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Yakima Railroad Area PCE Contamination

Groundwater Quality Performance Monitoring Data Summary 2016

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Yakima Railroad Area PCE Contamination

Groundwater Quality Performance Monitoring, Data Summary 2016

by

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Abstract

In 2016, the Washington State Department of Ecology conducted semi-annual sampling of the Yakima Railroad Area (YRRA) groundwater monitoring network. The YRRA is a 6-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) that 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 30 wells sampled in 2016, 14 wells (47%) 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 6 to 17 ug/L.

The elevated PCE concentrations primarily occurred in shallow wells at 4 of the source areas: Goodwill-City of Yakima, Washington Central Railroad Roundhouse (WCRR), Fifth Wheel Truck Repair, and Cameron Yakima. 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.

Higher PCE concentrations were also detected in the deeper WCRR wells with concentrations of 11 and 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 2016 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 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.

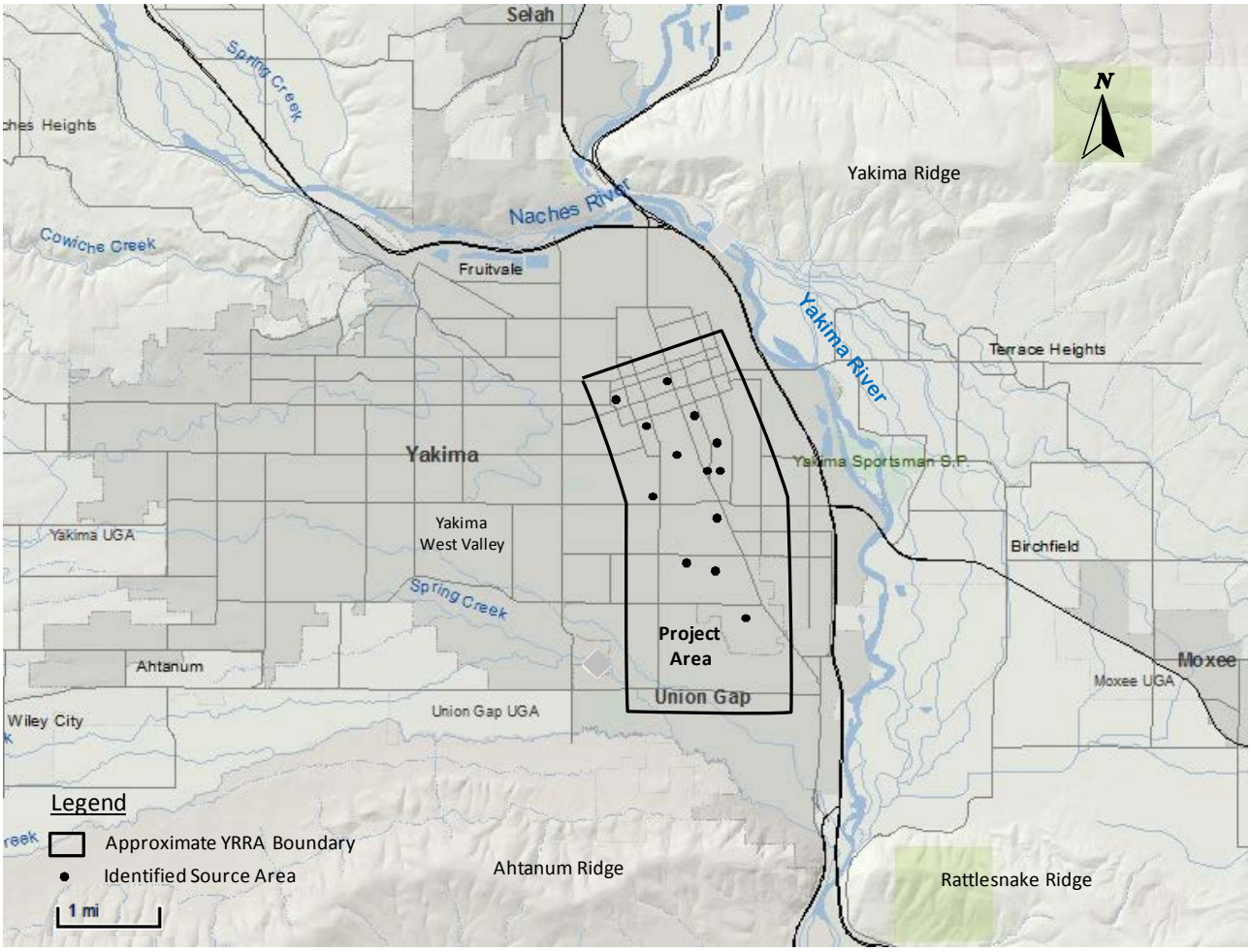

Figure 1. Yakima Railroad Area (YRRA) Project Location Map, Yakima, WA.

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. 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). The 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 portion 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 feet per foot in the northern portion of the project area to -0.005 feet per foot 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 which had consistently shown low or no detections for chlorinated volatile organic compounds (cVOCs) during previous sampling events.

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. As a result, Ecology collected groundwater samples from 18 wells in April 2016 and 18 wells in October 2016.

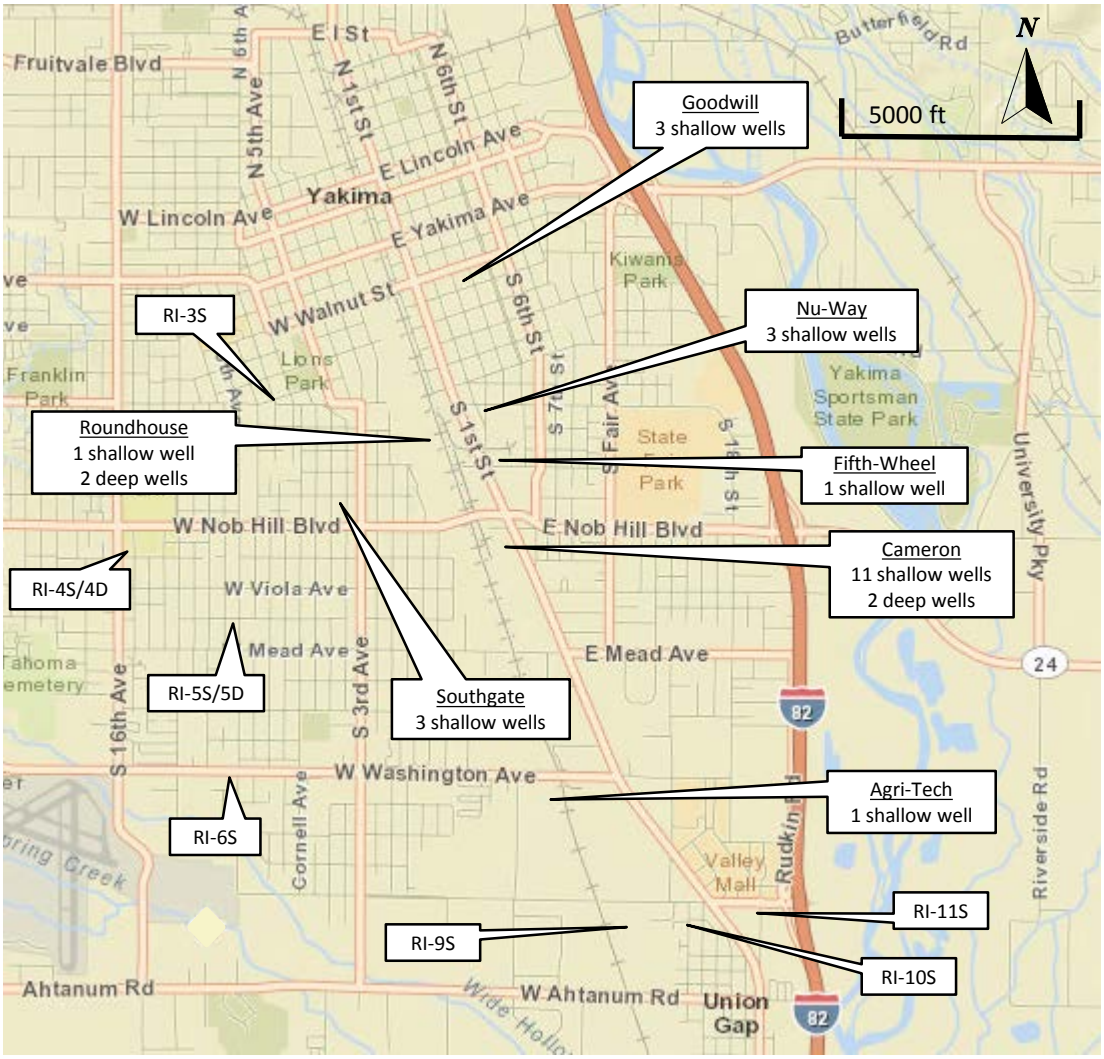

Figure 2. YRRA Sample Location Map.

Twenty-one of the sampled wells are associated with the following facilities: Goodwill-City of Yakima, Nu-Way Cleaners, Southgate Laundry, Washington Central Railroad Roundhouse (WCRR), Fifth Wheel Truck Repair, and Cameron Yakima. The well at Agri-Tech/Yakima Steel was not sampled in 2016 because it was inaccessible. Wells at 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 Standard Operating Procedures (SOPs) EAP052 (Marti, 2009) and EAP078 (Marti, 2014), and also the site-specific Quality Assurance Project Plan (Marti, 2013).

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 28 to 8 feet, respectively. The overall flow direction for the shallow groundwater appears to be consistently to the southeast, toward the Yakima River in both April and October. 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 which ranged from 3.9 to 7.2 mg/L, indicating aerobic conditions in both the shallow and deep wells. In contrast, dissolved oxygen in the deeper WCRR wells (WDOE-3I and WDOE-3D) were 0.3 and 0.2 mg/L, respectively. Dissolved oxygen values below 1 mg/L indicate an anaerobic environment.

Table 1. Summary of YRRA Stable Field Measurements, 2016

Parameter	Number of Samples	Minimum	Maximum	25th Percentile	Median	75th Percentile
Temperature (°C)	36	13.7	19	15.3	15.8	16.9
pH (Std Units)	36	6.4	8.0	6.7	6.8	6.9
Conductivity (uS/cm@25°C)	36	213	736	322	365	428
Dissolved Oxygen (mg/L)	36	0.2	7.2	5.1	5.6	6.7
Oxidation Reduction Potential (mV)	25	-38	422	192	244	366

Analytical Results

The 2016 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). Blank concentrations were all below the method detection limits for the target analytes. Accordingly, all data are considered to be of good quality and usable as presented here, without further qualification. See Appendix B for further details.

Historical groundwater data for the 36 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). Contaminated soil was removed from this site during an interim action in 1995 (Huntingdon Engineering, 1995). The 3 wells at this site are the northern most wells currently being sampled in the YRRA monitoring program.

Tetrachloroethene (PCE) was the only chlorinated solvent detected during the 2016 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 April 2016. 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 at or below 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).

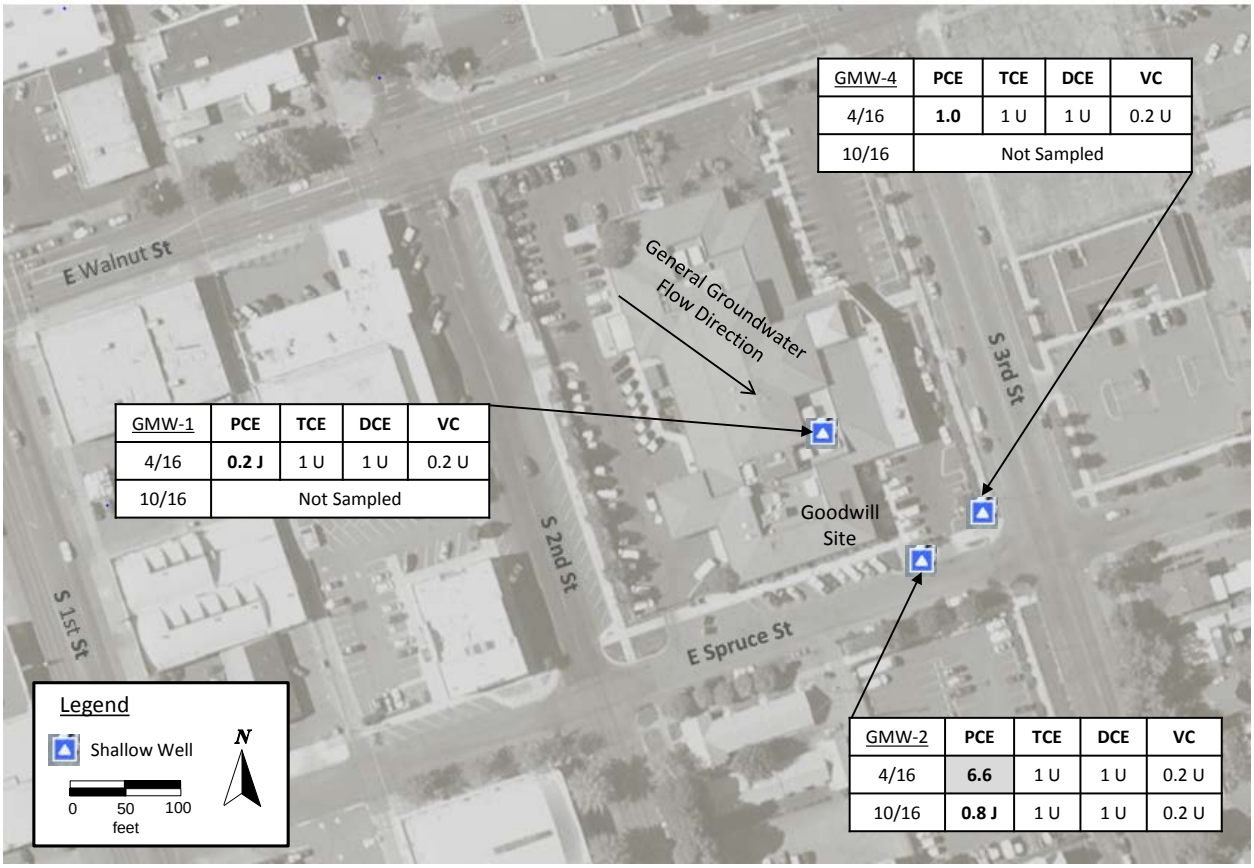

Figure 3. Goodwill-City of Yakima Well Locations and cVOC Results (ug/L) for 2016.

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 2016 monitoring period, only well NMW-1 was sampled. PCE was detected in this well at concentrations below the MTCA cleanup level of 5 ug/L in April (Figure 4). No other cVOCs were detected.

Well NMW-2 was not sampled in April because the well had an insufficient volume of water. This well was decommissioned in 2016 because of changing property use. Well NMW-3 remains inaccessible.

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.

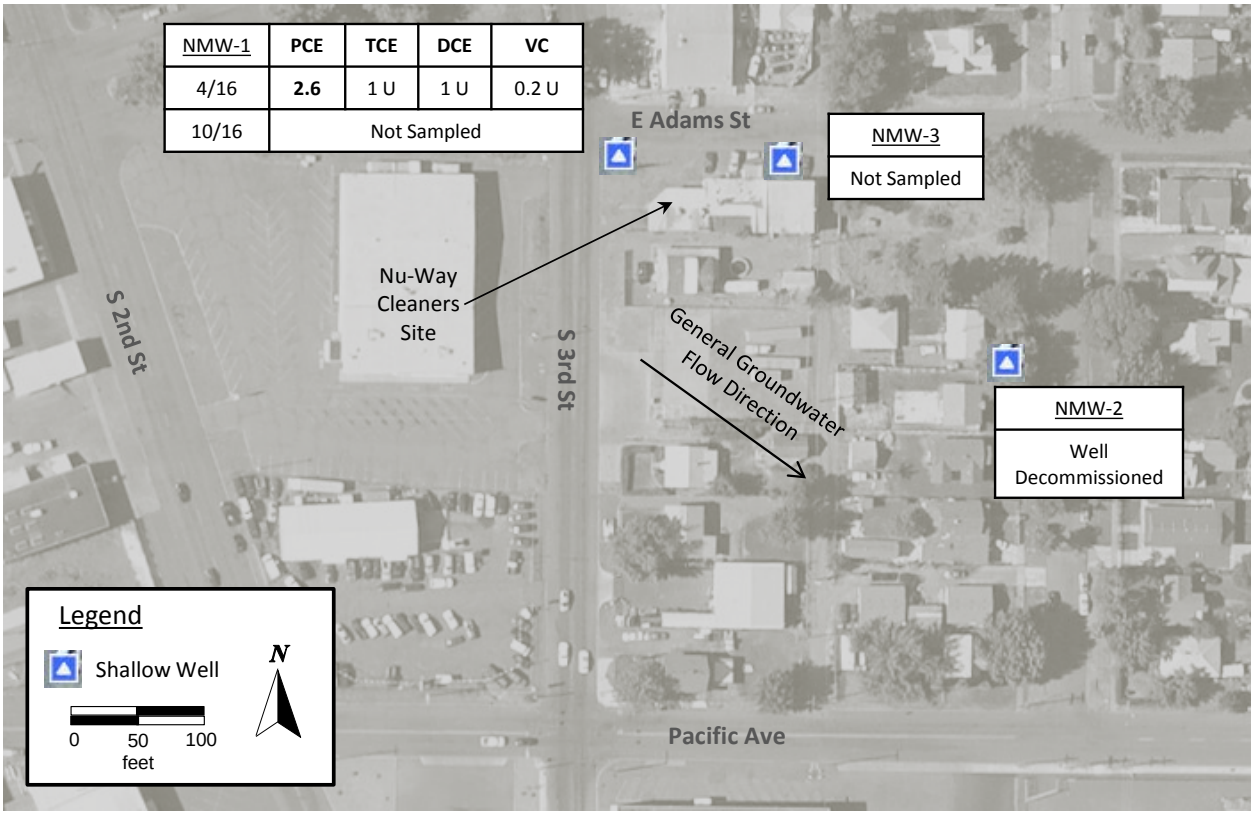

Figure 4. Nu-Way Cleaners Well Locations and cVOC Results (ug/L) for 2016.

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 2 wells sampled at Southgate Laundry in 2016 (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. Well SGMW-1 was not accessible for sampling in October.

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.

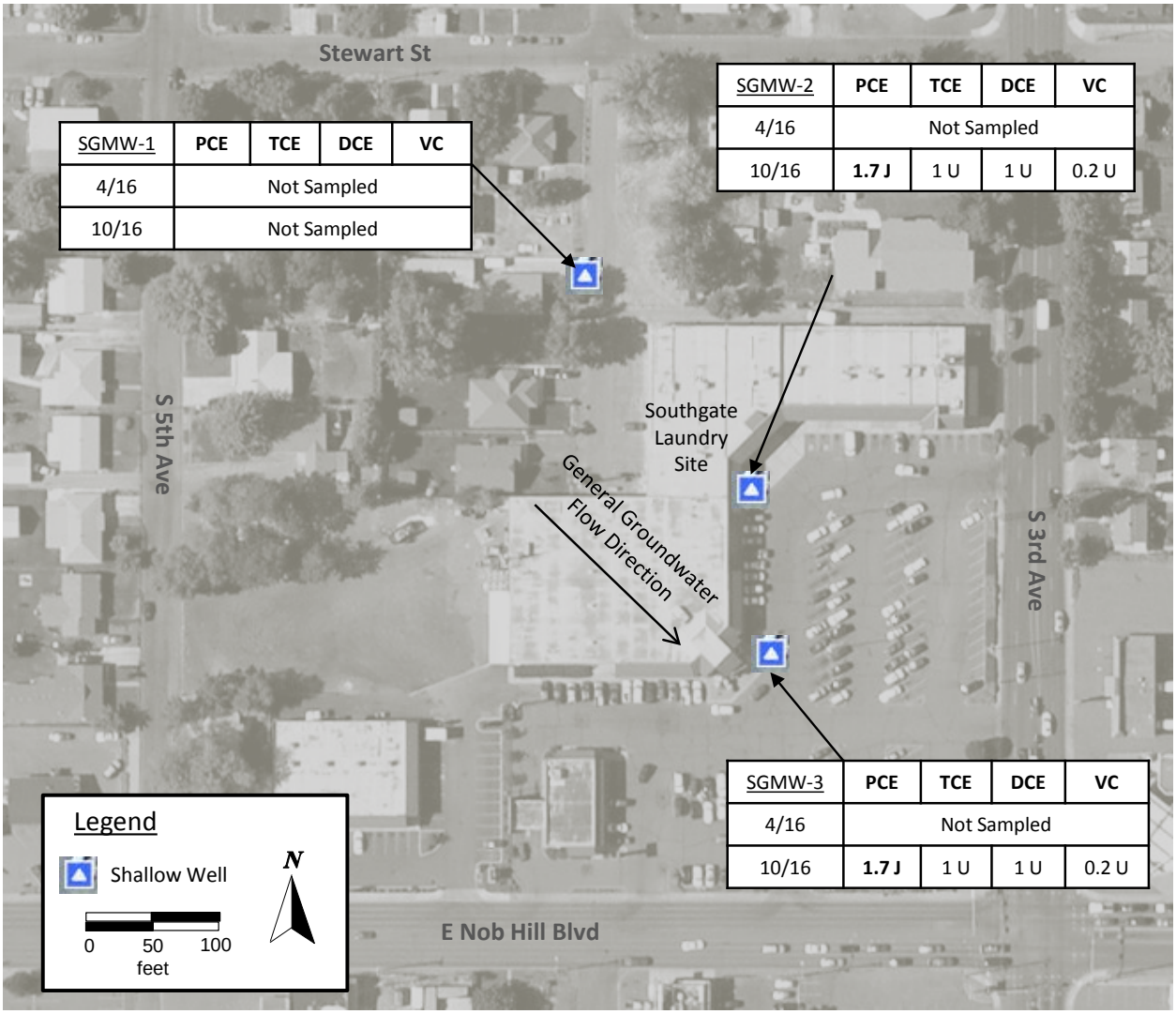

Figure 5. Southgate Laundry Well Locations and cVOC Results (ug/L) for 2016.

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 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.

PCE was detected above the cleanup level of 5 ug/L in all 3 WCRR wells during the 2016 monitoring period. Concentrations ranged from about 10 to 12 ug/L (Figure 6). Concentrations for 2016 were within the range of historical data collected since 1997.

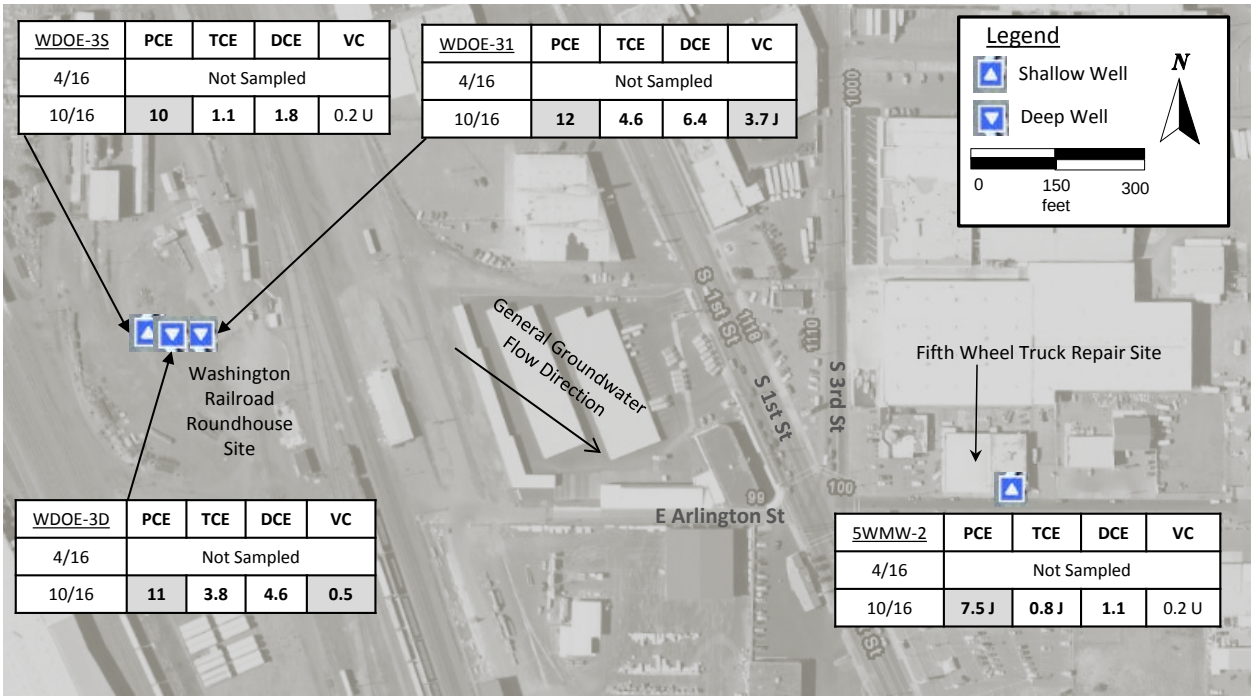

Figure 6. Washington Central Railroad Roundhouse and Fifth Wheel Truck Repair Well Locations and cVOC Results (ug/L) for 2016.

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 were also detected in all 3 wells. TCE, cis-1,2-DCE, and VC have consistently been detected in wells WDOE-3I and WDOE-3D, 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).

In 2016, cis-1,2-DCE was also detected in all 3 wells with a concentration range of 1.8 to 6.4 ug/L. All concentrations were below the MTCA Method A cleanup level of 70 ug/L.

Vinyl chloride continues to be detected in well WDOE-3I (3.7J ug/L) and WDOE-3D (0.5 ug/L) at concentrations exceeding the MTCA cleanup level of 0.2 ug/L. Wells WDOE-3I and WDOE-3D are the only wells in the YRRA monitoring program with detectable concentrations of vinyl chloride.

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 2016 at a concentration above the MTCA cleanup level (Figure 6 above). Groundwater monitoring data has been collected from well 5WMW-2 since 1999 to the present. During that time PCE concentrations have ranged from less than 1 to 11 ug/L, with higher concentrations consistently occurring in the fall. PCE concentrations appear to be gradually decreasing but still exceed the cleanup level on occasion (Figure C-14).

TCE and cis-1,2-DCE were also detected in this well at concentrations near 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 2016, Ecology collected groundwater samples from 11 wells on the Cameron Yakima site. PCE was detected in all wells at concentrations ranging from non-detect to 12 ug/L (Figure 7).

PCE was detected in the 2 upgradient wells (CYIMW106S and CYIMW107S) at concentrations ranging from approximately 3 to 9 ug/L during the 2016 monitoring period. Concentrations exceeded the cleanup level of 5 ug/L in both wells 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 spring in 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.

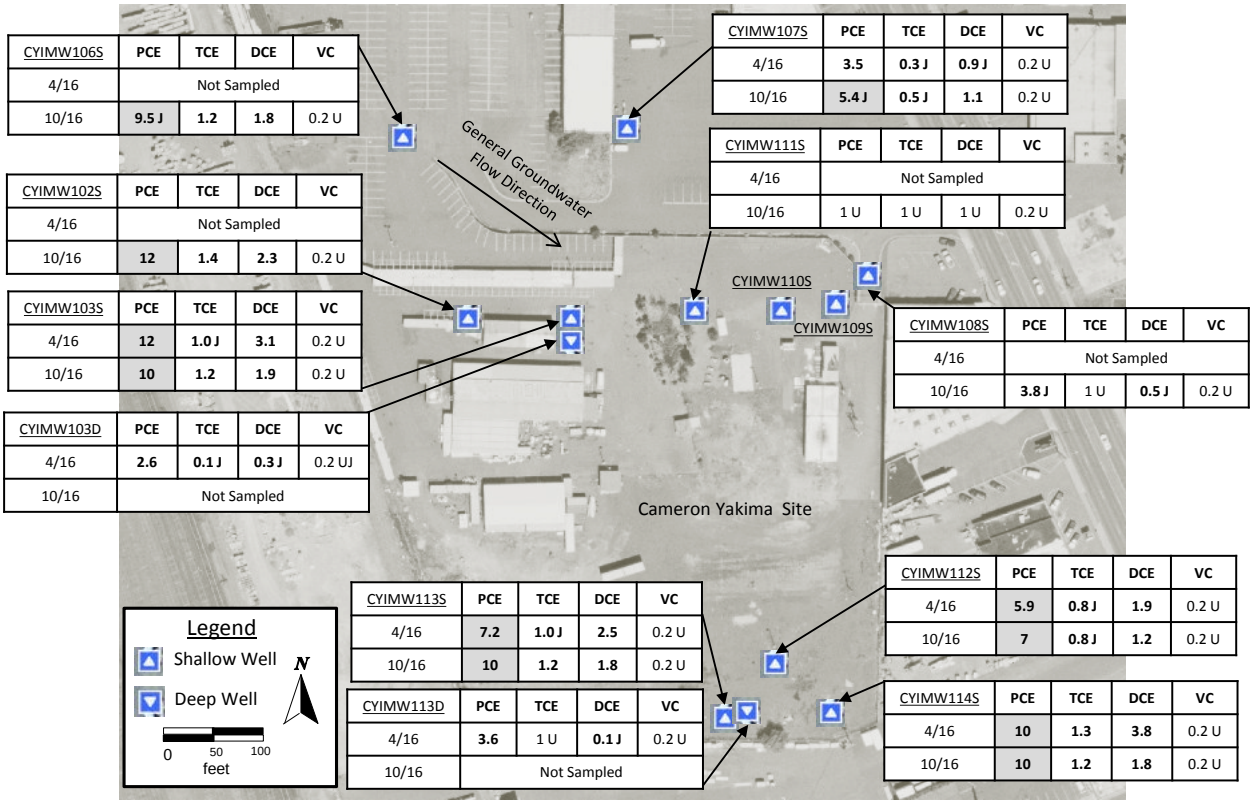

Figure 7. Cameron Yakima Well Locations and cVOC Results (ug/L) for 2016.

Wells CYIMW102S, CYIMW103S, and CYIMW103D are located in the northwest corner of the Cameron site. PCE concentrations in the two shallow wells ranged from 10 to 12 ug/L in 2016, 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 3 ug/L in 2016. Since monitoring began in 1997, the PCE range 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). Concentrations have mostly deceased to below the cleanup level of 5 ug/L since the interim action in 2000, including the 2016 data (Figures C-21, C-22, C-23, C-24).

Wells CYIMW112S, CYIMW113S, CYIMW113D, and CYIMW114S are located in the southeast corner of the property. PCE concentrations in the 3 shallow wells ranged from approximately 6 to 10 ug/L, consistently exceeding the cleanup level in both the spring and fall sample events. Contaminant concentrations in these 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 2015 (Figure C-27).

TCE and cis-1,2-DCE were detected in the Cameron wells at concentration ranges of non-detect to 1.4 ug/L and non-detect to 3.8 ug/L, respectively. Concentrations for 2016 were within the range of historical data collected since 1997.

Vinyl chloride has remained undetected at this site since sampling began in the 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).

Well AT-MW4 was scheduled for sampling during the fall 2016, but it could not be located. Typically, PCE concentrations in this well slightly exceed the cleanup level of 5 ug/L (Table C-5, Figure C-15).

YRRA Remedial Investigation Wells

Nine Remedial Investigation (RI) wells were sampled in 2016: 7 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. The 9 wells selected for continued monitoring are primarily located along the western and southern edges of the YRRA (Figure 2).

PCE was detected in all 9 RI wells in 2016. Concentrations in 5 of the shallow wells and the 2 deep wells ranged from approximately 0.3 to 2.9 ug/L (Figure 8). No other cVOCs were detected in the YRRA RI wells.

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.

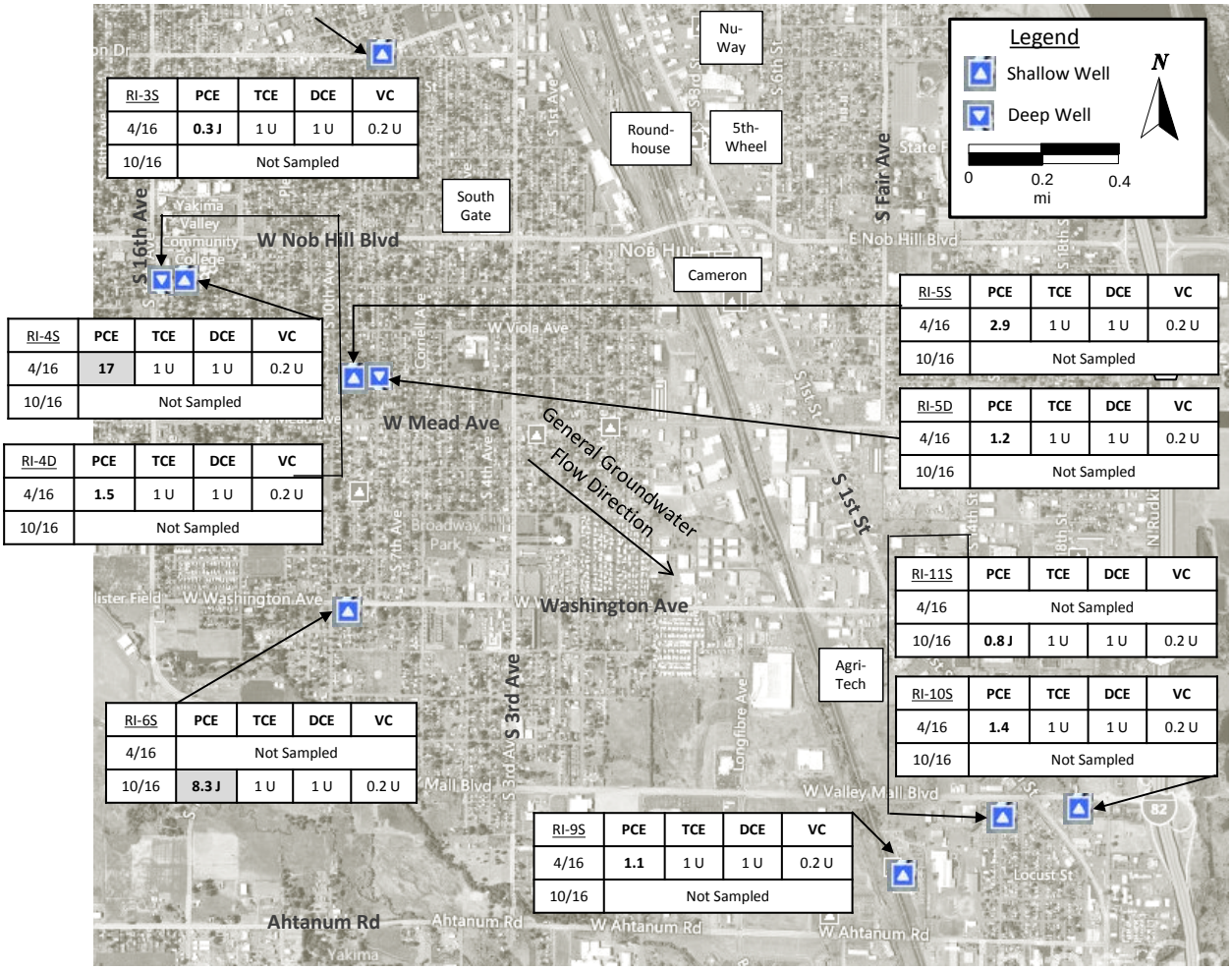

Figure 8. YRRA Remedial Investigation Well Locations and cVOC Results (ug/L) for 2016.

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 2016, the reported concentration was 17 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 1.2 to 2.9 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 8.3 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 2016 (Figures C-35, C-36, C-37).

Results Summary

Of the 30 wells sampled in 2016, 14 wells (47%) had PCE concentrations above the cleanup level of 5 ug/L (Table 2). These wells are located at Goodwill-City of Yakima, Washington Central Railroad Roundhouse (WCRR), Fifth Wheel Truck Repair, and Cameron Yakima. Two of the YRRA RI wells along the western edge of the study area also had elevated PCE concentrations.

Figure 9 shows maximum PCE concentration in shallow groundwater for the 2016 monitoring period. Twelve 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 6 to 17 ug/L.

The remaining 2 wells with elevated PCE concentrations are the deeper WCRR wells, WDOE-3I (58 feet) and WDOE-3D (100 feet). PCE concentrations above the cleanup level in these wells ranged from 11 to 12 ug/L. These wells, which exhibit anaerobic groundwater conditions, consistently have PCE metabolic breakdown products: TCE, cis-1,2-DCE, and VC. The vinyl chloride concentrations for these wells are consistently above the cleanup level of 0.2 ug/L.

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

Results from the 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 9). It is not clear whether the contaminant plumes are separate or co-mingled.

Although not part of Ecology's current monitoring program, Frank Wear Cleaners is another source area identified in the YRRA (Figure 9). The site, approximately 0.7 miles upgradient of the WCRR wells, is a substantial source of PCE contamination to the project area. It is currently undergoing active remediation which includes operation of a soil vapor extraction system (since 2012) and a groundwater remediation system that started in 2014. There has been a substantial reduction in the contaminant mass since these systems were activated. There is evidence that PCE has been mobilized from the soil matrix and that moderate reducing conditions have been generated to stimulate complete reductive dechlorination.

Groundwater at Frank Wear Cleaners is being monitored separately as part of the remediation. As of 2015, 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 (Hart Crowser, 2015).

Table 2. 2016 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	**6.6**	**0.8 J**	1 U	1 U	1 U	1 U	0.2 U	0.2 U
Washington Central Railroad Roundhouse								
WDOE-3S	--	**10**	--	**1.1**	--	**1.8**	--	0.2 U
WDOE-3I	--	**12**	--	**4.6**	--	**6.4**	--	**3.7 J**
WDOE-3D	--	**11**	--	**3.8**	--	**4.6**	--	**0.5**
Fifth Wheel Truck Repair								
5WMW-2	--	**7.5 J**	--	**0.8 J**	--	**1.1**	--	0.2 U
Cameron Yakima								
CYIMW102S	--	**12**	--	**1.4**	--	**2.3**	--	0.2 U
CYIMW103S	**12**	**10**	**1 J**	**1.2**	**3.1**	**1.9**	0.2 U	0.2 U
CYIMW106S	--	**9.5 J**	--	**1.2**	--	**1.8**	--	0.2 U
CYIMW107S	**3.5**	**5.4 J**	**0.3 J**	**0.5 J**	**0.9 J**	**1.1**	0.2 U	0.2 U
CYIMW112S	**5.9**	**7**	**0.8 J**	**0.8 J**	**1.9**	**1.2**	0.2 U	0.2 U
CYIMW113S	**7.2**	**10**	**1 J**	**1.2**	**2.5**	**1.8**	0.2 U	0.2 U
CYIMW114S	**10**	**10**	**1.3**	**1.2**	**3.8**	**1.8**	0.2 U	0.2 U
Remedial Investigation Wells								
RI-4S	**17**	--	1 U	--	1 U	--	0.2 U	--
RI-6S	--	**8.3 J**	--	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.
Bold: Analyte was detected.
Shade: Values are greater than MTCA cleanup levels.

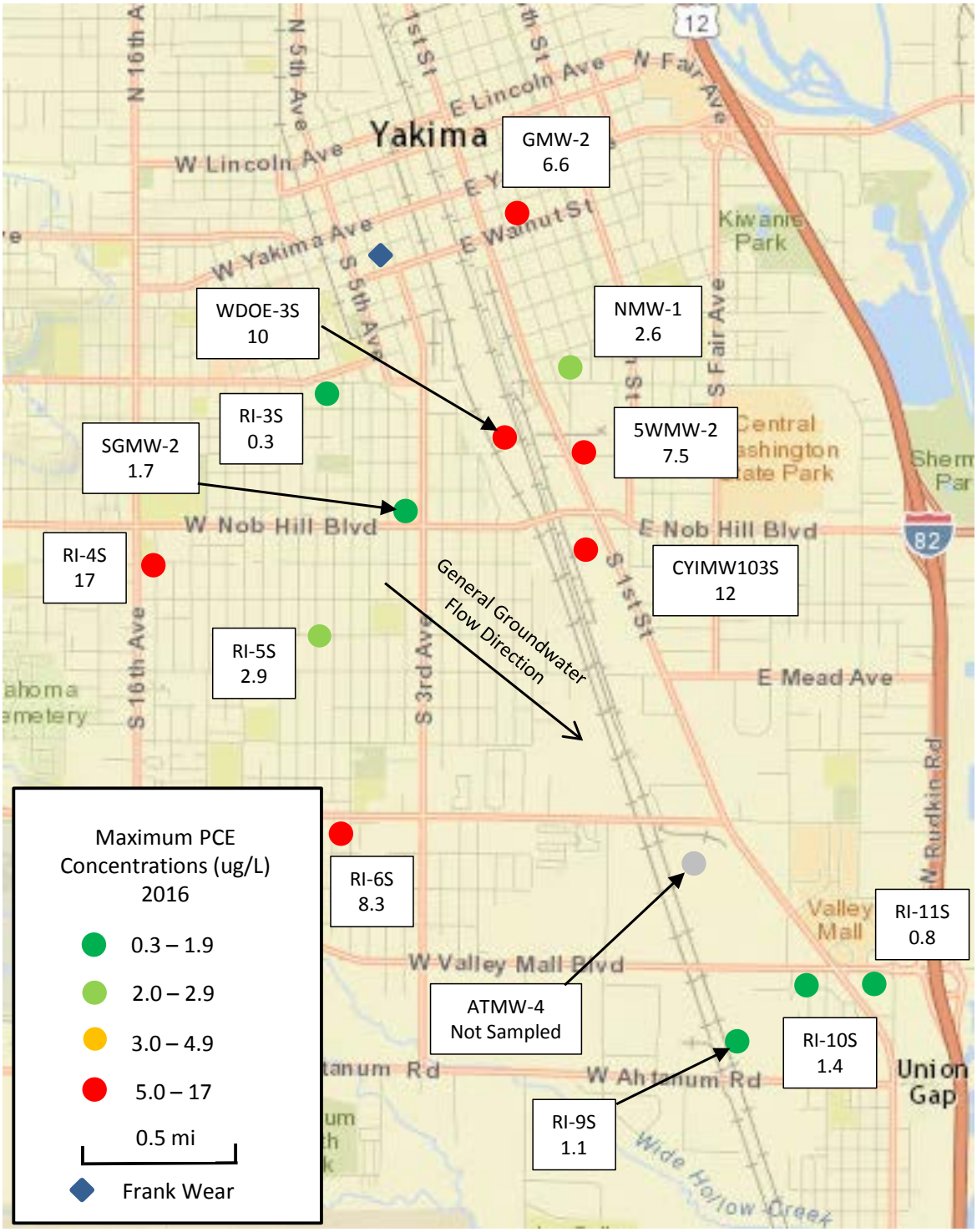

Figure 9. Shallow Zone Maximum PCE Concentrations (ug/L), 2016.

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 2016, Ecology collected groundwater samples from 30 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. As in the past, PCE metabolic breakdown products were 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.

PCE breakdown products are consistently detected in the central portion of the YRRA. In October 2014 significant increases in TCE and cis-1,2-DCE were observed in the two deeper WCRR wells, the Fifth Wheel Truck Repair well, and at Cameron Yakima. The greatest increases occurred in cis-1,2-DCE concentrations. The reason for the change in analyte detections and increased concentrations is unknown. Concentrations in 2015 and 2016 continue to decrease, returning to levels prior to October 2014.

The 2016 data show that the highest contaminant concentrations continue to occur in the central portion of the YRRA. These include Washington Central Railroad Roundhouse, Cameron Yakima, and Frank Wear Cleaners. 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 far below the cleanup level in 7 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, where the source areas are still being identified and that 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 30 wells sampled, 6 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 4 other deep wells are consistently below the cleanup levels and have remained fairly constant over the monitoring period, 1997 to 2016. Two of these wells are located 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 2016 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 36 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.

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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

-- 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, 2016.

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	4/19/2016	18.45	15.3	6.8	6.8	364	237
GMW-2	ABJ994	4/19/2016	16.65	16.1	6.8	6.9	366	250
		10/26/2016	16.44	16.9	6.8	4.4	--	213
GMW-4	BIN804	4/19/2016	17.29	16.5	6.7	7.0	372	322
Nu-Way Cleaners								
NMW-1	ABJ918	4/19/2016	18.66	16.8	6.4	6.8	374	323
Southgate Laundry								
SGMW-1	BIN801	10/26/2016	--	--	--	--	--	--
SGMW-2	BIN803	10/26/2016	27.50	15.7	6.8	7.2	--	317
SGMW-3	BIN802	10/26/2016	25.74	15.7	6.8	7.2	--	327
Washington Central Railroad Roundhouse								
WDOE-3S	BIN819	10/26/2016	21.82	17.2	6.6	6.2	--	371
WDOE-3I	BIN817	10/26/2016	22.38	16.2	6.8	0.3	60	377
WDOE-3D	BIN818	10/26/2016	24.27	16.3	7.1	0.2	-38	328
Fifth Wheel Truck Repair								
5WMW-2	BIN808	10/25/2016	17.04	17.9	6.8	3.9	--	404
Cameron Yakima Inc.								
CYIMW102S	BIN810	10/25/2016	15.56	17.1	6.8	4.8	191	469
CYIMW103S	BIN809	4/19/2016	19.13	16.3	6.5	6.6	362	399
		10/25/2016	16.26	18.2	6.8	5.5	192	474
CYIMW103D	AHR176	4/19/2016	19.62	17.6	6.9	4.1	344	313
CYIMW106S	BIN806	10/24/2016	17.64	17.9	6.6	5.2	--	475
CYIMW107S	BIN805	4/19/2016	21.97	18.1	6.6	7.2	365	277
		10/24/2016	18.94	16.8	6.7	5.9	--	376
CYIMW108S	BIN807	10/24/2016	17.60	17.2	6.7	6.0	--	340
CYIMW111S	--	10/25/2016	15.66	16.6	7.2	6.7	--	335
CYIMW112S	BIN811	4/20/2016	17.93	15.8	6.6	6.9	422	333
		10/25/2016	15.29	16.7	6.9	5.1	--	421
CYIMW113S	BIN814	4/20/2016	17.67	16.2	6.5	6.4	408	365
		10/25/2016	14.98	17.2	6.9	5.1	122	446

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	4/20/2016	18.97	17.3	7.0	5.2	376	285
CYIMW114S	BIN812	4/20/2016	18.29	17.0	6.5	5.6	380	434
		10/25/2016	15.55	17.7	6.8	5.1	130	443
Agri-Tech Yakima Steel Fabricators								
ATMW-4	BIN816	10/25/2016	--	--	--	--	--	--
YRRA Remedial Investigation Wells								
RI-3S	AEB112	4/19/2016	36.41	17.1	6.8	6.6	348	391
RI-4S	AEB126	4/18/2016	14.07	16.9	7.4	5.1	230	726
RI-4D	AEB125	4/18/2016	12.69	16.4	8.0	6.7	203	293
RI-5S	AEB114	4/18/2016	17.70	15.7	6.8	6.4	236	426
RI-5D	AEB113	4/18/2016	23.64	15.9	7.5	5.6	207	517
RI-6S	AEB122	10/24/2016	7.70	15.3	7.0	4.7	--	736
RI-9S	AEB116	4/18/2016	6.16	14.5	6.6	3.9	219	344
RI-10S	AEB128	4/18/2016	10.36	15.6	6.7	5.3	244	365
RI-11S	AEB130	10/25/2016	12.73	19.0	6.7	4.9	--	321

-- Not measured.

Appendix B. Quality Assurance Review

Data Quality Assessment – 2016 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 2016 monitoring period field replicates were collected from wells GMW-2, SGMW-2, WDOE-3D, CYIMW103S, RI-6S, and RI-10S. 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 Quality Assurance Project Plan (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 collected from the bladder pump following decontamination procedures and transport blanks were also submitted for analysis for each monitoring event. Neither of the blank types contained detectable levels of the target analytes.

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.

An October 2016 laboratory control sample exceeded the quality control limit for PCE, and a continuing calibration exceeded the quality control limit for vinyl chloride. The associated data for these laboratory quality assurance 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.ecy.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
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	

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]							
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	

[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.

Appendix C. Project Results, December 1997 to October 2016

Table C-1: Summary of Analytical Results (ug/L) for Goodwill-City of Yakima, December 1997 to October 2016.

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

Date	GMW-1				GMW-2				GMW-4			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
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
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	--	--	--	--
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.

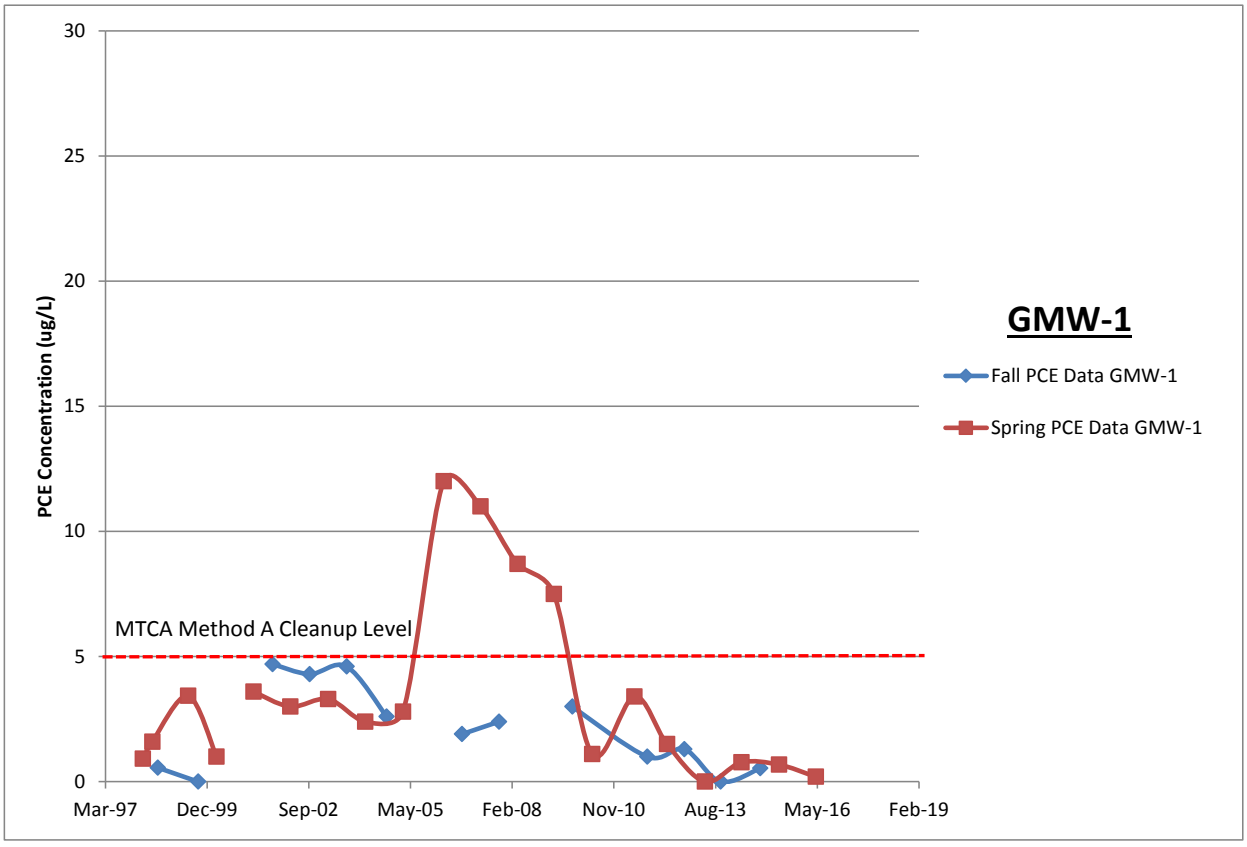

Figure C-1. Goodwill, Well GMW-1 PCE Results (ug/L), March 1998 to April 2016.

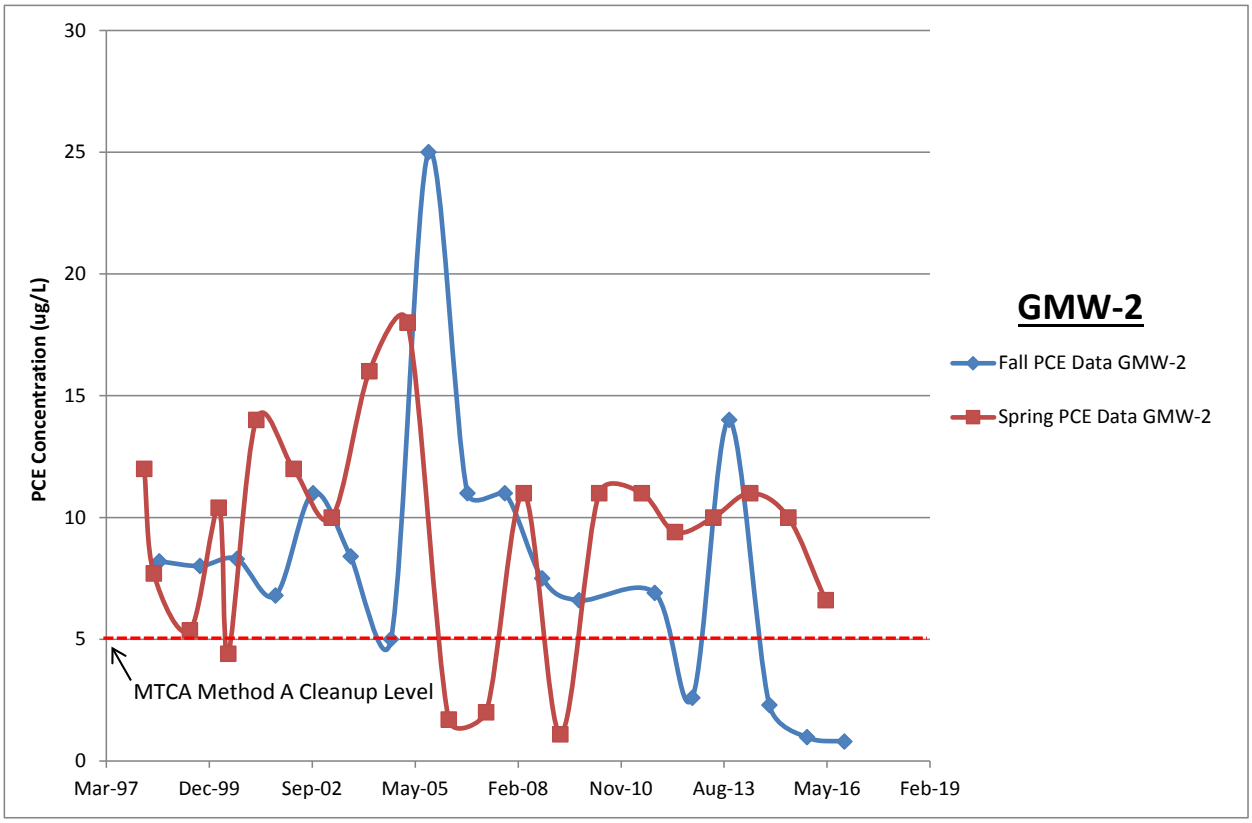

Figure C-2. Goodwill, Well GMW-2 PCE Results (ug/L), March 1998 to October 2016.

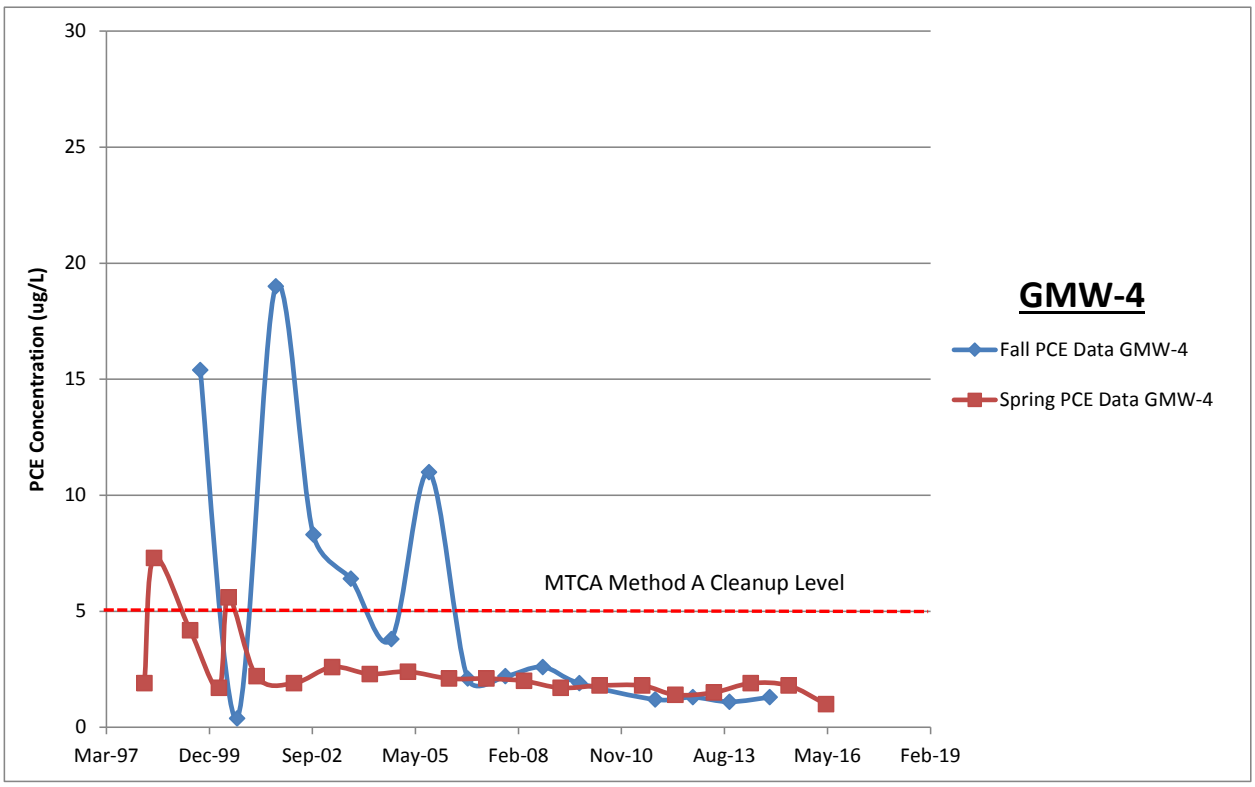

Figure C-3. Goodwill, Well GMW-4 PCE Results (ug/L), March 1998 to April 2016.

Table C-2: Summary of Analytical Results (ug/L) for Nu-Way Cleaners, December 1997 to October 2016.

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				--	--	--	--
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.

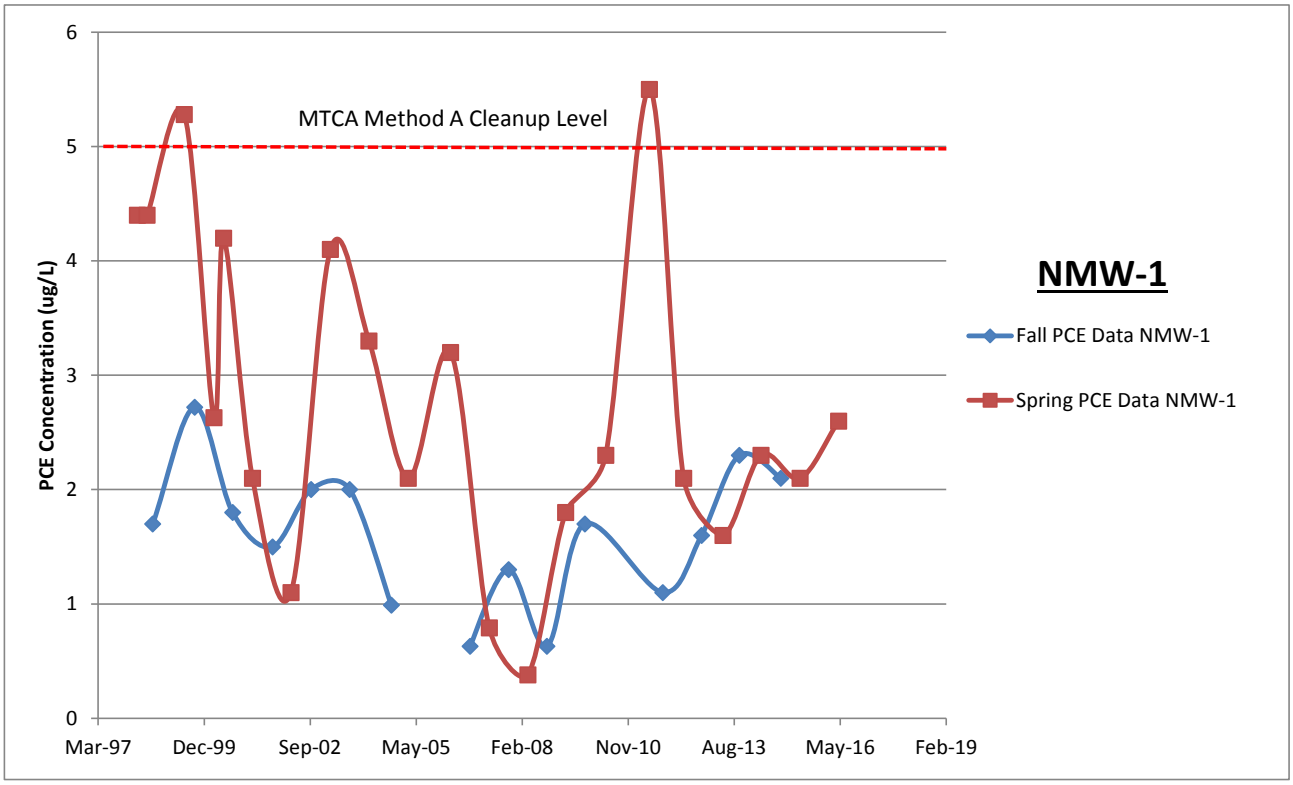

Figure C-4. Nu-Way Cleaners, Well NMW-1 PCE Results (ug/L), March 1998 to April 2016.

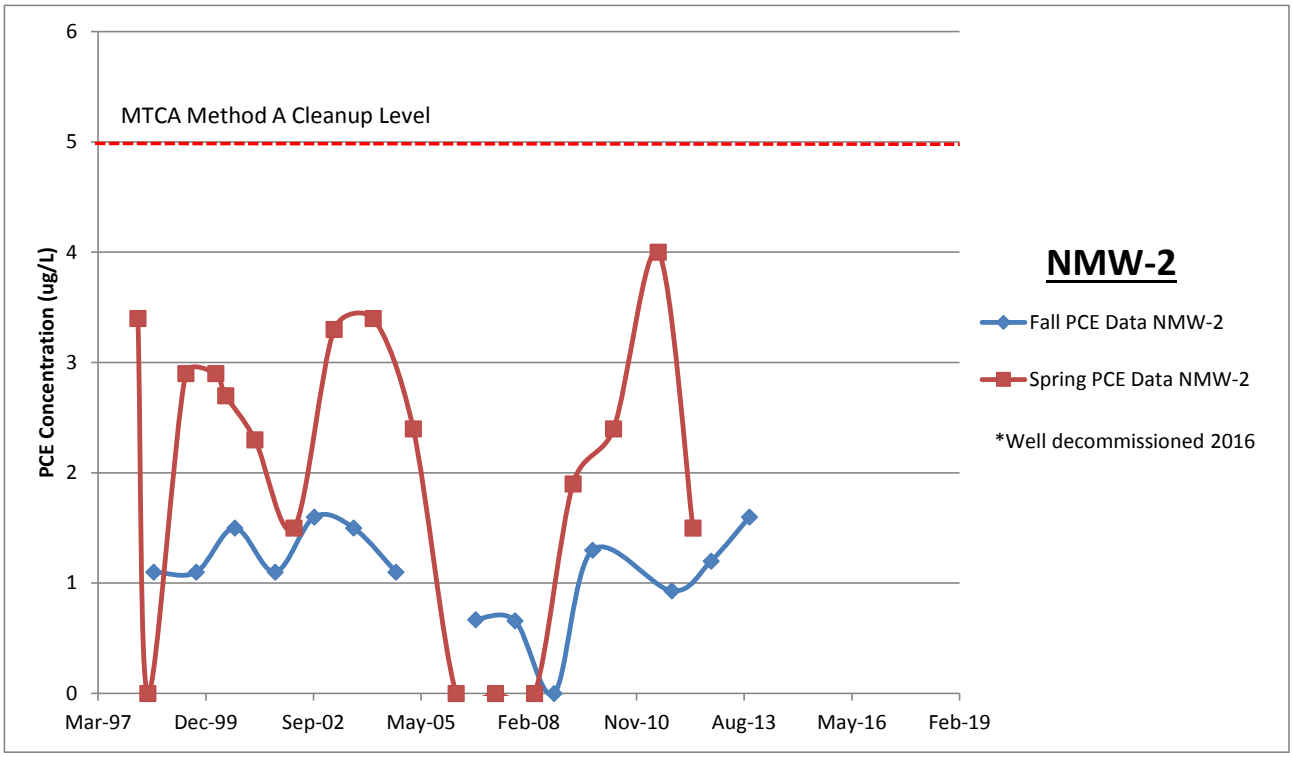

Figure C-5. Nu-Way Cleaners, Well NMW-2 PCE Results (ug/L), March 1998 to October 2013.

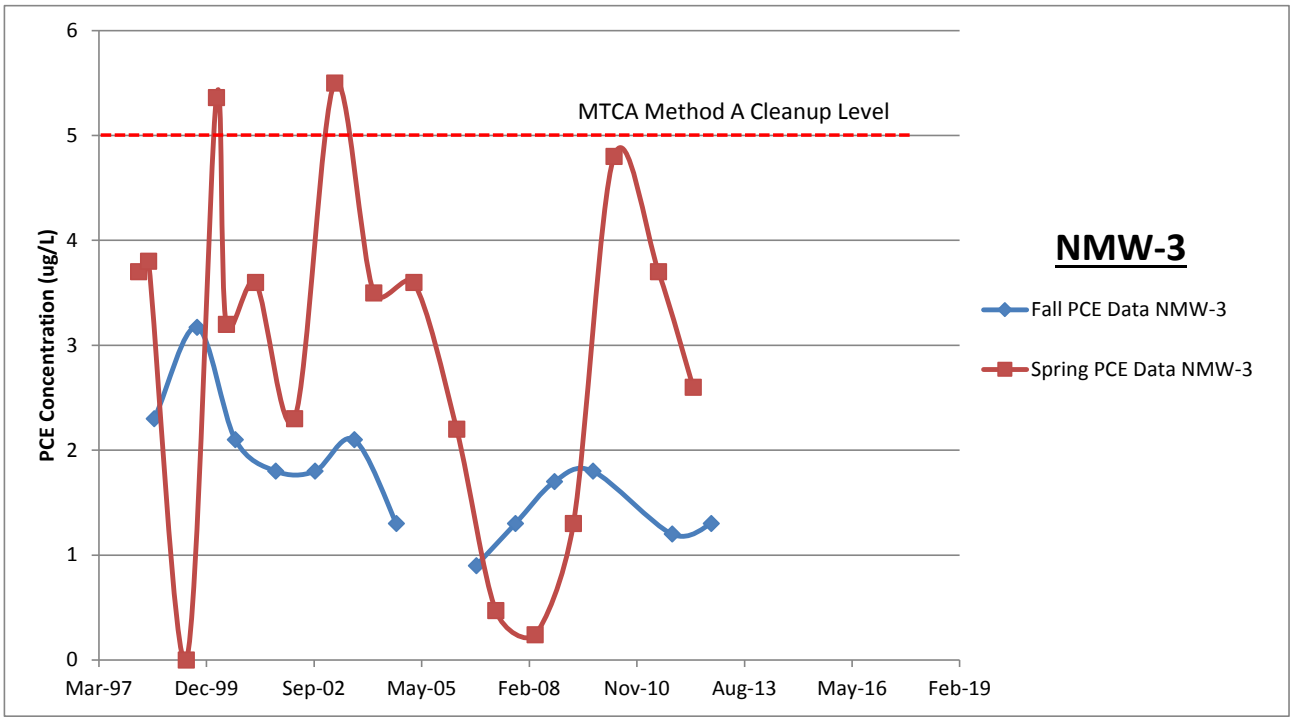

Figure C-6. Nu-Way Cleaners, Well NMW-3 PCE Results (ug/L), March 1998 to October 2012.

Table C-3: Summary of Analytical Results (ug/L) for Southgate Laundry, June 1999 to October 2016.

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
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.

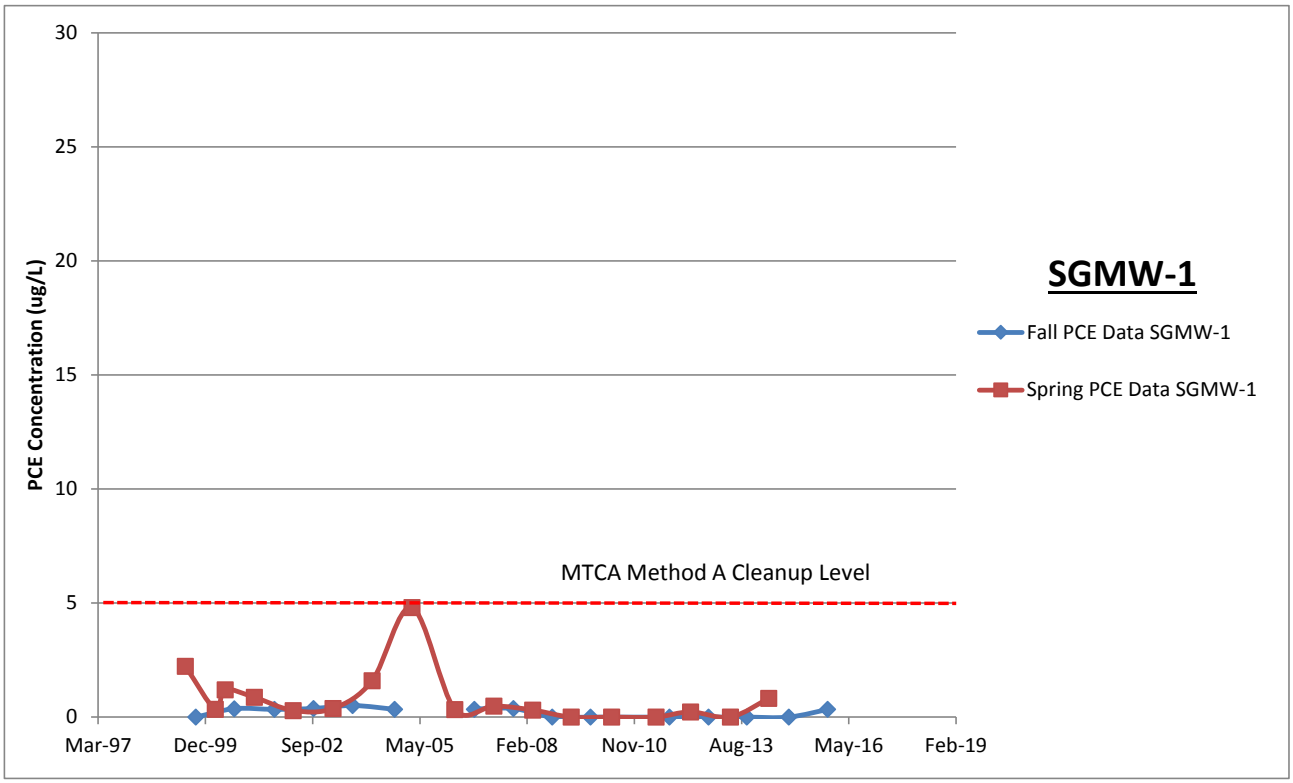

Figure C-7. Southgate Laundry, Well SGMW-1 PCE Results (ug/L), June 1999 to October 2015.

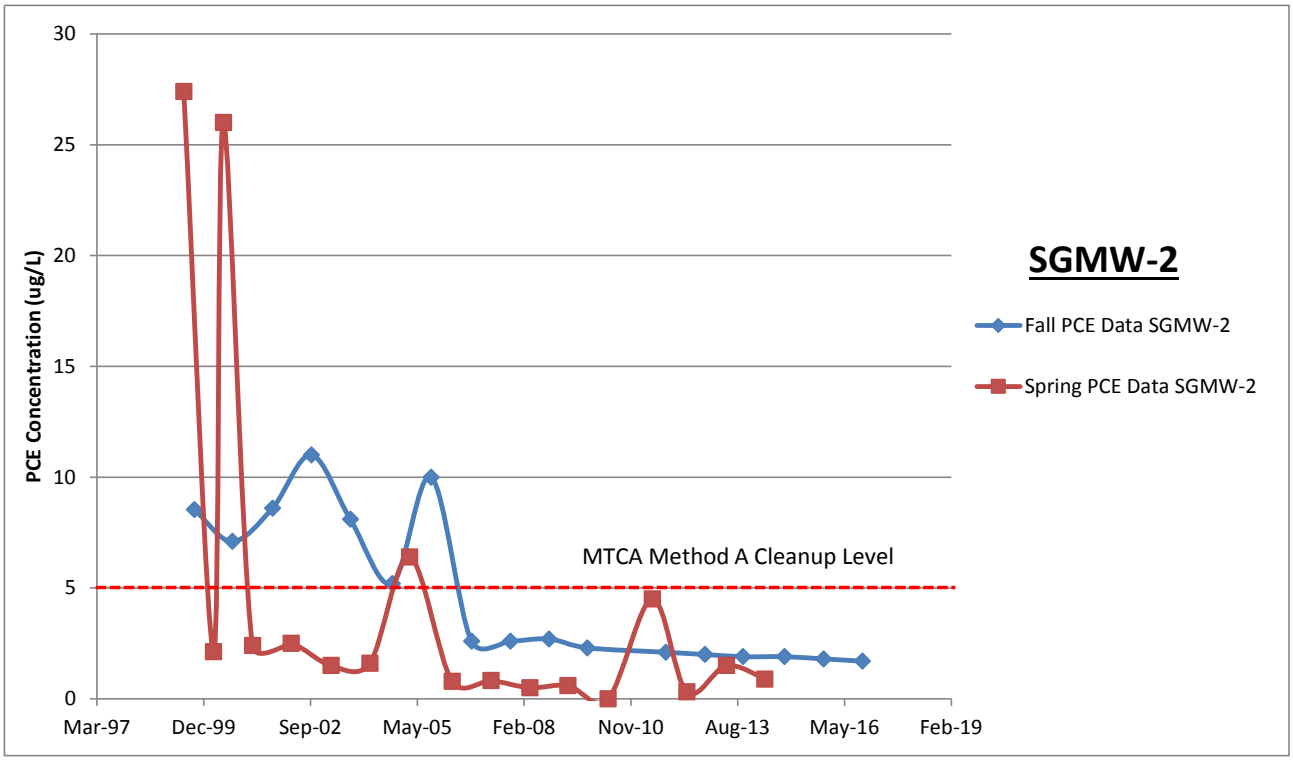

Figure C-8. Southgate Laundry, Well SGMW-2 PCE Results (ug/L), June 1999 to October 2016.

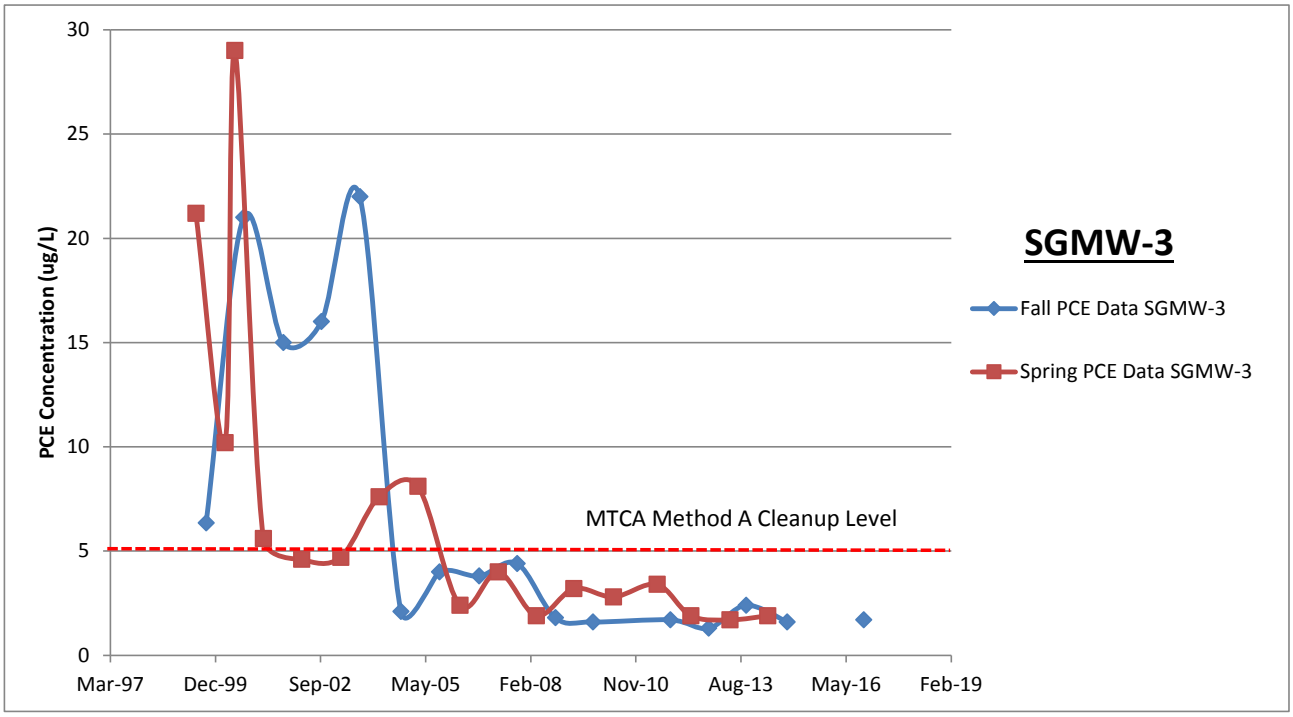

Figure C-9. Southgate Laundry, Well SGMW-3 PCE Results (ug/L), June 1999 to October 2016.

Table C-4: Summary of Analytical Results (ug/L) for Washington Central Railroad Roundhouse, December 1997 to October 2016.

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**
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.

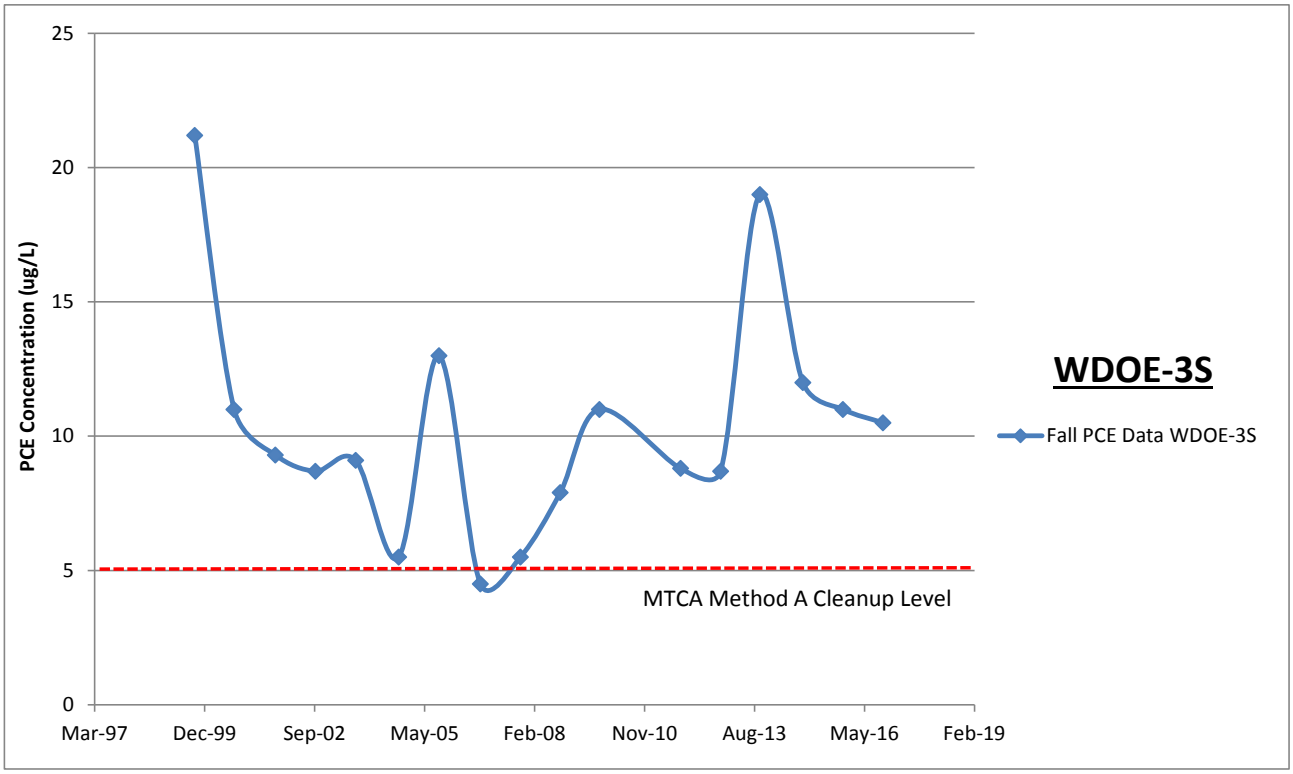

Figure C-10. Washington Central Railroad Roundhouse, Well WDOE-3S PCE Results (ug/L), September 1999 to October 2016.

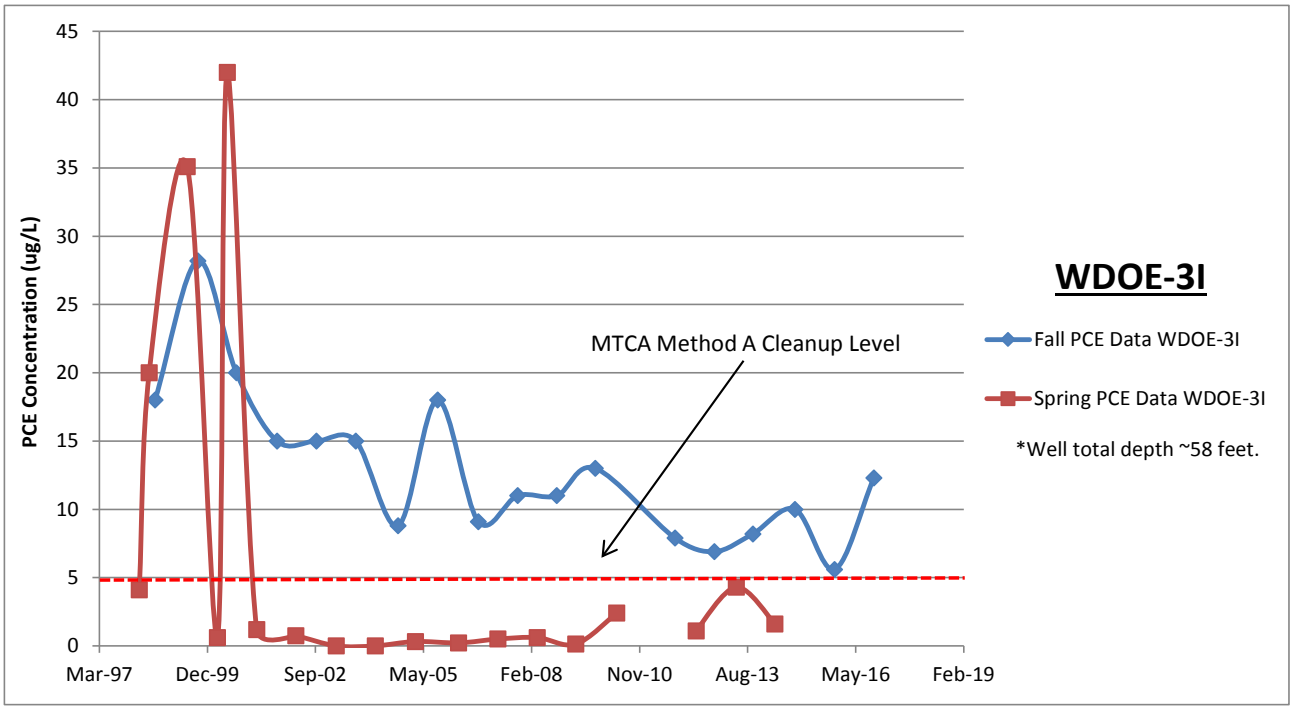

Figure C-11. Washington Central Railroad Roundhouse, Well WDOE-3I PCE Results (ug/L), March 1998 to October 2016.

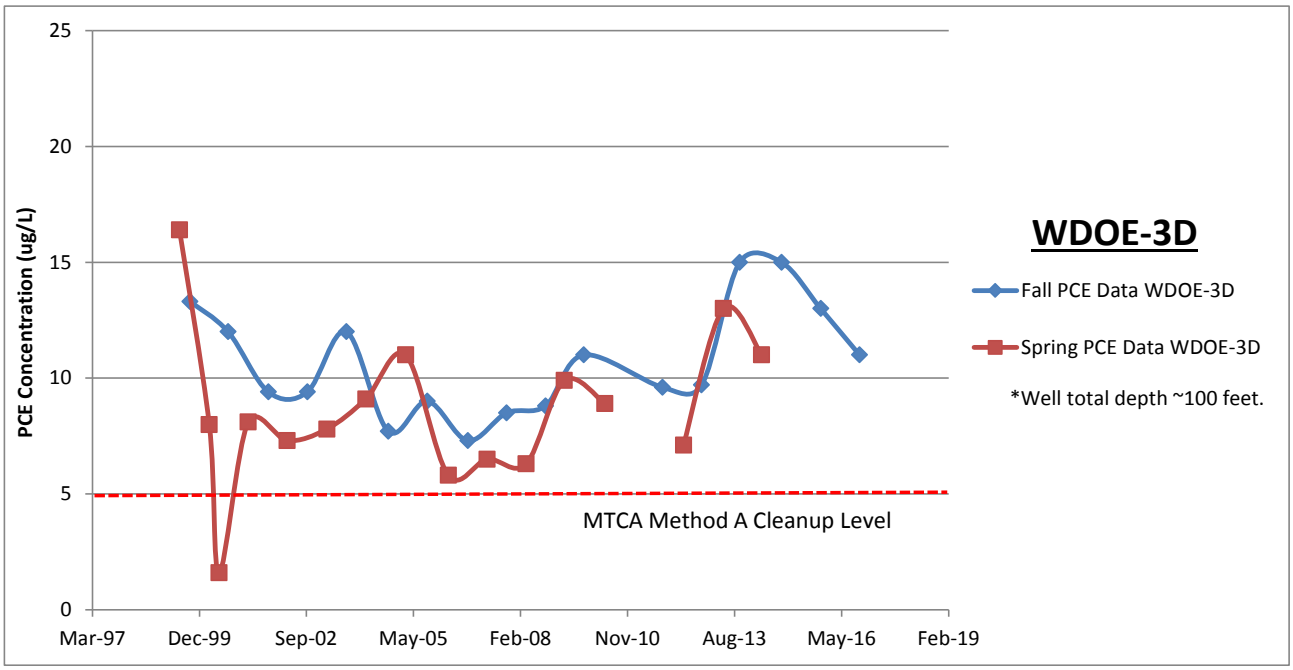

Figure C-12. Washington Central Railroad Roundhouse, Well WDOE-3D PCE Results (ug/L), June 1999 to October 2016.

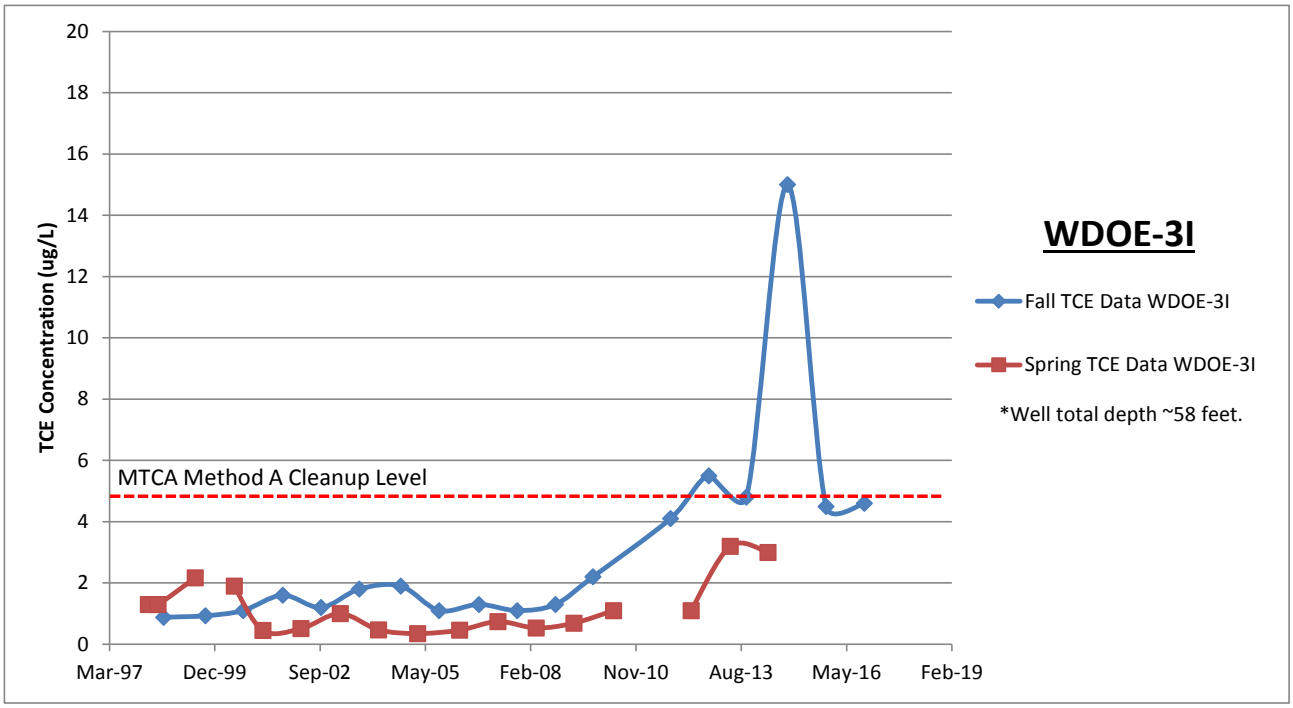

Figure C-13. Washington Central Railroad Roundhouse, Well WDOE-3I TCE Results (ug/L), June 1999 to October 2016.

Table C-5: Summary of Analytical Results (ug/L) for Fifth Wheel Truck Repair and Agri-Tech\ Yakima Steel, June 1999 to October 2016.

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	--	--	--	--
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.

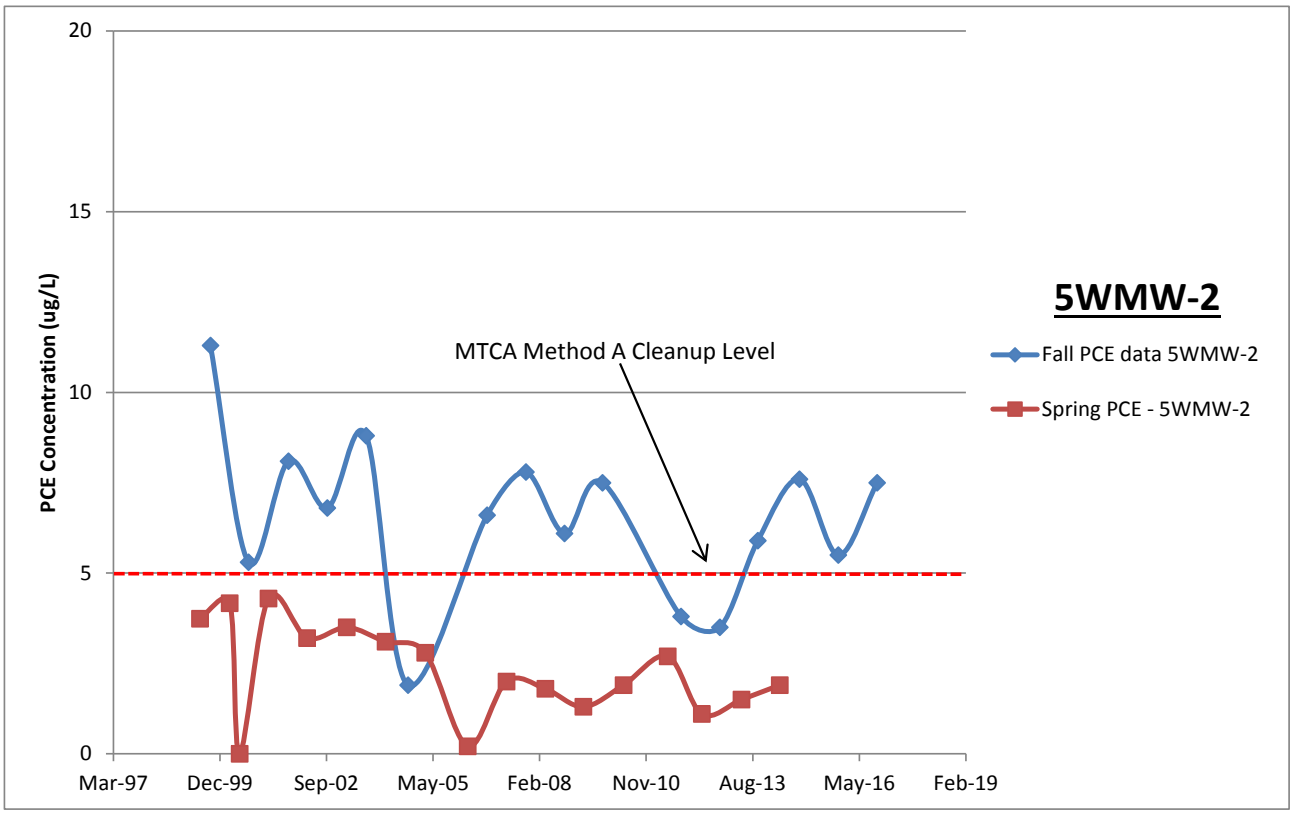

Figure C-14. Fifth Wheel Truck Repair, Well 5WMW-2 PCE Results (ug/L), June 1999 to October 2016.

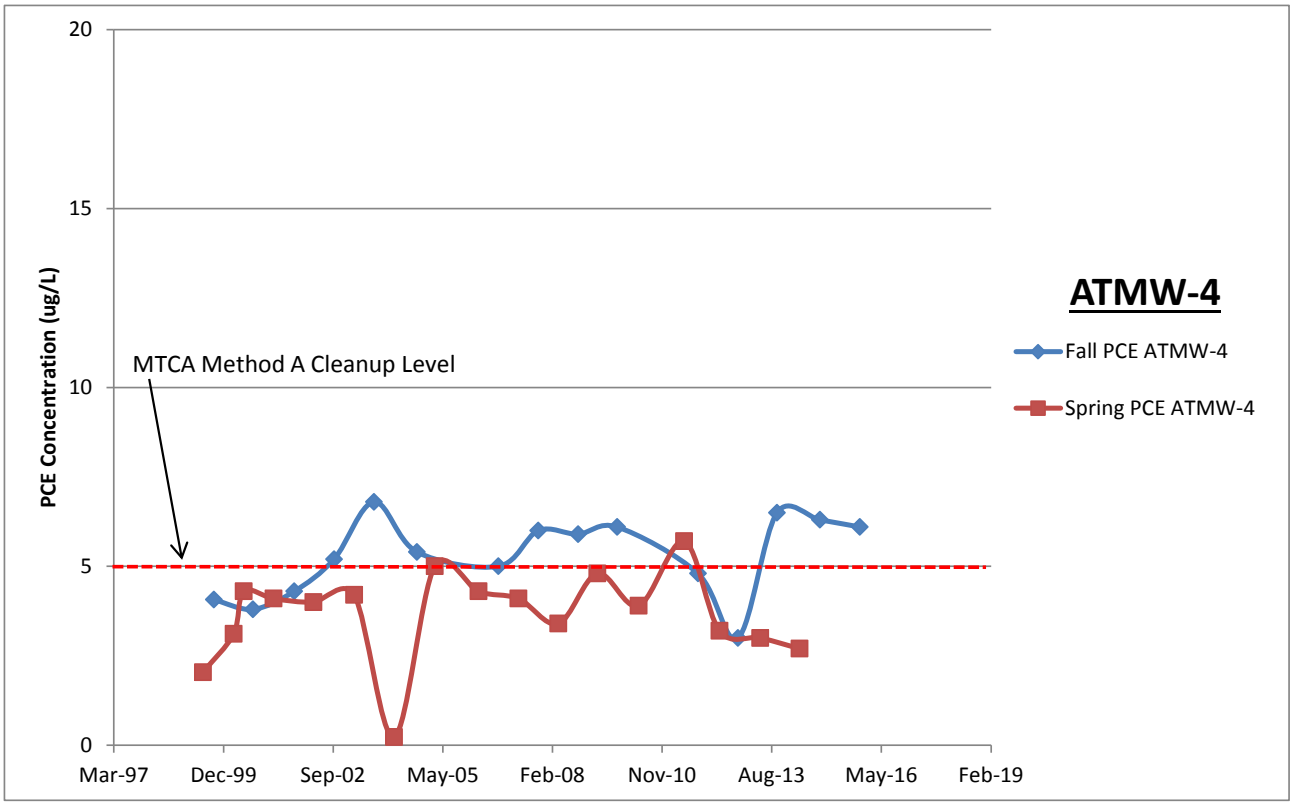

Figure C-15. Agri-Tech/Yakima Steel, Well AT-MW4 PCE Results (ug/L), June 1999 to October 2015.

Table C-6: Summary of Analytical Results (ug/L) for Cameron Yakima, Inc., December 1997 to October 2016.

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	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

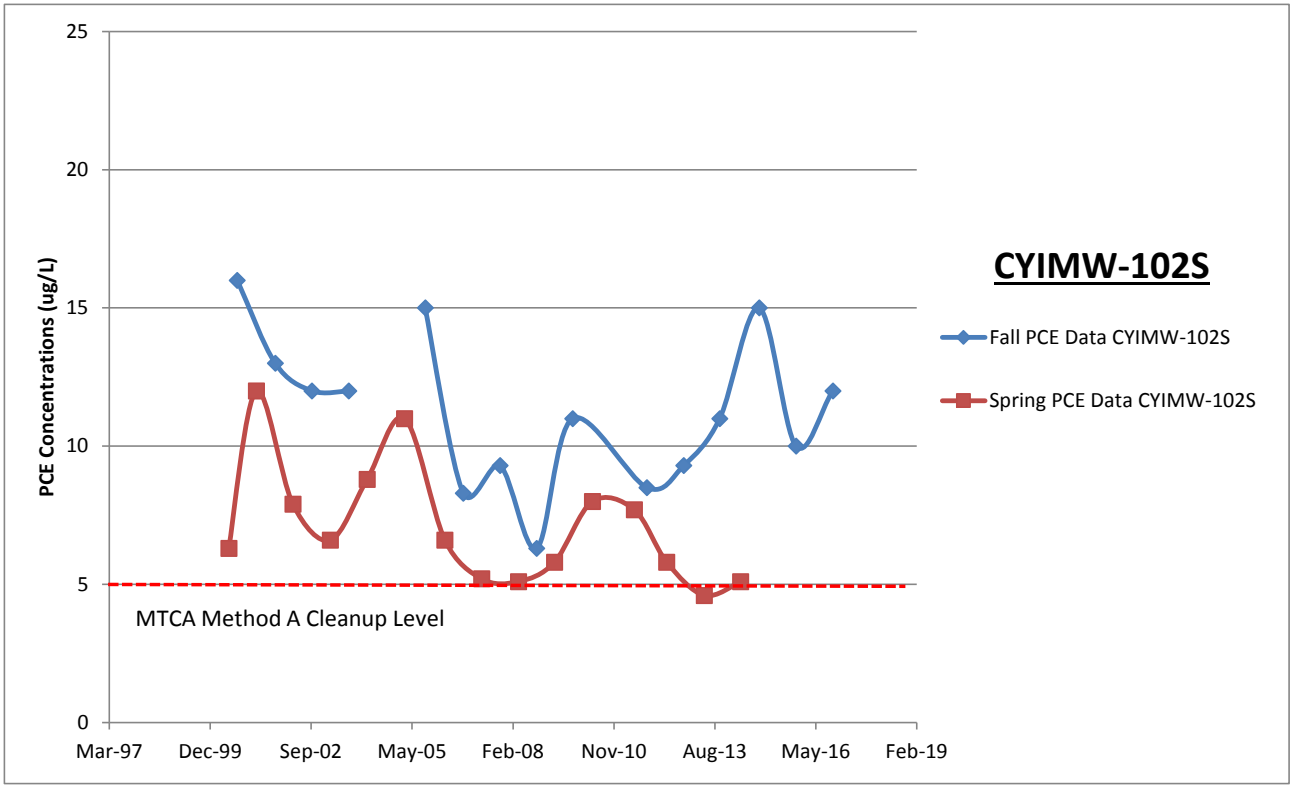

Figure C-16. Cameron Yakima, Well CYIMW-102S PCE Results (ug/L), June 2000 to October 2016.

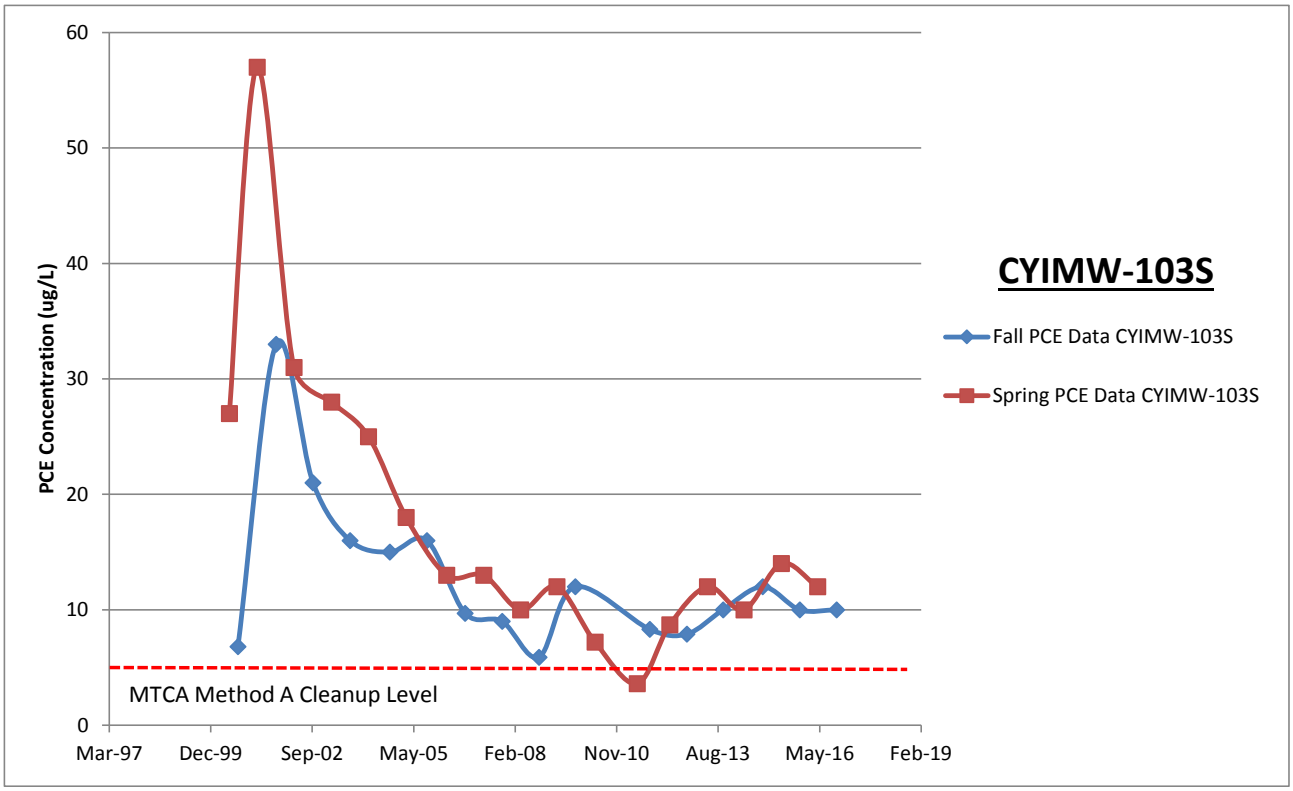

Figure C-17. Cameron Yakima, Well CYIMW-103S PCE Results (ug/L), June 2000 to October 2016.

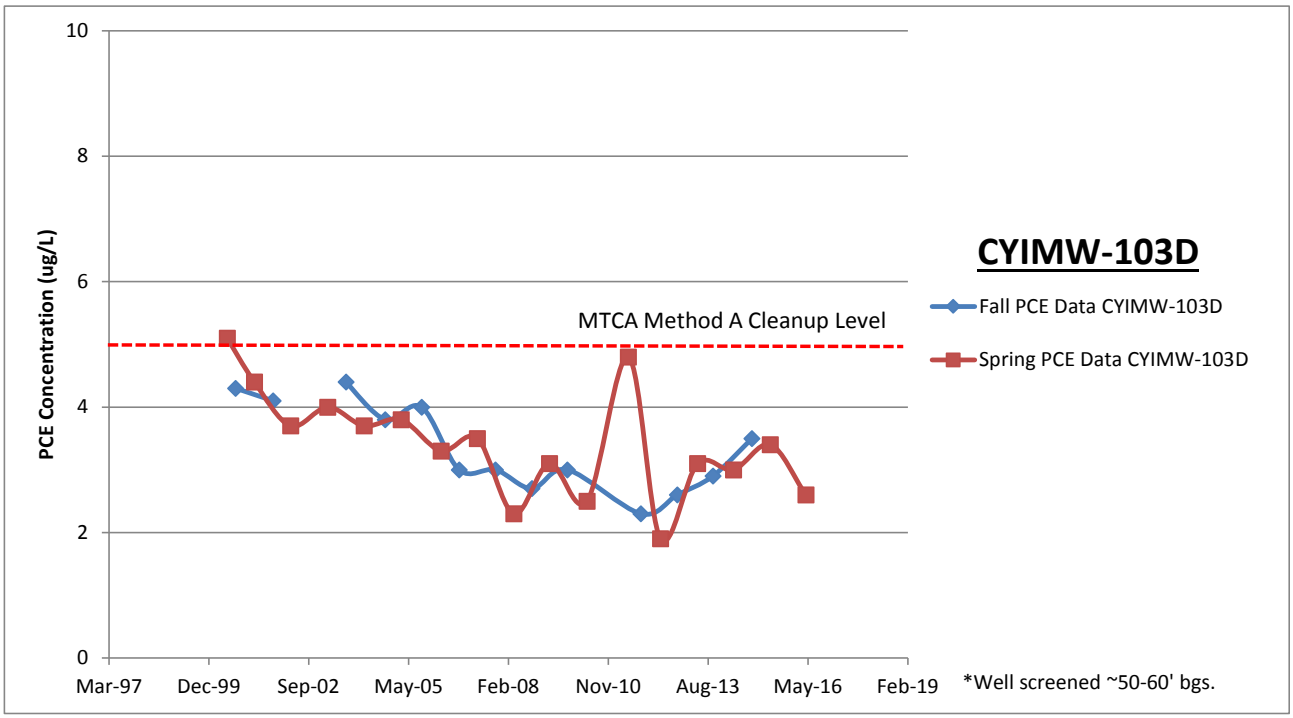

Figure C-18. Cameron Yakima, Well CYIMW-103D PCE Results (ug/L), June 2000 to April 2016.

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
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

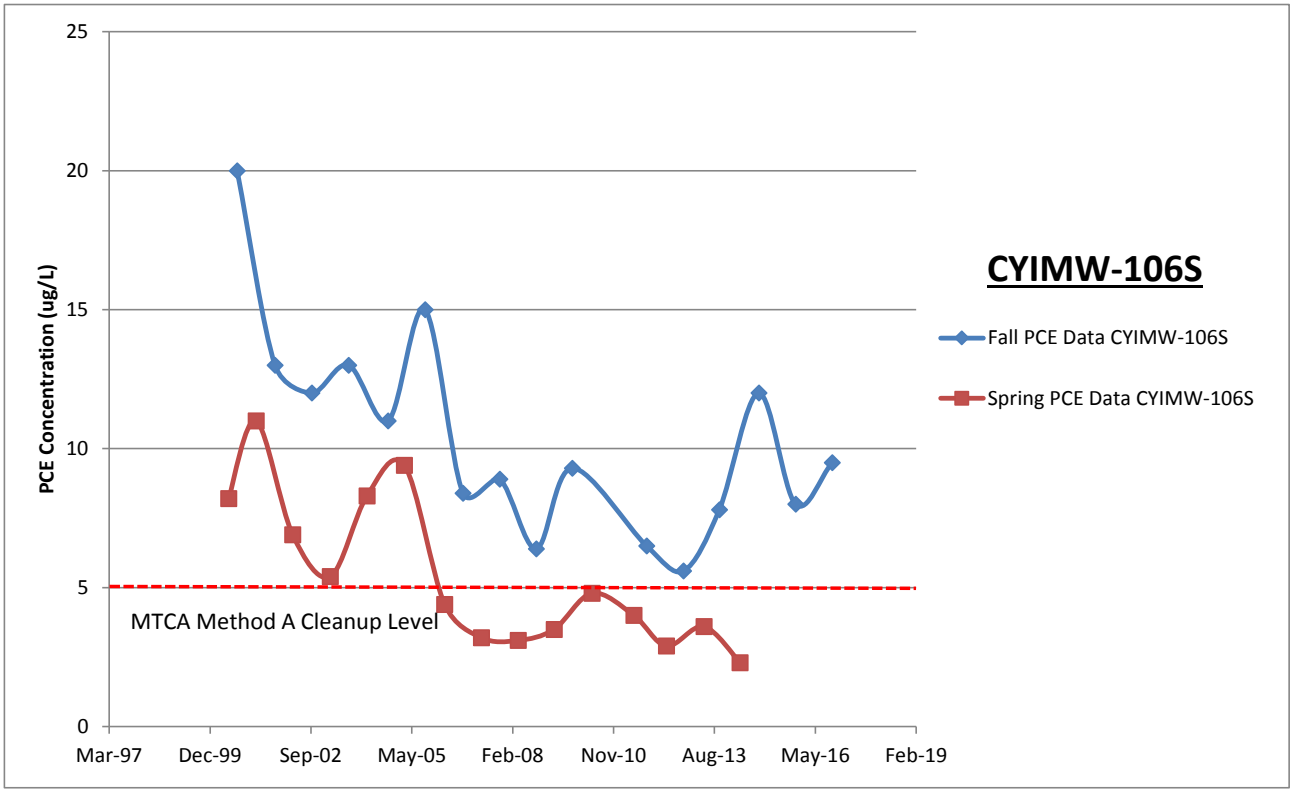

Figure C-19. Cameron Yakima, Well CYIMW-106S PCE Results (ug/L), June 2000 to October 2016.

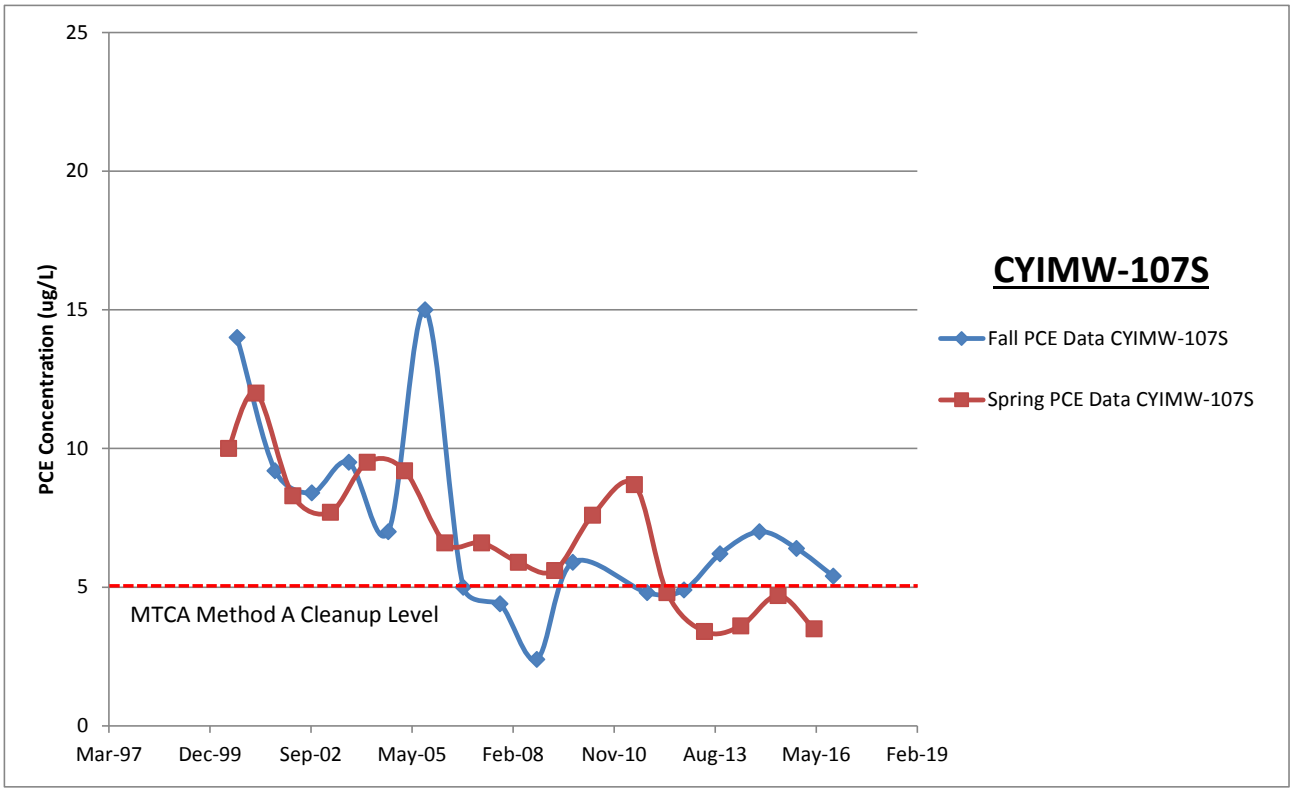

Figure C-20. Cameron Yakima, Well CYIMW-107S PCE Results (ug/L), June 2000 to October 2016.

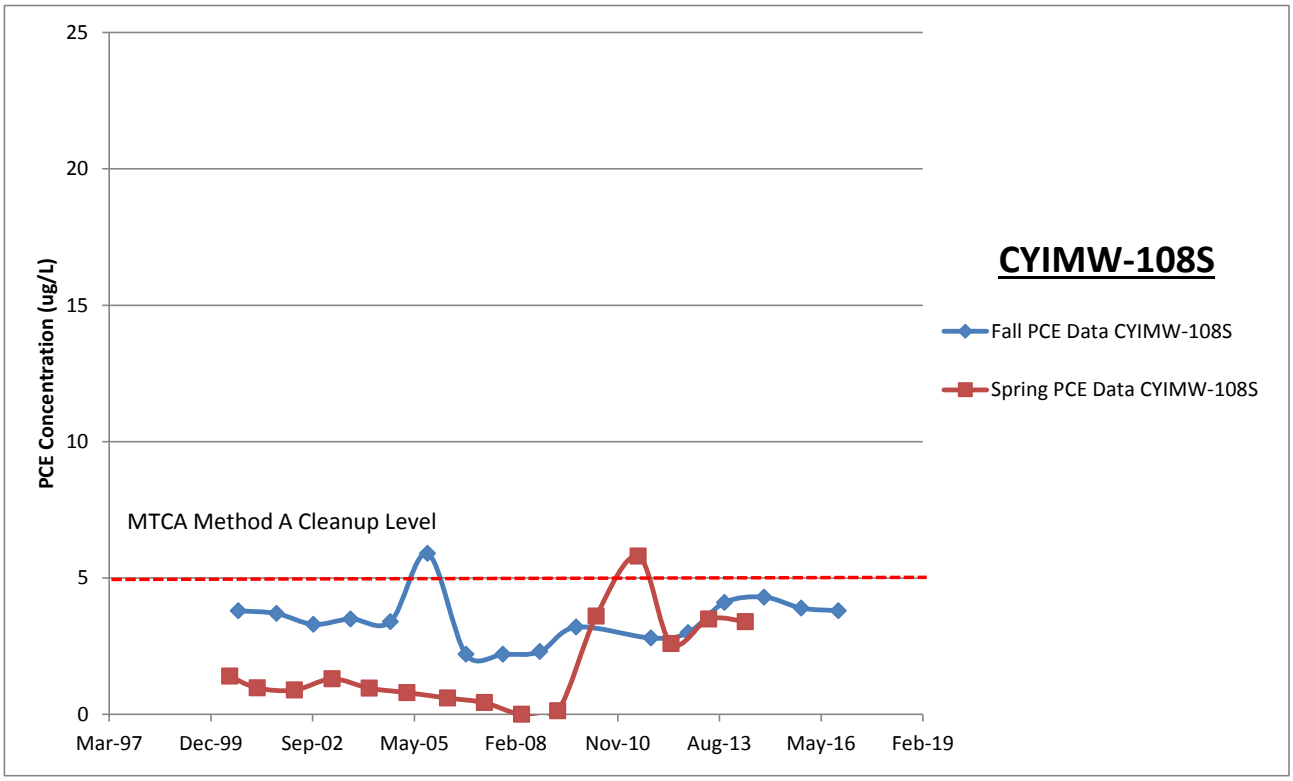

Figure C-21. Cameron Yakima, Well CYIMW-108S PCE Results (ug/L), June 2000 to October 2016.

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
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

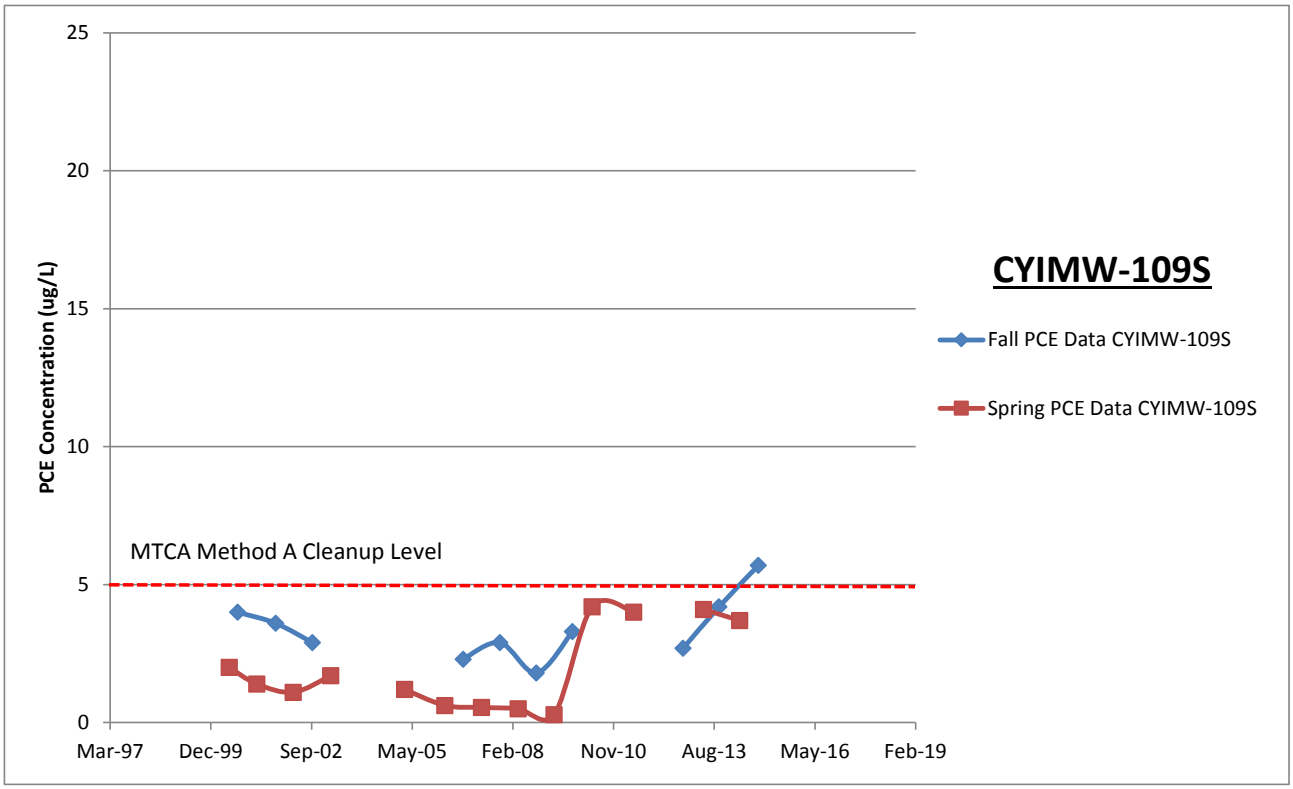

Figure C-22. Cameron Yakima, Well CYIMW-109S PCE Results (ug/L), June 2000 to October 2014.

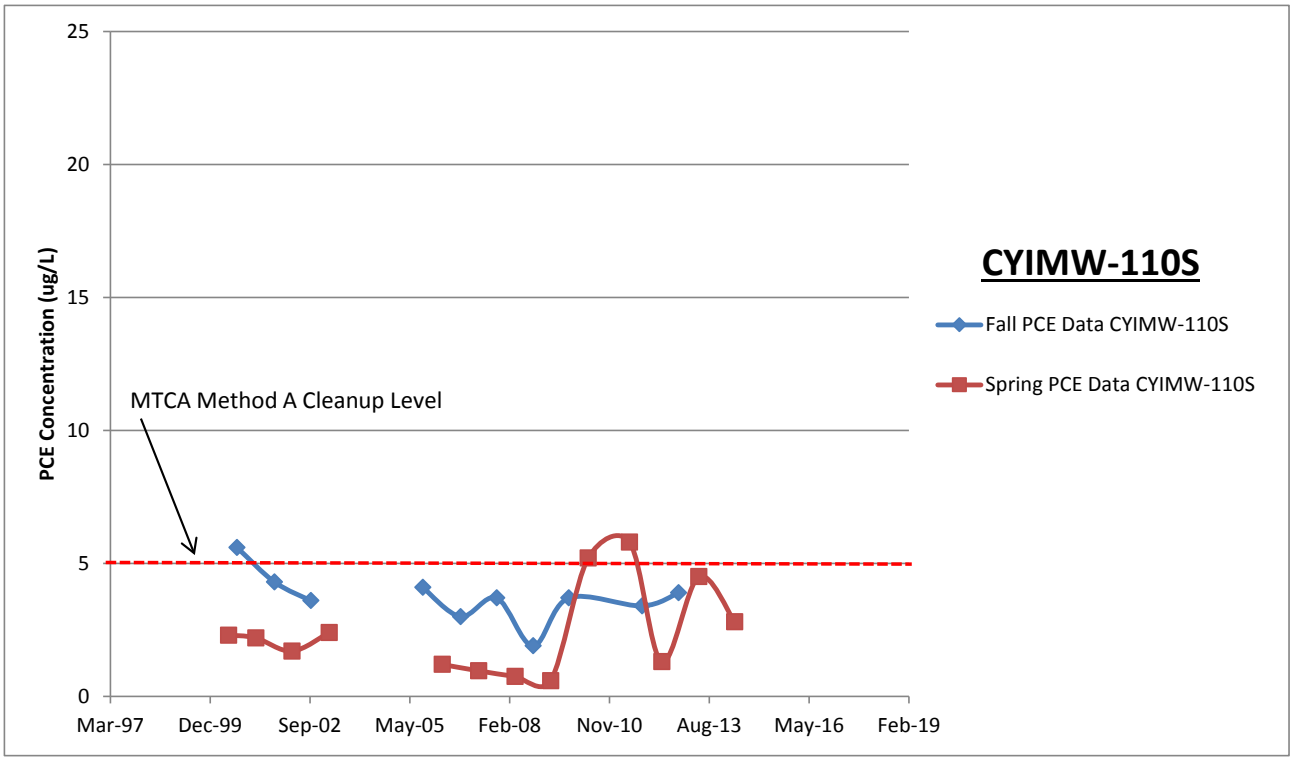

Figure C-23. Cameron Yakima, Well CYIMW-110S PCE Results (ug/L), June 2000 to April 2014.

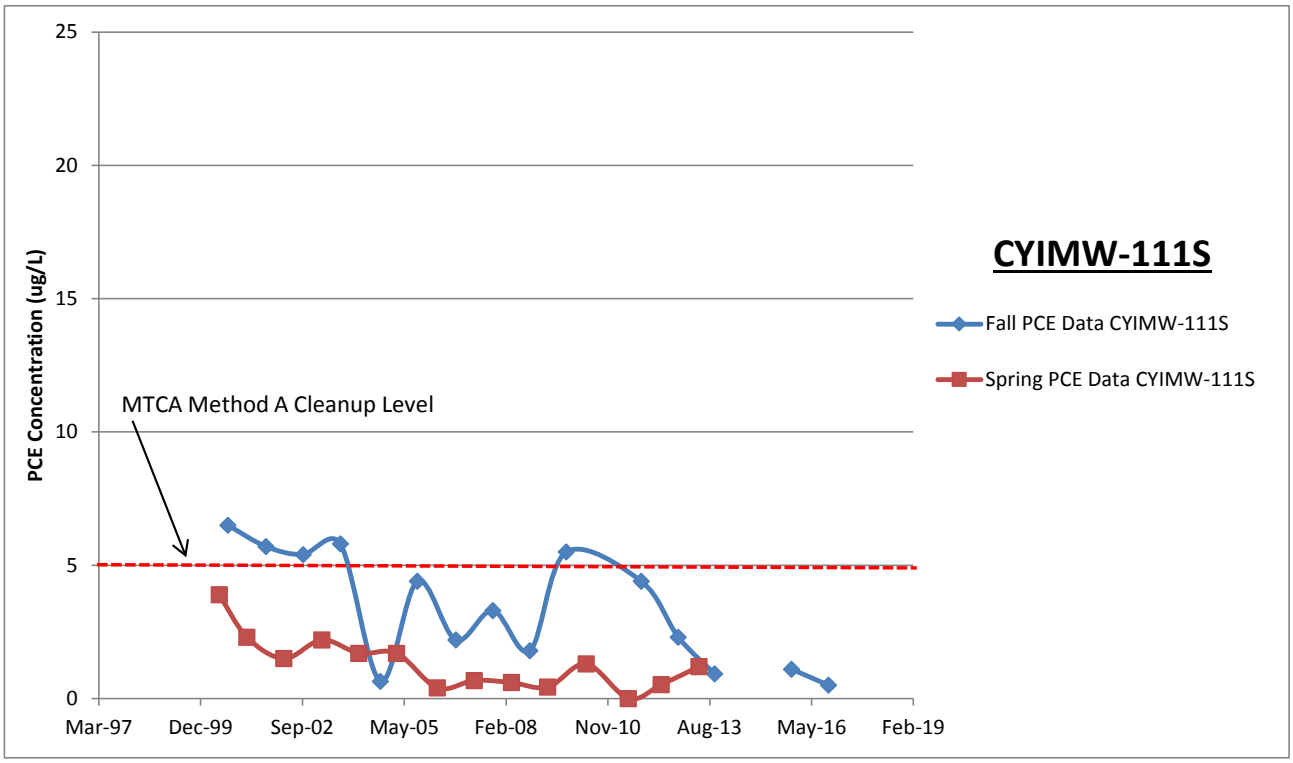

Figure C-24. Cameron Yakima, Well CYIMW-111S PCE Results (ug/L), June 2000 to October 2016.

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	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

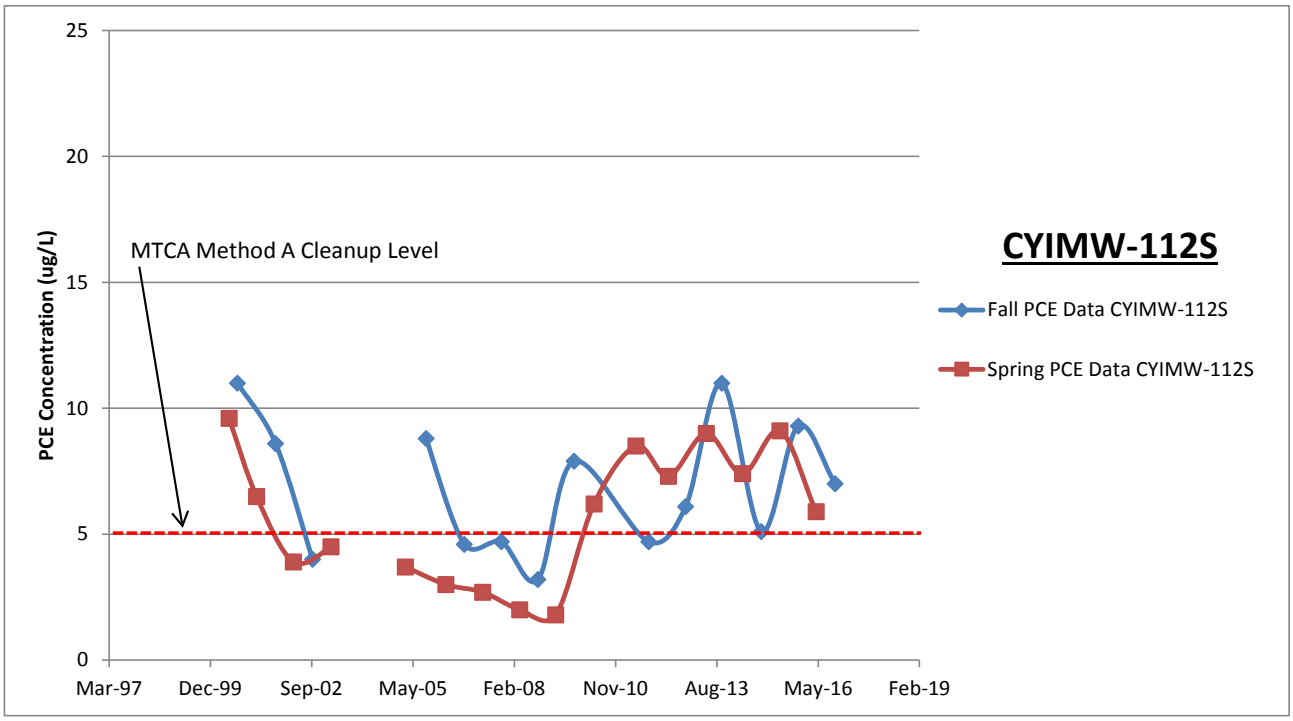

Figure C-25. Cameron Yakima, Well CYIMW-112S PCE Results (ug/L), June 2000 to October 2016.

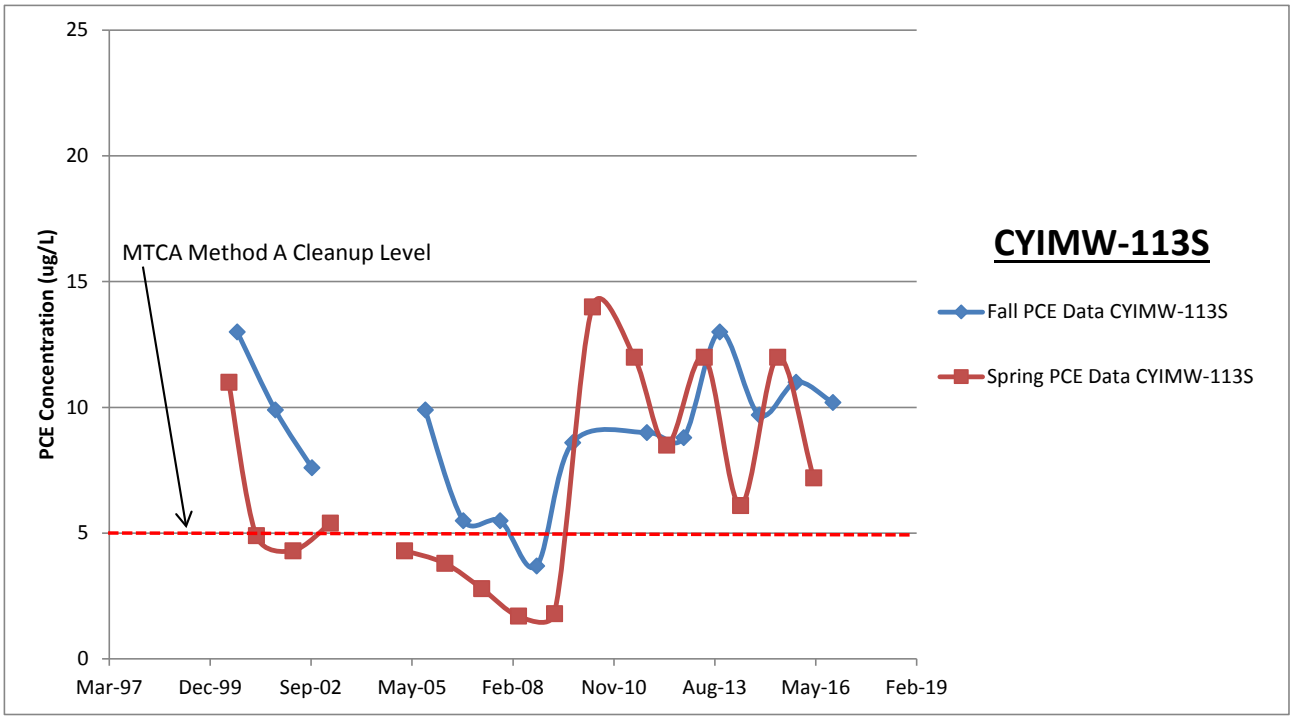

Figure C-26. Cameron Yakima, Well CYIMW-113S PCE Results (ug/L), June 2000 to October 2016.

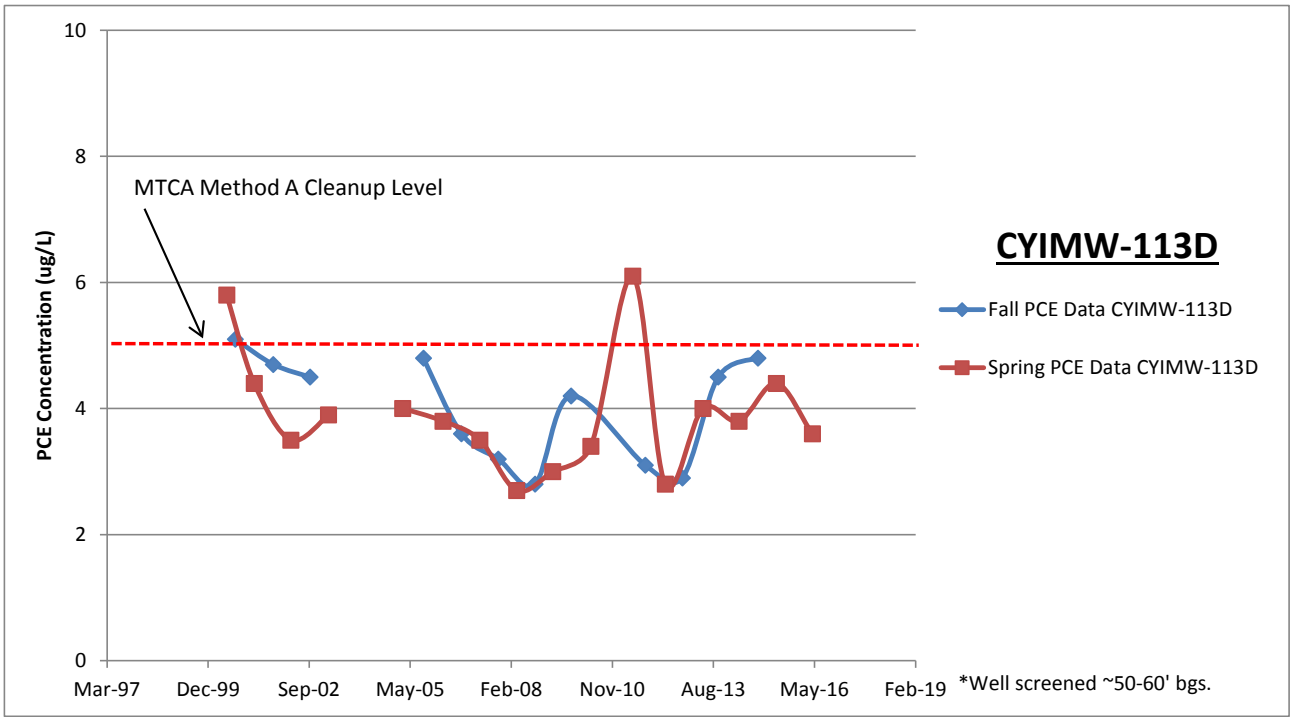

Figure C-27. Cameron Yakima, Well CYIMW-113D PCE Results (ug/L), June 2000 to April 2016.

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
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.

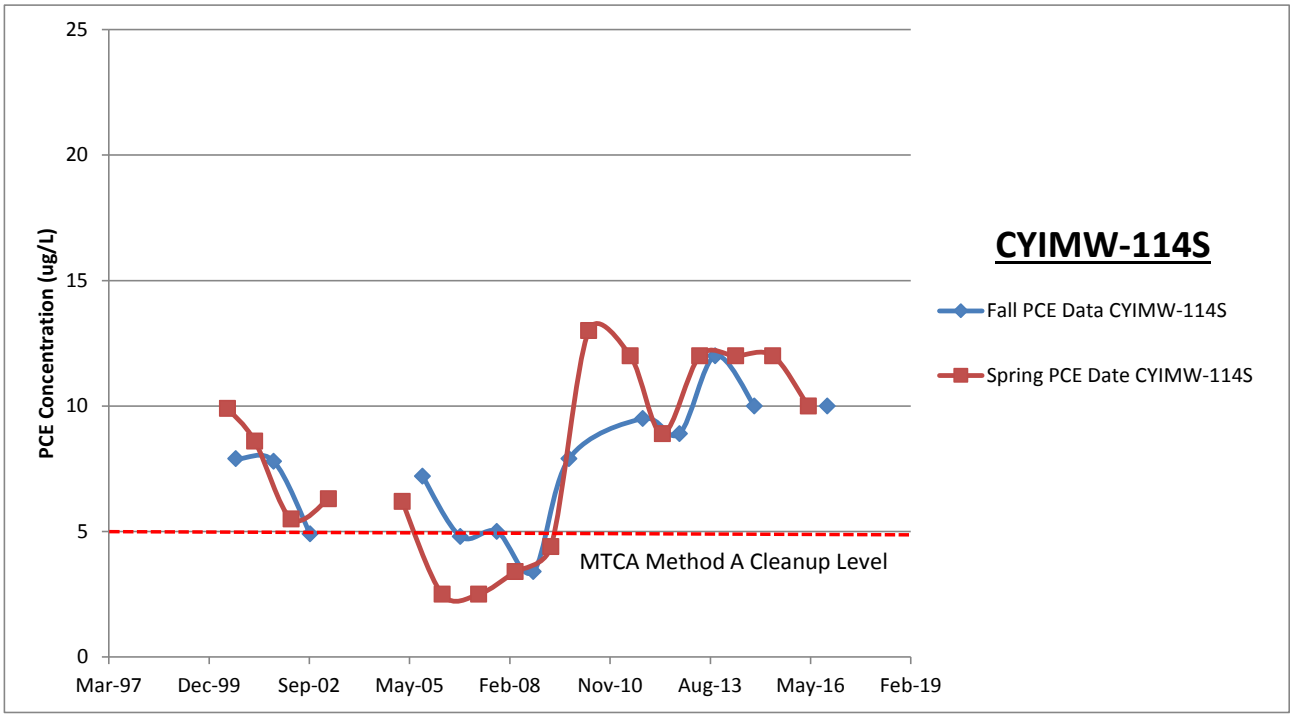

Figure C-28. Cameron Yakima, Well CYIMW-114S PCE Results (ug/L), June 2000 to October 2016.

Table C-7: Summary of Analytical Results (ug/L) for YRRA Remedial Investigation Wells, June 1999 to October 2016.

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	--	--	--	--	--	--	--	--	--	--	--	--
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

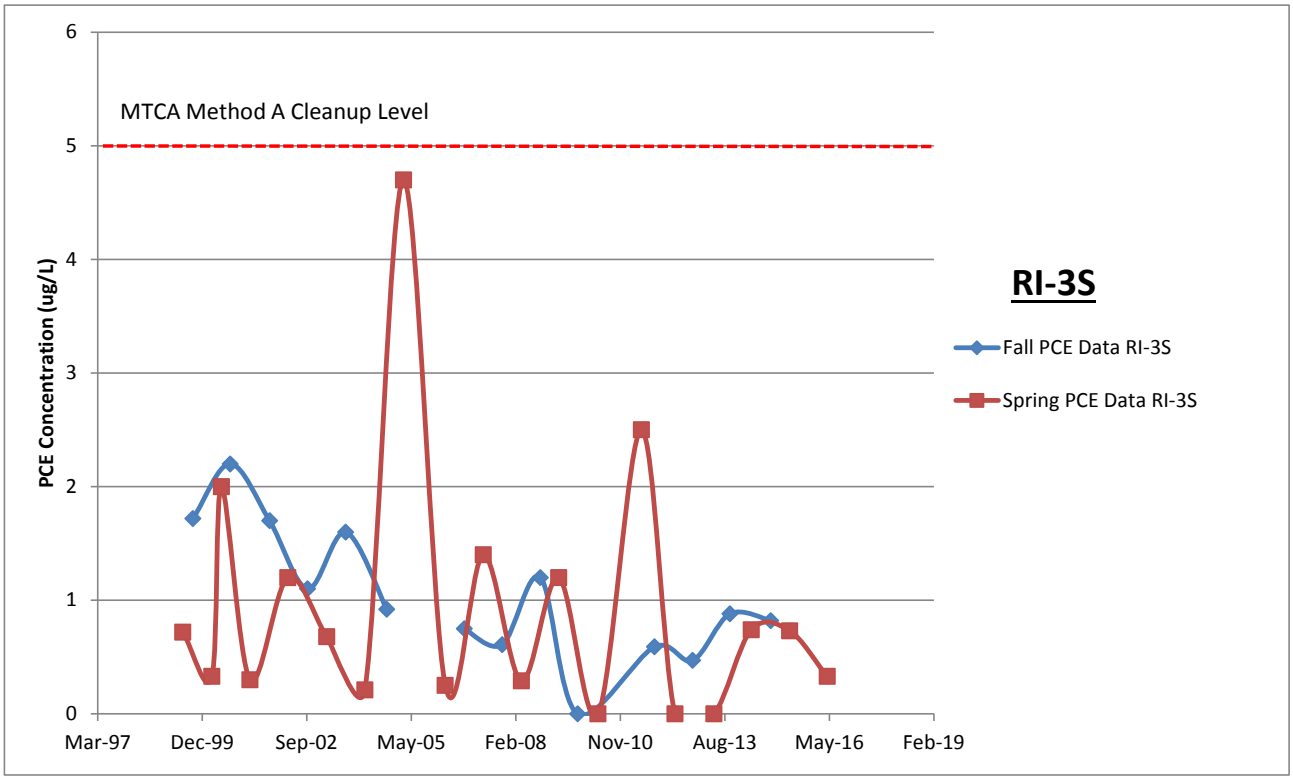

Figure C-29. YRRA Remedial Investigation Well RI-3S PCE Results, June 1999 to April 2016.

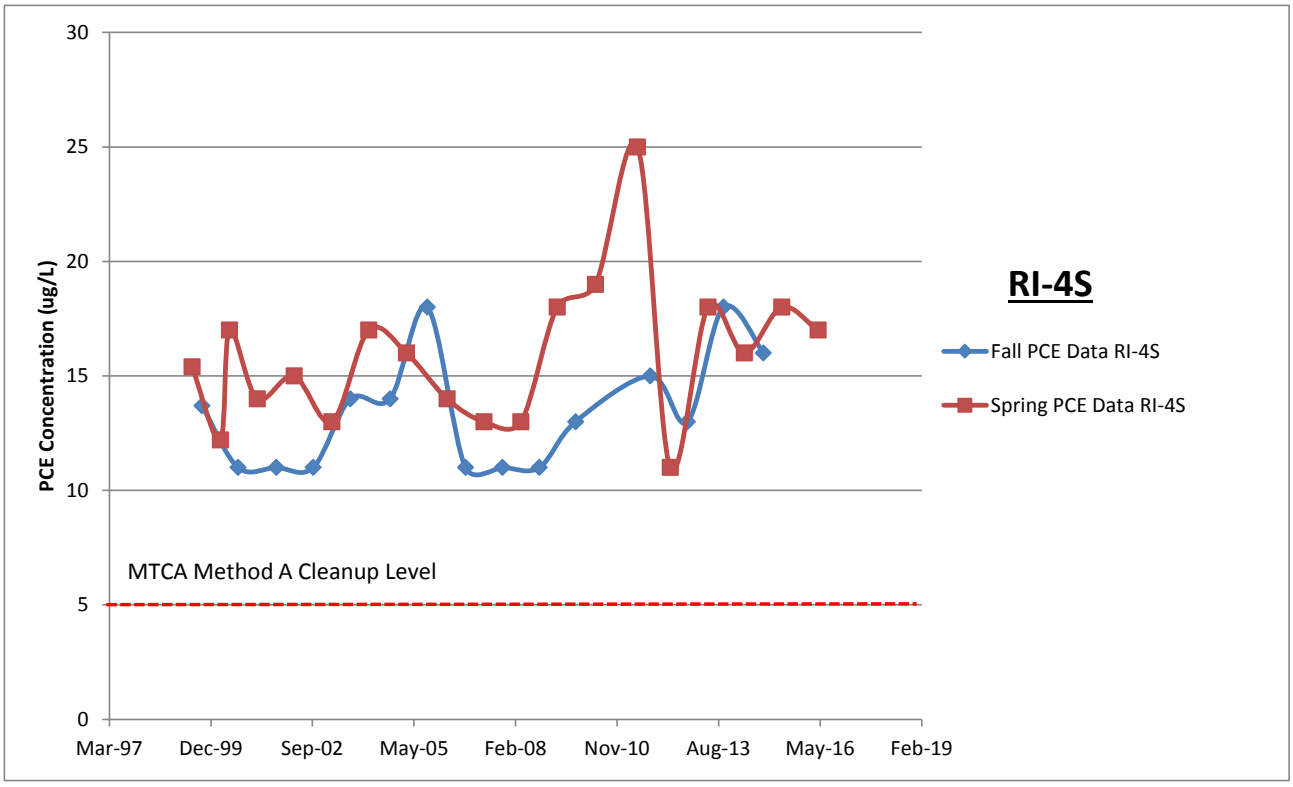

Figure C-30. YRRA Remedial Investigation Well RI-4S PCE Results, June 1999 to April 2016.

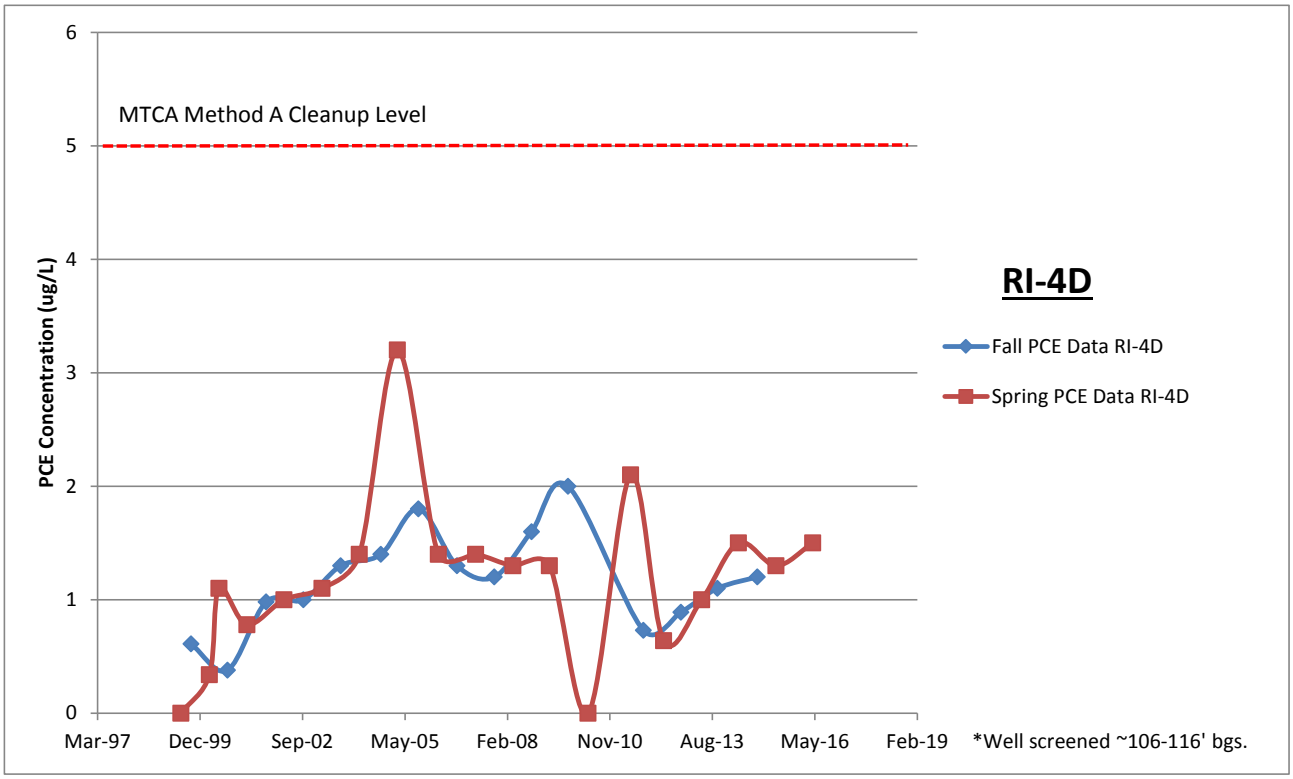

Figure C-31. YRRA Remedial Investigation Well RI-4D PCE Results, June 1999 to April 2016.

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
MTCA CL	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**	**5**	**5**	**70**	**0.2**

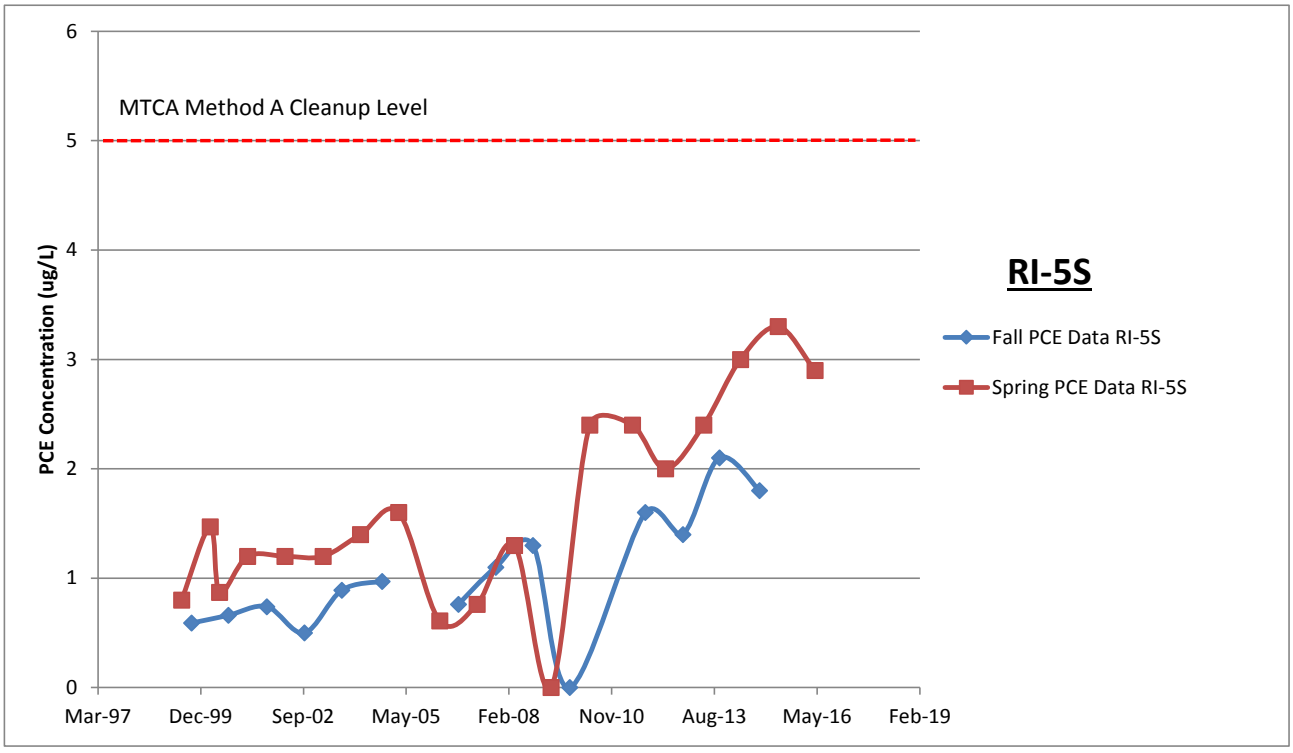

Figure C-32. YRRA Remedial Investigation Well RI-5S PCE Results, June 1999 to April 2016.

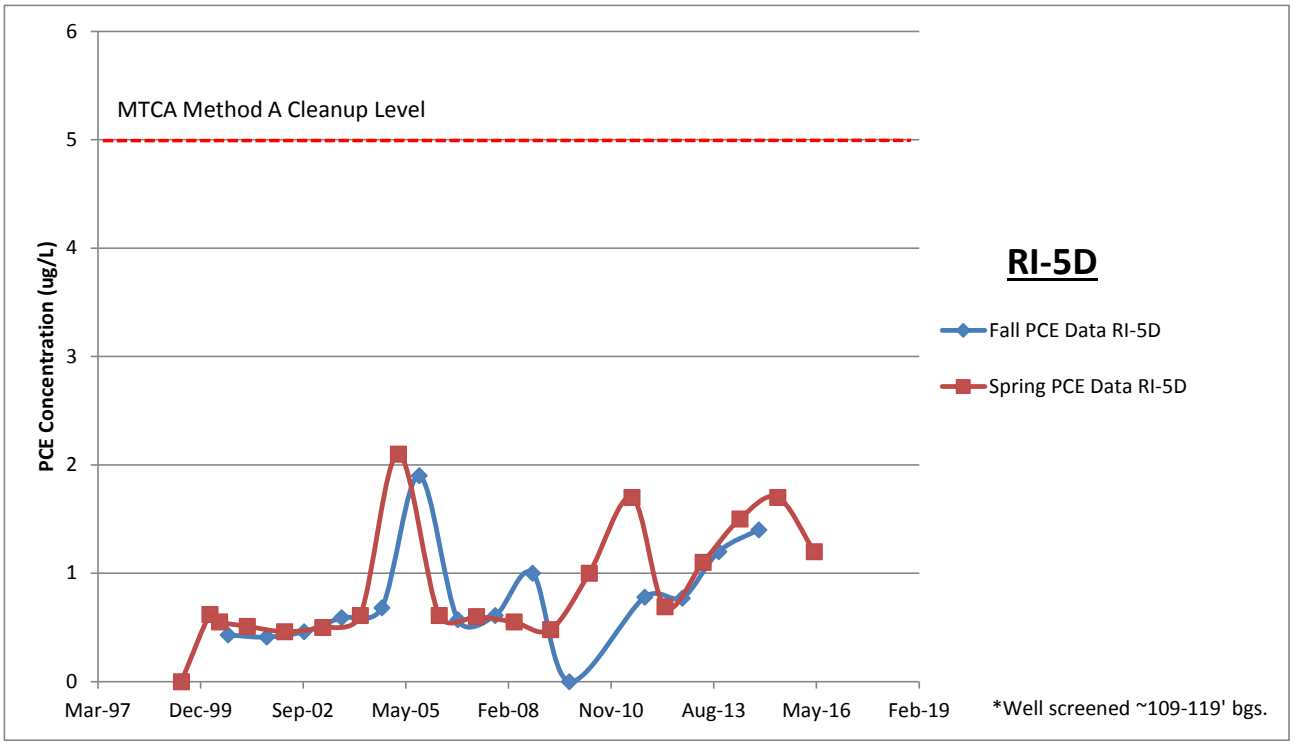

Figure C-33. YRRA Remedial Investigation Well RI-5D PCE Results, June 1999 to April 2016.

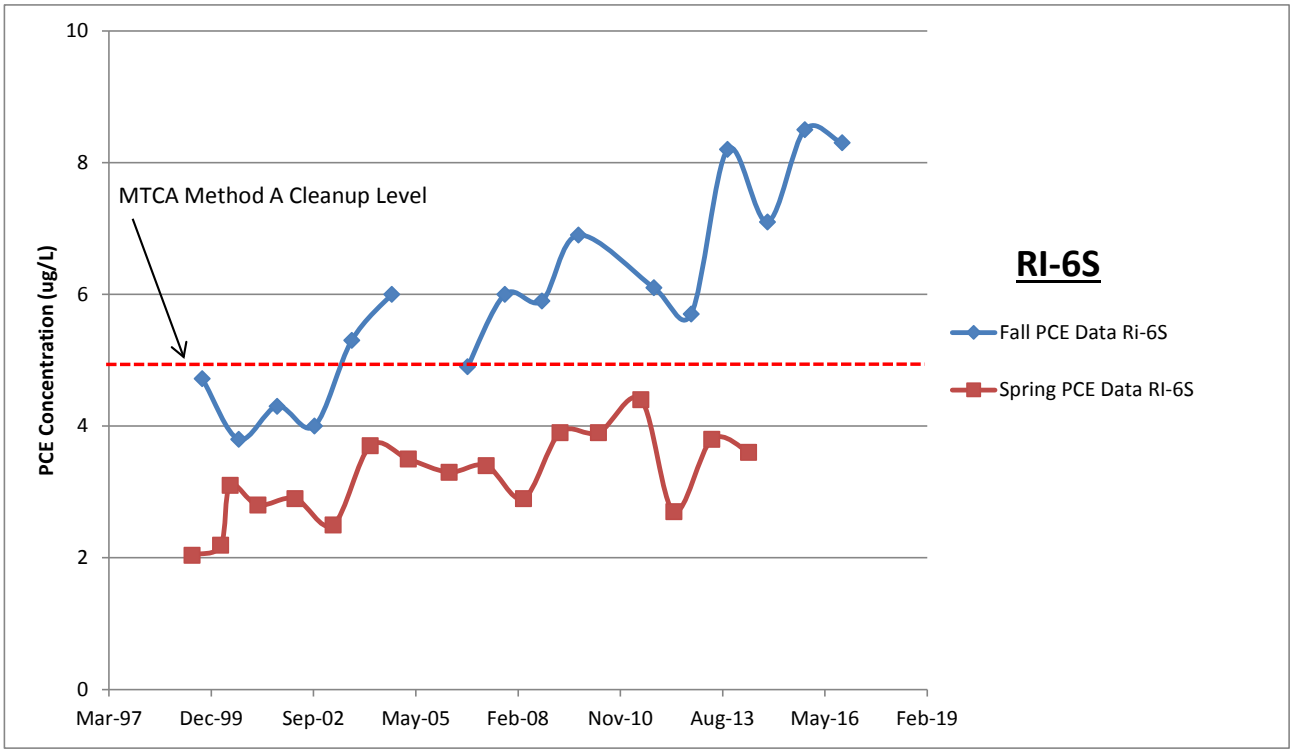

Figure C-34. YRRA Remedial Investigation Well RI-6S PCE Results, June 1999 to October 2016.

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	--	--	--	--	--	--	--	--	--	--	--	--

Date	RI-9S				RI-10S				RI-11S			
	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC	PCE	TCE	Cis-DCE	VC
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
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.

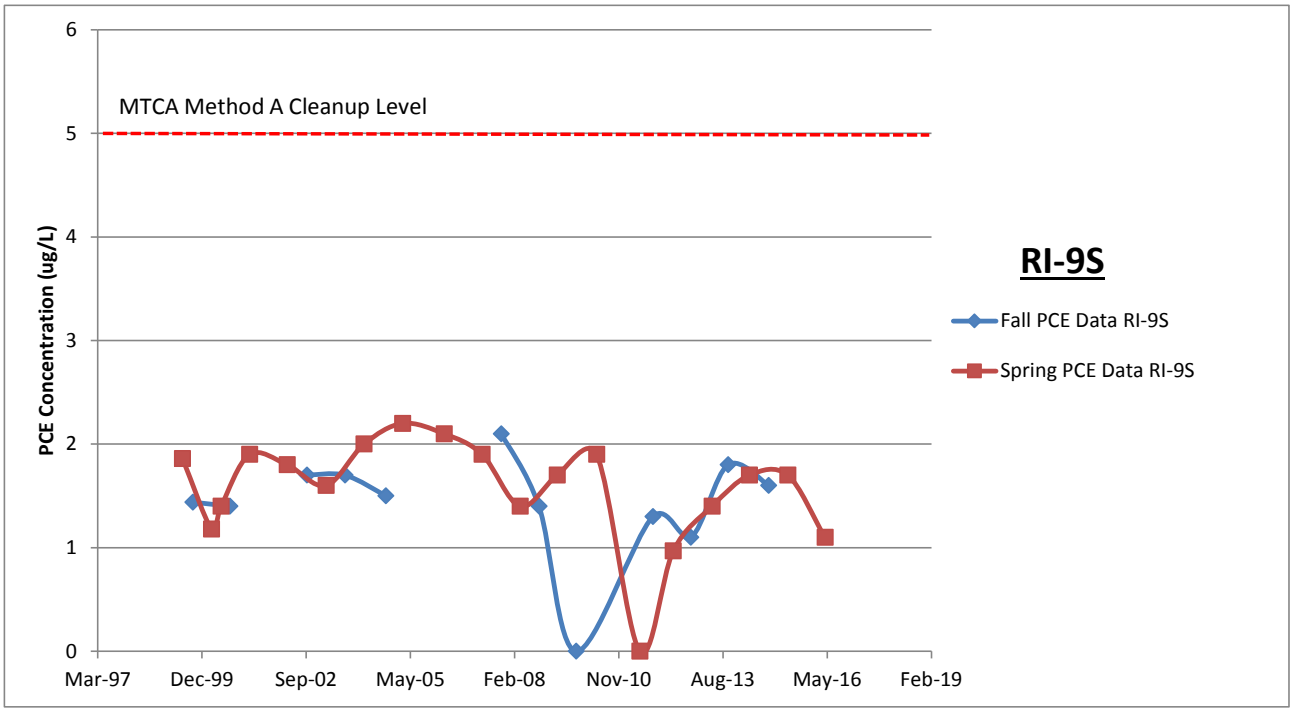

Figure C-35. YRRA Remedial Investigation Well RI-9S PCE Results, June 1999 to April 2016.

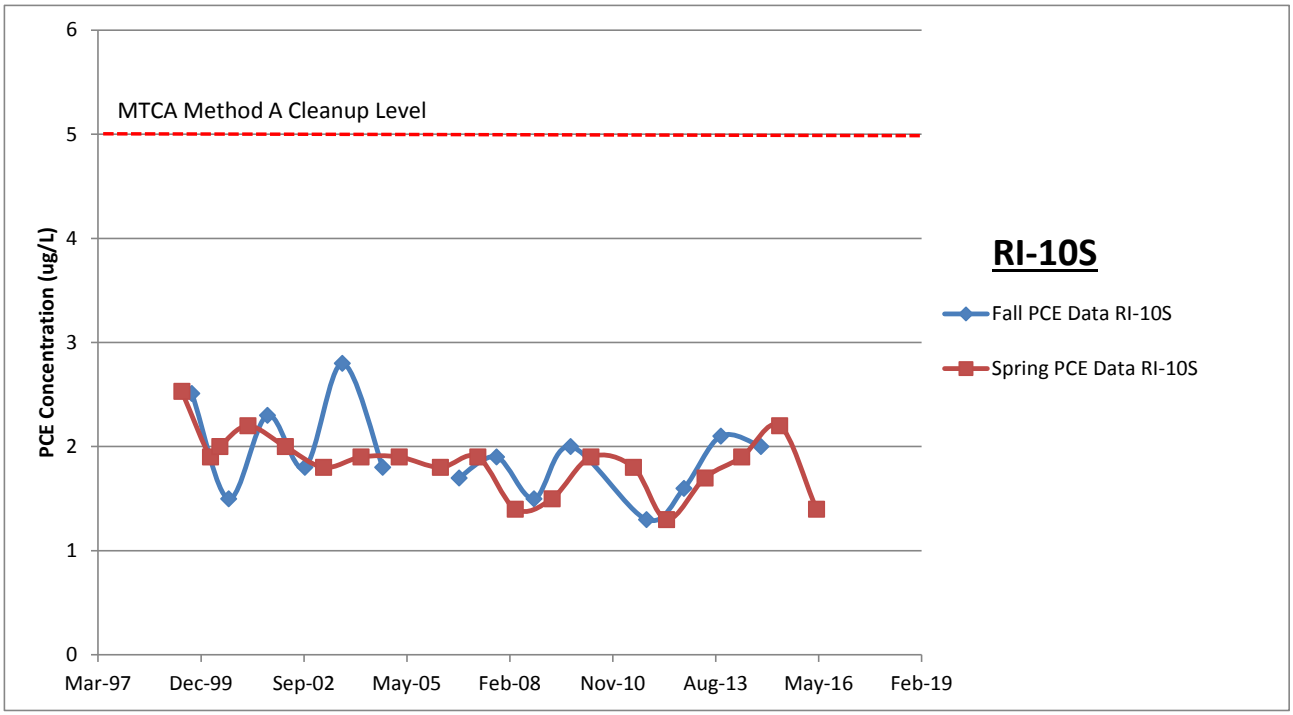

Figure C-36. YRRA Remedial Investigation Well RI-10S PCE Results, June 1999 to April 2016.

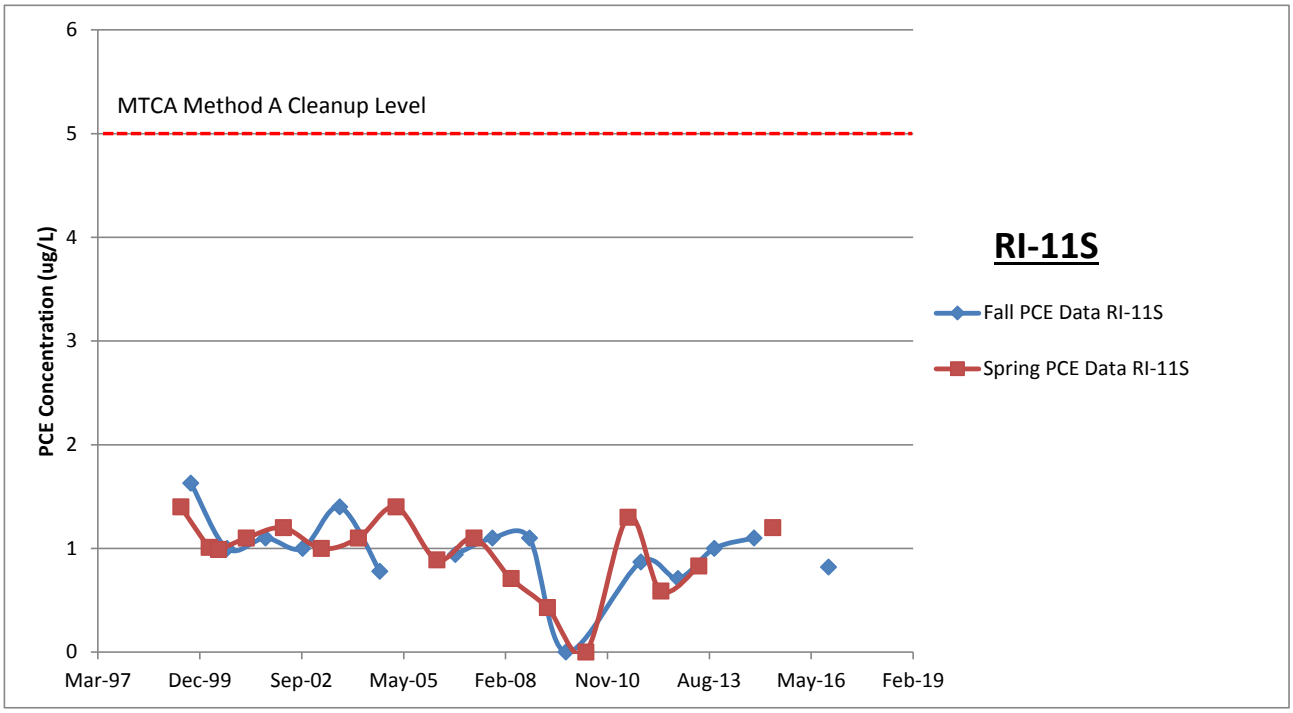

Figure C-37. YRRA Remedial Investigation Well RI-11S PCE Results, June 1999 to October 2016.

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