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Effectiveness Monitoring Report (EMR) for the P-Area Groundwater (PAGW) Operable Unit (OU) Zero Valent Iron Permeable Reactive Barrier (ZVI-PRB) Removal Action (U)

March 2019 through March 2021

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~	approximately
1Q20	first quarter of 2020
1Q21	first quarter of 2021
2Q20	second quarter of 2020
4Q20	fourth quarter of 2020
3Q21	third quarter of 2021
ac	acre
amsl	above mean sea level
cis-DCE	cis-1,2-dichloroethylene
cm	centimeter
cVOC	chlorinated volatile organic compound
1,1-DCE	1,1-dichloroethylene
DO	dissolved oxygen
DOC	dissolved organic carbon
EMP	Effectiveness Monitoring Plan
EMR	Effectiveness Monitoring Report
ft	feet/foot
ft/d	feet per day
ft/yr	feet per year
ha	hectare
HPIT	Hydraulic Pulse Interference Testing
in.	inch
km	kilometer
LAZ	Lower Aquifer Zone
m	meter
m/d	meter per day
m/yr	meter per year
MCL	maximum contaminant level
MDL	maximum detection limit
mg/L	milligram per liter
mi	mile
mV	millivolt
NTC	non-time critical
ORP	oxidation-reduction potential
OU	operable unit
PAGW	P-Area Groundwater
PAOU	P-Area Operable Unit
PCE	tetrachloroethylene
PDI	Pre-Design Investigation
PQL	practical quantification limit
PRB	permeable reactive barrier
P-RBC	P-Reactor Building Complex (105-P)
PSA	potential source area

RA	removal action
RADP	Removal Action Design Plan
RAO	removal action objective
RAR	Removal Action Report
RSER/EE/CA	Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis
SAP	Sampling and Analysis Plan
SCDHEC	South Carolina Department of Health and Environmental Control
SRNS	Savannah River Nuclear Solutions, LLC
SRS	Savannah River Site
TCCZ	Tan Clay Confining Zone
TCE	trichloroethylene
TOC	total organic carbon
trans-DCE	trans-1,2-dichloroethylene
UAZ	Upper Aquifer Zone
µg/L	microgram per liter
USDOE	United States Department of Energy
USEPA	U.S. Environmental Protection Agency
UTRA	Upper Three Runs Aquifer
VC	vinyl chloride
WSRC	Washington Savannah River Company LLC
yr	year
ZVI	zero-valent iron
ZVI-PRB	zero-valent iron permeable reactive barrier

1.0 INTRODUCTION

The P-Area Groundwater (PAGW) operable unit (OU) encompasses approximately (~) 2,226 hectares (ha) (5,500 acres [ac]) of groundwater beneath Savannah River Site's (SRS) P Area. Groundwater in the PAGW OU is contaminated with chlorinated volatile organic compounds (cVOCs), primarily trichloroethylene (TCE), and tritium. With approval from the United States Environmental Protection Agency (USEPA) and the South Carolina Department of Health and Environmental Control (SCDHEC), the United States Department of Energy (USDOE) conducted a non-time critical (NTC) removal action (RA) at the PAGW OU.

Field activities in support of the PAGW OU NTC RA were completed on January 14, 2020, in accordance with the approved Removal Action Design Plan (RADP) (Savannah River Nuclear Solutions [SRNS] 2019). The NTC RA consisted of emplacing ~672 metric tons (741 US tons) of zero-valent iron (ZVI) to construct an 80.5 meter (m) (264 feet [ft]) long permeable reactive barrier (PRB) with an average thickness greater than 10.2 centimeters (cm) (4 inches [in.]), as detailed in the Removal Action Report (RAR) (SRNS 2020b). Baseline sampling was conducted in March of 2019 and effectiveness monitoring began in February 2020 following construction of the ZVI-PRB. Effectiveness monitoring is being conducted in accordance with the approved Effectiveness Monitoring Plan (EMP) for the PAGW OU NTC RA (SRNS 2019). This Effectiveness Monitoring Report (EMR) is the first of five annual reports to document performance and effectiveness of the NTC RA technology, as well as present baseline results. Per the approved EMP, the first EMR is due 18 months after installation of the last monitoring well, which was completed on March 25, 2020 (SRNS 2019, SRNS 2020b). After the fifth annual EMR, the reporting frequency will be re-evaluated with the Core Team.

2.0 OPERABLE UNIT DESCRIPTION AND HISTORY

P Area is located in the central portion of the SRS ~4.0 kilometers (km) (2.5 miles [mi]) east-southeast of the geographic center of the SRS and about 6.4 km (4 mi) west of the nearest site boundary (Figure 1). P Area consists of a closed nuclear reactor building complex and several surface OUs and structures that were previously characterized and identified as sources to soil and groundwater contamination (Washington Savannah River Company, LLC [WSRC] 2006).

The P Area surface units identified as posing a risk to human health, the environment, and contributing to groundwater contamination were remediated as part of the P-Area Operable Unit (PAOU), including the P-Area Reactor Building Complex (P-RBC) (105-P) (SRNS 2008). Remedial actions associated with surface units included in the PAOU have been completed and are documented in the PAOU Post Construction Report (SRNS 2012). In particular, one surface unit, Potential Source Area (PSA)-3A, was determined to be the source of TCE plumes discharging to Steel Creek. PSA-3A was remediated in 2011 and remedial goals were met using soil vapor extraction enhanced with soil fracturing and In-Situ Chemical Oxidation injection.

Groundwater beneath P Area was impacted due to reactor and facility operations between 1954 and 1991. The PAGW OU was established for the purposes of groundwater modeling and encompasses the groundwater beneath P Area, northwest to Steel Creek, northeast toward PAR Pond and SRS Road F, and southeast to Meyers Branch and is established for the purposes of groundwater modeling (Figure 2). Groundwater plumes are present in the PAGW OU Upper Aquifer Zone (UAZ) and Lower Aquifer Zone (LAZ) of the Upper Three Runs Aquifer (UTRA).

2.1 Physiographic Setting

Topography of the PAGW OU ranges from 101 m (330 ft) above mean sea level (amsl) near P Area to 57.9 m (190 ft) amsl at the downstream end of Meyers Branch and Steel Creek. The area near the P-RBC is higher in elevation than the surrounding land. Surface drainage on the west side of the P-RBC is to the west, towards Steel Creek. Surface drainage on the east side of the P-RBC drains to unnamed tributaries that drain to PAR Pond. Surface drainage on the south side drains to wetlands and unnamed tributaries to Meyers Branch.

2.2 Hydrogeologic Setting

A detailed description of the hydrostratigraphy of the PAGW OU can be found in the 2013 Sampling and Analysis Plan (SAP) for the PAGW OU (SRNS 2013). The groundwater encompassed by the PAGW OU is in the Floridan aquifer system. The aquifer of interest for this

NTC RA is the UTRA, which is divided into the UAZ and the LAZ by an aquitard, the Tan Clay Confining Zone (TCCZ). The near-surface groundwater in P Area is isolated by PAR Pond to the east, Steel Creek to the west, and Meyers Branch to the south and east.

The 30-year (yr) average (1990 - 2020) rainfall for SRS is 122.6 cm per year (48.25 in. per yr) (SRNL 2021). P Area received 151 cm (59.6 in.) of rainfall in 2020 and 119 cm (46.7 in.) of rainfall in 2019, based on data from the 100-P rain gauge (Figure 3). The P-RBC area is a zone of local groundwater recharge, therefore a portion of rainfall in the area translates to the water table by moving vertically downward (WSRC 2008). Regionally, water levels have increased slightly in 2020 due to increased rainfall. This increase is reflected in water elevation measurements in ZVI-PRB monitoring wells, as demonstrated on hydrographs in Appendix B.

2.3 Nature and Extent of Contamination

The nature and extent of contamination was investigated for the PAGW OU using groundwater monitoring wells, direct-push technology, and surface water samples (SRNS 2013 and SRNS 2018b). Groundwater contamination associated with cVOCs is primarily exhibited in a narrow band north of the P-RBC and extends to the west to Steel Creek, where impact is known, and east towards an unnamed tributary to PAR Pond. Several areas in the P Area facility area were determined to be PSAs for the cVOC plumes, primarily tetrachloroethylene (PCE) and TCE. TCE contamination originating from P Area impacts the PAGW OU and follows groundwater flow for the UAZ and LAZ of the UTRA, shown in Figure 4 and Figure 5, respectively. In the UAZ, groundwater flows west-southwest, from the P-RBC, toward Steel Creek. The UAZ TCE plume impacts surface water in Steel Creek around surface water station SC-03.

The groundwater plume from the P-RBC to Steel Creek has been delineated into three sections, the source area, the neck area, and the distal area (Figures 4 and 5). The source area encompasses the portion of the plume where the source initially impacts groundwater and is centered northwest of the P-RBC within the P Area facility area. The neck area represents the area where the cVOC groundwater plumes are controlled by a buried geologic feature thus creating a narrowing of the groundwater plumes and is located to the west just outside of the P Area facility area. In this zone, the UAZ and upper LAZ contain large cobblestones in a sandy-clay matrix, promoting a narrowed zone of preferential groundwater flow. The plume then reaches further toward Steel Creek, where it begins to expand. This is the distal area and is where a large amount of mass is now concentrated.

Maximum contaminant level (MCL) exceedances in groundwater occur over an area of ~8.7/12 ha (21/30 ac) for TCE in the UAZ/LAZ, respectively (SRNS 2020a). PCE and cis-1,2-dichloroethylene (cis-DCE) plumes present in the UAZ and LAZ are contained within the TCE plume area as described and shown in the SAP Addendum (SRNS 2018b). Table 1 lists the maximum reported concentrations in first half of 2019 for TCE, PCE, and cis-DCE in the UAZ and LAZ within the three sections prior to implementation of the PAGW OU NTC RA. Due to the highly aerobic nature of SRS groundwater, incomplete degradation of PCE/TCE is occurring as evident by buildup of cis-DCE and no detection of other degradation byproducts. Surface water in Steel Creek is impacted by discharges of TCE contaminated groundwater above the MCL of 5 micrograms per liter (μg/L). The area of impact is localized to the upper section of the creek at surface water location SC-03 (Figure 4) and confirmed through characterization completed as part of the 2018 SAP Addendum (SRNS 2018b). Maximum TCE concentrations were observed at 28.3 μg/L in 2013 (surface water station SC-03). Recent (first quarter of 2021 [1Q21]) measured TCE concentrations are 16.2 μg/L.

The Core Team determined the PAGW OU contamination warranted a NTC RA to reduce cVOC mass flux. Installation of a ZVI-PRB to intersect TCE plume(s) in the neck area was chosen as the preferred method in the *Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis for Trichloroethylene Plumes Discharging to Steel Creek in P-Area Groundwater Operable Unit (NBN) (U)* (SRNS 2018a). The selected NTC RA was presented to the public in the *Action Memorandum and Responsiveness Summary for the Non-Time Critical Removal Action for the P-Area Groundwater Operable Unit (U)* (USDOE 2018). The Removal Action Objective (RAO), as presented in the PAGW OU Action Memorandum, is to protect human health and the environment by reducing the mass and down-gradient transport of the PAGW OU TCE groundwater plume. As stated in the Removal Site Evaluation Report/Engineering Evaluation/Cost Analysis (RSER/EE/CA), a TCE mass flux reduction of 80% should be sufficient to achieve the MCL in Steel Creek over time (SRNS 2018a).

In support of the PAGW OU NTC RA, a Pre-Design Investigation (PDI) was performed in the neck area of the TCE plumes to confirm site lithology, hydrogeologic, geochemical characteristics, and confirm extent of cVOC contamination as it relates to design, construction, and performance of the ZVI-PRB. During the RSER/EE/CA process, the assumption was that both the UAZ and LAZ TCE plumes would be targeted with the ZVI-PRB (SRNS 2018a). Data from the PDI indicated that TCE concentrations in the LAZ were lower than in the UAZ and that groundwater flow direction of the LAZ was much more northerly than what was expected (SRNS 2019). Considering that the LAZ groundwater flow direction would lead to inefficient capture of the TCE plume by the ZVI-PRB proposed, and the TCE concentration data which showed ~95% of the TCE mass is present in the UAZ, focus was placed on constructing a ZVI-PRB to target the UAZ TCE plume.

2.4 Removal Action Implementation and Monitoring Goals

Design and construction details for the final design are provided in the RADP and the RAR for the PAGW OU NTC RA (SRNS 2019 and SRNS 2020b). ZVI injections were completed on December 11, 2019 with the emplacement of ~672 metric tons (741 US tons) of ZVI. The completed ZVI-PRB is estimated to be 80.5 linear meters (264 linear feet) long and has a cross-sectional area of 2,140 square meters (23,040 square feet) intersecting groundwater flow in the UAZ (Figure 6). Soil concentrations for the plume cross-section in Figure 6 are based on soil plug samples collected from soil cores collected along the ZVI-PRB trace as part of the PDI. There are high cVOC concentrations entrained within the low-permeability sediments of the area, which are reflected in soil plug samples. However, monitoring wells are screened in more permeable zones and therefore groundwater samples indicate lower concentrations. Field activities were completed with closure of the injection wells on January 14, 2020.

Groundwater monitoring in support of the PAGW OU NTC RA was planned to begin the first month following implementation and follow the frequency outlined in the EMP, as summarized in Table 2. The monitoring plan approved in the RADP with EMP (SRNS 2019) will provide results that allow for assessment of the ZVI-PRB technology's effectiveness in destruction of cVOCs. A key component of assessment is four in-wall monitoring wells, which will provide direct results from the center of the implemented technology. The takeaways from this assessment will provide useful insight in the technology's potential applicability for future actions on site, or at other sites within the USDOE Complex. The primary focus of the EMP will be to assess performance of the PAGW OU NTC RA in meeting the RAO. Five annual EMRs will be submitted with the initial report submitted within 180 days of monitoring well completion (SRNS 2019).

The implemented ZVI-PRB is anticipated to reduce the mass flux of TCE through the neck area of the PAGW OU TCE plume by at least 80% in order to meet the RAO. This will be assessed through the monitoring of cVOC concentrations over time in 26 monitoring wells identified or installed for performance monitoring. ZVI is a recognized technology for reducing high level cVOCs (PCE and TCE) to harmless end-products without the build-up of harmful intermediates, such as cis-DCE, trans-1,2-dichloroethylene (trans-DCE), and chloroethene (vinyl chloride [VC]). In addition to TCE and PCE, degradation by-products will also be monitored.

Important geochemical and field measurements will be monitored to assess geochemical changes in the target zone. The high reducing potential of ZVI presents the possibility of flipping an aerobic aquifer to anaerobic, reducing conditions, traveling down-gradient as a reducing front over time. An anaerobic, reducing environment is conducive to natural anaerobic microbial activity, which are often heavy consumers of organic compounds, including the targeted contaminant TCE. The presence of a reducing environment in the UAZ of the PAGW OU will be measured by oxidation-reduction potential (ORP). Negative ORP values indicate a reducing environment, with higher negative numbers indicating the strength of the reducing agents in groundwater. In an environment with promising conditions for anaerobic microbes, the presence of intermediate cVOC degradation products are indicators of natural biodegradation, as ZVI is not anticipated to form a large mass of intermediates.

In addition, the selected analytes will provide data on the health of the ZVI-PRB. Nitrate, calcium, and sulfate are commonly occurring constituents in groundwater and are found in detectable concentrations within the UAZ of the UTRA in the PAGW OU. In literature, at the interface between groundwater and ZVI, nitrate has been observed to interact with the ZVI and result in a lessened reactivity, and therefore a decreased performance, known as passivation (Ritter, Odziemkowski, and Gillham 2002; Mishra and Farrell 2005). A decrease in nitrate concentrations down-gradient of the ZVI-PRB may indicate consumption of the ion by ZVI, and therefore may be indications of passivation. Sulfate and calcium ions in a reducing, high pH environment more readily precipitate out of solution. Precipitation within the ZVI-PRB leads to a decreased performance as the porosity, and therefore the retention time within the barrier, will decrease. This reduces the contact time of cVOCs with ZVI, and therefore reduces the potential for complete degradation. However, based on the treatability study performed during design activities of the PRB, it was concluded that it was unlikely, unless conditions changed, that the PRB would exhibit reduced effectiveness due to passivation and/or precipitation. However, overtime, under normal circumstances, it is expected that ZVI will lose some of its reactivity.

2.5 PAGW OU NTC RA Monitoring Network

As outlined in the RADP with EMP (SRNS 2019), the PAGW OU NTC RA monitoring network includes 26 monitoring wells. Table 2 provides construction details for the monitoring network and Figure 7 shows the locations for each monitoring point. Eight of the monitoring wells (PRW001C/DL/DU, PRW003C/DL/DU, and P003U/L) are located to the east of the ZVI-PRB and 14 wells (PRW002C/DL/DU, PRW004C/DL/DU, PRW005DL/DU, PRW006C/DL/DU, PRW007DL/DU, and P002U) are located to the west. The P003 well cluster is located farther to the east of the ZVI-PRB than the other wells and is considered a background monitoring well for monitoring in support of the PAGW OU RA EMP.

A baseline analysis was completed at 15 of the monitoring well locations in March of 2019 prior to construction of the ZVI-PRB. Baseline results are presented in Appendix Table A.1 and summarized in Table 3. Figure 8 presents baseline TCE results at the ZVI-PRB monitoring locations. Comparisons of baseline contaminant concentrations with monitoring well results east and west of the ZVI-PRB allows for assessment of the NTC RA performance in reducing TCE mass flux. In addition to the 22 monitoring wells on either side of the ZVI-PRB, four injection wells were retrofit with 2.5 cm (1 in.) diameter monitoring wells (PIW001D, PIW002D, PIW003D, and PIW004D). The in-wall monitoring wells present a key perspective, allowing for assessment of the conditions within the barrier itself. The approved EMP for the PAGW OU NTC RA outlined the analytes and frequency to be followed for the 26 monitoring wells as shown in Table 2 and Figure 7 (SRNS 2019).

For the four in-wall monitoring wells, the approved EMP for the PAGW OU NTC RA proposed sampling bimonthly for the first quarter, monthly sampling for the second quarter, and quarterly sampling for the remainder of the five year monitoring plan. This frequency was proposed with intentions of observing rapid changes in geochemical parameters and then to track these parameters over time. All other monitoring wells, with the exception of the PRW006 cluster, are scheduled to be sampled quarterly. The PRW006 well cluster is set farther west of the PRB and will be sampled annually.

Monitoring results are presented in Section 3.0 and discussed in Section 4.0. The complete data sets are presented in the appendices. Appendix A tabulates monitoring data from 2019 to 2021 for all wells and analytes in the PAGW OU NTC RA EMP. Specifically, Appendix Table A.1 presents the baseline contaminant results from 2019 and Appendix Table A.2 presents the monitoring results for the EMP from first quarter of 2020 (1Q20) to 1Q21. Appendix B presents hydrographs of water levels at the PAGW OU NTC RA monitoring wells from 2005 to present. Appendix C consists of time-series plots for select constituents from 2005 to present of the outlined analytes for the EMP to support the PAGW OU NTC RA.

3.0 MONITORING RESULTS AND DEVIATIONS

3.1 Deviations from the Monitoring Plan

Monitoring wells included in the PAGW OU NTC RA were sampled and analyzed as outlined in the RADP with EMP, with two deviations (SRNS 2019). Monitoring results from 1Q20 to 1Q21 are presented in Appendix Table A.2. The two deviations include:

1. The in-wall monitoring wells were proposed to be sampled bi-monthly for the first three months, monthly for the second three months, and then quarterly for the remaining four and a half years. However, issues with timing on the in-wall well completions, development, and waste acceptance analyses led to an initial sampling event six months after the final ZVI injection. Therefore, the ability to observe potential rapid changes in geochemical properties had passed and the four in-wall wells were scheduled for quarterly sampling throughout the five year monitoring plan, which was proposed and approved in the RAR for the PAGW OU NTC RA (SRNS 2020b).

2. Included in the geochemical analyses for the in-wall monitoring wells are total iron, ferric iron, and ferrous iron. Analyzing for the separate oxidation states of iron allows for assessment of the reductive environment created by the ZVI-PRB. However, following second quarter of 2020 (2Q20) sampling, the laboratory contracted for ferric and ferrous iron analyses was no longer available. Ferric and ferrous iron analyses were not conducted for third quarter of 2020, fourth quarter of 2020 (4Q20), and 1Q21. SRS has worked out laboratory issues, and ferric/ferrous iron analyses will resume for third quarter of 2021 (3Q21).

3.2 Upper Aquifer Zone

3.2.1 Groundwater Elevation Measurements and Groundwater Flow Direction

Hydrographs for UAZ monitoring wells of the effectiveness monitoring plan are presented in Appendix B. Recent increases reflect increased precipitation as shown in Figure 3. Regional water elevations and potentiometric contours for the UAZ are presented in Figure 9 using 1Q21 synchronous water level data. The regional groundwater flow direction in the UAZ is to the west towards Steel Creek. Hydraulic conductivity was calculated to be 10.59 meters per day (m/d) (34.76 feet per day [ft/d]) for the UAZ within the ZVI-PRB area through Hydraulic Pulse Interference Testing (HPIT) (SRNS 2019). The hydraulic gradient was calculated between PMW005DL and PGW026DL as 0.0047 ft/ft. Using an estimated effective porosity of 0.2 for the UAZ in P Area (SRNS 2019), the resulting regional groundwater flow velocity is 90.84 meters per year (m/yr) (298.2 feet per year [ft/yr]) in the NTC RA area. In Figure 10, focus is placed on the ZVI-PRB localized area within the UAZ potentiometric surface. In the vicinity of the ZVI-PRB, the hydraulic gradient is estimated using PRW003DU and PRW006DU to get 0.0045 ft/ft. This results in an estimated groundwater flow velocity of 86.97 m/yr (285.5 ft/yr), which is in good agreement with the regional NTC RA area velocity presented above.

Groundwater depth measurements are not included for the P00 series monitoring wells due to the diameter of the monitoring well and size of the installed pump, which does not allow access of a groundwater tape for measurement.

3.2.2 Chlorinated Volatile Organic Compounds

Per the EMP for the PAGW OU NTC RA (SRNS 2019), all monitoring wells are sampled and analyzed quarterly for select cVOCs, including PCE, TCE, cis-DCE, trans-DCE, 1,1-dichloroethylene (1,1-DCE), and VC. Between 1Q20 and 1Q21, 116 samples were collected and analyzed for the PAGW EMP wells. Out of the 116 samples, there were only one, one, and eight results above the practical quantification limit (PQL) for VC, 1,1-DCE, and trans-DCE, respectively. The maximum concentrations for each are: VC – 1.38 µg/L, 1,1-DCE – 2.02 µg/L, and trans-DCE – 15.7 µg/L. For the PAGW OU NTC RA, the targeted constituent is TCE. Baseline concentrations are summarized for all cVOCs in Table 3 and are compared to 1Q21 results in Table 4.

Trichloroethylene

For the UAZ, 1Q21 TCE results are presented in Figure 11. TCE concentrations in the background monitoring wells P003U and P003L were 522 µg/L and 3,260 µg/L, respectively. TCE concentrations in eastern UAZ monitoring wells ranged from 1.45 to 704 µg/L in 1Q21, with the maximum detection at PRW003DL. In western UAZ monitoring wells, TCE ranged from 2.11 to 819 µg/L, with the maximum at PRW007DU. The second highest TCE result in western UAZ monitoring wells was 159 µg/L, recorded at PRW006DL. TCE time-series plots are presented in Appendix Figures C.29 to C.40.

The concentration of TCE in groundwater immediately west of the ZVI-PRB (P002U, PRW002 and PRW004 clusters) has decreased from baseline conditions collected in March 2019, with the exception of PRW002DU (Figure 12), which had a low baseline TCE concentration. Three monitoring well clusters (PRW005, PRW006, and PRW007) are located farther west of the ZVI-PRB. As of 1Q21, concentrations in these monitoring well clusters have been relatively stable (Appendix Figures C.38 – C.40). However, these wells were installed post-PRB installation and therefore no baseline data are available for comparison.

The four in-wall monitoring wells (PIW series) were sampled for TCE starting in 2Q20, post-completion of the ZVI-PRB (Appendix Figures C.30 – C.33). For 2020, TCE results in the in-wall monitoring wells were low, with only 3 of 12 sample results above the PQL and a maximum of 5.03 µg/L (PIW003D in 4Q20). However, in the 1Q21 sampling event, PIW001D, PIW002D, and PIW003D had TCE results of 12.9 µg/L, 17.9 µg/L, and 18 µg/L, respectively (PIW004D was below maximum detection limit [MDL]). The maximum 1Q21 in-wall TCE concentration (18 µg/L) is 97.4% lower than the maximum 1Q21 result east of the ZVI-PRB (704 µg/L). It is important to note that the in-wall monitoring wells are located within the ZVI-PRB. Therefore, the detected results are located in the middle of the barrier and further degradation of detected cVOCs is likely to occur before groundwater exits the ZVI-PRB.

Tetrachloroethylene and Cis-1,2-Dichloroethylene

From 1Q20 to 1Q21, 19 of 93 samples collected for the UAZ EMP wells reported PCE detections above the MDL. The maximum 1Q21 result was 3.94 µg/L at PRW006DL. The maximum baseline PCE concentration was 5.15 µg/L at monitoring well P002U.

In the 1Q21 sampling event, the maximum UAZ result for cis-DCE was 470 µg/L at background monitoring well P003L. The maximum 1Q21 result east of the ZVI-PRB, excluding the background wells, was 75.2 µg/L at PRW003DL. The maximum result west of the ZVI-PRB was 180 µg/L at PRW004DL. Cis-DCE time-series plots are presented in Appendix Figures C.5 to C.16 for the PAGW OU NTC RA monitoring wells.

Out of the four in-wall monitoring wells, PIW003D is the only monitoring well with consistent detections of cis-DCE. Concentrations in the two most recent sampling events were 8.7 µg/L and 29.6 µg/L (4Q20 and 1Q21, respectively). Cis-DCE concentrations in P003U and P002U decreased slightly from July 2007 until monitoring began post-construction of the ZVI-PRB. P003L remained steady around the detection limit over the same time. Concentrations increased significantly in P003L during the baseline (892 µg/L) and have decreased slightly in 1Q21 (470 µg/L). Concentrations in P002U have increased since completion of the ZVI-PRB, with a 1Q21 result of 96.8 µg/L.

3.2.3 Geochemical Analyses

Samples collected in support of the ZVI-PRB monitoring were analyzed for select geochemical analytes in line with the approved EMP, summarized in Table 2. During the baseline sampling event, all completed monitoring wells were sampled and analyzed for geochemical analytes. In ongoing sampling events, only the in-wall monitoring wells were sampled for geochemical analyses. Baseline sampling conducted in 2019 provides initial conditions of the targeted groundwater. The results are presented in Appendix Table A.1 and summarized in Table 4.

Chloride, Ethylene, and Ethane Results

The breakdown of cVOCs produces end-products such as chloride, ethylene, and ethane. The maximum chloride concentration in baseline sampling of the UAZ monitoring wells was 3.64 milligram per liter (mg/L) at PRW002DU. Chloride concentrations in western groundwater monitoring wells are increasing slightly, with a 1Q21 maximum at P002U of 63.6 mg/L. The maximum background chloride concentration from 1Q20 to 1Q21 was 3.04 mg/L at P003U.

Ethylene and ethane results were inconclusive due to an increased MDL for samples taken between 1Q20 and 1Q21. A change in analytical method, due to changing laboratories, and an increase in the dilution required by high methane concentrations likely led to the increased MDL for ethylene. SRNS is working with the contracted laboratory to address this issue and anticipates to find a solution for 3Q21 sampling and moving forward.

Nitrate, Sulfate, Calcium, and Iron

Certain cations and anion in groundwater are useful to make assessments of ZVI-PRB health, as well as to assess if anaerobic conditions are present. Nitrate concentrations have decreased to below MDL (0.017 mg/L) in samples, down from a maximum UAZ baseline concentration of 2.82 mg/L. Sulfate also saw a decrease in concentration from the maximum baseline, with a maximum 1Q21 results down 90% (from 13.4 mg/L to 1.32 mg/L). Likewise, total iron concentrations have decreased from a maximum baseline of 741 µg/L, to below the PQL (100 µg/L) in all four in-wall monitoring well 1Q21 results. Conversely, concentrations of calcium have increased significantly. The maximum calcium concentration in the ZVI-PRB monitoring well baseline event was 4,810 µg/L in the UAZ. The 1Q21 maximum in the in-wall monitoring wells was 172,000 µg/L and in western monitoring wells was 9,930 µg/L.

Western monitoring wells were also sampled for total iron in 1Q21 and had results that ranged from 123 to 37,700 µg/L in the UAZ, up from the maximum baseline of 741 µg/L. Ferric and ferrous iron analyses were not obtained for sampling events from 2Q20 to 1Q21. However, shortly after ZVI-PRB completion in 1Q20, monitoring results for the two iron oxidation states west of the ZVI-PRB indicated the majority of total iron was ferrous iron (Appendix Table A-2).

3.2.4 Field Measurements

In addition to analytes listed in the PAGW OU NTC RA EMP, field measurements are collected during each sampling event and at each sampling location. These measurements are collected to ensure the samples have reached stability and the sample collected is representative of the targeted groundwater. However, the values collected during field measurements are also useful in assessment of conditions in the aquifer. Field measurements of ORP have significantly decreased from March 2019 to February 2021. During the baseline sampling, the range of UAZ ORP values was +124 millivolts (mV) to +428 mV. In 1Q21, the range of recorded ORP values for in-wall monitoring wells was -545 mV to -371 mV. The range of ORP results in monitoring wells immediately to the west of the ZVI-PRB was -144 mV to 151 mV. At the PRW006 monitoring well cluster further to the west, effects of reducing front are not observed, with ORP results consistent with background and baseline results.

Impacts to groundwater pH were observed following the ZVI-PRB installation. During baseline sampling, the maximum pH of the UAZ monitoring wells was 6.5. The range of in-wall monitoring well pH in 1Q21 was 10.5 to 11.4. Monitoring wells west of the ZVI-PRB had a slight increase initially, with a maximum pH in 1Q20 of 8.8 for UAZ monitoring wells immediately to the west. The pH in these wells has since returned to near baseline levels with a 1Q21 maximum of 6.7. For monitoring wells located further west of the ZVI-PRB, pH levels were not significantly affected.

3.3 Lower Aquifer Zone

3.3.1 Groundwater Elevation Measurements and Groundwater Flow Direction

The regional water elevations and potentiometric contours are mapped for the LAZ in Figure 13 using 1Q21 synchronous water level data. Potentiometric contours indicate a high point located within the ZVI-PRB vicinity and a groundwater divide along the ZVI-PRB. Using PRW002C and PGW014C, a hydraulic gradient of 0.0141 ft/ft was calculated. The calculated hydraulic conductivity for the LAZ in HPIT testing was 10.82 m/d (35.51 ft/d). Assuming a porosity of 0.2, the regional groundwater flow velocity was calculated as 278.4 m/yr (913.7 ft/yr) for the LAZ.

3.3.2 Chlorinated Volatile Organic Compounds

Trichloroethylene

There are five LAZ monitoring wells in the EMP (PRW001C, PRW002C, PRW003C, PRW004C, and PRW006C). TCE concentrations over time in the LAZ monitoring wells are shown in Figure 14. Excluding PRW006C, TCE concentrations are overall decreasing in the LAZ monitoring wells. The maximum baseline detection from LAZ wells for TCE was 664 µg/L at eastern well location PRW003C. In the 1Q21 sampling event, the maximum TCE concentration in the same four LAZ monitoring wells was 82.8 µg/L (PRW002C). Concentrations at PRW006C have increased slightly, from 24.3 to 46.6 µg/L. TCE results for 1Q21 in the LAZ are shown in Figure 15.

Tetrachloroethylene and Cis-1,2-Dichloroethylene

For the LAZ, the maximum baseline PCE result was at monitoring well PRW002C with a detection of 1.6 µg/L. From 1Q20 to 1Q21, there were no PCE detections above the PQL from any LAZ monitoring wells. The maximum J qualified result was at PRW001C with an estimated value of 0.78 µg/L.

The maximum baseline cis-DCE result for the LAZ was 138 µg/L at PRW003C. The maximum cis-DCE result in 1Q21 was 120 µg/L at PRW002C. Cis-DCE concentrations in the LAZ monitoring wells are presented over time in Figure 16.

3.3.3 Geochemical Analyses

Samples collected in the LAZ to support the ZVI-PRB monitoring were not analyzed for the entire geochemical analyte list, as proposed in the EMP and summarized in Table 2, except for baseline sampling in 2019. However, iron analyses were performed. For baseline LAZ sampling, iron ranged from 80.1 µg/L to 496 µg/L. In the 1Q21 sampling event, iron ranged from 8,930 µg/L to 43,900 µg/L.

3.3.4 Field Measurements

Field measurements taken in the LAZ monitoring wells present evidence of ZVI-PRB effects. In baseline sampling, the range of ORP in the LAZ was +181 mV to +294 mV. In 1Q21, ORP in the LAZ monitoring wells ranged from -453 mV to -92 mV, in the vicinity of the ZVI-PRB. Located further to the west at PRW006C, the ORP in 1Q21 was 209 mV.

In the LAZ monitoring wells, baseline pH values ranged from 5.3 to 7.2. Immediately following ZVI-PRB construction in 1Q20, the maximum pH in the LAZ was 10.5. In 1Q21, pH returned to baseline levels, with a range from 4.9 to 7.3.

4.0 MONITORING PERFORMANCE AND EFFECTIVENESS DISCUSSIONS

4.1 Groundwater Elevation and Flow Path

Groundwater flow across the ZVI-PRB in the UAZ is westerly towards Steel Creek, as expected, with groundwater velocity calculated as 86.97 m/yr (285.5 ft/yr) in 1Q21 (Figure 10). After one year of monitoring, based on limited data from one year of monitoring, it appears impact to the groundwater potentiometric surface is not observed. However, continual monitoring and evaluation will be performed to evaluate any changes in groundwater flow or potentiometric surface. The focused groundwater elevation contours indicate UAZ groundwater flow is predominantly in the northwestern direction, perpendicular to the ZVI-PRB trace (Figure 10). The variability in water levels exhibited in individual wells may be related to differences in screen elevations, which were selected to match higher permeability zones in the UAZ.

The 1Q21 LAZ potentiometric surface (Figure 13) indicates a high point exists in the vicinity of the PRW001 well cluster and a groundwater divide exist along the ZVI-PRB, with groundwater flowing north toward the ZVI-PRB, then outward to the northeast and west. Groundwater "mounding" in the LAZ may be a result of vertical flow from the UAZ, into the LAZ. However, after only one year of monitoring, the impact of the ZVI-PRB on the LAZ potentiometric surface is unclear and further monitoring is required to make conclusions.

4.2 ZVI-PRB cVOC Degradation

Effectiveness of the ZVI-PRB technology is demonstrated best by the in-wall monitoring well TCE results. East of the ZVI-PRB, UAZ TCE concentrations remain elevated, with a 1Q21 maximum of 704 µg/L and a maximum background concentration of 3,260 µg/L (P003L). The maximum 1Q21 in-wall TCE concentration was 18 µg/L, which demonstrates greater than 95% reduction in groundwater concentration from 704 µg/L. In-wall TCE concentrations have increased slightly since sampling of PIW series wells began in 2Q20. A slight rebound of concentrations was not unexpected, as the groundwater within the barrier reaches equilibrium following the large injection volumes associated with the ZVI-PRB construction.

Interpretation of the results in monitoring wells west of the ZVI-PRB may take more time considering time for back-diffusion to flush out residual cVOCs that are sorbed to low permeability sediments. Monitoring well clusters P002, PRW002, and PRW004 are located ~6.1 m (20 ft) from the ZVI-PRB, nearest the midpoint of the wall. In these wells, there is a decreasing TCE trend with the exception of PRW002DU, as shown in Figure 12. Concentrations in these wells were all below 11 ug/L for 1Q21 (maximum of 10.9 ug/L). The progression of this trend will be monitored in on-going reports, as there is potential for rebound with back-diffusion of low permeability sediments. Based on the timing of well installation, well clusters PRW005 and PRW007, located just west of and near the ends of the ZVI-PRB, do not have baseline results available. CVOC concentrations at PRW005 have remained low; at well cluster PRW007 however, TCE levels remain elevated with a maximum 1Q21 UAZ result of 819 µg/L.

Reductive dechlorination by-products, chloride and ethylene, were included in the ZVI-PRB sampling. For PRW004DU, the parent and daughter products of reductive dechlorination are plotted over time in Figure 17. Chloride concentrations increased slightly but have returned to baseline conditions in western monitoring wells. An increase in chloride is expected with dechlorination of cVOCs, however the increase observed may be more related to injection of sodium chloride during ZVI-PRB construction. Ethylene increased slightly from baseline to 1Q20, however issues with the MDL led to inconclusive results in all sampling from 2Q20 to 1Q21. SRS is working with the contracted laboratory to reduce the MDL and get meaningful results in future dissolved gas analyses.

4.3 ZVI-PRB Health and Longevity

In literature and studies of past ZVI-PRB installations, it was noted that the presence of some geochemical analytes in large concentrations can lead to precipitation within a ZVI-PRB, as well as coating of ZVI media resulting in reduced reactivity, or passivation (He, Wilson, and Wilkin 2008; Gu et al. 2001; Ritter 2000). Specific analytes of interest include, but are not limited to, sulfate, calcium, and nitrate. Results after one year of monitoring indicate nitrate and sulfate concentrations have decreased in the ZVI-PRB. This is a potential indicator that the constituents have interacted with the ZVI media and have come out of the aqueous phase. Theoretically, this could lead to precipitation and passivation of the ZVI that decreases performance in cVOC degradation. However, the influent concentrations are believed to be low enough to conclude that precipitation and/or passivation of the ZVI-PRB is not a concern (Batelle 2002; Yabusaki et al. 2001; Wilkin, Puls, and Sewell 2003; Gu et al. 2001). Influent concentrations shown to cause short term effects on performance were sulfate concentrations above 1,000 mg/L and nitrate on the order of 120 mg/L. In addition, a treatability study was conducted prior to ZVI-PRB installation to verify the geochemistry of the site groundwater and subsurface would not result in a significant loss in ZVI-PRB performance (SRNS 2019).

Calcium concentrations have increased significantly, from a maximum UAZ baseline of 4,810 ug/L to a 1Q21 maximum of 172,000 µg/L for in-wall monitoring wells. The significant spike in calcium concentration is most likely related to the amount of grout used to complete the injection wells for ZVI-PRB construction. There were 22 injection wells installed to construct the ZVI-PRB, with all of the annulus space filled with grout to ensure the specialized expansion casings propagated the ZVI fractures correctly. This large quantity of grout cement is likely to leach calcium due to the high pH levels created by the ZVI. Monitoring of changes in the calcium concentrations will continue for the ZVI-PRB to assess health of the ZVI-PRB, as calcium can precipitate out and result in a loss in ZVI-PRB porosity, and therefore reduce contact time with cVOCs.

4.4 ZVI-PRB Reducing Environment

Within the ZVI-PRB, reducing conditions are evidenced by high negative ORP values between -371 and -545 mV in 1Q21. Baseline ORP results in the UAZ ranged from +124 to +428 mV. The results indicate the aquifer in the vicinity of the ZVI-PRB has flipped from an oxidizing environment to a reducing environment.

The flip to reducing conditions in the aquifer support natural reductive chlorination of cVOCs as the anaerobic conditions extend out from the ZVI-PRB. However, the presence of anaerobic microbial species which degrade cVOCs is not guaranteed. General conditions that can support anaerobic microbial activity capable of cVOC degradation include:

- Depleted dissolved oxygen (DO), nitrate, and sulfate
- Elevated ferrous iron, manganese, methane, ethylene, ethane, chloride, and alkalinity
- Negative ORP
- Substrate availability (appreciable total organic carbon [TOC]/dissolved organic carbon [DOC] concentrations)
- Presence of cVOCs
- pH range between ~6-8

Based on the results from one year of sampling, conditions in the vicinity of the ZVI-PRB are reaching levels which would support further microbial degradation of cVOCs. However, at this point there is no evidence of microbial activity in the aquifer.

4.5 ZVI-PRB Impact on the LAZ

The ZVI-PRB design intended injection wells to key into the TCCZ as a means of hydraulic control, however the potential for penetration into the LAZ was recognized and therefore LAZ monitoring was retained in the EMP.

Groundwater elevation measurements and potentiometric surface mapping for the LAZ indicate there is influence from the ZVI-PRB. The extent of impact to the LAZ is unclear after one year of monitoring, therefore future monitoring of LAZ groundwater elevation will provide data to support further evaluation.

Monitoring results for TCE in the LAZ indicates a decrease in concentrations, with TCE decreasing from a baseline maximum of 664 µg/L to a 1Q21 maximum of 82.8 µg/L. The drop in TCE concentrations, combined with the flip in ORP values from high positive to very high negative, are indications of the ZVI-PRB impacts on the LAZ. In addition, potentiometric head data indicate a significant downward gradient between the UAZ and LAZ. Based on the observed effects, the constructed ZVI-PRB penetrates the TCCZ and continues into the LAZ along some portion of the trace. This is not a surprising observation, as the TCCZ is known to be inconsistent in places. Effects on the LAZ will continue to be monitored in future reporting.

5.0 SUMMARY AND RECOMMENDATIONS

The PAGW OU NTC RA was completed in January 2020 with the construction of a 80.5 linear meter (264 linear feet) long ZVI-PRB, designed to intersect groundwater flow in the UAZ of the UTRA to degrade cVOCs, primarily TCE. The PAGW OU NTC RAO is to protect human health and the environment by reducing the mass and down-gradient transport of the PAGW OU TCE groundwater plume. A TCE mass flux reduction of 80% was determined to be sufficient to meet the RAO.

After one year of effectiveness monitoring of ZVI-PRB performance, the effectiveness in the immediate vicinity of the PRB is highlighted by the following results:

- In-wall monitoring well results indicate TCE reduction greater than 95%;
- To the west of the ZVI-PRB, in the UAZ, TCE concentrations are trending downward;
- ORP results for the in-wall wells indicate a strongly reducing environment is present, extending to the west in the UAZ monitoring wells;
- The installed ZVI-PRB influences the LAZ, evidenced by observed reducing conditions and reduced TCE concentrations.

In-wall monitoring wells provide the strongest evidence of the ZVI-PRB effectiveness at this time. Analytical results to the west of the ZVI-PRB provide evidence of a reducing environment traveling away from the barrier with groundwater flow. Early indications are that the ZVI-PRB is impacting cVOC concentrations immediately to the west of the ZVI-PRB. However, it is expected that definitive conclusions on the ZVI-PRB impact to the PAGW OU TCE plume will require more time and evaluation. As more cVOC mass is removed by the ZVI-PRB, and clean groundwater flushes out cVOCs adsorbed to the low permeability sediments, the ZVI-PRB will reach peak optimization. As indicated in the RADP and RAR, this is anticipated to take 3-5 years from ZVI-PRB installation (SRNS 2019 and SRNS 2020b). Therefore, SRS recommends continued analytical monitoring in accordance with the approved EMP for the PAGW OU NTC RA. In order to remedy the ferric and ferrous iron deviation, SRS has worked out laboratory issues and ferric/ferrous iron analyses will resume for 3Q21.

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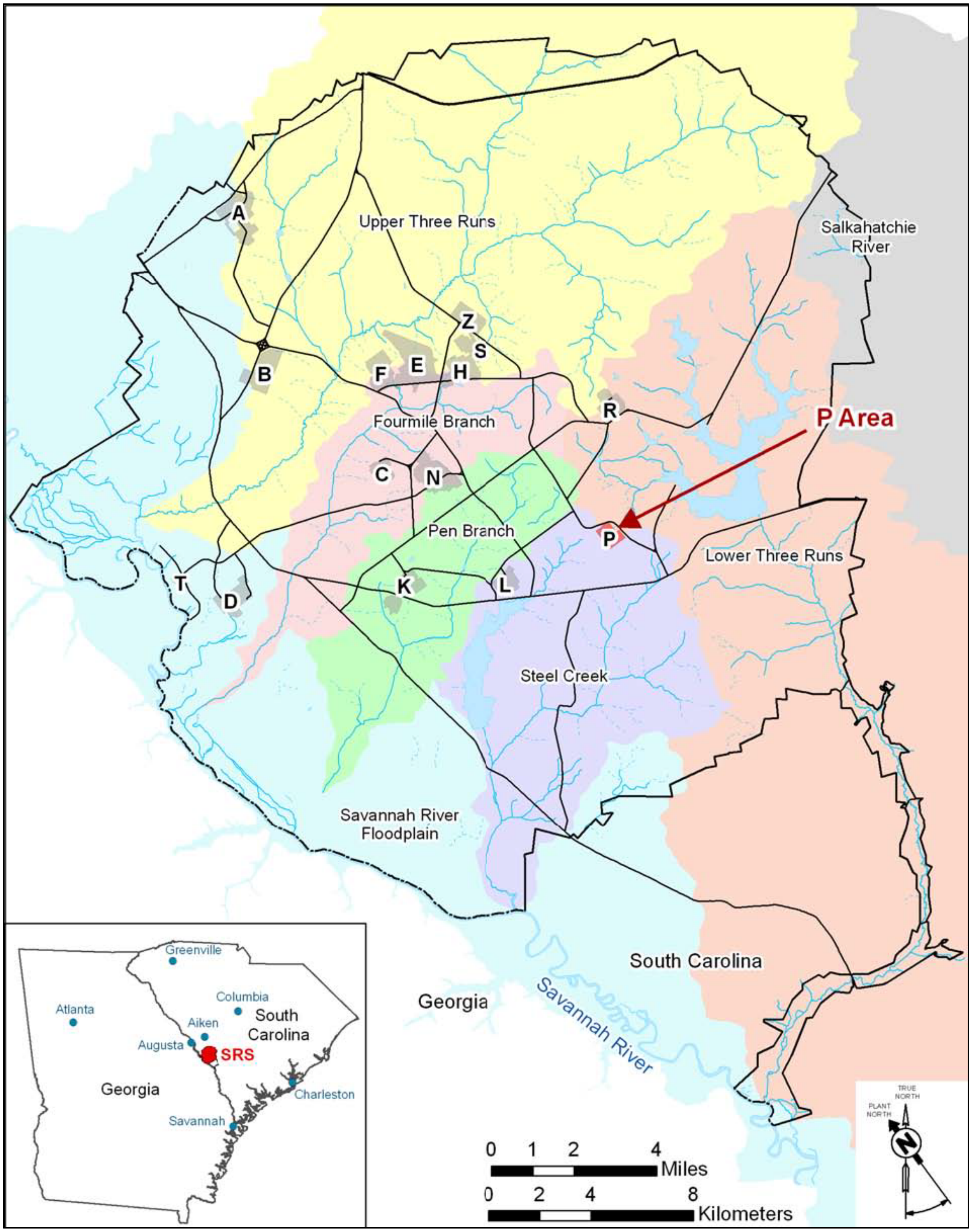

Figure 1. Location of P Area at the Savannah River Site

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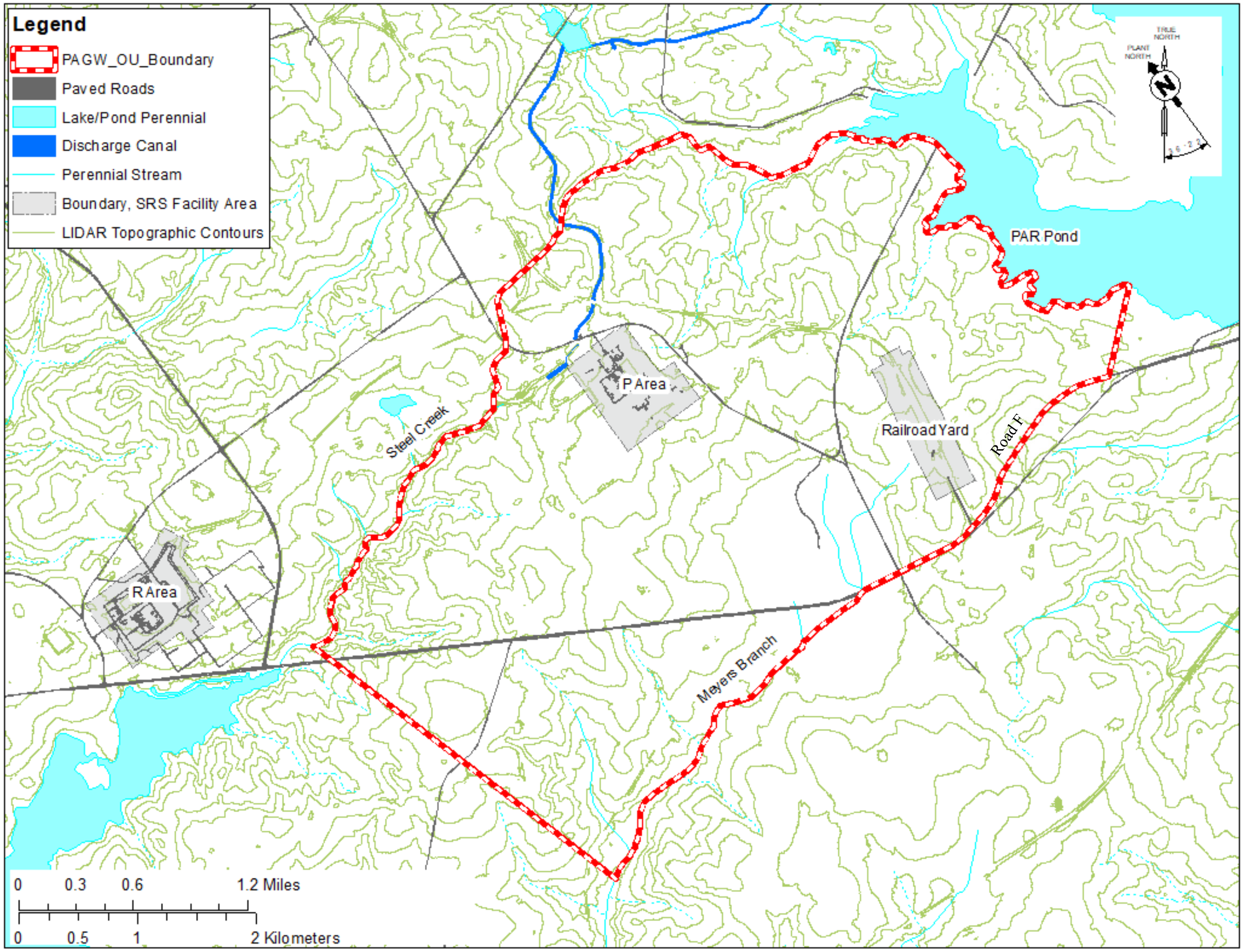

Figure 2. P-Area Groundwater Operable Unit Boundary Map

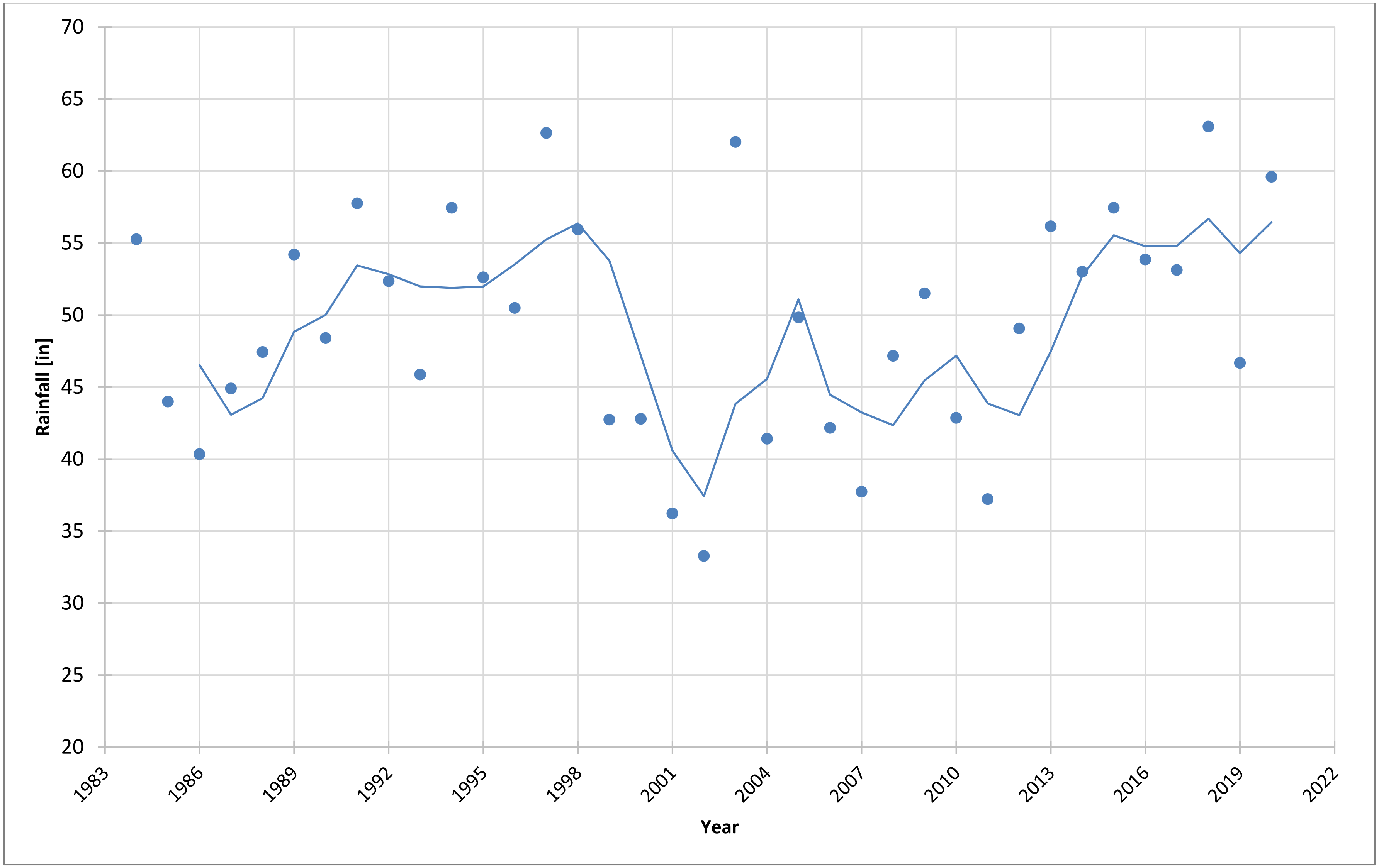

Figure 3. Total Annual Rainfall at 100-P Rain Gauge with a 3-Year Moving Average Trendline

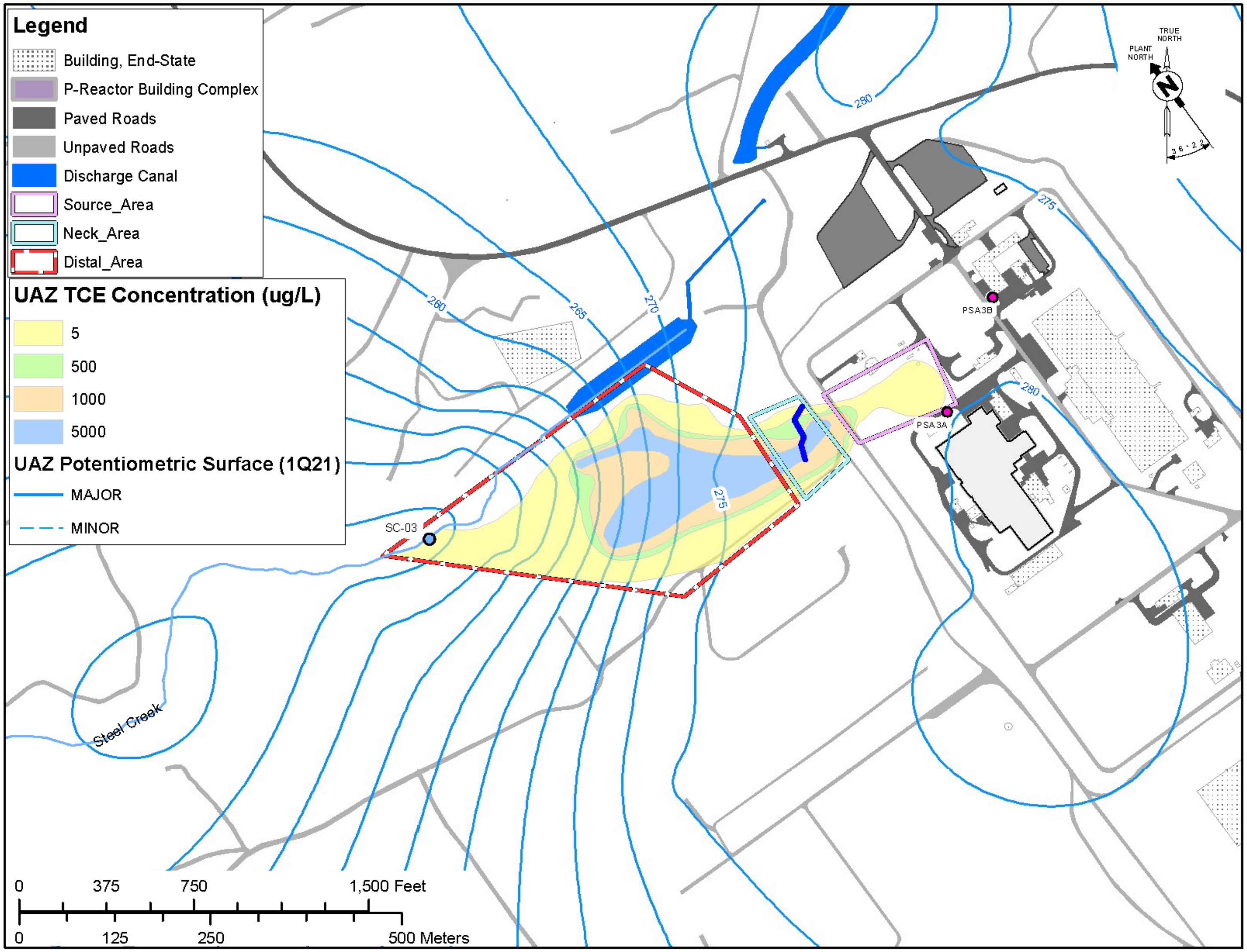

Figure 4. Trichloroethylene Plume Map for the Upper Aquifer Zone of the Upper Three Runs Aquifer (2018 Data)

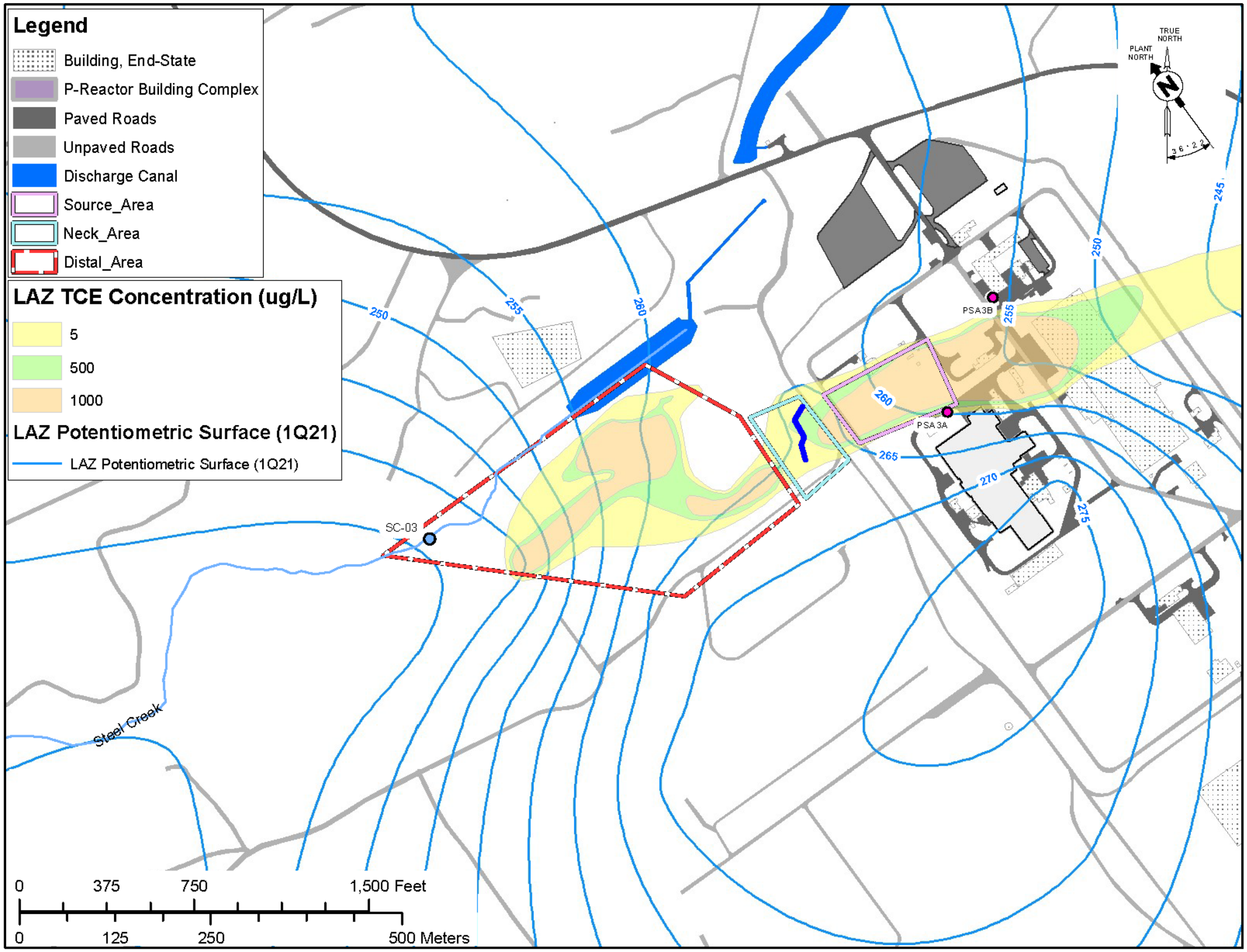

Figure 5. Trichloroethylene Plume Map for the Lower Aquifer Zone of the Upper Three Runs Aquifer (2018 Data)

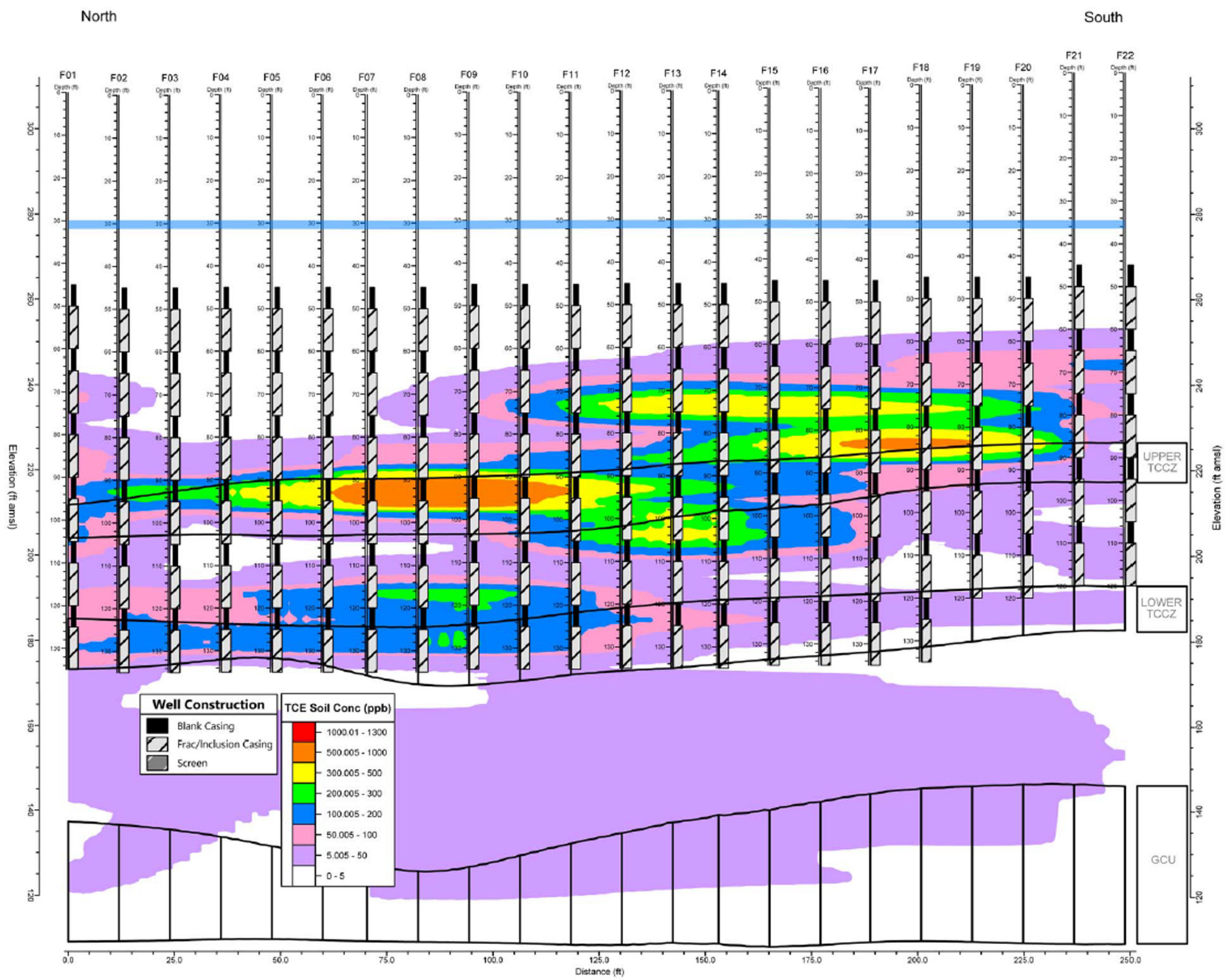

Figure 6. **TCE Plume Cross-Section with ZVI-PRB Injection Wells**

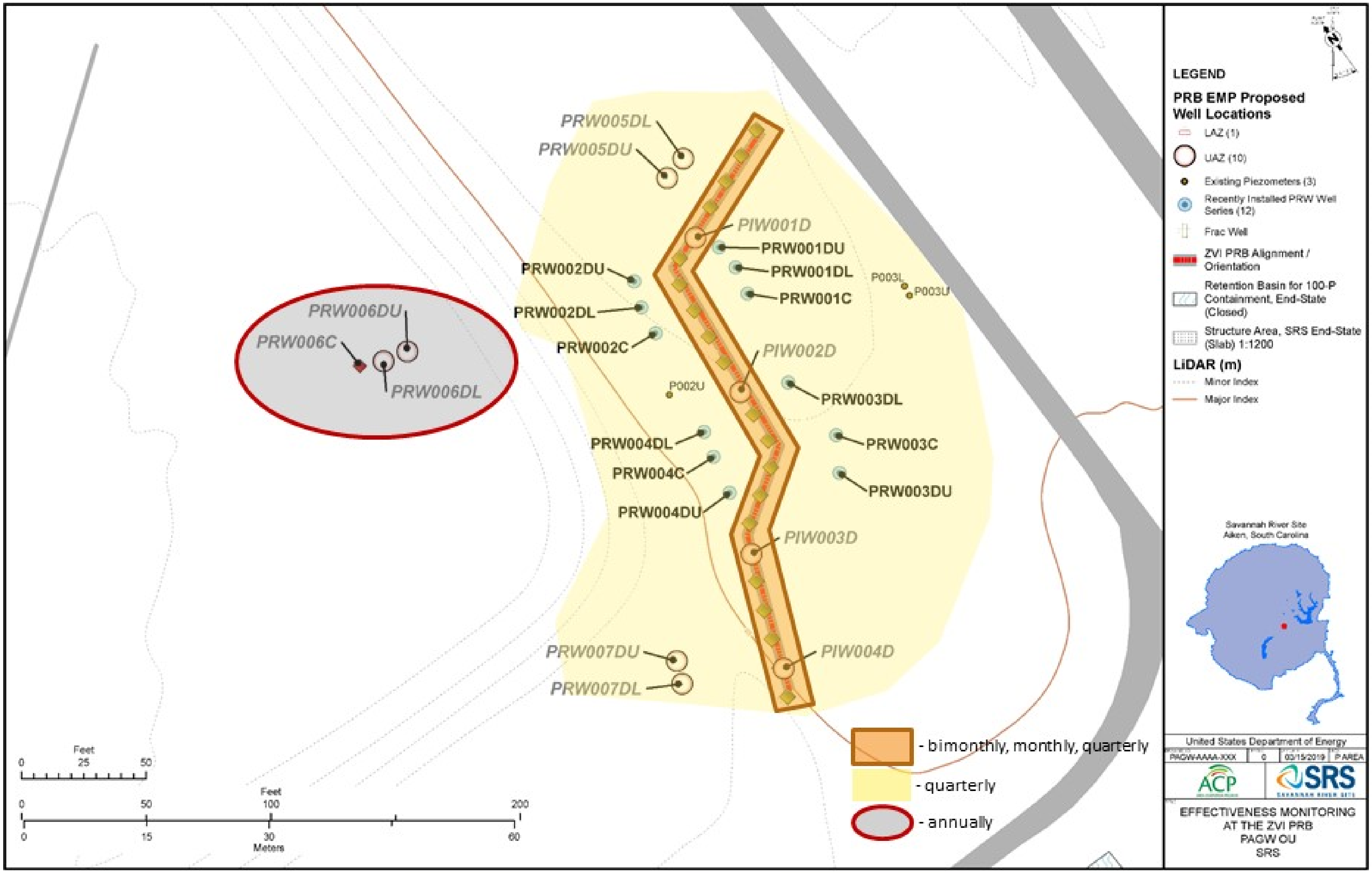

Figure 7. Effectiveness Monitoring Plan Locations

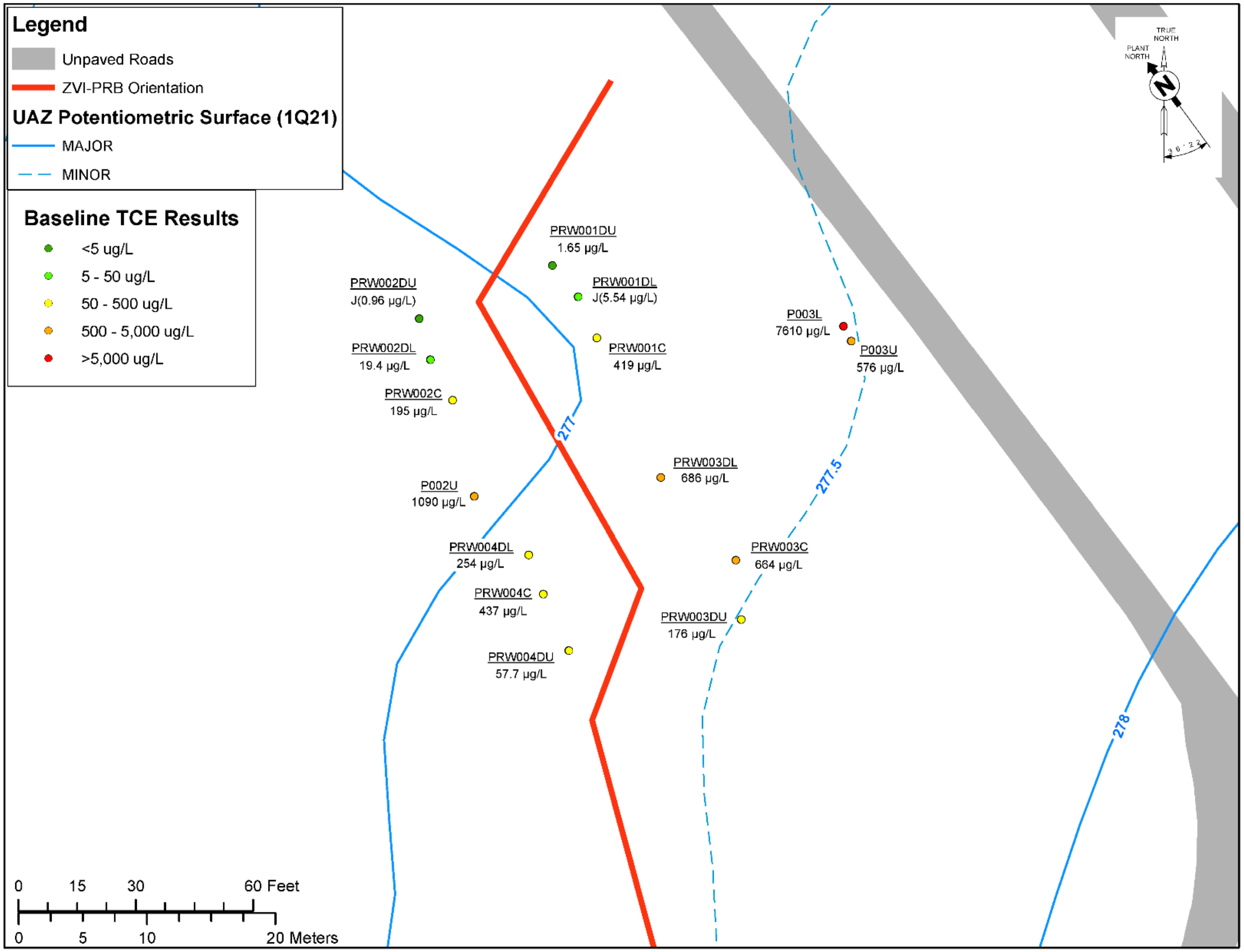

Figure 8. Baseline Concentrations of TCE in the PAGW OU EMP Monitoring Wells

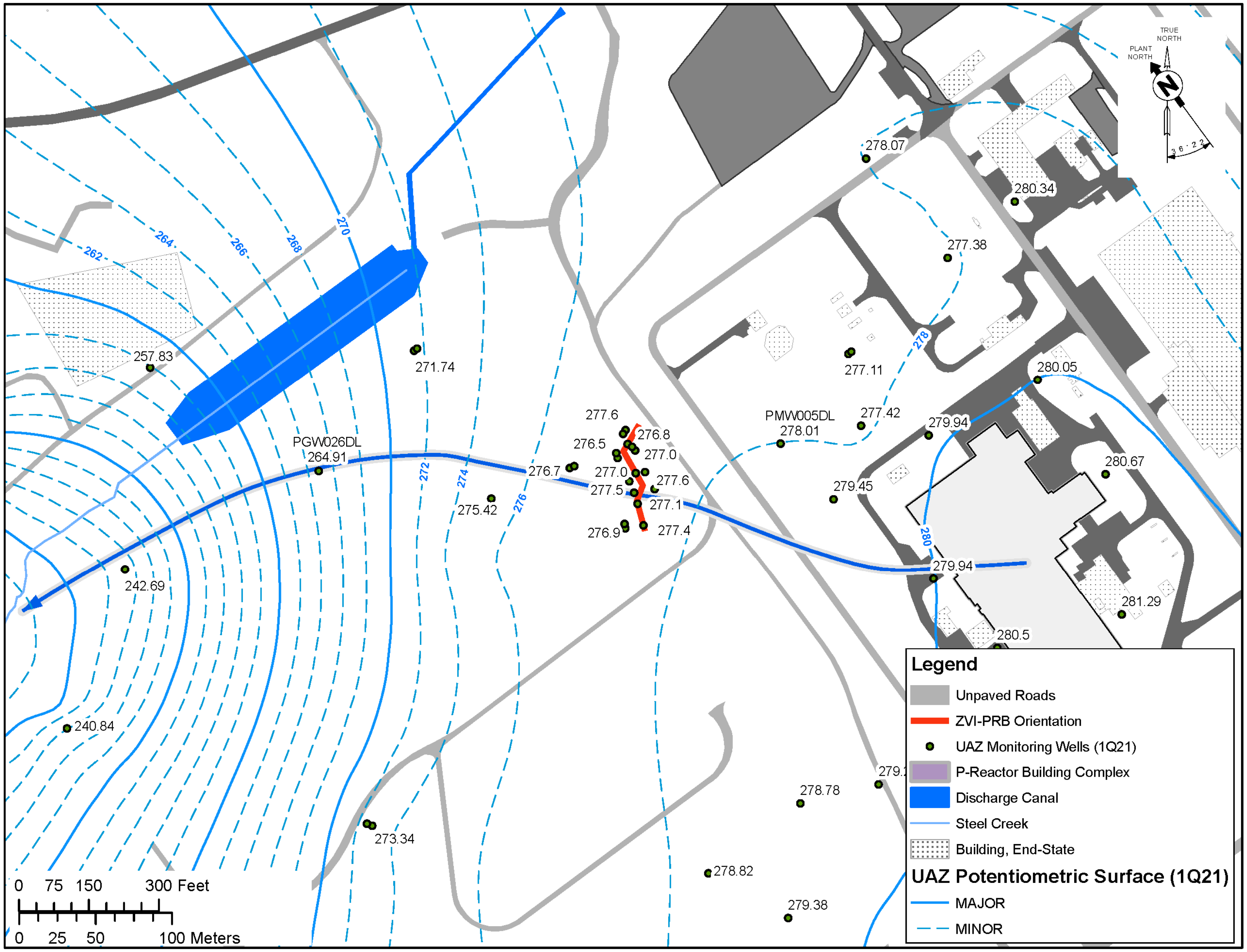

Figure 9. Regional UAZ Groundwater Elevations and Flow Direction (1Q21)

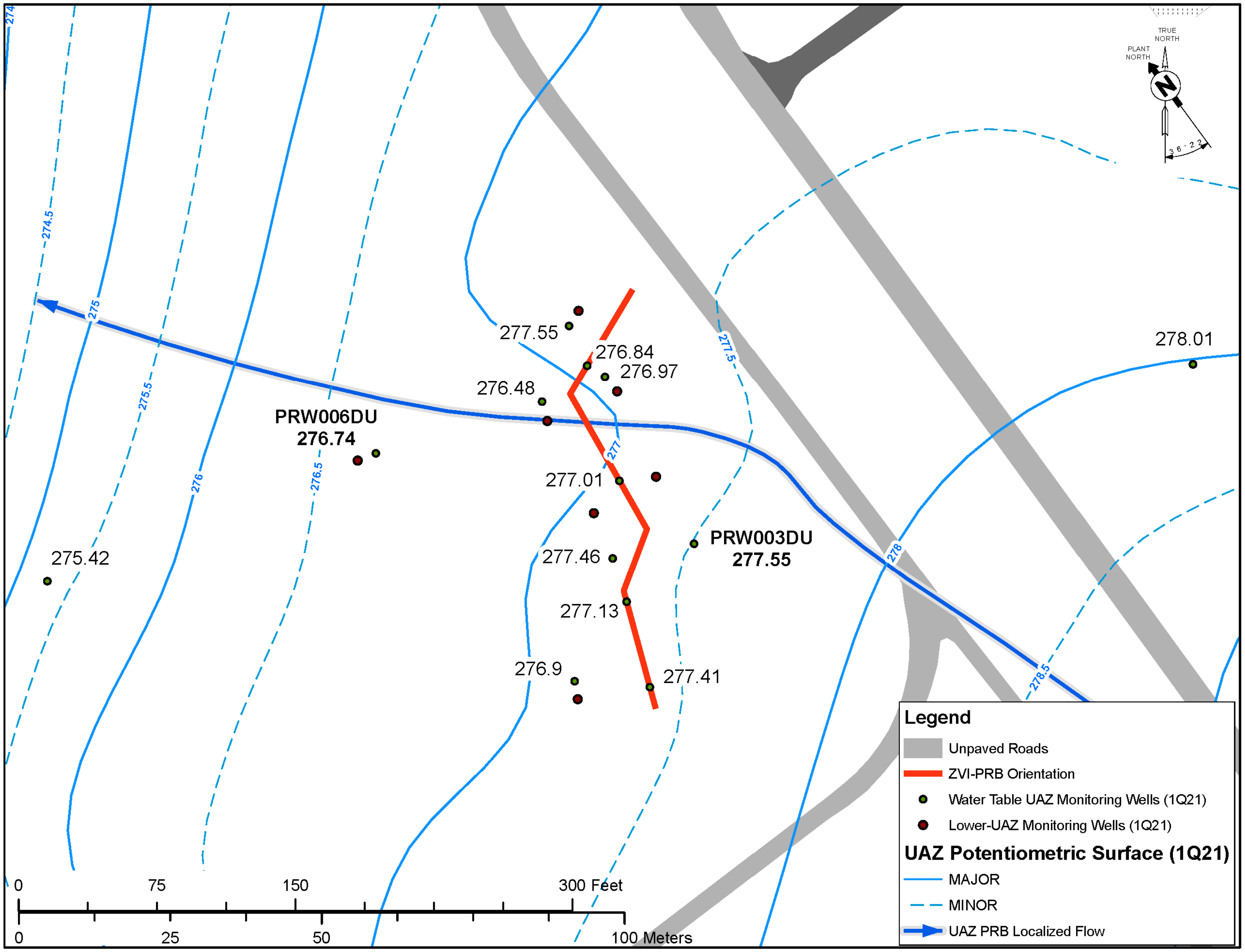

Figure 10. UAZ Water Elevations for 1Q21 at PAGW OU RA EMP Monitoring Wells

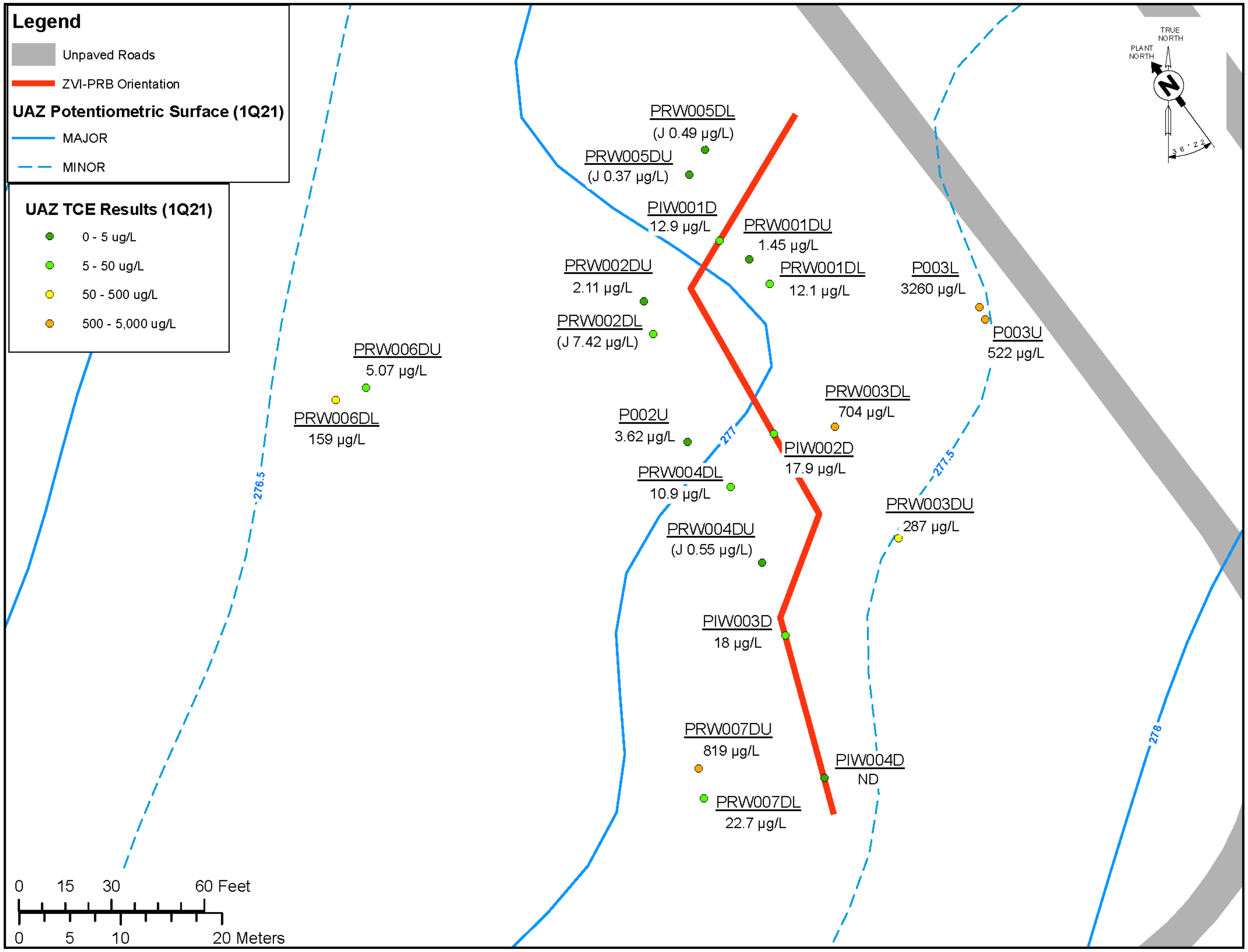

Figure 11. TCE Results for ZVI-PRB UAZ Monitoring Wells Sampled in 1Q21

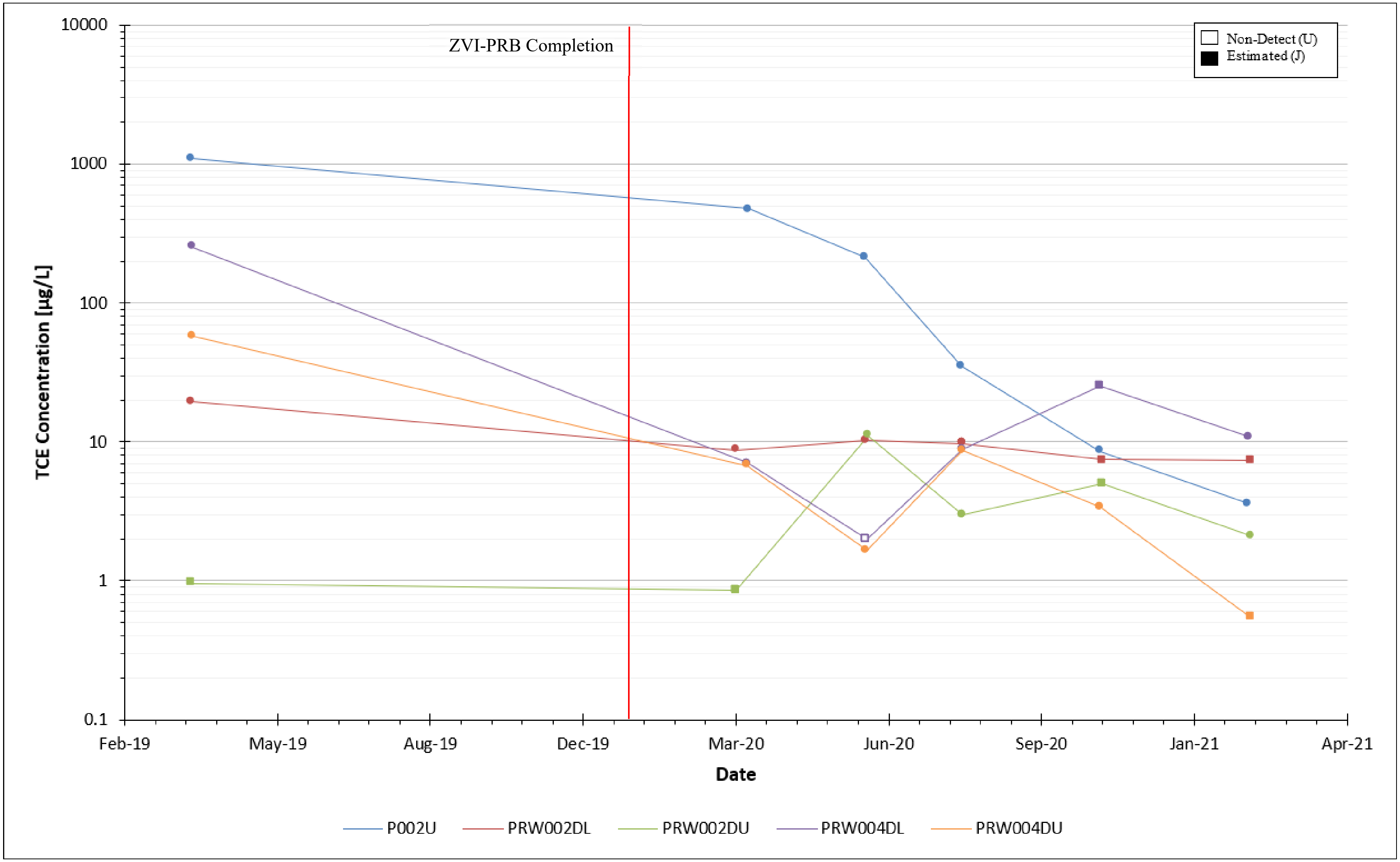

Figure 12. Time-Series Plot for TCE at Monitoring Wells Immediately West of ZVI-PRB

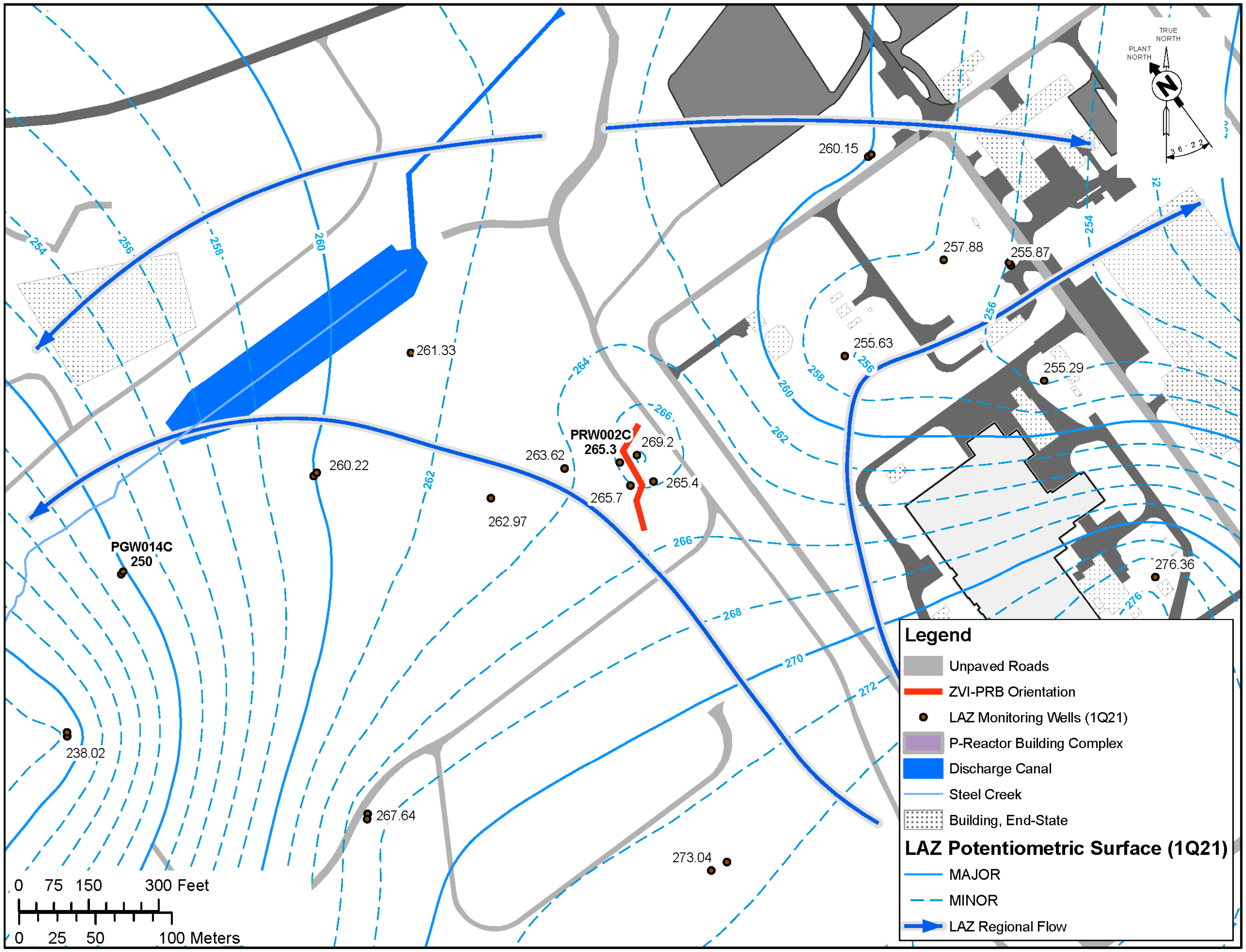

Figure 13. Regional LAZ Groundwater Elevations and Flow Direction (1Q21)

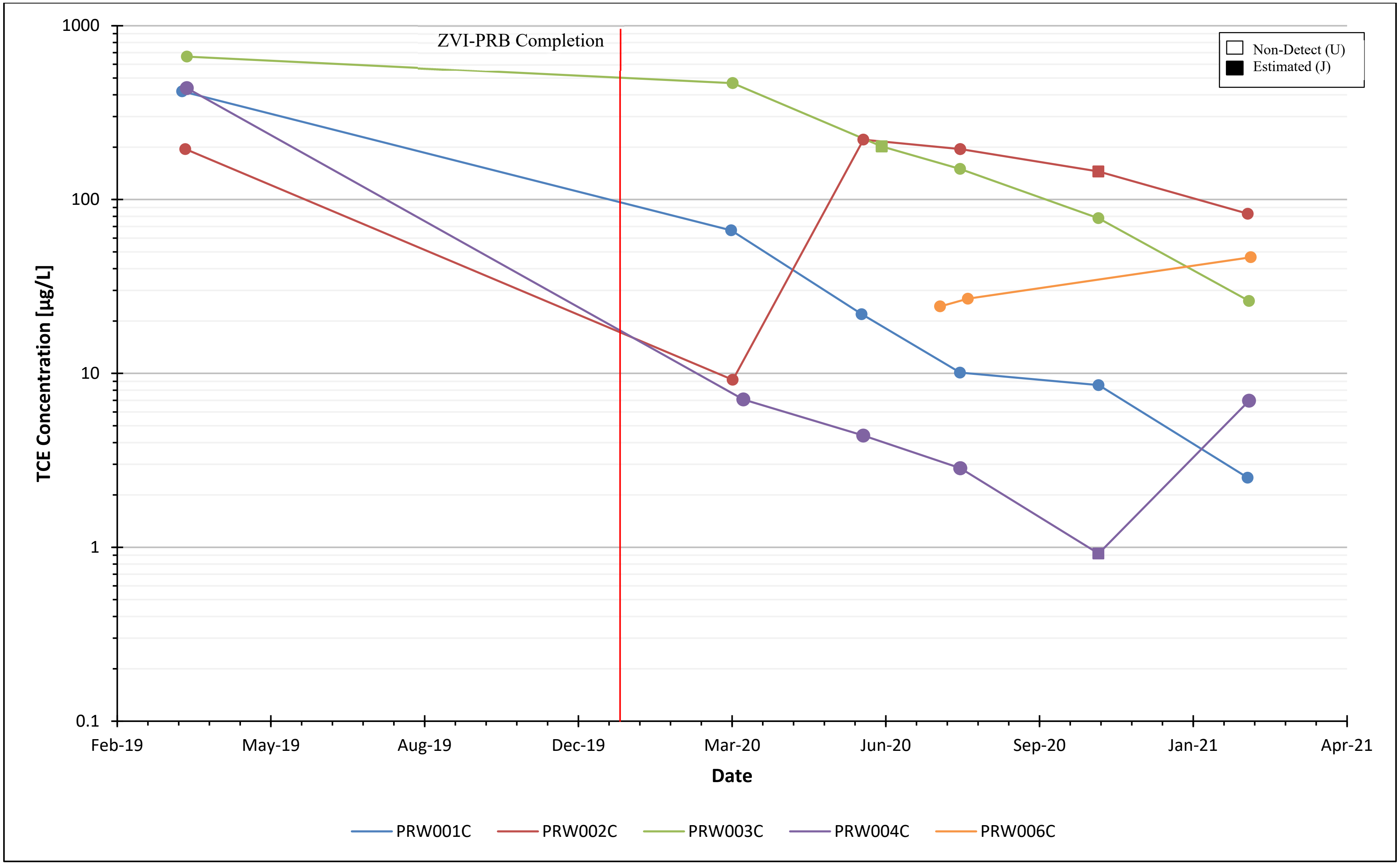

Figure 14. Time-Series Plot for TCE at LAZ Monitoring Wells of the PAGW OU NTC RA EMP

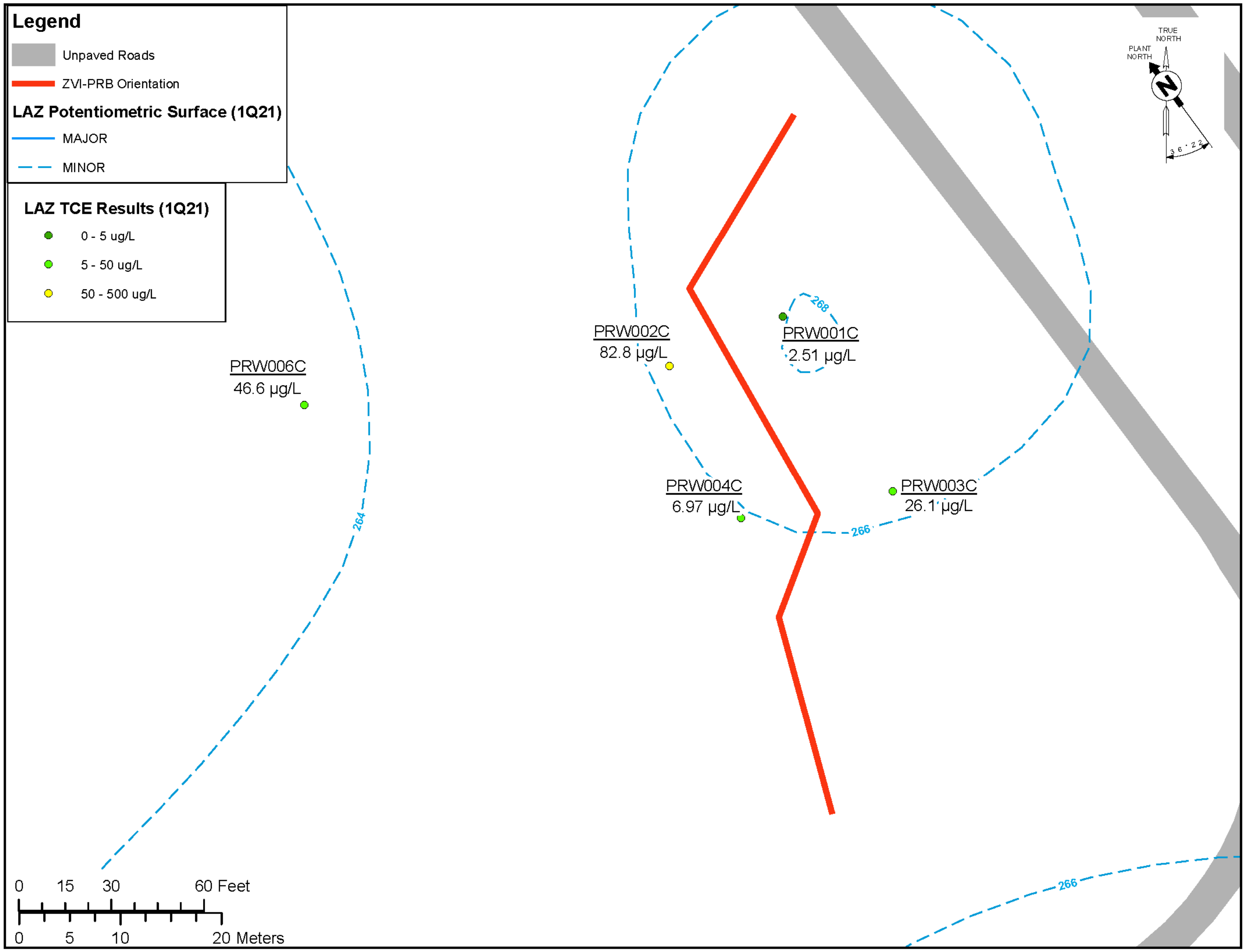

Figure 15. TCE Results for ZVI-PRB LAZ Monitoring Wells Sampled in 1Q21

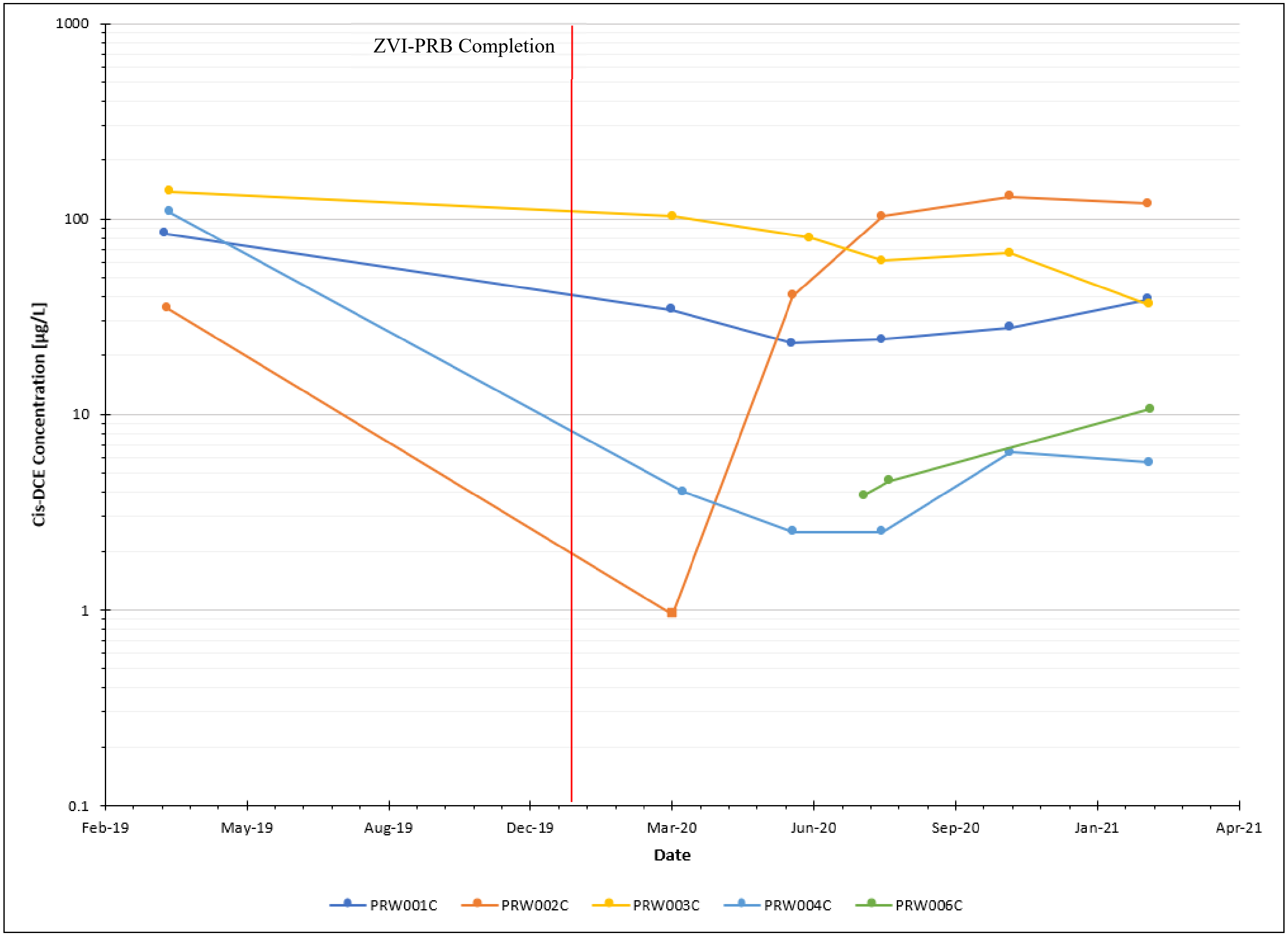

Figure 16. Cis-DCE Concentration Over Time for LAZ Monitoring Wells

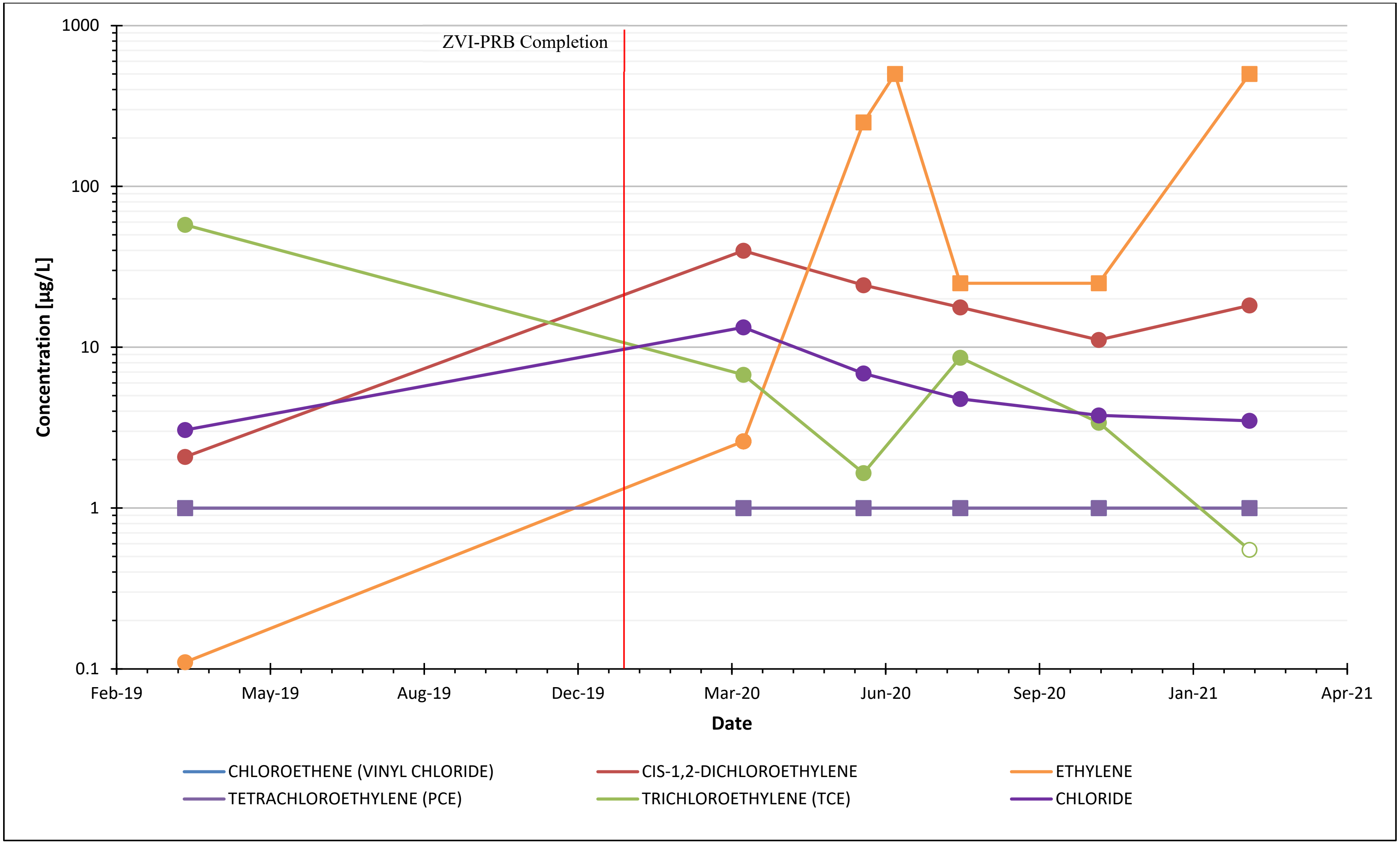

Figure 17. CVOC Degradation at PRW004DU

Table 1. Maximum Concentrations of PCE, TCE, and cis-DCE in the Three Plume Areas

Contaminant	MCL[1] *[μg/L]*	Maximum Concentration in UAZ *[μg/L]*			Maximum Concentration in LAZ *[μg/L]*		
		Source Area	Neck Area	Distal Area	Source Area	Neck Area	Distal Area
PCE	5	80.6	13.0	1.32 [2]	4.85	1.77 [2]	17 [2]
TCE	5	2,150	7,730	6,320	5,180	(791) [2]	5,560 [2]
cis-DCE	70	195	892 [2]	(300)	69.0	138 [2]	168 [2]

[1] MCL – maximum contaminant level

[2] Data from Baseline PRB sampling event in 2019, prior to ZVI-PRB installation.

Parenthesis indicate estimated values.

Table 2. Effectiveness Monitoring Plan Well Details

Station ID	EMP Analytes	Sampling Frequency	Aquifer Zone	UTM NAD27 Coordinates		Screen Interval *[ft bgs]*
				Northing	Easting	
PRW001DU	1	Quarterly	UAZ	445596.3162	3676631.902	81.64 – 91.64
PRW001DL	1	Quarterly	UAZ	445598.3731	3676629.427	109.78 – 119.67
PRW001C	1	Quarterly	LAZ	445599.9071	3676626.031	146 – 156
PRW002DU	1	Quarterly	UAZ	445585.9390	3676627.649	80.66 – 90.66
PRW002DL	1	Quarterly	UAZ	445586.9572	3676624.563	107.21 – 117.21
PRW002C	1	Quarterly	LAZ	445588.4929	3676621.475	148.06 – 158.06
PRW003DU	1	Quarterly	UAZ	445611.1735	3676604.102	61.82 – 71.82
PRW003DL	1	Quarterly	UAZ	445604.7647	3676615.225	94.85 – 104.85
PRW003C	1	Quarterly	LAZ	445610.6833	3676609.033	136.58 – 146.58
PRW004DU	1	Quarterly	UAZ	445597.7006	3676601.714	64.91 – 74.91
PRW004DL	1	Quarterly	UAZ	445594.6377	3676609.430	111.45 – 121.45
PRW004C	1	Quarterly	LAZ	445595.6558	3676606.345	144.38 – 154.38
PRW005DU	1	Quarterly	UAZ	445590.1508	3676640.252	86 – 96
PRW005DL	1	Quarterly	UAZ	445591.9763	3676642.705	108 – 118
PRW006DU	1	Annually	UAZ	445558.1963	3676619.181	90 – 100
PRW006DL	1	Annually	UAZ	445555.3423	3676617.965	120 – 130
PRW006C	1	Annually	LAZ	445552.4918	3676617.365	160 – 170
PRW007DU	1	Quarterly	UAZ	445591.1164	3676581.425	65 – 75
PRW007DL	1	Quarterly	UAZ	445591.8774	3676578.649	100 – 110
P002U	1	Quarterly	UAZ	445590.2617	3676613.766	87.5 – 92.5
P003U	1	Quarterly	UAZ	445619.5780	3676625.921	84.3 – 89.3
P003L	1	Quarterly	UAZ	445619.0672	3676627.156	113.6 – 118.6
PIW001D	1, 2	Quarterly	UAZ	445593.7400	3676634.072	90 – 110
PIW002D	1, 2	Quarterly	UAZ	445599.0687	3676614.949	85 – 105
PIW003D	1, 2	Quarterly	UAZ	445600.2528	3676595.233	70 – 90
PIW004D	1, 2	Quarterly	UAZ	445604.3150	3676581.044	60 – 80

ft bgs – feet below ground surface

1 Volatile Organic Compounds: tetrachloroethylene (PCE), trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-DCE), trans-1,2-dichloroethylene (trans-DCE), chloroethene (vinyl chloride [VC]), and 1,1-dichloroethylene (1,1-DCE)

2 Geochemical Analyses: Dissolved Organic Carbon (DOC), Total Organic Carbon (TOC), Total Dissolved Solids (TDS), alkalinity, chloride, nitrate-nitrite as nitrogen, sulfate, sulfide, methane, ethane, ethylene, phosphate, calcium, iron, ferrous iron (Fe^{2+}), ferric iron (Fe^{3+}), potassium, manganese, magnesium, sodium

Table 3. Baseline Concentrations for cVOCs and Geochemical Analytes

Analyte	Units	UAZ Range	UAZ Location of Maximum	LAZ Range	LAZ Location of Maximum
PCE	µg/L	0.34 – 5.15	P002U	0.65 – 1.60	PRW002C
TCE	µg/L	0.96 – 7610	P003L	195 – 664	PRW003C
cis-DCE	µg/L	0.45 – 892	P003L	35.0 – 138	PRW003C
trans-DCE	µg/L	0.54 – 15.3	P003L	1.08 – 2.84	PRW003C
1,1-DCE	µg/L	1.96[A]	P003L	ND (1.0)[B]	
VC	µg/L	1.10[A]	P003L	ND (1.0)[B]	
Alkalinity	mg/L	2.00 – 38.4	PRW004DL	6.00 – 40.8	PRW001C
Calcium	µg/L	536 – 4810	PRW001DL	804 – 13500	PRW001C
Chloride	mg/L	2.11 – 3.64	PRW002DU	2.20 – 3.03	PRW003C
DOC	mg/L	0.461 – 0.683	P002U	0.410 – 0.531	PRW002C
Ethane	µg/L	0.12 – 0.17	P003L	0.12 – 0.14	PRW002C
Ethylene	µg/L	0.11 – 0.55	PRW003DU	0.15 – 0.25	PRW002C
Ferric Iron	mg/L	ND (0.50)[B]		ND (0.50)[B]	
Ferrous Iron	mg/L	0.87[A]	PRW004DU	ND (0.50)[B]	
Total Iron	µg/L	104 – 852	P003L	80.1 – 496	PRW002C
Magnesium	µg/L	341 – 1360	PRW003DU	237 – 312	PRW003C
Manganese	µg/L	4.72 – 174	PRW004DU	55.1 – 262	PRW002C
Methane	µg/L	0.93 – 2400	PRW003DU	0.64 – 2.0	PRW002C
Nitrate	mg/L	0.217 – 2.82	PRW003DU	0.448 – 0.856	PRW003C
Phosphate	mg/L	0.045 – 0.089	PRW002DL	0.076 – 0.097	PRW002C
Potassium	µg/L	255 – 16800	PRW004DL	929 – 2810	PRW001C
Sodium	µg/L	2000 – 14400	PRW001DL	3370 – 9880	PRW004C
Sulfate	mg/L	0.533 – 13.4	PRW001DL	0.828 – 8.12	PRW003C
TDS	mg/L	4.29 – 65.7	PRW004DU	18.6 – 111	PRW001C
TOC	mg/L	0.362 – 0.595	PRW004DU	0.354 – 0.463	PRW001C

[A] Only one detection above the MDL

[B] All results were non-detect; PQL in parenthesis

Reported baseline values are from the following monitoring wells:

- UAZ: P002U, P003U, P003L, PRW001DU, PRW001DL, PRW002DU, PRW002DL, PRW003DU, PRW003DL, PRW004DU, PRW004DL
- LAZ: PRW001C, PRW002C, PRW003C, PRW004C

Table 4. Baseline Concentration Comparison with Most Recent Results (1Q21)

		East of ZVI-PRB [A]		West of ZVI-PRB [A]		In-Wall [A]
Analyte	Units	Baseline	1Q21	Baseline	1Q21	1Q21
PCE	µg/L	0.34 - 1.43	ND (10) [C]	0.7 - 5.15	ND (25) [C]	ND (1) [C]
TCE	µg/L	1.65 - 686	1.45 - 704	0.96 - 1,090	0.37 - 819	12.9 - 18
cis-DCE	µg/L	0.45 - 47.5	0.74 - 75.2	2.08 - 28.4	0.41 - 180	0.56 - 29.6
trans-DCE	µg/L	0.57 [B]	ND (10) [C]	0.54 [B]	ND (25) [C]	ND (1) [C]
1,1-DCE	µg/L	ND (1) [C]	ND (10) [C]	ND (1) [C]	ND (25) [C]	ND (1) [C]
VC	µg/L	ND (1) [C]	ND (10) [C]	ND (1) [C]	ND (25) [C]	0.84 [B]
Alkalinity	mg/L	5.8 - 37	0 - 90	2.2 - 38.4	6 - 129	133 - 999
Calcium	µg/L	1,190 - 4,810	2,050 - 9,790	850 - 2,230	814 - 9,930	69,500 - 172,000
Chloride	mg/L	2.82 - 3.18	2.66 - 16.4	2.11 - 3.64	3.49 - 63.6	17.4 - 113
DOC	mg/L	0.461 - 0.638	NS [D]	0.488 - 0.683	0.974 - 4.86	33.9 - 65.1
Ethane	µg/L	0.12 [B]	19.6 [B]	ND (0.1) [C]	11.1 [B]	28.9 - 62.3
Ethylene	µg/L	0.55 [B]	ND (500) [C]	0.11 [B]	ND (500) [C]	65.2 [B]
Ferric Iron	mg/L	ND (0.5) [C]	NS [D]	ND (0.5) [C]	NS [D]	NS [D]
Ferrous Iron	mg/L	ND (0.5) [C]	NS [D]	0.87 [B]	NS [D]	NS [D]
Total Iron	µg/L	53.3 - 178	147 - 32,700	148 - 741	70.1 - 37,700	47.7 - 64.1
Magnesium	µg/L	341 - 1,360	434 - 5,110	376 - 1,070	332 - 5,500	21 - 191
Manganese	µg/L	9.1 - 24.1	6.36 - 581	5.07 - 174	86.2 - 1,600	1.78 - 2.87
Methane	µg/L	0.93 - 2,400	23.4 - 8,440	1.9 - 600	43.7 - 6,900	469 - 1,600
Nitrate	mg/L	0.217 - 2.82	NS [D]	0.278 - 2.6	NS [D]	ND (0.05) [C]
Phosphate	mg/L	0.0456 - 0.0736	NS [D]	0.0449 - 0.0891	NS [D]	0.0224 - 0.284
Potassium	µg/L	255 - 11,000	322 - 10,500	556 - 16,800	249 - 19,900	1,770 - 5,890
Sodium	µg/L	2,630 - 14,400	2,510 - 18,000	3,240 - 12,200	2,550 - 66,100	10,400 - 36,900
Sulfate	mg/L	0.533 - 13.4	NS [D]	0.589 - 6.22	NS [D]	0.587 - 1.32
TDS	mg/L	40 - 47.1	NS [D]	4.29 - 65.7	NS [D]	274 - 697
TOC	mg/L	0.362 - 0.533	0.656 - 16.2	0.38 - 0.595	0.974 - 4.86	32.6 - 72.4

[A] Wells included in each set are:
East of ZVI-PRB: PRW001DU, PRW001DL, PRW003DU, PRW003DL
West of ZVI-PRB: PRW002DU, PRW002DL, PRW004DU, PRW004DL, PRW005DU, PRW005DL, PRW007DU, PRW007DL
In-Wall: PIW001D, PIW002D, PIW003D, PIW004D

[B] Only one value reported above MDL.

[C] No detections; Maximum PQL reported in parenthesis.

[D] Not sampled.

APPENDIX A

PAGW OU RA EMR Analytical Data 2019-2021

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Table A-1. Baseline Data for PAGW OU RA EMR

				Field Data												PRB Analytical Data Geochemical								
			SAMPLE COLLECTION DATE	AIR TEMPERATURE	FLOW RATE	OXIDATION/REDUCTION POTENTIAL	OXYGEN	PH	SPECIFIC CONDUCTANCE	TURBIDITY	VOLUME PURGED	WATER TEMPERATURE	DEPTH TO WATER	SAMPLING EVENT WATER ELEVATION	**Constituent**	CALCIUM	CHLORIDE	DISSOLVED ORGANIC CARBON	ETHANE	ETHYLENE	FERRIC IRON	FERROUS IRON	IRON	MAGNESIUM
			day-month-year	degC	gal/min	mV	mg/L	unitless	uS/cm	NTU	gal	degC	ft	ft	**Unit**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	**Well Use**	**Aquifer Zone**						8.5							**GWPS**								14000	
P002U	Monitoring Well	UAZ_UTRAU	19-Mar-2019	9.9	0.05	428	6.17	4.9	35	9.8	1	12	NS	NS		1100	2580	[683]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	148	596
P003L	Monitoring Well	UAZ_UTRAU	21-Mar-2019	6.1	0.05	386	3.53	4.8	25	8.9	1	17.9	NS	NS		536	2250	[635]	0.17	0.16	<EQL (500)	<EQL (500)	852	359
P003U	Monitoring Well	UAZ_UTRAU	20-Mar-2019	5.6	0.05	386	6.01	4.3	37	1.9	1	15.1	NS	NS		1100	2770	[488]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	<EQL (100)	669
PRW001C	Monitoring Well	LAZ_UTRAU	18-Mar-2019	9.7	0.2	290	4.25	7.2	96	5.2	7	20	43.7	265.1		13500	2200	[426]	<EQL (0.1)	0.18	<EQL (500)	<EQL (500)	[80.1]	237
PRW001DL	Monitoring Well	UAZ_UTRAU	19-Mar-2019	11.8	0.1	177	4.59	6.5	115	7.7	1	19.7	31.2	277.37		4810	3120	[638]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	104	341
PRW001DU	Monitoring Well	UAZ_UTRAU	19-Mar-2019	7.2	0.1	198	7.14	5.9	57	5.9	1	19.7	30.2	278.39		2140	3180	[537]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	[53.3]	612
PRW002C	Monitoring Well	LAZ_UTRAU	20-Mar-2019	7.2	0.1	181	3.55	5.7	33	14.7	2	17.7	44.18	265.23		804	2320	[531]	0.14	0.25	<EQL (500)	<EQL (500)	496	299
PRW002DL	Monitoring Well	UAZ_UTRAU	19-Mar-2019	9.3	0.1	341	9.24	6	64	14.1	3	18.9	32.97	276.19		850	3020	[543]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	381	376
PRW002DU	Monitoring Well	UAZ_UTRAU	19-Mar-2019	10.7	0.1	388	6.68	5.4	51	2.3	2	18.5	31.33	277.53		1170	3640	[512]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	<EQL (100)	782
PRW003C	Monitoring Well	LAZ_UTRAU	21-Mar-2019	18.9	0.1	294	4.82	5.8	59	20.2	21	19.8	44.22	265.26		932	3030	<EQL (1000)	0.12	0.15	<EQL (500)	<EQL (500)	188	312
PRW003DL	Monitoring Well	UAZ_UTRAU	19-Mar-2019	10.8	0.1	334	7.53	6.4	102	9.1	1	19.3	31.76	277.29		1190	3060	[577]	0.12	<EQL (0.1)	<EQL (500)	<EQL (500)	178	565
PRW003DU	Monitoring Well	UAZ_UTRAU	20-Mar-2019	17.1	0.1	294	5.56	5.4	58	5.5	3	19.7	30.96	278.86		3570	2820	[497]	<EQL (0.1)	0.55	<EQL (500)	<EQL (500)	[56.7]	1360
PRW004C	Monitoring Well	LAZ_UTRAU	21-Mar-2019	9.2	0.1	230	5.7	5.3	30	6.6	1	19.4	46.36	265.42		1370	2390	[497]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	361	308
PRW004DL	Monitoring Well	UAZ_UTRAU	20-Mar-2019	13.7	0.1	124	2.75	6.5	99	1.7	1	18.5	33.96	277.19		1450	2110	[644]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	<EQL (100)	393
PRW004DU	Monitoring Well	UAZ_UTRAU	20-Mar-2019	14.2	0.1	133	4.68	5.7	80	13	2	19.8	33.1	278.81		2230	3060	[652]	<EQL (0.1)	0.11	<EQL (500)	870	741	1070

Table A-1 Abbreviations and Definitions	
[##]	EPA Functional Guideline Code of 'J' was applied to the result, indicating an estimated quanity.
<PQL(##)	Constituent was below detection. The sample-specific Practical Quantitation Limit is in parentheses.
	Result exceeds applicable limit.
REJ	Result Rejected.
	Result is less than the applicable limit and without EPA Functional Guidline qualifiers.
NS	Requested to be sampled but was not. See comments as to why not.
Blue Text	Not a required sample analysis.

Table A-1 Field Comments	
C	Continuously pumping well / flowing stream
D	Dry well. No sample collected.
NS	Not sampled.
T	High turbidity. Some portions of the sample may not be analyzed.
X	Well pumped dry. Samples collected after well recovered.
N	Field parameters not stable when sample collected.
NC	No comment.

Table A-1. Baseline Data for PAGW OU RA EMR

				PRB Analytical Data																
				Geochemical											VOC					
			SAMPLE COLLECTION DATE	MANGANESE	METHANE	NITRATE	POTASSIUM	SODIUM	SULFATE	SULFIDE	TOTAL ALKALINITY (AS CACO3)	TOTAL DISSOLVED SOLIDS	TOTAL ORGANIC CARBON	TOTAL PHOSPHATES (AS P)	1,1-DICHLOROETHYLENE	CHLOROETHENE (VINYL CHLORIDE)	CIS-1,2-DICHLOROETHYLENE	TETRACHLOROETHYLENE (PCE)	TRANS-1,2-DICHLOROETHYLENE	TRICHLOROETHYLENE (TCE)
			day-month-year	ug/L	ug/L	ug/L	ug/L	mg/L	mg/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	**Well Use**	**Aquifer Zone**		430		10000									7	2	70	5	100	5
P002U	Monitoring Well	UAZ_UTRAU	19-Mar-2019	5.07	<EQL (0.5)	1710	556	3.24	0.589	<EQL (100)	[2.2]	[4290]	[467]	53.8	<EQL (1)	<EQL (1)	28.4	5.15	[0.54]	1090
P003L	Monitoring Well	UAZ_UTRAU	21-Mar-2019	[4.72]	1.8	538	1060	2	0.777	<EQL (100)	[2.4]	27100	[473]	72.9	1.96	1.1	892	[0.68]	15.3	7610
P003U	Monitoring Well	UAZ_UTRAU	20-Mar-2019	5.07	<EQL (0.5)	1880	466	3.44	0.541	<EQL (100)	[2]	<EQL (14300)	[402]	[47.7]	<EQL (1)	<EQL (1)	13.3	4.66	<EQL (1)	576
PRW001C	Monitoring Well	LAZ_UTRAU	18-Mar-2019	63.6	0.64	705	2810	3.93	1.7	<EQL (100)	40.8	111000	[463]	<EQL (50)	<EQL (1)	<EQL (1)	84.1	1.15	2.13	419
PRW001DL	Monitoring Well	UAZ_UTRAU	19-Mar-2019	9.1	1.3	442	[2940]	14.4	13.4	<EQL (100)	27.4	40000	[533]	61.6	<EQL (1)	<EQL (1)	[0.45]	[0.34]	<EQL (1)	[5.54]
PRW001DU	Monitoring Well	UAZ_UTRAU	19-Mar-2019	24.1	<EQL (0.5)	2320	[255]	7.56	1.86	<EQL (100)	9.4	<EQL (14300)	[386]	[49.6]	<EQL (1)	<EQL (1)	<EQL (1)	1.43	<EQL (1)	1.65
PRW002C	Monitoring Well	LAZ_UTRAU	20-Mar-2019	262	2	448	1410	3.84	1.88	<EQL (100)	6.8	<EQL (14300)	[427]	97.1	<EQL (1)	<EQL (1)	35	1.6	1.08	195
PRW002DL	Monitoring Well	UAZ_UTRAU	19-Mar-2019	7.72	1.9	938	652	12.2	3.74	<EQL (100)	20.2	<EQL (14300)	[390]	89.1	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	19.4
PRW002DU	Monitoring Well	UAZ_UTRAU	19-Mar-2019	5.37	<EQL (0.5)	2600	676	6.43	0.816	<EQL (100)	5	[4290]	[408]	[44.9]	<EQL (1)	<EQL (1)	<EQL (1)	2.9	<EQL (1)	[0.96]
PRW003C	Monitoring Well	LAZ_UTRAU	21-Mar-2019	72.1	1.7	856	1020	3.37	8.12	<EQL (100)	9.6	28600	[386]	78.2	<EQL (1)	<EQL (1)	138	[0.65]	2.84	664
PRW003DL	Monitoring Well	UAZ_UTRAU	19-Mar-2019	10.3	0.93	217	11000	11.5	10.1	<EQL (100)	31.8	47100	<EQL (1000)	73.6	<EQL (1)	<EQL (1)	47.5	<EQL (1)	[0.57]	686
PRW003DU	Monitoring Well	UAZ_UTRAU	20-Mar-2019	9.31	2400	2820	371	2.63	0.533	<EQL (100)	5.8	<EQL (14300)	[451]	[45.6]	<EQL (1)	<EQL (1)	5.44	1.2	<EQL (1)	176
PRW004C	Monitoring Well	LAZ_UTRAU	21-Mar-2019	55.1	<EQL (0.5)	743	929	9.88	0.828	<EQL (100)	6	27100	[371]	76.2	<EQL (1)	<EQL (1)	109	[0.86]	2.63	437
PRW004DL	Monitoring Well	UAZ_UTRAU	20-Mar-2019	7.52	2	278	16800	7.1	0.877	<EQL (100)	38.4	<EQL (14300)	[538]	54.1	<EQL (1)	<EQL (1)	2.47	[0.7]	<EQL (1)	254
PRW004DU	Monitoring Well	UAZ_UTRAU	20-Mar-2019	174	600	2570	1200	9.9	6.22	<EQL (100)	14.6	75700	[595]	58	<EQL (1)	<EQL (1)	2.08	<EQL (1)	<EQL (1)	57.7

Table A-1 Abbreviations and Definitions	
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<PQL(##)	Constituent was below detection. The sample-specific Practical Quantitation Limit is in parentheses.
	Result exceeds applicable limit.
REJ	Result Rejected.
	Result is less than the applicable limit and without EPA Functional Guidline qualifiers.
NS	Requested to be sampled but was not. See comments as to why not.
Blue Text	Not a required sample analysis.

Table A-1 Field Comments	
C	Continuously pumping well / flowing stream
D	Dry well. No sample collected.
NS	Not sampled.
T	High turbidity. Some portions of the sample may not be analyzed.
X	Well pumped dry. Samples collected after well recovered.
N	Field parameters not stable when sample collected.
NC	No comment.

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21				Field Data														PRB Analytical Data Geochemical							
			SAMPLE COLLECTION DATE	AIR TEMPERATURE	FLOW RATE	OXIDATION/REDUCTION POTENTIAL	OXYGEN	PH	SPECIFIC CONDUCTANCE	TURBIDITY	VOLUME PURGED	WATER TEMPERATURE	DEPTH TO WATER	SYNCHRONOUS MEASUREMENT DATE	SYNCHRONOUS WATER ELEVATION	SAMPLING EVENT WATER ELEVATION	Constituent	CALCIUM	CHLORIDE	DISSOLVED ORGANIC CARBON	ETHANE	ETHYLENE	FERRIC IRON	FERROUS IRON	IRON
			day-month-year	degC	gal/min	mV	mg/L	unitless	uS/cm	NTU	gal	degC	ft	day-month-year	ft	ft	Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	Well Use	Aquifer Zone						8.5									GWPS								14000
P002U[1]	Monitoring Well	UAZ_UTRAU	18-Mar-2020	18.2	0.1	-119	0.49	8.7	568	12.1	2	19.1	NS	NS	NS	NS		15500	67400	86400	84	16	540	45000	49000
			02-Jun-2020	31.4	0.1	181	7.77	7.6	513	17.6	3	22.8	NS	NS	NS	NS		15100	83100	96800	[98.2]	[13.3]	NS	NS	64900
			24-Jun-2020	25.7	0.1	-127	0.25	7.9	500	22.4	0	23.4	NS	NS	NS	NS		NS	NS	NS	53	<EQL (25)	NS	NS	NS
			04-Aug-2020	25.2	0.1	-114	8.97	7	533	98.7	5	21	NS	NS	NS	NS		14600	87200	55200	26.5	<EQL (25)	NS	NS	56700
			03-Nov-2020	17.6	0.1	-144	1.98	6.8	392	13	1	20.8	NS	NS	NS	NS		9760	NS	60220	48.8	<EQL (25)	NS	NS	43100
			08-Feb-2021	7.20	0.1	-129	11	6.6	446	14.9	3	19.2	NS	NS	NS	NS		9930	63600	NS	<EQL (25)	<EQL (25)	NS	NS	37700
P003L[1]	Monitoring Well	UAZ_UTRAU	11-Mar-2020	27.3	0.1	242	3.96	4.8	27	3.5	2	21.8	NS	NS	NS	NS		556	2190	2694	<EQL (0.1)	<EQL (0.1)	<EQL (500)	<EQL (500)	<EQL (100)
			02-Jun-2020	29.5	0.1	193.8	3.49	3.8	24	12.1	3	24.8	NS	NS	NS	NS		622	2080	[717]	<EQL (25)	<EQL (25)	NS	NS	351
			24-Jun-2020	27.2	0.1	193	12.25	4.3	22	10.1	2	21.8	NS	NS	NS	NS		NS	NS	NS	<EQL (25)	<EQL (25)	NS	NS	NS
			04-Aug-2020	29.6	0.1	208.1	10.15	4	20	14.2	3	21.7	NS	NS	NS	NS		591	2210	[640]	<EQL (25)	<EQL (25)	NS	NS	160
			03-Nov-2020	20.3	0.1	184	8.5	4.9	20	9.2	0	20.7	NS	NS	NS	NS		574	2470	[470]	<EQL (25)	<EQL (25)	NS	NS	<EQL (100)
			08-Feb-2021	10.0	0.1	207	12.1	5.3	121	8.1	2	19.1	NS	NS	NS	NS		530	2060	NS	<EQL (25)	<EQL (25)	NS	NS	<EQL (100)
P003U[1]	Monitoring Well	UAZ_UTRAU	11-Mar-2020	26.1	0.1	190	10.47	5.5	41	13.6	2	20.6	NS	NS	NS	NS		1190	2770	2594	<EQL (0.1)	0.14	<EQL (500)	<EQL (500)	<EQL (100)
			02-Jun-2020	26.5	0.1	181	7.77	4.4	34	7.6	3	21.5	NS	NS	NS	NS		1160	2640	[582]	<EQL (25)	<EQL (25)	NS	NS	110
			24-Jun-2020	26.4	0.1	178	10.3	4.6	35	7.4	1	21.6	NS	NS	NS	NS		NS	NS	NS	<EQL (25)	<EQL (25)	NS	NS	NS
			04-Aug-2020	27.2	0.1	205.3	10.03	3.9	31	6.8	2	21.1	NS	NS	NS	NS		1190	2910	[491]	<EQL (25)	<EQL (25)	NS	NS	[92.2]
			03-Nov-2020	18.7	0.1	NS	NS	5.2	35	9.3	1	22.3	NS	NS	NS	NS		1390	3040	<EQL (1000)	<EQL (25)	<EQL (25)	NS	NS	[88.3]
			08-Feb-2021	12.2	0.1	225	11.3	4.5	33	7.9	2	19.4	NS	NS	NS	NS		1070	2910	NS	<EQL (25)	<EQL (25)	NS	NS	<EQL (100)
PIW001D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	15.8	0.1	-371	-1.34	12.4	550	1.2	3	20.7	31.64	07-Jan-2020	275.335	281.395		51600	37400	78200	[47.8]	<EQL (50)	NS	NS	[52.9]
			10-Aug-2020	28.7	0.1	-137	-0.3	10.5	510	0.8	1	22.3	31.52	09-Jul-2020	281.435	281.515		59100	26600	49900	29.8	<EQL (25)	NS	NS	[49.9]
			03-Nov-2020	11.4	0.1	-547	1	11.3	474	1.4	2	20.4	34.7	09-Jul-2020	281.435	278.335		64200	23100	41600	38.1	<EQL (25)	NS	NS	107
			09-Feb-2021	22.8	0.1	-371	21.1	11.3	574	3.1	1	19.9	36.34	06-Jan-2021	276.835	276.695		69500	23400	34200	[28.9]	<EQL (50)	NS	NS	[64.1]
PIW002D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	17.2	0.1	-329	-3.87	12.2	850	1.1	2	20.6	32.92	07-Jan-2020	274.635	281.415		87800	78900	190000	118	<EQL (25)	NS	NS	286
			04-Aug-2020	21.6	0.1	-185	0.43	11.1	800	0.5	2	20.8	33.5	09-Jul-2020	281.735	280.835		99200	71900	267000	89.6	<EQL (25)	NS	NS	[65.2]
			04-Nov-2020	16.8	0.1	-309	11	11	907	1.3	1	21.2	36.07	09-Jul-2020	281.735	278.265		128000	66800	114800	61.5	<EQL (25)	NS	NS	[57]
			08-Feb-2021	12.9	0.1	-403	1	11.1	904	0.7	4	19.3	37.6	06-Jan-2021	277.005	276.735		107000	54900	62060	62.3	<EQL (25)	NS	NS	[47.7]
PIW003D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	19.1	0.1	-367	0.8	11.2	414	1.2	2	20.1	33.8	07-Jan-2020	275.13	281.63		57100	26000	42300	[58.8]	<EQL (125)	NS	NS	[90.2]
			04-Aug-2020	25.6	0.1	-222.7	0.13	10.7	341	0.3	2	21.3	34.4	09-Jul-2020	281.83	281.03		48600	22700	38500	53.4	25.7	NS	NS	110
			04-Nov-2020	21.6	0.1	-437	13	11.1	764	1	2	21.8	36.94	09-Jul-2020	281.83	278.49		62900	18900	41160	[50.4]	<EQL (125)	NS	NS	217
			08-Feb-2021	7.30	0.1	-545	1.1	11.4	551	0.5	3	20.3	38.32	06-Jan-2021	277.13	277.11		71300	17400	37000	60.8	65.2	NS	NS	[63]
PIW004D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	20.8	0.1	-357	0.6	10.9	963	12.7	2	20	35	07-Jan-2020	277.806	281.906		126000	199000	<EQL (50000)	[56.8]	<EQL (125)	NS	NS	132
			04-Aug-2020	27.7	0.1	-186.7	0.32	10.3	1214	0.4	2	21.1	35.5	09-Jul-2020	281.906	281.406		169000	151000	312000	58.1	[10.5]	NS	NS	[69.9]
			04-Nov-2020	11.2	0.1	-489.4	0.4	11.1	924	0.7	1	20	38	09-Jul-2020	281.906	278.906		140000	85700	116000	<EQL (125)	<EQL (125)	NS	NS	<EQL (100)
			10-Feb-2021	13.9	0.1	-403	2.1	10.5	950	0.5	3	19.7	39.37	06-Jan-2021	277.406	277.536		172000	113000	64960	[54.7]	<EQL (125)	NS	NS	[63.3]
PRW001C	Monitoring Well	LAZ_UTRAU	09-Mar-2020	22.8	0.2	-230	1.36	10.5	467	2.4	7	20.8	43.22	07-Jan-2020	264.35	267.33		17200	53100	41020	390	150	1100	30000	31400
			02-Jun-2020	21.6	0.2	-162	1.34	7	534	7.3	4	21	43.3	07-Jan-2020	264.35	270		23900	72200	97100	[487]	[190]	NS	NS	54500
			23-Jun-2020	23.2	0.2	-144	0.7	7	373	6.9	2	20.9	43	07-Jan-2020	264.35	270.3		NS	NS	NS	517	221	NS	NS	NS
			05-Aug-2020	26.6	0.2	-298	0.3	9.2	290	7.7	4	21.2	43.9	09-Jul-2020	265.72	269.4		15700	43600	72500	414	177	NS	NS	40100
			03-Nov-2020	23.9	0.2	-374	0.7	8.4	243	6.9	4	21.3	43.63	09-Jul-2020	265.72	269.67		15500	NS	28080	438	199	NS	NS	20400
			08-Feb-2021	13.6	0.2	-453	-1	7.3	237	8.6	6	20.6	43	06-Jan-2021	264.65	270.3		14600	35300	NS	396	195	NS	NS	35900

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21			Field Data															PRB Analytical Data – Geochemical							
			SAMPLE COLLECTION DATE	AIR TEMPERATURE	FLOW RATE	OXIDATION/REDUCTION POTENTIAL	OXYGEN	PH	SPECIFIC CONDUCTANCE	TURBIDITY	VOLUME PURGED	WATER TEMPERATURE	DEPTH TO WATER	SYNCHRONOUS MEASUREMENT DATE	SYNCHRONOUS WATER ELEVATION	SAMPLING EVENT WATER ELEVATION	Constituent	CALCIUM	CHLORIDE	DISSOLVED ORGANIC CARBON	ETHANE	ETHYLENE	FERRIC IRON	FERROUS IRON	IRON
			day-month-year	degC	gal/min	mV	mg/L	unitless	uS/cm	NTU	gal	degC	ft	day-month-year	ft	ft	Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	Well Use	Aquifer Zone						8.5									GWPS								14000
PRW001DL	Monitoring Well	UAZ_UTRAU	09-Mar-2020	22.8	0.1	198	0.24	6.2	134	13.3	2	20.1	33.05	09-Jan-2020	273.79	277.35		7490	2340	[11500]	0.12	0.29	<EQL (500)	5900	[8260]
			02-Jun-2020	26.2	0.1	-54.7	1.69	6.3	99	7.9	3	21.2	33.4	09-Jan-2020	273.79	279.79		5390	3200	4230	<EQL (25)	<EQL (25)	NS	NS	7240
			23-Jun-2020	26.7	0.1	-117	1.3	6.4	107	5.2	2	21.2	33.1	09-Jan-2020	273.79	280.09		NS	NS	NS	<EQL (25)	<EQL (25)	NS	NS	NS
			05-Aug-2020	31.6	0.1	-30	1	6.4	88	3.8	1	24.6	33.67	09-Jul-2020	280.29	279.52		4350	4450	8490	<EQL (25)	<EQL (25)	NS	NS	6700
			03-Nov-2020	24.3	0.1	-131	1.72	6.4	124	2.2	1	21.6	36.09	09-Jul-2020	280.29	277.1		7230	9590	15133	<EQL (25)	<EQL (25)	NS	NS	19600
			09-Feb-2021	17.9	0.2	126	8.6	6.2	295	5	2	20.3	36.77	06-Jan-2021	275.59	276.42		9790	16400	NS	<EQL (500)	<EQL (500)	NS	NS	32700
PRW001DU	Monitoring Well	UAZ_UTRAU	09-Mar-2020	25.8	0.1	-151.3	0.8	9.7	294	8.5	2	20.7	31.4	09-Jan-2020	275.26	278.8		6330	38500	53920	17	3.6	<EQL (500)	15000	16100
			02-Jun-2020	29.3	0.1	-134	1.15	7	188	6.2	3	21.1	31.8	09-Jan-2020	275.26	281.38		3950	25000	17100	[25.6]	<EQL (25)	NS	NS	9910
			23-Jun-2020	29.5	0.1	-130	0.3	7.1	174	6.1	2	21.3	31.5	09-Jan-2020	275.26	281.68		NS	NS	NS	<EQL (2500)	<EQL (2500)	NS	NS	NS
			05-Aug-2020	32.4	0.1	-124	0.7	7.2	142	1	1	24	32.16	09-Jul-2020	281.83	281.02		3060	18200	11800	[14.3]	<EQL (25)	NS	NS	7030
			03-Nov-2020	26.1	0.1	-159	1.05	7	135	1.2	2	21.2	34.62	09-Jul-2020	281.83	278.56		2860	13000	NS	[17.2]	<EQL (25)	NS	NS	7610
			08-Feb-2021	14.7	0.1	-176	0.4	6.9	134	0.6	2	20.8	34.52	06-Jan-2021	276.97	278.66		2580	11900	NS	[19.6]	<EQL (25)	NS	NS	6640
PRW002C	Monitoring Well	LAZ_UTRAU	10-Mar-2020	23.8	0.1	515	5.57	4.7	78	11.9	2	18.2	42.18	07-Jan-2020	264.93	268.55		8920	1070	[824]	<EQL (0.1)	<EQL (0.1)	<EQL (500)	590	256
			03-Jun-2020	30.3	0.1	90	6.87	5.7	66	14.7	2	28.1	43.83	07-Jan-2020	264.93	269.78		3600	2530	2860	<EQL (25)	<EQL (25)	NS	NS	581
			23-Jun-2020	20.7	0.1	99	7.6	5.2	62	8.4	1	21.8	43.43	07-Jan-2020	264.93	270.18		NS	NS	NS	<EQL (25)	<EQL (25)	NS	NS	NS
			05-Aug-2020	34.3	0.1	-21	1.7	6.2	80	10.4	1	23.6	44.47	09-Jul-2020	270.03	269.14		3530	4970	3020	<EQL (25)	<EQL (25)	NS	NS	4690
			03-Nov-2020	6.40	0.2	-13	7.8	7.1	119	10.1	3	20.6	46.9	09-Jul-2020	270.03	266.71		4950	NS	25360	48.3	<EQL (25)	NS	NS	49200
			08-Feb-2021	17.8	0.2	-133	3.6	6.6	449	12.4	4	20.2	46.55	06-Jan-2021	265.34	267.06		4210	38400	20040	167	36.3	NS	NS	43900
PRW002DL	Monitoring Well	UAZ_UTRAU	10-Mar-2020	15.8	0.1	316	0.15	6.1	203	6.7	3	19.9	32.53	09-Jan-2020	275	278.4		6250	16900	13660	2	0.47	570	18000	19400
			03-Jun-2020	32.6	0.1	-38	2.05	7	204	4.9	4	21.4	33.85	09-Jan-2020	275	279.84		6010	19400	6840	<EQL (500)	<EQL (500)	NS	NS	21700
			23-Jun-2020	21.4	0.1	-62	1.64	6.9	183	2.7	4	21.1	33.34	09-Jan-2020	275	280.35		NS	NS	NS	<EQL (1250)	<EQL (1250)	NS	NS	NS
			05-Aug-2020	37.9	0.1	-40	1.5	6.4	155	4.1	4	21.8	34.3	09-Jul-2020	280.19	279.39		6290	19300	5070	<EQL (25)	<EQL (25)	NS	NS	12200
			04-Nov-2020	9.60	0.2	20	1.5	6.2	138	5.1	2	20.3	36.8	09-Jul-2020	280.19	276.89		6500	12700	2000	<EQL (250)	<EQL (250)	NS	NS	4230
			10-Feb-2021	13.4	0.2	131	12	5.8	131	6.2	2	20.4	38.35	06-Jan-2021	275.49	275.34		6510	12500	2914	<EQL (250)	<EQL (250)	NS	NS	3130
PRW002DU	Monitoring Well	UAZ_UTRAU	10-Mar-2020	15.0	0.1	-100.8	6.8	8.6	65	14.1	4	19.6	31	09-Jan-2020	273.04	279.45		14100	7850	8526	1.7	0.42	<EQL (500)	4400	4410
			04-Jun-2020	23.4	0.1	-29	6.8	6.6	212	4.6	4	20.8	33.8	09-Jan-2020	273.04	279.83		6570	20900	11900	<EQL (500)	<EQL (500)	NS	NS	24500
			23-Jun-2020	22.3	0.1	133	1.31	7.9	384	13.7	3	21.3	32.3	09-Jan-2020	273.04	281.33		NS	NS	NS	25.2	<EQL (25)	NS	NS	NS
			05-Aug-2020	38.1	0.1	-186	0.2	7.7	330	7.1	4	21.9	33.2	09-Jul-2020	281.16	280.43		6490	45100	15000	26.2	<EQL (25)	NS	NS	23100
			04-Nov-2020	16.9	0.1	-110	4.3	6.8	210	6.4	1	20.6	35.7	09-Jul-2020	281.16	277.93		5410	29200	5010	<EQL (1250)	<EQL (1250)	NS	NS	18400
			10-Feb-2021	15.7	0.2	-144	0.02	6.5	224	7.8	3	20.5	37.38	06-Jan-2021	276.48	276.25		5390	30200	4822	<EQL (500)	<EQL (500)	NS	NS	17700
PRW003C	Monitoring Well	LAZ_UTRAU	10-Mar-2020	17.8	0.1	-11	74.4	7.1	120	9.5	3	19.7	42.33	07-Jan-2020	263.91	268.28		5950	14000	25800	1.6	0.31	<EQL (500)	2900	5530
			15-Jun-2020	22.7	0.2	24.5	6.8	6.7	113	7.1	3	20.4	43.5	07-Jan-2020	263.91	269.91		6650	17400	45200	<EQL (25)	<EQL (25)	NS	NS	10200
			05-Aug-2020	29.5	0.1	44.7	6.7	6.1	82	1	2	22.1	44.2	09-Jul-2020	269.99	269.21		5330	4310	[720]	<EQL (25)	<EQL (25)	NS	NS	564
			03-Nov-2020	15.1	0.2	-82	35	7.1	91	4.6	1	20.2	46.7	09-Jul-2020	269.99	266.71		4370	3740	3058	<EQL (25)	<EQL (25)	NS	NS	3370
			09-Feb-2021	12.2	0.2	-155	-0.1	6.6	278	9.1	6	20.1	44.54	06-Jan-2021	265.43	268.87		4800	34200	NS	<EQL (1250)	<EQL (1250)	NS	NS	25800
PRW003DL	Monitoring Well	UAZ_UTRAU	10-Mar-2020	23.6	0.1	-129.2	15.7	8.6	165	12	3	20.6	31.6	16-Jan-2020	274.29	279.53		4590	7730	28000	2.3	0.87	<EQL (500)	3700	3640
			15-Jun-2020	14.8	0.1	95	1.12	5.3	100	3.1	3	20.5	33.72	16-Jan-2020	274.29	280.3		2900	4500	<EQL (1000)	<EQL (50)	<EQL (50)	NS	NS	[1140]
			05-Aug-2020	25.4	0.1	190	0.44	6.2	99	5.8	1	21	34.3	09-Jul-2020	280.42	279.72		2150	4140	1600	<EQL (25)	<EQL (25)	NS	NS	[793]
			03-Nov-2020	16.0	0.1	37	29	6.4	77	5.7	1	21.4	36.75	09-Jul-2020	280.42	277.27		1740	2920	[943]	<EQL (25)	<EQL (25)	NS	NS	711
			09-Feb-2021	11.8	0.1	84	25.7	6.1	79	2.3	2	20.1	37.46	06-Jan-2021	275.75	276.56		2050	2660	NS	<EQL (25)	<EQL (25)	NS	NS	147

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

				Field Data														PRB Analytical Data / Geochemical							
			SAMPLE COLLECTION DATE	AIR TEMPERATURE	FLOW RATE	OXIDATION/REDUCTION POTENTIAL	OXYGEN	PH	SPECIFIC CONDUCTANCE	TURBIDITY	VOLUME PURGED	WATER TEMPERATURE	DEPTH TO WATER	SYNCHRONOUS MEASUREMENT DATE	SYNCHRONOUS WATER ELEVATION	SAMPLING EVENT WATER ELEVATION	Constituent	CALCIUM	CHLORIDE	DISSOLVED ORGANIC CARBON	ETHANE	ETHYLENE	FERRIC IRON	FERROUS IRON	IRON
			day-month-year	degC	gal/min	mV	mg/L	unitless	uS/cm	NTU	gal	degC	ft	day-month-year	ft	ft	Unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	Well Use	Aquifer Zone						8.5									GWPS								14000
PRW003DU	Monitoring Well	UAZ_UTRAU	11-Mar-2020	18.9	0.1	94	11.6	4.8	75	7.1	4	20.1	36.74	16-Jan-2020	276.64	274.3		4290	2860	1188	<EQL (0.1)	0.15	<EQL (500)	<EQL (500)	<EQL (100)
			15-Jun-2020	16.9	0.1	184	1.47	3.9	45	9.4	5	20.4	34.28	16-Jan-2020	276.64	279.52		2970	3480	<EQL (1000)	<EQL (250)	<EQL (250)	NS	NS	[64.4]
			05-Aug-2020	29.8	0.1	71.8	0.92	4.7	50	2.3	2	21.6	32.1	09-Jul-2020	282.43	281.7		2830	3070	1750	<EQL (25)	<EQL (25)	NS	NS	<EQL (100)
			03-Nov-2020	13.8	0.2	137	7	5	40	5.1	1	21.1	34.6	09-Jul-2020	282.43	279.2		2980	2660	[666]	<EQL (25)	<EQL (25)	NS	NS	[40]
			09-Feb-2021	12.9	0.2	129	1.4	4.6	46	4.1	2	20.1	36.38	06-Jan-2021	277.55	277.42		3100	2850	NS	<EQL (125)	<EQL (125)	NS	NS	<EQL (100)
PRW004C	Monitoring Well	LAZ_UTRAU	17-Mar-2020	11.6	0.1	5.4	11	6.2	954	2.8	3	18.3	43	07-Jan-2020	263.9	269.1		7490	[196000]	396080	66	4.7	<EQL (500)	14000	21400
			03-Jun-2020	22.3	0.2	-30.6	1.11	5.2	531	7	3	20.6	44.9	07-Jan-2020	263.9	269.99		3620	110000	204000	<EQL (250)	<EQL (250)	NS	NS	10300
			24-Jun-2020	24.6	0.2	-398	0.4	5.7	472	7.5	2	20.8	44.5	07-Jan-2020	263.9	270.39		NS	NS	NS	84.4	<EQL (25)	NS	NS	NS
			05-Aug-2020	37.1	0.1	-12.9	2.78	4.7	353	2.2	2	21.7	45.4	09-Jul-2020	270.19	269.49		2920	75200	92700	75.9	<EQL (25)	NS	NS	7060
			03-Nov-2020	13.5	0.2	-401	0	5.5	241	4.8	3	20.8	47.93	09-Jul-2020	270.19	266.96		5330	NS	NS	106	<EQL (25)	NS	NS	5550
			09-Feb-2021	9.70	0.2	-92	3.8	6.2	245	5.8	2	20	49.5	06-Jan-2021	265.67	265.39		9120	36600	30160	<EQL (750)	<EQL (750)	NS	NS	8930
PRW004DL	Monitoring Well	UAZ_UTRAU	17-Mar-2020	16.1	0.1	-163	11.54	8.8	258	11	2	21.4	33.52	09-Jan-2020	273.03	278.39		6100	2800	24400	<EQL (0.1)	0.63	<EQL (500)	11000	12500
			03-Jun-2020	27.3	0.1	-62	1.08	7.8	250	8.7	2	21.1	35.3	09-Jan-2020	273.03	279.33		6880	2400	2890	<EQL (500)	<EQL (500)	NS	NS	9250
			24-Jun-2020	27.9	0.1	-132	4.8	7.2	226	8.4	2	21.1	35	09-Jan-2020	273.03	279.63		NS	NS	NS	<EQL (500)	<EQL (500)	NS	NS	NS
			05-Aug-2020	37.8	0.1	-99.5	0.26	6.5	196	1.4	2	21.7	36.5	09-Jul-2020	279.79	278.13		6150	2620	2080	<EQL (25)	<EQL (25)	NS	NS	4840
			03-Nov-2020	15.7	0.2	-152.2	0	7.1	175	1.7	2	20.9	38.49	09-Jul-2020	279.79	276.14		7280	2490	[698]	<EQL (25)	<EQL (25)	NS	NS	4110
			09-Feb-2021	11.9	0.1	-135	3.7	6.7	188	9.4	1	20.1	39.7	06-Jan-2021	275.15	274.93		9610	3730	[997]	<EQL (50)	<EQL (50)	NS	NS	3030
PRW004DU	Monitoring Well	UAZ_UTRAU	17-Mar-2020	14.5	0.1	-133.8	10.5	8.4	125	13	3	19.9	31.51	09-Jan-2020	275.37	280.6		6090	13300	14780	7.8	2.6	<EQL (500)	24000	31500
			03-Jun-2020	30.7	0.1	-82.6	1.31	6.5	158	11.7	3	21	33.4	09-Jan-2020	275.37	281.72		6260	6870	4830	<EQL (250)	<EQL (250)	NS	NS	25700
			24-Jun-2020	29.8	0.1	-106	2.8	6.6	145	11.1	2	20.8	33.1	09-Jan-2020	275.37	282.02		NS	NS	NS	<EQL (500)	<EQL (500)	NS	NS	NS
			05-Aug-2020	32.8	0.1	-39	0.63	6	122	14.3	2	23	33.5	09-Jul-2020	282.29	281.62		3870	4770	2000	[11.8]	<EQL (25)	NS	NS	20300
			03-Nov-2020	18.4	0.2	-183	0	6.3	96	7.9	2	20.9	35.96	09-Jul-2020	282.29	279.16		2560	3770	1724	[24.2]	<EQL (25)	NS	NS	20800
			09-Feb-2021	13.4	0.1	-75	3.2	6	100	9.8	1	20.1	37.9	06-Jan-2021	277.46	277.22		2340	3490	1520	<EQL (500)	<EQL (500)	NS	NS	18600
PRW005DL	Monitoring Well	UAZ_UTRAU	23-Jul-2020	29.2	0.2	44	6.37	5.6	51	1.1	3	21.7	32.96	09-Jul-2020	280.19	279.75		1480	4270	1930	<EQL (25)	<EQL (25)	NS	NS	1270
			04-Aug-2020	33.3	0.2	36.7	5.91	5.3	46	1.8	2	22	33.2	09-Jul-2020	280.19	279.51		1390	4220	1750	<EQL (25)	<EQL (25)	NS	NS	1180
			04-Nov-2020	11.1	0.2	-16	66	5.2	39	1.5	1	20.7	35.86	09-Jul-2020	280.19	276.85		1440	4080	[898]	<EQL (25)	<EQL (25)	NS	NS	1160
			09-Feb-2021	17.2	0.1	53	5.5	5.2	43	1.2	1	20.7	37.5	09-Jul-2020	275.45	275.21		1140	4690	NS	<EQL (25)	<EQL (25)	NS	NS	1350
PRW005DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	32.1	0.1	-151	2.3	6.6	331	1.3	3	21.2	30.97	09-Jul-2020	282.37	281.93		2490	56400	11900	[11]	<EQL (25)	NS	NS	22900
			04-Aug-2020	32.8	0.2	-126.5	1.04	6.8	378	1.2	2	21.4	31.2	09-Jul-2020	282.37	281.7		2100	42000	8080	<EQL (25)	<EQL (25)	NS	NS	18800
			04-Nov-2020	11.1	0.2	-86	60	5.9	22	7.7	1	20.4	33.9	09-Jul-2020	282.37	279		1480	28800	1346	<EQL (125)	<EQL (125)	NS	NS	16100
			09-Feb-2021	15.9	0.1	-100	4.1	6.1	114	5.1	1	20.6	35.5	09-Jul-2020	277.55	277.4		814	17200	NS	<EQL (25)	<EQL (25)	NS	NS	9840
PRW006C	Monitoring Well	LAZ_UTRAU	23-Jul-2020	26.9	0.1	182	5.9	4.9	21	3.9	1	21.7	62.5	09-Jul-2020	268.15	267.58		721	2240	1790	<EQL (25)	<EQL (25)	NS	NS	225
			10-Aug-2020	33.5	0.1	80	8.1	5	27	0.7	1	24.7	62.96	09-Jul-2020	268.15	267.12		603	2030	[659]	<EQL (25)	<EQL (25)	NS	NS	[52.9]
			10-Feb-2021	16.7	0.1	209	96.4	4.9	16	0.8	1	20.2	66.6	09-Jul-2020	263.62	263.48		413	2570	NS	<EQL (25)	<EQL (25)	NS	NS	<EQL (100)
PRW006DL	Monitoring Well	UAZ_UTRAU	01-Jun-2020	26.7	2.5	173.3	5.98	4.9	45	1	398	23.5	47.6	NS	NS	282.65		NS	2830	NS	NS	NS	NS	NS	NS
			23-Jul-2020	29.8	0.1	216	6.1	4.2	39	2.3	1	21.2	49.5	09-Jul-2020	277.59	280.75		1220	2970	[806]	<EQL (25)	<EQL (25)	NS	NS	188
			10-Aug-2020	39.7	0.1	150	7.7	4.2	45	1	2	21.4	53.83	09-Jul-2020	277.59	276.42		1100	2770	1290	<EQL (25)	<EQL (25)	NS	NS	<EQL (100)
			10-Feb-2021	13.9	0.1	117	69	4.9	33	0.9	1	20.1	57.68	09-Jul-2020	272.71	272.57		<EQL (200)	[3250]	NS	<EQL (25)	<EQL (25)	NS	NS	<EQL (100)

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

				Field Data														PRB Analytical Data – Geochemical							
			SAMPLE COLLECTION DATE	AIR TEMPERATURE	FLOW RATE	OXIDATION/REDUCTION POTENTIAL	OXYGEN	PH	SPECIFIC CONDUCTANCE	TURBIDITY	VOLUME PURGED	WATER TEMPERATURE	DEPTH TO WATER	SYNCHRONOUS MEASUREMENT DATE	SYNCHRONOUS WATER ELEVATION	SAMPLING EVENT WATER ELEVATION	**Constituent**	CALCIUM	CHLORIDE	DISSOLVED ORGANIC CARBON	ETHANE	ETHYLENE	FERRIC IRON	FERROUS IRON	IRON
			day-month-year	degC	gal/min	mV	mg/L	unitless	uS/cm	NTU	gal	degC	ft	day-month-year	ft	ft	**Unit**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	**Well Use**	**Aquifer Zone**						8.5									**GWPS**								14000
PRW006DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	33.6	0.1	145	4.2	5	82	8.3	1	21	47.6	09-Jul-2020	281.37	282.72		4130	7230	1130	<EQL (25)	<EQL (25)	NS	NS	1090
			10-Aug-2020	39.1	0.1	148	2.9	4.6	94	10.6	2	21.3	49.82	09-Jul-2020	281.37	280.5		3640	7060	1800	<EQL (25)	<EQL (25)	NS	NS	351
			10-Feb-2021	15.6	0.1	235	35	5.2	70	5.2	2	20.2	53.7	09-Jul-2020	276.74	276.62		2370	5620	NS	<EQL (25)	<EQL (25)	NS	NS	123
PRW007DL	Monitoring Well	UAZ_UTRAU	23-Jul-2020	32.6	0.1	50	2.3	5.9	140	6.8	2	21	37.89	09-Jul-2020	279.3	278.89		5090	6980	1680	<EQL (25)	<EQL (25)	NS	NS	523
			04-Aug-2020	31.3	0.1	115.4	1.31	5.4	115	2.5	3	21	38.1	09-Jul-2020	279.3	278.68		4600	7020	[629]	<EQL (25)	<EQL (25)	NS	NS	201
			03-Nov-2020	10.8	0.1	56	3.2	5.9	101	5.2	2	20.1	40.4	09-Jul-2020	279.3	276.38		2540	6130	[409]	<EQL (25)	<EQL (25)	NS	NS	146
			10-Feb-2021	22.9	0.1	151	35	5.4	74	3.6	2	20.3	41.77	09-Jul-2020	274.94	275.01		1860	5260	NS	<EQL (25)	<EQL (25)	NS	NS	[70.1]
PRW007DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	33.2	0.1	33	1.9	5.3	173	10.4	5	20.4	35.37	09-Jul-2020	281.53	281.06		4050	15200	3740	[12.9]	<EQL (25)	NS	NS	5270
			04-Aug-2020	32.5	0.1	130	1.35	5.3	158	4.9	3	21	35.6	09-Jul-2020	281.53	280.83		3840	14800	2370	[13]	<EQL (25)	NS	NS	3310
			03-Nov-2020	19.1	0.1	54	2.2	5.3	103	4.7	1	20.2	38	09-Jul-2020	281.53	278.43		2220	7600	[987]	<EQL (25)	<EQL (25)	NS	NS	[90.9]
			10-Feb-2021	21.2	0.1	127	1	5.2	94	3.5	2	20.1	38.27	09-Jul-2020	276.9	278.16		2780	14200	NS	[11.1]	<EQL (25)	NS	NS	4560

1 P002U, P003U, and P003L monitoring well diameter is too small to accomadate a water depth tape for Depth to Water measurements.

Table A-2 Abbreviations and Definitions	
[##]	EPA Functional Guideline Code of 'J' was applied to the result, indicating an estimated quanity.
<PQL(##)	Constituent was below detection. The sample-specific Practical Quantitation Limit is in parentheses.
	Result exceeds applicable limit.
REJ	Result Rejected.
	Result is less than the applicable limit and without EPA Functional Guidline qualifiers.
NS	Requested to be sampled but was not. See comments as to why not.
Blue Text	Not a required sample analysis.

Table A-2 Field Comments	
C	Continuously pumping well / flowing stream
D	Dry well. No sample collected.
NS	Not sampled.
T	High turbidity. Some portions of the sample may not be analyzed.
X	Well pumped dry. Samples collected after well recovered.
N	Field parameters not stable when sample collected.
NC	No comment.

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

				PRB Analytical Data																	
				Geochemical												VOC					
			SAMPLE COLLECTION DATE	MAGNESIUM	MANGANESE	METHANE	NITRATE-NITRITE AS NITROGEN	POTASSIUM	SODIUM	SULFATE	SULFIDE	TOTAL ALKALINITY (AS CACO3)	TOTAL DISSOLVED SOLIDS	TOTAL ORGANIC CARBON	TOTAL PHOSPHATES (AS P)	1,1-DICHLOROETHYLENE	CHLOROETHENE (VINYL CHLORIDE)	CIS-1,2-DICHLOROETHYLENE	TETRACHLOROETHYLENE (PCE)	TRANS-1,2-DICHLOROETHYLENE	TRICHLOROETHYLENE (TCE)
			day-month-year	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	Well Use	Aquifer Zone			430		10									7	2	70	5	100	5
P002U[1]	Monitoring Well	UAZ_UTRAU	18-Mar-2020	8770	4770	95	<EQL (0.25)	1280	71.4	1.24	<EQL (100)	132	333000	138800	101	<EQL (1)	<EQL (1)	16.9	4.39	2.86	478
			02-Jun-2020	8930	4110	[788]	[0.026]	1290	84.4	0.68	<EQL (100)	110	339000	90300	189	[0.43]	<EQL (1)	120	2.57	2.44	212
			24-Jun-2020	NS	NS	929	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			04-Aug-2020	8620	3040	747	<EQL (0.5)	1080	83.3	4.12	<EQL (100)	103	361000	94867	[73.1]	<EQL (1)	<EQL (1)	77.5	[0.53]	[0.88]	35.3
			03-Nov-2020	5520	2070	1520	NS	790	53	0.718	NS	67.5	250000	39420	NS	<EQL (1)	<EQL (1)	142	<EQL (1)	[0.49]	8.56
			08-Feb-2021	5500	1600	183	NS	867	66.1	NS	NS	NS	NS	72480	NS	<EQL (2)	<EQL (2)	40	<EQL (2)	<EQL (2)	3.62
P003L[1]	Monitoring Well	UAZ_UTRAU	11-Mar-2020	370	[2.85]	0.55	[0.591]	1100	2.03	0.734	<EQL (100)	4.7	30000	[477]	[143]	2.02	1.38	836	1.04	15.7	6920
			02-Jun-2020	398	5.02	<EQL (25)	0.534	1270	2.16	0.623	<EQL (100)	4.5	31400	[687]	150	<EQL (500)	<EQL (500)	595	<EQL (500)	<EQL (500)	4680
			24-Jun-2020	NS	NS	[20.8]	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			04-Aug-2020	383	[3.22]	<EQL (25)	0.613	1160	2	0.633	<EQL (100)	4	14300	[556]	[58.2]	[0.89]	[0.53]	709	[0.35]	11.2	4370
			03-Nov-2020	373	[3.65]	<EQL (25)	NS	1210	1.99	0.689	NS	[3.98]	[22900]	<EQL (1000)	NS	<EQL (50)	<EQL (50)	561	<EQL (50)	<EQL (50)	3240
			08-Feb-2021	339	[2.76]	29.1	NS	1120	1.79	NS	NS	NS	NS	[658]	NS	<EQL (50)	<EQL (50)	470	<EQL (50)	<EQL (50)	3260
P003U[1]	Monitoring Well	UAZ_UTRAU	11-Mar-2020	707	5.46	<EQL (0.5)	[2.17]	480	3.56	0.678	<EQL (100)	3.72	31400	[453]	[137]	<EQL (1)	<EQL (1)	[5.4]	3.79	<EQL (1)	477
			02-Jun-2020	707	5.77	<EQL (25)	2.04	573	3.7	0.569	<EQL (100)	3.52	30000	[338]	160	<EQL (20)	<EQL (20)	[9.8]	<EQL (20)	<EQL (20)	698
			24-Jun-2020	NS	NS	<EQL (25)	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			04-Aug-2020	678	5.89	[12.6]	2.21	527	3.81	0.475	<EQL (100)	3.33	24300	[458]	[64.5]	<EQL (20)	<EQL (20)	[8.2]	<EQL (20)	<EQL (20)	362
			03-Nov-2020	775	[7.00]	<EQL (25)	NS	600	3.69	1.41	NS	2	58600	<EQL (1000)	NS	<EQL (10)	<EQL (10)	11.7	<EQL (10)	<EQL (10)	571
			08-Feb-2021	629	5.17	[20.3]	NS	525	3.45	NS	NS	NS	NS	[711]	NS	<EQL (10)	<EQL (10)	10.5	<EQL (10)	<EQL (10)	522
PIW001D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	272	[2.34]	647	<EQL (0.05)	9870	42.9	0.556	<EQL (100)	156	303000	51780	<EQL (50)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
			10-Aug-2020	41.4	[1.52]	709	<EQL (0.05)	12100	27.6	0.669	<EQL (100)	186	307000	47160	88.2	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
			03-Nov-2020	49.8	[4.16]	573	<EQL (0.05)	7900	20.4	0.666	<EQL (100)	173	316000	35480	<EQL (50)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
			09-Feb-2021	43.9	[1.93]	614	<EQL (0.05)	5890	15	0.587	<EQL (100)	172	274000	32800	<EQL (50)	<EQL (1)	<EQL (1)	[0.56]	<EQL (1)	<EQL (1)	12.9
PIW002D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	852	123	239	<EQL (0.05)	6370	78.2	1.2	<EQL (100)	226	471000	233600	[145]	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	[0.66]
			04-Aug-2020	322	8.89	475	0.0738	5490	61.6	1.28	<EQL (100)	226	540000	238800	[67]	<EQL (1)	<EQL (1)	[0.47]	<EQL (1)	<EQL (1)	<EQL (1)
			04-Nov-2020	80.2	[2.76]	474	<EQL (0.05)	5780	55.7	1.28	<EQL (100)	276	594000	137400	59.2	<EQL (1)	<EQL (1)	[0.51]	<EQL (1)	<EQL (1)	2.42
			08-Feb-2021	191	[1.78]	469	<EQL (0.05)	3620	36.9	1.32	<EQL (100)	225	499000	72120	73.2	<EQL (1)	<EQL (1)	1.02	<EQL (1)	<EQL (1)	17.9
PIW003D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	123	7.13	934	<EQL (0.05)	2740	18.5	0.815	<EQL (100)	127	240000	463200	[106]	<EQL (1)	<EQL (1)	1.99	<EQL (1)	<EQL (1)	1.21
			04-Aug-2020	145	5.38	1190	<EQL (0.05)	2280	18.6	0.742	<EQL (100)	115	226000	48780	[66.3]	<EQL (1)	<EQL (1)	1.94	<EQL (1)	<EQL (1)	[0.67]
			04-Nov-2020	55.5	6.77	1180	<EQL (0.05)	2460	16.7	0.655	<EQL (100)	152	279000	32400	[46.8]	<EQL (1)	<EQL (1)	8.7	<EQL (1)	<EQL (1)	5.03
			08-Feb-2021	[21.3]	[2.87]	1600	<EQL (0.05)	1770	10.4	0.704	<EQL (100)	158	303000	36500	[22.4]	<EQL (1)	[0.84]	29.6	<EQL (1)	<EQL (1)	18
PIW004D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	57.1	12.4	989	<EQL (0.05)	12600	158	1.7	<EQL (100)	319	813000	210000	[97.3]	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
			04-Aug-2020	83.5	5.15	1330	<EQL (0.05)	9730	93.3	2.23	<EQL (100)	371	997000	302800	[50.8]	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
			04-Nov-2020	55.1	[2.54]	1330	<EQL (0.05)	6650	62.1	0.739	<EQL (100)	304	723000	122600	54.6	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
			10-Feb-2021	[21]	[2.49]	1520	<EQL (0.05)	4710	33.9	0.927	<EQL (100)	306	716000	69140	284	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
PRW001C	Monitoring Well	LAZ_UTRAU	09-Mar-2020	1420	294	1200	<EQL (0.05)	1520	52.1	[0.305]	<EQL (100)	78.3	321000	60880	[118]	<EQL (1)	[0.73]	34.3	[0.78]	[0.42]	66.5
			02-Jun-2020	3510	605	[2280]	[0.0241]	2170	61.5	[0.182]	<EQL (100)	97.1	347000	93817	143	<EQL (1)	[1.28]	23.2	<EQL (1)	<EQL (1)	21.9
			23-Jun-2020	NS	NS	283	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	3150	519	[2200]	<EQL (2.5)	1620	49.5	0.763	<EQL (100)	61.4	213000	47633	[165]	<EQL (1)	[0.67]	24.2	<EQL (1)	<EQL (1)	10.1
			03-Nov-2020	2110	416	5320	NS	3930	34.2	[0.339]	NS	55.7	160000	26500	NS	<EQL (1)	[0.87]	27.9	<EQL (1)	<EQL (1)	8.56
			08-Feb-2021	1980	556	8020	NS	1960	31	NS	NS	NS	NS	23150	NS	<EQL (1)	[0.99]	38.7	<EQL (1)	<EQL (1)	2.51

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

				PRB Analytical Data																	
				Geochemical												VOC					
			SAMPLE COLLECTION DATE	MAGNESIUM	MANGANESE	METHANE	NITRATE-NITRITE AS NITROGEN	POTASSIUM	SODIUM	SULFATE	SULFIDE	TOTAL ALKALINITY (AS CACO3)	TOTAL DISSOLVED SOLIDS	TOTAL ORGANIC CARBON	TOTAL PHOSPHATES (AS P)	1,1-DICHLOROETHYLENE	CHLOROETHENE (VINYL CHLORIDE)	CIS-1,2-DICHLOROETHYLENE	TETRACHLOROETHYLENE (PCE)	TRANS-1,2-DICHLOROETHYLENE	TRICHLOROETHYLENE (TCE)
			day-month-year	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	Well Use	Aquifer Zone			430		10									7	2	70	5	100	5
PRW001DL	Monitoring Well	UAZ_UTRAU	09-Mar-2020	[1100]	[219]	16	<EQL (0.05)	[6090]	15.4	0.967	<EQL (100)	55.4	104000	7580	109	<EQL (1)	<EQL (1)	<EQL (1)	[0.84]	<EQL (1)	1.45
			02-Jun-2020	1520	318	[295]	<EQL (0.05)	6010	9.42	2.22	<EQL (100)	44.6	67100	3842	86.9	<EQL (1)	<EQL (1)	<EQL (1)	[0.39]	<EQL (1)	1.28
			23-Jun-2020	NS	NS	50.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	1900	256	28.6	<EQL (0.05)	4750	8.26	4.42	<EQL (100)	41.1	37100	2132	[90.6]	<EQL (1)	<EQL (1)	[0.95]	<EQL (1)	<EQL (1)	13.7
			03-Nov-2020	3790	387	268	NS	3240	11.9	1.64	NS	60.9	100000	11233	NS	<EQL (1)	<EQL (1)	1.11	<EQL (1)	<EQL (1)	1.87
			09-Feb-2021	5110	581	6020	NS	3570	18	NS	NS	NS	NS	16200	NS	<EQL (1)	<EQL (1)	[0.74]	<EQL (1)	<EQL (1)	12.1
PRW001DU	Monitoring Well	UAZ_UTRAU	09-Mar-2020	3120	914	8900	<EQL (0.05)	867	47.6	[0.199]	<EQL (100)	56.4	174000	44260	[156]	<EQL (1)	<EQL (1)	8.65	<EQL (1)	<EQL (1)	2
			02-Jun-2020	2240	467	[9440]	[0.0319]	677	31.2	[0.154]	<EQL (100)	36	101000	15980	226	<EQL (1)	<EQL (1)	3.92	<EQL (1)	<EQL (1)	<EQL (1)
			23-Jun-2020	NS	NS	12800	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	1820	344	9650	<EQL (0.05)	332	21.5	<EQL (0.4)	<EQL (100)	32.3	97100	9762	[111]	<EQL (1)	<EQL (1)	4.84	<EQL (1)	<EQL (1)	6.26
			03-Nov-2020	1720	318	7620	NS	423	18.5	[0.239]	NS	30.4	67100	7346	NS	<EQL (1)	<EQL (1)	10.7	[0.4]	<EQL (1)	3.41
			08-Feb-2021	1490	309	8440	NS	322	15.4	NS	NS	NS	NS	5738	NS	<EQL (1)	<EQL (1)	10.7	<EQL (1)	<EQL (1)	1.45
PRW002C	Monitoring Well	LAZ_UTRAU	10-Mar-2020	403	27.9	1.4	[0.362]	2710	3.66	2.06	<EQL (100)	31.1	95700	[657]	74.4	<EQL (1)	<EQL (1)	[0.95]	<EQL (1)	<EQL (1)	9.19
			03-Jun-2020	281	151	[14]	0.297	4980	4.83	1.27	<EQL (100)	24	60000	[547]	149	<EQL (5)	<EQL (5)	40.4	<EQL (5)	<EQL (5)	221
			23-Jun-2020	NS	NS	37.5	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	489	327	143	0.15	7020	7.18	0.521	<EQL (100)	31.9	15700	1310	[63.2]	<EQL (5)	<EQL (5)	103	<EQL (5)	<EQL (5)	195
			03-Nov-2020	1560	676	2950	NS	4870	13.6	[0.282]	NS	41.6	144000	21780	NS	<EQL (2)	<EQL (2)	130	<EQL (2)	[0.92]	145
			08-Feb-2021	1930	572	5290	NS	19100	42.3	NS	NS	NS	NS	13040	NS	<EQL (2.5)	<EQL (2.5)	120	<EQL (2.5)	<EQL (2.5)	82.8
PRW002DL	Monitoring Well	UAZ_UTRAU	10-Mar-2020	2490	472	3900	[0.0211]	5260	21	[0.319]	<EQL (100)	61.4	110000	12780	135	<EQL (1)	<EQL (1)	23.9	<EQL (1)	<EQL (1)	8.72
			03-Jun-2020	2640	537	[7320]	0.0954	3950	19.6	[0.357]	<EQL (100)	64.2	163000	6462	184	<EQL (1)	<EQL (1)	12.5	<EQL (1)	<EQL (1)	10.3
			23-Jun-2020	NS	NS	7930	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	2400	525	7920	0.174	3460	19.4	0.55	<EQL (100)	49.5	82900	3772	[96.2]	<EQL (1)	<EQL (1)	9.22	<EQL (1)	<EQL (1)	9.69
			04-Nov-2020	1830	381	2660	NS	9700	19.1	0.68	NS	51.5	100000	1520	NS	<EQL (1)	<EQL (1)	2.92	<EQL (1)	<EQL (1)	7.44
			10-Feb-2021	1610	364	[2320]	NS	9990	15.4	NS	NS	NS	NS	1620	NS	<EQL (1)	<EQL (1)	[2.73]	<EQL (1)	<EQL (1)	[7.42]
PRW002DU	Monitoring Well	UAZ_UTRAU	10-Mar-2020	1400	262	580	<EQL (0.05)	2770	9.78	2.62	<EQL (100)	49.1	104000	8362	101	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	[0.85]
			04-Jun-2020	[2740]	700	[6740]	0.115	3650	23.6	0.493	<EQL (100)	57	116000	10440	87.9	<EQL (1)	<EQL (1)	15.6	<EQL (1)	<EQL (1)	11
			23-Jun-2020	NS	NS	14700	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	3760	370	17200	<EQL (0.5)	1740	50.9	<EQL (0.4)	<EQL (100)	72.8	149000	15080	[78.1]	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	2.98
			04-Nov-2020	3010	365	13400	NS	1130	39.4	[0.28]	NS	54.1	143000	4936	NS	<EQL (1)	<EQL (1)	[0.38]	<EQL (1)	<EQL (1)	5.04
			10-Feb-2021	2710	316	[6900]	NS	813	31.1	NS	NS	NS	NS	4100	NS	<EQL (1)	<EQL (1)	[0.62]	<EQL (1)	<EQL (1)	2.11
PRW003C	Monitoring Well	LAZ_UTRAU	10-Mar-2020	713	318	9.9	[0.285]	6260	15.5	1.14	<EQL (100)	37.6	52900	26420	88	<EQL (1)	[0.37]	103	[0.63]	2.61	467
			15-Jun-2020	799	395	463	0.192	4340	23.3	1.39	<EQL (100)	40.9	87100	39550	<EQL (50)	<EQL (1)	<EQL (1)	80	<EQL (1)	1.67	[202]
			05-Aug-2020	338	28.4	96.9	0.328	6700	10.3	1.58	<EQL (100)	34.8	35700	[541]	[90.1]	<EQL (4)	<EQL (4)	60.9	<EQL (4)	[1.88]	150
			03-Nov-2020	483	72.1	498	NS	6300	8.08	1.88	NS	30.8	[55700]	3196	NS	<EQL (1)	<EQL (1)	66.9	<EQL (1)	1.63	78.1
			09-Feb-2021	1450	539	19300	NS	3360	36.5	NS	NS	NS	NS	24600	NS	<EQL (1)	<EQL (1)	36.6	<EQL (1)	[0.63]	26.1
PRW003DL	Monitoring Well	UAZ_UTRAU	10-Mar-2020	1440	361	88	<EQL (0.05)	13500	20.1	[0.242]	<EQL (100)	62	159000	26180	100	<EQL (1)	<EQL (1)	188	<EQL (1)	[0.46]	164
			15-Jun-2020	896	148	488	<EQL (0.05)	13100	10.5	1.29	<EQL (100)	40.9	60000	[875]	[164]	[0.66]	<EQL (1)	362	<EQL (1)	[0.6]	205
			05-Aug-2020	866	85.1	[571]	[0.0325]	12200	9.9	1.21	<EQL (100)	37.6	41400	[780]	<EQL (50)	<EQL (5)	<EQL (5)	428	<EQL (5)	<EQL (5)	258
			03-Nov-2020	637	30.7	[18.3]	NS	13100	8.92	1.63	NS	37	67100	[589]	NS	<EQL (5)	<EQL (5)	190	<EQL (5)	<EQL (5)	606
			09-Feb-2021	434	6.36	[23.4]	NS	10500	7.19	NS	NS	NS	NS	1030	NS	<EQL (10)	<EQL (10)	75.2	<EQL (10)	<EQL (10)	704

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

				PRB Analytical Data																	
				Geochemical												VOC					
			SAMPLE COLLECTION DATE	MAGNESIUM	MANGANESE	METHANE	NITRATE-NITRITE AS NITROGEN	POTASSIUM	SODIUM	SULFATE	SULFIDE	TOTAL ALKALINITY (AS CACO3)	TOTAL DISSOLVED SOLIDS	TOTAL ORGANIC CARBON	TOTAL PHOSPHATES (AS P)	1,1-DICHLOROETHYLENE	CHLOROETHENE (VINYL CHLORIDE)	CIS-1,2-DICHLOROETHYLENE	TETRACHLOROETHYLENE (PCE)	TRANS-1,2-DICHLOROETHYLENE	TRICHLOROETHYLENE (TCE)
			day-month-year	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	**Well Use**	**Aquifer Zone**			430		10									7	2	70	5	100	5
PRW003DU	Monitoring Well	UAZ_UTRAU	11-Mar-2020	1360	10.6	2700	[2.73]	346	2.66	0.635	<EQL (100)	9.39	55700	[510]	[130]	<EQL (1)	<EQL (1)	7.48	1.31	<EQL (1)	232
			15-Jun-2020	1330	9.06	2820	2.67	358	2.78	[0.338]	<EQL (100)	5.48	17100	<EQL (1000)	<EQL (50)	<EQL (1)	<EQL (1)	6.11	1.07	<EQL (1)	[209]
			05-Aug-2020	1290	7.71	3620	2.5	333	2.68	0.439	<EQL (100)	7.44	5710	[985]	[83.3]	<EQL (4)	<EQL (4)	7.92	<EQL (4)	<EQL (4)	209
			03-Nov-2020	1230	8.04	2300	NS	368	2.5	0.405	NS	5.77	[44300]	[497]	NS	<EQL (4)	<EQL (4)	9.4	<EQL (4)	<EQL (4)	215
			09-Feb-2021	1300	12.6	2310	NS	406	2.51	[0.34]	NS	NS	NS	[672]	NS	<EQL (4)	<EQL (4)	9.24	<EQL (4)	<EQL (4)	287
PRW004C	Monitoring Well	LAZ_UTRAU	17-Mar-2020	2840	292	190	<EQL (0.05)	2920	203	1.01	<EQL (100)	62.6	783000	384600	[125]	<EQL (1)	<EQL (1)	4.02	<EQL (1)	<EQL (1)	7.08
			03-Jun-2020	1080	87.4	[3370]	<EQL (0.05)	1910	114	[0.315]	<EQL (100)	64	484000	202333	175	<EQL (1)	<EQL (1)	2.52	<EQL (1)	<EQL (1)	4.39
			24-Jun-2020	NS	NS	3830	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	1230	90.5	8850	<EQL (0.05)	1090	68.7	[0.215]	<EQL (100)	43.4	319000	84660	[108]	<EQL (1)	<EQL (1)	2.52	<EQL (1)	<EQL (1)	2.85
			03-Nov-2020	1550	84.5	10800	NS	3440	49.1	<EQL (0.4)	NS	37.8	206000	47680	NS	<EQL (1)	<EQL (1)	6.38	<EQL (1)	<EQL (1)	[0.92]
			09-Feb-2021	1790	184	8580	NS	4230	31.9	NS	NS	NS	NS	31600	NS	<EQL (1)	<EQL (1)	5.69	<EQL (1)	<EQL (1)	6.97
PRW004DL	Monitoring Well	UAZ_UTRAU	17-Mar-2020	1300	264	350	<EQL (0.05)	22400	27.9	[0.139]	<EQL (100)	93	169000	28500	[177]	[0.43]	<EQL (1)	153	<EQL (1)	<EQL (1)	7.04
			03-Jun-2020	1670	307	[6180]	<EQL (0.05)	33700	29.6	<EQL (0.4)	<EQL (100)	113	186000	2254	197	<EQL (2)	<EQL (2)	141	<EQL (2)	<EQL (2)	<EQL (2)
			24-Jun-2020	NS	NS	5190	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	1350	271	2810	<EQL (0.05)	24500	22.2	[0.27]	<EQL (100)	87.5	74300	[781]	[102]	<EQL (2)	<EQL (2)	147	<EQL (2)	<EQL (2)	8.78
			03-Nov-2020	1130	220	882	NS	23600	18.5	<EQL (0.4)	NS	89.7	90000	[764]	NS	<EQL (2)	<EQL (2)	170	<EQL (2)	<EQL (2)	25.1
			09-Feb-2021	941	190	694	NS	19900	15.1	[0.189]	NS	NS	NS	[986]	NS	<EQL (2)	<EQL (2)	180	<EQL (2)	<EQL (2)	10.9
PRW004DU	Monitoring Well	UAZ_UTRAU	17-Mar-2020	3230	3750	3000	<EQL (0.05)	1100	14.7	[0.227]	<EQL (100)	50.5	109000	14680	[117]	<EQL (1)	<EQL (1)	39.8	<EQL (1)	<EQL (1)	6.74
			03-Jun-2020	2230	2320	[4770]	<EQL (0.05)	957	5.87	[0.224]	<EQL (100)	44	91400	4368	182	<EQL (1)	<EQL (1)	24.3	<EQL (1)	<EQL (1)	1.65
			24-Jun-2020	NS	NS	4920	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
			05-Aug-2020	1750	1920	5770	<EQL (0.25)	768	3.89	[0.248]	<EQL (100)	28.6	27100	1754	[97.1]	<EQL (1)	<EQL (1)	17.7	<EQL (1)	<EQL (1)	8.61
			03-Nov-2020	1470	1480	4700	NS	395	2.93	[0.24]	NS	35.8	64300	1162	NS	<EQL (1)	<EQL (1)	11.1	<EQL (1)	<EQL (1)	3.4
			09-Feb-2021	1150	1390	3680	NS	668	2.55	NS	NS	NS	NS	1330	NS	<EQL (1)	<EQL (1)	18.2	<EQL (1)	<EQL (1)	[0.55]
PRW005DL	Monitoring Well	UAZ_UTRAU	23-Jul-2020	918	137	[26.8]	[0.818]	374	5.19	3.05	<EQL (100)	8.22	31400	[636]	[525]	<EQL (1)	<EQL (1)	<EQL (1)	[0.39]	<EQL (1)	[0.35]
			04-Aug-2020	828	127	35.9	0.818	[294]	4.94	2.67	<EQL (100)	7.44	18600	[688]	[71.7]	<EQL (1)	<EQL (1)	<EQL (1)	[0.48]	<EQL (1)	[0.45]
			04-Nov-2020	910	94.3	25.5	NS	317	6.15	1.86	NS	6.97	60000	[487]	NS	<EQL (1)	<EQL (1)	<EQL (1)	[0.36]	<EQL (1)	1.52
			09-Feb-2021	661	139	43.7	NS	[249]	4.66	NS	NS	NS	NS	[935]	NS	<EQL (1)	<EQL (1)	[0.41]	<EQL (1)	<EQL (1)	[0.49]
PRW005DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	1370	4770	[3320]	<EQL (0.05)	1330	47.8	[0.371]	<EQL (100)	44	156000	11683	[567]	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
			04-Aug-2020	1100	3110	3760	<EQL (0.25)	1090	37.4	[0.228]	<EQL (100)	39.7	153000	7646	[62.3]	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)
			04-Nov-2020	1010	1580	1120	NS	1130	29.6	2.54	NS	34.8	124000	1244	NS	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	2.45
			09-Feb-2021	560	878	410	NS	598	14.9	NS	NS	NS	NS	1078	NS	<EQL (1)	<EQL (1)	[0.94]	<EQL (1)	<EQL (1)	[0.37]
PRW006C	Monitoring Well	LAZ_UTRAU	23-Jul-2020	207	118	[10.6]	[0.0232]	576	2.66	3.01	<EQL (100)	3.13	5710	[439]	[554]	<EQL (1)	<EQL (1)	3.86	<EQL (1)	<EQL (1)	24.3
			10-Aug-2020	199	94.1	<EQL (25)	<EQL (0.05)	433	2.32	3.67	<EQL (100)	2.35	12900	[404]	93.3	<EQL (1)	<EQL (1)	4.56	<EQL (1)	<EQL (1)	26.9
			10-Feb-2021	206	49.9	<EQL (25)	NS	394	1.51	NS	NS	NS	NS	<EQL (1000)	NS	<EQL (1)	<EQL (1)	10.6	[0.41]	[0.36]	46.6
PRW006DL	Monitoring Well	UAZ_UTRAU	01-Jun-2020	NS	NS	NS	NS	NS	NS	4.39	NS	NS	NS	NS	164	NS	NS	NS	4.98	NS	418
			23-Jul-2020	498	14.4	<EQL (25)	[1.23]	314	5.53	5.1	<EQL (100)	2.94	30000	[427]	[554]	<EQL (1)	<EQL (1)	2.87	3.27	<EQL (1)	267
			10-Aug-2020	479	9.54	<EQL (25)	1.22	[233]	5.2	3.63	<EQL (100)	4.11	30000	[341]	86.3	<EQL (4)	<EQL (4)	[3.28]	4.68	<EQL (4)	271
			10-Feb-2021	<EQL (30)	[4.68]	<EQL (25)	NS	[166]	<EQL (0.25)	NS	NS	NS	NS	[553]	NS	<EQL (1)	<EQL (1)	1.92	3.94	<EQL (1)	159

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

				PRB Analytical Data																	
				Geochemical												VOC					
			SAMPLE COLLECTION DATE	MAGNESIUM	MANGANESE	METHANE	NITRATE-NITRITE AS NITROGEN	POTASSIUM	SODIUM	SULFATE	SULFIDE	TOTAL ALKALINITY (AS CACO3)	TOTAL DISSOLVED SOLIDS	TOTAL ORGANIC CARBON	TOTAL PHOSPHATES (AS P)	1,1-DICHLOROETHYLENE	CHLOROETHENE (VINYL CHLORIDE)	CIS-1,2-DICHLOROETHYLENE	TETRACHLOROETHYLENE (PCE)	TRANS-1,2-DICHLOROETHYLENE	TRICHLOROETHYLENE (TCE)
			day-month-year	ug/L	ug/L	ug/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Station	**Well Use**	**Aquifer Zone**			430		10									7	2	70	5	100	5
PRW006DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	847	95.4	<EQL (25)	[1.66]	751	12.2	10.3	<EQL (100)	12.3	48600	[662]	[560]	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	2.82
			10-Aug-2020	778	74.2	<EQL (25)	1.93	623	12.9	10.6	<EQL (100)	12.3	60000	[560]	96.5	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	<EQL (1)	2.96
			10-Feb-2021	694	53.9	42.1	NS	541	9.51	6.94	NS	NS	NS	[664]	NS	<EQL (1)	<EQL (1)	<EQL (1)	[0.6]	<EQL (1)	5.07
PRW007DL	Monitoring Well	UAZ_UTRAU	23-Jul-2020	472	242	[11.4]	[0.852]	1600	21.5	20	<EQL (100)	27.8	81400	[539]	[554]	<EQL (1)	<EQL (1)	[0.42]	<EQL (1)	<EQL (1)	6.62
			04-Aug-2020	430	196	[12.8]	0.988	1510	20.7	19.6	<EQL (100)	26	81400	[619]	<EQL (50)	<EQL (1)	<EQL (1)	2.61	<EQL (1)	<EQL (1)	38.1
			03-Nov-2020	384	167	<EQL (25)	NS	1410	17.2	17.4	NS	16.9	90000	[380]	NS	<EQL (1)	<EQL (1)	1.24	<EQL (1)	<EQL (1)	10.7
			10-Feb-2021	332	106	<EQL (25)	NS	1370	12.7	NS	NS	NS	NS	[519]	NS	<EQL (1)	<EQL (1)	[0.83]	<EQL (1)	<EQL (1)	22.7
PRW007DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	1530	109	[839]	[0.545]	4280	22.1	24.3	<EQL (100)	23.5	84300	3330	[561]	[0.63]	<EQL (1)	51.2	2.84	1.18	1520
			04-Aug-2020	1370	89	620	1.03	4640	21.9	28.1	<EQL (100)	22.1	100000	1710	<EQL (50)	<EQL (25)	<EQL (25)	40	<EQL (25)	<EQL (25)	1120
			03-Nov-2020	892	22.6	59.2	NS	2950	16.9	20	NS	11.3	87100	[570]	NS	<EQL (20)	<EQL (20)	35.2	<EQL (20)	<EQL (20)	984
			10-Feb-2021	1460	86.2	230	NS	1090	18.7	NS	NS	NS	NS	5802	NS	<EQL (25)	<EQL (25)	33.5	<EQL (25)	<EQL (25)	819

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

Station	Well Use	Aquifer Zone	SAMPLE COLLECTION DATE (day-month-year)	Comments
P002U[1]	Monitoring Well	UAZ_UTRAU	18-Mar-2020	
			02-Jun-2020	
			24-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			04-Aug-2020	
			03-Nov-2020	
			08-Feb-2021	
P003L[1]	Monitoring Well	UAZ_UTRAU	11-Mar-2020	
			02-Jun-2020	
			24-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			04-Aug-2020	
			03-Nov-2020	
			08-Feb-2021	
P003U[1]	Monitoring Well	UAZ_UTRAU	11-Mar-2020	
			02-Jun-2020	
			24-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			04-Aug-2020	
			03-Nov-2020	
			08-Feb-2021	
PIW001D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			10-Aug-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			03-Nov-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			09-Feb-2021	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
PIW002D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			04-Aug-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			04-Nov-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			08-Feb-2021	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
PIW003D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			04-Aug-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			04-Nov-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			08-Feb-2021	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
PIW004D	Monitoring Well	UAZ_UTRAU	16-Jun-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			04-Aug-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			04-Nov-2020	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
			10-Feb-2021	PACE Analytical Laboratory does not have a rad license to handle radioactive groundwater samples for ferric and ferrous iron.
PRW001C	Monitoring Well	LAZ_UTRAU	09-Mar-2020	
			02-Jun-2020	
			23-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			03-Nov-2020	
			08-Feb-2021	

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

			SAMPLE COLLECTION DATE	
			day-month-year	
Station	Well Use	Aquifer Zone		Comments
PRW001DL	Monitoring Well	UAZ_UTRAU	09-Mar-2020	
			02-Jun-2020	
			23-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			03-Nov-2020	
			09-Feb-2021	
PRW001DU	Monitoring Well	UAZ_UTRAU	09-Mar-2020	
			02-Jun-2020	
			23-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			03-Nov-2020	
			08-Feb-2021	
PRW002C	Monitoring Well	LAZ_UTRAU	10-Mar-2020	
			03-Jun-2020	
			23-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			03-Nov-2020	
			08-Feb-2021	
PRW002DL	Monitoring Well	UAZ_UTRAU	10-Mar-2020	
			03-Jun-2020	
			23-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			04-Nov-2020	
			10-Feb-2021	
PRW002DU	Monitoring Well	UAZ_UTRAU	10-Mar-2020	
			04-Jun-2020	
			23-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			04-Nov-2020	
			10-Feb-2021	
PRW003C	Monitoring Well	LAZ_UTRAU	10-Mar-2020	
			15-Jun-2020	
			05-Aug-2020	
			03-Nov-2020	
			09-Feb-2021	
PRW003DL	Monitoring Well	UAZ_UTRAU	10-Mar-2020	
			15-Jun-2020	
			05-Aug-2020	
			03-Nov-2020	
			09-Feb-2021	

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

Station	Well Use	Aquifer Zone	SAMPLE COLLECTION DATE (day-month-year)	Comments
PRW003DU	Monitoring Well	UAZ_UTRAU	11-Mar-2020	
			15-Jun-2020	
			05-Aug-2020	
			03-Nov-2020	
			09-Feb-2021	
PRW004C	Monitoring Well	LAZ_UTRAU	17-Mar-2020	
			03-Jun-2020	
			24-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			03-Nov-2020	
			09-Feb-2021	
PRW004DL	Monitoring Well	UAZ_UTRAU	17-Mar-2020	
			03-Jun-2020	
			24-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			03-Nov-2020	
			09-Feb-2021	
PRW004DU	Monitoring Well	UAZ_UTRAU	17-Mar-2020	
			03-Jun-2020	
			24-Jun-2020	Additional sampling event to 02-Jun-2020, due to high dissolved gasses MDLs.
			05-Aug-2020	
			03-Nov-2020	
			09-Feb-2021	
PRW005DL	Monitoring Well	UAZ_UTRAU	23-Jul-2020	
			04-Aug-2020	
			04-Nov-2020	
			09-Feb-2021	
PRW005DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	
			04-Aug-2020	
			04-Nov-2020	
			09-Feb-2021	
PRW006C	Monitoring Well	LAZ_UTRAU	23-Jul-2020	
			10-Aug-2020	
			10-Feb-2021	
PRW006DL	Monitoring Well	UAZ_UTRAU	01-Jun-2020	Sampling event was completed on 23-Jul-2020.
			23-Jul-2020	
			10-Aug-2020	
			10-Feb-2021	

Table A-2. PAGW RA EMR Monitoring Well Data, 1Q20 - 1Q21

Station	Well Use	Aquifer Zone	SAMPLE COLLECTION DATE (day-month-year)	Comments
PRW006DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	
			10-Aug-2020	
			10-Feb-2021	
PRW007DL	Monitoring Well	UAZ_UTRAU	23-Jul-2020	
			04-Aug-2020	
			03-Nov-2020	
			10-Feb-2021	
PRW007DU	Monitoring Well	UAZ_UTRAU	23-Jul-2020	
			04-Aug-2020	
			03-Nov-2020	
			10-Feb-2021	

APPENDIX B

PAGW OU RA EMR Hydrographs

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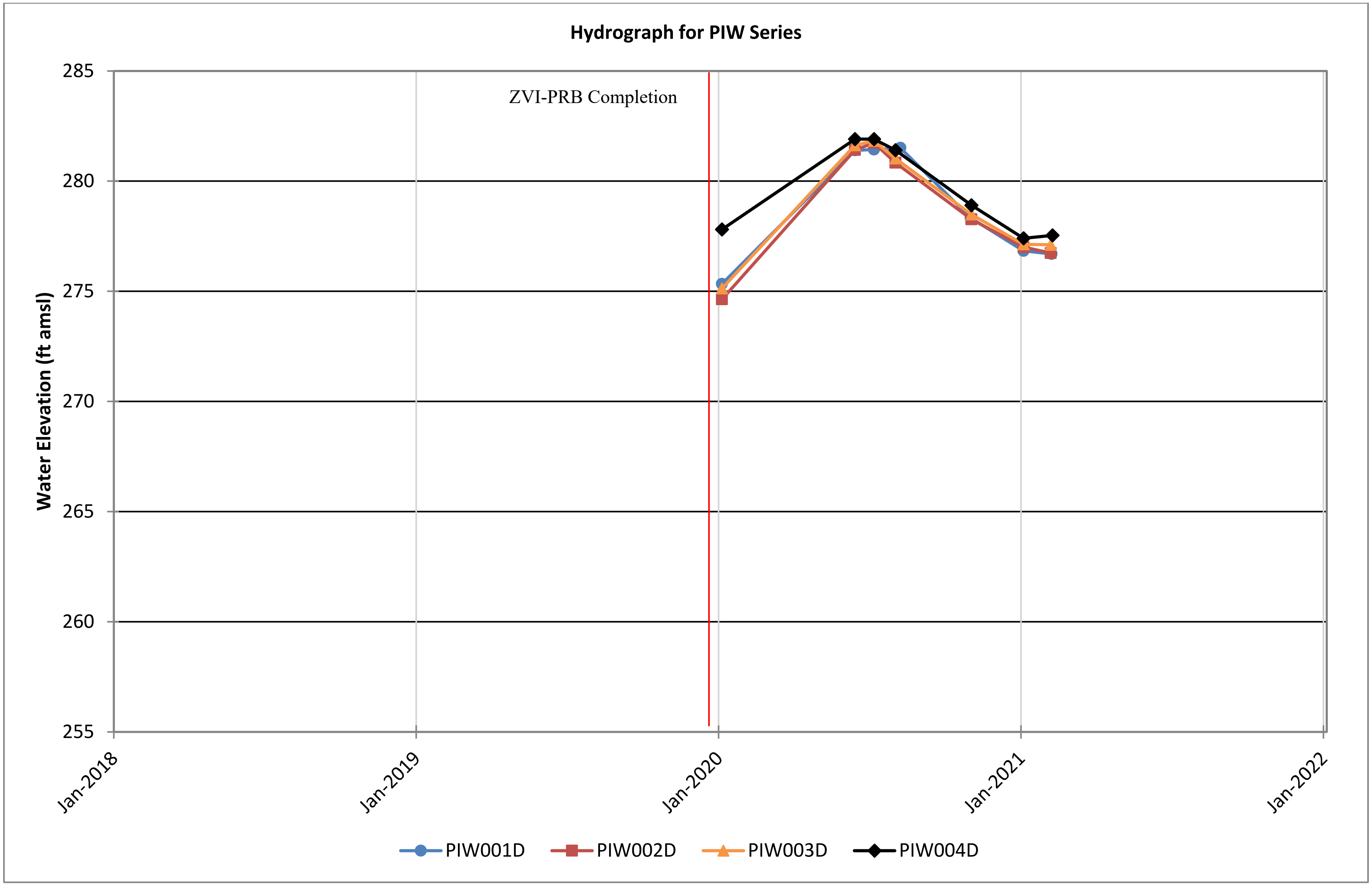

Figure B.1. Hydrograph for PIW Well Series

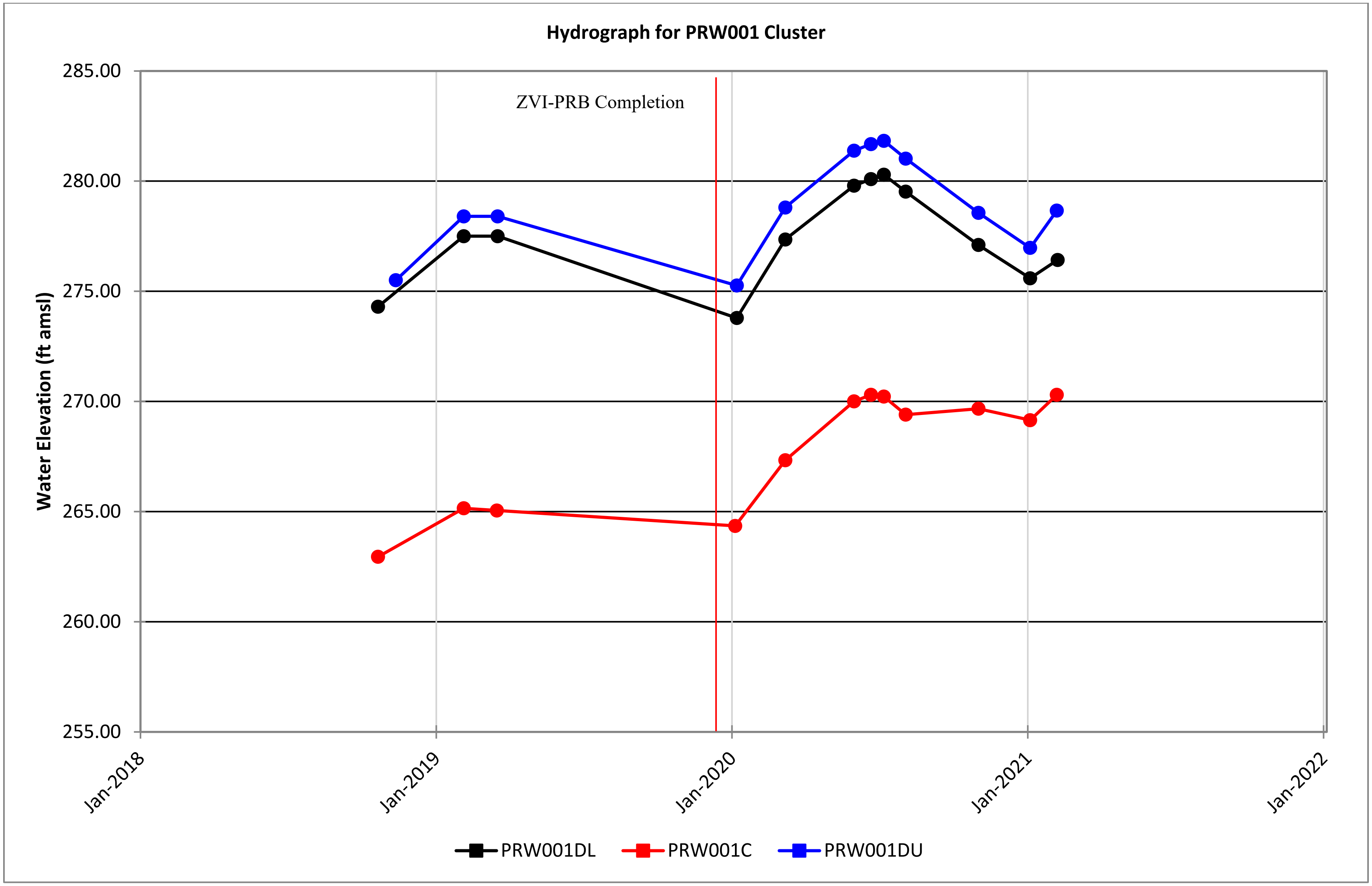

Figure B.2. Hydrograph for PRW001 Cluster

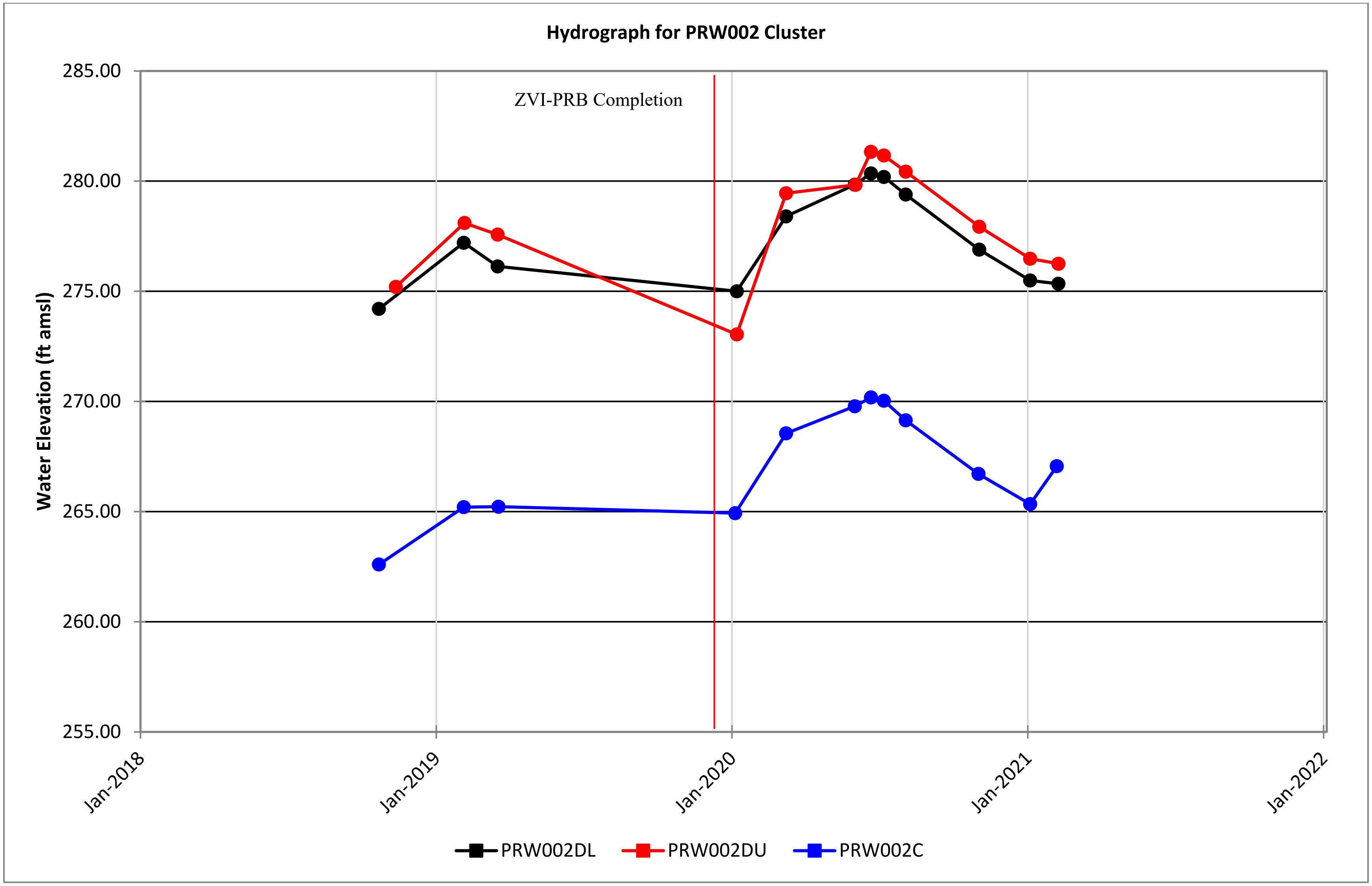

Figure B.3. Hydrograph for PRW002 Cluster

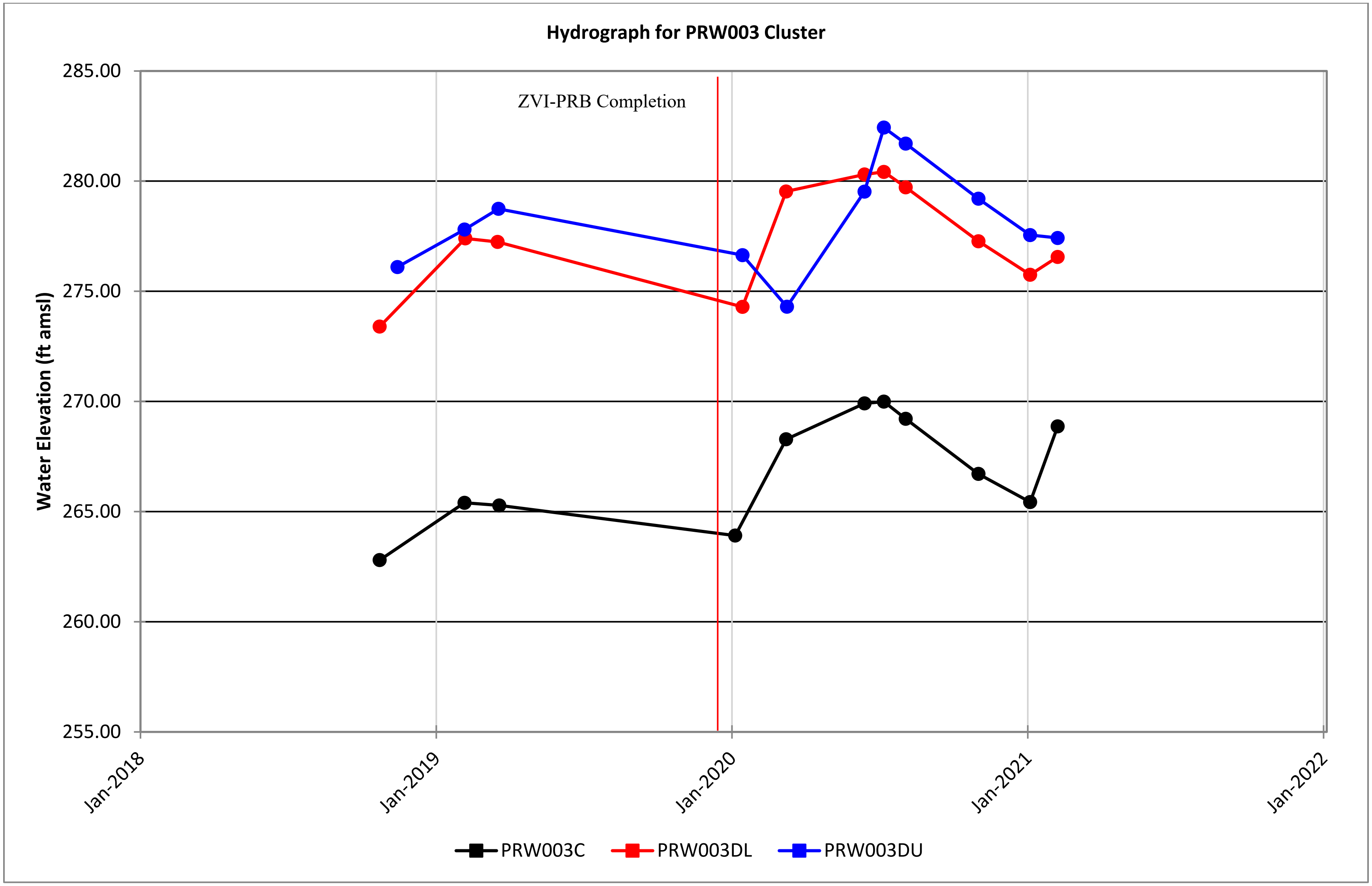

Figure B.4. Hydrograph for PRW003 Cluster

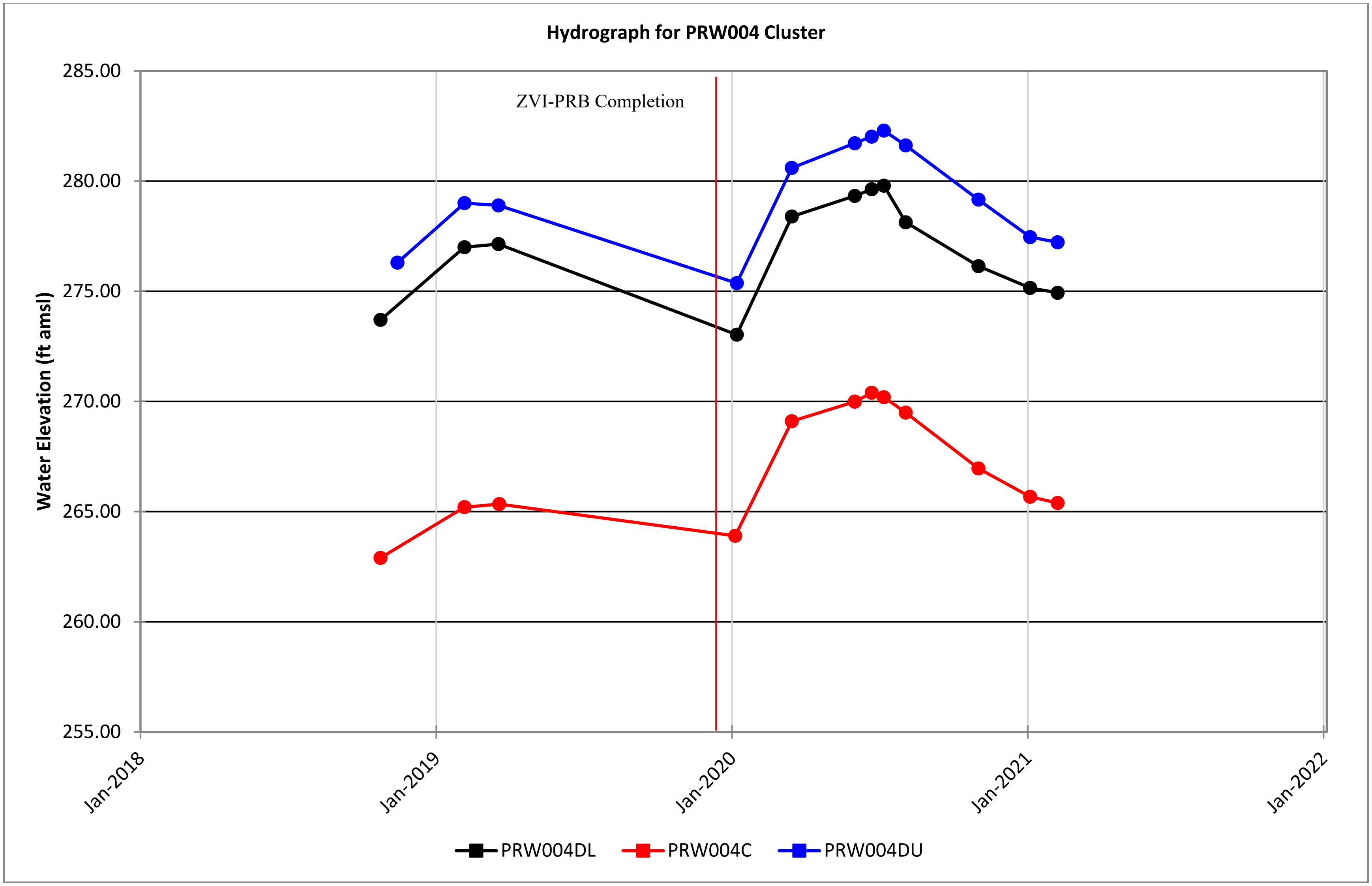

Figure B.5. Hydrograph for PRW004 Cluster

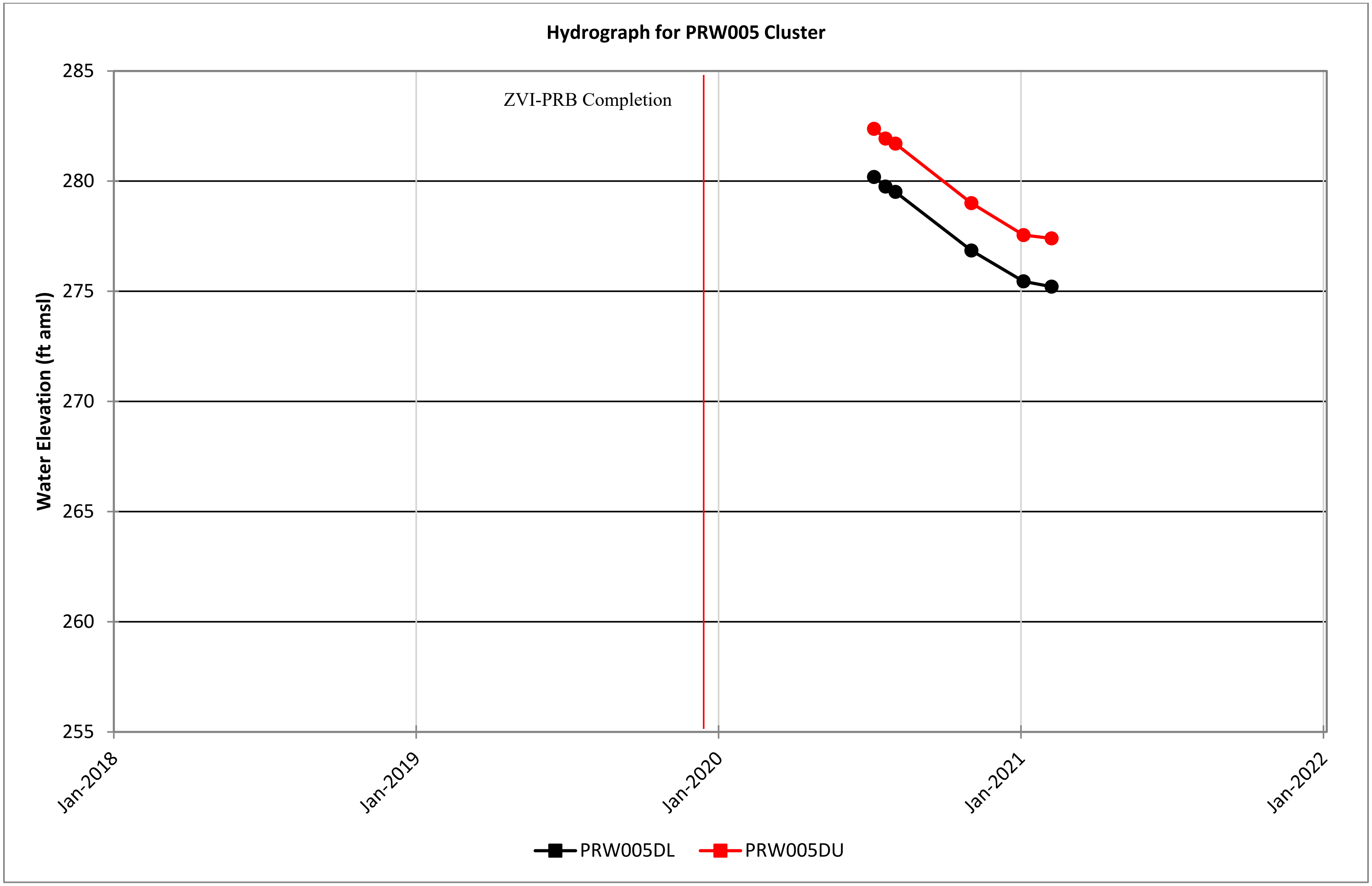

Figure B.6. Hydrograph for PRW005 Cluster

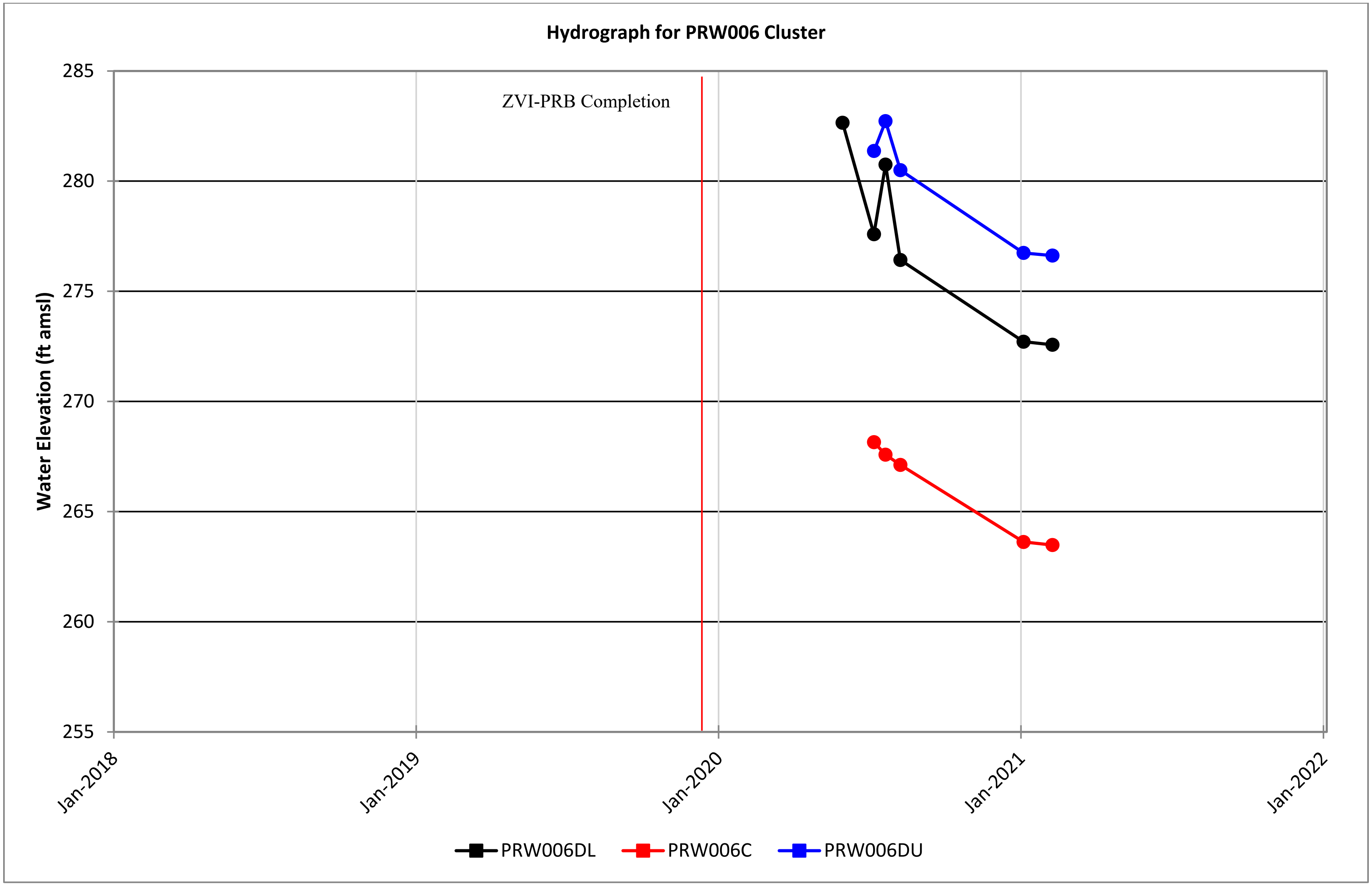

Figure B.7. Hydrograph for PRW006 Cluster

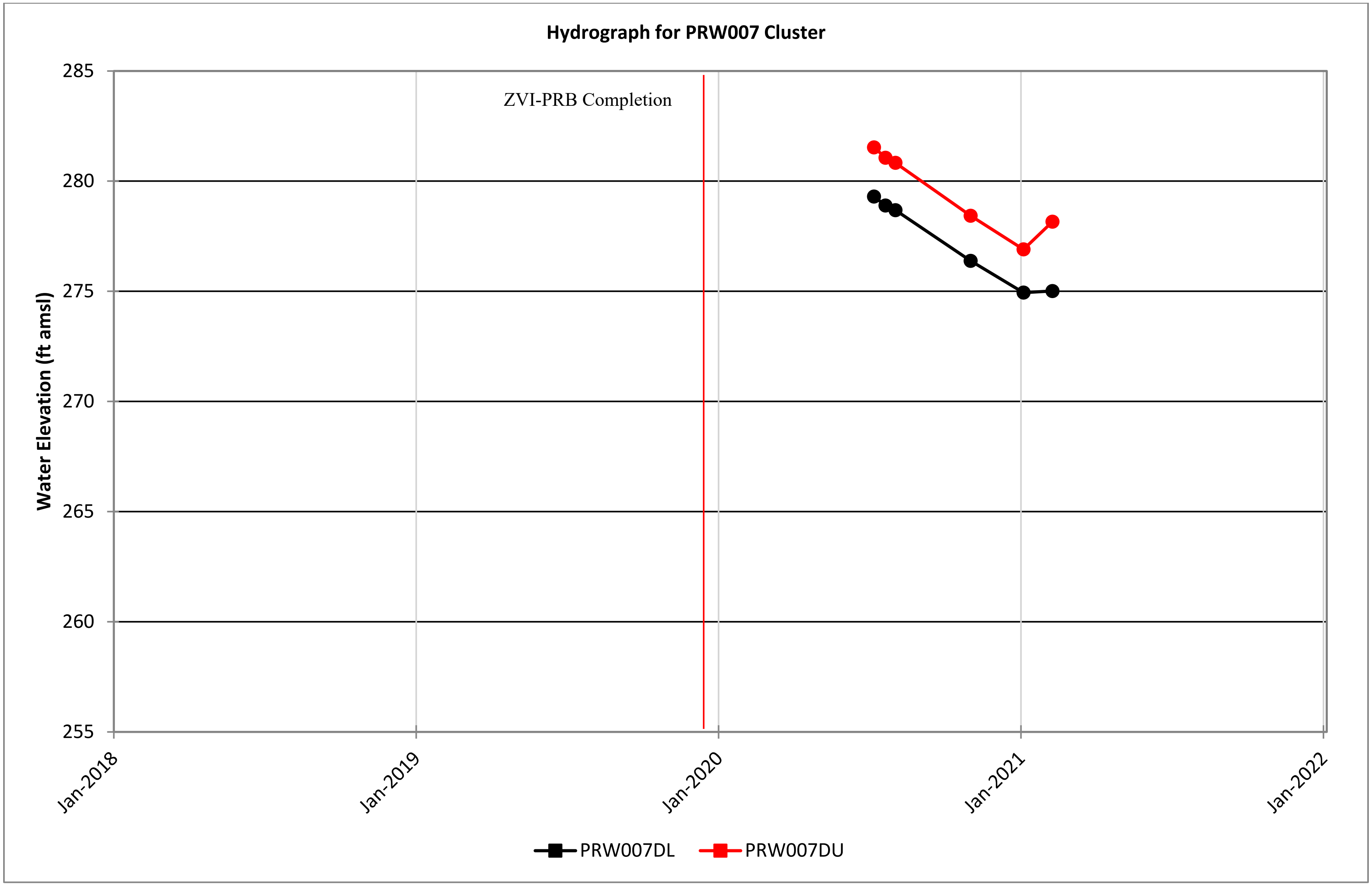

Figure B.8. Hydrograph for PRW007 Cluster

APPENDIX C

PAGW OU RA EMR Time-Series Plots

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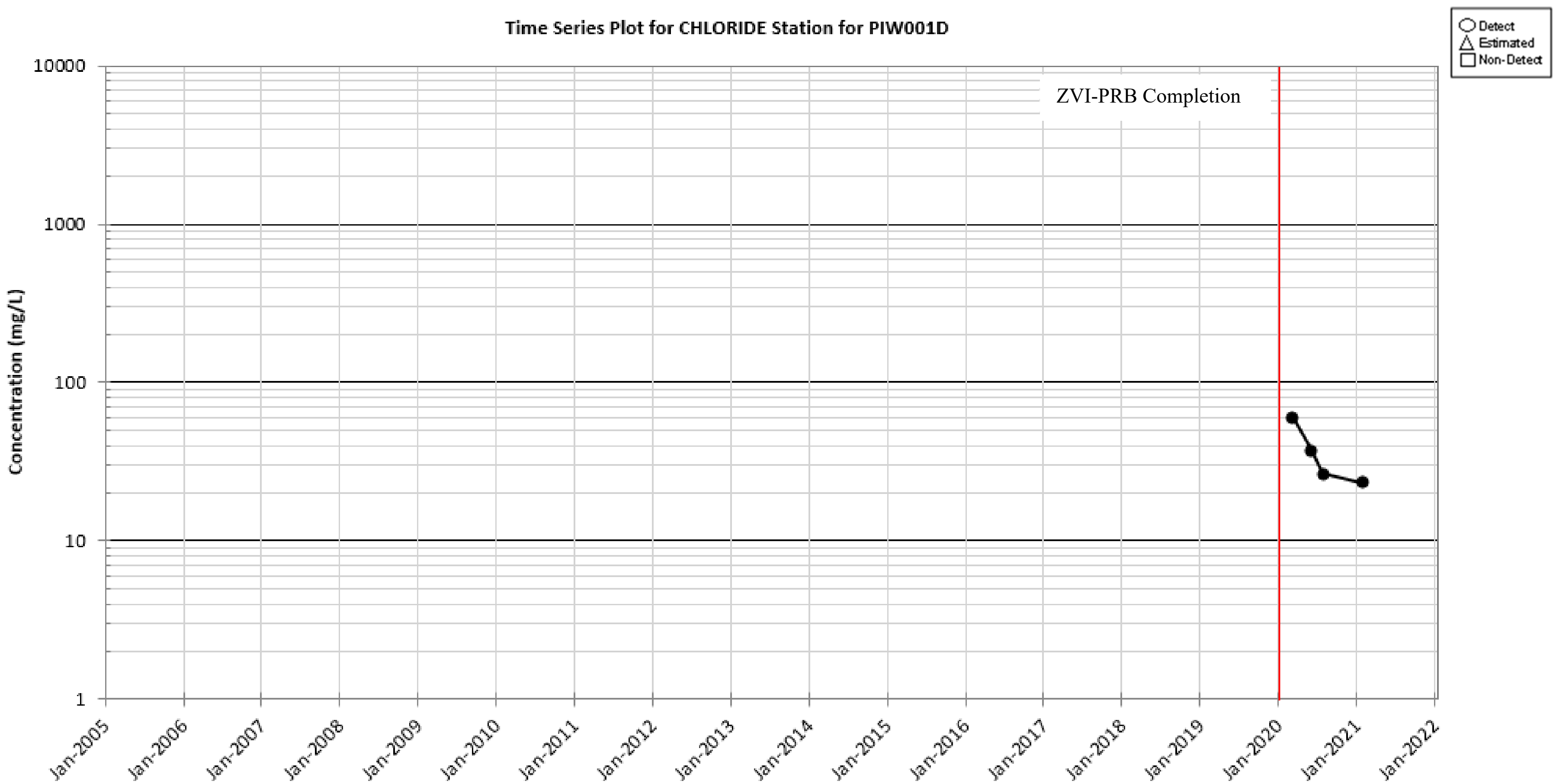

Figure C.1. Time Series Plot for Chloride at Monitoring Well PIW001D

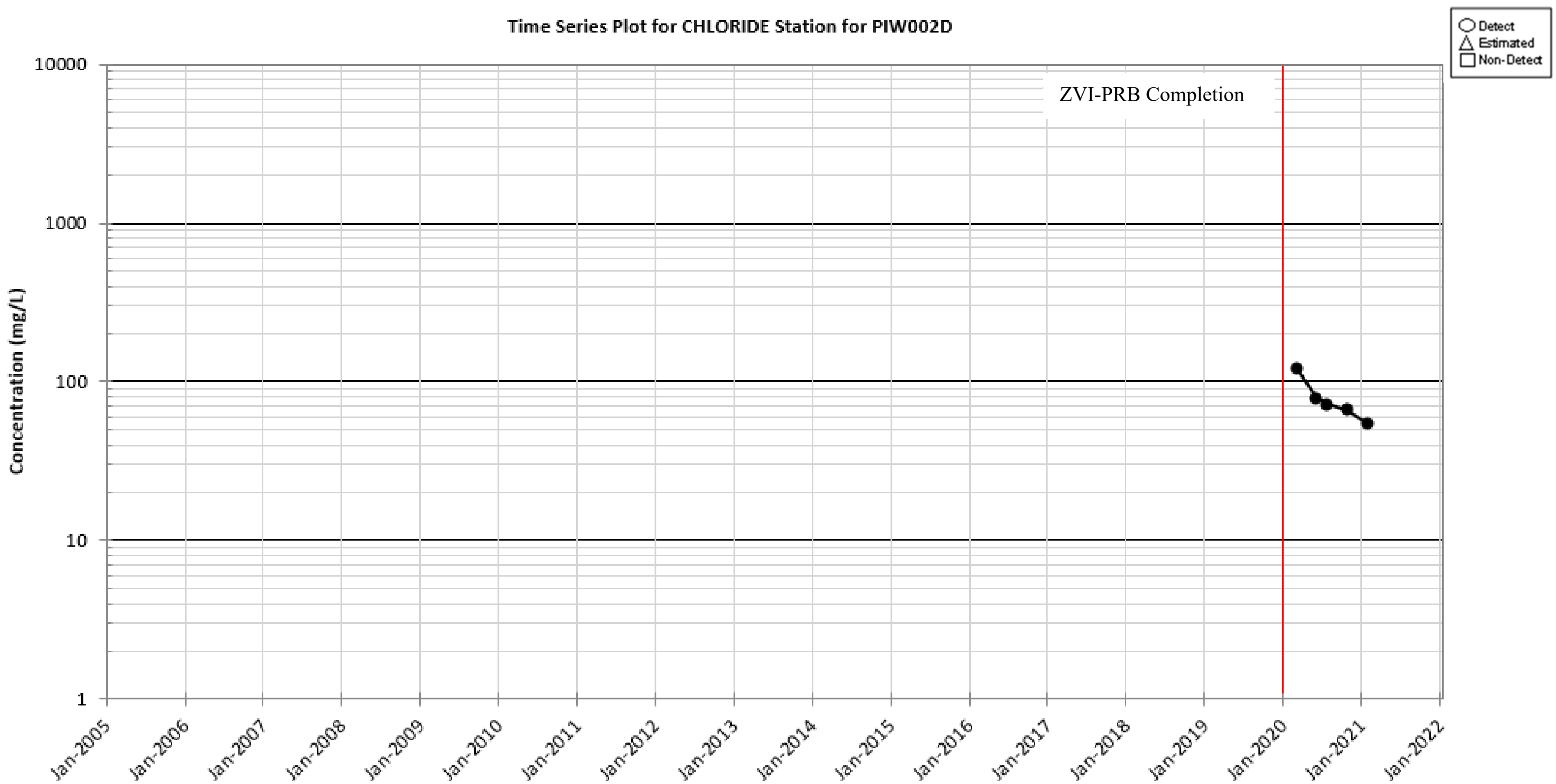

Figure C.2. Time Series Plot for Chloride at Monitoring Well PIW002D

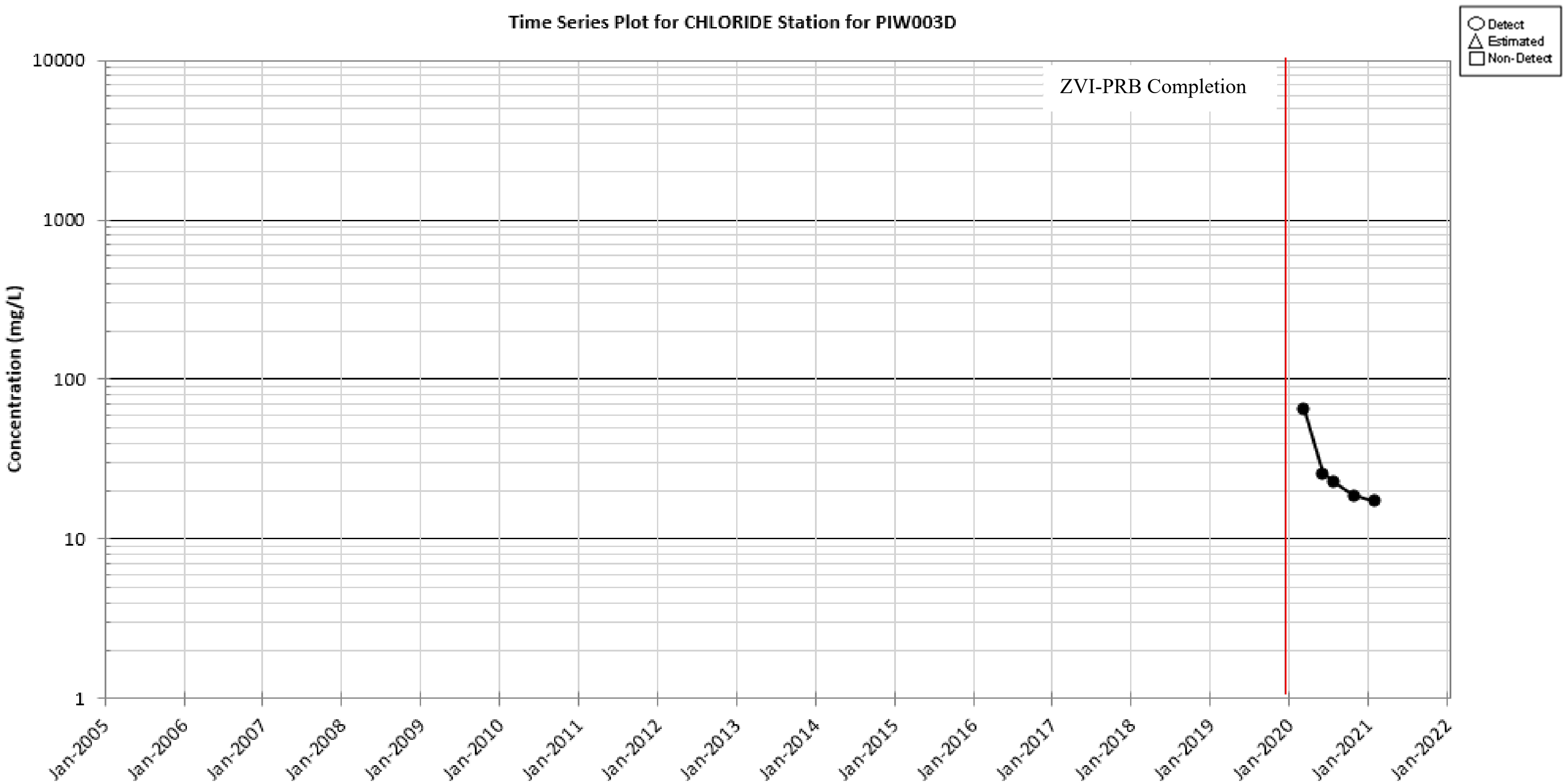

Figure C.3. Time Series Plot for Chloride at Monitoring Well PIW003D

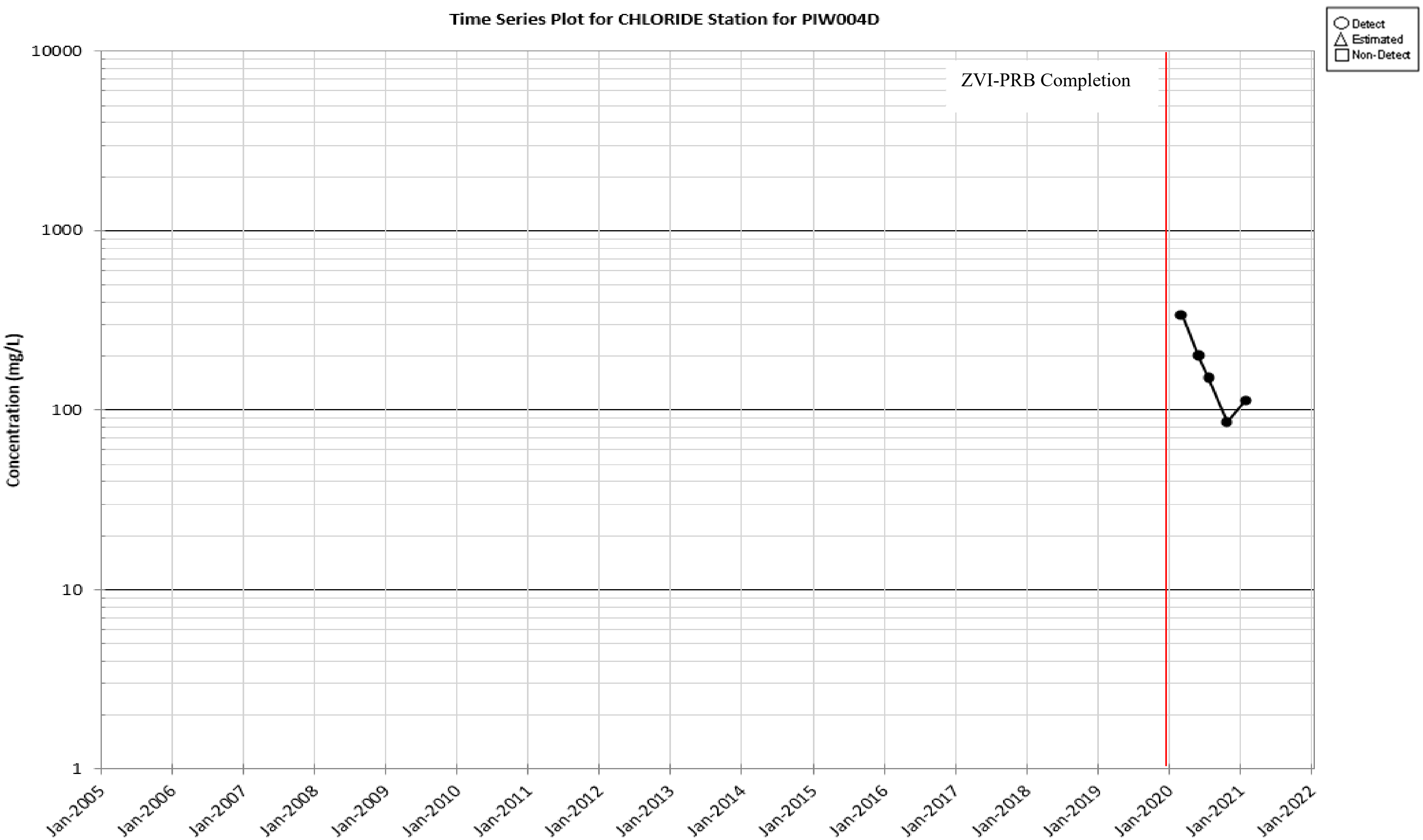

Figure C.4. Time Series Plot for Chloride at Monitoring Well PIW004D

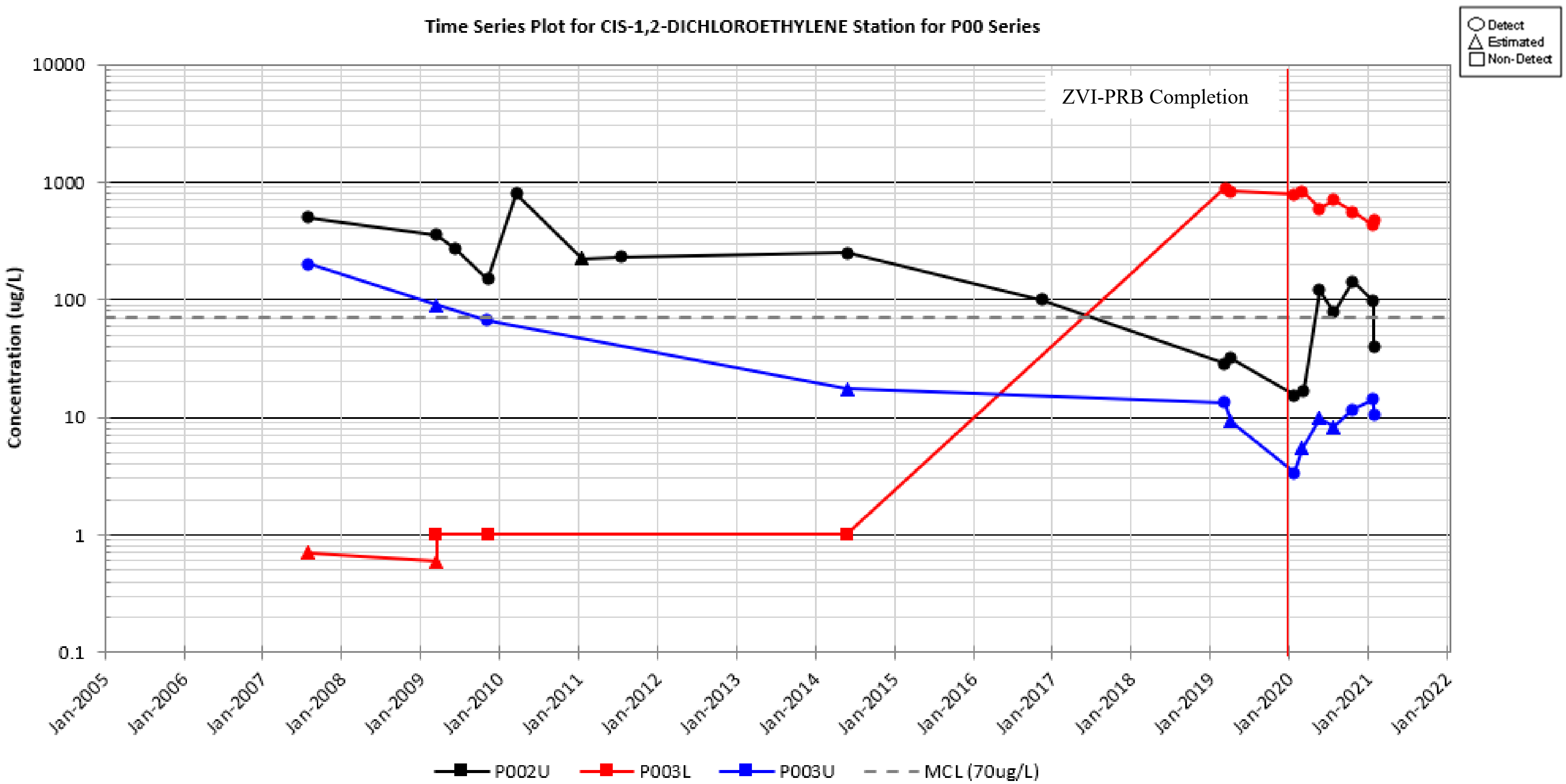

Figure C.5. Time Series Plot for Cis-1,2-Dichloroethylene at P00 Series Monitoring Wells

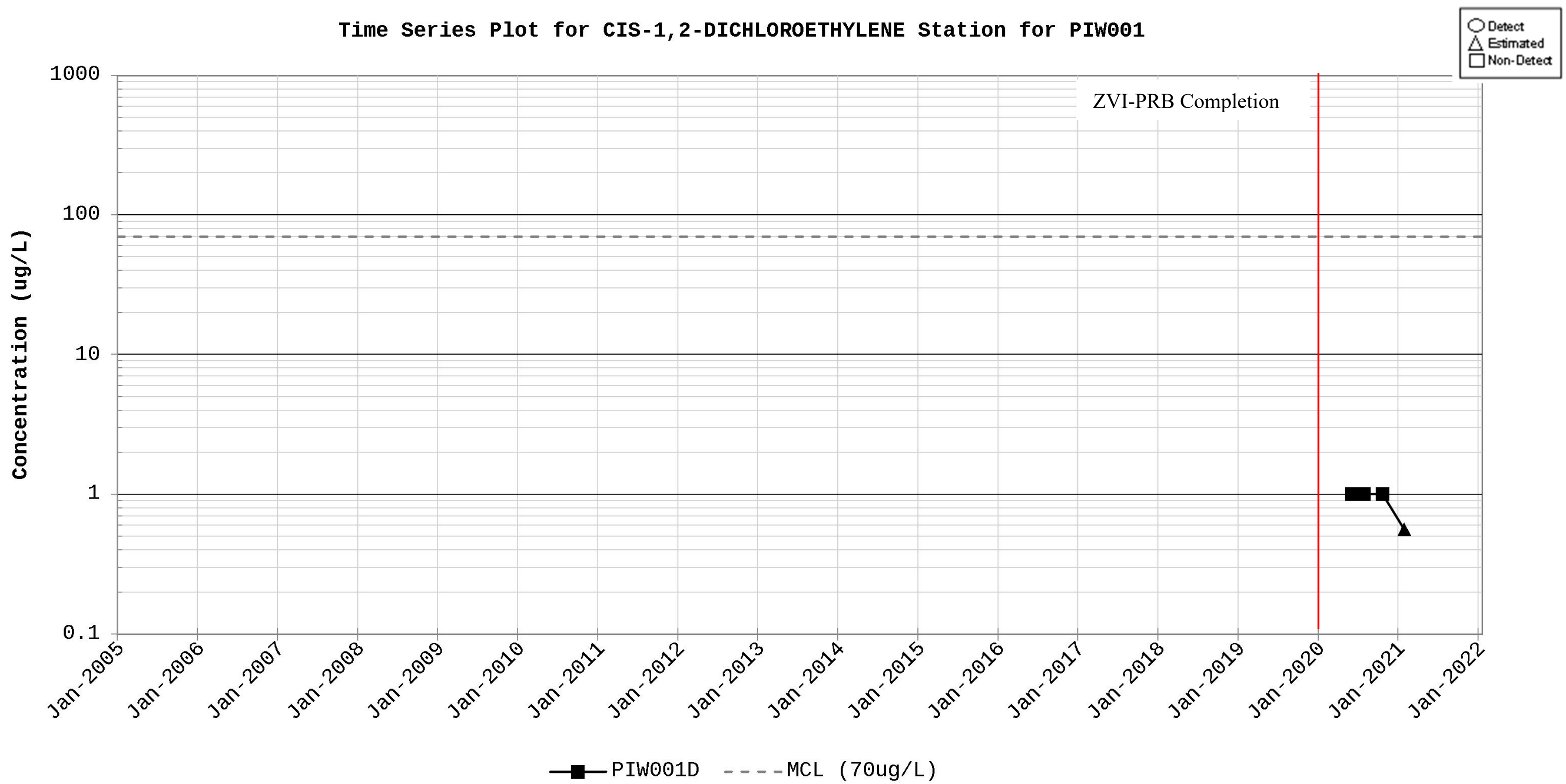

Figure C.6. Time Series Plot for Cis-1,2-Dichloroethylene at Monitoring Well PIW001D

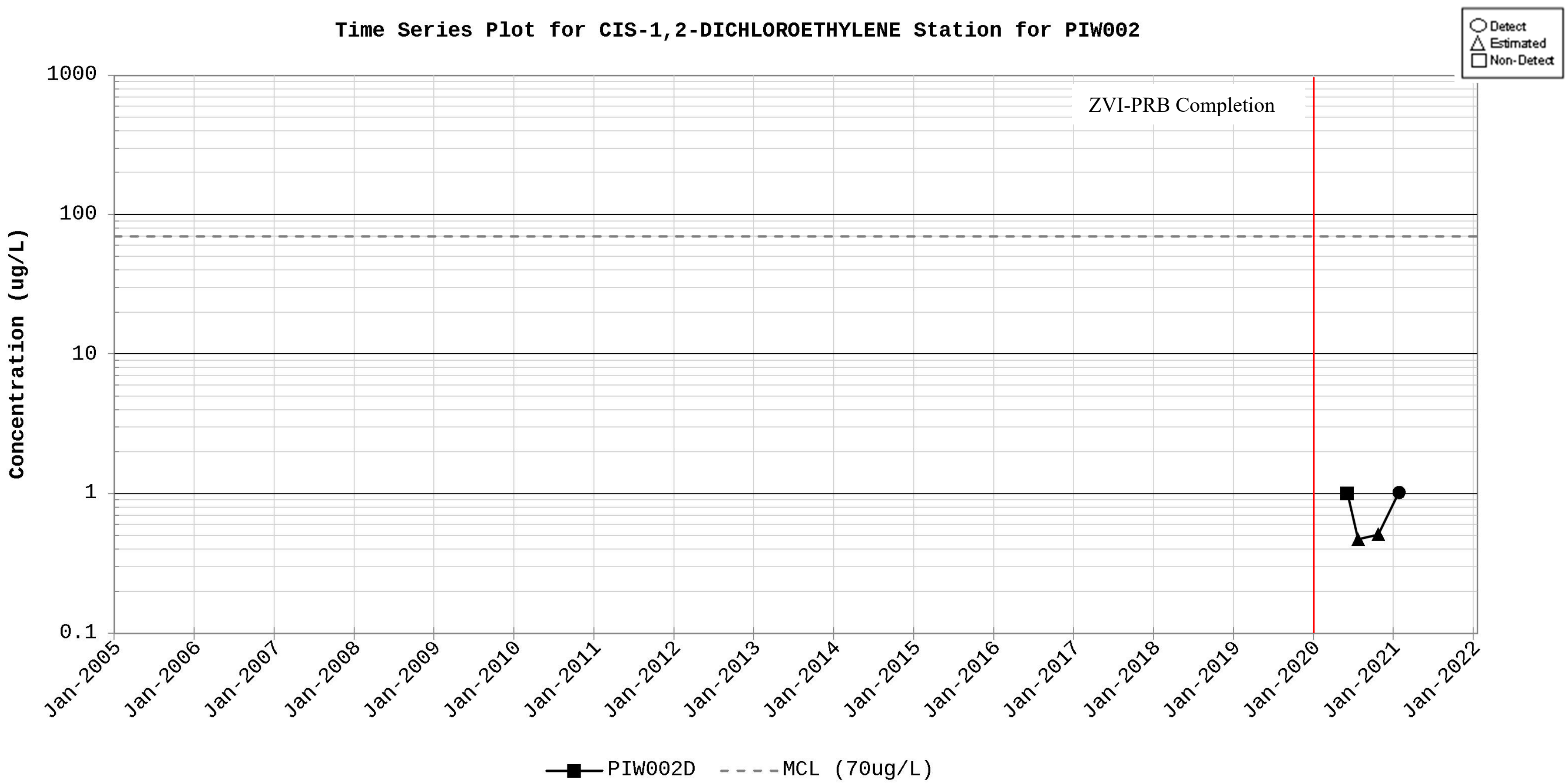

Figure C.7. Time Series Plot for Cis-1,2-Dichloroethylene at Monitoring Well PIW002D

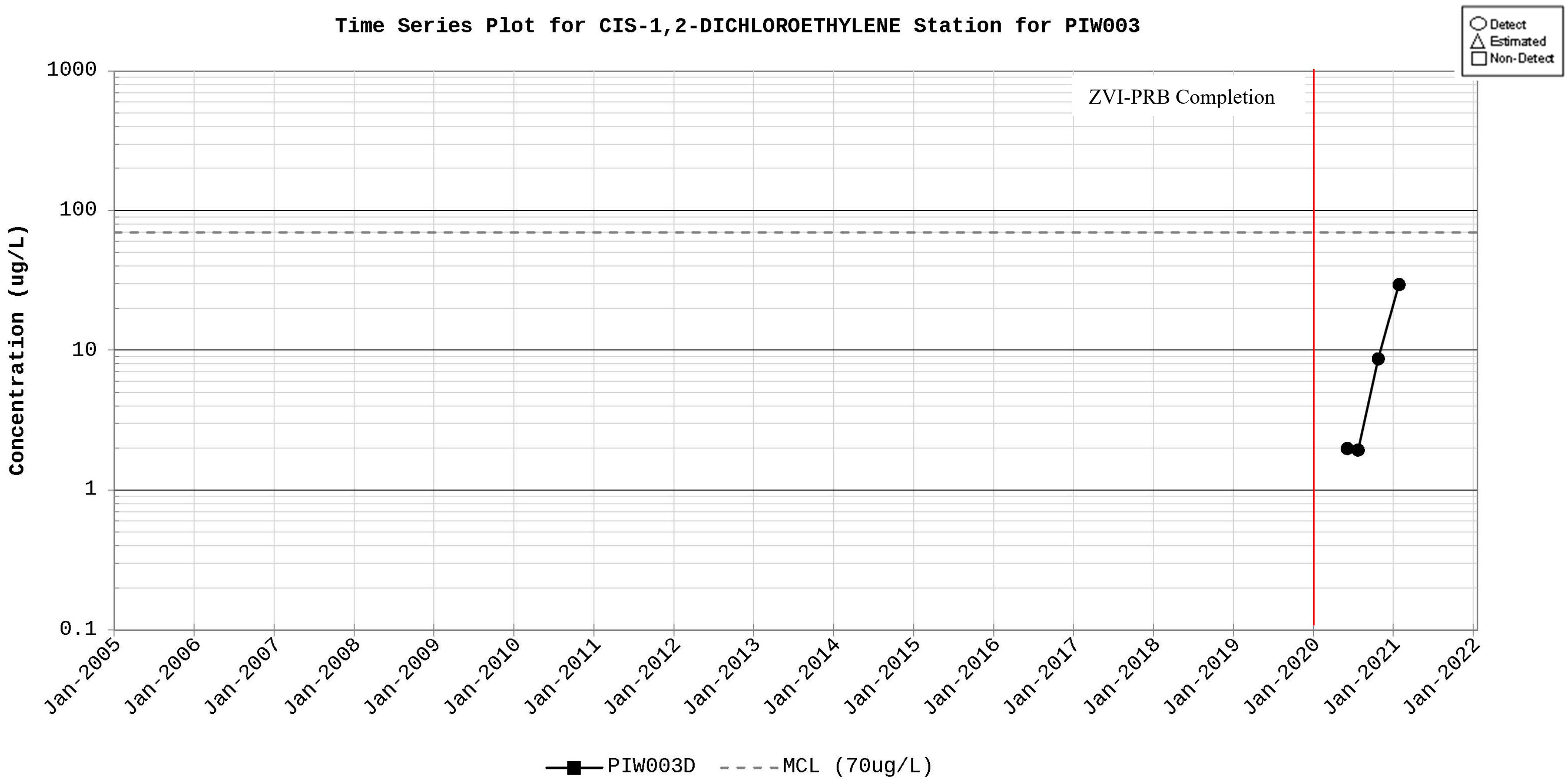

Figure C.8. Time Series Plot for Cis-1,2-Dichloroethylene at Monitoring Well PIW003D

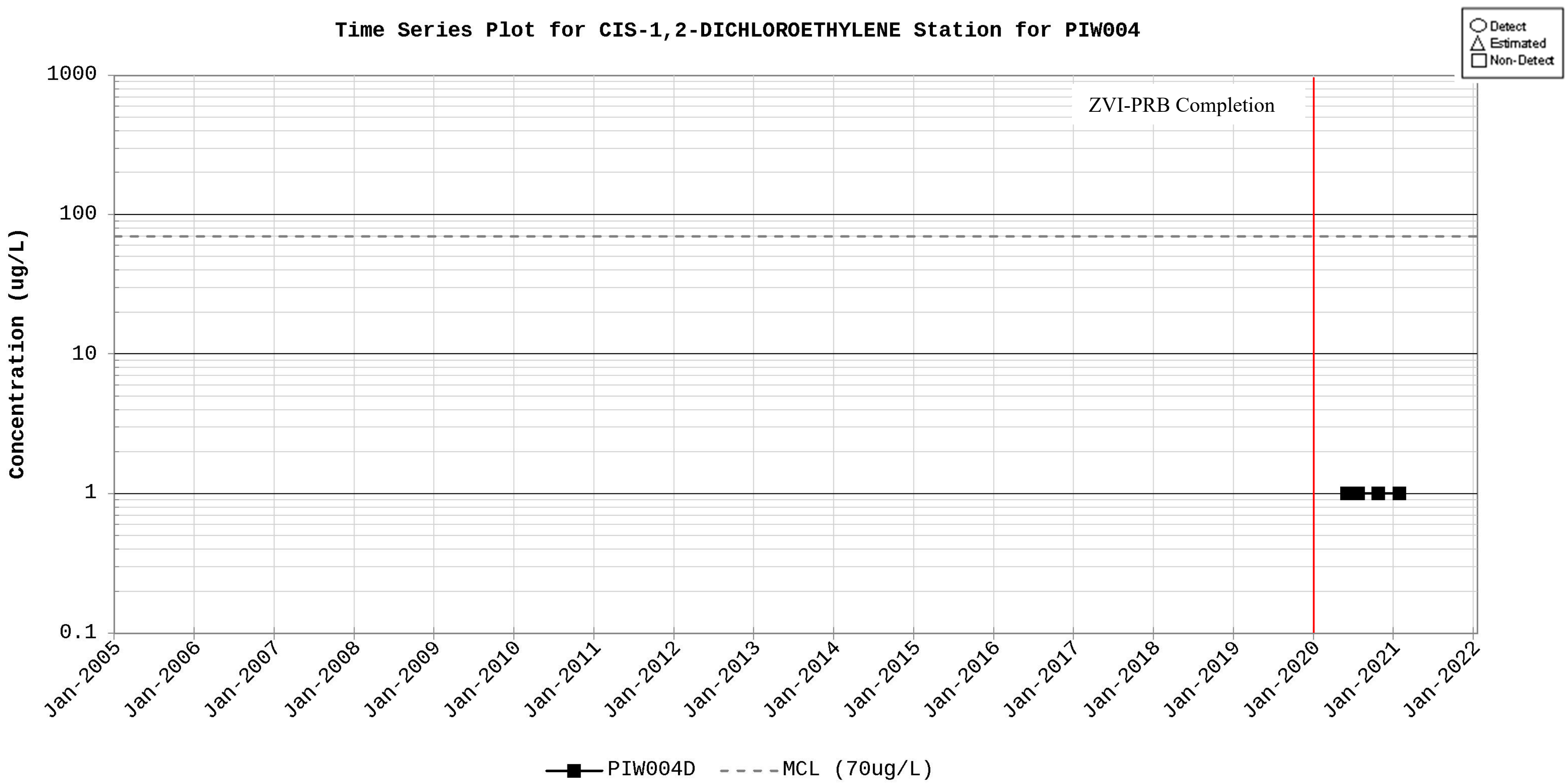

Figure C.9. Time Series Plot for Cis-1,2-Dichloroethylene at Monitoring Well PIW004D

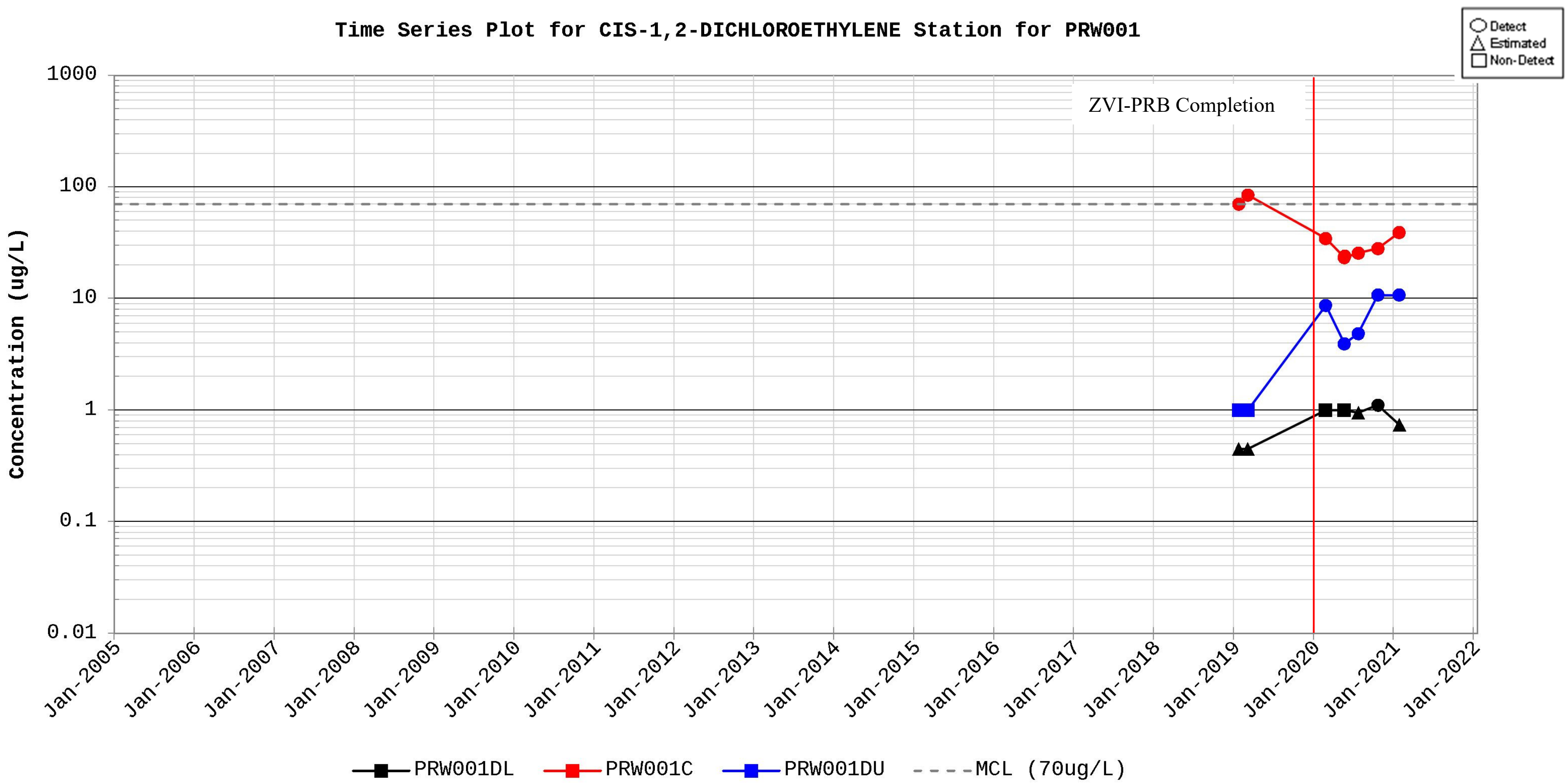

Figure C.10. Time Series Plot for Cis-1,2-Dichloroethylene at PRW001 Series Monitoring Wells

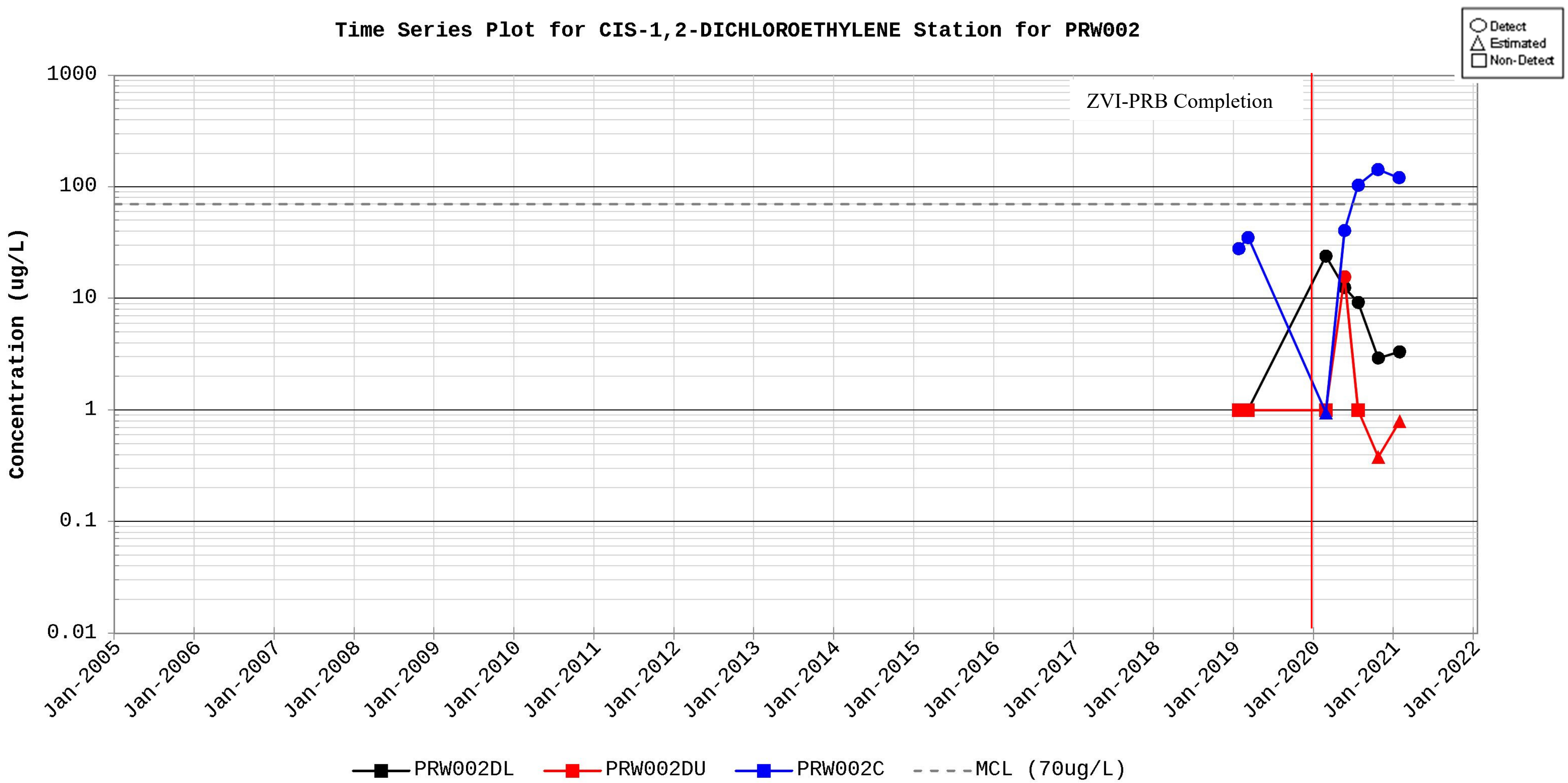

Figure C.11. Time Series Plot for Cis-1,2-Dichloroethylene at PRW002 Series Monitoring Wells

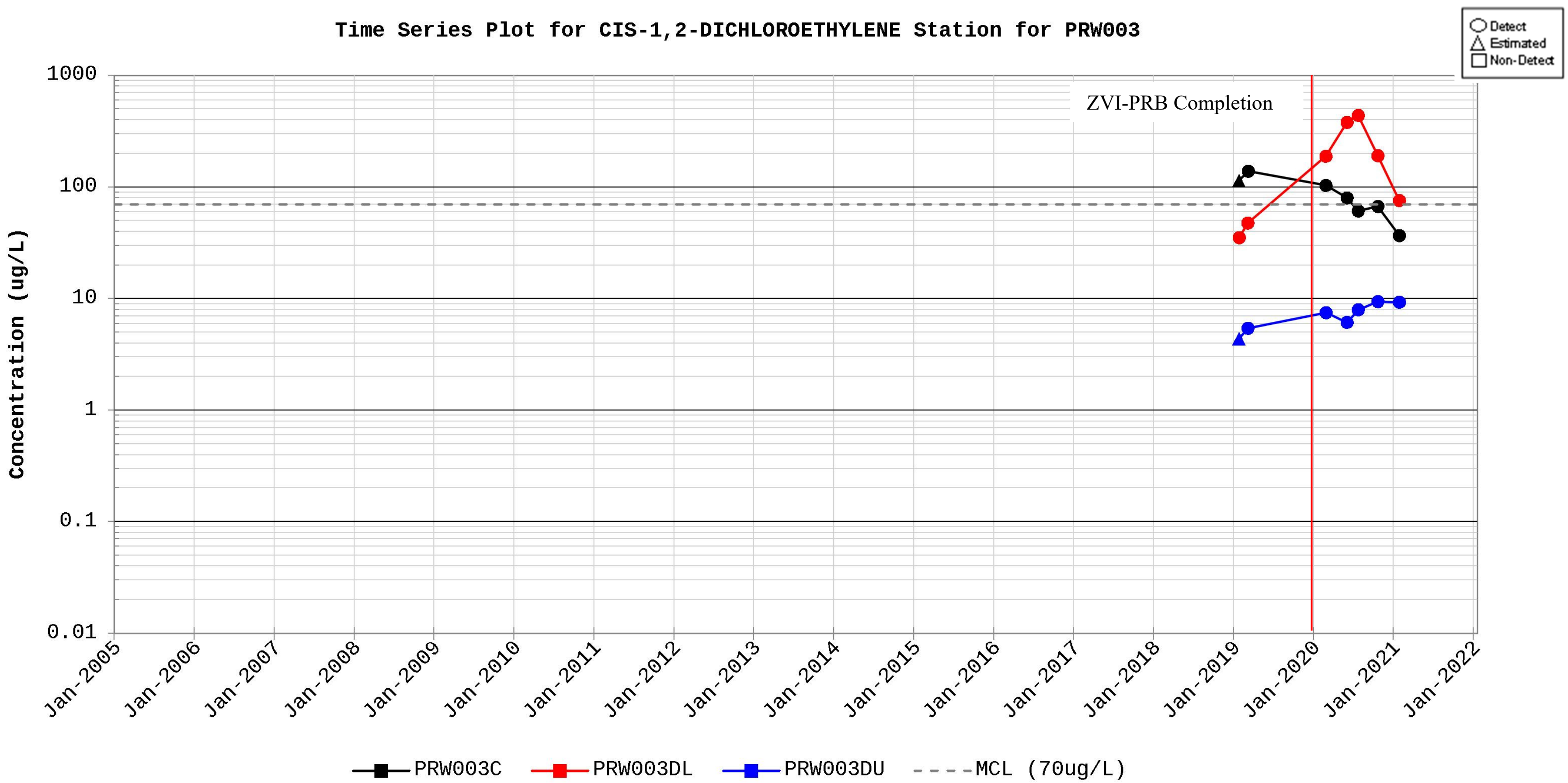

Figure C.12. Time Series Plot for Cis-1,2-Dichloroethylene at PRW003 Series Monitoring Wells

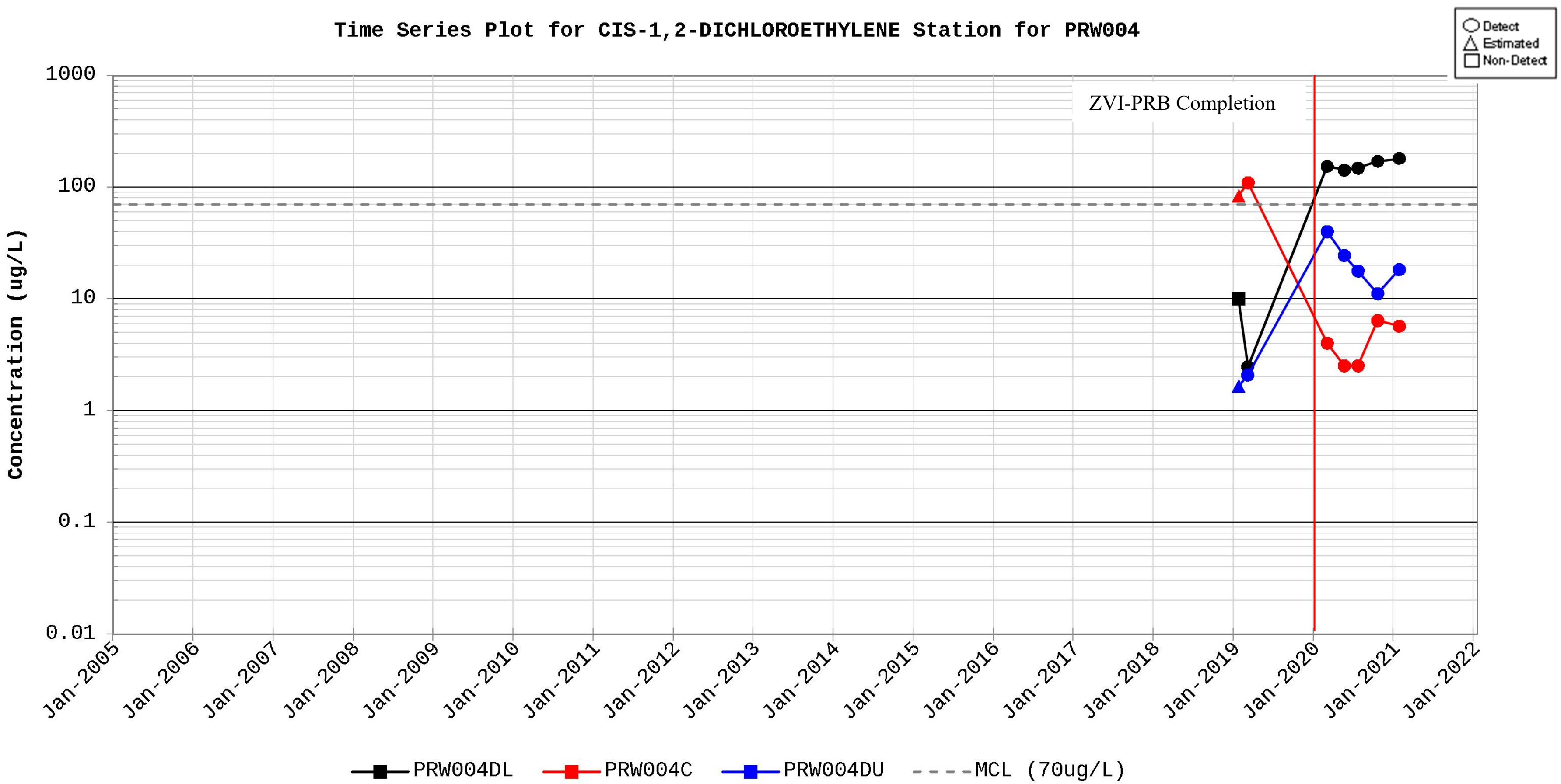

Figure C.13. Time Series Plot for Cis-1,2-Dichloroethylene at PRW004 Series Monitoring Wells

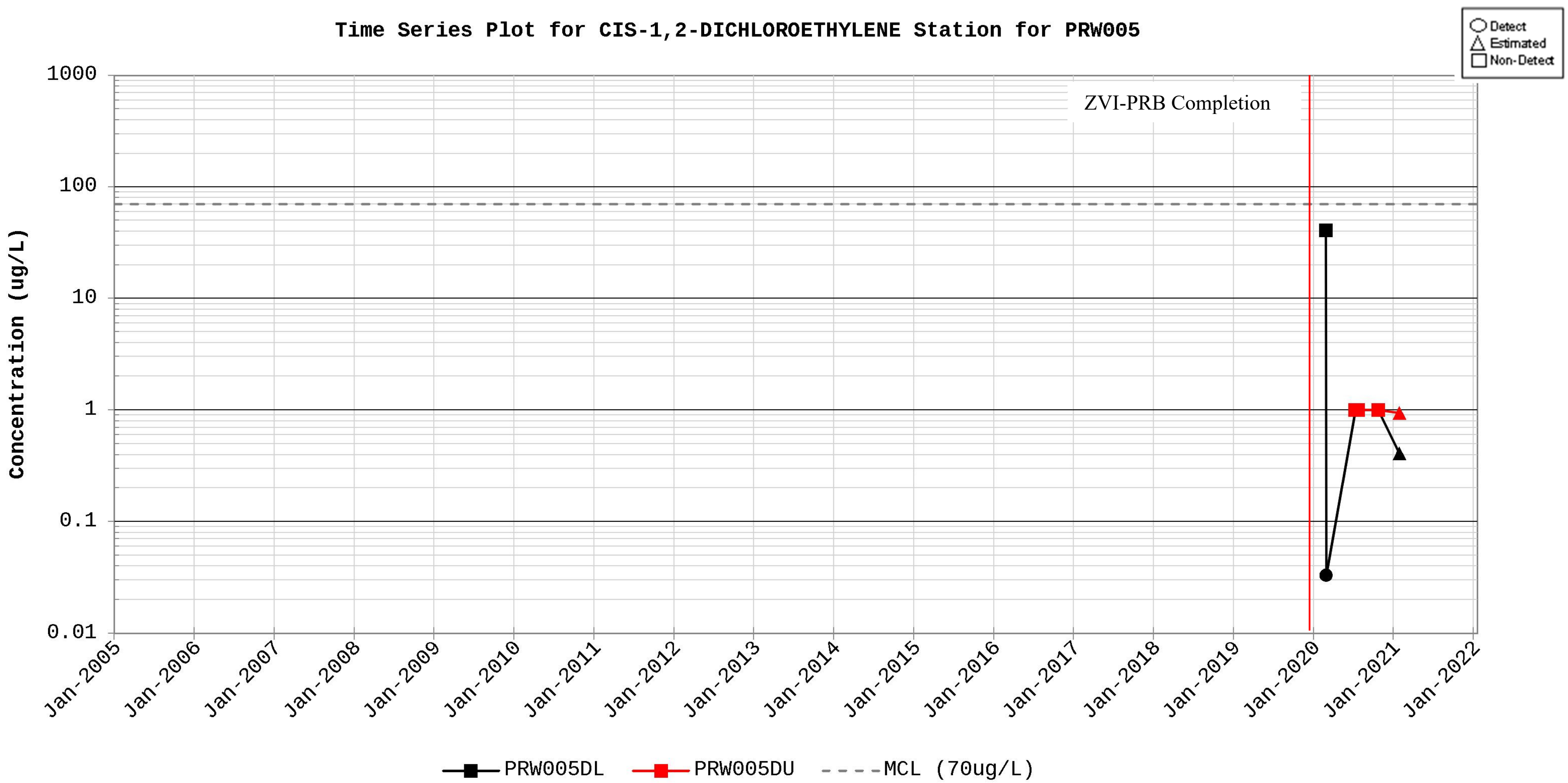

Figure C.14. Time Series Plot for Cis-1,2-Dichloroethylene at PRW005 Series Monitoring Wells

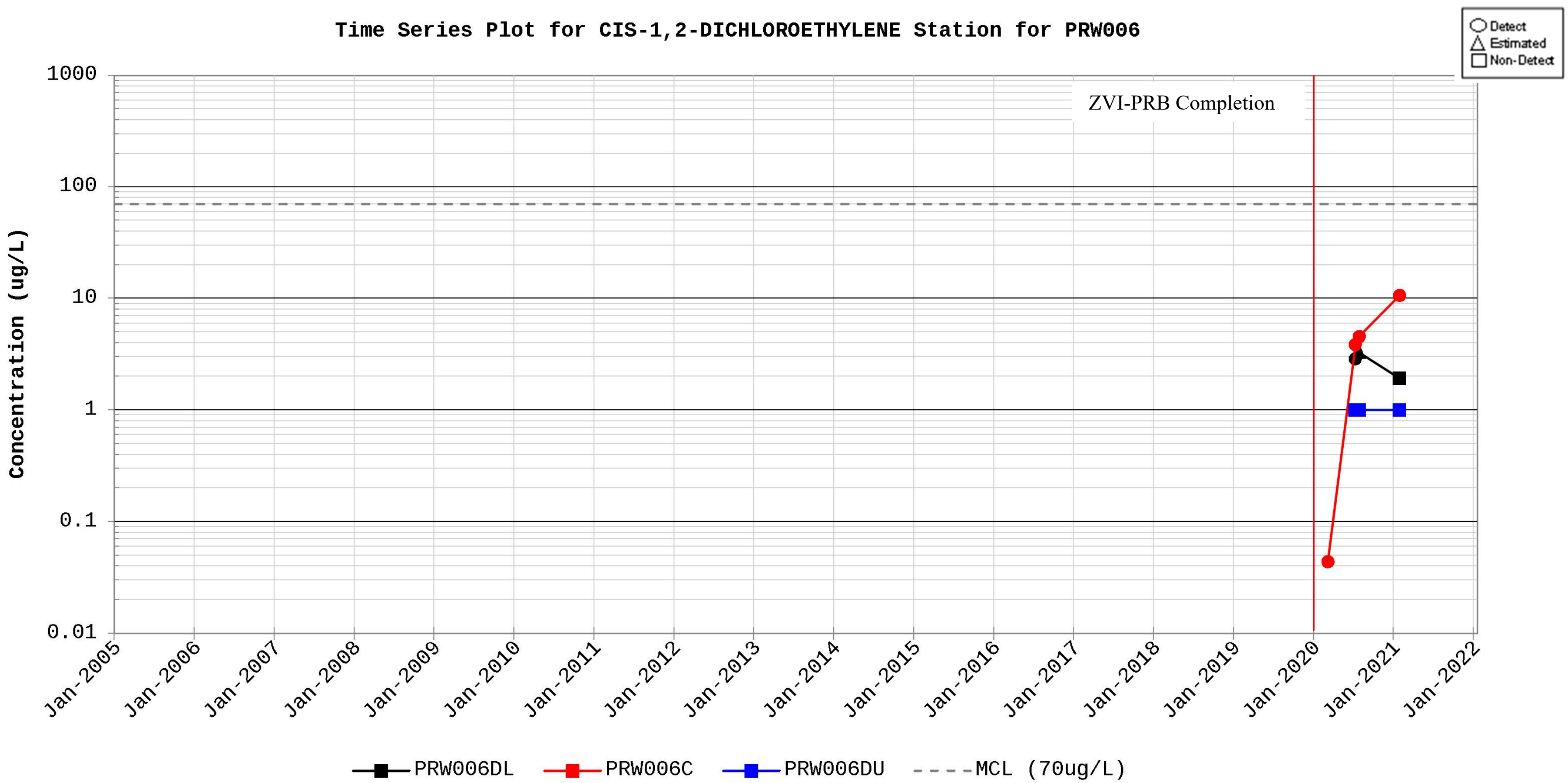

Figure C.15. Time Series Plot for Cis-1,2-Dichloroethylene at PRW006 Series Monitoring Wells

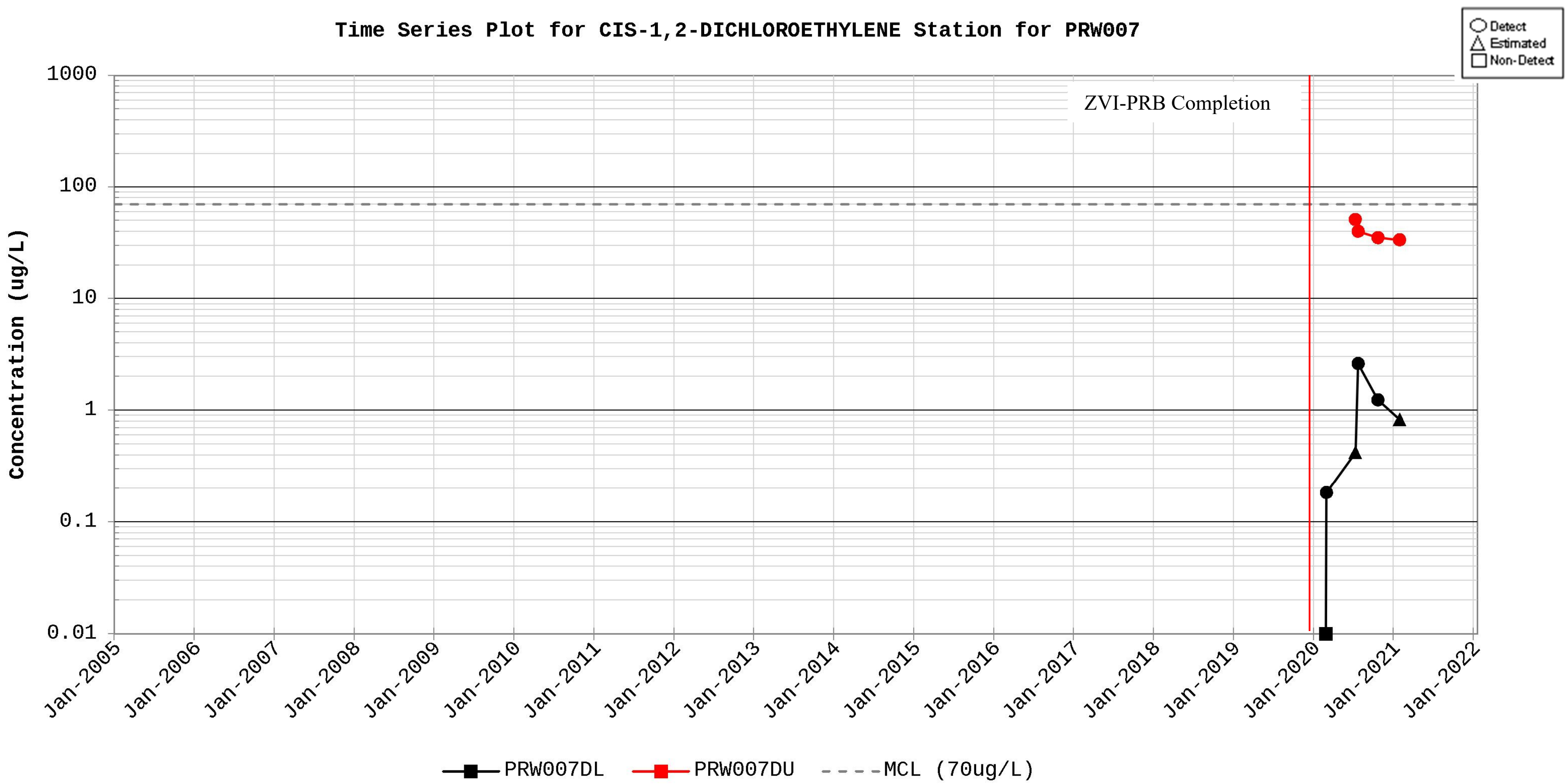

Figure C.16. Time Series Plot for Cis-1,2-Dichloroethylene at PRW007 Series Monitoring Wells

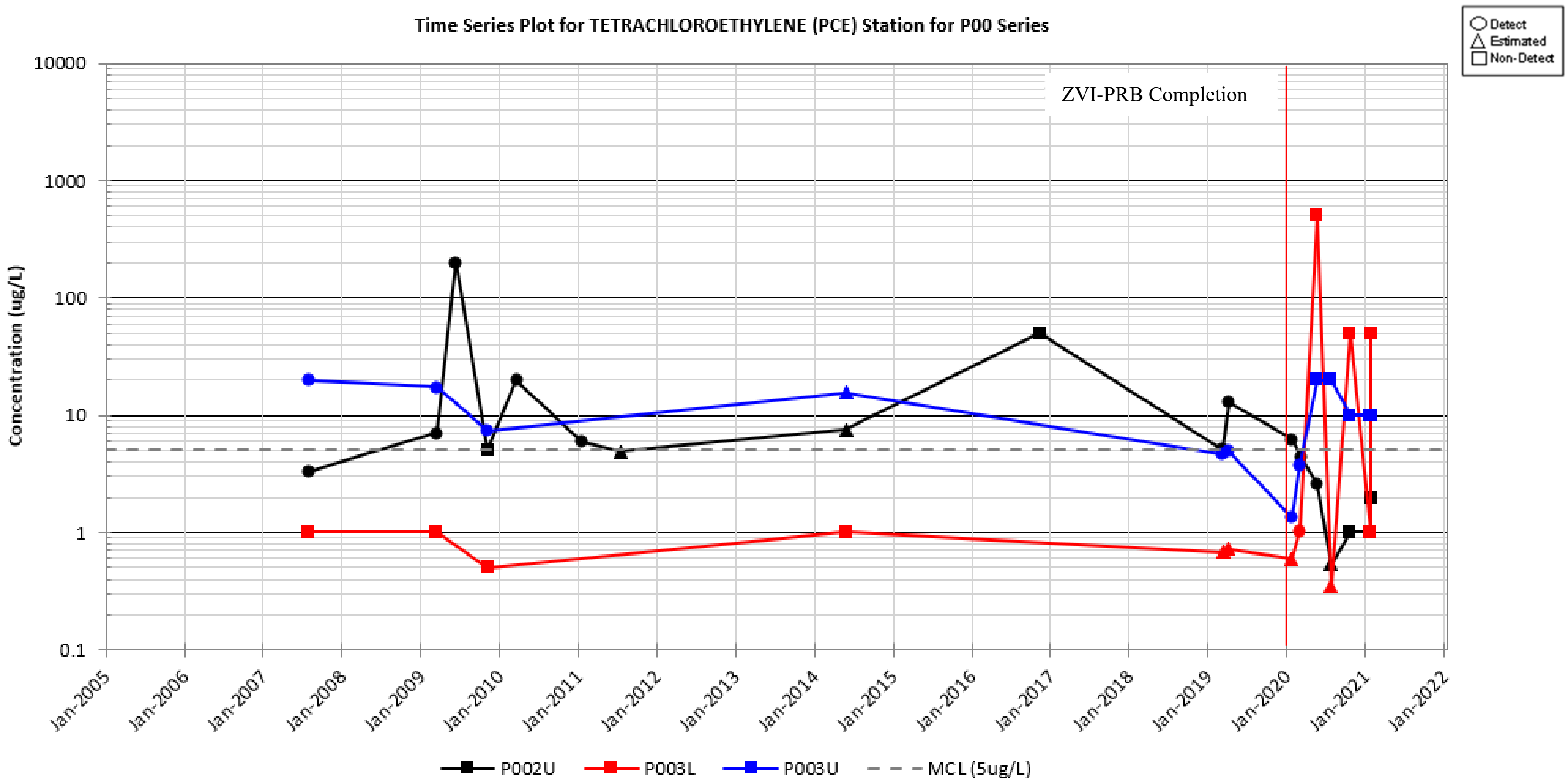

Figure C.17. Time Series Plot for Tetrachloroethylene (PCE) at P00 Series Monitoring Wells

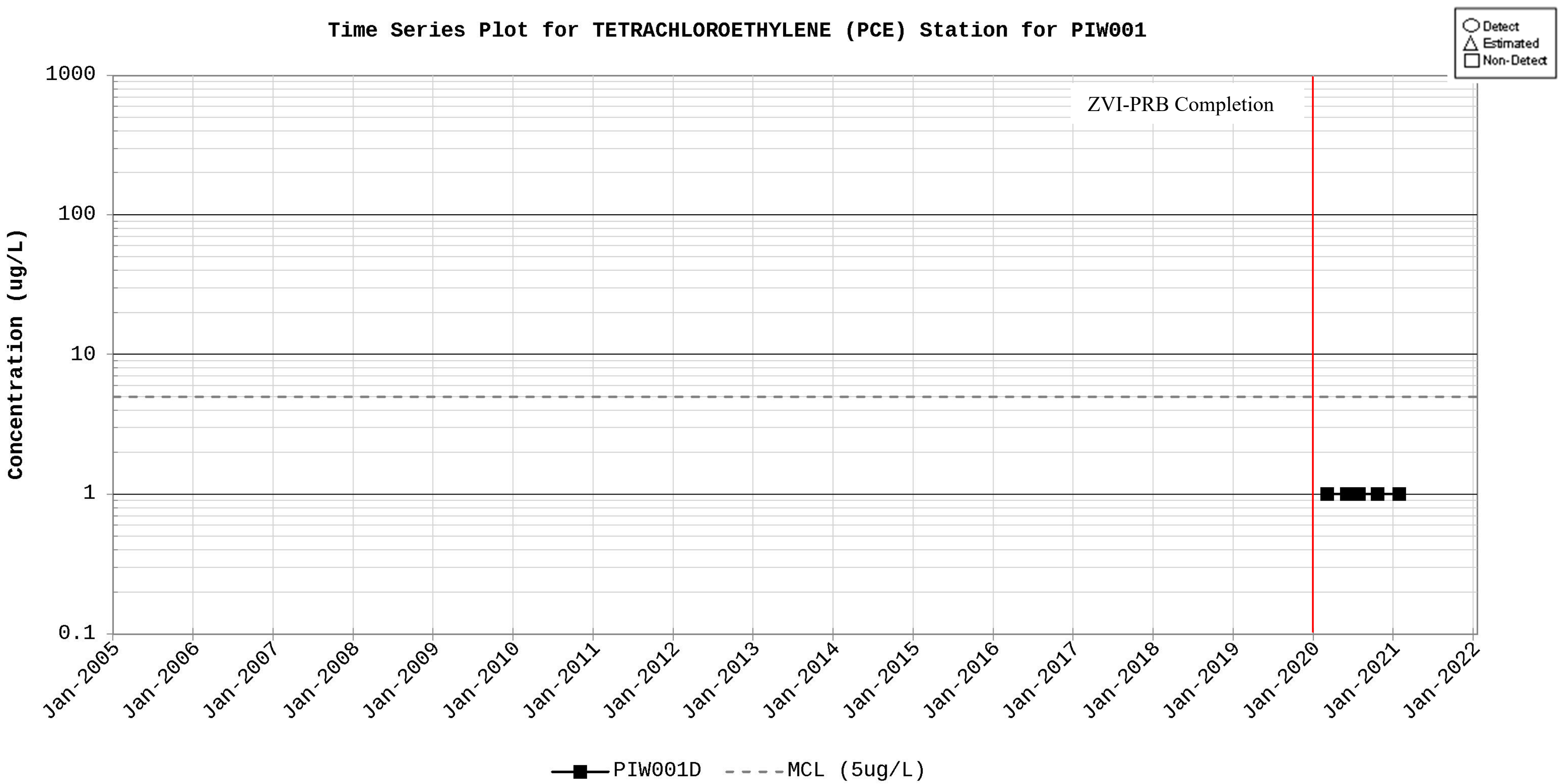

Figure C.18. Time Series Plot for Tetrachloroethylene (PCE) at Monitoring Well PIW001D

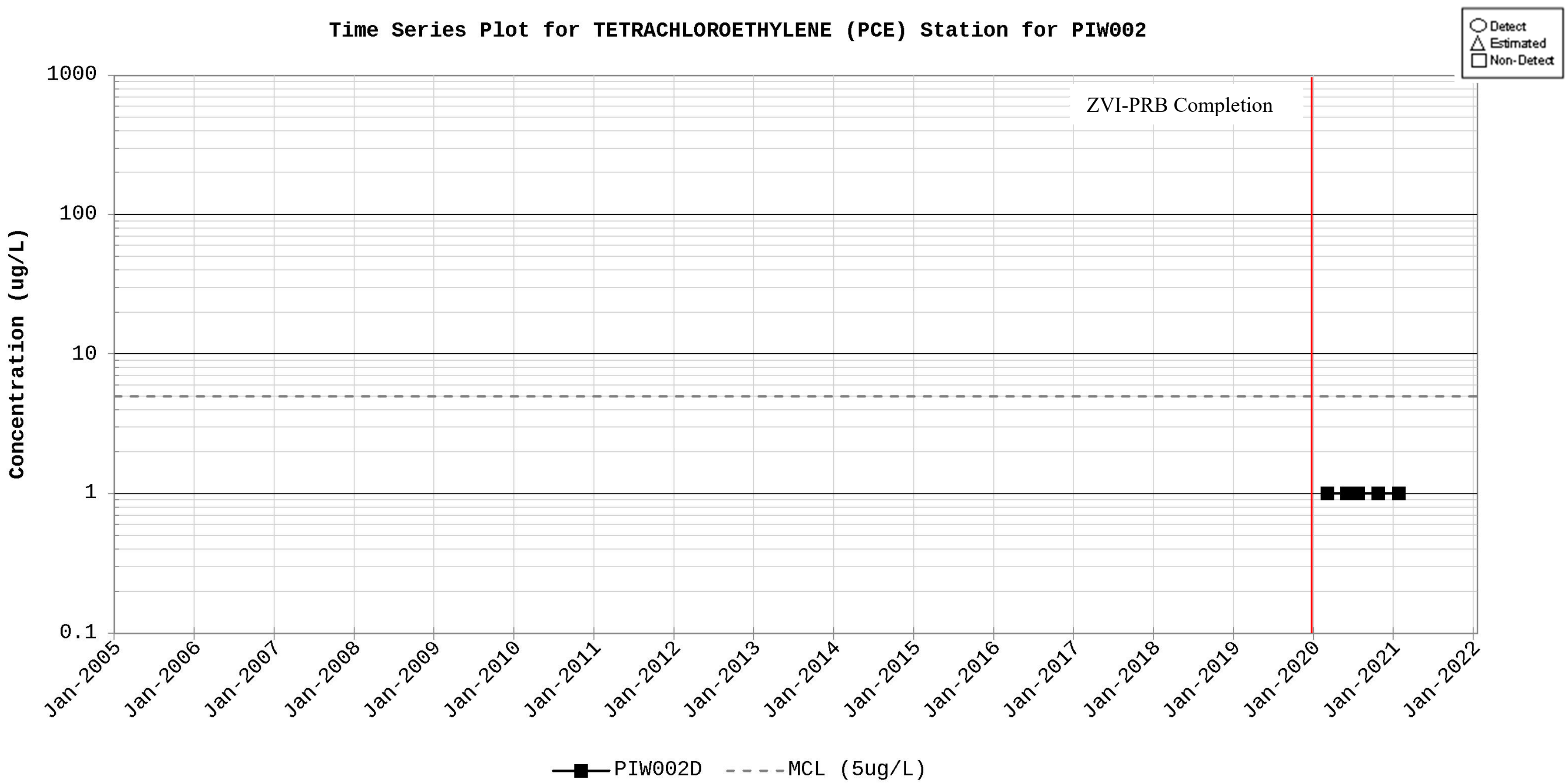

Figure C.19. Time Series Plot for Tetrachloroethylene (PCE) at Monitoring Well PIW002D

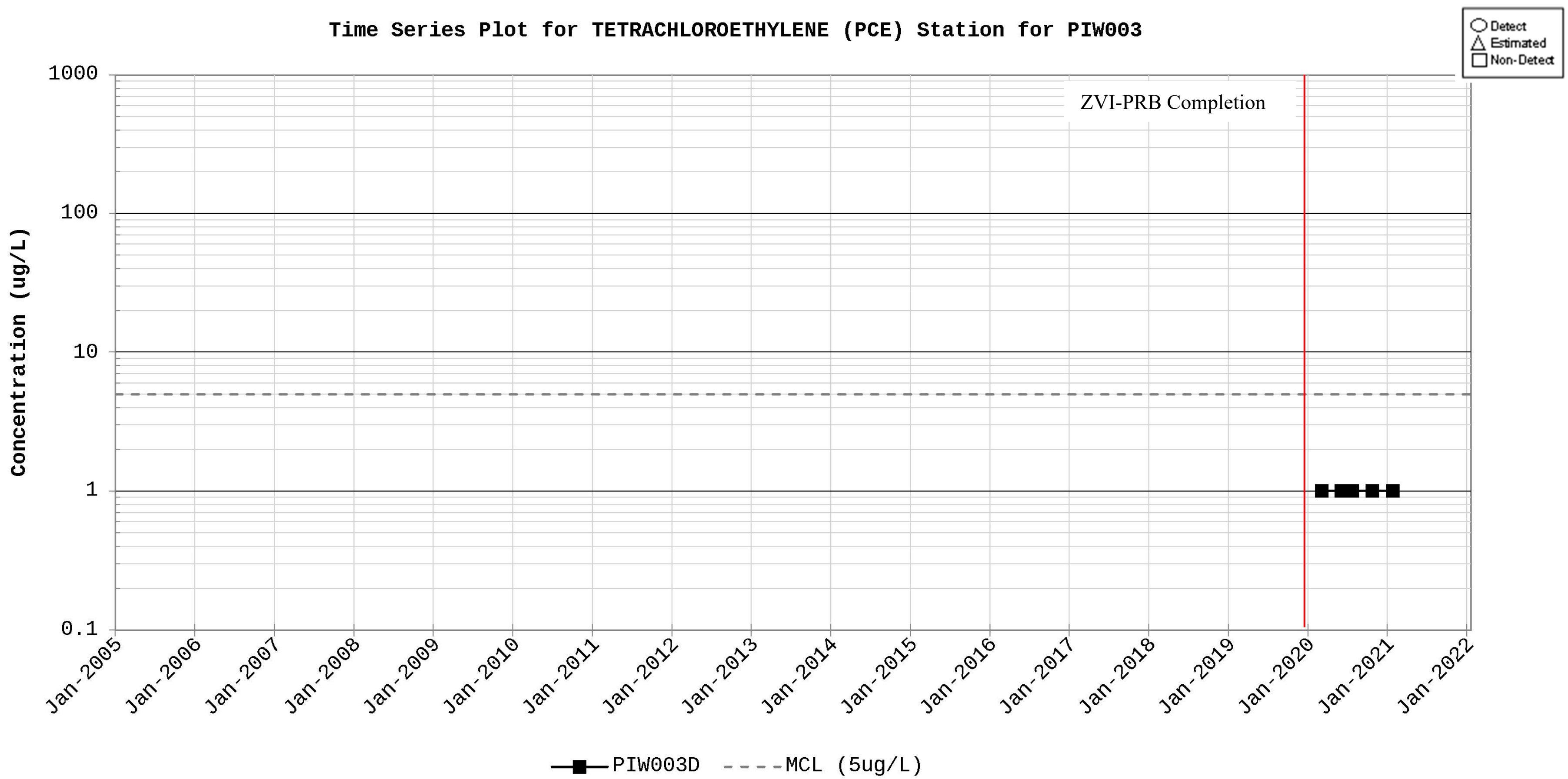

Figure C.20. Time Series Plot for Tetrachloroethylene (PCE) at Monitoring Well PIW003D

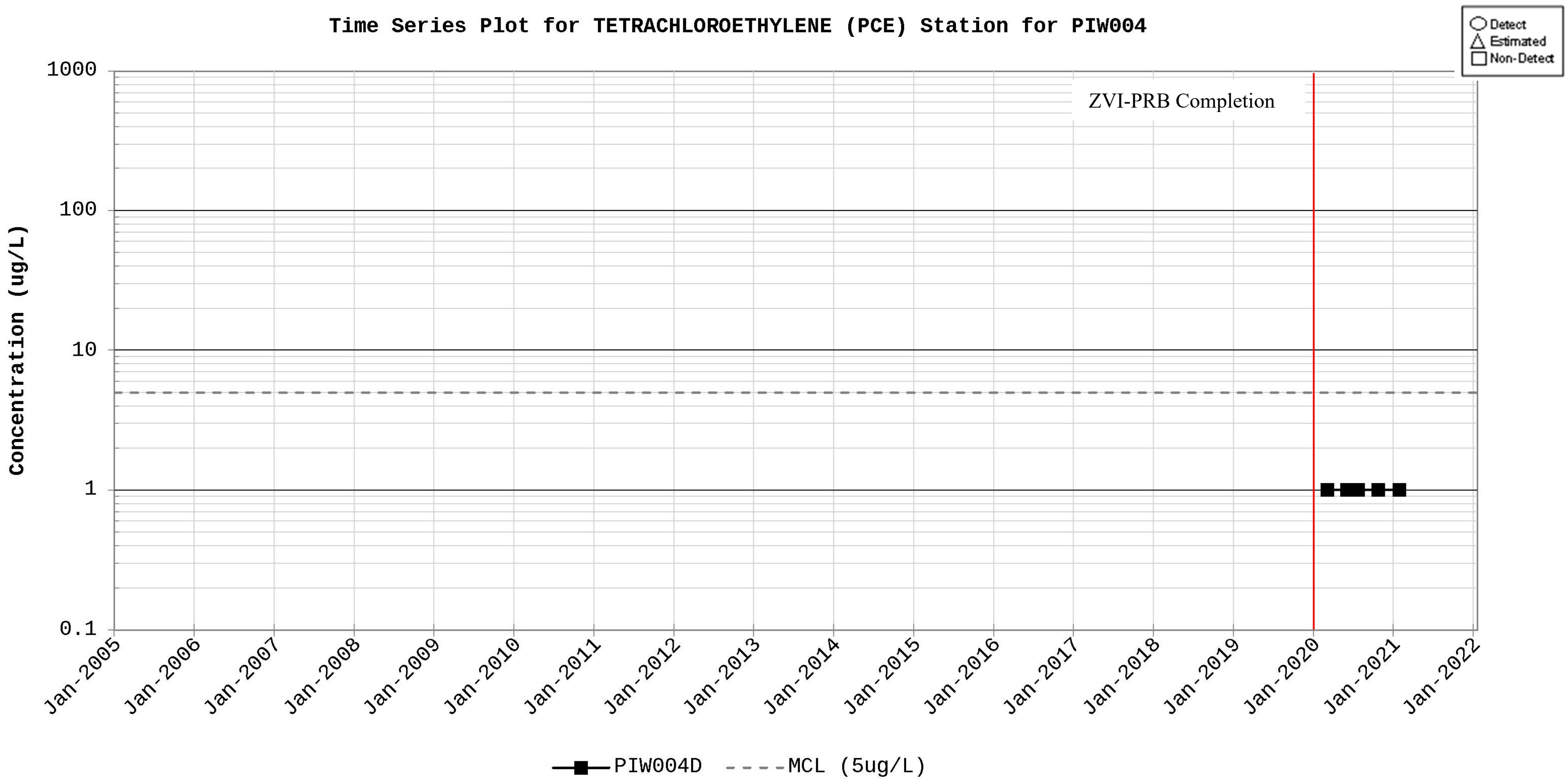

Figure C.21. Time Series Plot for Tetrachloroethylene (PCE) at Monitoring Well PIW004D

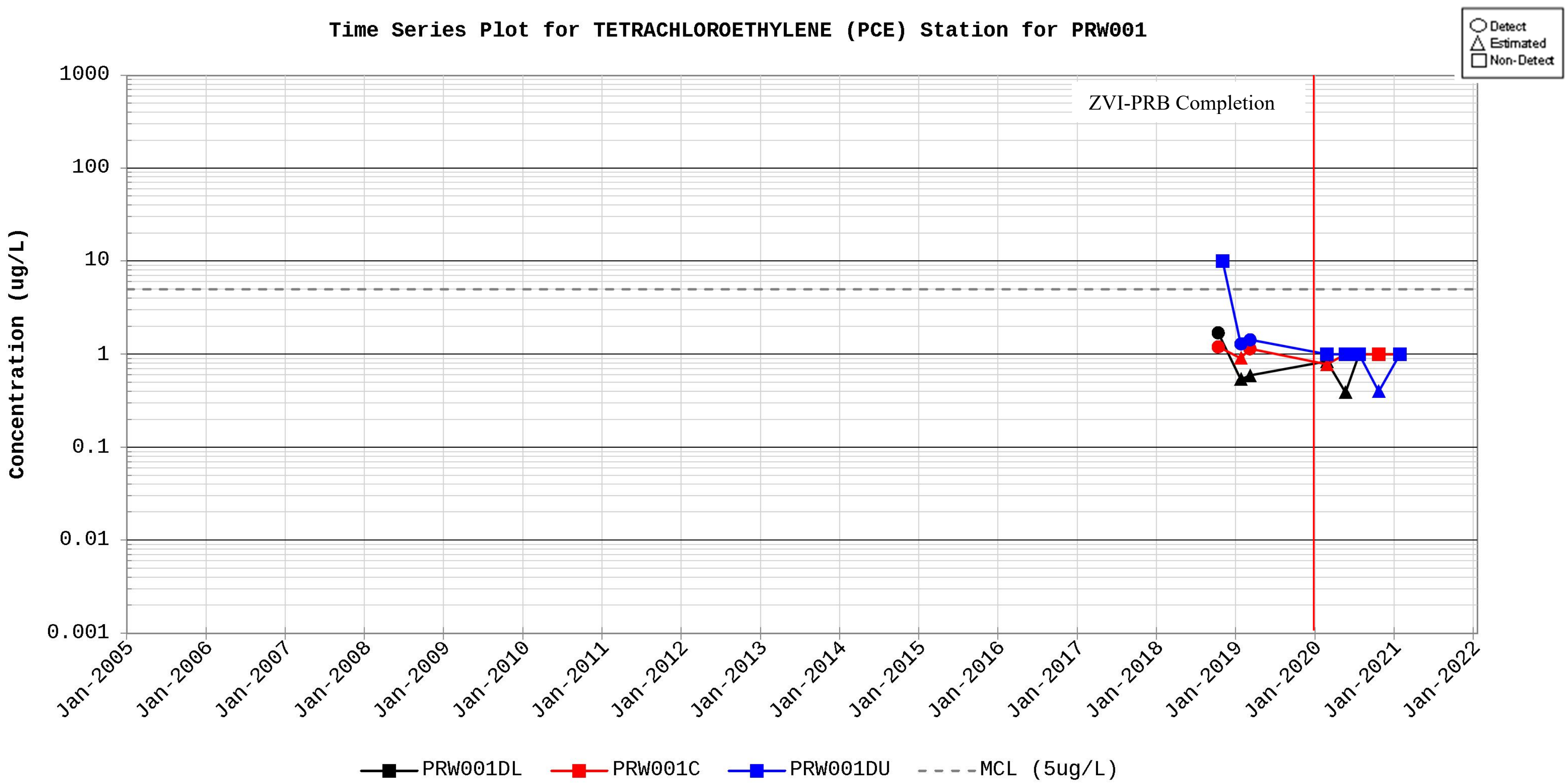

Figure C.22. Time Series Plot for Tetrachloroethylene (PCE) at PRW001 Series Monitoring Wells

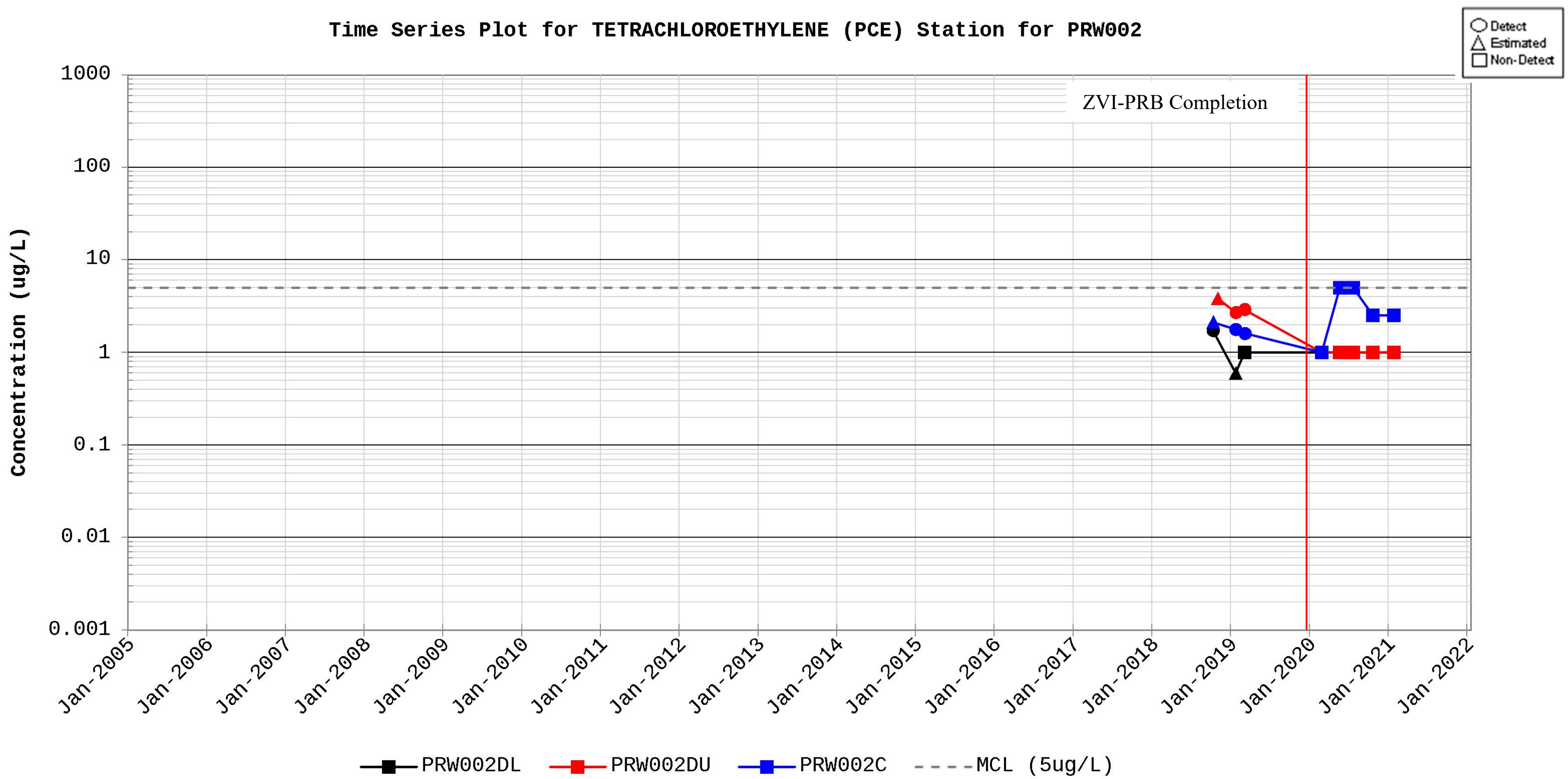

Figure C.23. Time Series Plot for Tetrachloroethylene (PCE) at PRW002 Series Monitoring Wells

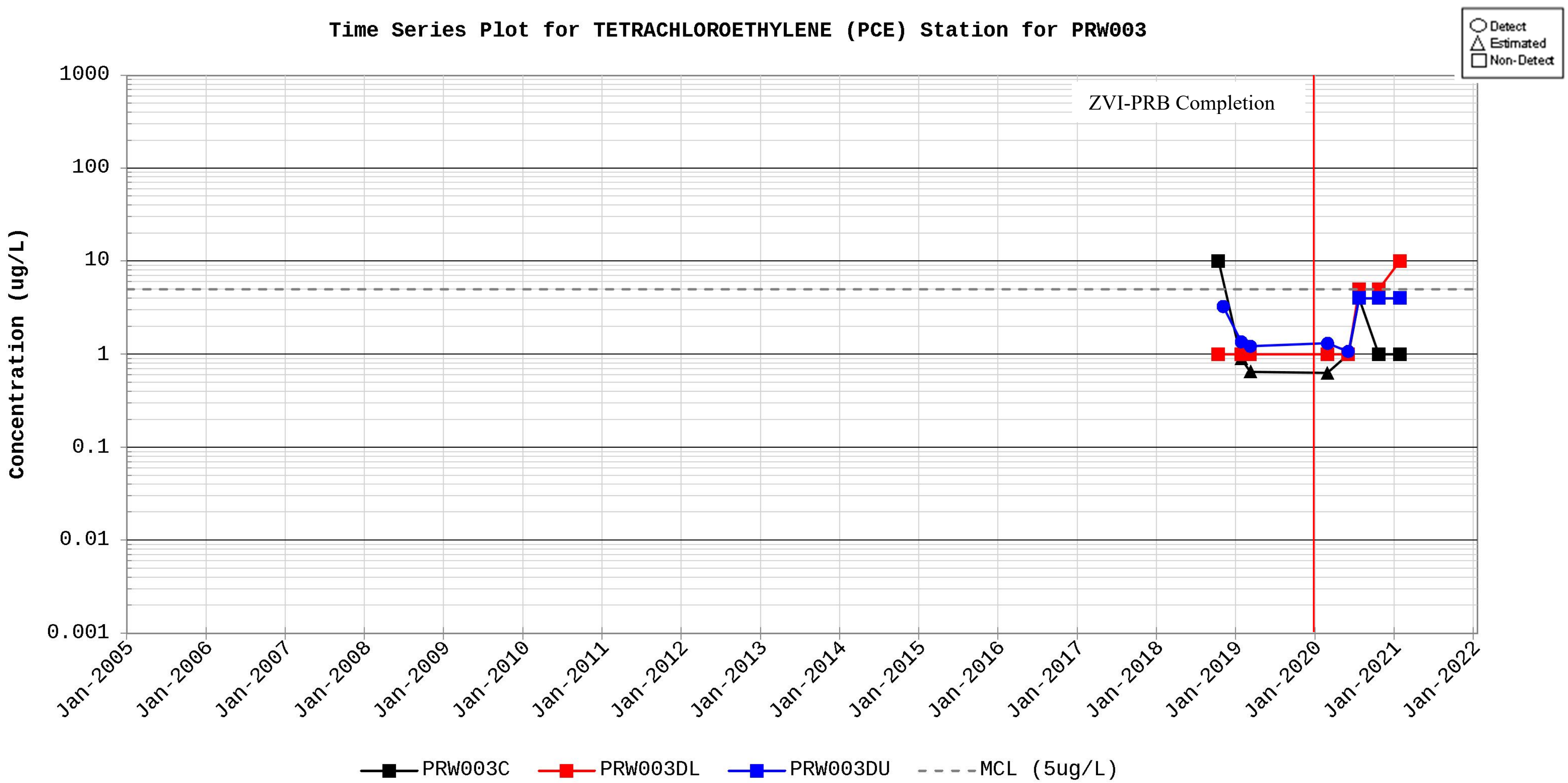

Figure C.24. Time Series Plot for Tetrachloroethylene (PCE) at PRW003 Series Monitoring Wells

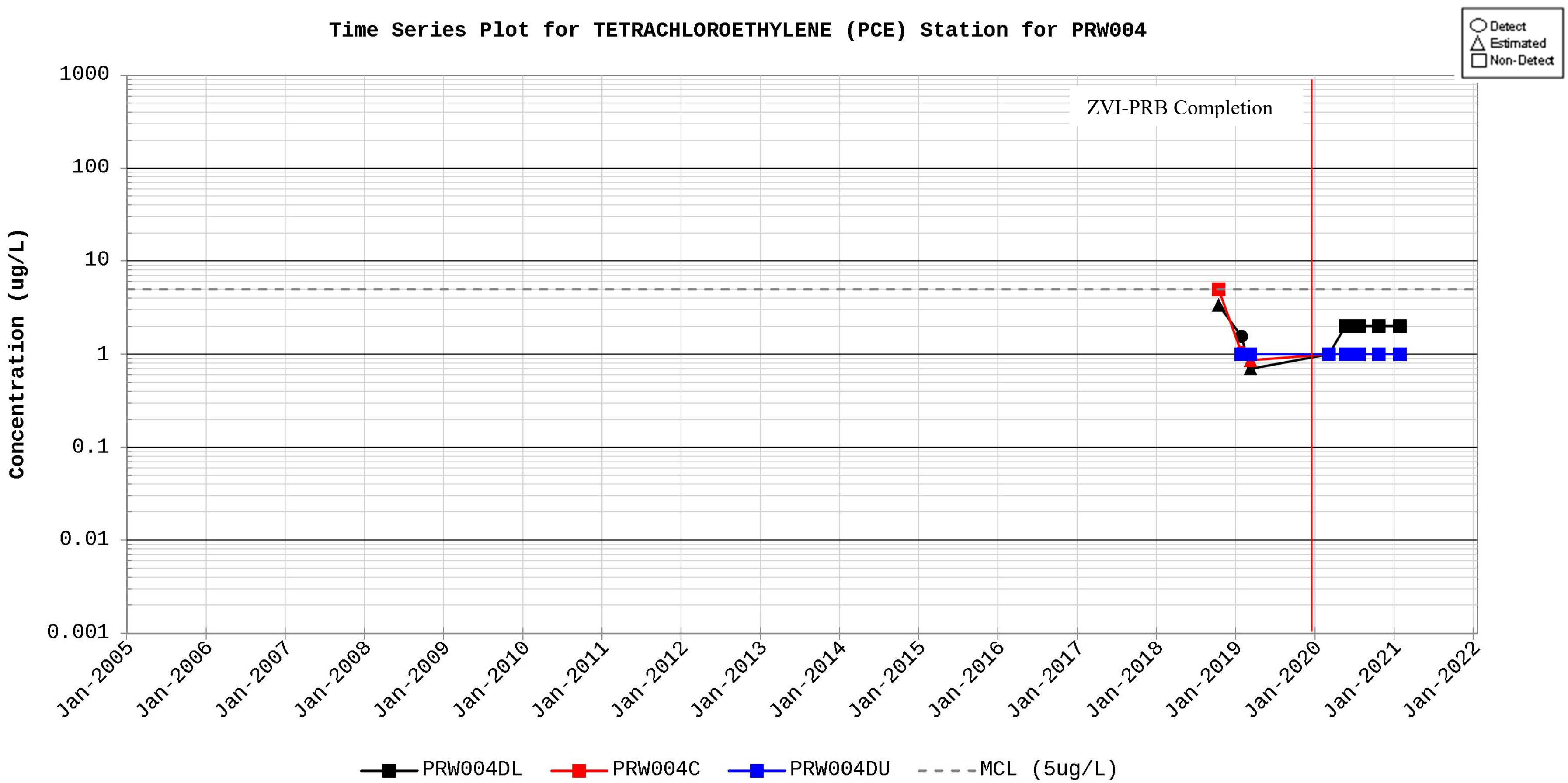

Figure C.25. Time Series Plot for Tetrachloroethylene (PCE) at PRW004 Series Monitoring Wells

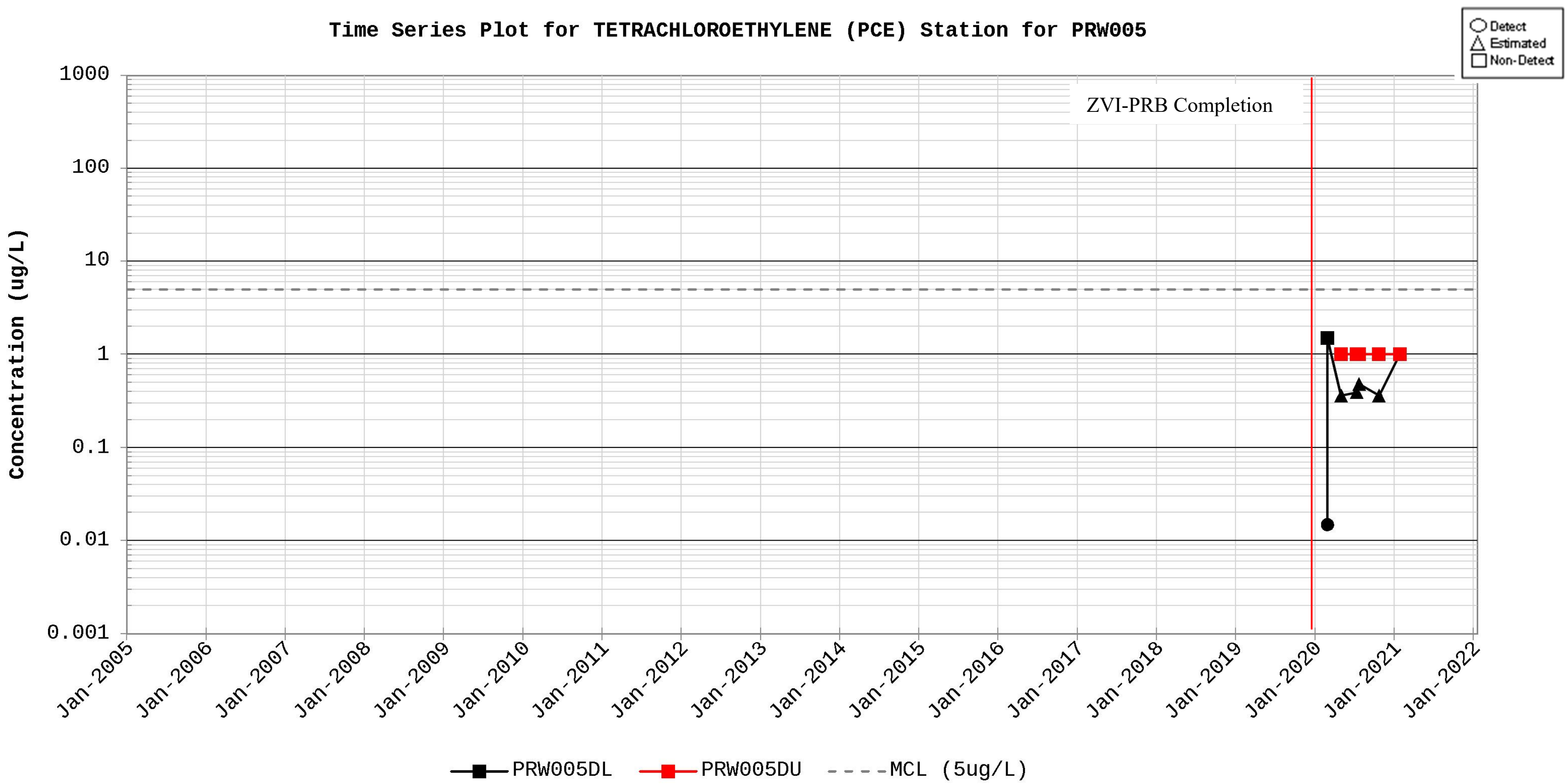

Figure C.26. Time Series Plot for Tetrachloroethylene (PCE) at PRW005 Series Monitoring Wells

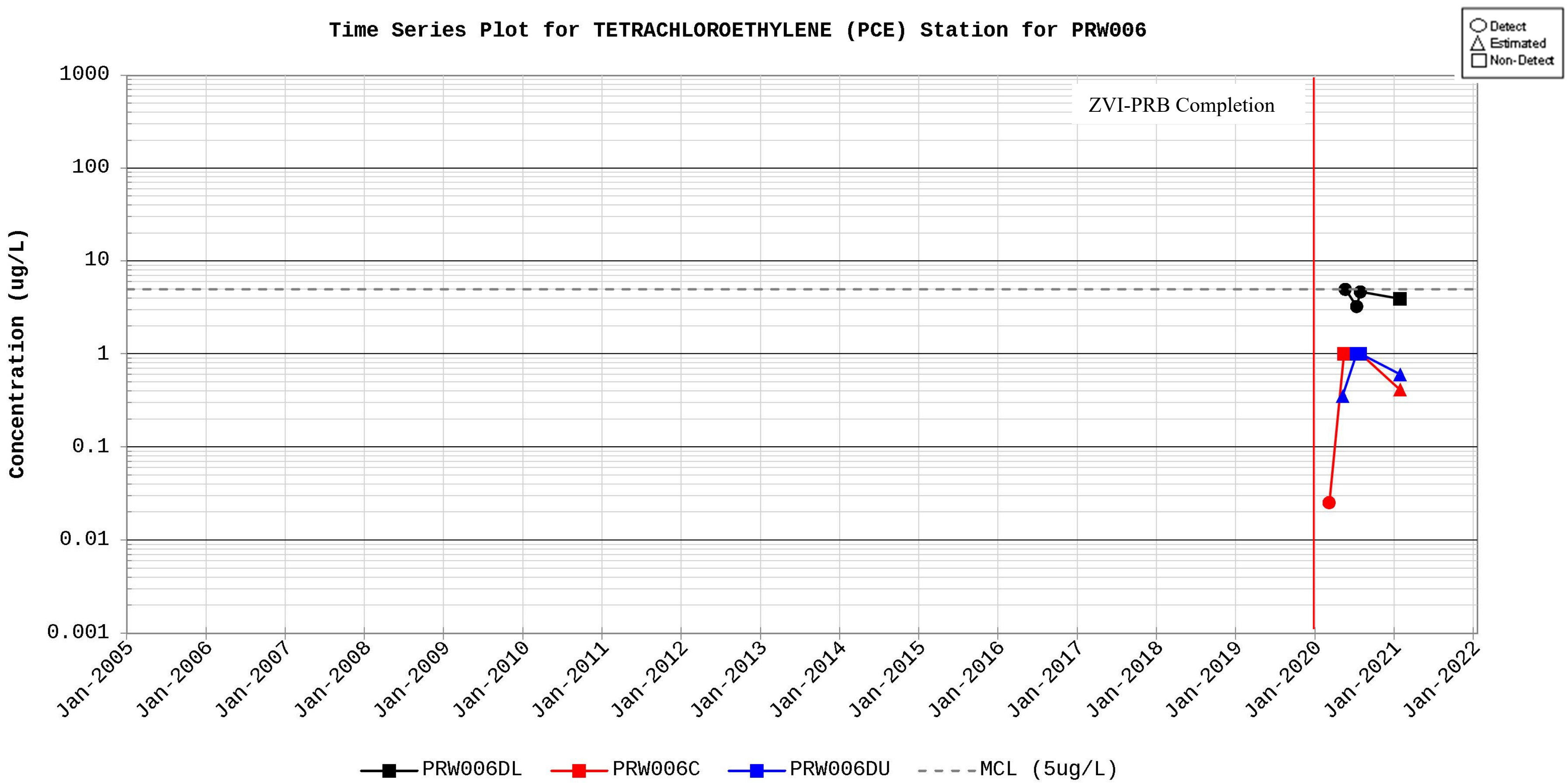

Figure C.27. Time Series Plot for Tetrachloroethylene (PCE) at PRW006 Series Monitoring Wells

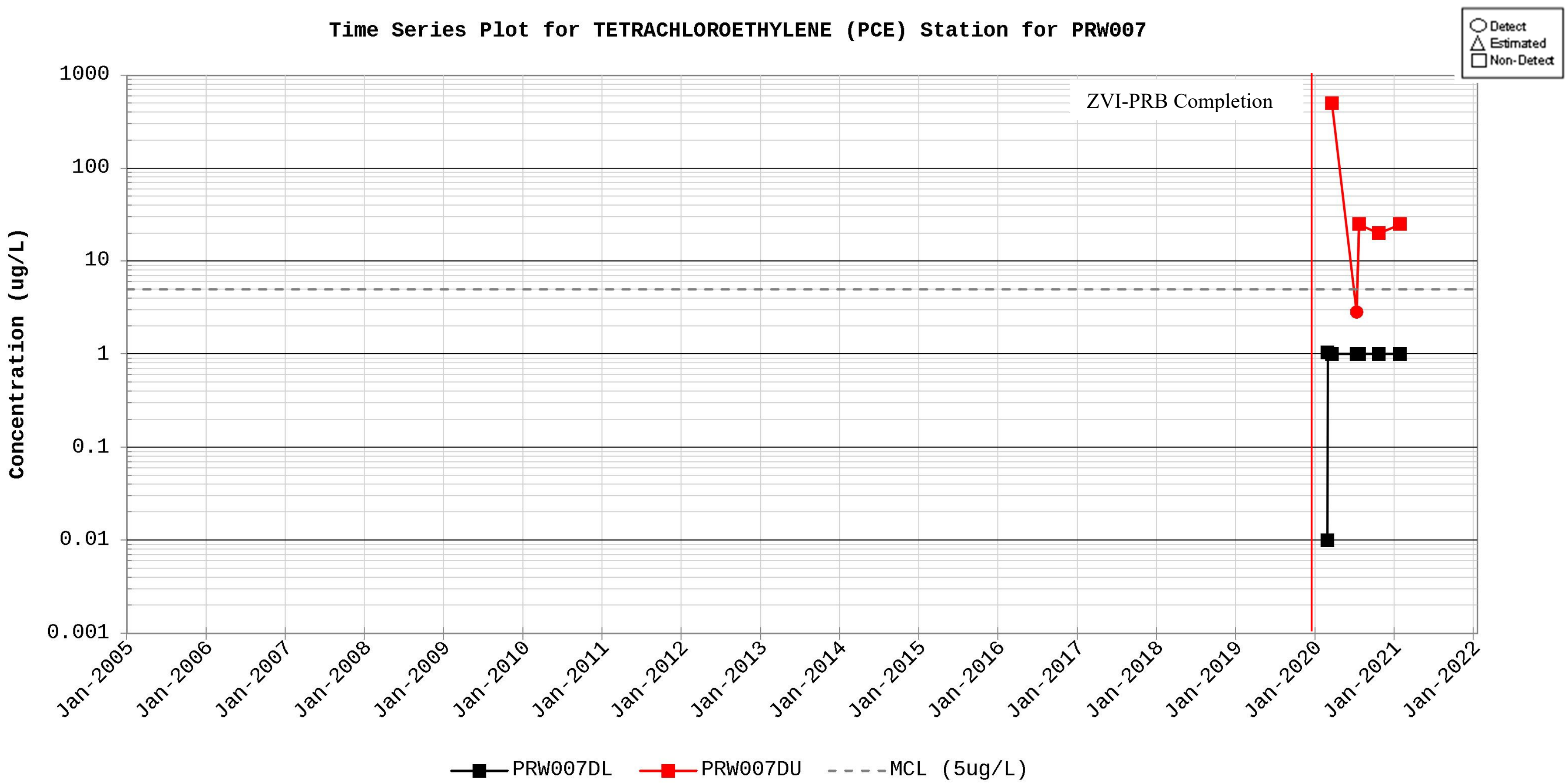

Figure C.28. Time Series Plot for Tetrachloroethylene (PCE) at PRW007 Series Monitoring Wells

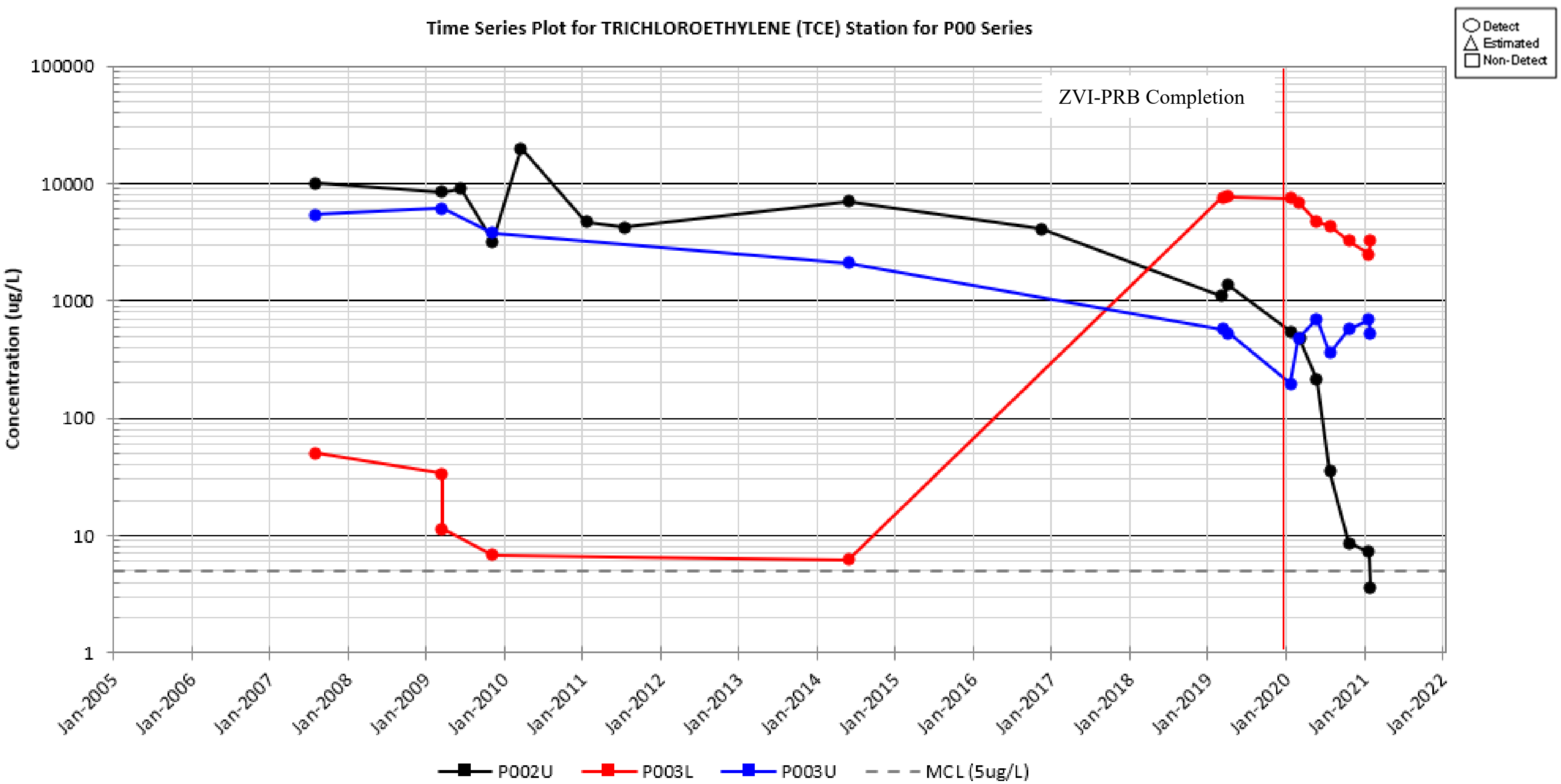

Figure C.29. Time Series Plot for Trichloroethylene (TCE) at P00 Series Monitoring Wells

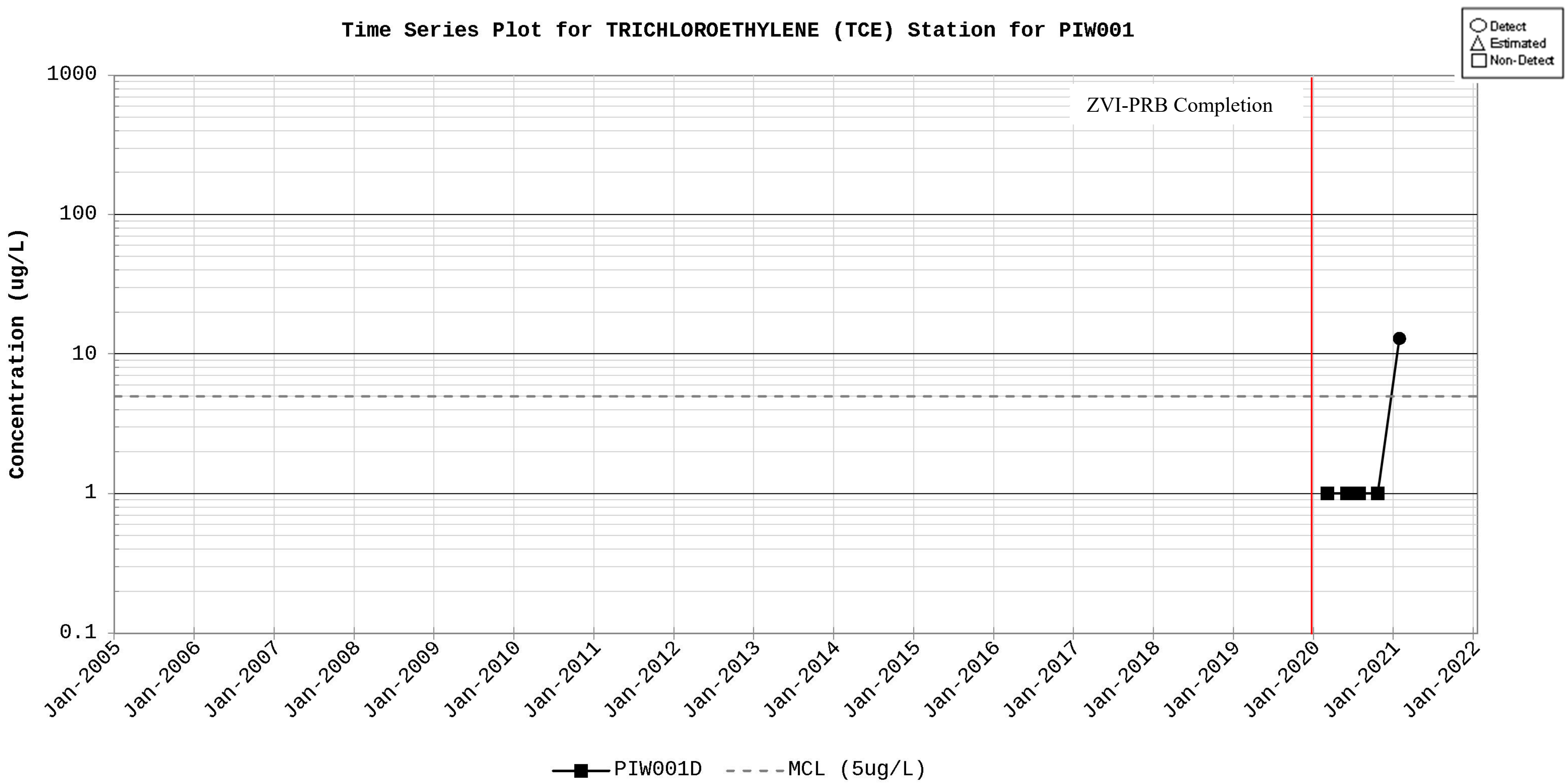

Figure C.30. Time Series Plot for Trichloroethylene (TCE) at Monitoring Well PIW001D

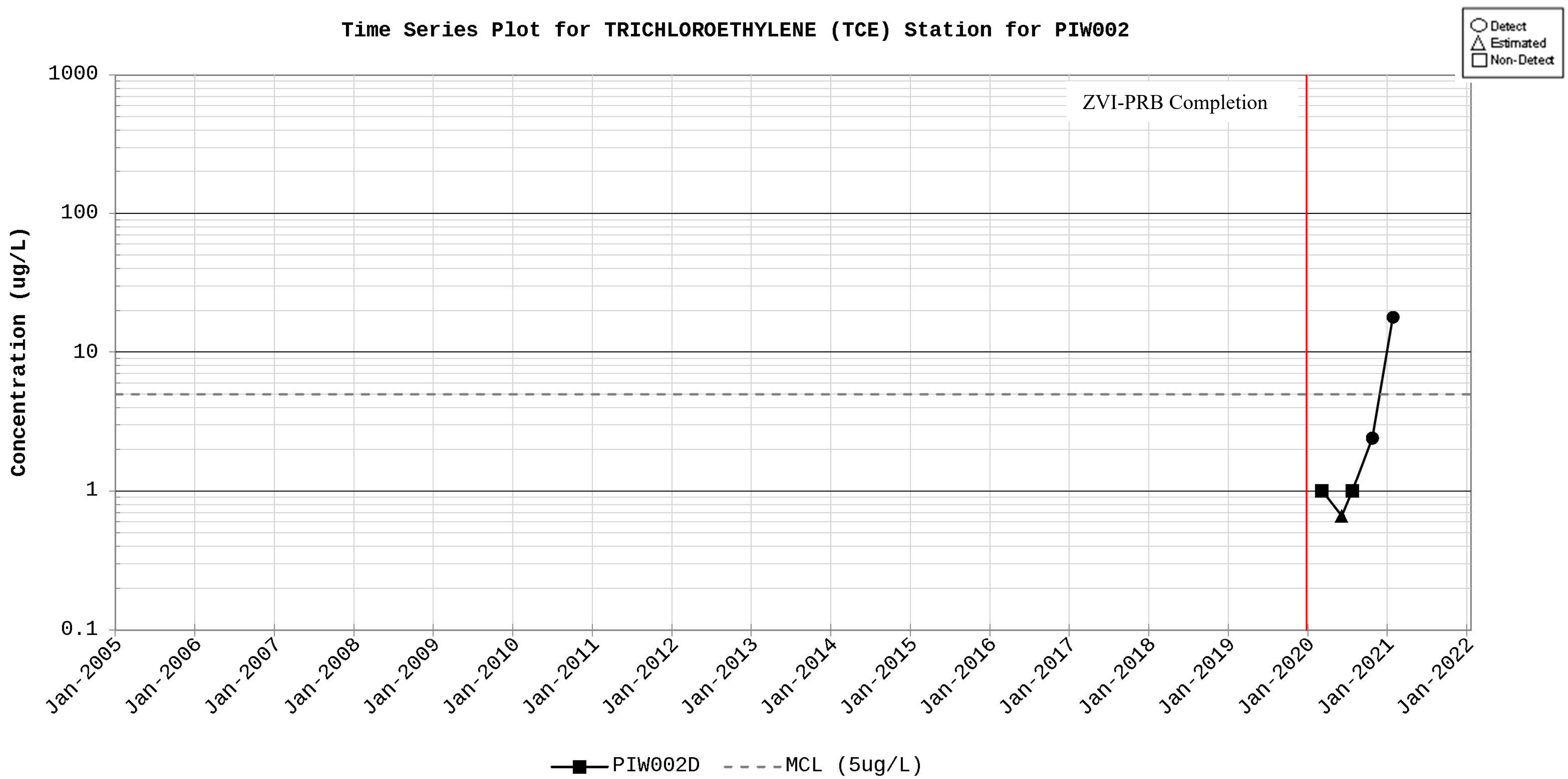

Figure C.31. Time Series Plot for Trichloroethylene (TCE) at Monitoring Well PIW002D

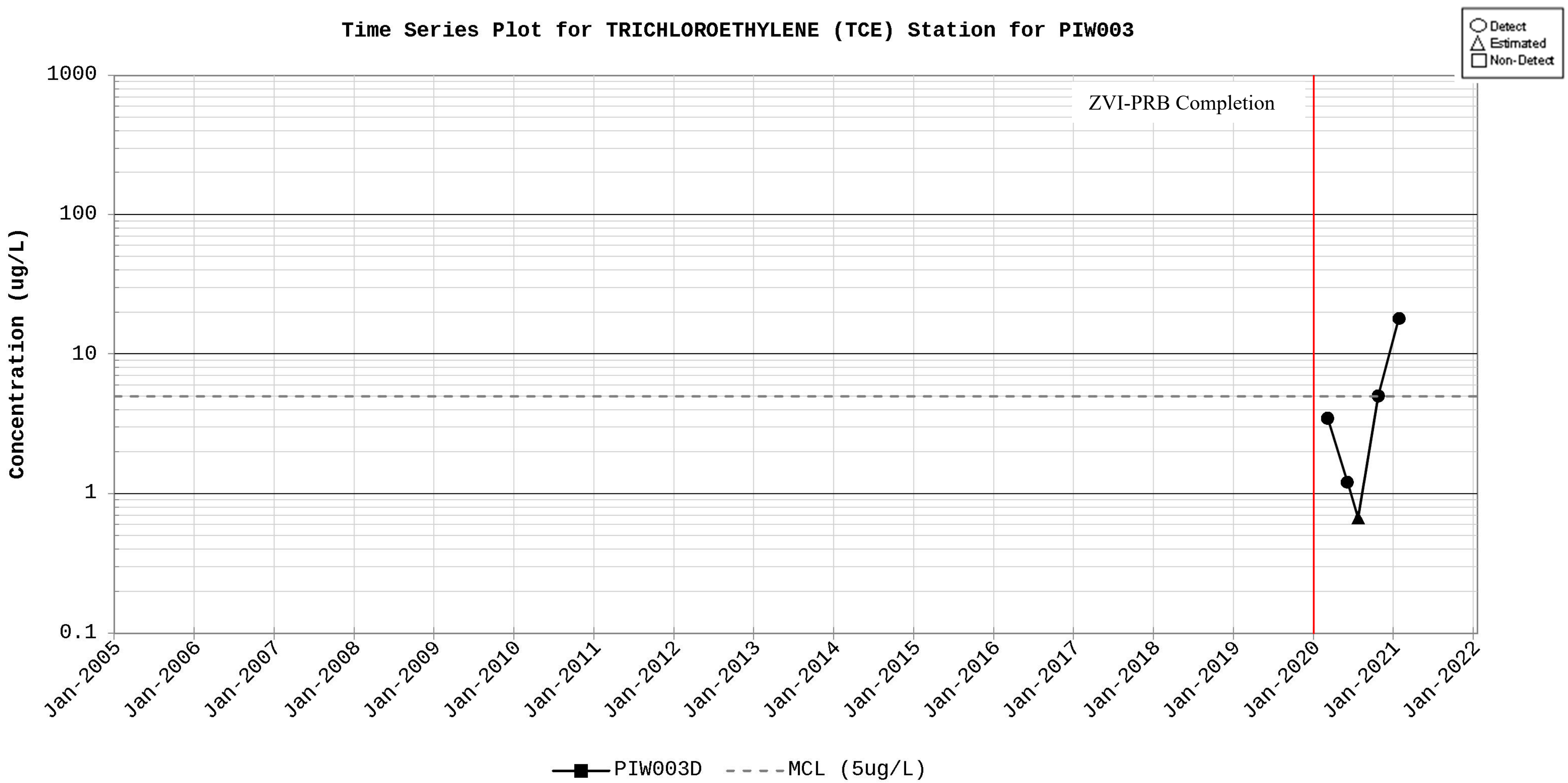

Figure C.32. Time Series Plot for Trichloroethylene (TCE) at Monitoring Well PIW003D

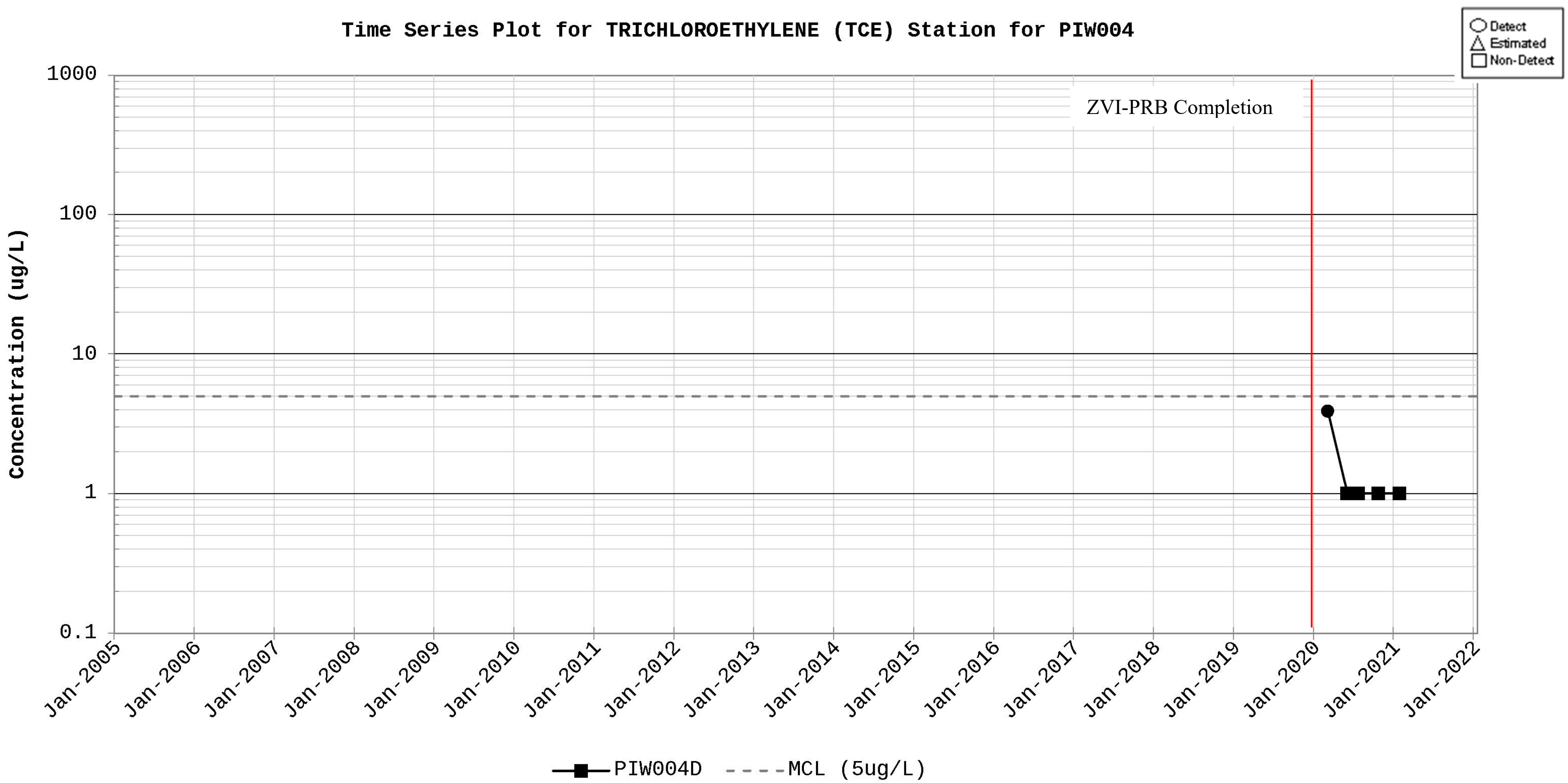

Figure C.33. Time Series Plot for Trichloroethylene (TCE) at Monitoring Well PIW004D

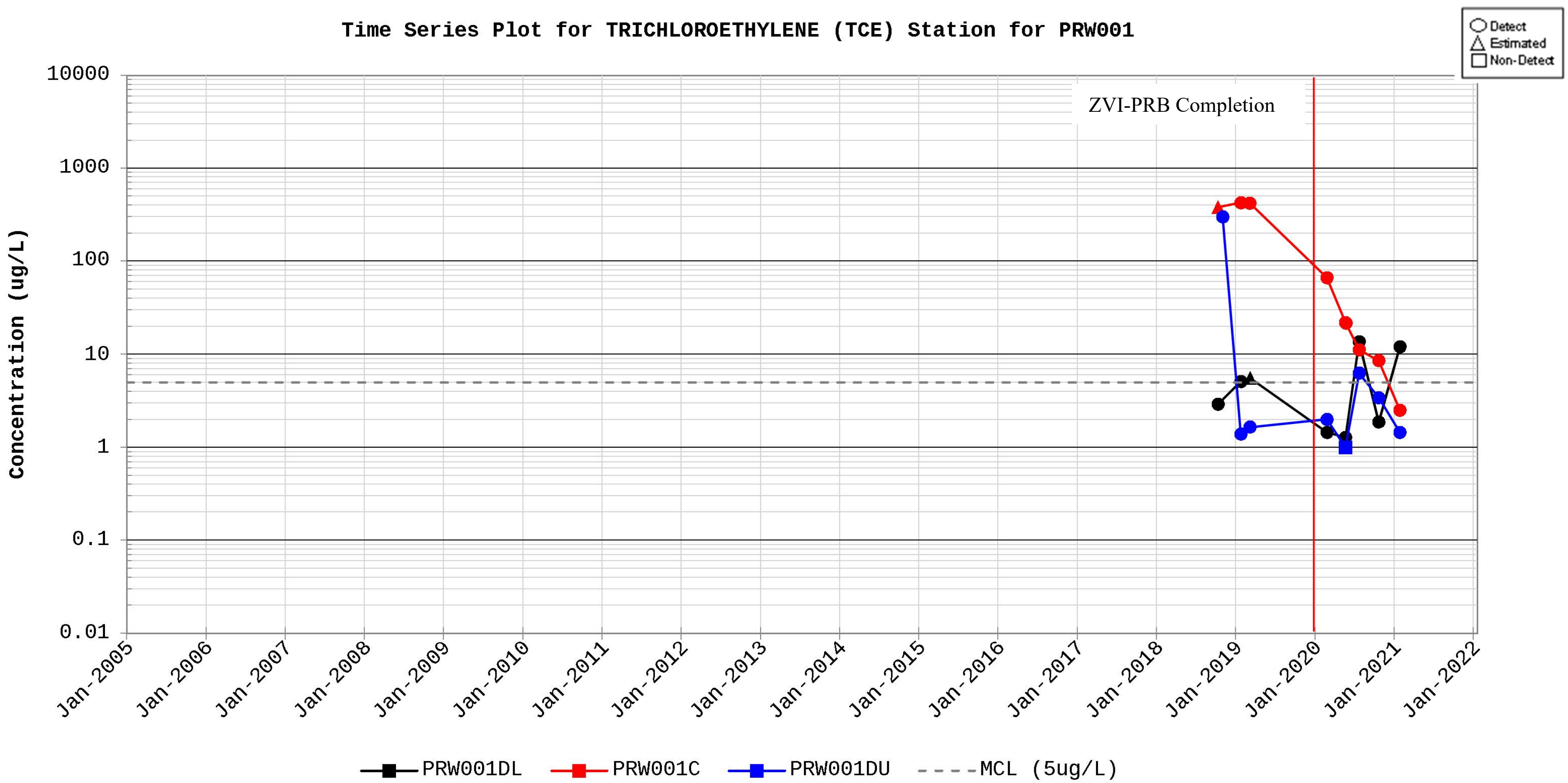

Figure C.34. Time Series Plot for Trichloroethylene (TCE) at PRW001 Series Monitoring Wells

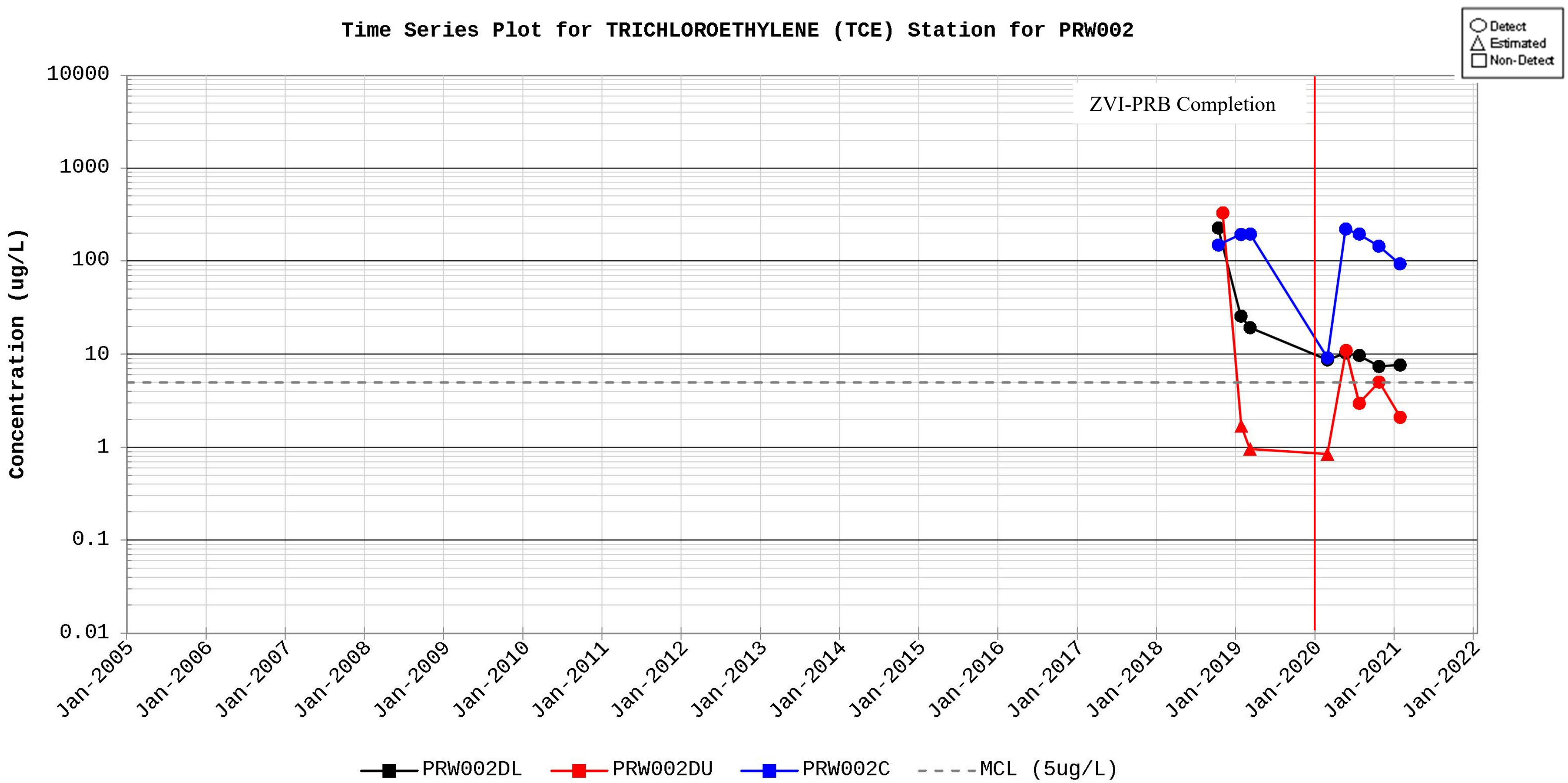

Figure C.35. Time Series Plot for Trichloroethylene (TCE) at PRW002 Series Monitoring Wells

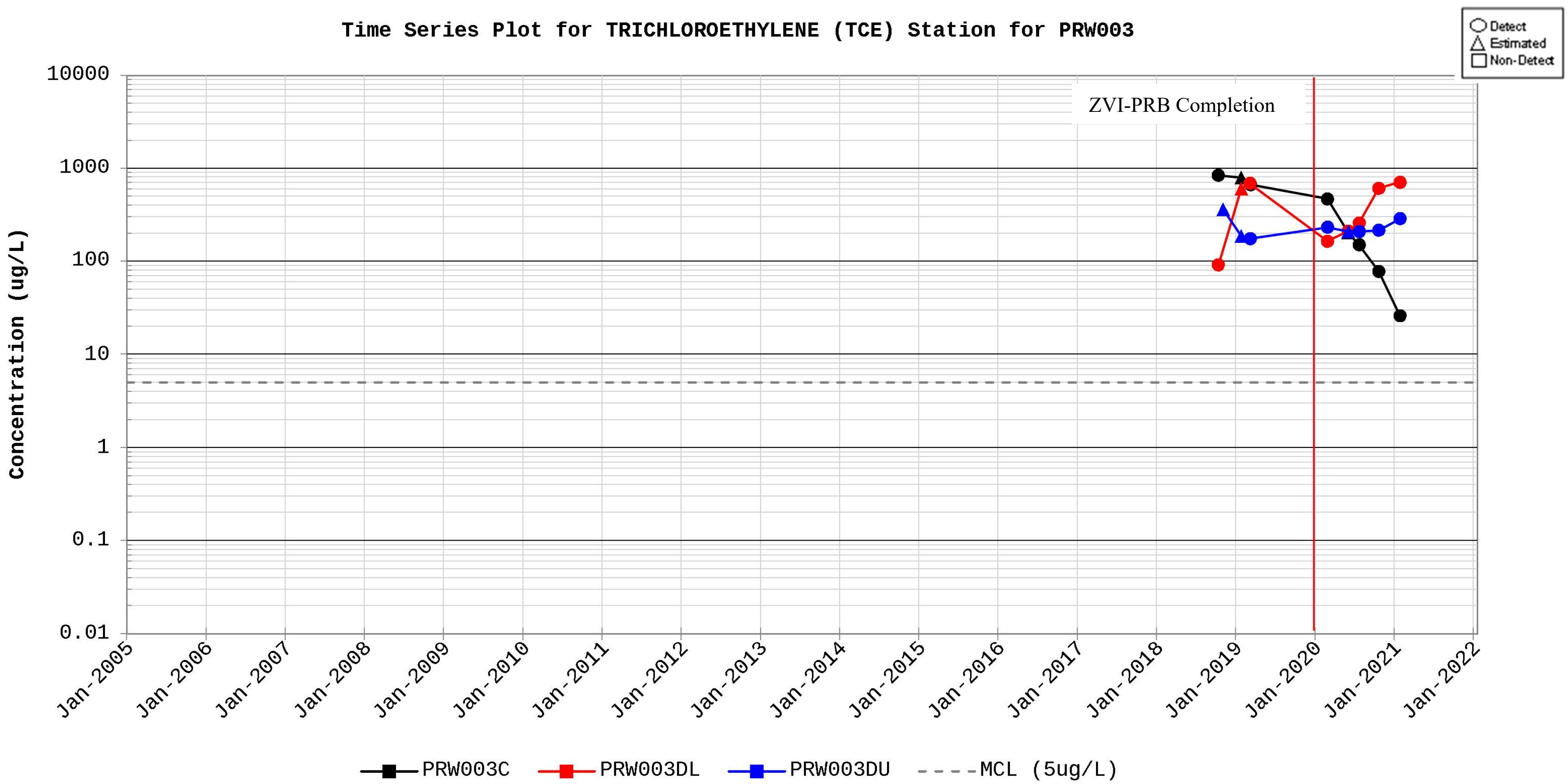

Figure C.36. Time Series Plot for Trichloroethylene (TCE) at PRW003 Series Monitoring Wells

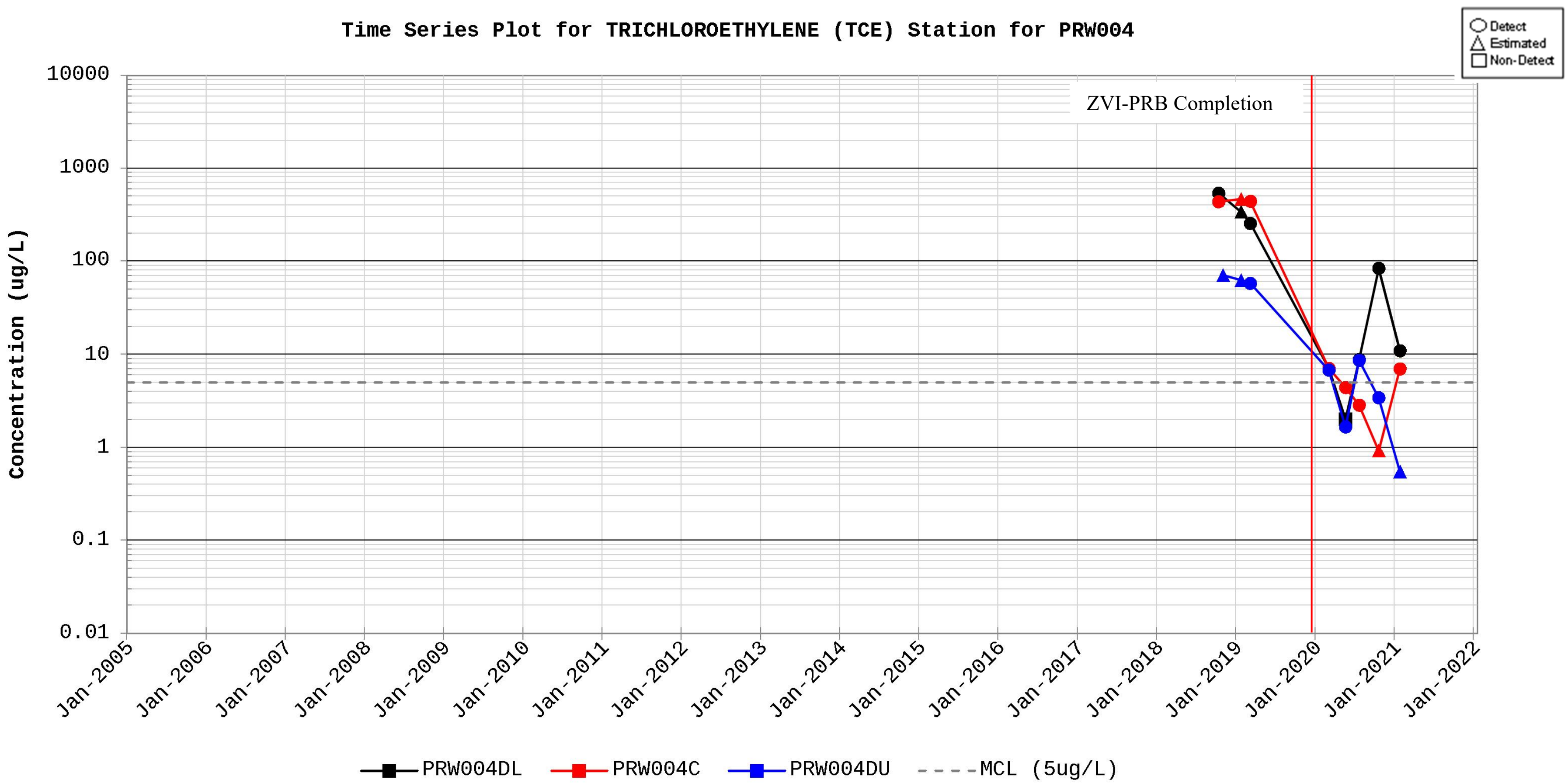

Figure C.37. Time Series Plot for Trichloroethylene (TCE) at PRW004 Series Monitoring Wells

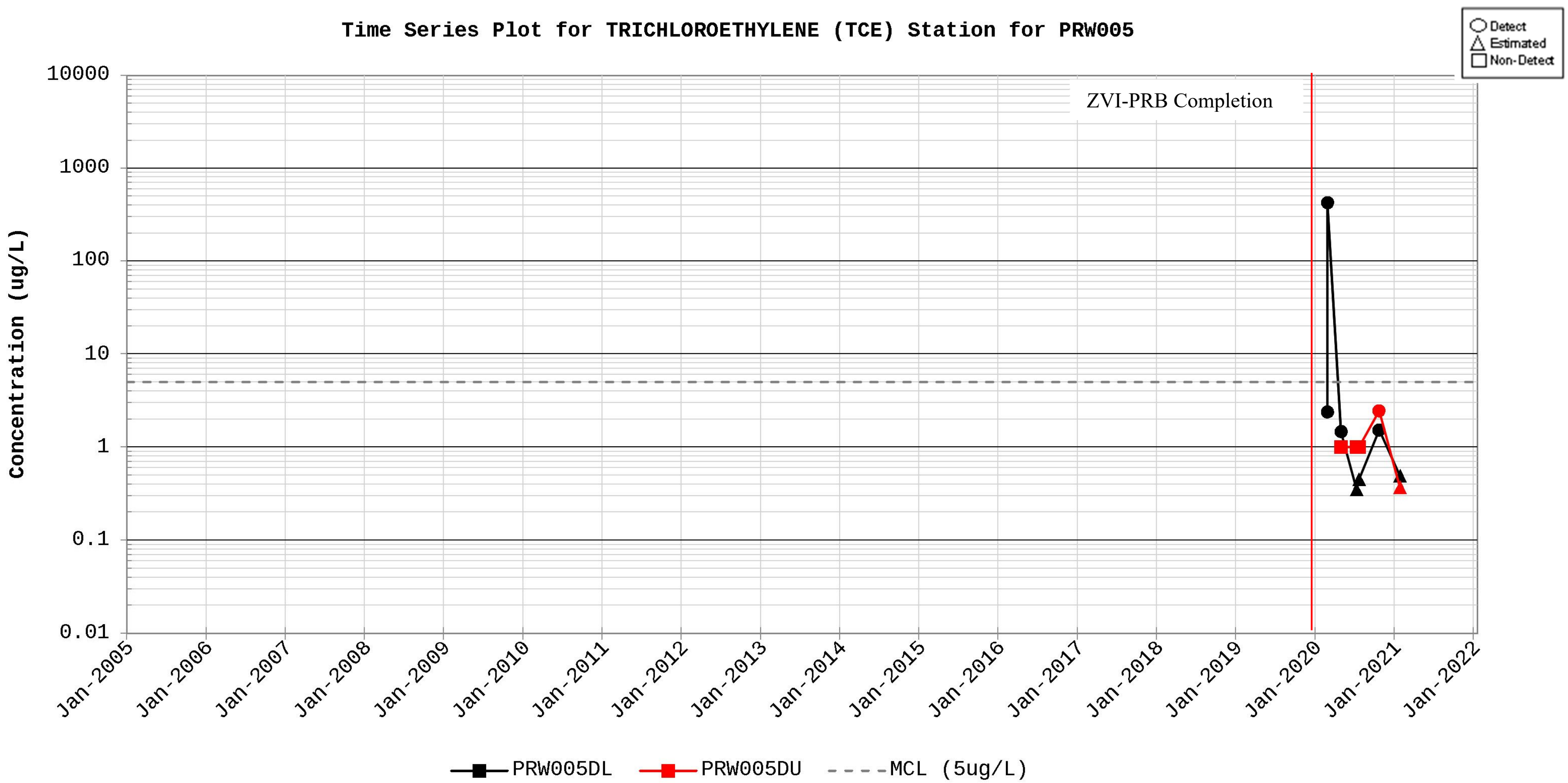

Figure C.38. Time Series Plot for Trichloroethylene (TCE) at PRW005 Series Monitoring Wells

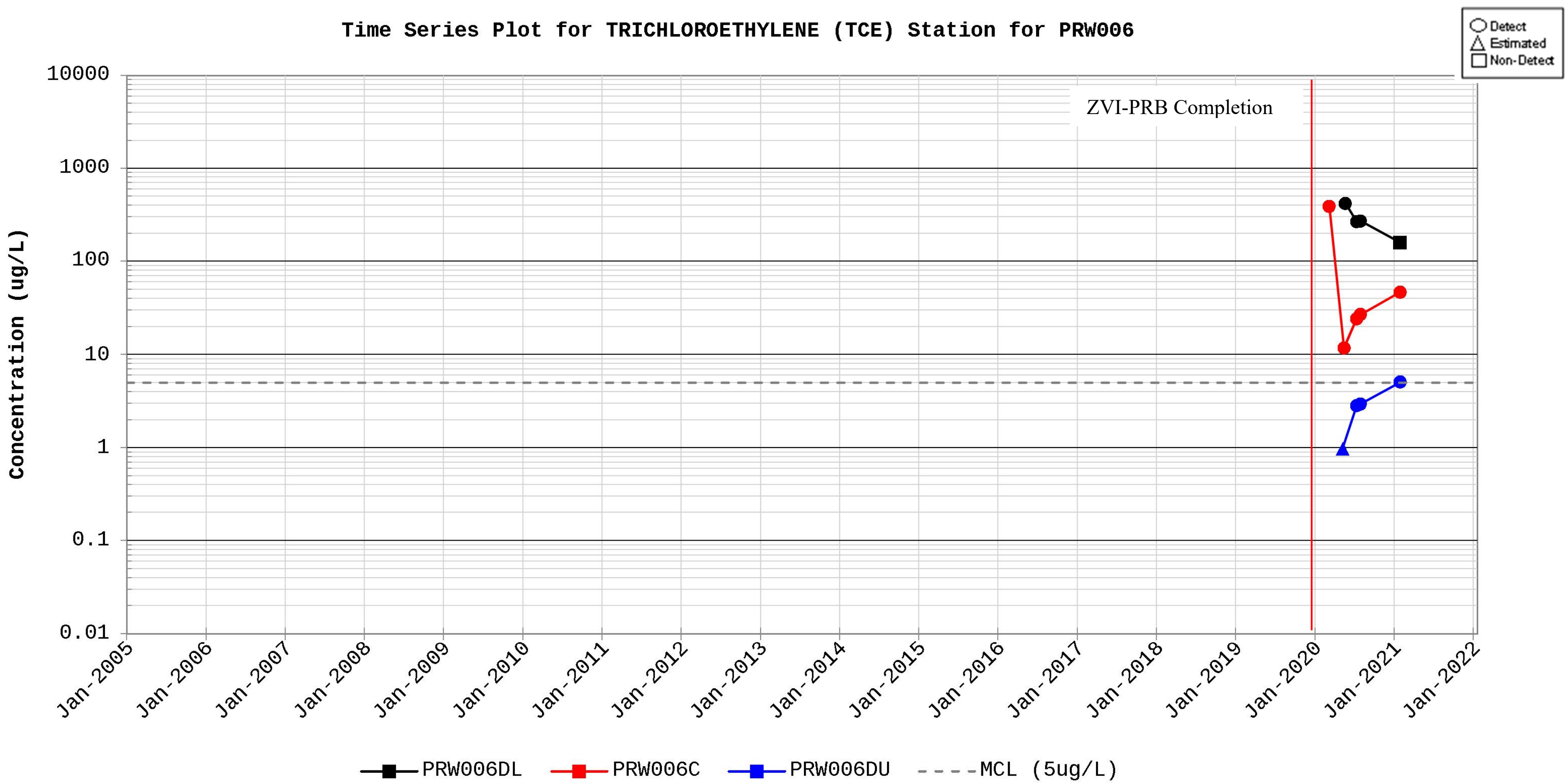

Figure C.39. Time Series Plot for Trichloroethylene (TCE) at PRW006 Series Monitoring Wells

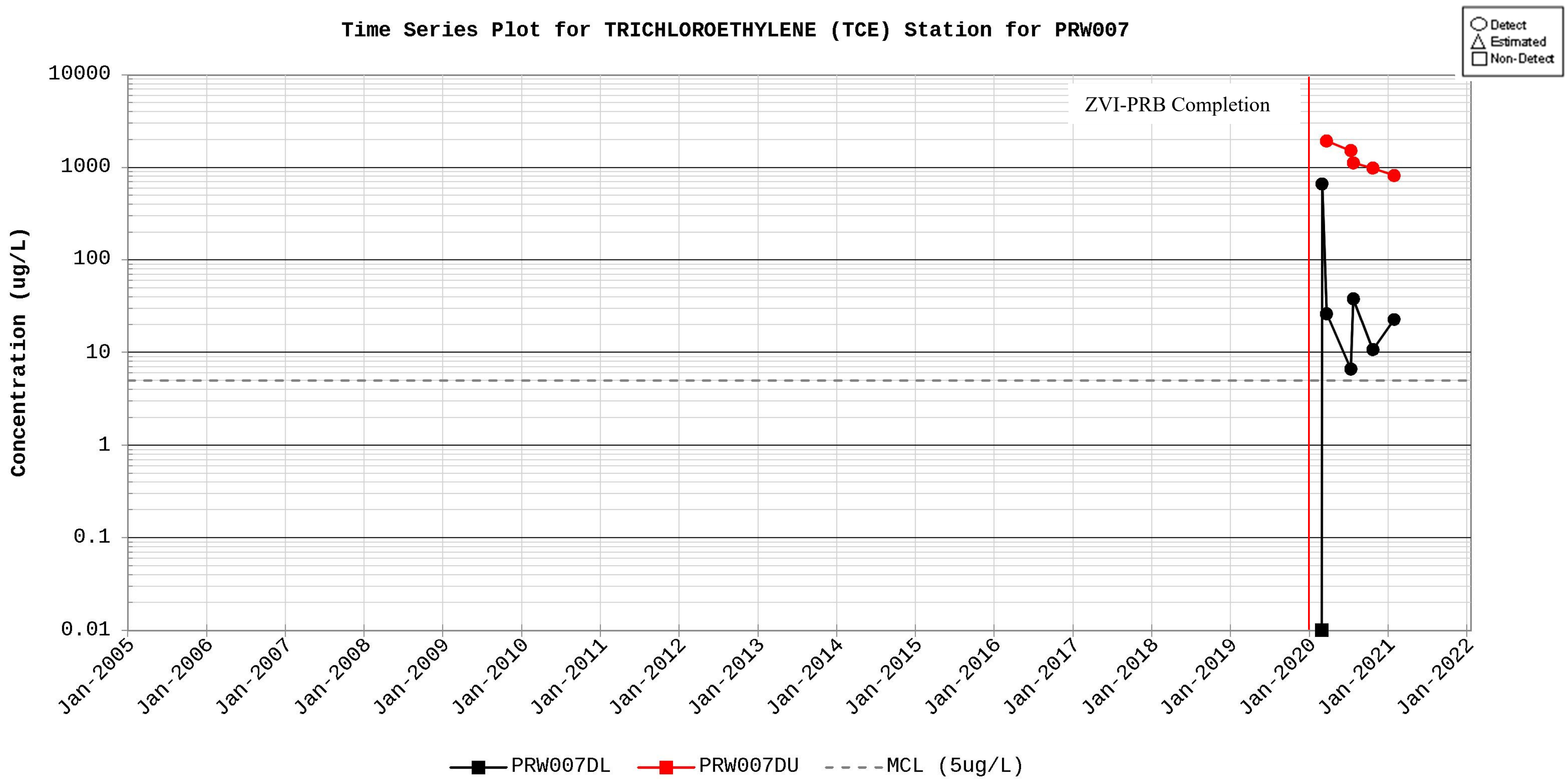

Figure C.40. Time Series Plot for Trichloroethylene (TCE) at PRW007 Series Monitoring Wells