	**9.5**	**0.36**	< 0.2	< 0.2	**0.96**	< 0.2	< 0.2	< 0.2
10/5/04	**11**	**0.26**	< 0.2	< 0.2	**7**	< 0.2	< 0.2	< 0.2	**3.4**	< 0.2	< 0.2	< 0.2
3/15/05	**9.4**	**0.27**	< 0.2	< 0.2	**9.2**	**0.28**	< 0.2	< 0.2	**0.8**	< 0.2	< 0.2	< 0.2
10/11/05	**15**	**0.29**	0.2 U	0.2 U	**15**	0.2 U	0.2 U	0.2 U	**5.9**	0.2 U	0.2 U	0.2 U
12/13/05	--	--	--	--	--	--	--	--	--	--	--	--
4/18/06	**4.4**	< 0.2	< 0.2	< 0.2	**6.6**	< 0.2	< 0.2	< 0.2	**0.6**	< 0.2	< 0.2	< 0.2
10/17/06	**8.4**	**0.24**	0.2 U	0.2 U	**5**	0.2 U	0.2 U	0.2 U	**2.2**	< 0.2	< 0.2	< 0.2
4/17/07	**3.2**	**0.22**	0.2 U	0.2 U	**6.6**	0.2 U	0.2 U	0.2 U	**0.43**	0.2 U	0.2 U	0.2 U
10/16/07	**8.9**	**0.24**	0.2 U	0.2 U	**4.4**	0.2 U	0.2 U	0.2 U	**2.2**	0.2 U	0.2 U	0.2 U
4/15/08	**3.1**	< 0.2	< 0.2	< 0.2	**5.9**	< 0.2	< 0.2	< 0.2	**0.48**	< 0.2	< 0.2	< 0.2
10/13/08	**6.4**	1 U	1 U	0.2 U	**2.4**	1 U	1 U	0.2 U	**2.3**	1 U	1 U	0.2 U
4/7/09	**3.5**	1 U	1 U	0.2 U	**5.6**	1 U	1 U	0.2 U	**0.13 J**	1 U	1 U	0.2 U
10/8/09	**9.3**	1 U	1 U	0.2 U	**5.9**	1 U	1 U	0.2 U	**3.2**	1 U	1 U	0.2 U
4/19/10	**4.8**	1 U	1 U	1 U	**7.6**	1 U	1 U	1 U	**3.6**	1 U	1 U	1 U
6/7/11	**4**	1 U	1 U	0.2 U	**8.7**	1 U	1 U	0.2 U	**5.8**	1 U	1 U	0.2 U
10/11/11	**6.5**	**0.21**	0.2 U	0.2 U	**4.8**	0.2 U	0.2 U	0.2 U	**2.8**	0.2 U	0.2 U	0.2 U
4/24/12	**2.9**	0.2 U	0.2 U	0.2 U	**4.9**	0.2 U	0.2 U	0.2 U	**2.6**	0.2 U	0.2 U	0.2 U
10/10/12	**5.6**	0.2 U	0.2 U	0.2 U	**4.9**	0.2 U	0.2 U	0.2 U	**3.1**	0.2 U	0.2 U	0.2 U
5/2013	**3.6**	1 U	1 U	1 U	**3.4**	1 U	1 U	1 U	**3.5**	1 U	1 U	1 U
10/2013	**7.8**	1 U	1 U	1 U	**6.2**	1 U	1 U	1 U	**4.1**	1 U	1 U	1 U

Date	CYIMW106S				CYIMW107S				CYIMW108S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**2.3 J**	1 U	1 U	1 U	**3.6 J**	**0.33 J**	1 U	1 U	**3.4 J**	**0.33 J**	1 U	1 U
10/2014	**12**	**2.9**	**24**	0.2 U	**7**	**1**	**5.9**	0.2 U	**4.3**	**0.58 J**	**3.5**	0.2 U
4/2015	--	--	--	--	**4.7**	**0.4 J**	**2.8**	0.2 U	--	--	--	--
10/2015	**8**	**1.3**	**5**	0.2 U	**6.4**	**0.74 J**	**3.5**	0.2 U	**3.9**	**0.27 J**	**1.1**	0.2 U
4/2016	--	--	--	--	**3.5**	**0.3 J**	**0.9 J**	0.2 U	--	--	--	--
10/2016	**9.5 J**	**1.2**	**1.8**	0.2 U	**5.4 J**	**0.53 J**	**1.1**	0.2 U	**3.8 J**	1 U	**0.5 J**	0.2 U
4/2017	--	--	--	--	**5.1**	**0.92 J**	**1.1**	0.2 U	--	--	--	--
9/2017	**6.2**	**0.65 J**	**0.89 J**	0.2 U	**1.4**	1 U	1 U	0.2 U	**2.5**	1 U	1 U	0.2 U
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

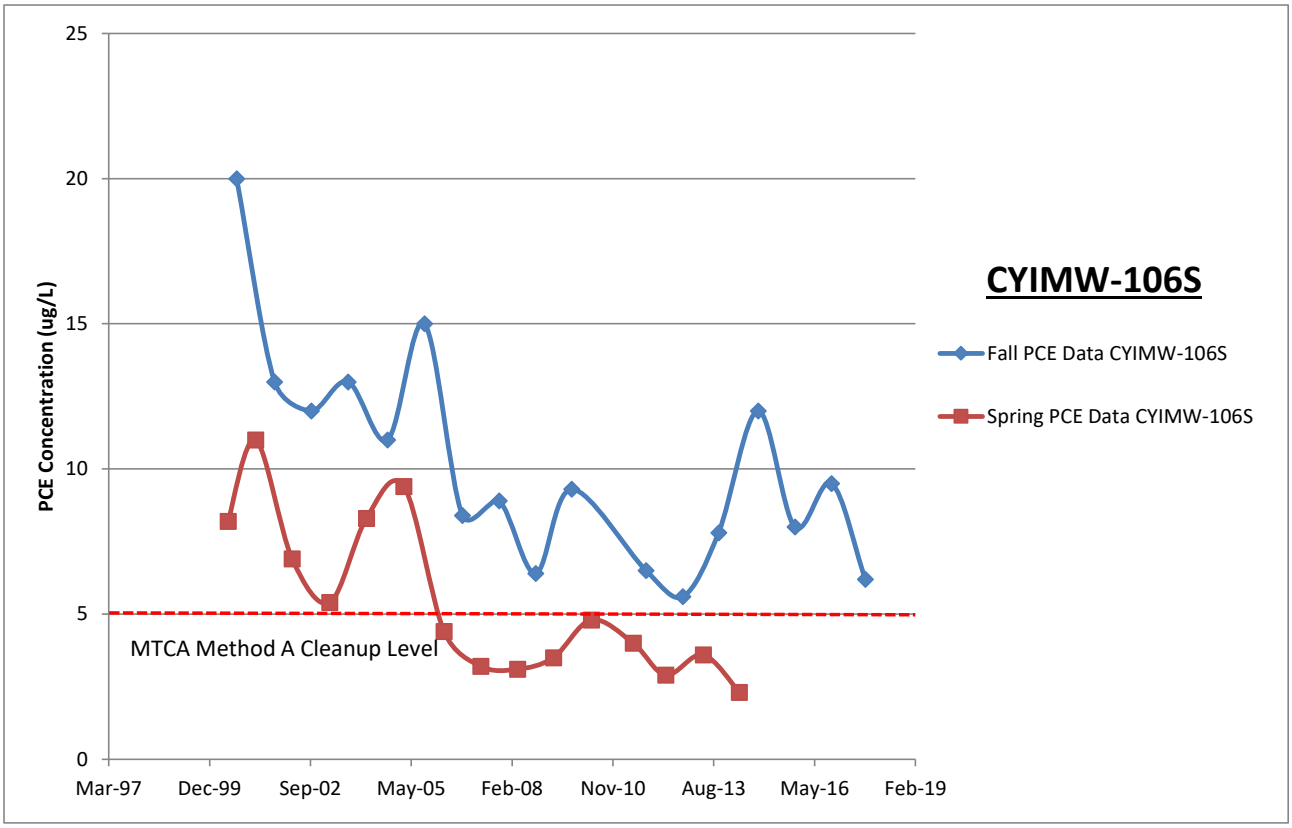

Figure C-19. Cameron Yakima, Well CYIMW-106S PCE Results (ug/L), June 2000 to September 2017.

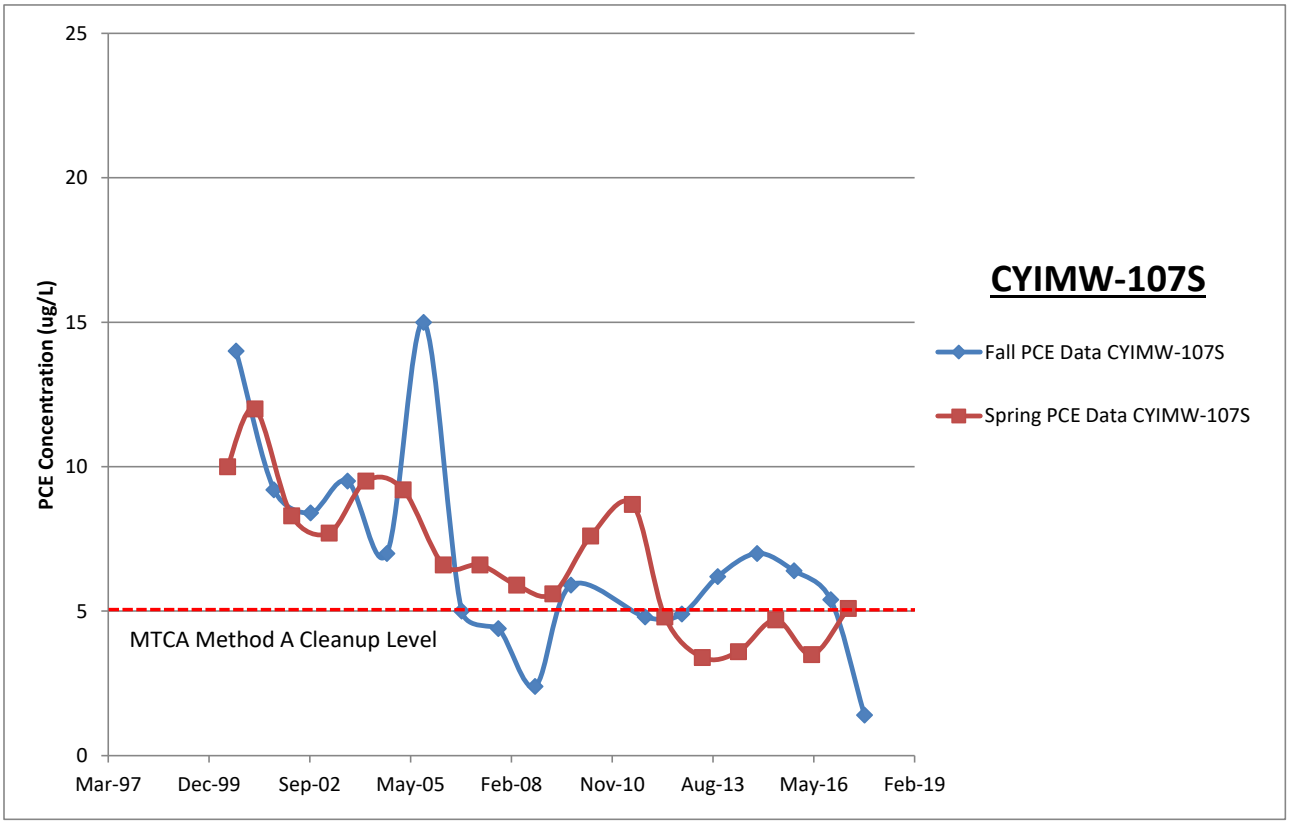

Figure C-20. Cameron Yakima, Well CYIMW-107S PCE Results (ug/L), June 2000 to September 2017.

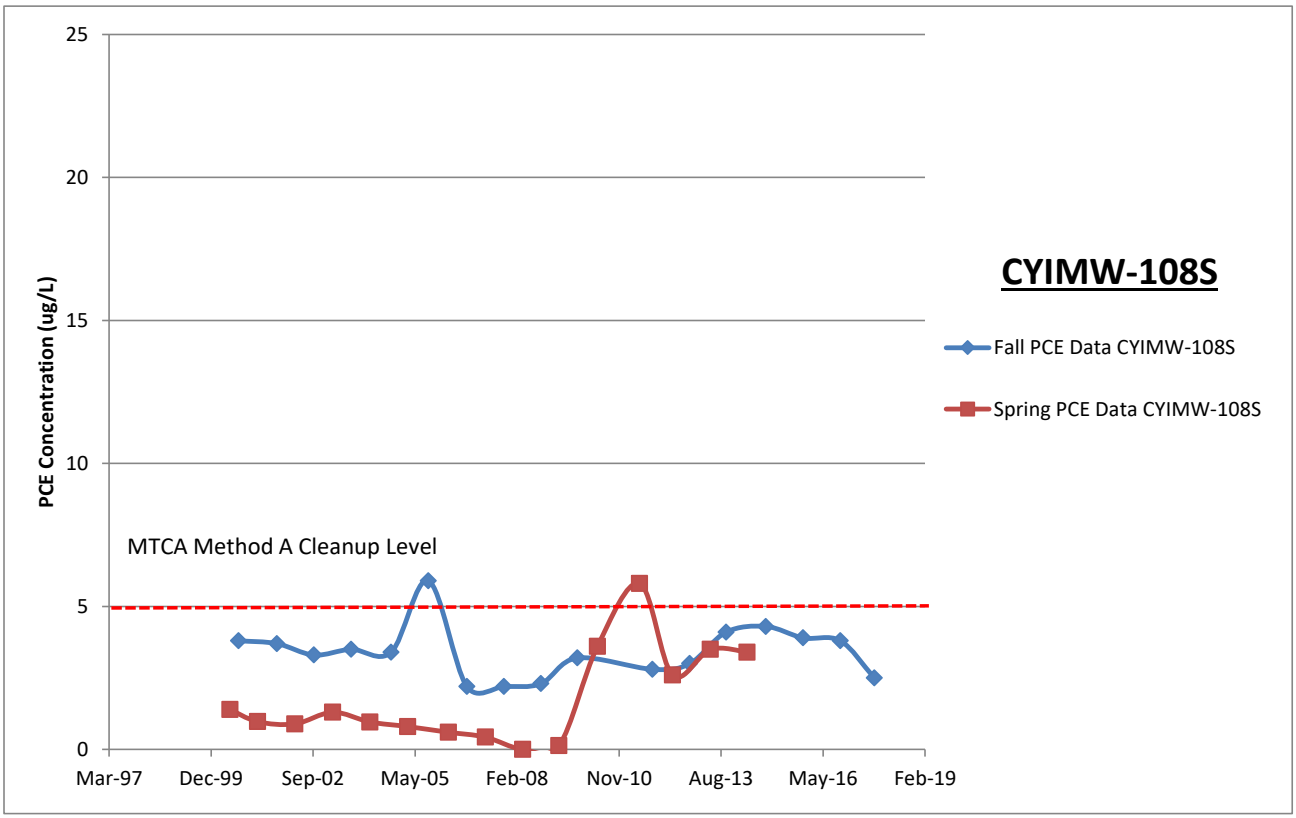

Figure C-21. Cameron Yakima, Well CYIMW-108S PCE Results (ug/L), June 2000 to September 2017.

Table C-6: Continued.

Date	CYIMW109S				CYIMW110S				CYIMW111S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	--	--	--	--	--	--	--	--	--	--	--	--
3/3/98	--	--	--	--	--	--	--	--	--	--	--	--
6/1/98	--	--	--	--	--	--	--	--	--	--	--	--
8/31/98	**7.1 J**	1 UJ	1 UJ	1 UJ	**8.3 J**	1 UJ	1 UJ	1 UJ	**9.4 J**	**0.19 J**	1 UJ	1 UJ
6/2/99	**3.77**	ND	ND	ND	**4.52**	ND	ND	ND	**6.1**	ND	ND	ND
9/8/99	**4.96**	ND	ND	ND	**5.86**	ND	ND	ND	**8.57**	ND	ND	ND
12/7/99	--	--	--	--	--	--	--	--	--	--	--	--
3/7/00	--	--	--	--	--	--	--	--	--	--	--	--
6/7/00	**2**	ND	ND	ND	**2.3**	ND	ND	ND	**3.9**	ND	ND	ND
8/30/00	**4**	ND	ND	ND	**5.6**	ND	ND	ND	**6.5**	ND	ND	ND
12/12/00	**3.8**	ND	ND	ND	**4.4**	ND	ND	ND	**5.1**	ND	ND	ND
3/6/01	**1.4**	ND	ND	ND	**2.2**	ND	ND	ND	**2.3**	ND	ND	ND
9/10/01	**3.6**	< 0.2	< 0.2	< 0.2	**4.3**	< 0.2	< 0.2	< 0.2	**5.7**	< 0.2	< 0.2	< 0.2
3/4/02	**1.1**	< 0.2	< 0.2	< 0.2	**1.7**	< 0.2	< 0.2	< 0.2	**1.5**	< 0.2	< 0.2	< 0.2
9/9/02	**2.9**	< 0.2	< 0.2	< 0.2	**3.6**	< 0.2	< 0.2	< 0.2	**5.4**	< 0.2	< 0.2	< 0.2
3/11/03	**1.7**	< 0.2	< 0.2	< 0.2	**2.4**	< 0.2	< 0.2	< 0.2	**2.2**	< 0.2	< 0.2	< 0.2
9/9/03	--	--	--	--	--	--	--	--	**5.8**	< 0.2	< 0.2	< 0.2
3/9/04	--	--	--	--	--	--	--	--	**1.7**	< 0.2	< 0.2	< 0.2
10/5/04	--	--	--	--	--	--	--	--	**0.65**	< 0.2	< 0.2	< 0.2
3/15/05	**1.2**	< 0.2	< 0.2	< 0.2	--	--	--	--	**1.7**	< 0.2	< 0.2	< 0.2
10/11/05	REJ				**4.1**	0.2 U	0.2 U	0.2 U	**4.4**	0.2 U	0.2 U	0.2 U
12/13/05	**1.4**	0.2 U	0.2 U	0.2 U	--	--	--	--	--	--	--	--
4/18/06	**0.62**	< 0.2	< 0.2	< 0.2	**1.2**	< 0.2	< 0.2	< 0.2	**0.4**	< 0.2	< 0.2	< 0.2
10/17/06	**2.3**	0.2 U	0.2 U	0.2 U	**3**	0.2 U	0.2 U	0.2 U	**2.2**	0.2 U	0.2 U	0.2 U
4/17/07	**0.55**	0.2 U	0.2 U	0.2 U	**0.96**	0.2 U	0.2 U	0.2 U	**0.68**	0.2 U	0.2 U	0.2 U
10/16/07	**2.9**	0.2 U	0.2 U	0.2 U	**3.7**	0.2 U	0.2 U	0.2 U	**3.3**	0.2 U	0.2 U	0.2 U
4/15/08	**0.5**	< 0.2	< 0.2	< 0.2	**0.75**	< 0.2	< 0.2	< 0.2	**0.6**	< 0.2	< 0.2	< 0.2
10/13/08	**1.8**	1 U	1 U	0.2 U	**1.9**	1 U	1 U	0.2 U	**1.8**	1 U	1 U	0.2 U
4/7/09	**0.29 J**	1 U	1 U	0.2 U	**0.59 J**	1 U	1 U	0.2 U	**0.43 J**	1 U	1 U	0.2 U
10/8/09	**3.3**	1 U	1 U	0.2 U	**3.7**	1 U	1 U	0.2 U	**5.5**	1 U	1 U	0.2 U
4/19/10	**4.2**	1 U	1 U	1 U	**5.2**	1 U	1 U	1 U	**1.3**	1 U	1 U	1 U
6/7/11	**4**	1 U	1 U	0.2 U	**5.8**	1 U	1 U	0.2 U	1 U	1 U	1 U	0.2 U
10/11/11	--	--	--	--	**3.4**	0.2 U	0.2 U	0.2 U	**4.4**	0.2 U	0.2 U	0.2 U
4/24/12	--	--	--	--	**1.3**	0.2 U	0.2 U	0.2 U	**0.52**	0.2 U	0.2 U	0.2 U
10/10/12	--	--	--	--	**3.9**	0.2 U	0.2 U	0.2 U	**2.3**	0.2 U	0.2 U	0.2 U
5/2013	**4.1**	1 U	1 U	1 U	**4.5**	1 U	1 U	1 U	**1.2**	1 U	1 U	1 U
10/2013	**4.2**	1 U	1 U	1 U	--	--	--	--	**0.93 J**	1 U	1 U	1 U

Date	CYIMW109S				CYIMW110S				CYIMW111S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**3.7 J**	**0.34 J**	1 U	1 U	**2.8 J**	**0.28 NJ**	1 U	1 U	--	--	--	--
10/2014	**5.7**	**1**	**7.2**	0.2 U	--	--	--	--	--	--	--	--
4/2015	--	--	--	--	--	--	--	--	--	--	--	--
10/2015	--	--	--	--	--	--	--	--	**1.1**	1 U	**0.57 J**	0.2 U
4/2016	--	--	--	--	--	--	--	--	--	--	--	--
10/2016	--	--	--	--	--	--	--	--	1 U	1 U	1 U	0.2 U
4/2017	--	--	--	--	--	--	--	--	--	--	--	--
9/2017	--	--	--	--	--	--	--	--	1 U	1 U	1 U	0.2 U
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

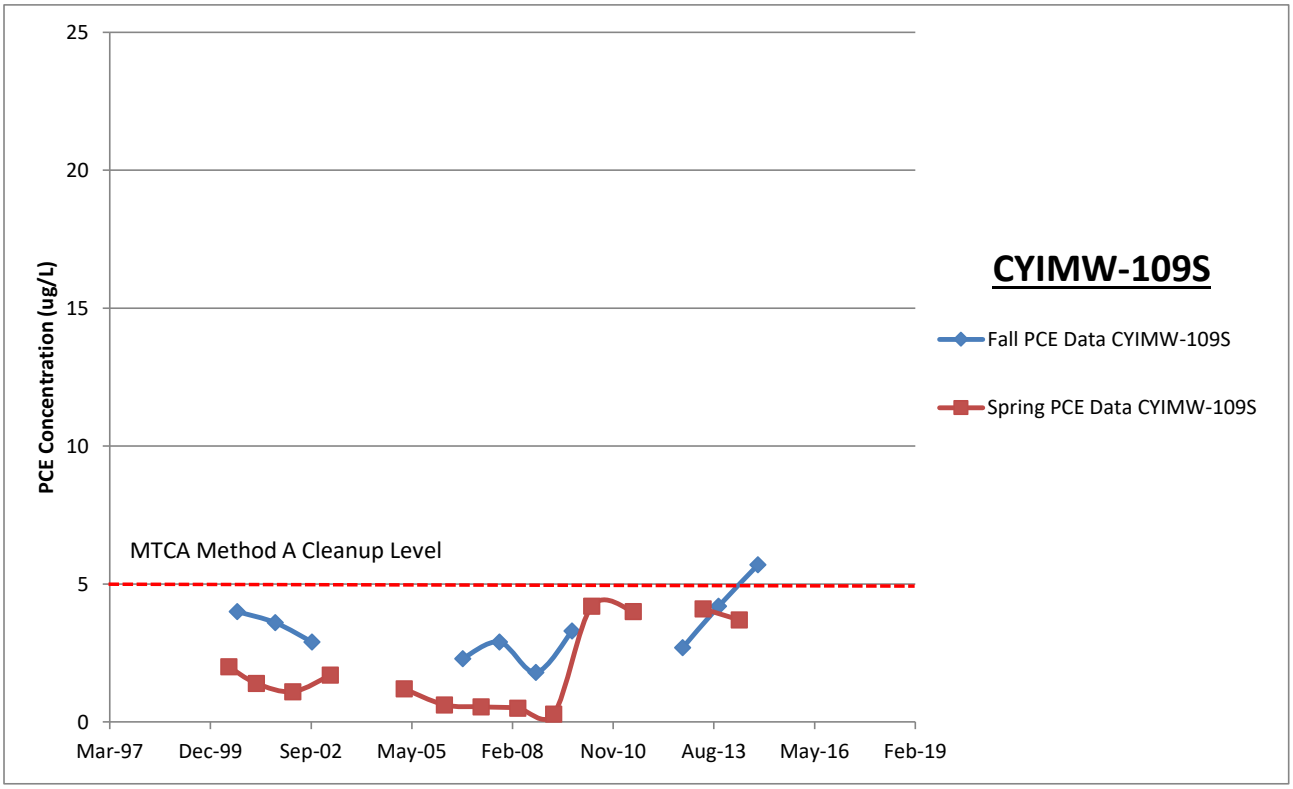

Figure C-22. Cameron Yakima, Well CYIMW-109S PCE Results (ug/L), June 2000 to October 2014.

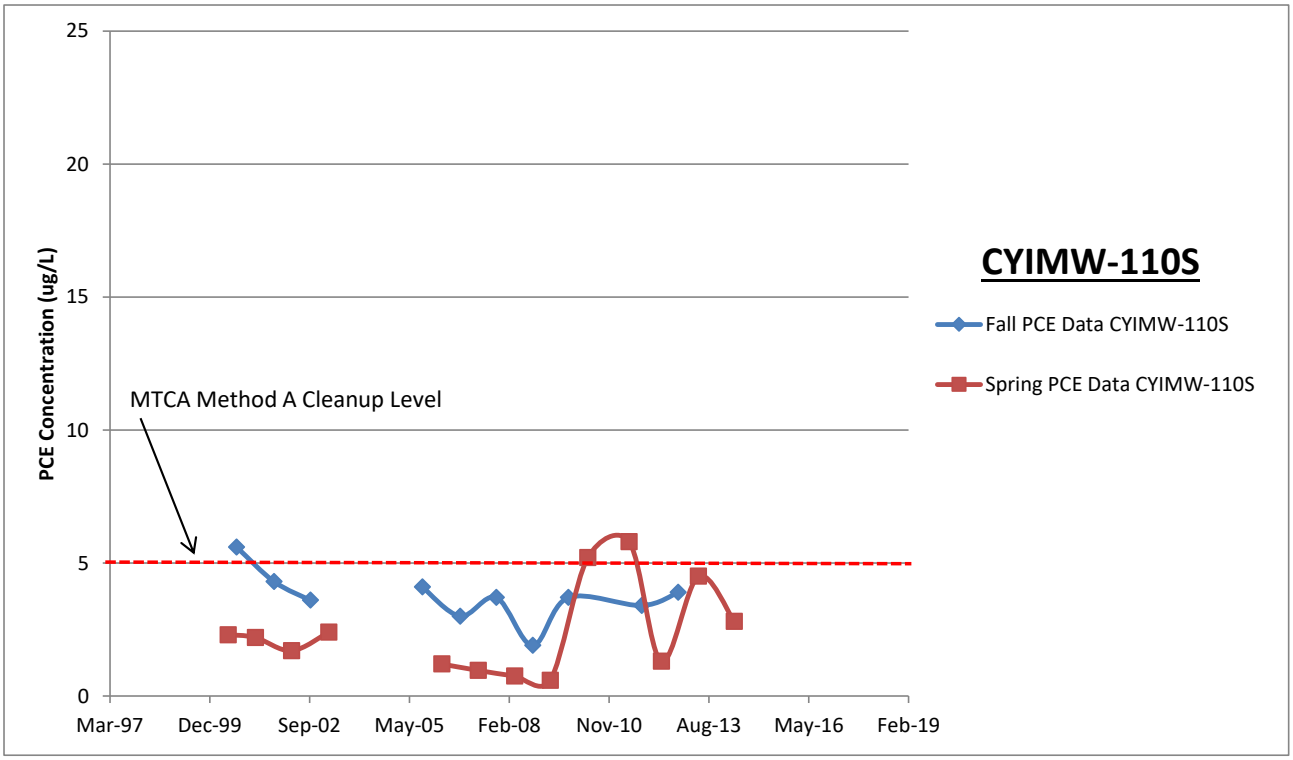

Figure C-23. Cameron Yakima, Well CYIMW-110S PCE Results (ug/L), June 2000 to April 2014.

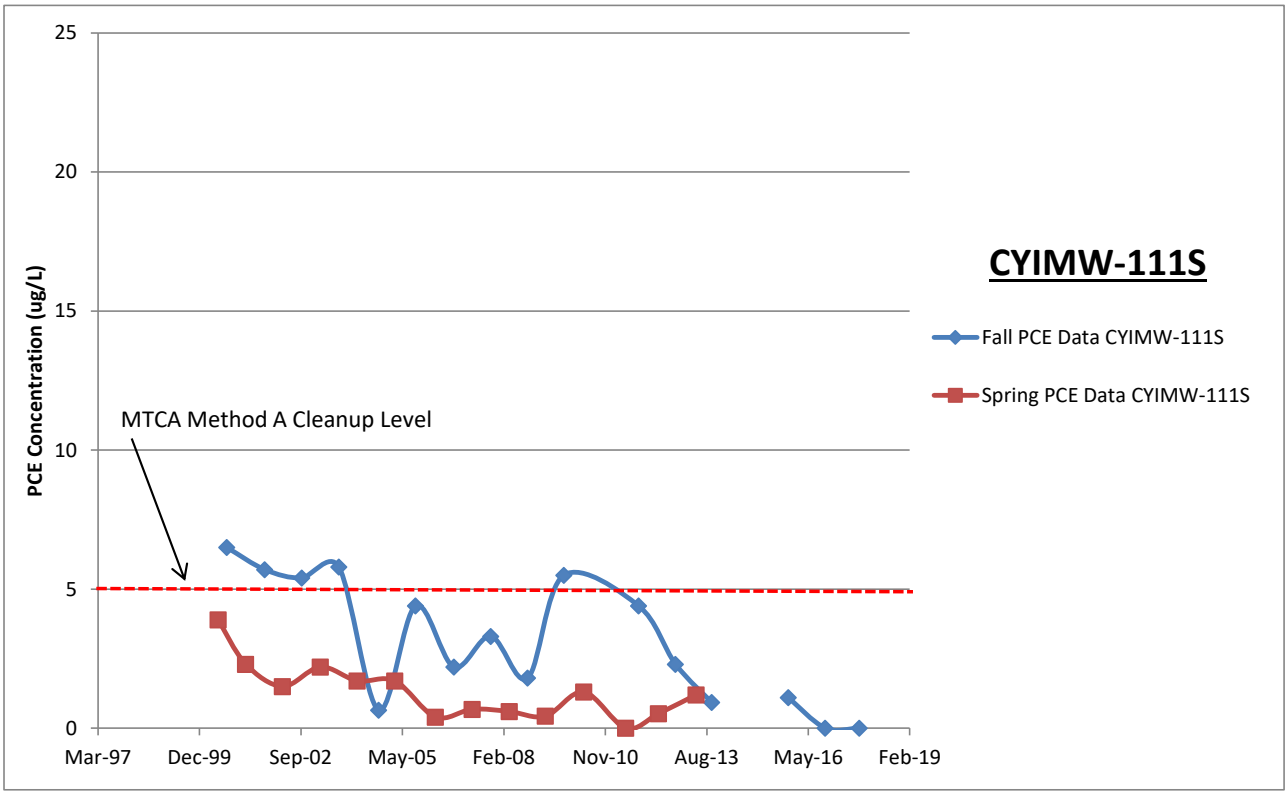

Figure C-24. Cameron Yakima, Well CYIMW-111S PCE Results (ug/L), June 2000 to September 2017.

Table C-6: Continued.

Date	CYIMW112S				CYIMW113S				CYIMW113D			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	--	--	--	--	--	--	--	--	--	--	--	--
3/3/98	--	--	--	--	--	--	--	--	--	--	--	--
6/1/98	--	--	--	--	--	--	--	--	--	--	--	--
8/31/98	**15 J**	**0.02 J**	**0.45 J**	1 UJ	**21 J**	**0.2 J**	**1.2 J**	1 UJ	**5 J**	1 UJ	1 UJ	1 UJ
6/2/99	**18.9**	**0.71 J**	**1.47**	ND	--	--	--	--	**5.34**	ND	ND	ND
9/8/99	**17.1**	**0.56 J**	**0.71 J**	ND	--	--	--	--	**5.46**	ND	ND	ND
12/7/99	--	--	--	--	--	--	--	--	--	--	--	--
3/7/00	--	--	--	--	--	--	--	--	--	--	--	--
6/7/00	**9.6**	**0.28**	ND	ND	--	--	--	--	**5.8**	ND	ND	ND
8/30/00	**11**	**0.37**	ND	ND	--	--	--	--	**5.1**	ND	ND	ND
12/12/00	**13**	**0.38**	ND	ND	--	--	--	--	**5.2**	ND	ND	ND
3/6/01	**6.5**	**0.24**	ND	ND	--	--	--	--	**4.4**	ND	ND	ND
9/10/01	**8.6**	**0.27**	< 0.2	< 0.2	--	--	--	--	**4.7**	< 0.2	< 0.2	< 0.2
3/4/02	**3.9**	< 0.2	< 0.2	< 0.2	--	--	--	--	**3.5**	< 0.2	< 0.2	< 0.2
9/9/02	**4**	< 0.2	< 0.2	< 0.2	--	--	--	--	**4.5**	< 0.2	< 0.2	< 0.2
3/11/03	**4.6**	**0.21**	< 0.2	< 0.2	--	--	--	--	**3.9**	< 0.2	< 0.2	< 0.2
9/9/03	--	--	--	--	--	--	--	--	--	--	--	--
3/9/04	--	--	--	--	--	--	--	--	--	--	--	--
10/5/04	--	--	--	--	--	--	--	--	--	--	--	--
3/15/05	**3.7**	< 0.2	< 0.2	< 0.2	--	--	--	--	**4**	< 0.2	< 0.2	< 0.2
10/11/05	**8.8**	0.2 U	0.2 U	0.2 U	**9.9**	0.2 U	0.2 U	0.2 U	**4.8**	< 0.2	< 0.2	< 0.2
12/13/05	--	--	--	--	--	--	--	--	--	--	--	--
4/18/06	**3**	< 0.2	< 0.2	< 0.2	--	--	--	--	**3.8**	< 0.2	< 0.2	< 0.2
10/17/06	**4.6**	0.2 U	0.2 U	0.2 U	**5.5**	0.2 U	0.2 U	0.2 U	**3.6**	0.2 U	0.2 U	0.2 U
4/17/07	**2.7**	0.2 U	0.2 U	0.2 U	**2.8**	0.2 U	0.2 U	0.2 U	**3.5**	0.2 U	0.2 U	0.2 U
10/16/07	**4.7**	0.2 U	0.2 U	0.2 U	**5.5**	0.2 U	0.2 U	0.2 U	**3.2**	0.2 U	0.2 U	0.2 U
4/15/08	**2**	< 0.2	< 0.2	< 0.2	--	--	--	--	**2.7**	< 0.2	< 0.2	< 0.2
10/13/08	**3.2**	1 U	1 U	0.2 U	**3.7**	1 U	1 U	0.2 U	**2.8**	1 U	1 U	0.2 U
4/7/09	**1.8**	1 U	1 U	0.2 U	**1.8**	1 U	1 U	0.2 U	**3**	1 U	1 U	0.2 U
10/8/09	**7.9**	1 U	1 U	0.2 U	**8.6**	1 U	1 U	0.2 U	**4.2**	1 U	1 U	0.2 U
4/19/10	**6.2**	1 U	1 U	1 U	**14**	1 U	1 U	1 U	**3.4**	1 U	1 U	1 U
6/7/11	**8.5**	1 U	1 U	0.2 U	**12**	1 U	1 U	0.2 U	**6.1**	1 U	1 U	0.2 U
10/11/11	**4.7**	0.2 U	0.2 U	0.2 U	**9**	**0.22**	0.2 U	0.2 U	**3.1**	0.2 U	0.2 U	0.2 U
4/24/12	**7.3**	**0.28**	0.2 U	0.2 U	**8.5**	**0.36**	0.2 U	0.2 U	**2.8**	0.2 U	0.2 U	0.2 U
10/10/12	**6.1**	0.2 U	0.2 U	0.2 U	**8.8**	**0.25**	0.2 U	0.2 U	**2.9**	0.2 U	0.2 U	0.2 U
5/2013	**9**	**0.44 J**	**0.45 J**	1 U	**12**	**0.58 J**	**0.51 J**	1 U	**4**	1 U	1 U	1 U
10/2013	**11**	1 U	1 U	1 U	**13**	1 U	1 U	1 U	**4.5**	1 U	1 U	1 U

Date	CYIMW112S				CYIMW113S				CYIMW113D			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**7.4 J**	**0.6 J**	1 U	1 U	**6.1 J**	**0.55 J**	1 U	1 U	**3.8 J**	**0.33 J**	1 U	1 U
10/2014	**5.1**	**0.67 J**	**4**	0.2 U	**9.7**	**2**	**14**	0.2 U	**4.8**	1 U	**2.1**	0.2 U
4/2015	**9.1**	**1.1**	**7.6**	0.2 U	**12**	**1.4**	**9.9**	0.2 U	**4.4**	1 U	**0.38 J**	0.2 U
10/2015	**9.3**	**1.3**	**5.6**	0.2 U	**11**	**1.6**	**6.7**	0.2 U	--	--	--	--
4/2016	**5.9**	**0.77 J**	**1.9**	0.2 U	**7.2**	**0.92 J**	**2.5**	0.2 U	**3.6**	1 U	**0.13 J**	0.2 U
10/2016	**7.0**	**0.8 J**	**1.2**	0.2 U	**10**	**1.2**	**1.8**	0.2 U	--	--	--	--
4/2017	--	--	--	--	**13**	**1.8**	**2.3**	0.2 U	**4.7**	**0.67 J**	1 U	0.2 U
9/2017	--	--	--	--	--	--	--	--	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

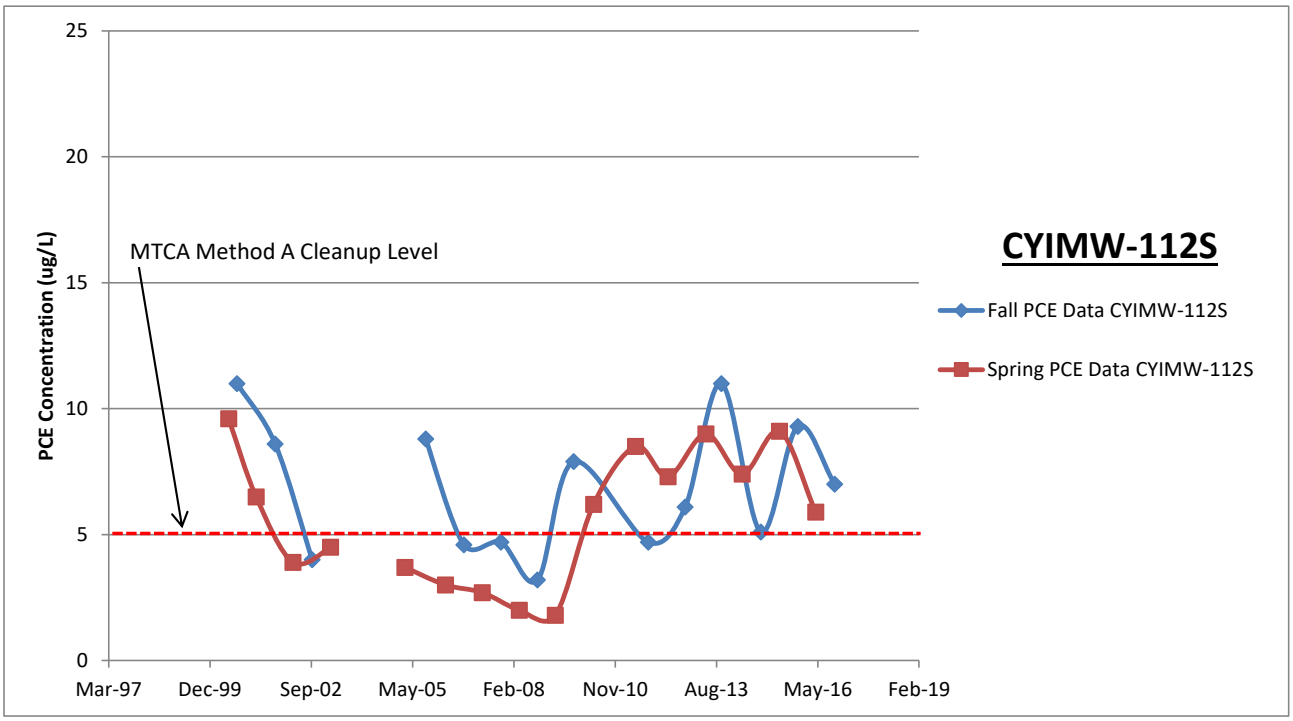

Figure C-25. Cameron Yakima, Well CYIMW-112S PCE Results (ug/L), June 2000 to October 2016.

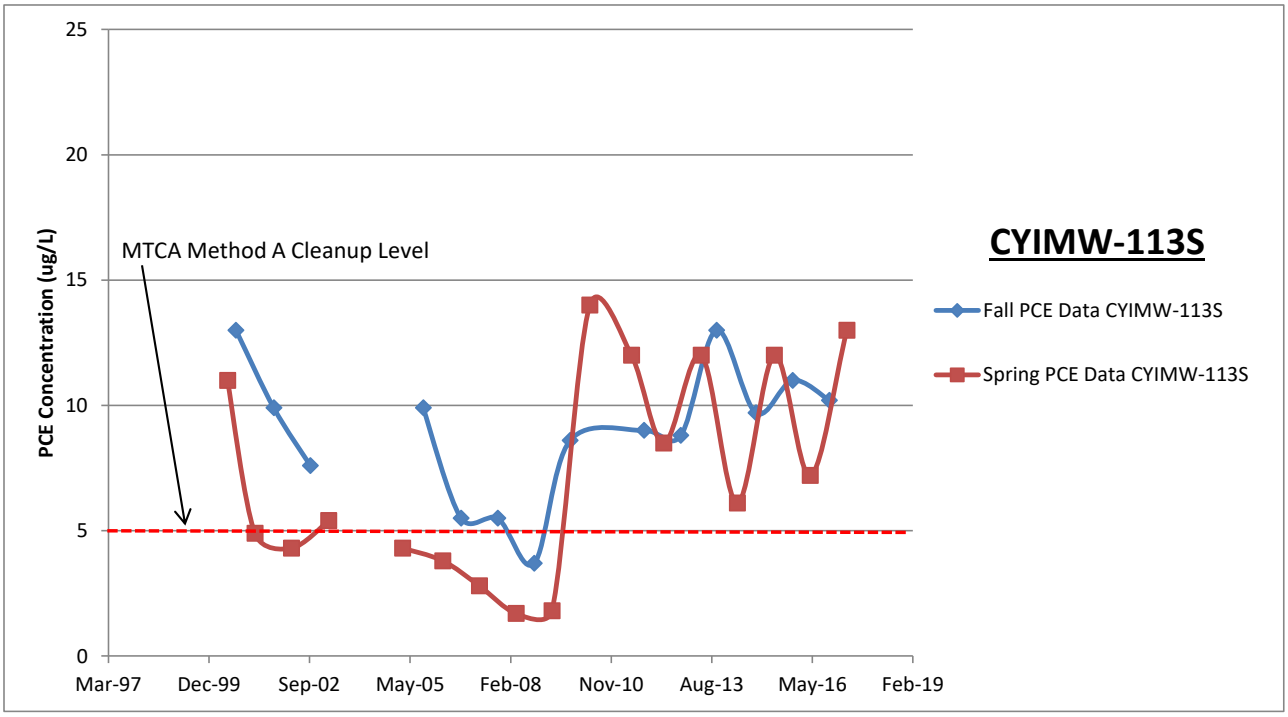

Figure C-26. Cameron Yakima, Well CYIMW-113S PCE Results (ug/L), June 2000 to April 2017.

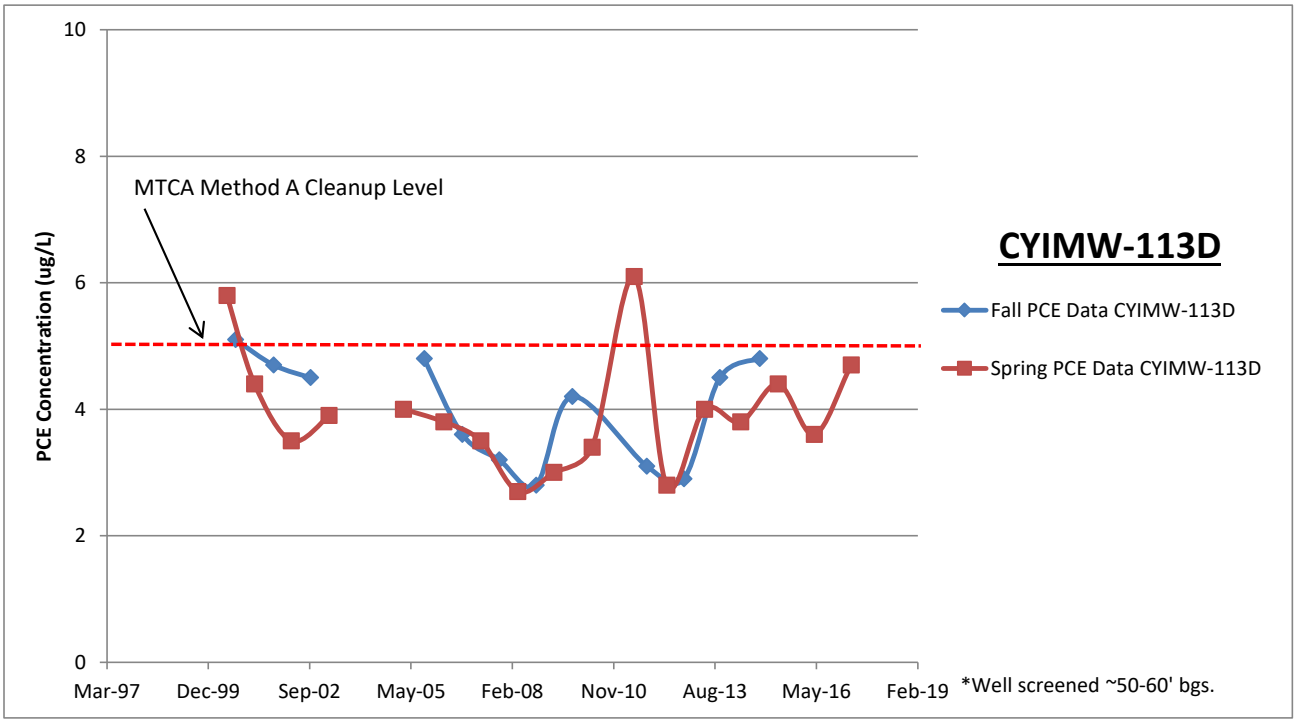

Figure C-27. Cameron Yakima, Well CYIMW-113D PCE Results (ug/L), June 2000 to April 2017.

Table C-6: Continued.

Date	CYIMW114S			
	PCE	TCE	Cis-DCE	VC
12/2/97	--	--	--	--
3/3/98	--	--	--	--
6/1/98	--	--	--	--
8/31/98	**15 J**	**0.03 J**	**0.72 J**	1 UJ
6/2/99	**19.1**	**0.65 J**	**1.59**	ND
9/8/99	**15.8**	**0.63 J**	**0.84 J**	ND
12/7/99	--	--	--	--
3/7/00	--	--	--	--
6/7/00	**9.9**	**0.28**	**0.2**	ND
8/30/00	**7.9**	**0.32**	ND	ND
12/12/00	**13**	**0.34**	ND	ND
3/6/01	**8.6**	**0.33**	ND	ND
9/10/01	**7.8**	**0.27**	< 0.2	< 0.2
3/4/02	**5.5**	**0.25**	< 0.2	< 0.2
9/9/02	**4.9**	< 0.2	< 0.2	< 0.2
3/11/03	**6.3**	< 0.2	< 0.2	< 0.2
9/9/03	--	--	--	--
3/9/04	--	--	--	--
10/5/04	--	--	--	--
3/15/05	**6.2**	**0.31**	< 0.2	< 0.2
10/11/05	**7.2**	0.2 U	0.2 U	0.2 U
12/13/05	--	--	--	--
4/18/06	**2.5**	< 0.2	< 0.2	< 0.2
10/17/06	**4.8**	0.2 U	0.2 U	0.2 U
4/17/07	**2.5**	0.2 U	0.2 U	0.2 U
10/16/07	**5**	0.2 U	0.2 U	0.2 U
4/15/08	**3.4**	< 0.2	< 0.2	< 0.2
10/13/08	**3.4**	1 U	1 U	0.2 U
4/7/09	**4.4**	1 U	**2.4**	0.2 U
10/8/09	**7.9**	1 U	1 U	0.2 U
4/19/10	**13**	1 U	1 U	1 U
6/7/11	**12**	1 U	1 U	0.2 U
10/11/11	**9.5**	**0.27**	0.2 U	0.2 U
4/24/12	**8.9**	**0.34**	0.2 U	0.2 U
10/10/12	**8.9**	**0.28**	0.2 U	0.2 U
5/2013	**12**	**0.41 J**	**0.46 J**	1 U
10/2013	**12**	1 U	1 U	1 U

Date	CYIMW114S			
	PCE	TCE	Cis-DCE	VC
4/2014	**12 J**	**0.79 J**	**0.52 J**	1 U
10/2014	**10**	**2.1**	**14**	0.2 U
4/2015	**12**	**1.4**	**11**	0.2 U
10/2015	--	--	--	--
4/2016	**10**	**1.3**	**3.8**	0.2 U
10/2016	**10**	**1.2**	**1.8**	0.2 U
4/2017	--	--	--	--
9/2017	**6.2**	**0.63 J**	**0.95 J**	0.2 U
MTCA CL	**5**	**5**	**70**	**0.2**

Notes for Table C-6 above

U: Analyte was not detected at or above the reported value.

J: Analyte was positively identified. The associated numerical result is an estimate.

UJ: The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately measure the analyte in the sample.

E: Reported result is an estimate because it exceeds the calibration range.

ND: Analyte was not detected.

REJ: Rejected. Result considered suspect due to possible cross-contamination. Well re-sampled in December 2005.

Bold: Analyte was detected.

Shade: Values are greater than MTCA cleanup levels.

--: Not Sampled.

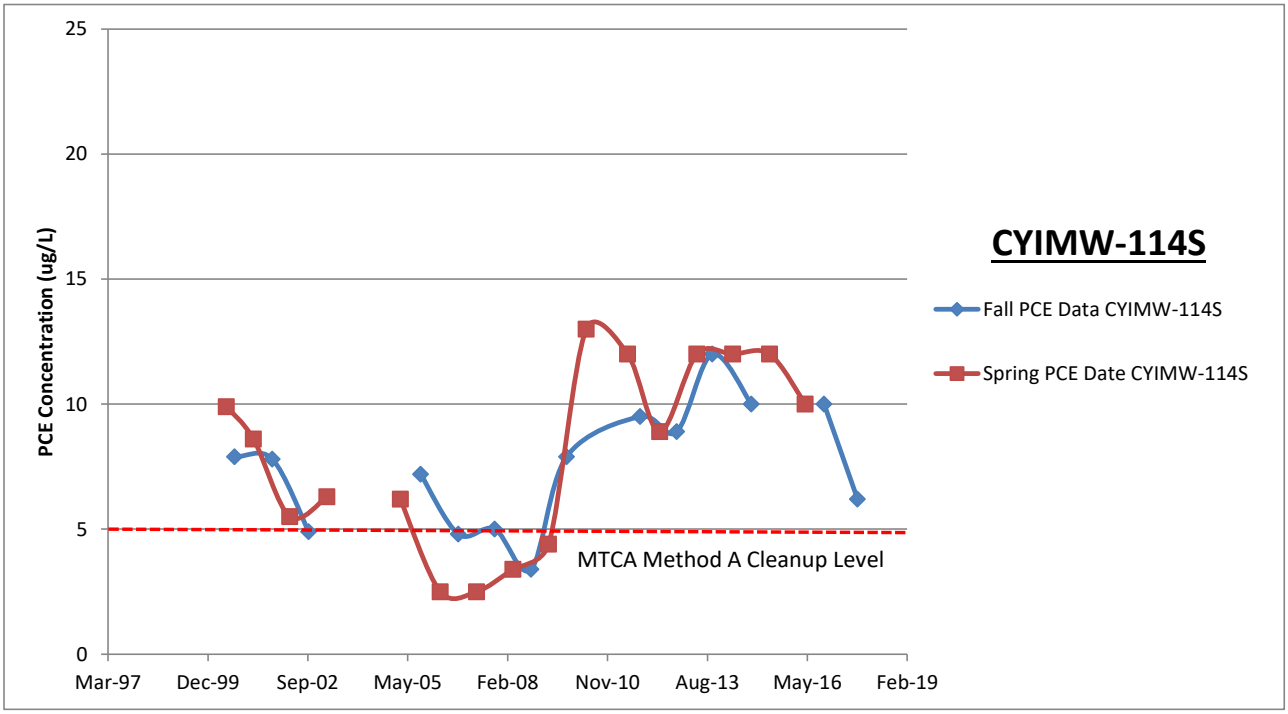

Figure C-28. Cameron Yakima, Well CYIMW-114S PCE Results (ug/L), June 2000 to September 2017.

Table C-7: Summary of Analytical Results (ug/L) for YRRA Remedial Investigation Wells, June 1999 to September 2017.

Date	RI-3S				RI-4S				RI-4D			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	--	--	--	--	--	--	--	--	--	--	--	--
3/3/98	--	--	--	--	--	--	--	--	--	--	--	--
6/1/98	--	--	--	--	--	--	--	--	--	--	--	--
8/31/98	--	--	--	--	--	--	--	--	--	--	--	--
6/2/99	**0.72 J**	0.15 U	0.1 U	0.14 U	**15.4**	0.15 U	0.1 U	0.14 U	0.25 U	0.15 U	0.1 U	0.14 U
9/8/99	**1.72**	0.15 U	0.1 U	0.14 U	**13.7**	0.15 U	0.1 U	0.14 U	**0.61 J**	0.15 U	0.1 U	0.14 U
12/7/99	**2.43**	0.15 U	**1.09**	0.14 U	**12.7**	**0.32 J**	0.1 U	0.14 U	**1.72**	**0.34 J**	0.1 U	0.14 U
3/7/00	**0.33 J**	0.15 U	0.1 U	0.14 U	**12.2**	0.15 U	0.1 U	0.14 U	**0.34 J**	0.15 U	0.1 U	0.14 U
6/7/00	**2**	**0.34**	**0.54**	0.14 U	**17**	0.15 U	0.1 U	0.14 U	**1.1**	0.15 U	0.1 U	0.14 U
8/30/00	**2.2**	**0.39**	**0.69**	0.14 U	**11**	0.15 U	0.1 U	0.14 U	**0.38**	0.15 U	0.1 U	0.14 U
12/12/00	**1.7**	**0.24**	**0.83**	0.14 U	**15**	0.15 U	0.1 U	0.14 U	**0.52**	0.15 U	0.1 U	0.14 U
3/6/01	**0.30**	0.15 U	0.1 U	0.14 U	**14**	0.15 U	0.1 U	0.14 U	**0.78**	0.15 U	0.1 U	0.14 U
9/10/01	**1.7**	**0.39**	**0.36**	<0.2	**11**	<0.2	<0.2	<0.2	**0.98**	<0.2	<0.2	<0.2
3/4/02	**1.2**	**0.24**	**0.4**	<0.2	**15**	<0.2	<0.2	<0.2	**1**	<0.2	<0.2	<0.2
9/9/02	**1.1**	**0.22**	**0.32**	<0.2	**11**	<0.2	<0.2	<0.2	**1**	<0.2	<0.2	<0.2
3/11/03	**0.68**	<0.2	**0.35**	<0.2	**13**	<0.2	<0.2	<0.2	**1.1**	<0.2	<0.2	<0.2
9/9/03	**1.6**	**0.26**	<0.2	<0.2	**14**	<0.2	<0.2	<0.2	**1.3**	<0.2	<0.2	<0.2
3/9/04	**0.21**	<0.2	<0.2	<0.2	**17**	<0.2	<0.2	<0.2	**1.4**	<0.2	<0.2	<0.2
10/5/04	**0.92**	**0.23**	<0.2	<0.2	**14**	<0.2	<0.2	<0.2	**1.4**	<0.2	<0.2	<0.2
3/15/05	**4.7**	<0.2	<0.2	<0.2	**16**	<0.2	<0.2	<0.2	**3.2**	<0.2	<0.2	<0.2
10/11/05	REJ				**18**	<0.2	<0.2	<0.2	**1.8**	<0.2	<0.2	<0.2
12/13/05	**1**	<0.2	<0.2	<0.2	--	--	--	--	--	--	--	--
4/18/06	**0.25**	<0.2	<0.2	<0.2	**14**	<0.2	<0.2	<0.2	**1.4**	<0.2	<0.2	<0.2
10/17/06	**0.75**	<0.2	<0.2	<0.2	**11**	<0.2	<0.2	<0.2	**1.3**	<0.2	<0.2	<0.2
4/17/07	**1.4**	**0.22**	**0.29**	<0.2	**13**	<0.2	<0.2	<0.2	**1.4**	<0.2	<0.2	<0.2
10/16/07	**0.61**	<0.2	<0.2	<0.2	**11**	<0.2	<0.2	<0.2	**1.2**	<0.2	<0.2	<0.2
4/15/08	**0.29**	<0.2	<0.2	<0.2	**13**	<0.2	<0.2	<0.2	**1.3**	<0.2	<0.2	<0.2
10/14/08	**1.2**	1 U	1 U	0.2 U	**11**	1 U	1 U	0.2 U	**1.6**	1 U	1 U	0.2 U
4/7/09	**1.2**	1 U	1 U	0.2 U	**18**	1 U	1 U	0.2 U	**1.3**	1 U	1 U	0.2 U
10/6/09	1 U	1 U	1 U	0.2 U	**13**	1 U	1 U	0.2 U	**2**	1 U	1 U	0.2 U
4/21/10	1 U	1 U	1 U	1 U	**19**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
6/7/11	**2.5**	1 U	1 U	0.2 U	**25**	1 U	1 U	0.2 U	**2.1**	1 U	1 U	0.2 U
10/11/11	**0.59**	0.2 U	0.2 U	0.2 U	**15**	0.2 U	0.2 U	0.2 U	**0.73**	0.2 U	0.2 U	0.2 U
4/23/12	0.2 U	0.2 U	0.2 U	0.2 U	**11**	0.2 U	0.2 U	0.2 U	**0.64**	0.2 U	0.2 U	0.2 U
10/11/12	**0.47**	0.2 U	0.2 U	0.2 U	**13**	0.2 U	0.2 U	0.2 U	**0.89**	0.2 U	0.2 U	0.2 U
5/2013	1 U	1 U	1 U	1 U	**18**	1 U	1 U	1 U	**1**	1 U	1 U	1 U
10/2013	**0.88 J**	1 U	1 U	1 U	**18**	1 U	1 U	1 U	**1.1**	1 U	1 U	1 U

Date	RI-3S				RI-4S				RI-4D			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**0.74 J**	1 U	1 U	1 U	**16 J**	1 U	1 U	1 U	**1.5 J**	1 U	1 U	1 U
10/2014	**0.82 J**	1 U	1 U	0.2 U	**16**	1 U	1 U	0.2 U	**1.2**	1 U	1 U	0.2 U
4/2015	**0.73 J**	1 U	1 U	0.2 U	**18 J**	1 UJ	1 UJ	0.2 UJ	**1.3 J**	1 UJ	1 UJ	0.2 UJ
10/2015	--	--	--	--	--	--	--	--	--	--	--	--
4/2016	**0.33 J**	1 U	1 U	0.2 U	**17**	1 U	1 U	0.2 U	**1.5**	1 U	1 U	0.2 U
10/2016	--	--	--	--	--	--	--	--	--	--	--	--
4/2017	**0.86 J**	1 U	1 U	0.2 U	**21**	1 U	1 U	0.2 U	**1.7**	1 U	1 U	0.2 U
9/2017	--	--	--	--	--	--	--	--	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

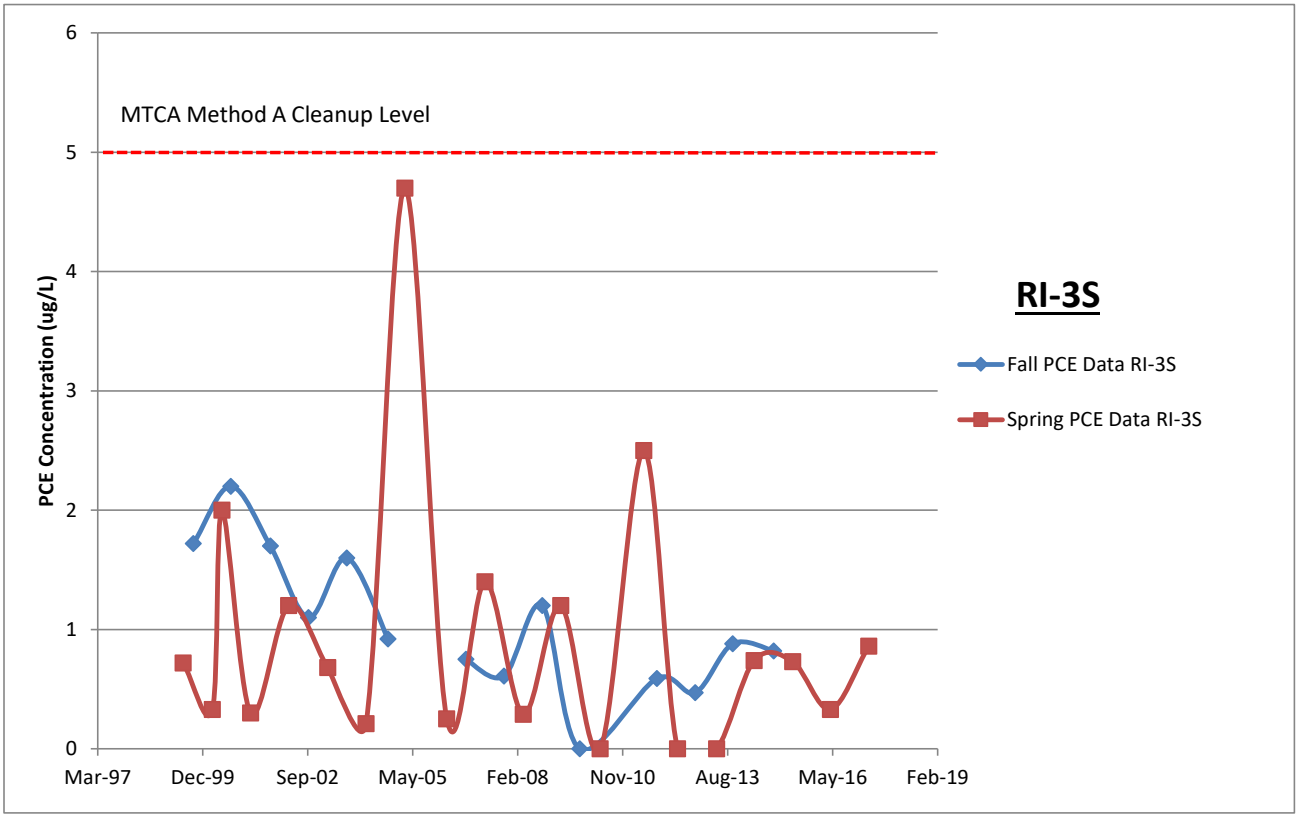

Figure C-29. YRRA Remedial Investigation Well RI-3S PCE Results, June 1999 to April 2017.

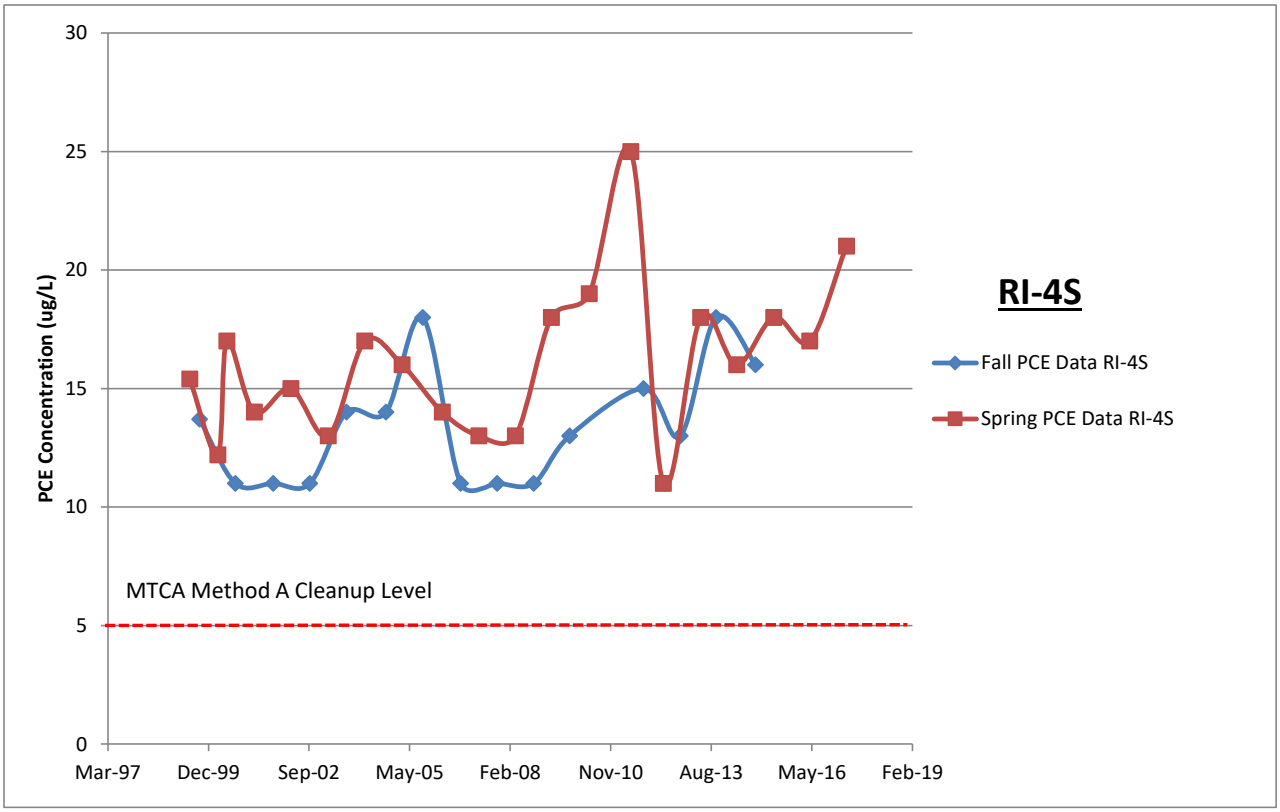

Figure C-30. YRRA Remedial Investigation Well RI-4S PCE Results, June 1999 to April 2017.

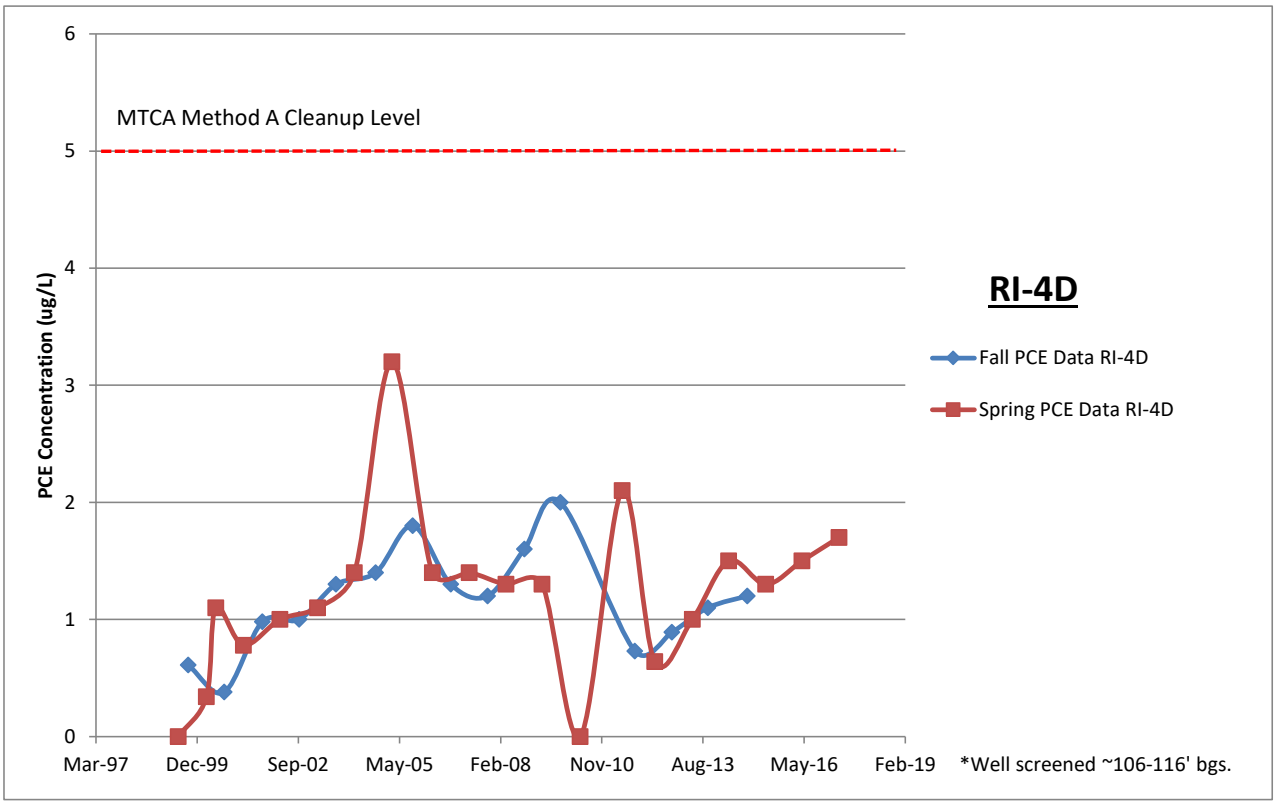

Figure C-31. YRRA Remedial Investigation Well RI-4D PCE Results, June 1999 to April 2017.

Table C-7: Continued.

Date	RI-5S				RI-5D				RI-6S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	--	--	--	--	--	--	--	--	--	--	--	--
3/3/98	--	--	--	--	--	--	--	--	--	--	--	--
6/1/98	--	--	--	--	--	--	--	--	--	--	--	--
8/31/98	--	--	--	--	--	--	--	--	--	--	--	--
6/2/99	**0.8 J**	0.15 U	0.1 U	0.14 U	0.25 U	0.15 U	0.1 U	0.14 U	**2.04**	0.15 U	0.1 U	0.14 U
9/8/99	**0.59 J**	0.15 U	0.1 U	0.14 U	0.25 U	0.15 U	0.1 U	0.14 U	**4.72**	0.15 U	0.1 U	0.14 U
12/7/99	**1.84**	0.15 U	0.1 U	0.14 U	**0.92 J**	0.15 U	0.1 U	0.14 U	**3.66**	0.15 U	0.1 U	0.14 U
3/7/00	**1.47**	0.15 U	0.1 U	0.14 U	**0.62 J**	0.15 U	0.1 U	0.14 U	**2.19**	0.15 U	0.1 U	0.14 U
6/7/00	**0.87**	0.15 U	0.1 U	0.14 U	**0.55**	0.15 U	0.1 U	0.14 U	**3.1**	0.15 U	0.1 U	0.14 U
8/30/00	**0.66**	0.15 U	0.1 U	0.14 U	**0.43**	0.15 U	0.1 U	0.14 U	**3.8**	0.15 U	0.1 U	0.14 U
12/12/00	**1.1**	0.15 U	0.1 U	0.14 U	**0.51**	0.15 U	0.1 U	0.14 U	**3.8**	0.15 U	0.1 U	0.14 U
3/6/01	**1.2**	0.15 U	0.1 U	0.14 U	**0.51**	0.15 U	0.1 U	0.14 U	**2.8**	0.15 U	0.1 U	0.14 U
9/10/01	**0.74**	<0.2	<0.2	<0.2	**0.41**	<0.2	<0.2	<0.2	**4.3**	<0.2	<0.2	<0.2
3/4/02	**1.2**	<0.2	<0.2	<0.2	**0.46**	<0.2	<0.2	<0.2	**2.9**	<0.2	<0.2	<0.2
9/9/02	**0.5**	<0.2	<0.2	<0.2	**0.46**	<0.2	<0.2	<0.2	**4**	<0.2	<0.2	<0.2
3/11/03	**1.2**	<0.2	<0.2	<0.2	**0.5**	<0.2	<0.2	<0.2	**2.5**	<0.2	<0.2	<0.2
9/9/03	**0.89**	<0.2	<0.2	<0.2	**0.59**	<0.2	<0.2	<0.2	**5.3**	<0.2	<0.2	<0.2
3/9/04	**1.4**	<0.2	<0.2	<0.2	**0.61**	<0.2	<0.2	<0.2	**3.7**	<0.2	<0.2	<0.2
10/5/04	**0.97**	<0.2	<0.2	<0.2	**0.68**	<0.2	<0.2	<0.2	**6**	<0.2	<0.2	<0.2
3/15/05	**1.6**	<0.2	<0.2	<0.2	**2.1**	<0.2	<0.2	<0.2	**3.5**	<0.2	<0.2	<0.2
10/11/05	REJ				**1.9**	<0.2	<0.2	<0.2	REJ			
12/13/05	**0.66**	<0.2	<0.2	<0.2	--	--	--	--	**4.1**	<0.2	<0.2	<0.2
4/18/06	**0.61**	<0.2	<0.2	<0.2	**0.61**	<0.2	<0.2	<0.2	**3.3**	<0.2	<0.2	<0.2
10/17/06	**0.76**	<0.2	<0.2	<0.2	**0.57**	<0.2	<0.2	<0.2	**4.9**	<0.2	<0.2	<0.2
4/17/07	**0.76**	<0.2	<0.2	<0.2	**0.60**	<0.2	<0.2	<0.2	**3.4**	<0.2	<0.2	<0.2
10/16/07	**1.1**	<0.2	<0.2	<0.2	**0.61**	<0.2	<0.2	<0.2	**6**	<0.2	<0.2	<0.2
4/15/08	**1.3**	<0.2	<0.2	<0.2	**0.55**	<0.2	<0.2	<0.2	**2.9**	<0.2	<0.2	<0.2
10/14/08	**1.3**	1 U	1 U	0.2 U	**1**	1 U	1 U	0.2 U	**5.9**	1 U	1 U	0.2 U
4/7/09	1 U	1 U	1 U	0.2 U	**0.48 J**	1 U	1 U	0.2 U	**3.9**	1 U	1 U	0.2 U
10/6/09	1 U	1 U	1 U	0.2 U	1 U	1 U	1 U	0.2 U	**6.9**	1 U	1 U	0.2 U
4/21/10	**2.4**	1 U	1 U	1 U	**1**	1 U	1 U	1 U	**3.9**	1 U	1 U	1 U
6/7/11	**2.4**	1 U	1 U	0.2 U	**1.7**	1 U	1 U	0.2 U	**4.4**	1 U	1 U	0.2 U
10/11/11	**1.6**	0.2 U	0.2 U	0.2 U	**0.78**	0.2 U	0.2 U	0.2 U	**6.1**	0.2 U	0.2 U	0.2 U
4/23/12	**2**	0.2 U	0.2 U	0.2 U	**0.69**	0.2 U	0.2 U	0.2 U	**2.7**	0.2 U	0.2 U	0.2 U
10/11/12	**1.4**	0.2 U	0.2 U	0.2 U	**0.77**	0.2 U	0.2 U	0.2 U	**5.7**	0.2 U	0.2 U	0.2 U
5/2013	**2.4**	1 U	1 U	1 U	**1.1**	1 U	1 U	1 U	**3.8**	1 U	1 U	1 U
10/2013	**2.1**	1 U	1 U	1 U	**1.2**	1 U	1 U	1 U	**8.2**	1 U	1 U	1 U

Date	RI-5S				RI-5D				RI-6S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2014	**3 J**	1 U	1 U	1 U	**1.5 J**	1 U	1 U	1 U	**3.6 J**	1 U	1 U	1 U
10/2014	**1.8**	1 U	1 U	0.2 U	**1.4**	1 U	1 U	0.2 U	**7.1**	1 U	1 U	0.2 U
4/2015	**3.3 J**	1 UJ	1 UJ	0.2 UJ	**1.7 J**	1 UJ	1 UJ	0.2 UJ	--	--	--	--
10/2015	--	--	--	--	--	--	--	--	**8.5**	1 U	1 U	0.2 U
4/2016	**2.9**	1 U	1 U	0.2 U	**1.2**	1 U	1 U	0.2 U	--	--	--	--
10/2016	--	--	--	--	--	--	--	--	**8.3 J**	1 U	1 U	0.2 U
4/2017	**4.2**	1 U	1 U	0.2 U	**1.8**	1 U	1 U	0.2 U	--	--	--	--
9/2017	--	--	--	--	--	--	--	--	**6.6**	1 U	1 U	0.2 U
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

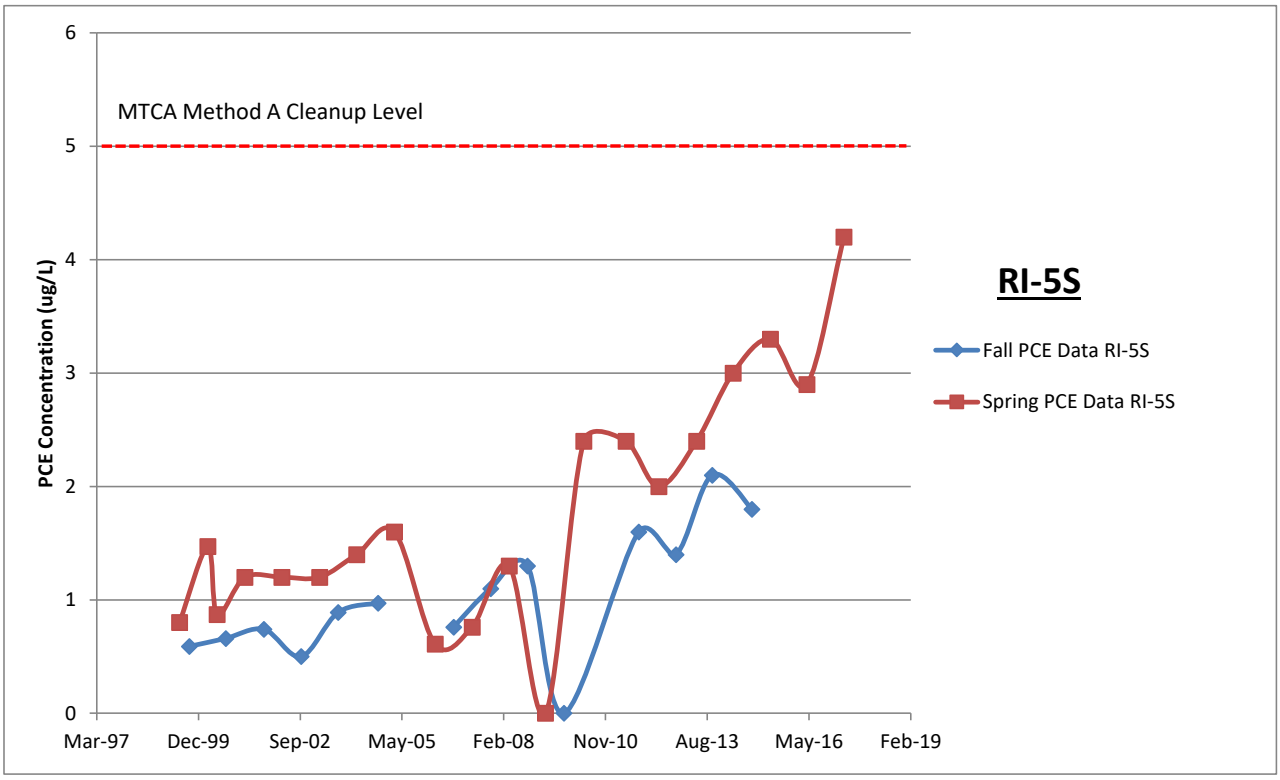

Figure C-32. YRRA Remedial Investigation Well RI-5S PCE Results, June 1999 to April 2017.

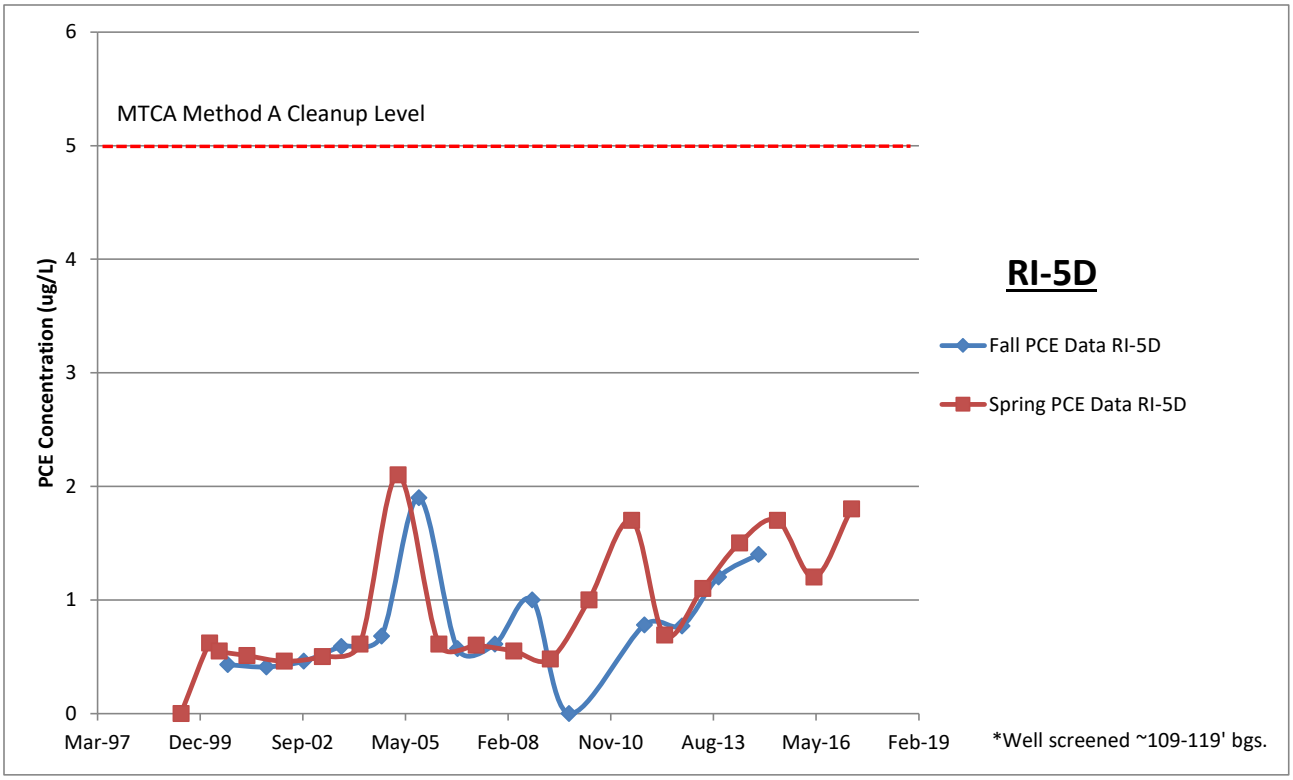

Figure C-33. YRRA Remedial Investigation Well RI-5D PCE Results, June 1999 to April 2017.

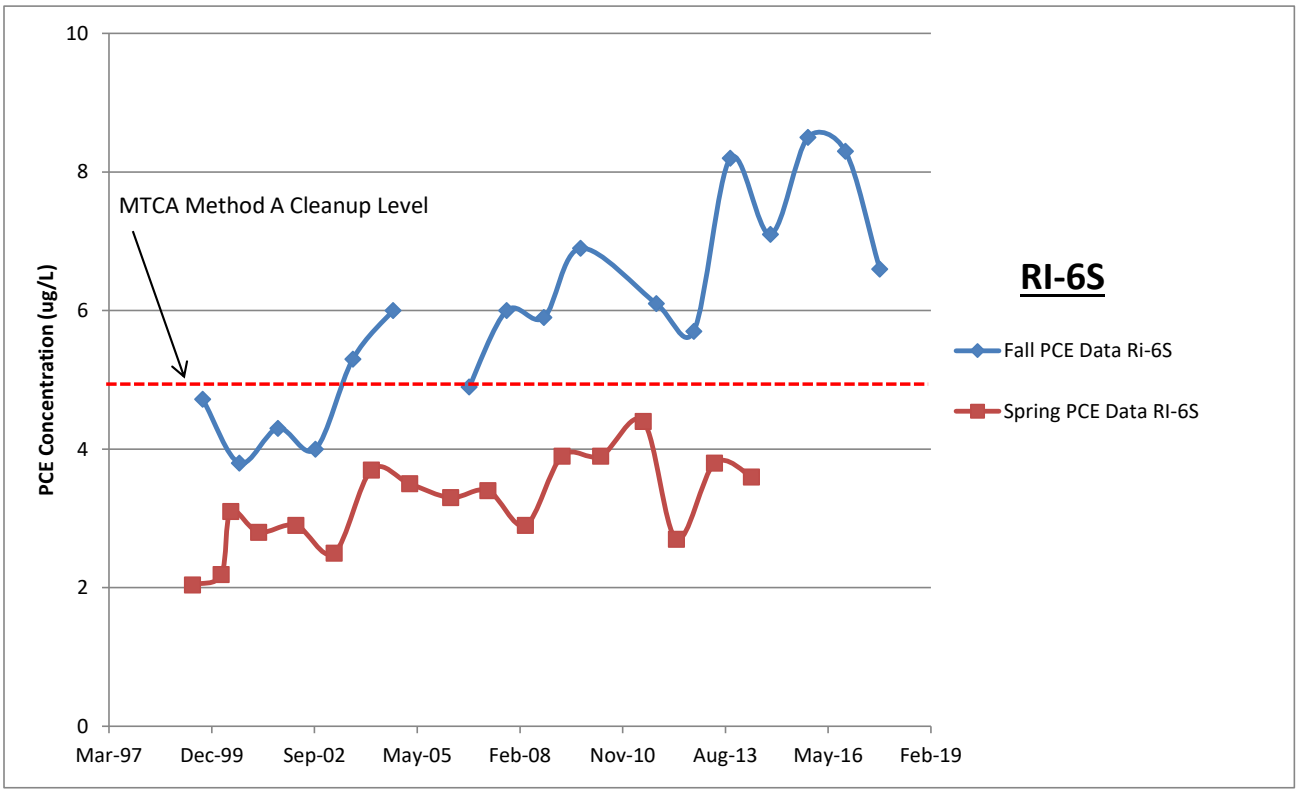

Figure C-34. YRRA Remedial Investigation Well RI-6S PCE Results, June 1999 to September 2017.

Table C-7: Continued.

Date	RI-9S				RI-10S				RI-11S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
12/2/97	--	--	--	--	--	--	--	--	--	--	--	--
3/3/98	--	--	--	--	--	--	--	--	--	--	--	--
6/1/98	--	--	--	--	--	--	--	--	--	--	--	--
8/31/98	--	--	--	--	--	--	--	--	--	--	--	--
6/2/99	**1.86**	0.15 U	0.1 U	0.14 U	**2.53**	0.15 U	0.1 U	0.14 U	**1.4**	0.15 U	0.1 U	0.14 U
9/8/99	**1.44**	0.15 U	0.1 U	0.14 U	**2.51**	0.15 U	0.1 U	0.14 U	**1.63**	0.15 U	0.1 U	0.14 U
12/7/99	**1.33**	0.15 U	0.1 U	0.14 U	**2.33**	0.15 U	0.1 U	0.14 U	**1.15**	0.15 U	0.1 U	0.14 U
3/7/00	**1.18**	0.15 U	0.1 U	0.14 U	**1.9**	0.15 U	0.1 U	0.14 U	**1.01**	0.15 U	0.1 U	0.14 U
6/7/00	**1.4**	0.15 U	0.1 U	0.14 U	**2**	0.15 U	0.1 U	0.14 U	**0.99**	0.15 U	0.1 U	0.14 U
8/30/00	**1.4**	0.15 U	0.1 U	0.14 U	**1.8**	0.15 U	0.1 U	0.14 U	**1**	0.15 U	0.1 U	0.14 U
12/12/00	**1.9**	**0.23**	0.1 U	0.14 U	**2.7**	0.15 U	0.1 U	0.14 U	**1.6**	0.15 U	0.1 U	0.14 U
3/6/01	**1.9**	**0.25**	0.1 U	0.14 U	**2.2**	0.15 U	0.1 U	0.14 U	**1.1**	0.15 U	0.1 U	0.14 U
9/10/01	--	--	--	--	**2.3**	<0.2	<0.2	<0.2	**1.1**	<0.2	<0.2	<0.2
3/4/02	**1.8**	**0.21**	<0.2	<0.2	**2**	<0.2	<0.2	<0.2	**1.2**	<0.2	<0.2	<0.2
9/9/02	**1.7**	**0.26**	<0.2	<0.2	**1.8**	<0.2	<0.2	<0.2	**1**	<0.2	<0.2	<0.2
3/11/03	**1.6**	**0.23**	<0.2	<0.2	**1.8**	<0.2	<0.2	<0.2	**1**	<0.2	<0.2	<0.2
9/9/03	**1.7**	<0.2	<0.2	<0.2	**2.8**	<0.2	<0.2	<0.2	**1.4**	<0.2	<0.2	<0.2
3/9/04	**2**	**0.25**	<0.2	<0.2	**1.9**	<0.2	<0.2	<0.2	**1.1**	<0.2	<0.2	<0.2
10/5/04	**1.5**	<0.2	<0.2	<0.2	**1.8**	<0.2	<0.2	<0.2	**0.78**	<0.2	<0.2	<0.2
3/15/05	**2.2**	<0.2	<0.2	<0.2	**1.9**	<0.2	<0.2	<0.2	**1.4**	<0.2	<0.2	<0.2
10/11/05	REJ				REJ				REJ			
12/13/05	**2.2**	<0.2	<0.2	<0.2	**1.6**	<0.2	<0.2	<0.2	**0.83**	<0.2	<0.2	<0.2
4/18/06	**2.1**	**0.21**	<0.2	<0.2	**1.8**	<0.2	<0.2	<0.2	**0.89**	<0.2	<0.2	<0.2
10/17/06	--	--	--	--	**1.7**	<0.2	<0.2	<0.2	**0.94**	<0.2	<0.2	<0.2
4/17/07	**1.9**	<0.2	<0.2	<0.2	**1.9**	<0.2	<0.2	<0.2	**1.1**	<0.2	<0.2	<0.2
10/16/07	**2.1**	<0.2	<0.2	<0.2	**1.9**	<0.2	<0.2	<0.2	**1.1**	<0.2	<0.2	<0.2
4/15/08	**1.4**	<0.2	<0.2	<0.2	**1.4**	<0.2	<0.2	<0.2	**0.71**	<0.2	<0.2	<0.2
10/14/08	**1.4**	1 U	1 U	0.2 U	**1.5**	1 U	1 U	0.2 U	**1.1**	1 U	1 U	0.2 U
4/7/09	**1.7**	1 U	1 U	0.2 U	**1.5**	1 U	1 U	0.2 U	**0.43 J**	1 U	1 U	0.2 U
10/6/09	1 U	1 U	1 U	0.2 U	**2**	1 U	1 U	0.2 U	1 U	1 U	1 U	0.2 U
4/21/10	**1.9**	1 U	1 U	1 U	**1.9**	1 U	1 U	1 U	1 U	1 U	1 U	0.2 U
6/7/11	1 U	1 U	1 U	0.2 U	**1.8**	1 U	1 U	0.2 U	**1.3**	1 U	1 U	0.2 U
10/11/11	**1.3**	0.2 U	0.2 U	0.2 U	**1.3**	0.2 U	0.2 U	0.2 U	**0.87**	0.2 U	0.2 U	0.2 U
4/23/12	**0.97**	0.2 U	0.2 U	0.2 U	**1.3**	0.2 U	0.2 U	0.2 U	**0.59**	0.2 U	0.2 U	0.2 U
10/11/12	**1.1**	0.2 U	0.2 U	0.2 U	**1.6**	0.2 U	0.2 U	0.2 U	**0.71**	0.2 U	0.2 U	0.2 U
5/2013	**1.4**	1 U	1 U	1 U	**1.7**	1 U	1 U	1 U	**0.83 J**	1 U	1 U	1 U
10/2013	**1.8**	1 U	1 U	1 U	**2.1**	1 U	1 U	1 U	**1**	1 U	1 U	1 U
4/2014	**1.7 J**	1 U	1 U	1 U	**1.9 J**	1 U	1 U	1 U	--	--	--	--
10/2014	**1.6**	1 U	1 U	0.2 U	**2**	1 U	1 U	0.2 U	**1.1**	1 U	1 U	0.2 U
4/2015	**1.7 J**	1 UJ	1 UJ	0.2 UJ	**2.2 J**	1 UJ	1 UJ	0.2 UJ	**1.2 J**	1 UJ	1 UJ	0.2 UJ
10/2015	--	--	--	--	--	--	--	--	--	--	--	--
4/2016	**1.1**	1 U	1 U	0.2 U	**1.4**	1 U	1 U	0.2 U	--	--	--	--
10/2016	--	--	--	--	--	--	--	--	**0.82 J**	1 U	1 U	0.2 U

Date	RI-9S				RI-10S				RI-11S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
4/2017	**1.6**	1 U	1 U	0.2 U	**2**	**0.6 NJ**	1 U	0.2 U	--	--	--	--
9/2017	--	--	--	--	--	--	--	--	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

Notes for Table C-7 above

U: Analyte was not detected at or above the reported value.

J: Analyte was positively identified. The associated numerical result is an estimate.

ND: Analyte was not detected.

REJ: Rejected. Result considered suspect due to possible cross-contamination. Well re-sampled in December 2005.

Bold: Analyte was detected.

Shade: Values are greater than MTCA cleanup levels.

--: Not Sampled.

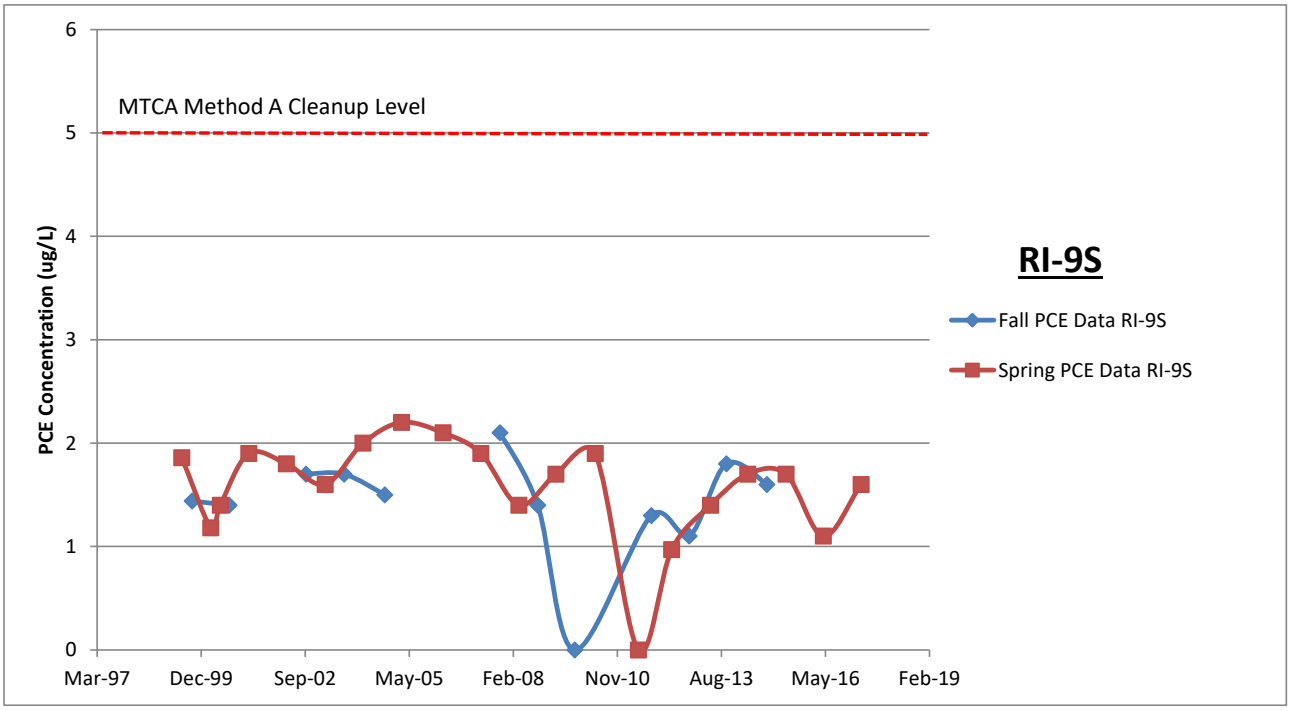

Figure C-35. YRRA Remedial Investigation Well RI-9S PCE Results, June 1999 to April 2017.

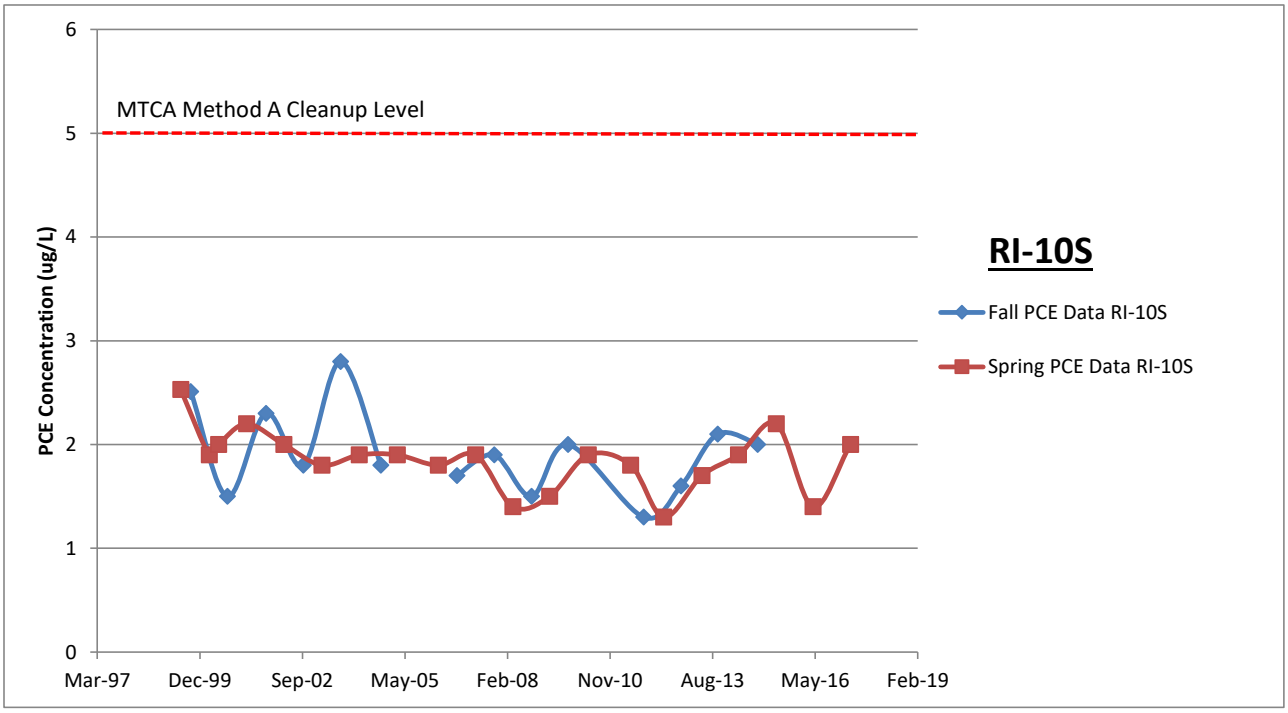

Figure C-36. YRRA Remedial Investigation Well RI-10S PCE Results, June 1999 to April 2017.

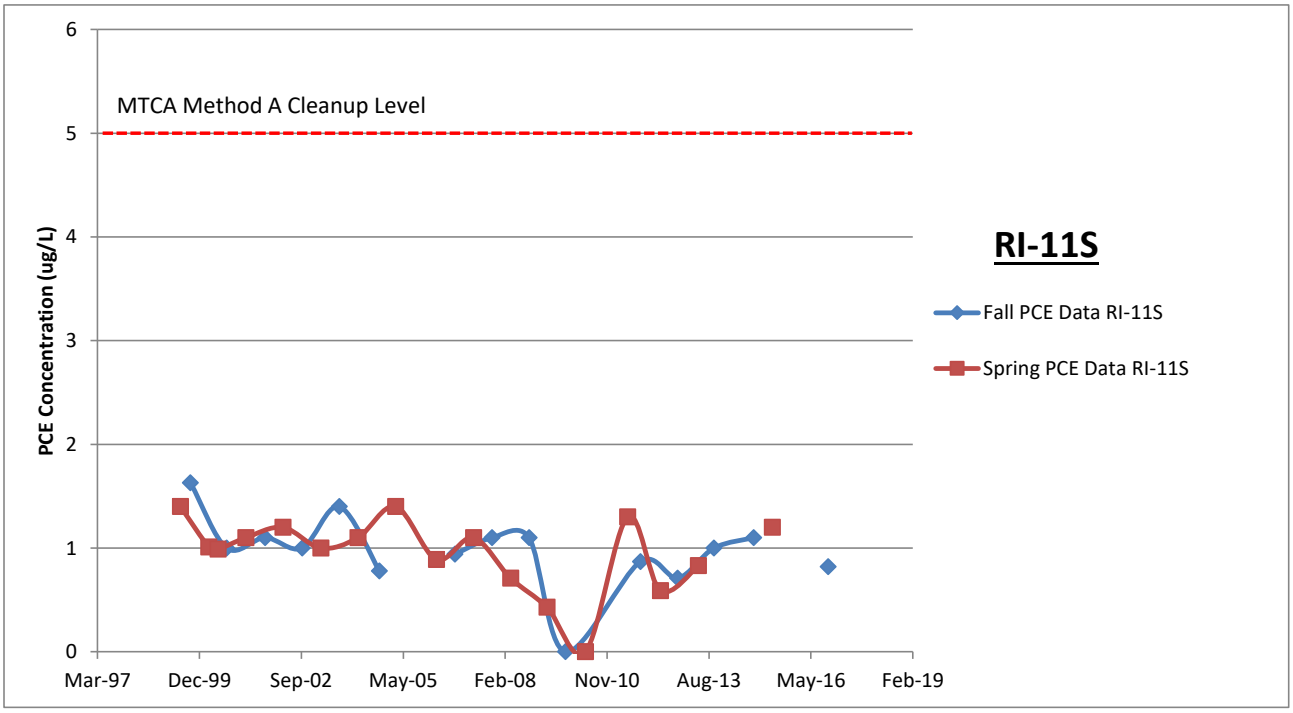

Figure C-37. YRRA Remedial Investigation Well RI-11S PCE Results, June 1999 to October 2016.

Table C-8: Summary of Analytical Results (ug/L) for Frank Wear Cleaners – Shallow Wells, February 1995 to September 2017.

Date	FWMW-4				FWMW-5				FWMW-6			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
2/1995	**1.7**	--	--	--	--	--	--	--	--	--	--	--
4/1995	**18**	--	--	--	--	--	--	--	--	--	--	--
9/1995	**6**	--	--	--	--	--	--	--	--	--	--	--
12/1995	**332**	--	--	--	--	--	--	--	--	--	--	--
12/1997	**1100**	--	--	--	**83**	--	--	--	--	--	--	--
3/1998	**210**	--	--	--	**390**	--	--	--	--	--	--	--
6/1998	**280**	--	--	--	**120**	--	--	--	--	--	--	--
8/1998	**34**	--	--	--	**17**	--	--	--	--	--	--	--
6/1999	**530**	--	--	--	**91**	--	--	--	--	--	--	--
9/1999	**52**	--	--	--	**19**	--	--	--	--	--	--	--
12/1999	**139**	--	--	--	**69**	--	--	--	--	--	--	--
3/2000	**700**	--	--	--	**103**	--	--	--	--	--	--	--
6/2000	**52**	--	--	--	**25**	--	--	--	--	--	--	--
8/2000	**11**	--	--	--	**6.6**	--	--	--	--	--	--	--
12/2000	**23**	--	--	--	**41**	--	--	--	--	--	--	--
3/2001	**876**	--	--	--	**17**	--	--	--	--	--	--	--
7/2005	**48**	--	--	--	--	--	--	--	**6**	1 U	1 U	5 U
10/2006	**30**	--	--	--	**6.5**	--	--	--	**2.6**	--	--	--
1/2007	--	--	--	--	**24**	1 U	1 U	1 U	--	--	--	--
4/2007	**20**	--	--	--	**2.9**	--	--	--	**3.1**	--	--	--
4/2012	**1900**	**1.3**	1 U	1 U	**12**	1 U	1 U	1 U	**4.9**	1 U	1 U	1 U
9/2012	**6.3**	1 U	1 U	1 U	**2.1**	1 U	1 U	1 U	**1.7**	1 U	1 U	1 U
12/2012	**9.1**	1 U	1 U	1 U	**8.8**	1 U	1 U	1 U	**2.2**	1 U	1 U	1 U
3/2013	**740**	1 U	1 U	1 U	**2.4**	1 U	1 U	1 U	**3.4**	1 U	1 U	1 U
1/2014	**150**	1 U	1 U	1 U	**1.5**	1 U	1 U	1 U	**1.5**	1 U	1 U	1 U
5/2014	**940**	10 U	10 U	0.02 U	**17000**	**220**	**520**	**0.052**	**1700**	**69**	**140**	0.02 U
8/2014	**320**	**150**	**200**	**0.2**	**76**	**15000**	**7700**	1 U	**570**	**5000**	**5000**	**0.83**
11/2014	**9.4**	**4.7**	**300**	**77**	5 U	5 U	**3200**	**620**	**19**	**8.6**	**390**	**26**
2/2015	**1500**	**39**	**41**	**60**	**37**	**60**	**230**	**250**	**31**	**19**	**130**	**7.2**
5/2015	**4.8**	**0.97**	**10**	**2**	**13**	**160**	**540**	**42**	**45**	**24**	**85**	**7.3**
8/2015	**12**	**5.9**	**55**	**1.3**	**98**	**150**	**1100**	**210**	**61**	**43**	**93**	**2.6**
12/2015	**11**	**6.3**	**52**	**2.2**	**61**	**220**	**350**	**83**	**7.1**	**18**	**51**	0.2 U
3/2016	**0.73**	**1.7**	**190**	**210**	50 U	20 U	**200**	**90**	**7.6**	**4.2**	**15**	**0.28**
4/2017	**235**	**27**	**23**	2 U	**30**	**44**	**43**	**46**	**3.9**	**1.4**	**2.2**	0.2 U
9/2017	**4.8 J**	**0.64 J**	**0.85 J**	0.2 UJ	**3.3 JB**	**0.99 JB**	1 U	0.2 UJ	**1.9**	1 U	1 U	0.2 U
MTCA CL	5	5	70	0.2	5	5	70	0.2	5	5	70	0.2

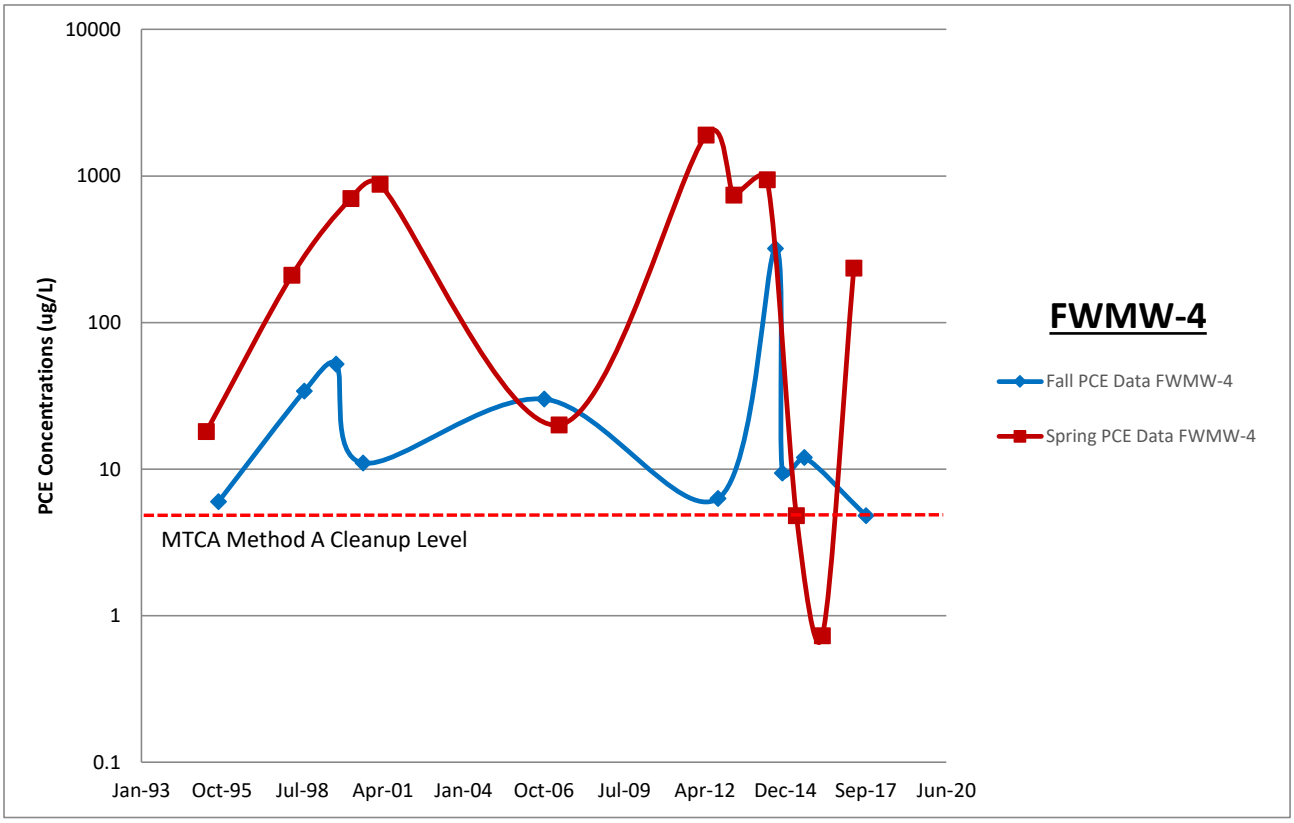

Figure C-38. YRRA Frank Wear Well FWMW-4 PCE Results, February 1995 to April 2017.

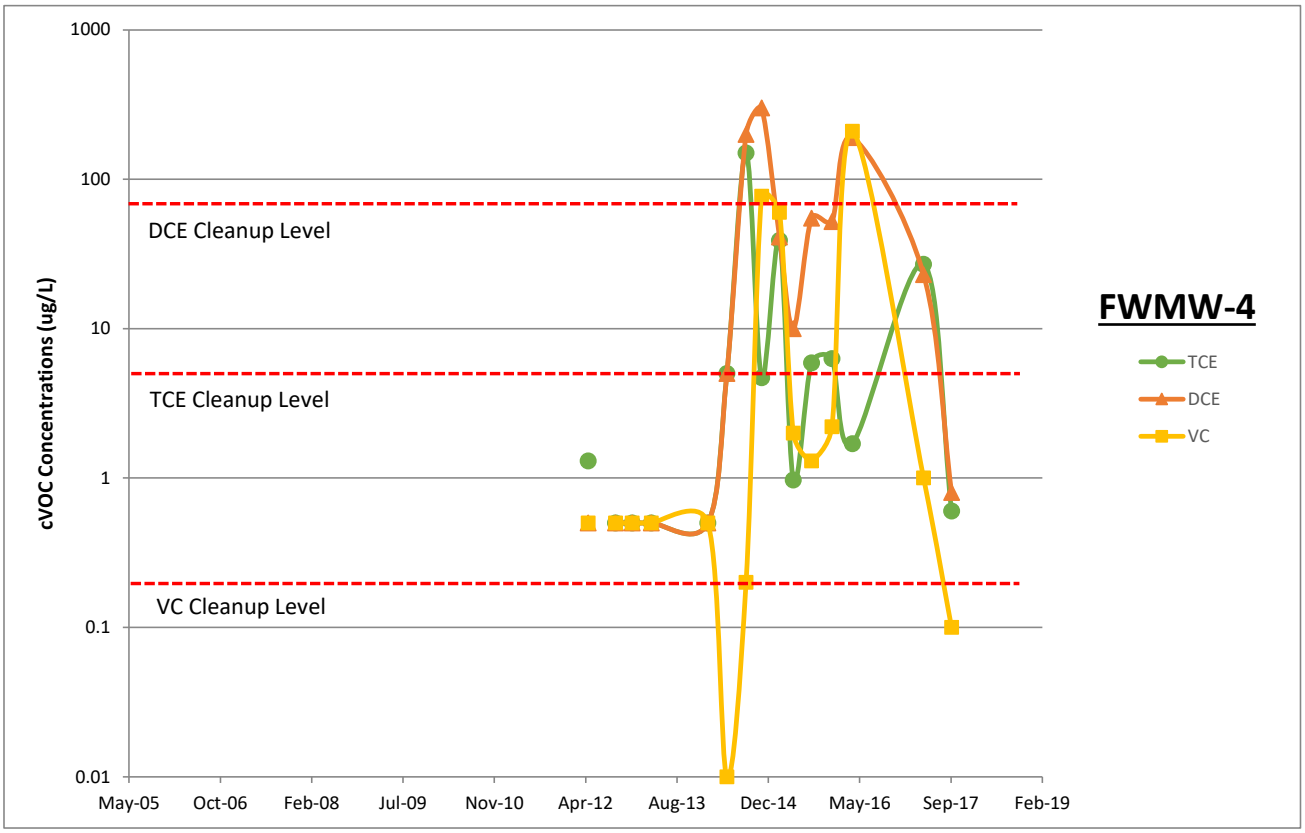

Figure C-39. YRRA Frank Wear Well FWMW-4 TCE, DCE and VC Results, April 2012 to April 2017.

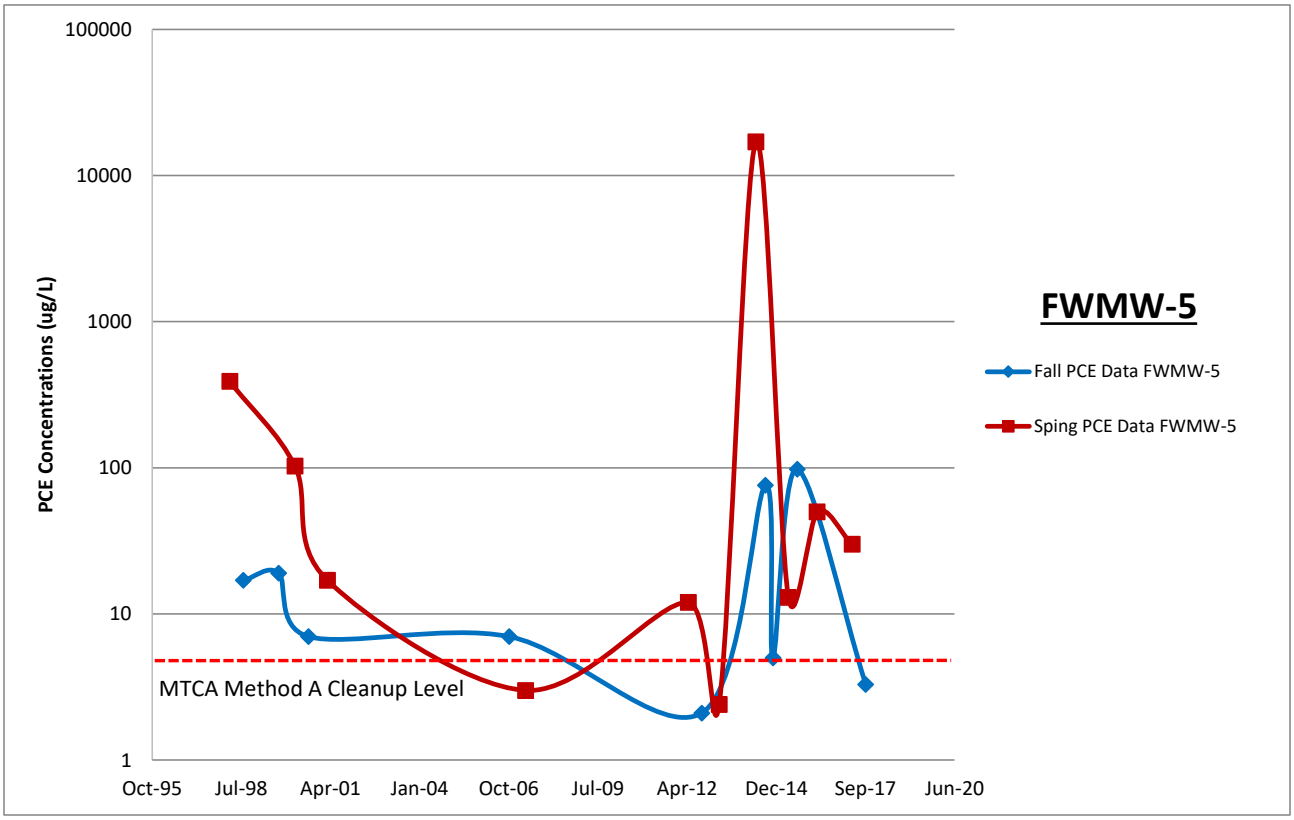

Figure C-40. YRRA Frank Wear Well FWMW-5 PCE Results, December 1997 to April 2017.

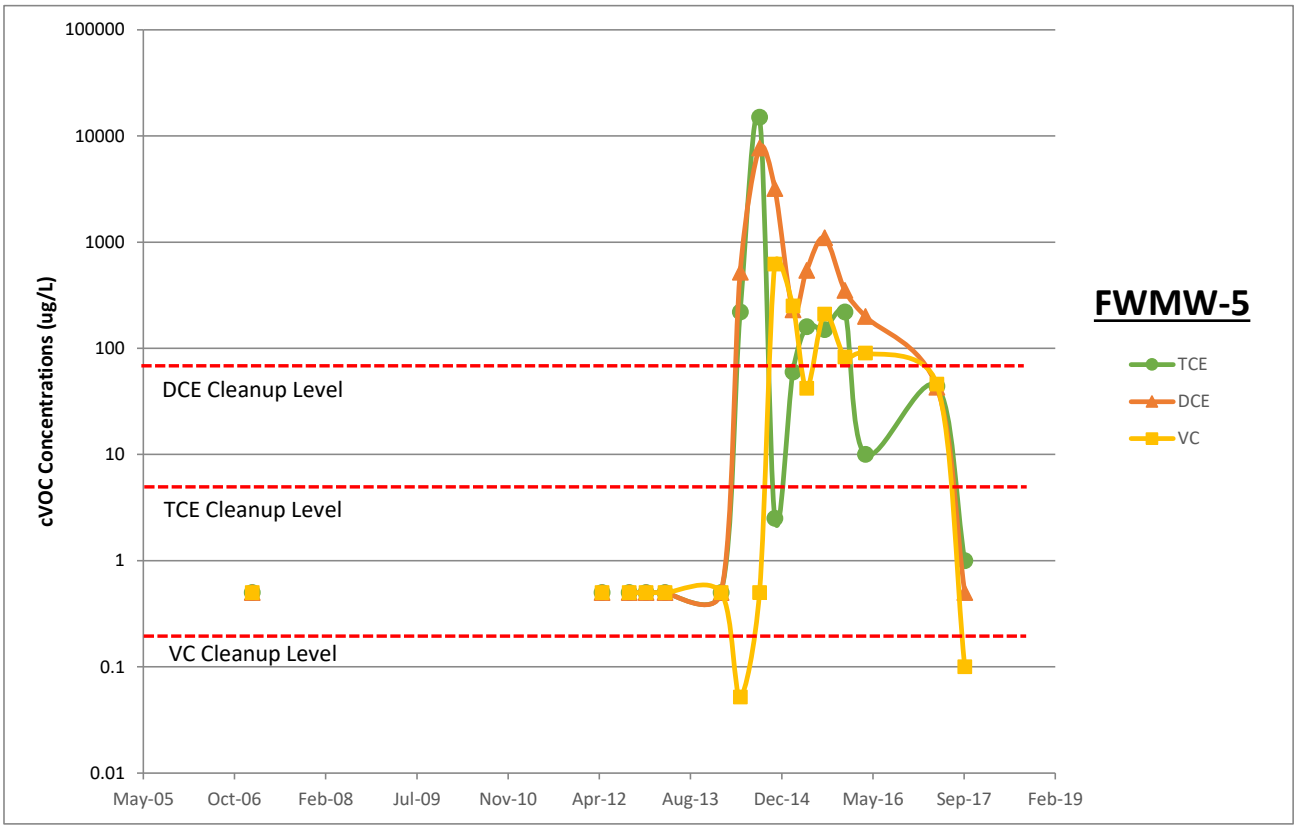

Figure C-41. YRRA Frank Wear Well FWMW-5 TCE, DCE and VC Results, January 2007 to April 2017.

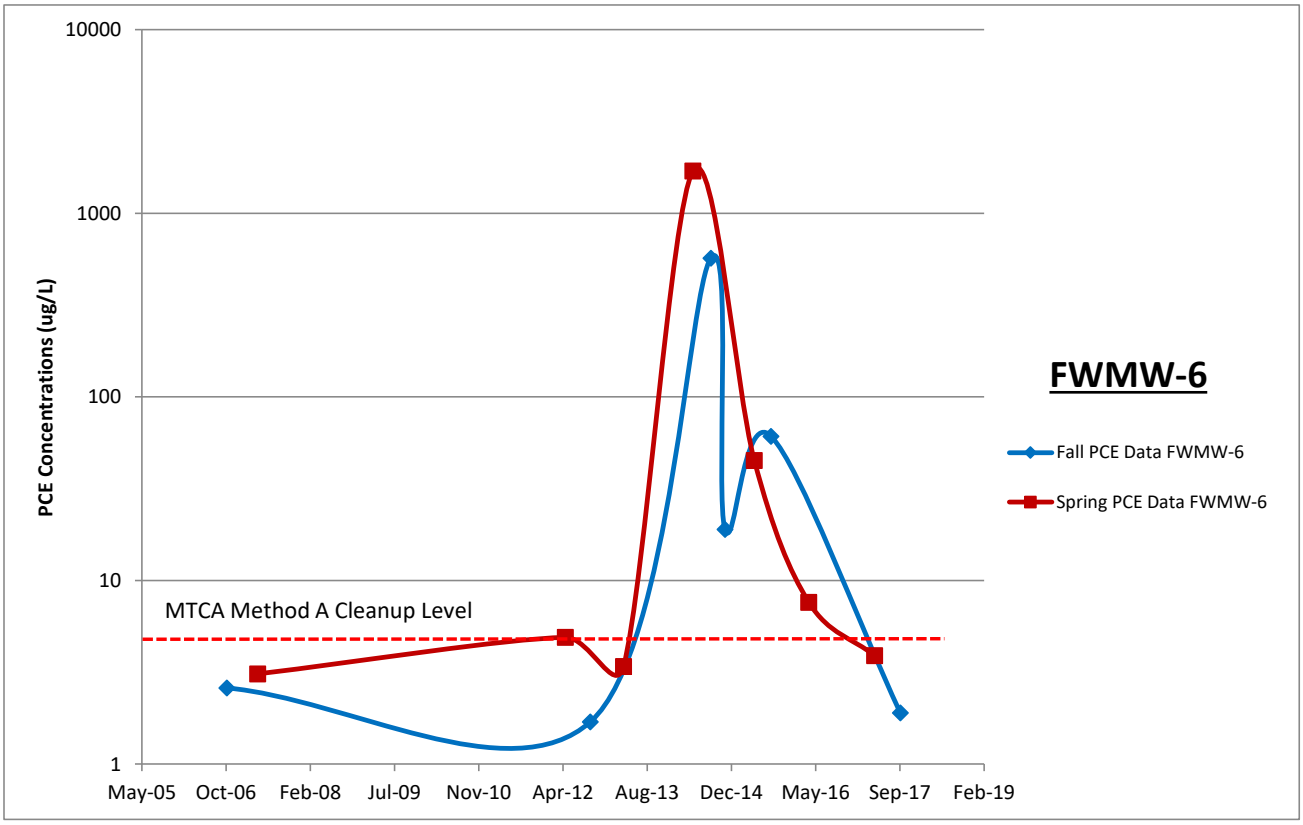

Figure C-42. YRRA Frank Wear Well FWMW-6 PCE Results, July 2005 to April 2017.

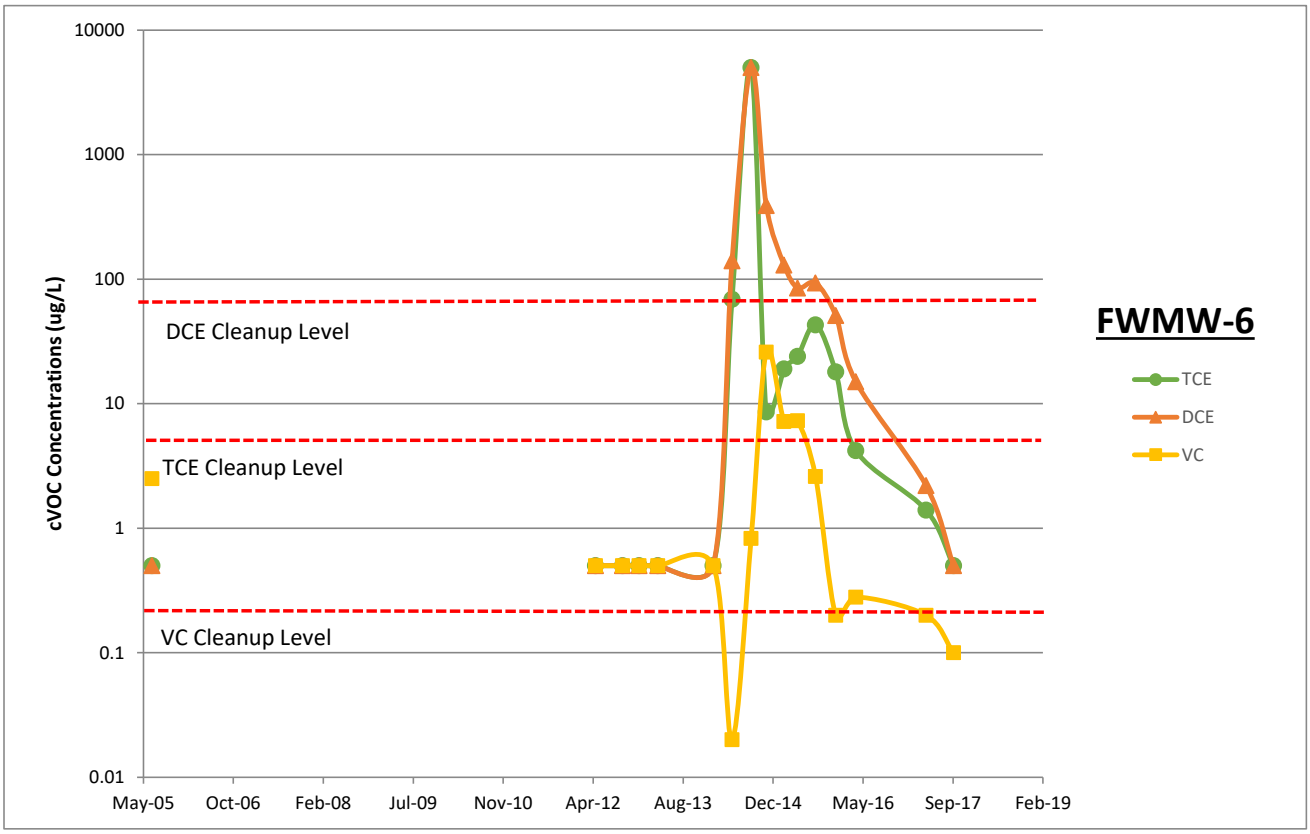

Figure C-43. YRRA Frank Wear Well FWMW-6 TCE, DCE and VC Results, July 2005 to April 2017.

Table C-8: Continued.

Date	FWMW-10				FWMW-16				FWMW-20			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
7/2005	**25100**	**8.3**	**5.4**	5 U	--	--	--	--	--	--	--	--
10/2006	**6900**	--	--	--	--	--	--	--	--	--	--	--
1/2007	**43500**	**12**	**2.3**	1 U	--	--	--	--	--	--	--	--
4/2007	**9200**	--	--	--	--	--	--	--	--	--	--	--
4/2012	**1800**	**1**	**14**	1 U	--	--	--	--	--	--	--	--
6/2012	--	--	--	--	**36**	1 U	1 U	1 U	**16**	1 U	1 U	1 U
9/2012	**11000**	**1.8**	**1.2**	1 U	**63**	1 U	1 U	1 U	**9.2**	1 U	1 U	1 U
12/2012	**44000**	**7.5**	**3**	1 U	**110**	1 U	1 U	1 U	**7**	1 U	1 U	1 U
3/2013	**1100**	1 U	**2.7**	1 U	**93**	1 U	1 U	1 U	**10**	1 U	1 U	1 U
1/2014	**3300**	1 U	1 U	1 U	**84**	1 U	1 U	1 U	**5.8**	1 U	1 U	1 U
5/2014	**1900**	**470**	**900**	**0.18**	**73**	**0.21**	0.1 U	0.02 U	**610**	**49**	**110**	0.02 U
8/2014	**3000**	**5500**	**5700**	2 U	**52**	**0.13**	0.1 U	0.02 U	**84**	**35**	**78**	0.02 U
11/2014	**370**	**190**	**3600**	**400**	**70**	**0.15**	0.1 U	0.02 U	**200**	**16**	**170**	**3.8**
2/2015	**2000**	**290**	**620**	**70**	**78**	0.2 U	0.2 U	0.02 U	**37**	**19**	**160**	**14**
5/2015	**2200**	**780**	**940**	**71**	**100**	**0.23**	**0.73**	0.02 U	**71**	**26**	**180**	**7.5**
8/2015	**330**	**320**	**880**	**28**	**72**	**0.21**	**0.57**	**0.073**	**340**	**23**	**95**	**2.1**
12/2015	**5200**	**850**	**990**	**110**	**66**	0.2 U	**1**	0.02 U	**310**	**29**	**120**	**1.1**
3/2016	**3400**	**500**	**340**	**16**	**71**	20 U	20 U	2 U	**29**	**17**	**64**	**0.86**
4/2017	**9110**	**1160**	**1510**	**358**	**28**	**12**	**52**	**54 J**	**136**	**25**	**53**	2 U
9/2017	**2530**	**3710**	**1310**	**260 J**	**14 J**	**1.6 B**	**25**	**8.8 J**	**91 J**	**15**	**52**	**19 J**
MTCA CL	5	5	70	0.2	5	5	70	0.2	5	5	70	0.2

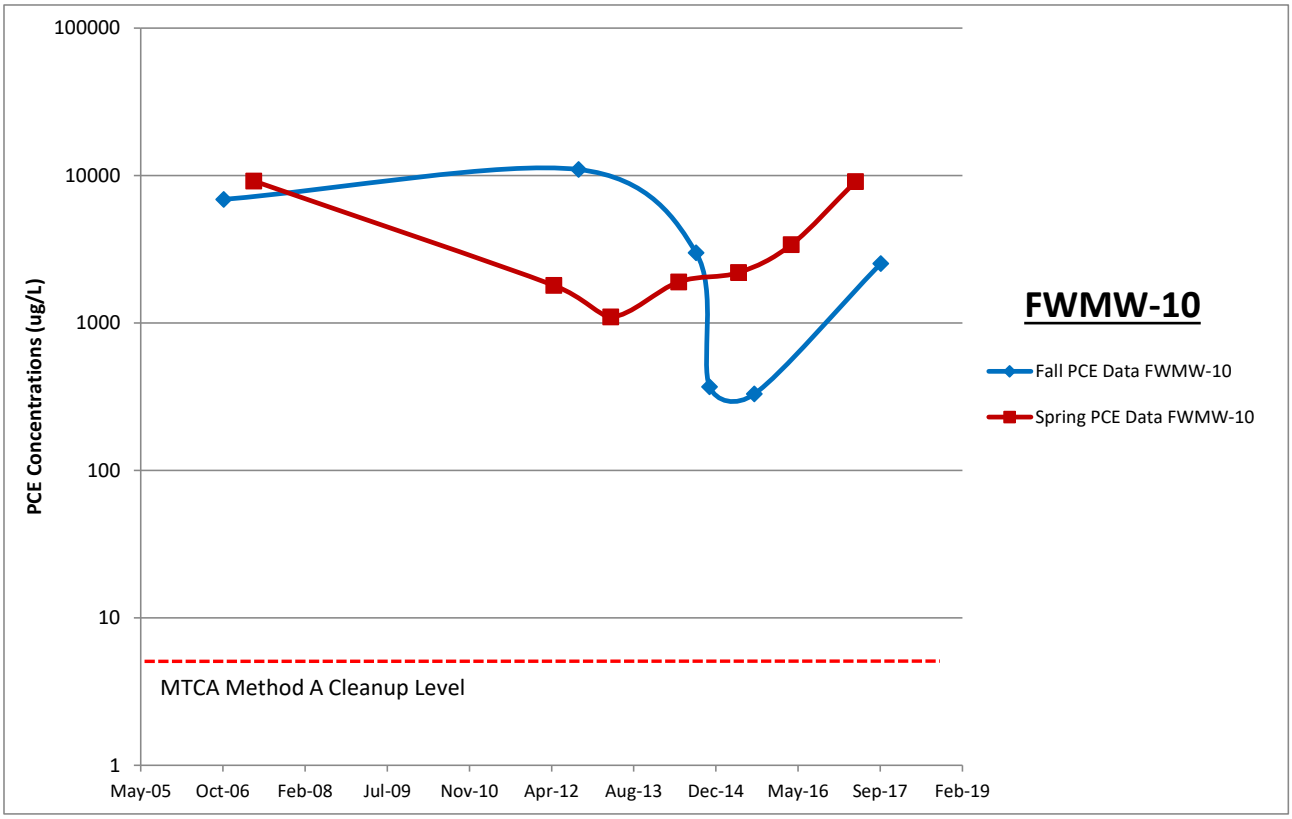

Figure C-44. YRRA Frank Wear Well FWMW-10 PCE Results, July 2005 to April 2017.

Figure C-45. YRRA Frank Wear Well FWMW-10 TCE, DCE and VC Results, July 2005 to April 2017.

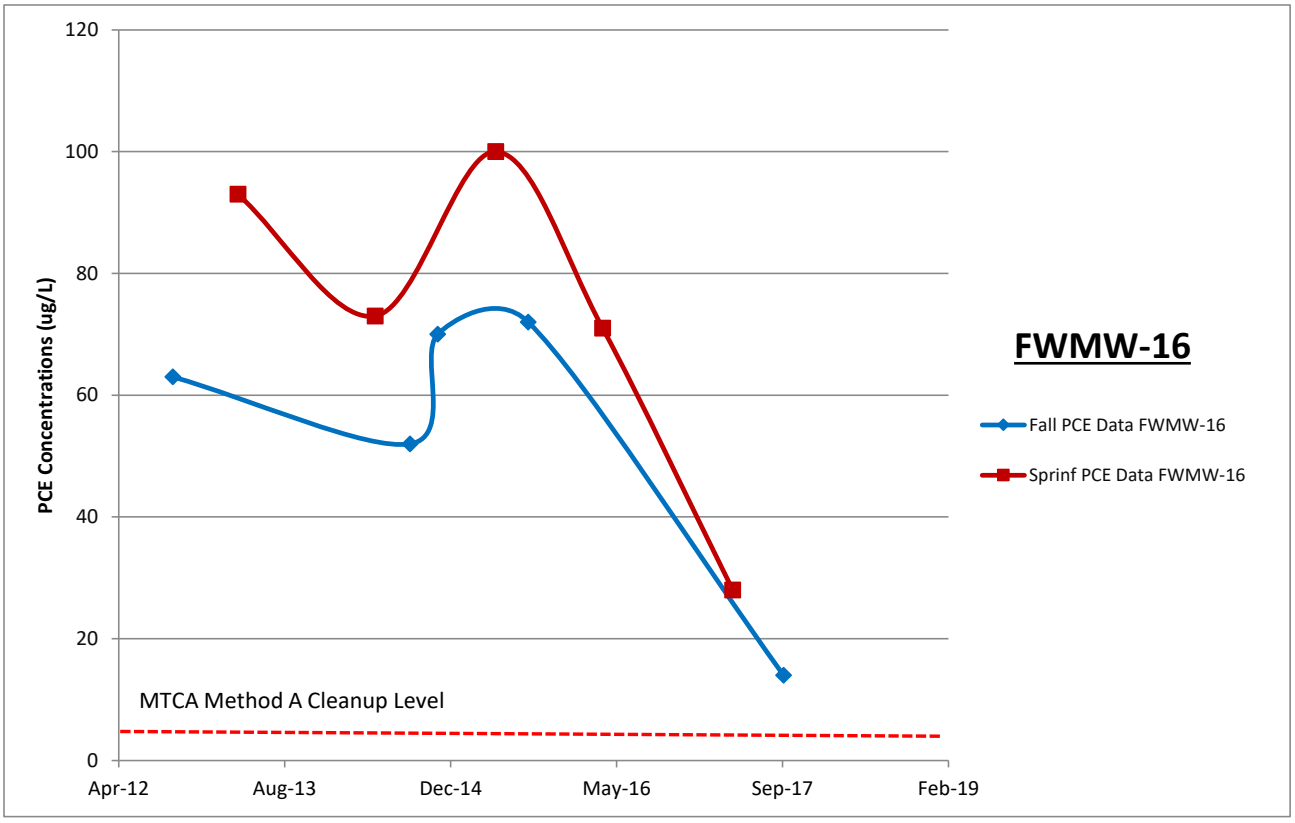

Figure C-46. YRRA Frank Wear Well FWMW-16 PCE Results, June 2012 to April 2017.

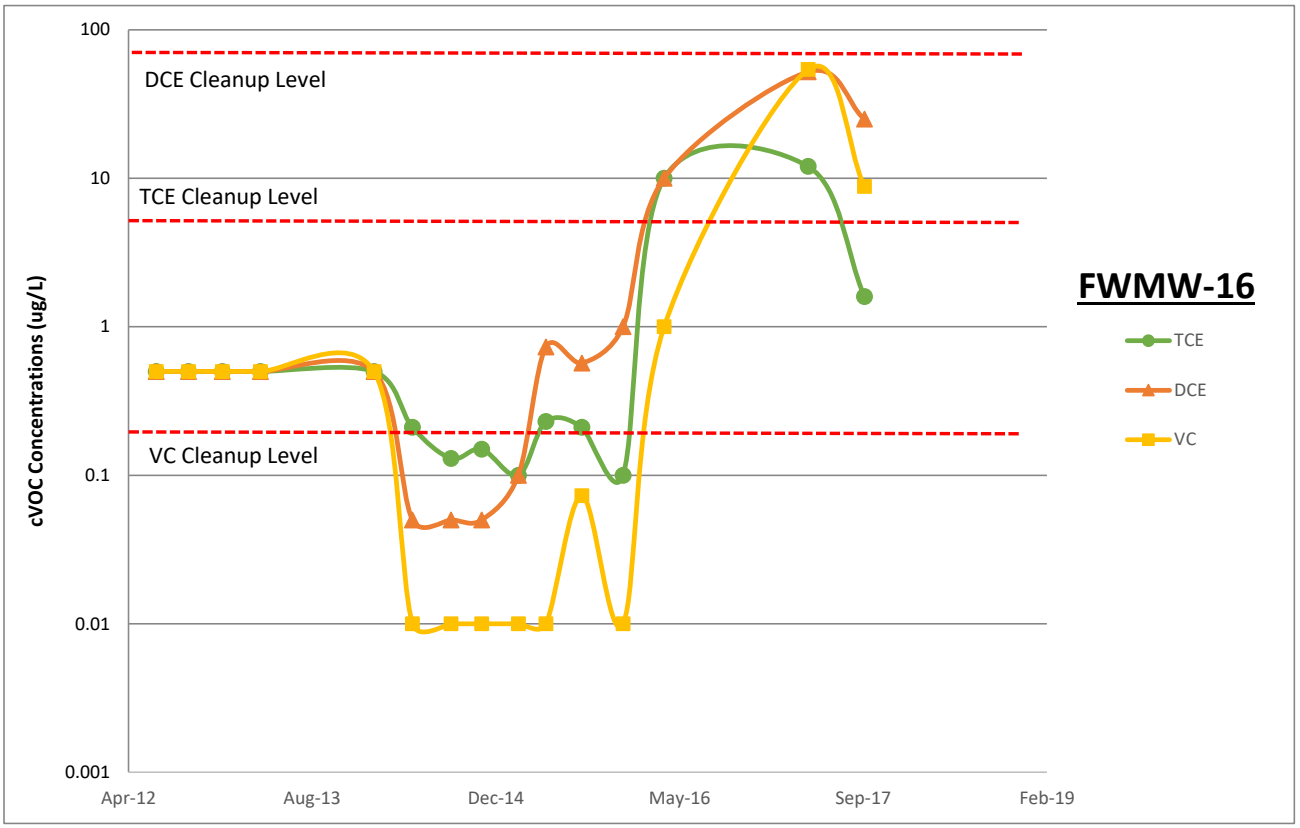

Figure C-47. YRRA Frank Wear Well FWMW-16 TCE, DCE and VC Results, June 2012 to April 2017.

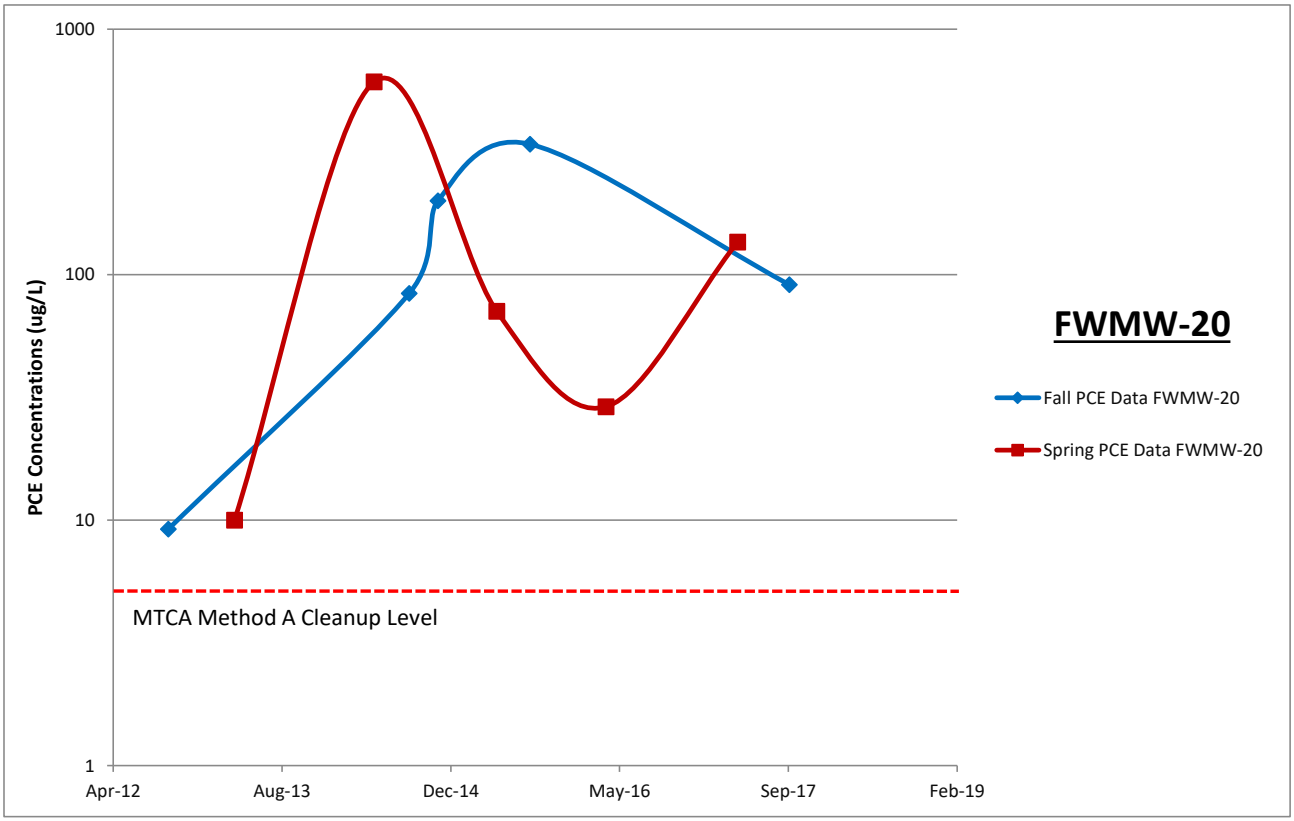

Figure C-48. YRRA Frank Wear Well FWMW-20 PCE Results, June 2012 to April 2017.

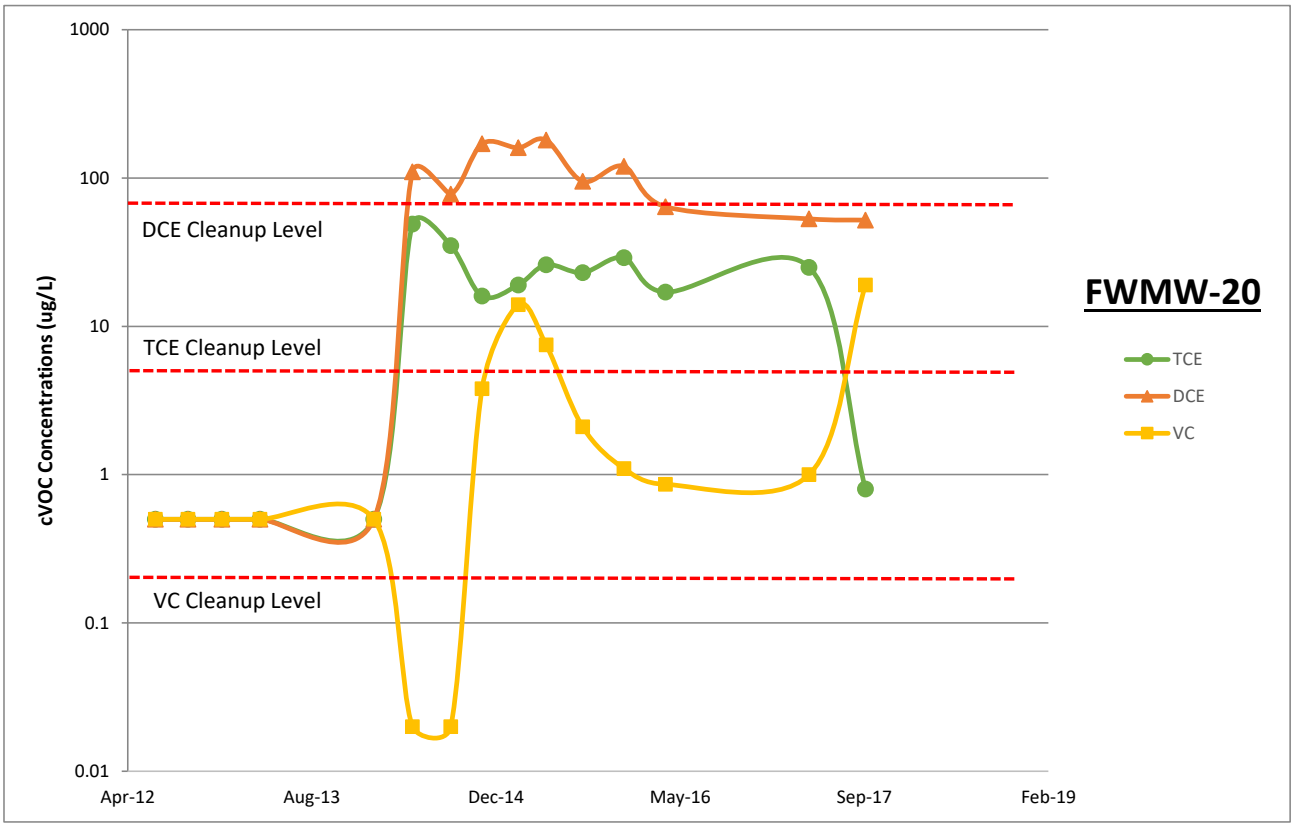

Figure C-49. YRRA Frank Wear Well FWMW-20 TCE, DCE and VC Results, June 2012 to April 2017.

Table C-8: Continued.

Date	FWMW-24			
	PCE	TCE	Cis-DCE	VC
6/2012	**130**	1 U	1 U	1 U
9/2012	**110**	1 U	1 U	1 U
12/2012	**170**	1 U	1 U	1 U
3/2013	**75**	1 U	1 U	1 U
1/2014	**34**	1 U	1 U	1 U
5/2014	**1000**	**140**	**330**	**0.024**
8/2014	**61**	**59**	**150**	0.02 U
11/2014	**27**	**18**	**440**	**21**
2/2015	**20**	**12**	**100**	**3**
5/2015	**32**	**17**	**120**	**13**
8/2015	**19**	**6.6**	**23**	**2**
12/2015	**82**	**37**	**130**	**12**
3/2016	**11**	**19**	**140**	**4.4**
4/2017	**81**	**27**	**40**	2 U
9/2017	**59 J**	**8.7**	**11**	0.2 UJ
MTCA CL	5	5	70	0.2

Notes for Table C-8 above

U: Analyte was not detected at or above the reported value.

J: Analyte was positively identified. The associated numerical result is an estimate.

Bold: Analyte was detected.

Shade: Values are greater than MTCA cleanup levels.

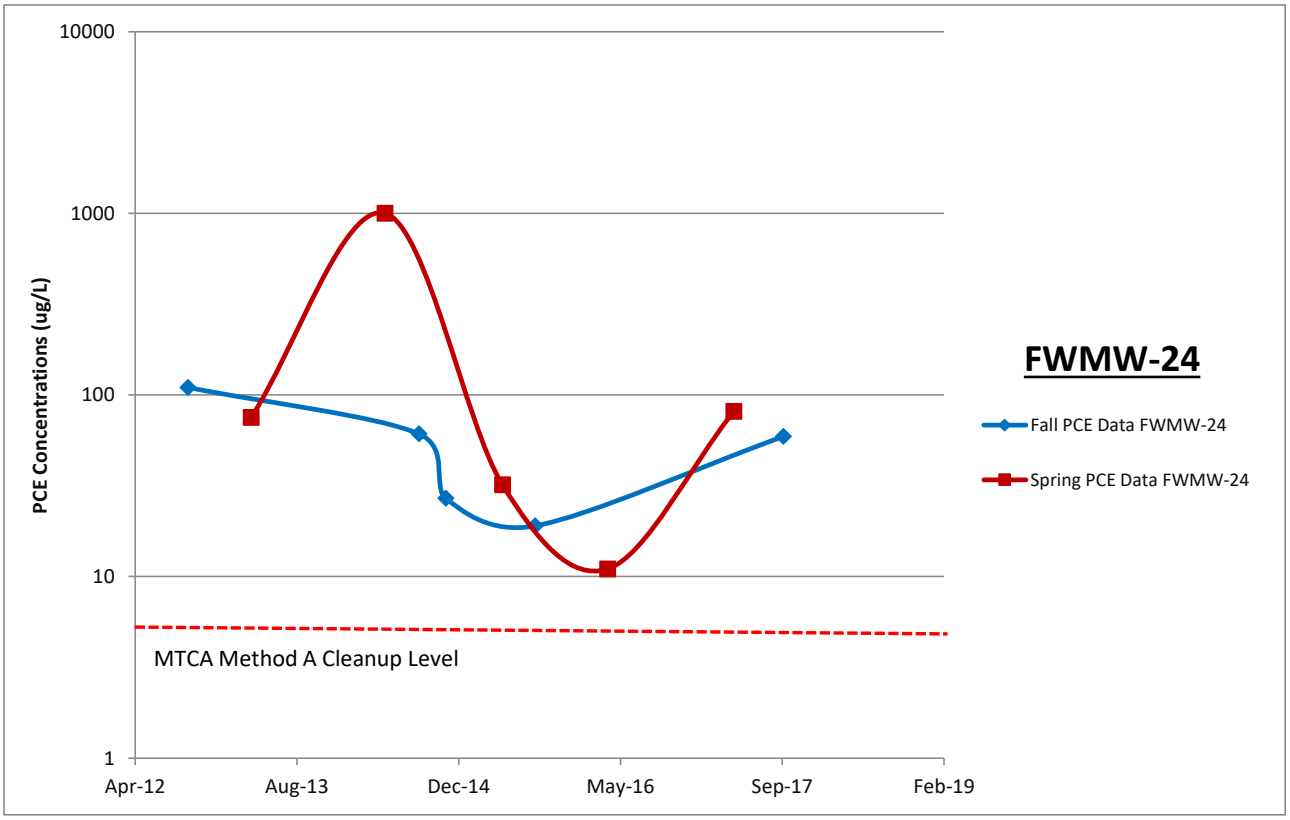

Figure C-50. YRRA Frank Wear Well FWMW-24 PCE Results, June 2012 to April 2017.

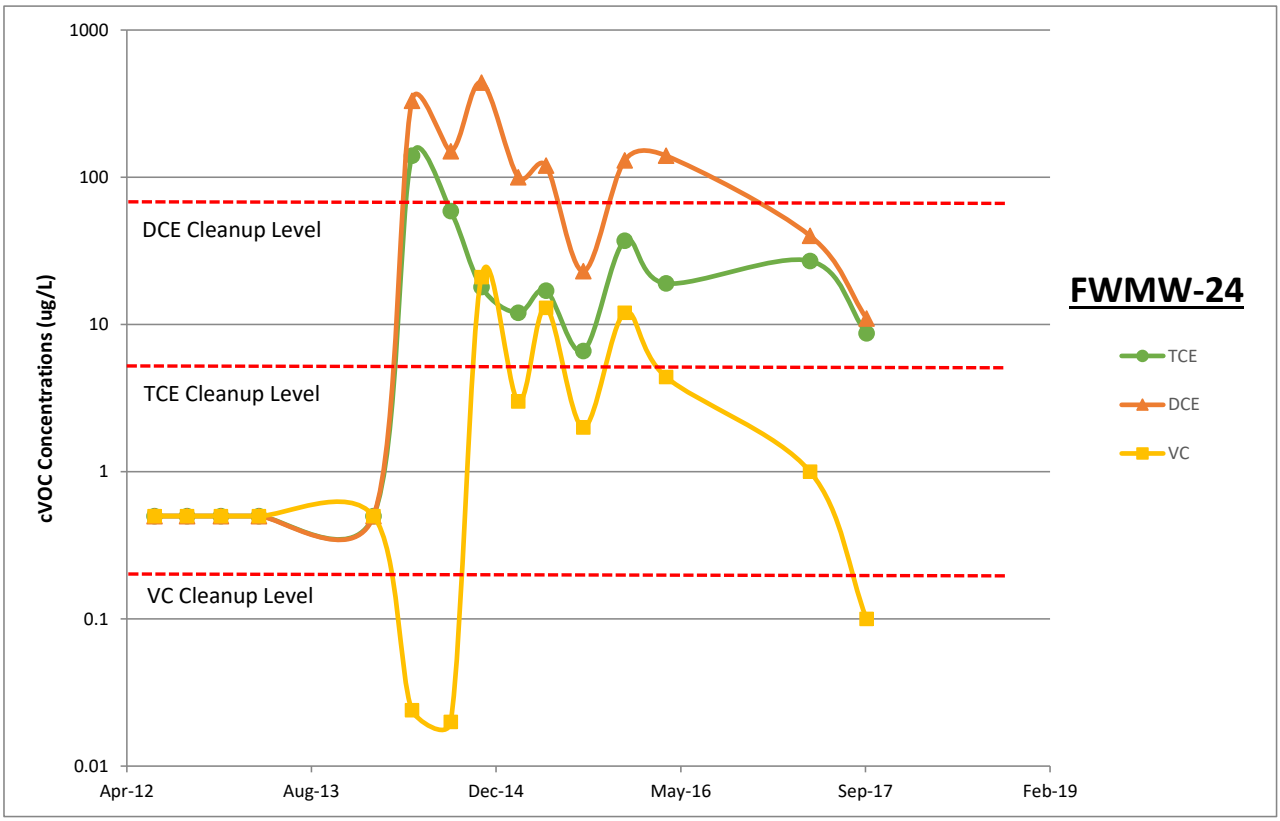

Figure C-51. YRRA Frank Wear Well FWMW-24 TCE, DCE and VC Results, June 2012 to April 2017.

Table C-9: Summary of Analytical Results (ug/L) for Frank Wear Cleaners – Deep Wells, June 2012 to September 2017.

Date	FWMW-17				FWMW-18				FWMW-19			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
6/2012	1 U	1 U	1 U	1 U	**1.2**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
9/2012	1 U	1 U	1 U	1 U	**5.7**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
12/2012	1 U	1 U	1 U	1 U	**1.1**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
3/2013	**1.1**	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1/2014	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
5/2014	**0.19**	0.1 U	0.1 U	0.02 U	**0.56**	0.1 U	0.1 U	0.02 U	**0.12**	0.1 U	0.1 U	0.02 U
8/2014	**0.17**	0.1 U	0.1 U	0.02 U	**0.34**	**0.15**	**0.11**	0.02 U	0.1 U	0.1 U	0.1 U	0.02 U
11/2014	0.1 U	0.1 U	**0.52**	0.02 U	**0.31**	0.1 U	**0.44**	0.02 U	**0.11**	0.1 U	0.1 U	0.02 U
2/2015	0.5 U	0.2 U	0.2 U	**0.086**	0.5 U	0.2 U	**2.1**	0.02 U	0.5 U	0.2 U	0.2 U	0.02 U
5/2015	0.5 U	0.2 U	**1.9**	0.02 U	0.5 U	0.2 U	**0.42**	**2.9**	0.5 U	0.2 U	0.2 U	0.02 U
8/2015	5 U	2 U	2 U	0.2 U	0.5 U	0.2 U	0.2 U	0.02 U	**0.62**	**0.37**	**0.54**	0.02 U
12/2015	**2**	**0.2**	**1.9**	0.02 U	0.5 U	0.2 U	**0.23**	0.02 U	0.5 U	0.2 U	0.2 U	0.02 U
3/2016	100 U	40 U	40 U	4 U	0.5 U	0.2 U	**0.55**	0.02 U	0.5 U	0.2 U	0.2 U	**0.053**
4/2017	**0.66 J**	**0.82 J**	**0.82 J**	0.2 U	**0.56 J**	**1.5**	**2.3**	0.2 U	1 U	1 U	1 U	0.2 U
9/2017	**0.64 J**	1 U	1 U	0.2 U	**0.58 J**	**1.6**	1 U	0.2 U	1 U	1 U	1 U	0.2 U
MTCA CL	5	5	70	0.2	5	5	70	0.2	5	5	70	0.2

U: Analyte was not detected at or above the reported value.
J: Analyte was positively identified. The associated numerical result is an estimate.
Bold: Analyte was detected.
Shade: Values are greater than MTCA cleanup levels.

Appendix D. Glossary, Acronyms, and Abbreviations

Glossary

Analyte: Water quality constituent being measured (parameter).

Dissolved oxygen: A measure of the amount of oxygen dissolved in water.

Groundwater: Water in the subsurface that saturates the rocks and sediment in which it occurs. The upper surface of groundwater saturation is commonly termed the water table.

Method Detection Limit: This definition for detection was first formally advanced in 40CFR 136, October 26, 1984 edition. MDL is defined there as the minimum concentration of an analyte that, in a given matrix and with a specific method, has a 99% probability of being identified, and reported to be greater than zero. (Federal Register, October 26, 1984).

Parameter: Water quality constituent being measured (analyte). A physical, chemical, or biological property whose values determine environmental characteristics or behavior.

pH: A measure of the acidity or alkalinity of water. A low pH value (0 to 7) indicates that an acidic condition is present, while a high pH (7 to 14) indicates a basic or alkaline condition. A pH of 7 is considered to be neutral. Since the pH scale is logarithmic, a water sample with a pH of 8 is ten times more basic than one with a pH of 7.

Reporting limit: The minimum value of the calibration range. Analyte detections between the method detection limit and the reporting limit are reported as having estimated concentrations.

Specific conductance: A measure of water's ability to conduct an electrical current. Specific conductance is related to the concentration and charge of dissolved ions in water.

Unconfined aquifer: An aquifer containing water that is not under pressure; the water level in a well is the same as the water table outside the well.

Acronyms and Abbreviations

Cis-1,2-DCE	Cis-1,2-dichloroethene
FS	Feasibility study
Dup	Duplicate
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management database
EPA	U.S. Environmental Protection Agency
FS	Feasibility study
LDPE	Low Density Polyethylene
MEL	Manchester Environmental Laboratory
MSL	Mean Sea Level
MTCA	Model Toxics Control Act
MW	Monitoring well
ORP	Oxidation-reduction potential
PCE	Tetrachloroethene
PVC	Polyvinyl chloride
RI	Remedial investigation
RPD	Relative percent difference
SOP	Standard operating procedure
TCE	Trichloroethene
TOC	Top of casing
USGS	U.S. Geological Survey
VC	Vinyl chloride
VOA	Volatile Organic Analysis
cVOC	chlorinated Volatile Organic Compounds
WAC	Washington Administrative Code
YRRA	Yakima Railroad Area (the project area)

Units of Measurement

°C	degrees centigrade
ft	feet
mg/L	milligrams per liter
mV	milli volts
s.u.	standard units
ug/L	micrograms per liter (parts per billion)
umhos/cm	micromhos per centimeter
uS/cm	microsiemens per centimeter, a unit of conductivity